US Army Corps of Engineers®
Engineer Research and Development Center

Coastal Inlets Research Program

Coastal Modeling System:

Coastal Model Test Bed & Optical Current Validation

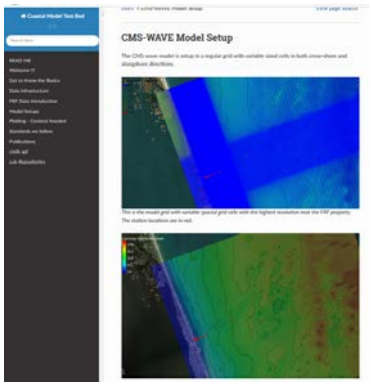
Need

During development, nearshore numerical models are tested over selected, oftentimes limited validation cases. The limited number of validation cases is due to the high cost of data collection. During this validation, model parameters may be tuned to fit these limited instances. Problems lie in that the true breadth of physical conditions may or may not be encapsulated in the discrete number of verification mistuned or model errors are not fully understood. By leveraging the data collection ongoing at the FRF and automating evaluation, the associated cost of validation data drops significantly and the breadth of validation increases substantially.

Approach

- Run numerical models (CMS) in real-time, during all conditions, building a rich data set
- Quantify performance of Optical Current Measurement technique (Chickadel 2003) using in-situ measured data
- Perform model-data comparisons on those in situ data and remotely sensed data

Technical Advancements



Running the CMS models in near real-time in a data-rich environment and evaluating the results provides quantification of the errors associated with model and uncertainties associated with models' assumptions. As more models are incorporated into CMTB, collective results will help highlight model components that need refinement.

1) Improved physical/empirical relationships in numerical models
2) Unique model data comparison tool using the Optical Current Meter technique for nearshore circulation
3) Key component of robust Verification, Validation, and Uncertainty Quantification (VVUQ)
4) Establish best practice guidance for users

Leveraging Opportunities

Leveraged with ongoing effort funded by USACE Coastal Ocean Data Systems (CODS) research program. Collaborative effort with ongoing academic research with Woods Hole Oceanographic Institute (WHOI) and University of Washington (UW).

Point of Contact

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Community of Practice (CoP)

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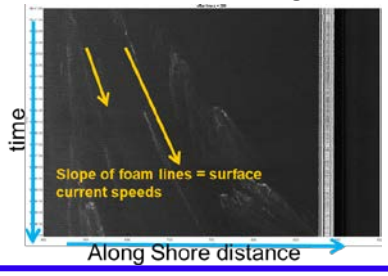
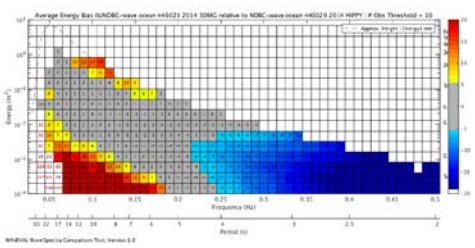
Reference

Chickadel, C. C., Robert A. Holman, and Michael H. Freilich. "An optical technique for the measurement of longshore currents." *JGR: Oceans* 108.C11 (2003).





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