

Heat flux in front of the Dotson Ice Shelf in Amundsen Sea.

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Abstract

The west Antarctic Ice sheet has been melting rapidly. The ice melting in the Amundsen Sea is caused by warm and salt Circumpolar Deep Water (CDW) intrusion along the deep trough. In order to estimate the effect of oceanic heat transport on the ice shelves melting, the temporal variability of water masses and currents were observed from two moorings in the eastern (K4) and western side (K5) of the Dotson Ice Shelf (DIS) using ADCP and Micro-Cat from January 2014 to January 2015. The observed bottom temperature and salinity at the eastern side is higher than that of the western side. During observation periods, the strong southward flow (>10 cm/s) appeared near the bottom at eastern side while the weaker northward flow (<5 cm/s) appeared at 400 m depths of western side. The isopycnal and southward flows at mid-depth show a clear seasonal variation at the K4 mooring point. During austral summer, the isopycnal was lifted and southward flow was strengthened. Similarly, calculated heat transport at eastern side shows the marked seasonal variation. The estimated oceanic heat transport to the DIS using the glider and mooring data was about 3.1 TW during observation periods.