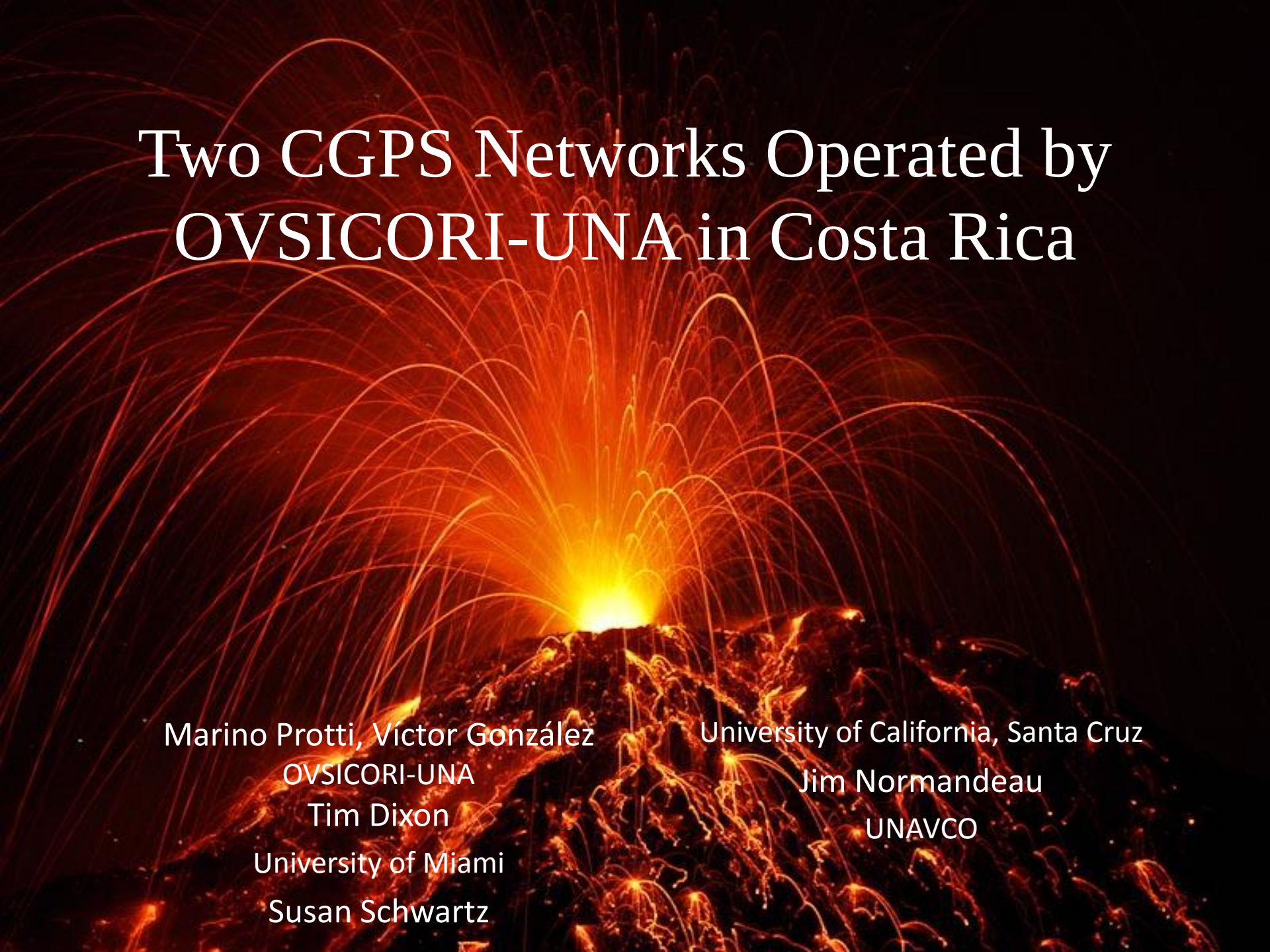
Two CGPS Networks Operated by OVSICORI-UNA in Costa Rica



Marino Protti, Víctor González
OVSICORI-UNA
Tim Dixon
University of Miami
Susan Schwartz
University of California, Santa Cruz
Jim Normandeau
UNAVCO

Summary

- OVSICORI-UNA operates two CGPS networks in Costa Rica for crustal deformation monitoring:

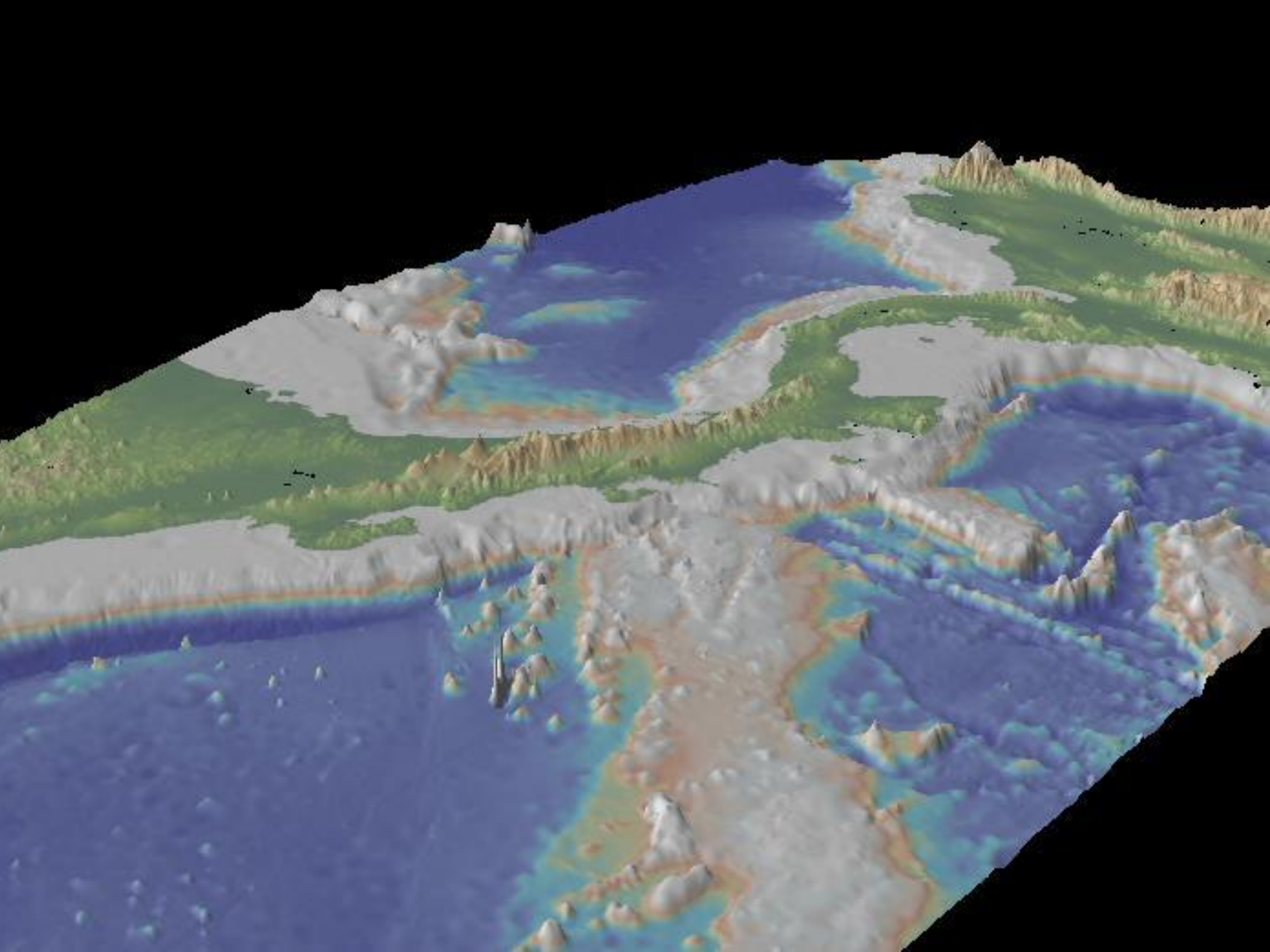
- A regional network on the Nicoya peninsula and its surroundings funded by US-NSF (UNAVCO, University of Miami, University of California at Santa Cruz and OVSICORI-UNA) (19 stations).

