The ICES Working Group on Oceanic Hydrography (WGOH): building on over 100 years of North Atlantic observations

PICES Conference, Portland

October 28th 2010

Glenn Nolan, Eugene Colbourne and Hedinn Valdimarsson (on behalf of WGOH)

Who are we?

ICES Working Group on Oceanic Hydrography

ICES Organisation

SG Ecosystem Functions

Data requests

ToRs

ICES WGOH

IROC

National Reports

Journal Publications

Detailed view of conditions by region

Data Centre

(planned)

ICES Working Group on Oceanic Hydrography

IROC Highlights for 2009

The upper layers of the northern North Atlantic and the Nordic seas were warm and saline in 2009 compared with the long-term average.

A strong, cold anomaly developed in the surface of the central North Atlantic during summer.

Warming and salinification of deep waters continues.

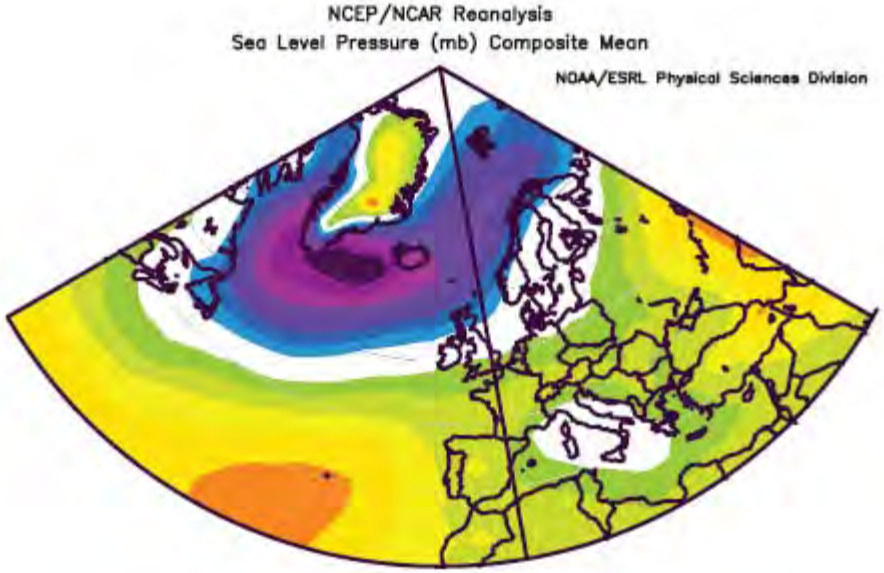
The Atmosphere during 2009

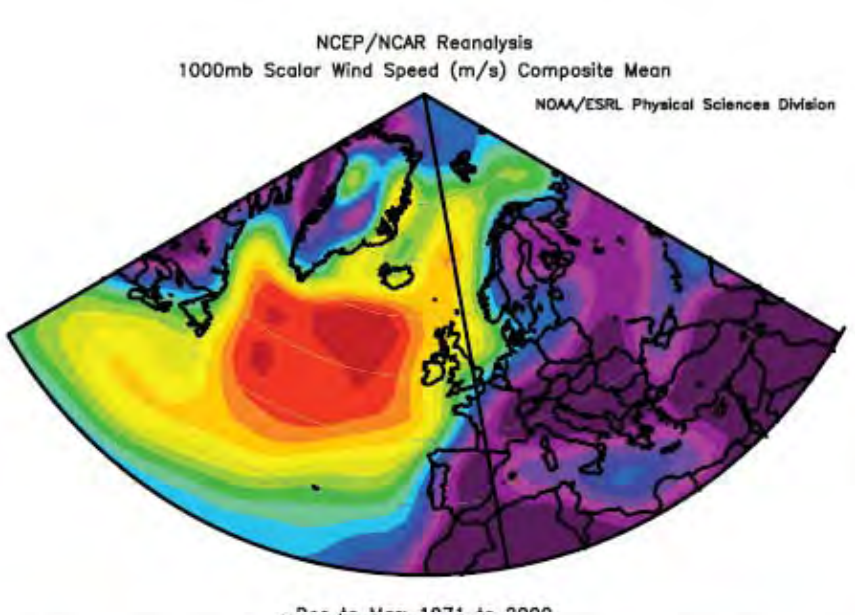
Surface air temperatures in the central North Atlantic and the Norwegian Sea were near normal, but were >1C higher than average in the Labrador, Barents, and Greenland seas.

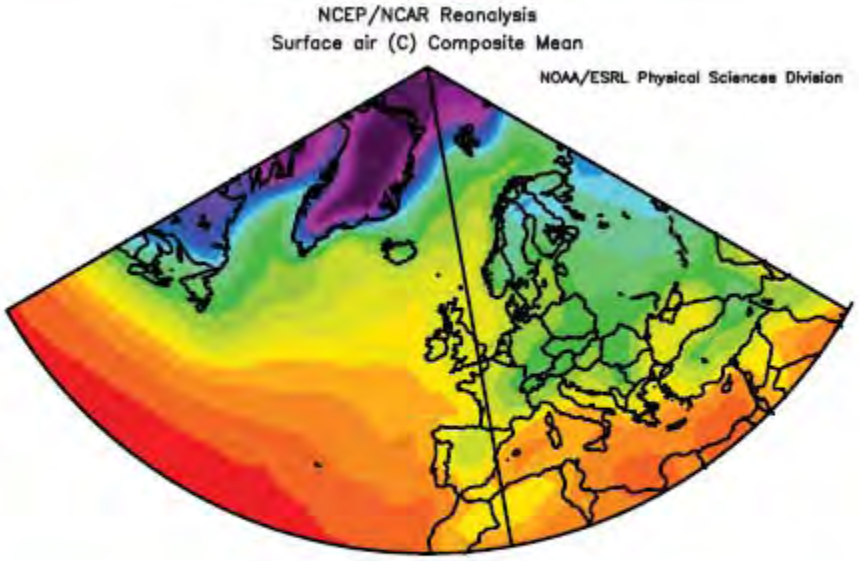
Mean winds weaker than normal across the eastern North Atlantic, southern Labrador Sea, NW European shelf, and Baltic, but stronger than normal east of Newfoundland and east of Azores.

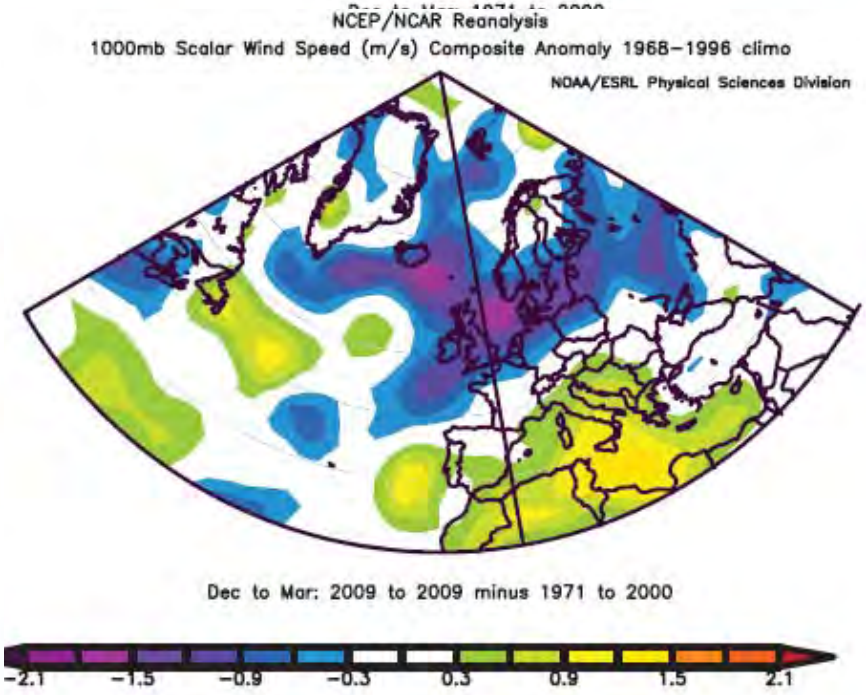
The NAO index in winter 2008/2009 was weakly negative.

