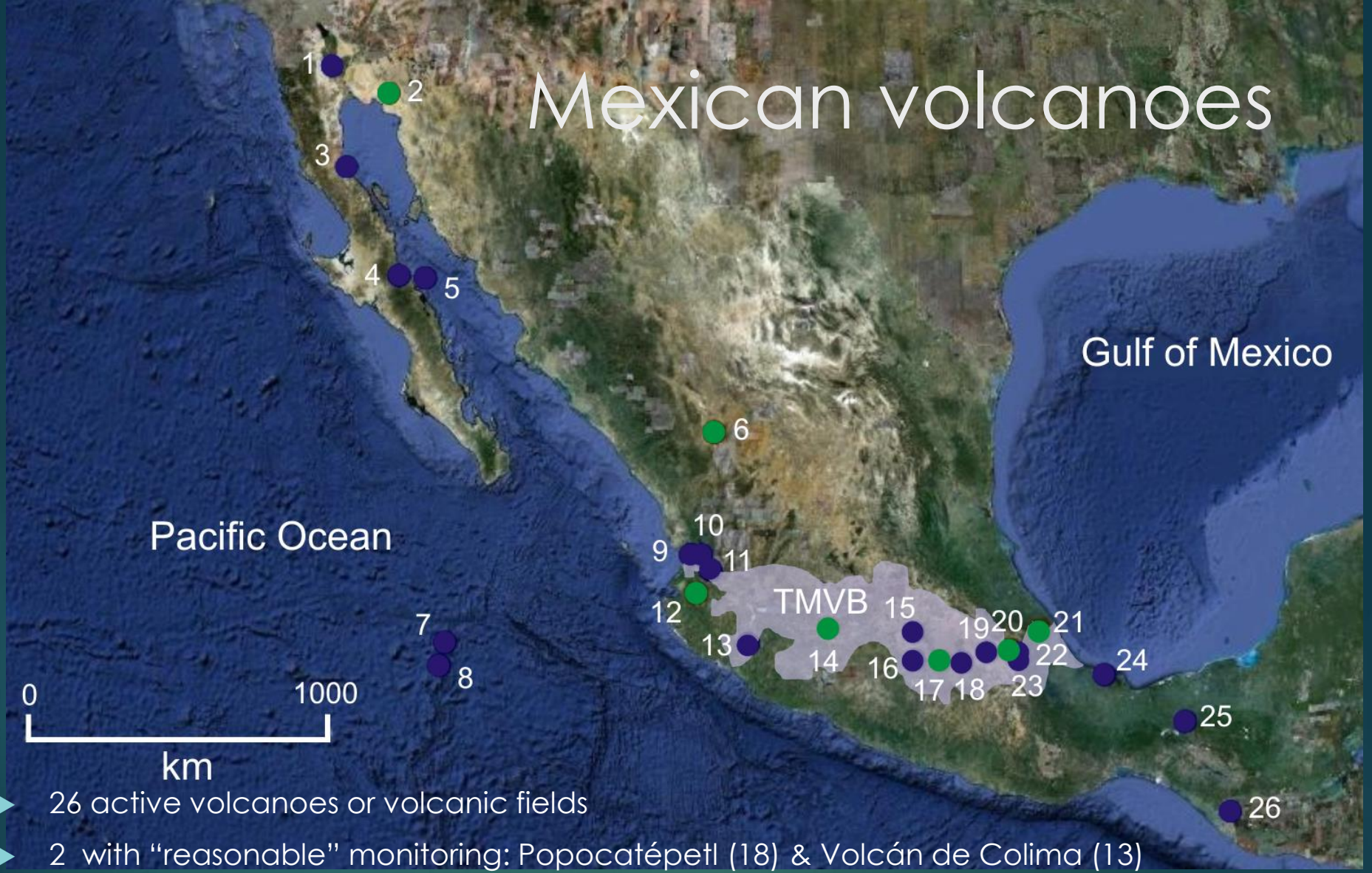
Volcán de Colima, Mexico – monitoring status