- A country wide network funded by the Government of Costa Rica (9 stations).

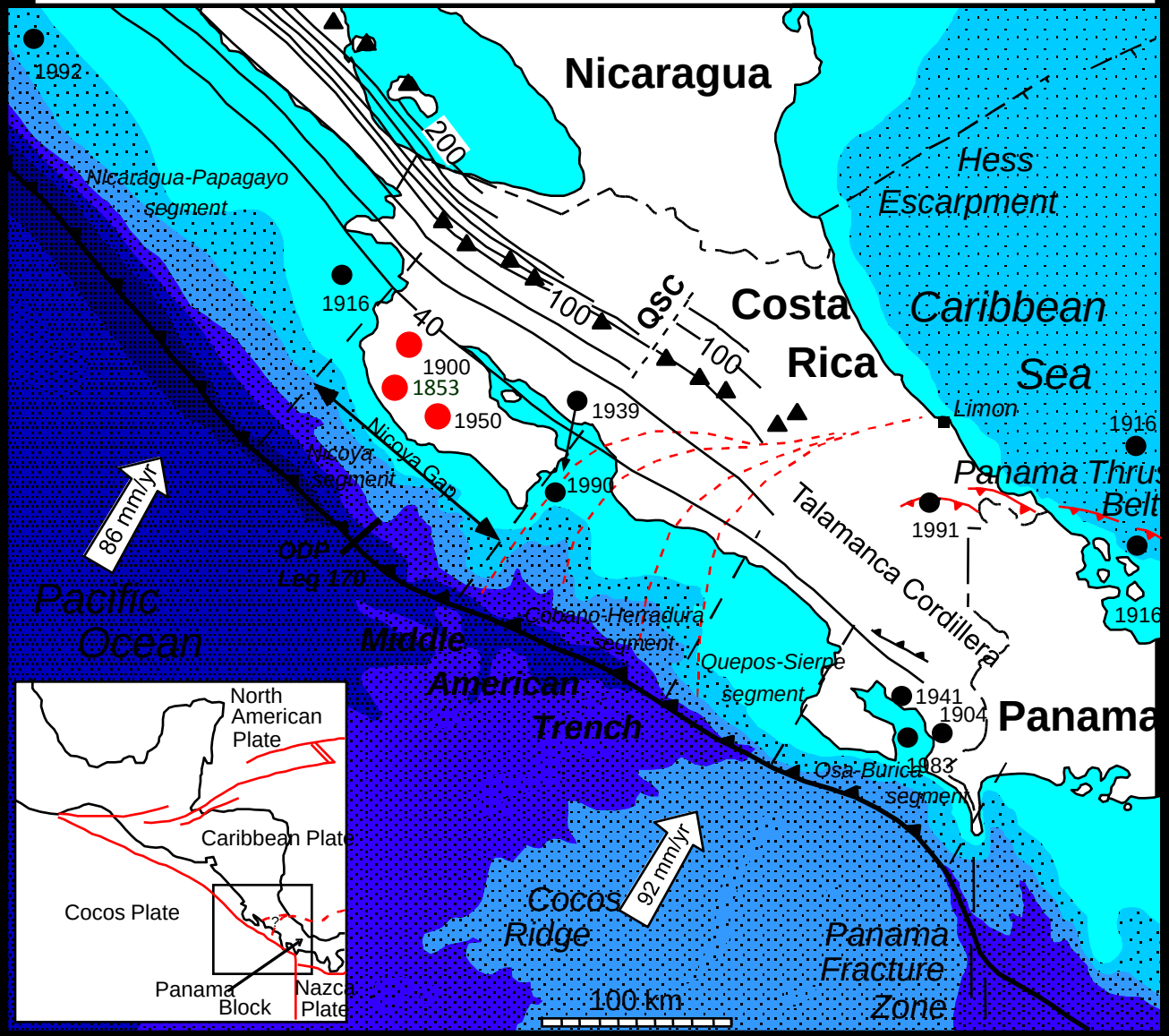
Also

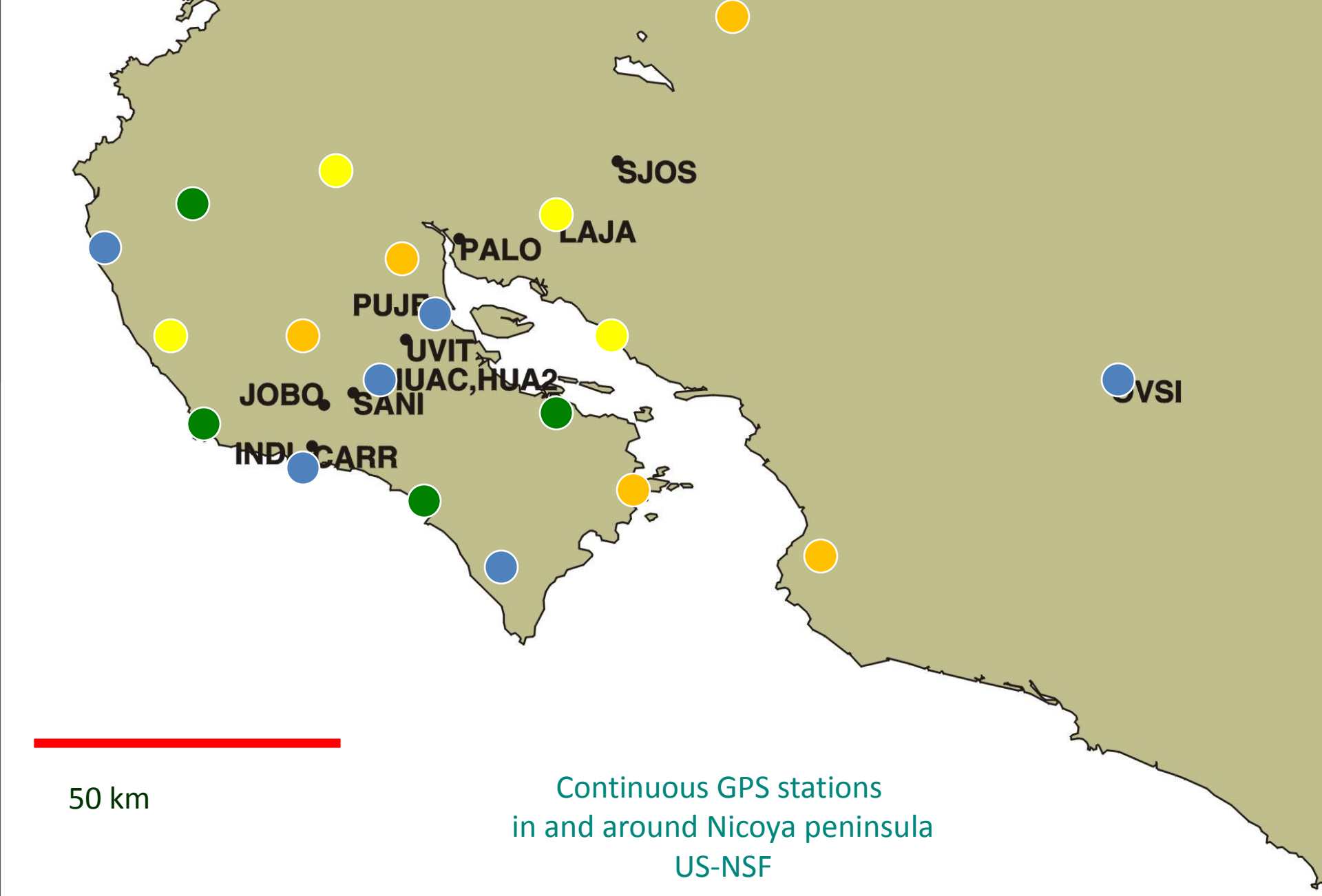
- 2 CGPS stations at Arenal volcano (since 1995) (4 by March 2011).
- 1 semipermanent GPS station at Irazú volcano (since 1999).
- 2 CGPS stations at Turrialba volcano (since 2010) (OVSICORI-UNA).

