

## **Oppdal Area**, Geologic Field Trip (*leave 0915 April 15, 2008*)

Regional Geology TGB4110, NTNU

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Tectonostratigraphy (nappe stratigraphy), metamorphism and folding in the Western Gneiss Region.

( Stopped at **Vollan** Ordovician turbidite conglomerates in Gauldalen instead of stop 1. Food store stop Oppdal.)

1. **Vang**, viking grave mounds. 3km west of Oppdal center. Rock no.18, brown on map. Greenish low-grade metamorphic sedimentary rocks of *Støren nappe*, Upper Allochthon. Conglomerate, greywacke sandstone. No fragments of gneiss, granite, or other continental rocks in conglomerate. All is from a volcanic, oceanic or island-arc source (Iapetus.) Rock is green because of metamorphic minerals: epidote, actinolite, chlorite. This could be ocean-floor metamorphism before thrusting. This rock could be considered part of an ophiolite. Probably Ordovician in age.) (*passed here at 1130. Skipped because of snow.*)

2. **Lønset**. West of turnoff to Storli, about 20km west of Oppdal center. Contact between *Åmotsdal* arkose, rock no.49, yellow on map, and *Lønset* gneiss, Precambrian basement. Note rocks have foliation, dipping west. We are on the west side of a foliation gneiss dome, the *Lønset* dome. Find the contact between Precambrian gneiss and Neoproterozoic metaarkose. Note lack of mafic rocks in light-colored arkoses, no mafic dikes. Note foliation in gneiss and arkose is parallel at contact. Both *Lønset* and *Åmotsdal* here are considered Parautochthon, only slightly thrust-transported.

3. **Holberget** cable crossing, truck tire chain parking space. About 25km west of Oppdal. *Åmotsdal* arkose, in core of F1 isoclinal fold (see geological map.) Arkose is less foliated here, because rocks are less deformed in the fold hinges. Because arkose is not flattened and foliated, original sedimentary structures such as cross-bedding are visible.

4. **Fylkesgrense** parking space, at border between Møre-Romsdal and Sør-Trøndelag fylke. About 30 km west of Oppdal. Coarse grained augen gneiss of *Risberget* nappe. Middle Allochthon, because they have some mafic dikes related to the Neoproterozoic rifting of Baltica before the Iapetus ocean formed. These middle Precambrian gneisses are lying over late Precambrian *Åmotsdal* arkose, therefore they must have been thrust. These are all igneous rocks, of felsic, intermediate and mafic composition. Rock no. 47, orange on map. (1300)

5. **Ishol**, gjettegrytter i Driva river. *Lønset* gneiss within the *Lønset* gneiss dome. Horizontal foliation. (1325)

6. **Morken**. Basal conglomerate in *Åmotsdal* arkose above (and below!) *Lønset* gneiss. The arkose and gneiss below are Autochthon, and the gneiss above is Parautochthon. Conglomerate is shown on map as rock no. 50, yellow. (*Skipped because of snow.*)

7. **Svarthaugen** creek. Possibility to collect cobbles of rapakivi augen granite, of *Risberget* nappe. Rapakivi granite has large crystals of red K-feldspar with margins of white plagioclase. This is a remarkable rock, occurring in scattered locations in Russia, Finland, Sweden, Norway, Greenland, Northern Canada, Wisconsin and California. All these rapakivi granites are of middle Precambrian age, and many are associated with anorthosites. (1353. *Visit to Driva Kro og Hytter, Steinsenter*)

8. **Magalaupe**t. About 15km south of Oppdal. Gjettegrytter. *Risberget* nappe. (1515)

(9. **Sætre** Oppdalskifer quarries. *Sætra* nappe. Neoproterozoic meta-arkose with mafic dikes. Much more strongly flattened than *Åmotsdal* meta-arkose, and the presence of rift-related mafic dikes show that this is Middle Allochthon (rifted margin of Baltica.) Rock no. 45, yellow on map. This is correlated with *Särv* nappe of Sweden.) (*stay in bus.*)

10. **Eidsvoll** quarry. Oppdalskifer. *Sætra* nappe. Mafic dikes and isoclinal recumbent folds. See journal article by Krill 198x. Walk along E6 to stop 11.

11. **Kleiva**. About 20km south of Oppdal. Rapakivi granite, augen gneiss, and metamorphosed anorthosite of *Risberget* nappe. These rocks have some mafic dikes. Rock no. 47, orange on map. This is correlated with *Tännäs* augen gneiss nappe of Sweden. Can be correlated crudely with Jotun nappe, also Middle Allochthon. (*leave 1650*)

(12. **Drivstua**. About 25km south of Oppdal. Garnet rich schist and amphibolite, retrograde metamorphosed to greenish rock. Some kyanite in quartz veins proves that this rock was first metamorphosed to high metamorphic grade, before it was retrograde metamorphosed in greenschist facies. *Blåhø* nappe, rock no.38, blue-green on map. It seems to consist of marine muds and mafic volcanic rock, so it is probably part of Iapetus and therefore Upper Allochthon. This is correlated with *Seve* nappe of Sweden.) (*skip this stop, return to Trondheim by 1850*)