

A review of the oceanography and Antarctic Bottom Water formation offshore Cape Darnley, East Antarctica

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Introduction

In this study we compile 40 years of oceanographic data for Cape Darnley, East Antarctica, to provide the climatological oceanographic conditions, and review the water mass properties in this region and their role in Antarctic Bottom Water formation. Our findings will contribute to planning future observing systems at Cape Darnley, determining the role Cape Darnley Bottom Water plays in our global oceanic and climate systems, and modelling past and future climate scenarios.

This collated dataset was transformed into TEOS-10 standards (i.e. absolute salinity, conservative temperature, and neutral density) for comparison. Further quality control was completed (i.e. >3 standard deviations from mean) and the output of this collation containing the raw data, gridded, and mean data can be found at [10.5281/zenodo.10976304](https://doi.org/10.5281/zenodo.10976304).

These supplementary figures provide additional spatial and temporal information on the data sources and water masses discussed in the associated paper. These also provide visual comparison between different data sources. All processing for these figures is discussed in the associated paper.

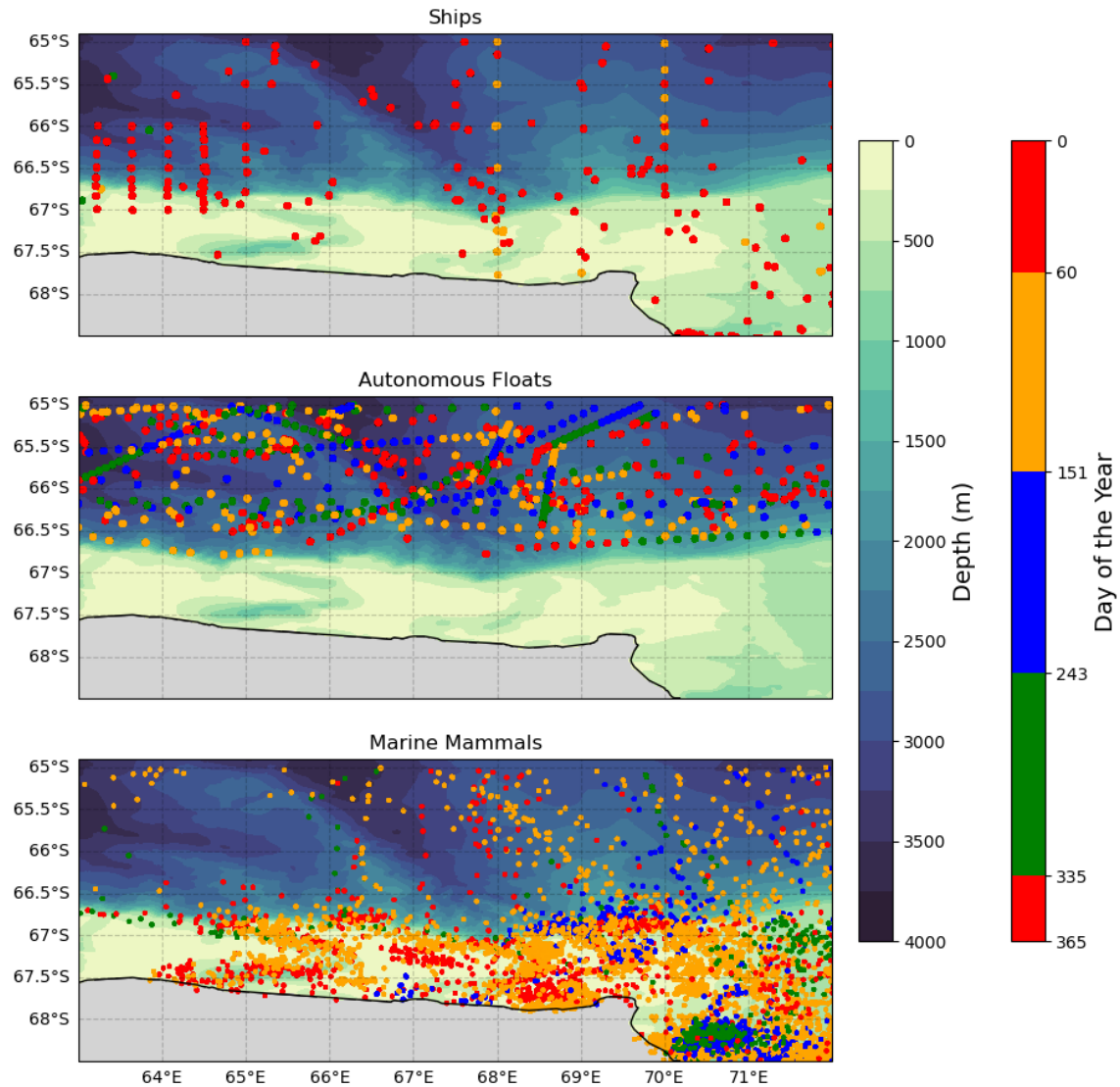


Figure S1. The location and austral season of data collected from ships, autonomous floats & seals (marine mammals) where red = summer, orange = autumn, blue = winter & green = spring, with bathymetry contours beneath.

