

Geophysical measurements as contribution to a seismic microzoning study: The Mérida metropolitan area, Venezuela

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As part of a seismic microzoning study; gravimetric, seismic refraction and microtremors measurements were done in the Mérida metropolitan area, in order to identify the shape and thickness of soft sediments. The study area was divided into two geographical zones: (1) Mérida terrace and (2) Ejido city. Bouguer anomaly map of Mérida terrace, generated using over a 200 ordinary stations with $\rho_B = 2.67 \text{ gr/cm}^3$, shows a variation between -381.58 y -360.57 mGal. A tridimensional gravity model of Mérida terrace was supported by geological cross-sections and maps, borehole information and previous seismic refraction and gravity models. The predominant periods obtained in Mérida terrace from H/V analysis vary between 0.087 s to 1.0 s. From the results obtained in each station it was possible generate a map of predominant periods of the area. Additionally, 1D and 2D models from five nearsurface seismic profiles were obtained in Ejido city displaying the following results: In a first layer the velocities are between 750-1115 m/s for P waves and 320-620 m/s for S waves, this layer displays a maximum thickness of 15 m. In a second layer the velocities are between 2080-2600 m/s for P waves and 550-830 m/s for S waves. All data was unified into a geographic information system. The results allow us to estimate a maximum sediment thickness to 120 m in Mérida city.

Keywords: Terrace sediments, Gravimetry, Seismic refraction, Microtremors, Mérida, Venezuela.