Report of 8th ASOF ISSG Meeting

October 18-19th, 2010,

Woods Hole MA, USA

Compiled by Thomas Haine (Johns Hopkins University) and Lilian Schbert (AWI)

April 2011

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Introduction

The goals of the 8th meeting of the ASOF ISSG were to:

1. Provide status updates on recent ASOF-relevant activities, and future plans.
2. Discuss how the next phase of ASOF will be implemented, in particular, the collaboration with AOMIP.

Tom Haine introduced the meeting by announcing that Ms. Lilian Schubert (AWI) would be providing secretarial and administrative support for ASOF on a part time basis. AWI's support of ASOF this way is greatly appreciated. Lilian is in the process of revamping the ASOF website which will be hosted at AWI. ASOF PIs should expect requests for updated material for the new website soon.

This report is comprised of summaries of the science presentations at the workshop and the subsequent discussions. The workshop agenda and list of participants appears in the Appendix.

Tentatively, the next ASOF ISSG meeting will be held in October 2011 in Bergen, hosted by Svein Osterhus.

Presentation Summaries

An observation based update of the of Atlantic Water pathways to the Arctic

Øystein Skagseth (with input from: Agnieszka Beszczynska-Möller, Randi Ingvaldsen, Harald Loeng, and Ursula Schauer)

The two-branch inflow of Atlantic Water to the Arctic has been known for more than a century (Helland-Hansen and Nansen, 1909; Kipowitsch); one branch through the Barents Sea and the West Spitzbergen Current (WSC) through the Fram Strait (Figure. 1). The relations between these two branches have been poorly known due to lack of relevant observations. However, with continuous current meter mooring arrays now spanning more than a decade a pattern of co-variability begins to emerge.

Here we investigate the co-variability of two Atlantic Water pathways to the Arctic via the Fram Strait or via the Barents Sea based on continuous current-meter moorings from 1997-2009. The variability of the volume fluxes of these two branches occur in opposite phase (Figure 2). Building on the hypothesis that anomalous inflow to the Barents Sea is oppositely compensated in the Fram Strait the causes of the variability are explored (Figure 3). We find in accordance with previous studies that the inflow to the Barents Sea is amplified by increased westerly winds in the inflow region. However, this forcing cannot alone explain the observed variability. Anomalous heat fluxes act to modify the density contrast between newly arrived Atlantic Inflow and waters that have resided the Barents Sea for some period. The effect of this changing density contrast via 1) increased baroclinic shear, 2) increased westward plume in the north and compensating inflow, or 3) changing baroclinic to barotropic conversion into the Barents Sea are not fully resolved, but would be an important goal for future research. However, the observations are in accordance with a dual effect of the wind; one by direct barotropic response and one indirect delayed effect via cooling and changing density field (Figure 4).

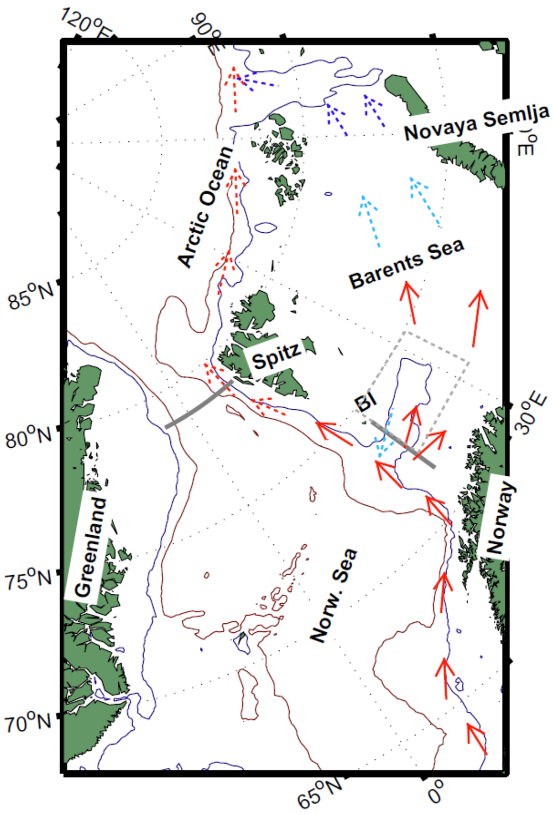

Figure 1: Map of the study area and BSO and West Spitzbergen current sections. The dashed square shows the area over which the air-sea heat flux used in Figure 3 is calculated.

