

# **IPY Arctic Ocean database and similar products : why do we need it?**

*G.Pantelev, (IARC), S.Kirillov(AARI)*

*Collaborators: J.Stroh(IARC), D.Nikolsky(GI UAF), V.Luchin(FEBRAS),  
O.Francis(UH), M.Yaremchuk(NRL),  
T.Kikuchi(JAMSTEC),I.Semiletov(IARC) and many others...*

**PAG meeting, Nov 6-7, 2012, China**

## **Summary:**

1. IPY database 2007-2009/2010
2. Examples: why do we need similar product:
  - a) 2008 –circulation
  - b) Bering Sea circulation: Aleutian Passes, Eastern Bering Sea
  - c) Hydrochemical Atlas of the Bering Sea
3. Waves
4. Thermal regimes in the Chukchi Sea since 1941-present
5. Future plans

IPY database: <http://oregon.iarc.uaf.edu/dbaccess.html>

Firefox +

GP's AO DB

<http://oregon.iarc.uaf.edu/dbaccess.html>

[Oregon Home](#)
[Arctic Ocean Measurement Database](#)
[Links to Sources and Original Datasets](#)
[Contact](#)

**Welcome to the AO DB**

Don't have access? Apply by emailing GP at [g1eb@iarc.uaf.edu](mailto:g1eb@iarc.uaf.edu) or [DOT@DOT.edu](mailto:DOT@DOT.edu). Please note that this site is currently under construction -- concerns should be directed to [jnstroh@alaska DOT.edu](mailto:jnstroh@alaska DOT.edu).

Please select the type of search you would like to make:

[Search Temperature/Salinity Records](#)  
[Search Surface Temperature Records](#)  
[Search Velocity Records](#)  
[Search Surface Height Records](#)

TSZ contributions as of 2012.10.30:

USA	266
Russia	2139
China	120
Sweden	133
Norway	112
Germany	691
<b>TOTAL</b>	<b>3461</b>

[IIP records as of 2012.11.01: 18287](#)

Map Image: [IBCAO V2.23](#)

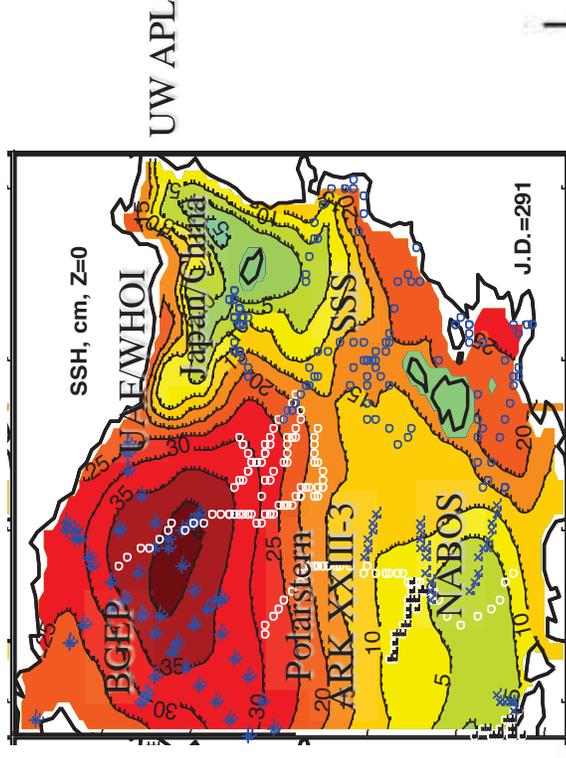




# IPY data base: why do we need it?

## 1. Data for 2008.

Own experience: typical time for data collection is 2-3 years...



2. **Surface water CO<sub>2</sub>.** Data are from Surface Ocean CO<sub>2</sub> Atlas (SOCAT) version 1.5. (EOS, Vol. 93, N12, 20 March 2012)



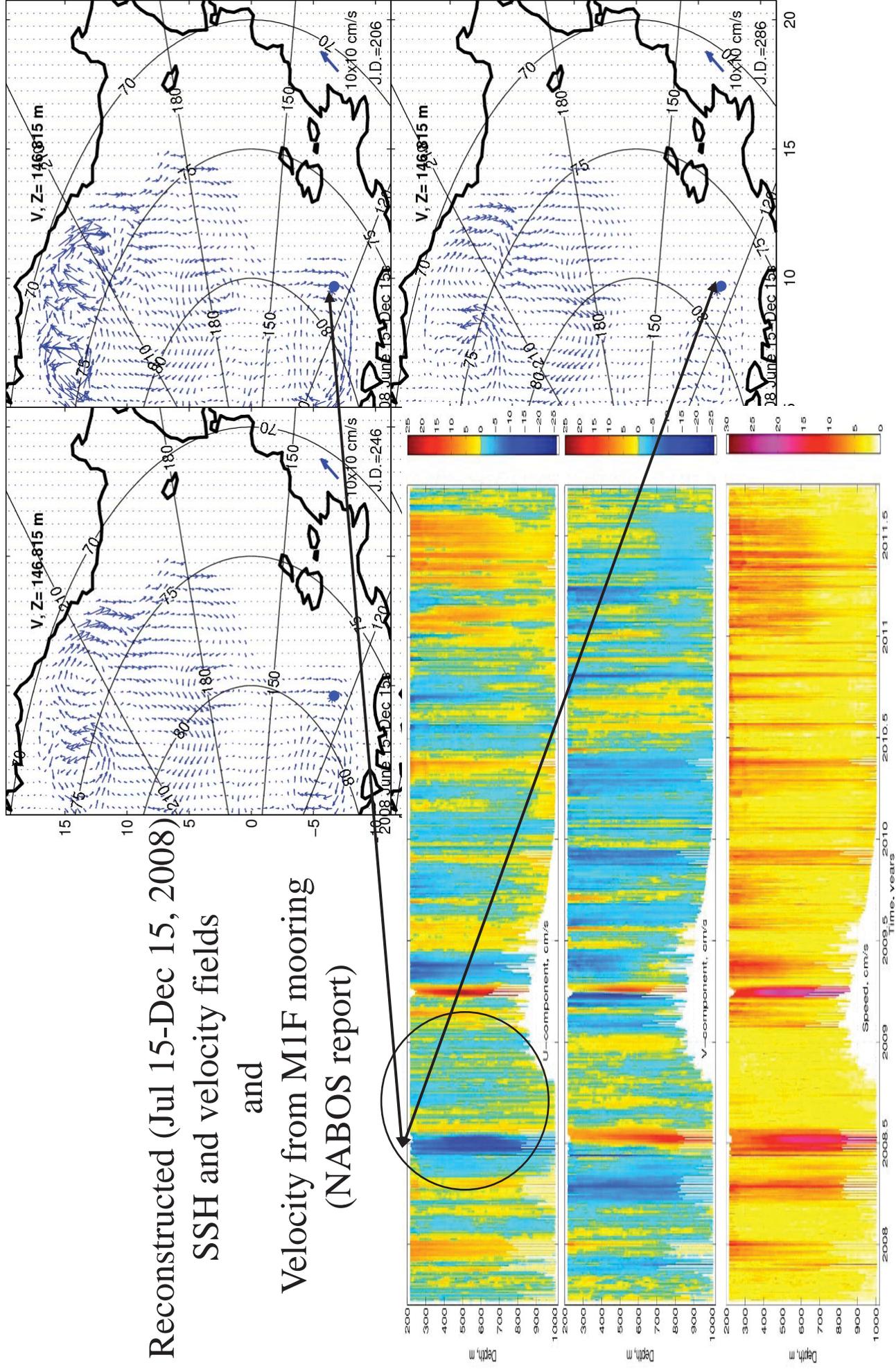
3. **Reply for the request of 2007-2010 data:**

Hi Gleb, We have collected shipboard CTD data. These will get posted soon. Regards, ....

