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Palynology of Arctic hyperthermal (PETM and ETM-2) vegetation from the early Paleogene Margaret Formation at Stenkul Fiord, Ellesmere Island, Nunavut, Canada

Markus Sudermann (1), David Greenwood (1), Christopher West (2), Jennifer Galloway (3), and Lutz Reinhardt (4)

(1) Brandon University, Brandon, Canada (sudermm97@brandonu.ca), (2) University of Saskatchewan, Saskatoon, Canada (christopher.west@usask.ca), (3) Geological Survey of Canada, Calgary, Canada (jennifer.galloway@canada.ca), (4) Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany (Lutz.Reinhardt@bgr.de)

High latitude climates and biota responded profoundly to early Paleogene warming events but evidence for these changes has mostly been found in the marine record. Microfossil reconstructions of terrestrial vegetation with higher stratigraphic resolution are restricted to marine cores east of Greenland and on the Lomonosov Ridge, and measured sections from the New Siberian Islands. The late Paleocene-early Eocene Margaret Formation at Stenkul Fiord on Ellesmere Island, Nunavut, Canada represents a nearly continuous lithostratigraphic section of fossil-rich deposits of clastics and coals, which preserve evidence of lush Arctic forests that reflect the warm global climate of the early Paleogene. The Margaret Formation was deposited during a time of significant climate warming, including major hyperthermal events such as the Paleocene-Eocene Thermal maximum (PETM) and Eocene Thermal Maximum 2 (ETM-2). Ash beds at Stenkul Fiord dated from detrital Zircon crystals provide a U-Pb age of 53.7 $\pm$ 0.6 Ma, which suggests these deposits record the ETM-2. Previous macrofloral and palynological reconstructions from Ellesmere Island provide evidence of a rich forest ecosystem and a warm wet paleoclimate but lack fine stratigraphic resolution and may not capture the terrestrial ecological consequences of hyperthermal events such as the ETM-2. This study therefore applies palynofacies analysis to: 1) reconstruct the terrestrial vegetation at Stenkul Fiord at a fine stratigraphic resolution for sections measured and sampled in 2017; 2) to establish a biostratigraphic framework linked to known U-Pb ages that will help place existing macrofloral collections into stratigraphic context; and 3) to determine compositional shifts in floral communities through time in response to intervals of major climatic change, specifically the ETM-2. Stratigraphic ranges of occurrence of pollen and spore taxa through these measured sections show changes associated with the ETM-2 hyperthermal. These data show that the character of vegetation (e.g., changes in species dominance) shifted during and after the ETM-2. Furthermore, first and last occurrences of microfloral taxa are being integrated with section-specific litho-stratigraphy and isotope-stratigraphy to facilitate the correlation of early Paleogene sediments at Stenkul Fiord. Initial results of carbon isotope measurements of bulk coal show that the PETM is present in the lowermost part of the measured section (cf. Reinhardt et al. EGU2019-10018 in session SSP2.2/CL1.36, EGU 2019), with the microflora shown to alter in response to this hyperthermal.