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The Structure of the Residual Flow in an Offshore Tidal Stream

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ABSTRACT

A theoretical account is given of the turbulent boundary layer at the ocean floor beneath a co-oscillating tidal flow. A parameterization, involving the techniques described by Johns and Dyke, is used to obtain an assessment of the contribution of the nonlinear advective terms in the system. In particular, the theory is applied to obtain a representation of the Lagrangian residual flow immediately above the ocean floor. This is evaluated numerically with parameters representative of the conditions in Liverpool Bay. It is found that the combined effect of the M_2 and S_2 tidal constituents leads to a predominantly northerly residual flow which can attain a magnitude of almost 3 cm sec^{-1} within 1 m of the ocean floor.

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