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Secular changes in sedimentary geochemistry across the Archean–Proterozoic (2.5-2.2 Ga) boundary.

MARINA SERAINE AND CHRISTOPHER SPENCER

Queen's University

Presenting Author: marina.seraine@queensu.ca

The Archean–Proterozoic boundary represents a period of substantial changes in the atmospheric, geologic, paleoclimate, and paleoenvironmental conditions on Earth. The oxygenation of the atmosphere, widely known as the Great Oxidation Event, is an example of one significant shift that occurred across this boundary from 2.5 to 2.3 Ga. The increase of free-oxygen in the atmosphere is commonly associated with the earliest global Huronian Glaciation, disappearance of the S-MIF signal, emergence of continents above sea level, and the decrease of δ17O in shales. In this study we investigate geochemical proxies in the sedimentary and magmatic rocks of the Immandra-Varzuga, Pechenga and Onega basins, located in Fennoscandia, Russia. Whole rock geochemistry data from shales suggest different tectonic settings, varying from arc, rift, and collisional environments. Whole rock from basalts indicates a predominantly mid-ocean ridge basalts (MORB) source, with associated within-plate lava, and minor island arc lava contributions. X-Ray Diffraction (XRD) analysis of shales shows that the primary and secondary mineralogy compositions remain similar through time, suggesting the predominance of quartz, albite, illite, biotite and clinochlore. The environmental depositional conditions in these settings are being complemented by triple oxygen analyses. This ongoing work aims to better constrain the geochemical changes across the A-P boundary with respect to depositional environments, weathering conditions, and geodynamic drivers.