Contribution ID: **22** Type: **Talk**

Overturning in the Nordic Seas

Tuesday 18 July 2023 09:45 (15 minutes)

A substantial portion of the dense water in the lower limb of the AMOC originates in the Nordic Seas, including the densest component. The volume of the water overflowing the Greenland-Scotland Ridge doubles through entrainment in the subpolar North Atlantic. As such, dense-water formation in the Nordic Seas is crucial for sustaining the AMOC. In this talk, I will highlight recent observational studies advancing our understanding of the overturning in the Nordic Seas. As a consequence of climate change, open-ocean convection in the interior gyres of the western Nordic Seas is subsiding. Observations demonstrate that dense waters formed in the Nordic Seas have become lighter, and descending isopycnals imply a decrease of the dense-water reservoir. This may affect the future supply of dense water to the overflows. Concurrently, new areas of dense-water formation are opening. In the Iceland Sea, the locus of dense-water formation is shifting westward along with the ice edge. Furthermore, the East Greenland Current has recently become ice-free in winter, and water that previously had been isolated from the atmosphere may now be further ventilated and densified on its southward transit. An extensive field campaign in 2024-2026 will help quantify the water-mass transformation and elucidate this potential mechanism for resilience of the overturning in the Nordic Seas. A similar effect of along-stream water-mass transformation due to sea-ice retreat is expected in the Atlantic Water boundary currents in the Arctic Ocean. Understanding the changing processes of dense-water formation at the northern extremity of the AMOC is imperative, as these headwaters to the lower limb of the AMOC affect the variability and potential predictability of the AMOC farther south and may sustain the AMOC even as overturning south of the Greenland-Scotland Ridge weakens in a warming climate.

Topic

Observational priorities –what should we measure?

Author: Dr SEMPER, Stefanie (University of Bergen & Woods Hole Oceanographic Institution)

Co-author: Prof. VÅGE, Kjetil (University of Bergen)

Presenter: Dr SEMPER, Stefanie (University of Bergen & Woods Hole Oceanographic Institution)

Session Classification: Value of AMOC Observing / Observational Priorities

Track Classification: Observational Priorities