

April 10, 2015  
ASSW/ISAR-4 – Plenary

Current Status and Selected Outcomes of the GRENE Arctic  
Climate Change Research Project (2011-2016)  
- “Rapid Change of the Arctic Climate System and its Global Influences” -

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The Arctic has become the hot topic not only just of a scientific aspect, but also of the society, due to abrupt retreat in summer sea ice area associated with global warming, rapid warming in surface air temperature, reduction of glaciers, melting permafrost and many other changes, recently. We have started a Japanese initiative "Arctic Climate Change Research Project" within the framework of the GRENE (Green Network of Excellence) Program funded by the Ministry of Education, Culture, Sports, Science and Technology, Japan (MEXT), in 2011. This Project targeted understanding and forecasting “Rapid Change of the Arctic Climate System and its Global Influences.” Four strategic research targets are set:

1. Understanding the mechanism of warming amplification in the Arctic,
2. Understanding the Arctic climate system for global climate and future change,
3. Evaluation of the impacts of Arctic change on weather and climate in Japan, marine ecosystems and fisheries,
4. Projection of sea ice distribution and Arctic sea routes.

As the network of universities and institutions in Japan, this 5-year Project involves more than 300 scientists from 39 institutions and universities. National Institute of Polar Research (NIPR) works as the core institute and

Japan Agency for Marine-Earth Science and Technology (JAMSTEC) joins as the supporting institute. There are 7 bottom up research themes on the atmosphere, terrestrial ecosystem, cryosphere, greenhouse gases, marine ecology and fisheries, sea ice and Arctic sea routes and climate modeling. The Project will realize multi-disciplinal study of Arctic region and connect to the projection of future Arctic and global climatic change by modeling.

4 years have already passed since the beginning of the project in 2011. During that time, pan Arctic observations have been carried out in many locations, such as Svalbard, Russian Siberia, Alaska, Canada, Greenland and the Arctic Ocean. In particular, cloud radar in high precision was established at Ny-Ålesund, Svalbard, and intensive atmospheric observations were carried out. In addition, the Arctic Ocean cruises by R/V "Mirai" and other icebreakers were conducted and also mooring buoy observations were carried out. The retrieved data were accumulated in the Arctic Data Archive (ADS) and served with interfaces for analysis. In addition, modeling study has been promoted from fundamental process model to general circulation model. Through these observations and analyses, new research results are originated.