Geophysical Research Abstracts, Vol. 8, 07068, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07068

Geodetic and seismological study of the Polochic Motagua left-lateral strike-slip fault system in Guatemala

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The Polochic-Motagua left-lateral strike-slip fault system, including the Polochic, Motagua and Jocotan faults, marks the on-land plate boundary between the Caribbean and the North American plates. A 24 points geodetic network distributed along 4 profiles across these faults, were installed and measured by GPS in February 1999 and re-measured in February 2003 and January 2006. The results from the 1999-2003 data analysis have shown that the relative velocity between the North American plate and the Caribbean plate is about 17-20mm/yr. The obtained velocity field could be fitted by simple elastic models using a fault centered on the Motagua fault trace, locked at 20 km depth with a slip rate decreasing from 20mm/yr (to the east) to 12 mm/yr (to the west). The 2006 data will be now combined with the previous ones to refine the kinematic model of the Polochic-Motagua fault system.

In January 2005, we also installed a network of 30 seismic stations, covering the eastern part of the Polochic-Motagua faults. This network included a profile of 9 broad bandstations, 100km long, perpendicular to the faults. It recorded continuously the local and regional seismicity during a period of 6 months. We will present an analysis of the micro-seismicity data and combine these data with the GPS results and tectonic observations to present a refined model of the active deformation of this complex area.