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Heidal revisited: new light on critical elements in the allochthon of the classical Otta region (Oppland)

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Major tectonic units of supposed Middle Allochthon position in the Heidal area include the lower Rudihø-Mukampen crystalline basement complex and the upper, mainly metasedimentary, Heidal unit. The two units are separated by a garnet grade ultramylonitic interface, so that the basement-cover relationship suggested by Strand (1951) is just hypothetical. The Heidal unit is overlain tectonically by Paleozoic metasupracrustal rocks of the Trondheim Nappe Complex. By contrast, the nature of the footwall units is more uncertain. Locally it is underlain by 'gabbro conglomerate', i.e. a polymict conglomerate in a greenish matrix, which has been correlated with similar units in the Valdres Group sparagmites, but a corridor of such rocks along Murudalen, shown by Siedlecka et al (1987), was not confirmed. One problem in establishing these correlations is that these units are cut by major northeast-trending extensional faults both to the southeast and northwest, the latter being the extension of the Lærdal-Gjende Fault.

The Rudihø-Mukampen complex is, in the north (Rudihø), characterised largely by high-grade metamorphic, mafic to intermediate garnet-pyroxene rocks, described by Gjelsvik (1947). To the south (Mukampen) an increasing planar medium-grade overprint is observed, linking this complex westward directly to the Jotun Nappe Complex along a northeast dipping amphibolite-facies shear zone. Dating by U-Pb indicates that high-grade metamorphism and intrusive activity occurred around 920-900 Ma, affecting gneisses with still poorly defined protolith ages between 1200 and 1700 Ma. The preliminary ages broadly fit the match, although the timing of the Sveconorwegian high-grade metamorphism post-dates by some 20-40 m.y. that of the main high-grade events in the Jotun and Lindås nappes.

The overlying sheeted Heidal pile, with rocks of still uncertain age, consists largely of garnet-micaschists, meta-psammites (flagstones), amphibolites and rare thin marble layers. Local lenses of serpentinite and augengneiss are also present. The unit possibly reflects high strain between middle and upper allochthon, resulting in repeated imbrication of different tectonic slices.

Both Rudihø and Heidal units were, at a late stage of the medium-grade shear, intruded by numerous granitic to trondhjemitic dykes ranging from dm to hundreds of meters in size. Dating of these intrusives is made extremely difficult because of the pervasiveness of xenocrystic zircon, but the present available data suggest that they are Early Silurian (435-420 Ma), just like those in the Jotun nappe and the Trondheim region.

Gjelsvik, T. 1947: Anorthosittkomplekset i Heidal. NGT 26. 58 pp.
Siedlecka, A. et al. 1987: Berggrunnskart Lillehammer, 1:250 000. NGU.
Strand, T. 1951: The Sel and Vågå map areas. Geology and petrology of a part of the Caledonides of Central Southern Norway. NGU 178, 117 pp.