METROPOLITAN CURITIBA – A NATURAL LAB FOR THE APPLICATION OF GEOPHYSICS TO GROUNDWATER

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Curitiba, the capital of Parana state, and surroundings, contain most of the known aquifer types. The Curitiba Terciary sedimentary Basin, presents a sequence of alternate clay and coarse sediment layers in its Guabirotuba Formation. The coarse sediment layers are not continuous, but locally have characterized porous aquifers producing 40 m3 per hour. The Pre-Cambrian metamorphic basement presents fractured aquifers which are seen to produce in excess of 80 m3 per hour. In the Metropolitan area, calcareous rocks present karst-fractured aquifers which produce in excess of 150 m3 per hour. In this environment, Geophysics has an important role not only in the aquifer exploration but also in the hazard prevention and geotechnical solutions for sinkholes, which may result from the change of water level when pumping takes place. Diabase dykes act as fracture guides and also as aquifer confining structure. They are key elements in the karst-fractured aquifer and also in the porous-fractured aquifer of the Parana Basin, particularly in the Furnas Formation.The Federal University of Parana is taking advantage of the natural geophysics lab located in its backyard for teaching and research purposes. As water is the electrical current vehicle in porous or fractured rocks, geoelectrical methods give the most relevant information, while the also important diabase dykes are easily mapped by the magnetic method. Several examples of geophysical application to ground water in the Metropolitan Curitiba are presented.