



Supercooling and water structure near the fjord glacier

Eugene Morozov (1), Alexey Marchenko (2), and Sergey Muzylev (3)

(1) Shirshov Institute of Oceanology, Internal waves, Moscow, Russian Federation (egmorozov@mail.ru), (2) Svalbard University Center, Longyearbyen, Norway, (3) Shirshov Institute of Oceanology, Internal waves, Moscow, Russian Federation

We analyze CTD measurements near a glacier descending into the ocean in the Temple Fjord (Spitsbergen). In winter, the water near the glacier is colder and fresher than at a distance of a few kilometers from the glacier. In winter, strong supercooling was found in the water column within 500 m from the glacier, which is interpreted as glaciohydraulic supercooling that occurs when fresh water melts under the glacier, rises rapidly in the sea near the glacier, and cools enough to freeze forming ice crystals. In summer, the water structure near the glacier did not differ much from the structure in the fjord because strong stratification prevents vertical motions of seawater; hence glaciohydraulic supercooling is not possible. Laboratory experiments on supercooling of seawater agree with the field results.