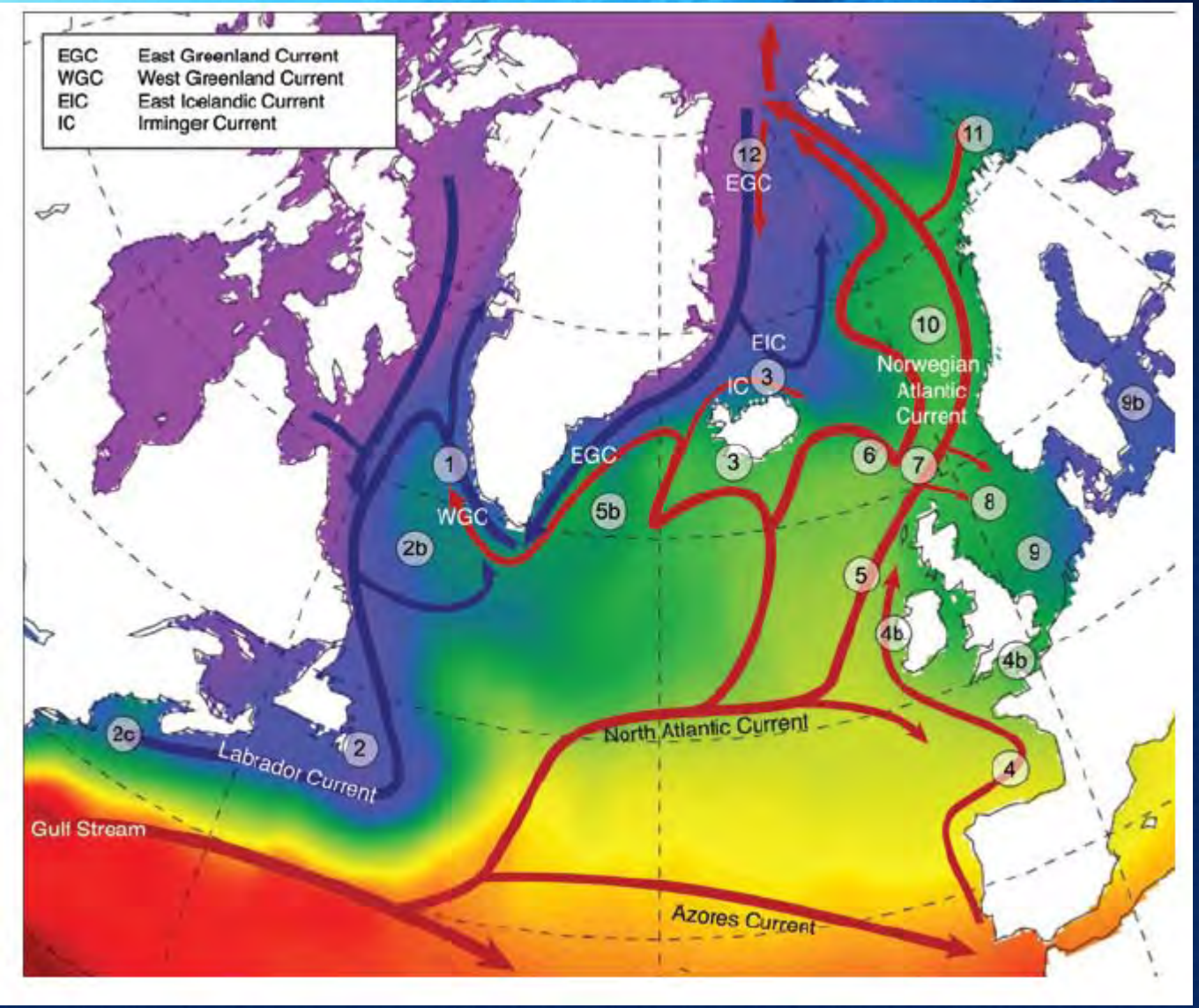
Atmospheric analysis











ICES Working Group on Oceanic Hydrography

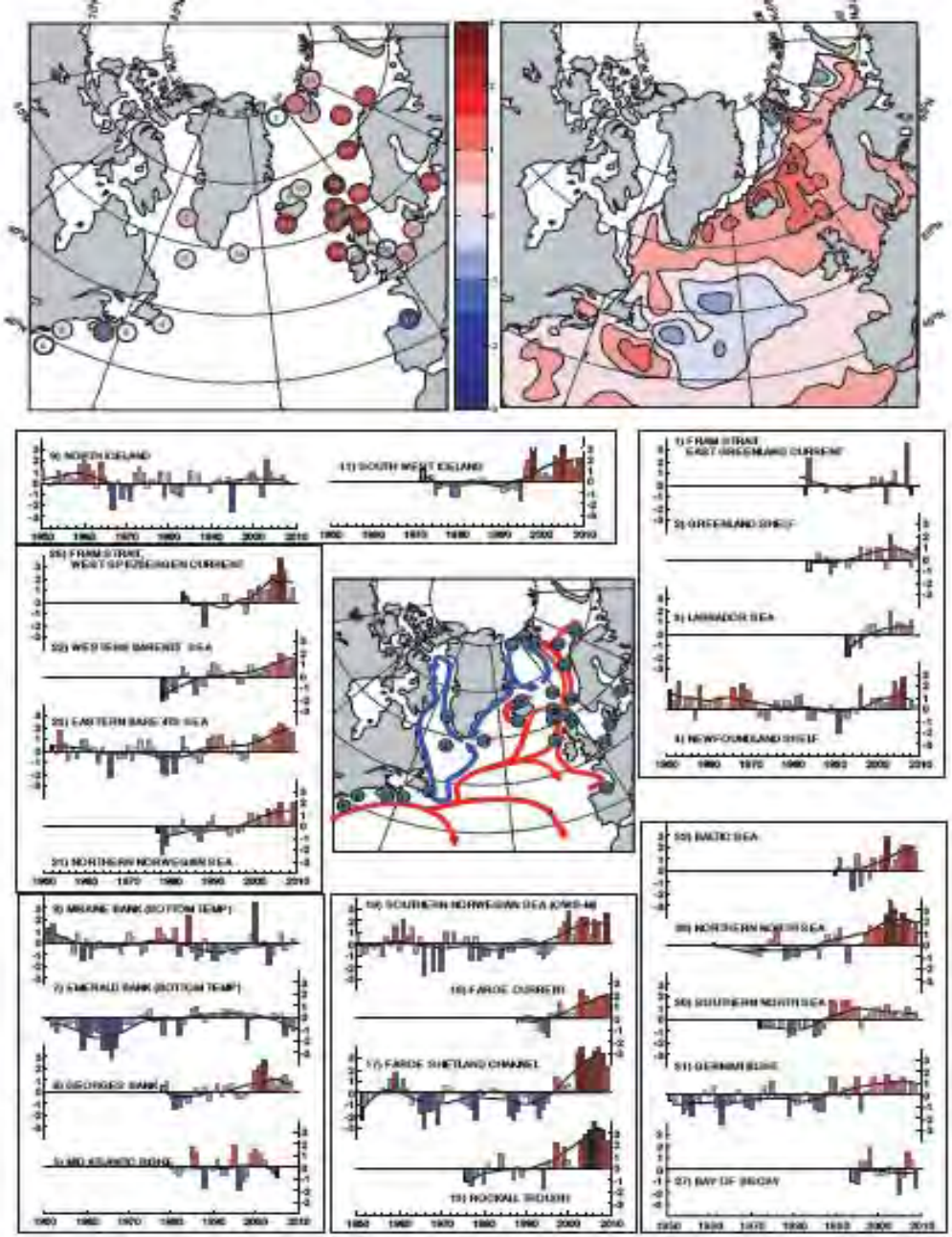
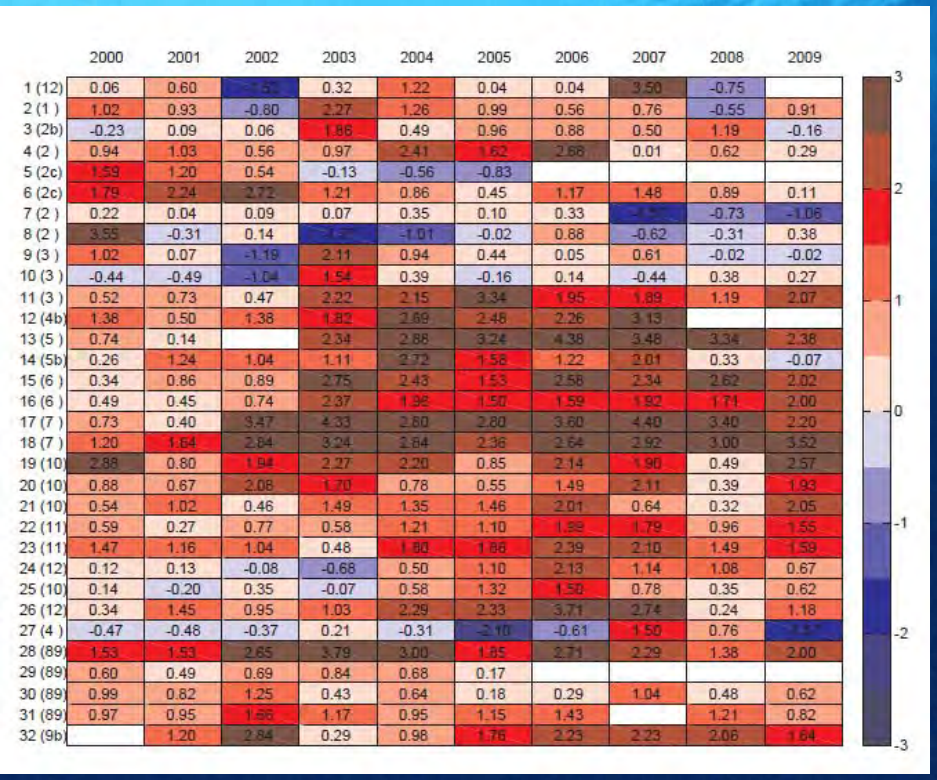


Figure 1.
Upper ocean temperature anomalies at selected locations across the North Atlantic. The anomalies are normalized with respect to the standard deviation (e.g. a value of +2 indicates 2 standard deviations above normal). Upper panels: maps of conditions in 2008; (left) data from in situ observations; (right) 2008 anomalies calculated from OISST.v2 data (see Figure 3). Lower panels: time-series of normalized anomalies at each of the selected stations. Colour intervals 0.5°C; reds = positive/warm; blues = negative/cool. See Figure 13 for a map supplying more details about the locations in this figure.

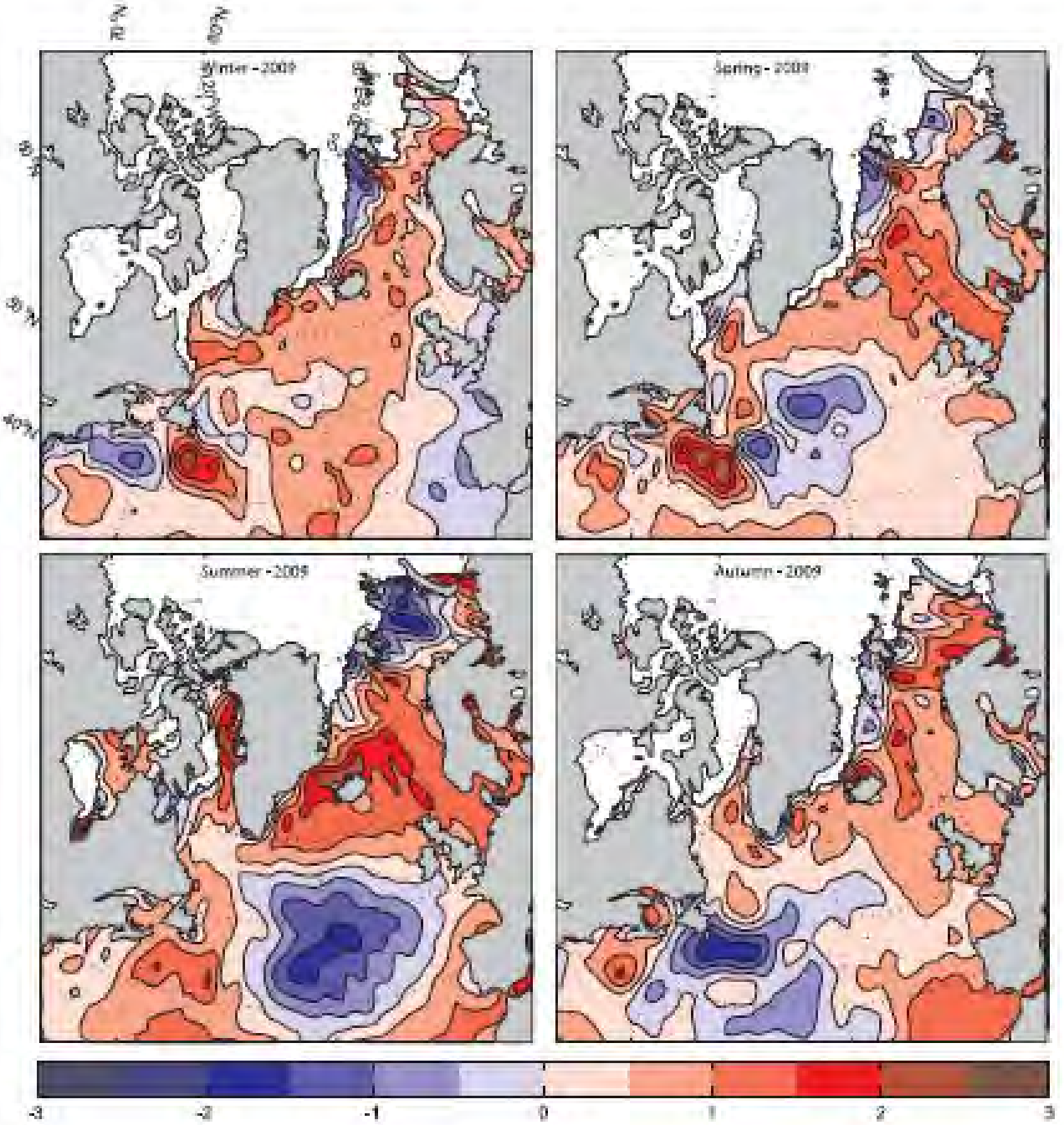
2009 Summary (all areas)



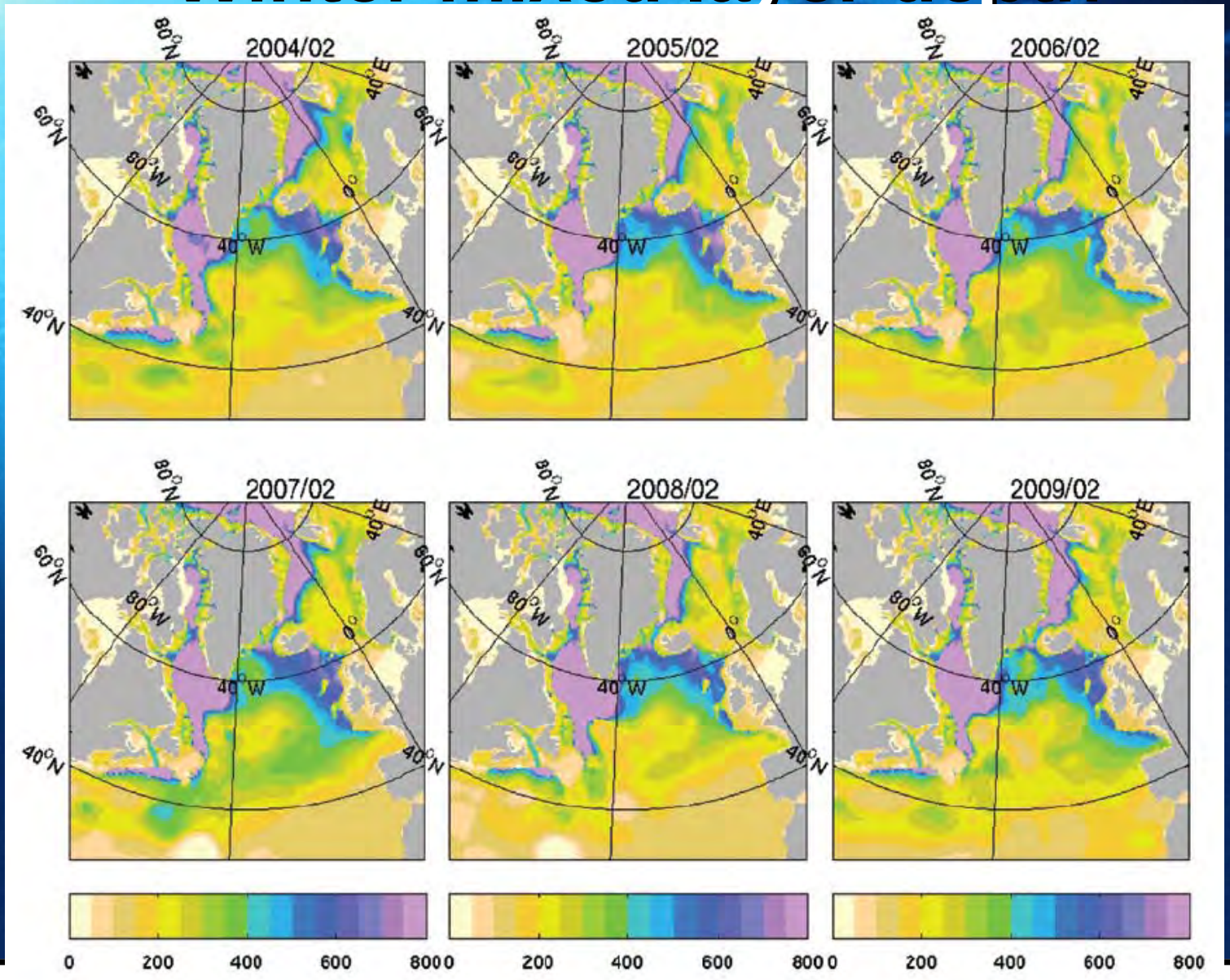
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1 (12)	0.06	0.60		0.32	1.22	0.04	0.04	3.50	-0.75	
2 (1)	1.02	0.93	-0.80	2.27	1.26	0.99	0.56	0.76	-0.55	0.91
3 (2b)	-0.23	0.09	0.06	1.86	0.49	0.96	0.88	0.50	1.19	-0.16
4 (2)	0.94	1.03	0.56	0.97	2.41	1.62	2.68	0.01	0.62	0.29
5 (2c)	1.59	1.20	0.54	-0.13	-0.56	-0.83				
6 (2c)	1.79	2.24	2.72	1.21	0.86	0.45	1.17	1.48	0.89	0.11
7 (2)	0.22	0.04	0.09	0.07	0.35	0.10	0.33		-0.73	-1.06
8 (2)	3.55	-0.31	0.14		-1.01	-0.02	0.88	-0.62	-0.31	0.38
9 (3)	1.02	0.07	-1.19	2.11	0.94	0.44	0.05	0.61	-0.02	-0.02
10 (3)	-0.44	-0.49	-1.04	1.54	0.39	-0.16	0.14	-0.44	0.38	0.27
11 (3)	0.52	0.73	0.47	2.22	2.15	3.34	1.95	1.89	1.19	2.07
12 (4b)	1.38	0.50	1.38	1.82	2.69	2.48	2.26	3.13		
13 (5)	0.74	0.14		2.34	2.88	3.24	4.38	3.48	3.34	2.38
14 (5b)	0.26	1.24	1.04	1.11	2.72	1.58	1.22	2.01	0.33	-0.07
15 (6)	0.34	0.86	0.89	2.75	2.43	1.53	2.56	2.34	2.62	2.02
16 (6)	0.49	0.45	0.74	2.37	1.98	1.50	1.59	1.92	1.71	2.00
17 (7)	0.73	0.40	3.47	4.33	2.80	2.80	3.60	4.40	3.40	2.20
18 (7)	1.20	1.84	2.84	3.24	2.84	2.36	2.64	2.92	3.00	3.52
19 (10)	2.88	0.80	1.94	2.27	2.20	0.85	2.14	1.90	0.49	2.57
20 (10)	0.88	0.67	2.08	1.70	0.78	0.55	1.49	2.11	0.39	1.93
21 (10)	0.54	1.02	0.46	1.49	1.35	1.46	2.01	0.64	0.32	2.05
22 (11)	0.59	0.27	0.77	0.58	1.21	1.10	1.88	1.79	0.96	1.55
23 (11)	1.47	1.16	1.04	0.48	1.80	1.86	2.39	2.10	1.49	1.59
24 (12)	0.12	0.13	-0.08	-0.68	0.50	1.10	2.13	1.14	1.08	0.67
25 (10)	0.14	-0.20	0.35	-0.07	0.58	1.32	1.50	0.78	0.35	0.62
26 (12)	0.34	1.45	0.95	1.03	2.29	2.33	3.71	2.74	0.24	1.18
27 (4)	-0.47	-0.48	-0.37	0.21	-0.31	-2.10	-0.61	1.50	0.76	
28 (89)	1.53	1.53	2.65	3.79	3.00	1.85	2.71	2.29	1.38	2.00
29 (89)	0.60	0.49	0.69	0.84	0.68	0.17				
30 (89)	0.99	0.82	1.25	0.43	0.64	0.18	0.29	1.04	0.48	0.62
31 (89)	0.97	0.95	1.66	1.17	0.95	1.15	1.43		1.21	0.82
32 (9b)		1.20	2.84	0.29	0.98	1.76	2.23	2.23	2.06	1.64

