

# The Jotun-Valdres Nappe Complex

Fernando Corfu<sup>a</sup>

Department of Geosciences, University of Oslo, Oslo, Norway, fernando.corfu@geo.uio.no

The Jotun-Valdres Nappe Complex (JVNC) consists of Precambrian intrusive and metamorphic rocks, in part with a cover of Late Precambrian to Early Paleozoic sediments (sparagmite), the whole thrust onto the autochthonous Baltic continent during the Scandian phase of the Caledonian Orogeny. The JVNC is a tectonic composite of different units with distinct magmatic and metamorphic histories. The uppermost unit, the Upper Jotun Nappe (UJN), comprises in its northeastern parts a stratiform felsic to ultramafic complex, with rocks formed at about 1650 Ma and metamorphosed to granulite facies in several stages between 960 and 890 Ma. The southwestern part shares a similar Sveconorwegian metamorphic history but lacks the 1650 Ma complex and is dominated instead by a 965 Ma gabbro-anorthosite massif. All parts of the UJN, but especially the centre, were invaded by the Silurian (ca. 428 Ma) granitic Årdal dyke complex. The Lower Jotun Nappe (LJN) consists mainly of 1650 Ma orthogneiss, metamorphosed and deformed at about 900 Ma, and later covered by sediments (sparagmite), but it does not have Silurian intrusives. These main tectonostratigraphic packages are separated by highly deformed, but generally low-grade metamorphic rocks of variable origin. On the northwestern flank of the JVNC, the basal unit is a zone of imbrication comprising analogues of the LJN and sparagmite, and also a late Sveconorwegian volcanic-subvolcanic complex derived from outboard of Baltica. All of this overlies the Fortun Nappe, which consists mainly of schist and phyllite, but also with solitary serpentinite lenses, ultramafic conglomerates, slices of felsic crust, and, in its southern parts, Early Ordovician and Late Silurian (421 Ma) intrusives. The sequence represents a hyperextension assemblage (Andersen et al. 2012; Jakob et al. 2017), formed by stretching and break-up of the Baltic crust. All the tested crustal fragments in the assemblage have Telemarkian ages (1520–1480 Ma), and there are no slices of the JVNC. This implies that hyperextension only developed in the Telemarkian crust, rather than the Gothian domains farther north, including the JVNC (1700–1600 Ma). The JVNC is transected by the SW-trending Devonian Lærdal-Gjende Fault, which formed a half graben as much as 8 km deep in the centre of the complex, but seems to die out in the north. In the south it splices off into different segments, which eventually link up with the Hardangerfjord Shear Zone.

## References

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