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Chemo- and palyno-stratigraphy of the Permian-Triassic transition in the Boreal region

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Late Permian and early Triassic sediments from Boreal regions are studied using palynological and organic geochemical tools. We present preliminary results from two sites: a Norwegian site which is represented by a 100-m long borehole core and outcrops from Deltadalen on Spitsbergen, and a Russian site which is represented by outcrops and short cores collected near Norilsk in northern Siberia. The main goals of the project are to improve the stratigraphy and to study the environmental changes at high resolution. There is a growing scientific consensus that end Permian biotic crisis was linked to the Siberian Traps Large Igneous Province (LIP) event. However, direct evidence for a stratigraphic correlation of the marine and terrestrial extinction events, with the volcanic successions in the Siberian basin, is rather limited. The Permian-Triassic boundary successions in the Arctic are crucial for direct correlation eastwards to the Siberian Traps. The magnitude and timing of a carbon isotope excursion near the Permian-Triassic boundary is an important stratigraphical tool that may help to unravel the sequence of the events happening during this important period. Preliminary results from the Deltadalen core near the base of the Vikinghøgda Formation show shifts in δ13C from -24.5 to -32.7‰ in the interval expected to span the Permian/Triassic boundary. New Rock-Eval pyrolysis data will shed further light on the origin of the organic matter (e.g. marine versus terrestrial) and may help to understand how much of the δ13C signal can be explained by changes in organic matter source and how much may be attributed to a global change in the carbon isotope signature. Furthermore, compound specific isotope analysis will be done on terrestrial derived lipids (long chain n-alkanes) to reconstruct changes in atmospheric carbon isotopes. In addition to chemostratigraphy, the palynological record will be used for biostratigraphical studies at both Deltadalen and Norilsk locations. Palynology may reveal changes in vegetation related to the Permian-Triassic transition. Our preliminary results from Deltadalen show that pollen and spores are well preserved and aquatic palynomorphs are abundant.