Abstract View

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Bottom Currents near a Small Hill on the Maderia Abyssal Plain

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ABSTRACT

Near-bottom currents at depths in exceeds of 5000 m have been measured in the Great Meteor East study area (near 31°30′N, 25°W) over a 3 year period. The sites selected were on top of a small abyssal hill, on its flank, and on the abyssal plain 30 km distant from the hill. The magnitude of the mean current 10 m above the seabed was 1–2 cm s^{-1} but its direction was quite different at the three sites and reflected the presence of a clockwise vortex trapped over the hill. On the plain the mean flow direction was to the west and directly opposed to that furnished by a β-spiral analysis of the density field. It is suggested that time dependent variations in the large-scale density field are more important than hitherto supposed.

For periods greater than 120 days the variance of the current on the plain is concentrated in the east component, and for periods 50–120 days the variance is concentrated in the north component. Fluctuations propagate *westward* at speed 1–10 cm s^{-1} but are more complex than barotropic planetary waves. From estimates of the integral time scale of these motions (6–14 days) horizontal diffusivities of between 2 and 5 ($\times 10^2$ m^2 s^{-1}) have been deduced.

Estimates of the abyssal vertical velocity on the flank and top of the hill reveal and influence of the slope of the local bottom; on the plain any signal is buried in measurement noise.