

New reflection seismic profiles across the southern Amundsen Basin and Lomonosov Ridge, Arctic Ocean

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In autumn 2018 a multichannel seismic reflection survey was performed in the southeastern part of the Amundsen Basin, on the Lomonosov Ridge and its transition to the Siberian Shelf. We present the new data, and a first glance at the findings, with the aim to enhance insights into the tectonic evolution, sedimentation history, and paleoceanography of the southeastern Arctic Ocean. Lines on the Lomonosov Ridge confirm the presence of 1600 m thick, undisturbed, parallel sedimentary layers. A prominent high amplitude reflector sequence within the strata can be directly correlated to previous seismo-stratigraphic models.

A 300 km long transect from the Gakkel Deep across the southeastern Amundsen Basin and over the Lomonosov Ridge images an up to 3 km thick sedimentary sequence covering a rough acoustic basement in the Amundsen Basin. A prominent unconformity can be traced through the basin, indicating widespread changes in tectonic and deposition conditions in the Arctic Ocean. The crustal surface shows strong deformation, in particular in the western part of the basin. Tentatively we link the deformation to a reorganisation of tectonic plates accompanied by a significant decrease in spreading rates. Tectonics led to uplift of the oceanic crust and the overlaying lowermost sedimentary sequence which are now exposed at a seamount like structure piercing through younger sediments. The structure was sampled successfully by employment of a dredge. The exposed rocks directly overlaying the oceanic crust consist of consolidated sand- and siltstones. Profiles across the transition from the Lomonosov Ridge to the Laptev Sea Shelf image a more than 2 km thick sedimentary sequence overlying a rugged and faulted acoustic basement. At first glance, no indications of a larger transform fault are found, which could elucidate the tectonic relation between the ridge and the shelf.