11th SSAGI

South American Symposium on Isotope Geology

Cochabamba-Bolivia
July 22-25, 2018

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Program and Abstracts

First lithium and magnesium isotope data for the carbonate rocks of the Bambuí Group, São Francisco Basin, Brazil

Gustavo M. Paula-Santos[1], Simone A. Kasemann[2], Frederike Wilckens[2], Marly Babinski[3], Anette Meixner[2], Jacinta Enzweiler[1]

1 Institute of Geosciences, University of Campinas, Brazil, e-mail gustavomps@yahoo.com.br
2 MARUM – Center for Marine Environmental Sciences, University of Bremen, Germany
3 Institute of Geosciences, University of São Paulo, Brazil

The Bambuí Group is an Ediacaran-Cambrian mixed carbonatic-siliciclastic unit that covers most of the São Francisco Basin, in east central Brazil. Its geological evolution is subdivided into three stages: (i) post-glacial, (ii) marine connected to other West Gondwana basins, and (iii) restricted. Here we present new Li and Mg isotope data for the carbonates rocks of each of these stages, sampled from a composed section in the southern sector of the São Francisco basin. Our aim was to monitor chemical weathering in the source areas and nutrient input into the basin and to check their relation to the biochemical record. Lithium and magnesium were quantitatively extracted from the samples by acid leachates and cation column procedures. Isotope measurements were carried out on a ThermoFisher Scientific Neptune Plus MC-ICP-MS in the isotope geochemistry laboratory at the University of Bremen.

The lowermost post-glacial cap carbonates display δ^{7}Li values between +4.40 and +10.24‰ and δ^{26}Mg values between -2.91 and -2.20‰. The isotope ratios co-variate with sedimentary facies and reflect local variations during marine transgression. When sea pathways connected the São Francisco Basin to other West Gondwana marine basins, both δ^{26}Mg and δ^{7}Li values stabilize around -3.5‰ and +16‰, respectively. This Li isotope value is notably lower than the composition of the modern ocean, suggesting distinct dynamics of clay mineral formation on the plant-free continents during Neoproterozoic-Cambrian time. These values are disturbed twice by negative Li isotope excursions perfectly mirrored by positive Mg isotope excursions that may record periods of increased silicate continental runoff and nutrient input. At this connected stage, *Cloudina* sp. fragments are described elsewhere in the Bambuí Group.

The restriction of the basin initiates the decoupling of the Li and Mg isotope systems. This was probably caused by a combination of uplifting and higher denudation rates of the orogens surrounding the basin, and deposition of the eroded sediments below sea level. In this scenario, carbonate rocks were the main fraction of the dissolved runoff. Such a change in the continental influx may explain the absence of complex fauna atop the occurrence of the *Cloudina* sp. and inhibition of bacterial sulphate reduction triggering methanogenic biological activity.