



Sea ice draft and ocean-to-ice heat flux in the central Arctic Ocean

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Ocean-to-ice heat flux, which is a key parameter in determining the mass balance of sea ice in the central Arctic Ocean, were estimated in the Transpolar Drift since 2000 by using ice-drifting buoy data, focusing especially on the role of sea ice drift speed in sea ice basal melting. The yearly averaged ocean-to-ice heat flux was greater in 2000 (3.10 W m^{-2}) and 2002 (2.89 W m^{-2}) than in 2004-2006 (about 1.44 W m^{-2}). Surface mixed-layer temperatures above freezing point (ΔT) were higher in 2000 and 2002 than in 2003-2006. Although background oceanographic conditions in the buoy drift area were different for each year, we confirmed the hypothesis of Inoue and Kikuchi (2006) that sea ice drift speed in June and July (JJ) is the most important factor in determining total heat input from the atmosphere to beneath sea ice during the melting season. The estimated ocean-to-ice heat flux and total basal melting in the Transpolar Drift were highly correlated with the mean ice drift in JJ. Based on this correlation between sea ice motion in JJ and ocean-to-ice heat flux, we suggest that ocean-to-ice heat flux displayed an increasing trend before the early 1990s, but a weakly decreasing trend after the mid-1990s to at least the mid-2000s.