4. **IMHO: until now, the best data provider - UW APL!**

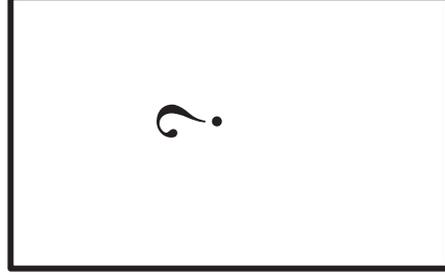
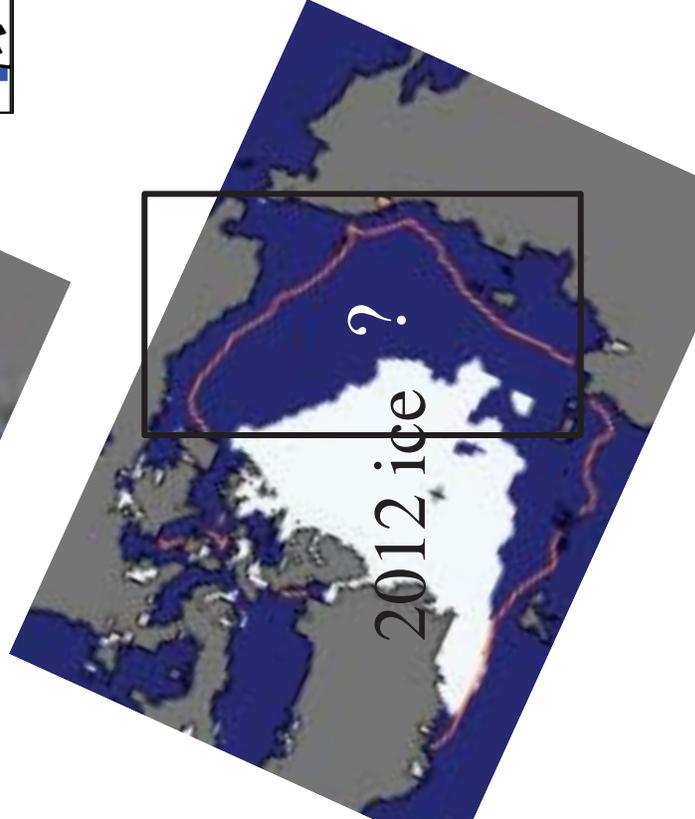
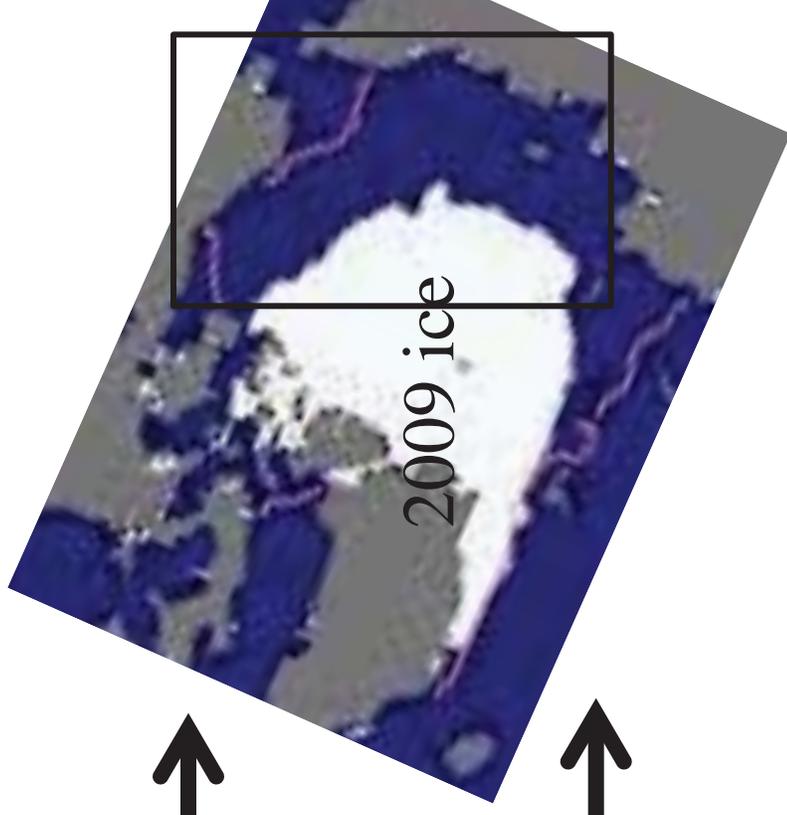
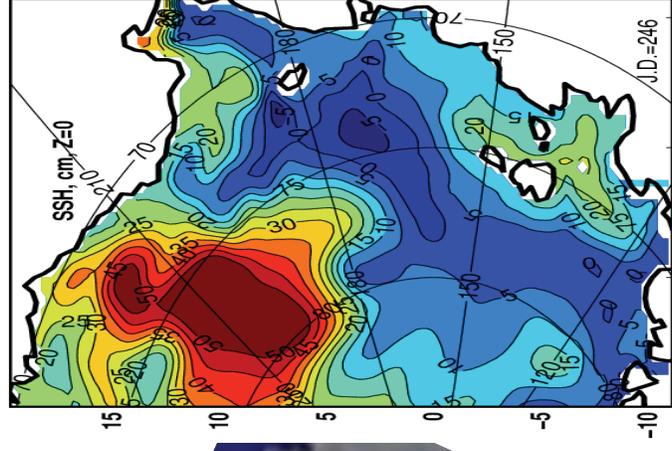
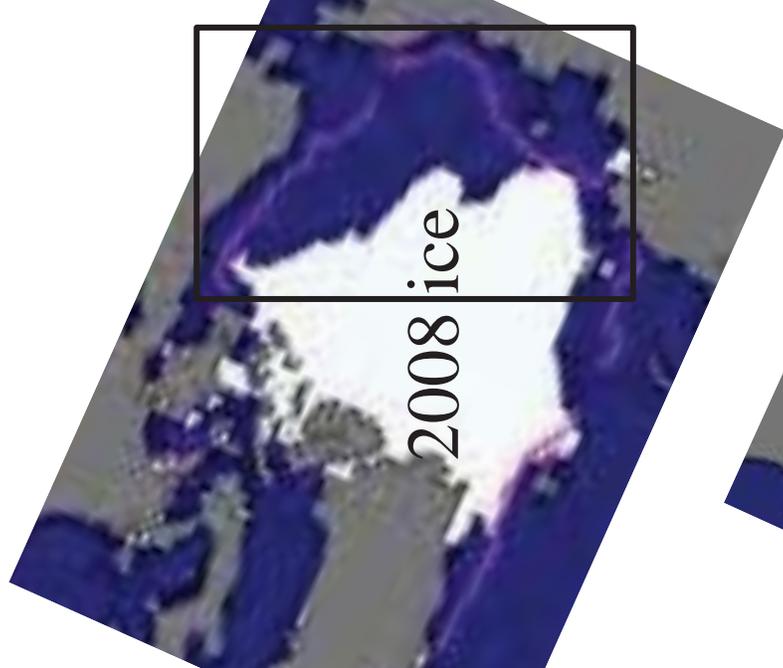
# 2008 circulation in the Arctic Ocean (4Dvar)

Reconstructed (Jul 15-Dec 15, 2008)  
SSH and velocity fields  
and  
Velocity from M1F mooring  
(NABOS report)





# 2008 circulation in the Arctic Ocean (4Dvar)



2013

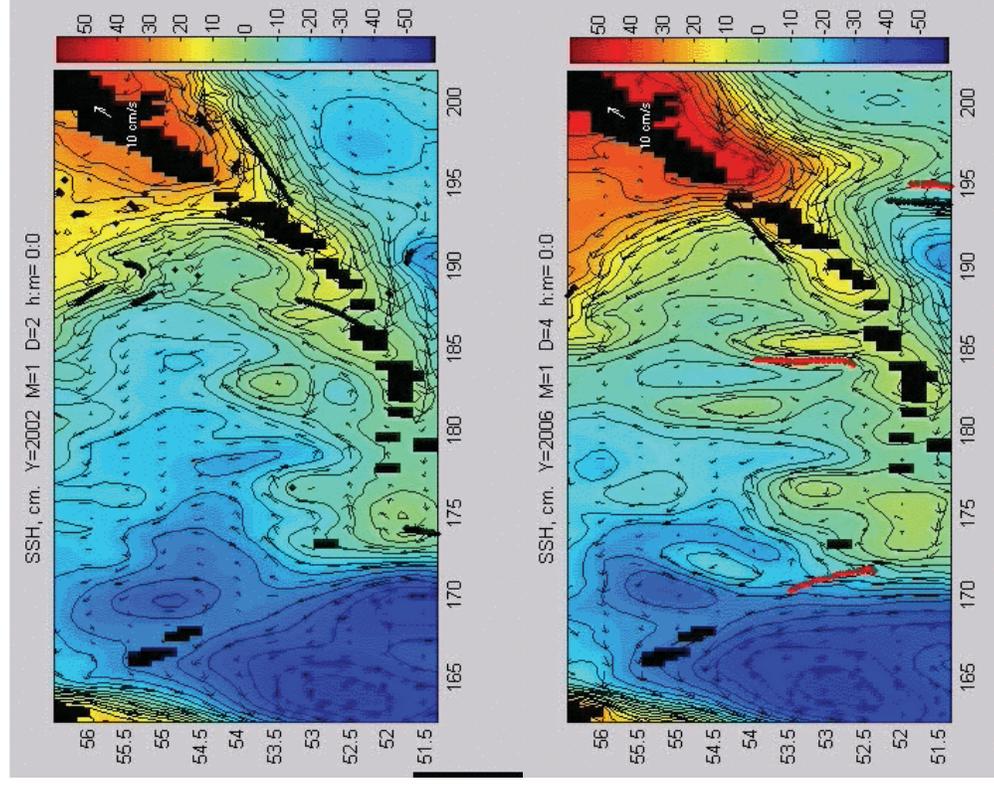
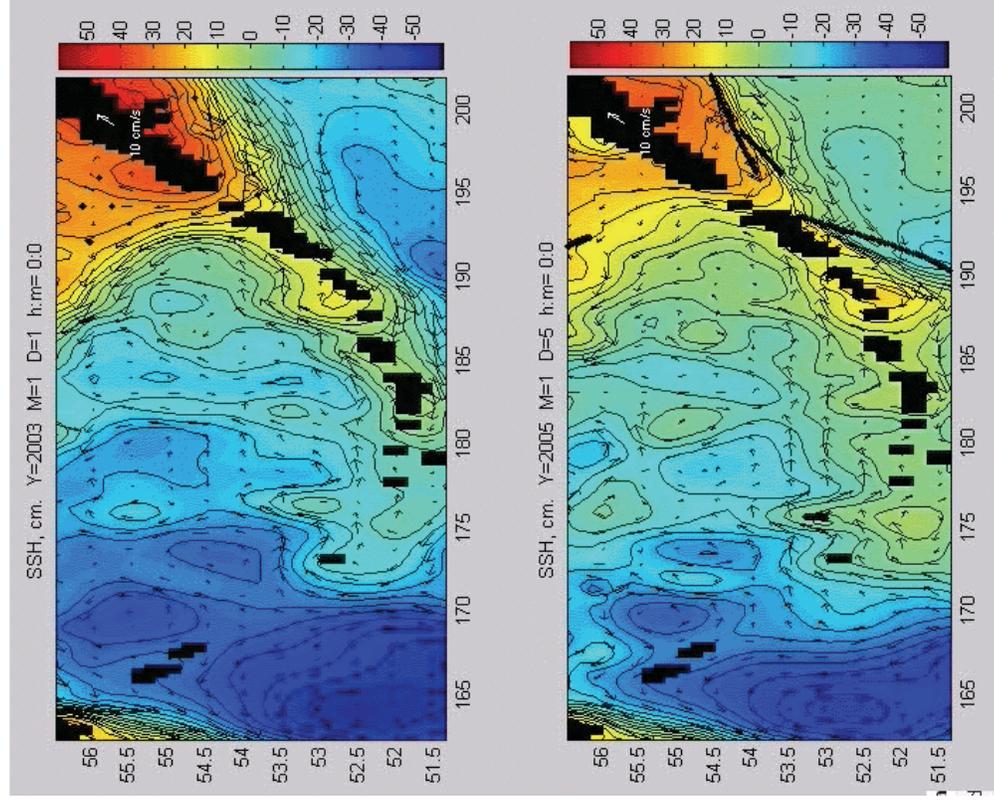


ice/circulation?