Tectonic setting of Central America



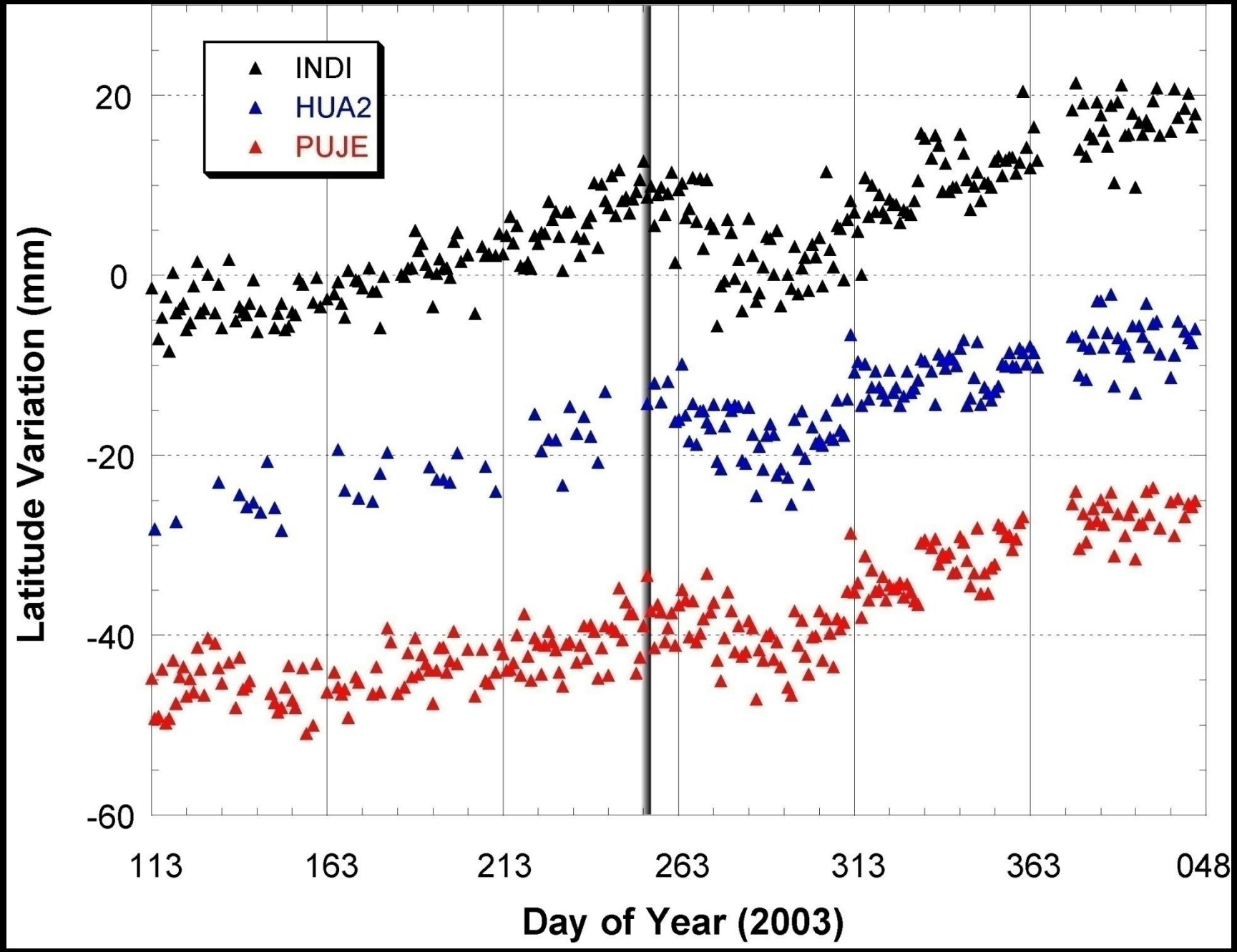
Tectonic Setting of Costa Rica

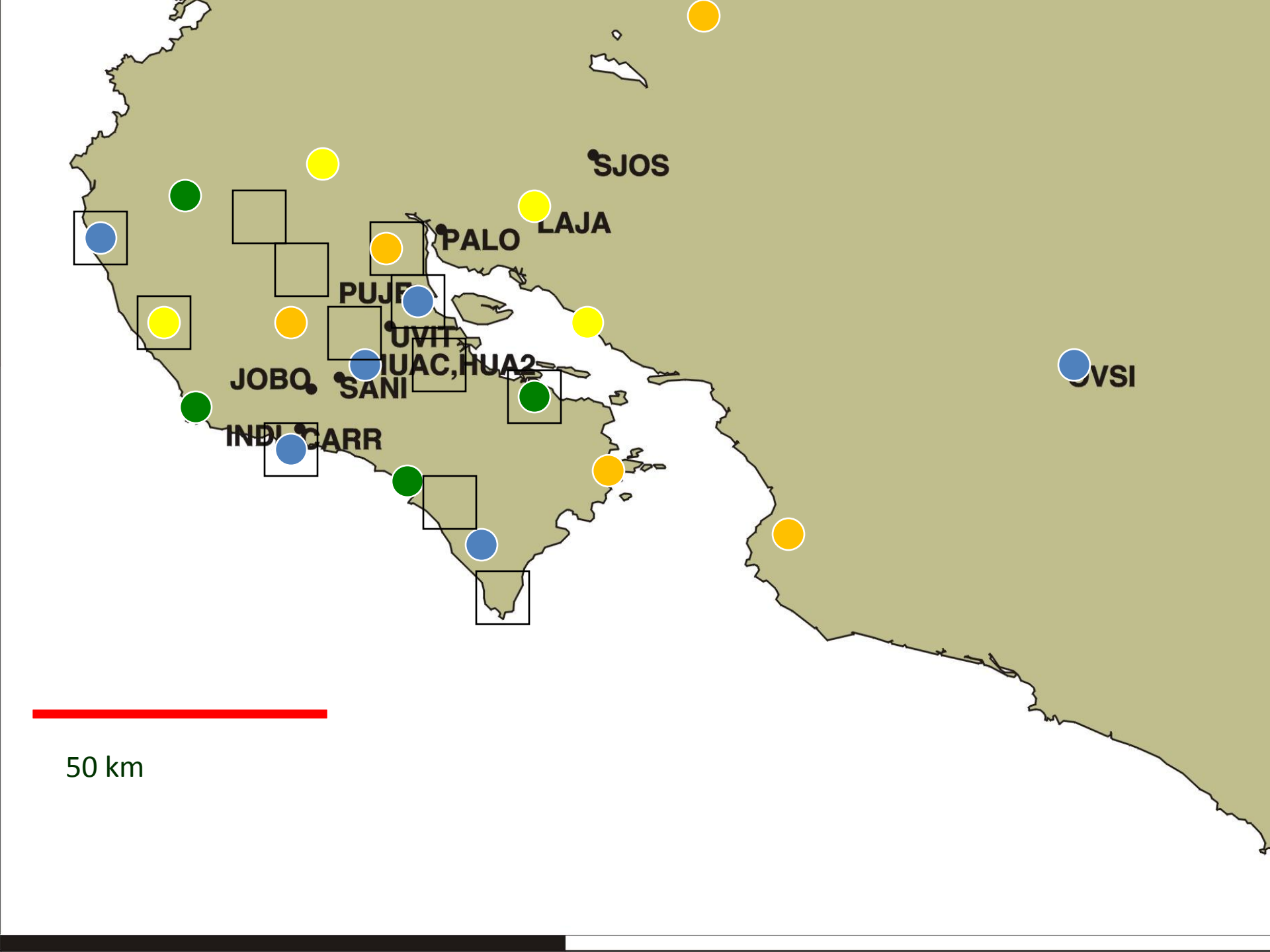




Continuous GPS stations
in and around Nicoya peninsula
