Geophysical Research Abstracts
Vol. 13, EGU2011-13118-2, 2011
EGU General Assembly 2011

Marine geophysical research helps to asses the seismic hazard at the Hispaniola island

Andrés Carbó-Gorosabel (1), José Luis Granja Bruña (1), Pilar Llanes Estrada (1), Alfonso Muñoz-Martín (1), María Druet (2), María Gómez Ballesteros (2), José Martín-Dávila (3), Antonio Pazos (3), Manuel Catalán (3), and Uri ten Brink (4)

(1) Applied Tectonophysics Group, Departamento de Geodinámica, Universidad Complutense de Madrid, 28040, Madrid, Spain.(jlgranja@geo.ucm.es), (2) Instituto Español de Oceanografía, 28002, Madrid, Spain., (3) Real Instituto y Observatorio de la Armada, 11100, San Fernando, Cádiz, Spain, (4) USGS, Woods Hole, MA 02543, USA.

Detailed seafloor mapping of complete geological provinces with swath bathymetry together with high-resolution seismic profiles provide critical perspective for the detection and study of active faults, which helps to assess their seismic and tsunami hazard. Since 2003 the Universidad Complutense de Madrid has been leading an international research group to study the north-eastern Caribbean, from the Lesser Antilles to Jamaica. This area comprises the 200-wide boundary zone between the North American and the Caribbean plates, where the relative movement of the later relative to the former is $\sim$18-20 $\pm$ 3 mm/year towards 070º-075º. The highly-oblique convergence between the plates in Hispaniola is accommodated by strain partitioning on seismic fault systems sub-parallel to the plate boundary: strike-slip (the Enriquillo-Plantain Garden and the Septentrional Fault zones) and the compressive deformed belts (the Muertos thrust belt and the North Hispaniola thrust belt).
Results from several research cruises offshore Hispaniola have permitted to identify and characterize zones of active deformation that were not observable onshore, such as the Muertos out-of-sequence thrust or the Beata Ridge summit fault zone. The Muertos out-of-sequence thrust could be related with the M$\sim$8 event occurred the 18th of October in 1751 which shook the central and south-eastern Hispaniola. In other seismic fault zones, such as the Enriquillo-Plantain Garden and the Septentrional Fault Zones, there is not a well knowledge of their offshore continuity. Future upcoming research cruises have as a partial target the study of the offshore continuity of these strike-slip seismic fault zones in the vicinity of Southern peninsula of Haiti, in the Jamaica Passage and in the Gonave Bay. The scientific and social interest in studying this region has greatly increased after the January 2010 M7.0 event in Haiti. As part of the NORCARIBE project, a research cruise will be taking place in the spring of 2012 aboard the Spanish R/V Hespérides. Multichannel, high-resolution and wide-angle seismic profiles, will be acquired together with swath bathymetry, magnetic and gravity data.
After two centuries without significant earthquakes in southern Hispaniola, the Enriquillo-Plantain Garden fault system was responsible for the seismic crisis of January 2010 in Haiti. A review of the original historical records located in the Archivo General de Indias and the Archivo General de la Marina (Spain), and the archives of the Dominican Republic will provide new constrictions for the epicenters and intensities of the main events from the 16th century, and will help to assess seismic and tsunami hazard in the region.