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Diurnal Shelf Waves in the Southern Weddell Sea

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ABSTRACT

Strong evidence is presented for the existence of barotropic shelf waves at diurnal frequencies in the shelf-break region of the southern Weddell Sea. Rotary spectra from long-term current meter records on the slope, at the shelf break and on the shelf show the same rotational sense as that predicted by a barotropic model. Phase speeds of the zero-mode shelf waves calculated from tidal analysis and rotary coherencies of current meter pairs oriented in an along-shelf direction are in the same range as that predicted by barotropic theory except for the O_1 constituents. The weak stratification of the Weddell Sea in the region of the slope results in nearly barotropic motion at diurnal frequencies. The anomalous behavior of the O_1 constituent could not be explained.

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