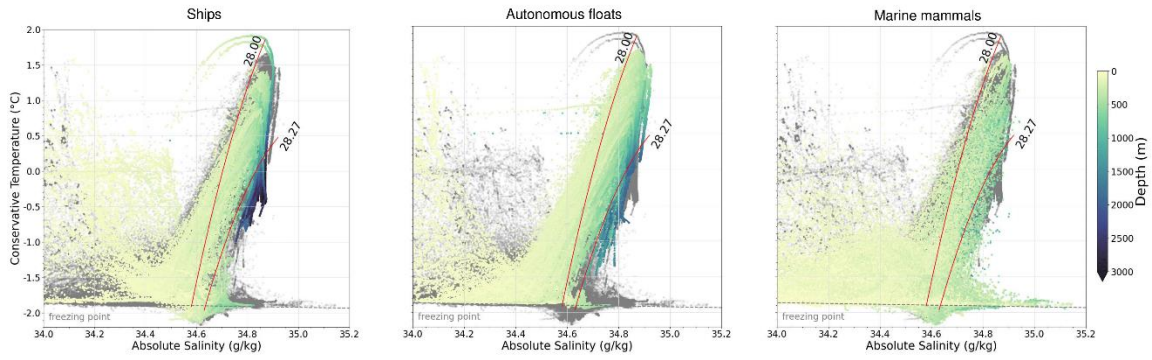


Figure S2. Conservative temperature vs absolute salinity plots for each of the three data sources (ships, autonomous floats & seals). The two red lines indicate the 28.00 & 28.27kg/m³ neutral density lines, with points in grey if they are not from the currently plotted data source, and coloured by depth if they are the current data source. The surface freezing point is represented by the grey dashed line.

