



Japan's Update to FARO for 2022 on Arctic Science Activities

Takuji Nakamura

National Institute of Polar Research

Research Organization of Information and Systems

Japan

Arctic Challenge for Sustainability II



Project Goal

"Towards the realization of a sustainable society, we promote advanced research to understand the current status and process of environmental changes in the Arctic and to improve meteorological and climate prediction in order to assess the impact of rapid environmental changes in the Arctic on human society, including Japan, as well as to implement the results of this research into society. We also provide domestic and international stakeholders with our scientific knowledge that will be a basis for legal and policy for the formation of international rules in the Arctic."

Promoting advanced and interdisciplinary research on the Arctic, aiming social implement of its results.

4 Strategic Goals

2 Priority Subjects



**Researchers:
About 220**

Research
Infrastructures

International
Collaboration Site

Research Vessel

Earth Observation
Satellite Data

Arctic Data archive System

Research Infrastructures

Research Vessel



Oceanographic research vessel, the Mirai
©JAMSTEC

Earth Observation Satellite Data



Arctic Data archive System



International Collaboration Sites

Number of users

329 person-day



Norway
Ny-Ålesund NIPR
Observatory

7 person-day



Denmark / Greenland
GINR Greenland
Institute of Natural
Resources

183 person-day



Denmark / Greenland
Qaanaaq Siorpaluk
Research Base

40 person-day



Norway
UNIS
University Centre in Svalbard



Canada
Centre d'études
Nordiques



Canada
CHARS Canadian High
Arctic Research Station



Finland
Pallas-Sodankylä Global
Atmosphere Watch (GAW)
station



Russia
Ice Base Cape Baranova

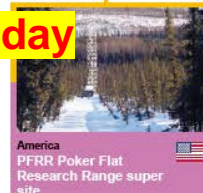


Russia
Spasskaya Pad Scientific
Forest Station

11 person-day



America
IARC International Arctic
Research Center, University
of Alaska Fairbanks

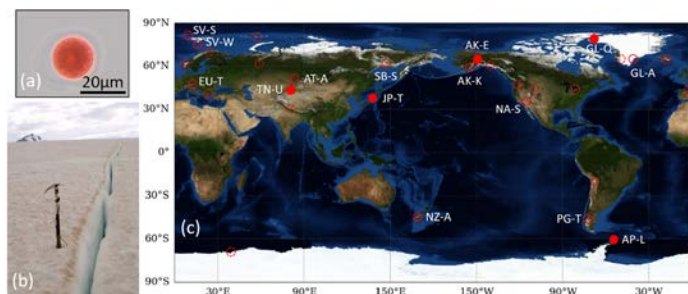


America
PFRR Poker Flat
Research Range super
site



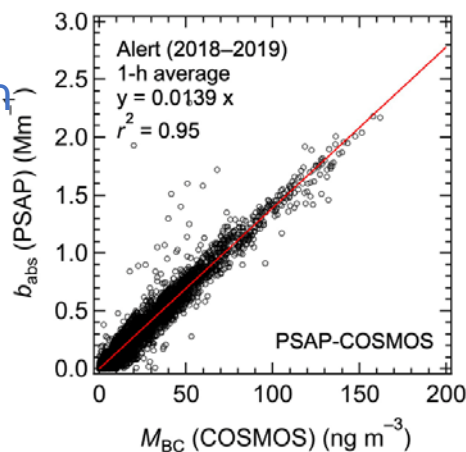
Research Results

Global simulation of snow algal blooming by coupling a land surface and newly developed snow algae models



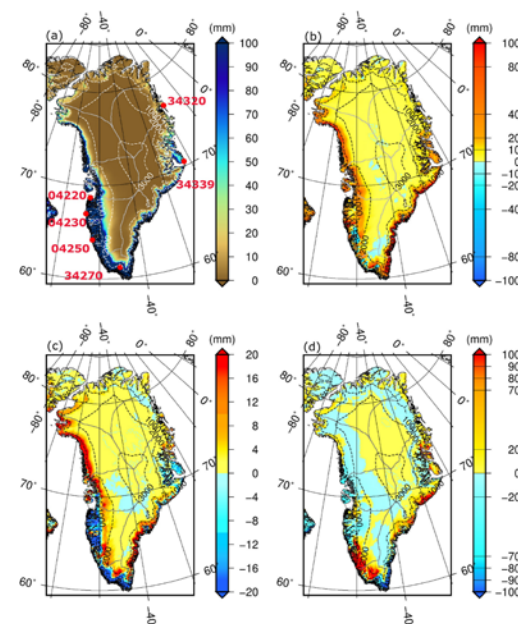
Y. Onuma, K. Yoshimura, N. Takeuchi
Journal of Geophysical Research: Biogeosciences at DOI: 10.1029/2021JG006339.
 6 January 2022
<https://www.iis.u-tokyo.ac.jp/en/news/3764/>

