The practical

The specific tasks you will need to follow can be printed as a pdf file.
You should use the information on this web site to explore the Western Gneiss Region .

A collection of salient features related to different tectonic units is presented below. In addition you should consult the related maps and sections, together with pictures and rock samples.
Here are some critical questions to answer:

1. Nature of the Western Gneiss Region

- Is there a coherent tract of eclogites?
- What is the structure?
- Are the units penetratively deformed?
- How are the exhumation structures distributed?
- What is the density of the eclogite, how does this compare with "normal" continental crust (e.g. granite)? How do these data help to eliminate possible exhumation mechanisms?

You will need to devise an experiment to measure the density of the rock samples. Material for this is available in the teaching lab.

Rock samples.

You have two samples of mafic rocks from the WGR. These have a similar bulk chemical composition but a partially different mineralogy. The samples record different parts of the PT path of the region.

- You will need to contrast the densities, texture and mineralogy of these rocks using the handspecimens.

In this regard you should consult the photographs of field relationships on these web pages to place these samples in context. There are a few helpful hints on mineral identification too.

- Were the mineralogical changes accompanied by significant deformation?

You should also check the relative position of these rocks using the regional map and the cross-section.

Notes on the samples

Sample a.

This comes from Flatraket. Visit this site for more information.

Sample b.

This comes from the northern shore of Nordfjord. Again you should visit this site for more

information.

2. Peak conditions.

Use the information provided to determine the **minimum peak pressure conditions** recorded within the region. You can plot the information on the PT diagram a version of which is also provided as a printable pdf file.

- What does the min peak PT position imply about the geothermal gradient at peak burial conditions.
- How does this compare with ìnormalî continental geotherms (c. 28…C/km)?

3. Exhumation (retrograde) conditions

You should plot the various PT positions of the WGR to construct a Pressure-Temperature path for the rocks. This will be approximate. Nevertheless it is an important way of visualising the tectonic evolution of the rocks.

4. The Upper allochthon and Hornelen basin

- Plot at Depth-time history for: The upper allochthon (UA) to include its cover of Devonian sediments.

This can be on the same PT diagram as for the rocks of the WGR and in this way you can contrast the histories of rocks on either side of the main detachment system.

5. Nature of the Hornelen Basin:

- What is the nature of the sediments and what evidence is there that they were locally sourced?
- How does the formation and filling of the Hornelen Basin relate to exhumation of the eclogites of the WGR?
- What type of tectonics formed the basin?

6. Contact between upper allochthon and the HP units.

What is its nature?

7. Synthesis

Write notes that synthesise your findings. You may find it useful to sketch out cartoons of the history here. Also, compare your findings from this case study with ideas and other examples in your lecture notes and in the background reading for this week's study.

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