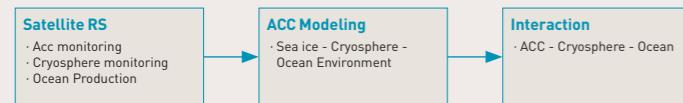


Aim and Contents of research

"Satellite remote sensing on west Antarctic ocean Research (STAR)" project was launched in 2014 and will continue until 2016.

In STAR project, west Antarctic Ocean is examined by RS with the numerical model of Antarctic Circumpolar Current (ACC) to understand the interaction between ACC and sea-ice. In addition, STAR project studies the relationship between sea-ice and ocean ecosystem (phytoplankton).

Research road map on the research period (2014-2016)

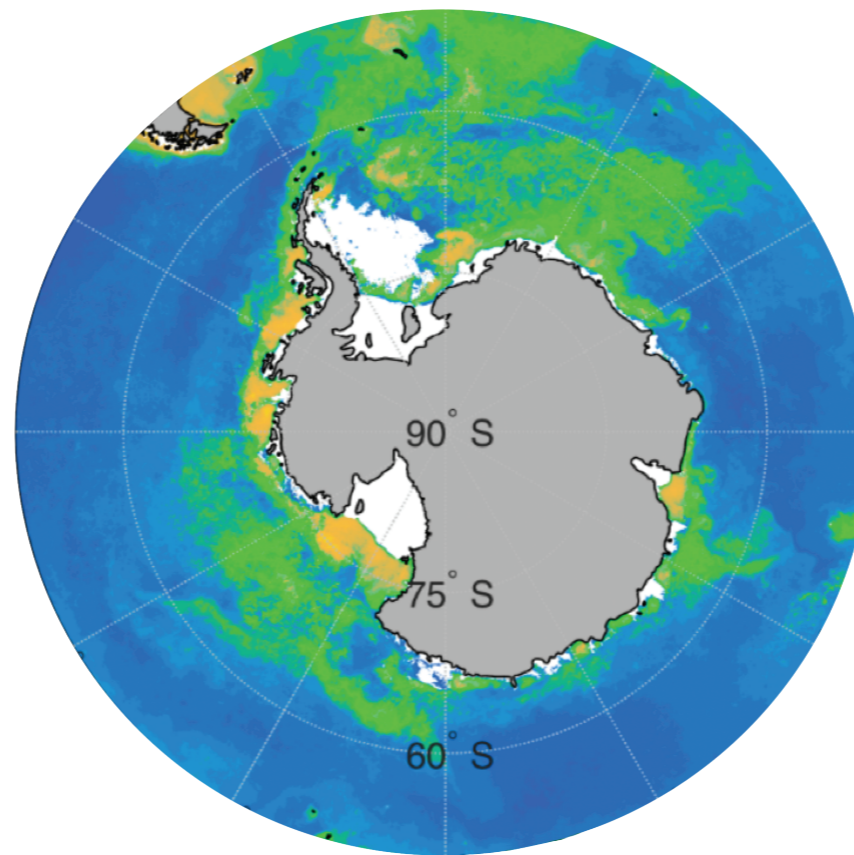
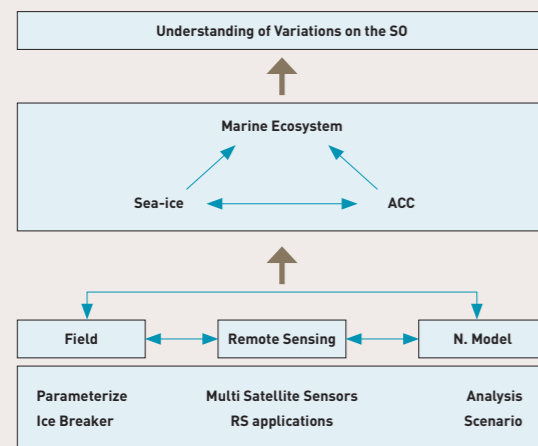


Research method

° STAR project includes the following research

- 1) ACC frontal features and sea-ice dynamics research by RS and numerical model.
- 2) RS ocean color-based primary production monitoring.
- 3) In situ observation of biogeochemical parameters such as pCO₂ and net community production and estimation of them using RS data.
- 4) RS algorithm assessment in high latitude region.
- 5) Development of application of RS for multi-discipline research on Polar region.

