

## **Middle Ordovician subduction of continental crust in the Scandinavian Caledonides – an example from Tjeliken, Seve Nappe Complex, Sweden**

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The Seve Nappe Complex (SNC) in the Scandinavian Caledonides represents the distal part of the margin of Baltica, which was subducted to depth of UHP metamorphism during the Caledonian orogeny. In contrast to the ages determined for the Western Gneiss Complex in Western Norway (ca. 420 - 400 Ma) which is interpreted to represent the subducted Baltican basement, the ages in the SNC and related nappes are overall older (ca. 500-430 Ma), with a general trend of higher ages in the North (Norrbotten) than in the South (Jämtland). As the previously published ages in the SNC are quite diverging it is difficult to reconstruct the tectonometamorphic history of this unit. Therefore exact dating with different methods is necessary to get a better constraint on the exact timing of subduction.

We present new age determinations on an eclogite and a garnet-phengite schist from Tjeliken in northern Jämtland, Sweden. There the SNC can be divided into three tectonic units, an Eastern, Middle and Western belt. The locality of Mt. Tjeliken is situated in the Eastern Belt. Thermodynamic modelling of the eclogite yielded a pressure of 25-26 kbar at 650-700 °C (Majka et al. 2014). Previous dating produced diverging ages of  $460 \pm 4$  Ma (Sm-Nd mineral isochrones, Brueckner & Van Roermund 2007) and  $446 \pm 1$  Ma (U-Pb zircon dating, Root & Corfu 2012). In this study metamorphic rims of zircons from the garnet-phengite schist were dated using secondary ion mass spectrometry (SIMS) and yielded a concordia age of  $458.9 \pm 2.5$  Ma. Lu-Hf garnet-whole rock dating yielded  $458.5 \pm 1.1$  Ma for the eclogite. Garnet in the eclogite shows a prograde major-element zoning and a concentration of Lu in the cores, indicating that this age is related to garnet growth during pressure increase, i.e. subduction. The identical ages from both rock types confirm subduction of the outer margin of Baltica during the Middle Ordovician in a fast subduction-exhumation cycle. The fact that Sm-Nd and Lu-Hf dating yielded identical ages within error suggests fast subduction.

Brueckner & Van Roermund 2007. *Journal of the Geological Society*, London, 164, 117-128.

Majka et al. 2014. In: Corfu et al., eds., *New Perspectives on the Caledonides of Scandinavia and Related Areas: Geological Society of London Special Publication 390*, p. 369–384.

Root & Corfu 2012. *Contributions to Mineralogy and Petrology*, 163, 769-788.