

## **Groundwater quality in an urban alluvial aquifer, Arusha, Tanzania Abstract n°2150**

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The objective of our research was to assess groundwater quality patterns below Sombetini and Unga Limited Wards in Arusha, Tanzania. The outcome will serve as input for a groundwater use management plan. There to, we drilled 23 boreholes with depths ranging from 5-30 m at 15 different locations, and equipped the boreholes with 2 inch piezometers with 2 m screens at varying depths. From these boreholes and existing wells and springs, we collected some 65 samples. Besides pH, electrical conductivity, nitrate, and alkalinity, another parameter sampled in the field with a handheld ion selective electrode was fluoride. The samples were stored and analyzed for all major cations and anions. Our first results indicated that alkalinity concentrations were high to very high (up to 25 mmol L) and strongly positively correlated with sodium, suggesting the influence of magmatic carbon dioxide as a driver for the dissolution of sodium-rich silicates present in the aquifer, which was composed of basaltic pebbles, cobbles, and boulders of various size and shape. Furthermore, shallow groundwater had highest concentrations of nitrate, while concentrations in groundwater from deeper piezometers were significantly less. Fluoride concentrations ranged from 1-50 mg L, which is rather high. Fluoride concentrations were positively correlated with sodium, suggesting that high fluoride concentrations may be associated with weathering of sodium-rich silicate minerals in basalt. In addition, fluoride was negatively correlated with calcium, while saturation indices for the mineral fluorite ranged between -2 and +1. This indicated that for the higher fluoride concentrations, the saturation index of fluorite was a limiting factor. Like nitrate, also for fluoride, concentrations generally reduced with depth, implying the presence of fluoride associated with waste water infiltration. Our first research results implied that groundwater use management strategies should discard the shallowest, most contaminated, groundwater and focus on defluoridation of groundwater from depths of 20 m and more below ground surface.

