WOVOdat 2.0

User Manual

By:

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November 2018

Introduction

WOVOdat is the World Organization of Volcano Observatories' (WOVO) Database of Volcanic Unrest; instrumentally and visually recorded changes in seismicity, ground deformation, gas emission, and other parameters from their normal baselines. The database is created per the structure and format as described in the WOVOdat 1.0 report of Venezky and Newhall (USGS Openfile report 2007-1117), updated in this WOVOdat 2.0 User Manual.

Volcanoes are frequently restless but only a fraction of unrest leads to eruptions. Uncertainties in interpretation of volcanic unrest are unacceptably high. WOVOdat will capture historical volcanic unrest and make it freely web-accessible, for reference during volcanic crises and for basic research on preeruption processes.

- WOVOdat will be to volcanology as epidemiological databases are to medicine — valuable tools for research and crisis response -

We are importing historical, parametric data from the current myriad of data formats, database architectures, servers and storage media, into a single, comprehensive relational database with standardized formats.

Our website (www.wovodat.org) supports interaction between WOVOdat developers, observatories, and other partners in building the database, e.g. accessing schematic design information and documentation, and utilities for submitting data. The on-line documentation helps users from volcano observatories to understand the structure and data formats of WOVOdat.

Why using MySQL?

WOVOdat choose a relational database for storing and accessing the large amounts of data of volcanic unrest. A relational database is a collection of tables that are related by common fields.

MySQL is an Open Source database, using Structured Query Language (SQL) which capable on handling relational database and also able to integrate with common web languages.

For further information about relational database terminology and concepts, we suggest users to consult online references about relational database concept.

What is WOVOML?

Data inside WOVOdat are stored in a MySQL database, where data tables organized and formatted following the WOVOdat 1.0/1.1 structure (Venezky and Newhall, 2007).

There are several ways to input data into WOVOdat database:

- Manual input under MySQL server (not practical when we have many data to feed in)
- Generate an XML format file which is compatible with WOVOdat SQL structure. *WOVOML* was therefore created as *WOVOdat standard reference XML format file, to facilitate data inputting/importing into the database.*

Detail information/documentation about WOVOdat data handling and formatting can be found at www.wovodat.org/doc/

Various scripts/tools to convert different data format into WOVOML will be made available online, so that the user able to import their data into WOVOdat database interactively.

Use of WOVOdat

WOVOdat will enable searches and comparisons of processed monitoring data, e.g., earthquake hypocenters, geodetic displacements, and gas fluxes from different episodes of unrest from a single volcano, or from unrest of different but analogous volcanoes.

Reference to analogues is especially needed during crises at volcanoes with no historical record or insufficient monitoring data of their own.

If unrest with character X,Y,Z is observed, the user can find other occurrences of similar unrest, and details of any resulting eruptions. Or, one might look for systematic of unrest at analogous volcanoes, selected on the basis of geologic or petrologic similarities.

When the database is sufficiently complete, tools will be made available for users to perform searches and comparisons interactively through our website. Tools for pattern recognition, eruption probability estimation, and other purposes are also planned.

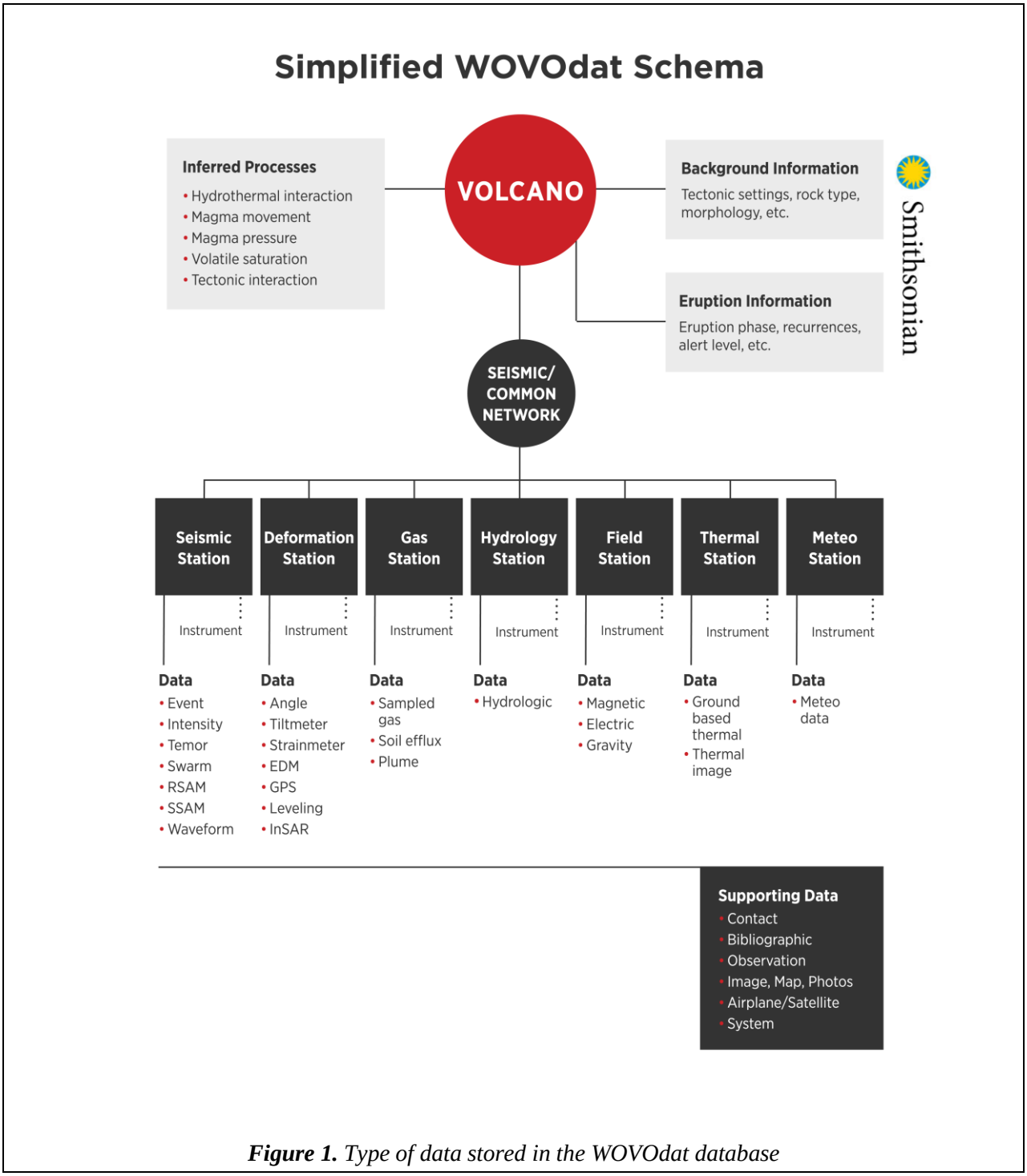

Figure 1. *Type of data stored in the WOVOdat database*

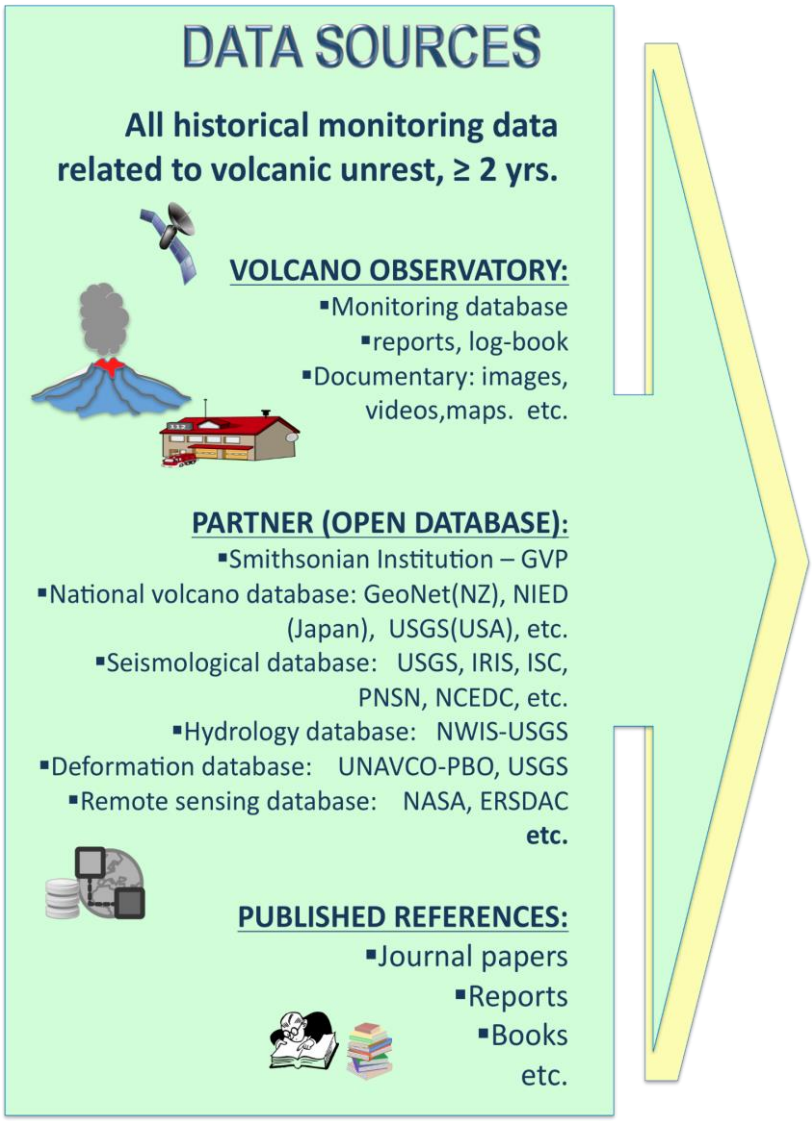

Figure 2. *Type of data sources*

WOVOdat Data Flow

Submitting Data

WOVOdat system uses xml format for its input data file. Any other data format would be converted into xml prior uploaded into the database. Once the original format is recognized, a build in script will be able to convert data into XML format to be then uploaded into MySQL database.

As anticipation of various data formats coming from different observatories, we provide interactive tools for users to submit data in any of three different ways. The data will be

converted into WOVOdat XML common formats (WOVOml), uploaded and stored in the database system.

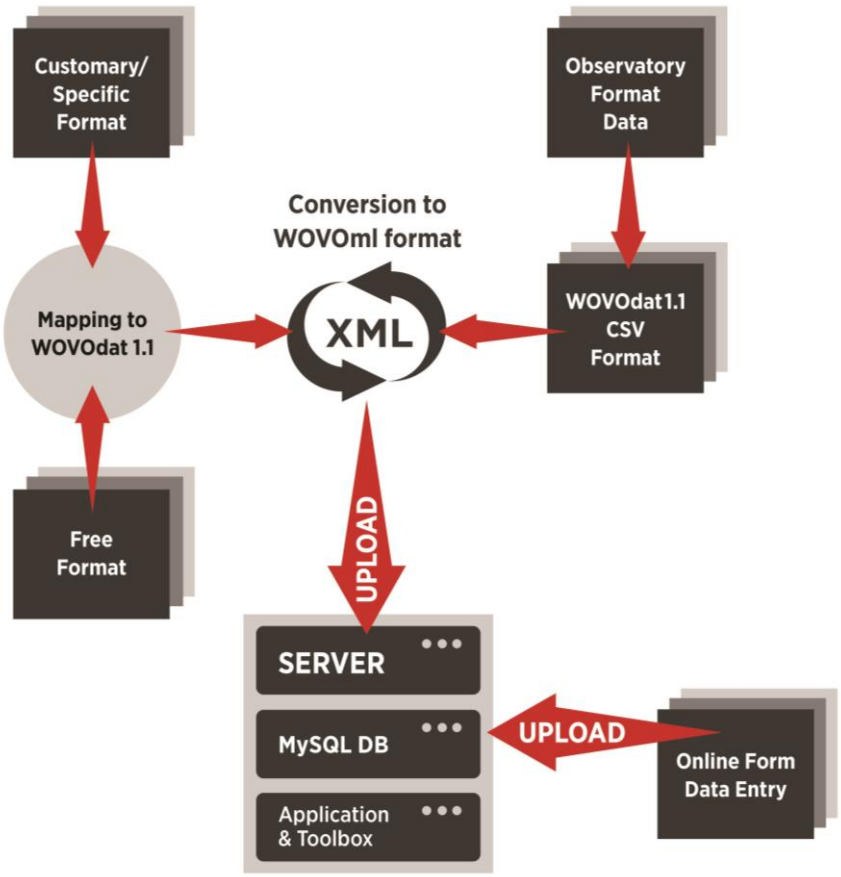

Figure 3. *WOVOdat data flow*

Currently we offer 3 options for users to contribute data:

(a) free format or original observatory format, (b) WOVOdat CSV standard format, and (c) Customary/known CSV format.

Data can also be contributed using an online form and uploaded into SQL database following WOVOdat XML standard format.

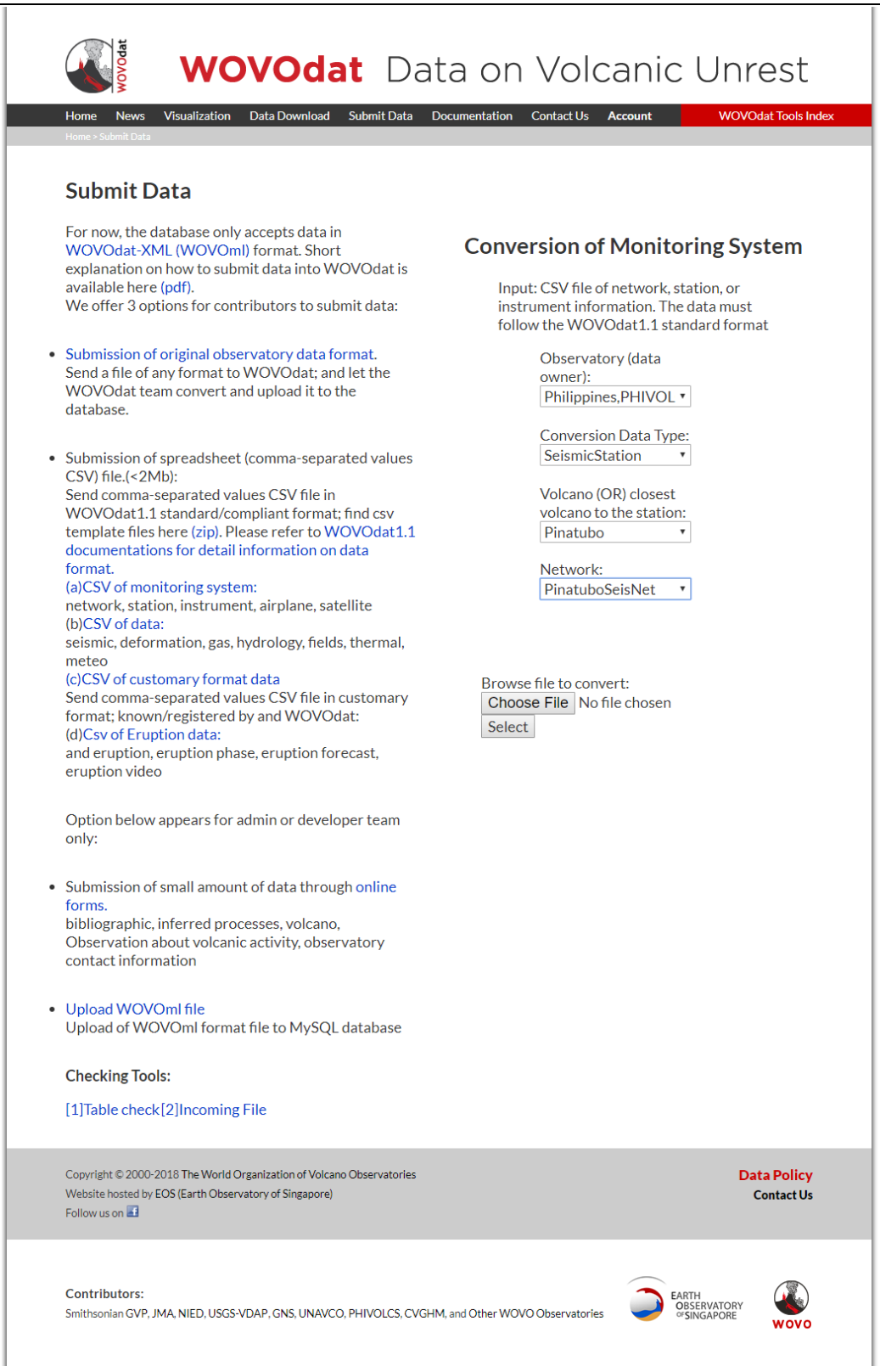

Figure 4. *Interactive online GUI for data submission*

The main users for WOVOdat will be observatory and other scientists seeking comparisons and analogues for their own volcanic unrest, or looking for systematics in pre-eruption behavior. We anticipate significant student use as well.

We are now in the phase of data population. The objective is to include all recorded historical unrest, including but not limited to that which led to eruption. From all reliable sources, including volcano observatories, published materials, and open and partner databases, data are stored in the WOVOdat system. ***Ownership of the data remains with the data contributors.***

Output and visualization tools

Various visualization tools will help users to query and view the data. Users will be able to interactively query the database and view volcano monitoring dataset.

Visualization tools in WOVOdat presently enable comparisons of processed monitoring data, e.g., earthquake hypocenters, displacements, and gas flux time series from different episodes of unrest from a single volcano, or from unrest of 2 different but analogous volcanoes. Nearly all data in WOVOdat are time-stamped and georeferenced, so that they can be studied in both space and time.
The data set is still in an early stage of population, but contains enough data to show users its potential.

WOVOdat invites those who wish to contribute visualization and other utilities to do so. Some of these may have already been developed for other personal or observatory uses.

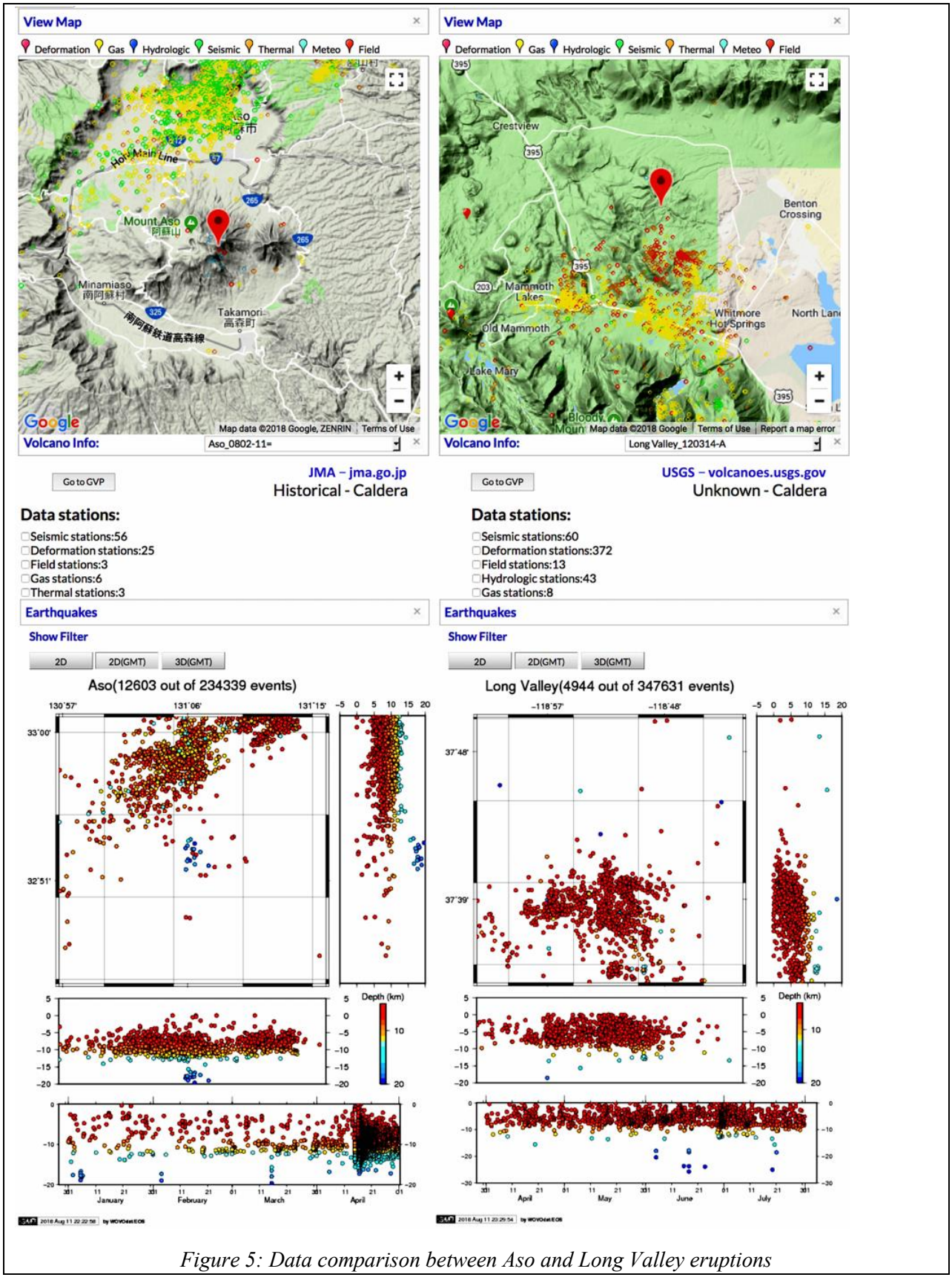

Figure 5: Data comparison between Aso and Long Valley eruptions

WOVOdat table structure and format

Overview on WOVOdat, original schema, table structures are described in WOVOdat version 1.0 (Venezky and Newhall, 2007). The current version is WOVOdat 2.0. The overall structure was retained from v1.0 to v2.0; most changes are in the details of parameters.

Reference: Venezky, D. Y., and Newhall, C. G., 2007, WOVOdat design document; the schema, table descriptions, and create table statements for the database of worldwide volcanic unrest (WOVOdat version 1.0): U.S. Geological Survey Open File Report 2007-1117, 184 p. [http://pubs.usgs.gov/of/2007/1117

Here is the list of tables used in the database, sorted by field:

Volcano

- Volcano - vd
- Volcano information - vd_inf
- Magma chamber - vd_mag
- Tectonic setting - vd_tec

Eruption

- Eruption - ed
- Eruption video - ed_vid
- Eruption phase - ed_phs
- Eruption forecast - ed_for
- Eruption Alert level color - ed_for_col

Seismic

- **Monitoring system**
  - Seismic network - sn
  - Seismic station - ss
  - Seismic instrument - si
  - Seismic component - si_cmp

- **Data**
  - Event recorded by a network - sd_evn
  - Event recorded by a single station - sd_evs
  - Tremor - sd_trm
  - Intensity - sd_int
  - Interval - sd_ivl
  - Waveform - sd_wav
  - RSAM-SSAM - sd_sam
  - RSAM data - sd_rsm
  - SSAM data - sd_ssm

Deformation

- **Monitoring system**
  - Common network - cn
  - Deformation station - ds
  - Deformation instrument (general) - di_gen
  - Tiltmeter/Strainmeter - di_tlt

- **Data**
  - Angle - dd_ang
  - EDM - dd_edm
  - GPS - dd_gps
  - GPS vector - dd_gpv
  - Leveling - dd_lev
  - Strain - dd_str
  - Electronic tilt - dd_tlt
  - Tilt vector - dd_tlv
  - InSAR image - dd_sar
  - InSAR Data Point - dd_srp
  - InSAR pixel - dd_srd

Fields

- **Monitoring system**
  - Common network - cn
  - Fields station - fs
  - Fields instrument - fi

- **Data**
  - Electric fields - fd_ele
  - Gravity - fd_gra
  - Magnetic fields - fd_mag
  - Magnetic vector - fd_mgv

Gas

- **Monitoring system**
  - Common network - cn
  - Gas station - gs
  - Gas instrument - gi

- **Data**
    - Directly sampled gas - gd
    - Plume - gd_plu
    - Soil efflux - gd_sol

Hydrologic

- **Monitoring system**
    - Common network - cn
    - Hydrologic station - hs
    - Hydrologic instrument - hi
- **Data**
    - Hydrologic data - hd

Thermal

- **Monitoring system**
    - Common network - cn
    - Thermal station - ts
    - Thermal instrument - ti
- **Data**
    - Ground-based thermal data - td
    - Thermal image - td_img
    - Thermal pixel - td_pix

Meteo

- **Monitoring system**
    - Common network - cn
    - Meteo station - ms
    - Meteo instrument - mi
- **Data**
    - Meteo data - med

Inferred processes

- Hydrothermal system interaction - ip_hyd
- Magma movement - ip_mag
- Buildup of magma pressure - ip_pres
- Volatile saturation - ip_sat
- Regional tectonics interaction - ip_tec

Other data

- Contact - cc
  Bibliographic - cb
- Observation - co
- Image - cm
- Map - md
- Airplane/Satellite - cs
- Earthquake terminology translation - st_eqt

System

- **Links**
  - Users to users permissions - jj_concon
  - Image related to data - jj_imgx
  - Contacts for volcanoes - jj_volcon
  - Networks monitoring volcanoes - jj_volnet
  - InSAR images created by satellites - j_sarsat
- **Database administration**
  - Registry - cr
  - Temporary registry - cr_tmp
  - Permission - cp
  - Upload history - cu
  - Change - ch
  - Download Data User Record - ddu

TABLE OF CONTENTS

Table of Contents

Introduction 2
WOVOdat Data Flow 5
Table of Contents 14
A. VOLCANO 17
A.1. vd – Volcano 17
A.2. vd_inf - Volcano information 18
A.3. vd_mag - Magma chamber 20
A.4. vd_tec - Tectonic setting 21
B. ERUPTION 22
B.1. ed – Eruption 22
B.2. ed_phs - Eruption phase 24
B.3. ed_vid - Eruption video 26
Indexes 28
B.4. ed_for - Eruption forecast 28
Links 30
B.4. ed_for_col – Alert Level color 30
This table allows the system to visualize an alert level defined by each observatory in the standardized & pre-defined color code. 30
C. SEISMIC MONITORING SYSTEM 31
C.1. sn - Seismic network 31
C.2. ss - Seismic station 34
C.3. si - Seismic instrument 36
C.4. si_cmp - Seismic component 38
D. SEISMIC DATA 40
D.1. sd_evn - Seismic event data from a network 40
D.2. sd_evs - Seismic event data from a single station 45
D.3. sd_int - Intensity 48
D.4. sd_trm - Tremor 49
D.5. sd_ivl - Interval (swarm) 52
D.6. sd_sam - RSAM-SSAM 56
D.6.a. sd_rsm - RSAM data 58
D.6.b. sd_ssm - SSAM data 59
D.7. sd_wav - Waveform 60
E. DEFORMATION MONITORING SYSTEM 61
E.1. cn - Common network (for Deformation network) 61
E.2. ds - Deformation station 64
E.3. di_gen - General deformation instrument 66
E.4. di_tlt - Tilt/Strain instrument 68
F. DEFORMATION DATA 70
F.1. dd_tlt - Electronic tilt 70
F.2. dd_tlv - Tilt vector 72
F.3. dd_str - Strain 74
F.4. dd_edm - EDM 77

F.5. dd_ang - Angle 79
F.6. dd_gps - GPS 81
F.7. dd_gpv - GPS vector 83
F.8. dd_lev - Leveling 87
F.9. dd_sar - InSAR image 89
F.9.a. j_sarsat - InSAR-satellite junction 91
F.9.b. dd_srd - InSAR Data pixel 92
F.10. dd_srp- InSAR Data point 93
G. FIELDS MONITORING SYSTEM 95
G.1. cn - Common network (for Fields network) 95
G.2. fs - Fields station 96
G.3. fi - Fields instrument 98
H. FIELDS DATA 99
H.1. fd_ele - Electric fields 99
H.2. fd_gra - Gravity 101
H.3. fd_mag - Magnetic fields 103
H.4. fd_mgv - Magnetic vector 105
I. GAS MONITORING SYSTEM 107
I.1. cn - Common network (gas network) 107
I.2. gs - Gas station 109
I.3. gi - Gas instrument 111
J. GAS DATA 113
J.1. gd - Directly sampled gas 113
J.2. gd_plu - Plume 115
J.3. gd_sol - Soil efflux 120
K. HYDROLOGIC MONITORING SYSTEM 122
K.1. cn - Common network (Hydrologic network) 122
K.2. hs - Hydrologic station 124
K.3. hi - Hydrologic instrument 126
L. HYDROLOGIC DATA 128
L.1. hd - Hydrologic data 128
M. THERMAL MONITORING SYSTEM 131
M.1. cn - Common network (Thermal network) 131
M.2. ts - Thermal station 133
M.3. ti - Thermal instrument 135
N. THERMAL DATA 138
N.1. td - Ground-based thermal data 138
N.2. td_img - Thermal image 141
N.3. td_pix - Thermal pixel data 144
O. METEOROLOGICAL MONITORING SYSTEM 145
O.1. cn - Common network (Meteo network) 145
N.2. ms - Meteo station 147
O.3. mi - Meteo instrument 148
P. METEOROLOGICAL DATA 151
P.1. med - Meteo data 151
Q. INFERRED PROCESSES 153
Q.1. ip_hyd - Hydrothermal system interaction 154
Q.2. ip_mag - Magma movement 157

Q.3. ip_pres - Buildup of magma pressure 160
Q.4. ip_sat - Volatile saturation 162
Q.5. ip_tec - Regional tectonics interaction 166
R. Common or Shared 171
R.1. cc - Contact 171
R.2. cb – Bibliographic 172
This table stores information about articles, papers, books, and web sites, with information that is related to the data in WOVOdat. 172
R.3. co - Observation 174
R.4. cm - Image 176
R.5. md - Map 177
R.6. cs - Satellite/Airplane 179
R.7. st_eqt – Earthquake translation 181
S. SYSTEM 182
S.1. jj_concon - User to user permissions 182
S.2. jj_imgx - Image junction 183
S.3. jj_volcon - Volcano-contact junction 184
S.4. jj_volnet - Volcano-network junction 185
S.5. j_sarsat - InSAR-satellite junction 185
S.6. cr - Registry 187
S.7. cr_tmp - Temporary registry 187
S.8. cp - Permission 188
S.9. cu - Upload history 189
S.10. ch - Change 190
NOTE 191
Appendix-1 WOVOdat XML-format 192
WOVOdat XML-format (version: November 2018) 202
Appendix-2 WOVOML 2.0 Schema 238
Appendix-3 MySQL Field Type 311
Appendix-4 Earthquake information 313
Earthquake Classification 313
Magnitude Types 316
Appendix-5 Introduction to Using WOVOdat (submit and visualize data) 317
Appendix-6 WOVOdat standalone package 349

A. VOLCANO

A.1. vd – Volcano

The volcano table is one of the fundamental tables of WOVOdat. In this table ***vd_id*** (the volcano identifier), which links to almost every table, is defined. Main data (Volcano name and CAVW number) for this table will mostly refer to the Smithsonian Global Volcanism Program (SI-GVP) at http://www.volcano.si.edu/world/volcanocriteria.cfm

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comment
1	**vd_id**	mediumint(8)		UNSIGNED	No	None	AUTO_IN-CREMENT		Volcano identifier (Index)
2	**vd_cavw**	varchar(15)	utf8_unicode_ci		Yes	NULL			the current CAVW number for this volcano
3	**vd_name**	varchar(255)	utf8_unicode_ci		Yes	NULL			Volcano name (first)
4	**vd_name2**	varchar(255)	utf8_unicode_ci		Yes	NULL			Volcano name (second)
5	**vd_tzone**	float			Yes	NULL			time zone (relative to UTC)
6	**vd_mcont**	char(1)	utf8_unicode_ci		Yes	NULL			multiple contact for this volcano
7	**vd_com**	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
8	**cc_id**	smallint(5)		UNSIGNED	Yes	NULL			First Contact ID
9	**cc_id2**	smallint(5)		UNSIGNED	Yes	NULL			Second Contact ID
10	**cc_id3**	smallint(5)		UNSIGNED	Yes	NULL			Third Contact ID
11	**cc_id4**	smallint(5)		UNSIGNED	Yes	NULL			Fourth Contact ID
12	**cc_id5**	smallint(5)		UNSIGNED	Yes	NULL			Fifth Contact ID
13	**vd_loaddate**	datetime			Yes	NULL			the date the data was entered (in UTC)
14	**vd_pubdate**	datetime			Yes	NULL			the date the data become public
15	**cc_id_load**	smallint(5)		UNSIGNED	Yes	NULL			contact ID for the person who

									entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_id	A	No	
CAVW NUMBER	BTREE	Yes	No	vd_cavw	A	Yes	
cc_id	BTREE	No	No	cc_id	A	Yes	

Links

Field	Link to
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id4	cc.cc_id
cc_id5	cc.cc_id
cc_id_load	cc.cc_id

A.2. vd_inf - Volcano information

This table contains information about the volcano that could possibly change over the life of the database, such as the CAVW number, geomorphology, and other descriptive information. Much of the information will be loaded from the Smithsonian Global Volcanism Program *'Volcano reference File (VRF)'.*

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**vd_inf_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano information identifier (Index)
2	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			the current CAVW number for this volcano
3	**vd_inf_cavw**	varchar(15)	*utf8_unicode_ci*		Yes	*NULL*			the current CAVW number for this volcano
4	**vd_inf_status**	enum('Anthropology', etc.)			No	Unknown			Volcano status
5	**vd_inf_status**	enum('Anthropology',etc.)							Status
6	**vd_inf_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Short narrative
7	**vd_inf_slat**	double			Yes	*NULL*		°	Summit latitude
8	**vd_inf_slon**	double			Yes	*NULL*		°	Summit longitude
9	**vd_inf_selev**	float			Yes	*NULL*		m	Summit elevation

10	**vd_inf_type**	enum('Caldera',etc.)			No	Unknown			Type
11	**vd_inf_country**	varchar(30)	utf8_unicode_ci		Yes	Null			Country location
12	**vd_inf_subreg**	varchar(30)	utf8_unicode_ci		Yes	Null			Sub Region (GVP-SI)
13	**vd_inf_loc**	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Geographic location
14	**vd_inf_rtype**	enum('Andesite/Basaltic Andesite','Basalt', etc.)			No	Unknown			Dominant rock type
15	**vd_inf_evol**	float			Yes	*NULL*		m_3	Volume of edifice
16	**vd_inf_numcald**	tinyint(4)		UNSIGNED	Yes	*NULL*			Number of calderas
17	**vd_inf_lcald_dia**	float			Yes	*NULL*		km	Diameter of largest caldera
18	**vd_inf_ycald_lat**	double			Yes	*NULL*		°	Latitude of youngest caldera
19	**vd_inf_ycald_lon**	double			Yes	*NULL*		°	Longitude of youngest caldera
20	**vd_inf_stime**	datetime			No	0000-00-00 00:00:00			Start time
21	**vd_inf_stime_unc**	datetime			Yes	*NULL*			Start time uncertainty
22	**vd_inf_etime**	datetime			No	9999-12-31 23:59:00			End time
23	**vd_inf_etime_unc**	datetime			Yes	*NULL*			End time uncertainty
24	**vd_inf_com**	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
25	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Contact ID
26	**vd_inf_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
27	**vd_inf_pubdate**	datetime			Yes	*NULL*			the date the data become public
28	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes Links

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_inf_id	A	No	
TYPE	BTREE	No	No	vd_inf_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
STATUS	BTREE	No	No	vd_inf_status	A	No	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id

vd_inf_status

⇨ 'Anthropology','Ar/Ar','Dendrochronology','Fumarolic','Historical','Holocene','Holocene?','Hot Springs','Hydration Rind','Hydrophonic','Ice Core','Lichenometry','Magnetism','Pleistocene','Potassium-Argon','Radiocarbon','Seismicity','Surface Exposure','Tephrochronology','Thermoluminescence','Uncertain','Uranium-series','Varve Count','Unknown'

vd_inf_type

⇨ 'Caldera','Cinder cone','Complex volcano','Compound volcano','Cone','Crater rows','Explosion craters','Fissure vent','Hydrothermal field','Lava cone','Lava dome','Maar','Pumice cone','Pyroclastic cone','Pyroclastic shield','Scoria cone','Shield volcano','Somma volcano','Stratovolcano','Subglacial volcano','Submarine volcano','Tuff cone','Tuff ring','Unknown','Volcanic complex','Volcanic field'

vd_inf_rtype

⇨ 'Andesite/Basaltic Andesite','Basalt','Basalt/Picro-asalt','Dacite','Foidite','Phonolite','Phonotephrite','Tephra-phonolite','Trachybasalt/Tephrite Basanite','Trachyandesite/Basaltic trachy-andesite','Trachyandesite','Trachyte/Trachydacite','Rhyolite','Unknown'

A.3. vd_mag - Magma chamber

This table contains information about the magma chamber such as its composition(s) and minimum size (based on the largest eruption volume). The information will obtain from various sources.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**vd_mag_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano magma cham-ber identifier (Index)
2	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
3	**vd_mag_lvz_dia**	float			Yes	*NULL*		km	Diameter of low velocity zone
4	**vd_mag_lvz_vol**	float			Yes	*NULL*		km^3	Volume of low velocity zone
5	**vd_mag_tlvz**	float			Yes	*NULL*		km	Depth to top of low velocity zone
6	**vd_mag_lerup_vol**	double			Yes	*NULL*		km^3	Volume of largest eruption, DRE
7	**vd_mag_drock**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Dominant rock type
8	**vd_mag_orock**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Outlier rock type

9	**vd_mag_orock2**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Second outlier rock type
10	**vd_mag_orock3**	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Third outlier rock type
11	**vd_mag_minsio2**	float			Yes	*NULL*			Minimum SiO2 content of whole rocks erupted
12	**vd_mag_maxsio2**	float			Yes	*NULL*			Maximum SiO2 content of whole rocks erupted
13	**vd_mag_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
14	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Owner ID
15	**vd_mag_loaddate**	datetime			Yes	*NULL*			the date the data was entered (in UTC)
16	**vd_mag_pubdate**	datetime			Yes	*NULL*			the date the data become public
17	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_mag_id	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

A.4. vd_tec - Tectonic setting

This table contains information about the local tectonic settings, such as rates of movement either along a plate or over a hotspot.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	**vd_tec_id**	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tectonic setting identifier (Index)

2	**vd_id**	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
3	**vd_tec_desc**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
4	**vd_tec_strslip**	float			Yes	*NULL*		cm/a	Rate of strike-slip
5	**vd_tec_ext**	float			Yes	*NULL*		cm/a	Rate of extension
6	**vd_tec_conv**	float			Yes	*NULL*		cm/a	Rate of convergence
7	**vd_tec_travhs**	float			Yes	*NULL*		cm/a	Travel rate across hotspot
8	**vd_tec_com**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
9	**cc_id**	smallint(5)		UNSIGNED	Yes	*NULL*			Contact ID
10	**vd_tec_loaddate**	datetime			Yes	*NULL*			the date the data was entered
11	**vd_tec_pubdate**	datetime			Yes	*NULL*			the date the data become public
12	**cc_id_load**	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
13	**cb_ids**	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	vd_tec_id	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B. ERUPTION

B.1. ed – Eruption This table stores general information about an eruption, in general can be classified in different ways based on the style or eruption, composition, duration, and location. The SI-GVP will be a source for most of the data in the eruption table. More additional information on eruption data can be found at http://www.volcano.si.edu/world/eruptioncriteria.cfm.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_id	mediumint(8)		UNSIGNED	No	*None*	AUTO-INCREMENT		Eruption identifier (index)
2	ed_code	varchar(30)	*utf8_unicode_c*		Yes	*NULL*			Eruption code
3	ed_num	mediumint(8)			Yes	*NULL*			Eruption Number
4	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
5	ed_name	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Eruption name
6	ed_nar	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Narrative
7	ed_stime	datetime			Yes	*NULL*			Eruption start time
8	ed_stime_bc	smallint(6)			Yes	*NULL*			BC year start time
9	ed_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	ed_etime	datetime			Yes	*NULL*			Eruption end time
11	ed_etime_bc	smallint(6)			Yes	*NULL*			BC year end time
12	ed_etime_unc	datetime			Yes	*NULL*			End time uncertainty
13	ed_climax	datetime			Yes	*NULL*			Onset of climax
14	ed_climax_bc	smallint(6)			Yes	*NULL*			BC year of eruption climax
15	ed_climax_unc	datetime			Yes	*NULL*			Onset of climax uncertainty
16	ed_vei	mediumint(9)			Yes	Null			VEI
17	ed_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	ed_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	ed_pubdate	datetime			Yes	*NULL*			the date the data become public
23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_id	A	No	
CODE	BTREE	No	No	ed_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.2. ed_phs - Eruption phase

This table stores specific information about the eruption such as the size of the phase and composition of magma.

	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_phs_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption phase identifier
2	ed_phs_code	varchar(30)	utf8_unicode_ci		Yes	*NULL*			Eruption phase code
3	ed_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption identifier
4	ed_phs_phsnum	float			Yes	*NULL*			Phase number
5	ed_phs_stime	datetime			Yes	*NULL*			Start time
6	ed_phs_stime_bc	smallint(6)			Yes	*NULL*			Year of start time before Christ
7	ed_phs_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
8	ed_phs_etime	datetime			Yes	*NULL*			End time
9	ed_phs_etime_bc	smallint(6)			Yes	*NULL*			Year of end time before Christ
10	ed_phs_etime_unc	datetime			Yes	*NULL*			End time uncertainty
11	ed_phs_type	enum('Phreatic eruption', 'Magmatic extrusion', 'Explosion', 'Sector collapse', 'Climactic phase', 'Tectonic earthquake')	utf8_unicode_ci		No	Null			Eruption Phase Type
12	ed_phs_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
13	ed_phs_vei	mediumint(9)			Yes	*NULL*			VEI (Volcanic Explosivity Index)
14	ed_phs_max_lext	float			Yes	*NULL*		m^3/s	Maximum lava extrusion rate
15	ed_phs_max_expdis	float			Yes	*NULL*		kg/s × 10^6	Maximum explosive mass discharge rate
16	ed_phs_dre_tot	float			Yes	Null			Total DRE volume
17	ed_phs_dre_lav	float			Yes	Null			DRE volume of lava
18	ed_phs_dre_tep	float			Yes	Null			DRE volume of tephra
19	ed_phs_mix	enum('Y', 'N', 'U')			Yes	Null		$m^3 \times 10^6$	Total DRE (DenseRock Equivalent) volume
20	ed_phs_dre_lav	float			Yes	Null		$m^3 \times 10^6$	DRE volume of lava
21	ed_phs_dre_tep	float			Yes	Null		$m^3 \times 10^6$	DRE volume of tephra
22	ed_phs_mix	enum('Y', 'N', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Evidence of magma mixing: Y=Yes, N=No, U=Unknown
23	ed_phs_col	float			Yes	*NULL*		km	Column height
24	ed_phs_coldet	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Column height determination
25	ed_phs_minsio2_mg	float			Yes	*NULL*		%	Minimum SiO_2 of matrix glass
26	ed_phs_maxsio2_mg	float			Yes	*NULL*		%	Maximum SiO_2 of matrix glass
27	ed_phs_minsio2_wr	float			Yes	*NULL*		%	Minimum SiO_2 of whole rock
28	ed_phs_maxsio2_wr	float			Yes	*NULL*		%	Maximum SiO_2 of whole rock

29	ed_phs_totxtl	float			Yes	*NULL*		%	Total crystallinity
30	ed_phs_phenc	float			Yes	*NULL*		%	Phenocryst content
31	ed_phs_phena	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Phenocryst assemblage
32	ed_phs_h2o	float			Yes	*NULL*			Pre-eruption water content
33	ed_phs_h2o_xtl	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of phenocryst and melt inclusion
34	ed_phs_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
35	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
36	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
37	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
38	ed_phs_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
39	ed_phs_pubdate	datetime			Yes	*NULL*			the date the data become public
40	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
41	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_phs_id	A	No	
CODE	BTREE	No	No	ed_phs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
ERUPTION	BTREE	No	No	ed_id	A	Yes	

Links

Field	Link to
ed_id	ed.ed_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.3. ed_vid - Eruption video

This table stores information about a video clip of the eruption.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_vid_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption video identifier
2	ed_vid_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Eruption video code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			volcano identifier
4	ed_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption identifier
5	ed_phs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption phase identifier
6	ed_vid_link	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to the file or info where to find the clip
7	ed_vid_stime	datetime			Yes	*NULL*			Start time
8	ed_vid_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
9	ed_vid_length	time			Yes	*NULL*			Length of the clip
10	ed_vid_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
11	ed_vid_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
12	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
13	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
14	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
15	ed_vid_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
16	ed_vid_pubdate	datetime			Yes	*NULL*			the date the data become public
17	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_vid_id	A	No	
CODE	BTREE	No	No	ed_vid_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
ERUPTION	BTREE	No	No	ed_id	A	Yes	
ERUPTION PHASE	BTREE	No	No	ed_phs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
ed_id	ed.ed_id
ed_phs_id	ed_phs.ed_phs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.4. ed_for - Eruption forecast

This table stores information about forecasts made for a phase of the eruption, such as an overview of the forecast and the times forecasted.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_for_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption forecast identifier
2	ed_for_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Eruption forecast code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	ed_phs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Eruption phase identifier
5	ed_for_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
6	ed_for_open	datetime			Yes	*NULL*			Earliest expected start time of eruption
7	ed_for_open_unc	datetime			Yes	*NULL*			Earliest expected start time of eruption uncertainty
8	ed_for_close	datetime			Yes	*NULL*			Latest expected start time of eruption
9	ed_for_close_unc	datetime			Yes	*NULL*			Latest expected start time of eruption uncertainty
10	ed_for_time	datetime			Yes	*NULL*			Issue date
11	ed_for_time_unc	datetime			Yes	*NULL*			Issue date uncertainty
12	ed_for_tsucc	enum('Y', 'N', 'P')	*utf8_unicode_ci*		Yes	*NULL*			Success on time: Y=Yes, N=No, P=Partly
13	ed_for_msucc	enum('Y', 'N', 'P')	*utf8_unicode_ci*		Yes	*NULL*			Success on magnitude: Y=Yes, N=No, P=Partly
14	ed_for_astime	datetime			Yes	*NULL*			Alert Start Time
15	ed_for_aetime	datetime			Yes	*NULL*			Alert End Time
16	ed_for_alevel	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Alert level
17	ed_for_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	ed_for_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	ed_for_pubdate	datetime			Yes	*NULL*			the date the data become public

23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_for_id	A	No	
CODE	BTREE	No	No	ed_for_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
ERUPTION PHASE	BTREE	No	No	ed_phs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
ed_phs_id	ed_phs.ed_phs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

B.4. ed_for_col – Alert Level color

This table allows the system to visualize an alert level defined by each observatory in the standardized & pre-defined color code.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ed_for_col_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Eruption alert color identifier
2	ed_for_col_org	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Alert level defined by each observatory
3	ed_for_col_color	varchar(255)		UNSIGNED	Yes	*NULL*			Standardized alert level color will be shown on visualization
4	cc_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Contact ID
5	ed_for_col_loaddate	smallint(5)		UNSIGNED	Yes	*NULL*			Load date, the date the data was entered (in UTC)
6	cc_id_load	datetime	*utf8_unicode_ci*		Yes	*NULL*			Loader ID, contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ed_for_col_id	A	No	

Links

Field	Link to
cc_id	cc.cc_id
cb_id_load	cb.cc_id

C. SEISMIC MONITORING SYSTEM

C.1. sn - Seismic network

This table contains information about the seismic network such as the velocity model used for computing the event locations and a general overview of the types of instruments used.

