13:45-15:30 Program Expansion and external outreach and interfaces

- Discuss the benefit and approaches to expanding the concept to cover other areas of the Arctic
- Examples of DBO-types studies in other areas of the Arctic:
  - "Multidisciplinary long-term studies at the Arctic deep-sea observatory HAUSGARTEN" *(Michael Klages)*
  - "Some visions on DBO type studies from a Swedish perspective" *(Leif Anderson)*
  - "Biological observations in Norway and some thoughts on the DBO strategy" *(Marit Reisgard)*
  - Others?
- Discussion on how do we develop a pan-Arctic network of DBO transects and sites?
- Relation of the DBO planning to the CBMPs Marine Expert Monitoring Groups (MEMG) "Circumpolar Marine Biodiversity Monitoring Plan" (*Kathy Crane*)
- Ways forward to develop the DBO into an observations network within the SAON framework (*John Calder*)

15:30-15:45 Coffee Break

15:45-17:30 Review data sharing, identify gaps, and future direction

- Review draft DBO data templates (*Grebmeier*)
- Discuss concept of integrated databases and how it might be achieved (*Grebmeier*)
- PAG DBO Ship plans for 2011 (*National members*)

Distributed Biological Observatory (DBO) 2010 Pilot Data Plans and 2011 Field Effort

Jacqueline M. Grebmeier

Chesapeake Biological Laboratory, University of Maryland Center for Environmental Science, Solomons, Maryland, USA

27 March 2011

Seoul, Korea

OUTLINE:

- Summary Matrix 2010 measurements
- Review DBO data templates
- Discuss concept of integrated databases and how it might be achieved
- Discuss possible joint analysis of data in integrated databases
- 2011 DBO field plans

"Vision" for Distributed Biological Observatory

Core standardized ship-based sampling:

- CTD, ADCP
- Chlorophyll
- Nutrients
- Ice algae/Phytoplankton (size, biomass and composition)
- Zooplankton (size, biomass and composition)
- Benthos (size, biomass and composition)
- Seabird (standard transects, no additional shiptime)
- Marine mammal observations (no additional ship time)

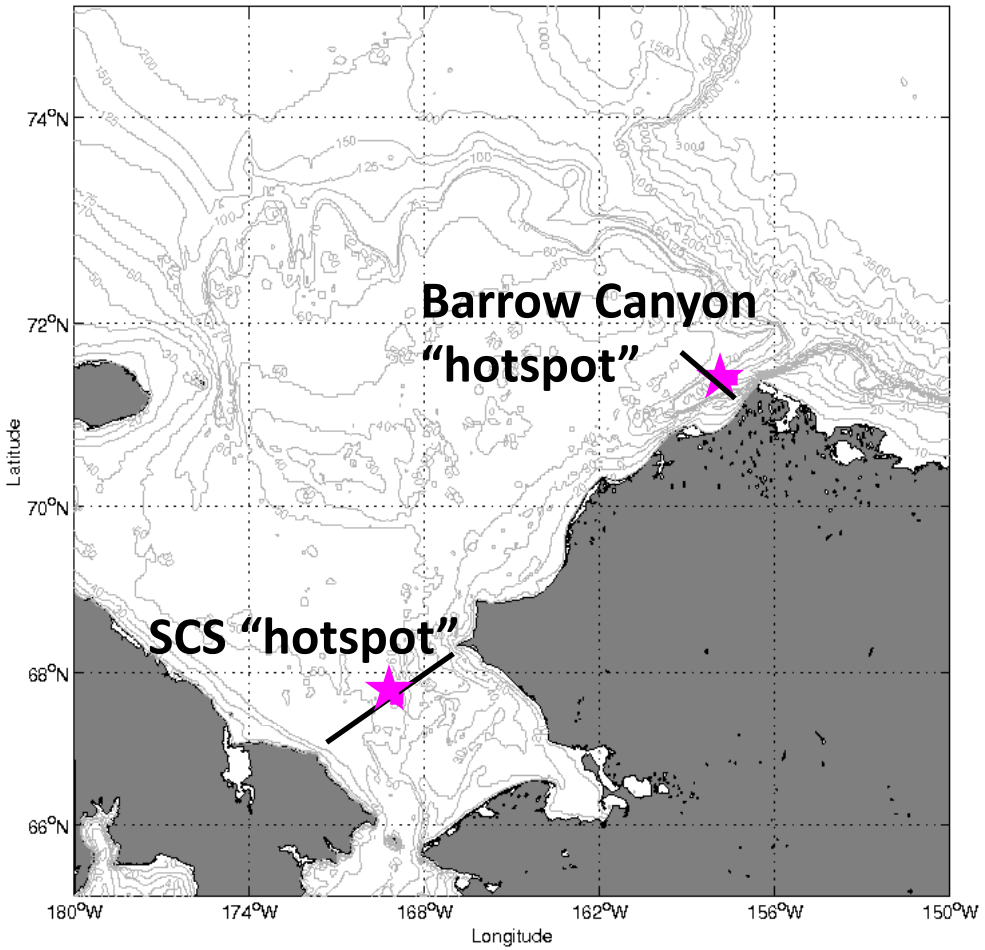
"Change detection array" – same measurements every year, process information in near real time <6 mos; detect regime shifts in rapid changes

