

**Aim and Contents of research**







- ° Establishment and Operation of Research Nodes
  - Continuously operate and maintain research nodes in the permafrost area of all 5 Arctic littoral states
- ° Development of the in-situ/cyber-infrastructure
  - Establish "3D unmanned measurement system(USN etc.)" and develop and apply basic monitoring technology such as cyber-infrastructure deliver technology on site (ICT convergence and fusion technology)
- ° International Joint Research and Data Acquisition
  - Through Participation in international cooperative programs such as SIOS, PAGE21, NGE, ADAPT with Arctic littoral states, deduct climate change and numerical environmental change in permafrost and establish the multidisciplinary Circum Arctic Unit

\* Continuous monitoring and promoting a research as a part of follow up measure for joining Svalbard Treaty, becoming a permanent observer in Arctic Council, and establishing the "Basic Planning of the Arctic Policy of Korea"

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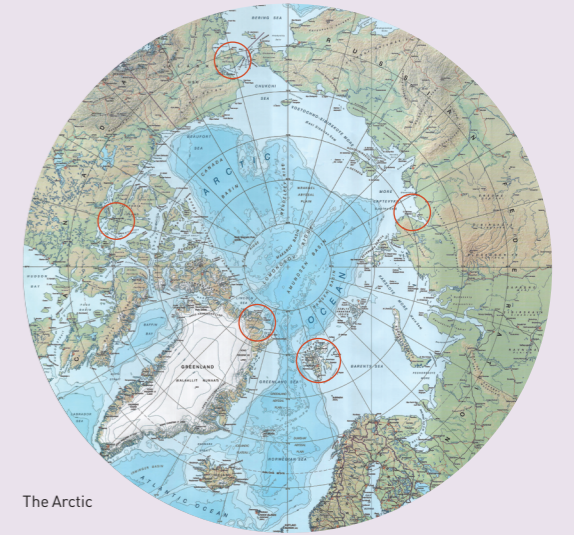


**Establishment of Circum Arctic Permafrost Environment Change Monitoring Network and Future Prediction Techniques (CAPEC)**

-  Polar Climate Change Research
-  Polar Earth-System Sciences
-  Polar Life Sciences
-  Polar Ocean Environment
-  Arctic Research
-  Promotion Program

**Arctic Research Center**

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<b>Partner Organizations</b>	GIST, Hanyang Univ., Seoul National Univ., Yonsei Univ., KICT, Univ. of AlaskaFairbanks(USA), NPI(Norway), etc.
<b>Research Duration</b>	June, 2011 ~ June, 2016 (Total: 5 years)
<b>Research Area</b>	Permafrost area of 5 Arctic littoral states (U.S.A(Alaska), Canada(Cambridge bay), Norway(Svalbard), Greenland(Zackenbergnord), Russia(Siberia))



The Arctic

**Research Background and Importance**

° This project is to predict and diagnose Arctic regions' rapid climate change and ecosystem and its impact on the Korean peninsula and other mid to lower latitude. The research area focuses on permafrost regions in the Arctic, and KOPRI is conducting the project with the fund from Korean Government(Ministry of Science, ICT and Future Planning (MSIP)) since June, 2011

