[JJ] Evening Poster | B (Biogeosciences) | B-CG Complex & General

[B-CG09]Decoding the history of Earth: From Hadean to the present

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Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The latest results of Earth's evolution and geological processes through 4.6 billion years from Hadean to Modern, based on various approaches including fieldworks, chemical analyses, experiments and computer simulation, will be presented. In this session, we aim to discuss and understand causal relationships and interplay among the evolution of Earth's deep interior, changes in the surface environments, and development and evolution of life. Wide-ranging topics are accepted.

[BCG09-P05]The study on material cycle of Archean mantle: Sulfur isotope anomaly of komatiite

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Multiple sulfur isotopes of a 2.7 Ga komatiite and related volcanics were measured to study recycled crustal material in Archean mantle. The measured komatiites are from Belingwe Greenstone Belt, Zimbabwe, which represent one of the best-preserved Archean komatiite in the world. The Belingwe volcanics has been classified into four groups: komatiite, komatiitic basalt, D-basalt and E-basalt. The results show that some komatiites and D-basalts exhibit clear S-MIF (−0.204‰ <Δ^{33}S <−0.115‰), whereas all the other samples do not show S-MIF (−0.025‰ <Δ^{33}S <+0.035‰). Based on petrological observation of the S-MIF-bearing samples, the sulfide minerals were crystallized at the time of eruption, but not introduced after the emplacement. The S-MIF signature only occurred in depleted rocks (i.e., komatiite and D-basalt), but not in enriched rocks (i.e., komatiitic basalt and E-basalt), suggesting that the S-MIF source were not assimilated from surrounding Archean crust at the time of eruption, but derived from the source mantle. The S-MIF bearing rocks also show lower initial ^{238}U/^{204}Pb, higher εNd and lower εSr values than non-S-MIF bearing rocks. All these characteristics support that the source mantle contained the MIF sulfur materials. The S-MIF signature may have been partly erased during the crustal contamination process or represent heterogeneous source in the Archean mantle. In either case, the results of this study indicate that Archean mantle contained S-MIF bearing materials, which probably represent subducted crustal material. Irrespective to tectonic style, transfer of surface material into the mantle has already been operated at least older than 2.7 Ga.