Structure of STAR project



SaTellite remote sensing on west Antarctic ocean Research (STAR)

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

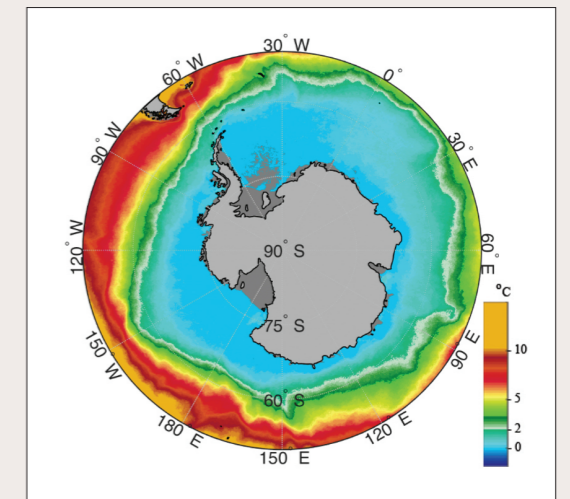
KOPRI Korea Polar Research Institute

26 Songdomirae-ro, Yeonsu-gu, Incheon, 406-840, Korea
Tel. +82-32-770-8400



Division of Polar Ocean Environment

Principle Investigator	Kim, Hyun-cheol
E-Mail	kimhc@kopri.re.kr
Partner Organizations	Louisiana State University, Pusan National University, UNIST, Pukyong National University
Research Duration	2014. 1 ~ 2016. 12 (total: 3yr)
Research Area	West Antarctic ocean including Antarctic Circumpolar Current (ACC)



Antarctic Ocean and Antarctic Circumpolar current (ACC)

Research Background and Importance

° The Antarctic Ocean has long been at issue due to its key role in regulating climate by sequestering atmospheric CO₂ via the solubility and biological pumps. However, severe weather conditions and an extensive iced area make it difficult to acquire in-situ data in the Antarctic Ocean.

° Superior spatio-temporal coverage satellite remote sensing (RS) have advanced our understanding of interaction between climate systems and their change.

° Polar environment provides an ideal experiential platform to monitor interactions among the systems not only because of dramatic temporal variation of biota but also because of rapid response of cryosphere to global warming.

Personnels



Hyun-cheol Kim

· Principal Investigator
· Satellite Remote Sensing



Doshik Hahm

· Chemical Oceanography



Jisoo Park

· Marine Biology



Tae Wan Kim

· Physical Oceanography



SangnHoon Hong

· Remote sensing



Junhwa Ji

· Remote sensing



Sunyoung Ha

· Marine Biogeochemical



Jinyoung Jung

· Aquatic Bioscience

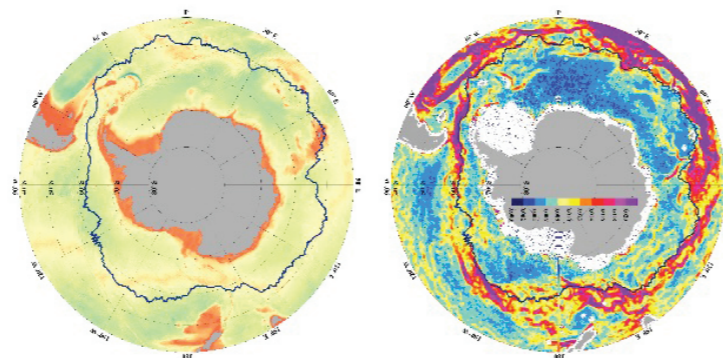
Organization of STAR



Overall Outcomes

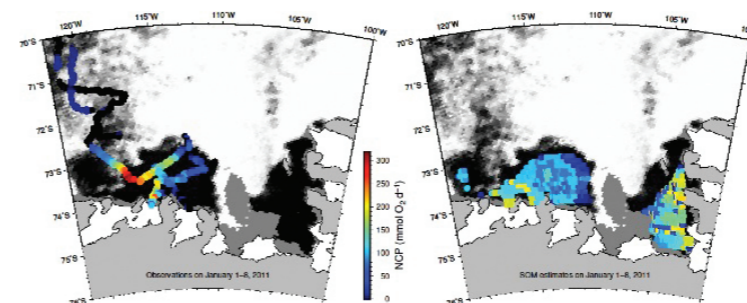
° **Development of the algorithm to map the Antarctic polar front.**

- Identify the location of Antarctic polar front from the satellite sea surface temperature measurements (Left)
- Identify the temporal and spatial distribution of Antarctic polar front (Right)



