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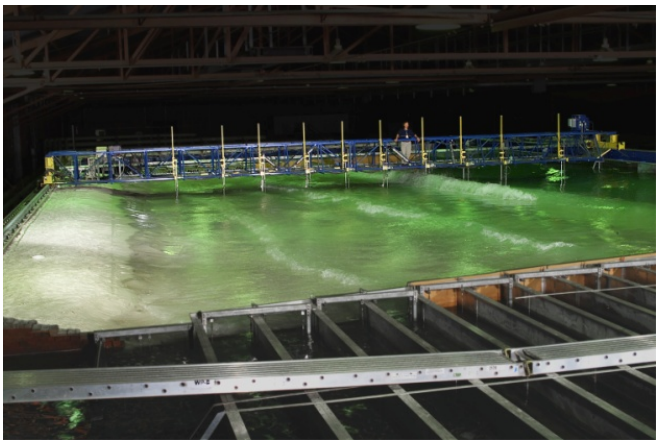
Swash Zone Waves, Current, and Sediment Transport (FY20)



Background: The Coastal Modeling System (CMS) is widely used by U.S. Army Corps of Engineer's Districts for planning, design, navigation O&M, and research studies. The importance of accuracy in numerically simulating nearshore processes is clear considering that the primary impact of storms occurs in the nearshore area, and predicting the extent of flooding and nearshore morphology change is fundamental to the USACE mission. The accuracy of coastal morphology models, however, is inadequate and calculated results can be in gross-error due to oversimplifications in suspension or transport. Furthermore, littoral transport includes both wave breaking and current-dominated processes typical of inlets. The morphological model implementation is largely untested, and the formulation is based on a narrow set of breaking-dominated experiments that may not be appropriate across this range of conditions related to inlets. Additionally, the lack of proper swash zone formulation limits the accuracy of shoreline change and dune predictions.

Approach:

- Compare CMS predictions with detailed laboratory data including a suite of waves, current, sediment transport, and associated morphology change.
- Evaluate wave-induced sediment transport in the surf zone using field data (FRF, Ogden Dunes, IN).
- Develop an extension of the C2SHORE model that permits hydrodynamic predictions and the associated transport and morphological change in the swash zone.

Technical Advancements: Two modules in calculating nearshore processes have been incorporated in the CMS. Testing, validation, and development will enhance CMS' capabilities in predicting nearshore berm migration and sediment transport, leading to a practical and reliable predictive technology.

Payoff: The effort will result in improved predictive technology through the systematic comparison of model and data and targeted development.

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