Global carbon isotope signal in the Middle Triassic on Svalbard

Victoria S. Engelschien¹, Øyvind Hammer¹, Fredrik Wesenlund², Jørn H. Hurum¹, and Atle Mørk³

¹Norwegian Center for Paleontology, Natural History Museum, University of Oslo, Oslo, Norway (v.s.engelschion@nhm.uio.no)
²Department of Geosciences, The Arctic University of Norway, Tromsø, Norway
³Department of Geoscience and Petroleum, The Norwegian University of Sciences and Technology, Trondheim, Norway

Several carbon isotope curves were recently published for the Early and Middle Triassic in Tethys. Recent work has also been done on the Early Triassic of Svalbard, but not yet for the Middle Triassic. This work is the first to measure $\delta^{13}$C for different Middle Triassic localities on Svalbard, which was then part of the Boreal Ocean on northern Pangea. Our aim is to understand the controls on the Svalbard carbon isotope curve and to place them in a global setting.

Correlating Triassic rocks around the world is interesting for several reasons. The Triassic Period was a tumultuous time for life, and the Arctic archipelago of Svalbard has shown to be an important locality to understand the early radiation of marine vertebrates in the Triassic. Much effort is also made to understand the development of the Barents Sea through Svalbard’s geology.

Carbon isotope curves are controlled by depositional environment and global fluctuations. Global factors such as the carbon cycle control the long-term carbon isotopic compositions, while short-term fluctuations may reflect the origin of organic materials in the sediment (e.g. algal or terrestrial matter), stratification of the water column, and/or surface water productivity. Carbon isotopes can therefore be useful to understand the depositional environment and to correlate time-equivalent rocks globally.

The dataset was collected through three seasons of fieldwork in Svalbard with localities from the islands Spitsbergen, Edgeøya and Bjørnøya. Detailed stratigraphic sampling has resulted in high-resolution $\delta^{13}$C curves. These show three strong transitions; 1) on the boundary between the Early and Middle Triassic, 2) in the middle of the formation and 3) at the Middle and Late Triassic boundary. Several Tethyan localities show a possibly similar Early-Middle Triassic signal. Current work in progress is sedimentological analysis by thin sections and X-ray fluorescence spectroscopy (XRF) to further understand the sedimentary environment.