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Simulation-based study of air-sea momentum fluxes nearshore XUANTING HAO, LIAN SHEN, University of Minnesota — Momentum fluxes at sea surface are crucial to air-sea interactions. In nearshore regions, the bathymetry variation has a significant impact on the surface wave field and complicates the momentum fluxes at water surface. In this study, we extend a high order spectral method to address wave-bottom interactions and wave modeling. From the wave simulation data, we use the Hilbert-Huang transform to quantify the properties of the wave spectrum, based on which the wave field is reconstructed for the detailed mechanistic study of wind-wave interactions using large-eddy simulation for the wind field. The roughness of the water surface is quantified using a dynamic model for the effects of subgrid-scale waves. The results show that the waves are sensitive to the water depth variation. Associated with the changes in the wave field, the momentum fluxes at the air-sea interface increase in shallow regions.

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