Marine Models in CSDMS

Circ: 2DFLOWVEL (C), ROMS, POM, Symphonie

Wave: WW3

Morph: Fanbuilder

SedTrans: Sedtrans05

Sedim: GPM, Dionisos, SedPack, Simsafadim, Sedflux, Sedsim, SimClast

GravFlow: Bing, Inflow, Sakura, Wsgfam, Gvg3dp

Sub: Compact, LithFlex1, LithFlex2, Subside

Source: Plume

Misc: Bio, Diffusion

Coastal: BarSim, CstASMITA,

Integrated: Delft3D

Carbonates: CarbGPM, FuzzyReef

Marine Modeling Data Needs

- Sea-surface temperature
- Winds (speed, direction, wind stress)
- Tides
- Waves
- River mouth discharge
- Sediment characteristics of seafloor

Gravity-driven transport in CSMDS

Many approaches (DNS, 1D avg'd Chezy balance)

CSDMS needs 2D (spatial), depth-avg'd models for turbidity currents, debris flows

- Several suitable models exist but are not yet in CSMDS

Failure conditions also have to be formulated in 2D

- Lee's GIS approach may be suitable, extends formulation currently in SedFlux

Proof-of-concept ideas

- River-ocean coupling in Arctic

- Gully formation on continental slope, related to sediment failure and feedback with pore pressure

- If models are capable of channel formation, how large would a basin have to be to have a channel run through it?

- Couple debris flow and turbidity current models (hard to do)

- Deformation of sea floor and feedbacks to deposition and stratigraphy

- Compare geometric models and process models of basin sedimentation

Priorities

1. Development of SedGrid to support a range of marine and coastal/terrestrial modeling projects

2. Addition of 2D, depth-averaged gravity flow models (turbidity currents and debris flows) to CSDMS; also 2D failure criteria

3. Create searchable model database

4. IRF and link SedFlux components with SedGrid