US-NSF

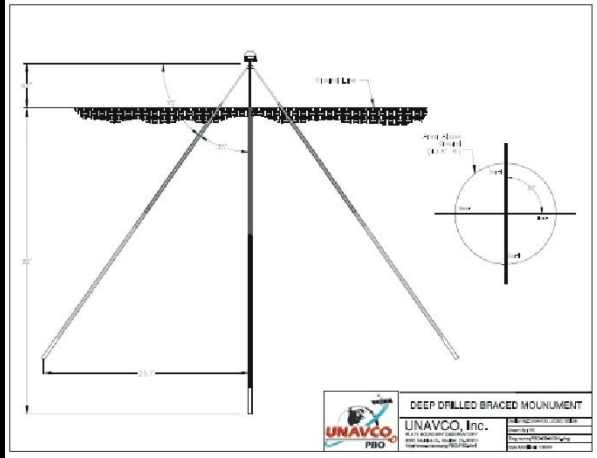
First CGPS (JICA 2002)

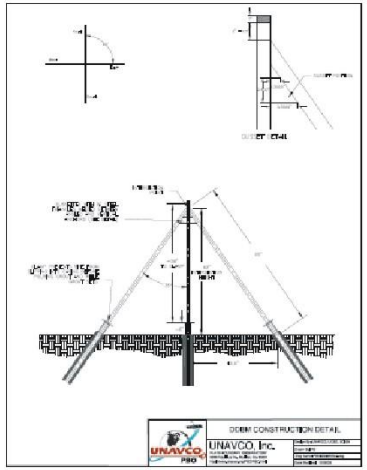

INDI
HUA2
PUJE
20
0
-20
-40
-60
Latitude Variation (mm)
113
163
213
263
313
363
048
Day of Year (2003)

