Presented before the General Assembly of the International Association of Seismology a Physics of the Earth Interiors (IASPEI), Chile, October 2005

SILENT SEISMIC ACTIVITY RECORDED IN COSTA RICA BY A CONTINUOUS GPS NETWORK

MARINO PROTTI 1, VÍCTOR GONZÁLEZ 1, MAKIKO IWAKUNI 2, TIMOTHY MELBOURNE 3, TERUYUKI KATO 2, TAKESHI IINUMA 2, SHINICHI MIYAZAKI 2, PETER LAFEMINA 4, TIMOTHY DIXON 4, SUSAN SCHWARTZ 5

1. OBSERVATORIO VULCANOLÓGICO Y SISMOLÓGICO DE COSTA RICA, UNIVERSIDAD NACIONAL, APARTADO 2346-3000, HEREDIA, COSTA RICA.
2. EARTHQUAKE RESEARCH INSTITUTE, THE UNIVERSITY OF TOKYO
3. DEPT. OF GEOLOGICAL SCIENCES, CENTRAL WASHINGTON UNIVERSITY
4. RSMAS-MGG, UNIVERSITY OF MIAMI
5. EARTH SCIENCES BOARD, UNIVERSITY OF CALIFORNIA, SANTA CRUZ

The first slow earthquake ever reported in Costa Rica began in mid-September 2003 and lasted about 4 weeks. Reprocessing of the data from the continuously recording, three-station, GPS network on the Nicoya Peninsula, Costa Rica, shows that at least one more slow event occurred earlier that year. We were also able to recognize at least two more silent events after the one in September 2003.

Continuous GPS data from four sites was processed with the Gipsy-Oasis II software [*Lichten and Border*, 1987] utilizing satellite orbit and clock parameters provided by JPL [*Heflin et al.*, 1992]. Point positioning and precise orbits and clocks were used to analyze the phase data with ambiguity resolution applied [*Zumberge et al.*, 1997]. Daily positions and covariance matrices were determined within the ITRF2000 reference frame [*Altamimi*, 2002] using daily frame products also from JPL. Final time series were simultaneously detrended and corrected for hardware upgrades, earthquakes, and annual and semi-annual sinusoidal signals caused by mismodeled seasonal effects. We are also including in our processing a continuous station to the SE, installed in late-October 2004 and another to the NW installed in mid-March 2005.

The slow seismic activity recorded is occurring along a portion of the subduction zone in NW Costa Rica, under and around the Nicoya peninsula. The Nicoya segment of the Middle America Trench has been recognized as a mature seismic gap with potential to generate an Mw>7.5 earthquake in the near future (it ruptured with large earthquakes in 1853, 1900 and 1950). These large events together with GPS results from campaigns in the region indicate around 50% of seismic coupling for large fast rupturing events, leaving about half of the potential slip from convergence to slide by means of slow earthquakes.

We will present details for each of the recorded slow earthquakes and present the plans for increasing the continuous GPS and seismic networks in the region.

1. Earthquake Source Processes – Modeling and Prediction
2. Slow earthquakes, Continuous GPS, Crustal Deformation
3. Marino Protti, Observatorio Vulcanológico y Sismologico de Costa Rica, Universidad Nacional, Apdo. 2346-3000, phone (506)261-0781, fax (506)261-0303, jprotti@una.ac.cr
4. O

5. PC
6. NO
7. Marino Protti
8. None