	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic network identifier
2	sn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic Network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	sn_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic Network name
5	sn_vmodel	varchar(511)	*utf8_unicode_ci*		Yes	*NULL*			Description of velocity model
6	sn_vmodel_detail	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to a file containing additional details about velocity model
7	sn_zerokm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		m	Elevation of zero km "depth"
8	sn_fdepth_flag	enum('Y', 'N', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Depth is fixed: Y=Yes, N=No, U=Unknown
9	sn_fdepth	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Fixed depth description
10	sn_stime	datetime			No	0000-00-00 00:00:00			Start date
11	sn_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
12	sn_etime	datetime			No	9999-12-31 23:59:00			End date
13	sn_etime_unc	datetime			Yes	*NULL*			End date uncertainty
14	sn_tot	tinyint(3)		UNSIGNED	Yes	*NULL*			Total number of seismometers
15	sn_bb	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of broadband seismometers
16	sn_smp	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of short- and mid-period seismometers
17	sn_digital	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of digital seismometers
18	sn_analog	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of analog seismometers
19	sn_tcomp	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of 3 component seismometers
20	sn_micro	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of microphones

21	sn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
22	sn_utc	float			Yes	*NULL*			Difference from UTC
23	sn_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
24	sn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
25	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
26	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
27	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
28	sn_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
29	sn_pubdate	datetime			Yes	*NULL*			the date the data become public
30	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
31	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sn_id	A	No	
CODE	BTREE	No	No	sn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C.2. ss - Seismic station

This table stores information such as a location, name, system gain, and comments about the seismic stations where the data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ss_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic station identifier
2	ss_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic station code
3	sn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Seismic network identifier
4	ss_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic station name
5	ss_lat	double			Yes	*NULL*		°	Station Latitude
6	ss_lon	double			Yes	*NULL*		°	Station longitude
7	ss_elev	float			Yes	*NULL*		m	Station elevation
8	ss_depth	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		m	Depth of instruments
9	ss_stime	datetime			No	0000-00-00 00:00:00			Start date
10	ss_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
11	ss_etime	datetime			No	9999-12-31 23:59:00			End date
12	ss_etime_unc	datetime			Yes	*NULL*			End date uncertainty
13	ss_utc	float			Yes	*NULL*			Difference from UTC
14	ss_instr_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Instrument types
15	ss_sgain	float			Yes	*NULL*			System gain
16	ss_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	ss_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory

18	ss_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	ss_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	ss_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ss_id	A	No	
CODE	BTREE	No	No	ss_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C.3. si - Seismic instrument

This table stores information such as the instrument name, model, number of components and response time.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	si_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic instrument identifier
2	si_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic instrument code
3	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			seismic station identifier
4	si_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the seismic instrument (recorder)
5	si_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Instrument type
6	si_range	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Dynamic range of seismic instrument
7	si_igain	float			Yes	*NULL*			the instrument gain
8	si_filter	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Filters, if applied
9	si_ncomp	tinyint(3)		UNSIGNED	Yes	*NULL*			Number of components
10	si_resp	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Response overview
11	si_resp_file	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			link to file containing re-sponse
12	si_stime	datetime			No	0000-00-00 00:00:00			Start date
13	si_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
14	si_etime	datetime			No	9999-12-31 23:59:00			End date
15	si_etime_unc	datetime			Yes	*NULL*			End date uncertainty

16	si_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
17	si_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	si_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	si_pubdate	datetime			Yes	*NULL*			the date the data become public
23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	si_id	A	No	
CODE	BTREE	No	No	si_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

C.4. si_cmp - Seismic component

This table stores information about an individual component (geophone) that sends data to the instrument or recorder such as the component name, model, orientation, band type, and sampling rate.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	si_cmp_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic component identifier
2	si_cmp_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic component code
3	si_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic instrument identifier
4	si_cmp_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the geophone
5	si_cmp_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Seismic component type
6	si_cmp_resp	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of response
7	si_cmp_band	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Band type (SEED conven-tion)
8	si_cmp_samp	float			Yes	*NULL*		Hz	Sampling rate
9	si_cmp_icode	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Instrument code (SEED convention)

10	si_cmp_orient	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Orientation code (SEED convention)
11	si_cmp_sens	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Sensitivity
12	si_cmp_depth	float			Yes	*NULL*		m	Depth
13	si_cmp_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
14	si_cmp_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	si_cmp_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	si_cmp_pubdate	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	si_cmp_id	A	No	
CODE	BTREE	No	No	si_cmp_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
INSTRUMENT	BTREE	No	No	si_id	A	Yes	

Links

Field	Link to
si_id	si.si_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D. SEISMIC DATA

D.1. sd_evn - Seismic event data from a network

This table contains seismic data that were collected from several stations in a network and then processed to give a location.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_evn_id	mediumint(8)		UNSIGNED	No	None	AUTO_INCREMENT		Seismic event identifier
2	sd_evn_code	varchar(30)	utf8_unicode_ci		Yes	NULL			Seismic event code
3	sn_id	smallint(5)		UNSIGNED	Yes	NULL			Seismic network identifier
4	sd_evn_arch	varchar(255)	utf8_unicode_ci		Yes	NULL			Location of the seismogram archive
5	sd_evn_time	datetime			Yes	NULL			Origin time
6	sd_evn_timecsec	decimal(2,2)			Yes	NULL			Centisecond precision for origin time
7	sd_evn_time_unc	datetime			Yes	NULL			Origin time uncertainty
8	sd_evn_timecsec_unc	decimal(2,2)			Yes	NULL			Centisecond precision for origin time uncertainty

9	sd_evn_dur	float			Yes	NULL		s	Average duration of the earthquake as recorded at stations <15 km from the volcano
10	sd_evn_dur_unc	float			Yes	NULL		s	Uncertainty in average duration of the earthquake
11	sd_evn_tech	varchar(255)	utf8_unicode_ci		Yes	NULL			The technique used to locate the event
12	sd_evn_picks	enum('A', 'R', 'H', 'U')	utf8_unicode_ci		Yes	NULL			Determination of picks: A=Automatic picker, R=Ruler, H=Human using a computer-based picker, U=Unknown
13	sd_evn_elat	double			Yes	NULL		°	Estimated latitude
14	sd_evn_elon	double			Yes	NULL		°	Estimated longitude
15	sd_evn_edep	float			Yes	NULL		km	Estimated depth
16	sd_evn_fixdep	enum('Y', 'N', 'U')	utf8_unicode_ci		Yes	NULL			Fixed depth: Y=Yes, N=No, U=Unknown
17	sd_evn_nst	tinyint(3)		UNSIGNED	Yes	NULL			The total number of seismic stations that reported arrival times for this earthquake
18	sd_evn_nph	tinyint(3)		UNSIGNED	Yes	NULL			The total number of P and S arrival-time observations used to compute the hypocenter location
19	sd_evn_gp	float			Yes	NULL		°	The largest azimuthal gap between azimuthally

									adjacent stations
20	sd_evn_dcs	float			Yes	NULL		km	Horizontal distance from the epicenter to the nearest station
21	sd_evn_rms	float			Yes	NULL		s	RMS travel time residual
22	sd_evn_herr	float			Yes	NULL		km	The horizontal location error defined as the length of the largest projection of the three principal errors on a horizontal plane
23	sd_evn_xerr	float			Yes	NULL		km	The maximum x (longitude) error for cases where the horizontal error is not given
24	sd_evn_yerr	float			Yes	NULL		km	The maximum y (latitude) error for cases where the horizontal error is not given
25	sd_evn_derr	float			Yes	NULL		km	The depth error defined as the largest projection of the three principal errors on a vertical line
26	sd_evn_locqual	varchar(255)	utf8_unicode_ci		Yes	NULL			The quality of the calculated location
27	sd_evn_pmag	float			Yes	NULL			The primary magnitude
28	sd_evn_pmag_type	varchar(30)	utf8_unicode_ci		Yes	NULL			The primary magnitude type, e.g., Ms, Mb, Mw, Md (see Appendix 4 for more info)

29	sd_evn_smag	float			Yes	NULL			A secondary magnitude
30	sd_evn_smag_type	varchar(30)	utf8_unicode_ci		Yes	NULL			Secondary magnitude type
31	sd_evn_eqtype	enum('R','Q','V','VT','VT_D','VT_S','H','H_HLF','H_LHF','LF','LF_LP','LF_T','LF_ILF','VLP','RF','E','U','O','X','G','PF','T','LP','HF','VH','VH_LC')			Yes	NULL			WOVOdat classification for the earthquake type (see Appendix 4 for more info)
32	sd_evn_mtscale	float			Yes	NULL			The scale of the following moment tensor data. Please store as a multiplier for the moment tensor data
33	sd_evn_mxx	float			Yes	NULL			Moment tensor m_xx stored as +/- x.xx
34	sd_evn_mxy	float			Yes	NULL			Moment tensor m_xy stored as +/- x.xx
35	sd_evn_mxz	float			Yes	NULL			Moment tensor m_xz stored
									as +/- x.xx
36	sd_evn_myy	float			Yes	NULL			Moment tensor m_yy
37	sd_evn_myz	float			Yes	NULL			Moment tensor m_yz
38	sd_evn_mzz	float			Yes	NULL			Moment tensor m_zz
39	sd_evn_strk1	float			Yes	NULL		°	Strike 1 of best double couple
40	sd_evn_strk1_err	float			Yes	NULL		°	The uncertainty in the value of strike 1
41	sd_evn_dip1	float			Yes	NULL		°	Dip 1 of best double couple
42	sd_evn_dip1_err	float			Yes	NULL		°	The uncertainty in the value of dip 1
43	sd_evn_rak1	float			Yes	NULL		°	Rake 1 of best double couple
44	sd_evn_rak1_err	float			Yes	NULL		°	The uncertainty in

									the value of rake 1
45	sd_evn_strk 2	float			Yes	NULL		°	Strike 2 of best double couple
46	sd_evn_strk 2_err	float			Yes	NULL		°	The uncertainty in the value of strike 2
47	sd_evn_dip2	float			Yes	NULL		°	Dip 2 of best double couple
48	sd_evn_dip2 _err	float			Yes	NULL		°	The uncertainty in the value of dip 2
49	sd_evn_rak2	float			Yes	NULL		°	Rake 2 of best double couple
50	sd_evn_rak2 _err	float			Yes	NULL		°	The uncertainty in the value of rake 2
51	sd_evn_foc	varchar(25 5)	utf8_unicod e_ci		Yes	NULL			The focal plane solution (beachball, w/ arrivals) stored as a .gif for well defined events
52	sd_evn_sam p	float			Yes	NULL		Hz	The sampling rate
53	sd_evn_ori	enum('D', 'O')	*utf8_unico de_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
54	sd_evn_com	varchar(25 5)	utf8_unicod e_ci		Yes	NULL			Comments
55	cc_id	smallint(5)		UNSIGNE D	Yes	NULL			First owner ID
56	cc_id2	smallint(5)		UNSIGNE D	Yes	NULL			Second owner ID
57	cc_id3	smallint(5)		UNSIGNE D	Yes	NULL			Third owner ID
58	sd_evn_load date	datetime			Yes	NULL			the date the data was entered (in UTC)
59	sd_evn_pub date	datetime			Yes	NULL			the date the data become public
60	cc_id_load	smallint(5)		UNSIGNE D	Yes	NULL			contact ID for the person

									who entered the data
61	cb_ids	varchar(255)	utf8_unicode_ci		Yes	NULL			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_evn_id	A	No	
CODE	BTREE	No	No	sd_evn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	
TECHNIQUE	BTREE	No	No	sd_evn_tech	A	Yes	
latlonIndex	BTREE	No	No	sd_evn_elat	A	Yes	
				sd_evn_elon	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.2. sd_evs - Seismic event data from a single station

This table contains seismic data that were collected from a single station and therefore no location can be calculated.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_evs_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic event identifier
2	sd_evs_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic event code
3	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			seismic station identifier
4	sd_evs_time	datetime			Yes	*NULL*			Start time
5	sd_evs_time_ms	decimal(2,2)			Yes	*NULL*			Centisecond precision for start time
6	sd_evs_time_unc	datetime			Yes	*NULL*			Start time uncertainty

7	sd_evs_time_unc_ms				Yes	*NULL*			Centisecond precision for start time uncertainty
8	sd_evs_picks	enum('A', 'R', 'H', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Determination of picks: A=Automatic picker, R=Ruler, H=Human using a computer-based picker, U=Unknown
9	sd_evs_spint	float			Yes	*NULL*		s	S-P interval
10	sd_evs_dur	float			Yes	*NULL*		s	Duration
11	sd_evs_dur_unc	float			Yes	*NULL*		s	Duration uncertainty
12	sd_evs_dist_actve n	float			Yes	*NULL*		km	Distance from active vent
13	sd_evs_maxamptrac	float			Yes	*NULL*			Maximum amplitude of trace
14	sd_evs_samp	float			Yes	*NULL*		Hz	Sampling rate
15	sd_evs_eqtype	enum('R','Q','V','VT','VT_D','VT_S','H', 'H_HLF', 'H_LHF','LF','LF_LP','LF_T','LF_ILF','VLP', 'RF','E','U','O','X','G','PF','T','LP', 'HF','VH','VH_LC')			Yes	NULL			WOVOdat classification for the earthquake type (see Appendix 4 for more info)
16	sd_evs_domFre	float			Yes	*NULL*		Hz	Dominant frequency
17	sd_evs_firMotion	enum('Up', 'Down', 'Unknown')	*utf8_unic ode_ci*		Yes	*NULL*			First motion of the earthquake waveform
18	sd_evs_mag	float			Yes	*NULL*			Earthquake magnitude
19	sd_evs_energy	float			Yes	*NULL*		erg	Seismic energy
20	sd_evs_Emaxam	float			Yes	NULL			Maximum Amplitude of E-component
21	sd_evs_Nmaxam	float			Yes	NULL			Maximum Amplitude of N-component
22	sd_evs_Zmaxam	float			Yes	NULL			Maximum Amplitude of Z-component
23	sd_evs_Efreq	float			Yes	NULL			Frequency at max-amplitude of E-component
24	sd_evs_Nfreq	float			Yes	NULL			Frequency at max-amplitude of N-component

25	sd_evs_Zfreq	float			Yes	NULL			Frequency at max-amplitude of F-component
20	sd_evs_ori	enum('D', 'O')	*utf8_unic ode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
21	sd_evs_com	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
22	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
23	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
24	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
25	sd_evs_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	sd_evs_pubdate	datetime			Yes	*NULL*			the date the data become public
27	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
28	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_evs_id	A	No	
CODE	BTREE	No	No	sd_evs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.3. sd_int - Intensity

This table was created to store information about the intensities of events that may or may not have been recorded by a station.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_int_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Sismic intensity identifier
2	sd_int_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic intensity code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	sd_evn_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic network event identifier
5	sd_evs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Single station event identifier
6	sd_int_time	datetime			Yes	*NULL*			Time
7	sd_int_time_unc	datetime			Yes	*NULL*			Time uncertainty
8	sd_int_city	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			City
9	sd_int_maxdist	float			Yes	*NULL*		km	Maximum distance felt
10	sd_int_maxrint	float			Yes	*NULL*			Maximum reported intensity
11	sd_int_maxrint_dist	float			Yes	*NULL*		km	Distance at maximum reported intensity
12	sd_int_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
13	sd_int_com	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
14	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID

15	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
16	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
17	sd_int_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
18	sd_int_pubdate	datetime			Yes	*NULL*			the date the data become public
19	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
20	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_int_id	A	No	
CODE	BTREE	No	No	sd_int_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
sd_evn_id	sd_evn.sd_evn_id
sd_evs_id	sd_evs.sd_evs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.4. sd_trm - Tremor

This table contains information about tremor such as the time interval, qualitative depth, dominant frequency, amplitude range, and reduced displacement.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_trm_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic tremor identifier
2	sd_trm_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic tremor code
3	sn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Seismic network identifier
4	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic station identifier
5	sd_trm_stime	datetime			Yes	*NULL*			Start time
6	sd_trm_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
7	sd_trm_etime	datetime			Yes	*NULL*			End time
8	sd_trm_etime_unc	datetime			Yes	*NULL*			End time uncertainty
9	sd_trm_dur_day	float			Yes	*NULL*		min	Duration per day
10	sd_trm_dur_day _unc	float			Yes	*NULL*		min	Duration per day uncertainty
11	sd_trm_type	enum('G', 'M', 'H', 'C')			Yes	*NULL*			WOVOdat classification for the earthquake type (see
									Appendix 4 for more info)
12	sd_trm_qdepth	enum('D', 'I', 'S', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Qualitative depth: D=Deep (>10 km), I=Intermediate (410 km), S=Shallow (0-4 km), U =Unknown
13	sd_trm_domfreq1	float			Yes	*NULL*		Hz	Dominant frequency
14	sd_trm_domfreq2	float			Yes	*NULL*		Hz	Second dominant frequency
15	sd_trm_maxamp	float			Yes	*NULL*			Maximum amplitude
16	sd_trm_noise	float			Yes	*NULL*			Background noise level

17	sd_trm_reddis	float			Yes	*NULL*			Reduced displacement (as estimated using a station >5km from source)
18	sd_trm_rderr	float			Yes	*NULL*			Reduced displacement error
19	sd_trm_visact	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of associated visible activity
20	sd_trm_minamp	float			Yes	*NULL*			Minimum amplitude
21	sd_trm_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
22	sd_trm_com	varchar(255)	utf8_unicode_ci		Yes	NULL			Comments
23	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
24	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
25	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
26	sd_trm_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
27	sd_trm_pubdate	datetime			Yes	*NULL*			the date the data become public
28	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
29	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_trm_id	A	No	
CODE	BTREE	No	No	sd_trm_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.5. sd_ivl - Interval (swarm)

This table contains data about earthquakes that occur in specified time intervals, e.g., as seismic swarms.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_ivl_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic interval identifier
2	sd_ivl_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic interval code
3	sn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Seismic network identifier
4	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic station identifier
5	sd_ivl_eqtype	enum('R','Q','V','VT','VT_D','VT_S','H','H_HLF','H_LHF','LF','LF_LP','LF_T','LF_ILF','VLP','RF','E','U','O','X','G','PF','T','LP','HF','VH','VH_LC')			Yes	*NULL*			Earthquake type (see Appendix 4 for more info)
6	sd_ivl_stime	datetime			Yes	*NULL*			Start time
7	sd_ivl_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
8	sd_ivl_etime	datetime			Yes	*NULL*			End time
9	sd_ivl_etime_unc	datetime			Yes	*NULL*			End time uncertainty

10	sd_ivl_hdist	float			Yes	*NULL*		km	Horizontal distance from summit to swarm center
11	sd_ivl_avgdepth	float			Yes	*NULL*		m	Mean depth of the swarm earthquakes
12	sd_ivl_vdispers	float			Yes	*NULL*		km	Vertical dispersion(range) of depth over which the swarm earthquakes occurred
13	sd_ivl_hmigr_hyp	float			Yes	*NULL*		km	Horizontal migration of hypocenters from/to the summit (outward=positive; inward=negative)
14	sd_ivl_vmigr_hyp	float			Yes	*NULL*		km	Vertical migration of hypocenters (up=positive, down=negative)
15	sd_ivl_patt	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Temporal pattern (defined pattern)
16	sd_ivl_data	enum('L', 'C', 'H', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Data type: L=Located earthquakes, C=Detected by computer trigger algorithm, H=Hand counted, U=Unknown
17	sd_ivl_picks	enum('A', 'R', 'H', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Determination of picks: A=Automatic picker, R=Ruler, H=Human using a computer-based picker, U=Unknown
18	sd_ivl_felt_stime	datetime			Yes	*NULL*			Felt earthquake counts start time
19	sd_ivl_felt_stime_ unc	datetime			Yes	*NULL*			Felt earthquake counts start

									time uncertainty
20	sd_ivl_felt_etime	datetime			Yes	*NULL*			Felt earthquake counts end time
21	sd_ivl_felt_etime_ unc	datetime			Yes	*NULL*			felt earthquake counts end time uncertainty
22	sd_ivl_nrec	mediumint(6)		UNSIGNED	Yes	*NULL*			Number of recorded earthquakes
23	sd_ivl_nfelt	smallint(4)		UNSIGNED	Yes	*NULL*			Number of felt earthquakes
24	sd_ivl_etot_stime	datetime			Yes	*NULL*			Total seismic energy release (seismic moment) measurement start time
25	sd_ivl_etot_stime_ unc	datetime			Yes	*NULL*			Total seismic energy release measurement start time uncertainty
26	sd_ivl_etot_etime	datetime			Yes	*NULL*			Total seismic energy release measurement end time
27	sd_ivl_etot_etime_ unc	datetime			Yes	*NULL*			Total seismic energy release measurement end time uncertainty
28	sd_ivl_etot	float			Yes	*NULL*		$erg^{-0.5}$	Total seismic energy release
29	sd_ivl_fmin	float			Yes	NULL		Hz	Minimum frequency of recorded earthquake
30	sd_ivl_fmax	float			Yes	NULL		Hz	Maximum frequency of recorded earthquake
31	sd_ivl_amin	float			Yes	*NULL*			Minimum amplitude of recorded earthquake
32	sd_ivl_amax	float			Yes	*NULL*			Maximum amplitude of recorded earthquake

33	sd_ivl_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
34	sd_ivl_dmin	float			Yes	*NULL*			Minimum duration (in s)
35	sd_ivl_dmax	float			Yes	*NULL*			Maximum duration (in s)
36	sd_ivl_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
37	sd_ivl_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
38	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
39	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
40	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
41	sd_ivl_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
42	sd_ivl_pubdate	datetime			Yes	*NULL*			the date the data become public
43	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
44	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_ivl_id	A	No	
CODE	BTREE	No	No	sd_ivl_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	sn_id	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
sn_id	sn.sn_id
ss_id	ss.ss_id
cc_id	cc.cc_id

cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.6. sd_sam - RSAM-SSAM

This table stores information of the Real-time Seismic Amplitude Measurements (RSAM) and Seismic Spectral Amplitude measurements (SSAM); needed to define the boundaries of the RSAM/SSAM images/graph. The time series data needed to create the graph/image are stored in the individual RSAM(sd_rsm) and SSAM(sd_ssm) tables.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_sam_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Seismic RSAM-SSAM identifier
2	sd_sam_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Seismic RSAM-SSAM code
3	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic station identifier
4	sd_sam_stime	datetime			Yes	*NULL*			Start time
5	sd_sam_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
6	sd_sam_etime	datetime			Yes	*NULL*			End time
7	sd_sam_etime_unc	datetime			Yes	*NULL*			End time uncertainty
8	sd_sam_int	float			Yes	*NULL*		s	Counting interval
9	sd_sam_int_unc	float			Yes	*NULL*		s	Counting interval uncertainty
10	sd_sam_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O=

									original from observatory
11	sd_sam_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
12	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
13	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
14	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
15	sd_sam_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
16	sd_sam_pubdate	datetime			Yes	*NULL*			the date the data become public
17	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
18	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_sam_id	A	No	
CODE	BTREE	No	No	sd_sam_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ss_id	A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id

cc_id_load	cc.cc_id
cb_ids	cb.cb_id

D.6.a. sd_rsm - RSAM data

This table stores the RSAM time series data needed to create an RSAM image/graph defined in sd_sam table.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_rsm_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		RSAM data identifier
2	sd_sam_id	mediumint(8)		UNSIGNED	Yes	*NULL*			RSAM-SSAM image/graph identifier
3	sd_rsm_stime	datetime			Yes	*NULL*			Start time
4	sd_rsm_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
5	sd_rsm_count	float			Yes	*NULL*			RSAM count during this interval
6	sd_rsm_calib	float			Yes	*NULL*			Reduced displacement per 100 RSAM counts
7	sd_rsm_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
8	sd_rsm_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
9	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_rsm_id	A	No	
TIME	BTREE	Yes	No	sd_sam_id	A	Yes	
				sd_rsm_stime	A	Yes	

Links

Field	Link to
sd_sam_id	sd_sam.sd_sam_id
cc_id_load	cc.cc_id

D.6.b. sd_ssm - SSAM data

This table stores the SSAM time series data needed to create an SSAM image/graph defined in sd_sam table.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_ssm_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		SSAM data identifier
2	sd_sam_id	mediumint(8)		UNSIGNED	Yes	*NULL*			RSAM-SSAM image/graph identifier
3	sd_ssm_stime	datetime			Yes	*NULL*			Start time
4	sd_ssm_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
5	sd_ssm_lowf	float			Yes	*NULL*		Hz	Low frequency limit
6	sd_ssm_highf	float			Yes	*NULL*		Hz	High frequency limit
7	sd_ssm_count	float			Yes	*NULL*			SSAM count during this interval
8	sd_ssm_calib	float			Yes	*NULL*			Reduced displacement per 100 SSAM counts
9	sd_ssm_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
10	sd_ssm_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
11	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_ssm_id	A	No	
TIME AND FREQUENCY	BTREE	Yes	No	sd_sam_id	A	Yes	
				sd_ssm_stime	A	Yes	
				sd_ssm_lowf	A	Yes	

Links

Field	Link to
sd_sam_id	sd_sam.sd_sam_id
cc_id_load	cc.cc_id

D.7. sd_wav - Waveform

This table contains sample of waveforms to highlight common and uncommon events (network event or singlestation event or tremor event) at different volcanoes. This waveform table links to the event table.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	sd_wav_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Waveform identifier
2	sd_wav_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Waveform code
3	ss_id	mediumint(8)		UNSIGNED	Yes	*NULL*			seismic station identifier
4	sd_evn_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic event identifier
5	sd_evs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Single event identifier
6	sd_trm_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Seismic tremor identifier
7	sd_wav_arch	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Location of seismogram archive (institutional address)
8	sd_wav_link	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to archive (path/link to the image file)
9	sd_wav_dist	enum('P', 'I', 'D', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Distance from summit: P=Proximal (< 2 km), I=Intermediate (2-5 km), D=Distal (> 5 km), U=Unknown
10	sd_wav_img	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Image/file format of the waveform
11	sd_wav_info	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Background information
12	sd_wav_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of the waveform
13	sd_wav_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
14	sd_wav_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID

16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	sd_wav_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	sd_wav_pubdate	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	sd_wav_id	0	A	No	
CODE	BTREE	No	No	sd_wav_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	
STATION	BTREE	No	No	ss_id		A	Yes	
EVENT	BTREE	No	No	sd_evn_id		A	Yes	
EVENT TYPE	BTREE	No	No	sd_evs_id		A	Yes	

Links

Field	Link to
ss_id	ss.ss_id
sd_evn_id	sd_evn.sd_evn_id
sd_evs_id	sd_evs.sd_evs_id
sd_trm_id	sd_trm.sd_trm_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E. DEFORMATION MONITORING SYSTEM

E.1. cn - Common network (for Deformation network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty

12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	

CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E.2. ds - Deformation station

This table stores information such as a location, name, and description for stations where deformation or geodetic data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ds_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Deformation station identifier
2	ds_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Deformation station code
3	ds_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Deformation station name
4	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Deformation network identifier
5	ds_perm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
6	ds_nlat	double			Yes	*NULL*		°	Station latitude
7	ds_nlon	double			Yes	*NULL*		°	Station longitude
8	ds_nelev	float			Yes	*NULL*		m	Station elevation
9	ds_herr_loc	float			Yes	*NULL*			Horizontal precision of station location
10	ds_stime	datetime			No	0000-00-00 00:00:00			Start time
11	ds_stime_unc	datetime			Yes	*NULL*			Start time uncertainty

12	ds_etime	datetime			No	9999-12-31 23:59:59			End time
13	ds_etime_unc	datetime			Yes	*NULL*			End time uncertainty
14	ds_utc	float			Yes	*NULL*			Difference from UTC
15	ds_rflag	enum('Y', 'N')	*utf8_unicode_ci*		Yes	*NULL*			Reference station: Y=Yes, N=No
16	ds_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	ds_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
18	ds_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	ds_loaddate	datetime			Yes	*NULL*			the date the data was entered
									(in UTC)
23	ds_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ds_id	A	No	
CODE	BTREE	No	No	ds_code	A	Yes	

OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E.3. di_gen - General deformation instrument

This table stores information about each individual instrument.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	di_gen_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Deformation instrument identifier
2	di_gen_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Deformation instrument code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	cs_id	smallint(5)		UNSIGNED	Yes	Null			Satellite ID
5	di_gen_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Deformation instrument name
6	di_gen_type	enum('Angle', 'CGPS', 'EDM', 'EDM_Reflector', 'GPS', 'Total_Station', 'OtherTypes')			Yes	*NULL*			Deformation instrument type
7	di_gen_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Units measured
8	di_gen_res	float			Yes	*NULL*			instrument resolution
9	di_gen_stn	float			Yes	*NULL*			Signal to noise
10	di_gen_stime	datetime			No	0000-00-00 00:00:00			Start time
11	di_gen_stime_unc	datetime			Yes	*NULL*			Start time

									uncertainty
12	di_gen_etime	datetime			No	9999-12-31 23:59:59			End time
13	di_gen_etime_unc	datetime			Yes	*NULL*			End time uncertainty
14	di_gen_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	di_gen_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	di_gen_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
20	di_gen_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	di_gen_id	A	No	
CODE	BTREE	No	No	di_gen_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	

OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

E.4. di_tlt - Tilt/Strain instrument

This table stores information about each individual instrument and provides the necessary data to process raw data from the tilt and strain data tables.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	di_tlt_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tilt/strain instrument identifier
2	di_tlt_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Tilt/Strain instrument code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	di_tlt_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Tilt/Strain instrument name
5	di_tlt_type	enum('Tilt', 'Strain')	*utf8_unicode_ci*		Yes	*NULL*			Tilt/strain instrument type
6	di_tlt_depth	float			Yes	*NULL*		m	Depth
7	di_tlt_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Units measured
8	di_tlt_res	float			Yes	*NULL*			Resolution
9	di_tlt_dir1	float			Yes	*NULL*		°	Azimuth of direction 1 (or X for tiltmeter) 0-360°
10	di_tlt_dir2	float			Yes	*NULL*		°	Azimuth of direction 2 (or Y for tiltmeter) 0-360°
11	di_tlt_dir3	float			Yes	*NULL*		°	Azimuth of direction 3 (0360°)

12	di_tlt_dir4	float			Yes	*NULL*		°	Azimuth of direction 4 (0360°)
13	di_tlt_econv1	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 1
14	di_tlt_econv2	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 2
15	di_tlt_econv3	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 3
16	di_tlt_econv4	float			Yes	*NULL*		µrad/mV or µstrain/mV	Electronic conversion for component 4
17	di_tlt_stime	datetime			No	0000-00-00 00:00:00			Start time
18	di_tlt_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
19	di_tlt_etime	datetime			No	9999-12-31 23:59:59			End time
20	di_tlt_etime_unc	datetime			Yes	*NULL*			End time uncertainty
21	di_tlt_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
22	di_tlt_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
23	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
24	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
25	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
26	di_tlt_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
27	di_tlt_pubdate	datetime			Yes	*NULL*			the date the data

									become public
28	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
29	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	di_tlt_id	83	A	No	
CODE	BTREE	No	No	di_tlt_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F. DEFORMATION DATA

F.1. dd_tlt - Electronic tilt

This table contains tilt data that are either raw or processed. Most modern tilt data are collected electronically and continuously

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_tlt_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tilt data identifier
2	dd_tlt_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Tilt data code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier

4	di_tlt_id	smallint(5)		UNSIGNED	Yes	*NULL*			Tilt/Strain instrument identifier
5	dd_tlt_time	datetime			Yes	*NULL*			Measurement time
6	dd_tlt_timecsec	decimal(2,2)			Yes	*NULL*			Centisecond precision for measurement time
7	dd_tlt_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	dd_tlt_timecsec_u nc	decimal(2,2)			Yes	*NULL*			Centisecond precision for measurement time uncertainty
9	dd_tlt_srate	double			Yes	*NULL*		sec	Sampling rate
10	dd_tlt1	double			Yes	*NULL*		μrad	Tilt measurement 1 or X (positive is down to the north)
11	dd_tlt2	double			Yes	*NULL*		μrad	Tilt measurement 2 or Y (postive is down to the east)
12	dd_tlt_err1	double			Yes	*NULL*			Tilt 1 error
13	dd_tlt_err2	double			Yes	*NULL*			Tilt 2 error
14	dd_tlt_proc_flg	enum('P','R')	*utf8_unicode_ci*		Yes	*NULL*			Flag: P=Processed, R=Raw
15	dd_tlt_temp	Double			Yes	*NULL*			temperature
16	dd_tlt_bat	double			Yes	*NULL*			battery
17	dd_tlt_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
18	dd_tlt_com	Varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	dd_tlt_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	dd_tlt_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_tlt_id	A	No	
CODE	BTREE	No	No	dd_tlt_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
di_tlt_id	di_tlt.di_tlt_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.2. dd_tlv - Tilt vector

This table stores tilt information from sources where we do not have the raw or semi-processed data (i.e. the original data are no longer available) and only have access to tilt vectors.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_tlv_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Tilt vector data identifier
2	dd_tlv_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Tilt vector data code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deformation station identifier
4	di_tlt_id	smallint(5)		UNSIGNED	Yes	*NULL*			Tilt/Strain instrument identifier
5	dd_tlv_stime	datetime			Yes	*NULL*			Start time
6	dd_tlv_stime_unc	datetime			Yes	*NULL*			Start time

									uncertainty
7	dd_tlv_etime	datetime			Yes	*NULL*			End time
8	dd_tlv_etime_unc	datetime			Yes	*NULL*			End time uncertainty
9	dd_tlv_mag	float			Yes	*NULL*		µrad	Magnitude of the
10	dd_tlv_azi	float			Yes	*NULL*		°	Azimuth
11	dd_tlv_magerr	float			Yes	*NULL*		µrad	Magnitude error
12	dd_tlv_azierr	float			Yes	*NULL*		°	Azimuth error
13	dd_tlv_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
14	dd_tlv_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	dd_tlv_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	dd_tlv_pubdate	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment

PRIMARY	BTREE	Yes	No	dd_tlv_id	A	No	
CODE	BTREE	No	No	dd_tlv_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
di_tlt_id	di_tlt.di_tlt_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.3. dd_str - Strain

This table stores both raw and processed strainmeter data. The raw strain data are stored by component, as microstrain with a positive value for contraction and negative value for dilatation. The processed data i.e. volumetric strains are stored in this table in microstrain, shear strains is stored.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comm
1	dd_str_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Strain c identifie
2	dd_str_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Strain c code
3	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Deform station identifie
4	di_tlt_id	smallint(5)		UNSIGNED	Yes	*NULL*			Deform instrum identifie
5	dd_str_time	datetime			Yes	*NULL*			Measur time in UTC
6	dd_str_time_unc	datetime			Yes	*NULL*			Measur time uncerta
7	dd_str_comp1	double			Yes	*NULL*		µstr ain	Strainm compor (positiv contrac negativ dilatatic
8	dd_str_comp2	double			Yes	*NULL*		µstr ain	Strainm compor (positiv contrac negativ dilatatic

9	dd_str_comp3	double			Yes	*NULL*		µstr ain	Strainm compor (positive contrac negative dilatatio
10	dd_str_comp4	double			Yes	*NULL*		µstr ain	Strainm compor (positive contrac negative dilatatio
11	dd_str_err1	double			Yes	*NULL*		µstr ain	Strainm compor error
12	dd_str_err2	double			Yes	*NULL*		µstr ain	Strainm compor error
13	dd_str_err3	double			Yes	*NULL*		µstr ain	Strainm compor error
14	dd_str_err4	double			Yes	*NULL*		µstr ain	Strainm compor error
15	dd_str_vdstr	double			Yes	*NULL*		µstr ain	Volume strain c (positive contrac negative dilatatio
16	dd_str_vdstr_err	double			Yes	*NULL*		µstr ain	Volume strain c error
17	dd_str_sstr_ax1	double			Yes	*NULL*		µstr ain	Shear strain of axis 1 (gamma-1)
18	dd_str_azi_ax1	float			Yes	*NULL*		°	Azimuth of axis 1 (gamma-1) in degrees (0-360°); measured from North with clockwise rotation as positive
19	dd_str_sstr_ax2	double			Yes	*NULL*		µstr ain	Shear strain of axis 2 (gamma-2)
20	dd_str_azi_ax2	float			Yes	*NULL*		°	Azimuth of axis 2 (gamma-2) in degrees (0-360°); measured from North with clockwise rotation as positive

21	dd_str_sstr_ax3	double			Yes	*NULL*		µstrain	Shear strain of axis 3 (gamma-3)
22	dd_str_azi_ax3	float			Yes	*NULL*		°	Azimuth of axis 3 (gamma-3) in degrees (0-360°); measured from North with clockwise rotation as positive
23	dd_str_stderr1	double			Yes	*NULL*		µstrain	Strain for axis 1 uncertainty
24	dd_str_stderr2	double			Yes	*NULL*		µstrain	Strain for axis 2 uncertainty
25	dd_str_stderr3	double			Yes	*NULL*		µstrain	Strain for axis 3 uncertainty
26	dd_str_pmax	double			Yes	*NULL*		µstrain	Maximum principal strain
27	dd_str_pmaxerr	double			Yes	*NULL*		µstrain	Maximum principal strain uncertainty
28	dd_str_pmin	double			Yes	*NULL*		µstrain	Minimum principal strain
29	dd_str_pminerr	double			Yes	*NULL*		µstrain	Minimum principal strain uncertainty
30	dd_str_pmax_dir	float			Yes	*NULL*		°	Maximum principal strain direction
31	dd_str_pmax_direrr	float			Yes	*NULL*		°	Maximum principal strain direction uncertainty
32	dd_str_pmin_dir	float			Yes	*NULL*		°	Minimum principal strain direction
33	dd_str_pmin_direrr	float			Yes	*NULL*		°	Minimum principal strain direction uncertainty
34	dd_str_bpres	float			Yes	*NULL*		bar	Barometric pressure
35	dd_str_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
36	dd_str_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
37	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
38	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
39	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
40	dd_str_loaddate	datetime			Yes	*NULL*			the date the data was

									entered (in UTC)
41	dd_str_pubdate	datetime			Yes	*NULL*			the date the data become public
42	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
43	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_str_id	A	No	
CODE	BTREE	No	No	dd_str_code	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	

Links

Field	Link to
ds_id	ds.ds_id
di_tlt_id	di_tlt.di_tlt_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.4. dd_edm - EDM

This table contains Electronic Distance measurement (EDM) data that were collected between two stations, an instrument station and a target or reflector station. EDM is generally collected as part of a campaign but is also possible collected continuously.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_edm_id	mediumint(8)		UN-SIGNED	No	*None*	AUTO_INCREMENT		EDM data identifier
2	dd_edm_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			EDM data code
3	di_gen_id	mediumint(8)		UN-SIGNED	Yes	*NULL*			General deformation

									instrument identifier
4	ds_id1	mediumint(8)		UNSIGNED	Yes	*NULL*			EDM instrument station identifier
5	ds_id2	mediumint(8)		UNSIGNED	Yes	*NULL*			Target (refector/mirror) station identifier
6	dd_edm_time	datetime			Yes	*NULL*			Measurement time
7	dd_edm_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	dd_edm_line	double			Yes	*NULL*		m	Measured line length
9	dd_edm_cerr	float			Yes	*NULL*		m	Constant error (indicator of instrument and reflector error)
10	dd_edm_serr	float			Yes	*NULL*		ppm	Scale error (indicator of error in line length due to temperature and pressure)
11	dd_edm_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
12	dd_edm_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
13	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
14	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
15	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
16	dd_edm_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)

17	dd_edm_pubdate	datetime			Yes	*NULL*			the date the data become public
18	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
19	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_edm_id	A	No	
CODE	BTREE	No	No	dd_edm_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id1	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id1	ds.ds_id
ds_id2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.5. dd_ang - Angle

This table contains a few angles from early geodetic surveys where someone would stand on a high point (on top of a mountain) and measure the horizontal and vertical angles to prominent features in the area.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_ang_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Deformation angle data
2	dd_ang_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Deformation angle code
3	di_gen_id	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation

									instrument identifier
4	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Theodolite/total station instrument identifier
5	ds_id1	mediumint(8)		UNSIGNED	Yes	*NULL*			Target station 1 ID
6	ds_id2	mediumint(8)		UNSIGNED	Yes	*NULL*			Target station 2 ID
7	dd_ang_time	datetime			Yes	*NULL*			Measurement time
8	dd_ang_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
9	dd_ang_hort1	float			Yes	*NULL*		°	Horizontal angle to target 1, as measured by theodolite/total-station (0360°)
10	dd_ang_hort2	float			Yes	*NULL*		°	Horizontal angle to target 2, as measured by theodolite/total-station (0360°)
11	dd_ang_vert1	float			Yes	*NULL*		°	Vertical angle to target 1, as
									measured by theodolite/total-station (0360°)
12	dd_ang_vert2	float			Yes	*NULL*		°	Vertical angle to target 2, as measured by theodolite/total-station (0360°)
13	dd_ang_herr1	float			Yes	*NULL*		°	Error on horizontal angle to target-1
14	dd_ang_herr2	float			Yes	*NULL*		°	Error on horizontal angle to target-2
15	dd_ang_verr1	float			Yes	*NULL*		°	Error on vertical angle to target-1
16	dd_ang_verr2	float			Yes	*NULL*		°	Error on vertical angle to target-2
17	dd_ang_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
18	dd_ang_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments

19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	dd_ang_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	dd_ang_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_ang_id	A	No	
CODE	BTREE	No	No	dd_ang_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id	ds.ds_id
ds_id1	ds.ds_id
ds_id2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.6. dd_gps - GPS

This table contains continuous and periodic data of GPS positions, collected at a single station and referenced to other station(s).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments

1	dd_gps_id	mediumint(8)		UNSIGNED	No	*None*	AUTO AUTOINCRE		GPS data identifier
2	dd_gps_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			GPS data code
3	di_gen_id	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
4	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS station identifier
5	ds_id_ref1	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS reference station-1 identifier
6	ds_id_ref2	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS reference station-2 identifier
7	dd_gps_time	datetime			Yes	*NULL*			Measurement time
8	dd_gps_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
9	dd_gps_lat	double			Yes	*NULL*		°	GPS latitude measurement (+/-xx.xxxxxxxxx)
10	dd_gps_lon	double			Yes	*NULL*		°	GPS longitude measurement (+/-xx.xxxxxxxxx)
11	dd_gps_elev	double			Yes	*NULL*		m	Elevation above sea level
12	dd_gps_nserr	double			Yes	*NULL*		°	N-S error
13	dd_gps_ewerr	double			Yes	*NULL*		°	E-W error
14	dd_gps_verr	float			Yes	*NULL*		m	Vertical error
15	dd_gps_software	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			The software used to determine the position (e.g. GIPSY, BERNESE, GAM-IT, etc.)
16	dd_gps_orbits	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Orbits used to determine the positions
17	dd_gps_dur	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		min	Duration of the solution (frequency of measurement and duration of time used to calculate each position)
18	dd_gps_qual	enum('E', 'G', 'P', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Quality: E=Excellent, G=Good, P=Poor, U=Unknown
19	dd_gps_slope	float			Yes	*NULL*			Slope/distance/baseline change
20	dd_gps_errslope	float			Yes	*NULL*			Slope/distance/baseline error

21	dd_gps_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
22	dd_gps_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
23	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
24	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
25	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
26	dd_gps_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
27	dd_gps_pubdate	datetime			Yes	*NULL*			the date the data become public
28	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
29	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_gps_id	A	No	
CODE	BTREE	No	No	dd_gps_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id	ds.ds_id
ds_id_ref1	ds.ds_id
ds_id_ref2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.7. dd_gpv - GPS vector

This table contains displacement vectors that were computed from GPS data, processed from the actual position data. The displacement vector can be described in

terms of North-, East-, and Vertical displacement (mm). But it can be also described by displacement magnitude (mm), azimuth (0-360°), and vector inclination (0-90°).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_gpv_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		GPS vector data identifier
2	dd_gpv_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			GPS vector data code
3	di_gen_id	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
4	ds_id	mediumint(8)		UNSIGNED	Yes	*NULL*			GPS station identifier
5	dd_gpv_stime	datetime			Yes	*NULL*			Start time
6	dd_gpv_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
7	dd_gpv_etime	datetime			Yes	*NULL*			End time
8	dd_gpv_etime_unc	datetime			Yes	*NULL*			End time uncertainty
9	dd_gpv_dmag	float			Yes	*NULL*		mm	Displacement magnitude
10	dd_gpv_daz	float			Yes	*NULL*		°	Displacement azimuth (0360°)
11	dd_gpv_vincl	float			Yes	*NULL*		°	Inclination of displacement vector (0-90°)
12	dd_gpv_N	float			Yes	*NULL*		mm	North displacement
13	dd_gpv_E	float			Yes	*NULL*		mm	East displacement
14	dd_gpv_vert	float			Yes	*NULL*		mm	Vertical displacement
15	dd_gpv_dherr	float			Yes	*NULL*		mm	horizontal uncertainty
16	dd_gpv_dnerr	float			Yes	*NULL*		mm	North displacement uncertainty
17	dd_gpv_deerr	float			Yes	*NULL*		mm	East displacement uncertainty

18	dd_gpv_dverr	float			Yes	*NULL*		mm	Vertical uncertainty
19	dd_gpv_refFrame	varchar(30)	*utf8_unico de_ci*		Yes	*NULL*			Reference Frame
20	dd_gpv_projection	varchar(30)	*utf8_unico de_ci*		Yes	*NULL*			Projection name
21	dd_gpv_ellipsoid	varchar(30)	*utf8_unico de_ci*		Yes	*NULL*			Ellipsoid name
22	dd_gpv_datum	varchar(30)	*utf8_unico de_ci*		Yes	*NULL*			Datum name
23	dd_gpv_refPosLat	decimal(10, 0)			Yes	*NULL*		°	GPS Reference Position (Latitude)
24	dd_gpv_refPosLon	decimal(10, 0)			Yes	*NULL*		°	GPS Reference Position (Longitude)
25	dd_gpv_refPosElev	decimal(10, 0)			Yes	*NULL*		m	GPS Reference Position (Elevation)
26	dd_gpv_staVelNorth	decimal(10, 0)			Yes	*NULL*		mm/yr	GPS station velocity (North)
27	dd_gpv_staVelNorth Err	decimal(10, 0)			Yes	*NULL*		mm/yr	GPS station velocity error (North)
28	dd_gpv_staVelEast	decimal(10, 0)			Yes	*NULL*		mm/yr	GPS station velocity (East)
29	dd_gpv_staVelEastEr r	decimal(10, 0)			Yes	*NULL*		mm/yr	GPS station velocity error (East)
30	dd_gpv_staVelVert	decimal(10, 0)			Yes	*NULL*		mm/yr	GPS station velocity (Vertical)
31	dd_gpv_staVelVertEr r	decimal(10, 0)			Yes	*NULL*		mm/yr	GPS station velocity error (Vertical)
32	dd_gpv_data Type	varchar(255)	*utf8_unico de_ci*		Yes	*NULL*			Type of data, reflect data processing level
33	dd_gpv_arch	varchar(255)	*utf8_unico de_ci*		Yes	*NULL*			Data archive location

34	dd_gpv_software	text	*utf8_unico de_ci*		Yes	*NULL*			The software used to process data
35	dd_gpv_ori	enum('D', 'O')	*utf8_unico de_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
36	dd_gpv_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
37	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
38	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
39	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
40	dd_gpv_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
41	dd_gpv_pubdate	datetime			Yes	*NULL*			the date the data become public
42	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
43	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_gpv_id	A	No	
CODE	BTREE	No	No	dd_gpv_code	A	Yes	
STATION	BTREE	No	No	ds_id	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id

ds_id	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.8. dd_lev - Leveling

This table contains data of elevation changes between successive benchmarks on a leveling line.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_lev_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Leveling data identifier
2	dd_lev_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Leveling data code
3	di_gen_id	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
4	ds_id_ref	mediumint(8)		UNSIGNED	Yes	*NULL*			Reference benchmark ID
5	ds_id1	mediumint(8)		UNSIGNED	Yes	*NULL*			First benchmark (n) ID
6	ds_id2	mediumint(8)		UNSIGNED	Yes	*NULL*			Second benchmark (n+1) ID
7	dd_lev_ord	mediumint(9)			Yes	*NULL*			the order of the survey
8	dd_lev_class	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			the class of the survey
9	dd_lev_time	datetime			Yes	*NULL*			Survey date
10	dd_lev_time_unc	datetime			Yes	*NULL*			Survey date uncertainty
11	dd_lev_delev	float			Yes	*NULL*		mm	Elevation change from the first benchmark to the second benchmark
12	dd_lev_herr	float			Yes	*NULL*		mm	Elevation change uncertainty
13	dd_lev_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original

									from observatory
14	dd_lev_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	dd_lev_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	dd_lev_pubdate	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_lev_id	A	No	
CODE	BTREE	No	No	dd_lev_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ds_id_ref	A	Yes	

Links

Field	Link to
di_gen_id	di_gen.di_gen_id
ds_id_ref	ds.ds_id
ds_id1	ds.ds_id
ds_id2	ds.ds_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id

cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.9. dd_sar - InSAR image

This table contains information about radar interferograms that show deformation of volcanoes. Only select, processed interferograms are included in WOVOdat. A separate InSAR-Satellite (j_sarsat) relationship table is available for cases where different satellite were used. The data used to create the interferogram are stored in the InSAR data table (dd_srd).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_sar_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		InSAR image identifier
2	dd_sar_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			InSAR image code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	di_gen_id	mediumint(8)		UNSIGNED	Yes	*NULL*			General deformation instrument ID
5	cs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Satellite ID
6	dd_sar_slat	double			Yes	*NULL*		°	The latitude in the starting corner
7	dd_sar_slon	double			Yes	*NULL*		°	The longitude in the starting corner
8	dd_sar_spos	enum('BLC', 'TLC')	*utf8_unicode_ci*		Yes	*NULL*			Starting position: BLC=Bottom Left Corner, TLC=Top Left Corner
9	dd_sar_rord	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			the order of the row (e.g. left to right)
10	dd_sar_nrows	smallint(5)		UNSIGNED	Yes	*NULL*			The number of rows in the image
11	dd_sar_ncols	smallint(5)		UNSIGNED	Yes	*NULL*			The number of columns in the image
12	dd_sar_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			The units used in the image (e.g. mm)
13	dd_sar_ndata	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Null data value
14	dd_sar_loc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Location name of the image (e.g. Yellowstone)

15	dd_sar_pair	enum('P', 'S', 'U')	*utf8_unicode_ci*		Yes	*NULL*			A flag indicating if th eimage is composed of: P=Pair, S=Stacked, U=Unknown
16	dd_sar_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	dd_sar_dem	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			The DEM used
18	dd_sar_dord	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			The order in which the bytes are stored (e.g. big endian or little endian)
19	dd_sar_img1_time	datetime			Yes	*NULL*			Date-time of the image 1 was taken
20	dd_sar_img1_time_unc	datetime			Yes	*NULL*			Date of image 1 uncertainty
21	dd_sar_img2_time	datetime			Yes	*NULL*			Date-time of the image 2 was taken
22	dd_sar_img2_time_unc	datetime			Yes	*NULL*			Date of image 2 uncertainty
23	dd_sar_pixsiz	float			Yes	*NULL*		m	Pixel size
24	dd_sar_spacing	float			Yes	*NULL*		°	Spacing of rows and columns (in decimal degrees)
25	dd_sar_lookang	float			Yes	*NULL*		°	the look angle
26	dd_sar_limb	enum('ASC', 'DES')	*utf8_unicode_ci*		Yes	*NULL*			Limb: ASC=Ascending, DES=Descending
27	dd_sar_img_path	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link where the interferogram image is stored
28	dd_sar_geotiff	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link where the GeoTIFF of interferogram is stored
29	dd_sar_prometh	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Processing method
30	dd_sar_softwr	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Software used
31	dd_sar_dem_qual	enum('E', 'G', 'F', 'U')	*utf8_unicode_ci*		Yes	*NULL*			DEM quality: E=Excellent (1m), G=Good (10m), F=Fair (100m), U=Unknown
32	dd_sar_ori	enum('D', 'O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
33	dd_sar_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments

34	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
35	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
36	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
37	dd_sar_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
38	dd_sar_pubdate	datetime			Yes	*NULL*			the date the data become public
39	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
40	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_sar_id	A	No	
CODE	BTREE	No	No	dd_sar_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
cs_id	BTREE	No	No	cs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
di_gen_id	di_gen.di_gen_id
cs_id	cs.cs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

F.9.a. j_sarsat - InSAR-satellite junction

This table was created for the many-to-many relationship between the satellite data and the InSAR data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	j_sarsat_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR satellite junction ID
2	dd_sar_id	mediumint(8)		UNSIGNED	Yes	*NULL*			InSAR image ID

3	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite identifier
4	j_sarsat_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	j_sarsat_id	A	No	
LINK	BTREE	Yes	No	dd_sar_id	A	Yes	
				cs_id	A	Yes	

Links

Field	Link to
dd_sar_id	dd_sar.dd_sar_id
cs_id	cs.cs_id
cc_id_load	cc.cc_id

F.9.b. dd_srd - InSAR Data pixel

This table contains the data collected by two satellites to create an InSAR image.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_srd_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR data ID
2	dd_sar_id	mediumint(8)		UNSIGNED	Yes	*NULL*			InSAR image ID
3	dd_srd_numb	int(10)		UNSIGNED	Yes	*NULL*			pixel number
4	dd_srd_dchange	float			Yes	*NULL*		mm	Range of change
5	dd_srd_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
6	dd_srd_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
7	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	dd_srd_id	A	No	

PIXEL NUMBER	BTREE	Yes	No	dd_sar_id	A	Yes	
				dd_srd_numb	A	Yes	

Links

Field	Link to
dd_sar_id	dd_sar.dd_sar_id
cc_id_load	cc.cc_id

F.10. dd_srp- InSAR Data point

This table contains the data collected by two satellites to create an InSAR data point.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	dd_srp_id	mediumint(8)		UN-SIGNED	No	*None*	AUTO_INCREMENT		Iidentifier
2	dd_srp_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			InSAR data point code
3	vd_id	mediumint(8)		UN-SIGNED	Yes	*NULL*			Volcano ID
4	cs_id1	mediumint(8)		UN-SIGNED	Yes	*NULL*			Satellite ID
5	cs_id2	mediumint(8)		UN-SIGNED	Yes	*NULL*			Satellite ID
6	dd_sar_id	mediumint(8)		UN-SIGNED	Yes	*NULL*			InSAR ID
7	dd_srp_img1_time	datetime			Yes	*NULL*			Date-time of the image 1 was taken
8	dd_srp_img1_time_unc	datetime			Yes	*NULL*			Date of image 1 uncertainty
9	dd_srp_img2_time	datetime			Yes	*NULL*			Date-time of the image 2 was taken
10	dd_srp_img2_time_unc	datetime			Yes	*NULL*			Date of image 2 uncertainty
11	dd_srp_lat	double			Yes	*NULL*			Latitude coordinate
12	dd_srp_lon	double			Yes	*NULL*			Longitude coordinate
13	dd_srp_elev	double			Yes	*NULL*			Elevation (from DEM)
14	dd_srp_dchange	float			Yes	*NULL*			Observed LOS displacement/ change of distance
15	dd_srp_losVer	float			Yes	*NULL*			LOS Vertical Value

16	dd_srp_los Hor	float			Yes	*NULL*			LOS Horizontal Value
17	dd_srp_los East	float			Yes	*NULL*			LOS East Value
18	dd_srp_los North	float			Yes	*NULL*			LOS North Value
19	dd_srp_units	varchar(30)			Yes	*NULL*			Units
20	dd_srp_ori	enum('D','O')			Yes	*NULL*			A flag for source of data: D=digitized/ Bibliography, O=Original from observatory
21	dd_srp_com	varchar(255)			Yes	*NULL*			Comments
22	cc_id	smallint(5)		UN-SIGNED	Yes	*NULL*			First owner ID
23	cc_id2	smallint(5)		UN-SIGNED	Yes	*NULL*			Second owner ID
24	cc_id3	smallint(5)		UN-SIGNED	Yes	*NULL*			Third owner ID
25	dd_srp_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	cc_id_load	smallint(5)		UN-SIGNED	Yes	*NULL*			Loader ID, contact ID for the person who entered the data

Indexes

Keyname	Type	Column
PRIMARY	PRIMARY	dd_srp_id
CODE	UNIQUE	dd_srp_code cc_id

Links

Field	Link to
vd_id	vd.vd_id
cs _id1	cs.cs_id
cs_id2	cs.cs_id
dd_sar_id	dd_sar.dd_sar_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id

G. FIELDS MONITORING SYSTEM

G.1. cn - Common network (for Fields network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	Medium int(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID

18	cc_id3	smallint (5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint (5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

G.2. fs - Fields station

This table stores information and description of the stations where fields data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fs_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Fields satation identifier
2	fs_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Fields station code

3	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Fields network ID
4	fs_name	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Fields station name
5	fs_lat	double			Yes	*NULL*		°	Latitude
6	fs_lon	double			Yes	*NULL*		°	Longitude
7	fs_elev	float			Yes	*NULL*		m	Elevation
8	fs_inst	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of instruments
9	fs_utc	float			Yes	*NULL*			Difference from UTC
10	fs_stime	datetime			No	0000-00-00 00:00:00			Start date
11	fs_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
12	fs_etime	datetime			No	1999-12-31 23:59:00			End date
13	fs_etime_unc	datetime			Yes	*NULL*			End date uncertainty
14	fs_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
15	fs_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (D=digitized from references O=original from observatory)
16	fs_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
17	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
19	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	fs_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	fs_pubdate	datetime			Yes	*NULL*			the date the data become public
22	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
23	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fs_id	A	No	
CODE	BTREE	No	No	fs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

G.3. fi - Fields instrument

This table stores information about the instruments used to collect magnetic, electric, and gravity data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fi_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Fields instrument identifier
2	fi_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Fields instrument code
3	fs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	fi_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manu-facturer of the field instrument (recorder)
5	fi_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The type of instrument(s)
6	fi_res	float			Yes	*NULL*			The resolution of each individual instrument in the instrument package
7	fi_units	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The units each instrument measures
8	fi_rate	float			Yes	*NULL*			The sampling rate for the instrument(s)
9	fi_filter	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The filter type, if applicable
10	fi_orient	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The orientation of the instrument, if applicable
11	fi_calc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Any processing used to convert, clean or correct te raw data. Please note the correctios made.
12	fi_stime	datetime			No	0000-00-00 00:00:00			Start time
13	fi_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
14	fi_etime	datetime			No	1999-12-31 23:59:00			End time
15	fi_etime_unc	datetime			Yes	*NULL*			End time uncertainty
16	fi_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (D=digitized from references O=original from observatory)

17	fi_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	fi_loaddate	datetime			Yes	*NULL*			the date the data was entered
									(in UTC)
22	fi_pubdate	datetime			Yes	*NULL*			the date the data become public
23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fi_id	A	No	
CODE	BTREE	No	No	fi_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	fs_id	A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H. FIELDS DATA

H.1. fd_ele - Electric fields

This table contains electric data in digital form. There are two reference stations used for self potential (SP) observation, and single field instrument for all campaign data. If the bandpass filter used, enter the high value in the fd_ele_lpass and the low value in the fd_ele_hpass.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fd_ele_id	mediumint (8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Electric data identifier

