



A groundwater quality index map for Namibia

Thomas Bergmann (1), Oliver Schulz (2), Heike Wanke (3), and Wilhelm Püttmann (4)

(1) Geowissenschaften, Goethe University, Frankfurt am Main, Germany (thomasvbergmann@gmx.de), (2) Institut für sozialökologische Forschung, Frankfurt am Main, Germany, (3) Geology, University of Namibia, Namibia, (4) Institut für Atmosphäre und Umwelt, Goethe University, Frankfurt am Main, Germany

Groundwater quality and contamination is a huge concern for the population of Namibia, especially for those living in remote areas. There, most farmers use their own wells to supply themselves and their animals with drinking water. In many cases, except for a few studies that were done in some areas, the only groundwater quality measurements that took place were taken at the time the well was drilled. These data were collected and are available through the national GROWAS-Database. Information on measurements determining the amount of contaminants such as fluoride, TDS, other major ions and nitrate for several thousand wells are provided there.

The aim of this study was I) to check the database for its reliability by comparing it to results from different studies and statistical analysis, II) to analyze the database on groundwater quality using different methods (statistical-, pattern- and correlation analysis) and III) to embed our own field work that took place within a selected Namibian region into that analysis. In order to get a better understanding of the groundwater problems in different areas of Namibia, a groundwater quality index map based on GROWAS was created using GIS processing techniques. This map uses several indicators for groundwater quality in relation to selected guidelines and combines them into an index, thus enabling the assessment of groundwater quality with regard to more than one pollutant. The goal of the groundwater quality map is to help identify where the overall groundwater quality is problematic and to communicate these problems. Additionally, suggestions for an enhancement of the database and for new field surveys will be given.

The field work was focusing on three farms within an area known for its problematic nitrate concentration in groundwater. There, 23 wells were probed. In order to identify the sources of the contamination, isotopic measurements were executed for three of these wells with high nitrate concentrations. Particularly in order to ensure that problems such as methemoglobinemia in infants will not occur, an understanding of contamination sources is important for those wells that are used to supply drinking water for households.