# Bering Sea circulation: Aleutian Passes 2002-2006

## Data sources:

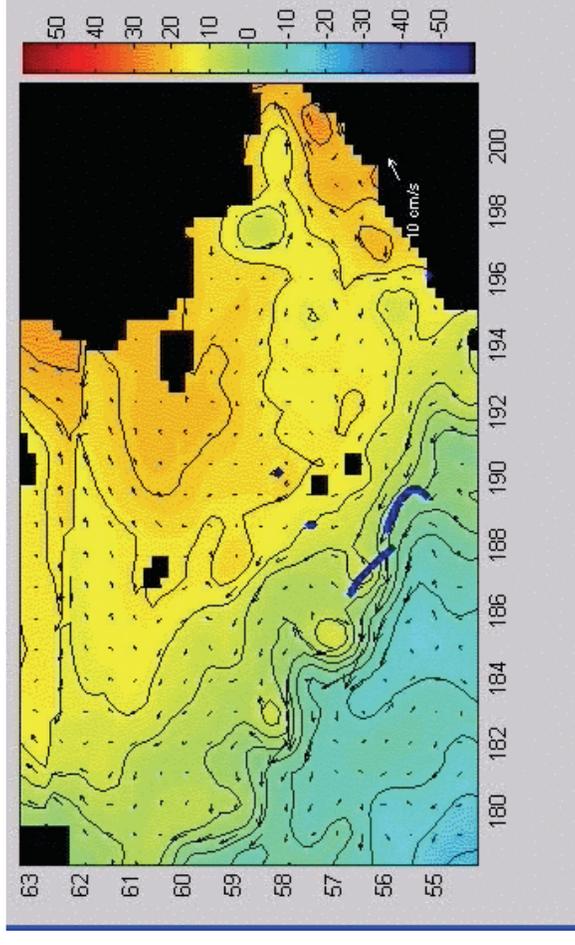
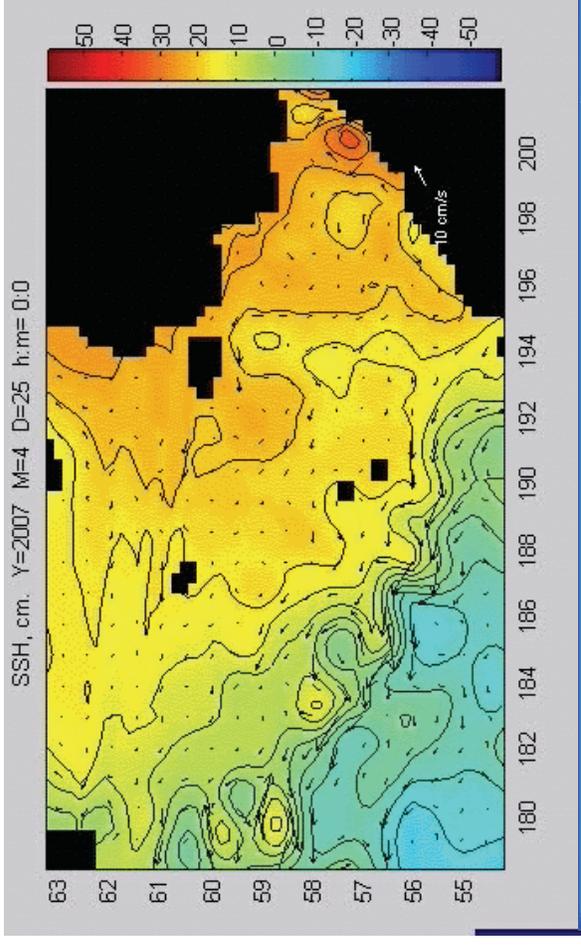
1. Climatological oceanographic Atlas of the Bering Sea: T/S/velocity and MDOT
2. SSH anomaly
3. NOAA surface drifters
4. ARGO drifters
5. CTD (courtesy V.Luchin, FEBRAS)



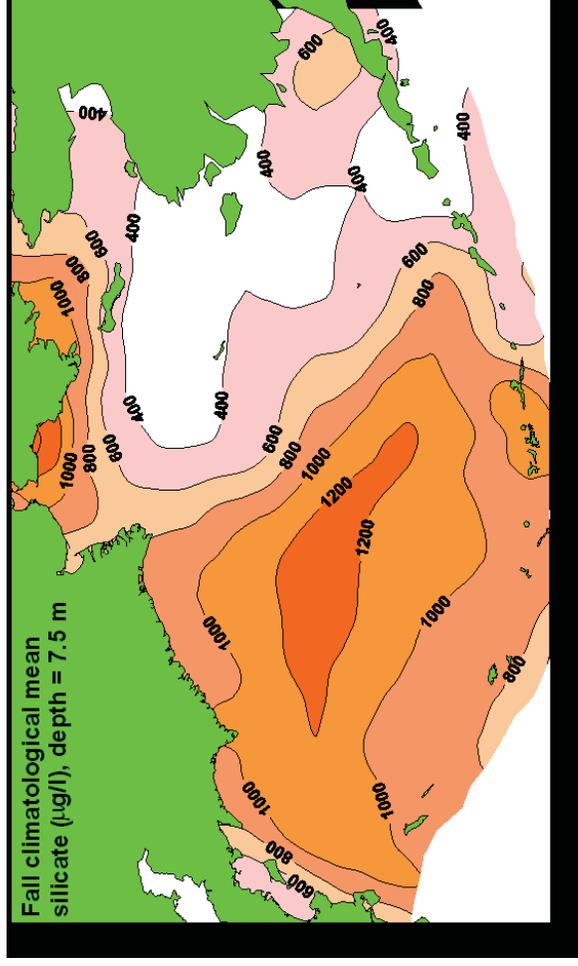
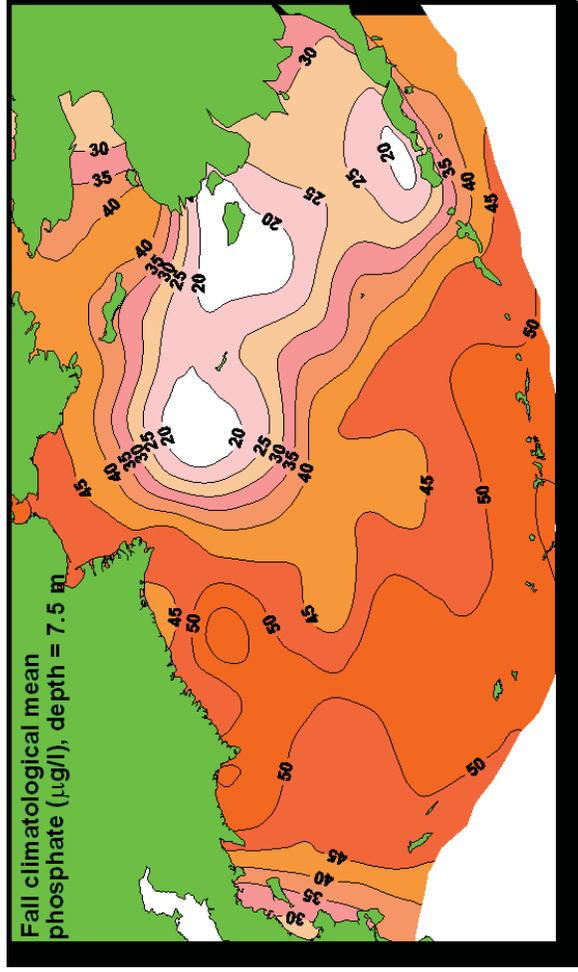
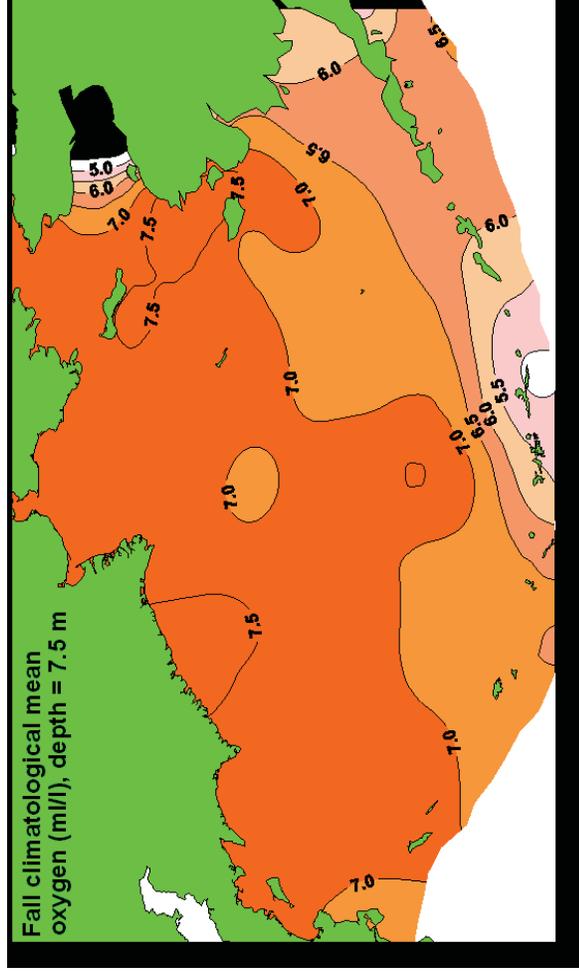
# Bering Sea circulation: Eastern Bering Sea 2007-2010