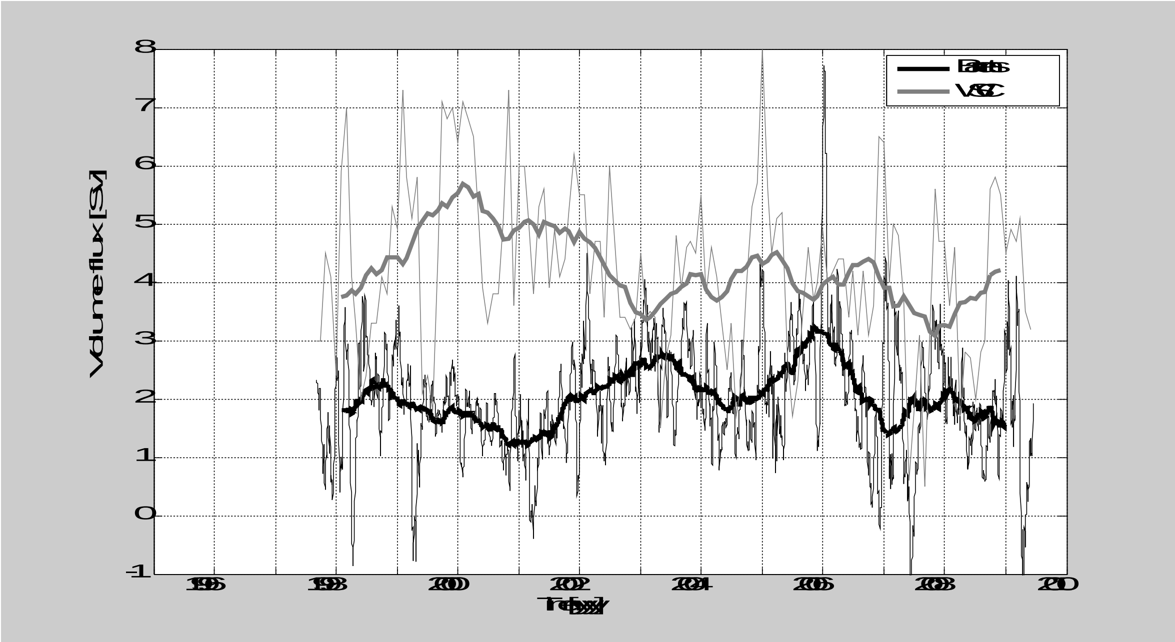

Figure 2: Volume transports of Atlantic Water into the Barents Sea and in the West Spitzbergen Current.

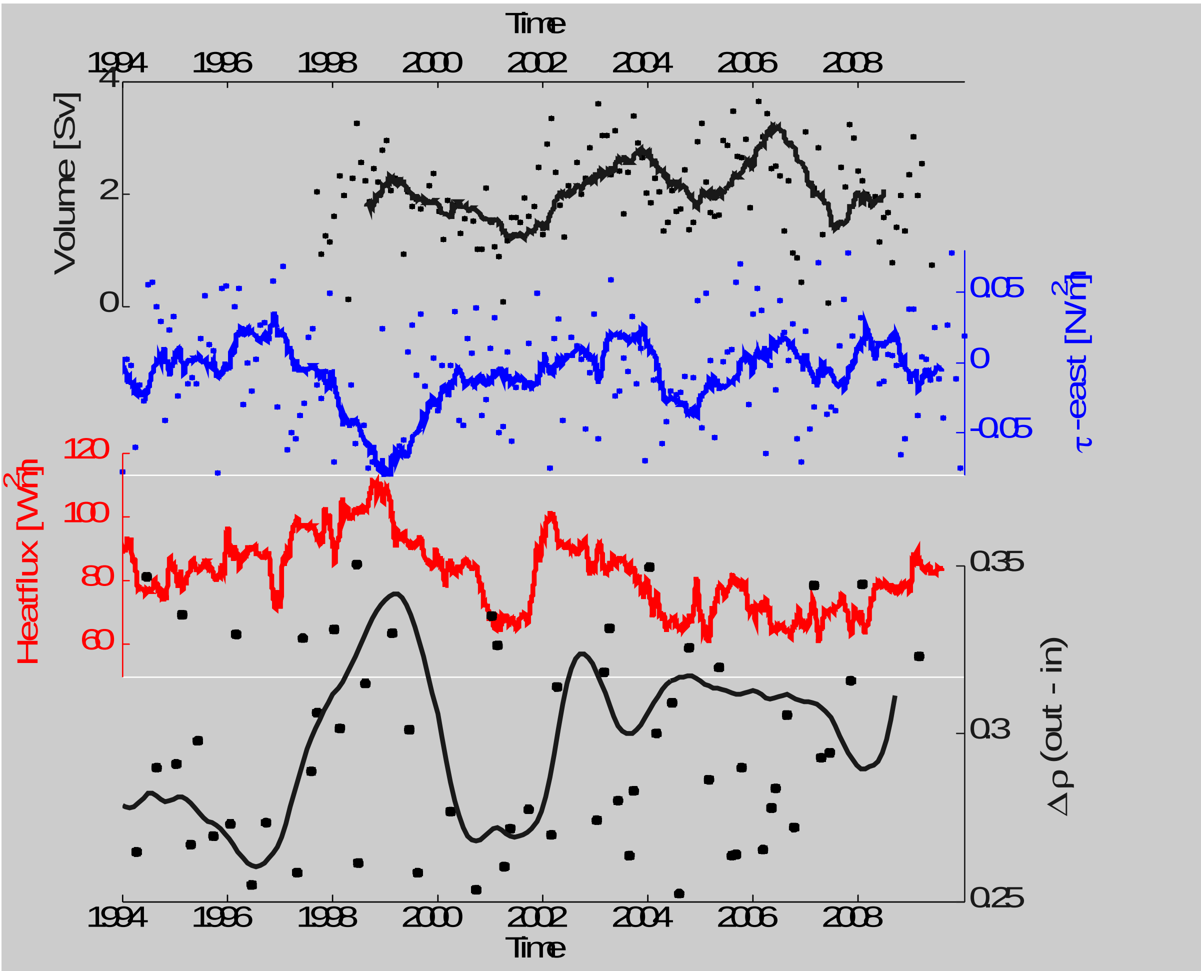

Figure 3: Time series of a) volume transport of AW in the BSO, b) zonal wind stress in the BSO [72-74ºN] defined positive toward east, c) mean total ocean to air heat loss heat flux (positive upward) in the area [72-75ºN, 20-35ºE], and d) density difference between the outflowing water at depth (deepest part of the BSO, and the inflowing Atlantic Water between 71.5-73ºN (see Fig. 1).

