



Comparison of approaches for aquifer productivity assignment in the Sahel-region

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Population growth and global warming, along with changing climate dynamics, are strongly increasing stress on the water resources in the Sahel zone. To handle the challenge of limited water supply, groundwater is used extensively, often without adoption of proper management strategies.

The implementation of any sustainable groundwater management strategy requires provision of fundamental spatial information on the respective aquifer. One of the most important parameters is the aquifer productivity, providing the basis for sustainable groundwater use. As available pertinent data are generally limited in sub-Saharan countries, a method which uses all types of available information is needed to assign productivity classes to aquifers. Both, more reliable data, such as step-drawdown tests and transmissivities, as well as less reliable information, such as well yields, have to be included to guarantee a data set sufficiently large for plausible aquifer productivity classification.

A comparison of studies analysing well yields, specific capacity and transmissivity to characterize aquifer productivity was performed. Their applicability to the pilot zone in the Sahel region was demonstrated, as they were originally designed for application at the national scale in Europe (Krásný, 1993; Graham et al., 2009) or continent wide and local studies in Africa (MacDonald et al. 2012; Bäuml 2011).

We identified a classification scheme for the categorization of aquifers based on the three parameters. For the final assignment of productivity a weighting and rating system was adopted, in order to account for the high variability in data quality. The resulting aquifer productivity map provides the basis for the preparation of thematic maps on aquifer vulnerability to climate change and pollution, groundwater recharge, and the delineation of potential zones for managed aquifer recharge. Whilst interpreting the map and its derivations for decision-making, local conditions of the study zone, such as population density, have to be considered.

References:

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