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The Eurekan in eastern North Greenland: insights from thermochronology

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Eastern North Greenland is a key area for studying the reorganisation of the North Atlantic-Arctic Realm during the Cenozoic. Due to its crucial position at the intersection of Atlantic Ocean, Arctic Ocean, and the West Greenland Rift Basin this area was significantly involved in the Eureka Orogeny leading to intracontinental compression/transpression observed on the Svalbard-Barents margin and the Canadian Archipelago as well as Northern Greenland. In the Neogene the final breakup occurred in this area, leading to the deep-water connection of the Arctic and North Atlantic Oceans.

It is characterized by the Carboniferous-Paleogene deposits of the Wandel Sea Basin overlaying Mesoproterozoic to early Palaeozoic supracrustal rocks. They occur in a series of pull apart basins along a zone of NE-SW-oriented faults. These faults are part of the DeGeer Shear Zone, along which the lateral offset of Greenland and Spitsbergen occurred during the Eureka Orogeny. In accordance the deposits are deformed, but the timing and the structural context of the deformation is much debated. Also, some deposits show unusually high thermal maturities of which the origin and geodynamic context is unclear.

We took samples across the Tolle-Land-Fault-Zone from the coast in the NE into the Caledonian basement in SW and applied apatite fission track analysis and (U-Th-Sm)/He thermochronology to reconstruct the thermal history of the respective segments of the fault zone and their thermal evolution in respect to the deformation and opening of the northern Atlantic. Preliminary results will be presented and the exhumation history and timing of deformation and thermal anomalies in eastern North Greenland and influence of the breakup will be discussed.