

**Research
Background
and
Importance**

°Recently published literatures (Joughin et al., 2014; Rignot et al., 2014) reported that the melting of the ice sheet in West Antarctica is "unstoppable" and could raise global sea levels by as much as 4 feet (1.2 m) in the next century. To predict the global mean sea level rise precisely, uncertainties related to the rapid changes in the Cryosphere should be reduced by collecting high quality data through long-term observation.

David Glacier that locates about 100 km away from the Jang Bogo Korean Antarctic Research Station is the most imposing outlet glacier in Victoria Land, Antarctica, and the estimated moving speed is up to 700 m/year. Drygalski Ice Tongue that stretches from the glacier vividly interacts with the Ross Sea, and several subglacial lakes in the upstream of the glacier influence to a large extent to the flow of the glacier.

Such a unique ice-dynamic system would be a huge outdoor laboratory to investigate the Cryospheric evolution in Antarctica.

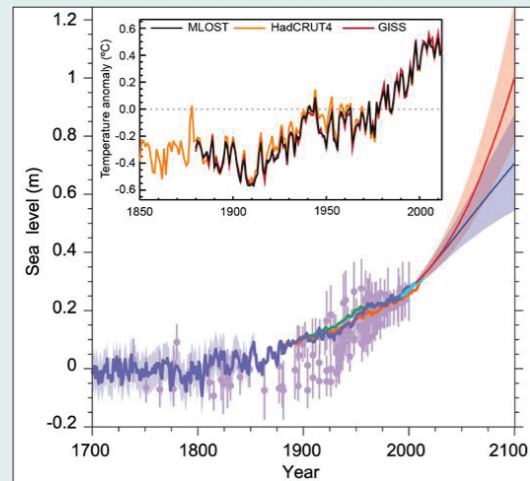


Figure 1. Compilation of paleo sealevel data (purple), tide gauge data (blue, red and green), altimeter data (light blue) and central estimates and likely ranges for projections of global mean sea level rise from the combination of CMIP5 and process-based models for RCP2.6 (blue) and RCP8.5 (red) scenarios.

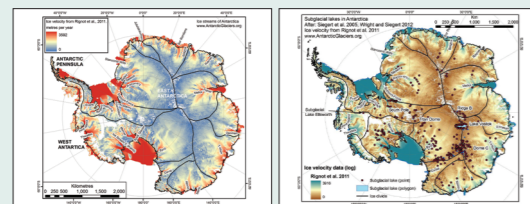


Figure 2. (Left) Ice velocity (Rignot et al., 2011), (Right) Subglacial lakes (Siebert et al., 2005; Wright and Siebert, 2012).

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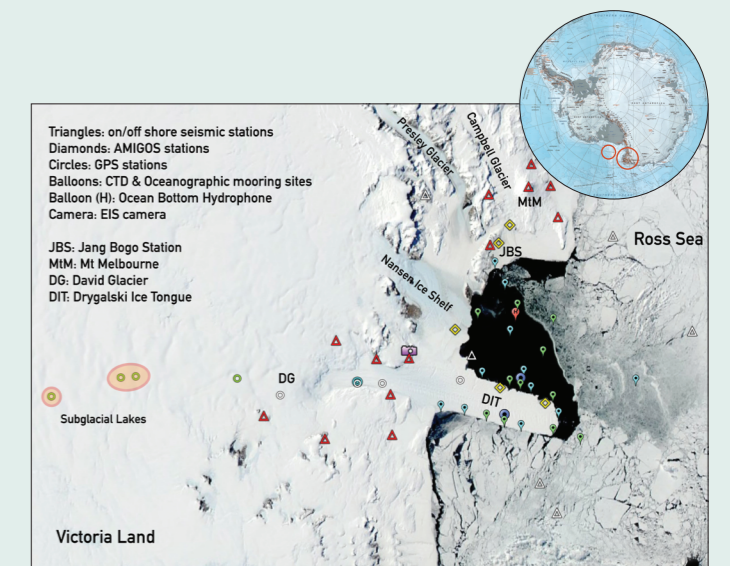