Observations of volume and heat transport from long term observatories in the North Atlantic Ocean and the Nordic Seas are used to study the poleward oceanic heat transport toward the Arctic

Svein Østerhus (with input from: B. Hansen, S. M. Olsen, and the THOR CT 3 group, www.eu-thor.eu)

Time-series extending back to the mid 1990's exist for the exchanges across the Greenland Scotland Ridge and in the Atlantic inflow branches in the Nordic Seas. This direct volume and heat transport measurements are combined with longer hydrographic time series and model results to study variation in volume and heat transport back to 1948. Observed volume transports show interannual variability but no trend in the volume transport of Atlantic water toward the Arctic Ocean. The observed heat transport shows a shift to higher temperature in the Atlantic Water after 1995. These results are also supported from the model simulation for the whole period from 1948 to 2010.

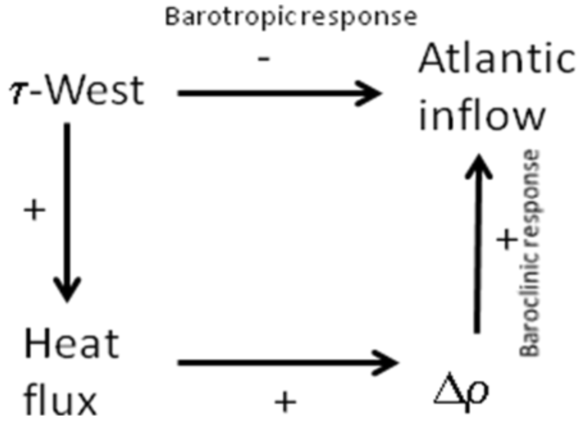

Figure 4: Conceptual model of the direct and indirect effect of the wind on the Inflow of Atlantic Water to the Barents Sea.

Atlantic water in the West Spitzbergen current–interannual variability, transformation and importance

Waldemar Walczowski

The Institute of Oceanology Polish Academy of Sciences (IOPAS) investigates the Nordic Seas since 1988. Every summer since 2000 IOPAS vessel R/V OCEANIA covers region between northern Norway and Fram Strait by series of 200 CTD and LADCP stations. Valuable time series of Atlantic Water (AW) properties were collected. IOPAS worked in various international projects as GSP, VEINS, and DAMOCLES. Last year's IOPAS participates the Polish-Norwegian projects ALKEKONGE and AWAKE.

Atlantic Water carried into the Arctic Ocean by the system of oceanic currents–North Atlantic, Norwegian-Atlantic, West Spitzbergen Current (WSC), is the main medium connecting this remote Arctic region with the global system. With its volume, AW carries huge amount of heat, salt, nutrients, and plankton. Properties of the AW entering the Arctic Ocean through the Fram Strait depend on both:

(a) properties of AW inflowing into the Nordic Seas;
(b) local transformation of AW.

During the flow through the Nordic Seas, AW stream undergoes remarkable changes–it loses volume and heat, mixes with ambient waters. In the WSC most of AW properties (temperature, salinity, heat content, AW section surface) changes almost linearly, i.e. temperature decreases 0.24°C/latitude degree. These processes, especially heat exchange with the atmosphere and cryosphere are essential for the Arctic climate and ecosystem.

During the last decade meaningful variations of AW properties in the region of Spitzbergen and Fram Strait have been observed. 15-year long series of summer observations carried by the IOPAS reveals two 6-year long periods of increasing and falling AW temperature and salinity. Horizontal distributions show that in summers 2004-2006 isotherm 5ºC at 100m has moved meridionally 4.5º northward. In 2006 temperature of AW core reached record high values, warm water expanded over the shelves, flowed into Spitzbergen fjords. Fraction of the warm pulse passed the Fram Strait and flowed into the Arctic Ocean.

IOPAS investigations reveal two causes of the 2006 AW warming:

(a) the lesser heat loss by the WSC core resulting from faster northward flow;
(b) enormous anticyclonic eddies in the western WSC branch which carried northwards huge heat anomalies.

In 2007 and 2008 the AW temperature fell, 2009 measurements suggested beginning of a new warm period, but in 2010 the AW temperature decreased again. It is interesting, because during this time AW salinity increased. There is high correlation between AW temperature and mean air temperature measured in Polish Polar Station in Hornsund (southern Svalbard). Also high correlation between the AW temperature and next winter ice coverage north of Svalbard exists.

In the future IOPAS will continue R/V OCEANIA cruises to the Nordic Seas. We are also going to continue launching ARGO floats. Time series obtained for whole year (September 2009-September 2010) from moored profiler (profiles of *T, S*, currents from WSC core, 2 times per day) will be analyzed, measurements will be continued.

