Korean Arctic Research
2015 update

International Cooperation Department
Korea Polar Research Institute

FARO Annual Meeting, ASSW 2016
Fairbanks, Alaska, 12 March 2016
Outline

KO PRI and Korean Arctic research; brief introduction

Ocean going research

Land based research at various sites

Modelling efforts

Korean Arctic Research Consortium launched
KOPRI and Korean Arctic research; brief introduction

KOPRI, lead agency for the national program, Government sponsored research institution

IBRV, a station in Svalbard, a number of pan-Arctic observation sites

~200 expeditioners a year, 20-30 million USD?

21 Arctic large and small projects and programs within KOPRI (15 field applications in 2015)
2015 Arctic Activity overview

Arctic research voyage; 2 legs, spanning 2 months

Terrestrial observation; Svalbard, Alaska, Cambridge Bay, Greenland (Nord)

New ‘modelling’ project and ‘upper atmospheric physics’ project starting

Korean Arctic Research Consortium launched

* Arctic Council WGs science contributions sought
Ocean going efforts;

Geographical focus on the Pacific Sector of Arctic and sub-Arctic

Multidisciplinary oceanographic and ecosystem field studies

Linked to PAG (Pacific Arctic Group) initiatives such as PACEO (Pacific Arctic Climate & Ecosystem Observatory)

Significant international collaboration; instrument deployment and expeditioner invitation
Korean Arctic Ocean Cruise track

Typical expedition period: from the end of July to the end of September
2015 Arctic survey
1st Leg (ocean and geophysics study)

- North Bering Sea (DBO 3)
- Chukchi Sea
- East Siberian Sea & Mendeleev Ridge
- Sea Ice station
- Ocean mooring station

- KOPRI (deploy)
- TUMSAT (recover)
KOPRI ocean mooring system

- Chukchi Sea and East Siberian Sea
- ADCP, Microcat, Sediment trap, RCM, AZFP

**KAMS-1**
- Top: ~40 m
- MicroCAT1: ~42 m
- T-logger1: ~45 m
- T-logger2: ~50 m
- MicroCAT2: ~70 m
- T-logger3: ~85 m
- MicroCAT3: ~100 m
- T-logger4: ~125 m
- T-logger5: ~150 m
- AZFP: ~175 m
- MicroCAT4: ~176 m
- T-logger6: ~200 m
- T-logger7: ~250 m
- ADCP (150 kHz): ~300 m
- MicroCAT5: ~301 m
- ST: ~320 m
- T-logger8: ~321 m
- Syntactic foam float: ~471 m
- AR: ~483 m
- Depth: ~500 m

**KAMS-2**
- Top: ~30 m
- MicroCAT1: ~32 m
- T-logger1: ~35 m
- T-logger2: ~40 m
- MicroCAT2: ~50 m
- T-logger3: ~75 m
- T-logger4: ~100 m
- MicroCAT3: ~120 m
- T-logger5: ~160 m
- AZFP: ~175 m
- MicroCAT4: ~176 m
- T-logger6: ~200 m
- T-logger7: ~250 m
- ADCP (300 kHz): ~170 m
- MicroCAT5: ~200 m
- T-logger8: ~321 m
- ST: ~320 m
- T-logger9: ~321 m
- RCM: ~325 m
- VITROVEX X 3: ~469 m
- AR: ~483 m
- Depth: ~500 m
Sea ice dynamics

International collaboration: KOPRI-SAMS- BAS-ONR-China-France-Spain

Buoy deployments for physical observation

- To measure in-situ physical parameters of atmosphere, ice and ocean autonomously
- To study the energy balance at the atmosphere-ice-ocean interface
Preliminary KOPRI Arctic ocean plan (2016 Aug-Sep)

- North Bering Sea (DBO 3)
- Chukchi Sea
- East Siberian Sea
  - Sea Ice station
  - Ocean mooring station
  - 2 KOPRI station

✓ Ocean
✓ Geophysics
✓ Gas hydrate
Future KOPRI Arctic survey

ARAON will cover the region from the Chukchi Borderland to the East Siberian Sea and Mendeleev Ridge.
Marine Geophysics

- Swath bathymetry
- High-resolution subsurface features (Subbottom Profiling)
- Gravity Survey ➔ Data shared with Arctic Gravity Project
2nd Leg: Paleocenography Study
(2015 Aug.24-Sep.9, 23 scientists)

East Siberian and Chukchi Sea

- Ecological Characteristics of Arctic Permafrost (Jul.9~Jul.20, 5 scientists)
- Arctic organisms: Cold-adaptation mechanisms and application (Jul.30~Oct.6, 1 scientist)
- Svalbard geology (Aug.5-Sep.2, 8 expeditioner)
- Upper atmospheric physics instrument installation (Oct 9-Oct 16)

- 2015 Arctic Youth Program (7.31~8.4, 9 participants)
Terrestrial / Ecological Study

CO₂, CH₄ & Soil Microbes

CO₂ & Plants

Soil Properties & Microbes
Council, Alaska (65°N)  

Greenhouse Gas Flux (CO₂, H₂O, CH₄)  
LED sensor  

Measurements of Net CO₂ Exchange  

Tethersonde  

Measurements of Photosynthesis & Soil Respiration
Cambridge Bay, Canada

- CH$_4$ analysis
- Climate change manipulation
- Setting up of NDVI sensors
- Soil sampling
Nord Station (Villum Research Station), Greenland (2015. Dec, 1 scientist)
Modeling efforts;

Impact of Arctic changes on mid latitudes as one of the key themes

Project newly launched ‘Relations between ‘cloud forcing and sea ice related physics’ and the climate in Northeast Asia with a view to improvement in weather prediction capability’

Environmental factors more closely looked in the Atlantic (Barents Sea and around)

Land based observations in Svalbard sought at an initial stage
Korea Arctic Research Consortium (KoARC) launched

Launched in October 2015

21 partner institutions

Assess and prioritize Korean Arctic research and strengthen the potential

Secretariat established at KO PRI

3 sub-groups in operation; science, industry, policy

URL; www.arctic.or.kr
Welcome collaboration

Collaboration one of our key emphases