## Data sources:

1. BEST: CTD, velocity from moorings
2. Climatological oceanographic Atlas of the Bering Sea: T/S/velocity and MDOT
3. SSH anomaly
4. NOAA surface drifters
5. ARGO drifters
6. Ice, SST

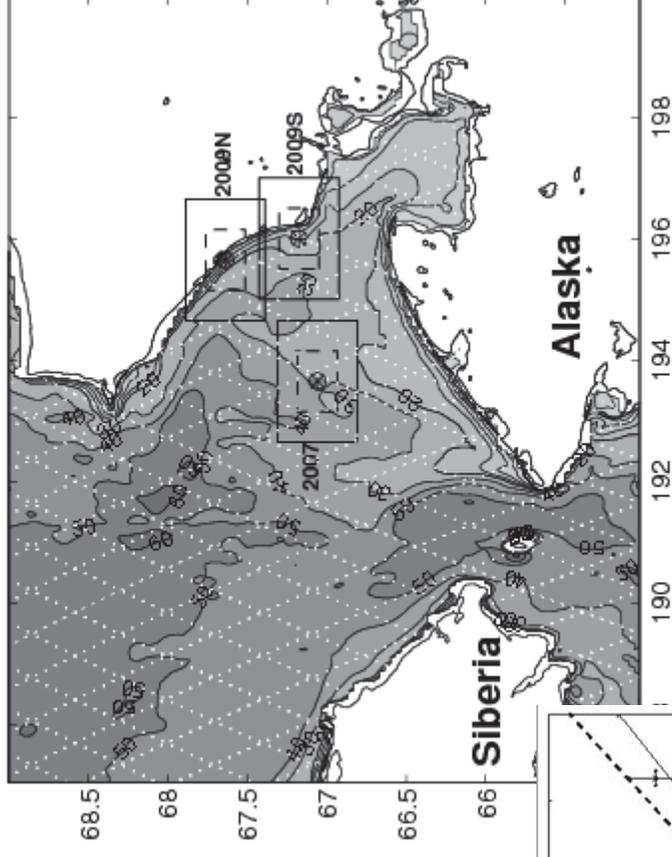


Oxygen, phosphate, silicate  
distributions  
during spring, summer and fall  
reconstructed through the  
Q4Dvar

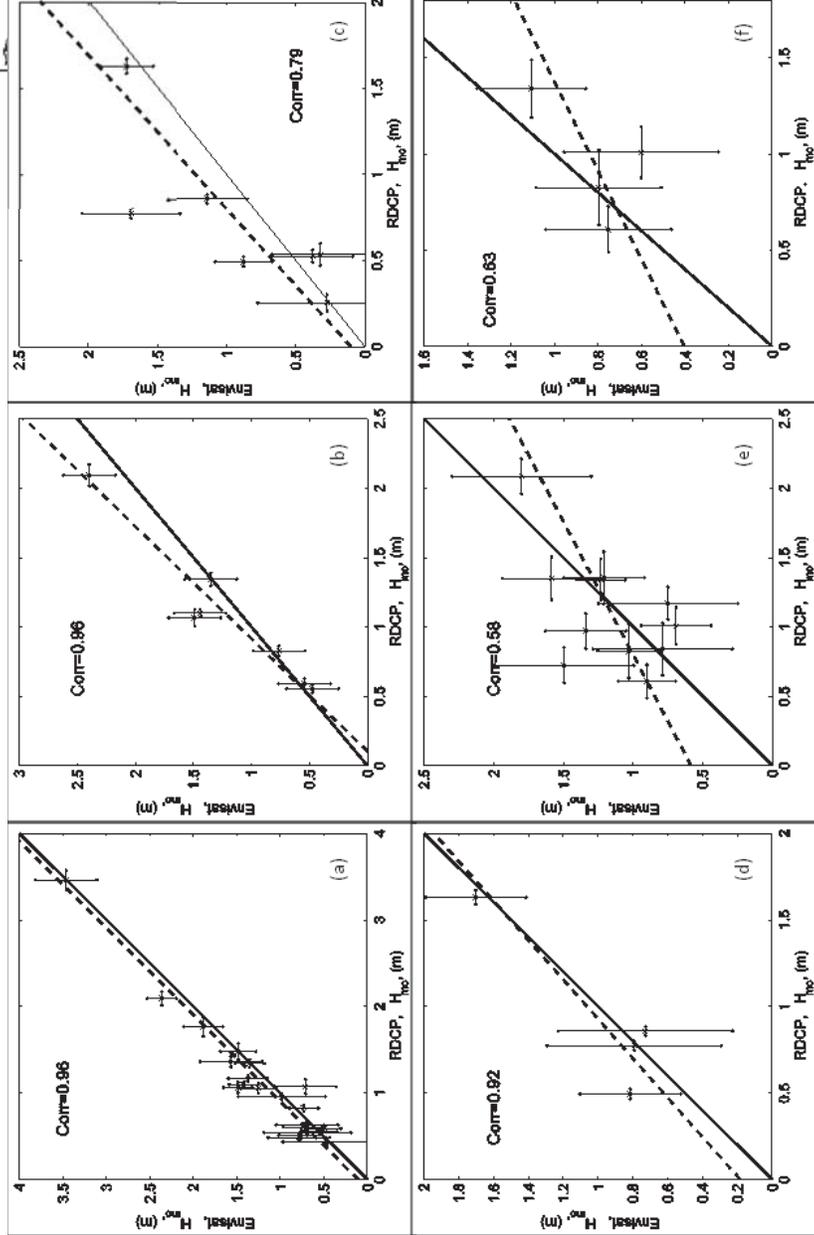


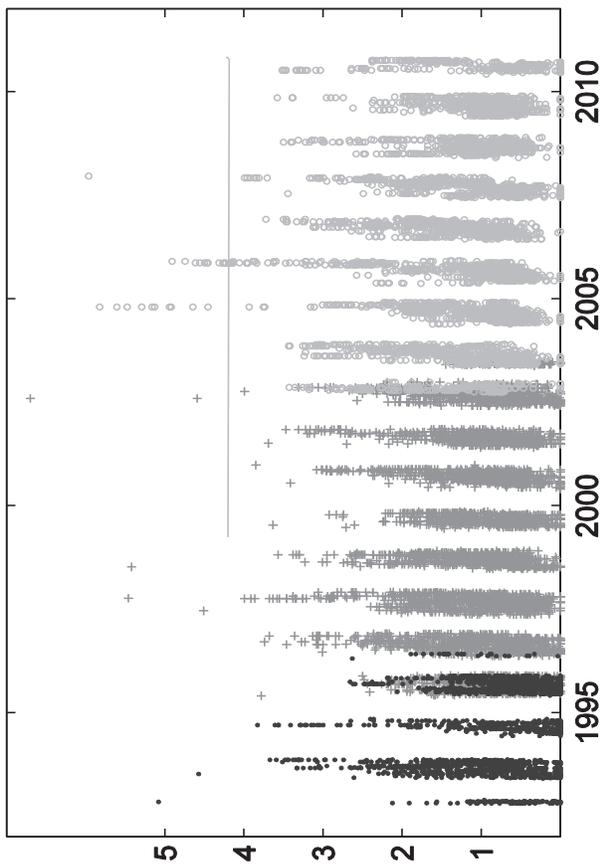
# Waves from satellite in the Arctic Ocean (together with O.Francis, Francis et al., 2012)

Significant wave height linear comparison from Recording Doppler Current Profiler (RDCP) dataset (x-axis) versus Envisat satellite altimeter dataset (y-axis) for (a) Station 2007 large domain (solid line, Fig 1), (b) Station 2009N small domain (dashed line, Fig 1), (c) Station 2009N large domain (solid line, Fig 1), (d) Station 2009S small domain (dashed line, Fig 1), (e) Station 2009S large domain (solid line, Fig 1), (f) Station 2009S small domain (dashed line, Fig 1).