2	fd_ele_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Electric data code
3	fs_id1	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier (reference station in which the electrode is subtracted, station A in the equation A-B)
4	fs_id2	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier (reference station in which the electrode being subtracted, station B in the equation AB)
5	fi_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields instrument identifier (for non-permanent/campaign)
6	fd_ele_time	datetime			Yes	*NULL*			Measurement time
7	fd_ele_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	fd_ele_field	float			Yes	*NULL*		mV	The electric field measurement
9	fd_ele_ferr	float			Yes	*NULL*		mV	electric field measurement uncertainty
10	fd_ele_dir	float			Yes	*NULL*		°	The direction from station-1 to station-2 (0-360° from North)
11	fd_ele_hpass	float			Yes	*NULL*		Hz	High pass filter frequency
12	fd_ele_lpass	float			Yes	*NULL*		Hz	Low pass filter frequency
13	fd_ele_spot	float			Yes	*NULL*		mV	Self potential between station A and B (1-2 or A-B)
14	fd_ele_spot_err	float			Yes	*NULL*		mV	Self potential uncertainty
15	fd_ele_ares	float			Yes	*NULL*		Ω m	Apparent resistivity
16	fd_ele_ares_err	float			Yes	*NULL*		Ω m	Apparent resistivity uncertainty
17	fd_ele_dres	float			Yes	*NULL*		Ω m	Direct resistivity
18	fd_ele_dres_err	float			Yes	*NULL*		Ω m	Direct resistivity uncertainty

19	fd_ele_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (D=digitized from references O=original from observatory)
20	fd_ele_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			First owner ID
21	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			the date the data was entered (in UTC)
24	fd_ele_loaddate	datetime			Yes	*NULL*			the date the data become public
25	fd_ele_pubdate	datetime			Yes	*NULL*			contact ID for the person who entered the data
26	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma
27	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to bibliography table

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_ele_id	A	No	
CODE	BTREE	No	No	fd_ele_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION 1	BTREE	No	No	fs_id1	A	Yes	

Links

Field	Link to
fs_id1	fs.fs_id
fs_id2	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H.2. fd_gra - Gravity

This table contains gravity data such as field strength and associated vertical displacement.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fd_gra_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Gravity data identfier
2	fd_gra_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			gravity data code
3	fs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	fs_id_ref	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields reference station ID for gravity measurement
5	fi_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Gravity fields instrument ID
6	fd_gra_time	datetime			Yes	*NULL*			Measurement time
7	fd_gra_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	fd_gra_fstr	double			Yes	*NULL*		Gal	Field strength
9	fd_gra_ferr	double			Yes	*NULL*		Gal	Strength uncertainty
10	fd_gra_vdisp	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Associated vertical displacement: Y=Yes, N=No, U=Unknown
11	fd_gra_gwater	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Associated change in groundwater level: Y=Yes, N=No, U=Unknown
12	fd_gra_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (D=digitized from references O=original from observatory)
13	fd_gra_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
14	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
15	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
16	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
17	fd_gra_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
18	fd_gra_pubdate	datetime			Yes	*NULL*			the date the data become public
19	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
20	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_gra_id	A	No	
CODE	BTREE	No	No	fd_gra_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	fs_id	A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
fs_id_ref	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H.3. fd_mag - Magnetic fields

This table contains magnetic data that were collected digitally.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fd_mag_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magnetic field trength ID
2	fd_mag_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magnetic field data code
3	fs_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	fs_id_ref	mediumint(8)		UNSIGNED	Yes	*NULL*			Magnetic reference station ID
5	fi_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Magnetic fields instrument ID
6	fd_mag_time	datetime			Yes	*NULL*			Measurement time
7	fd_mag_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
8	fd_mag_f	double			Yes	*NULL*		nT	The total magnetic field strength (F)
9	fd_mag_compx	double			Yes	*NULL*		nT	The X-component of magnetic field strength

10	fd_mag_compy	double			Yes	*NULL*		nT	The Y-component of magnetic field strength
11	fd_mag_compz	double			Yes	*NULL*		nT	The Z-component of magnetic field strength
12	fd_mag_ferr	float			Yes	*NULL*		nT	Total field strength uncertainty
13	fd_mag_errx	float			Yes	*NULL*		nT	uncertainty in the Xcomponent
14	fd_mag_erry	float			Yes	*NULL*		nT	uncertainty in the Ycomponent
15	fd_mag_errz	float			Yes	*NULL*		nT	uncertainty in the Zcomponent
16	fd_mag_highpass	float			Yes	*NULL*		Hz	High pass filter frequency
17	fd_mag_lowpass	float			Yes	*NULL*		Hz	Low pass filter frequency
18	fd_mag_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (D=digitized from references O=original from observatory)
19	fd_mag_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	fd_mag_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	fd_mag_pubdate	datetime			Yes	*NULL*			the date the data become public
25	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_mag_id	A	No	
CODE	BTREE	No	No	fd_mag_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	fs_id	A	Yes	

Links

Field	Link to
fs_id	fs.fs_id
fs_id_ref	fs.fs_id
fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

H.4. fd_mgv - Magnetic vector

This table contains magnetic vector data for which the data for the individual components is unavailable.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	fd_mgv_id	medium int(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magnetic vector identifier
2	fd_mgv_code	varchar (30)	*utf8_unicode_ci*		Yes	*NULL*			Magnetic vector code
3	fs_id	medium int(8)		UNSIGNED	Yes	*NULL*			Fields station identifier
4	fi_id	medium int(8)		UNSIGNED	Yes	*NULL*			Magnetic field instrument identifier
5	fd_mgv_time	datetime			Yes	*NULL*			Measurement time
6	fd_mgv_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
7	fd_mgv_dec	float			Yes	*NULL*		°	Measured declination (0-360°)
8	fd_mgv_incl	float			Yes	*NULL*		°	Measured inclination (0-360°)

9	fd_mgv_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			Source of data (D=digitized from references O=original from observatory)
10	fd_mgv_com	varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
11	cc_id	smallint (5)		UNSIGNED	Yes	*NULL*			First owner ID
12	cc_id2	smallint (5)		UNSIGNED	Yes	*NULL*			Second owner ID
13	cc_id3	smallint (5)		UNSIGNED	Yes	*NULL*			Third owner ID
14	fd_mgv_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
15	fd_mgv_pubdate	datetime			Yes	*NULL*			the date the data become public
16	cc_id_load	smallint (5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
17	cb_ids	varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	fd_mgv_id	0	A	No	
CODE	BTREE	No	No	fd_mgv_code		A	Yes	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	
STATION	BTREE	No	No	fs_id		A	Yes	

Links

Field	Link to
fs_id	fs.fs_id

fi_id	fi.fi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

I. GAS MONITORING SYSTEM

I.1. cn - Common network (gas network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC

13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to

vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

I.2. gs - Gas station

This table stores information such as a location, type of gas body monitored, and a description of the stations where gas data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gs_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Gas station identifier
2	gs_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Gas station code
3	gs_name	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Gas station name
4	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas network index
5	gs_lat	double			Yes	*NULL*		°	Latitude
6	gs_lon	double			Yes	*NULL*		°	Longitude
7	gs_elev	float			Yes	*NULL*		m	Elevation
8	gs_inst	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments installed in this site
9	gs_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of gas body found at the station (fumarole, diffuse soil degassing, remote plume)
10	gs_utc	float			Yes	*NULL*			Difference from UTC
11	gs_stime	datetime			No	0000-00-00 00:00:00			
12	gs_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
13	gs_etime	datetime			No	9999-12-31 23:59:59			
14	gs_etime_unc	datetime			Yes	*NULL*			End date uncertainty
15	gs_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
16	gs_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original

									from observatory
17	gs_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	gs_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	gs_pubdate	datetime			Yes	*NULL*			the date the data become public
23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gs_id	A	No	
CODE	BTREE	Yes	No	gs_code	A	Yes	
				cc_id	A	Yes	
				gs_stime	A	No	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

I.3. gi - Gas instrument

This table stores information about the instruments used to collect ground-based and remote gas data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gi_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		gas instrument identifier
2	gi_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Gas instrument code
3	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID, if the instrument is mounted on a satellite or airplane.
4	gs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station identifier
5	gi_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of instrument
6	gi_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the gas instrument (recorder)
7	gi_units	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Measured units
8	gi_pres	float			Yes	*NULL*			Resolution
9	gi_stn	float			Yes	*NULL*			Signal to noise
10	gi_calib	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Calibration
11	gi_stime	datetime			No	0000-00-00 00:00:00			Start date
12	gi_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
13	gi_etime	datetime			No	9999-12-31 23:59:59			End date
14	gi_etime_unc	datetime			Yes	*NULL*			End date uncertainty
15	gi_spatres	varchar(30)			Yes	NULL		km	Spatial resolution (nadir)
16	gi_ctsize	float			Yes	NULL		km	Cross track size
17	gi_atsize	float			Yes	NULL		km	Along track size

18	gi_swidth	float			Yes	NULL		km	Swath width (ground projection)
19	gi_tempres	varchar(30)			Yes	NULL			Temporal resolution (repeatability, return back to the same spot) [hours or days]
20	gi_rtime	varchar(30)			Yes	NULL			Return time (repeatability, return back to the exact spot with the same viewing angle) [hours or days]
21	gi_vangle	double			Yes	NULL			Angle of view from nadir
15	gi_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
16	gi_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
17	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
19	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	gi_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	gi_pubdate	datetime			Yes	*NULL*			the date the data become public

22	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
23	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gi_id	A	No	
CODE	BTREE	No	No	gi_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
SATELLITE	BTREE	No	No	cs_id	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
cs_id	cs.cs_id
gs_id	gs.gs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

J. GAS DATA

J.1. gd - Directly sampled gas

This table stores gas concentration data collected from a point source at ground sites. The type of point source is defined in the station table. Data include the gas temperature, concentrations, and environmental factors. Directly sampled gas can be collected either continuously or periodically. The species of gas reported can be from one of these possibilities:

- CO_2, SO_2, H_2S, HCl, HF, CH_4, H_2, CO, O_2 (in %w or %vol)
- $^3He/^4He$, $\delta^{13}C$, $\delta^{34}S$, $\delta^{18}O$, δD (in “per mil”)

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gd_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Directly sampled gas ID
2	gd_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Directly sampled gas code
3	gs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station identifier
4	gi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas instrument identifier
5	gd_time	datetime			Yes	*NULL*			Sampling/Measurement time
6	gd_time_unc	datetime			Yes	*NULL*			Sampling/Measurement time uncertainty
7	gd_gtemp	float			Yes	*NULL*		°C	Gas temperature
8	gd_bp	float			Yes	*NULL*		mbar	Atmospheric pressure at the time of the measurement
9	gd_flow	float			Yes	*NULL*			Measured gas emission rate
10	gd_species	enum('CO2', 'SO2', enum('CO2','SO2','H2S','HCl','HF','CH4','H2','CO','3He4He','d13C','d34S','d18O','dD','O 2')			Yes	*NULL*			Species or ratio of gas reported (CO_2, SO_2, H_2S, HCl, HF, CH_4, H_2, CO, O_2, $^3He/^4He$, $d^{13}C$, $d^{34}S$, $d^{18}O$, dD)
11	gd_waterfree_flag	enum('Y', 'N')	*utf8_unicode_ci*		Yes	*NULL*			Water free gas: Y=Yes, N=No
12	gd_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		%w or %vol or per mil	Reported units
13	gd_concentration	float			Yes	*NULL*			Gas concentration
14	gd_concentration_err	float			Yes	*NULL*			Gas concentration uncertainty
15	gd_recalc	enum('O', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Recalculated value: O=Original, R=Recalculated
16	gd_envir	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Environmental factors
17	gd_submin	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Information on sublimate minerals
18	gd_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
19	gd_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments

20	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	gd_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	gd_pubdate	datetime			Yes	*NULL*			the date the data become public
25	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gd_id	A	No	
CODE	BTREE	No	No	gd_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
gs_id	gs.gs_id
gi_id	gi.gi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

J.2. gd_plu - Plume

This table stores gas data collected (continuously or periodically) from a plume including the location of the vent, the height of the plume, and the gas emission rates.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gd_plu_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Gas plume data identifier
2	gd_plu_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Gas plume data code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	gd_plu_volc1	varchar(50)			Yes	NULL			Associated/neighbouring volcano (the SO2 satellite data might represent emission from other volcanoes)
5	gd_plu_volc2	varchar(50)			Yes	NULL			Associated/neighbouring volcano (the SO2 satellite data might represent emission from other volcanoes)
6	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID
7	gs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station ID
8	gi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas instrument ID
9	gd_plu_lat	double			Yes	*NULL*		°	Latitude of the vent in decimal degrees
10	gd_plu_lon	double			Yes	*NULL*		°	Longitude of the vent in decimal degrees
11	gd_plu_minboxlat	double			Yes	*NULL*			Minimum latitude of the area considered in the calculation
12	gd_plu_maxboxlat	double			Yes	NULL			Maximum latitude of the area considered in the calculation
13	gd_plu_minboxlon	double			Yes	NULL			Minimum longitude of the area considered in the calculation
14	gd_plu_maxboxlon	double			Yes	NULL			Maximum longitude of the area considered

									in the calculation
15	gd_plu_image	varchar(255)			Yes	NULL			Link to a file containing detail image about area of interest & brief synopsis
16	gd_plu_image_path	varchar(255)			Yes	NULL			Satellite Image
17	gd_plu_inter	varchar(255)			Yes	NULL			List of all possible interference sources of SO2 (pollution, other volcano eruption plume, copper smelter, cloud cover)
18	gd_plu_height	float			Yes	NULL		km	Height of the plume in km above the vent
19	gd_plu_hdet	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			the method used to measure the height
20	gd_plu_colheight	enum('TRL','TRM','STL')			Yes	*NULL*			Assumed SO2 column height
21	gd_plu_time	datetime			Yes	*NULL*			Measurement time in UTC
22	gd_plu_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
23	gd_plu_species	enum('CO2', 'SO2', 'H2S', 'HCl', 'HF', 'CO')	*utf8_unicode_ci*		Yes	*NULL*			Species of gas reported (CO_2, SO_2, H_2S, HCl, HF, and CO)
24	gd_plu_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		t/d or kg/s	Reported units
25	gd_plu_emit	float			Yes	*NULL*			Gas emision rate
26	gd_plu_mass	float			Yes	NULL			Gas mass (satellite)
27	gd_plu_ventmass	float			Yes	NULL			Gas mass at pixel where volcanic vent located (satellite)
28	gd_plu_maxmass	float			Yes	NULL			Gas mass at pixel where maximum SO2

									detected (satellite)
29	gd_plu_emit_err	float			Yes	*NULL*			Emission rate uncertainty
30	gd_plu_recalc	enum('O', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Recalculated value flag: O=Original(value directly from measurement), R=Recalculated(value recalculated from other parameter)
31	gd_plu_area	float							Gas plume coverage area
32	gd_plu_dist	float							Distance of maximum gas plume from the volcanic vent
33	gd_plu_dir	float							Direction of maximum gas plume from the volcanic vent
34	gd_plu_minwave	float							Minimum wavelength range (satellite)
35	gd_plu_maxwave	float							Maximum wavelength range (satellite)
36	gd_plu_spect	float							Spectral resolution (satellite)
37	gd_plu_tech	varchar(50)							The technique/algorithm used to calculate the gas plume emission/mass
38	gd_plu_wind	float			Yes	*NULL*		m/s	Wind speed
39	gd_plu_wsmin	Float			Yes	*NULL*		m/s	Minimum wind speed
40	gd_plu_wsmax	Float			Yes	*NULL*		m/s	Maximum wind speed
41	gd_plu_wdir	Varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		o	Dominant wind direction
42	gd_plu_weth	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Weather notes
43	gd_plu_etot	float							Total amount of daily emission
44	gd_plu_etot_err	float							Daily total amount uncertainty
45	gd_plu_etot_units	varchar(30)							Units of Total daily emission

46	gd_plu_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
47	gd_plu_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
48	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
49	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
50	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
51	gd_plu_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
52	gd_plu_pubdate	datetime			Yes	*NULL*			the date the data become public
53	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
54	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gd_plu_id	A	No	
CODE	BTREE	No	No	gd_plu_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cs_id	cs.cs_id
gs_id	gs.gs_id
gi_id	gi.gi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

J.3. gd_sol - Soil efflux

This table stores a daily total flux value for an individual gas species

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	gd_sol_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Soil Efflux data ID
2	gd_sol_code	varchar(30)	*utf8_u ni-code_ci*		Yes	*NULL*			Soil Efflux code
3	gs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas station ID
4	gi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Gas instrument ID
5	gd_sol_time	datetime			Yes	*NULL*			Measurement time
6	gd_sol_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
7	gd_sol_species	enum('CO2','SO2','H2S','HCl','HF','CH4','H2','CO','3He4He','d13C','d34S','d18O','dD','NH3','N2','Ar')	*utf8_u ni-code_ci*		Yes	*NULL*			Mesured species (CO_2, Radon, etc.)
8	gd_sol_tflux	float			Yes	*NULL*		t/d	Total flux
9	gd_sol_flux_err	float			Yes	*NULL*		t/d	Total flux uncertainty
10	gd_sol_pts	smallint(5)		UNSIGNED	Yes	*NULL*			Number of points
11	gd_sol_area	float			Yes	*NULL*		m_2	The area measured
12	gd_sol_high	float			Yes	*NULL*		$g/m^2/d$	Highest individual flux
13	gd_sol_temp	float			Yes	*NULL*		°C	Highest temperature

14	gd_sol_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Reported units
15	gd_sol_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
16	gd_sol_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
17	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
18	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*		m/s	Second owner ID
19	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
20	gd_sol_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
21	gd_sol_pubdate	datetime			Yes	*NULL*			the date the data become public
22	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
23	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	gd_sol_id	A	No	
CODE	BTREE	No	No	gd_sol_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	gs_id	A	Yes	

Links

Field	Link to
gs_id	gs.gs_id
gi_id	gi.gi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

K. HYDROLOGIC MONITORING SYSTEM

The hydrology section of WOVOdat contains water monitoring data that are collected from water wells, springs, or crater lakes, all broadly indicative of groundwater conditions and possible role of groundwater in volcanic unrest.

K.1. cn - Common network (Hydrologic network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network

									(from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id

cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

K.2. hs - Hydrologic station

This table stores information such as location, type of water body, and descriptions for stations where hydrologic data are collected. There are often multiple instruments at a station and some observatories may use an instrument at multiple stations; therefore the instrument will be linked directly to the hydrologic data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	hs_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrologic station ID
2	hs_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic station code
3	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic network ID
4	hs_lat	double			Yes	*NULL*		°	Latitude
5	hs_lon	double			Yes	*NULL*		°	Longitude
6	hs_elev	float			Yes	*NULL*		m	Elevation
7	hs_perm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
8	hs_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic station name
9	hs_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of water body (well, lake, spring, etc.)
10	hs_utc	float			Yes	*NULL*			Difference from UTC
11	hs_tscr	float			Yes	*NULL*		m	Top of screen (top of the interval open to inflow in meter below the surface)
12	hs_bscr	float			Yes	*NULL*		m	Bottom of screen

									(top of the interval open to inflow in meter below the surface)
13	hs_tdepth	double			Yes	*NULL*		m	Total depth of well
14	hs_stime	datetime			No	0000-00-00 00:00:00			Start date
15	hs_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
16	hs_etime	datetime			No	9999-12-31 23:59:59			End date
17	hs_etime_unc	datetime			Yes	*NULL*			End date uncertainty
18	hs_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
19	hs_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
20	hs_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
21	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
22	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
23	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
24	hs_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
25	hs_pubdate	datetime			Yes	*NULL*			the date the data become public
26	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
27	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table

									(cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	hs_id	A	No	
CODE	BTREE	No	No	hs_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

K.3. hi - Hydrologic instrument

This table stores information about each individual hydrologic instrument.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	hi_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrologic instrument identifier
2	hi_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic instrument code
3	hs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic station identifier
4	hi_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the hydrologic instrument (recorder)
5	hi_type	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Type of the instrument
									(float, pressure transducer, bubbler, rain gauge, barometer, flow meter, pH or conductivity meter)
6	hi_meas	enum('A', 'V')	*utf8_unicode_ci*		Yes	*NULL*			Pressure measurement type: A=Absolute,

									V=Vented(gauge)
7	hi_units	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Measured units
8	hi_res	float			Yes	*NULL*			Measurement resolution/precision
9	hi_stime	datetime			No	0000-00-00 00:00:00			Start date
10	hi_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
11	hi_etime	datetime			No	9999-12-31 23:59:59			End date
12	hi_etime_unc	datetime			Yes	*NULL*			End date uncertainty
13	hi_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	hi_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	hi_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	hi_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
20	hi_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	hi_id	A	No	
CODE	BTREE	No	No	hi_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	hs_id	A	Yes	

Links

Field	Link to
hs_id	hs.hs_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

L. HYDROLOGIC DATA

L.1. hd - Hydrologic data

This table stores all of the water data including temperature, water depth, and concentrations. The data are collected either continuously or periodically as part of a campaign. The most common campaign data are water levels, temperature, pH, and conductance, but but chemical concentrations can also be included.
Type of compound, kation, anion or ratio could have one of the following possibilities: SO_4, H_2S for total sulfide, Cl^-, F^-, HCO_3^-, Mg, Fe, Ca, Na, K, R_2O_3, SiO_2, Free CO_2, B, As, Li, Ba, Al (in mg/L), $^3He/^4He$, $^3He/^4He$ corrected, for corrected ratio from air contamination, $\delta^{13}C$, $\delta^{34}S$, δD, $\delta^{18}O$ (in per mil).

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	hd_id	Mediumint (8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Hydrologic data ID
2	hd_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hydrologic data code
3	hs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic station ID
4	hi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Hydrologic instrument ID
5	hd_time	datetime			Yes	*NULL*			Measurement time
6	hd_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
7	hd_temp	float			Yes	*NULL*		°C	Water temperature
8	hd_welev	double			Yes	*NULL*		m	The elevation of the water level above sea level
9	hd_wdepth	double			Yes	*NULL*		m	Water depth below the ground surface
10	hd_dwlev	double			Yes	*NULL*		m	Change in water level (if the water depth and

									water elevation are not available)
11	hd_bp	float			Yes	*NULL*		mbar	Barometric pressure at the time of measurement
12	hd_sdisc	double			Yes	*NULL*		L/s	Spring discharge rate
13	hd_prec	float			Yes	*NULL*		mm	measured precipitation (daily)
14	hd_dprec	float			Yes	*NULL*		mm	Daily precipitation of preceeding day
15	hd_tprec	enum('R', 'FR', 'S', 'H', 'R-FR', 'R-S', 'R-H', 'FR-R', 'FR-S', 'FR-H', 'S-R', 'S-FR', 'S-H', 'H-R', 'H-FR', 'H-S')			Yes	*NULL*			Type of precipitation: R=Rain, FR=Freezing Rain, S=Snow, H=Hail, or any combination
16	hd_ph	float			Yes	*NULL*			pH of the water
17	hd_ph_err	float			Yes	*NULL*			pH standard error
18	hd_cond	float			Yes	*NULL*		μmhos/cm or μSiemens/cm	Conductivity
19	hd_cond_err	float			Yes	*NULL*		μmhos/cm or μSiemens/cm	Conductivity standard error
20	hd_comp_species	enum('SO4', 'H2S', 'Cl', 'F', 'HCO3', 'Mg', 'Fe', 'Ca', 'Na', 'K', '3He4He', 'c3He4He', 'd13C', 'd34S', 'dD', 'd18O')			Yes	*NULL*			Type of compound, kation, anion or ratio
21	hd_comp_units	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		mg/L or per mil	Reported units (concentrations of common ions in mg/L or per mil)

22	hd_comp_co ntent	float			Yes	*NULL*			Content of compound, kation, anion or ratio
23	hd_comp_co ntent_err	float			Yes	*NULL*			Content of compound, kation, anion or ratio error
24	hd_atemp	Float			Yes	*NULL*		°C	Air temperture
25	hd_tds	Float			Yes	*NULL*		mg/L	Total dissolved solids (TDS)
26	hd_temp_err	Float			Yes	NULL			Uncertainty of water tepmerature
27	hd_welev_err	Float			Yes	NULL			Uncertainty of the elevation of the water level
28	hd_wdepth_err	Float			Yes	NULL			Uncertainty of water depth
29	hd_dwlev_err	Float			Yes	NULL			Change in water level uncertainty
30	hd_bp_err	Float			Yes	NULL			Barometric pressure uncertainty
31	hd_sdisc_err	Float			Yes	NULL			Spring discharge rate uncertainty
32	hd_prec_err	Float			Yes	NULL			Measured precipitation uncertainty (daily)
33	hd_dprec_err	Float			Yes	NULL			Uncertainty of the daily precipitation of preceding day
34	hd_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
35	hd_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
36	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
37	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
38	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID

39	hd_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
40	hd_pubdate	datetime			Yes	*NULL*			the date the data become public
41	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
42	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	hd_id	77137	A	No	
CODE	BTREE	No	No	hd_code	77137	A	Yes	
OWNER 1	BTREE	No	No	cc_id	1	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	77137	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	77137	A	Yes	
STATION	BTREE	No	No	hs_id	22	A	Yes	

Links

Field	Link to
hs_id	hs.hs_id
hi_id	hi.hi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

M. THERMAL MONITORING SYSTEM

Thermal tables contain ground-based data collected at the thermal site or image data collected remotely. These data can be collected continuously or periodically.

M.1. cn - Common network (Thermal network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknown			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network (from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID

19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data List of cb_ids, link to bibliography table (cb), separated by a comma
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

M.2. ts - Thermal station

This table stores information such as a location, name, and a description for stations where thermal data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ts_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Thermal station ID
2	ts_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal station code
3	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal network ID

4	ts_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal station or benchmark name
5	ts_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of thermal feature at the site (e.g. soil, fumarole, surface or crack in a dome, spring, crater lake, etc.) or if the station is used to collect remote image data.
6	ts_ground	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Soil or ground type
7	ts_lat	float			Yes	*NULL*		°	Latitude
8	ts_lon	float			Yes	*NULL*		°	Lontitude
9	ts_elev	float			Yes	*NULL*		m	Elevation
10	ts_perm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
11	ts_utc	float			Yes	*NULL*			Difference from UTC (- for hours before or ahead of GMT)
12	ts_stime	datetime			No	0000-00-00 00:00:00			Start date
13	ts_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
14	ts_etime	datetime			No	9999-12-31 23:59:59			End date
15	ts_etime_unc	datetime			Yes	*NULL*			End date uncertainty
16	ts_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
17	ts_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
18	ts_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID

22	ts_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
23	ts_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ts_id	A	No	
CODE	BTREE	No	No	ts_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

M.3. ti - Thermal instrument

This table was created to store information about the instruments used to collect ground-based and remote thermal data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ti_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Thermal instrument ID
2	ti_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal instrument code
3	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite identifier (for

									isntrument mounted on a satellite or airplane)
4	ts_id	smallint (5)		UNSIGNED	Yes	*NULL*			Thermal station ID (for instruments installed at a station)
5	ti_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of instrument
6	ti_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, manufacturer, and model of th einstrument.
7	ti_units	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			the units the instrument measures
8	ti_pres	float			Yes	*NULL*			typical instrumental measuring precission
9	ti_stn	float			Yes	*NULL*			Signal to noise ratio of the instrument
10	ti_stime	datetime			No	0000-00-00 00:00:00			Start date
11	ti_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
12	ti_etime	datetime			No	9999-12-31 23:59:59			End date
13	ti_etime_unc	datetime			Yes	*NULL*			End date uncertainty
14	ti_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data.

									D=digitized, O= original from observatory
15	ti_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	ti_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
20	ti_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ti_id	A	No	
CODE	BTREE	No	No	ti_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ts_id	A	Yes	
SATELLITE	BTREE	No	No	cs_id	A	Yes	

Links

Field	Link to
cs_id	cs.cs_id
ts_id	ts.ts_id
cc_id	cc.cc_id

cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N. THERMAL DATA

Thermal image data can be collected from an instrument mounted to a moving object e.g. satellite or airplane (thermal image table link to cs_id) or mounted to a stationary object e.g. caldera rim, observatory roof, etc.(thermal image table link to ts_id).

N.1. td - Ground-based thermal data

This table stores all non-image of the thermal data collected on the ground. This data can be collected continuously or periodically.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	td_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Ground-based thermal data
2	td_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Ground based thermal code
3	ts_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal station ID
4	ti_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal instrument ID
5	td_mtype	enum('Temperature','Temperature Above Background','Soil Temperature','Radiance','Radiance Power')	*utf8_unicode_ci*		Yes	*NULL*			Measurement type (e.g. thermocouple, thermal IR, etc.)
6	td_units	varchar(30)			Yes	*NULL*			Units
7	td_time	datetime			Yes	*NULL*			Measurement time
8	td_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty

9	td_depth	float			Yes	*NULL*		m	Depth of measurement below the ground surface (to derive geothermal gradients and/or heat flux)
10	td_distance	float			Yes	*NULL*		m	Distance from instrument to the measured object
11	td_calc_flag	enum('O', 'R')	*utf8_unicode_ci*		Yes	*NULL*			Recalculated value flag: O=Original/directly measured, R=Recalculated from other parameter
12	td_temp	float			Yes	*NULL*		°C	Measured temperature
13	td_terr	float			Yes	*NULL*		°C	Temperature standard error
14	td_aarea	float			Yes	*NULL*		m_2	Approximate area of the body measured
15	td_flux	float			Yes	*NULL*		W/m^2	Heat flux
16	td_ferr	float			Yes	*NULL*		W/m^2	Heat flux standard error
17	td_bkgg	float			Yes	*NULL*		°C/km	Background geothermal gradient
18	td_tcond	float			Yes	*NULL*		$W/(m^2$ °C)	Thermal conductivity at the station/measurement point, inferred from the soil type or measured intrinsically.
19	td_cond_err				Yes	*NULL*			Thermal conductivity uncertainty
20	td_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized,

									O= original from observatory
21	td_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
22	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
23	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
24	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
25	td_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	td_pubdate	datetime			Yes	*NULL*			the date the data become public
27	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
28	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	td_pix_id	A	No	
LAT/LON	BTREE	Yes	No	td_img_id	A	Yes	
				td_pix_lat	A	Yes	
				td_pix_lon	A	Yes	

Links

Field	Link to
td_img_id	td_img.td_img_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N.2. td_img - Thermal image

This table contains data collected from space, the air, or the ground that are used to create thermal images. The actual pixel-by-pixel data of the image are stored in the Thermal image data table (td_pix).

#	Column	Type	Collation	Attributes	Null	Default		Unit	Comments
1	td_img_id	smallint(5)		UNSIGNED	No	*None*		AUTO_INCREMENT	Thermal image ID
2	td_img_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Thermal image code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID
5	ts_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal station ID
6	ti_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal instrument ID
7	td_img_iplat	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of instrument platform (e.g. airplane, satellite, crater rim, etc.)
8	td_img_ialt	float			Yes	*NULL*		m	Instrument altitude
9	td_img_ilat	float			Yes	*NULL*		°	Instrument latitude
10	td_img_ilon	float			Yes	*NULL*		°	Instrument longitude
11	td_img_idatum	Varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Datum used for latitude or longitude
12	td_img_desc	Varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description of the image
13	td_img_time	datetime			Yes	*NULL*			Time of the image was taken
14	td_img_time_unc	datetime			Yes	*NULL*			Time uncertainty
15	td_img_bname	Varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Band name (each band separated by coma)

16	td_img_hbwave	float			Yes	*NULL*		μm	High band wavelength
17	td_img_lbwave	float			Yes	*NULL*		μm	Low band wavelength
18	td_img_path	blob		BINARY	Yes	*NULL*			Directory path/link where the image is stored
19	td_img_psize	float			Yes	*NULL*		m	Pixel size of the image
20	td_img_maxrad	float			Yes	*NULL*		$W/(m^2\text{-}m) \times 10^7$	Maximum radiance of any pixel in the frame
21	td_img_maxrrad	float			Yes	*NULL*		$W/(m^2\text{-}m \times sr) \times 10^7$	Maximum relative radiance (sr is spectral radiance, wavelength dependent)
22	td_img_maxtemp	float			Yes	*NULL*		°C	Temperature of the hottest pixel
23	td_img_totrad	float			Yes	*NULL*		$W/(m^2\text{-}m) \times 10^7$	Total radiance in the whole surface of the frame (integration of all pixel radiances)
24	td_img_maxflux	float			Yes	*NULL*		W/m^2	Maximum heat flux
25	td_img_ntres	float			Yes	*NULL*		°C	Nominal temperature esolution (per pixel)
26	td_img_atmcorr	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Atmospheric correction procedure/ method applied
27	td_img_thmcorr	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Thermal correction procedure/ method applied

									using ground truth points
28	td_img_ortho	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of orthorectification procedure used
29	td_img_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
30	td_img_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
31	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
32	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
33	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
34	td_img_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
35	td_img_pubdate	datetime			Yes	*NULL*			the date the data become public
36	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
37	cb_ids	Varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	td_img_id	A	No	
CODE	BTREE	No	No	td_img_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	

OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ts_id	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cs_id	cs.cs_id
ts_id	ts.ts_id
ti_id	ti.ti_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N.3. td_pix - Thermal pixel data

This table contains data for each pixel of a thermal image.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	td_pix_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Image data ID
2	td_img_id	smallint(5)		UNSIGNED	Yes	*NULL*			Thermal image ID
3	td_pix_elev	float			Yes	*NULL*		m	Elevation of the pixel center
4	td_pix_lat	float			Yes	*NULL*		°	Latitude of the pixel center
5	td_pix_lon	float			Yes	*NULL*		°	Longitude of the pixel center
6	td_pix_rad	float			Yes	*NULL*		$W/(m^2\text{-}m) \times 10^7$	Pixel radiance
7	td_pix_flux	float			Yes	*NULL*		W/m^2	Pixel heat flux
8	td_pix_temp	float			Yes	*NULL*		°C	Pixel temperature
9	td_pix_com	Varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
10	td_pix_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)

11	cc_id_load	Smallint (5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	td_pix_id	A	No	
LAT/LON	BTREE	Yes	No	td_img_id	A	Yes	
				td_pix_lat	A	Yes	
				td_pix_lon	A	Yes	

Links

Field	Link to
td_img_id	td_img.td_img_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

O. METEOROLOGICAL MONITORING SYSTEM

This section of WOVOdat contains meteorological monitoring data that are collected from available meteorological station around the volcano, to support other monitoring data and possible indication of volcanic unrest.

O.1. cn - Common network (Meteo network)

This table contains information about the (non-seismic) network of stations that collect data at a particular site, in general at one volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cn_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Common network identifier
2	cn_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Common network code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano identifier
4	cn_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Common network name
5	cn_type	enum('Deformation','Fields','Gas','Hydrologic','Thermal','Meteo','Unknown')			No	Unknow			Common network type
6	cn_area	float			Yes	*NULL*		km^2	Network area coverage
7	cn_map	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Path/link to the Map of the network

									(from observatory)
8	cn_stime	datetime			No	0000-00-00 00:00:00			Start time
9	cn_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
10	cn_etime	datetime			No	9999-12-31 23:59:59			End time
11	cn_etime_unc	datetime			Yes	*NULL*			End time uncertainty
12	cn_utc	float			Yes	*NULL*			Difference from UTC
13	cn_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
14	cn_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cn_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cn_loaddate	datetime			No	*None*			the date the data was entered (in UTC)
20	cn_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cn_id	A	No	
CODE	BTREE	No	No	cn_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
TYPE	BTREE	No	No	cn_type	A	No	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id

cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

N.2. ms - Meteo station

This table stores information such as location, and descriptions for stations where meteorological data are collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ms_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Meteorological station ID
2	ms_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteorological station code
3	cn_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteorology network ID
4	ms_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteorology station name
5	ms_lat	double			Yes	*NULL*		°	Latitude
6	ms_lon	double			Yes	*NULL*		°	Longitude
7	ms_elev	float			Yes	*NULL*		m	Elevation
8	ms_perm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of permanent instruments
9	ms_type	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Type of station (airport, local, regional, observatory, etc.)
10	ms_stime	datetime			No	0000-00-00 00:00:00			Start date
11	ms_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
12	ms_etime	datetime			No	9999-12-31 23:59:59			End date
13	ms_etime_unc	datetime			Yes	*NULL*			End date uncertainty
14	ms_utc	float			Yes	*NULL*			Difference from UTC
15	ms_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
16	ms_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from

									observatory
17	ms_com	Varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
19	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
20	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
21	ms_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
22	ms_pubdate	datetime			Yes	*NULL*			the date the data become public
23	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
24	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ms_id	A	No	
CODE	BTREE	No	No	ms_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
NETWORK	BTREE	No	No	cn_id	A	Yes	

Links

Field	Link to
cn_id	cn.cn_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

O.3. mi - Meteo instrument

This table stores information about each individual meteorological instrument. The instruments are either permanently or temporarily installed as part of a campaign.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	mi_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Meteorological instrument identifier
2	mi_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteorological instrument code
3	ms_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteorological station identifier
4	mi_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			The name, model, and manufacturer of the meteorological instrument (recorder)
5	mi_type	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Type of the instrument (rain gauge, windvane, anemometer, arometer or air pressure sensor, thermometer, soil thermometer, etc.)
6	mi_units	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Measured units
7	mi_res	float			Yes	*NULL*			Measurement resolution/precision
8	mi_stime	datetime			No	0000-00-00 00:00:00			Start date
9	mi_stime_unc	datetime			Yes	*NULL*			Start date uncertainty
10	mi_etime	datetime			No	9999-12-31 23:59:59			End date
11	mi_etime_unc	datetime			Yes	*NULL*			End date uncertainty
12	mi_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
13	mi_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original

									from observatory
14	mi_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
16	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
17	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
18	mi_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
19	mi_pubdate	datetime			Yes	*NULL*			the date the data become public
20	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
21	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	mi_id	1	A	No	
OWNER 1	BTREE	No	No	cc_id		A	Yes	
OWNER 2	BTREE	No	No	cc_id2		A	Yes	
OWNER 3	BTREE	No	No	cc_id3		A	Yes	
STATION	BTREE	No	No	ms_id		A	Yes	

Links

Field	Link to
ms_id	ms.ms_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

P. METEOROLOGICAL DATA

P.1. med - Meteo data

This table stores all of the meteo data including precipitation, wind speed, wind direction, air temperature, soil temperature, barometric pressure, and humidity. The data are collected either continuously or periodically as part of a campaign.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	med_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Meteo data ID
2	med_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Meteo data code
3	ms_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteo station ID
4	mi_id	smallint(5)		UNSIGNED	Yes	*NULL*			Meteo instrument ID
5	med_time	datetime			Yes	*NULL*			Measurement time
6	med_time_unc	datetime			Yes	*NULL*			Measurement time uncertainty
7	med_temp	float			Yes	*NULL*		°C	air temperature
8	med_stemp	float			Yes	*NULL*		°C	soil temperature
9	med_bp	float			Yes	*NULL*		mbar	Barometric pressure at the time of measurement
10	med_prec	float			Yes	*NULL*		mm	measured precipitation (daily)
11	med_tprec	enum('R', 'FR', 'S', 'H', 'R-FR', 'R-S', 'R-H', 'FR-R', 'FR-S', 'FR-H', 'S-R', 'S-FR', 'S-H', 'H-R', 'H-FR', 'H-S')			Yes	*NULL*			Type of precipitation: R=Rain, FR=Freezing Rain, S=Snow, H=Hail, or any combination
12	med_hd	float			Yes	*NULL*		%	humidity
13	med_wind	float			Yes	*NULL*		m/s	Wind speed
14	med_wsmin	float			Yes	*NULL*		m/s	Minimum wind speed

15	med_wsmax	float			Yes	*NULL*		m/s	Maximum wind speed
16	med_wdir	varchar(30)			Yes	*NULL*			Wind direction
17	med_clc	float			Yes	*NULL*			Cloud coverage
18	med_temp_unc	float			Yes	NULL			Air temperature uncertainty
19	med_stemp_unc	float			Yes	NULL			Soil temperature uncertainty
20	med_bp_unc	float			Yes	NULL			Barometric pressure uncertainty
21	med_prec_unc	float			Yes	NULL			Daily precipitation uncertainty
22	med_hd_unc	float			Yes	NULL			Humidity uncertainty
23	med_wind_unc	float			Yes	NULL			Wind speed uncertainty
24	med_wsmin_unc	float			Yes	NULL			Minimum wind speed uncertainty
25	med_wsmax_unc	float			Yes	NULL			Maximum wind speed uncertainty
26	med_wdir_unc	float			Yes	NULL			Wind direction uncertainty
27	med_clc_unc	float			Yes	NULL			Cloud coverage uncertainty
28	med_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
29	med_com	varchar(255)	*utf8_unicode_ci*		Yes	*NLLL*			Comments
30	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
31	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID

32	cc_id3	smallint (5)		UNSIGNED	Yes	*NULL*			Third owner ID
33	med_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
34	med_pubdate	datetime			Yes	*NULL*			the date the data become public
35	cc_id_load	smallint (5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
36	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	med_id	A	No	
CODE	BTREE	No	No	med_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ms_id	A	Yes	

Links

Field	Link to
ms_id	ms.ms_id
mi_id	mi.mi_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q. INFERRED PROCESSES

This tables were created to store historical inferences about processes causing volcanic unrest, based mostly on published references. Each of the inferred process

fields should express in a one-character flag (Y for yes, N for no, M for maybe, and U for unknown or no information).

Q.1. ip_hyd - Hydrothermal system interaction

This table stores information about magmatic interactions with the hydrothermal system

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ip_hyd_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Hydrothermal data ID
2	ip_hyd_cod e	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Hdrothermal data code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	ip_hyd_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_hyd_time _unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_hyd_star t	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_hyd_star t_unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_hyd_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_hyd_end _unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_hyd_gwa ter	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Convective heating of groundwater: Y=Yes, N=No, M=Maybe, U=Unknown
11	ip_hyd_ipor	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Destabilization of edifice by pore pressure increase: Y=Yes, N=No, M=Maybe, U=Unknown
12	ip_hyd_edef	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Elastic deformation induced by pore pressure change Y=Yes, N=No, M=Maybe, U=Unknown
13	ip_hyd_hfra c	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Hydrofracturing: Y=Yes, N=No, M=Maybe, U=Unknown
14	ip_hyd_btrem	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Boiling induced tremor: Y=Yes, N=No, M=Maybe, U=Unknown
15	ip_hyd_abgas	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Absorption of soluble gases: Y=Yes, N=No, M=Maybe, U=Unknown
16	ip_hyd_species	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Change in equilibrium species: Y=Yes, N=No, M=Maybe,

									U=Unknown
17	ip_hyd_chi m	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Boiling until dry chimneys are formed: Y=Yes, N=No, M=Maybe, U=Unknown
18	ip_hyd_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
19	ip_hyd_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	ip_hyd_load	datetime			Yes	*NULL*			the date the data was entered (in UTC
24	ip_hyd_pub date	datetime			Yes	*NULL*			the date the data become public
25	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

)

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_hyd_id	A	No	
CODE	BTREE	No	No	ip_hyd_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id

cb_ids	cb.cb_id

Q.2. ip_mag - Magma movement

This table stores information about processes related to the movement of magma.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ip_mag_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magma movement ID
2	ip_mag_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magma movement code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	ip_mag_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_mag_time_unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_mag_start	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_mag_start_unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_mag_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_mag_end_unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_mag_deepsupp	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			New or renewed supply of magma from depth: Y=Yes, N=No, M=Maybe, U=Unknown

11	ip_mag_asc	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma ascent, up from reservoir: Y=Yes, N=No, M=Maybe, U=Unknown
12	ip_mag_convb	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma conection/overturn induced from below by an intrusion at the base: Y=Yes, N=No, M=Maybe, U=Unknown
13	ip_mag_conv a	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma convection/overturn induced from above, by settling of a dense crystal-rich mass: Y=Yes, N=No, M=Maybe, U=Unknown
14	ip_mag_mix	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma mixing: Y=Yes, N=No, M=Maybe, U=Unknown
15	ip_mag_dike	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Dike intrusion: Y=Yes, N=No, M=Maybe, U=Unknown
16	ip_mag_pipe	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Intrusion through a pipe-like cylindrical conduit: Y=Yes, N=No, M=Maybe, U=Unknown
17	ip_mag_sill	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Sill intrusion: Y=Yes, N=No, M=Maybe, U=Unknown

18	ip_mag_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
19	ip_mag_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
20	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
21	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
22	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
23	ip_mag_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
24	ip_mag_pubdate	datetime			Yes	*NULL*			the date the data become public
25	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
26	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_mag_id	A	No	
CODE	BTREE	No	No	ip_mag_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.3. ip_pres - Buildup of magma pressure

This table stores information about processes related to an increase in magmatic pressure.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
	ip_pres_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Magma pressure ID
2	ip_pres_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Magma pressure code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	ip_pres_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_pres_time_unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_pres_start	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_pres_start_unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_pres_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_pres_end_unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_pres_gas	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Gas-induced

									overpressure: Y=Yes, N=No, M=Maybe, U=Unknown
11	ip_pres_tec	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma or tectonically induced overpressure: Y=Yes, N=No, M=Maybe, U=Unknown
12	ip_pres_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
13	ip_pres_co m	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
14	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
15	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
16	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
17	ip_pres_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
18	ip_pres_pubdate	datetime			Yes	*NULL*			the date the data become public
19	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
20	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated

									by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_pres_id	A	No	
CODE	BTREE	No	No	ip_pres_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.4. ip_sat - Volatile saturation

This table stores information about processes related to volatiles in the magma.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ip_sat_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volatile saturation ID
2	ip_sat_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation code
3	vd_id	mediumint(8)		UNSIGN	Yes	*NULL*			Volcano ID

				E D					
4	ip_sat_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_sat_time _unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_sat_start	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_sat_start _unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_sat_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_sat_end_ unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_sat_co2	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma became saturated with CO2 before an eruption and contributed to preeruption unrest: Y=Yes, N=No, M=Maybe, U=Unknown
11	ip_sat_h2o	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Magma became saturated with H2O before an eruption: Y=Yes, N=No, M=Maybe, U=Unknown

12	ip_sat_decomp	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by decompression: Y=Yes, N=No, M=Maybe, U=Unknown
13	ip_sat_dfo2	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by a change in f)2 Fugacity: Y=Yes, N=No, M=Maybe, U=Unknown
14	ip_sat_add	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by volatile addition: Y=Yes, N=No, M=Maybe, U=Unknown
15	ip_sat_xtl	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Volatile saturation by Crystallization or second boiling: Y=Yes, N=No, M=Maybe, U=Unknown
16	ip_sat_ves	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Subsurface, preeruptive increases in vesiculation, thereby decreasing density. Y=Yes, N=No, M=Maybe, U=Unknown
17	ip_sat_deve s	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Subsurface, preeruptive decrease in

									vesiculation, thereby increasing density: Y=Yes, N=No, M=Maybe, U=Unknown
18	ip_sat_degas	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Deep and near-surface degassing include gas explosion events: Y=Yes, N=No, M=Maybe, U=Unknown
19	ip_sat_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
20	ip_sat_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
21	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
22	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
23	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
24	ip_sat_load- date	datetime			Yes	*NULL*			the date the data was entered (in UTC)

25	ip_sat_pubdate	datetime			Yes	*NULL*			the date the data become public
26	cc_id_load	smallint (5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
27	cb_ids	varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Uniqueue	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_sat_id	0	A	No	
CODE	BTREE	No	No	ip_sat_code		A	Yes	
OWNER1	BTREE	No	No	cc_id		A	Yes	
OWNER2	BTREE	No	No	cc_id2		A	Yes	
OWNER3	BTREE	No	No	cc_id3		A	Yes	
VOLCANO	BTREE	No	No	vd_id		A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

Q.5. ip_tec - Regional tectonics interaction

This table stores information about processes related to regional tectonic events.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ip_tec_id	smallint (5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Reginal tectonic ID

2	ip_tec_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Regional tectonic code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	ip_tec_time	datetime			Yes	*NULL*			The date and time the inference was made.
5	ip_tec_time _unc	datetime			Yes	*NULL*			Inference time uncertainty
6	ip_tec_start	datetime			Yes	*NULL*			Start time, the time at which the inferred process began
7	ip_tec_start _unc	datetime			Yes	*NULL*			Start time uncertainty
8	ip_tec_end	datetime			Yes	*NULL*			End time, the time at which the inferred process ended
9	ip_tec_end_ unc	datetime			Yes	*NULL*			End time uncertainty
10	ip_tec_change	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Tectonically induced changes in magma/hydrothermal system: Y=Yes, N=No, M=Maybe, U=Unknown
11	ip_tec_sstress	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Changes in static stress after large regional earthquake (include viscoelastic process): Y=Yes, N=No, M=Maybe, U=Unknown
12	ip_tec_dstrain	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Dynamic strain, associated with passage of earthquake waves from

									distal source: Y=Yes, N=No, M=Maybe, U=Unknown
13	ip_tec_fault	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Local fault shear or other deformation of the cone: Y=Yes, N=No, M=Maybe, U=Unknown
14	ip_tec_seq	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Slow earthquake, as recorded by GPS or strain: Y=Yes, N=No, M=Maybe, U=Unknown
15	ip_tec_press	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Pressurization of magma or hydrothermal reservoir located several km (include Distal VT earthquake): Y=Yes, N=No, M=Maybe, U=Unknown
16	ip_tec_depress	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Depressurization of magma or hydrothermal reservoir located several km or more(include distal VT): Y=Yes, N=No, M=Maybe, U=Unknown
17	ip_tec_hppress	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Increase hydrothermal pore pressurs(lubrication) along faults beneath or

									near the volcano: Y=Yes, N=No, M=Maybe, U=Unknown
18	ip_tec_etide	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Earth-tide interaction with magma/hydrothermal systems: Y=Yes, N=No, M=Maybe, U=Unknown
19	ip_tec_atmp	enum('Y', 'N', 'M', 'U')	*utf8_unicode_ci*		Yes	*NULL*			Interaction of th evolcanic system with changes in atmospheric pressure, rainfall, wind, etc.: Y=Yes, N=No, M=Maybe, U=Unknown
20	ip_tec_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
21	ip_tec_com	char(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
22	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
23	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
24	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
25	ip_tec_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
26	ip_tec_pubdate	datetime			Yes	*NULL*			the date the data become public
27	cc_id_load	smallint(5)		UNSI	Yes	*NULL*			contact ID for the person who

				GNED					entered the data
28	cb_ids	varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ip_tec_id	A	No	
CODE	BTREE	No	No	ip_tec_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R. Common or Shared

The common or shared tables store data from within the Volcano > Network > Station > Instrument hierarchy that are used by almost all of the monitoring tables.