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1 (12)	-0.94	0.69	-1.40	0.42	0.51	1.78	1.69	2.01	-1.54	
2 (1)	0.80	1.02	-1.54	1.85	1.15	1.62	1.10	0.90	-1.06	1.20
3 (2b)	0.25	-0.24	0.27	0.17	0.92	0.71	0.24	0.46	1.04	1.17
4 (2)	0.38	-0.81	1.08	0.50	0.88	0.92	0.85	0.92	1.35	0.31
5 (2c)										
6 (2c)	-0.34	-0.83	0.25	-0.59	-1.96	-2.30	-1.08	-0.48	-0.13	-0.13
7 (2)	0.44	0.25	-0.22	0.74	0.17	0.34	0.44	-1.12	-0.67	-0.81
8 (2)	-0.97	0.12	-0.70	-1.15	-1.16	-1.73	-0.29	0.06	-0.50	-0.69
9 (3)	0.56	0.61	-0.48	1.14	0.81	0.02	-0.09	-0.09	-0.04	0.82
10 (3)	0.59	0.34	-0.12	0.29	0.35	0.18	0.70	0.69	0.75	0.55
11 (3)	0.99	0.83	0.97	2.54	2.37	3.40	2.37	2.46	2.08	3.17
12 (4b)										
13 (5)	1.17	0.74		2.57	2.52	2.19	2.13	2.34	2.71	2.82
14 (5b)	0.10	0.70	1.37	0.54	2.45	1.84	1.53	1.72	0.76	0.89
15 (6)	0.70	0.54	0.57	2.16	2.37	1.92	1.41	1.62	2.53	2.20
16 (6)	0.68	0.63	0.83	2.02	1.73	2.15	1.46	1.58	1.92	2.32
17 (7)	0.09	0.09	1.27	1.59	1.64	1.34	0.93	1.14	1.41	1.46
18 (7)	0.97	1.23	1.86	2.20	2.09	2.06	1.89	1.37	1.89	2.80
19 (10)	0.77	0.55	0.89	1.73	1.71	1.24	1.26	1.11	0.22	1.89
20 (10)	0.41	0.06	0.78	0.96	0.99	0.77	0.75	0.95	0.60	1.77
21 (10)	0.18	0.20	0.18	1.17	1.20	1.60	1.57	0.63	0.20	1.60
22 (11)	0.16	0.06	0.33	0.71	1.52	1.49	1.96	1.61	1.34	0.72
23 (11)	0.12	-0.72	-0.22	0.95	1.95	0.95	0.95	1.45	0.28	0.62
24 (12)	-0.33	0.12	0.16	-0.19	0.49	1.40	1.88	1.54	0.67	0.93
25 (10)	0.06	-0.22	0.40	0.14	0.74	1.48	1.70	1.30	0.90	0.80
26 (12)	0.38	1.89	1.51	1.51	1.89	3.40	4.15	2.23	1.17	2.30
27 (4)	-0.53	-1.94	-0.49	-1.02	-0.77	-0.23	0.76	0.77	0.94	0.02
28 (89)	-1.56	-1.93	-0.40	1.14	1.50	0.79	-0.43	-0.74	0.33	-0.07
29 (89)										
30 (89)	0.08	-1.65	-0.50	-0.39	0.52	0.18	0.72	-0.03	0.73	0.58
31 (89)	0.04	-0.95	-0.27	0.60	0.44	0.27	1.01		0.94	1.20
32 (9b)	-1.12	-1.98	-1.48	-1.79	-1.40	-0.98	-1.70	-0.94	-1.07	-0.81

Seasonal temperature anomalies 2009



Winter mixed layer depth



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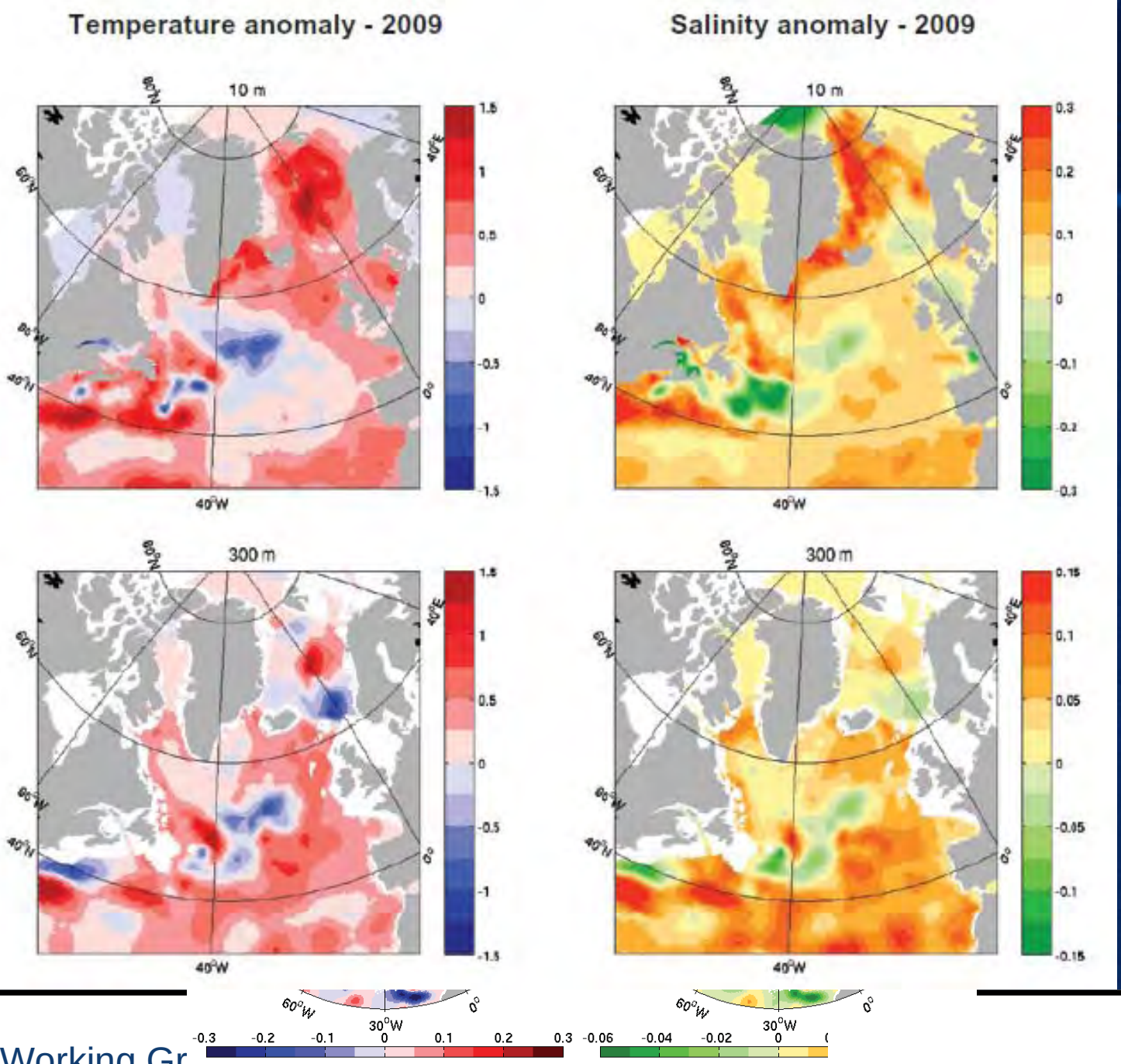
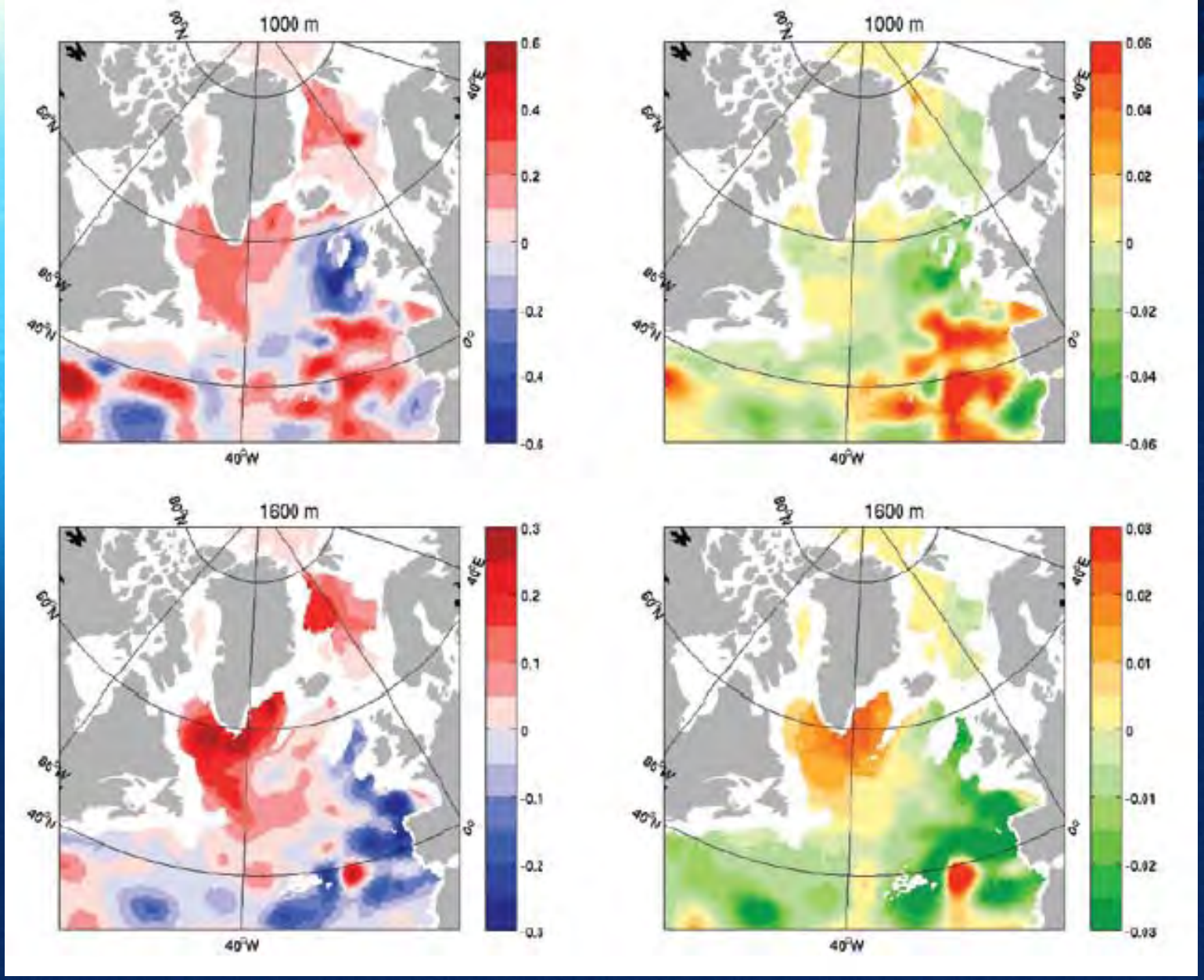

