Abstract View

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Spectral Scaling in a Tidal Boundary Layer

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ABSTRACT

The simple scaling of a tidal bottom boundary layer by the shear velocity, u_*, and the wall to the wall describes well the mean Bow field. To test the full extent of this scaling measurements were made of the turbulence spectra in a natural tidal flow and a steady canal flow. The scaling of the turbulence spectra by the distance to the wall works only when the ratio of spectral rate to the mean shear is large. Under these conditions estimates of shear velocity u_*, based on the dissipation derived from the magnitude of the inertial range of the spectra were found to agree to within 10 percent with estimates of the shear velocity from the mean velocity profiles and Reynolds stress. Within the 10 percent error bounds no effects ascribable to time dependence in the tidal spectra discerned, and hence the simple scaling of the momentum field by u_* and z may be used for higher-order moments.