US Army Corps of Engineers
Engineer Research and Development Center

Nearshore Processes

Need

The importance of accuracy in modeling nearshore processes is obvious considering that the primary impact of storms occurs in the nearshore arena, and predicting the extent of flooding and nearshore morphology change are fundamental to the USACE mission. Breaking waves are the primary mechanism for sand suspension, and the most striking morphological changes are driven by nearshore hydrodynamics. Despite the obvious importance, the surf zone sediment transport and morphology change remain poorly understood and predictive technologies are reliant on sparse data for calibration. Indeed, the problems are compounded in the swash zone. Runup levels determine structural damage and swash can dominate the sediment transport. The effects of winds and pressure and radiation stress as part of the total water level has reached some degree of maturity. However, an estimate of water level and damage that is based on surge and wave setup alone will be in gross error without an account of the wave runup and nearshore morphology

Approach

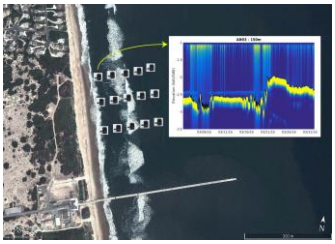
The objective of the Nearshore Processes WU is to bring the vast data resources and capabilities of the FRF to fruition in new and improved numerical modeling technology. This effort is focused on a new data collection campaign, the development of improved nearshore surf and swash algorithms, and rapid evaluation of model alterations with the Coastal Model Test Bed. It is expected that improvements and advances in the CSHORE family of models will follow directly from this comprehensive work

Outcomes

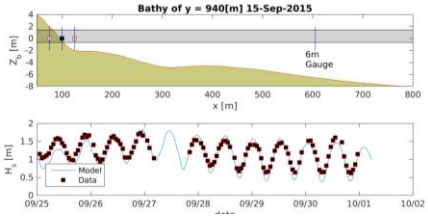
New array of bottom-tracking instruments to provide **time-series of seafloor elevation** that supplement the monthly FRF surveys and hydrodynamic instrumentation

Adding CSHORE family of models to the Coastal Model Test Bed with measured morphology change allows for **rapid assessment of nearshore morphology models**

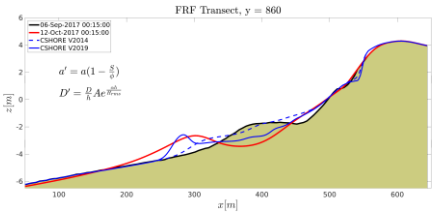
Developing new phase-averaged nearshore sediment transport algorithm. With a basis in the extensive historic and new FRF data, **implementing new transport formulations in the CSHORE family of models will allow for rational longer-term morphology prediction.**



New FRF altimeter array provides real-time bottom position data



Comprehensive model and data comparisons including wave, hydrodynamics and morphology



New phase-averaged sediment transport under development

More Information

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