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Atlantic water in Svalbard fjords: variability and effects on local sea ice cover

Arild Sundfjord (1), Jon Albretsen (2), Yoshie Kasajima (1), Agnieszka Prominska (3), Frank Nilsen (4), Agnieszka Beszczynska-Möller (3), Stefan Muckenhuber (5), Ketil Isaksen (6), Finlo Cottier (7), Sebasitan Gerland (1), and Jack Kohler (1)

(1) Norwegian Polar Institute, Tromso, Norway , (2) Institute for Marine Research, Flødevigen, Norway, (3) Insitute of Oceanology Polish Academy of Science, Sopot, Poland, (4) University Centre in Svalbard, Longyearbyen, Norway, (5) Nansen Environmental and Remote Sensing Center, Bergen, Norway, (6) Norwegian Meteorological Institute, Oslo, Norway, (7) Scottish Association for Marine Science, Oban, UK

Atlantic Water entering the Arctic fjords of western Svalbard transport large amounts of heat, sufficient to influence the local sea ice cover as well as contributing to glacier front melting. Recent measurement campaigns, including moorings and high-resolution surveys, spanning years with very different Atlantic Water inflow, were conducted in two fjords with different characteristics; Hornsund and Kongsfjorden. The data collected reveal a strong coupling between ocean-fjord exchanges and local sea ice cover. Possible triggering mechanisms for exchange events such as wind episodes, internal waves, and density differences are explored. Results from fine-resolution coupled ocean-sea ice model simulations complement the analysis of Atlantic Water exchange mechanisms and allow us to quantify the extent to which glacial runoff forces local circulation.