R.1. cc - Contact

This table provides all of the contact information for a person, observatory, or institution.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit
1	cc_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT	
2	cc_code	varchar(15)	*utf8_unicode_ci*		Yes	*NULL*		
3	cc_code2	varchar(15)	*utf8_unicode_ci*		Yes	*NULL*		
4	cc_fname	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		
5	cc_lname	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		
6	cc_obs	varchar(150)	*utf8_unicode_ci*		Yes	*NULL*		
7	cc_add1	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*		
8	cc_add2	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*		
9	cc_city	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*		
10	cc_state	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		
11	cc_country	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*		
12	cc_post	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*		
13	cc_url	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		
14	cc_email	varchar(320)	*utf8_unicode_ci*		Yes	*NULL*		
15	cc_phone	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*		
16	cc_phone2	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*		
17	cc_fax	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*		
18	cc_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*		
19	cc_loaddate	datetime			Yes	*NULL*		

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cc_id	A	No	
CODE	BTREE	Yes	No	cc_code	A	Yes	
CODE2	BTREE	Yes	No	cc_code2	A	Yes	

R.2. cb – Bibliographic

This table stores information about articles, papers, books, and web sites, with information that is related to the data in WOVOdat.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cb_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Bibliographic ID
2	cb_auth	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Authors/Editors
3	cb_year	year(4)			Yes	*NULL*			Publication year
4	cb_title	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Title
5	cb_journ	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Journal
6	cb_vol	varchar(20)	*utf8_unicode_ci*		Yes	*NULL*			Volume
7	**cb_pub**	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Publisher
8	cb_page	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Pages
9	cb_doi	varchar(20)	*utf8_unicode_ci*		Yes	*NULL*			Digital Object Identifier
10	cb_isbn	varchar(13)	*utf8_unicode_ci*		Yes	*NULL*			International Standard Book Number
11	cb_url	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Info on the web
12	cb_labadr	varchar(320)	*utf8_unicode_ci*		Yes	*NULL*			Email address of observatory
13	cb_keywords	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Keywords
14	cb_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
15	cb_loaddate	datetime			Yes	*NULL*			the date the data was entered
16	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cb_id	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id

R.3. co - Observation

This table provides storage for observations about volcanic activity.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	co_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Observation ID
2	co_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Observation Code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	co_slat	double			Yes	*NULL*			latitude
5	co_slat_err	float			Yes	*NULL*			Latitude Uncertainty
6	co_slon	double			Yes	*NULL*			Longitude
7	co_slon_err	float			Yes	*NULL*			Longitude Uncertainty
8	co_selev	double			Yes	*NULL*			Elevation
9	co_selev_err	float			Yes	*NULL*			Elevation Uncertainty
10	co_observe	varchar(1200)			Yes	*NULL*			Description
11	co_observe_type	varchar(255)			Yes	*NULL*			Type of observation (incandescence, pyroclastic flow, rock fall, lava flow, eruption column, steaming, lake bubbling,crater glow, extrusion rate, lake color, etc.)
12	co_obs_meas	varchar(30)			Yes	*NULL*			What quantifiable parameter that can be observed, or parameter that change during observation (PF runout distance, extrusion

									rate, explosion column height, etc.)
13	co_obs_meas_unit	varchar(30)			Yes	*NULL*			The units reported for the measured parameter (m, km, m3/s, etc.)
14	co_stime	datetime			Yes	*NULL*			Start time
15	co_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
16	co_etime	datetime			Yes	*NULL*			End time
17	co_etime_unc	datetime			Yes	*NULL*			End time uncertainty
18	co_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
19	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
20	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
21	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
22	co_loaddate	datetime			Yes	*NULL*			the date the data was entered
23	co_pubdate	datetime			Yes	*NULL*			the date the data become public
24	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
25	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	co_id	A	No	
CODE	BTREE	No	No	co_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.4. cm - Image

This table stores images that support other WOVOdat data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cm_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Image ID
2	cm_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Image Code
3	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
4	cm_lat	double			Yes	*NULL*			Latitude
5	cm_lon	double			Yes	*NULL*			Longitude
6	cm_location	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Location
7	cm_description	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description (including the scale)
8	cm_format	varchar(10)	*utf8_unicode_ci*		Yes	*NULL*			Image format
9	cm_date	datetime			Yes	*NULL*			Date
10	cm_date_unc	datetime			Yes	*NULL*			Date uncertainty
11	cm_image	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link/path where the image store
12	cm_usage	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Usage of image (copyright)
13	cm_keywords	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Keywords (for searches)
14	cm_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
15	cm_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
16	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
17	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
18	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
19	cm_loaddate	datetime			Yes	*NULL*			the date the data was entered
20	cm_pubdate	datetime			Yes	*NULL*			the date the data become public
21	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

22	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cm_id	A	No	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
CODE	BTREE	No	No	cm_code	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
VOLCANO	BTREE	No	No	vd_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.5. md - Map

This table stores information about maps that cover areas where WOVOdat data is collected.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	md_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Map ID
2	md_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Map Code
3	vd_id	mediumint(8)			Yes	*NULL*			Volcano ID
4	md_name	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Map Name
5	md_type	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Map Type (topo, DEM, etc.)
6	md_srtm	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to DEM stored on the WOVOdat server.
7	md_scale	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Scale of the map
8	md_contour	float			Yes	*NULL*		m	Contour interval
9	md_date	date			Yes	*NULL*			Publication date
10	md_date_unc	date			Yes	*NULL*			Publication date uncertainty
11	md_proj	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Projection

12	mp_map_datum	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Datum
13	md_west	float			Yes	*NULL*		°	West bounding coordinate
14	md_east	float			Yes	*NULL*		°	East bounding coordinate
15	md_north	float			Yes	*NULL*		°	North bounding coordinate
16	md_south	float			Yes	*NULL*		°	South bounding coordinate
17	md_elev_max	float			Yes	*NULL*		m	Maximum elevation
18	md_elev_min	float			Yes	*NULL*		m	Minimum elevation
19	md_use	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Intended use of the map
20	md_restrictions	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Restrictions on the use
21	md_quality	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Quality of the map
22	md_image	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Link to image
23	md_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
24	md_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
25	md_com	char(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
26	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
27	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
28	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
29	md_loaddate	datetime			Yes	*NULL*			the date the data was entered
30	md_pubdate	datetime			Yes	*NULL*			the date the data become public
31	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
32	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography

									table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	med_id	A	No	
CODE	BTREE	No	No	med_code	A	Yes	
OWNER 1	BTREE	No	No	cc_id	A	Yes	
OWNER 2	BTREE	No	No	cc_id2	A	Yes	
OWNER 3	BTREE	No	No	cc_id3	A	Yes	
STATION	BTREE	No	No	ms_id	A	Yes	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id2	cc.cc_id
cc_id3	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.6. cs - Satellite/Airplane

This table stores information about satellites and airplanes that are used for collecting data from above the surface of the earth.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cs_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Satellite/airplane ID
2	cs_code	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Satellite/airplane code
3	cs_type	enum('S', 'A')	*utf8_unicode_ci*		Yes	*NULL*			Type (A=Airplane, S=Satellite)
4	cs_name	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Satellite/airplane name
5	cs_stime	datetime			No	0000-00-00 00:00:00			Start time
6	cs_stime_unc	datetime			Yes	*NULL*			Start time uncertainty
7	cs_etime	datetime			No	9999-12-31 23:59:59			End time
8	cs_etime_unc	datetime			Yes	*NULL*			End time uncertainty
9	cs_otype	enum('LEO','GSO'			Yes	NULL			Satellite orbital type: Low Earth Orbit (LEO) or Geostationa

									ry orbit (GSO)
10	cs_oheight	float			Yes	NULL			Satellite orbital height (km)
11	cs_spatres	varchar(30)			Yes	NULL			Spatial resolution(nadir)(Km)
12	cs_ctsize	float			Yes	NULL			Cross track size (Km)
13	cs_atsize	float			Yes	NULL			Along track size (Km)
14	cs_swidth	float			Yes	NULL			Swath width (ground projection)(Km)
15	cs_tempres	varchar(30)			Yes	NULL			Temporal resolution (repeatability, return back to the same spot) hours or days
16	cs_rtime	float			Yes	NULL			Return time (repeatability, return back to the exact spot with the same viewing angle) hours or days
17	cs_vangle	float			Yes	NULL			Angle of view from nadir (o)
18	cs_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
19	cs_ori	enum('D','O')	*utf8_unicode_ci*		Yes	*NULL*			A flag for source of data. D=digitized, O= original from observatory
20	cs_com	char(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
21	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			First owner ID
22	cc_id2	smallint(5)		UNSIGNED	Yes	*NULL*			Second owner ID
23	cc_id3	smallint(5)		UNSIGNED	Yes	*NULL*			Third owner ID
24	cs_loaddate	datetime			Yes	*NULL*			the date the data was entered

25	cs_pubdate	datetime			Yes	*NULL*			the date the data become public
26	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data
27	cb_ids	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			List of cb_ids, link to bibliography table (cb), separated by a comma

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cb_id	56	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

R.7. st_eqt – Earthquake translation

The Earthquake Translation table (st_eqt, for Seismic Translation - Earthquake Types) allows users to translate an earthquake type defined by one observatory to the WOVOdat earthquake type. Some observatories refer to different earthquake types by the same name or similar earthquake types by different names.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	st_eqt_id	smallint(5)		UNSIGNED	No	*None*	AUTO_IN-CREMENT		Earthquake translation identifier
2	st_eqt_wovo	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			WOVOdat terminology
3	st_eqt_org	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Original terminology used by the observatory
3	st_eqt_name	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Earthquake name
4	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			Owner identifier
5	st_eqt_loaddate	datetime	*utf8_unicode_ci*		Yes	*NULL*			the date the data was entered (in UTC)
6	cc_id_load	smallint(5)	*utf8_unicode_ci*	UNSIGNED	Yes	*NULL*			contact ID for the person

									who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	st_eqt_id	A	No	
USER TRANSLATION	BTREE	Yes	No	st_eqt_wovo	A	Yes	
				cc_id	A	Yes	

Links

Field	Link to
cc_id	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

S. SYSTEM

S.1. jj_concon - User to user permissions

This table stores information about the permissions (upload, update, view their data or manage their account) given by a user to another.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_concon_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		User to user permission ID
2	cc_id	smallint(5)		UNSIGNED	No	*None*			Granting user ID (granter)
3	cc_id_granted	smallint(5)		UNSIGNED	No	*None*			Granted user ID
4	jj_concon_view	tinyint(1)			No	0			Permission to view unpublished data: 0=No, 1=Yes
5	jj_concon_upload	tinyint(1)			No	0			Permission to upload data: 0=No, 1=Yes
6	jj_concon_update	tinyint(1)			No	0			Permission to update data: 0=No, 1=Yes
7	jj_concon_admin	tinyint(1)			No	0			Permission to manage account: 0=No, 1=Yes
8	jj_concon_loaddate	datetime			Yes	*NULL*			the date the data was entered (in UTC)
9	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_concon_id	A	No	
GRANT	BTREE	Yes	No	cc_id	A	No	
				cc_id_granted	A	No	

Links

Field	Link to
cc_id	cc.cc_id
cc_id_granted	cc.cc_id
cc_id_load	cc.cc_id
cb_ids	cb.cb_id

S.2. jj_imgx - Image junction

This table was created to link images to other known data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_imgx_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Image junction ID
2	cm_id	smallint(5)		UNSIGNED	No	*None*			Image ID
3	jj_idname	enum('cb', 'cc', 'ch', 'cm', 'cn', 'co', 'cp', 'cr', 'cr_tmp', 'cs', 'cu', 'dd_ang', 'dd_edm', 'dd_gps', 'dd_gpv', 'dd_lev', 'dd_sar', 'dd_srd', 'dd_str', 'dd_tlt', 'dd_tlv', 'di_gen', 'di_tlt', 'ds', 'ed', 'ed_for', 'ed_phs', 'ed_vid', 'fd_ele', 'fd_gra', 'fd_mag', 'fd_mgv', 'fi', 'fs', 'gd', 'gd_plu', 'gd_sol', 'gi', etc.)			Yes	*NULL*			The name of the other table of interest
4	jj_x_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Linking table ID
5	jj_imgx_loaddate	datetime			Yes	*NULL*			the date the data was entered
6	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_imgx_id	A	No	
LINK	BTREE	Yes	No	cm_id	A	No	
				jj_idname	A	Yes	
				jj_x_id	A	Yes	

Links

Field	Link to
cm_id	cm.cm_id
jj_x_id	*jj_idname*.*jj_idname*_id
cc_id_load	cc.cc_id

S.3. jj_volcon - Volcano-contact junction

This table was created for the many-to-many relationship between the volcano and the observatories that monitor the volcano. This table was created to link images to other known data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_volcon_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano-contact junction ID
2	vd_id	mediumint(8)		UNSIGNED	No	*None*			Volcano ID
3	cc_id	smallint(5)			Yes	*NULL*			User/Owner ID
4	jj_volcon_loaddate	datetime		UNSIGNED	Yes	*NULL*			the date the data was entered
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_volcon_id	A	No	
LINK	BTREE	Yes	No	vd_id	A	No	
				cc_id	A	No	

Links

Field	Link to
vd_id	vd.vd_id
cc_id	cc.cc_id
cc_id_load	cc.cc_id

S.4. jj_volnet - Volcano-network junction

This table was created for the many-to-many relationship between the volcano and the observatories that monitor the volcano.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	jj_volnet_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Volcano-network junction ID
2	vd_id	mediumint(8)		UNSIGNED	Yes	*NULL*			Volcano ID
3	jj_net_id	smallint(5)		UNSIGNED	Yes	*NULL*			Network ID
4	jj_net_flag	enum('C', 'S')	*utf8_unicode_ci*		Yes	*NULL*			Network type: C=Common, S=Seismic
5	jj_volnet_loaddate	datetime			Yes	*NULL*			the date the data was entered
6	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	jj_volnet_id	A	No	
LINK	BTREE	Yes	No	vd_id	A	Yes	
				jj_net_id	A	Yes	
				jj_net_flag	A	Yes	
jj_volnet_id	BTREE	No	No	jj_volnet_id	A	No	
jj_volnet_id_2	BTREE	No	No	jj_volnet_id	A	No	

Links

Field	Link to
vd_id	vd.vd_id
jj_net_id	*jj_net_flag*n.*jj_net_flag*n_id
cc_id_load	cc.cc_id

S.5. j_sarsat - InSAR-satellite junction

This table was created for the many-to-many relationship between the satellite data and the InSAR data.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	j_sarsat_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		InSAR-satellite junction ID
2	dd_sar_id	Medium int(8)		UNSIGNED	Yes	*NULL*			InSAR image ID
3	cs_id	smallint(5)		UNSIGNED	Yes	*NULL*			Satellite ID
4	j_sarsat_loaddate	datetime			Yes	*NULL*			the date the data was entered
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	j_sarsat_id	A	No	
LINK	BTREE	Yes	No	dd_sar_id	A	Yes	
				cs_id	A	Yes	

Links

Field	Link to
dd_sar_id	dd_sar.dd_sar_id
cs_id	cs.cs_id
cc_id_load	cc.cc_id

Database Administration:

S.6. cr - Registry

This table provides username and password information for people who registered to WOVOdat.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cr_id	tinyint(3)		UNSIGNED	No	*None*	AUTO_INCREMENT		Registry ID
2	cc_id	smallint(5)		UNSIGNED	Yes	*NULL*			User ID
3	cr_uname	varchar(30)	*utf8_unicode_ci*		No	*None*			Username for login
4	cr_pwd	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Password for login
5	cr_regdate	datetime			Yes	*NULL*			Registration date
6	cr_update	datetime			Yes	*NULL*			Last update

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cr_id	A	No	
USERNAME	BTREE	Yes	No	cr_uname	A	No	
CONTACT	BTREE	Yes	No	cc_id	A	Yes	

Links

Field	Link to
cc_id_load	cc.cc_id

S.7. cr_tmp - Temporary registry

This table stores information about users who wish to register to WOVOdat while waiting for them to confirm registration by clicking the link provided in a confirmation email.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cr_tmp_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Temporary registry ID
2	cr_tmp_time	datetime			No	*None*			Time when the registry made
3	cr_tmp_email	varchar(320)	*utf8_unicode_ci*		No	*None*			Email
4	cr_tmp_fname	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			First name

5	cr_tmp_lname	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Last name
6	cr_tmp_obs	varchar(150)	*utf8_unicode_ci*		Yes	*NULL*			Observatory
7	cr_tmp_add1	varchar(60)	*utf8_unicode_ci*		Yes	*NULL*			Address 1
8	cr_tmp_add2	varchar (60)	*utf8_unicode_ci*		Yes	*NULL*			Address 2
9	cr_tmp_city	varchar (50)	*utf8_unicode_ci*		Yes	*NULL*			City
10	cr_tmp_state	varchar (30)	*utf8_unicode_ci*		Yes	*NULL*			State/Province
11	cr_tmp_country	varchar (50)	*utf8_unicode_ci*		Yes	*NULL*			Country
12	cr_tmp_post	varchar (30)	*utf8_unicode_ci*		Yes	*NULL*			Postal code
13	cr_tmp_url	varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			Web address
14	cr_tmp_phone	varchar(50)	*utf8_unicode_ci*		Yes	*NULL*			Phone
15	cr_tmp_phone2	varchar (50)	*utf8_unicode_ci*		Yes	*NULL*			Phone 2
16	cr_tmp_fax	varchar (60)	*utf8_unicode_ci*		Yes	*NULL*			Fax
17	cr_tmp_com	varchar (255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
18	cr_tmp_uname	varchar (30)	*utf8_unicode_ci*		No	*None*			Username
19	cr_tmp_pwd	varchar (60)	*utf8_unicode_ci*		Yes	*NULL*			Password

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cr_tmp_id	A	No	
USERNAME	BTREE	Yes	No	cr_tmp_uname	A	No	

S.8. cp - Permission

This table provides the access information for each registered user.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
	cp_id	tinyint(3)		UNSIGNED	No	*None*	AUTO_INCREMENT		Permission ID
2	cr_id	tinyint(3)		UNSIGNED	Yes	*NULL*			Registry ID
3	cp_access	enum('0','1','2','3','4','5','6','7','8','9')			No	9			Access level: 0=Developer, 9=Minimum access
4	cp_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
5	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cp_id	A	No	
REGISTEREDUSER	BTREE	Yes	No	cr_id	A	Yes	

Links

Field	Link to
cr_id	cr.cr_id
cc_id_load	cc.cc_id

S.9. cu - Upload history

This table stores information about all uploads made to the database, including those which failed.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	cu_id	mediumint(8)		UNSIGNED	No	*None*	AUTO_INCREMENT		Upload history ID
2	cu_file	varchar(255)	*utf8_unicode_ci*		No	*None*			Original uploaded file name
3	cu_type	enum('P', 'PE', 'TBP', 'T', 'TE', 'TBT', 'U', 'O')	*utf8_unicode_ci*		Yes	*NULL*			Type of upload: I=In database, N=Not in database (test), U=Undone, T=Temporary (to be treated later),

									W=translated to WOVOML, F=Failed
4	cu_com	text	*utf8_unicod e_ci*		Yes	*NULL*			Comments or error message
5	cu_loaddate	datetime			Yes	*NULL*			the date the data was entered
6	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	cu_id	19951	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id

S.10. ch - Change

This table stores information about any changes that have been made in the database.

#	Column	Type	Collation	Attributes	Null	Default	Extra	Unit	Comments
1	ch_id	smallint(5)		UNSIGNED	No	*None*	AUTO_INCREMENT		Change ID
2	ch_linkname	enum('cb', 'cc', 'ch', 'cm', 'cn', 'co', 'cp', 'cr', 'cr_tmp', 'cs', 'cu', 'dd_ang', 'dd_edm', 'dd_gps', 'dd_gpv', 'dd_lev', 'dd_sar', 'dd_srd', 'dd_str', 'dd_tlt', 'dd_tlv', 'di_gen', 'di_tlt', 'ds', 'ed', 'ed_for', 'ed_phs', 'ed_vid', 'fd_ele', 'fd_gra', 'fd_mag', 'fd_mgv', 'fi', 'fs', 'gd', 'gd_plu', 'gd_sol', 'gi', 'gs', 'hd', 'hi', 'hs', 'ip_hyd', 'ip_mag', 'ip_pres', 'ip_sat', 'ip_tec', 'jj_concon',		Yes	*NULL*				The name of the table where the change has been made.

		'jj_imgx', 'jj_volcon', 'jj_volnet', 'j_sarsat', 'md', 'sd_evn', 'sd_evs', 'sd_int', 'sd_ivl', 'sd_rsm', 'sd_sam', 'sd_ssm', 'sd_trm', 'sd_wav', 'si', 'si_cmp', 'sn', 'ss', 'st_eqt', 'td', 'td_img', 'td_pix', 'ti', 'ts', 'vd', 'vd_inf', 'vd_mag', 'vd_tec')							
3	ch_link_id	mediumint(8)		UNSIGNED	Yes	*NULL*			The ID-number of the set of data where the change has been made.
4	ch_atname	varchar(30)	*utf8_unicode_ci*		Yes	*NULL*			Field/attribute name where the change has been made
5	ch_desc	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Description
6	ch_com	varchar(255)	*utf8_unicode_ci*		Yes	*NULL*			Comments
7	ch_loaddate	datetime			Yes	*NULL*			the date the data was entered
8	cc_id_load	smallint(5)		UNSIGNED	Yes	*NULL*			contact ID for the person who entered the data

Indexes

Keyname	Type	Unique	Packed	Column	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ch_id	A	No	

Links

Field	Link to
cc_id_load	cc.cc_id

NOTE

1. element of the table that highlighted by light-gray shade: filled automatically by the system when the data uploaded

2. element written in “red”: link to other table
3. Standard datetime format: YYYY-MM-DD HH:MM:SS.SS (in UTC)
4. Standard origin time format: YYYY-MM-DD HH:MM:SS (in UTC)

Appendix-1 WOVOdat XML-format

WOVOdat XML template

Class, attributes, and elements

```
<?xml version="1.0" encoding="UTF-8"?>
<wovoml owner1="…" owner2="…" owner3="…" pubDate="…" v="…" version="…"
xmlns="http://www.wovodat.org" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.wovodat.org wovoml_schema.xsd ">
        <Observations>...</Observations>
        <InferredProcesses>...</InferredProcesses>
        <Eruptions>...</Eruptions>
        <MonitoringSystems>...</MonitoringSystems>
        <Data>...</Data>
</wovoml>
```

Observations: This class contains information for observations about volcanic activity.

```
<?xml version="1.0" encoding="UTF-8"?>
<wovoml owner1="…" owner2="…" owner3="…" pubDate="…" v="…" version="…"
xmlns="http://www.wovodat.org"  xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xsi:schemaLocation="http://www.wovodat.org wovoml_schema.xsd ">
```

```
<Observations owner1="…" owner2="…" owner3="…" pubDate="…" v="…">
    <Observation code="…" owner1="…" owner2="…" owner3="…" pubDate="…" v="…">
        <description>description</description>
        <startTime>YYYY-MM-DD HH:MM:SS</startTime>
        <startTimeUnc>startTimeUnc</startTimeUnc>
        <endTime>endTime</endTime>
        <endTimeUnc>endTimeUnc</endTimeUnc>
    </Observation>
</Observations>
```

Inferred Processes: This class contains information about historical (in most cases, published) inferences about processes causing volcanic unrest.

```
<InferredProcesses owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <MagmaMovement code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..."volcano="...">
                ...
        </MagmaMovement>
        <VolatileSat code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
        </VolatileSat>
        <MagmaPressure code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
        </MagmaPressure>
        <Hydrothermal code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
        </Hydrothermal>
        <RegionalTectonics code="..." owner1="..." owner2="..." owner3="..." pubDate="..."v="..."volcano="...">
                ...
        </RegionalTectonics>
</InferredProcesses>
```

Eruption: This class contains information about volcano eruption.

```
<Eruptions owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
    <Eruption code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
        ...
        <Video code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </Video>
        <Phase code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <Video code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Video>
            <Forecast code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Forecast>
        </Phase>
    </Eruption>
    <Phases eruption="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Phase code="..." eruption="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <Video code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Video>
            <Forecast code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </Forecast>
        </Phase>
    </Phases>
    <Video code="..." eruption="..." owner1="..." owner2="..." owner3="..." phase="..." pubDate="..." v="..." volcano="...">
        ...
    </Video>
    <Forecast code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
        ...
    </Forecast>
</Eruptions>
```

Monitoring system: This class contains information about all monitoring systems (network, stations, instruments, components) in a volcano.

```
<MonitoringSystems owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
    <Airplane code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        ...
        <GasInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </GasInstrument>
        <ThermalInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </ThermalInstrument>
    </Airplane>
```

```
    <DeformationNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
            <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <DeformationStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <DeformationInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </DeformationInstrument>
            <TiltStrainInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </TiltStrainInstrument>
        </DeformationStation>
    </DeformationNetwork>
    <DeformationStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <DeformationStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
            <DeformationInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </DeformationInstrument>
            <TiltStrainInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
            </TiltStrainInstrument>
        </DeformationStation>
    </DeformationStations>
    <DeformationInstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <DeformationInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </DeformationInstrument>
        <TiltStrainInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
            ...
        </TiltStrainInstrument>
    </DeformationInstruments>
```

```
<GasNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <GasStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <GasInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </GasInstrument>
        </GasStation>
</GasNetwork>
<GasStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <GasStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <GasInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </GasInstrument>
        </GasStation>
</GasStations>
<GasInstruments airplane="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <GasInstrument airplane="..." code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </GasInstrument>
</GasInstruments>
```

```
<FieldsNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <FieldsStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <FieldsInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </FieldsInstrument>
        </FieldsStation>
</FieldsNetwork>
<FieldsStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <FieldsStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <FieldsInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </FieldsInstrument>
        </FieldsStation>
</FieldsStations>
<FieldsInstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <FieldsInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </FieldsInstrument>
</FieldsInstruments>
```

```
<MeteoNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <MeteoStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..."  v="...">
                ...
                <MeteoInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." " v="...">
                        ...
                </MeteoInstrument>
        </MeteoStation>
</MeteoNetwork>
<MetoStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <MeteoStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <MetoInstrument code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </MeteoInstrument>
        </MeteoStation>
</MeteoStations>
<Meteoinstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <Meteoinstrument="..."  code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </Meteoinstrument>
</Meteoinstruments>
```

```
<ThermalNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <ThermalStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <ThermalInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </ThermalInstrument>
        </ThermalStation>
</ThermalNetwork>
<ThermalStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <ThermalStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <ThermalInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </ThermalInstrument>
        </ThermalStation>
</ThermalStations>
<ThermalInstruments airplane="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <ThermalInstrument airplane="..." code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
        </ThermalInstrument>
</ThermalInstruments>

<SeismicNetwork code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <Volcanoes>
                <volcanoCode>volcanoCode</volcanoCode>
        </Volcanoes>
        <SeismicStation code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <SeismicInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                        <SeismicComponent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                                ...
                        </SeismicComponent>
                </SeismicInstrument>
        </SeismicStation>
</SeismicNetwork>
<SeismicStations network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <SeismicStation code="..." network="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
                <SeismicInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                        <SeismicComponent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                                ...
                        </SeismicComponent>
                </SeismicInstrument>
        </SeismicStation>
</SeismicStations>
<SeismicInstruments owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <SeismicInstrument code="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
                <SeismicComponent code="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                        ...
                </SeismicComponent>
        </SeismicInstrument>
</SeismicInstruments>
<SeismicComponents instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <SeismicComponent code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
                ...
        </SeismicComponent>
</SeismicComponents>

</MonitoringSystems>
```

Data: This class contains information about all type of volcano monitoring data obtained/recorded by "Monitoring system".

```
<Data>
    <Deformation owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <ElectronicTiltDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <ElectronicTilt code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </ElectronicTilt>
        </ElectronicTiltDataset>
        <TiltVectorDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <TiltVector code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </TiltVector>
        </TiltVectorDataset>
        <StrainDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <Strain code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </Strain>
        </StrainDataset>
        <EDMDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation="..." v="...">
            <EDM code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation="..." v="...">
                ...
            </EDM>
        </EDMDataset>
        <AngleDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation1="..." targetStation2="..." v="...">
            <Angle code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." targetStation1="..." targetStation2="..." v="...">
                ...
            </Angle>
        </AngleDataset>
        <GPSDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." station="..." v="...">
            <GPS code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." station="..." v="...">
                ...
            </GPS>
        </GPSDataset>
        <GPSVectorDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <GPSVector code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                ...
            </GPSVector>
        </GPSVectorDataset>
        <LevelingDataset firstBMStation="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." secondBMStation="..." v="...">
            <Leveling code="..." firstBMStation="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." secondBMStation="..." v="...">
                ...
            </Leveling>
        </LevelingDataset>
        <InSARImageDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
            <InSARImage code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." v="..." volcano="...">
                <Satellites>
                    <satelliteCode>satelliteCode</satelliteCode>
                </Satellites>
                ...
                <InSARPixels>
                    <InSARPixel number="0">
                    <rangeOfChange>0.0</rangeOfChange>
                    </InSARPixel>
                </InSARPixels>
            </InSARImage>
        </InSARImageDataset>
    </Deformation>

    <Hydrologic owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
        <HydrologicSampleDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <HydrologicSample code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
                <HydrologicSpecies type="SO4">
                    ...
                </HydrologicSpecies>
                ...
            </HydrologicSample>
        </HydrologicSampleDataset>
    </Hydrologic>
```

```
<Gas owner1="..." owner2="..." owner3="..." pubDate="..." v="...">
    <GasSampleDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <GasSample code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            <GasSpecies type="CO2" waterFree="Y">
                ...
            </GasSpecies>
            ...
        </GasSample>
    </GasSampleDataset>
    <SoilEffluxDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <SoilEfflux code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </SoilEfflux>
    </SoilEffluxDataset>
    <PlumeDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="..." volcano="...">
        <Plume code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="..." volcano="...">
            <PlumeSpecies type="CO2">
                ...
            </PlumeSpecies>
            ...
        </Plume>
    </PlumeDataset>
</Gas>
```

```
<Fields>
    <MagneticDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." station="..." v="...">
        <Magnetic code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation="..." station="..." v="...">
            ...
        </Magnetic>
    </MagneticDataset>
    <MagneticVectorDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
        <MagneticVector code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." station="..." v="...">
            ...
        </MagneticVector>
    </MagneticVectorDataset>
    <ElectricDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." v="...">
        <Electric code="..." instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." v="...">
            ...
        </Electric>
    </ElectricDataset>
    <GravityDataset instrument="..." owner1="..." owner2="..." owner3="..." pubDate="..." refStation1="..." refStation2="..." v="...">
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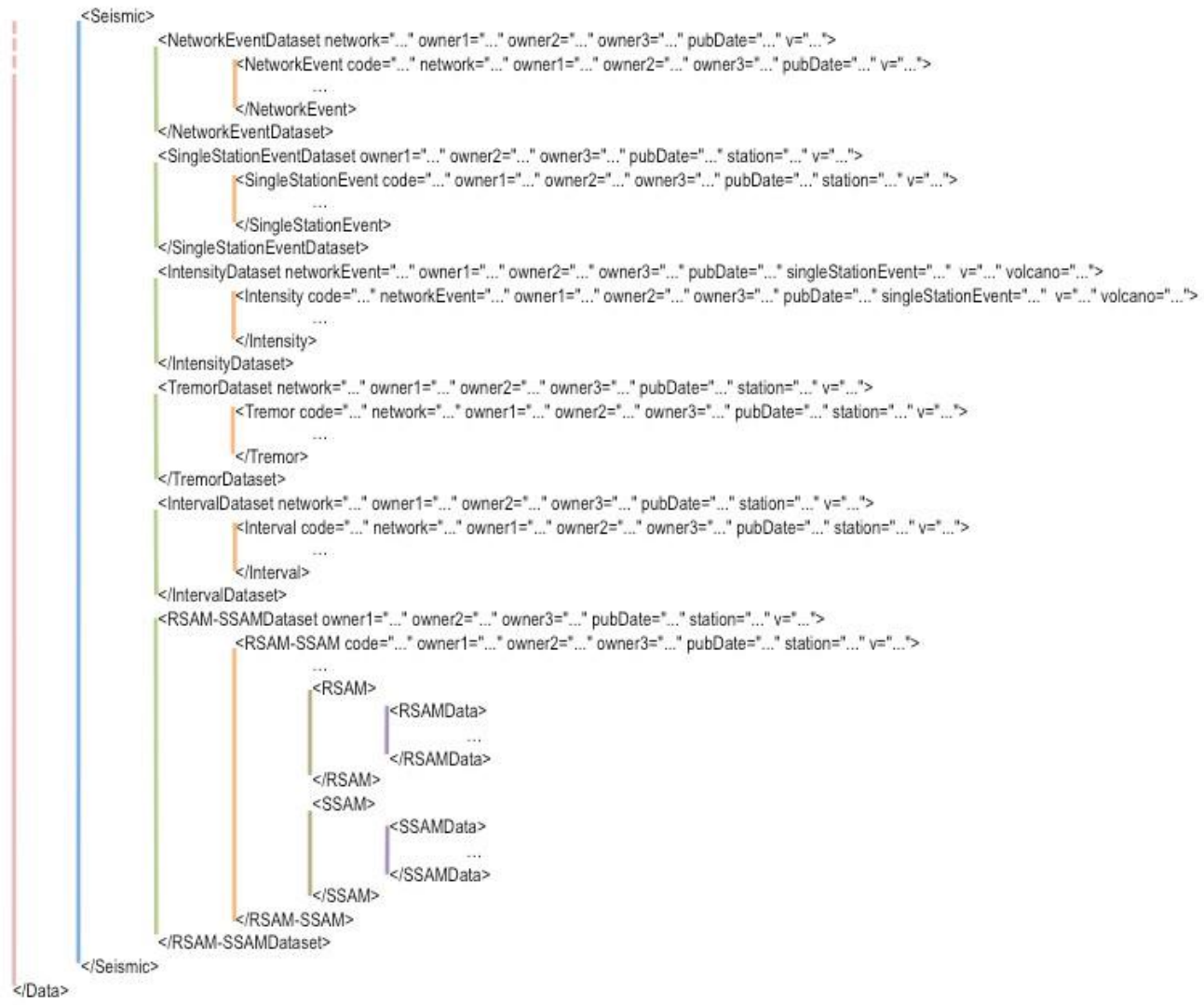
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WOVOdat XML-format (version: November 2018)

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Appendix-2 WOVOML 2.0 Schema

WOVOml_schema.xsd (version: November 2018)

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<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.wovodat.org" xmlns="http://www.wovodat.org"
elementFormDefault="qualified">

    <!-- ================================================================= -->
    <!-- Comments on this XSD file -->
    <!-- ================================================================= -->
    <xs:annotation>
        <xs:documentation xml:lang="en">
            WOVOML schema for uploading data to WOVOdat (www.wovodat.org).
            Version 2.0
            Last update:November 2018.
            For more information on how to use WOVOML, please refer to:
            www.wovodat.org/doc
        </xs:documentation>
    </xs:annotation>


    <!-- ================================================================= -->
    <!-- Simple types -->
    <!-- ================================================================= -->

    <!-- Decimal 2,2  -->
    <xs:simpleType name="decimal">
        <xs:restriction base="xs:decimal">
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            <xs:maxExclusive value="0.991"/>
        </xs:restriction>
    </xs:simpleType>

    <!-- Double without NaN -Inf +Inf -->
    <xs:simpleType name="double">
        <xs:restriction base="xs:double">
            <xs:minExclusive value="-INF"/>
            <xs:maxExclusive value="INF"/>
        </xs:restriction>
    </xs:simpleType>

    <!-- Float without NaN -Inf +Inf -->
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        <xs:restriction base="xs:float">
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    <!-- String 10 -->
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```

```
		<xs:restriction base="xs:string">
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		</xs:restriction>
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	<!-- String 15 (non-empty)  changed from  name="string10NE" coz ownercode varchar 15 in cc
table-->
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<!-- String 511 -->
<xs:simpleType name="string511">
	<xs:restriction base="xs:string">
		<xs:whiteSpace value="collapse"/>
		<xs:maxLength value="511"/>
	</xs:restriction>
</xs:simpleType>

<!-- String 1200 -->
<xs:simpleType name="string1200">
	<xs:restriction base="xs:string">
		<xs:whiteSpace value="collapse"/>
		<xs:maxLength value="1200"/>
	</xs:restriction>
</xs:simpleType>

<!-- Degrees 0-90 -->
<xs:simpleType name="deg0-90">
	<xs:restriction base="xs:double">
		<xs:minInclusive value="0"/>
		<xs:maxInclusive value="90"/>
	</xs:restriction>
</xs:simpleType>

<!-- Degrees 0-360 -->
<xs:simpleType name="deg0-360">
	<xs:restriction base="xs:double">
		<xs:minInclusive value="0"/>
		<xs:maxInclusive value="360"/>
```

```
		</xs:restriction>
</xs:simpleType>

<!-- Degrees -90 +90 -->
<xs:simpleType name="deg-90-90">
		<xs:restriction base="xs:double">
			<xs:minInclusive value="-90"/>
			<xs:maxInclusive value="90"/>
		</xs:restriction>
</xs:simpleType>

<!-- Degrees -180 +180 -->
<xs:simpleType name="deg-180-180">
		<xs:restriction base="xs:double">
			<xs:minInclusive value="-180"/>
			<xs:maxInclusive value="180"/>
		</xs:restriction>
</xs:simpleType>

<!-- Yes No enumeration -->
<xs:simpleType name="yesNoEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="Y"/>
			<xs:enumeration value="N"/>
		</xs:restriction>
</xs:simpleType>

<!-- Success enumeration -->
<xs:simpleType name="successEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="Y"/>
			<xs:enumeration value="N"/>
			<xs:enumeration value="P"/>
		</xs:restriction>
</xs:simpleType>

<!-- Yes No Unknown enumeration -->
<xs:simpleType name="yesNoUnkEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="Y"/>
			<xs:enumeration value="N"/>
			<xs:enumeration value="U"/>
		</xs:restriction>
</xs:simpleType>

<!-- Yes No Maybe Unknown enumeration -->
<xs:simpleType name="yesNoMaybeUnkEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="Y"/>
			<xs:enumeration value="N"/>
			<xs:enumeration value="M"/>
			<xs:enumeration value="U"/>
```

```
		</xs:restriction>
</xs:simpleType>

<!-- Permanent campaign enumeration -->
<xs:simpleType name="permCampEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="P"/>
			<xs:enumeration value="C"/>
		</xs:restriction>
</xs:simpleType>

<!-- Continuous periodically enumeration -->
<xs:simpleType name="contPeriodEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="C"/>
			<xs:enumeration value="P"/>
		</xs:restriction>
</xs:simpleType>

<!-- Processed raw enumeration -->
<xs:simpleType name="processedEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="P"/>
			<xs:enumeration value="R"/>
		</xs:restriction>
</xs:simpleType>

<!-- Pressure measurement type enumeration -->
<xs:simpleType name="pressureMeasTypeEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="A"/>
			<xs:enumeration value="V"/>
		</xs:restriction>
</xs:simpleType>

<!-- Pair stacked enumeration -->
<xs:simpleType name="pairStackedEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="P"/>
			<xs:enumeration value="S"/>
			<xs:enumeration value="U"/>
		</xs:restriction>
</xs:simpleType>

<!-- Picks determination enumeration -->
<xs:simpleType name="picksDeterminationEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="A"/>
			<xs:enumeration value="H"/>
			<xs:enumeration value="R"/>
```

```
                <xs:enumeration value="U"/>
        </xs:restriction>
</xs:simpleType>

<!-- Qualitative depth enumeration -->
<xs:simpleType name="qualitativeDepthEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="D"/>
                <xs:enumeration value="I"/>
                <xs:enumeration value="S"/>
                <xs:enumeration value="U"/>
        </xs:restriction>
</xs:simpleType>

<!-- Data type enumeration -->
<xs:simpleType name="dataTypeEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="C"/>
                <xs:enumeration value="H"/>
                <xs:enumeration value="L"/>
                <xs:enumeration value="U"/>
        </xs:restriction>
</xs:simpleType>

<!-- Distance enumeration -->
<xs:simpleType name="distEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="D"/>
                <xs:enumeration value="I"/>
                <xs:enumeration value="P"/>
                <xs:enumeration value="U"/>
        </xs:restriction>
</xs:simpleType>

<!-- Quality enumeration -->
<xs:simpleType name="qualityEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="E"/>
                <xs:enumeration value="G"/>
                <xs:enumeration value="P"/>
                <xs:enumeration value="U"/>
        </xs:restriction>
</xs:simpleType>

<!-- DEM quality enumeration -->
<xs:simpleType name="DEMQualityEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="E"/>
                <xs:enumeration value="F"/>
                <xs:enumeration value="G"/>
                <xs:enumeration value="U"/>
```

```
        </xs:restriction>
</xs:simpleType>

<!-- Start position enumeration -->
<xs:simpleType name="startPositionEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="BLC"/>
                <xs:enumeration value="TLC"/>
        </xs:restriction>
</xs:simpleType>

<!-- Limb enumeration -->
<xs:simpleType name="limbEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="ASC"/>
                <xs:enumeration value="DES"/>
        </xs:restriction>
</xs:simpleType>

<!-- Precipitation type enumeration -->
<xs:simpleType name="precipitationTypeEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="R"/>
                <xs:enumeration value="FR"/>
                <xs:enumeration value="S"/>
                <xs:enumeration value="H"/>
                <xs:enumeration value="R-FR"/>
                <xs:enumeration value="R-S"/>
                <xs:enumeration value="R-H"/>
                <xs:enumeration value="FR-R"/>
                <xs:enumeration value="FR-S"/>
                <xs:enumeration value="FR-H"/>
                <xs:enumeration value="S-R"/>
                <xs:enumeration value="S-FR"/>
                <xs:enumeration value="S-H"/>
                <xs:enumeration value="H-R"/>
                <xs:enumeration value="H-FR"/>
                <xs:enumeration value="H-S"/>
        </xs:restriction>
</xs:simpleType>

<!-- Earthquake type enumeration -->
<xs:simpleType name="eqTypeEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="R"/>
                <xs:enumeration value="Q"/>
                <xs:enumeration value="V"/>
                <xs:enumeration value="VT"/>
                <xs:enumeration value="VT_D"/>
                <xs:enumeration value="VT_S"/>
                <xs:enumeration value="H"/>
                <xs:enumeration value="H_HLF"/>
```

```
                <xs:enumeration value="H_LHF"/>
                <xs:enumeration value="LF"/>
                <xs:enumeration value="LF_LP"/>
                <xs:enumeration value="LF_T"/>
                <xs:enumeration value="LF_ILF"/>
                <xs:enumeration value="VLP"/>
                <xs:enumeration value="RF"/>
                <xs:enumeration value="E"/>
                <xs:enumeration value="U"/>
                <xs:enumeration value="O"/>
                <xs:enumeration value="X"/>
                <xs:enumeration value="G"/>
                <xs:enumeration value="PF"/>
                <xs:enumeration value="LP"/>
                <xs:enumeration value="HF"/>
                <xs:enumeration value="VH"/>
                <xs:enumeration value="VH_LC"/>
                <xs:enumeration value="T"/>
        </xs:restriction>
</xs:simpleType>

<!-- Tremor type enumeration -->
<xs:simpleType name="trmTypeEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="G"/>
                <xs:enumeration value="M"/>
                <xs:enumeration value="H"/>
                <xs:enumeration value="C"/>
                <xs:enumeration value="B"/>
        </xs:restriction>
</xs:simpleType>

<!-- Gas species enumeration -->
<xs:simpleType name="gasSpeciesEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="CO2"/>
                <xs:enumeration value="SO2"/>
                <xs:enumeration value="H2S"/>
                <xs:enumeration value="HCl"/>
                <xs:enumeration value="HF"/>
                <xs:enumeration value="CH4"/>
                <xs:enumeration value="H2"/>
                <xs:enumeration value="CO"/>
                <xs:enumeration value="3He4He"/>
                <xs:enumeration value="d13C"/>
                <xs:enumeration value="d34S"/>
                <xs:enumeration value="d18O"/>
                <xs:enumeration value="dD"/>
                <xs:enumeration value="NH3"/>
                <xs:enumeration value="N2"/>
                <xs:enumeration value="Ar"/>
                <xs:enumeration value="222Rn"/>
        </xs:restriction>
</xs:simpleType>
```

```
<!-- Waveform distance enumeration -->
<xs:simpleType name="wavefromdistanceEnum">
	<xs:restriction base="xs:string">
		<xs:whiteSpace value="collapse"/>
		<xs:enumeration value="P"/>
		<xs:enumeration value="I"/>
		<xs:enumeration value="D"/>
		<xs:enumeration value="U"/>
	</xs:restriction>
</xs:simpleType>

<!-- Plume species enumeration -->
<xs:simpleType name="plumeSpeciesEnum">
	<xs:restriction base="xs:string">
		<xs:whiteSpace value="collapse"/>
		<xs:enumeration value="CO2"/>
		<xs:enumeration value="SO2"/>
		<xs:enumeration value="H2S"/>
		<xs:enumeration value="HCl"/>
		<xs:enumeration value="HF"/>
		<xs:enumeration value="CO"/>
		<xs:enumeration value="CO2/SO2"/>
	</xs:restriction>
</xs:simpleType>

<!-- Hydrologic species enumeration -->
<xs:simpleType name="hydroSpeciesEnum">
	<xs:restriction base="xs:string">
		<xs:whiteSpace value="collapse"/>
		<xs:enumeration value="SO4"/>
		<xs:enumeration value="H2S"/>
		<xs:enumeration value="Cl"/>
		<xs:enumeration value="F"/>
		<xs:enumeration value="HCO3"/>
		<xs:enumeration value="Mg"/>
		<xs:enumeration value="Fe"/>
		<xs:enumeration value="Ca"/>
		<xs:enumeration value="Na"/>
		<xs:enumeration value="K"/>
		<xs:enumeration value="3He4He"/>
		<xs:enumeration value="c3He4He"/>
		<xs:enumeration value="d13C"/>
		<xs:enumeration value="d34S"/>
		<xs:enumeration value="dD"/>
		<xs:enumeration value="d18O"/>
		<xs:enumeration value="B"/>
		<xs:enumeration value="Li"/>
		<xs:enumeration value="SiO2"/>
		<xs:enumeration value="R2O3"/>
		<xs:enumeration value="SiO3"/>
		<xs:enumeration value="CO2"/>
		<xs:enumeration value="As"/>
		<xs:enumeration value="Ba"/>
		<xs:enumeration value="Al"/>
```

```
		</xs:restriction>
</xs:simpleType>

<!-- Original recalculated enumeration -->
<xs:simpleType name="oriRecalEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="O"/>
			<xs:enumeration value="R"/>
		</xs:restriction>
</xs:simpleType>

<!-- Digitize Original enumeration -->
<xs:simpleType name="orgDigEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="D"/>
			<xs:enumeration value="O"/>
		</xs:restriction>
</xs:simpleType>

<!-- Digitize Original enumeration -->
<xs:simpleType name="recalcEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="O"/>
			<xs:enumeration value="R"/>
		</xs:restriction>
</xs:simpleType>

<!-- General Deformation Instrument enumeration -->
<xs:simpleType name="diGenTypeEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="Angle"/>
			<xs:enumeration value="CGPS"/>
			<xs:enumeration value="EDM"/>
			<xs:enumeration value="EDM_Reflector"/>
			<xs:enumeration value="GPS"/>
			<xs:enumeration value="Total_Station"/>
			<xs:enumeration value="OtherTypes"/>
		</xs:restriction>
</xs:simpleType>

<!-- Deformation Tilt/Strain instrument enumeration -->
<xs:simpleType name="diTltTypeEnum">
		<xs:restriction base="xs:string">
			<xs:whiteSpace value="collapse"/>
			<xs:enumeration value="Tilt"/>
			<xs:enumeration value="Strain"/>
		</xs:restriction>
</xs:simpleType>

<!-- sd_evs First Motion enumeration -->
<xs:simpleType name="firMotionEnum">
		<xs:restriction base="xs:string">
```

```
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="Up"/>
                <xs:enumeration value="Down"/>
                <xs:enumeration value="Unknown"/>
        </xs:restriction>
</xs:simpleType>

<!-- Satellite/Airplane enumeration -->
<xs:simpleType name="oTypeEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="LEO"/>
                <xs:enumeration value="GSO"/>
        </xs:restriction>
</xs:simpleType>


<!-- gd_plume enumeration -->
<xs:simpleType name="colHeightEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="TRL"/>
                <xs:enumeration value="TRM"/>
                <xs:enumeration value="STL"/>
        </xs:restriction>
</xs:simpleType>

<!-- Eruption phase enumeration -->
<xs:simpleType name="phaseSpeciesEnum">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:enumeration value="Phreatic eruption"/>
                <xs:enumeration value="Magmatic extrusion"/>
                <xs:enumeration value="Explosion"/>
                <xs:enumeration value="Sector collapse"/>
                <xs:enumeration value="Climatic phase"/>
                <xs:enumeration value="Tectonic earthquake"/>
        </xs:restriction>
</xs:simpleType>

<!-- Time -->
<xs:simpleType name="time">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:length value="8"/>
                <xs:pattern value="[0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
                <xs:pattern value="2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
        </xs:restriction>
</xs:simpleType>

<!-- Date time (BC accepted) -->
<xs:simpleType name="dateTimeBC">
        <xs:restriction base="xs:string">
                <xs:whiteSpace value="collapse"/>
                <xs:pattern value=""/>
                <xs:pattern value="([ ])*"/>
```

<xs:pattern value="[0-9]{1}-0[0-9]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-0[0-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-1[0-2]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-0[0-9]-0[0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-0[0-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-1[0-2]-0[0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{1}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-0[0-9]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-0[0-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-1[0-2]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-0[0-9]-0[0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-0[0-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
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<xs:pattern value="-[0-9]{1}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{1}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
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<xs:pattern value="[0-9]{2}-0[0-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-1[0-2]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-0[0-9]-0[0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-0[0-9]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
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<xs:pattern value="[0-9]{2}-1[0-2]-[1-2][0-9] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="[0-9]{2}-1[0-2]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
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<xs:pattern value="-[0-9]{2}-0[0-9]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{2}-1[0-2]-0[0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{2}-1[0-2]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
<xs:pattern value="-[0-9]{2}-1[0-2]-3[0-1] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
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<xs:pattern value="-[0-9]{2}-0[0-9]-3[0-1] 2[0-3]:[0-5][0-9]:[0-5][0-9]"/>
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        </xs:restriction>
</xs:simpleType>

<!-- Date time -->
```

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		<xs:pattern value="[0-9]{4}-0[0-9]-3[0-1]"/>
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</xs:simpleType>

<!-- Date time (can be empty) -->
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		<xs:pattern value="([ ])*"/>
		<xs:pattern value="[0-9]{4}-0[0-9]-[0-2][0-9]"/>
		<xs:pattern value="[0-9]{4}-0[0-9]-3[0-1]"/>
		<xs:pattern value="[0-9]{4}-1[0-2]-[0-2][0-9]"/>
		<xs:pattern value="[0-9]{4}-1[0-2]-3[0-1]"/>
		<xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9]"/>
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	</xs:restriction>
</xs:simpleType>

<!-- Date time with microseconds -->
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```

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                <xs:pattern value="[0-9]{4}-0[1-9]-0[1-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-9])*"/>
                <xs:pattern value="[0-9]{4}-0[1-9]-[1-2][0-9] [0-1][0-9]:[0-5][0-9]:[0-5][0-9].([0-
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        </xs:restriction>
    </xs:simpleType>

    <!-- Date time uncertainty -->
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        </xs:restriction>
    </xs:simpleType>

    <!-- Date time uncertainty with microseconds -->
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            </xs:restriction>
    </xs:simpleType>


    <!-- ================================================================= -->
    <!-- Attribute groups -->
    <!-- ================================================================= -->
    <!-- Owners + publish date -->
    <xs:attributeGroup name="OwnersPubDateGroup">
            <xs:attribute name="owner1" type="string15NE"/>
            <xs:attribute name="owner2" type="string15NE"/>
            <xs:attribute name="owner3" type="string15NE"/>
            <xs:attribute name="pubDate" type="dateTime"/>
            <xs:attribute name="v" type="xs:string"/>
    </xs:attributeGroup>

    <!-- ================================================================= -->
    <!-- Groups -->
    <!-- ================================================================= -->
    <!-- Common network -->
    <xs:group name="CommonNetworkGroup">
            <xs:sequence>
                    <xs:element name="Volcanoes" type="VolcanoesType"/>
                    <xs:element name="name" type="string255" minOccurs="0"/>
                    <xs:element name="area" type="float" minOccurs="0"/>
                    <xs:element name="commonNetMap" type="string255" minOccurs="0"/>

                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
               <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
    </xs:group>

    <!-- Latitude longitude group -->
    <xs:group name="latLonGroup">
            <xs:sequence>
                    <xs:element name="lat" type="deg-90-90"/>
                    <xs:element name="lon" type="deg-180-180"/>
            </xs:sequence>
    </xs:group>
```

```
    <!-- Instrument latitude longitude group -->
    <xs:group name="instLatLonGroup">
        <xs:sequence>
            <xs:element name="instLat" type="deg-90-90"/>
            <xs:element name="instLon" type="deg-180-180"/>
        </xs:sequence>
    </xs:group>

    <!-- Start latitude longitude group -->
    <xs:group name="startLatLonGroup">
        <xs:sequence>
            <xs:element name="startLat" type="deg-90-90"/>
            <xs:element name="startLon" type="deg-180-180"/>
        </xs:sequence>
    </xs:group>

    <!-- Moment tensor -->
    <xs:group name="momentTensorGroup">
        <xs:sequence>
            <xs:element name="momentTensorScale" type="float"/>
            <xs:element name="momentTensorXX" type="float"/>
            <xs:element name="momentTensorXY" type="float"/>
            <xs:element name="momentTensorXZ" type="float"/>
            <xs:element name="momentTensorYY" type="float"/>
            <xs:element name="momentTensorYZ" type="float"/>
            <xs:element name="momentTensorZZ" type="float"/>
        </xs:sequence>
    </xs:group>


    <!-- ================================================================ -->
    <!-- Complex types -->
    <!-- ================================================================ -->
    <!-- wovoml (root) -->
    <xs:complexType name="wovomlType">
        <xs:sequence>
            <!-- Observations -->
            <xs:element name="Observations" type="ObservationsType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Inferred processes -->
            <xs:element name="InferredProcesses" type="InferredProcessesType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Eruptions -->
            <xs:element name="Eruptions" type="EruptionsType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Monitoring systems -->
            <xs:element name="MonitoringSystems" type="MonitoringSystemsType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Data -->
            <xs:element name="Data" type="DataType" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="version" type="xs:string" use="required"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>
```

```
    <!-- Observations -->
    <xs:complexType name="ObservationsType">
        <xs:sequence>
            <!-- Observation -->
            <xs:element name="Observation" type="ObservationType" minOccurs="1"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="volcano" type="string12NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Observation -->
    <xs:complexType name="ObservationType">
        <xs:sequence>

            <xs:element name="sLat" type="double" minOccurs="0"/>
            <xs:element name="sLatErr" type="float" minOccurs="0"/>
            <xs:element name="sLon" type="double" minOccurs="0"/>
            <xs:element name="sLonErr" type="float" minOccurs="0"/>
            <xs:element name="sElev" type="double" minOccurs="0"/>
            <xs:element name="sElevErr" type="float" minOccurs="0"/>
            <xs:element name="description" type="string1200" minOccurs="0"/>
            <xs:element name="obsType" type="string255" minOccurs="0"/>
            <xs:element name="obsMeas" type="string30" minOccurs="0"/>
            <xs:element name="obsMeasUni" type="string30" minOccurs="0"/>
            <xs:element name="obsMeasVal" type="float" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime" minOccurs="0"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="volcano" type="string12NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Inferred processes -->
    <xs:complexType name="InferredProcessesType">
        <xs:sequence>
            <!-- Magma movement -->
            <xs:element name="MagmaMovement" type="MagmaMovementType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Volatile saturation -->
            <xs:element name="VolatileSat" type="VolatileSatType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Magma pressure -->
            <xs:element name="MagmaPressure" type="MagmaPressureType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Hydrothermal -->
            <xs:element name="Hydrothermal" type="HydrothermalType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Regional tectonics -->
            <xs:element name="RegionalTectonics" type="RegionalTectonicsType"
minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
```