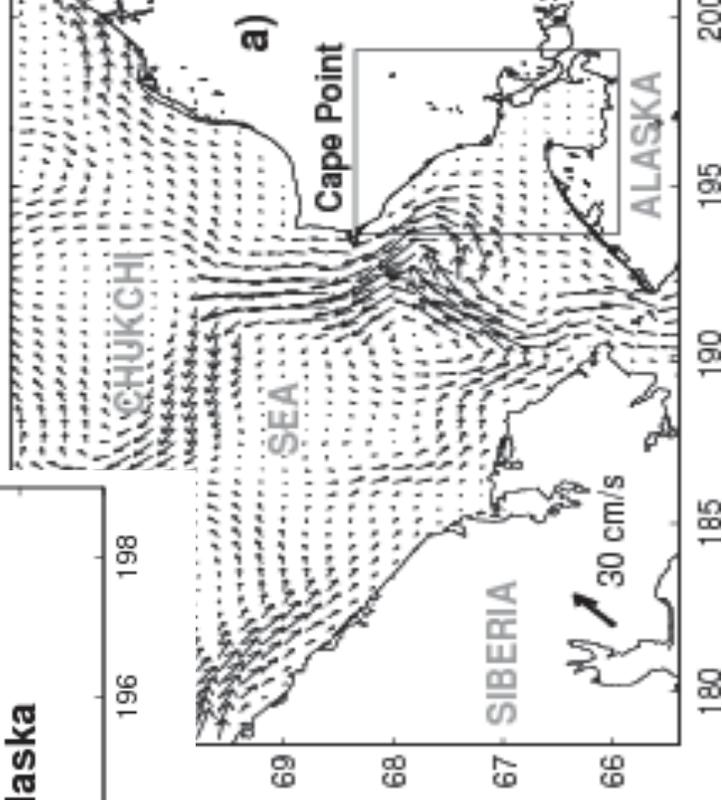
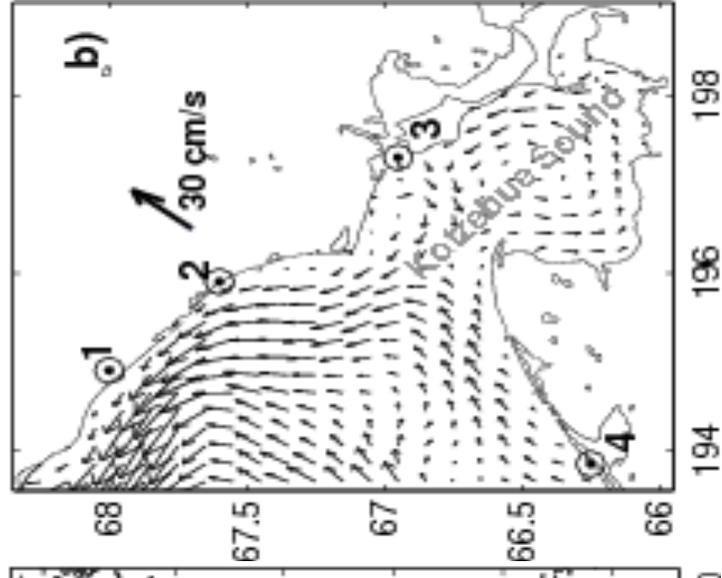
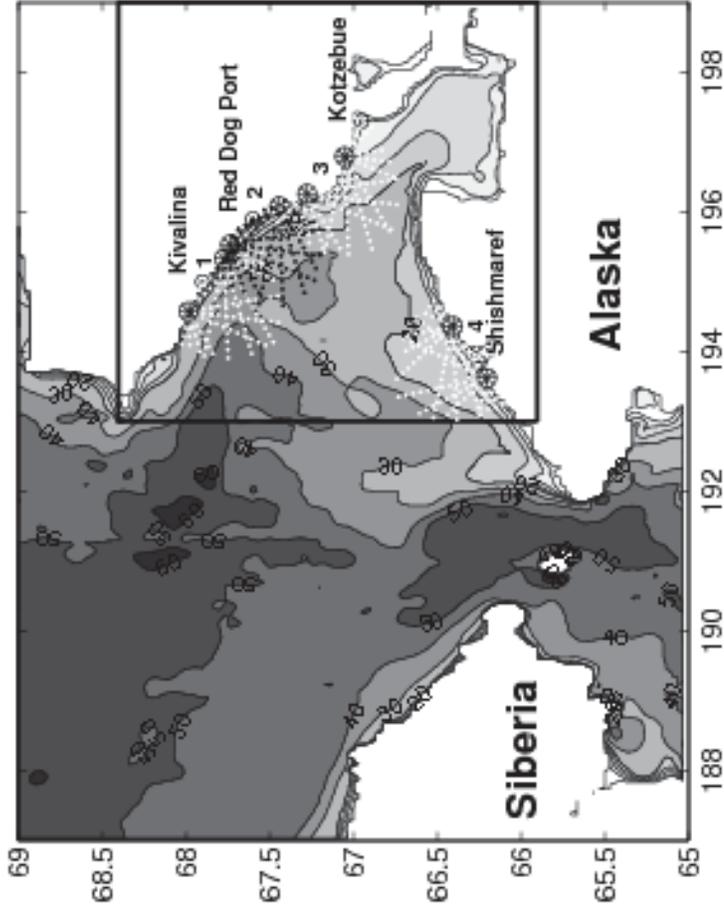


Region, satellite tracks (ERS-12, Envisat), locations, squares.

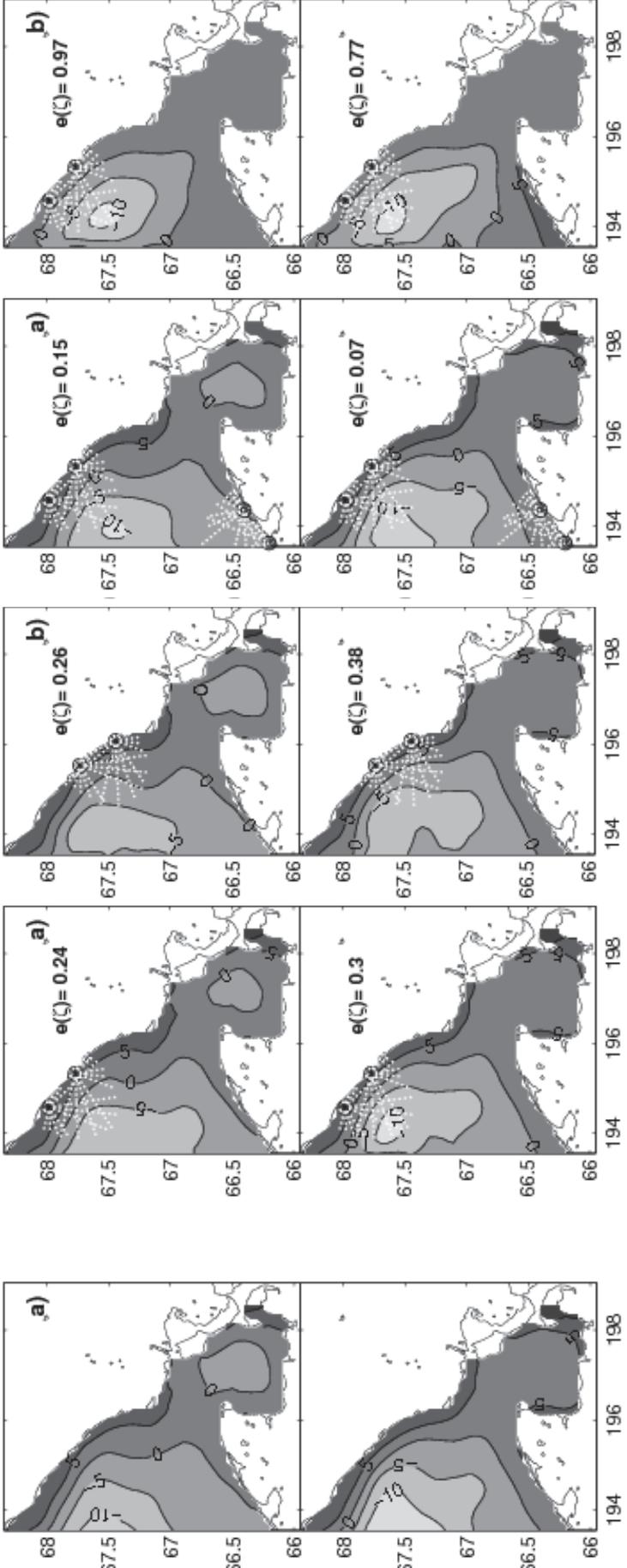
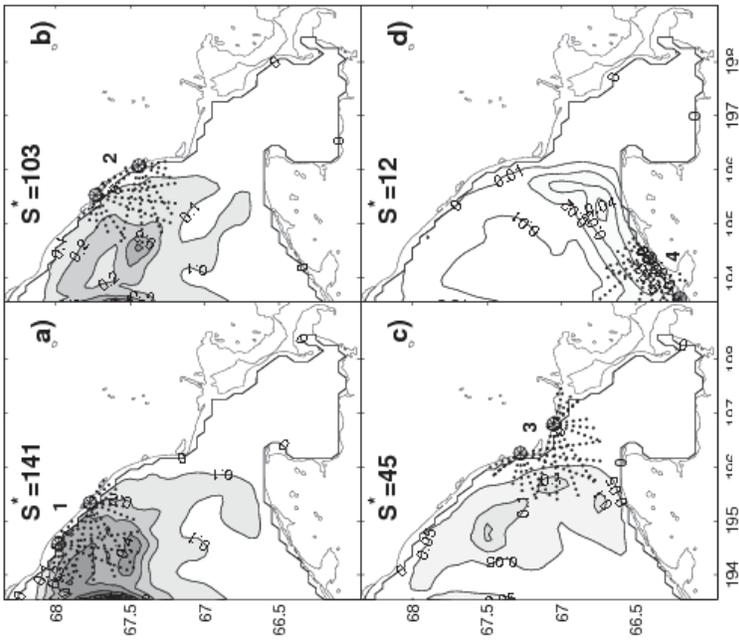




