



The East Greenland passive margin of the Scoresbysund region :

Cooling story of the Jameson Land Basin and the surrounding basement rocks

A.I. Biarc (1), E.H. Hartz (2), N. Hovius (3), J. Juez-Larré (1), P.A.M. Andriessen (1)

(1) Department of isotopic geochemistry, Vrije Universiteit, Amsterdam, (2) Physics of Geological Processes, University of Oslo, Oslo, (3) Department of Geosciences, University of Oslo, Oslo

The natural laboratory of the North European volcanic margin, and more precisely 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. Post-rift 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 the East-Greenland margin using apatite fission-track (AFT) and (U-Th)/He low-temperature thermochronology and to compare it to the Norwegian one. Each of these thermochronometers has 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. From published data [Hansen, 2000] and preliminary results from a 1,5 km high vertical profile, it appears that the basement rocks, west of the Jameson Land Basin cooled from the Late Paleozoic and into the early Jurassic while the basin itself was heated. The basement rocks then remain at the same temperature, the basin being cooled until Late Oligocene time where both parts are cooled together.

Vertical and horizontal profiles of igneous rocks have been sampled in summer 2005 in East Greenland, west of the basin. (U-Th)/He and fission track dating is being applied in order to have a better constraint 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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