Ocean subgroup breakout notes:

Grand challenge question:
How do persistent and extreme ocean, lake, land, atmospheric, and human drivers individually and compoundingly influence coastal dynamics that control erosion, flooding, deltaic dynamics, and land use changes that in turn feedback on atmospheric, terrestrial, and ocean/lake processes and determine the resilience of coastal ecosystems, infrastructure, and communities?

Participants:
Diana Bull (SNL): Coastal erosion modeling.
Wilbert Weijer (LANL): HiLAT PI
Scott Elliott (LANL): environmental chemistry modeler. Working for HiLAT, RUBISCO. Organic chemistry.
Ian Kraucunas (PNNL): ICOM, COMPASS projects. Atmospheric modeler, integrated modeler.
Aixue Hu (NCAR): CATALYST. AMOC modeler. Decadal/multi-decadal variability.
Elizabeth Hunke (LANL): ESMD lead for ICOM project. Sea ice modeler.
Billy Eymold (SNL)
Theresa Morrison (Scripps)
Vladimir Alexeev (UAF): large-scale dynamics of climate, hydrology. Coastal erosion.
Young-Oh Kwon (WHOI): ocean modeler, large-scale climate variability, impact on coastal ecosystem.
Joel Rowland (LANL): lead PI for InteRFACE. Geomorphology, hydrology.

Charge:
Feedback on Grand Challenge question*:*

How do persistent and extreme ocean, lake, land, atmospheric, and human drivers individually and compoundingly influence coastal dynamics that control erosion, flooding, deltaic dynamics, and land use changes that in turn feedback on atmospheric, terrestrial, and ocean/lake processes and determine the resilience of coastal ecosystems, infrastructure, and communities?

Scott: no rivers mentioned.
Joel: rivers fall under ‘land’. Other fluxes like coastal erosion also important.
Vladimir: add aspect of changing ocean.
Diana: acidification of the ocean, does it change the way nutrients are mobilized?
Joel: White Paper requires small, focused questions.
Scott: Rivers are important, should be called out.
Vladimir agrees.
Diana: Changes in atmospheric features (cyclones etc.), turn to ocean wave energy, frequency intensity of wave energy.
Joel: What should be in Grand Challenge for RGMA White Paper?

Ian: From ICOM perspective: integrative approach to interconnected coastal system. Everything touches everything else, not really reflected in GC.
Diana: take end of GC, make it beginning, focus on resilience of coastal ecosystems, infrastructure and communities.
Vladimir: Does not mention sea ice, part of the physical system, but also important for humans.
Joel: Not just Arctic, also encompassing east coast and great lakes.
Young-Oh: can we fold in predictability? Improved understanding of predictability, how its relates to better prediction.
Scott: Soil carbon good to link land to ocean BGC.
Vladimir: do we want to include interconnectedness in global sense?
Joel: What are the scale of the feedbacks? Within a coastal focus, what are feedbacks that system has.
Vladimir: North Slope of Alaska may not be that important globally, but opening ports may have global impacts, in different dimension.
Diana: Coastal modeling from ocean point of view is necessarily small scale. But you have to know non-local forcings. What is local, what is coming from far away.
Vladimir: parameterizing coastal erosion: what is good enough, in terms of level of detail.
Scott: applies both to ocean and atmosphere?
Diana: yes. How to incorporate remote forcings in local models.
Elizabeth: MODEX, models helping to guide experiments and field work. Can this breakout group contribute ideas?

Coupling: What can the ocean provide to land/atmosphere, what does it need?
Joel: critical couplings:
Rivers/oceans
Atmosphere/ocean
Non-river land fluxes/ocean
Vladimir: non-locality of processes at the coast. Far-field wave environment; sea ice;
Diana: currents; how changing currents interact with wave field; offshore atmospheric environment, plus near-shore atmospheric environment; major changes in thermohaline structure of the ocean; major changes of currents (AMOC, Beaufort Gyre);
Ian: new capabilities in E3SM, available to community within a few years. Interactions with human activities, like water management, coastal development, important for understanding coastal system dynamics. Two-way, or one-way couplings.
Elizabeth: In ICOM several developments: tides capability in ocean model, useful if effect of tides can be felt by the land. Two- and three-way coupling between land, rivers, and ocean.
Scott: We can think of deltas as processes in between.
Young-Oh: local vs non-local factors, teleconnection in ocean and atmosphere. Can be sources of predictability. It takes time for signal to propagate to coastal system, and large-scale climate variability has interannual and longer time scales. Coupling to marine ecosystems models, marine BGC, higher tropics, fish; marine heat wave matter for marine ecosystems. Tides, sea level variability and change, essential to better understand flooding.
Scott: turbidity, CDOM important for light availability of ecosystems.
WW: sediment transport, coastal and offshore export and slope stability.

Diana: connection between precipitation and land, not just for river flows, but also for coastline stability.

Focused questions:
Vladimir: Focused question: landfast ice, how it is modeled. It impacts coastal erosion A LOT.

Grand challenge - coupling is multiscale process. Upscaling to larger system, couple high frequency. Large scale coupling provide background to the coast.

How to quantify multiscal processes. Upscaling and downscaling. Timescales.

Be very specific of predictability.