Second tier ship-based sampling:

- Fishery acoustics (less effort than standardized bottom trawling)
- Bottom trawling (every 3-5 years)

Leveraged programs both domestic and international; also other parameters

DBO 2010 “Pilot” Season: International cruises to Pacific Arctic



Vessel	Country	PI
Moana Wave	USA	Grebmeier
Alaskan Enterprise (2011)	USA	Napp
Aaron (2011)	Korea	Chang
Xue Long	China	He
Mirai	Japan	Itoh
Laurier	Canada	Vagle
Healy	USA	Arrigo
Healy	USA	Pickart
Annika Marie	USA	Ashjian
Khromov	USA & Russia	woodgate

http://pag.arcticportal.org

2010 DBO International Pilot Project

DBO 2010 Data Parameter Matrix (SE Chukchi Sea-SECS) and Barrow Canyon (BC)

Cruise (DBO PI Lead)	Period	CTD*	Chlorophyll-extractions	Nutrients	Algae-Ice/Phyto-plankton: size, biomass, composition	Zooplankton: size, biomass, composition	Benthos: size, biomass, composition	Seabird surveys	Marine Mammal surveys
Healy 1001 (Pickart)	June-July (both)	x	x	x					
Sir Wilfrid Laurier (Vagle)	July (both)	x	x	x		x	x	x	
Araron (Chung)	July								
Moana Wave (Grebmeier)	July-Aug (both**)	x	x	x	x**	x**	x**	x	x
Xuelong (He)	July-Aug	x	x	x	x	x	x***		
Annika Marie (Ashjian)	August (BC)	x	x	x	Lugols samples for microplankton	x		x	x
Alaskan Enterprise (Napp/CHAOZ)	Aug-Sept (BC)	x				x			x
Khromov (Woodgate)	Aug (SECS)=CS line	x	x	x		x			x
Healy 1003 (Pickart)	Sept (BC)	x		x					
Mirai (Itoh)	Oct (BC)	x	x	x		x (hotspot)			

*=T, S, plus some cruises transmissivity, fluorescence (chlorophyll), CDOM, dissolved oxygen, pH