```
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Magma movement -->
    <xs:complexType name="MagmaMovementType">
            <xs:sequence>
                    <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="deepSupp" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="ascent" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="convecBelow" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="convecAbove" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="magmaMix" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="dikeIntru" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="pipeIntru" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="sillIntru" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Volatile saturation -->
    <xs:complexType name="VolatileSatType">
            <xs:sequence>
                    <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="CO2Sat" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="H2OSat" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="decompress" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="fugacity" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="volatileAdd" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="crystalOr2ndBoil" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="vesicul" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="devesicul" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="degas" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
```

```
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Magma pressure -->
    <xs:complexType name="MagmaPressureType">
            <xs:sequence>
                    <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="gasInduced" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="tectInduced" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrothermal -->
    <xs:complexType name="HydrothermalType">
            <xs:sequence>
                    <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="heatGwater" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="poreDestab" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="poreDeform" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="hydrofract" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="boilTremor" type="yesNoMaybeUnkEnum" minOccurs="0"/>
                    <xs:element name="absorSolGas" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="speciesEqbChange" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="boilDryChimneys" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Regional tectonics -->
```

```
    <xs:complexType name="RegionalTectonicsType">
        <xs:sequence>
            <xs:element name="inferTime" type="dateTime" minOccurs="0"/>
            <xs:element name="inferTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime" minOccurs="0"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="tectonicChanges" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="staticStress" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="dynamicStrain" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="localShear" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="slowEarthquake" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="distalPressure" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="distalDepressure" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="hydrothermalLubrication" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="earthTide" type="yesNoMaybeUnkEnum" minOccurs="0"/>
            <xs:element name="atmosInfluence" type="yesNoMaybeUnkEnum"
minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="volcano" type="string12NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Eruptions -->
    <xs:complexType name="EruptionsType">
        <xs:sequence>
            <!-- Eruption -->
            <xs:element name="Eruption" type="EruptionType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Phase alone -->
            <xs:element name="Phases" type="PhasesType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Video alone -->
            <xs:element name="Video" type="VideoAloneType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Forecast alone -->
            <xs:element name="Forecast" type="ForecastAloneType" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>

        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Eruption -->
    <xs:complexType name="EruptionType">
```

```
            <xs:sequence>

                  <!-- Eruption information -->
                  <xs:element name="eruptNumber" type="xs:integer" minOccurs="0"/>
                  <xs:element name="name" type="string60" minOccurs="0"/>
                  <xs:element name="narrative" type="string255" minOccurs="0"/>
                  <xs:element name="startTime" type="dateTimeBC"/>
                  <xs:element name="startTimeBC" type="xs:integer" minOccurs="0"/>
                  <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                  <xs:element name="endTime" type="dateTimeBC" minOccurs="0"/>
                  <xs:element name="endTimeBC" type="xs:integer" minOccurs="0"/>
                  <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                  <xs:element name="climaxTime" type="dateTimeBC" minOccurs="0"/>
                  <xs:element name="climaxTimeBC" type="xs:integer" minOccurs="0"/>
                  <xs:element name="climaxTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                  <xs:element name="eruptVei" type="xs:integer" minOccurs="0"/>
                  <xs:element name="eruptRType" type="string50" minOccurs="0"/>
                  <xs:element name="eruptMagamoving" type="yesNoEnum" minOccurs="0"/>
                  <xs:element name="comments" type="string255" minOccurs="0"/>
                  <xs:element name="comments2" type="string255" minOccurs="0"/>
                  <!-- Video -->
                  <xs:element name="Video" type="VideoType" minOccurs="0"
maxOccurs="unbounded"/>
                  <!-- Phase -->
                  <xs:element name="Phase" type="PhaseType" minOccurs="0"
maxOccurs="unbounded"/>

            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
      </xs:complexType>

      <!-- Phase -->
      <xs:complexType name="PhaseType">
            <xs:sequence>
                  <!-- Phase information -->
                  <xs:element name="phaseNumber" type="float" minOccurs="0"/>
                  <xs:element name="startTime" type="dateTimeBC"/>
                  <xs:element name="startTimeBC" type="xs:integer" minOccurs="0"/>
                  <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                  <xs:element name="endTime" type="dateTimeBC" minOccurs="0"/>
                  <xs:element name="endTimeBC" type="xs:integer" minOccurs="0"/>
                  <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                  <xs:element name="phaseType" type="phaseSpeciesEnum" minOccurs="0"/>
                  <xs:element name="description" type="string255" minOccurs="0"/>
                  <xs:element name="vei" type="xs:integer" minOccurs="0"/>
                  <xs:element name="maxLavaExtru" type="float" minOccurs="0"/>
                  <xs:element name="maxExpMassDis" type="float" minOccurs="0"/>
                  <xs:element name="dreTot" type="float" minOccurs="0"/>
                  <xs:element name="dreLav" type="float" minOccurs="0"/>
                  <xs:element name="dreTep" type="float" minOccurs="0"/>
                  <xs:element name="magmaMix" type="yesNoUnkEnum" minOccurs="0"/>
                  <xs:element name="maxColHeight" type="float" minOccurs="0"/>
                  <xs:element name="colHeightDet" type="string255" minOccurs="0"/>
                  <xs:element name="minSiO2MatrixGlass" type="float" minOccurs="0"/>
```

```
                    <xs:element name="maxSiO2MatrixGlass" type="float" minOccurs="0"/>
                    <xs:element name="minSiO2WholeRock" type="float" minOccurs="0"/>
                    <xs:element name="maxSiO2WholeRock" type="float" minOccurs="0"/>
                    <xs:element name="totCrystal" type="float" minOccurs="0"/>
                    <xs:element name="phenoContent" type="float" minOccurs="0"/>
                    <xs:element name="phenoAssemb" type="string255" minOccurs="0"/>
                    <xs:element name="preErupH2OContent" type="float" minOccurs="0"/>
                    <xs:element name="phenoMeltInclusion" type="string255" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

                    <!-- Video -->
                    <xs:element name="Video" type="VideoType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Forecast -->
                    <xs:element name="Forecast" type="ForecastType" minOccurs="0"
maxOccurs="unbounded"/>

            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Phases -->
    <xs:complexType name="PhasesType">
            <xs:sequence>
                    <!-- Phase alone -->
                    <xs:element name="Phase" type="PhaseAloneType" minOccurs="1"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="eruption" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Phase alone -->
    <xs:complexType name="PhaseAloneType">
            <xs:sequence>
                    <!-- Phase information -->
                    <xs:element name="phaseNumber" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTimeBC"/>
                    <xs:element name="startTimeBC" type="xs:integer" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeBC" minOccurs="0"/>
                    <xs:element name="endTimeBC" type="xs:integer" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="phaseType" type="phaseSpeciesEnum" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="vei" type="xs:integer" minOccurs="0"/>
                    <xs:element name="maxLavaExtru" type="float" minOccurs="0"/>
                    <xs:element name="maxExpMassDis" type="float" minOccurs="0"/>
                    <xs:element name="dreTot" type="float" minOccurs="0"/>
                    <xs:element name="dreLav" type="float" minOccurs="0"/>
                    <xs:element name="dreTep" type="float" minOccurs="0"/>
                    <xs:element name="magmaMix" type="yesNoUnkEnum" minOccurs="0"/>
                    <xs:element name="maxColHeight" type="float" minOccurs="0"/>
                    <xs:element name="colHeightDet" type="string255" minOccurs="0"/>
                    <xs:element name="minSiO2MatrixGlass" type="float" minOccurs="0"/>
```

```
                    <xs:element name="maxSiO2MatrixGlass" type="float" minOccurs="0"/>
                    <xs:element name="minSiO2WholeRock" type="float" minOccurs="0"/>
                    <xs:element name="maxSiO2WholeRock" type="float" minOccurs="0"/>
                    <xs:element name="totCrystal" type="float" minOccurs="0"/>
                    <xs:element name="phenoContent" type="float" minOccurs="0"/>
                    <xs:element name="phenoAssemb" type="string255" minOccurs="0"/>
                    <xs:element name="preErupH2OContent" type="float" minOccurs="0"/>
                    <xs:element name="phenoMeltInclusion" type="string255" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Video -->
                    <xs:element name="Video" type="VideoType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Forecast -->
                    <xs:element name="Forecast" type="ForecastType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="eruption" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Video -->
    <xs:complexType name="VideoType">
            <xs:sequence>
                    <xs:element name="link" type="string255"/>
                    <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="length" type="time" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Video alone -->
    <xs:complexType name="VideoAloneType">
            <xs:sequence>
                    <xs:element name="link" type="string255"/>
                    <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="length" type="time" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="eruption" type="string30NE"/>
            <xs:attribute name="phase" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Forecast -->
    <xs:complexType name="ForecastType">
            <xs:sequence>
                    <xs:element name="description" type="string1200" minOccurs="0"/>
```

```
                    <xs:element name="earliestStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="earliestStartTimeUnc" type="dateTimeUnc"
minOccurs="0"/>
                    <xs:element name="latestStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="latestStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="issueTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="issueTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="timeSuccess" type="successEnum" minOccurs="0"/>
                    <xs:element name="magniSuccess" type="successEnum" minOccurs="0"/>
                    <xs:element name="alertStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="alertEndTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="alertLevel" type="string255" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="phase" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Forecast alone -->
    <xs:complexType name="ForecastAloneType">
            <xs:sequence>
                    <xs:element name="description" type="string1200" minOccurs="0"/>
                    <xs:element name="earliestStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="earliestStartTimeUnc" type="dateTimeUnc"
minOccurs="0"/>
                    <xs:element name="latestStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="latestStartTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="issueTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="issueTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="timeSuccess" type="successEnum" minOccurs="0"/>
                    <xs:element name="magniSuccess" type="successEnum" minOccurs="0"/>
                    <xs:element name="alertStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="alertEndTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="alertLevel" type="string255" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="phase" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Monitoring systems -->
    <xs:complexType name="MonitoringSystemsType">
            <xs:sequence>
                    <!-- Airplane -->
                    <xs:element name="Airplane" type="AirplaneType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Satellite -->
                    <xs:element name="Satellite" type="SatelliteType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Deformation network -->
                    <xs:element name="DeformationNetwork" type="DeformationNetworkType"
minOccurs="0" maxOccurs="unbounded"/>
```

```
                        <!-- Deformation stations -->
                        <xs:element name="DeformationStations" type="DeformationStationsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Deformation instruments -->
                        <xs:element name="DeformationInstruments"
type="DeformationInstrumentsType" minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Gas network -->
                        <xs:element name="GasNetwork" type="GasNetworkType" minOccurs="0"
maxOccurs="unbounded"/>
                        <!-- Gas stations -->
                        <xs:element name="GasStations" type="GasStationsType" minOccurs="0"
maxOccurs="unbounded"/>
                        <!-- Gas instruments -->
                        <xs:element name="GasInstruments" type="GasInstrumentsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Hydrologic network -->
                        <xs:element name="HydrologicNetwork" type="HydrologicNetworkType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Hydrologic stations -->
                        <xs:element name="HydrologicStations" type="HydrologicStationsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Hydrologic instruments -->
                        <xs:element name="HydrologicInstruments" type="HydrologicInstrumentsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Fields network -->
                        <xs:element name="FieldsNetwork" type="FieldsNetworkType" minOccurs="0"
maxOccurs="unbounded"/>
                        <!-- Fields stations -->
                        <xs:element name="FieldsStations" type="FieldsStationsType" minOccurs="0"
maxOccurs="unbounded"/>
                        <!-- Fields instruments -->
                        <xs:element name="FieldsInstruments" type="FieldsInstrumentsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Thermal network -->
                        <xs:element name="ThermalNetwork" type="ThermalNetworkType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Thermal stations -->
                        <xs:element name="ThermalStations" type="ThermalStationsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Thermal instruments -->
                        <xs:element name="ThermalInstruments" type="ThermalInstrumentsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Meteo network -->
                        <xs:element name="MeteoNetwork" type="MeteoNetworkType" minOccurs="0"
maxOccurs="unbounded"/>
                        <!-- Meteo stations -->
                        <xs:element name="MeteoStations" type="MeteoStationsType" minOccurs="0"
maxOccurs="unbounded"/>
                        <!-- Meteo instruments -->
                        <xs:element name="MeteoInstruments" type="MeteoInstrumentsType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Seismic network -->
                        <xs:element name="SeismicNetwork" type="SeismicNetworkType"
minOccurs="0" maxOccurs="unbounded"/>
                        <!-- Seismic stations -->
```

```
                    <xs:element name="SeismicStations" type="SeismicStationsType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Seismic instruments -->
                    <xs:element name="SeismicInstruments" type="SeismicInstrumentsType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Seismic components -->
                    <xs:element name="SeismicComponents" type="SeismicComponentsType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Airplane -->
    <xs:complexType name="AirplaneType">
            <xs:sequence>
                    <xs:element name="name" type="string50" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="oType" type="oTypeEnum" minOccurs="0"/>
                    <xs:element name="oHeight" type="float" minOccurs="0"/>
                    <xs:element name="spatres" type="string30" minOccurs="0"/>
                    <xs:element name="ctSize" type="float" minOccurs="0"/>
                    <xs:element name="atSize" type="float" minOccurs="0"/>

                    <xs:element name="sWidth" type="float" minOccurs="0"/>

                    <xs:element name="tempres" type="string30" minOccurs="0"/>
                    <xs:element name="rTime" type="float" minOccurs="0"/>
                    <xs:element name="vAngle" type="float" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Gas instrument -->
                    <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Thermal instrument -->
                    <xs:element name="ThermalInstrument" type="ThermalInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>


    <!-- Satellite -->
    <xs:complexType name="SatelliteType">
            <xs:sequence>
                    <xs:element name="name" type="string50" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="oType" type="oTypeEnum" minOccurs="0"/>
                    <xs:element name="oHeight" type="float" minOccurs="0"/>
```

```
                    <xs:element name="spatres" type="string30" minOccurs="0"/>
                    <xs:element name="ctSize" type="float" minOccurs="0"/>
                    <xs:element name="atSize" type="float" minOccurs="0"/>

                    <xs:element name="sWidth" type="float" minOccurs="0"/>
                    <xs:element name="tempres" type="string30" minOccurs="0"/>
                    <xs:element name="rTime" type="float" minOccurs="0"/>
                    <xs:element name="vAngle" type="float" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Gas instrument -->
                    <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Thermal instrument -->
                    <xs:element name="ThermalInstrument" type="ThermalInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Deformation instrument  -->
                    <xs:element name="DeformationInstrument" type="DeformationInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>


    <!-- Deformation network -->
    <xs:complexType name="DeformationNetworkType">
            <xs:sequence>
                    <xs:group ref="CommonNetworkGroup"/>
                    <!-- Deformation station -->
                    <xs:element name="DeformationStation" type="DeformationStationType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Deformation station -->
    <xs:complexType name="DeformationStationType">
            <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="horizPrecision" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="refStation" type="yesNoEnum" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
```

```
                    <xs:element name="comments" type="string255" minOccurs="0"/>

                    <!-- Deformation instrument -->
                    <xs:element name="DeformationInstrument" type="DeformationInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Tilt/Instrument instrument -->
                    <xs:element name="TiltStrainInstrument" type="TiltStrainInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Deformation stations -->
    <xs:complexType name="DeformationStationsType">
            <xs:sequence>
                    <!-- Deformation station -->
                    <xs:element name="DeformationStation" type="DeformationStationAloneType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Deformation station alone -->
    <xs:complexType name="DeformationStationAloneType">
            <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="horizPrecision" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="refStation" type="yesNoEnum" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

                    <!-- Deformation instrument -->
                    <xs:element name="DeformationInstrument" type="DeformationInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Tilt/Instrument instrument -->
                    <xs:element name="TiltStrainInstrument" type="TiltStrainInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Deformation instrument -->
    <xs:complexType name="DeformationInstrumentType">
```

```
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
              <xs:element name="type" type="diGenTypeEnum"/>
                <xs:element name="units" type="string30" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Tilt/Strain instrument -->
    <xs:complexType name="TiltStrainInstrumentType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="diTltTypeEnum"/>
                <xs:element name="depth" type="float" minOccurs="0"/>
                <xs:element name="units" type="string30" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="direction1" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction2" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction3" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction4" type="deg0-360" minOccurs="0"/>
                <xs:element name="electroConv1" type="float" minOccurs="0"/>
                <xs:element name="electroConv2" type="float" minOccurs="0"/>
                <xs:element name="electroConv3" type="float" minOccurs="0"/>
                <xs:element name="electroConv4" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Deformation instruments -->
    <xs:complexType name="DeformationInstrumentsType">
            <xs:sequence>
                <!-- Deformation instrument -->
                <xs:element name="DeformationInstrument"
type="DeformationInstrumentAloneType" minOccurs="0" maxOccurs="unbounded"/>
                <!-- Tilt/Strain instrument -->
                <xs:element name="TiltStrainInstrument" type="TiltStrainInstrumentAloneType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
```

```
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Deformation instrument alone -->
<xs:complexType name="DeformationInstrumentAloneType">
        <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
           <xs:element name="type" type="diGenTypeEnum"/>
                <xs:element name="units" type="string30" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="satellite" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Tilt/Strain instrument alone -->
<xs:complexType name="TiltStrainInstrumentAloneType">
        <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="diTltTypeEnum"/>
                <xs:element name="depth" type="float" minOccurs="0"/>
                <xs:element name="units" type="string30" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="direction1" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction2" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction3" type="deg0-360" minOccurs="0"/>
                <xs:element name="direction4" type="deg0-360" minOccurs="0"/>
                <xs:element name="electroConv1" type="float" minOccurs="0"/>
                <xs:element name="electroConv2" type="float" minOccurs="0"/>
                <xs:element name="electroConv3" type="float" minOccurs="0"/>
                <xs:element name="electroConv4" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gas network -->
<xs:complexType name="GasNetworkType">
        <xs:sequence>
                <xs:group ref="CommonNetworkGroup"/>
```

```
                    <!-- Gas station -->
                    <xs:element name="GasStation" type="GasStationType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas station -->
    <xs:complexType name="GasStationType">
            <xs:sequence>
                    <xs:element name="name" type="string50" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:element name="type" type="string255" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Gas instrument -->
                    <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas instrument -->
    <xs:complexType name="GasInstrumentType">
            <xs:sequence>
                    <xs:element name="type" type="string255" minOccurs="0"/>
                    <xs:element name="name" type="string255" minOccurs="0"/>
                    <xs:element name="units" type="string50" minOccurs="0"/>
                    <xs:element name="resolution" type="float" minOccurs="0"/>
                    <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                    <xs:element name="calibration" type="string255" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="spatRes" type="string30" minOccurs="0"/>
                    <xs:element name="crossTSize" type="float" minOccurs="0"/>
                    <xs:element name="alongTSize" type="float" minOccurs="0"/>
                    <xs:element name="swathWidth" type="float" minOccurs="0"/>
                    <xs:element name="tempRes" type="string30" minOccurs="0"/>
                    <xs:element name="returnTime" type="string30" minOccurs="0"/>

                    <xs:element name="viewAngle" type="double" minOccurs="0"/>

                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
```

```
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas stations -->
    <xs:complexType name="GasStationsType">
            <xs:sequence>
                <!-- Gas station -->
                <xs:element name="GasStation" type="GasStationAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas station alone -->
    <xs:complexType name="GasStationAloneType">
            <xs:sequence>
                <xs:element name="name" type="string50" minOccurs="0"/>
                <xs:group ref="latLonGroup" minOccurs="0"/>
                <xs:element name="elev" type="float" minOccurs="0"/>
                <xs:element name="permInst" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string255" minOccurs="0"/>
                <xs:element name="diffUTC" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
                <!-- Gas instrument -->
                <xs:element name="GasInstrument" type="GasInstrumentType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas instruments -->
    <xs:complexType name="GasInstrumentsType">
            <xs:sequence>
                <!-- Gas instrument -->
                <xs:element name="GasInstrument" type="GasInstrumentAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="airplane" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas instrument alone -->
```

```
    <xs:complexType name="GasInstrumentAloneType">
        <xs:sequence>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="units" type="string50" minOccurs="0"/>
            <xs:element name="resolution" type="float" minOccurs="0"/>
            <xs:element name="signalToNoise" type="float" minOccurs="0"/>
            <xs:element name="calibration" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="spatRes" type="string30" minOccurs="0"/>
            <xs:element name="crossTSize" type="float" minOccurs="0"/>
            <xs:element name="alongTSize" type="float" minOccurs="0"/>
            <xs:element name="swathWidth" type="float" minOccurs="0"/>
            <xs:element name="tempRes" type="string30" minOccurs="0"/>
            <xs:element name="returnTime" type="string30" minOccurs="0"/>

            <xs:element name="viewAngle" type="double" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="airplane" type="string30NE"/>
        <xs:attribute name="satellite" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic network -->
    <xs:complexType name="HydrologicNetworkType">
        <xs:sequence>
            <xs:group ref="CommonNetworkGroup"/>
            <!-- Hydrologic station -->
            <xs:element name="HydrologicStation" type="HydrologicStationType"
minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic station -->
    <xs:complexType name="HydrologicStationType">
        <xs:sequence>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="permInst" type="string255" minOccurs="0"/>
            <xs:element name="name" type="string30" minOccurs="0"/>
            <xs:element name="waterBodyType" type="string255" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="screenTop" type="float" minOccurs="0"/>
            <xs:element name="screenBottom" type="float" minOccurs="0"/>
            <xs:element name="wellDepth" type="double" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
```

```
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

                    <!-- Hydrologic instrument -->
                    <xs:element name="HydrologicInstrument" type="HydrologicInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic instrument -->
    <xs:complexType name="HydrologicInstrumentType">
            <xs:sequence>
                    <xs:element name="name" type="string255" minOccurs="0"/>
                    <xs:element name="type" type="string50" minOccurs="0"/>
                    <xs:element name="pressureMeasType" type="pressureMeasTypeEnum"
minOccurs="0"/>
                    <xs:element name="units" type="string50" minOccurs="0"/>
                    <xs:element name="resolution" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic stations -->
    <xs:complexType name="HydrologicStationsType">
            <xs:sequence>
                    <!-- Hydrologic station alone -->
                    <xs:element name="HydrologicStation" type="HydrologicStationAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic station alone -->
    <xs:complexType name="HydrologicStationAloneType">
            <xs:sequence>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:element name="waterBodyType" type="string255" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
```

```
                        <xs:element name="screenTop" type="float" minOccurs="0"/>
                        <xs:element name="screenBottom" type="float" minOccurs="0"/>
                        <xs:element name="wellDepth" type="double" minOccurs="0"/>
                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="description" type="string255" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                        <!-- Hydrologic instrument -->
                        <xs:element name="HydrologicInstrument" type="HydrologicInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attribute name="network" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Hydrologic instruments -->
        <xs:complexType name="HydrologicInstrumentsType">
                <xs:sequence>
                        <!-- Hydrologic instrument -->
                        <xs:element name="HydrologicInstrument"
type="HydrologicInstrumentAloneType" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Hydrologic instrument alone -->
        <xs:complexType name="HydrologicInstrumentAloneType">
                <xs:sequence>
                        <xs:element name="name" type="string255" minOccurs="0"/>
                        <xs:element name="type" type="string50" minOccurs="0"/>
                        <xs:element name="pressureMeasType" type="pressureMeasTypeEnum"
minOccurs="0"/>
                        <xs:element name="units" type="string50" minOccurs="0"/>
                        <xs:element name="resolution" type="float" minOccurs="0"/>
                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="description" type="string255" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Fields network -->
        <xs:complexType name="FieldsNetworkType">
                <xs:sequence>
                        <xs:group ref="CommonNetworkGroup"/>
```

```
                <!-- Fields station -->
                <xs:element name="FieldsStation" type="FieldsStationType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Fields station -->
    <xs:complexType name="FieldsStationType">
            <xs:sequence>
                <xs:element name="name" type="string50" minOccurs="0"/>
                <xs:group ref="latLonGroup" minOccurs="0"/>
                <xs:element name="elev" type="float" minOccurs="0"/>
                <xs:element name="permInst" type="string255" minOccurs="0"/>
                <xs:element name="diffUTC" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>

                <!-- Fields instrument -->
                <xs:element name="FieldsInstrument" type="FieldsInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Fields instrument -->
    <xs:complexType name="FieldsInstrumentType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string255" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="units" type="string255" minOccurs="0"/>
                <xs:element name="sampleRate" type="float" minOccurs="0"/>
                <xs:element name="filterType" type="string255" minOccurs="0"/>
                <xs:element name="orientation" type="string255" minOccurs="0"/>
                <xs:element name="calculation" type="string255" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Fields stations -->
    <xs:complexType name="FieldsStationsType">
```

```
            <xs:sequence>
                <!-- Fields station alone -->
                <xs:element name="FieldsStation" type="FieldsStationAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Fields station alone -->
    <xs:complexType name="FieldsStationAloneType">
            <xs:sequence>
                <xs:element name="name" type="string50" minOccurs="0"/>
                <xs:group ref="latLonGroup" minOccurs="0"/>
                <xs:element name="elev" type="float" minOccurs="0"/>
                <xs:element name="permInst" type="string255" minOccurs="0"/>
                <xs:element name="diffUTC" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
                <!-- Fields instrument -->
                <xs:element name="FieldsInstrument" type="FieldsInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Fields instruments -->
    <xs:complexType name="FieldsInstrumentsType">
            <xs:sequence>
                <!-- Fields instrument alone -->
                <xs:element name="FieldsInstrument" type="FieldsInstrumentAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Fields instrument alone -->
    <xs:complexType name="FieldsInstrumentAloneType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string255" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="units" type="string255" minOccurs="0"/>
                <xs:element name="sampleRate" type="float" minOccurs="0"/>
                <xs:element name="filterType" type="string255" minOccurs="0"/>
                <xs:element name="orientation" type="string255" minOccurs="0"/>
                <xs:element name="calculation" type="string255" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
```

```
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Thermal network -->
        <xs:complexType name="ThermalNetworkType">
                <xs:sequence>
                        <xs:group ref="CommonNetworkGroup"/>
                        <!-- Thermal station -->
                        <xs:element name="ThermalStation" type="ThermalStationType" minOccurs="0"
maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Thermal station -->
        <xs:complexType name="ThermalStationType">
                <xs:sequence>
                        <xs:element name="name" type="string30" minOccurs="0"/>
                        <xs:element name="thermalFeatType" type="string255" minOccurs="0"/>
                        <xs:element name="groundType" type="string255" minOccurs="0"/>
                        <xs:group ref="latLonGroup" minOccurs="0"/>
                        <xs:element name="elev" type="float" minOccurs="0"/>
                        <xs:element name="permInst" type="string255" minOccurs="0"/>
                        <xs:element name="diffUTC" type="float" minOccurs="0"/>
                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="description" type="string255" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                        <!-- Thermal instrument -->
                        <xs:element name="ThermalInstrument" type="ThermalInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Thermal stations -->
        <xs:complexType name="ThermalStationsType">
                <xs:sequence>
                        <!-- Thermal station -->
                        <xs:element name="ThermalStation" type="ThermalStationAloneType"
maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="network" type="string30NE"/>
```

```
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal station alone -->
    <xs:complexType name="ThermalStationAloneType">
            <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:element name="thermalFeatType" type="string255" minOccurs="0"/>
                    <xs:element name="groundType" type="string255" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Thermal instrument -->
                    <xs:element name="ThermalInstrument" type="ThermalInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal instrument -->
    <xs:complexType name="ThermalInstrumentType">
            <xs:sequence>
                    <xs:element name="type" type="string255" minOccurs="0"/>
                    <xs:element name="name" type="string255" minOccurs="0"/>
                    <xs:element name="units" type="string50" minOccurs="0"/>
                    <xs:element name="resolution" type="float" minOccurs="0"/>
                    <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal instruments -->
    <xs:complexType name="ThermalInstrumentsType">
            <xs:sequence>
                    <!-- Thermal instrument -->
                    <xs:element name="ThermalInstrument" type="ThermalInstrumentAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
```

```
            <xs:attribute name="airplane" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal instrument alone -->
    <xs:complexType name="ThermalInstrumentAloneType">
            <xs:sequence>
                    <xs:element name="type" type="string255" minOccurs="0"/>
                    <xs:element name="name" type="string255" minOccurs="0"/>
                    <xs:element name="units" type="string50" minOccurs="0"/>
                    <xs:element name="resolution" type="float" minOccurs="0"/>
                    <xs:element name="signalToNoise" type="float" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="airplane" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Meteo network -->
    <xs:complexType name="MeteoNetworkType">
            <xs:sequence>
                    <xs:group ref="CommonNetworkGroup"/>
                    <!-- Meteo station -->
                    <xs:element name="MeteoStation" type="MeteoStationType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Meteo station -->
    <xs:complexType name="MeteoStationType">
            <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="permInst" type="string255" minOccurs="0"/>
                    <xs:element name="type" type="string255" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Meteo instrument -->
```

```
                    <xs:element name="MeteoInstrument" type="MeteoInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Meteo instrument -->
        <xs:complexType name="MeteoInstrumentType">
                <xs:sequence>
                        <xs:element name="name" type="string255" minOccurs="0"/>
                        <xs:element name="type" type="string50" minOccurs="0"/>
                        <xs:element name="units" type="string50" minOccurs="0"/>
                        <xs:element name="resolution" type="float" minOccurs="0"/>
                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="description" type="string255" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Meteo stations -->
        <xs:complexType name="MeteoStationsType">
                <xs:sequence>
                        <!-- Meteo station alone -->
                        <xs:element name="MeteoStation" type="MeteoStationAloneType"
maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="network" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Meteo station alone -->
        <xs:complexType name="MeteoStationAloneType">
                <xs:sequence>
                        <xs:element name="name" type="string30" minOccurs="0"/>
                        <xs:group ref="latLonGroup" minOccurs="0"/>
                        <xs:element name="elev" type="float" minOccurs="0"/>
                        <xs:element name="permInst" type="string255" minOccurs="0"/>
                        <xs:element name="type" type="string255" minOccurs="0"/>
                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                        <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="diffUTC" type="float" minOccurs="0"/>
                        <xs:element name="description" type="string255" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>

                        <!-- Meteo instrument -->
```

```
                <xs:element name="MeteoInstrument" type="MeteoInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Meteo instruments -->
    <xs:complexType name="MeteoInstrumentsType">
            <xs:sequence>
                <!-- Meteo instrument -->
                <xs:element name="MeteoInstrument" type="MeteoInstrumentAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Meteo instrument alone -->
    <xs:complexType name="MeteoInstrumentAloneType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string50" minOccurs="0"/>
                <xs:element name="units" type="string50" minOccurs="0"/>
                <xs:element name="resolution" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="description" type="string255" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic network -->
    <xs:complexType name="SeismicNetworkType">
            <xs:sequence>
                <xs:element name="Volcanoes" type="VolcanoesType" minOccurs="0"/>
                <xs:element name="name" type="string30" minOccurs="0"/>
                <xs:element name="velocityModel" type="string511" minOccurs="0"/>
                <xs:element name="velocityModelDetail" type="string511" minOccurs="0"/>
                <xs:element name="zeroDepth" type="string255" minOccurs="0"/>
                <xs:element name="fixedDepth" type="yesNoUnkEnum" minOccurs="0"/>
                <xs:element name="fixedDepthDesc" type="string255" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime" minOccurs="0"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="numberOfSeismo" type="xs:integer" minOccurs="0"/>
                <xs:element name="numberOfBBSeismo" type="xs:integer" minOccurs="0"/>
                <xs:element name="numberOfSMPSeismo" type="xs:integer" minOccurs="0"/>
```

```
                    <xs:element name="numberOfDigiSeismo" type="xs:integer" minOccurs="0"/>
                    <xs:element name="numberOfAnaSeismo" type="xs:integer" minOccurs="0"/>
                    <xs:element name="numberOf3CompSeismo" type="xs:integer"
minOccurs="0"/>
                    <xs:element name="numberOfMicro" type="xs:integer" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Seismic station -->
                    <xs:element name="SeismicStation" type="SeismicStationType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic station -->
    <xs:complexType name="SeismicStationType">
            <xs:sequence>
                    <xs:element name="name" type="string30" minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:element name="instDepth" type="string255" minOccurs="0"/>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="diffUTC" type="float" minOccurs="0"/>
                    <xs:element name="instType" type="string255" minOccurs="0"/>
                    <xs:element name="systemGain" type="float" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

                    <xs:element name="comments" type="string255" minOccurs="0"/>


                    <!-- Seismic instrument -->
                    <xs:element name="SeismicInstrument" type="SeismicInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic stations -->
    <xs:complexType name="SeismicStationsType">
            <xs:sequence>
                    <!-- Seismic station alone -->
                    <xs:element name="SeismicStation" type="SeismicStationAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>
```

```
    <!-- Seismic station alone -->
    <xs:complexType name="SeismicStationAloneType">
        <xs:sequence>
            <xs:element name="name" type="string30" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="elev" type="float" minOccurs="0"/>
            <xs:element name="instDepth" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="diffUTC" type="float" minOccurs="0"/>
            <xs:element name="instType" type="string255" minOccurs="0"/>
            <xs:element name="systemGain" type="float" minOccurs="0"/>
            <xs:element name="description" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Seismic instrument -->
            <xs:element name="SeismicInstrument" type="SeismicInstrumentType"
minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="network" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic instrument -->
    <xs:complexType name="SeismicInstrumentType">
        <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="dynamicRange" type="string255" minOccurs="0"/>
            <xs:element name="gain" type="float" minOccurs="0"/>
            <xs:element name="filters" type="string255" minOccurs="0"/>
            <xs:element name="numberOfComp" type="xs:integer" minOccurs="0"/>
            <xs:element name="respOverview" type="string255" minOccurs="0"/>
            <xs:element name="respFile" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

            <xs:element name="comments" type="string255" minOccurs="0"/>
            <!-- Seismic component -->
            <xs:element name="SeismicComponent" type="SeismicComponentType"
minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic instruments -->
    <xs:complexType name="SeismicInstrumentsType">
        <xs:sequence>
            <!-- Seismic instrument alone -->
```

```
                <xs:element name="SeismicInstrument" type="SeismicInstrumentAloneType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic instrument alone -->
    <xs:complexType name="SeismicInstrumentAloneType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string255" minOccurs="0"/>
                <xs:element name="dynamicRange" type="string255" minOccurs="0"/>
                <xs:element name="gain" type="float" minOccurs="0"/>
                <xs:element name="filters" type="string255" minOccurs="0"/>
                <xs:element name="numberOfComp" type="xs:integer" minOccurs="0"/>
                <xs:element name="respOverview" type="string255" minOccurs="0"/>
                <xs:element name="respFile" type="string255" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

                <xs:element name="comments" type="string255" minOccurs="0"/>
                <!-- Seismic component -->
                <xs:element name="SeismicComponent" type="SeismicComponentType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic component -->
    <xs:complexType name="SeismicComponentType">
            <xs:sequence>
                <xs:element name="name" type="string255" minOccurs="0"/>
                <xs:element name="type" type="string255" minOccurs="0"/>
                <xs:element name="respDesc" type="string255" minOccurs="0"/>
                <xs:element name="seedBandCode" type="string30" minOccurs="0"/>
                <xs:element name="sampleRate" type="float" minOccurs="0"/>
                <xs:element name="seedInstCode" type="string30" minOccurs="0"/>
                <xs:element name="seedOrientCode" type="string30" minOccurs="0"/>
                <xs:element name="sensitivity" type="string255" minOccurs="0"/>
                <xs:element name="depth" type="float" minOccurs="0"/>
                <xs:element name="startTime" type="dateTime"/>
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>
```

```
    <!-- Seismic components -->
    <xs:complexType name="SeismicComponentsType">
        <xs:sequence>
            <!-- Seismic component -->
            <xs:element name="SeismicComponent" type="SeismicComponentAloneType"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic component alone -->
    <xs:complexType name="SeismicComponentAloneType">
        <xs:sequence>
            <xs:element name="name" type="string255" minOccurs="0"/>
            <xs:element name="type" type="string255" minOccurs="0"/>
            <xs:element name="respDesc" type="string255" minOccurs="0"/>
            <xs:element name="seedBandCode" type="string30" minOccurs="0"/>
            <xs:element name="sampleRate" type="float" minOccurs="0"/>
            <xs:element name="seedInstCode" type="string30" minOccurs="0"/>
            <xs:element name="seedOrientCode" type="string30" minOccurs="0"/>
            <xs:element name="sensitivity" type="string255" minOccurs="0"/>
            <xs:element name="depth" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>

        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Volcanoes list -->
    <xs:complexType name="VolcanoesType">
        <xs:sequence>
            <xs:element name="volcanoCode" maxOccurs="unbounded">
                <xs:complexType>
                    <xs:simpleContent>
                        <xs:extension base="string30">
                            <xs:attribute name="number"
type="xs:integer"/>
                        </xs:extension>
                    </xs:simpleContent>
                </xs:complexType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>

    <!-- Volcano code -->
    <xs:complexType name="VolcanoCodeType">
        <xs:sequence>
            <xs:element name="volcanoCode" type="string30" maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
```

```
    <!-- Data -->
    <xs:complexType name="DataType">
        <xs:sequence>
            <!-- Deformation -->
            <xs:element name="Deformation" type="DeformationType" minOccurs="0"/>
            <!-- Gas -->
            <xs:element name="Gas" type="GasType" minOccurs="0"/>
            <!-- Hydrologic -->
            <xs:element name="Hydrologic" type="HydrologicType" minOccurs="0"/>
            <!-- Fields -->
            <xs:element name="Fields" type="FieldsType" minOccurs="0"/>
            <!-- Thermal -->
            <xs:element name="Thermal" type="ThermalType" minOccurs="0"/>
            <!-- Meteo -->
            <xs:element name="Meteo" type="MeteoType" minOccurs="0"/>
            <!-- Seismic -->
            <xs:element name="Seismic" type="SeismicType" minOccurs="0"/>
        </xs:sequence>
    </xs:complexType>

    <!-- Deformation -->
    <xs:complexType name="DeformationType">
        <xs:sequence>
            <!-- Electronic tilt dataset -->
            <xs:element name="ElectronicTiltDataset" type="ElectronicTiltDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Tilt vector dataset -->
            <xs:element name="TiltVectorDataset" type="TiltVectorDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Strain dataset -->
            <xs:element name="StrainDataset" type="StrainDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- EDM dataset -->
            <xs:element name="EDMDataset" type="EDMDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- Angle dataset -->
            <xs:element name="AngleDataset" type="AngleDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- GPS dataset -->
            <xs:element name="GPSDataset" type="GPSDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
            <!-- GPS vector dataset -->
            <xs:element name="GPSVectorDataset" type="GPSVectorDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Leveling dataset -->
            <xs:element name="LevelingDataset" type="LevelingDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- InSAR image dataset -->
            <xs:element name="InSARImageDataset" type="InSARImageDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- InSAR image dataset  -->
            <xs:element name="InSARDataPointset" type="InSARDataPointsetType"
minOccurs="0" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
```

```
    </xs:complexType>

    <!-- Electronic tilt dataset -->
    <xs:complexType name="ElectronicTiltDatasetType">
        <xs:sequence>
            <!-- Electronic tilt -->
            <xs:element name="ElectronicTilt" type="ElectronicTiltType"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Electronic tilt -->
    <xs:complexType name="ElectronicTiltType">
        <xs:sequence>
            <xs:element name="measTime" type="dateTimemsec"/>
            <xs:element name="measTimeCsec" type="decimal" minOccurs="0"/>
            <xs:element name="measTimeUnc" type="dateTimeUncmsec" minOccurs="0"/>
            <xs:element name="measTimeCsecUnc" type="decimal" minOccurs="0"/>

            <xs:element name="sampleRate" type="double" minOccurs="0"/>
            <xs:element name="tilt1" type="double" minOccurs="0"/>
            <xs:element name="tilt2" type="double" minOccurs="0"/>
            <xs:element name="tilt1Unc" type="double" minOccurs="0"/>
            <xs:element name="tilt2Unc" type="double" minOccurs="0"/>
            <xs:element name="processed" type="processedEnum" minOccurs="0"/>
            <xs:element name="temperature" type="double" minOccurs="0"/>
            <xs:element name="battery" type="double" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Tilt vector dataset -->
    <xs:complexType name="TiltVectorDatasetType">
        <xs:sequence>
            <!-- Tilt vector -->
            <xs:element name="TiltVector" type="TiltVectorType"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Tilt vector -->
    <xs:complexType name="TiltVectorType">
        <xs:sequence>
            <xs:element name="startTime" type="dateTime"/>
            <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
```

```
                <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="magnitude" type="float" minOccurs="0"/>
                <xs:element name="azimuth" type="deg0-360" minOccurs="0"/>
                <xs:element name="magnitudeUnc" type="float" minOccurs="0"/>
                <xs:element name="azimuthUnc" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Strain dataset -->
<xs:complexType name="StrainDatasetType">
        <xs:sequence>
                <!-- Strain -->
                <xs:element name="Strain" type="StrainType" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Strain -->
<xs:complexType name="StrainType">
        <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="component1" type="double" minOccurs="0"/>
                <xs:element name="component2" type="double" minOccurs="0"/>
                <xs:element name="component3" type="double" minOccurs="0"/>
                <xs:element name="component4" type="double" minOccurs="0"/>
                <xs:element name="component1Unc" type="double" minOccurs="0"/>
                <xs:element name="component2Unc" type="double" minOccurs="0"/>
                <xs:element name="component3Unc" type="double" minOccurs="0"/>
                <xs:element name="component4Unc" type="double" minOccurs="0"/>
                <xs:element name="volumetricStrain" type="double" minOccurs="0"/>
                <xs:element name="volumetricStrainUnc" type="double" minOccurs="0"/>
                <xs:element name="shearStrainAxis1" type="double" minOccurs="0"/>
                <xs:element name="azimuthAxis1" type="deg0-360" minOccurs="0"/>
                <xs:element name="shearStrainAxis2" type="double" minOccurs="0"/>
                <xs:element name="azimuthAxis2" type="deg0-360" minOccurs="0"/>
                <xs:element name="shearStrainAxis3" type="double" minOccurs="0"/>
                <xs:element name="azimuthAxis3" type="deg0-360" minOccurs="0"/>
                <xs:element name="shearStrainAxis1Unc" type="double" minOccurs="0"/>
                <xs:element name="shearStrainAxis2Unc" type="double" minOccurs="0"/>
                <xs:element name="shearStrainAxis3Unc" type="double" minOccurs="0"/>
                <xs:element name="maxPrincipalStrain" type="double" minOccurs="0"/>
                <xs:element name="maxPrincipalStrainUnc" type="double" minOccurs="0"/>
                <xs:element name="minPrincipalStrain" type="double" minOccurs="0"/>
                <xs:element name="minPrincipalStrainUnc" type="double" minOccurs="0"/>
                <xs:element name="maxPrincipalStrainDir" type="deg0-360" minOccurs="0"/>
                <xs:element name="maxPrincipalStrainDirUnc" type="float" minOccurs="0"/>
```

```
                <xs:element name="minPrincipalStrainDir" type="deg0-360" minOccurs="0"/>
                <xs:element name="minPrincipalStrainDirUnc" type="float" minOccurs="0"/>
                <xs:element name="barPress" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- EDM dataset -->
<xs:complexType name="EDMDatasetType">
        <xs:sequence>
                <!-- EDM -->
                <xs:element name="EDM" type="EDMType" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="targetStation" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- EDM -->
<xs:complexType name="EDMType">
        <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="lineLength" type="double" minOccurs="0"/>
                <xs:element name="constantErr" type="float" minOccurs="0"/>
                <xs:element name="scaleErr" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>

        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="targetStation" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Angle dataset -->
<xs:complexType name="AngleDatasetType">
        <xs:sequence>
                <!-- Angle -->
                <xs:element name="Angle" type="AngleType" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="targetStation1" type="string30NE"/>
        <xs:attribute name="targetStation2" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>
```

```
<!-- Angle -->
<xs:complexType name="AngleType">
	<xs:sequence>
		<xs:element name="measTime" type="dateTime"/>
		<xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
		<xs:element name="hAngle1" type="deg0-360" minOccurs="0"/>
		<xs:element name="hAngle2" type="deg0-360" minOccurs="0"/>
		<xs:element name="vAngle1" type="deg-90-90" minOccurs="0"/>
		<xs:element name="vAngle2" type="deg-90-90" minOccurs="0"/>
		<xs:element name="hAngle1Unc" type="float" minOccurs="0"/>
		<xs:element name="hAngle2Unc" type="float" minOccurs="0"/>
		<xs:element name="vAngle1Unc" type="float" minOccurs="0"/>
		<xs:element name="vAngle2Unc" type="float" minOccurs="0"/>
		<xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
		<xs:element name="comments" type="string255" minOccurs="0"/>
	</xs:sequence>
	<xs:attribute name="code" type="string30NE" use="required"/>
	<xs:attribute name="instrument" type="string30NE"/>
	<xs:attribute name="station" type="string30NE"/>
	<xs:attribute name="targetStation1" type="string30NE"/>
	<xs:attribute name="targetStation2" type="string30NE"/>
	<xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- GPS dataset -->
<xs:complexType name="GPSDatasetType">
	<xs:sequence>
		<!-- GPS -->
		<xs:element name="GPS" type="GPSType" maxOccurs="unbounded"/>
	</xs:sequence>
	<xs:attribute name="instrument" type="string30NE"/>
	<xs:attribute name="station" type="string30NE"/>
	<xs:attribute name="refStation1" type="string30NE"/>
	<xs:attribute name="refStation2" type="string30NE"/>
	<xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- GPS -->
<xs:complexType name="GPSType">
	<xs:sequence>
		<xs:element name="measTime" type="dateTime"/>
		<xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
		<xs:group  ref="latLonGroup" minOccurs="0"/>
		<xs:element name="elev" type="double" minOccurs="0"/>
		<xs:element name="N-SErr" type="double" minOccurs="0"/>
		<xs:element name="E-WErr" type="double" minOccurs="0"/>
		<xs:element name="verticalErr" type="float" minOccurs="0"/>
		<xs:element name="software" type="string50" minOccurs="0"/>
		<xs:element name="orbits" type="string255" minOccurs="0"/>
		<xs:element name="duration" type="string255" minOccurs="0"/>
		<xs:element name="quality" type="qualityEnum" minOccurs="0"/>
		<xs:element name="slope" type="double" minOccurs="0"/>
		<xs:element name="errSlope" type="float" minOccurs="0"/>
		<xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
		<xs:element name="comments" type="string255" minOccurs="0"/>
```

```
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="refStation1" type="string30NE"/>
            <xs:attribute name="refStation2" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- GPS vector dataset -->
    <xs:complexType name="GPSVectorDatasetType">
            <xs:sequence>
                    <!-- GPS vector -->
                    <xs:element name="GPSVector" type="GPSVectorType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- GPS vector -->
    <xs:complexType name="GPSVectorType">
            <xs:sequence>
                    <xs:element name="startTime" type="dateTime"/>
                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="magnitude" type="float" minOccurs="0"/>
                    <xs:element name="azimuth" type="deg0-360" minOccurs="0"/>
                    <xs:element name="inclination" type="deg0-90" minOccurs="0"/>
                    <xs:element name="northDispl" type="float" minOccurs="0"/>
                    <xs:element name="eastDispl" type="float" minOccurs="0"/>
                    <xs:element name="vertDispl" type="float" minOccurs="0"/>
                    <xs:element name="magnitudeErr" type="float" minOccurs="0"/>
                    <xs:element name="northDisplErr" type="float" minOccurs="0"/>
                    <xs:element name="eastDisplErr" type="float" minOccurs="0"/>
                    <xs:element name="vertDisplErr" type="float" minOccurs="0"/>
                    <xs:element name="refFrame" type="string30" minOccurs="0"/>
                    <xs:element name="projection" type="string30"  minOccurs="0"/>

                    <xs:element name="ellipsoid" type="string30"  minOccurs="0"/>
                    <xs:element name="datum" type="string30" minOccurs="0"/>
                    <xs:element name="refPosLat" type="float" minOccurs="0"/>

                    <xs:element name="refPosLon" type="float" minOccurs="0"/>

                    <xs:element name="refPosElev" type="float" minOccurs="0"/>

                    <xs:element name="staVelNorth" type="float" minOccurs="0"/>
                    <xs:element name="staVelNorthErr" type="float" minOccurs="0"/>

                    <xs:element name="staVelEast" type="float" minOccurs="0"/>

                    <xs:element name="staVelEastErr" type="float" minOccurs="0"/>
```

```
                <xs:element name="staVelVert" type="float" minOccurs="0"/>

                <xs:element name="staVelVertErr" type="float" minOccurs="0"/>

                <xs:element name="gpvDataType" type="string255" minOccurs="0"/>

                <xs:element name="gpvArchive" type="string255" minOccurs="0"/>

                <xs:element name="gpvSoftware" type="string255" minOccurs="0"/>

                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Leveling dataset -->
<xs:complexType name="LevelingDatasetType">
        <xs:sequence>
                <!-- Leveling -->
                <xs:element name="Leveling" type="LevelingType" maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="refStation" type="string30NE"/>
        <xs:attribute name="firstBMStation" type="string30NE"/>
        <xs:attribute name="secondBMStation" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Leveling -->
<xs:complexType name="LevelingType">
        <xs:sequence>
                <xs:element name="order" type="xs:integer" minOccurs="0"/>
                <xs:element name="class" type="string30" minOccurs="0"/>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="elevChange" type="float" minOccurs="0"/>
                <xs:element name="elevChangeUnc" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="refStation" type="string30NE"/>
        <xs:attribute name="firstBMStation" type="string30NE"/>
        <xs:attribute name="secondBMStation" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- InSAR image dataset -->
<xs:complexType name="InSARImageDatasetType">
        <xs:sequence>
```

```
                    <!-- InSAR image -->
                    <xs:element name="InSARImage" type="InSARImageType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attribute name="volcano" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- InSAR image -->
    <xs:complexType name="InSARImageType">
            <xs:sequence>
                    <xs:group ref="startLatLonGroup" minOccurs="0"/>
                    <xs:element name="startPosition" type="startPositionEnum" minOccurs="0"/>
                    <xs:element name="rowOrder" type="string30" minOccurs="0"/>
                    <xs:element name="numbOfRows" type="xs:integer" minOccurs="0"/>
                    <xs:element name="numbOfCols" type="xs:integer" minOccurs="0"/>
                    <xs:element name="units" type="string30" minOccurs="0"/>
                    <xs:element name="nullValue" type="string30" minOccurs="0"/>
                    <xs:element name="location" type="string255" minOccurs="0"/>
                    <xs:element name="pair" type="pairStackedEnum" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="DEM" type="string50" minOccurs="0"/>
                    <xs:element name="bytesOrder" type="string30" minOccurs="0"/>
                    <xs:element name="img1Time" type="dateTime"/>
                    <xs:element name="img1TimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="img2Time" type="dateTime"/>
                    <xs:element name="img2TimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="metersPixelSize" type="float" minOccurs="0"/>
                    <xs:element name="degreesPixelSize" type="float" minOccurs="0"/>
                    <xs:element name="lookAngle" type="float" minOccurs="0"/>
                    <xs:element name="limb" type="limbEnum" minOccurs="0"/>
                    <xs:element name="imagepath" type="string255" minOccurs="0"/>

                    <xs:element name="geotiff" type="string255" minOccurs="0"/>
                    <xs:element name="processMethod" type="string255" minOccurs="0"/>
                    <xs:element name="software" type="string255" minOccurs="0"/>
                    <xs:element name="DEMQuality" type="DEMQualityEnum" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

                    <!-- InSAR image pixels -->
                    <xs:element name="InSARPixels" type="InSARPixelsType" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attribute name="volcano" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>


    <!-- InSAR Date Point dataset -->
    <xs:complexType name="InSARDataPointsetType">
            <xs:sequence>
```

```
                    <!-- InSAR data point -->
                    <xs:element name="InSARDataPoint" type="InSARDataPointType"
maxOccurs="unbounded"/>
            </xs:sequence>

            <xs:attribute name="satellite1" type="string30NE"/>
            <xs:attribute name="satellite2" type="string30NE"/>
            <xs:attribute name="volcano" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- InSAR image -->
    <xs:complexType name="InSARDataPointType">
            <xs:sequence>
                    <xs:element name="image1" type="dateTime" minOccurs="0"/>
                    <xs:element name="image1Unc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="image2" type="dateTime" minOccurs="0"/>
                    <xs:element name="image2Unc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:group ref="startLatLonGroup" minOccurs="0"/>
                    <xs:element name="elev" type="double" minOccurs="0"/>
                    <xs:element name="dChage" type="float" minOccurs="0"/>
                    <xs:element name="losVer" type="float" minOccurs="0"/>
                    <xs:element name="losHor" type="float" minOccurs="0"/>
                    <xs:element name="losEast" type="float" minOccurs="0"/>
                    <xs:element name="losNorth" type="float" minOccurs="0"/>
                    <xs:element name="units" type="string30" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>

            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="satellite1" type="string30NE"/>
            <xs:attribute name="satellite2" type="string30NE"/>
            <xs:attribute name="volcano" type="string30NE"/>
            <xs:attribute name="insar" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- InSAR pixels -->
    <xs:complexType name="InSARPixelsType">
            <xs:sequence>
                    <!-- InSAR image pixel -->
                    <xs:element name="InSARPixel" type="InSARPixelType"
maxOccurs="unbounded"/>
            </xs:sequence>
    </xs:complexType>

    <!-- InSAR pixel -->
    <xs:complexType name="InSARPixelType">
            <xs:sequence>
                    <xs:element name="rangeOfChange" type="float"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="number" type="xs:integer" use="required"/>
    </xs:complexType>
```

