



Role of Fast Ice in the Laptev Sea Shelf Circulation

P. Itkin (1), R. Gerdes (1), C. Köberle (1), and S. Adams (2)

(1) Alfred Wegener Institute for Polar and Marine Research, Am Handelshafen 12, 27570 Bremerhaven, Germany (prozman@awi.de), (2) University of Trier, Faculty of Geography / Geosciences, Dept. of Environmental Meteorology, Trier, Germany

Fast ice covers large areas of the Laptev Sea from late November until June. It forms an immobile lid over the inner shelf and it efficiently decouples the atmosphere from the ocean. The aim of this paper is to study the impact of fast ice on the ocean circulation on the Laptev Sea shelf and in the adjacent Arctic Ocean. We use a sea ice - ocean coupled model in an experiment with and without fast ice parameterization. The comparative study of model runs with partly idealized configuration can not give absolute estimates, but can point out the relative importance of the fast ice cover for the salinity distribution in the Laptev Sea and its vicinity. Our results show that on the shelf covered exclusively by drift ice, the surface layer is on average saltier by 0.7 and the bottom layer is fresher by 1 compared to the case when the inner shelf is covered by fast ice. This difference in salinity is caused by the difference in the Ekman pumping location, enhanced import of more saline water from the outer shelf and weaker vertical redistribution of the river water between the depth layers in the experiment with the fast ice. Thus, the Laptev Sea fast ice has an important role in the winter river water redistribution.