



Baltican versus Laurentian Crust in the Norwegian Caledonides between Latitudes 67° and 69° N: Implications for Mountains across oceans

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Field and geochronological data (U-Pb ID-TIMS, SHRIMP, and LA ICPMS) on granitoids and their metasedimentary hosts are reported for rocks of the Bodø and Ofoten regions of north-central Norway documenting the distribution of Baltican versus Laurentian crust and allowing for tectonostratigraphic correlations across the EW-trending Tysfjord basement culmination. In the Bodø region, large areas previously interpreted as domes cored by Baltic basement (ca. 1.8 Ga; e.g., Heggmovatn and Landegode domes) are in fact Caledonian thrust sheets belonging to the exotic (Laurentian) Uppermost Allochthon. The Bratten orthogneiss, the Landegode augen gneiss, and the batholithic Tårnvika augen gneiss each has a ca. 950 Ma age of crystallization, and are together called the Rørstad complex. Orthogneisses that intrude metasedimentary units of the Heggmo allochthon (formerly the Heggmovatn dome) are dated to ca. 930 Ma, and these are intruded by 430 Ma leucogranites; U-Pb analysis of detrital zircons from metasiliciclastic rocks constrain the age of deposition to between 1100-930 Ma. We lithologically correlate the metasedimentary rocks between the Heggmo and Rørstad complexes. The Rørstad complex was migmatized at ca. 450 Ma and then was intruded by 430 Ma granitoids. Ordovician migmatites have not been documented in the Heggmo unit but such relics might have been masked by intense Scandian magmatic and metamorphic activity. The Rørstad and Heggmo units have straightforward age correlations to Mesoproterozoic to Neoproterozoic rock complexes in southern East Greenland and in other parts of the North Atlantic realm (i.e. Krummedal sequence and Eleonore Bay Supergroup). Laurentian Grenville-continental crust preserved in the Uppermost Allochthon of the Bodø region, therefore, records tectonic events that took place on the northeastern Laurentian continental margin prior to its Scandian continent-continent collision with Baltica.

In Ofoten, ~150 km north of Bodø, the basal units of the Uppermost Allochthon comprise a thick sequence of platform marbles (Evenes Group) that overlie a fragmented ophiolite complex dated at ca. 474 Ma. Multiple suites of felsic intrusions occur within the overlying Bogen and Niingen nappes and in the underlying Narvik nappe (Upper Allochthon) but none are found in the Evenes Group. A geochemically distinct (A-type) suite of ca. 470 Ma granites (Snaufjell granite) intrudes the Bogen Group and implies correlation to parts of the Uppermost Allochthon in the Helgeland nappe far to the south of Bodø; lithologically correlative units also occur directly south of Tysfjord in the Engøløy synform, the southern counterpart to the Ofoten synform. Ordovician magmatism and metamorphism and Grenville detrital zircon age populations within rocks of Lofoten-Vesterålen imply slivers of the Uppermost Allochthon exist far to the west of exposed Baltic basement. Although we have not identified Tonian-aged plutonic rocks north of Tysfjord, U-Pb detrital zircon age populations in quartzites from Lofoten-Vesterålen (Leknes and Gullsfjord), and the Evenes, Bogen, and Niingen groups indicate that they too likely have Laurentian origins. We speculate on potential Laurentian source areas and possible interactions between the two conjugate continental sides of the orogen that could have resulted in the Scandian amalgamation of these orphaned terranes.