Magnesium isotope fractionation in basins of the Bangong lake system, western Tibetan plateau

U. WIECHERT[1], F. K. WILCKENS[*12], M. WEYNELL[1] AND J. A. SCHUESSLER[3]

[1]Freie Universität Berlin, Germany (*correspondence: fwilckens@marum.de)
[2]MARUM-Center for Marine Environmental Sciences, University of Bremen, Germany
[3]GFZ German Research Centre for Geosciences, Helmholtz Centre Potsdam, Germany

Water chemistry and magnesium isotope ratios in stream and lake waters, as well as river and lake sediments from Lake Bangong and its catchment area are presented.

The Bangong lake system consists of several basins with a water chemistry reflecting the high evaporation and low precipitation rates on the western Tibetan plateau. The water chemistry of the different basins indicates removal of Ca^{2+} and in some cases of Mg^{2+} and HCO_3^- during evaporation of the water. The isotope ratio of magnesium ($\delta^{26}Mg$ relative to DSM-3) in the dissolved load varies between -2.2 to -0.6‰ and in the sediments between -2.3 to -0.9‰. $\delta^{26}Mg$ values in carbonate fractions of the sediments vary between -2.1 to -3.7‰ and the carbonate leached residues between -0.3 to -1.7‰.

Magnesium isotope ratios in the streams reflect mainly the catchment lithology but may be locally affected by the precipitation of carbonates. Magnesium in the lake basins is primarily a mixture of magnesium from the different tributaries, but a positive correlation between salinity and $\delta^{26}Mg$ of the waters provides evidence for isotope fractionating processes in the lake. The carbonate fractions of the lake sediments are enriched in ^{24}Mg compared to the bulk sediments, but also most of the sediment residues after carbonate-leaching with acetic acid are enriched in magnesium compared to the upper continental crust.

This implies that both, the precipitation of carbonates and probably the exchange with silicates, preferentially remove isotopically light Mg from the water. This is in accordance with recent studies showing that the exchangeable Mg in clay minerals is isotopically light [1] [2].

[1] Wimpenny et al. (2013) *GCA* **128**, 178-194; [2] Li et al. (2014) *EPSL* **394**, 82-93