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New heat flow measurements from central Arctic Ocean - reconciling observations and modelling.

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As a consequence of cooling of the Earth's interior, measurements of surface heat flow reflect the thermal structure and tectonic evolution of a given region. For the Arctic Ocean region, constraints on its the thermal evolution are hampered by notably sparse measurements of heat flow. Furthermore, previous results from the central Lomonosov Ridge and the adjacent central Amundsen Basin reveal variable magnitudes, including those higher than expected considering plate cooling or simple uniform stretching models. We present new heat flow results gathered from 17 sediment cores acquired during the "Arctic Ocean 2016" and "SWERUS-C3" expeditions. Three sites located in the Amundsen Basin reveal heat flow in the order of 71-95 mW/m2, in line-with or slightly higher (1-21 mW/m2) than expected from oceanic heat flow curves. These values are substantially lower than values of another study, with 104-127 mW/m2 found on similarly aged oceanic crust in the Amundsen Basin. Sites from the submerged continental fragments of the Lomonosov Ridge and Marvin Spur recovered heat flow in the order of 53-76 and 51-69 mW/m2 respectively. When considering the potential enhanced surface heat flux from radiogenic heat production in the crust, these variable measurements are broadly in line with predictions from uniform extension models for continental crust. A slow upper mantle seismic anomaly in the vicinity of the North Pole might therefore have a compositional as well as thermal component. This complexity highlights the difficult in disentangling temporally and spatially evolving crustal, lithospheric and mantle processes to present-day surface heat flow contributions.