



# IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"

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PHYSICAL OCEANOGRAPHY

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**ABSTRACT Subject :**

High Salinity Shelf Water production in Terra Nova Bay, Ross Sea from high-resolution near-surface salinity observations.

**Abstract** 16/02/2023 04:45:17

High Salinity Shelf Water (HSSW) is a precursor to Antarctic Bottom Water (AABW), a water mass that facilitates the sequestration of atmospheric heat and carbon into the deep ocean. The salinity of HSSW in the Ross Sea is sensitive to both local and broader regional forcing, with implications for the density of downstream AABW and the ocean's ability to buffer against climate change. One poorly constrained source of HSSW variability in this region is its rate of production within Terra Nova Bay (TNB) in the western Ross Sea. Here, we use an unprecedented set of near-surface salinity, current velocity, and acoustic surface tracking timeseries, collected from a mooring in TNB in austral winter 2017, to estimate HSSW production rates. In one of few studies at the resolution of individual katabatic wind events, we find that HSSW production rates correlate with katabatic wind event frequency in early winter and with frequency, strength, and duration in late winter, suggesting a complex dependence on polynya dynamics. We calculate an average HSSW production rate of  $\sim 0.6$  Sverdrups ( $10^6 \text{ m}^3 \text{ s}^{-1}$ ) that allows us to validate an approach for estimating production rates from parametrized net surface heat fluxes, which we use to examine interannual variability in production rates across the decade. Though further mooring-based estimates are needed for confirmation, results suggest HSSW production in TNB has been mostly increasing since 2015 and could play a previously unrecognized role in the recently observed recovery of HSSW salinity in this region.

