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THE INTERNATIONAL ASSOCIATION OF HYDROGEOLOGISTS



AQUA 2015

HYDROGEOLOGY: BACK TO THE FUTURE!

42nd IAH Congress - ROME

Sapienza University of Rome - 13/18 September 2015

ABSTRACT BOOK

342 - APPLICATION OF DFN APPROACH FOR CHARACTERIZING A FRACTURED CRYSTALLINE ROCK AQUIFER AT A TROPICAL REGION IN SÃO PAULO, BRAZIL

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The Jurubatuba Channel area in São Paulo city has been of mainly industrial use since the 1950s, with intense use of groundwater through deep supply wells. Many of the industries have used chlorinated solvents in their processes and accidental spills have resulted in water and soil contamination in multiple locations. The association of the possible dense non-aqueous phase liquid in the contaminated areas with strong vertical downward hydraulic potentials caused by the pumping of supply wells has enabled the transport of these substances to depths of up to 300 meters into the fractured bedrock aquifer.

This work aims to establish a conceptual model of the contamination, from the saprolite unit to the fractured gneiss aquifer, in one of the contaminated areas, applying the Discrete Fracture Network approach for that. Studies of this nature are important, since the description of the weathered bedrock aquifer, its hydraulic connection with the fractures of the bedrock aquifer and the behavior of chlorinated solvents in this environment are not common in the literature.

Two studies are being carried in the scope of this project: one with regards to structural characterization of the fractured aquifer and its hydraulic relations with the overlying weathered units; and other, to the lithological characterization and the influence of fractures in contaminant diffusion into the matrix in the fractured aquifer. To this end, a borehole of 60 m-deep was drilled in a contaminated area, where a detailed core logging was conducted for structures and lithological description, which guided the sampling of soil and rock samples for VOC and physical analyses. Then, several imaging and geophysical tests, like ATV, OTV, ALS-TVP, were conducted in the borehole, which guided the definition of depths for hydraulic tests and the design of a multilevel system (MLS) for groundwater monitoring.

Preliminary results indicated that most of the mass of contaminants in the rock, especially PCE, is concentrated on the top of the hard weathered bedrock, located in the depth of 15 m, and within the soft weathered bedrock, whose contact represents a strong change in matrix porosities.