

GrIOOS

Greenland Ice Sheet/Ocean Observing System Workshop December 12-13, 2015

**Fort Mason Center Firehouse, 2 Marina Blvd,
San Francisco, CA 94123**

<http://fortmason.org/venue/firehouse/>

GrIOOS is aimed at collecting long-term glaciological, oceanic and atmospheric data to improve our understanding of, and ability to predict, Greenland Ice Sheet changes and their relation to the ocean, including the marine ecosystem, and the atmosphere. Special emphasis is on data that will enable quantification of both the oceanic forcing of the Greenland Ice Sheet and the impact of ice sheet changes on the ocean and marine ecosystems. Atmospheric forcing is relevant to GrIOOS through the impact of surface melt on submarine melt (and calving) but the focus of this meeting is not on establishing an observing system to improve SMB.

Steering and Organizing Committee

Jakob Abermann (Asiaq, Greenland); Andreas Peter Ahlstrom (GEUS, DK);
Gordon Hamilton (U. Maine, USA); Patrick Heimbach (U Texas Austin/MIT USA);
Ruth Mottram* (DMI, DK); Sophie Nowicki (GISS, NASA, USA);
Ted Scambos (NSIDC, USA; SEARCH), Fiamma Straneo (WHOI, USA; SEARCH);
David Sutherland (U Oregon, USA); Martin Truffer* (UAF, USA).

**will not be attending the meeting.*



Saturday December 12th

(ISMIP6 participants will join us in the morning sessions)

8:30 - 9:00

Breakfast

9:00 - 10:40

Session 1: Why an Observing System?

Chairs: Patrick Heimbach; Ian Joughin

Note takers: Alistair Everett, Ian Fenty

Review of basic understanding of ice forcing ocean and vice versa; identify the long-term needs

1. Introduction and goals (Straneo, 20 min)
2. Glacier retreat/advance – (G. Hamilton/T. Moon – 10 min)
3. Ocean forcing glaciers
 - i) Theory/Modeling/Observations of submarine melting (A. Jenkins; 10 min)
 - ii) Ice sheet Modeling: Impact of ocean variability (T. Payne, 20 min)
4. Glaciers forcing ocean (Sutherland/Heimbach, 10 min)
5. Atmospheric forcing of glacier setting (A. Ahlstrom, 10 min)
6. Impact of glacier changes on the marine ecosystem (A. Rosing-Asvid; 10 min)

10:40 - 11:00

Coffee Break

11:00 - 12:30

Session 2: What Have We Learned - Glacier/Fjord Projects?

Chairs: Fiamma Straneo; Gordon Hamilton

Note takers: Tom Cowton, Kristin Schild

Brief reviews (3 slides max) of glacier/fjord experiments

- Ummanaq (Catania)
- Nuuk Fjord/Glacier (Mortensen)
- Store Glacier (Hubbard)
- Upernavik (Ahlstrom)
- Bowdoin (Sugiyama)
- Alison/Hayes (Porter)
- Qanaaq –(Rodehacke DMI)
- Helheim/Sermilik F. (Straneo/Hamilton)
- 79 North – (Straneo summarizing AWI etc. plans)
- Kangerlugssuaq (Inall)
- Jakobshavn (Holland)
- Petermann – Mix

12:30 - 1:30

Lunch

1:30 - 3:00

Session 3: Existing Measurements

Chairs : Dave Sutherland and Twila Moon

Note takers: Maureen Walczak and Andrew Hamilton

*Summary of existing networks, monitoring sites, airborne and remote sensing
(2 slides per program)*

In situ:

- Asiaq (Abermann)
- PROMICE/GCNET (Ahlstrom) w. airborne work
- GNet (Bevis)
- DMI Met Stations (Rodehacke),
- Fisheries data (Rosing-Asvid),
- Fram Strait (de Steur),
- Davis Strait (Dutrieux)
- OSNAP (Straneo)
- ARGO (Straneo)
- GLISN (Bartholomaus)
- Nuuk/Zackenbergl monitoring sites (Mortensen)
- Baffin Bay Observatory (Future Canadian/EU/Greenland) – (Mortensen)
- Denmark Strait (?) – In all future plans

Remote sensing/airborne assets

- Landsat/SAR (Moon/Joughin)
- Mass balance/elevation changes (Csatho)
- Surface Mass Balance/Surface Melt (Tedesco)
- Oceanic remote sensing (Sutherland/Heimbach)
- Icebridge (Koenig)
- ESA's Climate Change Initiative (Ahlstrom)

Mixed

- OMG – NASA (Fenty)

3:00 - 3:30

Coffee Break

3:30 - 5:00

Session 4: Breakout Session I

Three group brainstorming for GrIOOS.

What measurements are needed? Where, how many and how do they tie to existing networks?

