Coastal BGC Breakout (E3SM All-Hands Spring Meeting)

Wed. March 20, 2019

Attendees:

- Phillip J. Wolfram
- Yan Feng
- Hong-Yi Li
- Tian Zhou
- Zeli Tan
- Peter Thornton
- Steven Brus
- ZHENDONG CAO
- Nicole Jeffery
- Mathew Maltrud

3:00-4:00pm   Updates on ongoing and planned coastal developments (talks should be about 5 min or less to allow ample time for group questions / discussion):

- Toward a coastal BGC capability (Phillip J. Wolfram)
- Improved land-atm-ocean fluxes (Yan Feng) Dust_coastBGC.pdf
- MOSART-heat/BGC (Hong-Yi Li) MOSART_heat_E3SM.pptx
- Mosart urban hydrology   (Hong-Yi Li) MOSART-urban_E3SM.pptx
- MOSART inundation (Tian Zhou) MOSART-inundation.TZ.pdf
- MOSART erosional N and P fluxes (Zeli Tan) E3SM_all_hands_ztan copy.pptx
- ELM-saltmarsh: predicting vegetation and sediment BGC response to warming and SLR in a tidal marsh environment (Peter Thornton)
- MPAS-O waves (Steven Brus) Integration of wind-wave physics into E3SM through WaveWatchIII coupling
- Toward MPAS-O coastal sediment transport (ZHENDONG CAO) Cao_Sediment-Transport-Model.pptx
- Benthic sediment BGC flux model (Fei Chai and Zhengui Wang) Sediment_Flux_Model_UMaine.pptx (Phillip J. Wolfram to give overview for them)

4:00-4:20pm Discussion of metrics and targeted analysis of coastal BGC for v1/v2

Existing:

- MPAS-Analysis surface BGC capability (https://github.com/MPAS-Dev/MPAS-Analysis/pull/433)

Some examples:

- Use-inspired metrics to support DOE mission includes coastal carbon sources/sinks
- Coastal ocean region maps (Total coastal, Arctic, SO, eastern/western US coast, select river mouths…) for pre-processed coastal quantities to evaluate primary production, chlorophyll, CO2 fluxes…
- Coastal extremes (heat, salinity, acidification, surface height…)
- Fast ice concentration (being done), Fast ice bgc vs. drift ice bgc
- Coastal polynya bgc
- Extremes in river discharge
- Coastal winds, coastal precipitation

4:20 - 4:30pm Discussion of coastal bgc science interests and wish list

Some examples:

- coastal BGC (e.g., salinity, DO, toxins and its implications for ecology)
- sediment-BGC interactions (especially at the bed and in suspended load)
- harmful algal blooms (tie back to water quality above but represent a coastal hazard worthy of quantification in E3SM
- increased benthic trophic levels, e.g., sea grass, algae (which are also important for flow drag)
- anthropogenic coastal pollutants (e.g., chemical effluents from manufacturing and their effect on coastal ecosystems and coastal climate evolution)