Telica Volcano, Nicaragua
Preliminary results of the TESAND experiment

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Location

(adapted from LaFemina et al. 2009)
Background

- One of the most active volcanoes in Nicaragua
- Basaltic andesite composition
  - Elevation: 1061m
  - Crater: 700m wide, 120m deep.
“Quiescently active”

What is a “quiescently active” volcano?
- Exhibits a continuously high level of geophysical activity with no clear ‘background’ or ‘unrest’ states’.
Seismicity

High rate of LP seismicity with an average of several hundred events per day.
1999 activity

- During May-June 1999 there was a series of explosions and VEI1 eruptions.
- Explosions continued throughout August, October and November 1999.
- Lava lake observed on 19th August 1999.
- VEI2 eruption on 29th December 1999.
Multiplet analysis of seismicity during 1999 activity

Unique LP families identified using waveform cross correlation
Pre-eruption period: 30\textsuperscript{th} August – 29\textsuperscript{th} December 1999

- LP events are not strongly correlated.
- Large number of individual families, each containing only a few events.
- Generated by non-unique processes. Period of instability?
Post-eruption period: January – March 2000

- LP events are more closely correlated.
- Fewer individual families but a larger number of events per family.
- Generated by repeating source. System resuming stable, non-destructive activity?
TESAND Network
– TElica Seismic And Deformation Network

• Collaboration between University of South Florida (USA), Pennsylvania State University (USA) and INETER (Nicaragua).
• Spatially dense network:
  - six broadband seismometers
  - ten high rate CGPS
  - pressure sensor
  - weather station
• Deployment completed in March 2010 and scheduled to run continuously until 2013.
Network deployment

Yellow triangles - seismic stations
Red triangles - CGPS stations
Blue triangle - pressure sensor
Network deployment

GPS antenna (seismic)

GPS antenna (Geodesy)

INETER hut

GPS receiver

Seismometer

Telica volcano

INETER hut (TELN)

GPS antenna (Geodesy)
Crater observations

- Fractures
- Strongly jetting fracture(s) observed in March 2010
- Approximate location of November 2009 incandescent fracture
- Incandescent C-shaped feature observed in March 2010
- Gas pumping from fracture observed in March 2010

- November 2009 incandescence
- March 2010 incandescent crack/skylight
- November 2009 incandescent fracture
9th October 2010 Seismic Event

- Unconfirmed report of an explosion at Telica’s summit.
- Currently we only have recording of this event from station TBCF (broadband seismometer and pressure sensor)
- Dominant seismic energy at 5.5Hz

• VLP energy seen in waveform below 1Hz
• Subsidence is observed following the 1999 eruption
• New CGPS stations in the TESAND network indicate ongoing subsidence

(Figures from H.Giersson)
Questions?