US Army Corps of Engineers®
Engineer Research and Development Center

# Coastal Inlets Research Program

## Coastal Modeling System:

### *Coastal Inlet and Nearshore Evaluation and Development of CMS & C2SHORE*

**Need**

The importance of accuracy in modeling nearshore processes is obvious 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. Users of CMS require its ability to simulate waves, hydrodynamics, sediment transport, and morphodynamics in nearshore zone to address problems related to shoreline erosion, to design and assess nearshore placement of dredged sediment material and beach nourishment projects, and to predict seasonal onshore-offshore bar migration. The present C2SHORE model implementation and the existing algorithms to calculate surf/swash zone cross-shore processes in the CMS are largely untested, and the formulation based on a narrow set of breaking-dominated experiments also needs to be examined across the range of wave and hydrodynamic conditions.

**Approach**

- Compare LSTF data with the two surf/swash zone modules in the CMS and check the sediment mass balance in the flow module.
- Compare the CMS model and the detailed FRF array data.
- Evaluate RIOS wave, current, and bathymetric inversion datasets and select optimal timeframe to test CMS and C2SHORE.
- Select a current-dominated, tidal inlet case to compare the CMS and C2SHORE sediment models.

**Technical Advancements**

Two modules in calculating nearshore processes have been incorporated in the CMS. Testing and validation of the modules will enhance CMS' capabilities in predicting nearshore berm migration and sediment transport. The degree of accuracy in the components of mean velocity will indicate deficiencies in the predictions that impact the skill in nearshore sediment transport predictions.

**Leveraging Opportunities**

This work is leveraged against ongoing work in the nearshore processes project and the evaluation of nearshore berm placement project, which are funded by the CIRP, Flood & Coastal Systems, Coastal Ocean Data Systems, and RSM Programs.

**Point of Contact**

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**Community of Practice (CoP)**

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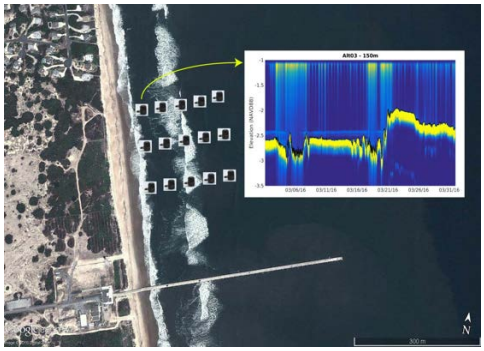

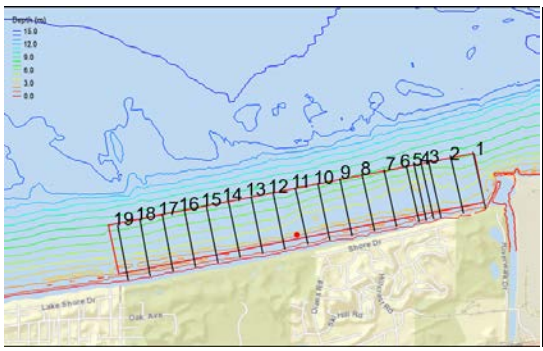


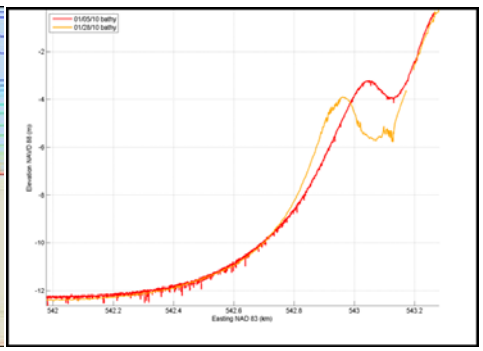

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