° **NCP estimation by using merged data of In situ and RS**

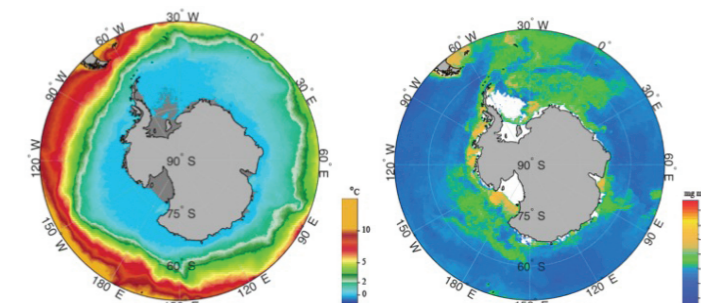
- In-situ observation in the Amudsen Polynya (Left)
- NCP estimation using satellite data (SST, SSS, MLD) (Right)



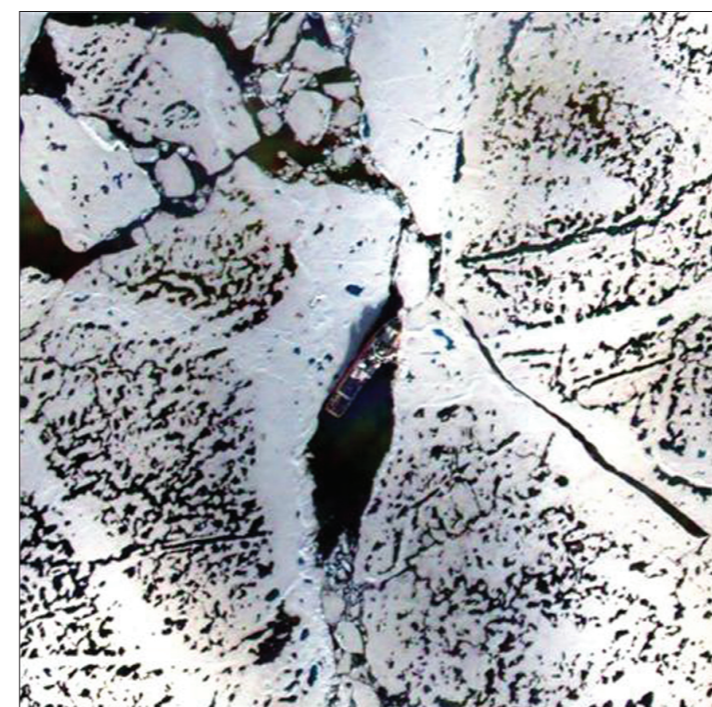
NCP: Net Community Production, SST: Sea Surface Temperature, SSS: Sea Surface Salinity, MLD: Mixed Layer Depth, RS: Remote Sensing, ACC: Antarctic Circumpolar Current

° **Southern Ocean (SO) Satellite Observing, MODIS (2001-2014)**

- Satellite retrieved SST gradient along ACC (Left)
- Satellite retrieved OC (phytoplankton) distribution on Southern Ocean (Right)

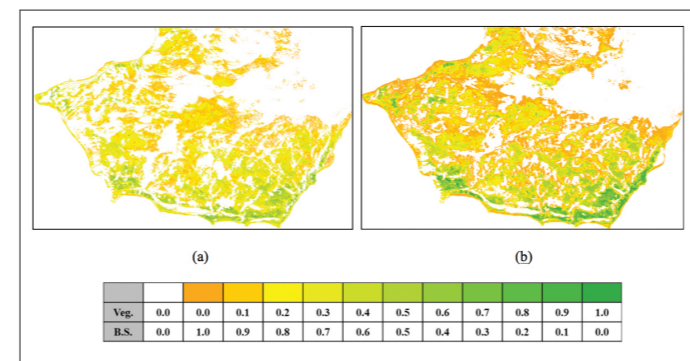


° **Sea-ice Simultaneous Observing by Ice Breaker Araon (KOPRI) and satellite Komsat-3 (KARI)**



° **Research publication: "Vegetation abundance on the Barton Peninsula, Antarctica: estimation from high-resolution satellite images", Polar biology, 37(11), 1579-1588, 2014**

- Vegetation distribution analysis by high resolution satellite data of Komsat-2 (14 Feb. 2012) and QuickBird (6 Dec. 2006)



Future Plans and Application

- ° **Improve our understanding of climate on the remote earth**
 - understand of cryosphere on the ocean
 - development an international program on the southern ocean
- ° **Development of applicable remote sensing technique**
 - effective interdisciplinary research
- ° **Effective response to the rapid climate change**
 - sustainable earth and better human life
- ° **Korea-led satellite remote sensing for the remote earth**
 - development of satellite for polar monitoring

Research Road map for next 10 years