NICK VARLEY

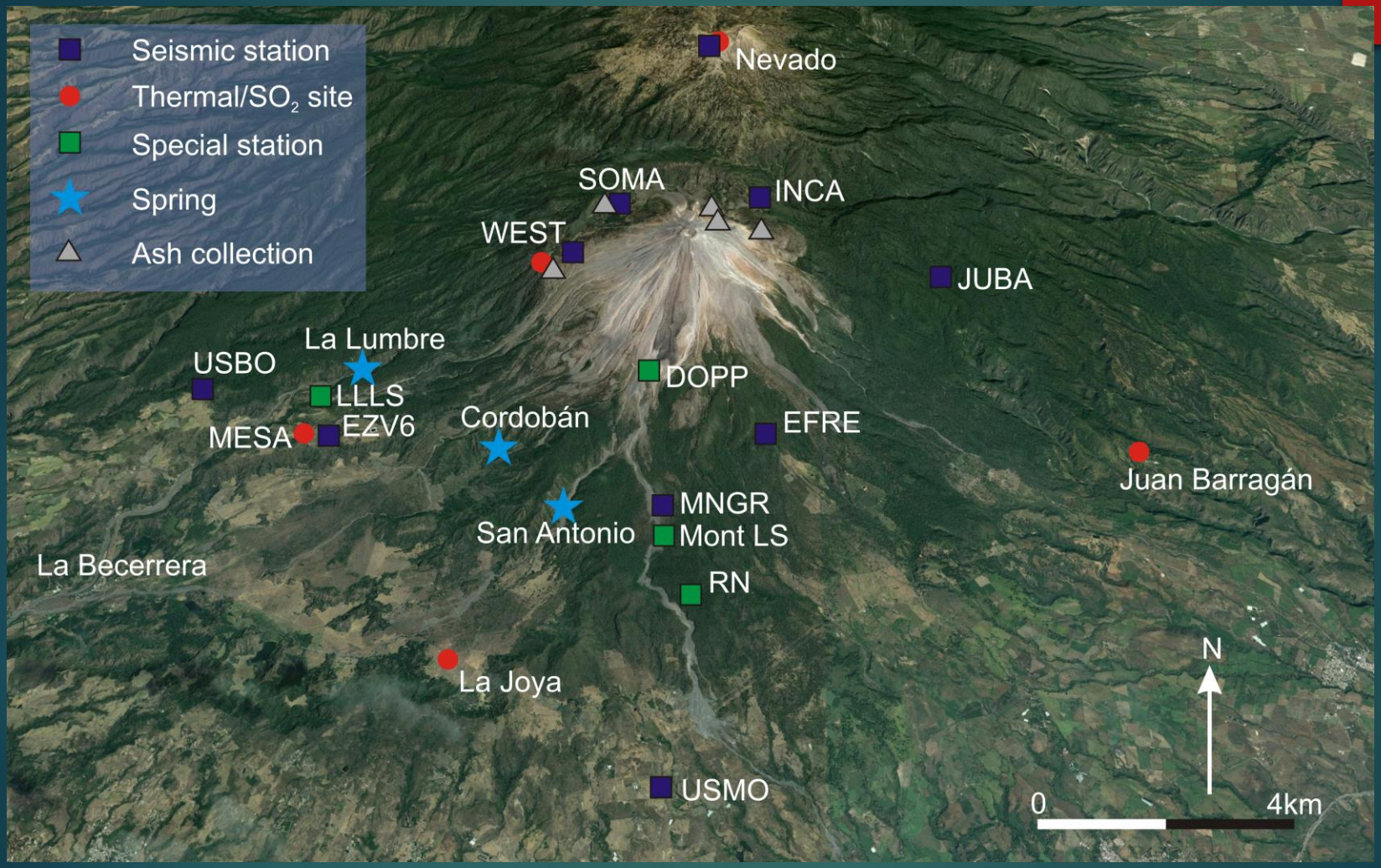
FACULTAD DE CIENCIAS, UNIVERSIDAD DE COLIMA, MEXICO

Mexican volcanoes



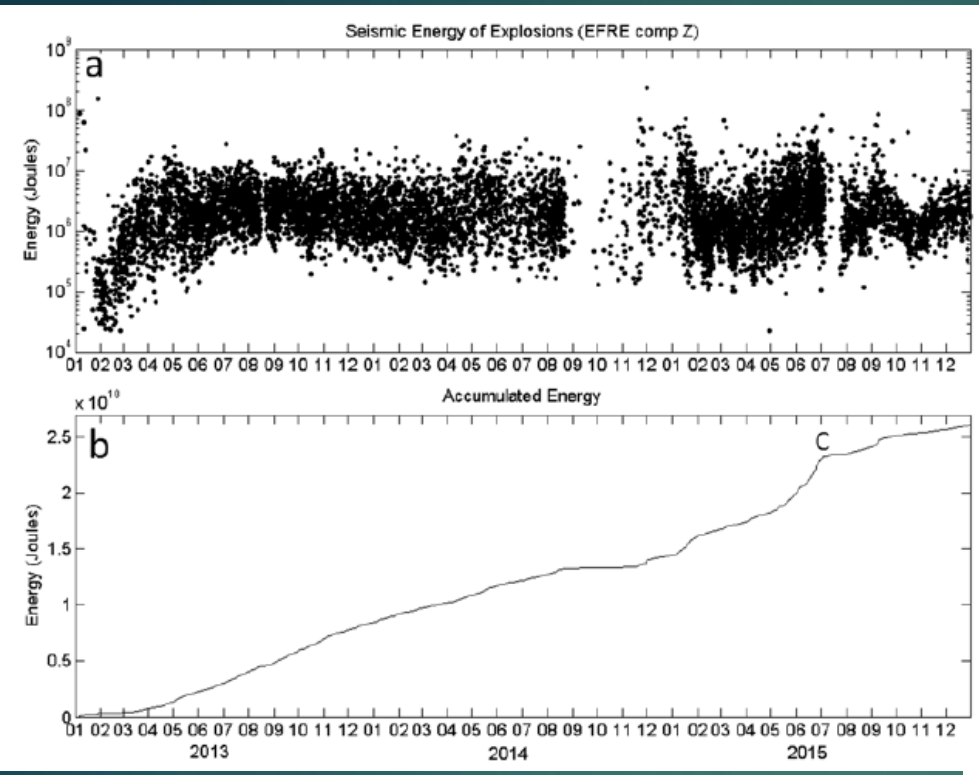
- 26 active volcanoes or volcanic fields
- 2 with "reasonable" monitoring: Popocatépetl (18) & Volcán de Colima (13)
- 5 with minimal monitoring: El Chichón (25), Tacaná (26), Ceboruco (11), Isla Socorro (8), Citlaltépetl (22)
- Dangerous fields of distributed volcanism: Chichinautzin (17), Michoacán-Guanajuato (14)
- Problem of role definition and integration of monitoring