Estimates of mass absorption cross sections of black carbon for filter-based absorption photometers in the Arctic



Sho Ohata, et al.
Atmospheric Measurement Techniques
 20 October 2021
<https://amt.copernicus.org/articles/14/6723/2021/>

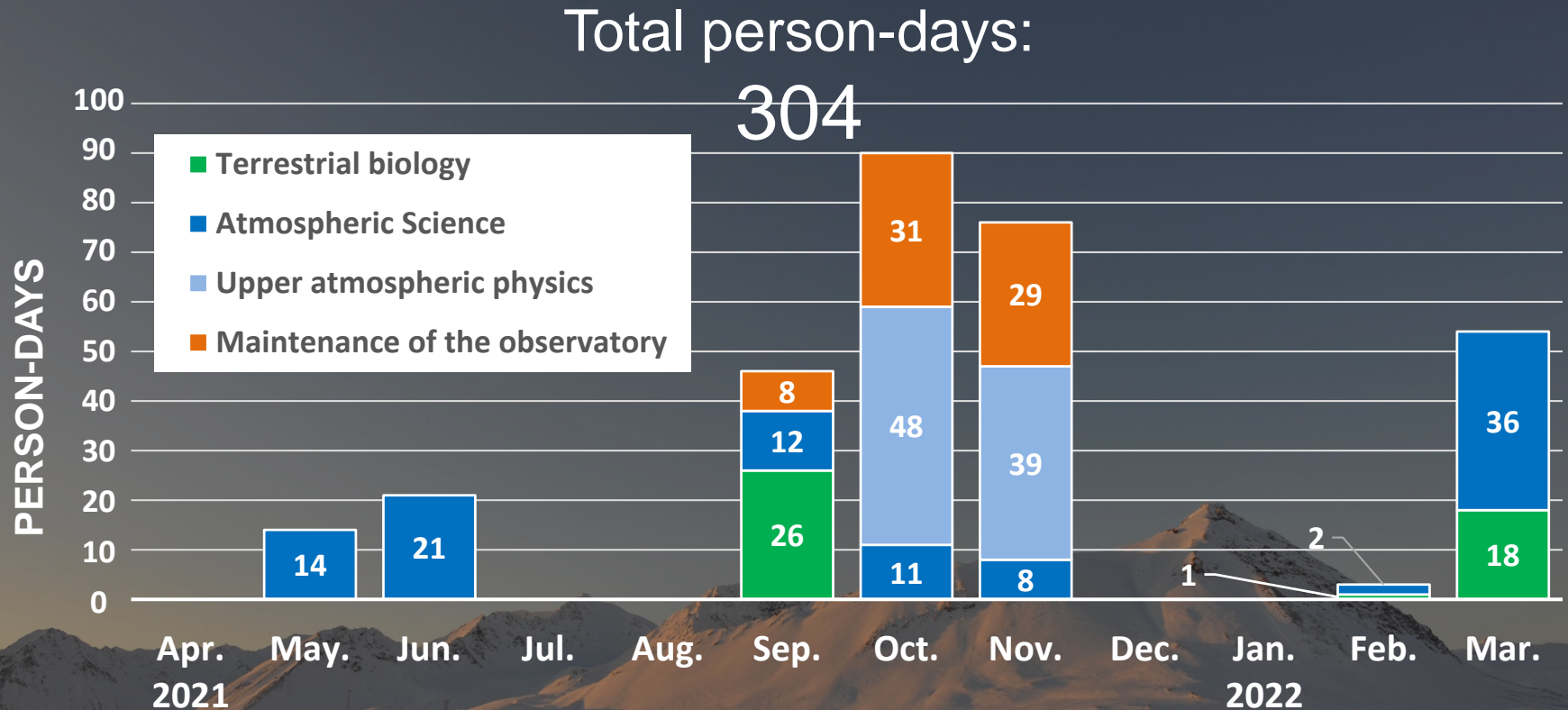
Rainfall on the Greenland ice sheet: present-day climatology from a high-resolution non-hydrostatic polar regional climate model



M. Niwano, et al.
Geophysical Research Letters
 DOI : 10.1029/2021GL092942
 August 2021
<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GL092942>

Ny-Ålesund Visit under COVID-19 situation

Researchers and technical staff successfully visited Ny-Ålesund, supported by the Norwegian Polar Institute.