# Optimal observations: HFR

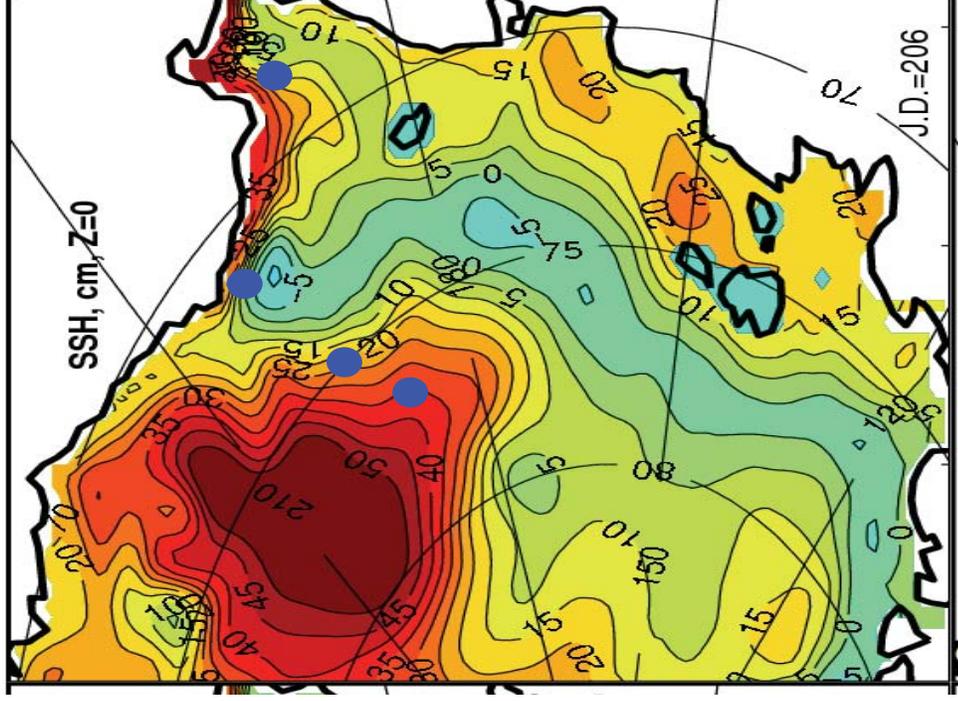
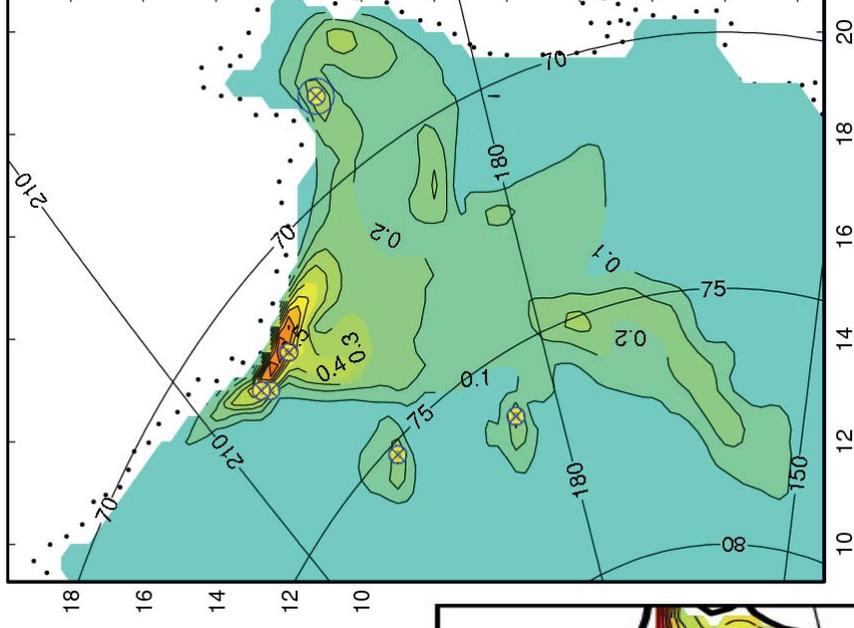
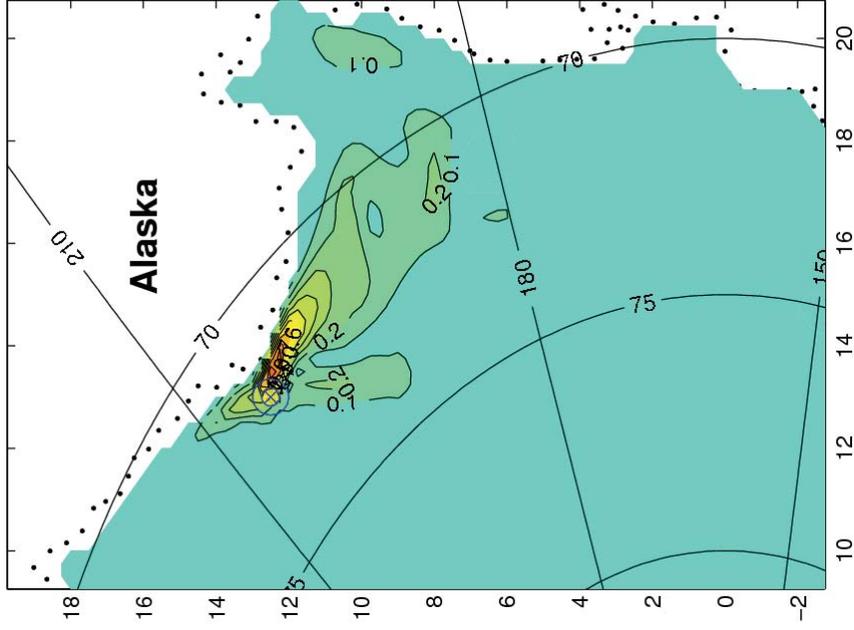


# Optimal observations: HFR Adjoint sensitivity analysis and OSSE's



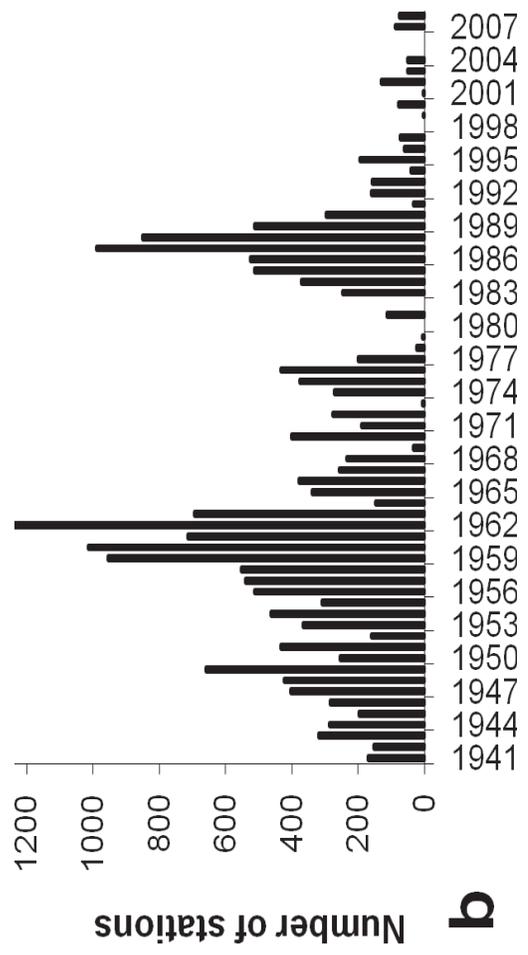
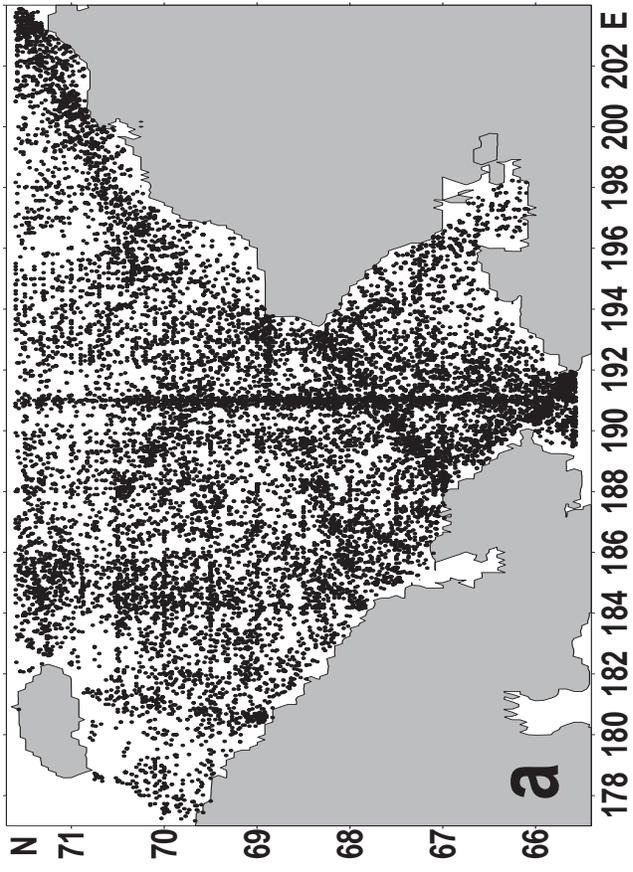
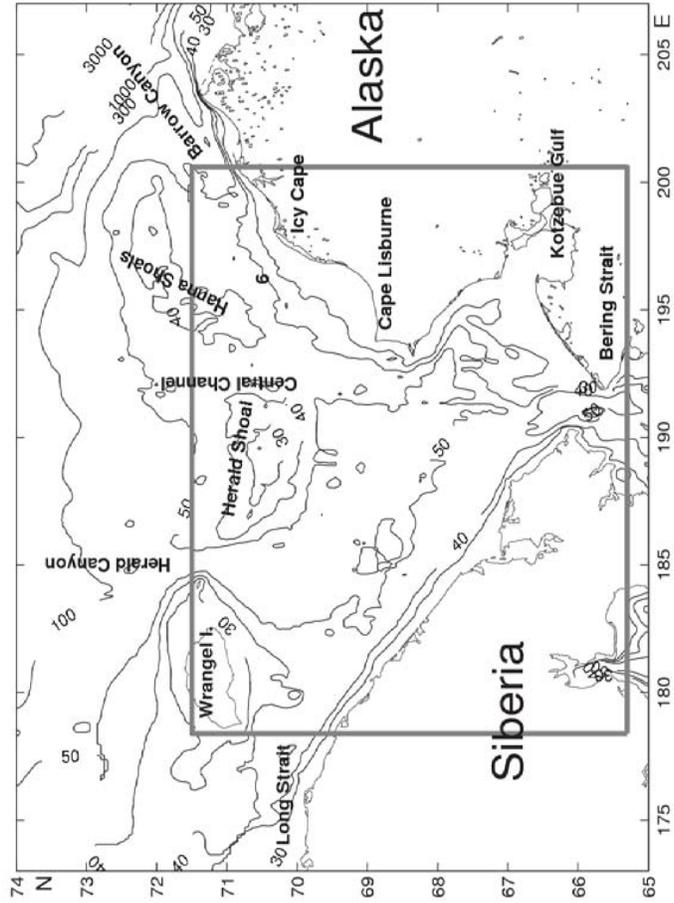
# Optimal observations: moorings

