



## **Grenville-Sveconorwegian in the high Arctic - sediment provenance of the Paleozoic succession of northern Novaya Zemlya**

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Discussion of Grenville-Sveconorwegian Orogeny is often restricted to the southeastern Laurentian and southwestern Baltican margins. This has its reason in the apparent absence of autochthonous Mesoproterozoic deformed basement beneath the North Atlantic continental margins and adjacent high Arctic realm. Orogeny in East Greenland and on Svalbard is Early Neoproterozoic, just overlapping the younger Grenville-Sveconorwegian in time. Sediments with a Grenville-Sveconorwegian zircon age provenance are common in the high Arctic. These relationships have been explained by long-distance (3000-4000 km) transport of either sediments or terranes (or both) from the Grenville-Sveconorwegian Orogen in the south. An alternative interpretation favours a northwards continuation of the Grenville-Sveconorwegian Orogen beneath the North Atlantic and Arctic Caledonides, providing the source for both sediments and for allochthons with a Grenville-Sveconorwegian age component.

This presentation contributes to the discussion with a large dataset of detrital zircon U-Pb ages from the northeastern, stratigraphically deepest part of Novaya Zemlya. The Novaya Zemlya fold-and-thrust-belt is the northern continuation of the late Paleozoic Uralide Orogen. Little is known about its deeper structure and the basement history of the adjacent Barents and Kara shelves. Geological evidence and the comprehensive analysis of detrital zircons from the entire Paleozoic succession of northeastern Novaya Zemlya demonstrates that Cambro-Ordovician turbidite-dominated deposition was almost exclusively sourced from a Timanian (late Neoproterozoic and Early Cambrian) basement similar in age to the igneous rocks that crop out along the thrust front of the orogen. Near the end of the Ordovician, a profound change in sedimentary environment and provenance occurred. The dominating turbidites give way to shallower water sandstones, which include diamictites/olistostromes in the Silurian and carbonate rocks and fluvial red sandstones in the Devonian. Over 90% of the zircons from these Silurian and Devonian rocks have ages characteristic of the Sveconorwegian Orogen. In the Carboniferous, sediments are again derived almost entirely from Timanian source areas, and also from the Uralian Orogen in the Permian.

We interpret the change in sedimentary environments and sudden and comprehensive influx of Paleo- to early Neoproterozoic zircons as the response of the sedimentary system to basement uplift related to Caledonian thrusting in the eastern Barents Shelf. The complete dominance of zircons derived from Grenville-Sveconorwegian basement compares well with the allochthons of the Scandinavian Caledonides, which were derived from the continental margins of Baltica. The existence of an "external" Valhalla Orogen extending northwards from the Grenville-Sveconorwegian type area far into the high Arctic has recently been proposed, to accommodate the existence of late Grenvillian orogeny in East Greenland and Svalbard. We prefer the interpretation that the whole Grenville-Sveconorwegian Orogen extends into the Arctic, underlying the Caledonian hinterland.