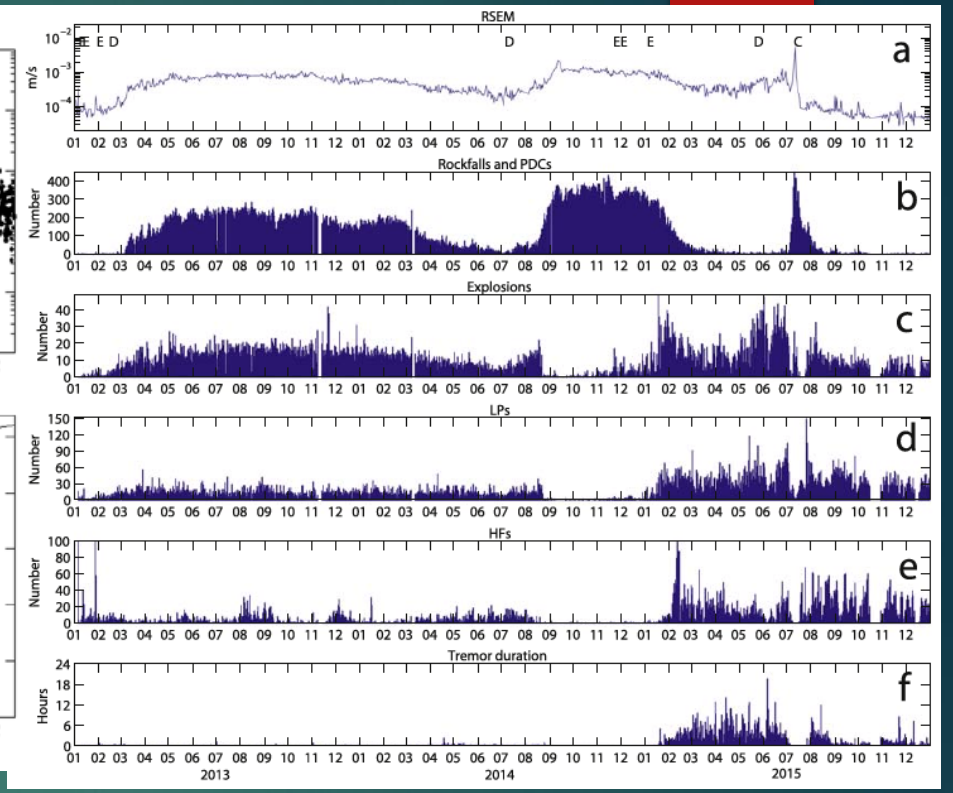
Volcán de Colima network



- Main locations for monitoring activities
- Currently – financial difficulties have limited maintenance

