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PRELIMINARY CHARACTERIZATION STUDY OF A CENOZOIC-MESOZOIC TRANSITION LAYER TO IMPROVE PARAMETER INFORMATION FOR NUMERICAL GROUNDWATER FLUX MODEL

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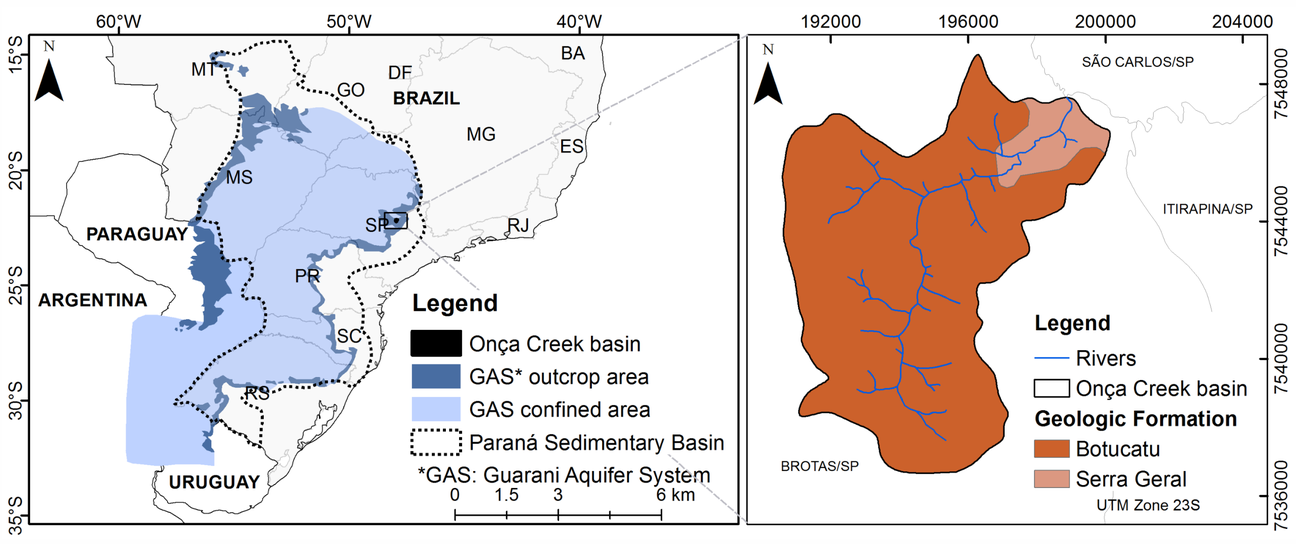
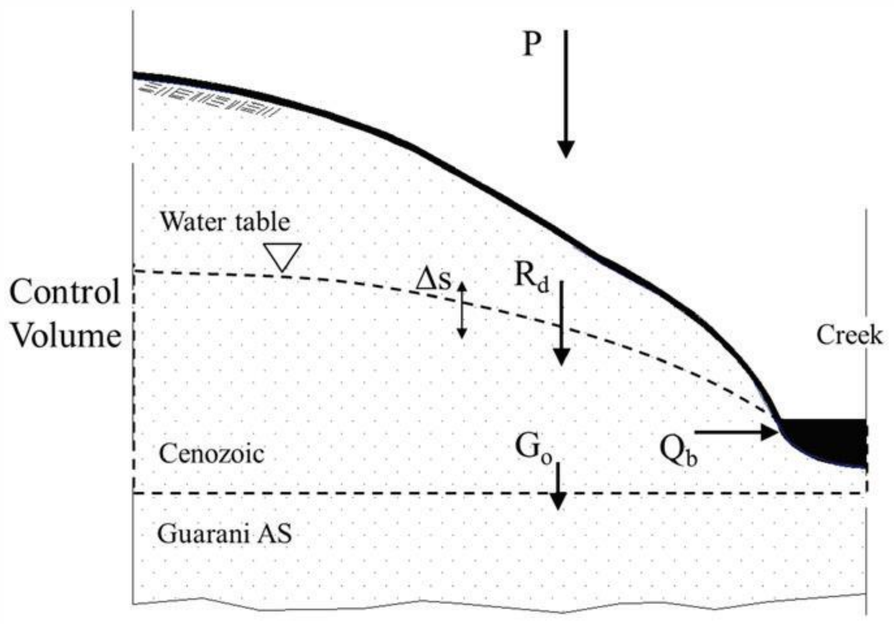
INTRODUCTION

Water flux in saturated zone depends on several factors related to hydrological data, land use and soil characteristics such as soil particle size distribution and porosity. These soil features, as well as chemical proprieties, vary with the soil depth which may help to characterize geologic layers with different ages. On a geologic interface, hydrogeological parameters (e.g. hydraulic conductivity) may suffer an abrupt change which highly modifies groundwater flow nets. Usually, numerical models have been used to simulate groundwater fluxes, however there is a lack of substantial soil information to feed the models. This study aims to identify the interface between Cenozoic and Mesozoic sediments to improve a conceptual hydrogeological model applied to an outcrop zone of the Guarani Aquifer System, in Brotas, São Paulo, Brazil.

