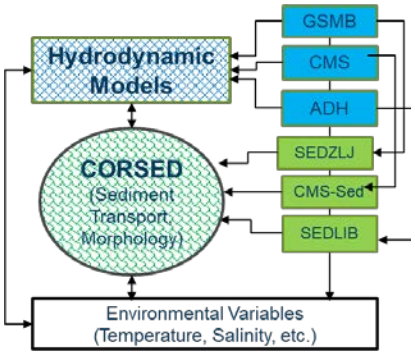
US Army Corps of Engineers®
Engineer Research and Development Center

Coastal Inlets Research Program

Coastal Modeling System:

CORSED Consolidated Sediment Transport Code

Need



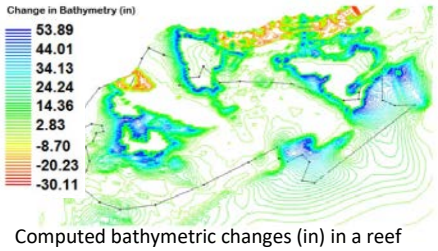
CORSED-driven Processes and Modules

ERDC maintains multiple sediment transport codes developed by different teams for differing purposes. Each code has advantages and limitations. The SEDZLJ code was originally developed to simulate transport of predominately fine-grained (silt/clay) cohesive sediment in current-dominated environments. SEDZLJ has been modified by ERDC for mixed sediment transport (sand/silt/clay) in coastal environments. SEDZLJ is the ERDC workhorse code for cohesive sediment transport in stratified coastal systems. Another ERDC developed sediment transport code is SEDLIB which was developed to simulate multi-grain transport in rivers and creeks. SEDLIB was specifically designed to simulate transport and mixing of multiple sand classes. SEDLIB has mostly been applied for reimbursable projects as a sand transport code in riverine systems. Coastal and estuarine capabilities are currently being readied for field use. ERDC has invested significant manpower and funding to developing two alternative sediment transport codes. What is required is one consolidated sediment transport code (CORSED) which operates across multiple hydrodynamic platforms and permits user-selected features from both SEDZLJ and SEDLIB. This unitary library code will permit ERDC to compete efficiently with other models and provide the best transport predictions to clients in a cost effective manner.

Approach

- Modularize existing sediment transport codes (SEDZLJ, SEDLIB, and CMS).
- Restructure hydrodynamic models (EFDC, GSMB/CH3D, etc.) so that they are able to drive modularized sediment transport libraries.
- Fill gaps between models/modules using additional linkers.
- Perform verification and validation of models by simulating benchmark problems, and compare results simulated by old and new codes.
- Standardize version control and model release.
- Develop user-friendly GUI for model application.

Technical Advancements



Computed bathymetric changes (in) in a reef

The advancements and benefits of this research include: 1) constructing a comprehensive CORSED library framework that includes all functional capabilities of both SEDZLJ and SEDLIB, 2) developing a flexible and adaptable framework for incorporating new sediment transport process algorithms into a documented sediment transport library, 3) providing a framework in which sediment transport modelers from across USACE can incorporate new sediment process methods in a documented, flexible, and version-controlled environment, 4) fostering collaboration between presently disparate sediment transport groups in ERDC, and 5) a team of CORSED users within ERDC who are familiar with complexities associated with cohesive sediment transport model application.

Leveraging Opportunities

This project will provide USACE projects which require sediment transport modeling to utilize one flexible and adaptable sediment transport framework. The sediment transport library will operate across hydrodynamic frameworks typically used by ERDC for reimbursable projects and research, including ADH, GSMB, and CMS. In addition, this project will develop a team of sediment transport modelers who understand the complexity of sediment transport and enable to provide engineering solutions.

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Community of Practice (CoP)

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