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Normal Modes of the World Ocean. Part IV: Synthesis of Diurnal and Semidiurnal Tides

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ABSTRACT

Diurnal and semidiurnal tides of second and third degree are synthesized from 60 normal modes with period in the range 8 to 96 h. Diurnal tides, especially those of second degree, can be represented by remarkably few modes. The principal lunar diurnal constituent, for example, consists almost entirely of a single forced mode excited mainly in the Pacific and Indian Oceans.

Semidiurnals are spectrally more heterogeneous, and more resonant, than diurnals, but some specific features can be attributed to individual modes. Several of the most energetic modes in the principal lunar semidiurnal constituent are prominent in the Atlantic Ocean. Together with the fact that diurnally excited modes are relatively weak in that region, this presumably accounts for the observed tendency for the total tide to be predominantly semidiurnal in the Atlantic but mixed diurnal and semidiurnal in many parts of the Pacific and Indian Oceans.

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