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Timing of deformation, metamorphism and leucogranite intrusion in the lower part of the Seve Nappe Complex in central Jämtland, Swedish Caledonides

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The new LA-ICP-MS zircon isotope age data from paragneiss, amphibolite and two leucogranite intrusions in the Lower Seve Nappe of the Åre synform in the Caledonides of central Jämtland provide evidence of both Silurian and Ordovician tectonothermal histories. Well established concordant c. 468 and c. 470 Ma magmatic ages for the SÅ quarry leucogranite, which cut earlier foliations and folds in the host-rock amphibolites and paragneisses, imply a tectonothermal history prior to the Middle Ordovician (c. 469 Ma), perhaps synchronous with what has been previously recognized in the Seve Nappe Complex of Norrbotten (e.g. Root & Corfu, 2012), 400 km farther north in the Swedish Caledonides, and very recently also in the Middle Seve Nappe in central Jämtland (Walczak et al. 2020).

The field relationships and data presented here show that magmatic activity occurred during the early Silurian (c. 443 Ma) and earlier during the Early to Middle Ordovician (c. 469 Ma), and that deformation and metamorphism took place both prior to and after c. 469 Ma. The Lower Seve rocks from the nearby COSC-1 drill core have been metamorphosed in the upper amphibolite facies, however, the remnants of the high-pressure metamorphic history are preserved in the relic minerals, including high-silica white mica, in the garnet-bearing mica schists. The exact age of the high-pressure metamorphism is not known so far; however, it predates the 460-430 Ma amphibolite facies deformation recorded by titanites in the amphibolites (Giuntoli et al. 2020).

Zircons in an amphibolite proved to be highly discordant but indicate Early Silurian metamorphism during isoclinal folding. Detrital zircons in a paragneiss are dominated by Sveconorwegian populations, but also include a range of younger Neoproterozoic grains down to the Early Ediacaran (c. 600 Ma).

This new evidence of early Caledonian deformation and metamorphism indicates that the Seve tectonothermal history in central Jämtland probably started early in the Ordovician, or before. Subduction and accretion along the Baltoscandian outer margin occurred prior to the Scandian continent-continent collision, with Siluro-Devonian emplacement of the Seve Nappe Complex

across the foreland basins onto the Baltoscandian platform.

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