

Abstract

We observed drag coefficients and intensity of turbulence over sea ice field, and estimated sensible and latent heat transfer processes between frozen sea and atmosphere in the Chukchi Sea, which is one of the marginal seas of the Arctic Ocean, under cooling season. The drag coefficient is $(1.7 \sim 8.9) \times 10^{-3}$ and its value is larger than that of several previous studies. On the other hand, the intensity of turbulence is lower than that of the wind-driven sea, and is influenced by the inhomogeneous surface roughness of sea ice and the fresh snow over sea ice. Both sensible and latent heat fluxes show upward large values, that is, $45 \sim 114 \text{ W/m}^2$ and $20 \sim 48 \text{ W/m}^2$, respectively. The effect of open water largely caused to upward heat transfers and local instability of atmosphere. Therefore, present observational data suggest that we have to consider the effect of inhomogeneous roughness of sea ice, fresh snow over sea ice and open water as sensitive subjects of air-sea interaction in the marginal ice zone under cooling season.