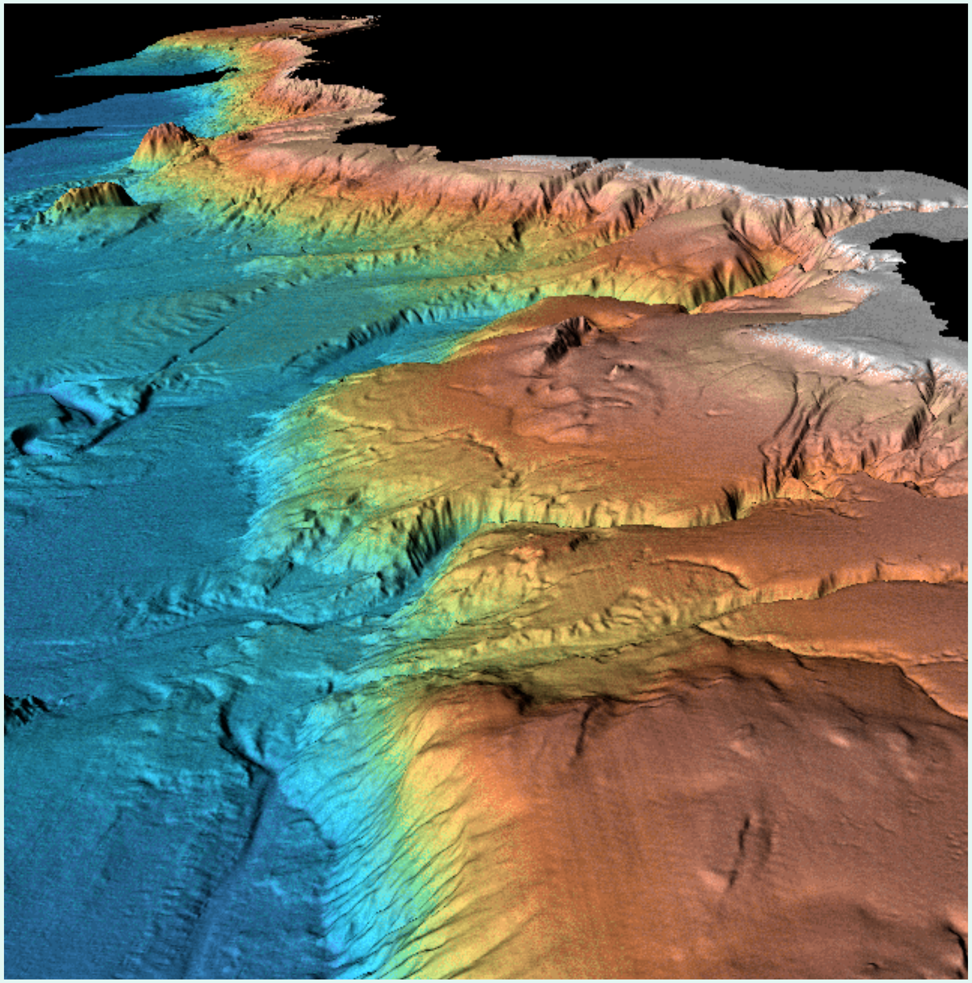
Marine Working Group

- Shelf (with estuaries?)
- Slope
- Deeper marine basins
- Carbonate systems
- Short and long time scales



From L. Pratson

Marine Working Group

Intermediate-term goals:

- Populate the marine component of CSDMS with a core set of high-priority models that have been documented and evaluated
- Test the coupling of 2-3 models for functionality and utility.

Long-term goals:

- Develop a proof-of-concept project that extends beyond the marine realm
- Assure that CSDMS has a toolbox of marine models that will serve the needs of research, education and management users.

Marine WG Meetings

March 2008 (Orlando)

- *Scope and knowledge (model) gaps, priorities*
- *Proof-of-concept ideas*

February 2009 (Charlottesville)

- *Required elements to be useful for individual, group and/or proof-of-concept applications*
- *Proof-of-concept ideas focused on shelf processes*

October 2009 (Boulder)

- *Slope and deeper marine models and gaps*
- *Proof-of-concept ideas focused on slope&deeper*

MWG priorities for new CSDMS capabilities

- Circulation and wave models, particularly ROMS (hydrodynamics, currently not modular) and SWAN or WWIII (waves)
- Develop a common framework for obtaining gridded land/sea surface elevation and for attaching soil/ sediment properties to this grid and that can be augmented with deeper cells for strat/morph modeling (similar to SedFlux).
- Develop a method for generating gridded and/or time series input data needed to run the models in CSDMS (e.g., SST, wind speed & direction, tides, waves, river mouth discharge, sediment characteristics of seafloor)

Characteristics of ideal proof-of-concept projects

- 2-way coupling (feedbacks)
- Link marine with coastal, estuarine and/or terrestrial processes
- Elements that can be tested against data
- Better done within CSDMS than by an individual/group working outside this framework
- Model elements are in CSDMS or exist in forms that can relatively easily be brought into CSDMS. Ideal if modular enough that as new models are added, they could replace or add to others being used in the project.
- Inputs and outputs identified in such a way as to make it easy to plug things in and out.

