Using Geochemical Techniques to Decipher Paleo-Environmental Changes Across the Permian-Triassic Extinction in Eastern Greenland

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The Permian-Triassic Boundary represents an extinction event that occurred around 250 mya. Volcanic activity originating in Siberia may have been the driver that tipped global climate towards unrecoverable conditions leading to the the loss of close to 96% of marine species. Studies of this time in Earth's history are typically focused on the paleo-equitorial Tethys Ocean basin. Here we integrate data from the southern Boreal Sea region with lower latitude data to present a richer understanding of ocean conditions at the time of this extinction.

Samples (n=85) were collected from the Oskedal member of the Woodie Creek Formation along the northeast coast of the Østgrønland region of Eastern Greenland. The samples are mostly shales and crossbedded sandstones that cover the uppermost Permian across the boundary into the Triassic. Samples were powdered and homogenized and major as well as trace element composition were analyzed by X-Ray Fluorescence and Inductively Coupled Plasma Mass Spectrometry, respectively. We also analyzed stable carbon isotopic composition (inorganic and organic) via Isotope-Ratio Mass Spectrometry. These data were used to chemostratigraphically integrate this section into the global $\delta^{13}C$ stratigraphy as well as to reconstruct the paleoenvironmental conditions. We identified changes in paleoproductivity approaching the boundary that support wide-spread anoxia at this time with these data also revealing localized conditions of shelf anoxia.