

## **Mapping local groundwater flow systems in the regolith of Dodowa, Ghana Abstract n°2145**

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The objective of our research was to carry out a groundwater flow systems analysis (GFSA) in the township of Dodowa, a peri-urban area on the Accra Plains, Ghana. The GFSA will serve as input for a groundwater use management plan. Thereto, we carried out Electrical Resistivity Tomography along 7 transects of 200-1000 m, we drilled 10 boreholes with depths ranging from 15-70 m at 6 different locations and equipped the boreholes with 2 and 4 inch multi-level piezometers, we carried out pumping tests and slug tests to determine permeability, and we collected some 50 water samples from dug and drilled wells. Samples were analysed both in the field and at the UNESCO-IHE laboratories, for all major cations and anions. Finally, we determined the steady-state groundwater balance. Our first results indicated that the geology of the area is mainly composed of weathered quartz-arenites and phyllites of the Togo Structural Unit and hornblende gneiss of the Dahomeyan Structural Unit. The thickness of the weathered zone varied from a few meter to a few 10s of meter. Horizontal permeabilities in the weathered quartzite ranged from 0.01 -1.0 m d+ groundwater flow in the gneiss was mainly determined by relatively permeable (< 3 m d) and inter-connected fractures. We identified a steady-state local groundwater flow system, whereby recharge occurred on the higher northern side of Dodowa and discharge on the southern side. Groundwater quality ranged from fresh water with a low chlorinity and low alkalinity in the recharge area to brackish groundwater in the discharge area. Brackish groundwater was mainly due to evaporation, giving rise to ion concentration factors up to 20. Nested in this local system was a plume of polluted nitrate-rich groundwater originating from the infiltration of waste water from the township. Our first research results implied that groundwater dominated by local flow provides a relatively simple set of boundary conditions with which local groundwater use management strategies can be developed.

