Geophysical Research Abstracts, Vol. 8, 05992, 2006
SRef-ID: 1607-7962/gra/EGU06-A-05992

Consequences of waste water seepage for the water quality of a karst spring (Gallusquelle, Swabian Alb, Germany)

B. Heinz (1), **S. Birk** (2), A. Kappler (1), R. Liedl (1), T. Geyer (3), K. Straub (1), K. Bester (4)

(1) Zentrum für Angewandte Geowissenschaften, Universität Tübingen, Germany, (2) Institut für Erdwissenschaften, Karl-Franzens-Universität Graz, Austria, (3) Geowissenschaftliches Zentrum der Universität Göttingen, Germany, (4) Waste and Waste Water Management, Universität Duisburg-Essen, Germany (steffen.birk@uni-graz.at)

Karst aquifers represent important drinking water resources worldwide. However, they exhibit a high vulnerability against contamination with chemicals and faecal bacteria due to rapid uptake and transport of pollutants via the conduit system. In this study the consequences of overflows of a rain spillway basin after heavy rain events for the water quality of a karst spring (Gallusquelle, Swabian Alb, Southwest Germany) were followed and quantified. The objective was to verify the connection between the infiltration of waste water in the catchment and the decreasing water quality at the spring which had been suggested previously based on a tracer experiment. Therefore both microbiological as well as geochemical parameters were analysed. Five overflow events with the subsequent changes in spring water quality were followed within a 5-month period. The number of microbial colonies growing at 20°C and at 36°C, respectively, showed maxima 2 to 5 days after the overflow events in the range of 103 to 104 CFU/ml (colony forming units per ml). The maxima for the more specific indicators for faecal contamination, the total number of coliformic bacteria and the concentration of Escherichia coli, were about three to four orders of magnitude higher than the background (approx. 17 CFU/100 ml for total coliforms, approx. 1 CFU/100 ml for E. coli). Turbidity was correlating well with the high bacterial concentrations, but for lower cell numbers it was not sensitive enough as indicator demonstrating the risk of small numbers of pathogens in drinking water. Changes in the chemical composition of the spring water such as the concentration of chloride, sodium and

of total organic carbon (TOC) also coincided with the increases of microbiological parameters and turbidity. A comparative evaluation for the contaminants showed a similar dependence of transport velocity on the hydraulic gradient as for the artificial tracer. From the temporal as well as from the qualitative development of the spring responses after overflows we conclude that the waste water from the rain spillway basin represents the main source for the contamination at the spring.