



Shallow geoelectrical and seismic refraction survey for the determination of the thicknesses of the gravel channels in the Canyon of La Huasteca, Santa Catarina Nuevo Leon, Mexico

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The metropolitan area of Monterrey is located in a region where the pluvial precipitation is erratic and concentrated. There are long periods of little precipitation and short periods of great abundance. The constant growth of the metropolitan area, as well as the extreme climatic conditions makes insufficient the supply obtained by the dams La Boca, Cerro Prieto and El Cuchillo. Due to previous thing it is necessary to carry out extraction of groundwater of the Buenos Aires System in the Huasteca canyon. One of the first tasks to be able to establish a model of the acquifer of the Buenos Aires System, was the rise of geologic cartographies to detail made by students of the Facultad de Ciencias de la Tierra, UANL and of the Technical University of Aachen. Another of the questions was the determination of the thicknesses of the gravel channels, in the zones of interaction between the free (gravel) and the deep acquifer (limestone). The methodologies for the exploration of the underground water in a certain area are based on superficial geology and the phreatic level of existing wells. Nevertheless, it is not only recommended to focus the exploration from the geologic

point of view, but to always complement with applied geophysical since this allows to make a view type "X-rays" of the subsoil, of indirect way, applying diverse geophysical techniques. The aquifer of the Cañón de La Huasteca conforms himself for a shallow aquifer of gravels, possibly also in fractures of the formation Méndez (shales) and a deep aquifer in calcareous (in fractures and karstic zones). In the present work were made 2 profiles of seismic refraction and 6 profiles of electrical resistivity. From the seismic data collected with these profiles two geologic sections were obtained and a model of velocities. They consist of gravel channels whose velocity changes from 1000 m/s to 1300 m/s and thickness from 16 m to 53 m. Below the layer of gravel channels can be inferred the layer of limestones. From the dipole-dipole geoelectrical survey were obtained two dimensional models. The geoelectrical data were inverted using the software denominated RES2DINV and using quadratic programming. Of the obtained models the next characteristic are highlighted: a) Poor conductor. Generally related to breaches of the Tertiary, to alluvial deposits of the Quaternary one and dry alluvial sediments. b) Good conductor. Related with the bed of streams. The models 2-D obtained with base to the data of apparent resistivity allowed to relate the anomalies with the shallow lithology present.