**=all water column, plankton and benthic data at "hotspot" sites only; seabird and marine mammal survey throughout

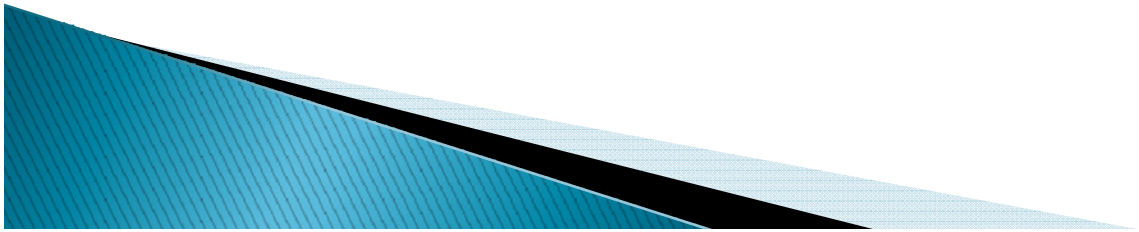
Issue 1-Draft DBO data templates

1. Data templates:
   - T, S, CTD (cnv files)
   - Chemical parameters-see matrix (e.g., nutrients, DO)
   - Biological parameters-see matrix (e.g., chl, phyto, zoop, benthos ID, abundance, biomass, size)

3. Need examples templates
   - 2010 CTD data format: Bob Pickart (cvn files)
   - Ex. Nelson (zoops), Grebmeier (benthic)
   - Come to common decision on data format and location
   - All data sets need metadata file

4. Timeline for data for DBO use by countries, open availability to scientific community

5. Issue of publication

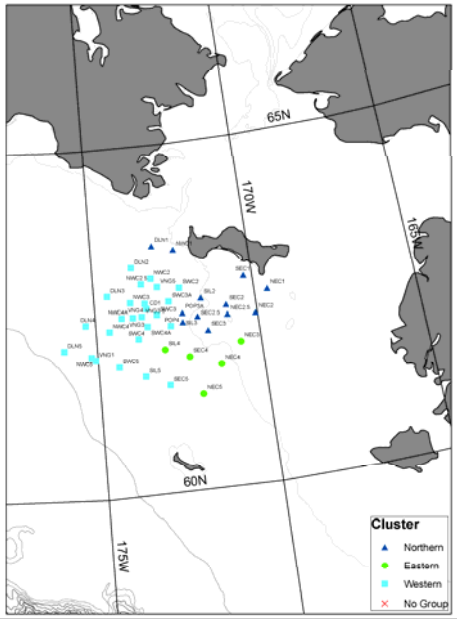


Example: Hydrographic and chlorophyll data (Carin Ashjian, DBO BC 2010)

								Concentration units are micromoles per liter.				Chl a	Phaeo
Station	Line	Month	Day	Lat	Long	Depth	PO4	N+N	Silicate	NO2	NH4	µg/l	µg/l
22	1	8	24	71.62135	155.928067	1	0.550	0.08	1.98	0.080	0.015	0.11370782	-0.0208513
22						10	0.542	0.21	1.95	0.082	0.013	0.11663278	-0.018994
22						40	1.490	8.68	21.46	0.202	0.738	0.11736402	0.01135981
25	1	8	24	71.4965333	157.669117	1	0.431	0.13	1.39	0.078	0.109	0.10639542	-0.0211109
25						10	0.515	0.18	1.88	0.069	0.000	0.11955774	-0.0167381
25						40	1.282	5.27	12.36	0.155	1.115	0.18244438	0.11206619
27	1	8	24	71.41445	157.4975	1	0.492	0.31	0.78	0.035	0.074	0.1864662	0.01239817
27						10	0.527	0.26	1.28	0.029	0.010	0.34587652	0.10804437
27						40	1.028	2.69	8.97	0.170	2.089	0.38353538	0.12657764
29	1	8	24	71.33005	157.3305	1	0.623	0.42	4.40	0.018	0.036	0.46360616	0.12780613
29						10	0.641	0.40	3.59	0.031	0.026	2.3052341	0.64027009
29						40	0.676	0.32	4.92	0.030	0.688	0.66030972	0.30810797
31	1	8	24	71.2472667	157.16455	1	0.605	0.34	3.41	0.032	0.161	0.54916124	0.15782353
31						10	0.592	0.23	3.46	0.033	0.070	0.49322138	0.24285577
31						40	0.737	0.49	6.25	0.042	0.521	0.27933368	0.2455248

