Abstract Submitted
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Wave, Current and Bottom Topographical Interactions in the Coastal Ocean Bottom Boundary Layer[1] ADITYA NAYAK, CHENG LI, DANIEL CHOI, JOSEPH KATZ, Johns Hopkins University — PIV measurements were performed in the inner part of the coastal ocean bottom boundary layer (BBL), at a depth of 20m. 2D velocity distributions with resolution of 4.5 mm were obtained in two 28×28 cm^2 planes, the first aligned with the current, and the second with the dominant wave direction. Filtering the reflection from the bottom facilitated velocity measurements starting from 3 mm above the seabed, fully resolving the inner part of the wave and current boundary layers. Co-located acoustic doppler velocimeter measurements were used to calculate Reynolds stress profiles by filtering out wave-induced motions from the PIV data. High-resolution sonar was used to map the bottom topography, and characterize the roughness. Several datasets, some spanning an entire tidal cycle were obtained at 6 Hz, under varying relative wave-current magnitude and directions, as well as ripple orientations. The PIV data resolved the interaction of currents and waves with the roughness, and suggested, consistent with the Grant and Madsen model, that the BBL contained two log layers with different slopes. The thicker and milder sloped log layer was part of the mean current boundary layer. Below it, a thinner layer with a higher slope was part of the wave boundary layer.

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