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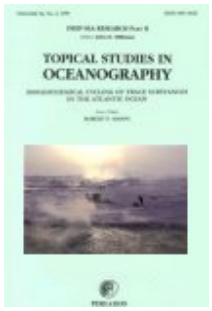
The European Subpolar Ocean Programme: ESOP, Guest Edited by Peter Wadhams, Jean Claude Gascard and Lisa Miller



This Special Issue contains some important results from the European Subpolar Ocean Programme (ESOP), a 1993-7 project under EU MAST, which investigated the large-scale, mesoscale and small-scale sea ice-ocean interactions in the Greenland Sea and their influence on the carbon cycle. The programme involved 22 European partners, and results are presented in 19 papers with a unifying preface.

ESOP was the first investigation to link atmospheric forcing, sea ice and circulation within the Greenland Sea with the uptake and vertical flux of carbon. On the large scale the fluxes of ice, water and carbon into and through the Greenland Sea were deduced from hydrological, chemical and biological surveys and from satellites, floats, moored sonar and sediment trap measurements. On the mesoscale, attention was focused on the region of the Odden ice tongue and the normally ice-free bay, Nordbukta, separating Odden from the East Greenland Current. Subsurface eddies and local frazil-pancake ice production, with its associated salt fluxes, were found to be active elements in preconditioning this region for winter convection. On the small scale, hydrodynamic plumes and thermobaric instabilities were also found to be relevant for deep mixing. Evidence of a decline in the volume and depth of convection has been accumulating for the last decade, and what we have learned about the mechanisms of deep water formation and carbon sequestration in the Greenland Sea is furthering our understanding of the possible role of this area as a switch for rapid climate changes.