Example zooplankton spreadsheet (John Nelson, C30; IOS Canada)

Comment	Total # in sample	average PL/length (mm)	average weight (mg)	biomass (mg)	vol filtered (m^3)	vol filtered 85%	biomass mg/m^3 85%	count #/m^3 85%	biomass mg/m^3	count #/m^3	top5
	96	1.10	0.00	0.19	24.63	20.94	0.01	4.59	0.0078	3.90	
	96	1.40	0.00	0.18	24.63	20.94	0.01	4.59	0.0074	3.90	
	128	1.80	0.01	1.02	24.63	20.94	0.05	6.11	0.0416	5.20	
	160	2.60	0.05	8.00	24.63	20.94	0.38	7.64	0.3248	6.50	
	384	3.20	0.09	32.64	24.63	20.94	1.56	18.34	1.3252	15.59	x
	256	3.20	0.09	21.76	24.63	20.94	1.04	12.23	0.8835	10.39	
	70	4.60	0.22	15.40	24.63	20.94	0.74	3.34	0.6253	2.84	
	32	4.60	0.22	7.04	24.63	20.94	0.34	1.53	0.2858	1.30	
	3	6.20	0.68	2.04	24.63	20.94	0.10	0.14	0.0828	0.12	
	68	4.40	0.18	12.24	24.63	20.94	0.58	3.25	0.4970	2.76	
	102	6.40	1.62	165.24	24.63	20.94	7.89	4.87	6.7089	4.14	x
	32	3.10	0.39	12.48	24.63	20.94	0.60	1.53	0.5067	1.30	
	64	1.00	0.01	0.45	24.63	20.94	0.02	3.06	0.0182	2.60	
	64	0.95	0.00	0.26	24.63	20.94	0.01	3.06	0.0104	2.60	
species?	32	2.60	0.14	4.48	24.63	20.94	0.21	1.53	0.1819	1.30	
	64	2.70	0.20	12.80	24.63	20.94	0.61	3.06	0.5197	2.60	
	256	0.90	0.01	2.05	24.63	20.94	0.10	12.23	0.0832	10.39	
	96	0.90	0.01	0.86	24.63	20.94	0.04	4.59	0.0351	3.90	
	96	0.90	0.01	0.58	24.63	20.94	0.03	4.59	0.0234	3.90	
	64	0.80	0.00	0.32	24.63	20.94	0.02	3.06	0.0130	2.60	
	128	0.90	0.01	1.02	24.63	20.94	0.05	6.11	0.0416	5.20	
	32	1.40	0.02	0.67	24.63	20.94	0.03	1.53	0.0273	1.30	
	32	1.10	0.02	0.58	24.63	20.94	0.03	1.53	0.0234	1.30	
	32	0.90	0.01	0.19	24.63	20.94	0.01	1.53	0.0078	1.30	
	32	1.30	0.02	0.58	24.63	20.94	0.03	1.53	0.0234	1.30	
	32	0.90	0.01	0.38	24.63	20.94	0.02	1.53	0.0156	1.30	
	32	0.80	0.01	0.26	24.63	20.94	0.01	1.53	0.0104	1.30	
	64	1.80	0.13	8.32	24.63	20.94	0.40	3.06	0.3378	2.60	
	640	3.80	0.55	352.00	24.63	20.94	16.81	30.57	14.2915	25.98	x
species? 0.	64	0.60	0.00	0.13	24.63	20.94	0.01	3.06	0.0052	2.60	
	32	0.80	0.01	0.32	24.63	20.94	0.02	1.53	0.0130	1.30	
	32	0.80	0.01	0.32	24.63	20.94	0.02	1.53	0.0130	1.30	
	640	0.60	0.00	0.32	24.63	20.94	0.02	30.57	0.0130	25.98	
	4480	0.90	0.00	6.72	24.63	20.94	0.32	213.99	0.2728	181.89	
	32	0.50	0.00	0.10	24.63	20.94	0.00	1.53	0.0039	1.30	
	32	0.80	0.00	0.10	24.63	20.94	0.00	1.53	0.0039	1.30	
	64	1.20	0.00	0.19	24.63	20.94	0.01	3.06	0.0078	2.60	
	192	0.20	0.01	2.30	24.63	20.94	0.11	9.17	0.0935	7.80	
	1824	0.40	0.01	21.89	24.63	20.94	1.05	87.12	0.8887	74.06	
	480	0.70	0.01	5.76	24.63	20.94	0.28	22.93	0.2339	19.49	
	96	1.10	0.00	0.33	24.63	20.94	0.02	4.59	0.0133	3.90	
	32	1.50	0.01	0.38	24.63	20.94	0.02	1.53	0.0156	1.30	
	64	1.10	0.01	0.83	24.63	20.94	0.04	3.06	0.0338	2.60	
	128	2.50	0.17	21.12	24.63	20.94	1.01	6.11	0.8575	5.20	
	384	0.50	0.00	0.69	24.63	20.94	0.03	18.34	0.0281	15.59	
	896	0.70	0.00	1.61	24.63	20.94	0.08	42.80	0.0655	36.38	
species?	32	1.40	0.01	0.38	24.63	20.94	0.02	1.53	0.0156	1.30	



