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Tidal Internal Waves in the Bransfield Strait, Antarctica

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Observations of tidal internal waves in the Bransfield Strait, Antarctica, are analyzed. The measurements were carried out for 14 days on a moored station equipped with five autonomous temperature and pressure sensors. The mooring was deployed on the slope of Nelson Island (South Shetland Islands archipelago) over a depth of 70 m at point 62°21' S, 58°49' W. Analysis is based on the fluctuations of isotherms. Vertical displacements of temperature revealed that strong internal vertical oscillations up to 30–40 m are caused by the diurnal internal tide. Spectral analysis of vertical displacements of the 0.9°C isotherm showed a clear peak at a period of 24 h. It is known that the tides in the Bransfield Strait are mostly mixed diurnal and semidiurnal, but during the Antarctic summer, diurnal tide component may intensify. The velocity ellipses of the barotropic tidal currents were estimated using the global tidal model TPX09.0. It was found that tidal ellipses rotate clockwise with a period of 24 h and anticlockwise with a period of 12 h. The waves are forced due to the interaction of the barotropic tide with the bottom topography. Diurnal internal tides do not develop at latitudes higher than 30° over flat bottom. The research was supported by RFBR grant 20-08-00246.