Temperature anomaly - 2009
Salinity anomaly - 2009
10 m
300 m
60°N
40°E
60°W
40°W
0°
30°W
1.5
1
0.5
0
-0.5
-1
-1.5
0.3
0.2
0.1
-0.1
-0.2
-0.3
0.15
0.05
-0.05
-0.15
-0.3 -0.2 -0.1 0 0.1 0.2 0.3
-0.06 -0.04 -0.02 0



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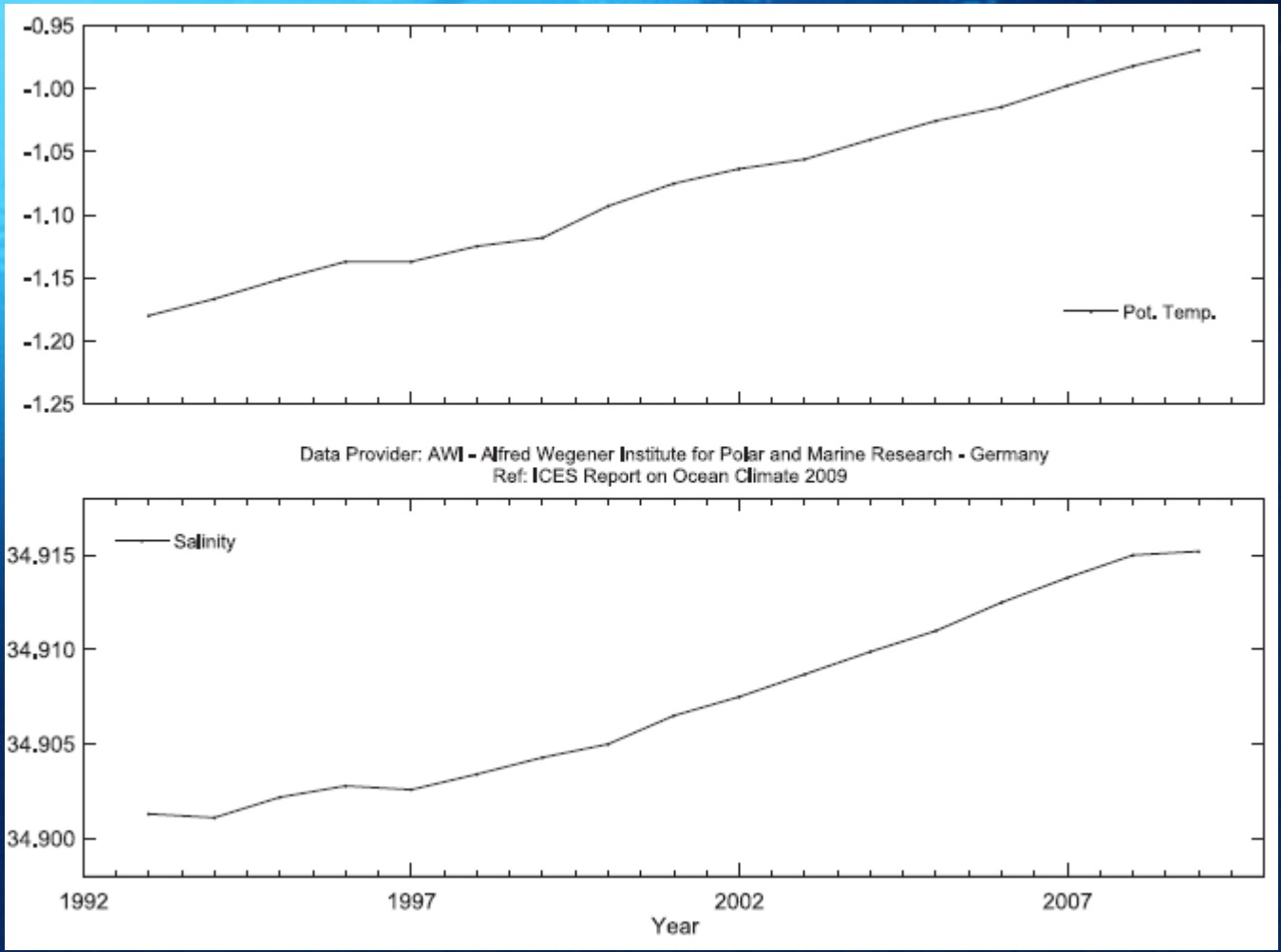
Greenland Sea: 3000m depth



Recent publications using IROC

Harrald, M., Wright, P.J., Neat, Francis C (2010) Substock variation in reproductive traits in North Sea cod (Gadus morhua) Canadian Journal of Fisheries and Aquatic Sciences, Vol. 67, no. 5, pp. 866-876. May 2010.

Ken Drinkwater (2010), Comparison of the response of Atlantic cod (Gadus morhua) in the high-latitude regions of the North Atlantic during the warm periods of the 1920s-1960s and the 1990s-2000s, Deep Sea Research Part II: Topical Studies in Oceanography, Volume 56, Issues 21-22,

Holt, J., Wakelin, S. Lowe, J. Tinker. (2010) The potential impacts of climate change on the hydrography of the northwest European continental shelf Progress In Oceanography, Volume 86, Issues 3-4, September 2010, Pages 361-379

Ullgren, J. E. and M. White (2010) Water mass interaction at intermediate depths in the southern Rockall Trough, northeastern North Atlantic. Deep Sea Research Part I: Oceanographic Research Papers 57(2): 248-257.

Hosoda, S.,Suga, T.,Shikama, N., Mizuno, K.(2009) Global surface layer salinity change detected by Argo and its implication for hydrological cycle intensification. Journal of Oceanography. Volume 65, Number 4, 579-586, DOI: 10.1007/s10872-009-0049-1

Noguera, P., C. Collins, D. Bruno, C. Pert, A. Turnbull, A. McIntosh, K. Lester, I. Bricknell, S. Wallace and P. Cook (2009). Red vent syndrome in wild Atlantic salmon Salmo salar in Scotland is associated with Anisakis simplex sensu stricto (Nematoda: Anisakidae). Dis Aquat Org 87: 199-215.

Neumann, H., S. Ehrich and I. Kroncke (2009). "Variability of epifauna and temperature in the northern North Sea." Marine Biology 156(9): 1817-1826.

Belkin, I. M. (2009). "Rapid warming of Large Marine Ecosystems." Progress in Oceanography, 81, 207-213.

Borges, A. and N. Gypens, 2009, Carbonate chemistry in the coastal zone responds more strongly to eutrophication than to ocean acidification. Limnol. Oceanogr 55(1): 346-353.

Davies, R. W. D. and R. Rangeley (2009). "Banking on cod: Exploring economic incentives for recovering Grand Banks and North Sea cod fisheries." Marine Policy In Press, Corrected Proof.

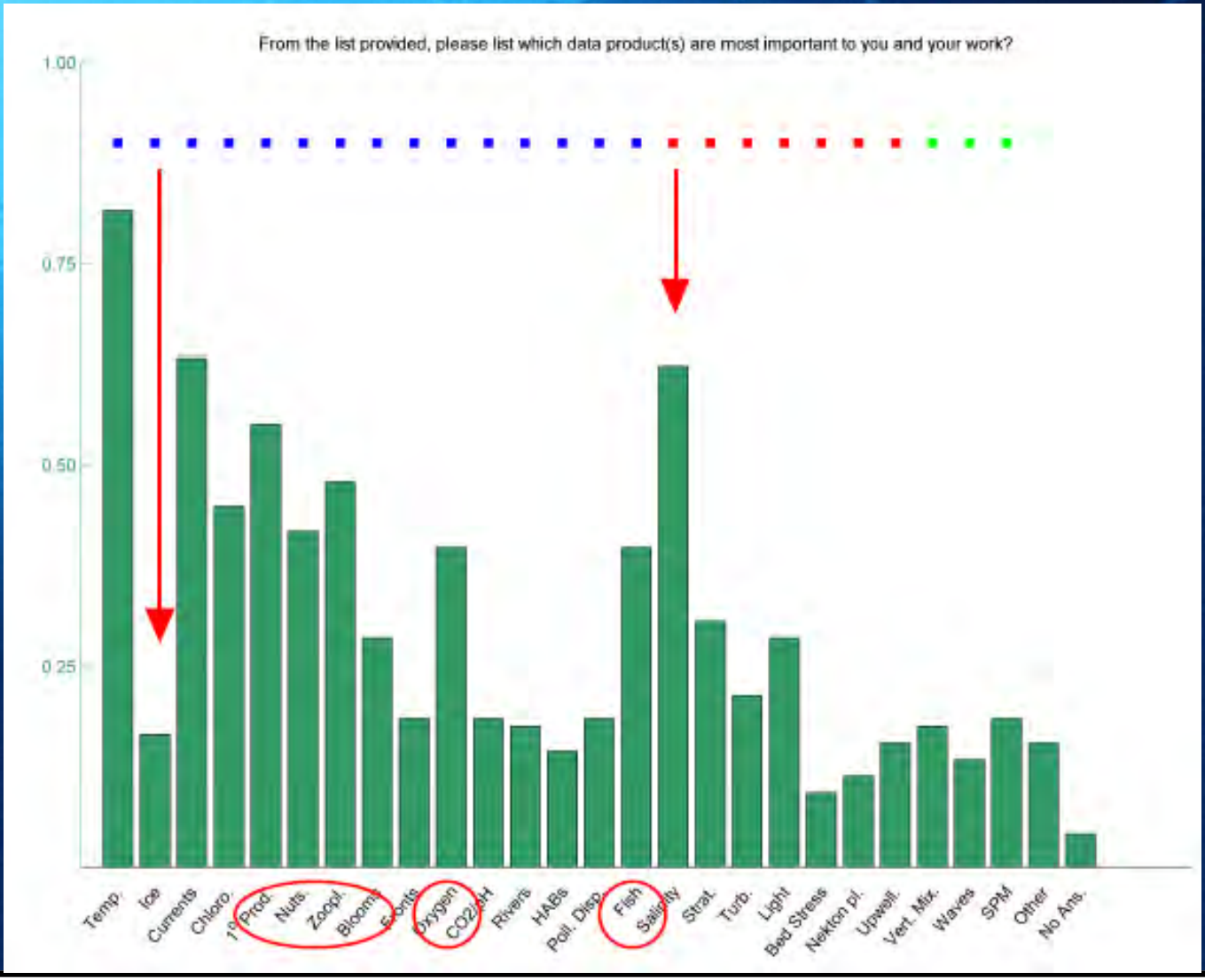
WG Oceanographic Products for Fisheries and Environment (WGOOFE)

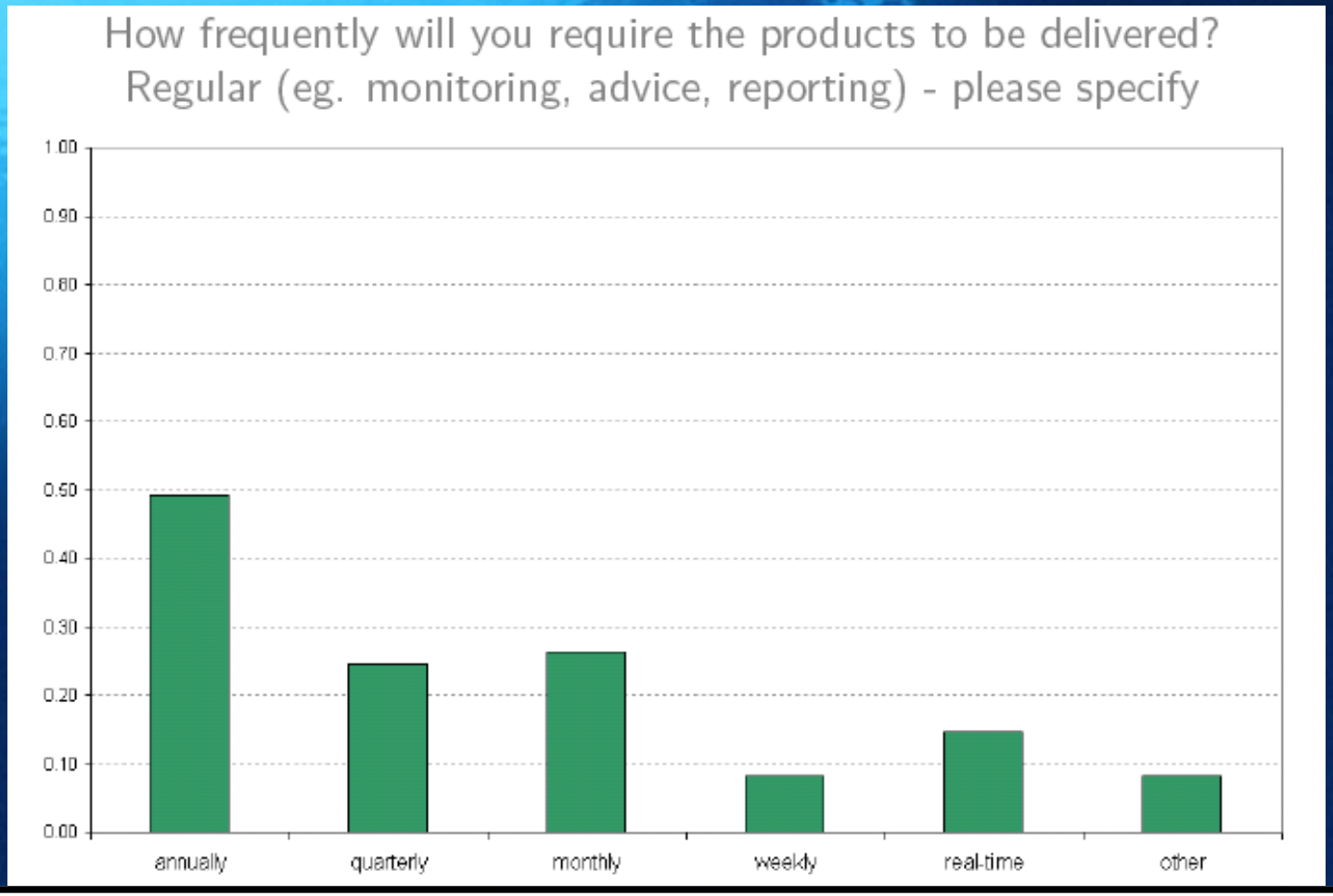
Who are WGOOFE?
ICES Expert Group aimed to provide an **interface between users and providers** of operational oceanographic products