```
    <!-- Gas -->
    <xs:complexType name="GasType">
        <xs:sequence>
            <!-- Gas sample dataset -->
            <xs:element name="GasSampleDataset" type="GasSampleDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Soil efflux dataset -->
            <xs:element name="SoilEffluxDataset" type="SoilEffluxDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            <!-- Plume dataset -->
            <xs:element name="PlumeDataset" type="PlumeDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas sample dataset -->
    <xs:complexType name="GasSampleDatasetType">
        <xs:sequence>
            <!-- Gas sample -->
            <xs:element name="GasSample" type="GasSampleType"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas sample -->
    <xs:complexType name="GasSampleType">
        <xs:sequence>
            <!-- Gas species -->
            <xs:element name="GasSpecies" type="GasSpeciesType"
maxOccurs="unbounded"/>
            <xs:element name="measTime" type="dateTime"/>
            <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="temperature" type="float" minOccurs="0"/>
            <xs:element name="atmosPress" type="float" minOccurs="0"/>
            <xs:element name="emissionRate" type="float" minOccurs="0"/>
            <xs:element name="environFactors" type="string255" minOccurs="0"/>
            <xs:element name="sublimateMinerals" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gas species -->
    <xs:complexType name="GasSpeciesType">
        <xs:sequence>
            <xs:element name="concentration" type="float" minOccurs="0"/>
            <xs:element name="concentrationUnc" type="float" minOccurs="0"/>
```

```
                    <xs:element name="units" type="string30" minOccurs="0"/>
                    <xs:element name="recalculated" type="oriRecalEnum" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="type" type="gasSpeciesEnum" use="required"/>
                <xs:attribute name="waterFree" type="yesNoEnum" use="required"/>
        </xs:complexType>

        <!-- Soil efflux dataset -->
        <xs:complexType name="SoilEffluxDatasetType">
                <xs:sequence>
                    <!-- Gas sample -->
                    <xs:element name="SoilEfflux" type="SoilEffluxType"
maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="instrument" type="string30NE"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Soil efflux -->
        <xs:complexType name="SoilEffluxType">
                <xs:sequence>
                    <xs:element name="measTime" type="dateTime"/>
                    <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="species" type="gasSpeciesEnum"
maxOccurs="unbounded"/>
                    <xs:element name="totalFlux" type="float" minOccurs="0"/>
                    <xs:element name="totalFluxUnc" type="float" minOccurs="0"/>
                    <xs:element name="numberOfPoints" type="xs:integer" minOccurs="0"/>
                    <xs:element name="area" type="float" minOccurs="0"/>
                    <xs:element name="highestFlux" type="float" minOccurs="0"/>
                    <xs:element name="highestTemp" type="float" minOccurs="0"/>
                    <xs:element name="reportedUnits" type="string30" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attribute name="instrument" type="string30NE"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- Plume dataset -->
        <xs:complexType name="PlumeDatasetType">
                <xs:sequence>
                    <!-- Plume -->
                    <xs:element name="Plume" type="PlumeType" maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="volcano" type="string12NE"/>
                <xs:attribute name="instrument" type="string30NE"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attribute name="airplane" type="string30NE"/>
                <xs:attribute name="satellite" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>
```

```
    <!-- Plume -->
    <xs:complexType name="PlumeType">
        <xs:sequence>
            <!-- Plume species -->
            <xs:element name="PlumeSpecies" type="PlumeSpeciesType"
maxOccurs="unbounded"/>

            <xs:element name="volc1" type="string50" minOccurs="0"/>
            <xs:element name="volc2" type="string50" minOccurs="0"/>
            <xs:group ref="latLonGroup" minOccurs="0"/>
            <xs:element name="minBoxLat" type="double" minOccurs="0"/>
            <xs:element name="maxBoxLat" type="double" minOccurs="0"/>
            <xs:element name="minBoxLon" type="double" minOccurs="0"/>
            <xs:element name="maxBoxLon" type="double" minOccurs="0"/>
            <xs:element name="image" type="string255" minOccurs="0"/>
            <xs:element name="imagepath" type="string255" minOccurs="0"/>
            <xs:element name="interference" type="string255" minOccurs="0"/>
            <xs:element name="height" type="float" minOccurs="0"/>
            <xs:element name="heightDetermination" type="string255" minOccurs="0"/>

            <xs:element name="colHeight" type="colHeightEnum" minOccurs="0"/>
            <xs:element name="measTime" type="dateTime"/>
            <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="units" type="string30" minOccurs="0"/>
            <xs:element name="emit" type="float" minOccurs="0"/>
            <xs:element name="mass" type="float" minOccurs="0"/>
            <xs:element name="ventMass" type="float" minOccurs="0"/>
            <xs:element name="maxMass" type="float" minOccurs="0"/>
            <xs:element name="emitErr" type="float" minOccurs="0"/>
            <xs:element name="recalc" type="recalcEnum" minOccurs="0"/>
            <xs:element name="coverageArea" type="float" minOccurs="0"/>
            <xs:element name="maxDistance" type="float" minOccurs="0"/>
            <xs:element name="maxDirection" type="float" minOccurs="0"/>
            <xs:element name="minWaveLength" type="float" minOccurs="0"/>
            <xs:element name="maxWaveLength" type="float" minOccurs="0"/>
            <xs:element name="spectral" type="float" minOccurs="0"/>
            <xs:element name="technique" type="string50" minOccurs="0"/>
            <xs:element name="windSpeed" type="float" minOccurs="0"/>
            <xs:element name="minWindSpeed" type="float" minOccurs="0"/>
            <xs:element name="maxWindSpeed" type="float" minOccurs="0"/>
            <xs:element name="windDirection" type="string30" minOccurs="0"/>

            <xs:element name="weatherNotes" type="string255" minOccurs="0"/>
            <xs:element name="totalDailyEmission" type="float" minOccurs="0"/>
            <xs:element name="totalDailyEmissionUnc" type="float" minOccurs="0"/>
            <xs:element name="totalDailyEmissionUnit" type="string30" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="volcano" type="string12NE"/>
        <xs:attribute name="instrument" type="string30NE"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="airplane" type="string30NE"/>
        <xs:attribute name="satellite" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
```

```
	</xs:complexType>

	<!-- Plume species -->
	<xs:complexType name="PlumeSpeciesType">
		<xs:sequence>
			<xs:element name="emissionRate" type="float" minOccurs="0"/>
			<xs:element name="mass" type="float" minOccurs="0"/>
			<xs:element name="ventMass" type="float" minOccurs="0"/>
			<xs:element name="maxMass" type="float" minOccurs="0"/>
			<xs:element name="emissionRateUnc" type="float" minOccurs="0"/>
			<xs:element name="units" type="string30" minOccurs="0"/>
			<xs:element name="recalculated" type="oriRecalEnum" minOccurs="0"/>

		</xs:sequence>
		<xs:attribute name="type" type="plumeSpeciesEnum" use="required"/>
	</xs:complexType>

	<!-- Hydrologic -->
	<xs:complexType name="HydrologicType">
		<xs:sequence>
			<!-- Hydrologic sample dataset -->
			<xs:element name="HydrologicSampleDataset"
type="HydrologicSampleDatasetType" minOccurs="0" maxOccurs="unbounded"/>
		</xs:sequence>
		<xs:attributeGroup ref="OwnersPubDateGroup"/>
	</xs:complexType>

	<!-- Hydrologic sample dataset -->
	<xs:complexType name="HydrologicSampleDatasetType">
		<xs:sequence>
			<!-- Hydrologic sample -->
			<xs:element name="HydrologicSample" type="HydrologicSampleType"
maxOccurs="unbounded"/>
		</xs:sequence>
		<xs:attribute name="instrument" type="string30NE"/>
		<xs:attribute name="station" type="string30NE"/>
		<xs:attributeGroup ref="OwnersPubDateGroup"/>
	</xs:complexType>

	<!-- Hydrologic sample -->
	<xs:complexType name="HydrologicSampleType">
		<xs:sequence>
			<!-- Hydrologic species -->
			<xs:element name="HydrologicSpecies" type="HydrologicSpeciesType"
maxOccurs="unbounded"/>
			<xs:element name="measTime" type="dateTime"/>
			<xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
			<xs:element name="temperature" type="float" minOccurs="0"/>
			<xs:element name="elev" type="double" minOccurs="0"/>
			<xs:element name="depth" type="double" minOccurs="0"/>
			<xs:element name="waterLevelChange" type="double" minOccurs="0"/>
			<xs:element name="atmosPress" type="float" minOccurs="0"/>
			<xs:element name="springDischRate" type="double" minOccurs="0"/>
			<xs:element name="precipitation" type="float" minOccurs="0"/>
			<xs:element name="dailyPrecipitation" type="float" minOccurs="0"/>
```

```
                    <xs:element name="precipitationType" type="precipitationTypeEnum"
minOccurs="0"/>
                    <xs:element name="pH" type="float" minOccurs="0"/>
                    <xs:element name="pHUnc" type="float" minOccurs="0"/>
                    <xs:element name="conductivity" type="float" minOccurs="0"/>
                    <xs:element name="conductivityUnc" type="float" minOccurs="0"/>
                    <xs:element name="units" type="string30" minOccurs="0"/>
                    <xs:element name="componentCon" type="float" minOccurs="0"/>
                    <xs:element name="componentConErr" type="float" minOccurs="0"/>
                    <xs:element name="airTemp" type="float" minOccurs="0"/>
                    <xs:element name="totalDisolvedSolid" type="float" minOccurs="0"/>
                    <xs:element name="waterTempUnc" type="float" minOccurs="0"/>

                    <xs:element name="waterLevEleUnc" type="float" minOccurs="0"/>

                    <xs:element name="waterDepthUnc" type="float" minOccurs="0"/>

                    <xs:element name="waterLevelChangeUnc" type="float" minOccurs="0"/>

                    <xs:element name="barometricPressUnc" type="float" minOccurs="0"/>
                    <xs:element name="SpringDischargeRateUnc" type="float" minOccurs="0"/>

                    <xs:element name="meaPrecUnc" type="float" minOccurs="0"/>

                    <xs:element name="dailyPrecUnc" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Hydrologic species -->
    <xs:complexType name="HydrologicSpeciesType">
            <xs:sequence>
                    <xs:element name="content" type="float" minOccurs="0"/>
                    <xs:element name="contentUnc" type="float" minOccurs="0"/>
                    <xs:element name="units" type="string30" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="type" type="hydroSpeciesEnum" use="required"/>
    </xs:complexType>

    <!-- Fields -->
    <xs:complexType name="FieldsType">
            <xs:sequence>
                    <!-- Magnetic dataset -->
                    <xs:element name="MagneticDataset" type="MagneticDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Magnetic vector dataset -->
                    <xs:element name="MagneticVectorDataset"
type="MagneticVectorDatasetType" minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Electric dataset -->
                    <xs:element name="ElectricDataset" type="ElectricDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
```

```
                <!-- Gravity dataset -->
                <xs:element name="GravityDataset" type="GravityDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
    </xs:complexType>

    <!-- Magnetic dataset -->
    <xs:complexType name="MagneticDatasetType">
            <xs:sequence>
                <!-- Magnetic -->
                <xs:element name="Magnetic" type="MagneticType" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="refStation" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Magnetic -->
    <xs:complexType name="MagneticType">
            <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="F" type="double" minOccurs="0"/>
                <xs:element name="X" type="double" minOccurs="0"/>
                <xs:element name="Y" type="double" minOccurs="0"/>
                <xs:element name="Z" type="double" minOccurs="0"/>
                <xs:element name="FUnc" type="float" minOccurs="0"/>
                <xs:element name="XUnc" type="float" minOccurs="0"/>
                <xs:element name="YUnc" type="float" minOccurs="0"/>
                <xs:element name="ZUnc" type="float" minOccurs="0"/>
                <xs:element name="highPass" type="float" minOccurs="0"/>
                <xs:element name="lowPass" type="float" minOccurs="0"/>
                <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="refStation" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Magnetic vector dataset -->
    <xs:complexType name="MagneticVectorDatasetType">
            <xs:sequence>
                <!-- Magnetic vector -->
                <xs:element name="MagneticVector" type="MagneticVectorType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Magnetic vector -->
```

```
<xs:complexType name="MagneticVectorType">
	<xs:sequence>
		<xs:element name="measTime" type="dateTime"/>
		<xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
		<xs:element name="declination" type="deg0-360" minOccurs="0"/>
		<xs:element name="inclination" type="deg0-90" minOccurs="0"/>
		<xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>

		<xs:element name="comments" type="string255" minOccurs="0"/>
	</xs:sequence>
	<xs:attribute name="code" type="string30NE" use="required"/>
	<xs:attribute name="instrument" type="string30NE"/>
	<xs:attribute name="station" type="string30NE"/>
	<xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Electric dataset -->
<xs:complexType name="ElectricDatasetType">
	<xs:sequence>
		<!-- Electric -->
		<xs:element name="Electric" type="ElectricType" maxOccurs="unbounded"/>
	</xs:sequence>
	<xs:attribute name="instrument" type="string30NE"/>
	<xs:attribute name="refStation1" type="string30NE"/>
	<xs:attribute name="refStation2" type="string30NE"/>
	<xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Electric -->
<xs:complexType name="ElectricType">
	<xs:sequence>
		<xs:element name="measTime" type="dateTime"/>
		<xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
		<xs:element name="field" type="float" minOccurs="0"/>
		<xs:element name="fieldUnc" type="float" minOccurs="0"/>
		<xs:element name="direction" type="deg0-360" minOccurs="0"/>
		<xs:element name="highPass" type="float" minOccurs="0"/>
		<xs:element name="lowPass" type="float" minOccurs="0"/>
		<xs:element name="selfPotential" type="float" minOccurs="0"/>
		<xs:element name="selfPotentialUnc" type="float" minOccurs="0"/>
		<xs:element name="apparentResistivity" type="float" minOccurs="0"/>
		<xs:element name="apparentResistivityUnc" type="float" minOccurs="0"/>
		<xs:element name="directResistivity" type="float" minOccurs="0"/>
		<xs:element name="directResistivityUnc" type="float" minOccurs="0"/>
	  <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
		<xs:element name="comments" type="string255" minOccurs="0"/>
	</xs:sequence>
	<xs:attribute name="code" type="string30NE" use="required"/>
	<xs:attribute name="instrument" type="string30NE"/>
	<xs:attribute name="refStation1" type="string30NE"/>
	<xs:attribute name="refStation2" type="string30NE"/>
	<xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Gravity dataset -->
<xs:complexType name="GravityDatasetType">
```

```
            <xs:sequence>
                <!-- Gravity -->
                <xs:element name="Gravity" type="GravityType" maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="refStation" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Gravity -->
    <xs:complexType name="GravityType">
            <xs:sequence>
                <xs:element name="measTime" type="dateTime"/>
                <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                <xs:element name="fieldStrength" type="double" minOccurs="0"/>
                <xs:element name="fieldStrengthUnc" type="double" minOccurs="0"/>
                <xs:element name="assocVertDispl" type="string255" minOccurs="0"/>
                <xs:element name="assocGWaterLevel" type="string255" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="refStation" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal -->
    <xs:complexType name="ThermalType">
            <xs:sequence>
                <!-- Ground-based dataset -->
                <xs:element name="Ground-basedDataset" type="GroundBasedDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
                <!-- Thermal image dataset -->
                <xs:element name="ThermalImageDataset" type="ThermalImageDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
    </xs:complexType>

    <!-- Ground-based dataset -->
    <xs:complexType name="GroundBasedDatasetType">
            <xs:sequence>
                <!-- Ground-based -->
                <xs:element name="Ground-based" type="GroundBasedType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Ground-based -->
    <xs:complexType name="GroundBasedType">
            <xs:sequence>
```

```
                    <xs:element name="measType" type="string255" minOccurs="0"/>
                    <xs:element name="units" type="string30" minOccurs="0"/>
                    <xs:element name="measTime" type="dateTime"/>
                    <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="measDepth" type="float" minOccurs="0"/>
                    <xs:element name="distance" type="float" minOccurs="0"/>
                    <xs:element name="recalculated" type="oriRecalEnum" minOccurs="0"/>
                    <xs:element name="temperature" type="float" minOccurs="0"/>
                    <xs:element name="temperatureUnc" type="float" minOccurs="0"/>
                    <xs:element name="area" type="float" minOccurs="0"/>
                    <xs:element name="heatFlux" type="float" minOccurs="0"/>
                    <xs:element name="heatFluxUnc" type="float" minOccurs="0"/>
                    <xs:element name="bgGeothermGradient" type="float" minOccurs="0"/>
                    <xs:element name="conductivity" type="float" minOccurs="0"/>
                    <xs:element name="conductivityUnc" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal image dataset -->
    <xs:complexType name="ThermalImageDatasetType">
            <xs:sequence>
                    <!-- Thermal image -->
                    <xs:element name="ThermalImage" type="ThermalImageType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="airplane" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal image -->
    <xs:complexType name="ThermalImageType">
            <xs:sequence>
                    <xs:element name="instPlatform" type="string255" minOccurs="0"/>
                    <xs:element name="instAlt" type="float" minOccurs="0"/>
                    <xs:group ref="instLatLonGroup" minOccurs="0"/>
                    <xs:element name="datum" type="string30" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="time" type="dateTime"/>
                    <xs:element name="timeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="bandName" type="string255" minOccurs="0"/>
                    <xs:element name="highBandWavelength" type="float" minOccurs="0"/>
                    <xs:element name="lowBandWavelength" type="float" minOccurs="0"/>
                    <xs:element name="imagepath" type="string255" minOccurs="0"/>
                    <xs:element name="pixelSize" type="float" minOccurs="0"/>
                    <xs:element name="maxRadiance" type="float" minOccurs="0"/>
                    <xs:element name="maxRelativeRadiance" type="float" minOccurs="0"/>
```

```
                    <xs:element name="hottestPixelTemp" type="float" minOccurs="0"/>
                    <xs:element name="totRadiance" type="float" minOccurs="0"/>
                    <xs:element name="maxHeatFlux" type="float" minOccurs="0"/>
                    <xs:element name="nominalTempRes" type="float" minOccurs="0"/>
                    <xs:element name="atmosCorrection" type="string255" minOccurs="0"/>
                    <xs:element name="thermCorrection" type="string255" minOccurs="0"/>
                    <xs:element name="orthorecProc" type="string255" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                    <!-- Thermal image pixels -->
                    <xs:element name="ThermalPixels" type="ThermalPixelsType" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="volcano" type="string12NE"/>
            <xs:attribute name="instrument" type="string30NE"/>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="satellite" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Thermal pixels -->
    <xs:complexType name="ThermalPixelsType">
            <xs:sequence>
                    <!-- Thermal image pixel -->
                    <xs:element name="ThermalPixel" type="ThermalPixelType"
maxOccurs="unbounded"/>
            </xs:sequence>
    </xs:complexType>

    <!-- Thermal pixel -->
    <xs:complexType name="ThermalPixelType">
            <xs:sequence>
                    <xs:element name="elev" type="float" minOccurs="0"/>
                    <xs:group ref="latLonGroup"/>
                    <xs:element name="radiance" type="float" minOccurs="0"/>
                    <xs:element name="heatFlux" type="float" minOccurs="0"/>
                    <xs:element name="temperature" type="float" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
    </xs:complexType>

    <!-- Meteo -->
    <xs:complexType name="MeteoType">
            <xs:sequence>
                    <!-- Meteo dataset -->
                    <xs:element name="MeteoDataset" type="MeteoDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>


    <!-- Meteo dataset -->
    <xs:complexType name="MeteoDatasetType">
            <xs:sequence>
                    <!-- Meteo -->
```

```
                    <xs:element name="MeteoData" type="MeteoDataType"
maxOccurs="unbounded"/>
                </xs:sequence>
                <xs:attribute name="instrument" type="string30NE"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Meteo -->
    <xs:complexType name="MeteoDataType">
                <xs:sequence>
                    <xs:element name="measTime" type="dateTime"/>
                    <xs:element name="measTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="airTemp" type="float" minOccurs="0"/>
                    <xs:element name="soilTemp" type="float" minOccurs="0"/>
                    <xs:element name="baroPress" type="float" minOccurs="0"/>
                    <xs:element name="dailyPrecipitation" type="float" minOccurs="0"/>
                    <xs:element name="precipitationType" type="precipitationTypeEnum"
minOccurs="0"/>
                    <xs:element name="humidity" type="float" minOccurs="0"/>
                    <xs:element name="windSpeed" type="float" minOccurs="0"/>
                    <xs:element name="minWindSpeed" type="float" minOccurs="0"/>
                    <xs:element name="maxWindSpeed" type="float" minOccurs="0"/>
                    <xs:element name="windDirection" type="string30" minOccurs="0"/>
                    <xs:element name="cloudCoverage" type="float" minOccurs="0"/>
                    <xs:element name="tempUnc" type="float" minOccurs="0"/>
                    <xs:element name="stempUnc" type="float" minOccurs="0"/>
                    <xs:element name="bpUnc" type="float" minOccurs="0"/>
                    <xs:element name="precUnc" type="float" minOccurs="0"/>
                    <xs:element name="hdUnc" type="float" minOccurs="0"/>
                    <xs:element name="windUnc" type="float" minOccurs="0"/>
                    <xs:element name="windSpeedMinUnc" type="float" minOccurs="0"/>
                    <xs:element name="windSpeedMaxUnc" type="float" minOccurs="0"/>
                    <xs:element name="windDirUn" type="float" minOccurs="0"/>
                    <xs:element name="clcUnc" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attribute name="instrument" type="string30NE"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Seismic -->
    <xs:complexType name="SeismicType">
                <xs:sequence>
                    <!-- Network event dataset -->
                    <xs:element name="NetworkEventDataset" type="NetworkEventDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Single station event dataset -->
                    <xs:element name="SingleStationEventDataset"
type="SingleStationEventDatasetType" minOccurs="0" maxOccurs="unbounded"/>
                    <!-- Intensity dataset -->
                    <xs:element name="IntensityDataset" type="IntensityDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
```

```
                    <!-- Tremor dataset -->
                    <xs:element name="TremorDataset" type="TremorDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- Interval dataset -->
                    <xs:element name="IntervalDataset" type="IntervalDatasetType" minOccurs="0"
maxOccurs="unbounded"/>
                    <!-- RSAM-SSAM dataset -->
                    <xs:element name="RSAM-SSAMDataset" type="RSAM-SSAMDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
                    <!-- WAVEFORM dataset -->
                    <xs:element name="WaveformDataset" type="WaveformDatasetType"
minOccurs="0" maxOccurs="unbounded"/>
            </xs:sequence>
    </xs:complexType>

    <!-- Network event dataset -->
    <xs:complexType name="NetworkEventDatasetType">
            <xs:sequence>
                    <!-- Network event -->
                    <xs:element name="NetworkEvent" type="NetworkEventType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Network event -->
    <xs:complexType name="NetworkEventType">
            <xs:sequence>
                    <xs:element name="seismoArchive" type="string255" minOccurs="0"/>
                    <xs:element name="originTime" type="dateTimemsec"/>
                    <xs:element name="originTimeCsec" type="decimal" minOccurs="0"/>
                    <xs:element name="originTimeUnc" type="dateTimeUncmsec" minOccurs="0"/>
                    <xs:element name="originTimeCsecUnc" type="decimal" minOccurs="0"/>

                    <xs:element name="duration" type="float" minOccurs="0"/>
                    <xs:element name="durationUnc" type="float" minOccurs="0"/>
                    <xs:element name="locaTechnique" type="string255" minOccurs="0"/>
                    <xs:element name="picksDetermination" type="picksDeterminationEnum"
minOccurs="0"/>
                    <xs:group ref="latLonGroup" minOccurs="0"/>
                    <xs:element name="depth" type="float" minOccurs="0"/>
                    <xs:element name="fixedDepth" type="yesNoUnkEnum" minOccurs="0"/>
                    <xs:element name="numberOfStations" type="xs:integer" minOccurs="0"/>
                    <xs:element name="numberOfPhases" type="xs:integer" minOccurs="0"/>
                    <xs:element name="largestAzimuthGap" type="deg0-360" minOccurs="0"/>
                    <xs:element name="distClosestStation" type="float" minOccurs="0"/>
                    <xs:element name="travelTimeRMS" type="float" minOccurs="0"/>
                    <xs:element name="horizLocaErr" type="float" minOccurs="0"/>
                    <xs:element name="maxLonErr" type="xs:float" minOccurs="0"/>
                    <xs:element name="maxLatErr" type="xs:float" minOccurs="0"/>
                    <xs:element name="depthErr" type="float" minOccurs="0"/>
                    <xs:element name="locaQuality" type="string255" minOccurs="0"/>
                    <xs:element name="primMagnitude" type="float" minOccurs="0"/>
                    <xs:element name="primMagnitudeType" type="string30" minOccurs="0"/>
                    <xs:element name="secMagnitude" type="float" minOccurs="0"/>
```

```
                    <xs:element name="secMagnitudeType" type="string30" minOccurs="0"/>
                    <xs:element name="earthquakeType" type="eqTypeEnum" minOccurs="0"/>
                    <xs:group ref="momentTensorGroup" minOccurs="0"/>
                    <xs:element name="strike1" type="deg0-360" minOccurs="0"/>
                    <xs:element name="strike1Unc" type="float" minOccurs="0"/>
                    <xs:element name="dip1" type="deg0-90" minOccurs="0"/>
                    <xs:element name="dip1Unc" type="float" minOccurs="0"/>
                    <xs:element name="rake1" type="deg-180-180" minOccurs="0"/>
                    <xs:element name="rake1Unc" type="float" minOccurs="0"/>
                    <xs:element name="strike2" type="deg0-360" minOccurs="0"/>
                    <xs:element name="strike2Unc" type="float" minOccurs="0"/>
                    <xs:element name="dip2" type="deg0-90" minOccurs="0"/>
                    <xs:element name="dip2Unc" type="float" minOccurs="0"/>
                    <xs:element name="rake2" type="deg-180-180" minOccurs="0"/>
                    <xs:element name="rake2Unc" type="float" minOccurs="0"/>
                    <xs:element name="focalPlaneSol" type="string255" minOccurs="0"/>
                    <xs:element name="sampleRate" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
            <xs:attribute name="code" type="string30NE" use="required"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Single station event dataset -->
    <xs:complexType name="SingleStationEventDatasetType">
            <xs:sequence>
                    <!-- Single station event -->
                    <xs:element name="SingleStationEvent" type="SingleStationEventType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Single station event -->
    <xs:complexType name="SingleStationEventType">
            <xs:sequence>
                    <xs:element name="startTime" type="dateTimemsec"/>
                    <xs:element name="startTimeCsec" type="decimal" minOccurs="0"/>
                    <xs:element name="startTimeUnc" type="dateTimeUncmsec" minOccurs="0"/>
                    <xs:element name="startTimeCsecUnc" type="decimal" minOccurs="0"/>

                    <xs:element name="picksDetermination" type="picksDeterminationEnum"
minOccurs="0"/>
                    <xs:element name="SPInterval" type="float" minOccurs="0"/>

                    <xs:element name="duration" type="float" minOccurs="0"/>
                    <xs:element name="durationUnc" type="float" minOccurs="0"/>
                    <xs:element name="distActiveVent" type="float" minOccurs="0"/>
                    <xs:element name="maxAmplitude" type="float" minOccurs="0"/>
                    <xs:element name="sampleRate" type="float" minOccurs="0"/>
                    <xs:element name="earthquakeType" type="eqTypeEnum" minOccurs="0"/>
                    <xs:element name="domFrequency" type="float" minOccurs="0"/>
                    <xs:element name="firstMotion" type="firMotionEnum" minOccurs="0"/>
```

```
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                <xs:element name="energy" type="float" minOccurs="0"/>
                <xs:element name="eMaxAmplitude" type="float" minOccurs="0"/>
                <xs:element name="NMaxAmplitude" type="float" minOccurs="0"/>
                <xs:element name="ZMaxAmplitude" type="float" minOccurs="0"/>
                <xs:element name="eMaxFreAmplitude" type="float" minOccurs="0"/>
                <xs:element name="NMaxFreAmplitude" type="float" minOccurs="0"/>
                <xs:element name="ZMaxFreAmplitude" type="float" minOccurs="0"/>
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                <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
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<!-- Intensity dataset -->
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        </xs:sequence>
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        <xs:attribute name="singleStationEvent" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Intensity -->
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                <xs:element name="maxReported" type="float" minOccurs="0"/>
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        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="volcano" type="string12NE"/>
        <xs:attribute name="networkEvent" type="string30NE"/>
        <xs:attribute name="singleStationEvent" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
</xs:complexType>

<!-- Tremor dataset -->
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                <!-- Tremor -->
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        <xs:attribute name="network" type="string30NE"/>
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```

```
    </xs:complexType>

    <!-- Tremor -->
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            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
            <xs:element name="durationPerDay" type="float" minOccurs="0"/>
            <xs:element name="durationPerDayUnc" type="float" minOccurs="0"/>

            <xs:element name="type" type="trmTypeEnum" minOccurs="0"/>
            <xs:element name="qualitativeDepth" type="qualitativeDepthEnum"
minOccurs="0"/>
            <xs:element name="dominantFreq" type="float" minOccurs="0"/>
            <xs:element name="secondDominantFreq" type="float" minOccurs="0"/>
            <xs:element name="maxAmplitude" type="float" minOccurs="0"/>
            <xs:element name="backgroundNoise" type="float" minOccurs="0"/>
            <xs:element name="reducedDisp" type="float" minOccurs="0"/>
            <xs:element name="reducedDispUnc" type="float" minOccurs="0"/>
            <xs:element name="visibleActivity" type="string255" minOccurs="0"/>
            <xs:element name="minAmplitude" type="float" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="network" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Interval dataset -->
    <xs:complexType name="IntervalDatasetType">
        <xs:sequence>
            <!-- Interval -->
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        </xs:sequence>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="network" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- Interval -->
    <xs:complexType name="IntervalType">
        <xs:sequence>
            <xs:element name="earthquakeType" type="eqTypeEnum" minOccurs="0"/>
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            <xs:element name="endTime" type="dateTimeEmpty" minOccurs="0"/>
            <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>

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            <xs:element name="meanDepth" type="float" minOccurs="0"/>
            <xs:element name="verticalDisp" type="float" minOccurs="0"/>
```

```
                    <xs:element name="hypocenterHMigr" type="float" minOccurs="0"/>
                    <xs:element name="hypocenterVMigr" type="float" minOccurs="0"/>
                    <xs:element name="temporalPattern" type="string30" minOccurs="0"/>
                    <xs:element name="dataType" type="dataTypeEnum" minOccurs="0"/>
                    <xs:element name="picksDetermination" type="picksDeterminationEnum"
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                    <xs:element name="feltEqCntStartTimeUnc" type="dateTimeUnc"
minOccurs="0"/>
                    <xs:element name="feltEqCntEndTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="feltEqCntEndTimeUnc" type="dateTimeUnc"
minOccurs="0"/>
                    <xs:element name="numbOfRecEq" type="xs:integer" minOccurs="0"/>
                    <xs:element name="numbOfFeltEq" type="xs:integer" minOccurs="0"/>
                    <xs:element name="energyMeasStartTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="energyMeasStartTimeUnc" type="dateTimeUnc"
minOccurs="0"/>
                    <xs:element name="energyMeasEndTime" type="dateTime" minOccurs="0"/>
                    <xs:element name="energyMeasEndTimeUnc" type="dateTimeUnc"
minOccurs="0"/>
                    <xs:element name="energyRelease" type="float" minOccurs="0"/>
                    <xs:element name="minFrequency" type="float" minOccurs="0"/>
                    <xs:element name="maxFrequency" type="float" minOccurs="0"/>
                    <xs:element name="minAmplitude" type="float" minOccurs="0"/>
                    <xs:element name="maxAmplitude" type="float" minOccurs="0"/>
                    <xs:element name="description" type="string255" minOccurs="0"/>
                    <xs:element name="minDuration" type="float" minOccurs="0"/>
                    <xs:element name="maxDuration" type="float" minOccurs="0"/>
                    <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                    <xs:element name="comments" type="string255" minOccurs="0"/>
            </xs:sequence>
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            <xs:attribute name="station" type="string30NE"/>
            <xs:attribute name="network" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
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    <!-- RSAM-SSAM dataset -->
    <xs:complexType name="RSAM-SSAMDatasetType">
            <xs:sequence>
                    <!-- RSAM-SSAM -->
                    <xs:element name="RSAM-SSAM" type="RSAM-SSAMType"
maxOccurs="unbounded"/>
            </xs:sequence>
            <xs:attribute name="station" type="string30NE"/>
            <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>

    <!-- RSAM-SSAM -->
    <xs:complexType name="RSAM-SSAMType">
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                    <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="endTime" type="dateTime"/>
                    <xs:element name="endTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                    <xs:element name="cntInterval" type="float"/>
```

```
                        <xs:element name="cntIntervalUnc" type="float" minOccurs="0"/>
                        <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>

                        <xs:element name="RSAM" type="RSAMType" minOccurs="0"/>
                        <xs:element name="SSAM" type="SSAMType" minOccurs="0"/>
                </xs:sequence>
                <xs:attribute name="code" type="string30NE" use="required"/>
                <xs:attribute name="station" type="string30NE"/>
                <xs:attributeGroup ref="OwnersPubDateGroup"/>
        </xs:complexType>

        <!-- RSAM -->
        <xs:complexType name="RSAMType">
                <xs:sequence>
                        <!-- RSAM data -->
                        <xs:element name="RSAMData" type="RSAMDataType"
maxOccurs="unbounded"/>
                </xs:sequence>
        </xs:complexType>

        <!-- RSAM data -->
        <xs:complexType name="RSAMDataType">
                <xs:sequence>
                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
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                        <xs:element name="calibration" type="float" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
        </xs:complexType>

        <!-- SSAM -->
        <xs:complexType name="SSAMType">
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                        <!-- SSAM data -->
                        <xs:element name="SSAMData" type="SSAMDataType"
maxOccurs="unbounded"/>
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        </xs:complexType>

        <!-- SSAM data -->
        <xs:complexType name="SSAMDataType">
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                        <xs:element name="startTime" type="dateTime"/>
                        <xs:element name="startTimeUnc" type="dateTimeUnc" minOccurs="0"/>
                        <xs:element name="lowFreq" type="float"/>
                        <xs:element name="highFreq" type="float"/>
                        <xs:element name="cnt" type="float"/>
                        <xs:element name="calibration" type="float" minOccurs="0"/>
                        <xs:element name="comments" type="string255" minOccurs="0"/>
                </xs:sequence>
        </xs:complexType>
```

```
    <!-- Waveform dataset -->
    <xs:complexType name="WaveformDatasetType">
        <xs:sequence>
            <!-- Waveform -->
            <xs:element name="Waveform" type="WaveformType"
maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>



    <!-- Waveform -->
    <xs:complexType name="WaveformType">
        <xs:sequence>
            <xs:element name="archive" type="string30" minOccurs="0"/>
            <xs:element name="link" type="string30" minOccurs="0"/>
            <xs:element name="distSummit" type="wavefromdistanceEnum"
minOccurs="0"/>
            <xs:element name="image" type="string30" minOccurs="0"/>
            <xs:element name="information" type="string30" minOccurs="0"/>
            <xs:element name="description" type="string30" minOccurs="0"/>
            <xs:element name="orgDigitize" type="orgDigEnum" minOccurs="0"/>
            <xs:element name="comments" type="string255" minOccurs="0"/>
        </xs:sequence>
        <xs:attribute name="code" type="string30NE" use="required"/>
        <xs:attribute name="station" type="string30NE"/>
        <xs:attribute name="networkEvent" type="string30NE"/>
        <xs:attribute name="singleStationEvent" type="string30NE"/>
        <xs:attribute name="tremor" type="string30NE"/>
        <xs:attributeGroup ref="OwnersPubDateGroup"/>
    </xs:complexType>


    <!-- ========================================================== -->
    <!-- Root element -->
    <!-- ========================================================== -->
    <xs:element name="wovoml" type="wovomlType"/>

</xs:schema>
```

Appendix-3 MySQL Field Type

MySQL Field Types

MySQL supports a number of column types, which may be grouped into three categories: numeric types, date and time types, and string (character) types. This section first gives an overview of the types available. Please refer to the MySQL manuals for more details.

Type	Use for	Size
TINYINT	A very small integer	The signed range is –128 to 127. The unsigned range is 0 to 255.
SMALLINT	A small integer	The signed range is –32768 to 32767. The unsigned range is 0 to 65535
MEDIUMINT	A medium-size integer	The signed range is –8388608 to 8388607. The unsigned range is 0 to 16777215
INT or INTEGER	A normal-size integer	The signed range is –2147483648 to 2147483647. The unsigned range is 0 to 4294967295
BIGINT	A large integer	The signed range is –9223372036854775808 to 9223372036854775807. The unsigned range is 0 to 18446744073709551615
FLOAT	A small (single-precision) floatingpoint number. Cannot be unsigned	Ranges are –3.402823466E+38 to –1.175494351E-38, 0 and 1.175494351E-38 to 3.402823466E+38. If the number of Decimals is not set or <= 24 it is a singleprecision floating point number
DOUBLE, DOUBLE PRECISION, REAL	A normal-size (double-precision) floating-point number. Cannot be unsigned	Ranges are -1.7976931348623157E+308 to -2.2250738585072014E-308, 0 and 2.2250738585072014E-308 to 1.7976931348623157E+308. If the number of Decimals is not set or 25 <= Decimals <= 53 stands for a double-precision floating point number
DECIMAL, NUMERIC	An unpacked floating-point number. Cannot be unsigned	Behaves like a CHAR column: “unpacked” means the number is stored as a string, using one character for each digit of the value. The decimal point, and, for negative numbers, the ‘-‘ sign is not counted in Length. If Decimals is 0, values will have no decimal point or fractional part. The maximum range of DECIMAL values is the same as for DOUBLE, but the actual range for a given DECIMAL column may be constrained by the choice of Length and Decimals. If Decimals is left out it’s set to 0. If Length is left out it’s set to 10. Note that in MySQL 3.22 the Length includes the sign and the decimal point
DATE	A date	The supported range is ‘1000-01-01’ to ‘9999-12-31’. MySQL displays DATE values in ‘YYYY-MM-DD’ format
DATETIME	A date and time combination	The supported range is ‘1000-01-01 00:00:00’ to ‘9999-12-31 23:59:59’. MySQL displays DATETIME values in ‘YYYY-MM-DD HH:MM:SS’ format
TIMESTAMP	A timestamp	The range is ‘1970-01-01 00:00:00’ to sometime in the year 2037. MySQL displays TIMESTAMP values in YYYYMMDDHHMMSS, YYMMDDHHMMSS, YYYYMMDD or YYMMDD format, depending on whether M is 14 (or missing), 12, 8 or 6, but allows you to assign values to TIMESTAMP columns using either strings or numbers. A TIMESTAMP column is useful for recording the date and time of an INSERT or UPDATE operation because it is automatically set to the date and time of the most recent operation if you don’t give it a value yourself
TIME	A time	The range is ‘-838:59:59’ to ‘838:59:59’. MySQL displays TIME values in ‘HH:MM:SS’ format, but allows you to assign values to TIME columns using either strings or numbers
YEAR	A year in 2- or 4- digit formats (default is 4-digit)	The allowable values are 1901 to 2155, and 0000 in the 4 year format and 19702069 if you use the 2 digit format (70-69). MySQL displays YEAR values in YYYY format, but allows you to assign values to YEAR columns using either strings or numbers. (The YEAR type is new in MySQL 3.22.)

CHAR	A fixed-length string that is always right-padded with spaces to the specified length when stored	The range of Length is 1 to 255 characters. Trailing spaces are removed when the value is retrieved. CHAR values are sorted and compared in case-insensitive fashion according to the default character set unless the BINARY keyword is given
VARCHAR	A variable-length string. Note: Trailing spaces are removed when the value is stored (this differs from the ANSI SQL specification)	The range of Length is 1 to 255 characters. VARCHAR values are sorted and compared in case-insensitive fashion unless the BINARY keyword is given
TINYBLOB, TINYTEXT		A BLOB or TEXT column with a maximum length of 255 (2^8 - 1) characters
BLOB, TEXT		A BLOB or TEXT column with a maximum length of 65535 (2^16 - 1) characters
MEDIUMBLOB, MEDIUMTEXT		A BLOB or TEXT column with a maximum length of 16777215 (2^24 - 1) characters
LONGBLOB, LONGTEXT		A BLOB or TEXT column with a maximum length of 4294967295 (2^32 - 1) characters
ENUM	An enumeration	A string object that can have only one value, chosen from the list of values 'value1', 'value2', ..., or NULL. An ENUM can have a maximum of 65535 distinct values.
SET	A set	A string object that can have zero or more values, each of which must be chosen from the list of values 'value1', 'value2', ... A SET can have a maximum of 64 members

Appendix-4 Earthquake information

Earthquake Classification

There are 26 types of earthquake for WOVOdat (sd_evn_eqtype):

1. VT : volcano-tectonics
2. VT_D : Deep volcano-tectonics
3. VT_S : Shallow volcano-tectonics
4. H : hybrid
5. H_HLF : High- then follow by low frequency Hybrid
6. H_LHF : Low- then follow by high frequency Hybrid
7. LF : low frequency
8. LF_LP : LF- (Long period)
9. LF_T : LF- (Tornillo 0.7-8Hz 0.5-5min)
10. LF_ILF : LF- (Intermediate low frequency)
11. VLP : very-long period
12. RF : Rockfall
13. E : eruption quake

14. U : unknown origin
15. O : Other, non-volcanic origin
16. X : Undefined
17. G : Gas burst
18. PF : Pyroclastic Flow
19. R : regional tectonic earthquake
20. Q : quarry blasts
21. V : generic volcanic quake without any further classification
22. T :
23. LP :
24. HF :
25. VH :
26. VH_LC :

Description of the 8 types of earthquake classifications occurring in and at surrounding volcanoes:

1. VT-type

VT-type is uses for volcanic earthquake that results from faulting failure mechanism. It is similar to regional seismic event except that it happens inside or underneath volcanic body. Many observatories might use different terminology, such as high-frequency event (HF). In the former time A-Type of Minakami's classification is more widely used. As this type of event is generated by faulting process, when the source-receiver distance is quite far (more than 2 km from Minakami's term), P and S phases could be clearly distinguished in seismogram. With a modern instrument, digital seismic record could identify VT-type that might be at a closer distance. Thus it is possible to identify VT-type of closer source. Faulting process generates a high frequency signal of more than 5 Hz. Thus, a term of "HF- event" is usually used in place of VT-type.

2. H-type

H-type is used to name Hybrid seismic event. It is an events containing a combination of high and low frequency.

B-Type from Minakami is based on that there is no clear S arrival, which could be similar to shallow VT (shallow
VT). However it could be also related to a dome growth. Event-accompanying dome growth is in a form of Hybrid (St. Helens) (= or MP (Merapi)). Hybrid events usually consist of HF part (first onset) and LF part (coda) (Redoubt, Monserrat), whereas LHF is another hybrid with inverse order (LF first then HF).

3. LF-type

Low frequency event is related to the volcanic process inside volcano. Fluid and gas play role in creating such an event. It frequency is about 0.5-5 Hz. There is no indication of P-S distinction because it is not from faulting mechanism.

4. VLP

Installation of broadband seismograph in many volcanoes could have revealed the presence of VLP events. Its signal period ranges from 2 to 30 second. (in Hachijo island T=20s; Erebus T=8-20s; Stromboli T=2-30s). Some recent studies

conclude that VLP is related to a movement of a gas slug inside volcano conduit. (O'Brien and Bean, GRL 35, 2008)

5. E (for Explosion)

Explosion event is seismic signal that accompany eruption process.

6. T (for Tremor)

Tremor is a continuous seismic signal with a duration from several minutes to days. Many volcanoes produce tremor with only single dominant frequency (monochromatic tremor), or tremor with two or harmonic peaks (harmonic tremor). Some tremors, from record observation have wider frequency content (non-harmonic tremor). Earthquake swarm with dense event population, commonly happen prior to eruption, (=short interval between events) could produce non-harmonic tremor, or a "dense- events" tremor

7. R

R-type, or regional type uses for tectonic earthquakes occurring close to the volcano. For individual volcanic cone, the term "close" refers to distance of less than 30 km (?) from the volcano edifice. For a volcanic zone, such as Campi Flegrei and Auckland volcanic zones, it refers to distance of 30 km (?) from the outer boundary of the zone. Storing data about tectonic earthquakes near volcano in the WOVOdat is important as in several cases that volcanic activity could be affected or re-awaked by tectonic earthquakes.

8. Q-type

Quary blast occuring on volcanic region. R and Q is non-volcanic earthquake, however it may have a relation to volcanic activity or occured in volcanic area. V is used when the type is not specified.

To store more detail classification, earthquake subtypes are added.

Earthquake general classification	Type of earthquake	Subtype of earthquake
Regional Tectonic	Regional Tectonic (R)	
Quarry blast	Quarry blast (Q)	
Volcanic	General volcanic (V)	
	Volcano tectonic (VT)	General or non specified (VT)
		Deep (VT_D)
		Shallow (VT_S)
	Hybrid (H)	General or non specified (H)
		High- then follow by low frequency (H_HLF)
		Low- then follow by high frequency (H_LHF)
	Low frequency (LF)	Long period (LF_LP)
		Tornillo 0.7-8Hz 0.5-5min (LF_T)

		Intermediate low frequency (LF_ILF)
	Very long period (VLP)	
	Explosion (E)	
	Unknown origin (U)	
	Other, non volcanic origin (O)	
	Undefined (X)	

sd_evn_eqtype =>
'R','Q','V','VT','VT_D','VT_S','H','H_HLF','H_LHF','LF','LF_LP','LF_T','LF_ILF','VLP','RF','E'
,'U','O','X','G','PF','T','LP','HF','VH','VH_LC'

Earthquake general classification	Type of tremor	Subtype of tremor
Volcanic	Tremor (T)	General or non specified (T)
		Harmonic (H)
		Monochromatic (M)
		Close-events tremor (C)

sd_trm_type => 'T','H','M','C'

Magnitude Types

The identifying factor for the magnitudes is the magnitude type, sd_evn_pmag_type and sd_evn_smag_type. The magnitude types are limited to the following:

- **duration (Md)**
  The duration magnitude is based on the duration of shaking as measured by the time decay of the amplitude of the seismogram. This magnitude (also known as coda magnitude) is often used to compute magnitude from seismograms with "clipped" waveforms due to limited dynamic recording range of analog instrumentation.
- **local (ML)**
  The local magnitude (ML) is the original magnitude relationship defined by Richter and Gutenberg for local earthquakes and is based on the maximum amplitude of a seismogram recorded on a Wood-Anderson torsion seismograph (appropriate adjustments are made for modern instrumentation).
- **surface wave (Ms)**
  The surface wave magnitude (Ms) is used for distant earthquakes based on the amplitude of Rayleigh surface waves measured at a period near 20 sec.
- **moment (Mw)**
  The moment magnitude (Mw) is based on the moment of the earthquake, which is equal to the rigidity of the earth times the average amount of slip on the fault times the amount of fault area that slipped.
- **body (Mb)**

The body magnitude (Mb) is based on the amplitude of P body- waves and is most appropriate for deep-focus earthquakes.

Appendix-5 Introduction to Using WOVOdat (submit and visualize data)

Introduction to Using WOVOdat (version November 2018)

WOVOdat is a web-accessible database of worldwide historical volcanic unrest. Open user access which is launched during 2013 IAVCEI Kagoshima meeting allow the registered user to access the WOVOdat website (***www.wovodat.org***). Through this website, users will be able to obtain general information about WOVOdat and find 4 first-level menu selections:

- ***News:*** *Users will be able to get latest news of WOVOdata*

- ***Visualization:***
  - **Single volcano view:** Shaded relief and monitoring stations, with 2D or 3D hypocenter display, and time-series for multiple parameters, including pre-defined default or user selected small number of parameters.
  - **Side by side comparisons:** Similar display as described above, but also allow comparing 2 unrests (within the same volcano or between 2 volcanoes).
  - **Temporal evolution of unrest:** Plotting of hypocenters and other parameters through time, slowly enough that the user can see how the unrest developed in time and space.
  - **Classic episodes of unrest :** This page will bring up summaries of unrest at selected

"classic" cases. For now we simply have a downloadable PDF file for the **Pinatubo 1991** eruption but in the future it will be a package where all the data will be an interactive standalone visualization and download module.

- ***Data Download:***

  - **Data search by volcano:** Search unrest data availability for a selected volcano. The results will be displayed in table, with link to data visualization (single volcano view) and data download.

  - **Boolean searches:** By selecting time period and selected data type, user will be directed to data visualization (single volcano view) or data download link.
    a. For analogous volcanoes (searching keys from Volcano Table)
    b. For analogous episodes of unrest (searching for episodes that satisfy specified criteria, e.g., M>4, etc.

- ***Submit Data***: Currently we offer 3 options for users to contribute data:

  (a) free format or original observatory format,

  (b) WOVOdat CSV standard format, and

  (c) Customary/known CSV format.

  Data can also be contributed using an online form and uploaded into SQL database following WOVOdat XML standard format.

- ***Documentation***: Users may consult and download documentations (user manual, SQL schema, XML format, table formats). A WOVOdat installable standalone package is available for observatories that want to adapt WOVOdat for their own data management.

- ***Contact Us***: We invite scientists from volcano observatories, universities, and research institutions to participate in the growing of WOVOdat database by sharing their data and their expertise in developing visualization tools and other utilities (optimisazion of Boolean search, pattern recognition, data display, etc.). For further information, please contact WOVOdat developer team through **wovodat@wovodat.org.**

- ***WOVOdat Tools Index***: Contains a compilations of all tools in WOVOdat. We expect to develop and adapt various application tools including statistical analysis, machine learning etc, and these will be added here

1. **Creating an account:**

   Fill in the registration form through *http://www.wovodat.org/populate/regist_form.php*

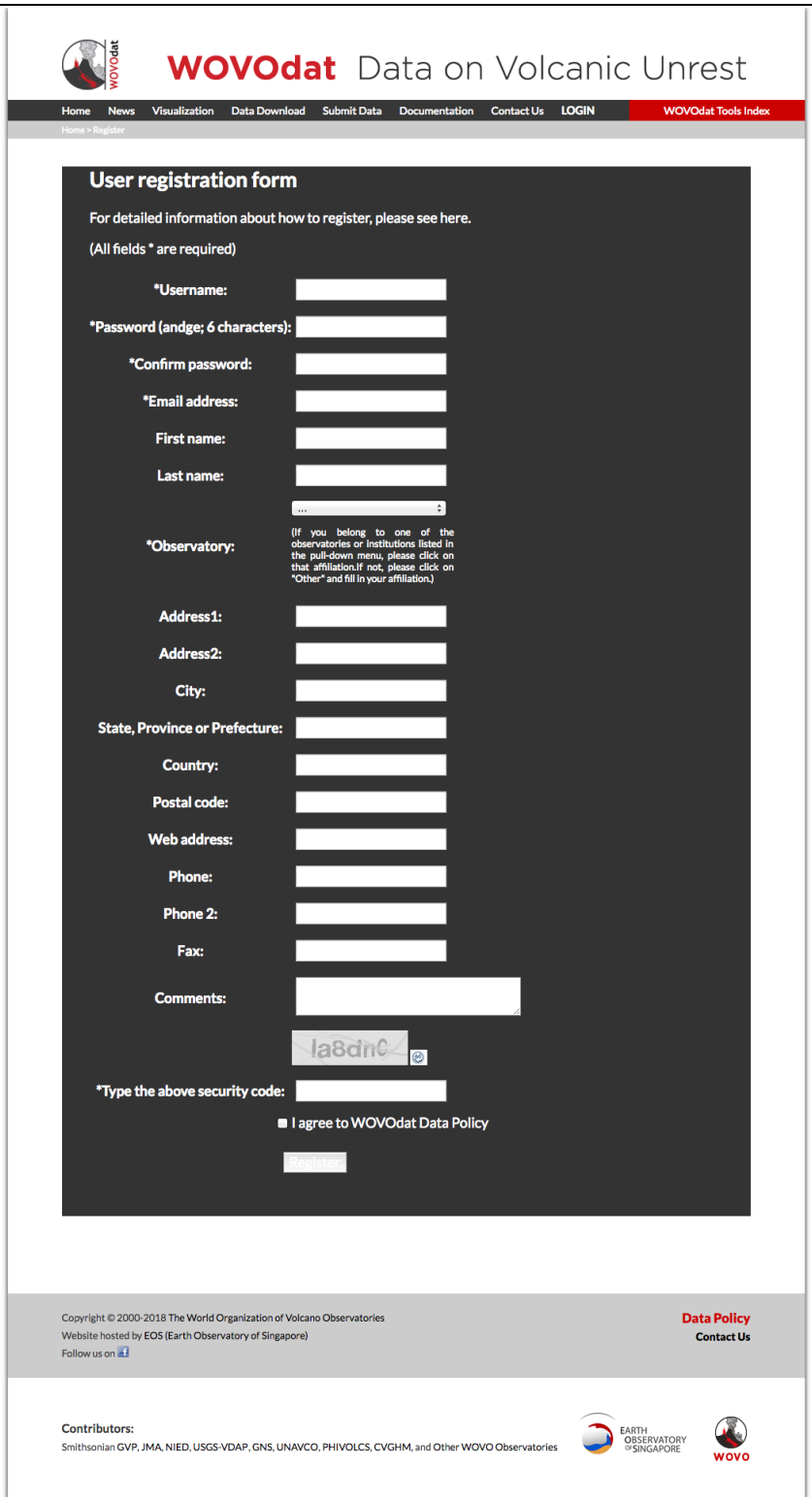


Figure 6. WOVOdat user registration form

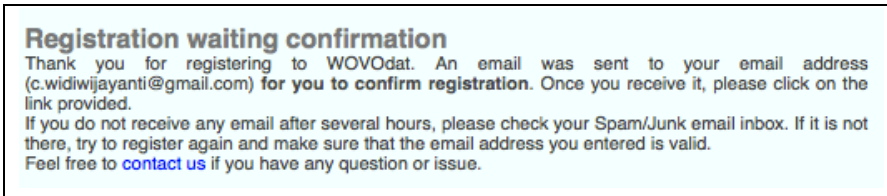


Figure 7. Registration process

When the filled form is successfully submitted into the system, an email will be sent to registered email address. To confirm the registration, the user will be required to click the link provided in the email.