Seismic analysis

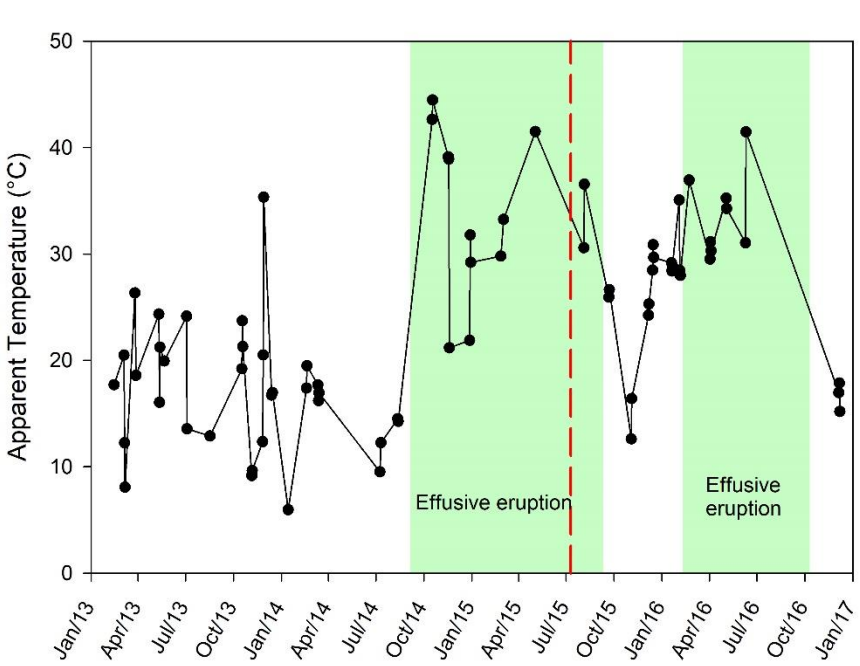


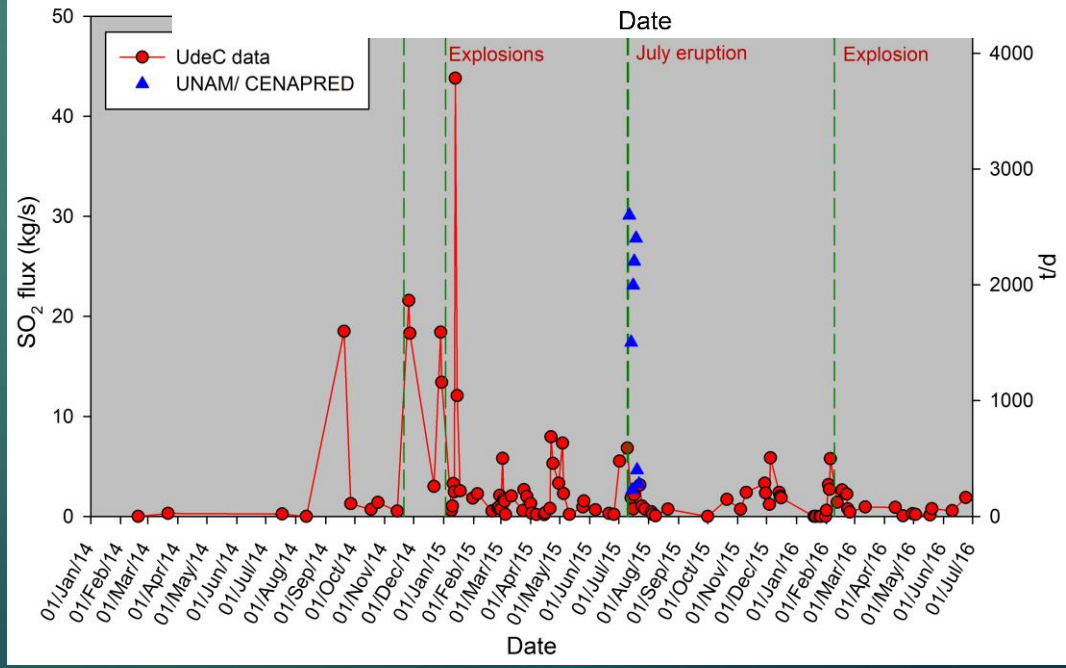


- Calculation of seismic energy released by explosions
- Automatic classification system by Hidden Markov Model

Ground-based monitoring

- Seismic stations (10)
- Infrasound detectors (4)
- SO_2 flux – Flyspec units
- Thermal – fixed station & flights etc.
- GPS stations
- Geochemistry – spring waters
- Ash monitoring
- Cameras

