Goldschmidt 2024 Abstract
https://doi.org/10.46247/gold2024.22813

Tracking temporal changes in Banded Iron Formations from the Hamersley Group, Western Australia

DR. ALEX J MCCOY-WEST, PHD[1] AND DAVID MCB MARTIN[2]

[1]IsoTropics Geochemistry Laboratory, James Cook University
[2]Geological Survey of Western Australia

Presenting Author: alex.mccoywest@jcu.edu.au

Banded iron formations (BIF) underpin our understanding of the geochemical evolution of the oceans in the lead up to the Great Oxidation Event, with changes in their chemical, mineralogical and isotopic compositions recording the physiochemical conditions in the Earth's hydrosphere at the time of their deposition [1]. Given that some of their precursor minerals are resistant to diagenetic processes, BIFs often faithfully preserve the chemical composition of seawater [2-3]. In this contribution the trace element and Zn isotope systematics of a collection of BIF from the Hamersley Basin, Western Australia will be discussed. The sample suite includes 75 drill core samples which range in age from 2.63 to 2.42 Ga, and have been chosen to avoid regions of secondary hypogene enrichment or supergene alteration, and include samples from all of major BIF bearing horizons of the Hamersley Group (i.e. Marra Mamba, Brockman, Mt Sylvia, Weeli Wolli and Boolgeeda Formations). However, in an endeavour to eliminate sampling biases samples were collected at a relatively even spacing throughout the formations. High precision trace element analyses of 45 elements have been conducted using TQ-ICP-MS. The following observations will be discussed: 1) Geochemical signatures of at least 50% of the samples represent pristine analogues of ancient ocean chemistry; 2) Increasing detrital input to BIF in Hamersley Group with time, suggests at least localized continental emergence; 3) A clear temporal shift is also apparent in the composition of the detrital contaminants shifting from mafic to felsic with time. The trace element systematics will also be complemented with recently acquired Zn isotope data.

[1] Bau and Möller (1993) *GCA* 57, 2239-2249; [2] Robbins et al. (2015) *Chemical Geology* 402, 30-39. [3] Alexander et al. (2009) *EPSL* 283, 144-155.