

The Thermal History of East Greenland: Insights From Regional Apatite Fission Track and (U-Th)/He Data

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ABSTRACT

Protracted rifting between Greenland and Norway and the opening of the North Atlantic resulted in the development of offshore petroleum basins in Mid-Norway and the Northeast Greenland Shelf. Provenance work has established a sediment link between East Greenland and Mid-Norway. Northeast Greenland may also have provided syn-rift sediment to the Barents Shelf. Constraining the thermal evolution of East Greenland can improve our understanding of the evolution of rifting and denudation and therefore the development of these offshore petroleum basins. Apatite fission track and (U-Th)/He data from numerous vertical profile sections across East Greenland will be discussed. They are placed in the context of the timing of initial rifting and peak denudation, the thermal evolution of the crust, and field observations of structures and regional unconformity surfaces. Inverse modeling reveals remarkably consistent thermal histories across the region. These both confirm previous field observations, such as the importance of a Mid-Late Permian unconformity surface, and offer new insights, including the discovery of marked cooling events during the Late Triassic to Early Jurassic period and during the Oligocene.