

PHYSICAL OCEANOGRAPHY AND ATMOSPHERIC SCIENCES

Discussion points during breakout session

Overarching science issues—

- fate of the ocean heat sink (where does the heat go as climate warms?)
- Ocean acidification – sea ice and air sea fluxes of gases/ CO₂
- Ocean/Atmosphere/cryosphere system – sensitivities, processes

Specific measurements which will be needed -

Ice-ocean-atmosphere interaction

turbulent fluxes of heat, radiative and momentum

local coupling of surface fluxes on polar cyclones – strength and motion

Ocean- ice shelf interactions – bulk properties

Sea ice heat and mass balance

Dynamics/thermodynamics of polynyas/ convective processes

Discussion points during breakout session – cont'd

Sub ice shelf boundary layer processes

- AUV/Gliders/Helo access to ice shelves

Fresh water and mass fluxes in the glacial-ocean systems –
purposeful tracer

- requires maneuverable, smaller ice-strengthened vessel for near-glacier sampling

All the above require year-round access

Technical implications:

- larger platform above bridge level for mounting autonomous underway atmospheric and radiative instruments
- larger airborne vehicle capability (not just helicopter)
- 80 day or longer endurance
- ice access during over the side operations

General Circulation

Subpolar gyre fluxes/ Meridional Overturning Circulation – decadal variability

Exchanges across shelf/slope regions

Ice sheet/shelf mass balance and impact on the global general circulation

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Broader Mission requirements:

- support of global ocean observing networks - both terrestrial and submerged (eg moorings, AUV, AWS, AMIGOS, GPS)
- support of process studies year-round
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