Thermal anomalies in Late Mesozoic to Cenozoic basin deposits: What can they tell us about the separation of Greenland from Svalbard?

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Paleogene rocks from Svalbard yield exceptionally high vitrinite reflectance values up to 4%. Even higher vitrinite reflectance data, along with high bitumen reflectance values, are found from Cretaceous to Paleogene rocks of the conjugated northeast Greenland margin. These rocks also contain coke. Since the distinct pattern of high thermal maturity affects both sides of the Fram Strait, it is interpreted to be caused by a heating event during a time when Greenland and Svalbard / Eurasia were still contiguous or close together. As heating overprints Paleogene sediments, we further assume that it postdates the Eocene Eurekan deformation and is related to subsequent (trans-)tensional movement leading to continental separation and eventually to the opening of the Fram Strait. The Fram Strait is the only deepwater connection of the Arctic Ocean with other oceans and is key for understanding the climatic, tectonic and paleo-oceanographic evolution of the Arctic realm. Timing and trigger mechanisms for mid- to late Miocene tectonic activity around the Fram Strait are still poorly constrained. For this study, we will test the following hypotheses using apatite fission track and apatite (U-Th-Sm)/He thermochronology: (i) Heating of the west and east side of the Fram Strait occurred simultaneously and was caused by incipient sea floor spreading in the Fram Strait; (ii) heating occurred during mid- to late Miocene in relation to uplift/exhumation and enhanced magmatic activity. Vitrinite reflectance data indicate temperatures high enough to reset low-temperature thermochronometers, thus our results will allow to date the thermal event and to investigate how it was temporarily and spatially connected to the separation of Greenland from Svalbard and thus to the opening of the northern North Atlantic Ocean and the Fram Strait. First Data will be presented.