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Southeastern Arctic Ocean, seismic reflection images of cruise ark2018

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Text:

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 used to directly correlate to previous seismostratigraphic models. A major aim of the expedition was the acquisition of cross lines relative to previous surveys covering the location of the upcoming IODP-377 project.

A 300 km long transect across the Amundsen Basin images a 3 km thick sedimentary sequence covering a rough acoustic basement. The high-amplitude-reflector sequence can also be traced in the basin, indicating widespread changes in tectonic and deposition conditions in the eastern Arctic Ocean. The crustal surface shows strong deformation, especially in the western part of the Basin, which can be associated with a re-organisation of tectonic plates accompanied by a significant decrease in spreading rates. A seamount, likely of a magmatic origin, was observed rising from the crust and penetrating all sedimentary layers. Dredge-sampling on an outcrop at the western slope of the rise reveal a cover of consolidated sand- and siltstones. Lines 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 can be detected, which could elucidate the tectonic relation between the ridge and the shelf. Several large mass wasting events or debris flows are indicated in the strata. An erosional channel with a sediment drift on its southern edge may provide clues to ocean current development.

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