PALAEOBASEMENT-HIGHS IN THE CALEDONIDES OF NORTHERN SWEDEN

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During the Caledonian collision between Laurentia and Baltica in Silurian times, slices of bedrock were thrust onto the Baltic craton. The Caledonian tectonic stratigraphy consists of four principal units (Lower, Middle, Upper and Uppermost Allochthon). The Middle Allochthon is a tectonostratigraphic level inferred to represent the rifted Neoproterozoic margin of Baltica and is heterogeneously composed of telescoped fault-controlled sedimentary basins and basement plinths.

The Akkajaure-Sarek-Kvikkjokk area in northern Sweden is located within the Caledonian belt and is composed of three principal thrust-sheet complexes: the Lower Allochthon, the Middle Allochthon and finally the Seve Nappe Complex. The Middle Allochthon in both these areas are dominated by plutonic rocks in the Akkajaure Nappe Complex to the north and the disrupted Sarek-Kvikkjokk Magmatic Complex (SaKMaC) to the south.

In order to test whether it is possible to preliminary restore the position of the palaeo-basement highs, a U-Pb geochronology study of zircons was undertaken to constrain the timing of magmatic activity in the different parts of the area. To maximise the chance of getting the original crystallisation age of the rocks we have done ID-TIMS analyses on abraded zircons. We have concentrated our efforts to the study of rocks of granitic and syenitic compositions, but in combining the isotopic results with field observations we also aim towards an interpretation of the magmatic evolution, especially from the Sarek area, where good outcrops of non-deformed rocks makes field observations much easier.

The resulting ages from the mainly granitic Akkajaure Nappe Complex yield one group of ages between 1800 +/- 2 Ma and 1779 +/- 7 Ma, whereas ACMG-suite in
the area intruded between 1776 +/- 3 Ma and 1761 +/- 9 Ma.
The lithologies of the Sarek- Kvikkjokk area are comparable to the ACMG-suite in
the Lofoten-Vesterålen area, northern Norway, but they tend to be somewhat younger.
The main phases of the Lofoten-Vesterålen suite formed between 1800-1790 Ma.
This is more in agreement with the ages found in the Akkajaure Nappe Complex.
This indicates that it is possible to correlate the nappes with the basement present to
the west and the northwest.
Stretching lineations in the area indicate a Caledonian transport direction towards
ESE. Furthermore, potential field data indicate that the Lofoten Complex is present
also in ridges offshore and hence that it is larger than what is present onshore.
Estimates on transport distances done in the region postulate a maximum distance
of 600 km. The present distance between Lofoten and the study area is of the same
order. This implies simple translational tectonics during the main, Silurian phase of
the Caledonian orogeny.