Investigating Cryospheric Evolution of the Victoria Land, Antarctica

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

Division of Polar Earth-System Sciences

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Partner Organizations	SNU/KMU/EWU/GeoLux/NOAA/AWI/NASA/NIWA/NYU/WHOI/SIO/NSIDC/EIS/GEUS
Research Duration	2014. 9 ~ 2018. 6 (Total: 46 months)
Research Area	Victoria Land-Ross Sea Region, Antarctica



EGGNet

Aim and Contents of research

° The ultimate goal of our research project is to understand physical interactions between subglacial lakes-glacier-ice tongue-ocean through an integrated cryosphere observation network (EGGNet) so that we could improve an ice dynamics model

° To acquire unprecedented long-term high quality observation data, we develop cold-rated telemetry systems consisting of seismic stations, GPS stations, AMIGOS, ADIOS, Ocean Bottom Seismographs, Autonomous Underwater Hydrophones, and EIS cameras through international collaboration

° Satellite remote sensing and field surveys including active source seismic survey, radar surveys, airborne geophysical survey, magnetotellurics survey are additional key components of our observation activities

° Investigation of seismic velocity and attenuation structures in the Earth, ice mass balance, basal melting, ice moving speed, subglacial hydrology, mapping subglacial topography, and physical oceanography near and beneath the ice tongue would elucidate the ice dynamics in the study region

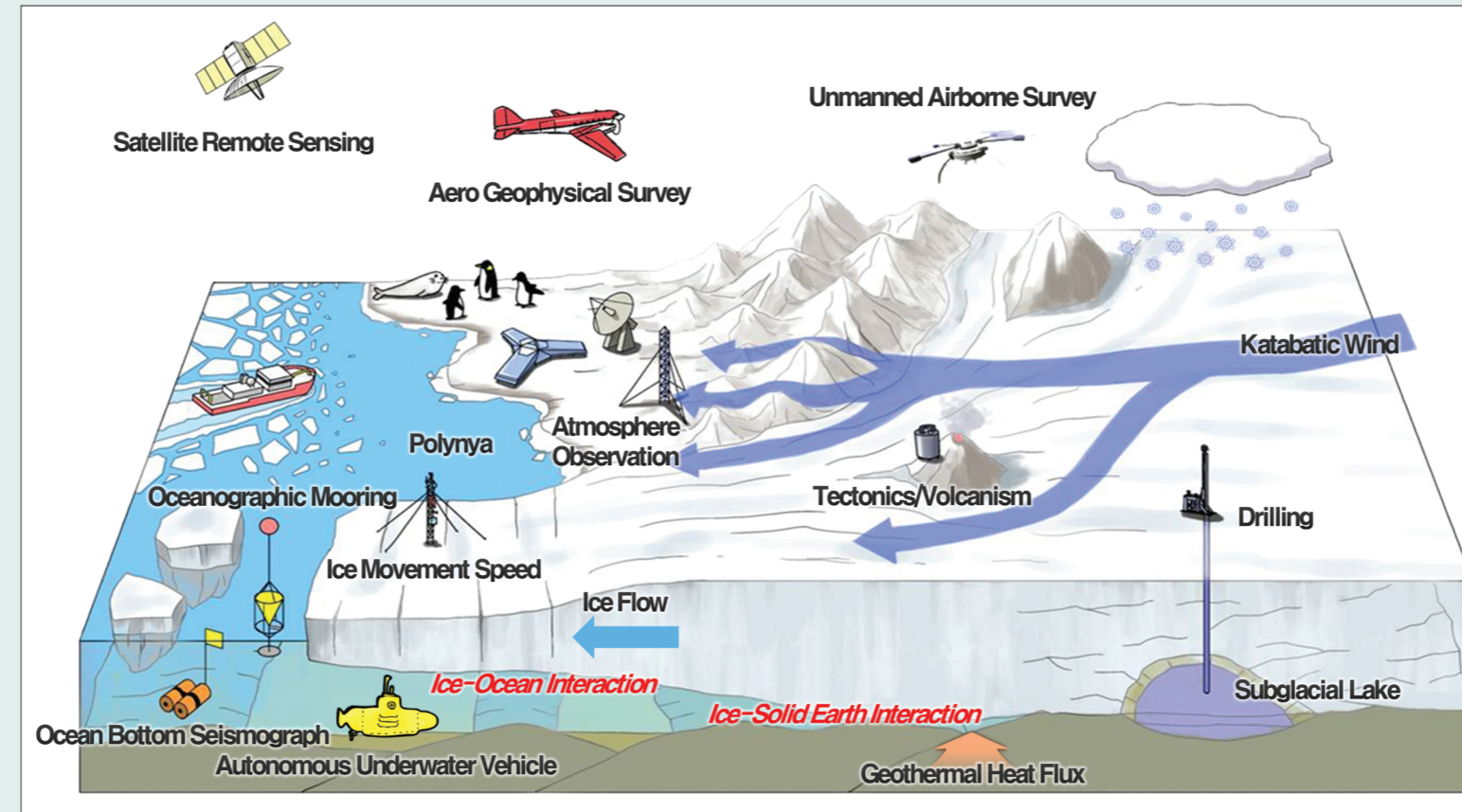
° Diagnostic and prognostic numerical simulation based on an ice-ocean coupled model using the long-term high quality observation data would give us a better understanding of global sea-level rise