Why WGOOFE is needed?
Apparent lack of oceanographic data products used in fishery and environmental research within ICES
Thought to be related to a shortage in suitable oceanographic data products available

How does WGOOFE address these issues?
Collate information on available data products on a web portal http://www.wgoofe.org/
Help define user requirements within the ICES Community and communicate this to providers of oceanographic data products

WGOOFE Questionnaire



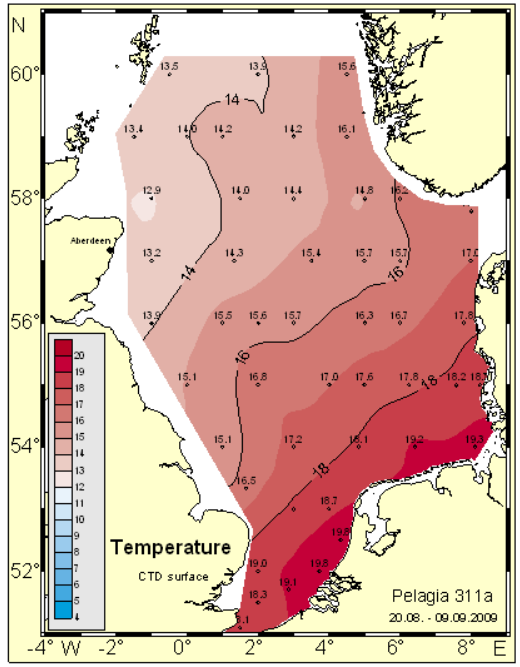

How frequently will you require the products to be delivered?
Regular (eg. monitoring, advice, reporting) - please specify
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
annually
quarterly
monthly
weekly
real-time
other

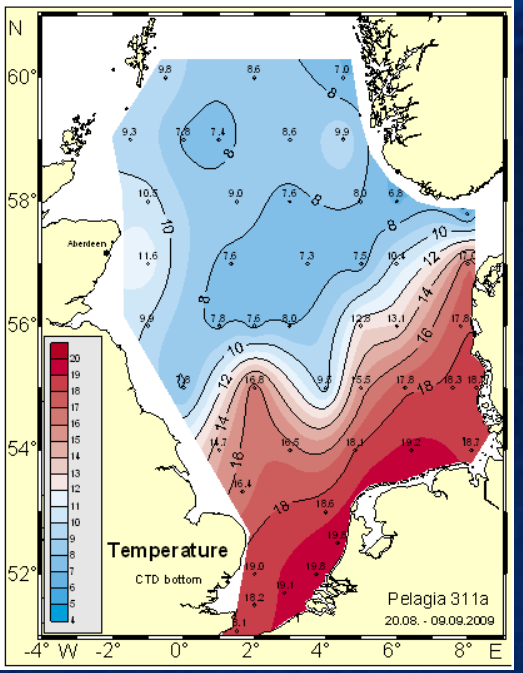
Conclusions

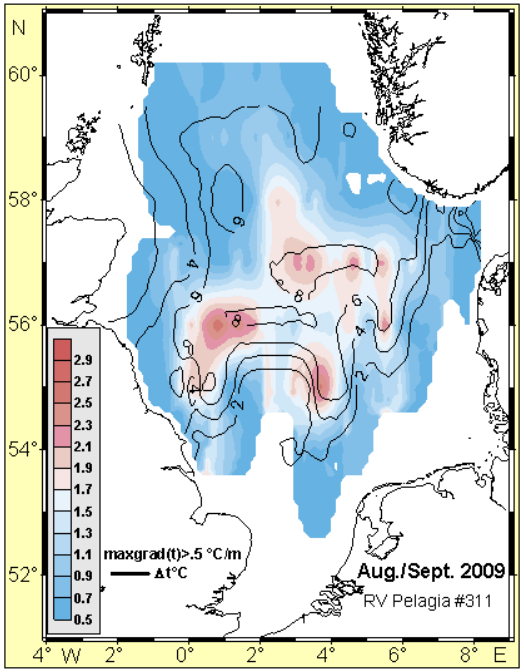
- Fishery and Environmental Scientists are most interested in historic time series, which are regularly updated and flexible in terms of spatial & temporal limits and resolutions.
- Real time and short term forecasts seem of much less interest.
- Good quality metadata on the methods also important (listed by 60%).
- 91% asked to download the numerical data, in addition to or rather than graphical output (maps, figures, ...)
- WGOOFE will meet in Bergen: Nov 22nd to 24th 2010
  - morten.skogen@imr.no

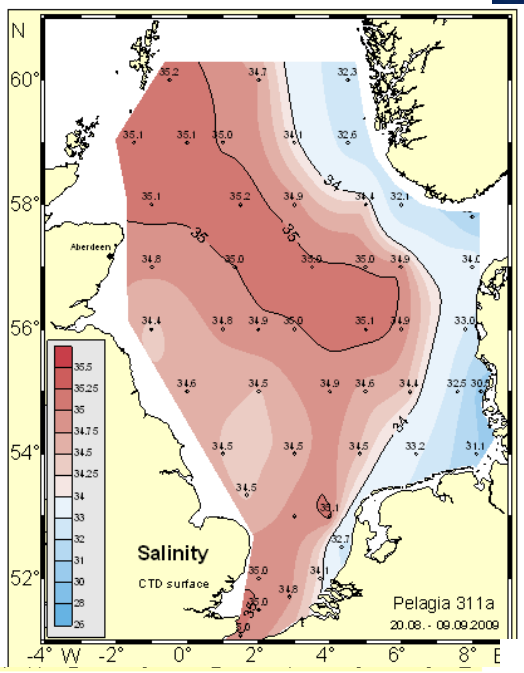
Summer SST, SSS and gradient maps (2009)