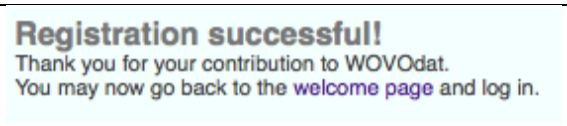


Figure 8. Registration confirmation

2. News: *http://www.wovodat.org/about/news.php*

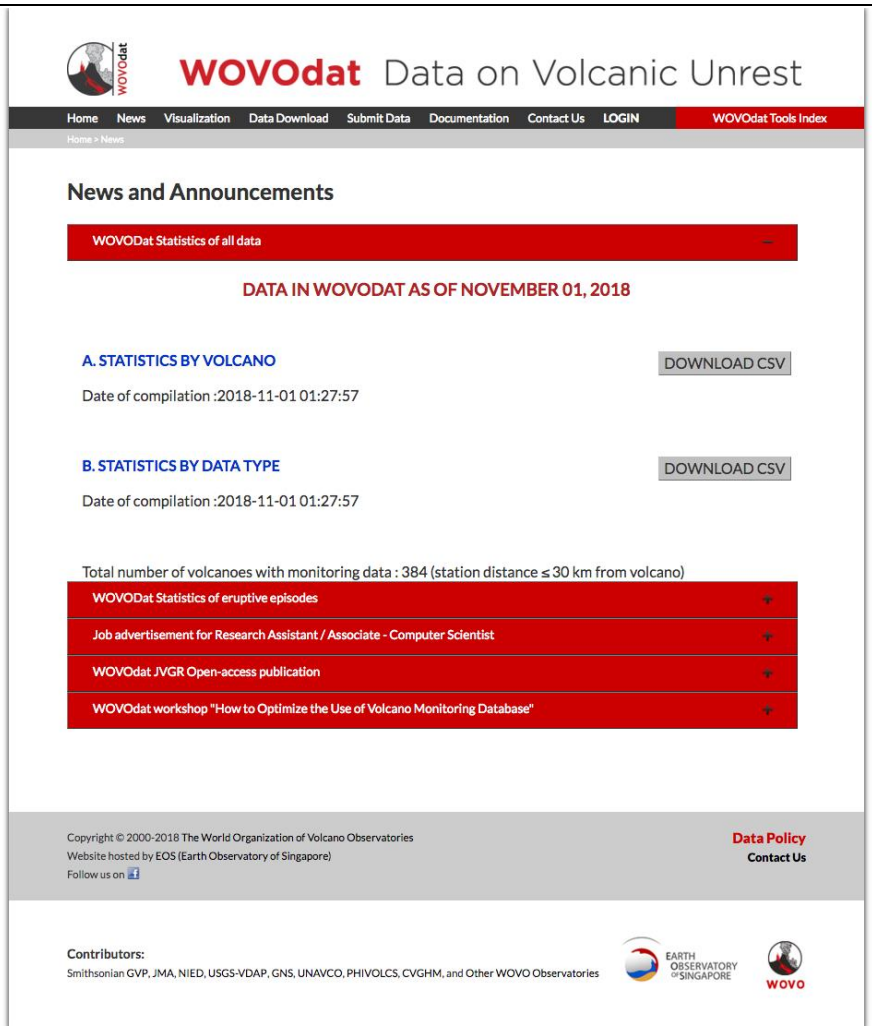


Figure 9. News page

3. **Visualization:** http://www.wovodat.org/precursor/index_unrest_devel_v6.php

3.1 - Single volcano view: Shaded relief and monitoring stations, with 2D or 3D hypocenter display, and time-series for multiple parameters, including pre-defined default or user selected small number of parameters.

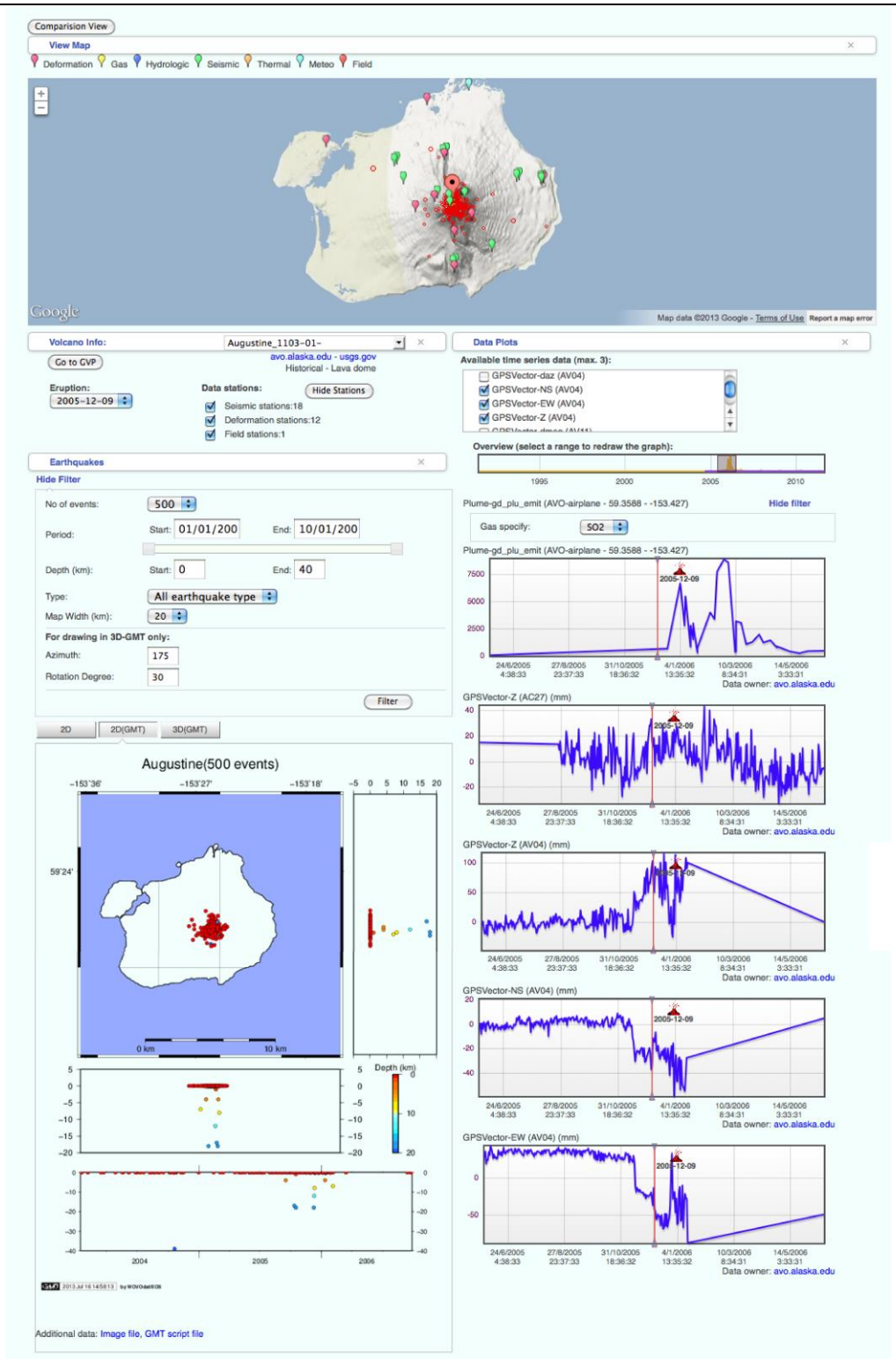


Figure 10. Example of visualization: precursory data of Augustine eruption 5 Dec 2005

3.2 - Side by side comparisons:

http://www.wovodat.org/precursor/index_unrest_devel_v5.php

Similar display as described above, but also allow comparing 2 unrests (within the same volcano or between 2 volcanoes).

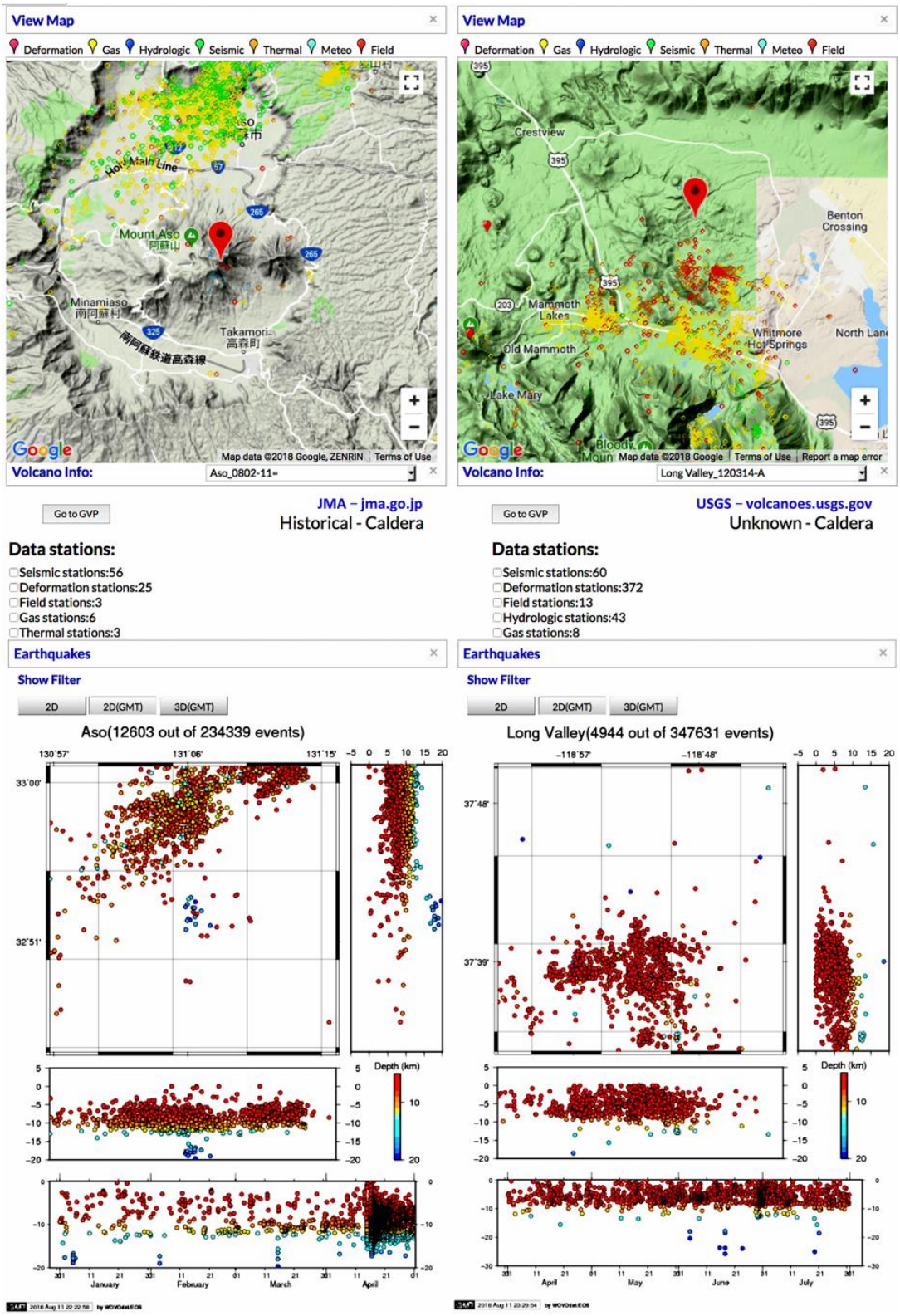


Figure 11: Data comparison between Aso and Long Valley eruptions

***3.3* - Temporal evolution of unrest:** http://www.wovodat.org/eruption/index.php

Plotting of hypocenters and other parameters through time, slowly enough that the user can see how the unrest developed in time and space.

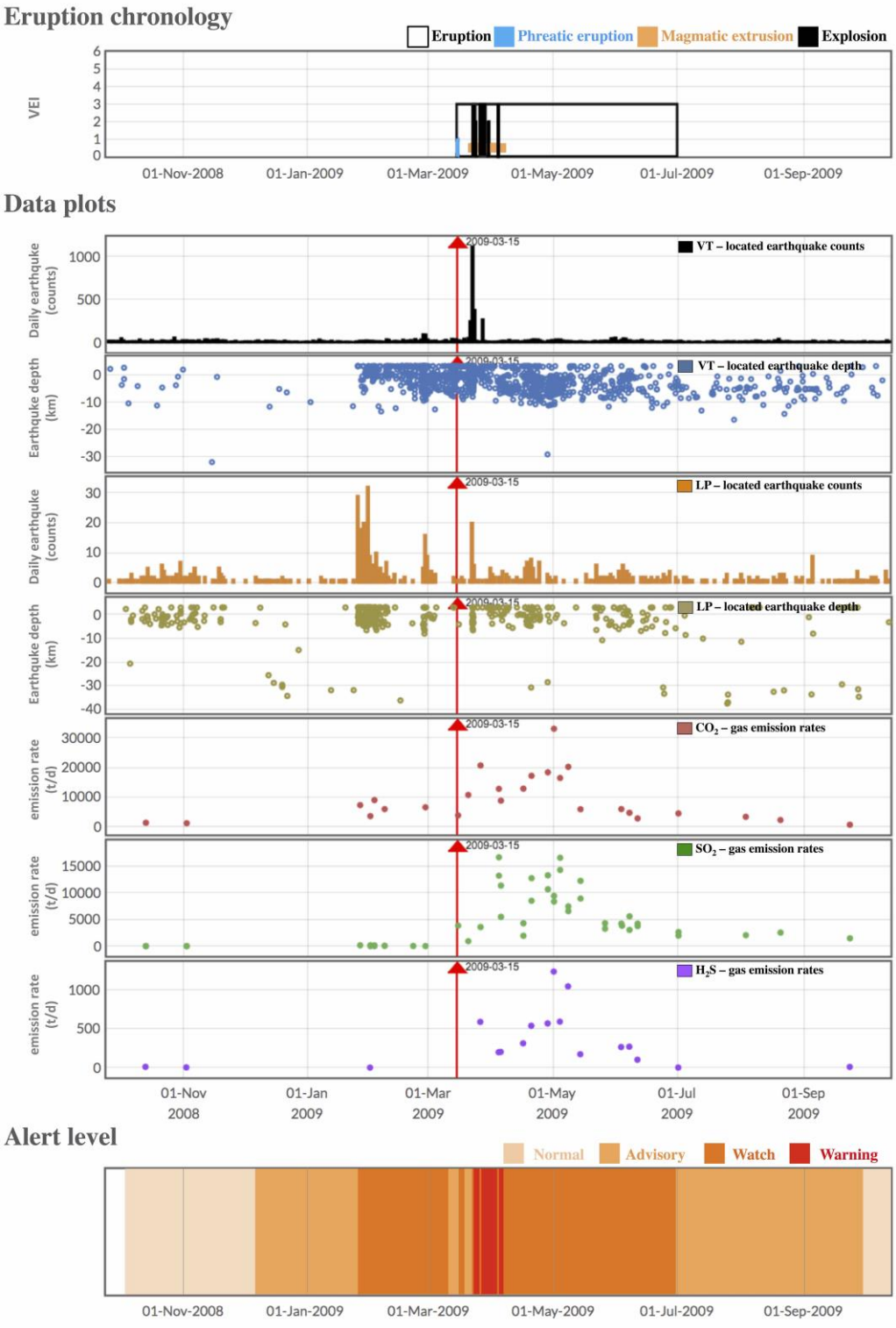


Figure 12: Temporal Evolution of unrest

3.4 - Classic episodes of unrest : *http://www.wovodat.org/epiunrest/classicepisodes.php*
This page will bring up summaries of unrest at selected "classic" cases.

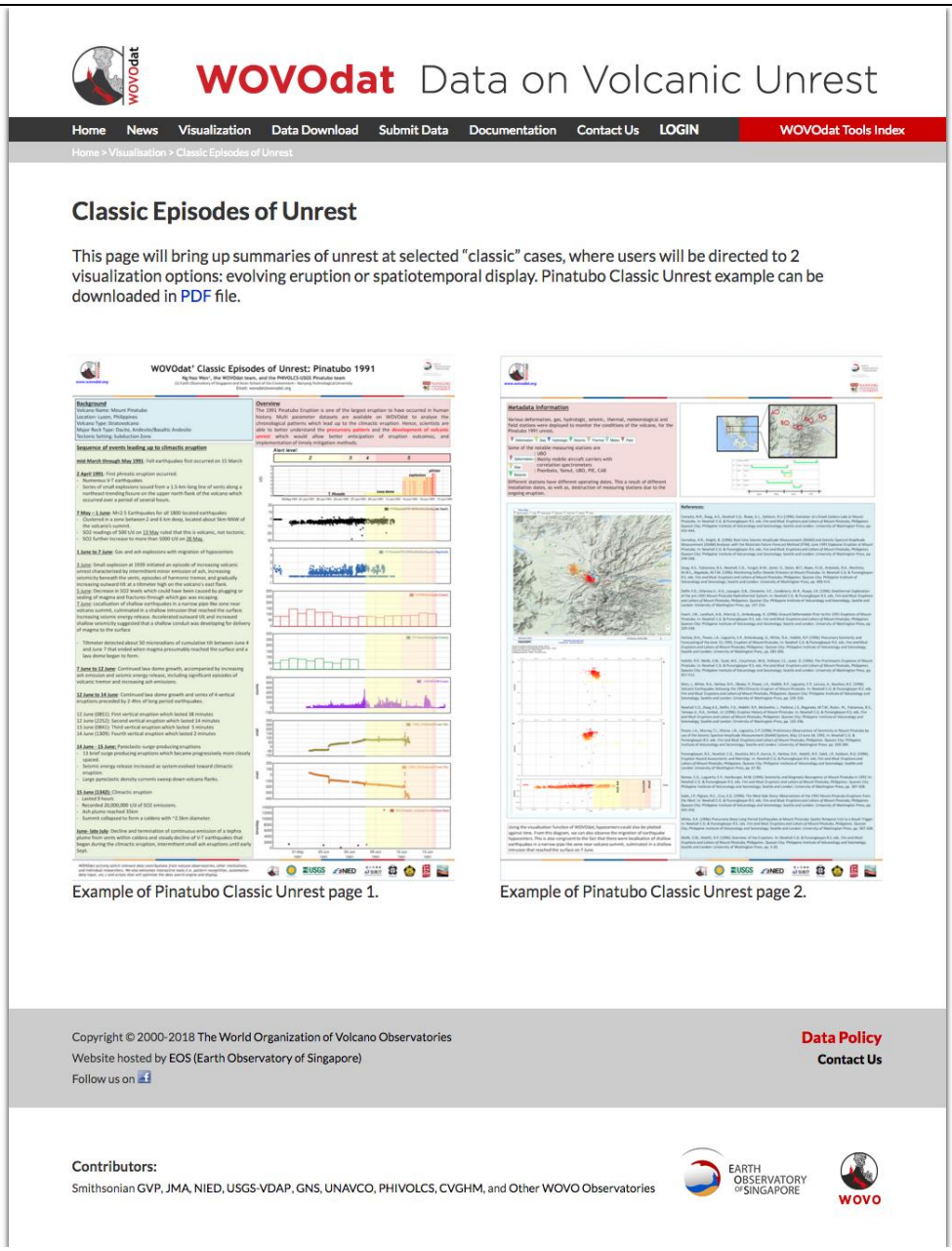


Figure 13: Classic episodes of unrest

4. Data Download:

4.1 - Data search by volcano:

http://www.wovodat.org/populate/convertie/Volcano_zone/main.php?data_type=zone_index

Search unrest data availability for a selected volcano. The results will be displayed in table, with link to data visualization (single volcano view) and data download.

Figure 14: Google map, showing location of worldwide Holocene volcanoes with data (red) and without data (yellow).

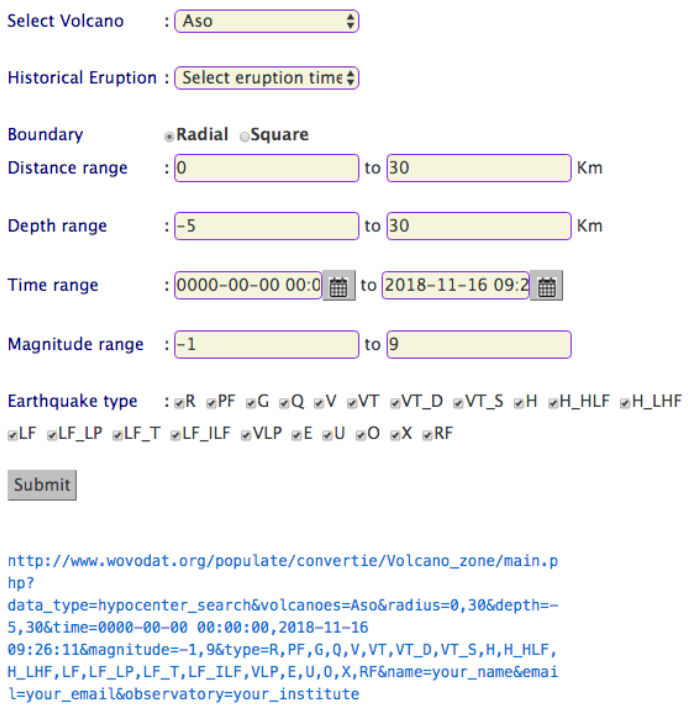
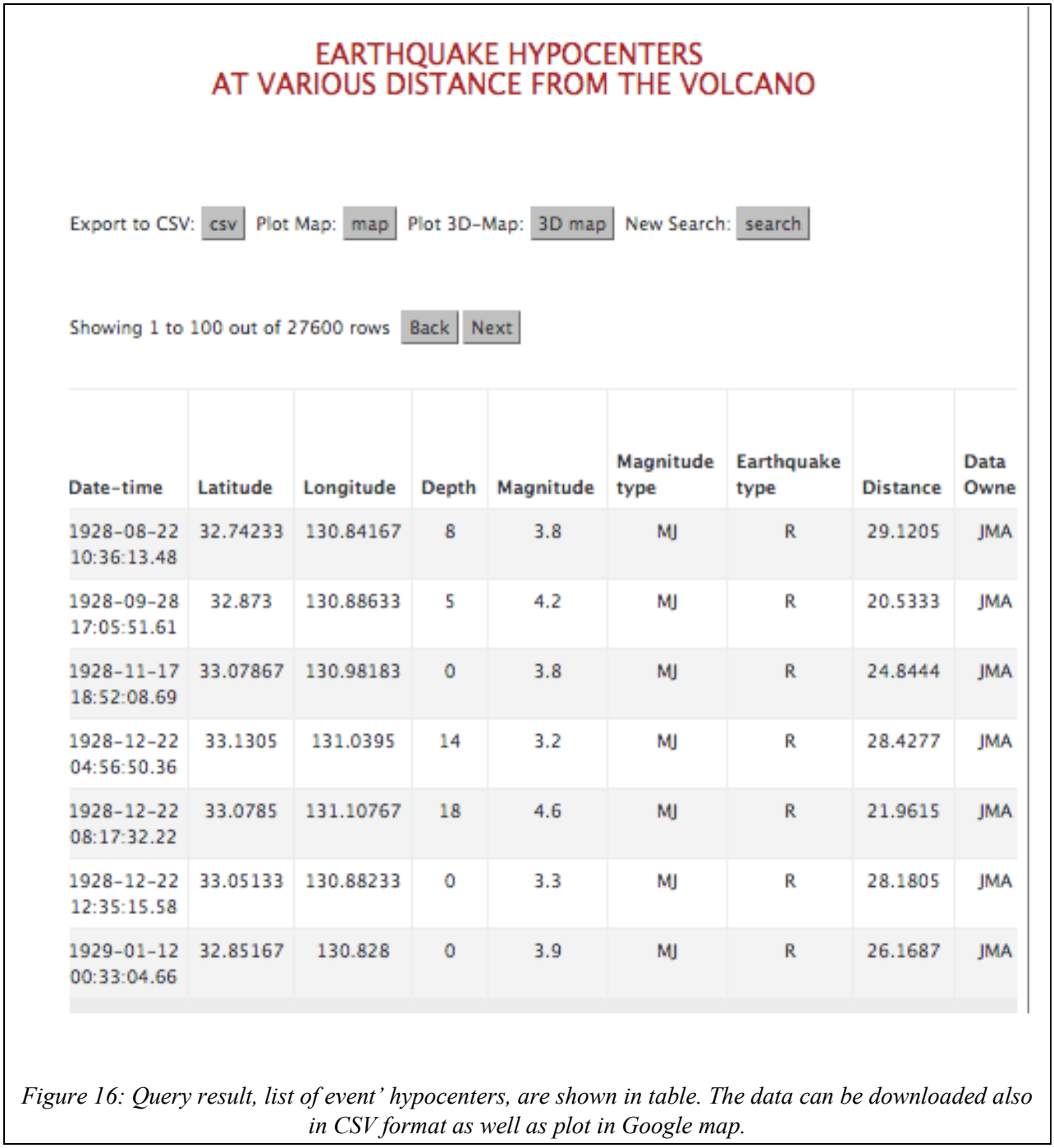


Figure 15: Table showing volcano information and link to GVP web-page, WOVOdat visualization tools, and advance data query form.



EARTHQUAKE HYPOCENTERS
AT VARIOUS DISTANCE FROM THE VOLCANO

Export to CSV: csv Plot Map: map Plot 3D-Map: 3D map New Search: search

Showing 1 to 100 out of 27600 rows Back Next

Date-time	Latitude	Longitude	Depth	Magnitude	Magnitude type	Earthquake type	Distance	Data Owne
1928-08-22 10:36:13.48	32.74233	130.84167	8	3.8	MJ	R	29.1205	JMA
1928-09-28 17:05:51.61	32.873	130.88633	5	4.2	MJ	R	20.5333	JMA
1928-11-17 18:52:08.69	33.07867	130.98183	0	3.8	MJ	R	24.8444	JMA
1928-12-22 04:56:50.36	33.1305	131.0395	14	3.2	MJ	R	28.4277	JMA
1928-12-22 08:17:32.22	33.0785	131.10767	18	4.6	MJ	R	21.9615	JMA
1928-12-22 12:35:15.58	33.05133	130.88233	0	3.3	MJ	R	28.1805	JMA
1929-01-12 00:33:04.66	32.85167	130.828	0	3.9	MJ	R	26.1687	JMA

Figure 16: Query result, list of event' hypocenters, are shown in table. The data can be downloaded also in CSV format as well as plot in Google map.

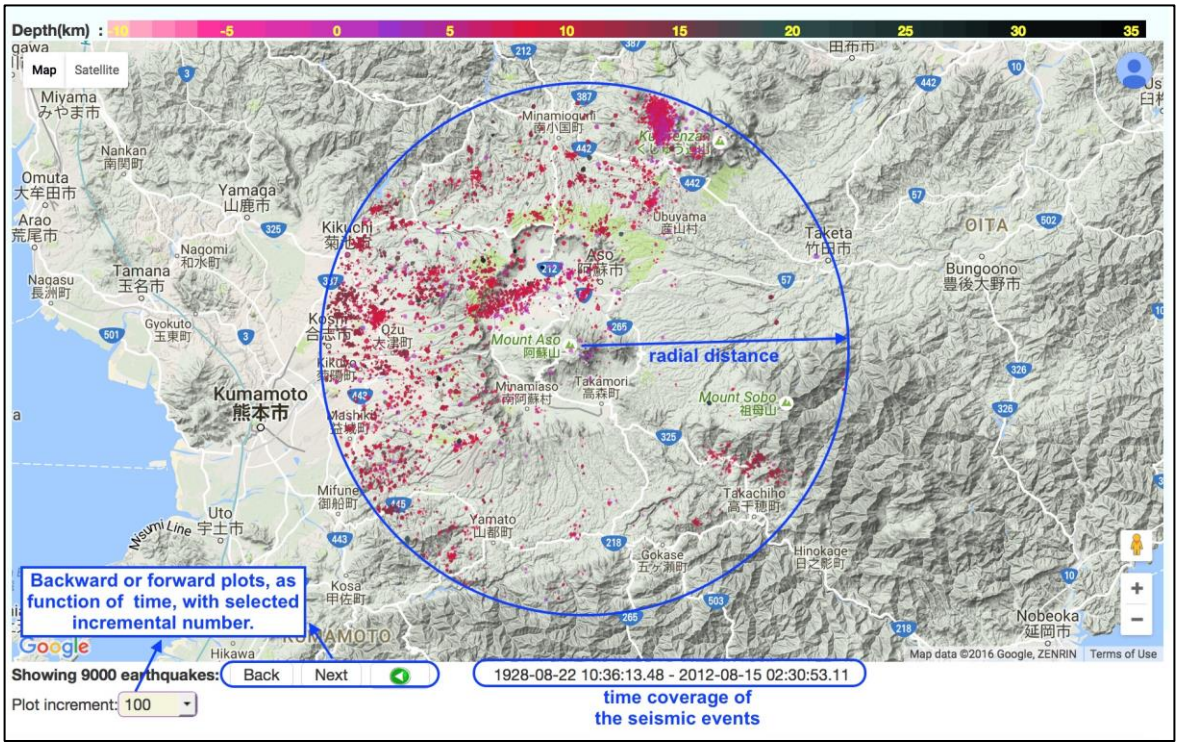


Figure 17: Backward and forward hypocenter plot, by selected incremental number, as function of time

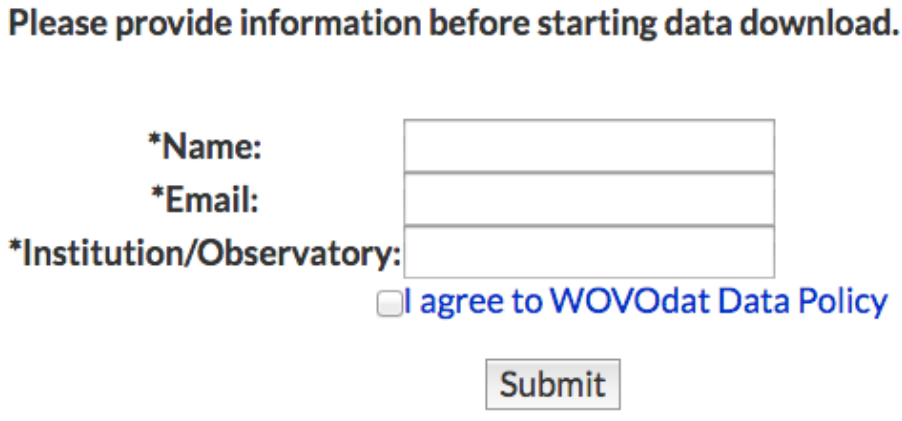


Figure 18: User wish to download the data, will require to fill up personal detail form and accepting WOVOdat data policy. Any data download, will automatically tracked and registered in "ddu" table.

ddu

Table comments: Keep track who download which data type

Column	Type	Null	Default	Comments
ddu_id	smallint(5)	No		Download data user id
cr_id	smallint(5)	Yes	*NULL*	Log in user id like download as a registered user
ddu_name	varchar(30)	No		Download data user name like download as a guest user
ddu_email	varchar(30)	No		Email
ddu_obs	varchar(30)	Yes	*NULL*	Download data user obs
ddu_ip	varchar(30)	No		Download data user's IP address
ddu_time	datetime	No		The time user download data
ddu_country	varchar(30)	Yes	*NULL*	Country where user download data
ddu_city	varchar(30)	Yes	*NULL*	City where user download data
vd_name	varchar(50)	No		User download data for this vol
cc_id	smallint(5)	No		To keep data owner Id
ddu_dataType	varchar(30)	No		User dowload data type
ddu_dataStartTime	datetime	No		User download data start time
ddu_dataEndTime	datetime	No		User download data end time

Indexes

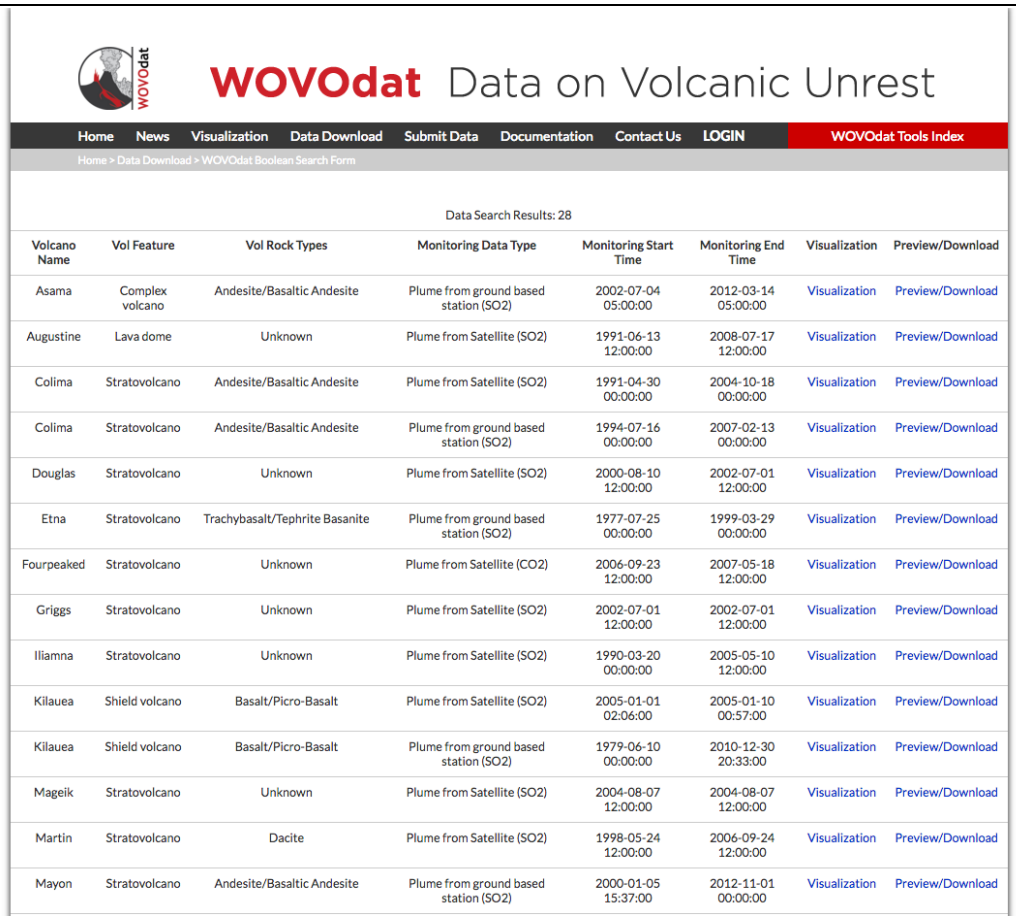
Keyname	Type	Unique	Packed	Column	Cardinality	Collation	Null	Comment
PRIMARY	BTREE	Yes	No	ddu_id	528	A	No	
cr_id	BTREE	No	No	cr_id	14	A	Yes	
cc_id	BTREE	No	No	cc_id	33	A	No	

Figure 19: "ddu" table format, to keep track user who download and which data had been downloaded.

4.2 - Boolean searches: *http://www.wovodat.org/boolean/booleanIndex.php*

By selecting time period and selected data type, user will be directed to data visualization (single volcano view) or data download link.

Figure 20: Boolean search form



WOVOdat Data on Volcanic Unrest

Home | News | Visualization | Data Download | Submit Data | Documentation | Contact Us | LOGIN | WOVOdat Tools Index

Home > Data Download > WOVOdat Boolean Search Form

Data Search Results: 28

Volcano Name	Vol Feature	Vol Rock Types	Monitoring Data Type	Monitoring Start Time	Monitoring End Time	Visualization	Preview/Download
Asama	Complex volcano	Andesite/Basaltic Andesite	Plume from ground based station (SO2)	2002-07-04 05:00:00	2012-03-14 05:00:00	Visualization	Preview/Download
Augustine	Lava dome	Unknown	Plume from Satellite (SO2)	1991-06-13 12:00:00	2008-07-17 12:00:00	Visualization	Preview/Download
Colima	Stratovolcano	Andesite/Basaltic Andesite	Plume from Satellite (SO2)	1991-04-30 00:00:00	2004-10-18 00:00:00	Visualization	Preview/Download
Colima	Stratovolcano	Andesite/Basaltic Andesite	Plume from ground based station (SO2)	1994-07-16 00:00:00	2007-02-13 00:00:00	Visualization	Preview/Download
Douglas	Stratovolcano	Unknown	Plume from Satellite (SO2)	2000-08-10 12:00:00	2002-07-01 12:00:00	Visualization	Preview/Download
Etna	Stratovolcano	Trachybasalt/Tephrite Basanite	Plume from ground based station (SO2)	1977-07-25 00:00:00	1999-03-29 00:00:00	Visualization	Preview/Download
Fourpeaked	Stratovolcano	Unknown	Plume from Satellite (CO2)	2006-09-23 12:00:00	2007-05-18 12:00:00	Visualization	Preview/Download
Griggs	Stratovolcano	Unknown	Plume from Satellite (SO2)	2002-07-01 12:00:00	2002-07-01 12:00:00	Visualization	Preview/Download
Iliamna	Stratovolcano	Unknown	Plume from Satellite (SO2)	1990-03-20 00:00:00	2005-05-10 12:00:00	Visualization	Preview/Download
Kilauea	Shield volcano	Basalt/Picro-Basalt	Plume from Satellite (SO2)	2005-01-01 02:06:00	2005-01-10 00:57:00	Visualization	Preview/Download
Kilauea	Shield volcano	Basalt/Picro-Basalt	Plume from ground based station (SO2)	1979-06-10 00:00:00	2010-12-30 20:33:00	Visualization	Preview/Download
Mageik	Stratovolcano	Unknown	Plume from Satellite (SO2)	2004-08-07 12:00:00	2004-08-07 12:00:00	Visualization	Preview/Download
Martin	Stratovolcano	Dacite	Plume from Satellite (SO2)	1998-05-24 12:00:00	2006-09-24 12:00:00	Visualization	Preview/Download
Mayon	Stratovolcano	Andesite/Basaltic Andesite	Plume from ground based station (SO2)	2000-01-05 15:37:00	2012-11-01 00:00:00	Visualization	Preview/Download

Figure 21: Boolean search results

5. **Submit Data:** *http://www.wovodat.org/populate/home_populate.php*

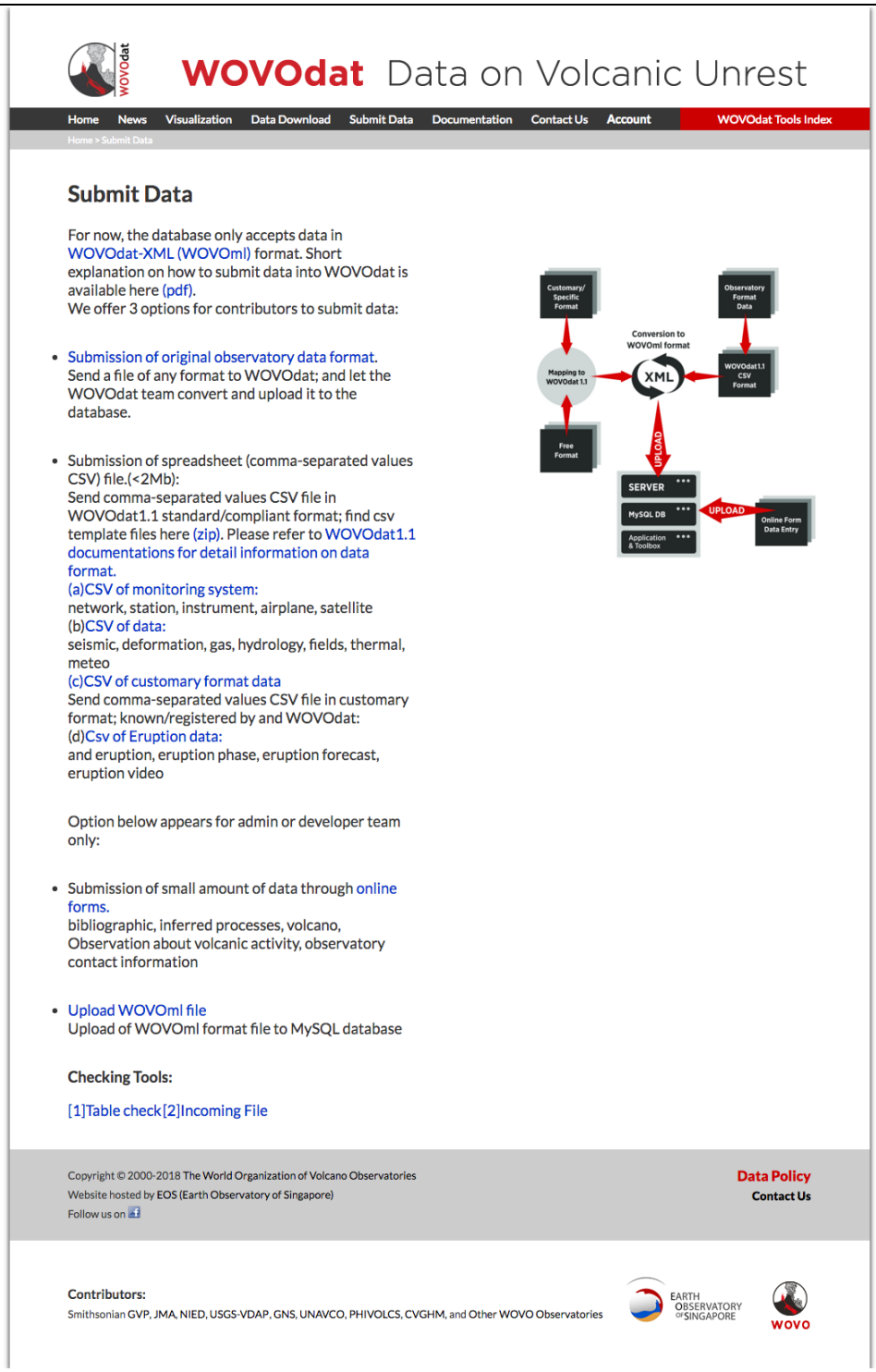


Figure 22: WOVOdat online UI for data submission (data conversion and upload)

For now, the database only accepts data in WOVOdat-XML (WOVOml) format. A short explanation on how to submit data into WOVOdat is available here (pdf).

We offer different options for contributors to submit data:

ONLINE DATA CONVERSION

Online data conversion allows the user to convert their observatory data from comma-separated values (CSV) into standardized WOVOdat-XML format (WOVOml).

1. Submission of original observatory data format.
   Send metadata/information and monitoring data file of any format to WOVOdat; and let the WOVOdat team convert and upload it to the database.

2. Submission of spreadsheet CSV file.(<2Mb):
   Send comma-separated values CSV file in WOVOdat1.1 standard/compliant format. CSV template for each table can be downloaded here (zip). Please refer to WOVOdat1.1 document for detailed information on data format.

   (a)CSV of monitoring system:
   Metadata/information concerning monitoring network, station, instrumentation, component, airplane/satellite

   (b)CSV of data:
   Monitoring data: Seismic, deformation, gas, hydrology, fields, thermal, and meteorology.

Customary online conversion

Send comma-separated values CSV file in standard observatory format (specifically for known/registered format by WOVOdat):

(c) CSV of customary format data

DATA UPLOAD *(This option only appears for the admin or developer team only):*

1. Input data using online form:

   Submission of small amount of data through ***online forms.*** Including bibliographic, inferred processes, volcano, observation about volcanic activity, observatory contact information.

2. ***Upload WOVOml file***

After successfully converting their csv file to XML format, the user will be able to upload their WOVOml format file to the MySQL database.

3. **Submiting data through online conversion**

(a) Monitoring system

User will be required to submit their volcano monitoring metadata/information prior submitting their monitoring data into WOVOdat database. WOVOdat divides volcano monitoring into 7 different groups: Seismic, deformation, gas, hydrology, fields, thermal, and meteorology.

Following hierarchical schema of WOVOdat, the user will first submit ***network*** => then follow by ***station*** => ***instrument***.

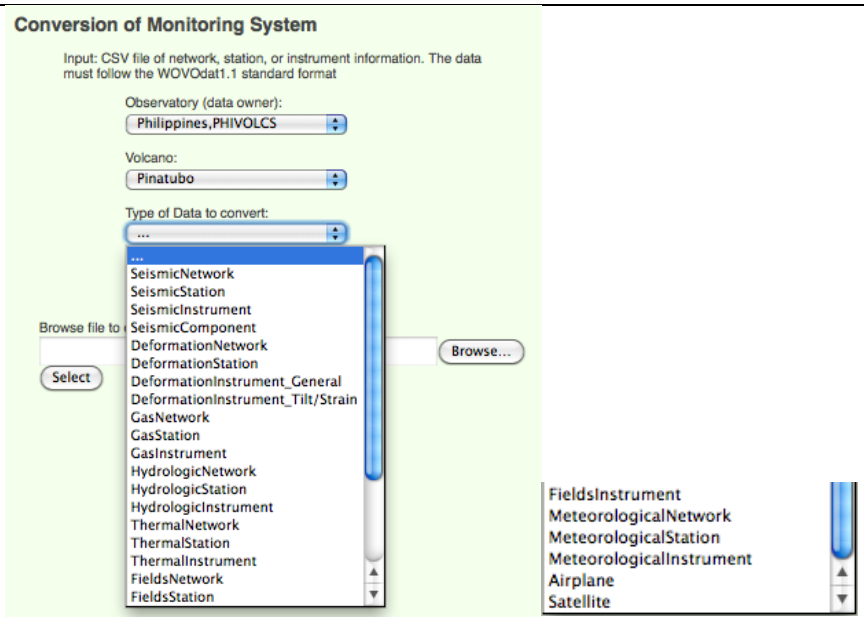


Figure 23. *WOVOdat online user interface to convert metadata/information about volcano monitoring system.*

(b) Monitoring data

Various types of monitoring data currently managed in the WOVOdat database are:

- **Seismic**: Event recorded by network, event recorded by single station, tremor, intensity, interval/swarm (earthquake count, seismic energy), waveform example, RSAM, and SSAM.
- **Deformation**: Tilt (radial-displacement and vector), strain, electronic distance measurement (EDM), angle, GPS (displacement and vector), leveling, and InSAR.
- **Fields**: Electric fields, gravity, magnetic (fields and vector)

- **Gas**: Directly sampled gas, plume, soil efflux.
- **Hydrologic**: Hydrologic measurement (physical and chemical component)
- **Thermal**: Ground based and remote thermal measurement
- **Meteorological data**

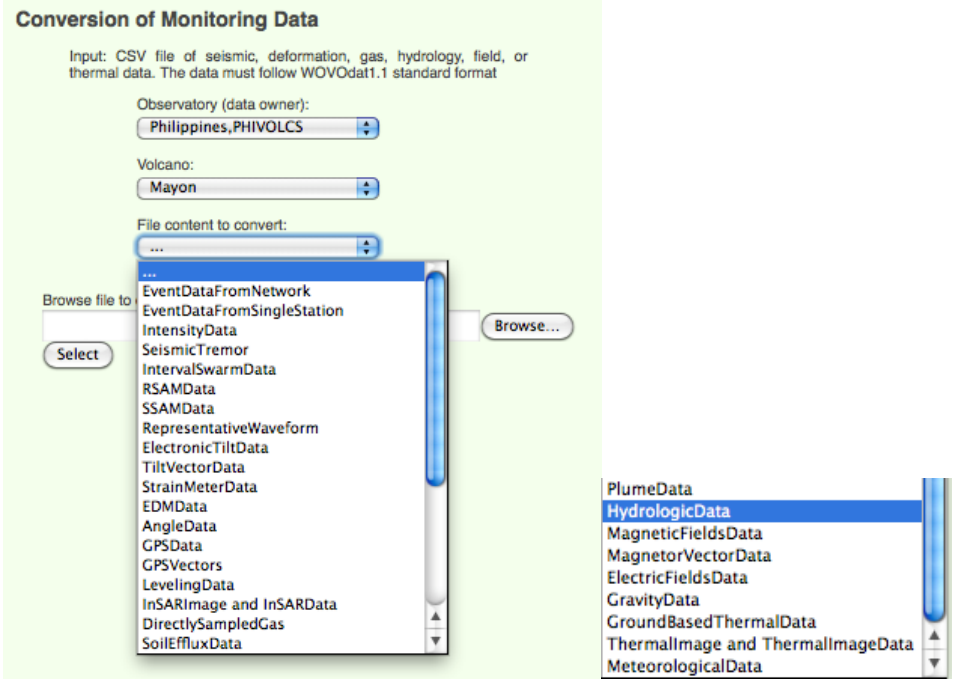


Figure 24. *WOVOdat online user interface to convert various type of volcano monitoring data.*

(c) Customary format data

This part is an automatic online conversion, intended for specific data format from observatory/partner, where the data format has already been mapped and known by WOVOdat system.

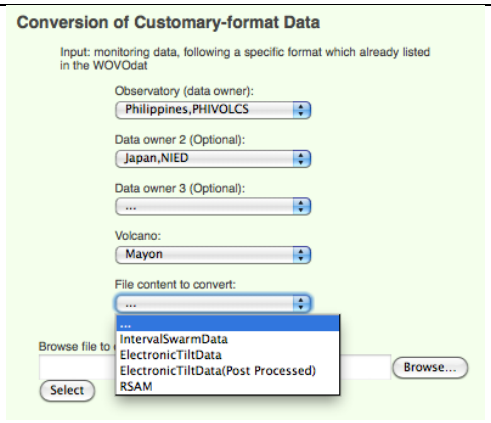
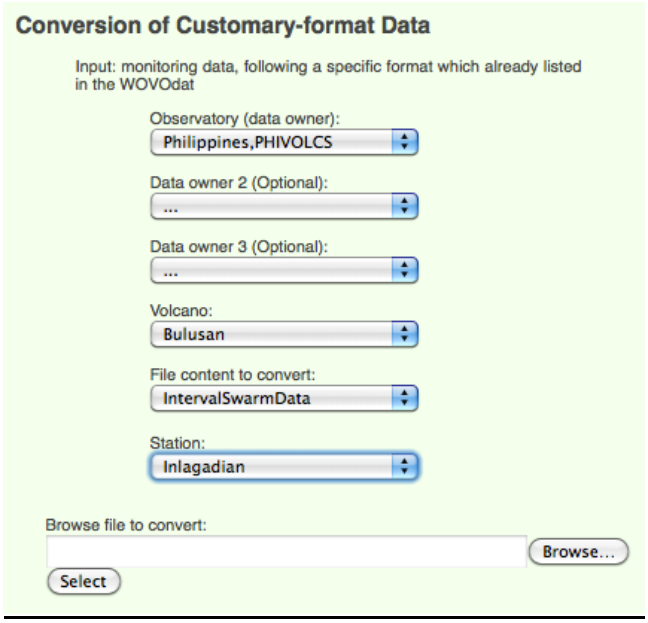
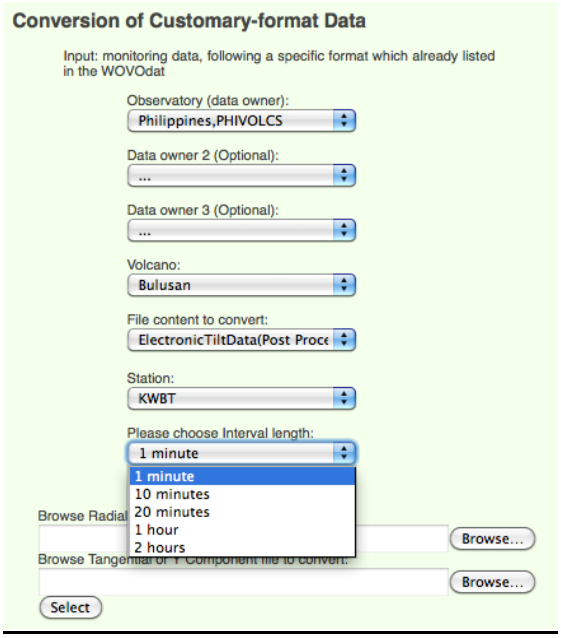


Figure 25. *Example of customary automatic conversion for PHIVOLCS data format.*

C-1. Interval Swarm Data



C-2. Electronic tilt data (post processed)



C-3. Electronic Tilt Data

C-4. RSAM

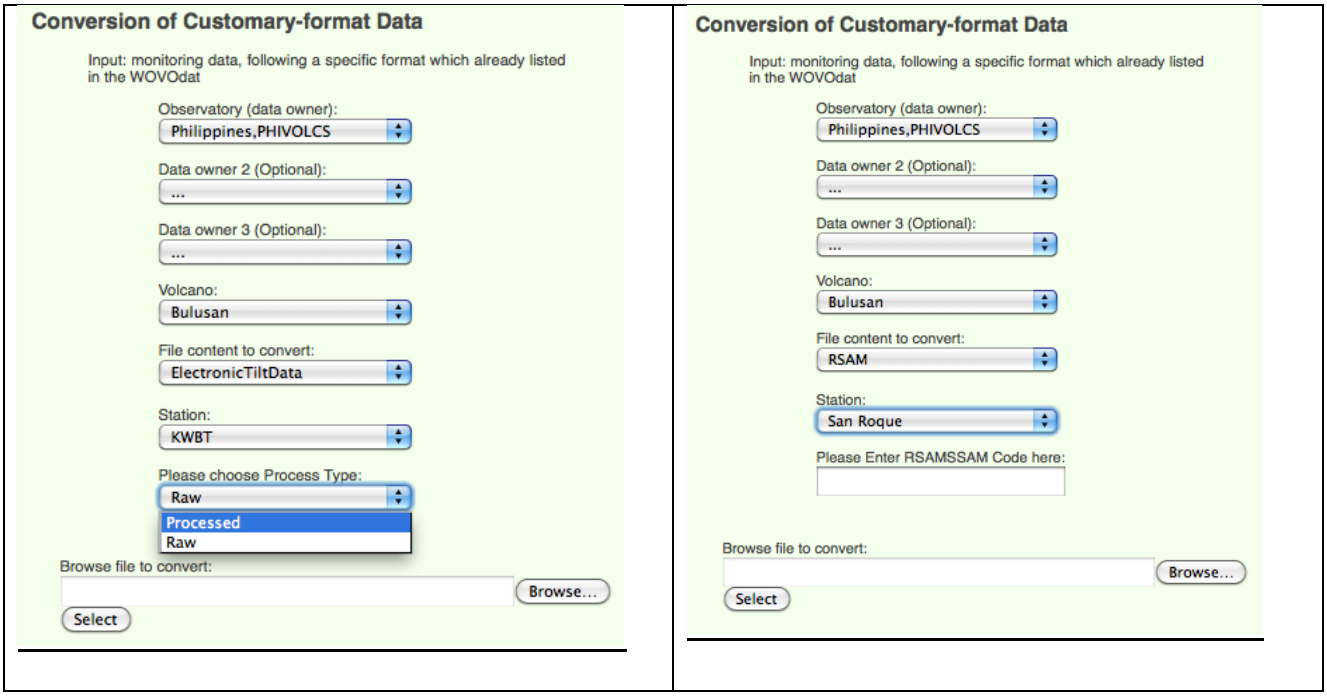


Figure 26. *Example of customary automatic conversion*

for PHIVOLCS data format (cont.).