**KOPRI**  
Korea Polar Research Institute

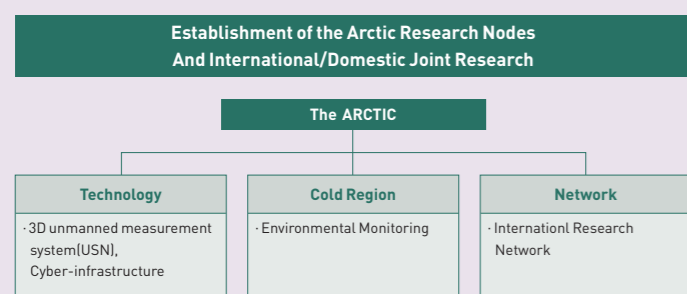
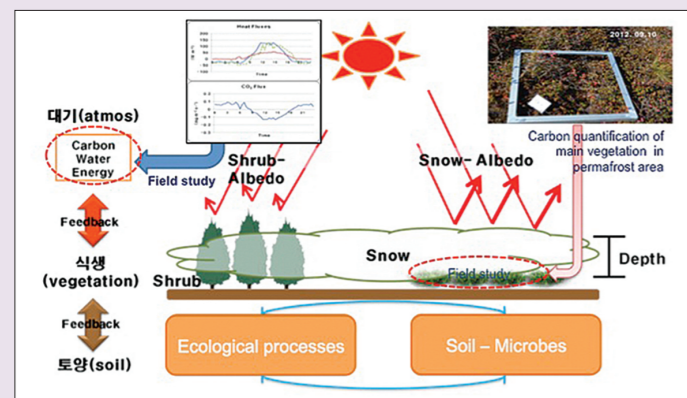
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**Research method**

- Through both domestic and international cooperative research, integration of the atmosphere, permafrost, soil, modeling, and many other fields that are related to Arctic region to achieve the goal
- Atmosphere** : Establish a foundation for close examine and analysis of the environmental change caused by climate change and predict its ripple effect. Create vertical column between underground-surface-atmosphere and establish and operate physical-dynamical environment of underground/ physical environment of surface atmosphere-ecology/ aerosol-greenhouse gas density in the loser atmosphere and physical-dynamical environment of flux close examining standard observation data acquisition system from each column
- Permafrost** : Understand the impact of global warming on permafrost regions and the organisms that inhabits there through identifying the interaction between geophysics and chemical properties of soil, greenhouse gases and organisms
- Modeling** : Based on the data from atmosphere, permafrost, and paleoclimate change, predict the Arctic region's climate change and establish Arctic surface-vegetation-hydrology integrated model

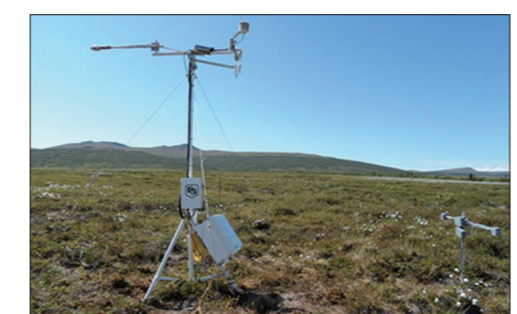
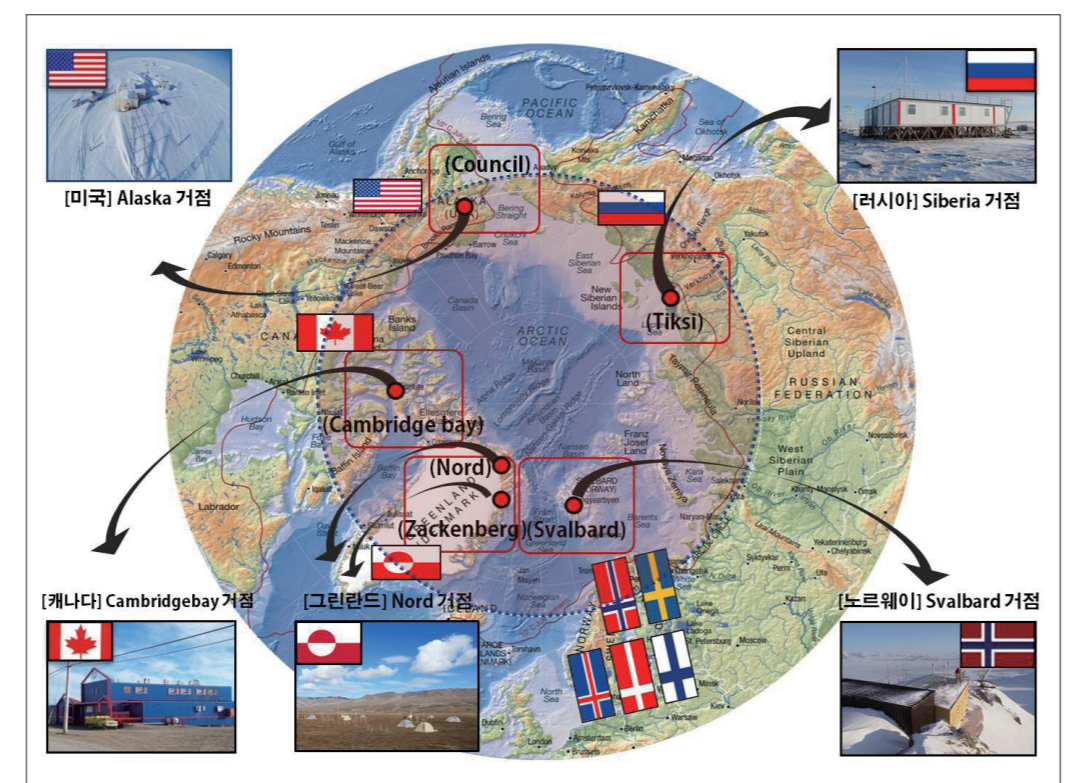
**Atmosphere-vegetation-soil field study and interaction study, future prediction**



