

Characterisation of groundwater recharge in a semiarid karstic environment of south Spain by means of stable isotopes and hydrogeochemical data

This study was carried out in cooperation with the University of Granada (Spain), the Geological Survey of Spain (IGME) and the Alfred Wegener Institut Potsdam (AWI). The objective of this study, which is funded by IGME, is to refine the understanding of recharge processes in watersheds representative for karstic semiarid areas by means of stable isotope analysis and hydrogeochemistry. Stable isotopes were analysed at AWI Potsdam.

We focus on the *Granada* aquifer system which is located in an intramontane basin bounded by high mountain ranges providing elevation differences of almost 2900 m. These altitude gradients lead to important temperature and precipitation gradients and provide excellent conditions for the application of stable isotopes of water whose composition depends mainly on temperature. Samples of rain, snow, surface water and groundwater were collected for stable isotope studies ($\delta^{18}\text{O}$, D) and, in the case of ground- and surface waters, also for major and minor ion analysis. Calculated recharge altitudes of springs yielded source areas of mainly snowmelt recharge. The isotope compositions of spring water indicate water sources from the western Mediterranean as well as from the Atlantic without indicating a seasonal trend. Based on the isotope pattern of the Quaternary aquifer different sources of recharge by bankfiltration of the main rivers and by subsurface flow discharged from the adjacent carbonate aquifer could be identified.