

A01-P19

CHARACTERISTICS OF SEA-ICE DRAFT REVEALED BY A MOORED ICE-PROFILING SONAR IN THE CHUKCHI SEA OFF BARROW, ALASKA

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The recent decrease in summer sea ice in the Arctic has impacted the surrounding coastal regions with respect to shipping, oil and gas development, coastal erosion, and use of the ice as a hunting platform among others. For these activities, ice-thickness information is of major importance. However, availability of ice-thickness data is still quite limited due to the challenges of both in situ and remote sensing observations.

From August 2009 to July 2010, a mooring with an ice-profiling sonar (IPS) was deployed in the coastal region of the Chukchi Sea off Barrow, Alaska. This mooring observation is a part of the Seasonal Ice Zone Observing Network (SIZONet) to complement various other sea-ice observations in the region. The mooring site (71.237N, 157.653W) is located within the Chukchi Sea Polynya and near a data grid point of the Advanced Microwave Scanning Radiometer for the Earth Observing System (AMSR-E). The mooring consists of an ice-profiling sonar, an acoustic Doppler current profiler (ADCP), and a conductivity-temperature recorder.

Using an ice-velocity time series obtained by the ADCP, a draft time series obtained by the IPS is converted to a spatial series. This spatial draft data from the prominent sea-ice season (November-June) has the mean and maximum drafts of 1.2 and 25.3 m, respectively. The draft data obtained by the IPS confirms that the thin-ice algorithm based on the AMSR-E data¹ correctly identified open-water and thin-ice (thickness < 0.2 m) periods.

¹ K. Iwamoto, K.I. Ohshima, T. Tamura & S. Nishashi (2013) Estimation of thin ice thickness from AMSR-E data in the Chukchi Sea, *International Journal of Remote Sensing*, 34:2, 486-489, DOI: 10.1080/01431161.2012.712229