



Cenozoic uplift on the West Greenland margin: active sedimentary basins in quiet Archean terranes.

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The North Atlantic is believed by some authors to have experienced tectonically induced uplift within the Cenozoic. Examination of evidence, onshore and offshore, has been interpreted to imply the presence of kilometre scale uplift across the margins of the Barents Sea, North Sea, Baffin Bay and Greenland Sea. Development of topography on the West Greenland margin (Baffin Bay), in particular, has been subject to much discussion and dispute. A series of low temperature thermochronological (AFT and AHe) studies onshore and interpretation of seismic architecture offshore have suggested uplift of the entire margin totalling ~ 3 km. However, challenges to this work and recent analysis on the opposing margin (Baffin Island) have raised questions about the validity of this interpretation.

The present work reviews and remodels the thermochronological data from onshore West Greenland with the aim of re-evaluating our understanding of the margin's history. New concepts within the discipline, such as effect of radiation damage on Helium diffusivity, contemporary modelling approaches and denudational mapping are all utilised to investigate alternative interpretations to this margins complex post rift evolution.

In contrast to earlier studies our new approach indicates slow protracted cooling across much of the region; however, reworked sedimentary samples taken from the Cretaceous Nuussuaq Basin display periods of rapid reheating and cooling. These new models suggest the Nuussuaq Basin experienced a tectonically active Cenozoic, while the surrounding Archean basement remained quiet. Faults located within the basin appear to have been reactivated during the Palaeocene and Eocene, a period of well-documented inversion events throughout the North Atlantic, and may have resulted in subaerial kilometre scale uplift.

This interpretation of the margin's evolution has wider implications for the treatment of low temperature thermochronological data and the geological history of the North Atlantic.