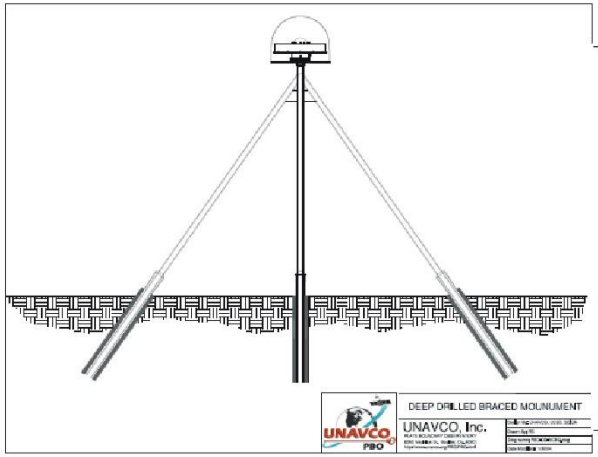

SJOS
LAJA
PALO
PUJE
UVIT
HUAC,HUA2
JOBQ
SANI
INDI
CARR
OVSI
50 km

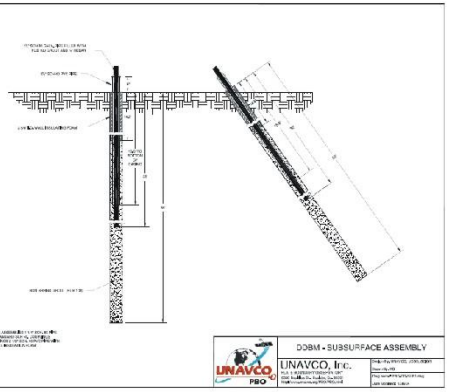
Why so much interest in the Nicoya Peninsula?

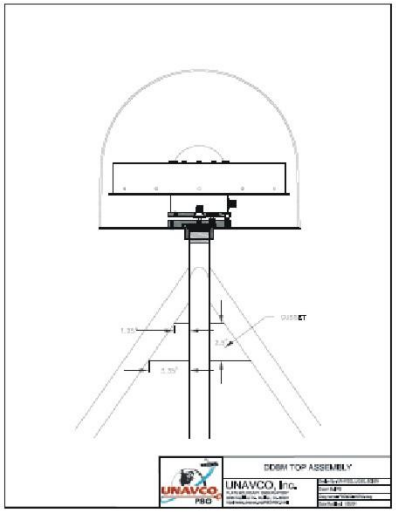
- It is the seismogenic region that generates the largest earthquakes in Costa Rica.
- It has been 60 years since its last rupture (1853, 1900 and 1950).
- The peninsula is sitting right over the seismogenic zone.
- It has been studied for many years with different techniques (high resolution marine seismics, refraction profiles, scan mapping, an ALVIN cruise, IODP legs, broadband off-shore and on shore seismic networks, GPS, electronic tiltmeters).
- The recorded deformation rates are very high.
- It was part of the target region of both, the Seismogenic Zone Experiment (SEIZE) and the Subduction Factory (SUBFAC) initiatives of MARGINS.