What is new in Bering Strait?

Rebecca Woodgate

A year-round mooring program has been on-going in the Bering Strait almost continuously since 1990. In 2007, the typical 2-4 mooring array was replaced with an 8 mooring array spanning both US and Russian parts of the strait, and including measurements of the temperature, salinity and motion in the upper layers, as well as the traditional near bottom measurements. The 2010 mooring cruise was particularly lucky with weather, which allowed us to accomplish a broad survey of the southern Chukchi, especially along the Russian coast. Whale recorders deployed on the moorings for the first time last year, have yielded almost a year of acoustic data on marine mammals in the Strait. Our published paper (Woodgate et al, 2010, GRL) quantifies the ocean heat fluxes through the strait up to 2007, and concludes "Heat fluxes increase from 2001 to a 2007 maximum, 5-6x10^{20}J/yr. This is twice the 2001 heat flux, comparable to the annual shortwave radiative flux into the Chukchi Sea, and enough to melt 1/3rd of the 2007 seasonal Arctic sea-ice loss. We suggest the Bering Strait inflow influences sea-ice by providing a trigger for the onset of solar-driven melt, a conduit for oceanic heat into the Arctic, and (due to long transit times) a subsurface heat source within the Arctic in winter. The substantial interannual variability reflects temperature and transport changes, the latter (especially recently) being significantly affected by variability (> 0.2Sv equivalent) in the Pacific-Arctic pressure-head driving the flow." We present also preliminary results updated to 2009, including estimates of freshwater fluxes, and water column stratification in temperature, salinity and velocity.

Future field work on DSO and the western Arctic boundary current (not for publication)

Robert Pickart

Upstream pathways of Denmark Strait overflow water

Kjetil Vage

The dense Nordic seas' overflow waters constitute the lower limb of the Atlantic meridional overturning circulation (MOC), and, as such, are a crucial component of the Earth's climate system. Warm subtropical-origin waters flow northward across the Greenland–Scotland Ridge where they are subject to intense air-sea interaction. After releasing heat to the atmosphere, the resulting dense water returns southward by flowing through the gaps in the ridge and descending the continental slope as overflow plumes. These overflows represent the headwaters of the MOC; the largest of these is the Denmark Strait Overflow Water plume which passes southward between Greenland and Iceland and contributes to the Deep Western Boundary Current. It is commonly thought that the primary source of the overflow water is the East Greenland Current (EGC), a southward-flowing current along the continental slope of Greenland. However, this view has been called into question with the discovery of the Northwest Icelandic Jet (NIJ)-a current transporting overflow water towards the Denmark Strait along the continental slope of Iceland. Results from two shipboard hydrographic/velocity surveys in October 2008 and August 2009 highlight the importance of the NIJ. During the period of the surveys, the NIJ was found to supply both the densest overflow water and a significant fraction of the total overflow transport (30%-50%). The NIJ was traced as far upstream as northeast of Iceland, confirming it as a distinct pathway from the EGC.

On the variability of the East Greenland spill jet in summer 2003

Marcello Magaldi

Results from a high-resolution (~2 km) numerical simulation of the Irminger Basin during Summer 2003 are presented. The focus is on the East Greenland Spill Jet, a recently discovered component of the circulation in the basin. The simulation compares well with observations of surface fields, Denmark Strait Overflow (DSO) and the hydrographic structure of typical sections in the basin. The model reveals new aspects of the circulation on scales of O(0.1-10) days and O(1-100) km. The model Spill Jet results from the cascade of dense waters over the East Greenland shelf. It is present throughout the simulation, but exhibits large variations on periods of O(0.1-10) days. The Spill Jet sometimes appears as a distinct feature in the velocity field, flowing along the slope and entraining ambient waters. At other times, it cannot be distinguished in the velocity field from surface eddies or from the DSO, as it may include, in the latter case, waters denser than $\sigma_\theta \geq 27.80$ kgm^{-3}. It can reach depths of 1300 m. The vorticity structure of the Jet confirms its unstable nature with relative and tilting vorticity terms reaching, in some locations, twice the planetary vorticity term. The average model Spill Jet transport is 4.9±1.7 Sv equatorward, about two and a half times larger than has been previously reported from a single ship transect in August 2001. Kinematic analysis of the model results suggests two different types of spilling events. In the first case (Type I), a local perturbation results in dense waters descending over the shelfbreak into the Irminger Basin. In the second case (Type II), surface instabilities associated with the DSO variability initiate the spilling process. During summer 2003, more than half of the largest Spill Jet transport values are of Type II.

Arctic remote forcing of NW Atlantic shelf ecosystems

Charles Greene

Regime shifts in Northwest Atlantic shelf ecosystems can be remotely forced by climate-associated atmosphere-ocean interactions in the North Atlantic and Arctic Ocean Basins. This remote climate forcing is mediated primarily by basin- and hemispheric-scale changes in ocean circulation. In my talk, I synthesize results from process-oriented field studies and retrospective analyses of time-series data to document the linkages between climate, ocean circulation, and ecosystem dynamics. These results demonstrate that bottom-up forcing associated with climate plays a prominent role in the dynamics of these ecosystems. I conclude that a broad perspective, one encompassing basin- and hemispheric-scale processes, will be necessary to understand the role of climate in forcing marine ecosystem regime shifts.