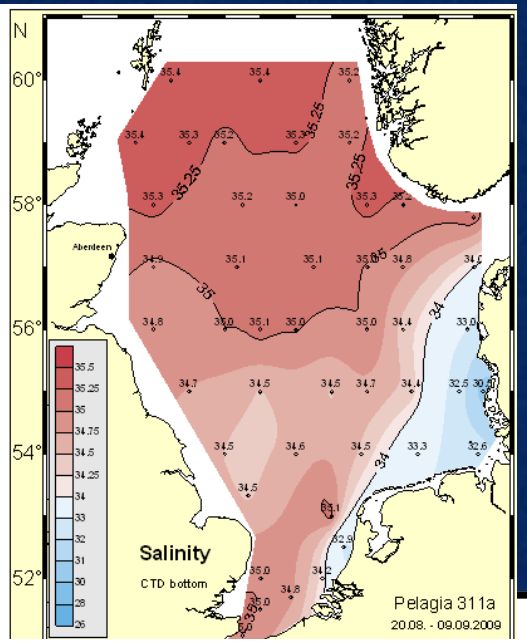
Courtesy:
Holger Klein, BSH



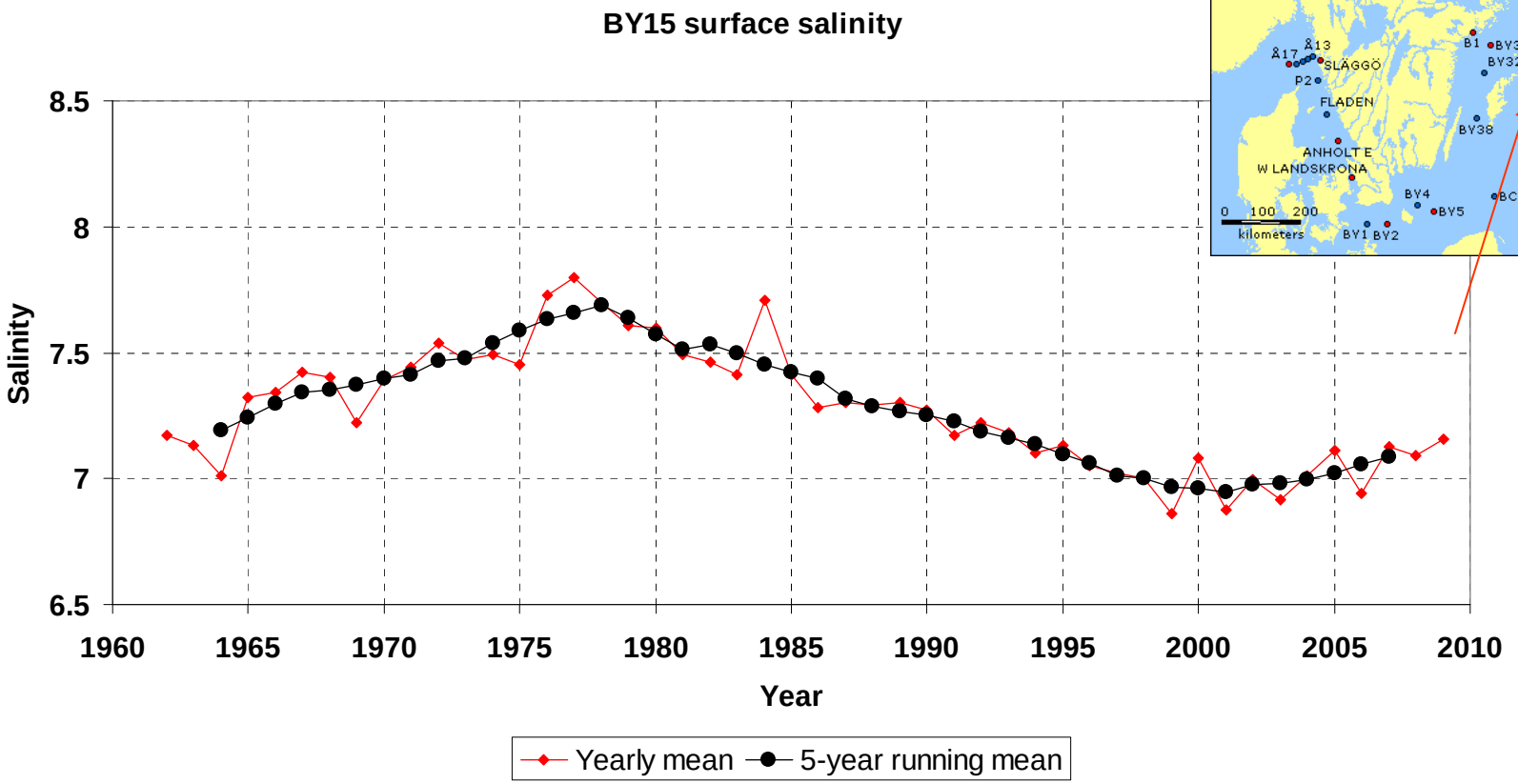








Surface salinity, BY15



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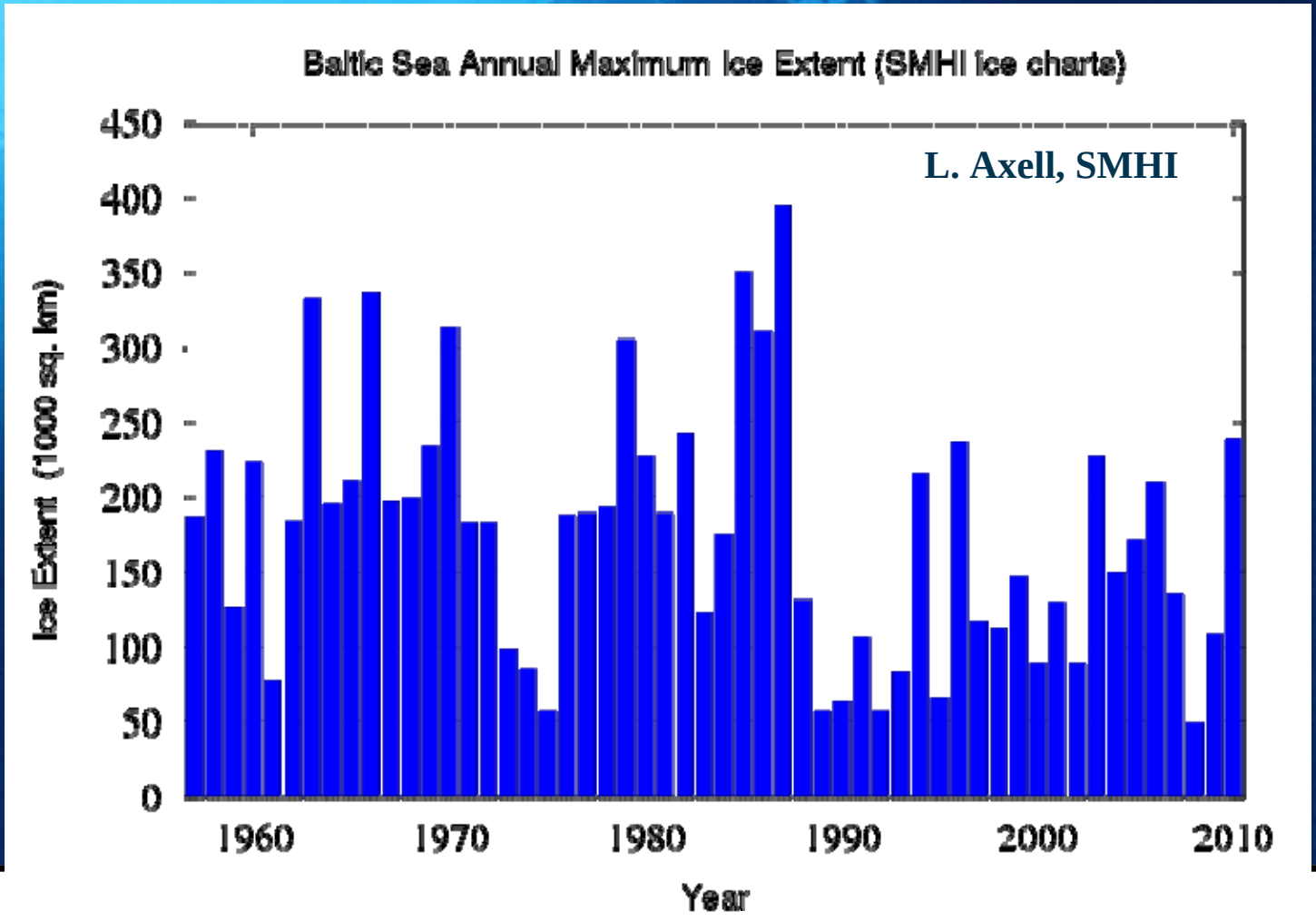
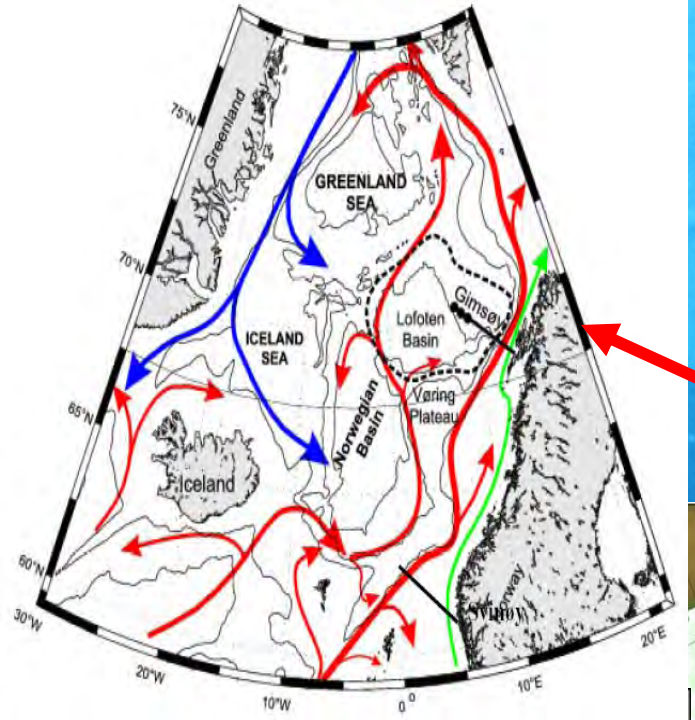
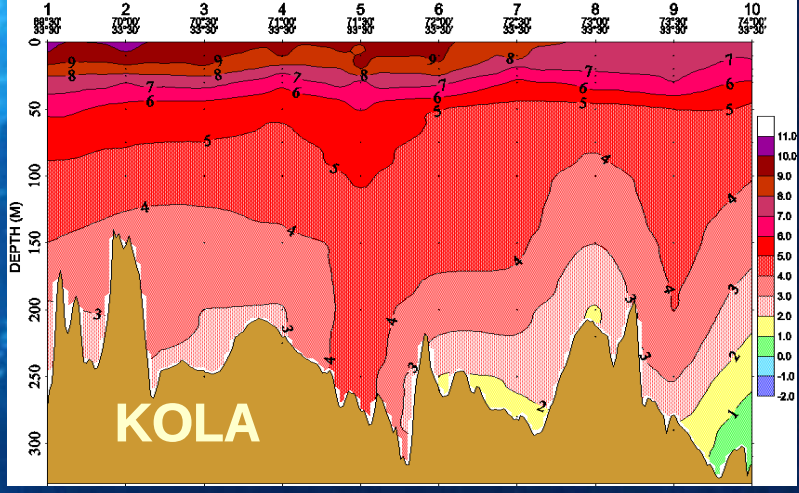
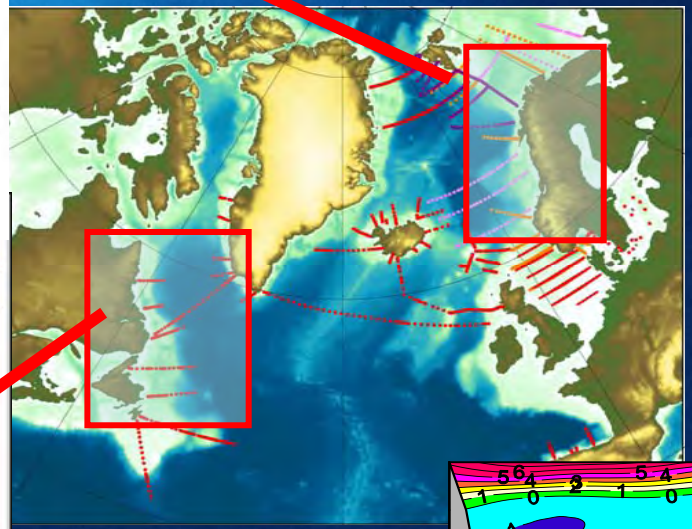
Maximum ice extent (1957 to present)





