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Turning points for semidiurnal (M2) internal tides in the deep ocean BENJAMIN KING, MARK STONE, HEPENG ZHANG, MICHAEL MARDER, HARRY SWINNEY, University of Texas at Austin, ROBERT SCOTT, National Oceanography Centre, Southampton — Previous work has mentioned the possibility of "turning points" in the deep ocean, depths at which the local buoyancy frequency $N(z)$ becomes smaller than the lunar semidiurnal (M2) tidal frequency: $N(z) < \omega_{M2}$) [W. Munk, Evolution of Physical Oceanography, MIT Press (1981)]. At these hypothetical locations, incident M2 internal tides would reflect from the turning points, resulting in regions in the deep ocean that are off limits to M2 internal tides. We have conducted the first systematic search for turning points by analyzing CTD (conductivity, temperature, depth) data obtained at 18,000 locations as a part of the World Ocean Circulation Experiment (WOCE), to determine $N(z)$ on a global scale. We have found that turning points are common in the deep ocean. We also present numerical simulations of internal wave beam interactions with turning points, and solutions of the vertical mode eigenvalue problem to determine what effects turning points might have on both internal wave beams and vertical modes.

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