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Tectonostratigraphic correlations and provenance of Caledonian Nappes and basement-cover sequences along the Tornetrask-Lofoten geotransect, Northern Scandinavian Caledonides (N68.5o): New Insights from U-Pb Detrital Zircon Analysis

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U-Pb LA-ICP-MS detrital zircon ages are reported for siliciclastic cover units to Precambrian basement rocks and for units within the stack of Caledonian thrust nappes exposed along the Tornetrask-Lofoten geotransect in northern Scandinavia (latitude N68.5o). Detrital zircon populations from the Cambrian Dividal Group in the Swedish foreland are dominated by Mesoproterozoic ages with relatively minor Paleoproterozoic and Archaen populations with a distinct Timanian peak at 570 Ma. The autochthonous cover sequence to the external Rombak window at Bjørnfjell has predictable peaks at ca. 2.7 Ga and 1.8 Ga consistent with derivation from both the Lofoten –Vesterålen terrane (LVT) and West Troms Basement Complex (WTBC), and like the rest of our basement-cover samples it does not contain the Timanian population. Zircons from a cover sequence of the Lower/Middle Allochthon at Bjørnfjell define a discordia with an upper intercept age of ca. 2.8 Ga suggesting a supracrustal sequence that is pre-1.8 Ga but post- 2.7 Ga. To the west, on Hinnøy, the Storvann Group sediments are found to represent the true cover sequence to Baltica as they clearly were sourced from the underlying Baltic basement (ca. 2.8 Ga to 1.4 Ga). Metasedimentary units of the Andøya Precambrian supracrustal succession has detrital zircons aged between ca. 2.7 to 2.1 Ga, and are correlative to the supracrustals in the WTBC. Detrital zircon populations from structurally dismembered and isolated metasedimentary packages within basement units along Gullesfjord (Hinnøy), which had previously been considered to be a xenolithic raft in an Archaean pluton in the LVT, and in Leknes (Lofoten) indicate that they occur within allochthonous thrust sheets derived from a foreland to the Grenville orogen of Laurentia.

Structurally above the imbricated basement-cover thrust sheets, a sample from the lower parts of the nappe stack, i.e. the far-traveled Narvik nappe complex (Upper Allochthon), is dominated by a 1.2 -1.0 Ga population of Grenvillian detrital zircons. The overlying Ofoten nappe complex (Uppermost Allochthon) contains the Tangen Sequence (Evenes nappe), which previously was assigned a Neoproterozoic depositional age based on isotope-chemostratigraphy, is dominated by Cambro-Ordovician detrital zircons, consistent with derivation from the directly underlying Lillevik/Gratangseidet Igneous complex, implying that an important Ordovician unconformity is preserved in these units. The overlying Bogen nappe and the structurally highest Niingen nappe are dominated by 1.2 -1.0 Ga age populations and contain other detrital zircon age signatures that resemble those of the Narvik nappe sample, and additionally they resemble those of the Balsfjord Group in the nappe stack of the Tromsø region (150 km to the north) - all are thus likely correlative. We interpret these detrital age populations to have been sourced from the Grenville orogen of Laurentia.