Optimization of the mooring observations in the Pacific Arctic: 4Dvar IC Adjoint sensitivity analysis of the optimized circulation in July 25 2008



# Thermal regimes in the Chukchi Sea since 1941-present

(V. Luchin, G.Panteleev)



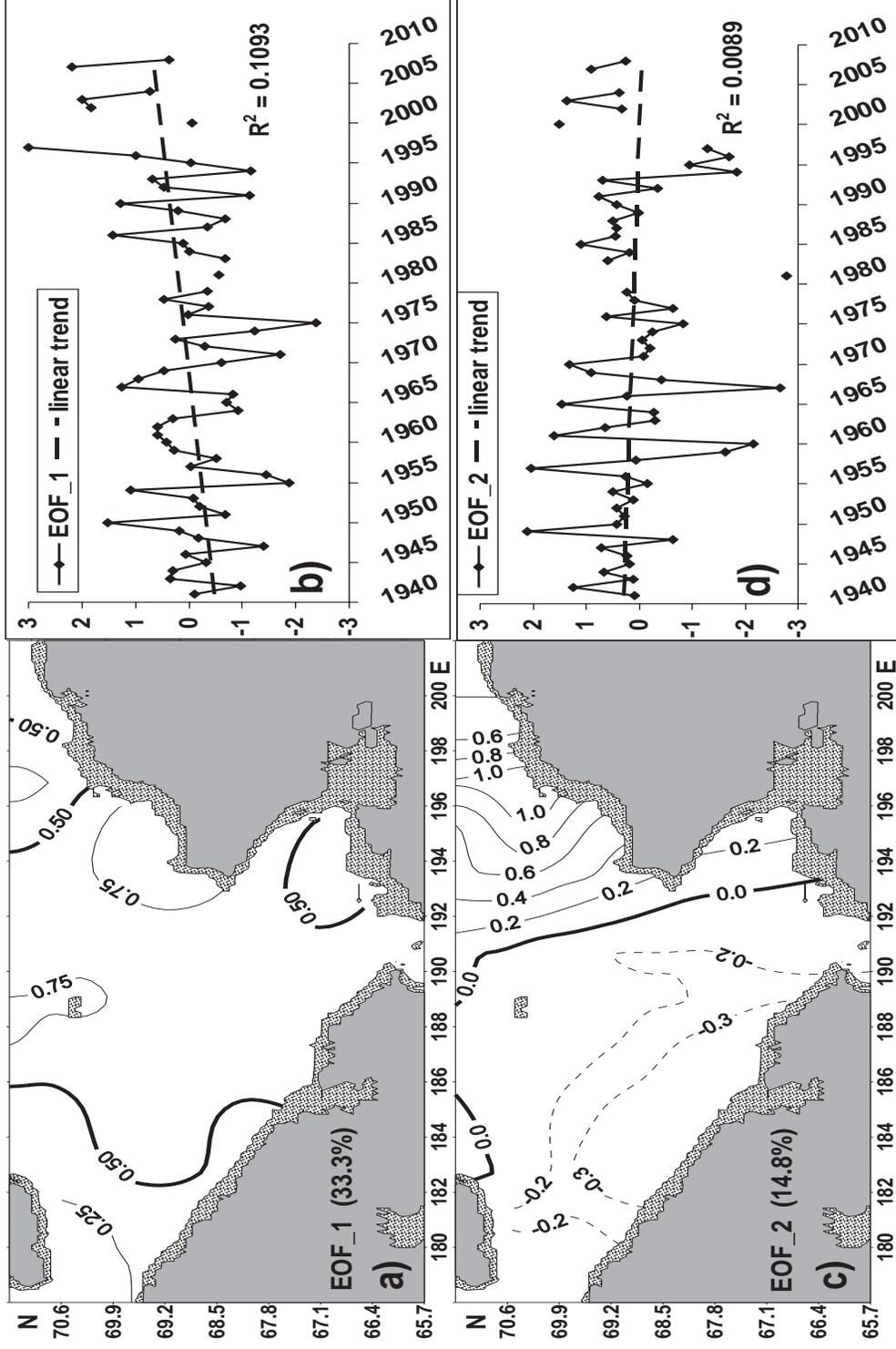
Data base was collected by  
V. Luchin  
From Russian, American, Canadian  
and Japanese data sources:  
20,369 profiles.

**b**

# Thermal regimes in the Chukchi Sea since 1941-present

(V. Luchin, G.Panteleev)

## EOF analysis

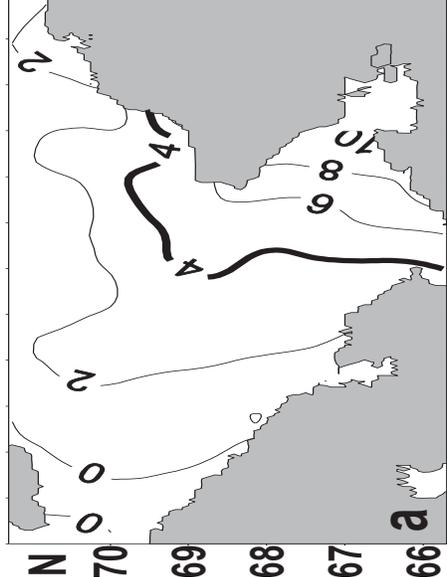


# Thermal regimes in the Chukchi Sea since 1941-present

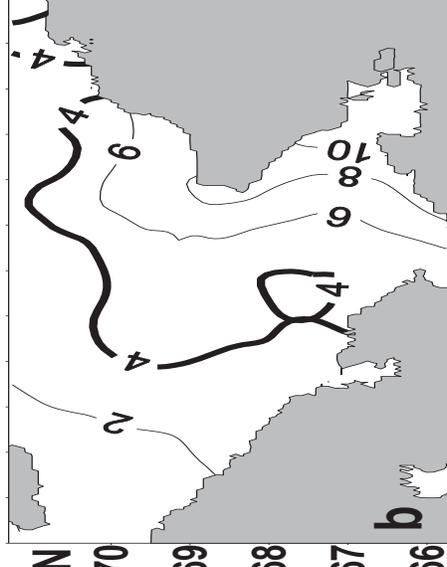
(V. Luchin, G.Panteleev)

## Typical temperature distributions

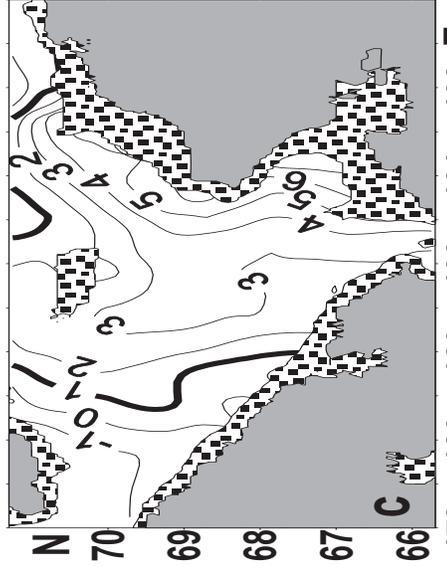
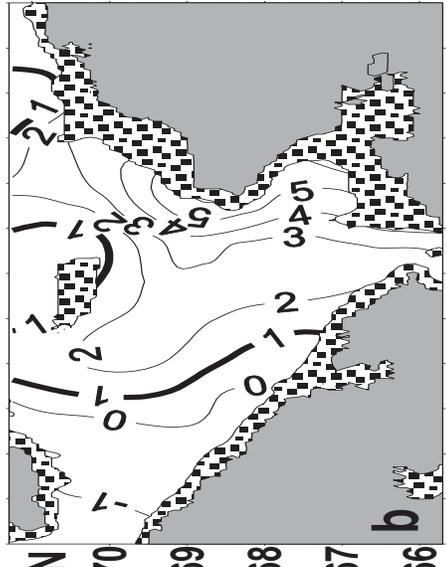
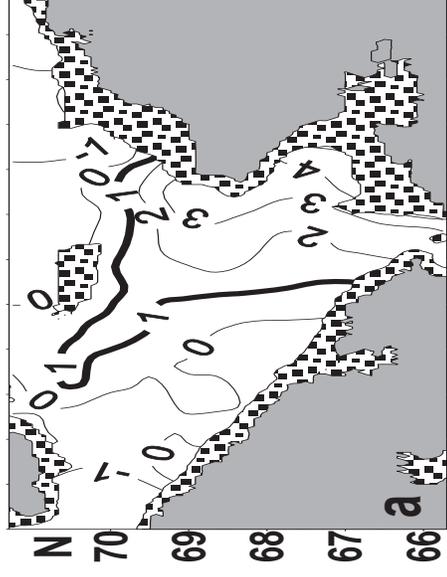
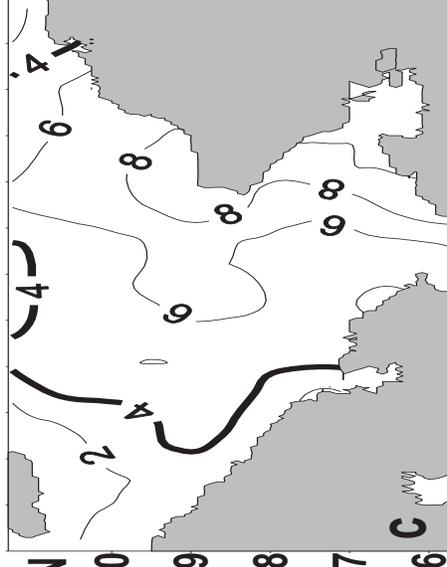
COLD



