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## A Model Archive for Simulations in a Partially-Mixed Idealized Estuary using the COAWST System: Model Code and Output

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## Dataset Information

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### Academic Department and/or Research Group:

Virginia Institute of Marine Science

### Title of Dataset:

A Model Archive for Simulations in a Partially-Mixed Idealized Estuary using the COAWST System: Model Code and Output.

### Publication Date:

2019

### Description:

These files are input files, model code and output used for an associated publication in the *Journal of Marine Science and Engineering* (see below). Compressed files with the .gz file extension can be opened with Gzip GNU software (open source). Compressed files with the .tar file extension can be opened with Gzip Tar software (open source). Many of the input and output files use the NetCDF (Network Common Data Form) file format and these files have “nc” as a file extension and can be read using a variety of open source tools: see <http://www.unidata.ucar.edu/software/netcdf/docs/>.

The reference run included all three cohesive processes (bed consolidation, flocculation and sediment-induced stratification) and is denoted as "ref". All other runs are indicated by the cohesive processes included in the run, for example oceans\_sed\_bed.nc is the output file for the model run that incorporates bed consolidation and sediment-induced stratification but not flocculation. The abbreviations are: “bed” for bed consolidation, “sed” for sediment-induced stratification, “floc” for flocculation, “3cls” for 3 sediment classes, and “5cls” for 5 sediment classes. COAWST (Coupled Ocean Atmospheric Wave Sediment Transport) version 3.2 was used for these simulations. For access to the COAWST modeling system source code, see [https://coawstmodel-trac.sourcerepo.com/coawstmodel\\_COAWST/](https://coawstmodel-trac.sourcerepo.com/coawstmodel_COAWST/).

**File Description Table:** Use this table to describe your individual files and/or folders, add rows as needed.

File Name	Description
oceanrst_sed2.nc	Input file – Sediment spin-up output with 11 size sediment classes used for reference case runs
oceanrst_sed_floc_3cls.nc	Input file – Sediment spin-up output with 3 sediment size classes used for sensitivity test
oceanrst_sed_floc_5cls.nc	Input file – Sediment spin-up output with 5 sediment size classes used for sensitivity tests
ocean_ref.in	Input File – Model run information for the reference case run
sediment_york.in	Input File – Sediment transport for 11 size sediment class cases
sediment_york_3cls.nc	Input File – Sediment transport for 3 size sediment class case

sediment_york_5cls.nc	Input File – Sediment transport for 5 size sediment class case
coawst.bash	Model Code – Script to compile model code
estuary_test2.h	Model Code – Header file containing ROMS model implementation setup
ana_fsobc.h	Source Code – File setting the tidal height on the western boundary
ana_grid.h	Source Code – File setting the idealized estuary grid
ana_m2obc.h	Source Code – File setting the river discharge
ana_tobc.h	Source Code – File setting the temperature and salinity values at the boundaries
trunk	Source Code – Directory that contains the ROMS model code
oceanhis_ref_v2.nc	Model Output – Model output for reference case
oceanhis_bed_sed.nc	Model Output – Model output for the no flocculation case
oceanhis_bed_floc.nc	Model Output – Model output for the beginning of the no sediment-induced stratification case
oceanhis_bed_floc2.nc	Model Output – Model output for the end of the no sediment-induced stratification case
oceanhis_sed_floc.nc	Model Output – Model output for the no consolidation case
oceanhis_floc_3cls.nc	Model Output – Model output for the 3 size sediment class case
oceanhis_floc_5cls.nc	Model Output – Model output for the 5 size sediment class case

**Abstract:** This dataset includes model input, code and output used in the publication Tarpley et al. (2019, *Journal of Marine Science and Engineering*), which used a coupled hydrodynamic-sediment transport model to investigate the roles of flocculation, bed consolidation and sediment-induced stratification on changes in fine-grained sediment distribution in an idealized estuarine model. The modeling system used in the development was the Coupled Ocean-Atmosphere-Wave-Sediment Transport (COAWST) framework.

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**Keywords:**

Sediment transport, Coupled Ocean-Atmosphere-Wave-Sediment Transport (COAWST) model, cohesive sediment, numerical modeling, flocculation, bed consolidation, sediment-induced stratification

**Associated Publications:**

Tarpley, D.R.N., Harris, C.K., Friedrichs, C.T., Sherwood, C.R. (2019). Tidal variation in cohesive sediment distribution and sensitivity to flocculation and bed consolidation in an idealized, partially mixed estuary. *Journal of Marine Science and Engineering*.

**Publication Statement:**

Author contributions: 1. Tarpley – Model development, implementation and analysis. 2. Harris – Oversaw all aspects of model development. 3. Friedrichs – Oversaw aspects of experiment design.