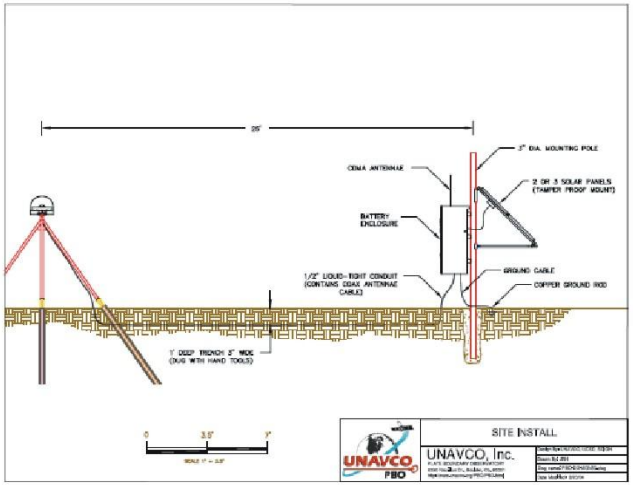

DEEP DRILLED BRACED MOUNUMENT
UNAVCO, Inc.
PBO


DDBM CONSTRUCTION DETAIL
UNAVCO, Inc.
PBO


DEEP DRILLED BRACED MOUNUMENT
UNAVCO, Inc.
PBO

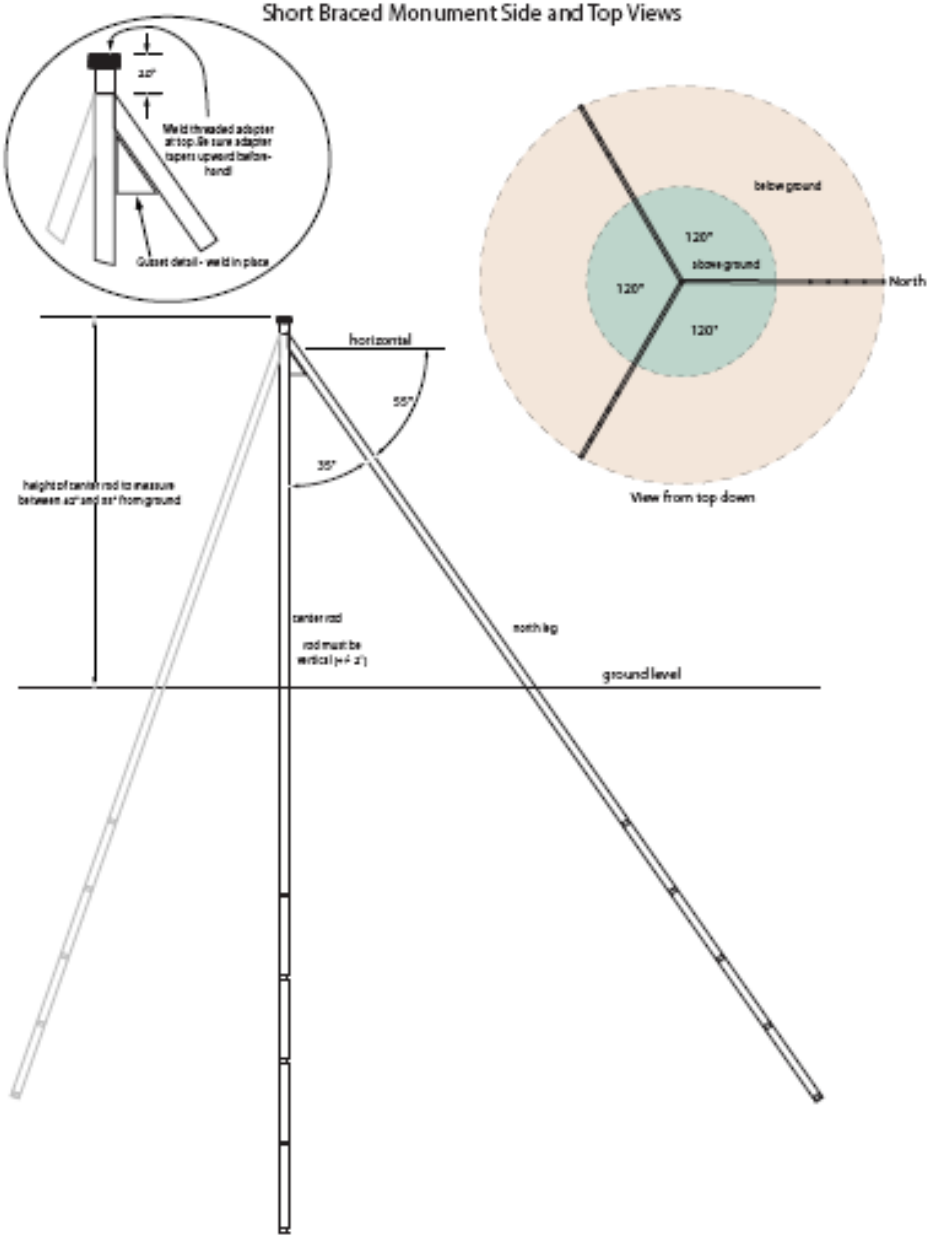

DDBM - SUBSURFACE ASSEMBLY
UNAVCO, Inc.
PBO


DDBM TOP ASSEMBLY
UNAVCO, Inc.
PBO


25'
3" DIA. MOUNTING POLE
CDMA ANTENNAE
2 OR 3 SOLAR PANELS (TAMPER PROOF MOUNT)
BATTERY ENCLOSURE
1/2" LIQUID- TIGHT CONDUIT (CONTAINS GPS ANTENNAE CABLE)
GROUND CABLE
COPPER GROUND ROD
1' DEEP TRENCH 3" WIDE (DUG WITH HAND TOOLS)
SITE INSTALL
UNAVCO, Inc.
PBO

