



FY20 RSM IPR

ERDC, CORSED Consolidated Sediment Transport Code E Hayter / J Gailani

BLUF: Develop CORSED, a sediment transport library that includes multiple ERDC-maintained sediment transport codes and permits application across several hydrodynamic platforms (see Fig. 1).

Challenge/Objectives

- Developing the standalone CORSED library that includes SEDZLJ-LIB and SEDLIB
- Linking the library to CMS, AdH & GSMB

Approach

- Modularize existing USACE sediment transport codes into a single library (SEDZLJ and SEDLIB).
- Develop linker code to couple library with each hydrodynamic code (AdH, GSMB, CMS)
- Perform V&V of CORSED.
- Standardize version control and model release, and develop user-friendly GUI/documentation.

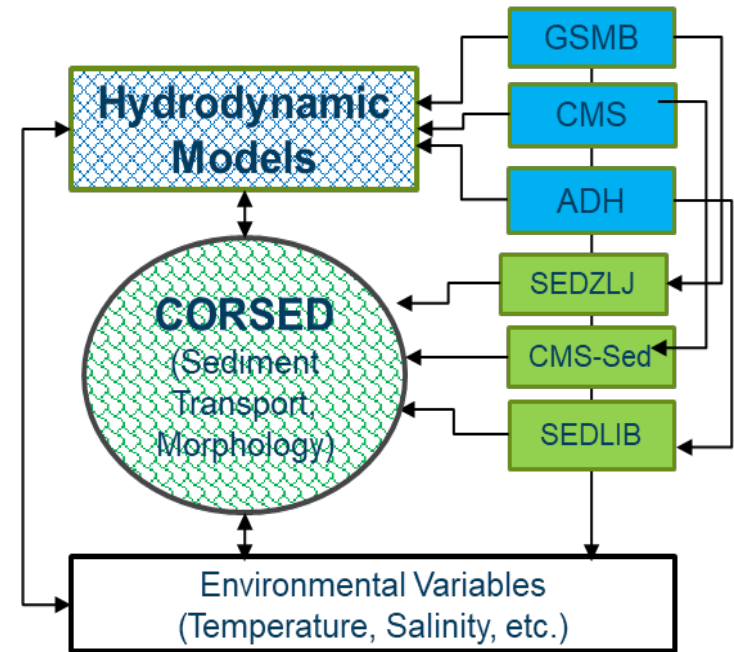


Fig. 1. CORSED-driven processes and simulation modules

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District/Other USACE PDT Members

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Leveraging/Collaborative Opportunities

USACE projects which require sediment transport modeling will utilize one adaptable sediment transport framework which is independent of the hydrodynamic platform. CORSED is part of the CHL model modernization initiative and is supported by multiple programs. Technologies will be transferred directly to key districts and training in the use of CORSED will be provided in FY22.

Stakeholders/Partners



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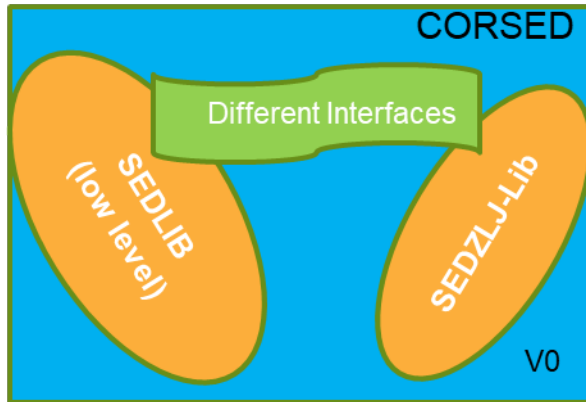


Fig. 2a – Initial CORSED Structure

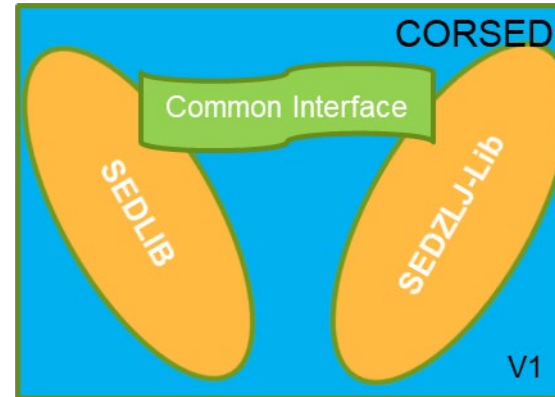


Fig. 2b – Second CORSED Structure

Accomplishments/Deliverables & Lessons Learned

- Developed and verified SEDZLJ-Lib-v1, develop linker code to GSMB, thoroughly test both SEDZLJ-Lib-v1 and the linkage to GSMB.
- Developed and tested the initial CORSED sediment transport library structure shown in Figure 2a. This task developed a platform-independent library that combines, with different interfaces, two ERDC sediment transport codes: SEDLIB and SEDZLJ. Figure 2b shows the structure of the next version of CORSED to be developed in a future R&D project.

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What challenges did you face to get your project to implementation and how did you move past them? If not yet implemented, what is your path forward to construction? (Give us your lessons learned that you think might benefit other Districts)

- **Challenges to Achieve Project Objectives**
 - Limited in-house expertise for sediment transport code development and model application
 - Limited in-house expertise on library development (one in EL and one in CHL)
 - Multiple sediment transport models with different independent development teams

- **Solution requires two actions**
 - Develop a cross-laboratory research team familiar with sediment transport
 - Development of in-house expertise underway
 - ▶ Train at least one new computer scientist in the development of libraries.
 - ▶ Train/Mentor younger engineers/scientists in a) scientific code development, b) knowledge of sediment transport processes, and c) correctly applying existing computer models to sites.

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**How is this project benefiting the USACE and Nation?
(efficiency, monetary, technical, relationship building, outreach, etc.)
(Volume of sediment to be managed, Acres created, etc.)**

The advancements and benefits of this research include:

- **Fostering collaboration between presently disparate sediment transport groups in ERDC that results in the development of a cross-laboratory research team familiar with sediment transport modeling;**
- **A comprehensive CORSED library framework that includes all functional capabilities of both SEDZLJ and SEDLIB;**
- **A flexible framework that permits ERDC sediment processes R&D to be efficiently developed, tested, integrated into practice, documented and distributed to users;**
- **A framework for collaboration with external sediment transport researchers – developing a broad, national user base which advances state-of-practice;**
- **A team of CORSED users within ERDC who are familiar with complexities associated with cohesive sediment transport model applications; and**
- **Cost savings and efficiency associated with reducing the number of sediment transport platforms maintained by USACE.**