

STEPPED STRUCTURE IN TEMPERATURE AND SALINITY PROFILES, OBSERVED NEAR ICEBERGS TRAPPED BY FAST ICE, ANTARCTICA (ABSTRACT)

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Step-like thermohaline structure was observed in conductivity-temperature-depth (CTD) profiles taken near an iceberg trapped by fast ice in Ongul Strait, Antarctica. The structure was observed in November and December, 1991, when the upper layer water was above the in situ freezing point by about 0.1–0.3°C, and not observed in May, when the upper layer water was very close to the freezing point. In the December observation, the structure was only observed downstream (about 70 m from) the iceberg, but not upstream. The structure was developed between the sea surface and 75 m depth, which seems to correspond to the underwater range of the iceberg. The steps average 25 m in thickness and typically display discontinuities of 0.05°C in temperature, 0.05‰ in salinity. We also observed a similar stepped structure near a larger iceberg off the Langhovde. In this case, the steps average 35 m in thickness, 0.05°C in temperature, 0.11‰ in salinity. These observations suggest that the stepped structure is closely related to sea-water/iceberg interaction, possibly the cell formation mechanism of HUPPERT and TURNER, who investigated ice blocks melting into a salinity gradient. The observed layer thickness, 25–35 m, is one order larger than that predicted by the theory and laboratory experiments in HUPPERT and TURNER.

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