

A high resolution record of Paleoproterozoic environmental change: XRF core scan data from the Turee Creek Drilling Project (TCDP), Hamersley and Turee creek groups, Western Australia

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The Paleoproterozoic is marked by arguably the most important environmental changes in Earth history, including Earth's first widespread glaciation [1] and the first long-lived accumulation of atmospheric oxygen [2]. Geological evidence for these dramatic events is preserved on multiple continents, but few sedimentary records are as complete as that preserved in the ca. 2.7 – 2.4 Ga Hamersley and Turee Creek Groups, Western Australia. The Turee Creek Drilling Project (TCDP) targeted the uppermost part of that record with three scientific drill cores into the Hamersley and Turee Creek groups, sampling the Boolgeeda Iron Formation, the Meteorite Bore Diamictite, and mudstones and carbonates of the Kazput formation. All three cores (> 400m total) were analyzed in high resolution (avg. 3 cm steps) for selected major and trace elements using the Avaatech XRF core scanner at IFREMER, Brest, France. This data will be presented along with an intercalibration exercise based on data from >150 powdered samples, spanning all sedimentary lithologies, that were analyzed for major and trace elements by classical acid-digest techniques. Of particular interest in the dataset are several horizons of sedimentary Mn enrichment, similar to those observed for approximately contemporaneous cores from the Koegas Subgroup, Griqualand West, South Africa (Agouron cores GEC01 and GTF01) which have been used to suggest the presence of a transient Mn-oxidizing photosystem prior to the evolution of oxygenic photosynthesis [3].

[1] Hoffman PF (2013) *Chem. Geol.* **362**: 143-156. [2] Lyons *et al.* (2014) *Nature* **506**: 307-315. [3] Johnson *et al.* (2013) *PNAS* **110**: 11238-11243.