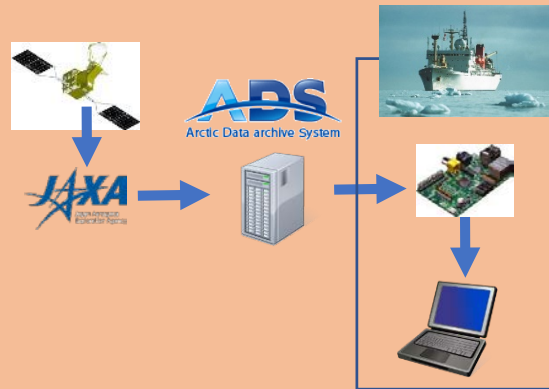


NiPR
National Institute of Polar Research

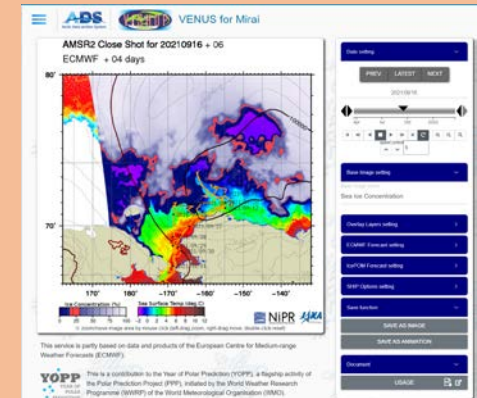


<https://ads.nipr.ac.jp/>

VENUS (VEssel Navigator by Unitized System)



The vessel navigation support system for sea ice area



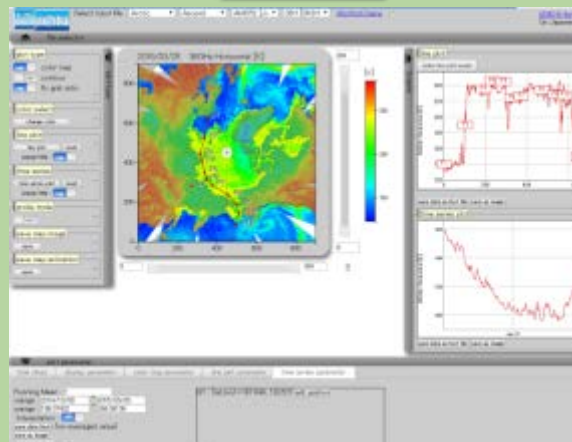
Navigational support chart for R/V Mirai Arctic cruise

極KIWA



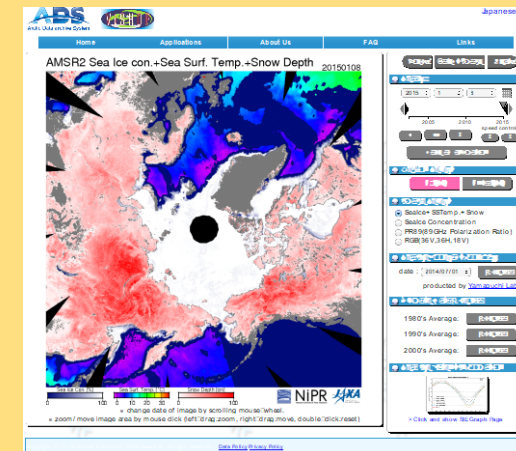
Research data registration system and Metadata search service.
Registered more than 250 datasets

