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Título do Trabalho: Sr-Cr-Cd isotopes and trace elements in a post-Marinoan cap dolostone, Southern Paraguay Belt, Brazil

Forma de apresentação: Oral

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Resumo do trabalho:

The cap dolostones are distinctive strata deposited shortly after major Neoproterozoic glaciations. Post-Marinoan cap dolostones occur worldwide and mark the base of the Ediacaran Period at 635 Ma. They bear unique sedimentological features and stratigraphic patterns. We present new trace elements and Sr-Cr-Cd isotope data of a 50 m-thick post-Marinoan cap dolostone succession in the Southern Paraguay Belt (Mato Grosso do Sul State, Brazil). The studied section comprises basal dolograinstones up to 11 m and a tubestone-microbialite association throughout the upper 39 m. Powdered samples were dissolved in 0.5 N nitric acid and trace elements were obtained by inductively coupled plasma mass spectrometry (ICP-MS). Ion exchange columns were used for element purification. For Cr, a 50Cr-54Cr double spike was added before the column steps, aiming at a 4:1 sample to spike ratio. Similarly, a 106Cd-108Cd double spike was added to the samples. Isotopic measurements were carried out with a thermal ionization mass spectrometer (TIMS; IsotopX Isoprobe T) at the University of Copenhagen, Denmark. Slightly negative Ce anomalies down to 0.84 in the tubestone facies point to a mildly oxygenated surface seawater. Elevated 87Sr/86Sr ratios, around 0.7100, suggest the influence of meltwater plumes, promoting salinity-stratification and hampering Sr mixing. Such salinity-stratification would have caused the formation of dolomite in shallow waters with 87Sr/86Sr ratios significantly higher than the 635 Ma oceanic value of 0.7077. Negative $\delta^{53}\text{Cr}$ signatures, below the Bulk Silicate Earth (BSE) value, indicate reduction of Cr by microbial metabolism in pore waters. This process results in isotopic fractionations, causing the $\delta^{53}\text{Cr}$ to drop, from BSE/slightly positive values, as obtained in the basal dolograinstone facies, to a strongly negative range, with values down to -1.0‰ . Lastly, $\delta^{114}\text{Cd}$ values increase from -0.11‰ in the basal grainstones to 0.17‰ in the tubestone-microbialite sequence, suggesting a significant rise in primary productivity levels. Reconstruction of seawater Cd isotope composition ($\delta^{114}\text{Cd}_{\text{sw}}$), applying the isotopic offset relative to isotopic fractionation when Cd is incorporated into calcite, shows that $\delta^{114}\text{Cd}_{\text{sw}}$ may have reached values of present-day surface seawater, where the isotopic composition is controlled by high phytoplankton uptake. Our findings reinforce the influence of meltwater plumes on cap dolostone formation and highlight that the recovery of marine bioproductivity may have occurred in the immediate aftermath of the Marinoan Glaciation.

Palavras-Chave do trabalho: cap dolostone; Cd isotopes; Cr isotopes; Marinoan Glaciation; Sr isotopes;