

#### p-WebGIS (Polar Ocean Web GIS)

#### Korea-Polar Ocean in Rapid Transition (K-PORT)

Hyun-cheol Kim Head, Department of Polar Remote Sensing, DPOE PI, Sung-ho Kang Director, Division of Polar Ocean Environment



# Background

- Polar Ocean survey by IBRV ARAON since 2009
  - Massive in-situ data archiving
  - Requirement a high-quality-controlled data
- Promote efficiency utilize field data
  - Easy access Data Base on any time and place
  - Fast and Intuitive data analysis
  - Systematic Management Data
  - Multidisciplinary Collaboration
- Help to understand environmental changes in Polar Ocean related with climate change



# **Overview of p-WebGIS**

- Subproject of "Korea-Polar Ocean in Rapid Transition (K-PORT, PI: Sung-ho Kang)"
- Aim: Archiving and Utilize data from the main project
- Progress on 1<sup>st</sup> stage
  - 1<sup>st</sup> year (2013~2014): Prototype system
    - Implemented only basic functions
  - 2<sup>nd</sup> year (2014~2015): Advanced system
    - Provided more spatial analysis functions
    - Allowed users to upload in-situ data
    - Added some practical functions
  - 3<sup>rd</sup> year (2015~2016): *Field support system* 
    - Be focused on off-line version for field researchers
    - Provide more spatial analysis functions
    - Be more stable system
- Plan of 2<sup>nd</sup> stage : 2016~2020
  - Sophisticate system, end-user friendly designed



#### Layout

#### http://kport.kopri.re.kr





• Daily / Monthly sea ice concentration data from 1978 to 2014



09/2013



#### Topography







#### Bathymetry







## Data summary (2009-2014)





## **Field Measurements**

• Biological / Chemical / Physical oceanography and Marine geology data





#### Field Data Types

Biological oceanography	Bacteria	Physical oceanography	Density
	Chlorophyll-a		Potential Temperature
	Macromolecular(Carbohydrates)		Pressure
	Macromolecular(Lipids)		Salinity
	Macromolecular(Proteins)		Temperature
	Mesozooplankton	Marine geology	Sub/Bottom profile
	Phytoplankton		Swath bathymetry
	Protozoa(Ciliates)		
	Protozoa(Heterotrophic dinoflagellate)		
	RS Chlorophyll		
	Virus		
Chemical oceanography	DIC		
	DOC		
	DON		
	Nutrients(NH4)		
	Nutrients(NO2+NO3)		
	Nutrients(PO4)		
	Nutrients(SiO2)		
	pCO2		
	ΡΟϹ(μΜ)		
	Primary production(Carbon)		
	Primary production(NH4)		
	Primary production(NO3)		
	ТА		



#### **Vector Layers**

• Bathymetry, EEZ, Coastline, etc





#### Field Measurements

• Biological / Chemical / Physical oceanography and Marine geology data





#### Field Measurements

• Biological / Chemical / Physical oceanography and Marine geology data





### Field Data Analysis

Oceanography data visualization





## Field Data Analysis

- Marine geology data visualization
  - : Swath bathymetry, Sub/Bottom profile





## **Spatial Analysis**

#### Spatial distribution of field data with different methods





ile Type : DO

#### Data Upload/Download



#### Research Data File $\bigcirc$ $\bigcirc$ \* Upload Type Research Image File Research Result File \* Title Charles Cha Date 2015.06.23 11:36:45 Name yyyy-mm-dd 🏥 ~ yyyy-mm-dd 🧰 0 🖍 \* Period Researcher Start Longitude Start Latitude **End Longitude** End Latitude

#### RESEARCH Data Template Download File List

			×	1 2				ARA01B_C	.csv - Excel				<u> </u>	- ×
Total (6)	Output Number 10 🔻		파	i ș	산의	페이지 레이아웃	수식 M		검토 R	W N	ACROBAT			로그인
			B1		- E 🗙	$\checkmark f_x$	Latitude							~
No.		Title		A	В	с		D			E	F		<b></b>
			1	Station	Latitude	Longitude	Date(MM	/DD/YYY	()(HH:MM:	SS) I	Depth (m)	Chlorophyll-a	(ug/L)	
1	pCO2		2	1	73.12686	-168.93845	07/20/201	10 4:53:21			1		80.0	\$
			3	1	73.12686	-168.93845	07/20/201	10 4:53:21			10		0.15	<b>i</b>
2	DOC		4	1	73.12686	-168.93845	07/20/201	10 4:53:21			20		0.39	,
			5	1	73.12686	-168.93845	07/20/201	10 4:53:21			30		1.46	•
3	Nutrients		6	1	73.12686	-168.93845	07/20/201	LO 4:53:21			50		1.47	
			7	3	73.5117	-166.98798	07/21/201	17:08:4	5		1		0.1	
4	Microzooplankton		8	3	/3.511/	-166.98798	07/21/201	17:08:4	5		10		0.1	-
			9	3	73.5117	-166.98798	07/21/201	17:08:4	5		20		0.13	
5	Chlorophyll		10	3	/3.511/	-166.98798	07/21/201	1/:08:4	5		30		0.16	·
			11	3	/3.511/	-166.98798	07/21/201	17:08:4	5		40		1.2/	
6	Biological oceanography		12	3	73.5117	-166.98798	07/21/201	10 17:08:4	5		50		2.42	
	5 517		13	3	/3.511/	-166.98798	07/21/20	10 17:08:4	5		08		0.42	
			14	4	73.74886	-167.02765	07/23/201	10 5:21:23			2		0.13	
			15	4	73.74880	-167.02765	07/23/201	0 5:21:23			10		0.09	
			10	4	73.74000	167.02765	07/23/201	0 5:21:25			50		2.05	
			10	4	72 74880	167.02765	07/23/201	10 5-21-22			65		2.46	
			10	4	73.74880	-167.02765	07/23/201	10 5.21.23			90		0.24	-
			20	- 6	75.02718	-159.47405	07/26/201	0 17.10.3	4		1		0.03	
			20	6	75.02718	-159.47405	07/26/201	10 17:10:3	4		10		0.03	-
			22	6	75.02718	-159.47405	07/26/201	0 17:10:3	4		30		0.00	
			22	6	75.02718	-159.47405	07/26/201	0 17.10.3	4		45		0.00	
					ARA01B_	c 🕀				-				•
			_		-									

Research file type 🔻				
티파일 없음				
nnesessary	Status	O Applied	Anapplied	
			close	insert



#### **Future Plans**

- Will have another 5 years for the Arctic ocean
  - Standardize architecture of ocean database
  - Focus on better field support system
    - : Data upload/download, more analysis functions
  - Provide Web-based system for public users
- Share all the data produced in the Arctic ocean
  Lead potential research collaborations
- Analyze the data interactively without expensive commercial GIS software
  - Open source based GIS engine