Proof-of-concept ideas

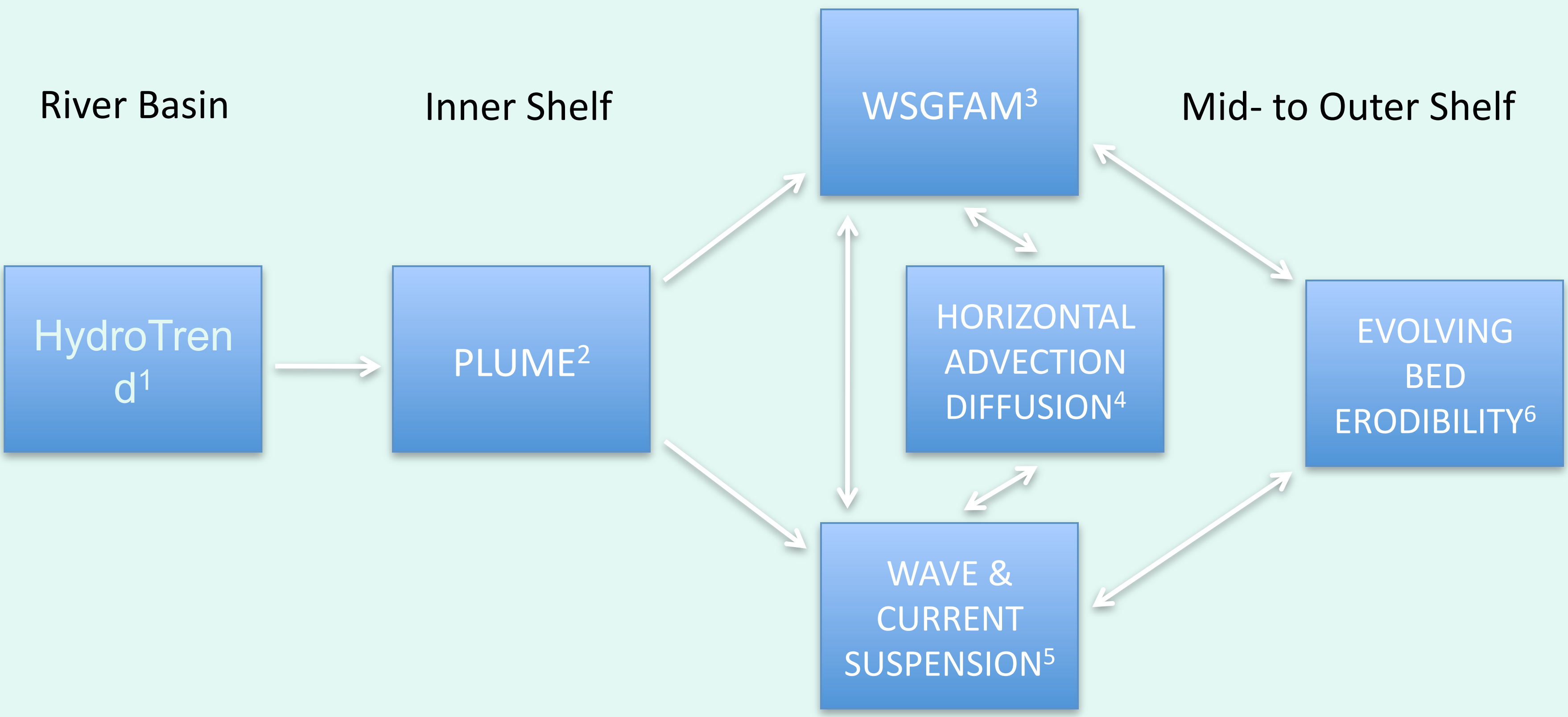
Linking marine with coastal and/or terrestrial:

- Changes in river mouth morphology through time and effect on river plume discharge and flood deposition
- Feedbacks between delta morphology, sediment dispersal and wave climate
- Subsidence associated with degradation of organic matter
- Rapid tectonic uplift (perhaps earthquake induced) and consequent effects sediment production
- Tropical muddy deltas where physical setting is forcing unusual biogeochemistry

CSDMS Proposal to NSF (Friedrichs & Wiberg, Submitted):

"Developing a Quantitative Understanding of Mud Dispersal Across and Along a Suite of Continental Shelves"

Proposal to link existing, downloadable, open source sediment transport models:



<u>Appropriate, relatively simple, open-source, physics-based component models are freely available:</u>

1) Kettner & Syvitski (2008), http://csdms.colorado.edu/
2) Hutton & Syvitski (2008), http://csdms.colorado.edu/
3) Friedrichs & Scully (2007), http://csdms.colorado.edu/
4) Roelvink et al. (2006), http://www.xbeach.org/
5) Traykovski, Wiberg, Geyer (2007), http://svn1.hosted-projects.com/cmgsoft/sstm/
6) Sanford (2008), http://www.sciencedirect.com/ (as electronic appendix)

Feedbacks between delta morphology, sediment dispersal and wave climate

Necessary model components:

1. Riverine discharge (e.g., HydroTrend)
2. Plume sediment settling (e.g., Plume)
3. Sediment gravity flows (e.g., WSGFAM)
4. Wave-current resuspension (e.g., SSTM)
5. Advection-diffusion (e.g., XBeach)
6. Bed consolidation (e.g., Sanford model)
7. Net deposition and erosion

Model forcing/boundary conditions:

- Drainage basin properties, bathymetry, waves, winds and wind-driven currents, tides