Chemical Ocean (w/ bio/geochem. and air/sea chem.)

Big Questions:

How are seawater properties (T, S, O_2, nutrients, C system, CFCs, chemistry) and ecosystems changing in the Antarctic and Arctic over decades to centuries? Seasonal cycles?

Impact of ice shelf loss, sea ice loss (expansion), warming, and ice margin changes on biogeochemistry of polar oceans.

Biogeochemical cycles (source to sink) of bioactive elements.

Gas hydrates: standing stock and potential loss (Arctic).

What factors (light, iron, vitamins, macronutrients) affect photosynthesis in polar phytoplankton?

Seep/chemosynthetic comm. biogeochemistry and ecology.

Cyclic sea salt aerosols and transport to polar boundary layer.

Chemistry and physical properties of snow on sea ice and snow that has been blown across sea ice and open leads.

What is the role of atmospheric deposition on trace element biogeochemistry in the Polar seas?

Will photochemical processes in polar surface waters change with decreasing sea ice, and as a result change the cycling of many photoactive/label compounds?

Trajectory and impacts of ocean acidification in polar oceans.

Sedimentary sinks and seabed fluxes of C and Opal.

Chemical Oceanography (et al.) SMR refresh & practical needs:

Nextgen CTD including “Kevlar” (conduct.?) line for clean casts

Uncontaminated seawater system of high capacity and capable of operation in ice

Ability to support AUV’s, ROV’s, and airborne samplers with chemical/geochemical payloads

Dedicated clean lab and molecular bio space

Walk in Freezers and Coolers

Dedicated salinometer space but electrophoresis req. dated

Chemical Oceanography (et al.) SMR refresh & practical needs:

Ship handles/works well in open ocean as well as ice

Amidship Baltic Room (some raise safety issues)

Clean air sampling capabilities installed in bow or high mast

Radiochemistry restricted to portable van labs

Hazmat supplies/waste to be considered in design

Fiber optic as well as EM cables with “slip rings”

Mostly this group does not endorse moon pool