Candidate Recommendation

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ORIGINAL BIG IDEA

How does coastal morphology change as a result of the interaction of sea level rise, subsidence, shoreline geodynamics, fluvial sediment and water supply, ecosystem dynamics, built environment and coastal hazards, and how do we best manage it for benefit of coastal populations?

What is your specific* recommendation?

(* Don't be abstract, general, or try to do too much in your recommendations. Try to be specific, actionable, stand alone)

Promote convergent investigations of responses of coastal morphology and ecosystems to the interactions of SLR, subsidence, shoreline and ecosystem dynamics, the built environment and coastal hazards (storms, tsunamis etc.). Focus on several distinct coastal areas where multiple data sets are already collected and support comprehensive collection of missing components. Don't focus on just "natural sciences" data. Include humanities, economics and social science data in these evaluations. Data sources need to be broad and interdisciplinary:

- Natural sciences data: water flow (USGS), suspended sediment, sediment budgets, wave climate, ecological mapping and dynamics, weather (NWS), subsidence rates, bathymetry (NOAA/NOS), groundwater, coastal zone soil survey (NRCS), ADCP, LiDAR, and economics etc. to quantify and model coastal changes and evolving hazards.
- Humanities and social science data: archival research, archaeological data, historical records, oral histories, ethnographic surveys, user surveys, etc.
- Economic data and modeling: fisheries records, valuation of ecosystem services, land and real estate values.
- Develop early and active collaboration with managers and stakeholders to inform critical concerns that focus research questions. Provide incentives for participation of stakeholders.
- Involve citizen scientists in coastal change measurements and monitoring to enhance the scope of the research and enrich community engagement, outreach and education on coastal change issues.

With regards to coastal geomorphology change, support:

- Projects that fill in gaps in knowledge where other datasets are already available,
- Projects that compile disparate regional data and make it available (i.e., that incorporate and publish Surface Elevation Table data from a region; needed in Maryland, already available in Louisiana).
- Projects that utilize and incorporate multiple of these datasets as well as various collaborators with expertise relating to these very different datasets.
- Projects that explicitly identify feedbacks, nonlinearities, and tipping points for coastal geomorphology, ecosystems and communities.

Incorporate the utilization of multiple and differing datasets in the evaluation of projects. Aim for comprehensive integration of data sets and modeling. In addition to data collected at a research location, include in the evaluation the inclusion of linked data such as from the upstream catchment area supplying water, sediment, and contaminants to the main focus areas.

Why is it valuable?

Who does it impact? How? How will the world be better? Who are the stakeholders and who will you partner with to make it stronger?

Much coastal planning is based on static morphology/ecology and a “bathtub” model of sea level rise. Understanding coastal processes and dynamics will help us to predict ecosystem migration/loss and coastal risks and identify opportunities to promote resilient coasts and communities.

Understanding how the built environment alters morphologic and ecological response to climate change will promote and support more proactive planning and responses by coastal communities in place of reactive planning and responses. This will help fill the need to avoid mitigation that actually makes the problem worse by being able to predict consequences of different societal and cultural responses on appropriate time scales. It will also provide needed context for evaluating the use of nature-based solutions, such as marshes, mangroves, coral reefs, oyster reefs, sand dunes and beaches, to reduce risks and promote coastal resilience.

Understanding how the landscape dynamically changes will improve modeling of storms and their impacts in the future, beyond including just sea level rise.

It is useful to have a place in which both the forcings (bio-physico-chemical) and the container (the morphology of the coastal zone on both sides of the shore and the type of substrate) are stored. This place will have to be accessible by anyone (stakeholders, scientists, any citizen). Consider the Web Soil Survey as a model: it provides spatial data and reports, linked to many lab analyses and evaluations. It could also be linked to real time monitoring data such as stream gauges. Data will be available in real time. Focus sites should span both natural and built environment and have capacity for strong community engagement.

Changing coastal morphodynamics and water flow will affect the impacts of storms, tsunamis and the associated flows of contaminants through the system.

What’s the reasoning or supporting evidence behind it?

Evidence based, fact based, Takes into context current research (hasn’t already been tried and failed). How will you validate success? How is it grounded in existing scholarship? Why do this now, above all the other things we could do?.

Validation of success:

Success would come at different scales. Compiling data into one place, providing both historic and real-time data for specific locations or regions, would be a success in itself. The publication of interdisciplinary research combining different approaches to understanding

coastal change would be another metric of success. Promoting coastal environmental engagement and literacy will be a key metric. The strongest metric for success would be the adoption of coastal management plans and/or legislation that accept and incorporate interdisciplinarily informed predictions of coastal change by local, state, or federal governments.

Evidence based/Grounding in existing scholarship:
Many disciplines already have models of how coastal morphology will change, taking very different approaches. Fluvial and coastal geomorphologists, hydrologists, geomorphologists, soil scientists, ecologists and others all have their own approaches to this question. Hubs should offer mechanisms to drive convergence of these well-established approaches into synthesis datasets, models, and predictions related to coastal change. Engagement of stakeholders and local communities in problem-based research leads to more equitable and widely accepted outcomes and decision making

Why now:
We know that sea level rise, development, altered climate, and other factors are threatening coastal communities and ecosystems. Understanding how these communities and ecosystems will have to mitigate/migrate is of pressing importance right now and will only continue to become more important as we focus limited resources on increasing resiliency and ensuring that and necessary migrations/evolutions happen in a controlled manner.