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Turbulence processes induced by common seagrass species: experiments with dynamically equivalent synthetic models. ROBERT C. HOUSEAGO, University of Hull, LIU HONG, JAMES L. BEST, University of Illinois, DANIEL R. PARSONS, University of Hull, LEONARDO P. CHAMORRO, University of Illinois — The fluid-structure interaction of a dynamically and morphologically scaled flexible canopy, representative of the typical seagrass *Zostera marina*, was experimentally studied in a Refractive Index Matching (RIM) flume for unobstructed optical access. The turbulence dynamics induced by the bespoke synthetic canopy was described at various Cauchy and Reynolds numbers and compared with a rigid counterpart. Spatiotemporal characterisation of the flow was performed in wall-normal planes throughout the canopy using high-speed PIV at a frequency of 100Hz. Energetic Kelvin-Helmholtz instability and turbulent structures associated with the canopy mixing layer modulated the flow and behaviour of the structures. The deflection and waving motion of the flexible canopy blades led to distinct hydrodynamics in comparison to the rigid canopy, with enhancement and redistribution of turbulence in a frequency band mostly from the canopy top, where turbulence associated with vortex shedding from rigid canopy rods is absent in the flexible canopy. It resulted in substantial changes in the transport between above and within the vegetation canopies.

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