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Seasonal mixed layer heat budget in the North Iceland Basin

E. DE BOISSESON (1), V. THIERRY (2), H. MERCIER (3), and G. CANIAUX (4)

(1) IFREMER, LPO, BREST, France (eric.de.boisseson@ifremer.fr), (2) IFREMER, LPO, BREST, France (virginie.thierry@ifremer.fr), (3) CNRS, LPO, BREST, France (herle.mercier@ifremer.fr), (4) CNRM/GAME, Météo-France/CNRS, TOULOUSE, France (guy.caniaux@meteo.fr)

Subpolar Mode Waters have been sampled in the whole North Iceland Basin by several hydrographic surveys and some ARGO floats. Mode waters are thick, weakly stratified near-surface layers with homogeneous properties. They are formed by winter convection, which is mainly driven by surface heat fluxes. Their properties are determined in the mixed layer. These waters become mode water when they definitely escape the mixed layer during the spring restratification. This work aims to quantify the main processes driving the seasonal heat budget of the mixed layer in the North Iceland Basin. A first calculation is done with ARGO data. It confirms the predominant influence of the atmospheric surface heat fluxes. A similar calculation is done from outputs of a DRAKKAR model. The ¼° global simulation ORCA025-G70 with interannual forcing from 1958 to 2004 is used. The two calculations yield similar results and complement each other, confirming the validity of the simulation and stating that the calculation with ARGO floats is representative of the North Iceland Basin. A deeper analysis of the results highlights the importance of light penetration, advection and turbulent mixing to close the mixed layer heat budget. Air-sea heat fluxes, advection and vertical turbulent mixing are the main processes that drive the seasonal cycle of the mixed layer and set the properties of the next generation of Subpolar Mode Waters in the North Iceland Basin.