

Discussion page Coastal Working Group (WG)

At the March 8 meeting of the Coastal Working Group, we initiated the discussion about *possible proof-of-concept projects*, one of our short-term goals listed in the Strategic Plan:

- ?Define proof-of-concept questions?questions that require linking together models of different environments, preferably spanning between coastal and terrestrial or marine environments. These should be examples of types of interesting and relevant scientific questions, but should have known answers, to allow evaluation of the pilot modeling endeavor.?

Although most of the Working Group members had not yet considered what projects could meet the criteria listed above, the Chair tossed out one example:

- How do land-use changes in hillslope/mountain environments affect coastline evolution, via altered fluvial sediment loads? The evolution of the Ebro Delta, Spain provides one known instance that we could try to reproduce, in which progressive deforestation in the mountainous watershed lead to the emergence of the delta, where an estuary previously indented the rocky coastline (Montsia Museum, Ebro Delta, Spain). Subsequently, reforestation and development in the watershed have reduced sediment loads, apparently causing the balance between wave driven sediment transport and fluvial delivery to shift and leading to a shift in the morphological evolution of the delta (Ashton and Murray, Coastal Dynamics ?05), producing the current distinctive shape (Figure below).



A proof-of-concept project should involve modeling challenges, and yet should be achievable within 5 years; models of the component environments should already exist. For the Ebro Delta example, candidate models would include the CHILD and Ashton-Murray models of terrestrial and coastal landscape evolution, respectively, and the moving-boundary nature of the coupling would provide a significant challenge.

Working group members stated that impressive data sets are available to evaluate this modeling project, ranging from millennial scale to modern processes, and that coupled models that were successful in this case study could also be applied to other wave-influenced deltas including the Brazos and Danube deltas. Working Group members agreed to propose other possibilities, and to discuss them in coming weeks and months.

This wiki page can serve as the venue for these discussions.

Update: At the Feb. 2009 meeting we discussed this and other proof-of-concept possibilities (see report, under 'reports' from the Coastal WG page).

With the help of Eric Hutton at the Integration Facility (Eric is the go-to person for the Coastal WG), we (esp. Andrew Ashton) are working on an offshoot of the idea above; we are linking SedFlux3D, a dynamic avulsion model following that of Jerolmack and Paola, and the Coastal Evolution Model, to explore basic questions

about how fluvial and coastal processes interact.

A proposal more directly addressing the Ebro-delta related questions above will also be resubmitted soon, and plans are underway for other proposals arising from the discussions at the Feb. 2009 meeting.

Our tasks:

1) Contribute our models (all sorts) to the list of coastal models (available from the Coastal WG page, or the ['Models' page](#)). The first steps are easy! Just fill out [the Model questionnaire](#) (our leader James Syvitski says if you spend more than half an hour at the first go, you're taking it too seriously. You can embellish it later via the wiki), and contribute the code. Ultimately, form models that are appropriate for linking to other models, the code should be broken into Initialize, Run, Finalize--see the [CSDMS handbook](#), from the ['Help' page](#)--but that isn't a condition for submitting a model. We would like to make science easier for everyone by making models available to all, whether they are simplified and abstract (even analytical), or detailed and application oriented. Not all the models need to be slated for eventual link-ability.

2) Generate proposals for projects requiring the model linking that CSDMS facilitates. Such proposals will need to address compelling science questions, of course, but the CSDMS connection will be a strong Broader-Impacts element.

We can use this page to discuss all of these goals and issues. Do you have comments about models or types of models that should be added (contributed)? Do you have ideas for proof-of-concept projects, either those that would make good proposals, or those that might be prioritized for the CSDMS resources (i.e. Eric Hutton's time and assistance)?