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Coupled Wave, Current, and Morphology Approach for Accurate Coastal Flow Simulation H.S. TANG, Dept. of Civil Eng., City College, City Univ. of New York, NY, NY 10031, T.R. KEEN, Naval Research Lab., Oceanography, Stennis Space Center, MS 39529 — Accurate simulation of coastal ocean flows is now urgently needed but this is challenging because in general the flows are multi-physics and multi-scale in nature. In this study we adopt a multi-physics approach by coupling models individually designed for different phenomena. Particularly, wave, current, and seafloor morphology models are coupled in a simultaneous manner. The system of governing equations consists of the wave action equation, the shallow water equations, and the Exner equation, which are the framework for actual models such as SWAN and SHORECIRC. Flux limited version of Roe scheme is derived to discretize the system for high-resolution solutions. Numerical experiments will be presented for validations of the scheme, and example simulations such as wind driven sand dune evolution will be demonstrated for the performance of the coupling system.

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