

**Studies of processes governing Arctic sea ice development - the ICE-Fluxes project**

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ICE Fluxes investigates the physical processes that control the behavior of the Arctic sea ice. The Arctic sea ice cover is part of a complex and very dynamic physical system that includes the atmosphere (wind, sunlight, snow and rainfall, aerosols), the snow on top of the sea ice, the sea ice itself, the ocean underneath, and the biological organisms and by-products in the ice and water. We aim to improve the understanding of how the components interact and which processes control the development of the sea ice cover. Over the past three decades, the Arctic sea ice cover has changed substantially with reductions in both extent and thickness. In ICE-Fluxes, we focus on understanding processes from small to larger scales that govern energy and mass fluxes between the atmosphere, snow, sea ice, and ocean. Some of the core topics in the project are effects of features such as melt ponds on sea ice, and sea ice ridges relative to albedo and transmissivity, and upper-ocean turbulent heat fluxes as controlled by forcing, stratification and under-ice topography. We also study ocean heat transport variability and sea ice dynamics on regional scale. Here, preliminary results from the first year of the project's field campaigns are presented. Studies of ice and ocean were performed on four shipbased expeditions to areas around Svalbard, the Barents Sea, and the Fram Strait, supplemented by airborne measurements from helicopter, and satellite remote sensing. Besides the extensive field work, the project includes also modelling initiatives using simple to highly sophisticated models, and laboratory experiments with a rotating tank.