Example Benthic data file
Bensum.xls file, plus taxa.xls specific data files (Jackie Grebmeier)

- Infaunal taxa summary: abundance, biomass, dominant fauna
- Also station taxa files
- Sediment grain size
- Sediment chlorophyll

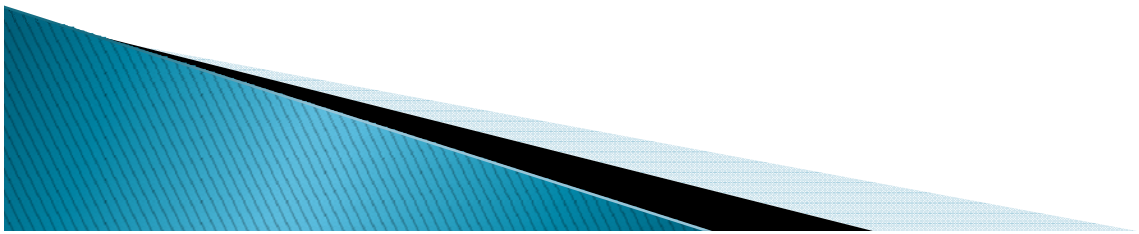
Cruise	Stn #	Stn. Name	Abundance (#/m²)	Biomass (g/m²)	Biomass (gC/m²)	Taxa (#)	Abundance: Top 3 (#/m²)	%	Biomass: Top 3 (g/m²)	%	Biomass: Top 3 (gC/m²)	%
HLY0601	1	NEC5	1710.000	276.823	8.526	36	*Nucula belloti*	30.0	*Nuculana radiata*	72.3	*Nuculana radiata*	44.6
							Leuconiidae	13.3	*Nucula belloti*	6.1	Melitidae	12.3
							Nuculana radiata	11.8	Melitidae	5.1	Nephtyidae	11.8
HLY0601	2	SEC5	540.000	111.460	4.585	30	*Nucula belloti*	19.9	*Macoma calcarea*	72.6	*Macoma calcarea*	61.8
							Ophiuridae	13.4	*Yoldia sp.*	7.7	Nephtyidae	11.9
							Macoma calcarea	8.3	Nephtyidae	6.8	*Yoldia sp.*	8.8
HLY0601	3	SIL5	1730.000	274.592	10.141	36	Capitellidae	23.8	Mytilidae	39.7	*Nucula belloti*	31.5
							Nucula belloti	22.0	*Nucula belloti*	29.9	Mytilidae	30.1
							Macoma calcarea	7.5	*Macoma calcarea*	13.4	*Macoma calcarea*	12.7
HLY0601	4	SWC5	2020.000	270.861	10.670	42	*Nucula belloti*	35.8	*Nucula belloti*	29.9	*Nucula belloti*	29.6
							Macoma calcarea	14.7	*Macoma calcarea*	21.6	*Macoma calcarea*	19.2
							Capitellidae	7.8	Ophiuridae	12.4	Maldanidae	18.2
									Maldanidae	10.3	Nephtyidae	13.4
HLY0601	5	VNG1	1990.000	365.554	16.075	39	*Nucula belloti*	42.0	*Nucula belloti*	35.6	Maldanidae	31.9
							Yoldia sp.	9.9	Maldanidae	20.0	*Nucula belloti*	31.6
							Maldanidae	7.2	*Nuculana radiata*	10.5	Rhynchocoela	10.0
HLY0601	6	NWC5	1680.000	303.887	10.416	40	*Nucula belloti*	33.8	*Nuculana radiata*	33.8	Maldanidae	25.2
							Lituolidae	9.7	*Nucula belloti*	18.5	*Nucula belloti*	21.0
							Lumbrineridae	7.3	*Macoma calcarea*	13.6	*Nuculana radiata*	18.7
									Maldanidae	12.3	*Macoma calcarea*	13.9

