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The Jotun and related nappe complexes, southern Norway

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The Caledonides in southern Norway have a substrate of autochthonous to parautochthonous metasedimentary rocks overlain by allochthonous crystalline nappe complexes. The Jotun Nappe Complex, the largest of these, is itself composed of several parts with somewhat different histories. The common element linking all the parts is an intense overprint during the Sveconorwegian orogeny, varying in intensity from deformation at relatively low to medium grade metamorphic conditions to high grade metamorphism and local anatexis (Schärer 1980; Lundmark et al. (2007). The Inner Sogn anorthosite complex was emplaced at about 970 Ma (Lundmark and Corfu 2008), but most of the nappe formed between 1700 and 1600 Ma, with local components of 1450 and 1250 Ma, and with locally important felsic dyke complexes intruded in the Mid Silurian (427 Ma) during thrusting. The association of Sveconorwegian gabbro-anorthosite intrusion, high grade metamorphism and Caledonian felsic magmas is also a characteristic of the Lindås Nappe in the Bergen Arc, except that the latter contains Caledonian eclogites which have yet to be observed in the Jotun Nappe Complex. In the northeastern parts of the region, the Jotun Nappe Complex is underlain by the Espedalen Nappe Complex, which also contains an anorthosite massif, but is distinct in terms of primary age, most parts having formed at about 1520 Ma before undergoing Sveconorwegian metamorphism. The western flank of the Jotun Nappe Complex in the Sognefjell region is instead underlain by a highly sheared and distinct suite of 960-950 Ma gabbroic to tonalitic rocks and ca. 1700 Ma orthogneiss. These rocks may link up to the Bergsdalen nappes to the southwest. Another important element of these allochthons is the Hardanger-Ryfylke Nappe Complex, whose major nappe sheet (Kvitenut) compares with the Jotun Nappe Complex in being composed of 1700-1600 Ma orthogneisses severely affected by Sveconorwegian deformation and local anatexis. There is, however, an important distinction in that the Sveconorwegian activity (including granitic magmatism) occurred at 1000 Ma in Kvitenut and Dyrskard (Roffeis et al., this meeting), but later at 950-900 Ma in Jotun and Lindås. The uppermost sheet of the Hardanger-Ryfylke Nappe Complex appears to have a special history which may link it to a higher tectonic level (Upper Allochthon) not present elsewhere in these nappes. In conclusion, most elements of these nappes in the Middle Allochthon in southern Norway are consistent with a pre-Caledonian position at the edge of Baltica, but there are many internal peculiarities which will eventually contribute to constrain more precisely their specific original locations.

Lundmark et al. 2007. Precambrian Res 159: 133-154
Lundmark and Corfu 2008. Contrib Mineral Petrol 155: 147–163
Schärer 1980. Earth Planet Sci Lett 49: 205-218