

INTERDISCIPLINARY INVESTIGATION ON SOIL-DAMAGE RELATION IN THE SUCRE STATE, EASTERN VENEZUELA – MACRO- TO MICRO-SCALE STUDIES REALIZED AFTER THE 1997 CARIACO EARTHQUAKE

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The small town of Cariaco as well as Cumana, the capital of Sucre State, were the most affected towns by the July 9, 1997 Cariaco earthquake ($M_s=6.8$). In order to study the effect of the soil conditions on the damage distribution, microtremor observations were performed in and around Cariaco and Cumana. Principal periods of soils oscillate between 0.2 and 0.4 s in Cariaco and 0.2 to 1 s in Cumana. Seismic refraction surveys were realized as well as geotechnical investigations. Low seismic velocities are observed down to 40-60 m in Cariaco and at various depths in Cumana. The high percentage of damage in the center of Cariaco, among other factors, can be attributed to the thickness of the soft soils in that area. The damage distribution in Cumana shows a good correlation with the distribution of river and coastal plain sediments and low predominant periods. For the determination of the thickness of the Quaternary sediments 5 seismic refraction profiles, between 10 and 20 km long, were measured in 1998 crossing the Cariaco valley. Quaternary sediments with seismic velocities ranging between 1.5 and 3 km/s overly bedrock with p-velocities of more than 4 km/s. Increasing thickness of unconsolidated, water saturated Quaternary sediments towards the Gulf of Cariaco in the west is observed. Aftershock recordings obtained by the international RESICA 97 (Red Sismológica de Cariaco 1997) temporary deployment of 43 seismological stations are used for the composition of seismic sections in order to know the basement structures and seismic velocities.