- with additional parameter-specific data sets
- need metadata (Readme file) to describe cruise, dates, sampling, analyses

Issue 2: Concept of integrated databases and how it might be achieved

1. PAG webpage where link data specific to DBO collections at one portal, load matrix on a DBO website, with highlight box to click to raw data files and perhaps composite maps at national sites
2. Can maintain data sets at home site, but need meta data access on DBO site
3. Issue of QA/QC
4. Standardization of data collections, data format, and access

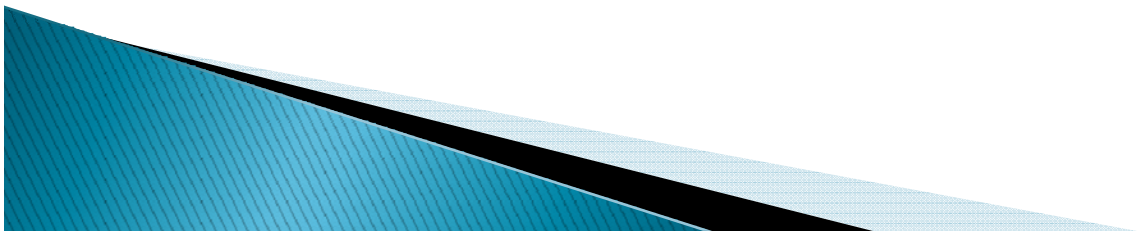
Issue 3: Possible joint analyses of data in integrated databases



Issue 4: Standardization of the sampling procedures and analyses

Zooplankton collections (Hopcroft, Kosobokova, Nelson): use vertically towed bongo nets with standard mesh sizes: 150 micron and 60 micron; also use 1000 micron Bongo net for collecting large animals (ctenophores, euphausiids, amphipods); use same standard nets would be of great importance for any future comparisona

Benthic: standard 0.1 m2 van Veen grabs, sieve through 1 mm screens for macrofauna



Status Report on SAON

Meeting of Senior Arctic Officials (SAO)
October 19–20, 2010
Torshavn, Faroe Islands, Denmark

The DBO will depend on international cooperation to provide sustained and coordinated sampling

It is envisioned that data will be made available through the Sustaining Arctic Observing Network (SAON)

Last week, the SAON Steering Group** proposed that SAON undergo a transition from a planning process to an operational program. The Status Report outlines the proposal for creating the operational phase of SAON.

