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A full year of extreme sea-ice and atmosphere conditions in the Eurasian Arctic: the OCEAN environment during MOSAiC

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The Arctic Ocean, although remote to most of us, is linked to lower latitudes by way of climate, physics, biology and biogeochemistry. Strongly coupled to the rapidly changing Arctic atmosphere and sea-ice, the ocean is subject to amplification of change amid global trends in climate. The relatively fresh and cold upper mixed-layer in the Arctic basin exhibits a strong seasonal cycle, yet the deeper warm water of Atlantic origin largely stays isolated from the ice. Further, changes in heat, salt and momentum due to exchange with ice and atmosphere cannot penetrate to great depth due to a strong halocline. Nevertheless, we observed changes in the upper water column stratification and mixing, due to storms and freeze-induced brine release during the year-long MOSAiC experiment. This was further expressed by significant variability in (sub)mesoscale processes, including eddies and frontal adjustment. We will present results from ocean observations during the MOSAiC drift using a variety of manually-operated devices and autonomous platforms within several 10s of kilometres from the drifting icebreaker Polarstern. Preliminary analyses of our data highlight a pronounced seasonal cycle in mixed-layer depth and upper ocean stratification characteristics connected to brine release, turbulent events triggered by storms, and geographic background variability. We will further detail the observed full-depth water mass distribution and attempt to untangle temporal and spatial variability. Finally, we will give an overview of Team-OCEAN analyses and interdisciplinary projects.

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