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Timing of the vertical movements of the Northern European margin system

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The natural laboratory of the North European volcanic margin, and more precisely Southern Norway and East Greenland, is the study area of this PhD project. Landscapes resulting from continental break-up are characterized by high elevation margins and their associated escarpments. Postrift domal uplift patterns are a distinct feature of the north Atlantic margins.

This project aims at reconstructing the timing and magnitude of uplift and denudation of both margins using apatite fission-track (AFT) and (U-Th)/He low- temperature thermochronology. Each of these thermochronometers have a different closure temperature: apatite fission tracks from 120˚ to 60˚C [Gleadow et al., 2002] and apatite (U-Th)/He from 70˚ to 40˚C [Farley et al., 2002]. Thermochronological analysis of Precambrian and Caledonian rocks provides, therefore, information on temperature changes of crustal basement rocks over the course of time, generally caused by erosive and tectonic processes.

In two earlier studies, M. Rohrman and B. Hendrix dated basement rocks with AFT and (U-Th)/He in the southern and northern parts of Norway respectively. It appears from the results that both margins have experienced considerably different cooling histories since Caledonide times. Hendrix and Andriessen (2002) indicate two events of cooling and denudation: one continuous during the Late Carboniferous-Permian and one during the Late Cretaceous-Paleogene. Whilst in the southern part, cooling occurred during the Triassic-Jurassic (Rohrman et al 1995) and possibly during Neogene times. In order to have a better constrain on the Tertiary exhumation, (U-Th)/He dating is being applied to a number of Rohrman's samples across Caledonian struc-

tures until the Møre-Trøndelag Fault Zone. Because of the lower closure temperature of the (U-Th)/He thermochronometer results might help in answering the occurrence or not of significant Neogene exhumation and the relation with climate.

Vertical profiles of igneous rocks will be sampled this summer in East Greenland. (U-Th)/He and fission track dating will be applied in order to have a better constrain on the Tertiary exhumation. Our preliminary results obtained for (U-Th)/He analyses from a paleosurface in Liverpool Land reveal a strong erosional episode just before break-up of the North Atlantic at 55 My, followed by a period of burial under thick basalts. A final period of significant exhumation took place at the time the Iceland hot spot passed below the region ca. 25 Ma.

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