STUDY AREA



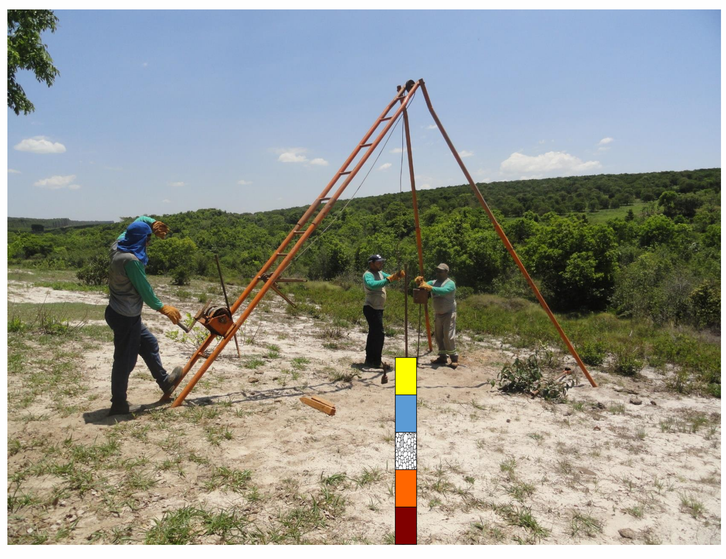
Onça Creek Basin (OCB) located in outcrop zone of the Guarani Aquifer System



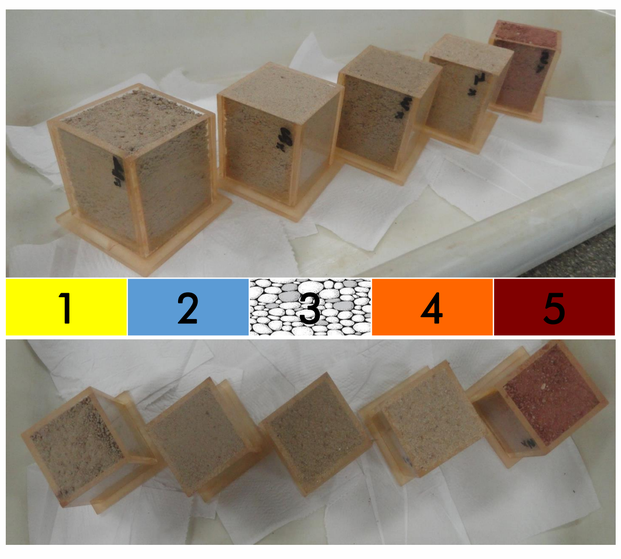
Hydrogeological conceptual model (Wendland et al., 2015)

MATERIAL AND METHODS

Preliminary soil characterization through field observation, soil particle size distribution by the gamma-ray attenuation method, and determination of iron(III) in sulfuric acid analysis were realized on six soil disturbed samples collected up to a depth of 5.5 meters.



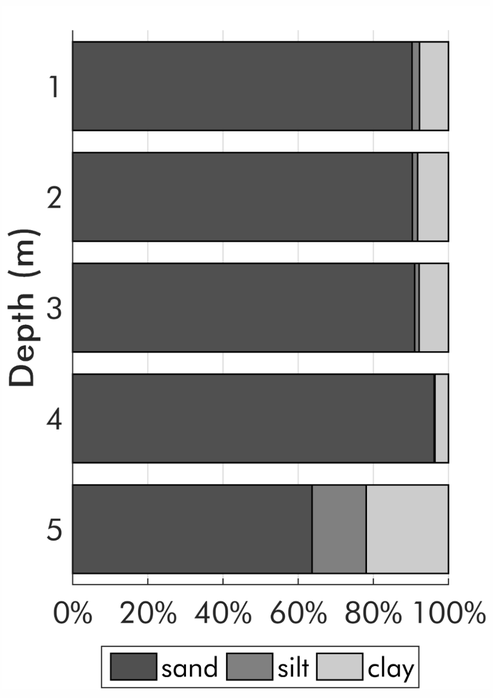
Soil samples collect



Soil samples

Soil particle size distribution device

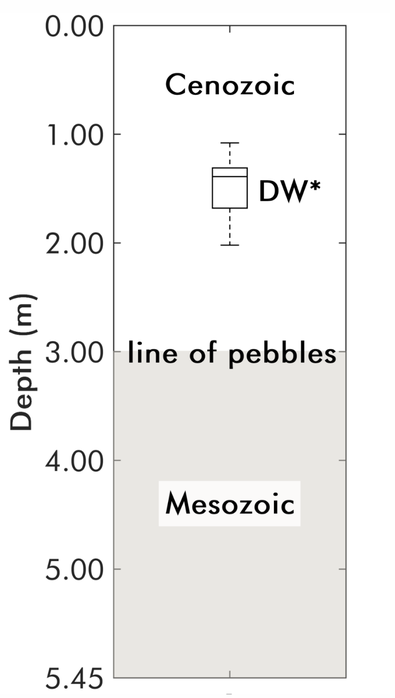
RESULTS AND DISCUSSION



Soil particle size distribution

Depth (m)	Fe_2O_3 (%)
1.00	0.25
2.00	0.27
3.45	0.87
4.00	0.15
5.00	1.77
5.45	1.66

Iron (III) content



Hydrogeological model from soil analysis (*DW: distance to water)

Predominantly sandy soil (mean of 90.6%) was identified at the first meters. A line of pebble was observed at a depth of 3.0 m, which is common at the bottom of Cenozoic layers. In sequence, there was a thin layer of mostly sandy soil (96.2%) followed by soil samples with higher iron (III) content (increase of 91.3%) and clay fraction (21.8%). The latter layers correspond to Mesozoic sediments. Also, it was detected that the water level was above the Cenozoic sediments.

CONCLUSION

Therefore, it was possible to identify a change of soil morphology in depth which characterized a transition layer from Cenozoic to Mesozoic sediments, located below groundwater level, which contributes to improve a conceptual hydrogeological model.

REFERENCE

Wendland, E., Gomes, L. H. and Troeger, U. W. E. [2015] Recharge contribution to the Guarani Aquifer System estimated from the water balance method in a representative watershed. Anais da Academia Brasileira de Ciências, 87(2), 595–609.

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CAPES
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