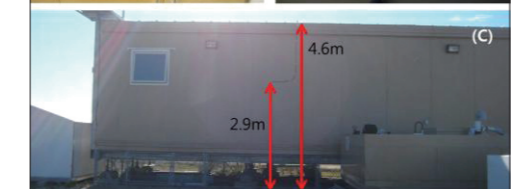
**Overall Outcomes**

**Secure observation nodes in 5 Arctic littoral states [U.S,(Alaska), Canada(Cambridge bay), Norway(Svalbard), Greenland(Zackenberg/Nord), Russia(Siberia)]**

- Establish and apply USN and cyber-network to permafrost's atmosphere, organism, soil



Coral reef at the coast of Kiaerstranda, ca. 20 km west of the Dasan Station



Coral reef at the coast of Kiaerstranda, ca. 20 km west of the Dasan Station

**Promote international cooperative researches with other research station operating countries including Arctic littoral states (U.S., Norway, Canada, etc), Germany and many others**

- Draw a climate change scenario in permafrost area, establish a multi-disciplinary circum-arctic research unit among industries, universities, and research institutes
- Utilize Svalbard international infrastructure with Norway, Germany, France, Italy and many others and operate climate change monitoring system
- MOU agreement with Greenland (Denmark): KOPRI-Denmark Aarhus University
- Research cooperation with PAGE 21 (EU's largest permafrost research project) and ADAPT (Canada's permafrost research project)
- Cooperative research and research facilities and infrastructure share agreement with IARC and CHARS

**Close examination of permafrost environment and ecological traits**

- Publication of 'The Story of Tundra'
- Photo exhibition: Arctic Tundra for media publication to show research activities and Arctic sites
- Assist on governmental international cooperation such as Arctic Council



**Future Plans and Application**

- Strengthen international cooperation with the states that are participating in Arctic Council**
  - With 5 Arctic littoral states and EU Arctic research nations, develop and operate an international cooperative research frame
  - Joint observation and sharing of data from Arctic research stations to enhance the ties between participating countries
- Expand the scope of Arctic research and Arctic data to increase the national competitiveness**
  - Multi-disciplinary study between atmosphere, soil, ecology, geophysics, electronics/telecommunication with the participation from industrial, academical, and research institutional fields
  - Participate in University of Arctic(UArctic) to enhance the quality of Arctic education and to raise Arctic researcher
  - Increase national competitiveness by owning and utilizing Arctic observation Big data from international cooperative research
- Active participation of establishment of Arctic related science policy**
  - Participate in International Conference on Arctic Research Planning (ICARP) discussion: focus on Arctic related international organization from 2013 to 2014 , confirm Arctic research plan for the next decade in Arctic Science Summit Week in April, 2015
  - Reflect Republic of Korea's opinion through International Arctic Science Committee(IASC), International Permafrost Association(IPA), Nordic Council, European Polar Consortium and many other international polar community

