



Recent progress in recognition of UHP metamorphism in allochthons of the Scandinavian Caledonides (Seve Nappe Complex and Tromsø Nappe)

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During the last ten years, UHP rocks have been discovered within far-travelled allochthons of the Scandinavian Caledonides including the Seve Nappe Complex (SNC) of the Middle Allochthon and Tromsø Nappe within the Uppermost Allochthon. The first evidence for UHP conditions in the SNC was documented in a kyanite-bearing eclogite dike within the Friningen garnet peridotite. Subsequently, UHP conditions were determined for phengite eclogite and garnet pyroxenite from Stor Jougdan and pelitic gneisses from Åreskutan. Finally, diamond was found in metasedimentary rocks of the SNC at three localities (Snasahögarna, Åreskutan and most recently near Saxnäs), c. 250 km apart, confirming regional UHP conditions within this allochthon. In the Tromsø Nappe (northern Norway), evidence for UHP metamorphism comes from phengite- and kyanite-bearing eclogites from Tønsvika and Tromsdalstind, and diamond-bearing gneisses from Tønsvika. Microdiamond occurs in-situ as single and composite (mostly with Mg-Fe carbonate) inclusions within garnet and zircon. The calculated P-T conditions for the diamond-bearing samples are 4.1-4.2 GPa/830-840°C (Åreskutan), and 3.5-4.0 GPa/ 750-800°C (Tønsvika), in the diamond stability field.

The UHP metamorphism in the SNC and Tromsø Nappe is probably Late Ordovician (c. 460-450 Ma), i.e. c. 40-50 Ma older than that in the Western Gneiss Region of southwestern Norway. Whereas the latter occurred during the collision between Laurentia and Baltica in the Late Silurian to Early Devonian, the processes leading to Ordovician UHP metamorphism occurred during closure of the Iapetus Ocean and are less well understood. The occurrence of two UHP metamorphic events in the Scandinavian Caledonides implies subduction, exhumation, and re-subduction of continental crust. This is an observation that could be of importance for the understanding of orogeny at convergent plate boundaries in general. The following questions remain to be answered: (1) Was UHP metamorphism in the SNC related to continent-continent or arc-continent collision? (2) Which processes lead to the emplacement of peridotite bodies with subcontinental mantle affinity into Baltican continental crust? (3) Was the Tromsø Nappe of Laurentian origin, or a part of the Baltoscandian margin emplaced by out-of-sequence thrusting, or a terrane of unknown affinity? Therefore, it is important to constrain the areal extent, pressure-temperature conditions, timing, and kinematics of UHP metamorphism in these allochthonous units.