Preliminary study on the mass-independent fractionation signature of sulfur isotope from Huoqiu BIF in the North China Craton

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The Archean sulfur cycle has been debated for a long time. The banded iron formations (BIFs) are considered to be representative sedimentary formation, which preserved valuable evidences of the Archean atmospheric and oceanic conditions. In this study, the composition of multiple sulfur isotopes (Δ33S and δ34S) for pyrite from the Huoqiu BIF were measured.

The Huoqiu BIF is located in Anhui Province of the North China Craton (NCC) and formed during 2.56 Ga – 2.75 Ga. The iron ore bodies are hosted by the Precambrian high–grade metamorphic rocks of Huoqiu Group. Iron ores are mainly composed of quartz and magnetite with small amount of hornblende, carbonate minerals and sulfide minerals. In addition, the iron ore contain well-preserved banding texture even though they experienced high grade metamorphism.

The measured δ34S values range from 1.8 to 4.6 ‰. The Δ33S values are up to -2 ‰, which is considered to be indicative of mass-independent fractionation (MIF) signature. The data presented here combined with the previous study will be helpful for understanding the Archean atmospheric sulfur cycle.