EGU22-10635
https://doi.org/10.5194/egusphere-egu22-10635
EGU General Assembly 2022

Coastal and offshore controls on the variability of the Undercurrent in the Amundsen Sea

Oana Dragomir[1], Alessandro Silvano[1], Anna Hogg[2], Michael Meredith[3], George Nurser[4], and Alberto Naveira Garabato[1]

[1]University of Southampton, Ocean and Earth Science, Southampton, UK (oana.dragomir@soton.ac.uk)
[2]The Centre for Polar Observation and Modelling, University of Leeds, Leeds, UK
[3]British Antarctic Survey, Cambridge, UK
[4]National Oceanography Centre, Southampton SO14 3ZH, UK

The marine-terminating glaciers of the Amundsen Sea are experiencing increased basal melting associated with an inflow of warm and salty water from the deep ocean onto the shelf via submarine glacial troughs. Modelling work suggests that variability in the transport of this source of heat across the shelf-break and onto the Dotson Trough in the western Amundsen Sea is regulated by wind-driven changes in an eastward undercurrent that flows along the continental slope.

What controls the strength and variability of the undercurrent, however, is not well documented due to a lack of observations in the region. Here, we use a 5-year mooring record of undercurrent velocity in the Dotson Trough in conjunction with a novel 16-year altimetric sea level product that includes measurements in regions of near-perennial ice cover to describe the connection between undercurrent variability and climate modes on seasonal to interannual time scales.

We find a robust signature of the undercurrent variability that is linked to both a circumpolar coastal sea level signal as well as to the sea level in an offshore region in the Amundsen Sea. We discuss the implications of this undercurrent-sea level covariability in the context of atmospheric climate modes and we further explore what this link conveys about the undercurrent variability on interannual timescales by using of our full altimetry record.