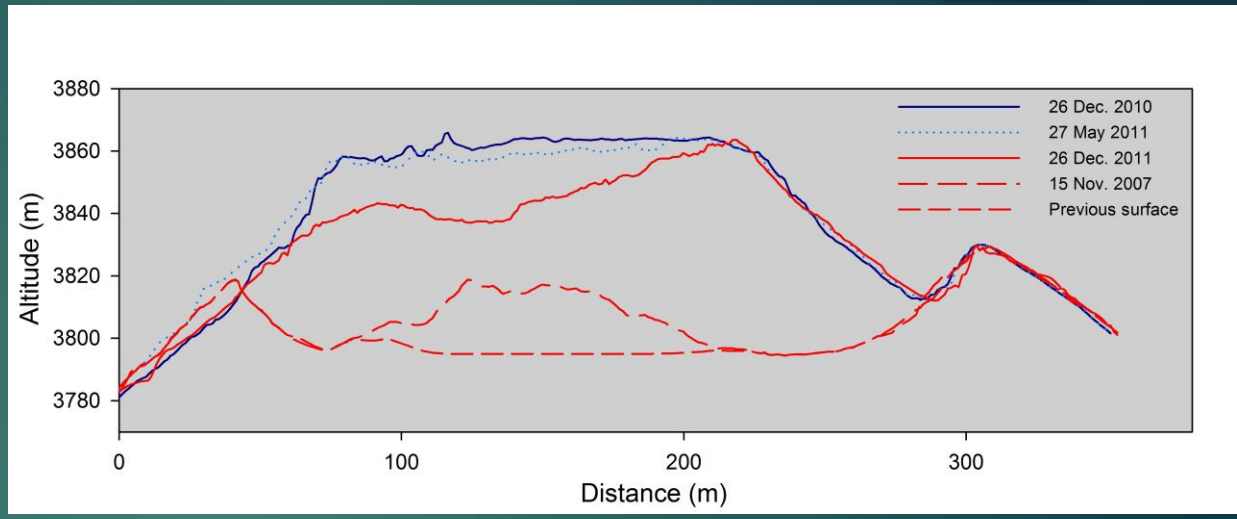


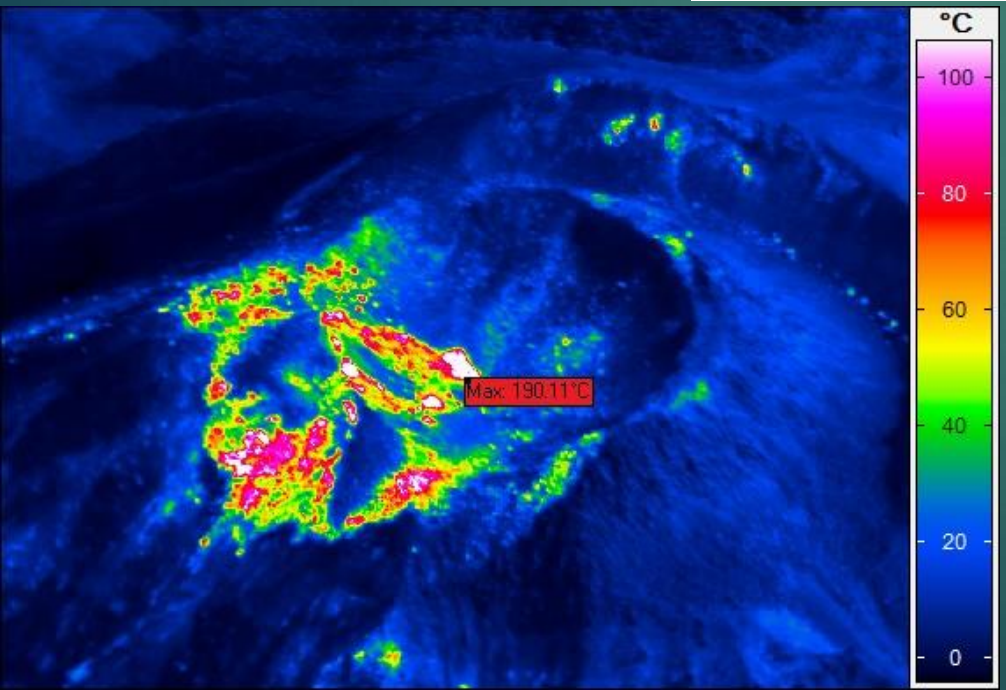


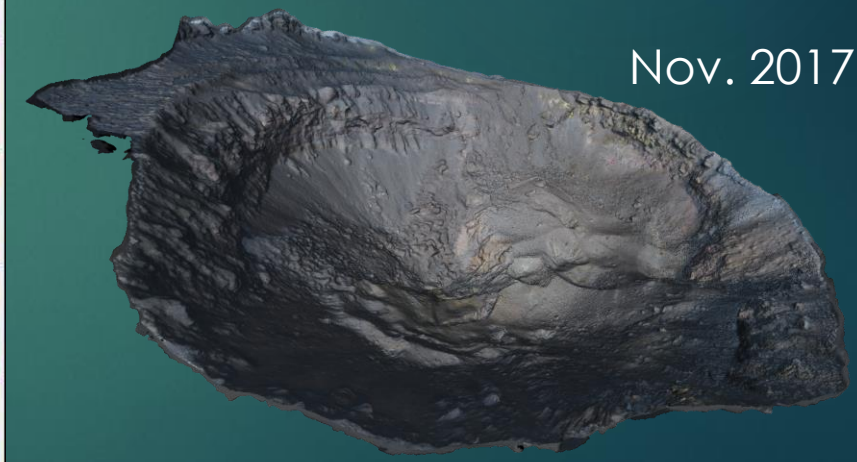
SO_2 flux time series from early 2014 to October 2016. Peaks relating to larger Vulcanian explosions can be observed (21 November 2014, 3 January 2015 and 9 February 2016) as well as the large eruption of 10-11 July 2015.