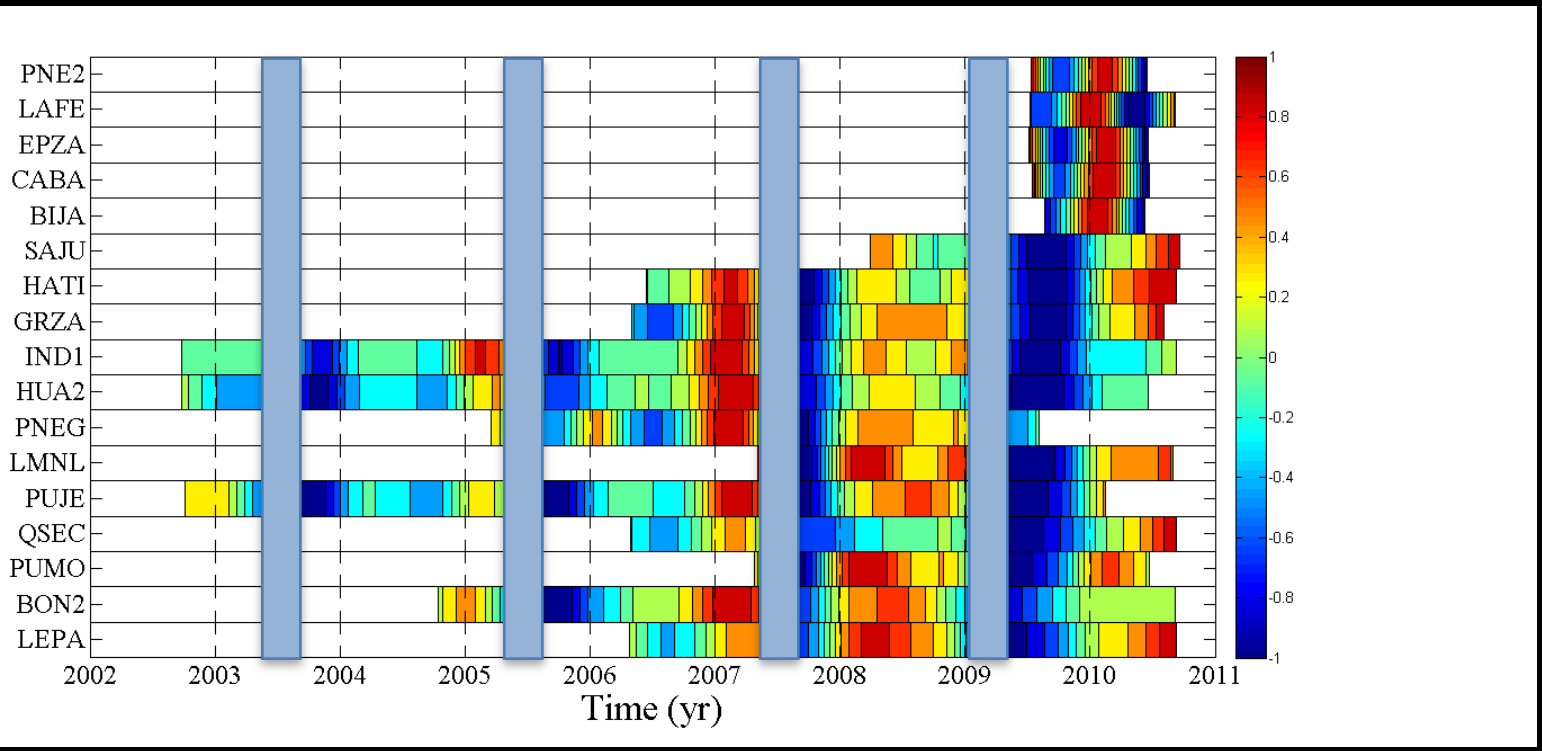

UNA
UNIVERSIDAD NACIONAL
COSTA RICA

Short Braced Monument Side and Top Views



El Viejo

Costa Rica Network Positionogram



East Component

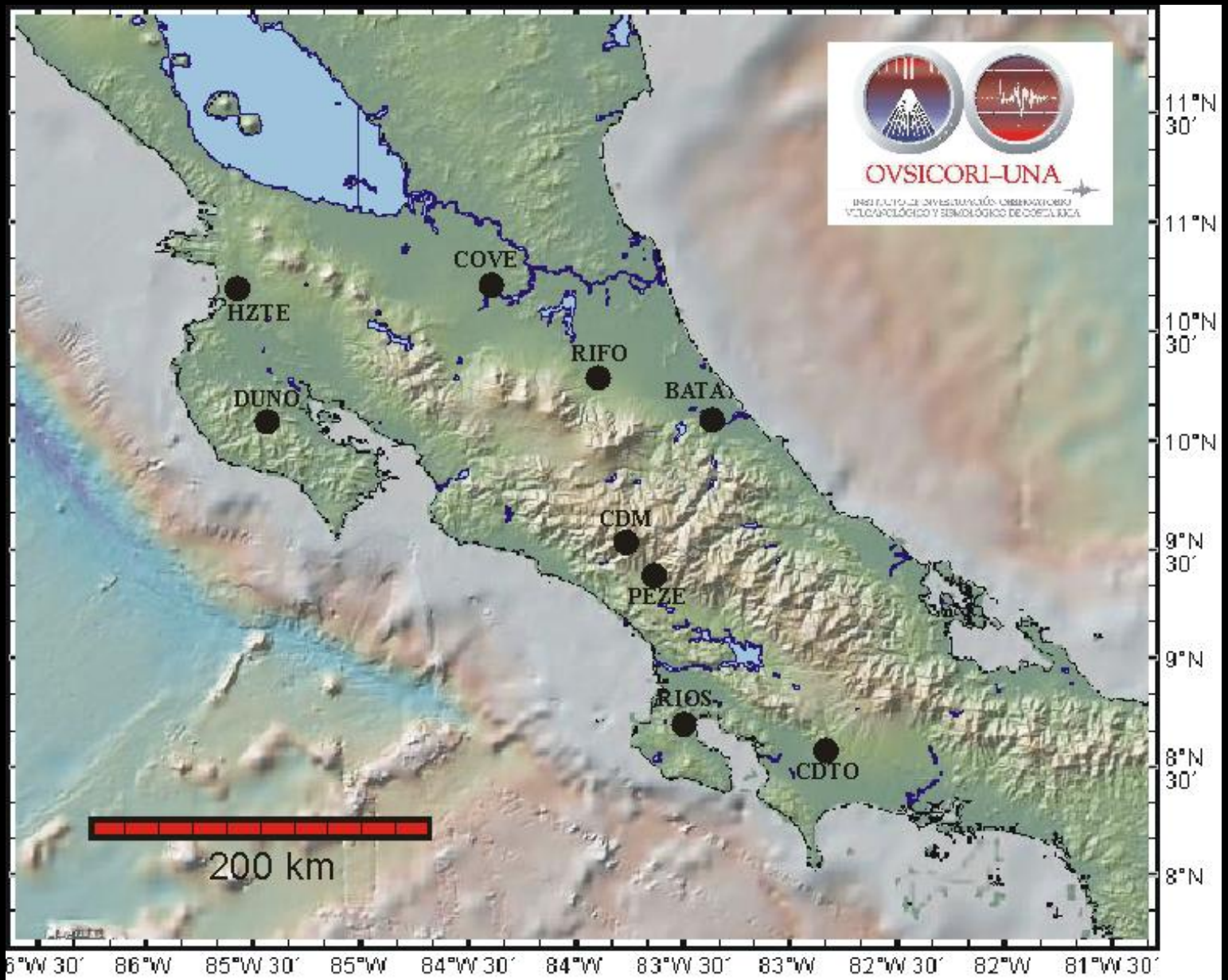
4 events detected

Recurrence interval ~2 years

From: Dixon, T.H.; Y. Jiang; S. Wdowinski; S. Y. Schwartz; M. Protti; V. M. Gonzalez; EPISODIC SLIP EVENTS MEASURED BY A CONTINUOUS GPS NETWORK ON THE NICOYA PENINSULA, COSTA RICA; Abstract G41C-01 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.

