



Groundwater vulnerability to climate change: A Comparison of point-count and weighting methods in the Sahel region

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Groundwater is the most important source of drinking water in the Sahel region. Population growth and expanding agricultural water demand increases the importance of reliable groundwater resources for human livelihoods and national economies. Within a technical cooperation project, the Federal Institute of Geosciences and Natural Resources (BGR) supports the efforts of the Lake Chad Basin Commission (LCBC) to implement a sustainable transboundary groundwater management of the Lake Chad basin. The increasing pressure on groundwater resources in the semi-arid Sahel region requires the adoption of sustainable management strategies.

Low data availability and quality requires simple and robust methods to evaluate the effect of climate change on groundwater resources. Point-count system and weighting methods were compared regarding their ability to estimate groundwater vulnerability to climate change. The selection of parameters and the structure of the rating and weighting schemes are crucial aspects in method development and application. The major external stress factors on groundwater resources are recharge and extraction rates, while the sensitivity of aquifers to climate change can be described by intrinsic aquifer properties such as productivity or transmissivity.

Results were standardized in order to allow comparison and discussion of the obtained vulnerability maps. While standardization reduces differences due to classification it also highlights method-inherent differences caused by parameter selection and weighting. The plausibility of the results is evaluated by comparing two time slices - historic and present day conditions – and the local precipitation record.