THE NORTH ATLANTIC CURRENT

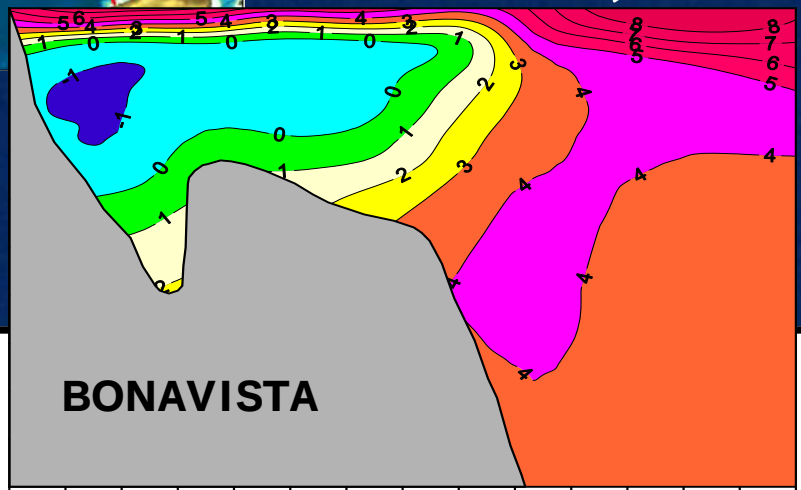




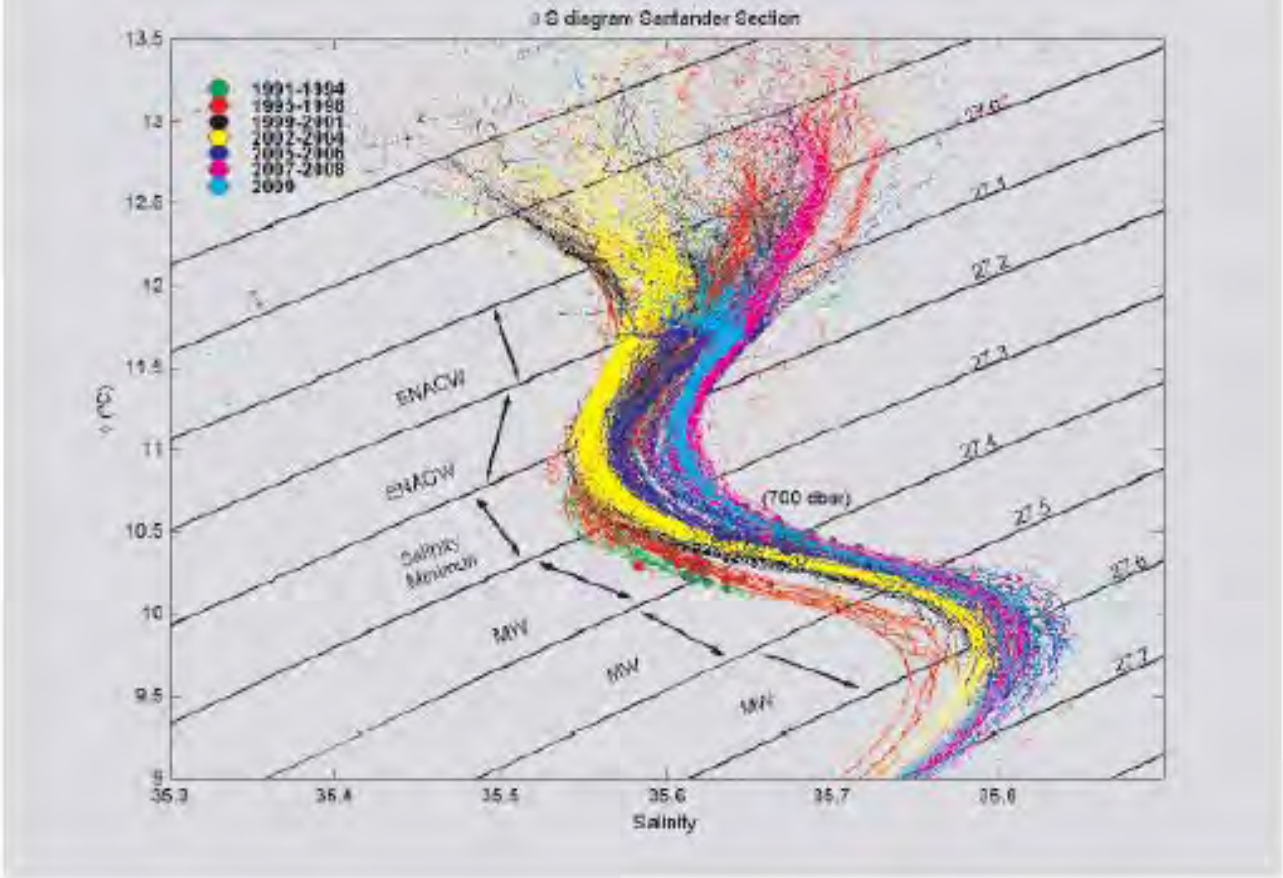
TEMPERATURE CROSS-SECTIONS

Courtesy: E.Colbourne, DFO

THE LABRADOR CURRENT

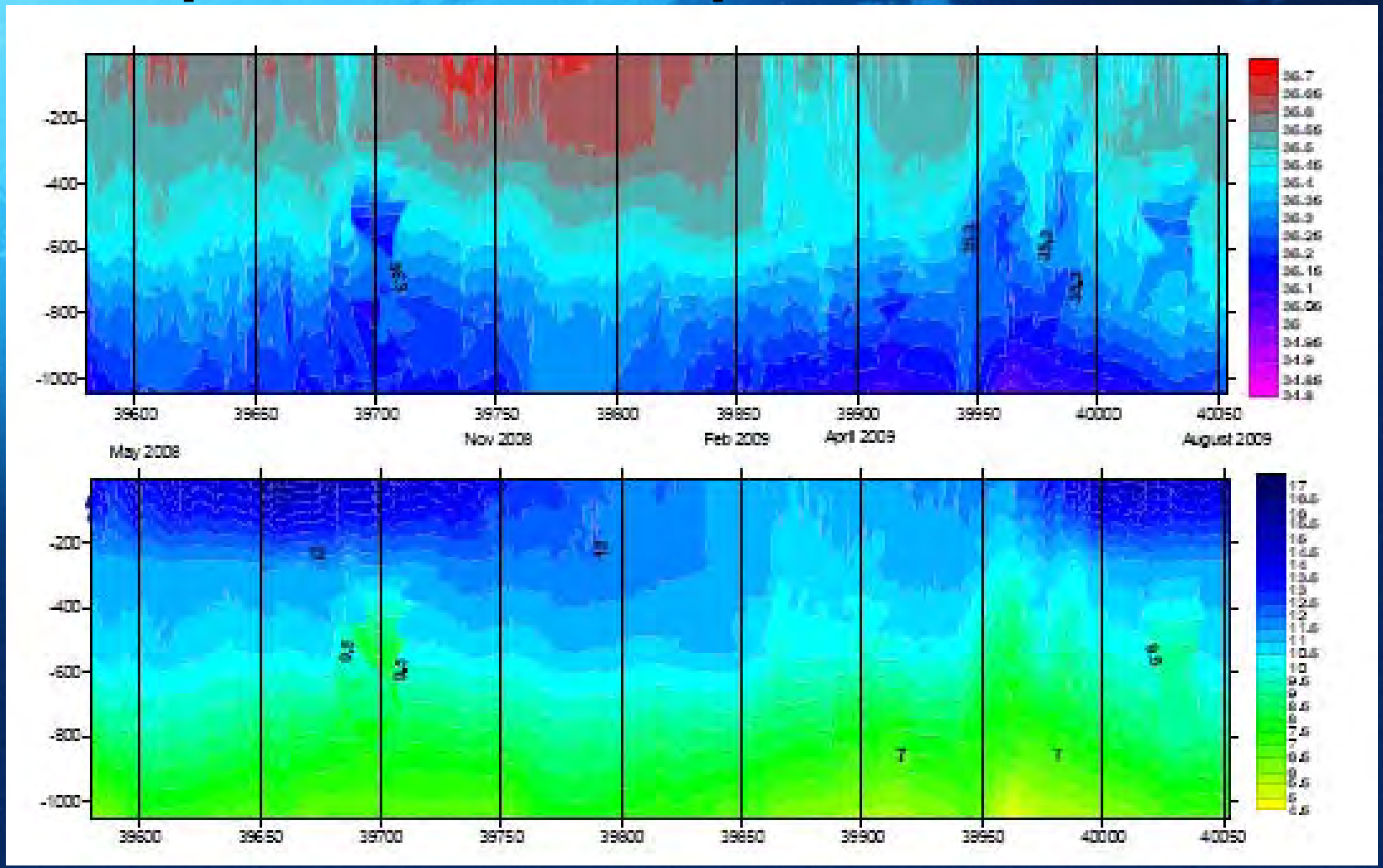


Water masses at Santander stations 6 and 7

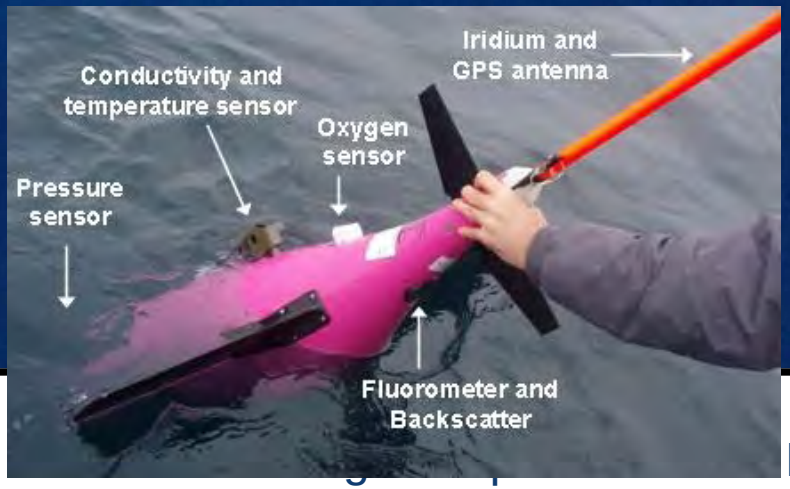


Courtesy:
A. Lavin, IEO

Porcupine Bank Temp/Sal structure



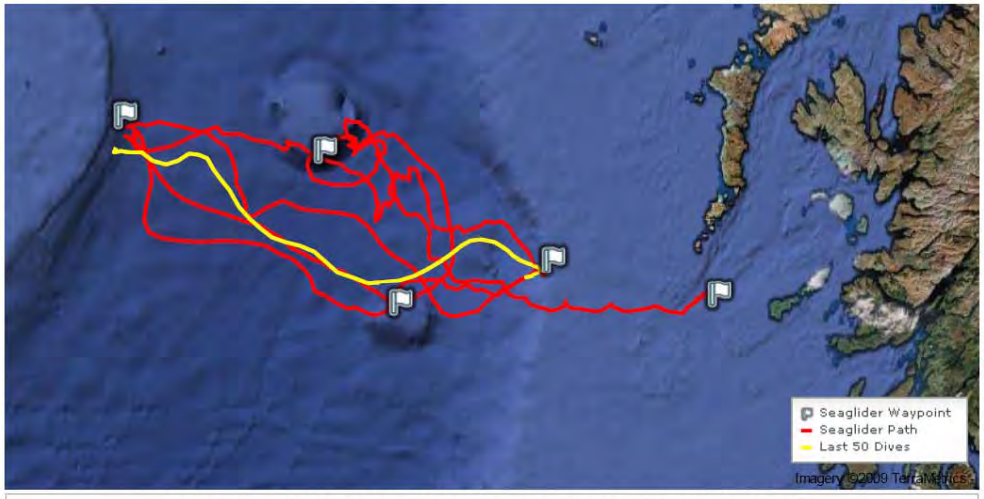
SAMS gliders – transforming the way we monitor ocean circulation and fluxes



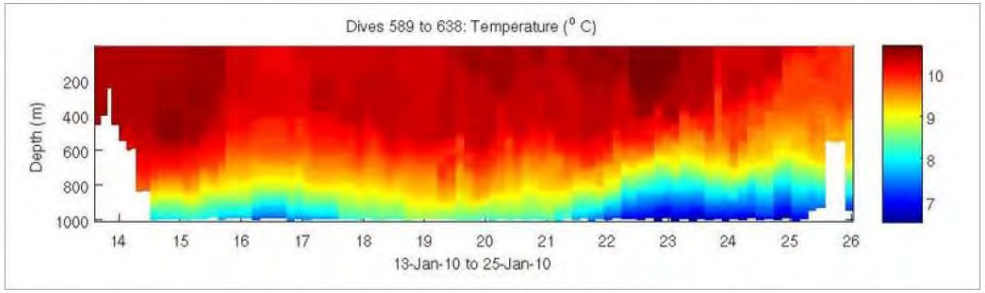
The Scottish Association for Marine Science

Talisker Seaglider

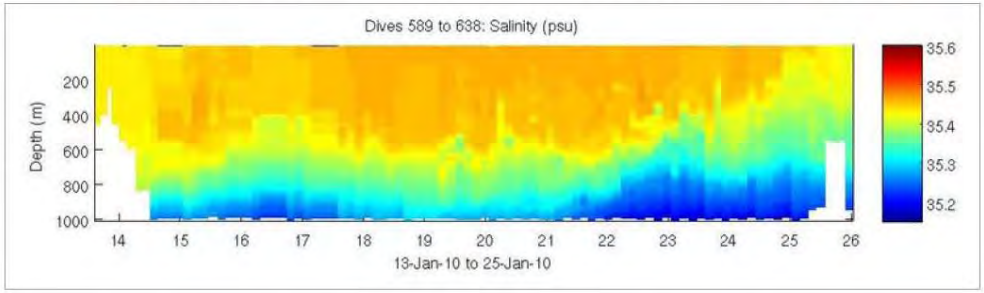
SAMS Seaglider (Talisker) :: Mission 1: To monitor the Rockall Trough



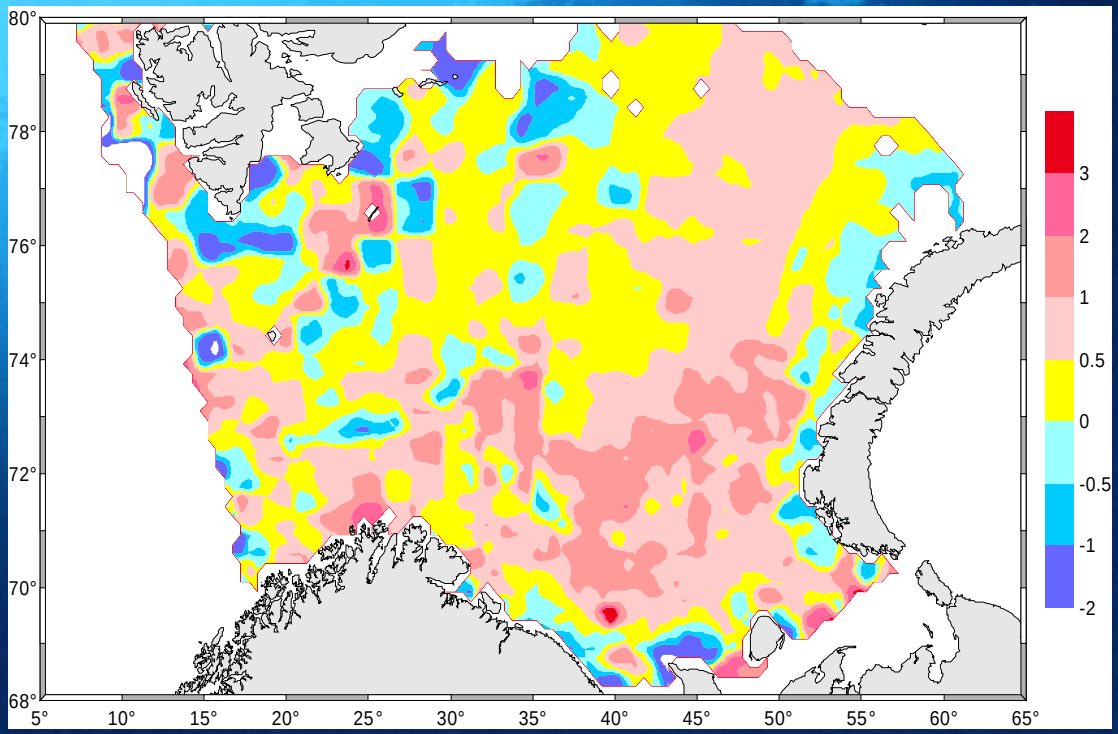
Latest dive, number 638 at 57.29 N, 12.91 W was received on 2010-01-26 03:39 GMT.
Zoom into the map to access plots and data for each dive or click on the plots below to access plots and data for the latest dive.



Temperature section from the last 50 dives.
The temperature of the Rockall Trough has risen by 1 deg C in the last 30 years -
using gliders we can monitor future changes and quantify the natural variability in the upper 1000 m of the water column.