5:00 - 8:00

Reception

Joint with ISMIP (Ice Sheet Modeling Intercomparison Project)

Sunday December 13th

8:30 - 9:00

Breakfast

9:00 - 10:00

Session 5: Summary From Previous Days Including Breakouts

Chairs: Jakob Abermann; David Sutherland

Note takers: Ellyn Enderlin, Pierre Dutrieux

10:00 - 10:40

Session 6: Program Managers Input (TBA)

Chair: P. Heimbach

Note takers: Rebecca Jackson, Kristin Schild

10:40 - 11:00

Coffee Break

11:00 - 12:30

Session 7: Measurement Techniques

Chairs: Gordon Hamilton, Ted Scambos, Andreas Ahlstrom

Note takers: Andrew Hamilton; Dave Porter

Review instrumentation/measurement techniques including feasibility/costs.

12:30 - 1:30

Lunch

1:30 - 3:00

Session 8: Breakout Session II

Breakout again into three groups and continue brainstorming GrIOOS.

What is feasible, what instrumentation, what will it cost?

Contrast what is easy to measure/was is important

Produce table of easy versus important (include costs)

Discuss what technology is missing

3:00 - 3:30

Coffee Break

3:30 - 5:00

Session 9: Summary Discussion/Presentation of the 3 Groups

Discussion lead: Bob Bindschadler

Note takers: Rebecca Jackson and Tim Bartholomaus

Steering Committee Members

Jakob Abermann (Asiaq, Greenland)
Andreas Ahlstrom (GEUS, DK; glaciologist)
Gordon Hamilton (U. Maine, USA; glaciologist)
Patrick Heimbach (MIT/U. Texas USA; ocean modeler)
Sophie Nowicki (GISS, NASA, USA; ice sheet modeler, ISMIP)
Ted Scambos (NSIDC, USA; SEARCH; remote sensing, Antarctica)
Fiamma Straneo (WHOI, USA; SEARCH, oceanographer, Greenland ice/ocean)
David Sutherland (U. Oregon, USA; oceanographer, Greenland ice/ocean)

Facilitator

Bob Bindschadler (SEARCH, glaciology, NASA, USA)

Other Participants

Mike Bevis (Ohio State U., USA; GNet)
Laura de Steur (NPI, NO; ocean, Fram Strait, Greenland ice/ocean)
Aqqalu Rosing-Asvid (GINR, Greenland; marine biologist)
David Holland (NYU, USA; ice/ocean)
John Mortensen (GINR, Greenland; oceanographer)
Ian Joughin (APL-UW, USA; ice remote sensing)
Beatha Csatho (U. Buffalo, USA; remote sensing)
Marco Tedesco (CUNY, USA; surface mass balance)
Asa Rennermalm (Rutgers, USA; hydrology)
Alun Hubbard (Aberystwth, UK; glaciologist)
Mark Inall (SAMS, UK; oceanographer)
Adrian Jenkins (BAS, UK; ice/ocean)
Leigh Stearns (Kansas U., USA; glaciologist)
Ginny Catania (U. Texas, USA; glaciologist)
Shin Sugiyama (Hokkaido, Japan; glaciologist)
Erin Pettit (UAF, USA; acoustics for ice)
Dave Finnegan (CRREL, USA; engineering; lidar)
Sridhar Anandakrishan (PSU, USA; glaciology)
Alan Mix (Oregon State U., USA; paleo)
Christian Rodehacke (DMI, DK; ice sheet modeling)
Lora Koenig (NSIDC, USA; hydrology, Icebridge)
Irina Overeem (NSTAAR, USA; sediment plumes)

Early Career (S indicate students, P postdoc)

Dave Porter (LDEO, USA; ice/ocean)
Pierre Dutrieux (APL-UW, USA; ocean/ice, Davis Strait)
Ian Fenty (JPL, NASA; USA, OMG NASA)
Twila Moon (U. Oregon, USA; glaciology/remote sensing) (P)
Andrew Hamilton (UBC, CA; glacier/ocean, AUVs, Canadian glaciers) (S)
Tim Bartholomaeus (UTIG, USA; seismic, radars, glaciology)
Alistair Everett (Swansea, UK; glaciology) (S)
Kristin Schild (Dartmouth, USA; remote sensing, sediment) (S)
Rebecca Jackson (WHOI/MIT, USA; oceanography) (S)
Ellyn Enderlin (U. Maine, USA; glaciers, icebergs, remote sensing)
Tom Cowton (U. Edinburgh, UK; ocean modeler) (P)
Maureen Walczak (Oregon SU, paleo) (P)

Program Managers

Eric Lindstrom (NASA)
William Ambrose (NSF)
Martin Jeffries (ONR)

Greenlandic Government Representative

Inuuteq Holm Olsen (Minister Plenipotentiary for Greenland to the USA)

Arcus on site coordinator

Lisa Sheffield Guy