VISION



Online visualization application for Climate, Satellite and Simulation data

VISHOP

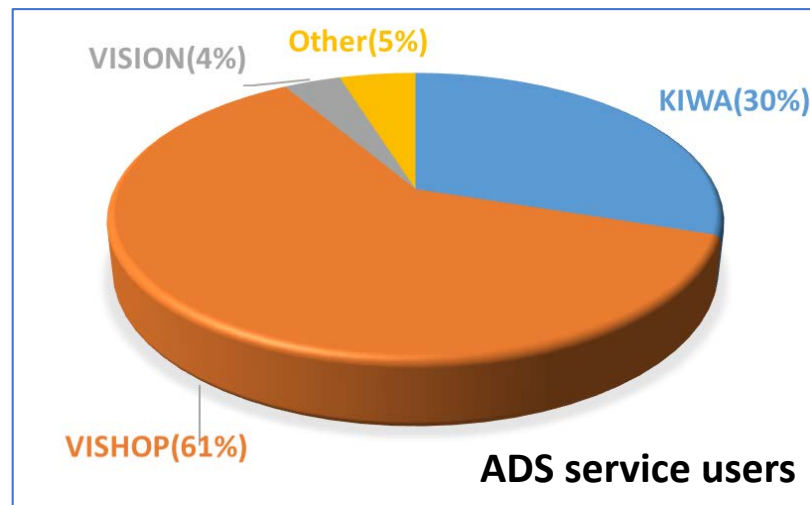
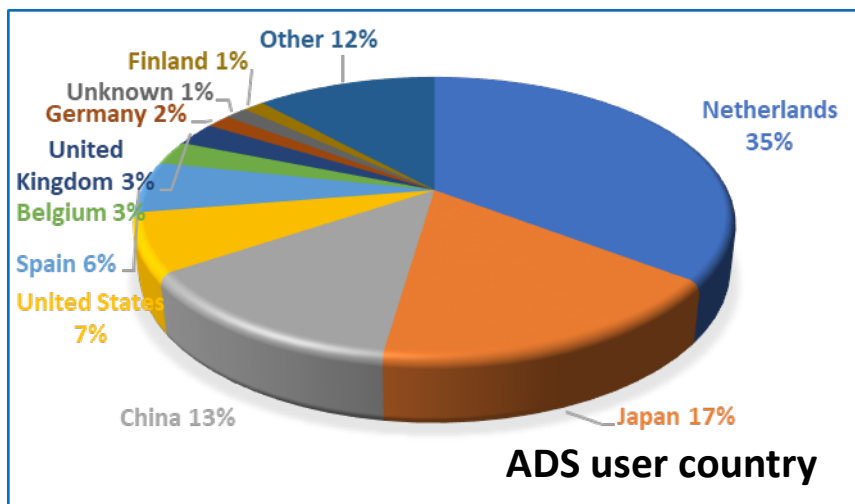


Semi-real-time polar environ. obs. Monitor and Sea Ice prediction

■ Access Analysis of ADS Page View number

FY2016	2.25 Million
FY2017	2.62 Million
FY2018	3.00 Million
FY2019	3.85 Million
FY2020	4.20 Million

- Approximately 80% of users are international (Netherlands, USA, UK, Spain, etc.).
- VISHOP is used by 61% users, followed by KIWA with 30% users.



■ Registration number

International Collaborative Research (Registration number of arDirectory)	325
Data Publication (Registration number of data to ADS KIWA)	Metadata : 1005 Real Data : 523
Number of Data DOIs assigned	72

- ADS lectures are effective to increase data registration
- KIWA users are increasing mainly due to DOI's.

EISCAT (European Incoherent SCATter)

The EISCAT Scientific Association is an international research organization operating the world's largest-class incoherent scatter radar system to undertake **cutting edge sciences for atmospheric, ionospheric and geospace studies, space weather and global change.**

Affiliated in the Association in 1996, Japan has jointly contributed to the operation and sciences with the EISCAT radars in collaboration with member countries.

Japan has contributed to the construction of EISCAT Svalbard radar



Associates:



1996~

2007~

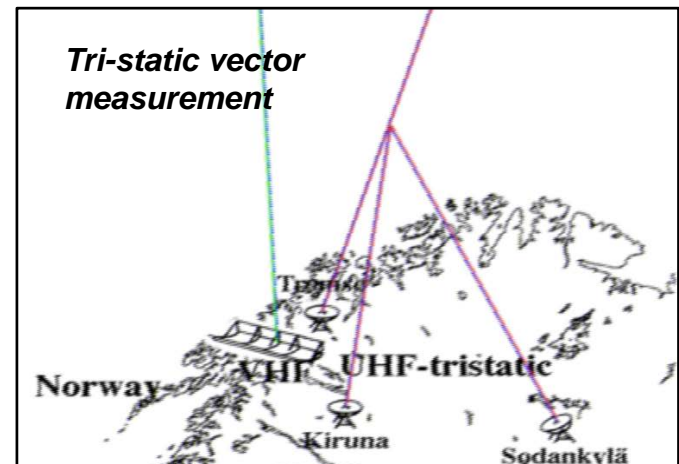
Affiliates:



2016~

2020~

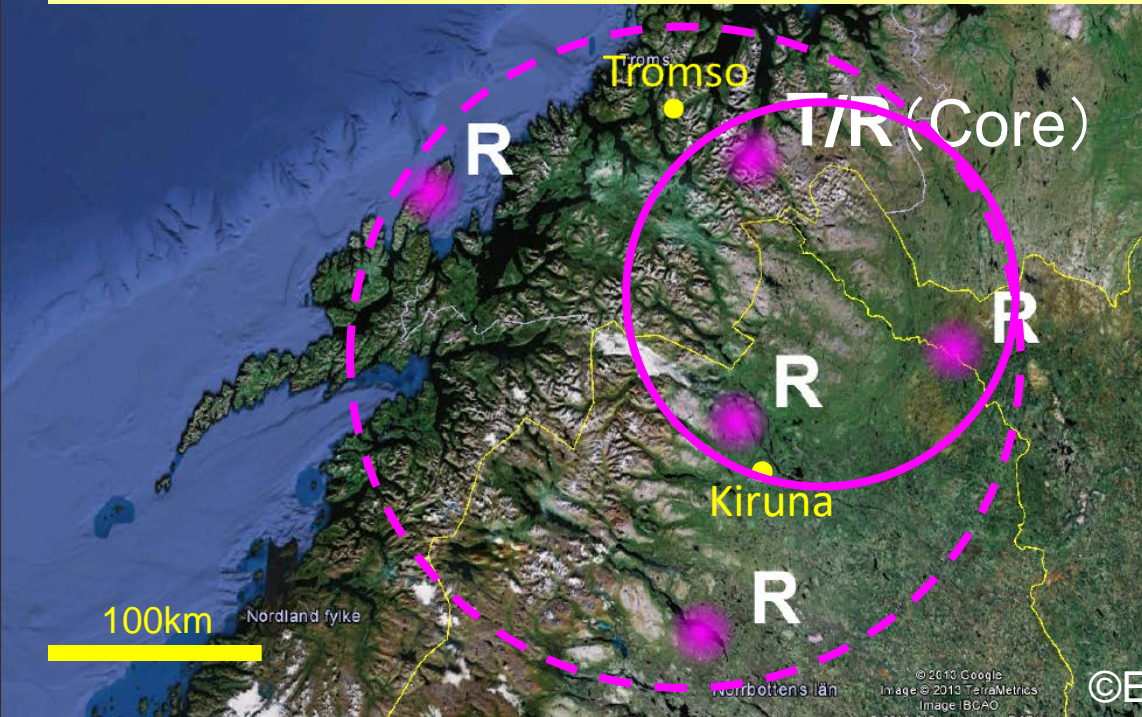
2020~



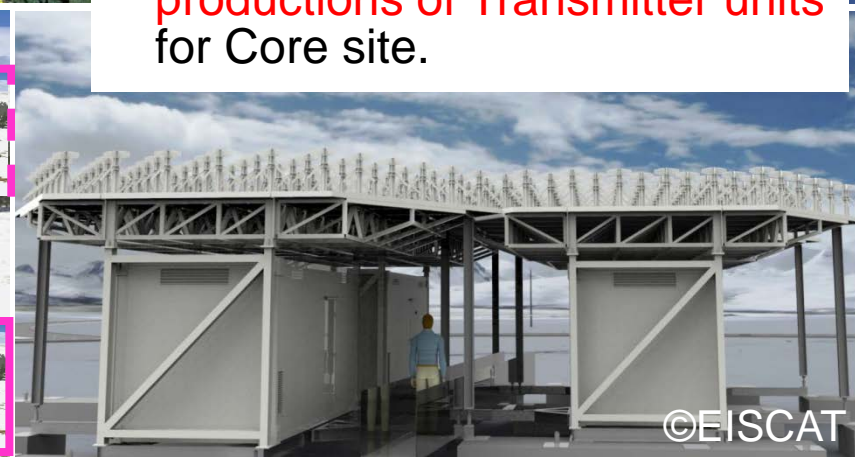
KST UHF radars



EISCAT 3D is the major upgrade of the existing EISCAT mainland radars, with **a multi-static phased array system** composed of **one central** active (transmit-receive) site and **4 receive-only** sites to provide us 50-100 times higher temporal resolution than the present system.



- The construction of the 1st stage of EISCAT_3D has been underway to be completed by the end of 2022, 1-year delay due to COVID-19.
- Since 2014 NIPR has been contributed to develop energy-efficient High Power Amplifier units for EISCAT3D-PfP, which has been transferred to a test sub-array system for EISCAT_3D.
- Since 2018 NIPR has been in-cash contributing to mass-productions of Transmitter units for Core site.



Budget for 2021

Arctic Research Program of MEXT

➤ Construction process for a new Arctic Research Vessel

3552 MJPY (27 MEUR for 2022)

Scheduled to be completed and in service in 2026



➤ Arctic Challenge for Sustainability II (ArCS II)

1005MJPY (7.6 MEUR for 2022)

5-year program until 2025

