



Transport processes in a structured vadose zone above migmatitic basement, Benin/Westafrika.

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ABSTRACT: The vadose zone above a fractured migmatitic aquifer in Benin/Westafrika consists of a saprolithic zone, followed by a lateritic strengthened zone and a soil zone.

In order to understand the groundwater recharge and related transport processes the percolation through this structured zone is monitored by TDR measuring tubes (50-240 cm) representatively placed in the 30 qkm test site. Weekly measurements are conducted with a mobile TDR tube access probe in depth intervals of 30 cm. Based on those measurements the spatiotemporal development of the soil water content in the unsaturated zone in respect to geology and lithology can be shown. Both a clear dependence of the soil moisture content on the substrate and a strong influence of low permeable horizons on the percolating water is evident. The lateritic strengthened soil horizons act as aquitards, where the percolation of the infiltrating precipitation water is deviated and forms interflow. However, a part of the percolate is able to pass the nearly impermeable lateritic horizons through preferential flow-paths and thus contribute to the groundwater recharge.

To quantify the data, tracer techniques such as environmental isotopes (2H, 3H, 18O) as well as artificial tracer tests in the vadose and saturated zone have been performed.

The work is included in a multidisciplinary project (IMPETUS) about fresh water management and embedded in a national project about "Global chance of the water cycle" (GLOWA).