Mo isotope geochemistry of the Datangpo Formation in the Nanhua Basin, South China

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Mo isotopic (δ^{98}Mo) records for the Datangpo Formation on the Yangtze Platform are presented. The Datangpo Formation was deposited between the late Cryogenian (Marinoan) glaciation and the early Cryogenian (Sturtian) glaciation in the Nanhua Basin, South China. The Daotuo section is located in Songtao County in northeastern Guizhou Province (Drill core ZK105). According to lithostratigraphic analysis, the studied Daotuo section can be divided into 5 units, of which unit 2 is a 12.5-m-thick interval composed of organic carbon and Mn-carbonate shale.

All of the elemental and the REE characteristics of Mn-carbonate ores of Daotuo section suggest that although now preserved as Mn-carbonate minerals, these deposits were initially precipitated as oxides or hydroxides. Mo isotopes are reported relative to NIST 3134 using the standard δ notation. δ^{98}Mo of Daotuo section ranges from -2.48‰ to 1.76‰, averaging -0.29‰, and δ^{98}Mo of Unit 2 ranges from -0.46‰ to 1.76‰, averaging 0.30‰. A four-stage model can be used to explain of this set of data. Stage 1, Mn^{2+} was oxidized, and huge amount of Mn oxides (hydroxides) aborbed much of Mo duiring equilibrium fractionation process, then the remainder Mo isotope of sedimentary environment was heaver than global ocean. Stage 2, With more and more Mn^{2+} oxided, remainder Mo in sedimentary environment was quantitatively adsored to Mn oxides (hydroxides). Stage 3, Replenish with Mo to this sedimentary environment, and Mn^{2+} was oxidized continuously. Stage 4, Mn oxides (hydroxides) were reduced and converted to Mn carbonates in the diagenetic environment, at the same time, absorbed Mo was released to ambient black shales. δ^{98}Mo of Unit 2 maybe the result of these stages, however this value cannot be use to estimate the Mo isotope of global ocean of this period.

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