

## **Airborne observations of Arctic mixed-phase clouds and boundary layer profiles over the Fram Strait in the vicinity of Svalbard**

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The phenomenon of Arctic Amplification is most evident in the rise of the near-surface air temperature in the Arctic observed in the last decades and being at least twice as strong as the global average. The mechanisms behind that are widely discussed. Many processes and their feedback mechanisms are still poorly understood. To increase the understanding of such processes, direct observations are needed, but are barely available. Such observations are collected within the framework of the "Arctic Amplification: Climate relevant atmospheric and surface processes and feedback mechanisms (AC)3" project, where several airborne campaigns have been carried out focusing on observations of Arctic mixed-phase clouds and boundary layer processes and their role with respect to Arctic amplification. Up to three research aircraft (Polar 5 and 6 from the Alfred-Wegener-Institute for Polar and Marine Research and the German High Altitude and Long Range Research Aircraft (HALO)) equipped with state-of-the-art remote sensing and in-situ instrumentation have been deployed within these campaigns where measurements have been performed over the Fram Strait northwest of Svalbard during spring, summer, and early autumn covering the Arctic ocean, marginal ice zone, and closed sea ice.

Within this presentation, we will give an overview of the airborne campaigns (ACLOUD, AFLUX, MOSAiC-ACA, and HALO-(AC)3) carried out in recent years, introduce the instruments operated, measurements performed, and data collected, and present selected research highlights achieved so far.