Geophysical Research Abstracts
Vol. 18, EGU2016-9600-5, 2016
EGU General Assembly 2016

Boron and strontium isotope compositions of groundwater from the La Paz arid coastal aquifer, Baja California Sur, Mexico

Jürgen Mahlknecht (1), Martin Rosner (2), and Anette Meixner (3)

(1) Centro del Agua para América Latina y el Caribe, Tecnologico de Monterrey, Monterrey, Mexico (jurgen@itesm.mx), (2) Isoanalysis UG, Berlin, Germany, (3) Isotope Geochemistry, Universität Bremen, Bremen, Germany

In groundwater studies boron and strontium isotopic compositions can be used to identify natural and anthropogenic sources as well as processes related to groundwater recharge, flow and mixing. The La Paz arid costal aquifer in Baja California Sur, Mexico, is the most important source of drinking and irrigation water for La Paz area and suffers from anthropogenic contamination and intensive exploitation of the aquifer causing seawater intrusion and general groundwater abatement. The relatively un-radiogenic 87Sr/86Sr isotope ratios of the La Paz groundwater range in a narrow field between 0.7054 and 0.7062. In contrast to strontium the boron isotope composition displays a large variability between +27 and +55 permil d11B. The relatively low 87Sr/86Sr ratios of the La Paz groundwater highlight a significant contribution of strontium derived from local terrestrial sediments and igneous rocks with known 87Sr/86Sr ratios between 0.705 and 0.7035. The large variability of d11B values indicate that multiple sources and processes determine the boron isotope composition of La Paz groundwater. Rainwater (high d11B), seawater (∼+40 permil) due to seawater intrusions, wastewater (low to medium d11B) and boron derived from the local geology (low to medium d11B) explain most of the observed groundwater d11B variability. However, d11B values higher than modern seawater point to significant boron isotope fractionation by preferential absorption of 10B onto clay minerals during the evolution of some groundwater samples. Due to low boron concentrations in rainwater a significant contribution of 11B-rich rainwater (>+40 permil) on the La Paz groundwater is unlikely.