



## **A fission track study of southeast Baffin Island and the influence of pre-existing heterogeneous thermal crustal properties**

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New apatite fission track data collected from exposures on southeast Baffin Island exhibit central ages that range from 200 Ma to 440 Ma, and mean track lengths that vary between 12-13.3  $\mu\text{m}$ . First order analysis of these data (central age vs mean track length plot) reveals a trend typical of samples that have experienced contemporaneous cooling from an array of initial palaeodepths. One-dimensional inverse thermal modelling of individual samples suggests that cooling through the partial annealing zone ( $\sim 120\text{-}60\text{ }^{\circ}\text{C}$ ) occurred over periods between 100 and 300 Myr. Modelling the three-dimensional exhumation of a heterogeneous crust with flat topography demonstrates that a significant amount of the variability in observed fission track ages could be attributed to heterogeneity in crustal heat production and thermal conductivity. The remaining variability in the observed data set is attributed here to differential erosion from a non-uniform initial topography. However, age jumps over short distances require other explanations such as faulting. Collectively, these results suggest that the observed data are consistent with a simple exhumation scenario where the present-day high topography is a remnant of that created during Palaeoproterozoic orogenies. The new data do not display any recent (Cenozoic) periods of exhumation.