



Observation of topographic Rossby waves in the shelfbreak of the Chukchi Sea

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One-year-long current measurements from August 2014 at 193 m in the Chukchi Sea shelfbreak (74.80°N, 167.89°W) showed subinertial topographic Rossby waves (TRWs) around 35-hour period. The mooring was equipped with an upward-looking acoustic Doppler current profiler (ADCP, RDI WHS 600 kHz) at 58 m and a downward-looking ADCP (RDI WHS 300 kHz) at 63 m. Observations reveal bottom-intensified current fluctuations, and significant coherence between near-bottom temperature and up-slope velocity with a 90° phase lag around 35-hour periods, typical characteristics of the TRW. Theoretical estimation from in-situ measured temperature and topography data confirms that the near 35-hour period TRW with a horizontal scale of 17 km is plausible in the study area. Energetic TRWs are observed in September and October, during the sea-ice free season, while weak TRWs in other sea-ice covered months. Overall, TRW events agree well with the strong wind-stress events over the Chukchi Sea, suggesting that the TRWs are triggered by the atmospheric forcing. An exceptional TRW event in early November that has nothing to do with the wind stress appears to be caused by the interaction between background current and topography. This study implies that TRW-induced cross-shelf currents can play an important role in the seawater exchange between the shallow continental shelf and deep ocean in the Chukchi Sea.