Example of conversion processes: *Conversion of seismic-monitoring system*

A. Conversion of seismic network CSV to XML format.

Through online submission, the user inputs/uploads a CSV file *(following WOVOdat standard format)*.

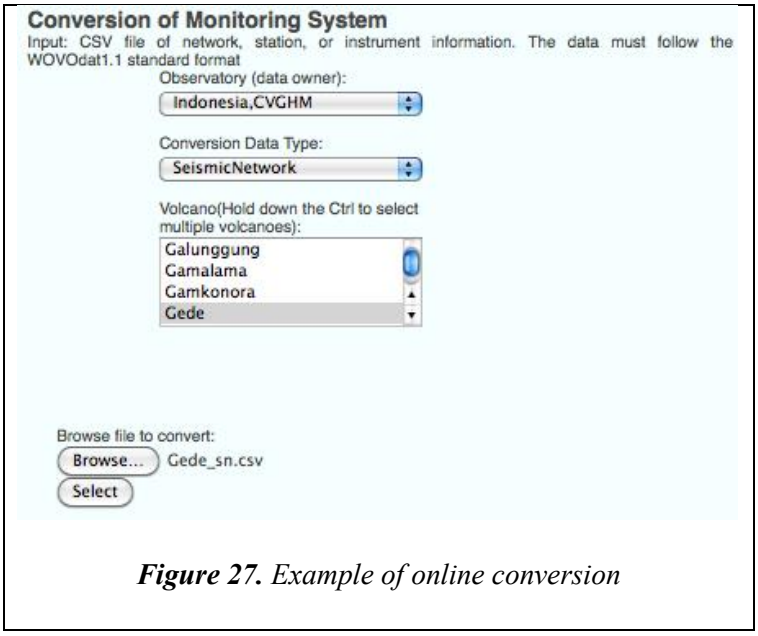


Figure 27. *Example of online conversion*

Below is an example of the seismic network (sn) table, following the WOVOdat CSV template.

sn_id	sn_code	vd_id	sn_name	sn_vmodel	sn_vmodel_detail
	Gede_Seismic_Net		Gede Seismic Network	Regional Velocity Model (... and others, 1993). Layer number Vp (km/sec) Top of layer (km) Vp/Vs 1 5.3 -3.0 1.78 2 5.6 4.0 1.78 3 6.2 10.0 1.78 4 6.9 15.0 1.78 5 7.4 20.0 1.78 6 7.7 35.0 1.78 7 7.9 33.0 1.78 8 8.1 47.0 1.78 9 8.3 65.0 1.78	/home/wovodat/public_html/WOVOdat/region/06/03/waveform/vmodel.txt

sn_zerokm	sn_fdepth_flag	sn_fdepth	sn_stime	sn_stime_unc	sn_etime	sn_etime_unc	sn_tot
0 elevation (sea level)	U	Unknown if depth is fixed	1980-08-01 06:00:00	NULL	NULL	NULL	10

sn_bb	sn_smp	sn_digital	sn_analog	sn_tcomp	sn_micro	sn_desc	sn_utc
5	5	10	0	7	0	Gede seismic monitoring system from CVGHM	7

sn_ori	sn_com	cc_id	cc_id2	cc_id3	sn_loaddate	sn_pubdate	cc_id_load	cb_ids
O	DUMMY DATA.	NULL	NULL	NULL	NULL	1992-08-17 06:00:00	NULL	NULL

Note:

- sn_id is primary key index for this table
- Red colored fields: vd_id, cc_id, and cb_ids are foreign key index, which link to another tables (in this case: vd, ss, and cb table).
- The fields highlighted in grey are left blank, since it will be assigned automatically by the system or filled by the web-form.
- Standard WOVOdat datetime is YYYY-MM-DD hh:mm:ss (preffered in UTC)
- Please see WOVOdat User manual (http://www.wovodat.org/doc/database/1.1/index.php) for more detailed information about the table format.

Converting CSV to WOVOml format:

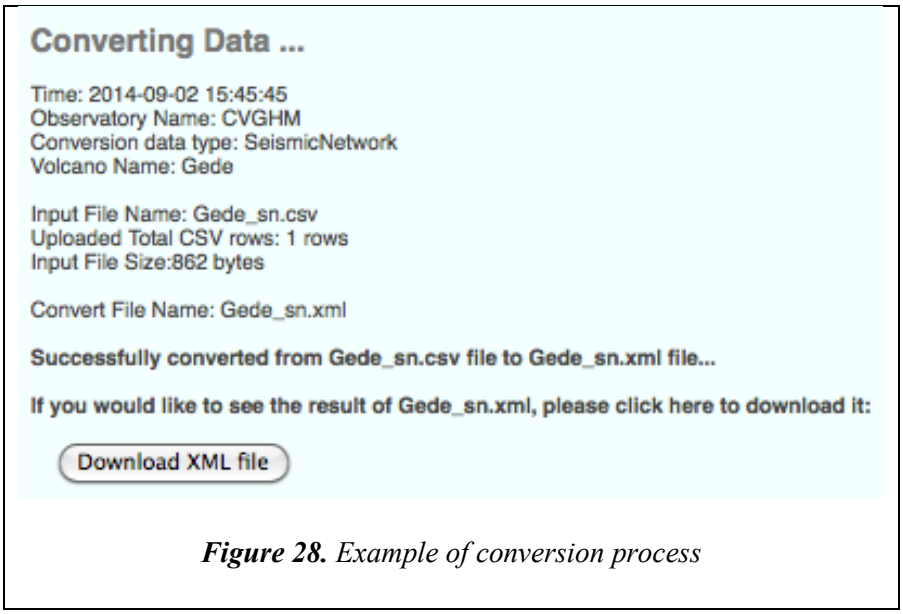


Figure 28. *Example of conversion process*

User will be able to retrieve the XML file, as conversion output. Below is an example of XML format for Gede seismic network (dummy data).

```
<?xml version="1.0" encoding="UTF-8" ?>
<wovoml xmlns="http://www.wovodat.org" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.1.0" xsi:schemaLocation="http://www.wovodat.org/WOVOdatV1.xsd">
<MonitoringSystems>
        <SeismicNetwork code="Gede_Seismic_Net" owner1="CVGHM" pubDate="1992-08-17 06:00:00">
                <Volcanoes>
                        <volcanoCode>0603-06=</volcanoCode>
                </Volcanoes>
                <name>Gede Seismic Network</name>
                <velocityModel>Regional Velocity Model (... and others, 1993).
                        Layer number Vp (km/sec) Top of layer (km) Vp/Vs
                        1 5.3 -3.0 1.78
                        2 5.6 4.0 1.78
```

```
                3 6.2 10.0 1.78
                4 6.9 15.0 1.78
                5 7.4 20.0 1.78
                6 7.7 35.0 1.78
                7 7.9 33.0 1.78
                8 8.1 47.0 1.78
                9 8.3 65.0 1.78</velocityModel>

        <velocityModelDetail>/home/wovodat/public_html/WOVOdat/region/06/03/waveform/vmodel.txt</velocityModelDetail>
                <zeroDepth>0 elevation (sea level)</zeroDepth>
                <fixedDepth>U</fixedDepth>
                <fixedDepthDesc>Unknown if depth is fixed</fixedDepthDesc>
                <startTime>1980-01-17 06:00:00</startTime>
                <numberOfSeismo>10</numberOfSeismo>
                <numberOfBBSeismo>5</numberOfBBSeismo>
                <numberOfSMPSeismo>5</numberOfSMPSeismo>
                <numberOfDigiSeismo>10</numberOfDigiSeismo>
                <numberOfAnaSeismo>0</numberOfAnaSeismo>
                <numberOf3CompSeismo>7</numberOf3CompSeismo>
                <numberOfMicro>0</numberOfMicro>
                <description>Gede seismic monitoring system from CVGHM </description>
                <diffUTC>7</diffUTC>
                <orgDigitize>O</orgDigitize>
                <comments>DUMMY DATA.</comments>
        </SeismicNetwork>
</MonitoringSystems>
    </wovoml>
```

B. Upload XML file to the MySQL database.

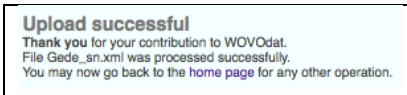


Figure 29. *Example of data uploading process*

Data is stored in the database.

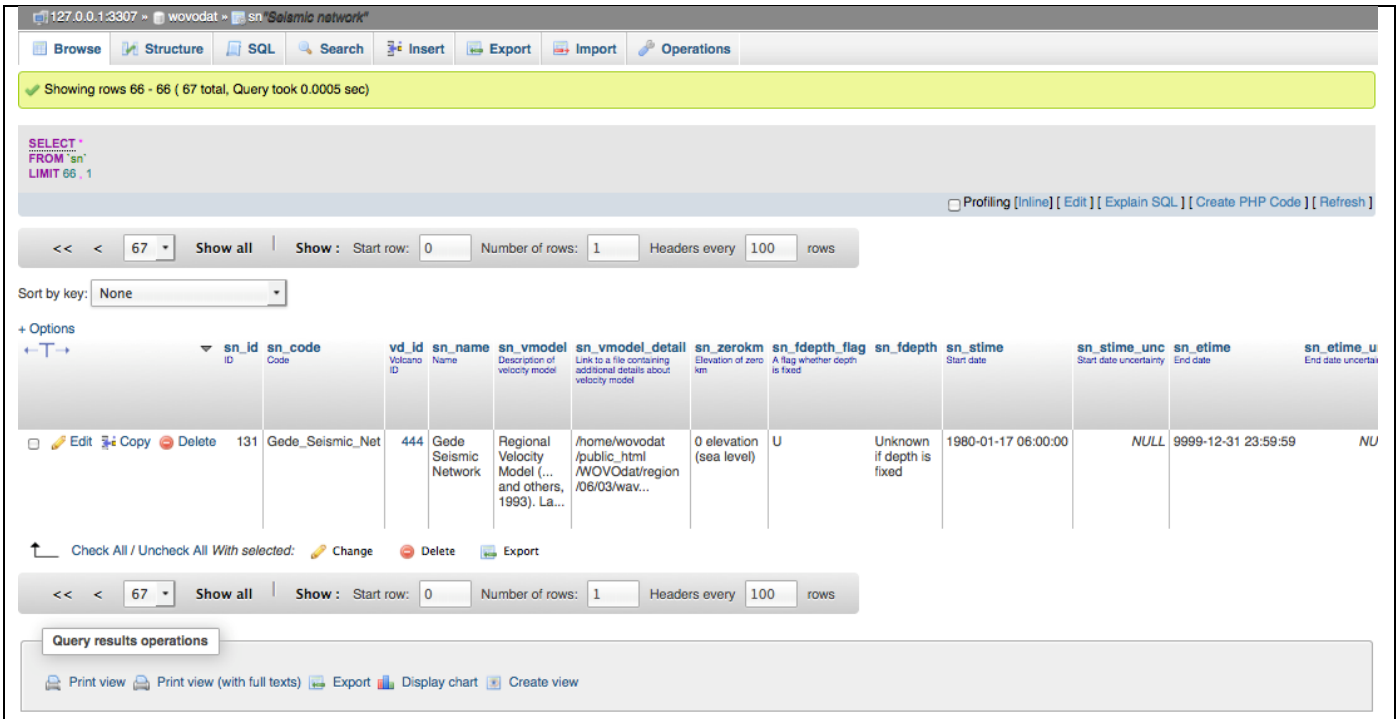


Figure 30. *Data successfully input into MySQL database*

After successfully input monitoring system metadata (network, station information, and instrument information), user will be able to input data.

Submiting data through online form:

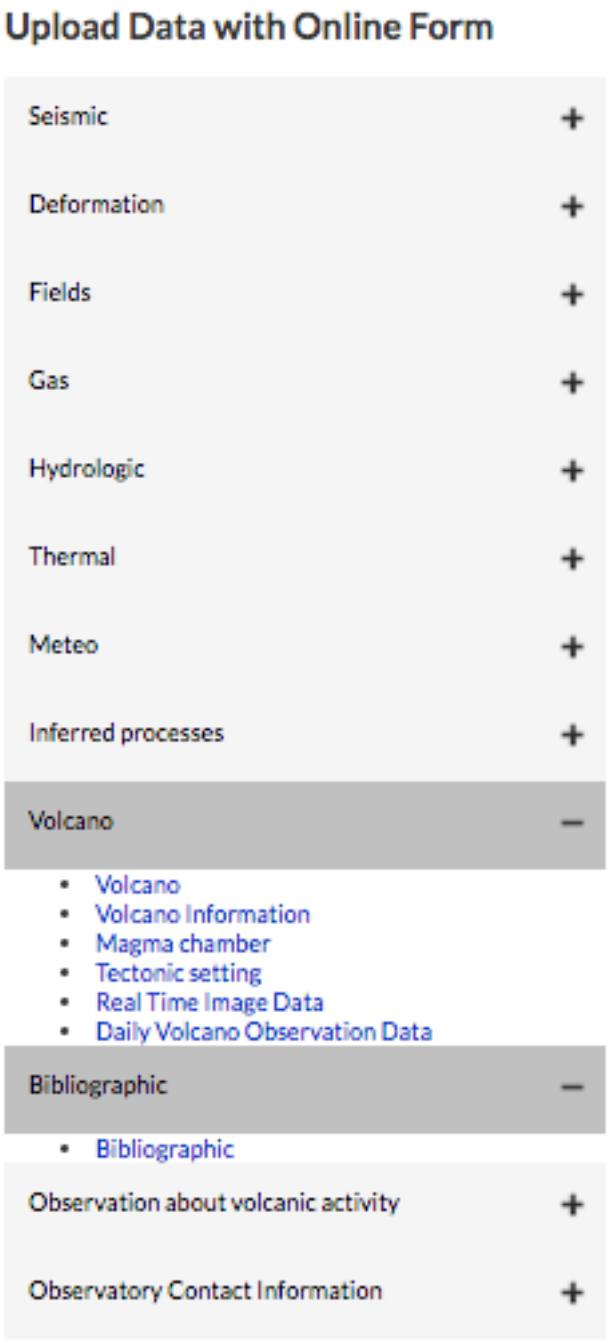


Figure 31. *List of various type of WOVOdat online form*

=> Bibliography table:

Figure 32. *WOVOdat online form for Bibliography*

=> Volcano Information:

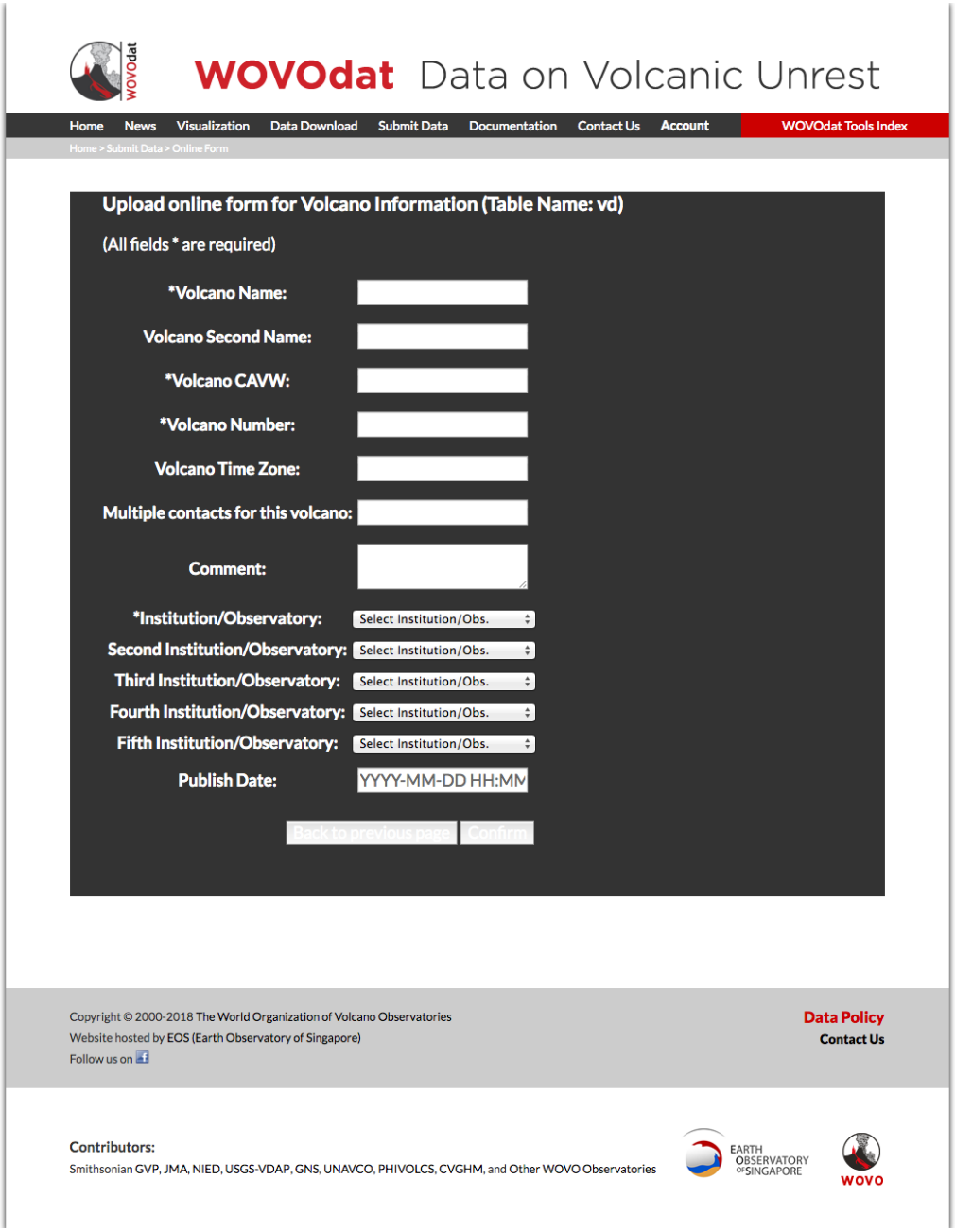


Figure 33:*WOVOdat online form for* Volcano Information

6. Documents: *http://www.wovodat.org/doc/*

Users may consult and download the WOVOdat documents (user manual, SQL schema, XML format, table formats, etc.).

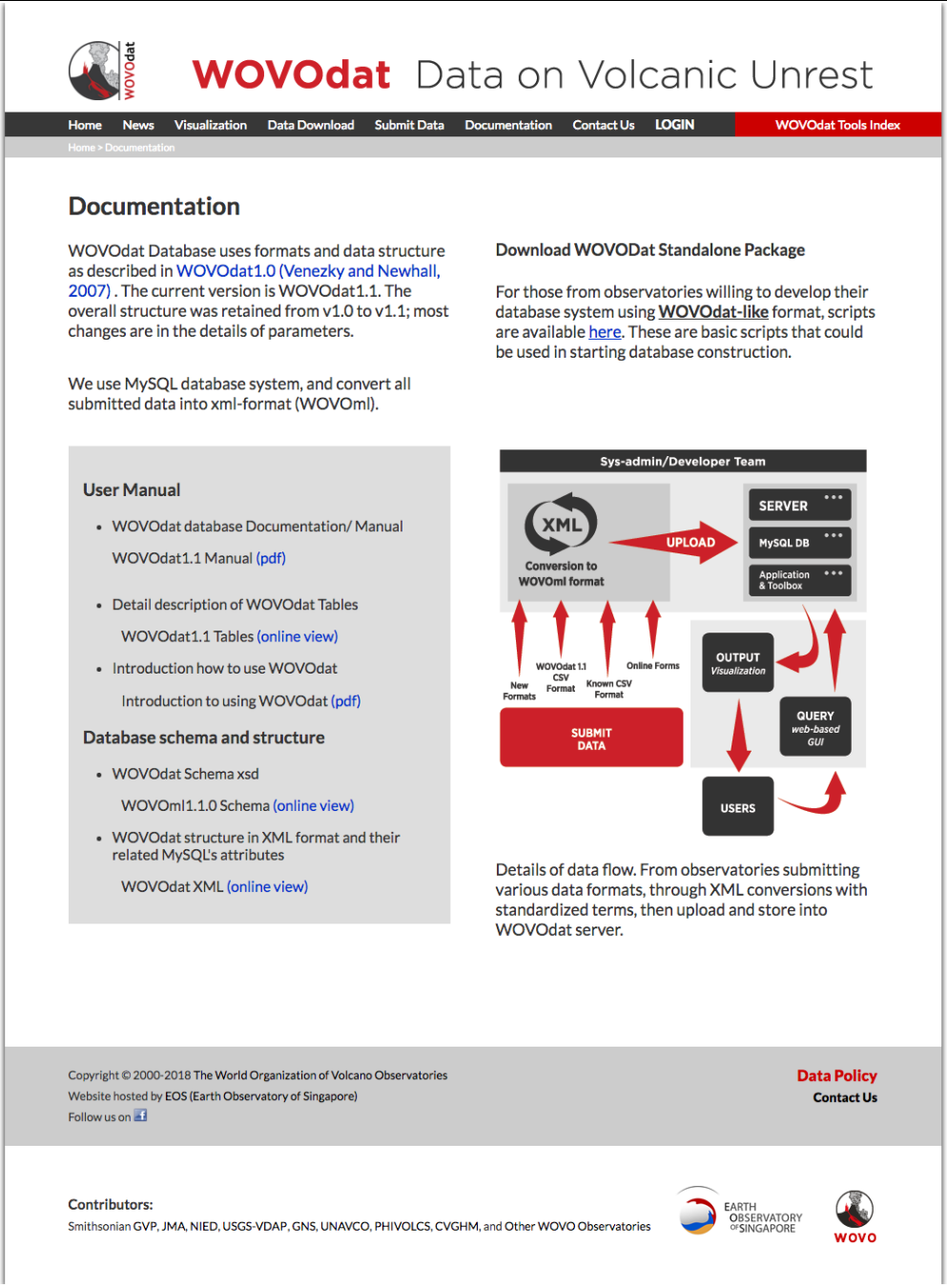


Figure 34:*WOVOdat documents available for online or download through our website.*

6. **Contact Us:** *http://www.wovodat.org/populate/contact_us_form.php*

The more data in WOVOdat, the more useful it will be. We invite scientists from volcano observatories, universities, and research institutions to participate in the growing of WOVOdat database by sharing their data and their expertise in developing visualization and other utilities.

Contact us via email: WOVOdat developer team (wovodat@wovodat.org)

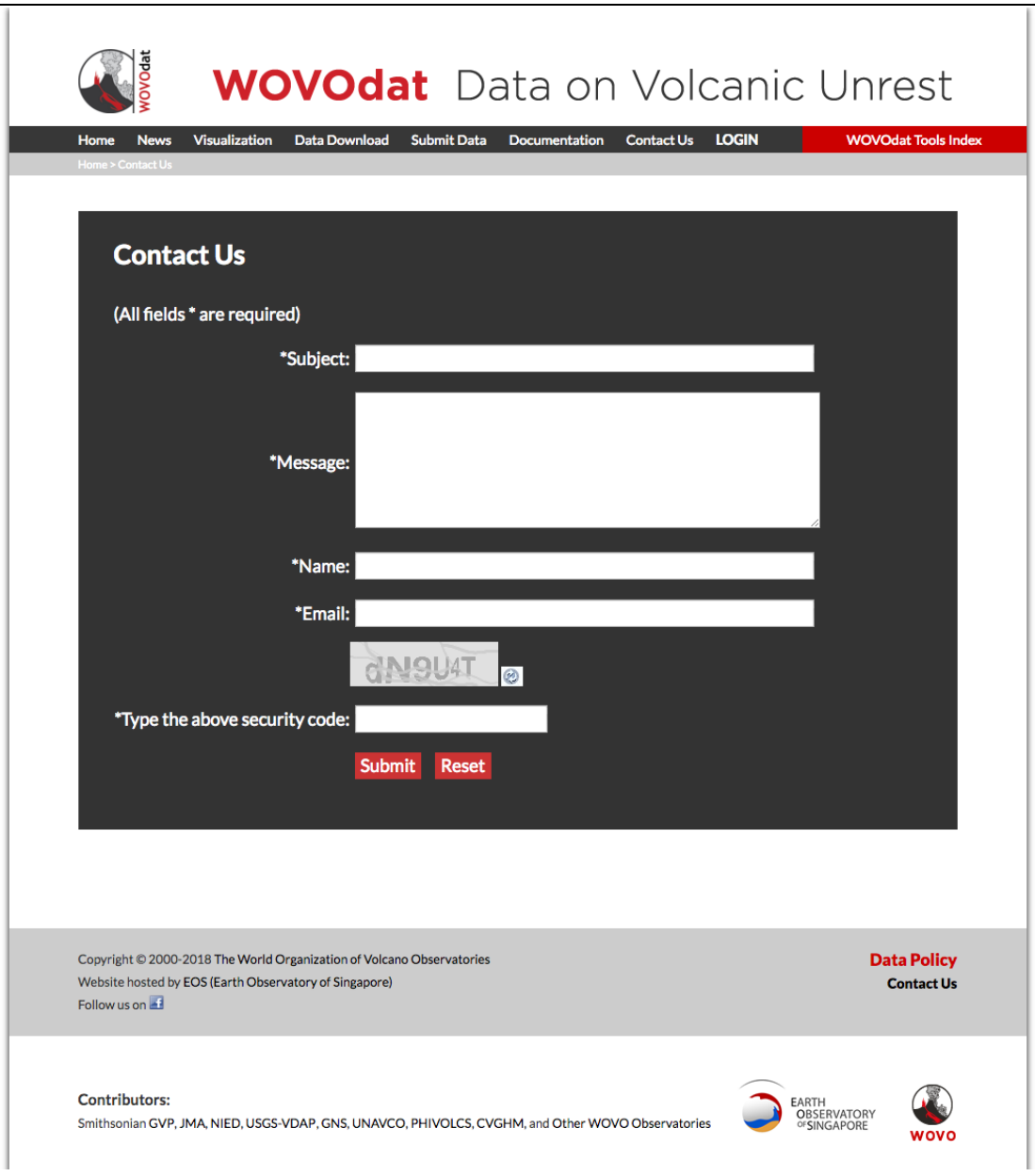


Figure 35: *Contact us page*

Appendix-6 WOVOdat standalone package

Installing WOVOdat Structure on own system (version: September 2014)

WOVOdat scripts are also available for countries those willing to start developing their own database for managing volcano monitoring data. This also to familiarize users/observatories with the WOVOdat data formats.

We provide a ready installable MySQL database template (WOVOdat database), which follow schematic structure and format of WOVOdat, designated for each individual volcano observatory.

An interactive tool for user to submit data is also provided (WOVOdat tool). The data will be converted from common WOVOdat CSV format into WOVOdat XML common formats (WOVOml), uploaded and store in the database system.

Detail information about installation is explained in the README file.

Package downloadable through: *http://www.wovodat.org/installing/download_installable.php*

Figure 36: *WOVOdat package is downloadable, together with UI tools and installation README file.*

Setting Up The Computer for WOVOdat
And Installing WOVOdat database
(last updated: Sep 2014)

This documentation is for Ubuntu 12.04 LTS.

Getting Started

The WOVOdat is a Linux base SQL of volcanic unrest database. In this tutorial we will describe an example on how to install WOVOdat database into a localhost on an Ubuntu base system.

Note: To be able to install WOVOdat packages, the user should be sys-admin or have sys-admin privileges.

Prerequisite:
Computer running Ubuntu operating system. The latest Ubuntu can be obtained from http://www.ubuntu.com.

The following packages are required:

- Apache2
- Mysql
- Php5 (Note: Please install Php version 5.4 or earlier)
- Php-pear
- Php-db
- Phpmyadmin – The GUI tool to handle the administration of mysql
- GMT

The following packages are optional:

- Openssh-server
- Filezilla --GUI tool to transfer file(s) between computers
- Image Magick

  %apt-get install imagemagick

The above packages can be downloaded and installed from the Ubuntu online repository using the Ubuntu apt-get tool or Synaptic Package Manager.

Installation

- **Install Apache2**

```
% sudo apt-get install apache2

% echo "ServerName  localhost" | sudo tee
/etc/apache2/conf.d/fqdn
```

Check the Apache2 installation

- Using web browser go to the URL http://localhost, if you see "It works!", this proves that the Apache works.

- **Install php5**

```
% sudo apt-get install php5

% echo "<?php phpinfo(); ?>" | sudo tee
/var/www/test.php
```

Check the PHP 5 installation

- Restart apache2:

```
% sudo /etc/init.d/apache2 restart
```

- Go to the URL http://localhost/test.php, if you can see the description of PHP5 configuration, it proves that PHP5 installation is successful.

- **Install mysql**

```
% sudo apt-get install mysql-server mysql-client mysql-
common
```

Check the mysql installation

- From the terminal:

```
% mysql -u root -p
```

If it prompts you for the password to login, it means that MySQL is successfully installed.

- **Install phpmyadmin**

```
% sudo apt-get install phpmyadmin
% sudo /etc/init.d/apache2 restart
```

Check the phpmyadmin installation

- Go to the URL http://localhost/phpmyadmin, if you can see the phpmyadmin login page, it proves that the phpmyadmin works fine. The user will need to provide the root login of mysql to log into phpmyadmin. Once logged in, the user can create the phpmyadmin user account(s).
(Note: path will be different if you are installing on virtual machine)

  If you do not see the phpmyadmin login page, do the following steps and go to the URL http://localhost/phpmyadmin again.

```
%sudo ln -s /etc/phpmyadmin/apache.conf
/etc/apache2/conf.d/phpmyadmin.conf

% sudo /etc/init.d/apache2 restart
```

- **Install php-pear**

```
% sudo apt-get install php-pear
```

- **Install php-db**

```
% sudo apt-get install php-db
```

- **Install openssh-server**

```
% sudo apt-get install openssh-server
```

- **Install filezilla**

```
% sudo apt-get install filezilla
```

- **Install Image Magick (Ubuntu 12.04 LTS needs it)**

```
% apt-get install imagemagick
```

- **Install netCDF**

  - Download netCDF from http://www.unidata.ucar.edu/downloads/netcdf/netcdf-4_1_3/index.jsp

  - Uncompress the downloaded file at /home/usrName directory. The **/home/usrName/netcdf-4.1.3** will be created after uncompressing the netcdf-4.1.3.tar.gz.

```
% tar -zxvf netcdf-4.1.3.tar.gz
```

  - Compile and install netCDF. By default, netCDF is installed in /usr/local and it is recommended.

```
% cd /home/username/netcdf-4.1.3

% sudo apt-get install make

% sudo ./configure –disable-netcdf-4

% sudo make check install
```

- **Install GMT**

  - Go to the link http://gmt.soest.hawaii.edu/ and click on the "Download" link that is on left side menu. After that, click on "INSTALL_FORM" is in the middle of the page. Find the "install_gmt.sh" file and download it to your favor directory.

  - Go into that the directory where GMT is downloaded. Execute the following command and accept the given default option.

```
% chmod 755 ./install_gmt.sh
% sudo  ./install_gmt.sh
```

Note:

- **DO NOT** install netCDF through install_gmt.sh because the netCDF installed by install_gmt.sh is pretty old version and we have already installed the netCDF-4.1.3 which is the newer version.
- The **install_gmt.sh** must be executed as super user. In order for the GMT works with WOVOdat, the GMT tool should be installed in **/usr/lib/gmt/bin**

- **Refer to the sample installation below**

```
% sudo ./install_gmt.sh

====>>>> Interactive installation of GMT <<<<====

We first need a questions and answer session to determine how
and where GMT is to be installed.   Then, when all parameters
have been assembled, we will run the installation (unless you
chose -n when starting this script).

This script will install the latest version of GMT 4.5.8.

==> Enter make utility to use [make]: make

If you are behind a firewall you will need to use a passive ftp session.
Only if you have some very old ftp client, you may have to resort to active ftp
(which involves the server connecting back to the client).

==> Do you want passive ftp transmission (y/n) [y]: y
==> Have you installed netcdf (version 3.6 or later)? (y/n) [y]: y
==> Enter directory with netcdf lib and include [/usr/local]: /usr/local

GMT4 offers experimental and optional support for other grid formats
and plotting of geotiffs via GDAL.  To use this option you must already
have the GDAL library and include files installed.

==> Use experimental GDAL grid input in GMT4 (y/n) [y]: n
==> Install GMT version 4.5.8? (y/n) [y]: y
==> Install GSHHS version 2.2.0? (y/n) [y]: y
==> Get the GMT version 4.5.8 archive (38 Mb) via ftp? (y/n) [y]: y
==> Get the GSHHS version 2.2.0 archive (45 Mb) via ftp? (y/n) [y]: y
```

We offer 9 different ftp sites. Choose the one nearest you in order to minimize net traffic and transmission times. The sites are:

1. SOEST, U of Hawaii [GMT Home], Honolulu, Hawaii, USA
2. NOAA, Lab for Satellite Altimetry, Silver Spring, Maryland, USA
3. IRIS, Incorporated Research Institutions for Seismology, Seattle, Washington, USA
4. IAG-USP, Dept of Geophysics, U. of Sao Paulo, BRAZIL
5. Dept of Geosciences, U of Oslo, NORWAY
6. Goodie Domain Service, Vienna U of Techology, AUSTRIA
7. Tokai U, Shimizu, JAPAN
8. School of Geosciences, U of Sydney, AUSTRALIA
9. TENET, Tertiary Education & Research Networks of South Africa, SOUTH AFRICA

==> Enter your choice [1]: 7
You selected site number 7:
7. Tokai U, Shimizu, JAPAN

This anonymous ftp server ftp.scc.u-tokai.ac.jp only accepts connections from computers on the Internet that are registered in the Domain Name System (DNS). If you encounter a problem connecting because your computer is not registered, please either use a different computer that is registered or see your computer systems administrator (or your site DNS coordinator) to register your computer.

GMT can use two different algorithms for Delauney triangulation.

Shewchuk [1996]: Modern and very fast, copyrighted.
Watson [1982] : Older and slower, public domain.

Because of the copyright, GMT uses Watson's routine by default.
However, most will want to use the optional Shewchuk routine.
==> Use optional Shewchuk's triangulation routine (y/n)? [y]: y

The installation will install all GMT components in several subdirectories under one root directory. On most Unix systems this root directory will be something like /usr/local or /sw, under which the installation will add bin, lib, share, etc. Below you are asked to select to location of each of the subdirectories.

==> Directory for GMT4 executables? [/home/wovodat/GMT4.5.8/bin]: **/usr/lib/gmt/bin**
==> Directory for GMT4 linkable libraries? [/usr/lib/gmt/lib]: **/usr/lib/gmt/lib**
==> Directory for GMT4 include files? [/usr/lib/gmt/include]: **/usr/lib/gmt/include**
==> Directory for GMT4 data resources? [/usr/lib/gmt/share]: **/usr/lib/gmt/share**

Unix man pages are usually stored in /usr/man/manX, where X is the relevant man section. Below, you will be asked for the /usr/man part; the /manX will be appended automatically, so do not answer /usr/man/man1.

==> Directory for GMT4 man pages? [/usr/lib/gmt/man]: **/usr/lib/gmt/man**
==> Directory for GMT4 doc pages? [/usr/lib/gmt/share/doc/gmt]: **/usr/lib/gmt/share/doc/gmt**

```
use POSIX advisory file locking on the file.  Apparently, some
versions of the Network File System (NFS) have not implemented
file locking properly.  We know this is the case with Linux
pre-2.4 kernels when mounting NFS disks from a Unix server.
If this is your case you should turn file locking OFF.

==> Use POSIX Advisory File Locking in GMT4 (y/n) [n]: n
==> Want to test GMT4 by running the 30 examples? (y/n) [y]: y
==> Delete all tar files after install? (y/n) [n]: n
==> Enter name of the parameter file that will now be created
[GMT4param.txt]: GMT4param.txt
Session parameters written to file GMT4param.txt
==> Hit return to start the install:
```

- After GMT installation, add the following entries into **/root/.bashrc and /home/wovodat/.bashrc** if the entries have not been set.

```
export
PATH=/usr/lib/gmt/bin:/usr/lib/gmt/lib:/usr/lib/gmt/include:/usr/lib:$PATH
export GMTHOME=/usr/lib/gmt
export GMTPATH=/usr/lib/gmt/bin
export MANPATH=/usr/lib/gmt/man:/usr/share/man:$MANPATH
```

Check GMT installation

- **From the terminal:**

```
% source .bashrc

%man psxy  (OR)  %  psxy
```

If GMT is successfully installed , it shows a manual page.

Install WOVOdat Tool

- Download WOVODAT User Interface Tool (wovodat_Tool.tar) from http://wovodat.org/installing/download_installable.php and save it under the directory: /home. This tar file includes:

    - Subdirectory-paths to organize and store script and data files.

    - PHP and HTML scripts for web-based user interface; include WOVOdat ***Documentation, Visualization*** and ***Submit Data*** with all scripts to convert WOVOdat CSV format into WOVOdat XML format, and upload WOVOdat XML to store the data into the database.

- Uncompress the tar file under directory: /home. The whole package of scripts will therefore store under: /home/wovodat

```
%tar cvf wovodat_Tool.tar wovodat/PEAR  (Tar command line)
% tar –xvf wovodat_Tool.tar            (Untar command line)
```

Install WOVOdat Database

❶ Download WOVOdat database template (wovodat.sql) file from http://wovodat.org/installing/download_installable.php and save it into your favorite directory.

❷ Use web browser to go to this link http://localhost/phpmyadmin to import a database and create a new account.

❸ Log in page will appear in the web browser, as shown in Figure 3. Type in MySQL username and password.

❹ Press on 'Go' button to log in.

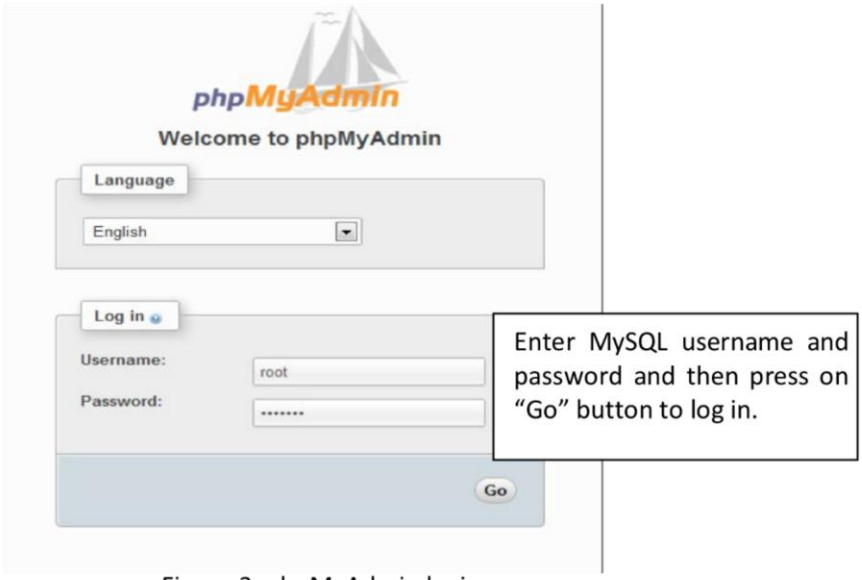


Figure 3. phpMyAdmin login page

Creating the new database and the new account using phpmyadmin

Default Database Name:	wovodatdb Default
Username:	wovodatuser
Default Password:	wovodatpassword

Note: if you want to change default database name, username and password, edit the following files:

- /home/wovodat/public_html/WOVOdat/PEAR/php/MYDB.php
- /home/wovodat/public_html/WOVOdat//PEAR/php/include/db_connect.php
- /home/wovodat/public_html/WOVOdat/PEAR/php/include/db_connect_view.php

How to import wovodat database (see Figure 4)

❶ Click on “Import” button that is at the top right frame to import “wovodat.sql” file.

❷ Click on “Browse” button to locate and choose “wovodat.sql” file from your computer and select ‘utf8’ for the character set.

❸ Click on “Go” button to import it.

❹ Now “wovodatdb” database has been installed on your system.

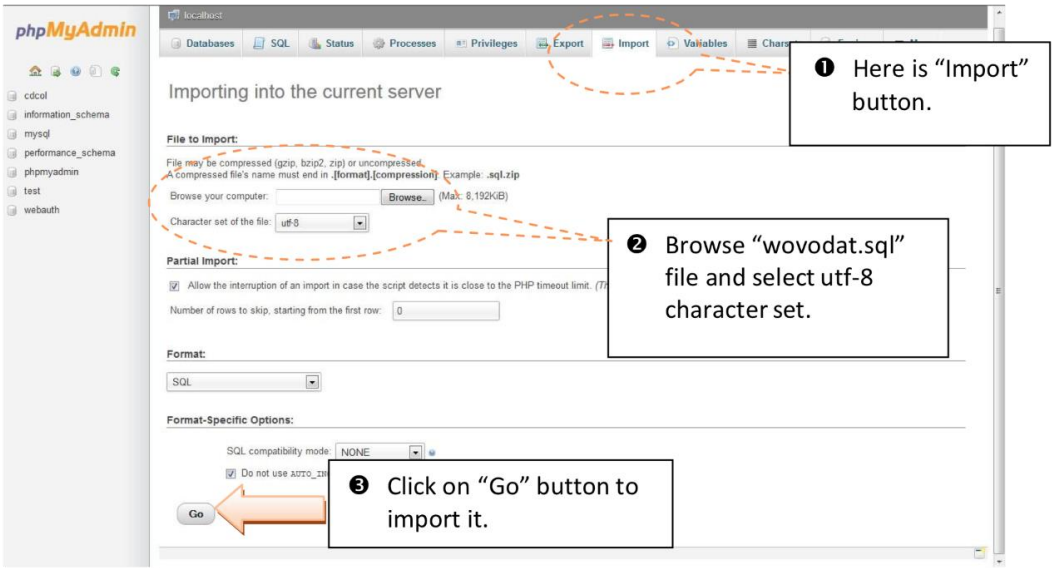


Figure 4. Importing a database into the current server using phpMyAdmin GUI

How to create a new account

Setting up new user account (see Figure 5)

❶ Click on Privileges menu that is at the left hand side panel.

❷ Click on "Add a new User" link near bottom left of Privileges page.

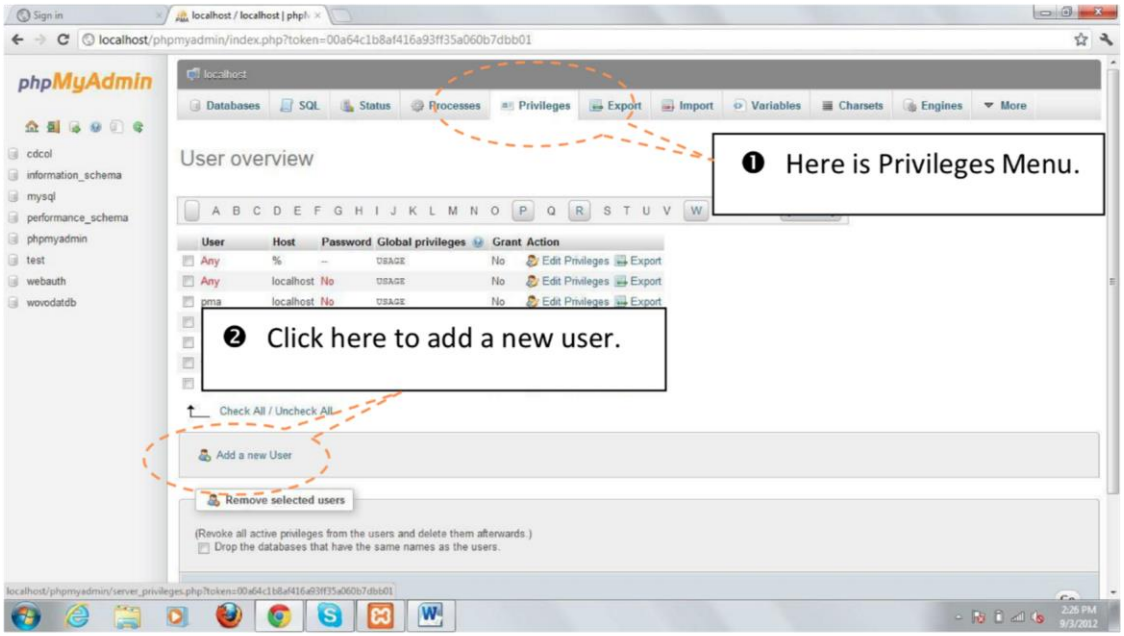


Figure 5. Create new account using phpMyAdmin GUI

Create login information and setting up privilege (see Figure 6)

❸ Choose the field category from the left hand side drop down box and then move the cursor to the right hand side and type fill in the fields.

❹ Click on 'none' radio button under "Database for user" section.

❺ Click on "Check All" beside Global Privileges to give all permissions for the "wovodatuser".

❻ There is no change under "Resource Limits" section.

❼ The last step is to click on "Create user" button to create the "wovodatuser" user account.

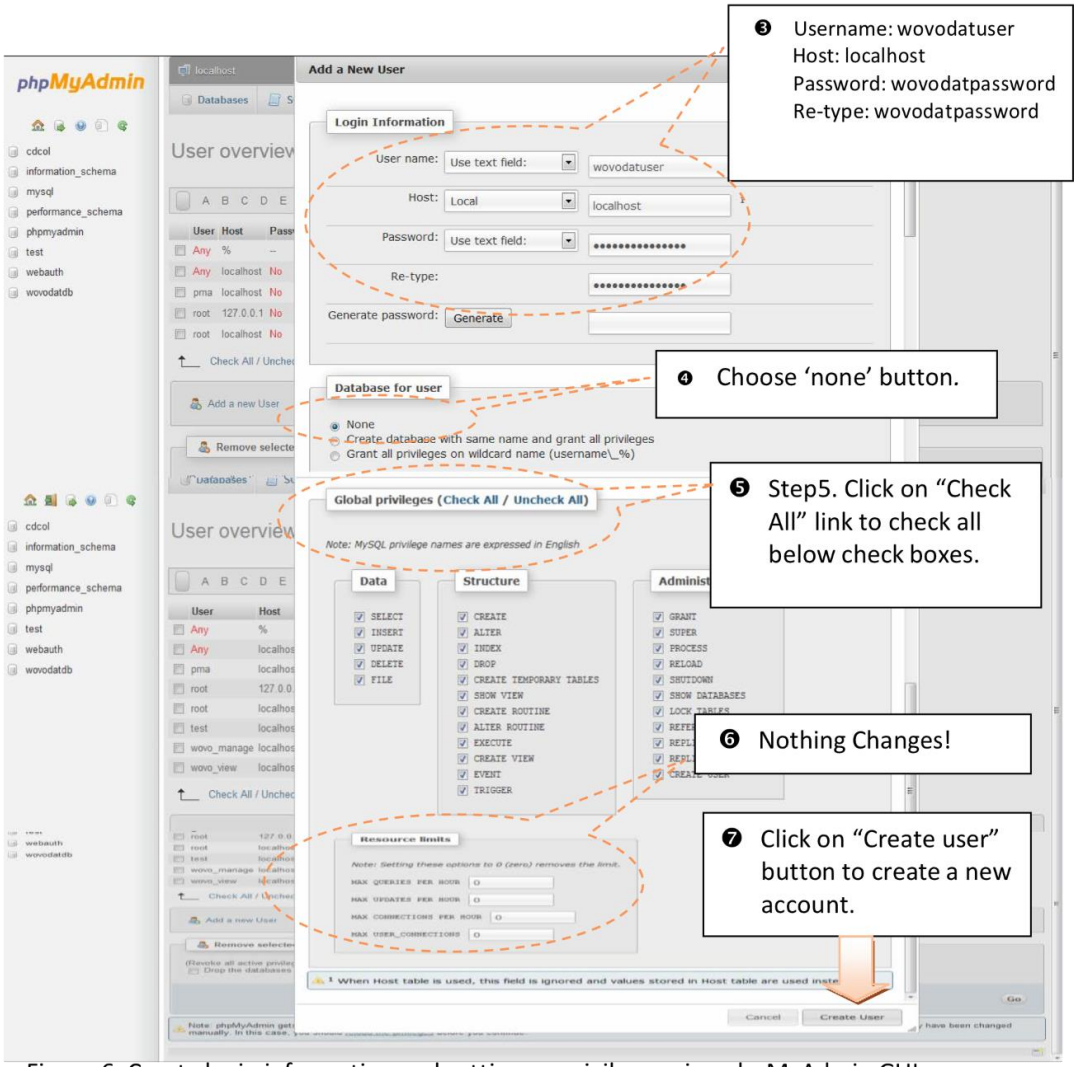


Figure 6. Create login information and setting up privilege using phpMyAdmin GUI

Configuration

After finish with the installation, the next step is to configure Apache2 and PHP5 for the WOVOdat website and the database.

- Configure the default site to **/home/wovodat/public_html/WOVOdat/**
  Edit *default* file using *vi* or other editor:

```
% sudo vi /etc/apache2/sites-available/default
      ⇨ Replace the path /var/www with
        /home/wovodat/public_html/WOVOdat/
```

- Refer to the sample default file below:

```
<VirtualHost *:80>
        ServerAdmin webmaster@localhost
        DocumentRoot  /home /wovodat/public_html/WOVOdat
        <Directory />
                Options FollowSymLinks
                AllowOverride None
        </Directory>

       <Directory /home/wovodat/public_html/WOVOdat >
                Options Indexes FollowSymLinks MultiViews
                AllowOverride None
                Order allow,deny
                allow from all
        </Directory>

        <Directory /home/wovodat/public_html/WOVOdat/output>
                Options Indexes FollowSymLinks MultiViews
                AllowOverride None
                Order allow,deny
                allow from all
        </Directory>

        ScriptAlias  /cgi-bin/  /usr/lib/cgi-bin/
        <Directory  "/usr/lib/cgi-bin">
                AllowOverride None
                Options +ExecCGI -MultiViews +SymLinksIfOwnerMatch
                Order allow,deny
                Allow from all
        </Directory>

        ErrorLog /var/log/apache2/error.log

        # Possible values include: debug, info, notice, warn, error, crit,
        # alert, emerg.
        LogLevel warn

        CustomLog /var/log/apache2/access.log combined

       Alias /doc/ "/usr/share/doc/"
       <Directory "/usr/share/doc/">
            Options Indexes MultiViews FollowSymLinks
            AllowOverride None
            Order deny,allow
            Deny from all
            Allow from 127.0.0.0/255.0.0.0 ::1/128
        </Directory>
</VirtualHost>
```

- Change the mode of the "*/home/wovodat/*"

```
% sudo chmod 755 /home/wovodat -R
```

- Change the owner of the */home/wovodat/incoming* to "www-data".

```
% sudo chown -R www-data:root /home/wovodat/incoming
/home/wovodat/region /home/wovodat/public_html/WOVOdat/output

% sudo chown www-data:root /home/wovodat/login_history.txt
```

- Edit the *php.ini* to include */home/wovodat/PEAR*

```
% sudo vi /etc/php5/apache2/php.ini
 ⇨ Modify the include_path entry as following:
include_path = ".:/home/wovodat/PEAR:/usr/share/php"
```

- Restart Apache2

```
% sudo /etc/init.d/apache2 restart
```

- Using the web-browser and type in "http://localhost". The website should appear in your web browser.

For any inquiries and comments please contact WOVOdat developer team:
http://www.wovodat.org/populate/contact_us_form.php