**John Calder (AMAP) and David Hik (IASC), SAON SG Co-Chairs

www.arcticobserving.org

2011 DBO International DBO Project

Dates (2011) /Port calls	Ship	Project	PAG contact	Chief Scientist
July 15 (Dutch Harbor),-Aug	USCGC Healy	ICESCAPE (NASA)	Robert Pickart rpickart@whoi.edu	Kevin Arrigo <Kevin.arrigo@healy.polarscience.net>
July	Sir Wilfrid Laurier	C30	Robert Fudge	TBD
July –August (Dutch Harbor)	RV Araron (DBO-SCS)	Korean Expedition	Kyung Ho Chung (KOPRI)	TBD
August -Sept	TBD	Chukchi Acoustics, Oceanography, and Zooplankton Study (CHAOZ) (NOAA)	Jeff Napp/Sue Moore	TBD
August	Khromov	RUSALCA	Kathy Crane	Rebecca Woodgate
August	Annika Marie		Carin Ashjian	Carin Ashjian <cashjian@woi.edu>
September	Healy		Robert Pickart	Robert Pickart rpickart@whoi.edu

2012: Araron, Khromov, Xuelong

2013: Mirai

2014: Xuelong

2011 DBO International Project

DBO 2010 Data Parameter Matrix (SE Chukchi Sea-SECS) and Barrow Canyon (BC)

Cruise (DBO PI Lead)	Period (DBO lines)	CTD*	Chlorophyll-extractions	Nutrients	Algae-Ice/Phyto-plankton: size, biomass, composition	Zooplankton: size, biomass, composition	Benthos: size, biomass, composition	Seabird surveys	Marine Mammal surveys
Healy 1101 (Pickart and Arrigo)	July-August(both)	x	x	x					
Sir Wilfrid Laurier (Vagle)	July (both)	x							
Araron (Chung)	July	x							
Xuelong (He)	July-Aug	x							
Annika Marie (Ashjian)	August (BC)	x	x	x		x			x
Alaskan Enterprise (Napp/CHAOZ)	Aug-Sept (BC)	x				x			x
Khromov (Woodgate)	Aug (SECS)=RUS ALCA CS line	x		x		x			x
Healy 1003 (Pickart)	Sept (BC)	x		x				x (Kuletz?)	

*=T, S, plus some cruises transmissivity, fluorescence (chlorophyll), CDOM, dissolved oxygen, pH

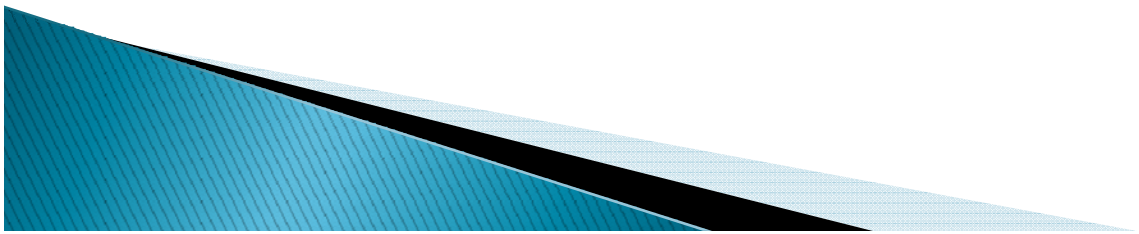
Other PAG country plans (comments or presentations)

Lessons Learned from 2010-Comments?

1. Overall transfer CTD data from one Chief Scientist to next in DBO time field sequence worked well

1. There is a need to post data on come DBO data portal? Ex. In 2010 Bob Pickart provided ftp site to up and download data for physical oceanographic and hydrographic data

2. We need comment portal all DBO data sites: physical, biogeochemical and biological



Thank you for participating.

Any comments?

One final thing: please make sure you have either registered through the ASSW2011 website or signed your name on the sheet if you are interested to be on the DBO contact list for further information