

Hyperextension along the pre-Caledonian margin of the Iapetus? Age and origin of discontinuous gneiss sheets associated with deep-marine sediments, Alpine metaperidotites and detrital serpentinites

Johannes Jakob, Manar Alsaif, Fernando Corfu, and Torgeir B. Andersen

The Centre for Earth Evolution and Dynamics (CEED), University of Oslo, Norway (johannes.jakob@geo.uio.no, manara@student.geo.uio.no, fernando.corfu@geo.uio.no, t.b.andersen@geo.uio.no)

A mélange zone is positioned structurally below some large Proterozoic crystalline nappe complexes (NC), including the Upper Bergsdalen, Jotun and Lindås NCs in the South Norwegian Caledonides. The mélange is characterized by a lithological association of originally deep marine sediments intercalated with some coarser grained siliciclastic metasediments including meta-sandstone and conglomerates, thin slivers of gneisses, as well as detrital serpentinites and 'Alpine-type' metaperidotites. The formation of the mélange and particularly the origin of the detrital serpentinites are disputed. Several models have been suggested including formation as a) an ophiolitic mélange during ophiolite obduction, b) an unconformable post-obduction transgressive sequence or c) a mélange formed during hyperextension along the pre-Caledonian margin of Baltica.

Here we present new ID-TIMS U-Pb geochronology of zircon and titanite separated from some of the laterally discontinuous gneiss slivers of variably granitic to gabbroic composition. These gneisses are intercalated with the metasediments as sheets with a maximum strike length of up to 40 km, in the case of the Haukenes gneiss in the Bergen area. Two main groups of gneisses can be distinguished; a) rocks formed at ca. 1495 Ma, 1212 Ma, and 1094 Ma, respectively and b) felsic to mafic meta-intrusives formed in the Early Ordovician between 486 and 474 Ma. In the Samnanger Complex the mélange was truncated by little deformed minor granitoid intrusives at 420 Ma.

We propose a Baltican origin for the Mesoproterozoic gneisses. This also implies that the mélange has an affinity with Baltica as is also suggested by its tectonostratigraphic position below the Jotun, Lindås and Upper Bergsdalen Nappe complexes.