

Ice at the Interface

Atmosphere-Ice-Ocean Boundary Layer Processes
and Their Role in Polar Change

*Toward better understanding of boundary processes in the
atmosphere-ice-ocean system and their contribution to
biogeochemical cycling within the climate system.*

June 25-27, 2012 • Boulder, Colorado USA



Goals

Bring together observational experts, theorists, and modelers
Understand boundary layer processes in polar sea regions
Move GCM polar components toward “earth system” modeling
Address both Arctic and Antarctic issues

Deliverables

Workshop report/EOS article (*in progress*)

New collaborations and research/development ideas

Working groups forming during/after workshop:

- *ice-ocean dynamics/stress coupling*
- *carbonate chemistry/DIC pump*
- *DMS and methane*

Schedule

June 2012						
	Bndry Layer		MOSAiC			
24	25	26	27	28	29	30

Scientific Outcomes

- ▶ Theme: Episodic and extreme events
fracturing, freezing fronts in sea ice, DMS emissions
- ▶ Theme: Stratification
mobility, exchanges with deeper ocean, stronger currents
- ▶ Theme: Precipitation
Snow, surface water, clouds/storms, NH/SI differences
- ▶ Theme: Marginal ice zone
wave action, bio/chemical interactions, floe size
- ▶ Model development
priorities: Snow physics, fluid flow within ice, ice-ocean dynamics (especially roughness length), clouds/radiation
outlook: under-ice ponds, superimposed ice, flooding and snow-ice formation, floe size distribution
- ▶ Observational wish-list ... more/better/automated
discussed further during the MOSAiC workshop
- ▶ 3 working groups (previous slide)

Boundary Layer Workshop Agenda

Discussion Leaders

Day 1

Welcome

What is the Atmo-Ice-Ocean Boundary Layer?

Biogeochemistry/Ice-Ocean motivator

State of the Art in GCMs: Ice-Ocean

Theoretical Overview: Ice in the Ocean

Focus Topic: Ice-Ocean Thermo Interface

Focus Topic: Large-Scale Ice-Ocean Dynamics

Walt & Elizabeth

Jim Overland

Steve Ackley

Elizabeth Hunke

Miles McPhee

Adrian Turner

Andrew Roberts

Day 2

Biogeochemistry/Atmo motivator

Focus Topic: Waves

State of the Art in GCMs: Atmo Interface I

State of the Art in GCMs: Atmo Interface II

Focus Topic: Clouds and Radiation

Focus Topic: Atmo Turbulent Surface Fluxes

Scott Elliott

Luke Bennetts

Jen Kay (CESM)

Jeff Ridley (HadGEM)

Neil Barton

Ed Andreas

Day 3

Focus Topic: Biogeochemistry

Strategizing for the Future: MOSAiC

Strategizing for the Future: Modeling

Final Remarks

Brice Loose

Matt Shupe

David Bailey

Elizabeth Hunke

IASC working groups

Cryosphere
Atmosphere
Marine

organizers

Elizabeth Hunke, Walt Meier
Jim Overland
Jeremy Wilkinson
Ola Persson (MOSAiC)

Participants

	early career	other
Total	15	32
IASC Funding	5	5
CliC Funding	2	1
SCAR Funding	2	0

Countries

Australia	Netherlands
Belgium	Norway
Canada	Sweden
Finland	UK
Germany	USA

<http://oceans11.lanl.gov/trac/CICE/wiki/BoundaryLayerWorkshop>