Sámara, May 2008

OVSICORI-UNA CGPS network



Permanent broadband-CGPS vault

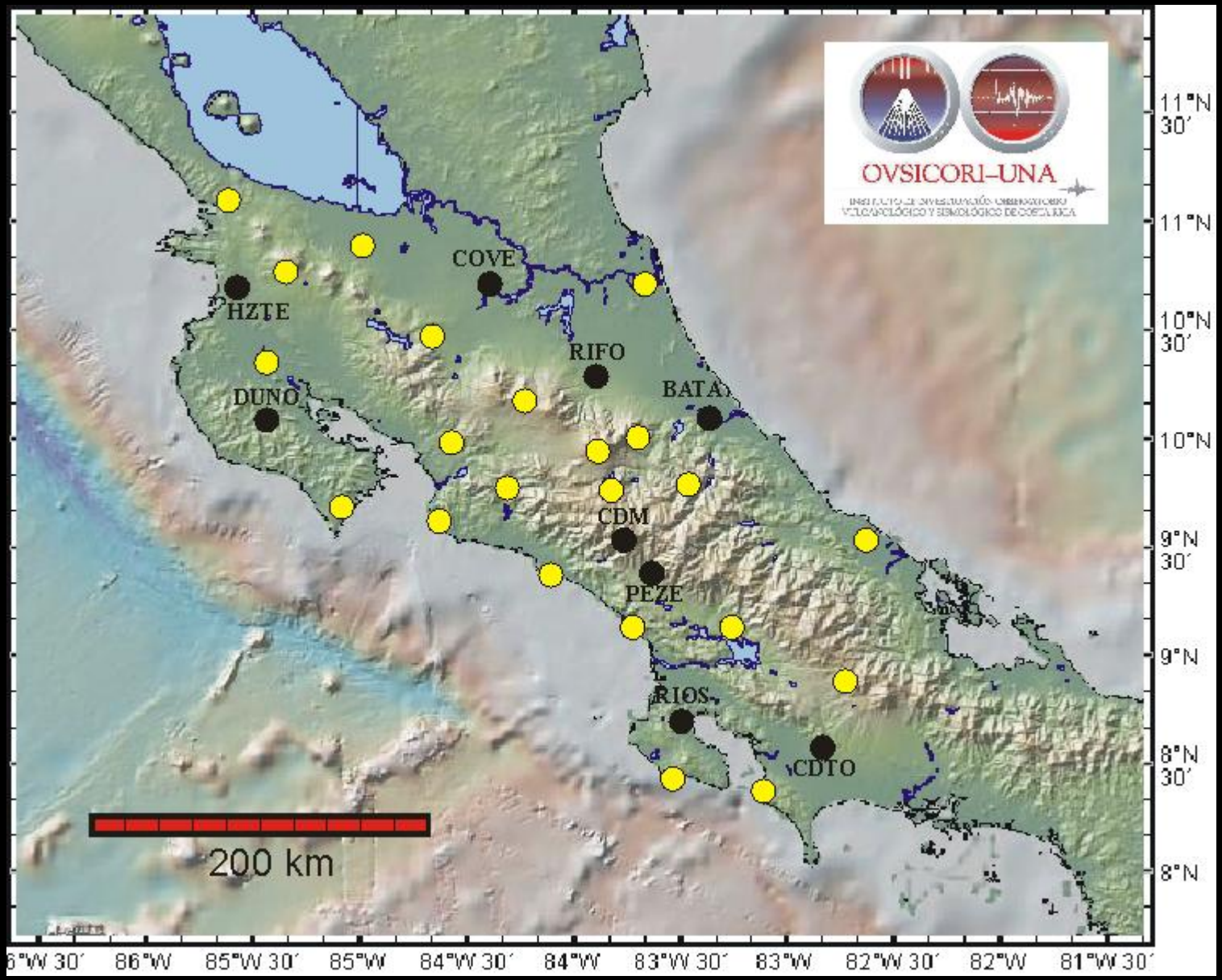
+ STS-2
+ Episensor

+ Quanterra QT-330
+ Trimble NetRs
+ VSAT

BATAN

RIFO

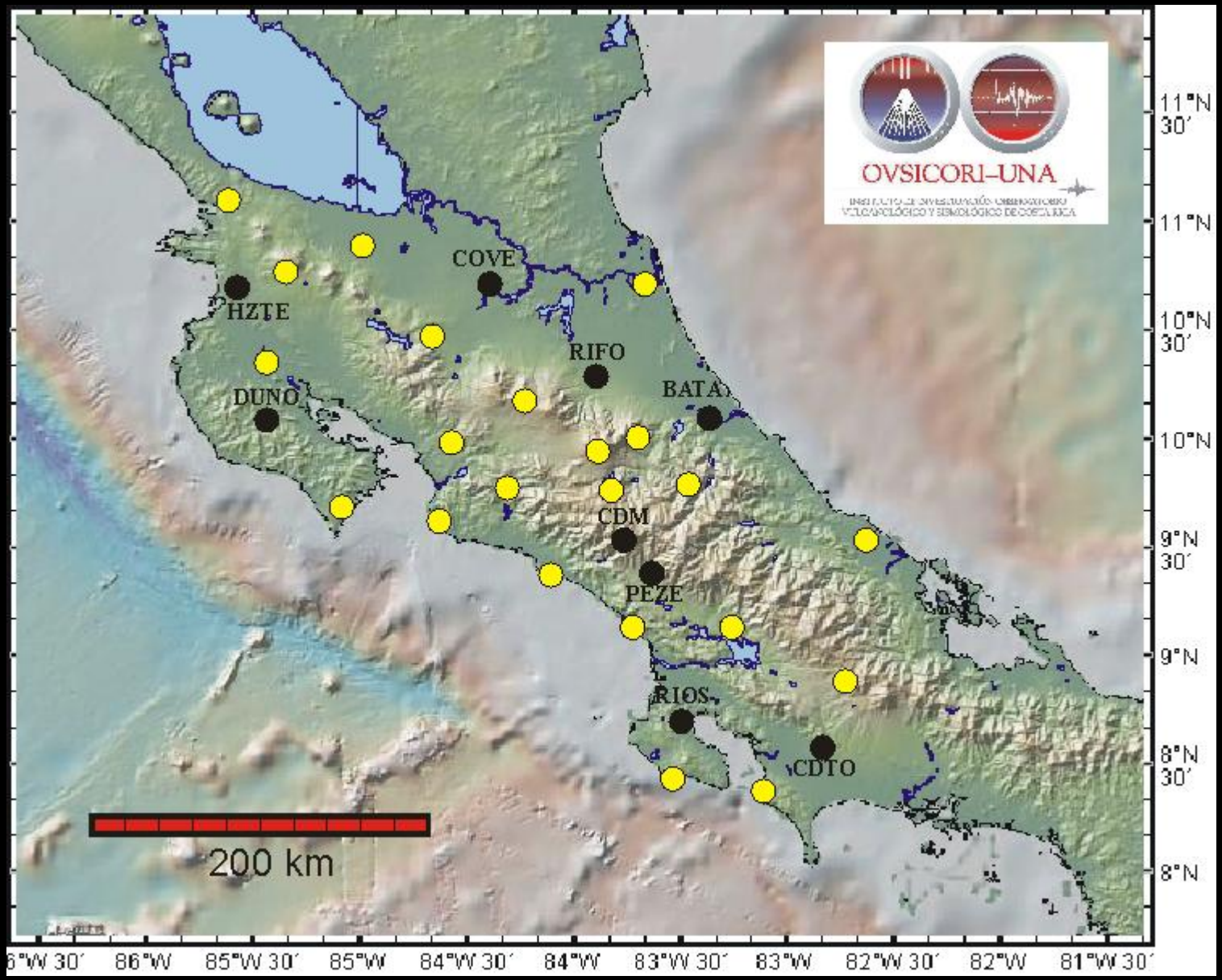
Current & Future OVSICORI's CGPS network



For COCONet……..
And the objective of this session

- Land-use access
- Data Communication
- Security

Current & Future OVSICORI's CGPS network



In Summary

- Right now, OVSICORI-UNA operates 28 CGPS in Costa Rica to monitor crustal deformation and 5 for volcano deformation.

Plans and goals

- To expand the CGPS network to ~50 stations.
- Improve monuments for OVSICORI's CGPS sites.
- Install a CGPS station in Cocos Is. (only place a.s.l. on the Cocos plate).
- Archive all CGPS data at UNAVCO.
- Train at least two people to process GPS data.
- Include data from all sites into an automated daily solution algorithm to generate daily-updated time series.