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Cenozoic burial and exhumation history of the Kangerlussuaq area, East Greenland, revealed by new apatite fission-track data

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The Kangerlussuaq area in East Greenland (c. 68°N) has witnessed a complex geological development during the Cenozoic. The Skaergaard intrusion and the up to 5 km thick flood basalts formed during a short period around 55 Ma, and subsequently numerous intrusive bodies were emplaced, primarily during the Eocene. Relatively little is known about the geological history over the last 35 Myr, other than that an outlier of Middle Miocene lavas is located in the area at an elevation of c. 2.7 km. At the present-day, the area is deeply eroded and magmatic bodies that were emplaced deeply in the crust, are now exposed at the surface, but at the same time, the area has a significant elevation and even hosts the highest peak in Greenland, Gunbjørn Fjeld, 3.7 km above sea level.

To unravel the history of burial and exhumation in the Kangerlussuaq area, new apatite fission-track analysis (AFTA) data has been acquired for 75 rock samples. Preliminary results show that the area has been subject to several phases of cooling since burial under the Palaeogene flood basalts. Phases of regional cooling along the coast that occurred at the Eocene-Oligocene transition and in the late Neogene are interpreted to be due to uplift and exhumation. Cooling events of local extent that occurred in the Eocene, Oligocene and Miocene are interpreted to be related to both exhumation and to circulating hot fluids. Results from samples along vertical transects reveal details of the protracted exhumation history, and that the present topography was formed during the late Neogene.