

VARIABILITY OF ADCP BACKSCATTERING SIGNALS CAPTURED BY LONG-TERM MOORINGS: AMUNDSEN SHELF, ANTARCTICA

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ABSTRACT

Using a series of bottom-moored, upward-looking acoustic Doppler current profilers (ADCPs), high-temporal resolution profiles of acoustic backscatter were collected in the Amundsen Shelf. All mooring systems with ADCP have been installed and recovered by a coherent international collaboration between Korea and Sweden. The long-term (4 years) time series of mooring data was analyzed to investigate the seasonal and interannual variabilities in sea ice concentration (SIC) and Circumpolar Deep Water (CDW) thickness on acoustic backscatter. The depth of maximum mean volume backscattering strength (MVBS) showed a significant correlation with SIC and CDW thickness. From 2010 through 2014 year, the MVBS measured by ADCP gradually decreased, which corresponded to the decreasing trend of Chl-a. The daily cycle in the vertical distribution of acoustic backscatter varied distinctly with changing surface ice conditions. When sea ice cover was low, acoustic backscatter was associated with sunlight's daily cycle. The acoustic backscatter descended and ascended at sunrise and sunset, respectively. In contrast, when sea ice cover was high, high acoustic backscatter remained near the bottom. During the presentation, in-depth discussion on how the external forcings (e.g., wind, SIC, and current) can control the vertical motion of backscatter strengths and their seasonal and interannual variabilities will be dealt with.