Deep internal tides near steep topographies southeast of Kyushu, Japan observed by the lowered acoustic Doppler current profiler (LADCP)

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With full-depth velocity data taken in a wide area by an LADCP, ageostrophic bottom-intensified flows were observed in a thick near-homogeneous density layer below approximately 3000m depth around the steep topographies southeast of Kyushu. In this region, internal tides are known to be generated at the 3000m depth layer where the tops of the topographies penetrate into the upper density-stratified layer. Only semi-diurnal tidal waves generated there would be able to be transmitted into the abyssal layer, owing to vertically inclined energy intrusion angles with small Brunt-Vaisala frequency. In fact, the LADCP-observed current direction changes were in phase with the semi-diurnal tides, but not with the diurnal tides.