Research method

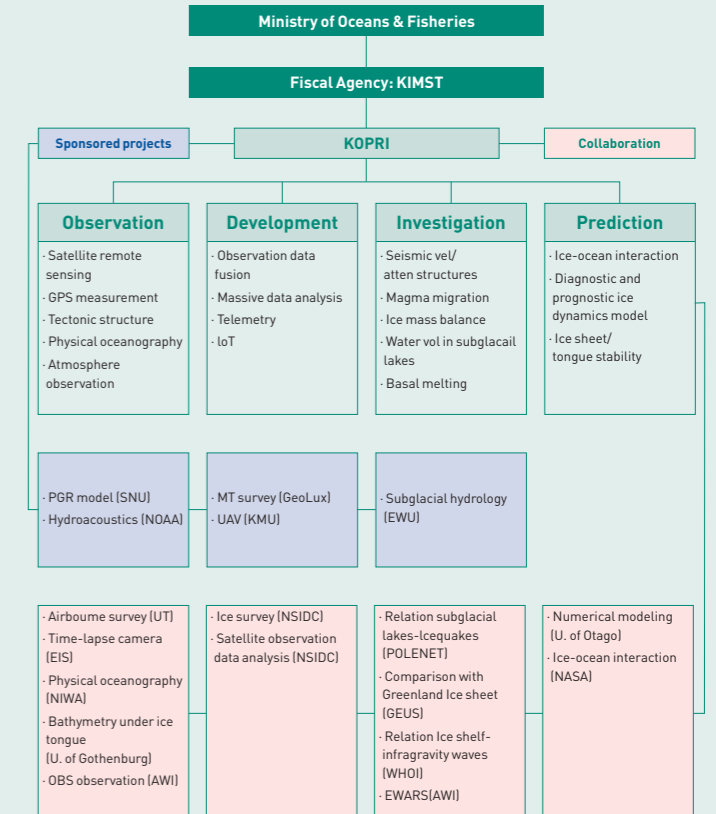
° The only research project at KOPRI taking advantage of the both mega infrastructure, IBRV ARAON and Jang Bogo Antarctic Research Station

° A multidisciplinary approach has applied to collect observation data

° To create strong collaborative relationships with academia and industry would be pivotal to attain the research goals



Understanding physical interactions between multi-spheres.



Instrumentation of EGGNet.

Challenges under extreme conditions.

Future Plans and Application

- ° Playing a leading role in polar scientific activities through intensive efforts to build long-term cryosphere monitoring network
- ° To validate ice sheet models by comparison against observations toward better diagnosis and prediction
- ° Contribution to developing polar technology on other related fields such as ice coring and geophysics in the Antarctic continent