Theme 3: Export and Regeneration

Initial Conditions

1. How do processes and rates vary with depth?
2. How do processes and rates vary with time and space (e.g. different biogeochemical and physical regimes)?
3. What is the relative importance of biotic versus abiotic processes and rates on export and regeneration?
4. How do processes and rates vary along dissolved-particulate continuum?
5. Do we understand the processes well enough to make predictions about the future and interpret paleorecords?

Discussion, revision, reorganization and recommendations following, and building on, 5-minute talks by individual investigators.

Things to do now:

- Combine circulation rate tracers and AOU (length sale) to different TEIs (dissolved and particulate) to figure out what parts of these trends are/are not part of regeneration?
    - Alan, Max, Mariko, Maeve, Bill, Greg, others…
- Calculate TEI fluxes and POC fluxes from Th data (multiple isotopes) we have now from Atlantic and Pacific basins.
    - Erin, Ken, Phoebe, Bob
- Use inverse modeling and multiple dissolved TEI profiles to back-out regeneration rates.
    - Better define the preformed endmembers.
        - Francois, Keith, Bill, Ben: Get better constraint on preformed signal with 2D surface map/modeling
    - compare all of the above
- Compare (Fe, Cu, Co) ligand data to upper ocean particulate TEI data to identify the role of ligands in remobilizing particulate metals in the DCM.
    - Kristen, Randie, Maeve, Kathy
- Look at regional differences (high/low dust, OMZ) in export and thermocline regeneration processes (e.g. depth of TEI-cline).
    - Kathy, Pete, Bob , Ben

Things to do soon:

Things to do in the future (future cruises):

1. Calculate carbon and TEI fluxes to microbial standing stocks.

2. Calculate the relative impact of bacteria and zooplankton on TEI export.
3. Flow cytometry
4. 16S sequences
5. sediment traps
6. better depth resolution in upper water column?
7. optical techniques for particle sizes/sinking rates

Break-out group ideas:

- Tracer vs. AOU relationships
  Things to do now:
    - Use other tracers (Ce, Nd, Th, others) to de-couple AOU relationships
- Measurements on future GEOTRACES cruises