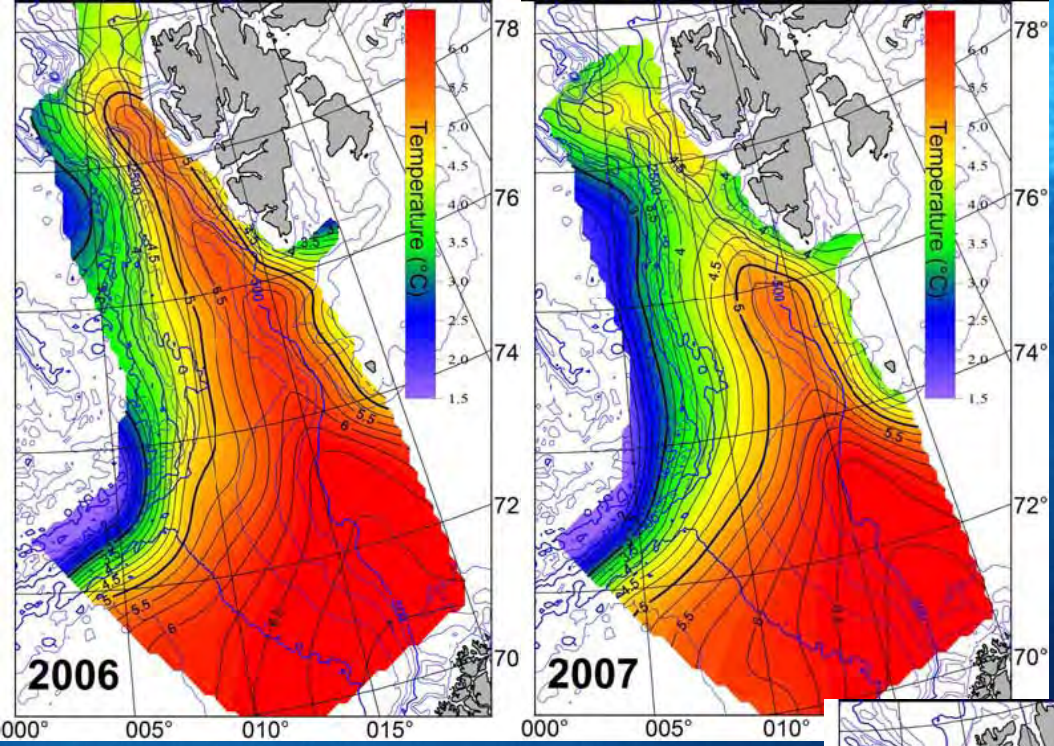


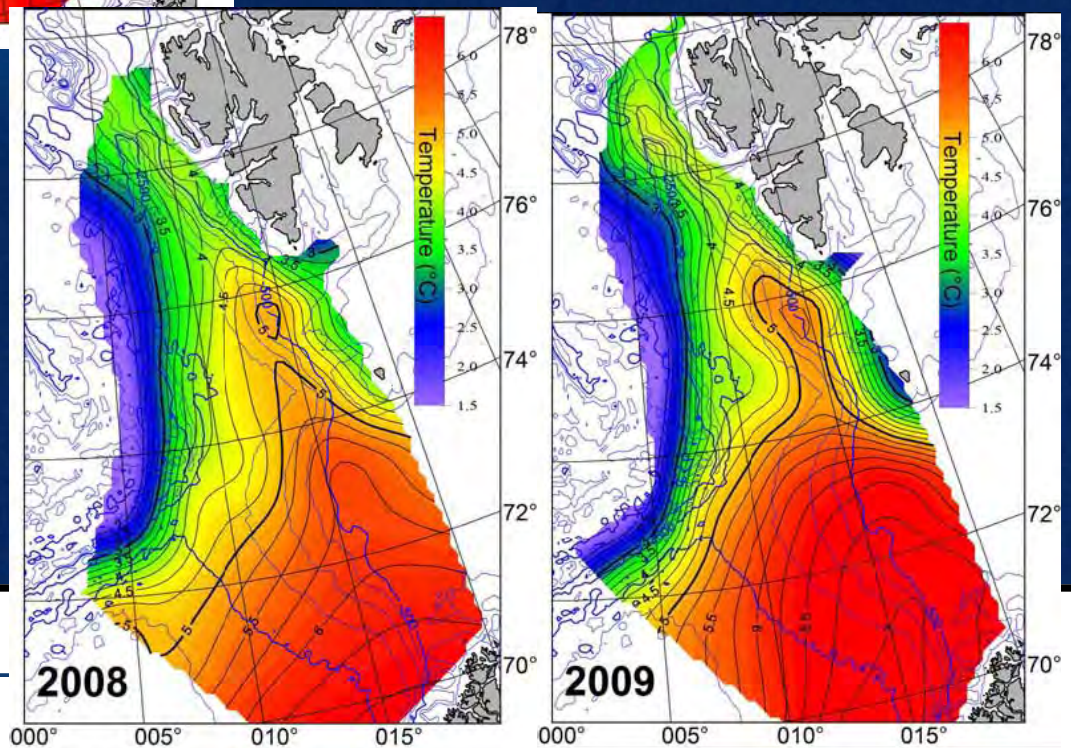
Bottom temperature anomalies in the Barents Sea in August-September 2009 (Anon., 2010).



Courtesy: A.Trofimov (PINRO)

Temperature at 100 dbar in June/July 2006–2009.

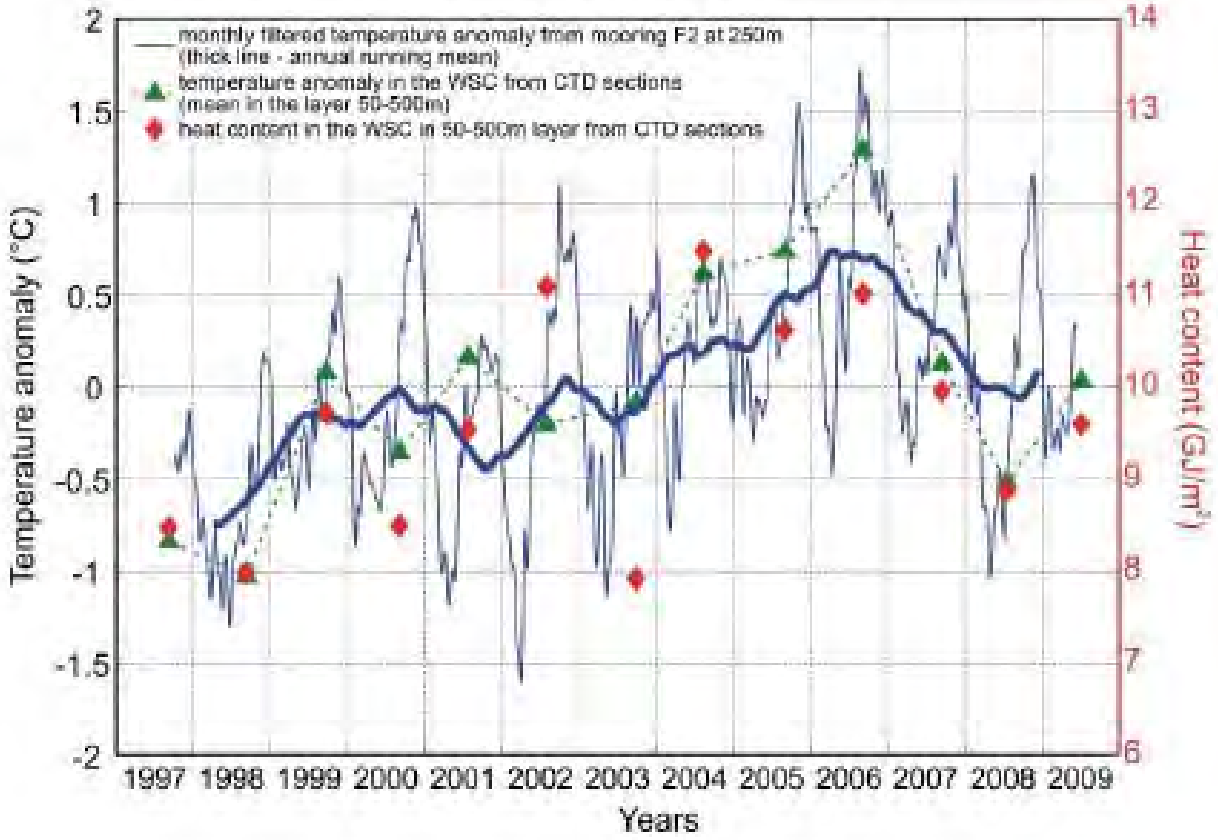




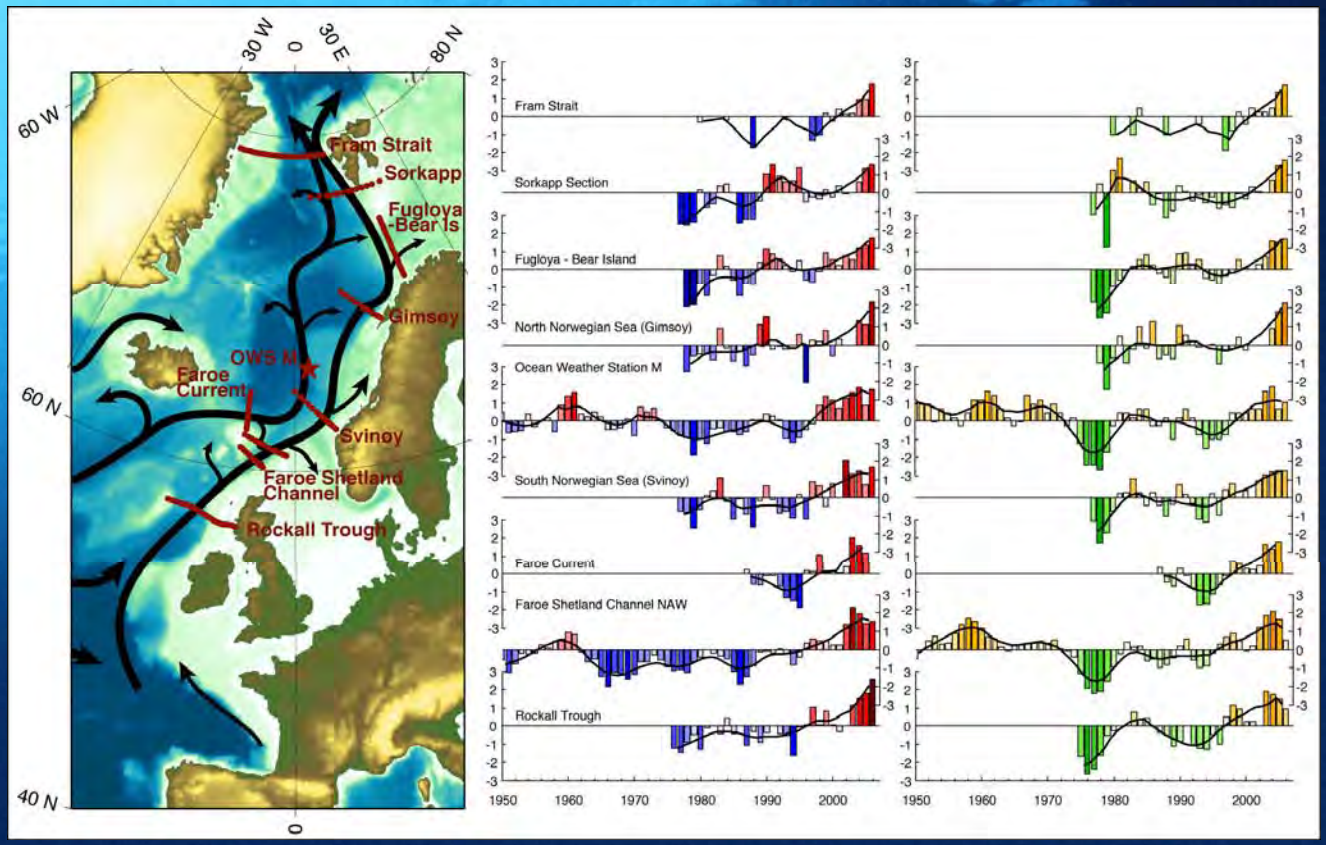
Courtesy:
W. Walcowski,
IOPAN

Comparison of temperature anomaly measured at the depth of 250 m (mooring Vs summer hydrographic sections (green triangles))

Courtesy:
A. **Beszczynska-Möller**, AWI

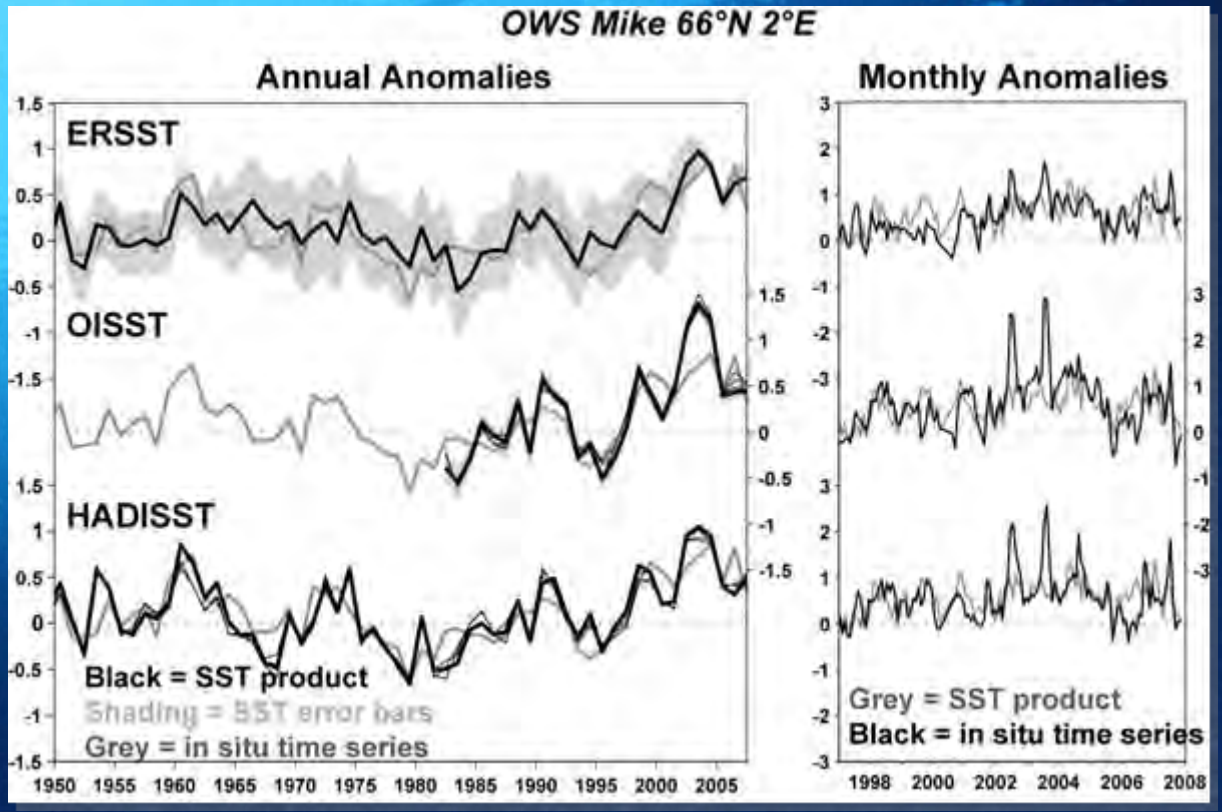


WGOH collaborative research



Holliday et al, 2008, Reversal of the 1960s-1990s freshening trend in the NE North Atlantic and Nordic Seas, *GRL* (35)

WGOH collaborative research



Hughes et al, 2008. Comparison of in situ Time Series of temperature with gridded sea-surface temperature data sets in the North Atlantic. ICES Journal of Marine Science

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May 10th to 12th 2011
Santander, Spain

Abstract deadline:
15 January 2011

Deadline for early registration:
31 March 2011

ınic Hydrography

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More information at:
http://www.noc.soton.ac.uk/ooc/ICES_WGOH/