



Explosion seismic investigations of the Caribbean – South America plate interactions in northern Venezuela

M. Schmitz (1), J. Sánchez (1), V. Rocabado (1), G. Gil (1), R. De Marco (1), V. Cano (1), M. Bezada (1), J. Avila (1), E. Vieira (1), M. Yáñez (1), A. Levander (2), C. Zelt (2) and BOLIVAR active seismic working group

(1) FUNVISIS, Caracas, Venezuela, (2) Rice University, Houston, Texas, USA, contact: mschmitz@funvisis.org.ve

In the complex Caribbean-South America (CAR-SA) plate boundary zone, a relative motion of 2 cm/year is accommodated by the Oca-Ancón, San Sebastián and El Pilar fault zones, a 1000 km long and 100 km wide dextral strike-slip fault system. Within the framework of the **BOLIVAR (Broadband Ocean-Land Investigations of Venezuela and the Antilles arc Region)** and **GEODINOS (Geodinámica reciente del límite norte de la placa Sudamericana)** projects, active seismic measurements were done during the months of April and May (deep seismic refraction) and December (deep seismic reflection) 2004 in northern Venezuela between 64°W and 70°W. Four deep seismic profiles were acquired perpendicular to the Caribbean-South America plate boundary. They run across the Caribbean Mountain System in the north into the related foreland basins in the south, bounded further south by the stable SA Guayana craton. Up to now, little has been known about the crystalline crustal structure. In eastern Venezuela, the overall crustal thickness decreases from 45 km in the craton to ~35 km along the coastline. This presentation focuses on the land shots recorded along the profiles by up to 800 single-channel recording instruments (RefTek Texans) provided by the IRIS/PASSCAL Instrument Centre. Additionally, air gun shots from the marine refraction lines, recorded by the broadband stations of the Venezuelan national seismic network as well as the BOLIVAR project PASSCAL broadband network, were used to build seismic sections with first arrivals to offsets greater than 200 km. To date, preliminary crustal models are available for the four seismic refraction profiles. Along the westernmost profile at 70°W, a crustal thinning from about 35 km to 25 km is observed beneath the Falcón basin. Important variations in crustal

structure due to the onset of the foreland sediments are observed on the other three profiles. Generally good signal to noise ratios enable the identification of signals from upper crustal structures as well as the reflections from the Moho. Indications for upper mantle phases are given on the recordings from the airgun shots in the seismological networks. The data will provide information on the crust and mantle structure in the plate boundary region to the northern edge of the South American craton (Contribution to projects G-2002000478, PDVSA-INTEVEP – FUNVISIS - 04-141 and NSF - Continental Dynamics Program).