# Groundwater-level response to rainfall and quantification of recharge in weathered basement aquifers in Benin
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Weathered hard rock aquifers underline about 80% of Benin (West Africa). Despite groundwater is the primary source of water for domestic supply, the quantification of recharge and the key processes controlling it are poorly known. In this study, we monitored water-level and chemistry (including intrinsic isotopes) over several hydrological years at ten experimental sites located in different geological units of basement rocks in Benin. At six locations, water-level time-series were monitored in nested wells completed in the weathered zone (WZ) and the deeper fissured zone (FZ). We applied correlation methods to investigate groundwater level response to rainfall, and we used the Water Table Fluctuation method (WTFM) to quantify the recharge. Deuterium and oxygen 18, but also Tritium of groundwater sampled in both the WZ and the FZ indicate a current rainwater signature. Moreover, the monitoring of water conductivity in boreholes indicates a dilution of the groundwater after the rainy season in the WZ and partially in the FZ. We conclude that the recharge is direct, current and concerns the WZ and partially the FZ. Water-level variations reveal two apparent infiltration velocities, i.e. a slow flow at every location and a rapid flow at some locations. These two apparent infiltration velocities underline different recharge processes. Annual recharge rates at the ten experimental locations are ranging in-between 50 and 250mm year on average which represents 5 to 25% of the annual rainfall. Our newly quantification of recharge is lower than the previous estimates which were based on the water balance approach. Moreover, comparison of yearly groundwater balance and rainfall indicates that aquifer storage is in equilibrium with mean rainfall. Groundwater storage is then vulnerable to any change in rainfall.