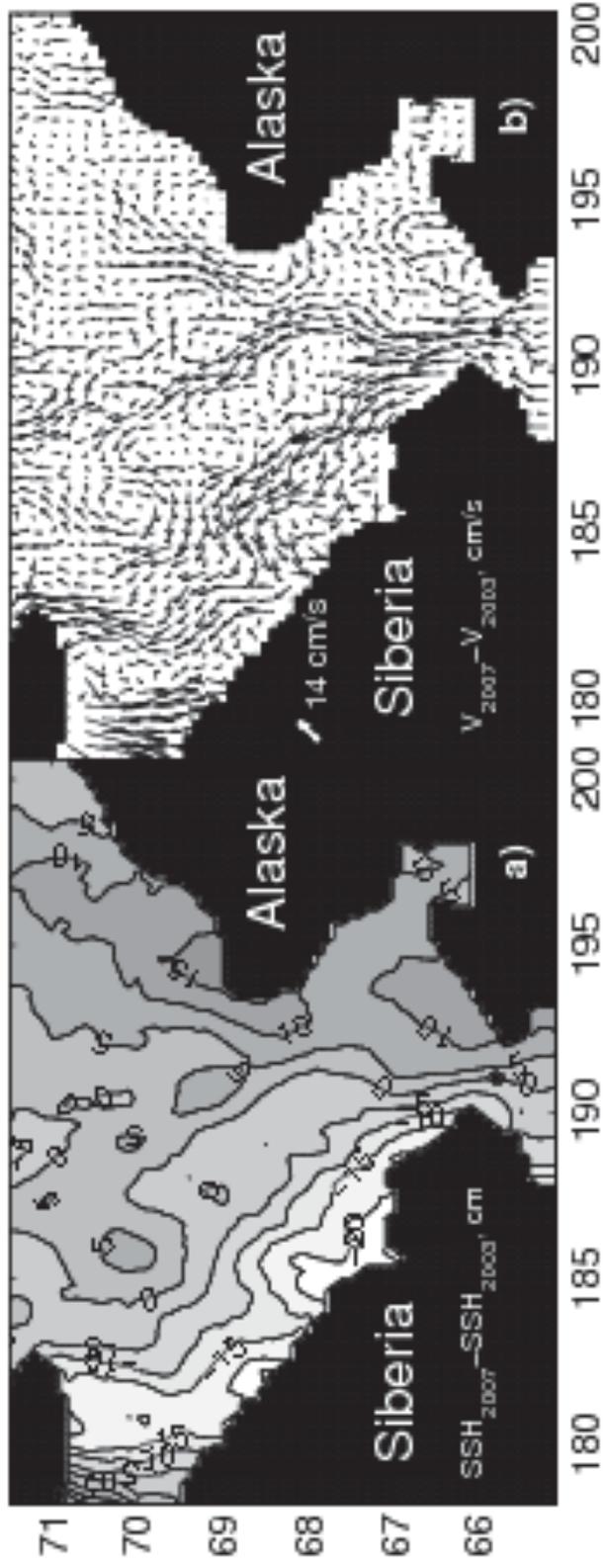
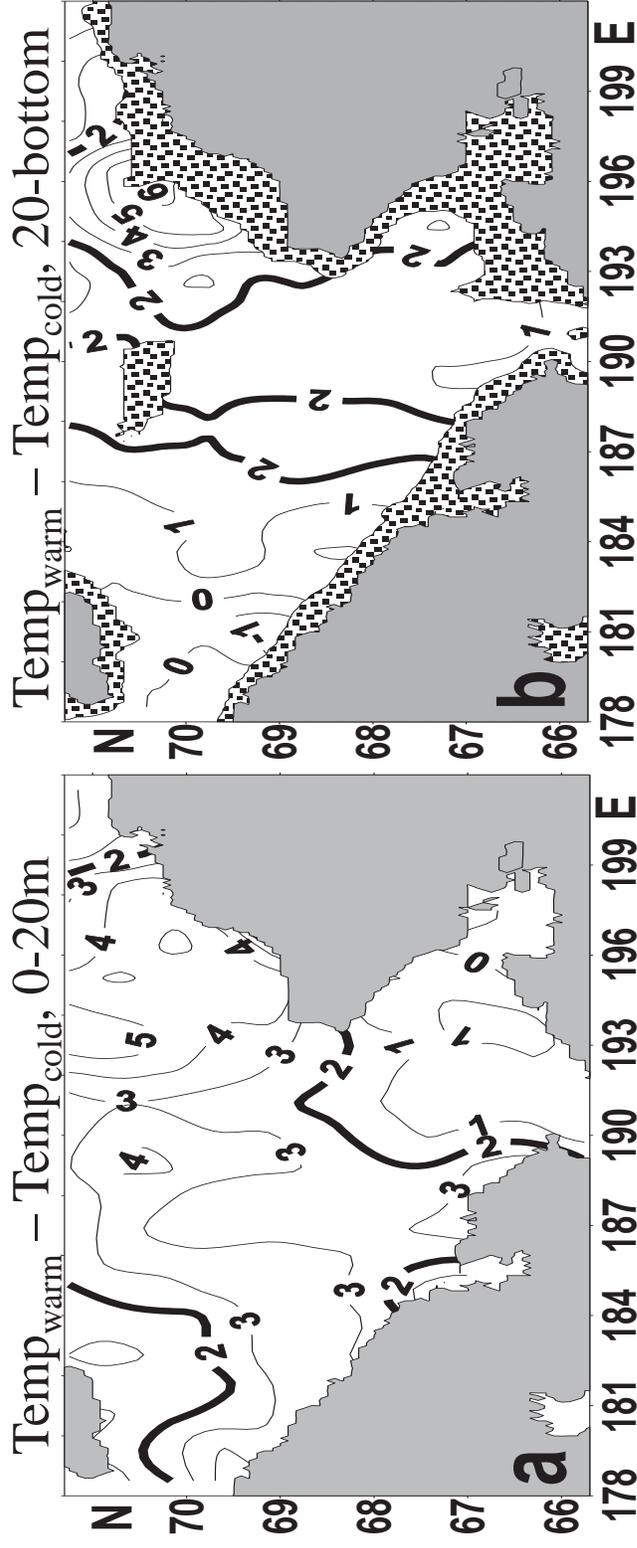
NORMAL



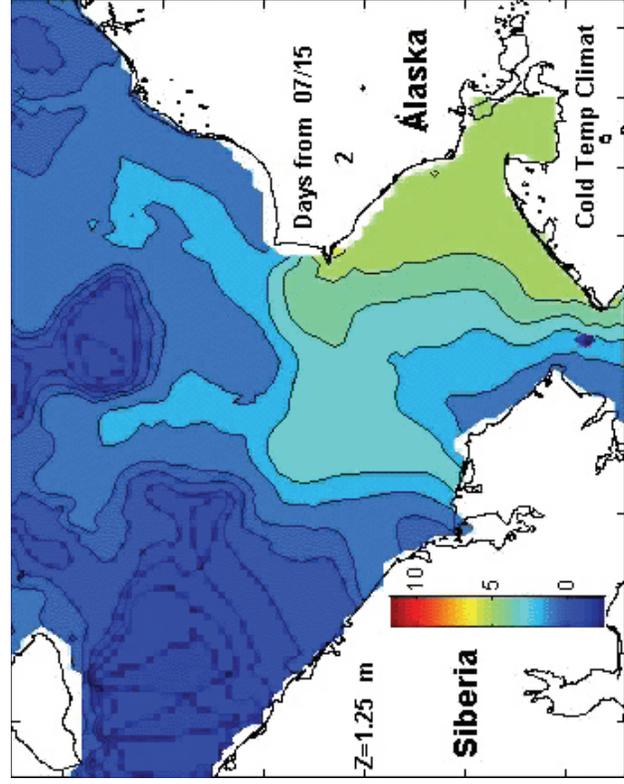
WARM



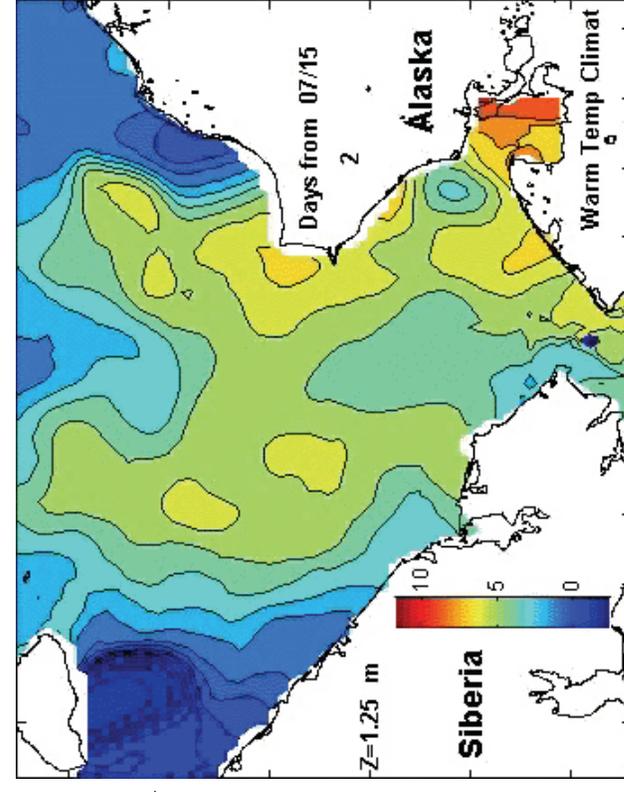
# $T_{\text{warm}} - T_{\text{cold}}$ and SSH anom<sub>2007</sub> - SSH anom<sub>2003</sub>



Results of 4Dvar data assimilation: reconstructed circulation during the typical warm (50,54,62,68,78,86,80,02,04,07) and cold (55,56,65,74,75,81,83,88,94) year



Cold



Warm

