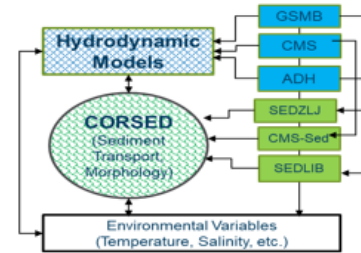


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CORSED Consolidated Sediment Transport Code (FY20)

Background: 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 at the University of California at Santa Barbara for the EPA in order 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 waters, estuaries, harbors, lakes, and rivers. Versions of SEDZLJ exist which include transport of contaminants which adsorb to fine-grained sediments. This code has been applied for multiple reimbursable projects, predominately funded by EPA. SEDZLJ reimbursable projects are performed in the EFDC and GSMB hydrodynamic models. Another ERDC developed sediment transport code is SEDLIB which was developed to simulate multi-grain transport in rivers and creeks. SEDLIB operates primarily within the ADH model. SEDLIB was designed to simulate transport and winnowing of multiple sand classes. SEDLIB also includes cohesive sediment transport algorithms, although these have not been exercised sufficiently in real-world applications.



CORSED-driven Processes and Simulation Modules

Approach: The purpose of this research is to develop a unified mixed sediment transport library (CORSED) that 1) will have the broad applicability required to address a wide range of sediment transport issues addressed by ERDC in rivers, estuaries, and coastal seas, and 2) be linked to the following ERDC hydrodynamic and transport models: ADH, CMS, and GSMB. CORSED will include SEDLIB, the sediment transport library in ADH, and SEDZLJ, the sediment transport model in GSMB. Both CORSED and the linkage of CORSED to the listed hydrodynamic and transport models will be thoroughly tested using both laboratory and field scale data sets. The first version of CORSED will have little overlap between the two libraries (SEDLIB and SEDZLJ-Lib) with their own interfaces. A unified interface to CORSED will be constructed that is forward looking to allow for additional inputs needed by other sediment routines to be included in future efforts.

Technical Advancements:

- A CORSED library framework that includes all functional capabilities of both SEDZLJ and SEDLIB.
- An adaptable framework for incorporating new sediment transport process algorithms into a documented sediment transport library.
- A framework in which sediment transport modelers from across USACE can incorporate new sediment process methods in a version-controlled environment.

Payoff: The benefits include: 1) fostering collaboration between disparate sediment transport groups in ERDC; 2) a comprehensive CORSED library that includes capabilities of both SEDZLJ and SEDLIB; 3) an adaptable framework for incorporating new sediment transport process algorithms into a documented sediment transport library; and 4) a team of CORSED users within ERDC who are familiar with complexities associated with cohesive sediment transport model applications.

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Coastal Inlets Research Program



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