Aerial monitoring

- Thermal precursors
- Photogrammetry using both photos & thermal images





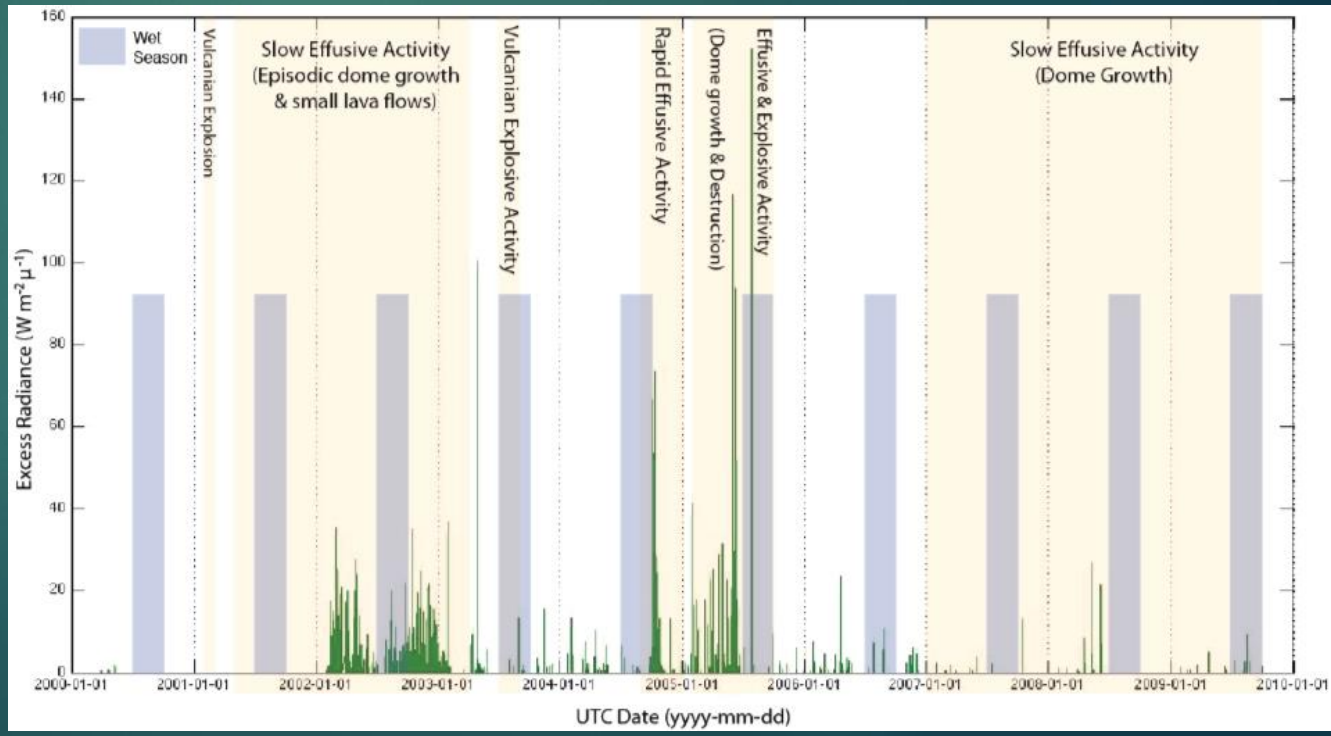


Nov. 2017

Drones for photogrammetry

Satellite monitoring

- MIROVA – regular incorporation in analysis
- Thermal GOES/MODIS
- Ash plume forecasting – FALL 3D (UNAM)
- External collaborations – InSAR
- Much room for expansion



Requirements/plans

- Functioning GPS network
- Replacement of UV spectrometers & SO_2 camera
- Further thermal monitoring stations
- Replacement of some seismometers
- Faster petrological/geochemical analysis
- Increase use of remote sensing

Problems:

- Lack of government support despite major eruption in 2015
- Very limited human resources
- Volcano between 2 states with poor integration

Global Volcano Monitoring Infrastructure

- Could assist in obtaining funding
- Happy to contribute

nick@ucol.mx