Arctic break out session

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Observational efforts
Process considerations

Observational efforts

- Shipboard observations (US Arctic, Chukchi Sea, Bering Sea, Canadian Archipelago, eastern Arctic)
  - DIC, TA pCO2, nutrients, hydrography, tracers
- Moorings
  - Chukchi Sea, Canad. Archipelago
- Land based/river observations
  - Major Arctic rivers (Carbon metabolism stream to estuary)
- Airborne studies
  - land atmosphere carbon exchange Yukon valley/river
- Satellite studies
  - with some focus on land systems, thawing/freezing periods
- Process studies
  - Bering Sea, Amundsen Gulf

Processes

- **River estuary fluxes:**
  - Constraining average concentrations
  - Sources
  - Discharge under ice
  - Coastal erosion/permafrost thawing -> Corg. carbon input, reactivity??
  - Coastal erosion, POC flux
  - Shift in DOC/DIC ratio while thawing of permafrost toward lower ratio (more remineralization in rivers)
    - more TA, DIC, less Corg?)
  - Changing processes -> climate change
- **Cross shelf exchange**
  - Moorings, (radio)-tracers

Processes

- **Sediment burial / productivity**
  - Radio tracers approaches tough at seasonal timescales due to methods
  - Arctic never at steady state, too dynamic
  - Sediment trap studies 2003/2004 (normal ice), and 2007/2008 low ice
    - (Changing processes -> climate change)
  - Representation of actual processes
  - Places where no measurements have been made until recently due to accessibility
- **Productivity measurements**
  - What to measure best: DIC-NCP approach, biological species/ foodweb approaches
  - Ice dynamics vs. productivity
  - Cloud cover, ice cover vs. satellite observations

Processes

- **Air-sea exchange:**
  - Ice cover interactions
    - constraining CO2 flux through ice
  - other gases: Methane?
  - Will changes in ice cover effect the flux of methane (to the coast), change in sink/source status?
  - CO2 flux out of Yukon/rivers? Enhanced delivery of DOM -> respiratory CO2 increased?
    - Soil respiration vs. in-stream respiration, DOC vs. POC.
  - Shifting DOM respiration in location (upstream with warming)?
  - groundwater fluxes might increase with thawing/warming.
  - Role/location of groundwater contribution upstream vs. coastal location?
  - Groundwater flow system is changing at the entire scales, not only at the coastal side.
  - Satellite and duration of thawing period (over land satellite sees 25km grid cell)

More/less DOM respiration, or shift of location timing?