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MODE Tides

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ABSTRACT

IGPP and AOML bottom pressure measurements at four MODE stations constitute a unique set of deep-sea tidal measurements (although deployed for other purposes). A response analysis relative to a Bermuda reference has been optimized with regard to the number of complex weights and the makeup of gravitational and radiational inputs. Duplicate instrumentation on EDIE capsule gave 32.067 , 2.5° 32.074 , 2.6° for M_2 amplitude (cm) and Greenwich epoch, thus attesting the reality of measured small station *differences* (order 1 cm, 1°). M_2 tidal currents (calculated from the M_2 surface and bottom slopes) have u and v speeds of 0.5 and 0.8 cm s^{-1} , respectively, in rough agreement (both amplitude and phase) with preliminary estimates from current measurements. M_2 and K_1 tides are in accord with sonic existing cotidal and co-range charts. M_2 tides are a fraction of equilibrium magnitude, whereas M_4 , M_5 and M_6 (typically 0.07 , 0.05 , 0.03 cm) vastly exceed equilibrium values. Presumably these overtides are generated by nonlinear coupling in the world's shallow basins, from where they radiate into the global oceans to attain a level where radiative and dissipative processes are somehow balanced.

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