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Characterizing Turbulent Events at a Tidal Energy Site from Acoustic Doppler Velocity Observations KATHERINE MCCAFFREY[1], University of Colorado at Boulder, BAYLOR FOX-KEMPER[2], Brown University, PETER HAMLINGTON[3], University of Colorado at Boulder — As interest in marine renewable energy increases, observations are crucial to understanding the environments encountered by energy conversion devices. Data obtained from an acoustic Doppler current profiler and an acoustic Doppler velocimeter at two locations in the Puget Sound, WA are used to perform a detailed analysis of the turbulent environment that is expected to be present at a turbine placed in a tidal strait. Metrics such as turbulence intensity, structure functions, probability density functions, intermittency, coherent turbulence kinetic energy, anisotropy invariants, and linear combinations of eigenvalues are used to characterize the turbulence. The results indicate that coherent turbulence kinetic energy and turbulence intensity can be used to identify and parameterize different turbulent events in the flow. An analysis of the anisotropy characteristics leads to a physical description of turbulent events (defined using both turbulence intensity and coherent turbulent kinetic energy) as being dominated by one component of the Reynolds stresses. During non-turbulent events, the flow is dominated by two Reynolds stress components. The importance of these results for the development of realistic models of energy conversion devices is outlined.

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