Geophysical Research Abstracts
Vol. 15, EGU2013-10176, 2013
EGU General Assembly 2013

The Halti-Corrovarre enigma in the northern Scandes: new ID-TIMS U/Pb zircon data

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The Caledonides of northern Norway are dominated by the Kalak Nappe Complex (KNC), mainly composed of greenschist facies quartzo-feldspathic sandstones, variously intruded by dolerite dykes and minor granites. The highest components of the KNC, the Halti, Corrovarre, Seiland and Gjesvaer nappes (apparently the same structural level), are of higher metamorphic grade and include prominent igneous suites. The Halti and Corrovarre nappes comprise mafic dyke-swarms that intrude and partially melt the meta-sandstones and also include both ultramafites and gabbros. By contrast, the Seiland nappe is dominated by a major igneous province ranging in composition from alkaline gabbro to nepheline syenite and the Gjesvaer nappe is dominated by migmatites. The KNC overrides other thrust sheets, also dominated by siliciclastic successions, the Laksefjord and Gaissa nappes, and all these allochthons overlie a thin Cambrian-Ediacaran sedimentary veneer and the Precambrian crystalline basement of Baltica. Palinspastic reconstructions of the nappes indicate that the KNC has been emplaced at least two hundred kilometres southeastwards onto the Baltoscandian platform; attempts to balance cross-sections have suggested transport distance of the highest Kalak nappes to be in the order of three times this distance. Mapping of the Kalak nappes southwards into Sweden has established their correlation with the Särv and Seve nappes, together comprising the Middle Allochthon.

Recent ID-TIMS, U/Pb dating by one of us (FC) of zircons extracted from granitic melts within the dyke-swarms of the Halti and Corrovarre nappes has confirmed the results of previous studies. In Halti, ages of 441-436 Ma compare well with previous zircon and baddeleyite studies; this dunite, troctolite, gabbro, sheeted-dyke suite is of early Llandovery age, overlapping in time with the early Scandian collision of Baltica and Laurentia. In Corrovarre, the granitic melts within the dyke-swarm yield 610 Ma ages, closely comparable with early Ediacaran ages obtained from a neighbouring granite at Rahpesvarri and also the age of the dyke swarms in the Seve and Särv nappes in the Swedish Caledonides. These new ages, taken in relation to the results of recent studies of the Seiland and Gjesvaer nappes, will be presented, along with alternative interpretations of the late Neoproterozoic to early Paleozoic tectonic evolution of this part of the Caledonides.