Observing the snow properties in the Arctic coastal waters of the Canadian Beaufort Sea with helicopter-borne ground-penetrating radar, laser and electromagnetic sensors

Simon Prinsenberg (with input from: Jim Hamilton, Ingrid Peterson and Roger Pettipas)

As part of the Arctic, Sub-Arctic Ocean Flux (ASOF) and the International Polar Year (IPY) programs, a research project consisting of mooring, modelling and analysis work has studied since 1998 the ocean and ice fluxes passing through Barrow Strait, one of the three main pathways (Figures 5 and 6) through the Canadian Arctic Archipelago (CAA). The aim is to understand the variability in ocean and sea ice volume, heat and freshwater fluxes passing through the CAA and to determine their relationship to the ocean and ice budgets of the Arctic Ocean itself and to the circulation and vertical ventilation of the North Atlantic Ocean.

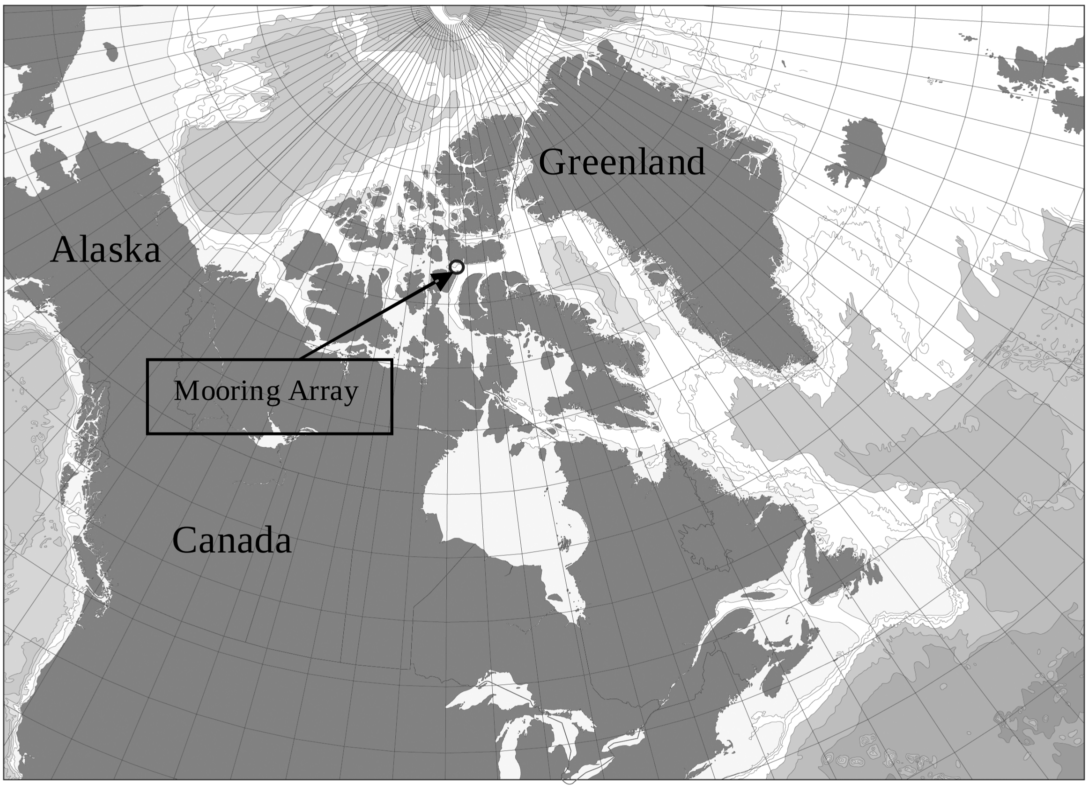

Figure 5. Map of Canadian Arctic showing the mooring array location in eastern Barrow Strait within the Canadian Arctic Archipelago.

Fall 2010 results of the Canadian Arctic Through-flow Study (CATS)–Barrow Strait

Simon Prinsenberg (with input from: Jim Hamilton, Ingrid Peterson and Roger Pettipas)

Eleven years of mooring data has now been processed and analyzed. The eastwards setting Arctic surface waters within Barrow Strait concentrate along the south shore where monthly mean currents are large (15.3cm/sec) as compared to smaller west setting mean currents (2.2cm/sec) along the north shore. Bi-monthly mean velocities reach up to 50cm/sec in summer months along the south shore while only reach 10cm/sec along the north shore with hourly maximum values reaching up to 150cm/sec.