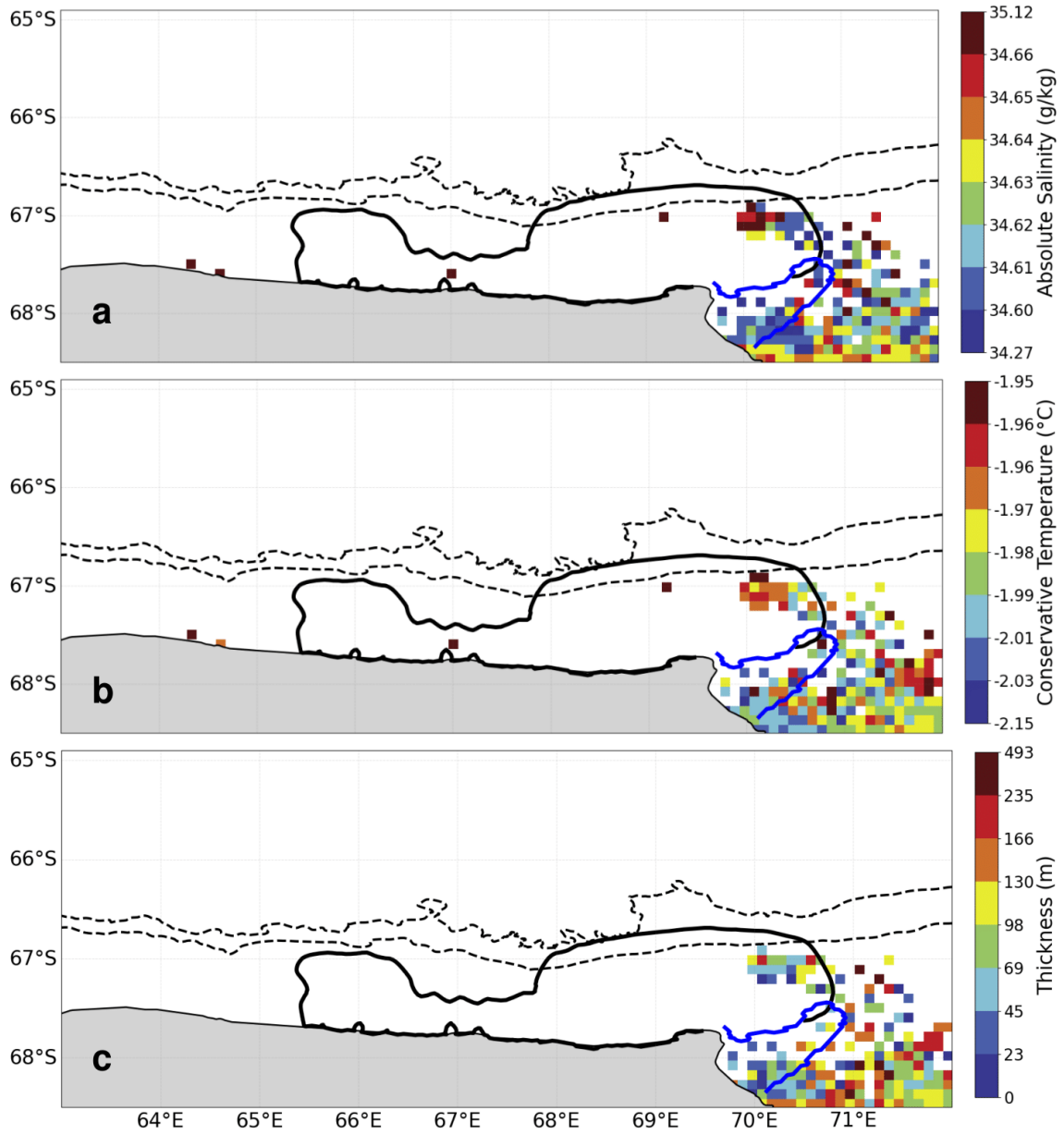


Figure S3. Gridded data of Ice Shelf Water ($\theta < -1.95^{\circ}\text{C}$) for a) absolute salinity, b) conservative temperature & c) thickness. The black dotted lines represent the 600m and 2000m isobaths, the solid black line represents the polynya outline, and the solid blue line represents the ice barrier.

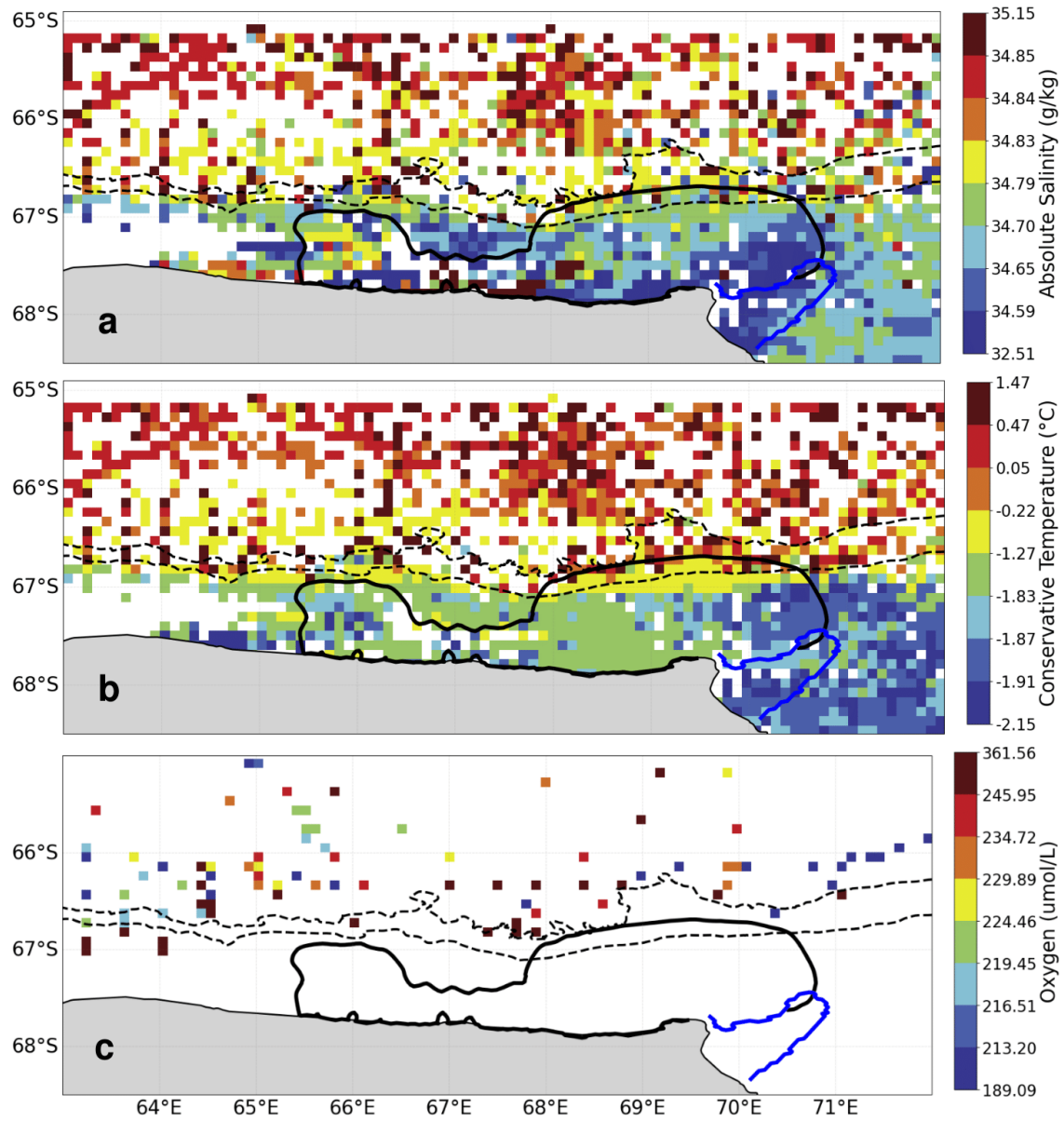


Figure S4. Gridded data of bottom of cast for a) absolute salinity, b) conservative temperature & c) oxygen. The black dotted lines represent the 600m and 2000m isobaths, the solid black line represents the polynya outline, and the solid blue line represents the ice barrier.