

UNSATURATED ZONE MONITORING: HYDRAULICS AND HYDROCHEMISTRY IN URÂNIA (SÃO PAULO, BRASIL)

Bertolo, Reginaldo A.¹ & Hirata, Ricardo C. A.²

1 - Hidrogeólogo e doutorando pelo Instituto de Geociências – Universidade de São Paulo. Caixa Postal 11348 CEP 05508-900, São Paulo, SP, Brasil. Fone 55.11.9970.3313. Fa 11.278.9107. Email: rebertolo@originet.com.br

2 - Professor do Instituto de Geociências – Universidade de São Paulo. Caixa Postal 11348 CEP 05508-900, São Paulo, SP, Brasil. Fone 55.11.818.4230. Fax 55.11.818.4207. Email: rhirata@usp.br

Groundwater geochemistry evolution through unsaturated zone has been studied at an experimental station in Urânia municipality, São Paulo State, Brazil. The aim of this publication is to present a brief description of the facility, installation procedures of the unsaturated zone monitoring equipment and water sampling. 12 tensiometers and 12 suction lysimeters were installed (from 0.5 to 9 m deep) in a large-diameter borehole of 1.5 diameter and 10 m deep. Another 6 tensiometers and 6 suction lysimeters were installed, 3 m apart from the borehole, at 0.5 and 1.0 m depth from surface. Tensiometer measurement and suction lysimeter sampling results have indicated a great lateral variability of capillary pressures, ion concentration and soil-pore water distribution. The causes of these variabilities have been related to natural soil heterogeneity (macropore effect), well construction problem and, mainly, deep root activities. The deep root activities are due to a mango tree located approximately 10 m from the borehole. During the dry season, the tensiometers located closer to the tree present an average capillary pressure of 500 mmHg, in opposition to 400 mmHg in tensiometers in the other side. The unsaturated-pore water quality also showed compositional variations related to the root activities. Higher concentrations of H^+ , HCO_3^- , CO_2 ($5,10E-07$ mol/L, $9,31E-04$ mol/L, $2,78E-02$ mol/L), and lower values of NO_3^- ($0,78E-04$ mol/L), in comparison to the concentrations of H^+ ($2,29E-07$ mol/L), HCO_3^- ($4,00E-04$ mol/L), CO_2 ($6,33E-03$ mol/L) and NO_3^- ($5,29E-04$ mol/L), have indicated that the root respiration increases the presence of CO_2 , with elevation of HCO_3^- , and H^+ . NO_3^- is used as nutrient by plants.

Key-words: Unsaturated Zone, Monitoring, Hydrogeochemistry

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