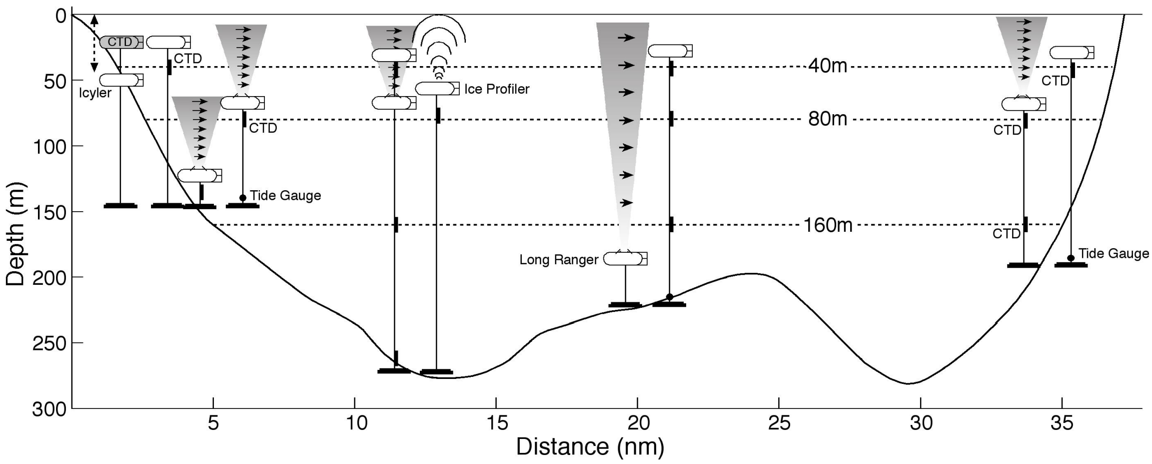

Figure 6. Barrow Strait mooring array for 2003-04 looking upstream to the Arctic with the south shore on the left of the figure and north on the right (37nm equals 65km).

Volume as well as the freshwater and heat transports derived from the mooring data exhibit large seasonal and inter-annual variations with small fluxes in the fall and winter and large fluxes in late summer (Figure 7). Heat fluxes are mainly negative indicating that the Arctic surface water is colder and will cool the Atlantic Ocean. The seasonal volume flux estimates range from a low of -0.02 Sv in the fall of 2007 to a max of 1.75Sv in the summer of 2001. The seasonal 11-yr mean volume flux has a summer maximum (0.90Sv) and a winter minimum (0.20Sv). A secondary peak in late winter (February) of 0.40Sv is also observed (Figure 8). It has an 11-year annual mean of 0.60Sv and varies inter-annually by ±0.25Sv. In general, the freshwater flux is 1/15 of the volume flux and follows the volume seasonal variability as it is mainly driven by the currents. A regression analysis of the monthly transport anomaly through Lancaster Sound with NCEP/NCAR Reanalysis wind anomalies (55-90°N) shows that the transport anomaly is significantly correlated with far-field wind forcing in the Beaufort Sea. Northeastward wind anomalies in the Beaufort Sea, parallel to the western side of the Canadian Arctic Archipelago, show the highest correlation with the monthly volume transport anomaly, explaining 42% of the variance. Northwestward wind anomalies east of Greenland have a weaker effect, explaining an additional 8% of the variance. The response to winds in the Beaufort Sea represents transport being driven by the sea level difference between opposite ends of the NW Passage, and the sea level difference being determined mainly by the setup caused by alongshore winds in the Beaufort Sea. Northwestward winds east of Greenland would help define the large-scale cyclonic wind and ice drift anomalies, which would increase the setup along Arctic coastlines over a long distance, and increase transport through the Northwest Passage. Figure 7 shows the simulated transport generated by the Beaufort Sea winds (r= 0.81 correlation with observed transports) and the simulated transports generated by the Beaufort-plus Greenland winds (r= 0.84 correlation with observed transports).

Freshwater and heat transport are highly correlated with volume transport. The correlation coefficients between volume transport and freshwater and heat transport are greater than 0.96 for both total transport and transport anomalies. Thus based on the transport estimates, the results for volume transport generally apply for freshwater and heat transport as well. However, freshwater transport magnitude is likely underestimated since it is based on measurements from CTD sensors at depths greater than 25-30m missing the surface fresh water layer. The results covering 8 year of data and regression analysis were presented in Prinsenberg et al. (2009) and the preliminary results that show that the ice arch location in Lancaster Sound and Barrow Strait is related to the local air temperature and wind speed were presented in Peterson et al. (2008).

Prinsenberg, S.J., Jim Hamilton, Ingrid Peterson and Roger Pettipas, 2009. Observing and interpreting the seasonal variability of the oceanographic fluxes passing through Lancaster Sound of the Canadian Arctic Archipelago. In: Influence of climate change on the changing Arctic and Sub-Arctic conditions, Eds. Prof. Jacques Nihoul and Prof. Andrey Kostianoy, Springer-Verlag, Dordrecht, The Netherlands, pp. 119-137.

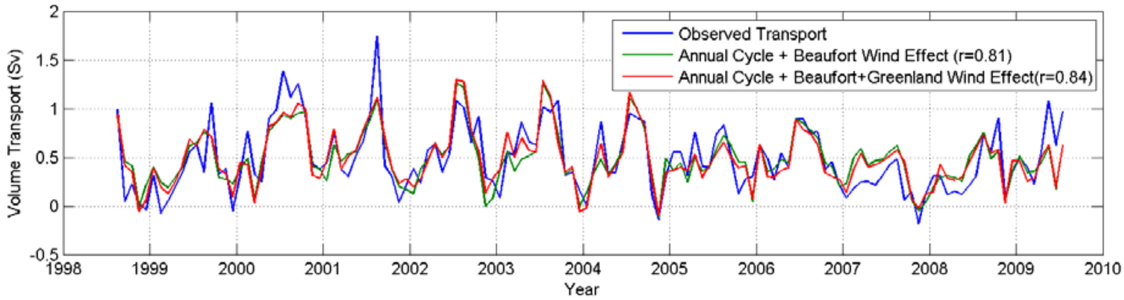

Figure 7. Monthly (blue) estimated volume transports through eastern Barrow Strait from August 1998 to August 2009 and simulated regression estimates using Beaufort wind (green) and Beaufort plus Greenland winds (red).

