Geophysical Research Abstracts
Vol. 14, EGU2012-2062, 2012
EGU General Assembly 2012

Hydrogeochemistry of the surface waters of the Ebro River Basin (Spain): a multi-isotopic characterization (H-O-Li-B-Sr isotopes)

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In the present study, we report hydrogen, oxygen, lithium, boron and strontium isotope measurements (δ^2H, δ^{18}O, δ^7Li, δ^{11}B and ^{87}Sr/^{86}Sr) together with major and trace elements in the dissolved load of 25 river samples collected within the Ebro River Basin in Spain. The Ebro River Basin is mainly dominated by carbonates and evaporites from the Paleozoic and Mesozoic terrains. The Ebro river mainstream was sampled at Amposta one time per month between June 2005 and May 2006. And secondly, the Ebro river along its main course and its main tributaries were sampled during one field campaign in April 2006.

The main objective of the present work is to characterize the hydrogeochemistry of the surface waters within the Ebro River Basin and to constrain the behavior of Li and B and their isotopes during water/rock interactions at the scale of a large river basin having various lithologies with a specific aim to investigate spatio-temporal variations for both Li and B isotopes signatures within the Ebro River Basin. The main goal of this study is thus to determine the sources contributing to Li and B in the river waters of the Ebro Basin, as well as to characterize the controlling factors that can determine the distribution of Li and B and their isotopes in the river waters of the Ebro Basin.

Stable water isotopes (δ^2H, δ^{18}O) show that all the river waters have a purely local origin from precipitation, without significant evaporation or water/rock interaction, as all points plot close to the general meteoric-water line. In the river waters, Li isotopic signatures (δ^7Li) are comprised between +12.9 and +20.9‰ δ^{11}B values are ranging from +9.9 to +25.0‰ and ^{87}Sr/^{86}Sr are between 0.70786 and 0.70897.