Ingrid Peterson, Simon Prinsenberg, James Hamilton and Roger Pettipas, 2008. Variability of oceanographic and ice properties of the Canadian Arctic Archipelago. International Council for the Exploration of the Sea (ICES-2008) Annual Conf. Proceedings; ICES CM 2007/B:16, 14pp.

Ice-Ocean Interactions in Greenland

Fiamma Straneo (with input from: G. Hamilton, D. Sutherland, R. Curry, L. Stearns, and C. Cenedese)

Net mass loss from the Greenland Ice Sheet has increased rapidly over the last decade, primarily as a result of the acceleration and retreat of outlet glaciers in western and southeast Greenland. The leading hypothesis is that the acceleration was due to an increase in ocean-driven submarine melting at the glaciers' termini–which are typically grounded ~600 m below sea-level in Greenland's deep fjords. Yet, our knowledge of the water masses present in the fjords and the circulation associated with the submarine melting is very limited. Here we present measurements from three glacial fjords in East Greenland obtained from synoptic surveys using an icebreaker, small local vessels and helicopters, as well as moored data. These show that the fjords are filled year-round with cold waters of Arctic origin, transported by the East Greenland Current, overlaying warm waters of Atlantic origin. These waters are continuously and rapidly replenished via exchange with the shelf. Melting is primarily driven by the Atlantic Waters but the presence of the Arctic layer above effectively limits the vertical reach of the upwelling meltwater plume at the ice edge. These results show that the large scale oceanic stratification has a strong impact on the melting of Greenland's glaciers and that variability in either the Arctic or Atlantic water masses will drive variations in the submarine melt rate.

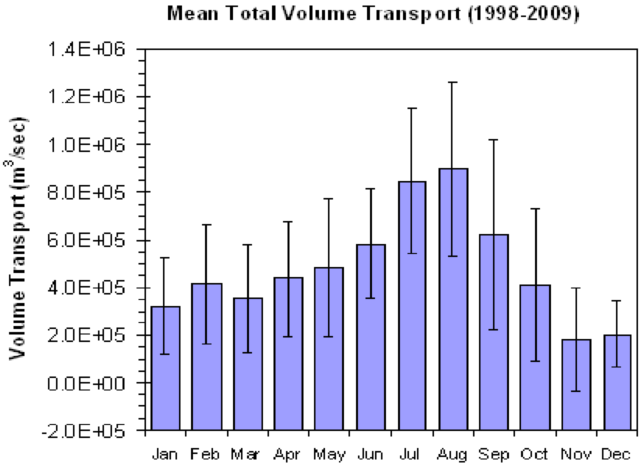

Figure 8. Monthly mean volume flux through eastern Barrow Strait derived from 11-years of mooring data (Aug. 1998–Aug. 2009).

AOMIP goals, objectives and results. Discussion of cooperation with AOMIP

Andrey Proshutinsky

The Arctic Ocean Model Intercomparison Project (AOMIP, 2000–present) new phase was funded by NSF on September 1, 2008. The major AOMIP goals remain without change since project beginning in 2000 and are: (1) Validate and improve Arctic Ocean models in a coordinated fashion and (2) Investigate variability of the Arctic Ocean and sea ice at seasonal to decadal time scales, and identify mechanisms responsible for the observed changes. Major 2008-present project activities have been related with a conduction of a set of coordinated numerical and observational studies, namely: Bering Strait volume, heat and salt fluxes; Canada Basin: shelf-basin exchange and mechanisms; Pacific Water circulation (origin, forcing, pathways); Canada Basin: major mechanisms of halocline formation and variability; Circulation and fate of fresh water from river runoff; Beaufort Gyre: mechanisms of fresh water accumulation and release; Fresh water balance of the Arctic Ocean; Atlantic Water circulation; Ecosystem experiments; Observations, state estimation, and adjoint methods. One of presentation conclusions is that AOMIP has been actively working with ASOF collaborators during reporting period and will continue working in the future. Results of this work will be published in the special JGR section "Arctic Ocean investigation employing AOMIP-2 models" (paper submission due is December 31, 2010).

Appendix

8th ASOF ISSG Meeting

Woods Hole Oceanographic Institution, Woods Hole, MA, USA

Fuglister Room, Room 201, Clark Laboratory

18, 19th October 2010

In Association with the 14th AOMIP Workshop, 20-22 October

Purpose
The purpose of the ISSG meeting is to:

3. Host the iAOOS planning activity on the IPY-legacy observing system for Greenland.
4. Provide status updates on recent ASOF-relevant activities, and future plans.
5. Discuss how the next phase of ASOF will be implemented, in particular, the collaboration with AOMIP.

The two-day meeting will be split into two separate sessions, each lasting one day: First, we will discuss status and prospects for continuing the observing system east and west of Greenland (on Monday, 18th October). This activity, which is supported by the Arctic Ocean Sciences Board (AOSB), will inform the Integrated Arctic Ocean Observing System (iAOOS) planning process. iAOOS, a major project of the AOSB, will report at the end of 2010. Our Workshop will directly contribute to the iAOOS report concerning the Greenland observing system. Before open discussion starts, several speakers will summarize what is currently known, what we need to know next, and what is required of the observing system to find out. The iAOOS Workshop will be chaired by Bob Dickson, and will be open to all interested scientists at WHOI.

Second, we will hold an ASOF-2 business meeting on the second day (Tuesday, 19th October). This discussion will provide updates on status and prospects for ASOF-relevant research, and discuss how the ASOF initiative should move forward. We will have a discussion on ways in which to collaborate with the AOMIP project. This meeting will be chaired by Tom Haine, and will be closed to the public. Most people have 30min slots to talk, but expect lots of discussion during that time.

Finally, the 14th Arctic Ocean Modeling Intercomparison Project (AOMIP) meeting will take place on Wednesday to Friday (20th to 22nd October). Attendees of the ASOF ISSG meeting are encouraged to attend the AOMIP discussions too, and should inform Andrey Proshutinsky (aproshutinsky@whoi.edu) to register for the meeting and to receive the agenda.

Logistics
We will meet in the Fuglister Room (room 201) in Clark Laboratory, WHOI, Quisset Campus. See the emails from Andrey Proshutinsky (aproshutinsky@whoi.edu) for more details, including maps, and travel advice.

There will be computer and projector for us to use, plus a whiteboard and wireless internet access. The room is available to us from 7am until 6pm, and we will start promptly at 8:45am.

Light breakfast fare will be available before we begin. Coffee, tea, water, and juice will be served at 10:35am and 3:35pm Lunch is available at 12:35pm

List of Attendees:

ISSG attendees:	**Invited Guests:**
Jean-Claude Gascard (LODYC) Tom Haine (JHU) Craig Lee (UW APL) Michael Karcher (AWI/OASYS) Svein Østerhus (U. Bergen) Bob Pickart (WHOI) Simon Prinsenberg (BIO) Bert Rudels (FIMR) Lilian Schubert (AWI) Fiamma Straneo (WHOI) Rebecca Woodgate (UW APL) Peili Wu (UKMO)	Øystein Skagseth (IMR) Bob Dickson (CEFAS) Waldemar Walczowski (IOPAN) Laura de Steur (NPI) Andreas Muenchow (Udel) Gleb Pantaleev (IARC) Andrey Proshutinsky (WHOI) Alexandra Jahn (McGill) Ruediger Gerdes (AWI) Marcello Magaldi (JHU) Patrick Heimbach (MIT) Kjetil Våge (Bergen) Charles Greene (Cornell)
Apologies from: Agnieszka Beszczynska-Moeller (AWI) Ruth Curry (WHOI) Kelly Falkner (NSF/OSU) Sirpa Hakkinen (NASA GSFC) Takashi Kikuchi (JAMSTEC) Humfrey Melling (IOSBC) Bogi Hansen (FRS) Hjalmar Hjatun (FRS) Harald Loeng (IMR) Peter Rhines (UW) Igor Yashayaev (BIO)	**Additional Input Requested from:** Tor Eldevik,

8th ASOF ISSG Meeting,
Fuglister Room, WHOI
Tuesday 19th October 2010

08:45 AM	Tom Haine (JHU) Report on action items from 7th ISSG meeting, and charge to meeting
09:05 AM	Øystein Skagseth (IMR) “An observation based update of the Norwegian Atlantic Current”
09:35 AM	Svein Østerhus (U. Bergen) “Poleward propagation of ocean heat anomalies”
10:05 AM	Waldemar Walczowski (IOPAN) “Atlantic Water in the West Spitsbergen Current - interanual variability, transformation and importance”
10:35 AM	**Coffee Break**
11:05 AM	Rebecca Woodgate (UW APL) “What's new in the Bering Strait?”
11:35 AM	Kjetil Våge (U. Bergen) “Upstream pathways of Denmark Strait Overflow Water”
12:05 PM	Bob Pickart (WHOI) “Future field work on DSO and the western Arctic boundary current“
12:35 PM	**Lunch**
01:35 PM	Marcello Magaldi (JHU) “On the variability of the East Greenland Spill Jet in Summer 2003”
02:05 PM	Charles Greene (Cornell) “Arctic Remote Forcing of NW Atlantic Shelf Ecosystems” Discussion of cooperation with ecosystems programs
02:35 PM	Simon Prinsenberg (BIO) “Observing the snow and ice properties in the Arctic coastal waters of the Canad Beaufort Sea with helicopter-borne Ground-Penetrating Radar, Laser and Electromagnetic sensors.”
03:05 PM	Fiamma Straneo (WHOI) “Ice Sheet Ocean interactions in East Greenland”
03:35 PM	**Coffee/tea break**
04:05 PM	Michael Karcher (AWI/OASYS) “The ACCES project”
04:35 PM	Andrey Proshutinsky (WHOI) “AOMIP goals, objectives and results” Discussion of cooperation with AOM
05:05 PM	Other ISSG business: Funding Strategy, including Scientific Coordinator, Task Group structure and task delegation, dissemination, next meeting
05:35 PM	**Close**