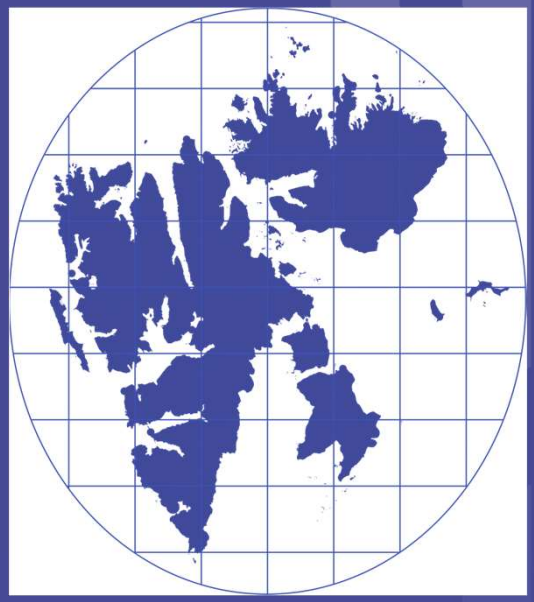
Svalbard Integrated Arctic Earth Observing System

A cooperative international research infrastructure for Arctic Earth System Science (ESS)



Shridhar D. Jawak

Remote Sensing Officer

Copernicus Relays

SIOS
SVALBARD INTEGRATED ARCTIC EARTH OBSERVING SYSTEM

ESA Arktalas Hoaava Workshop-2022

SIOS
SVALBARD INTEGRATED ARCTIC EARTH OBSERVING SYSTEM

Svalbard Integrated Arctic Earth Observing System

An international research infrastructure for Arctic Earth System Science (ESS)

Vision

We will be the leading long-term observing system in the Arctic to serve Earth system science and society

SIOS
SVALBARD INTEGRATED ARCTIC EARTH OBSERVING SYSTEM

Mission

An international partnership of researchers studying the environment and climate in and around Svalbard to

- Develop an efficient observing system
- Share technology, experience and data
- Close knowledge gaps
- Decrease the environmental footprint of science

www.sios-svalbard.org

SIOS – a Norwegian initiated international collaboration to create a regional observing system

The Observing System

- A cooperating international research infrastructure for improved knowledge of environmental and climate change in the Arctic
- Focus to answer Earth System Science questions
- Systematic long term observations – stable over time, yet dynamic as new questions from society arise
- Minimizing environmental footprint, optimizing measurements and resources, new technologies, remote sensing, integration of data
- Open, free and harmonized data
- **Improving research conditions** for scientists working in ESS

The regional scope

- The Norwegian archipelago Svalbard and surrounding waters

SIOS

ESS = Earth System Science

www.sios-svalbard.org

The Svalbard Integrated Arctic Earth Observing System

- **A consortium** of institutions with research infrastructure in & around Svalbard

Independent organisation
28 institutions from 10 countries

- **An observing system** for Earth System Science (ESS)

Focus on processes,
eg. environmental and climate change

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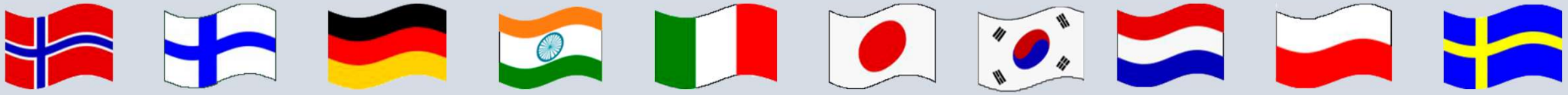
Cooperation of international institutions



ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

National Research Council of Italy

UNIVERSITY OF BERGEN

Institute of Geophysics
Polish Academy of Sciences

UiO : University of Oslo

Akvaplan niva

university of groningen

NiPR
National Institute of Polar Research

POLARFORSKNINGS SEKRETARIATET
SWEDISH POLAR RESEARCH SECRETARIAT

INAR

NERSC

NINA
Norwegian Institute for Nature Research

Norwegian Meteorological Institute

NORCE

Andøya Space

NIVA
Norsk institutt for vannforskning

NORWEGIAN POLAR INSTITUTE

UNIVERSITY OF SILESIA IN KATOWICE

INSTITUTE OF MARINE RESEARCH

UNIS

GEOLOGICAL SURVEY OF NORWAY
- NGU -

NILU

NTNU

UNIVERSITY OF TROMSØ
UiT / THE ARCTIC UNIVERSITY OF NORWAY

NVE

NCPOR

KOPRI
Korea Polar Research Institute

NORSAR

SIOS

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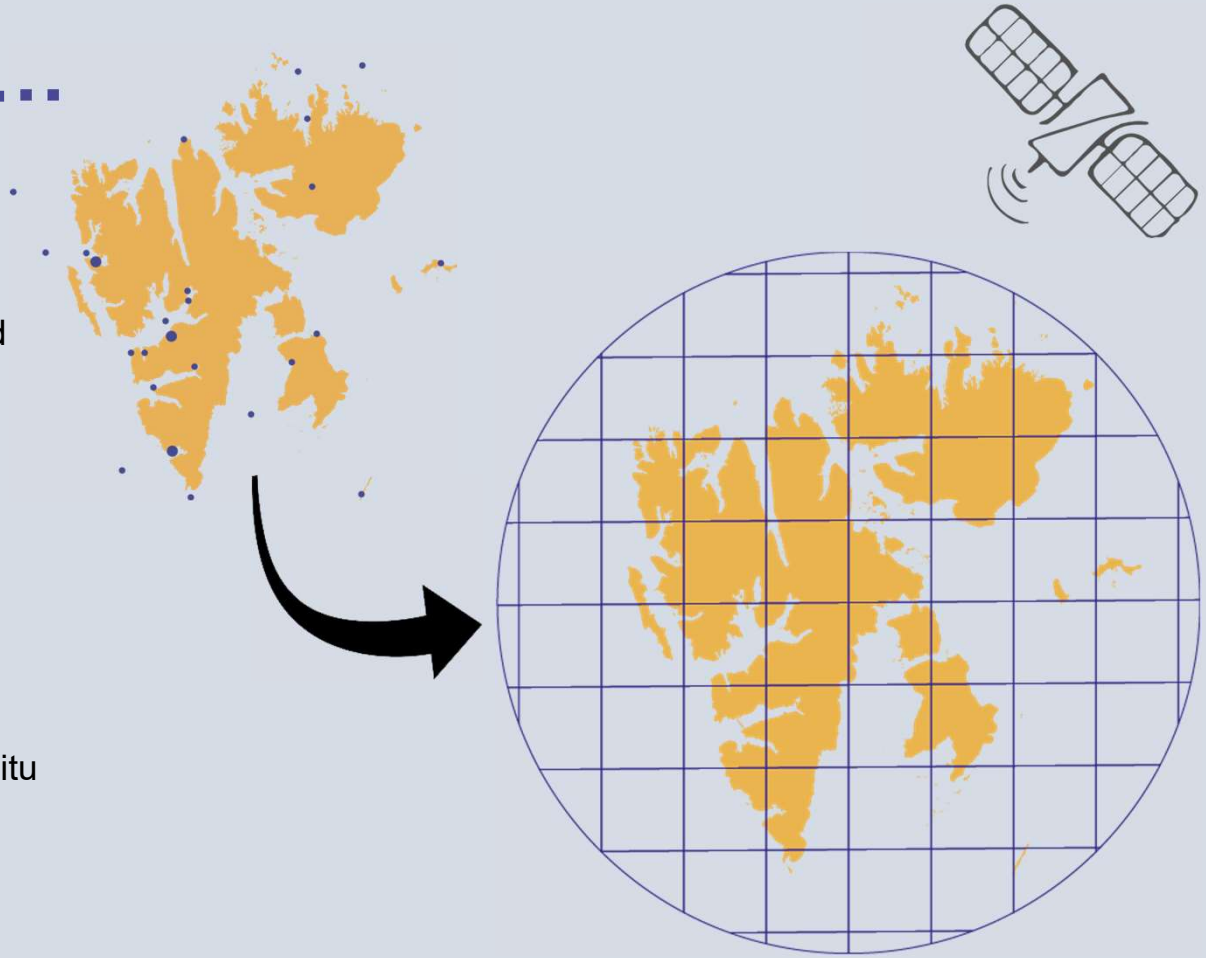
SIOS works towards …

- **Integration** of new & existing infrastructure and data
- A network of **systematic observations**
- **Better temporal and spatial coverage** of key observational data
- Reliable access to **long-term** monitoring data
- **Improved integration** of space-based and in-situ observations
- **Improving research conditions** for scientists working in ESS



SIOS

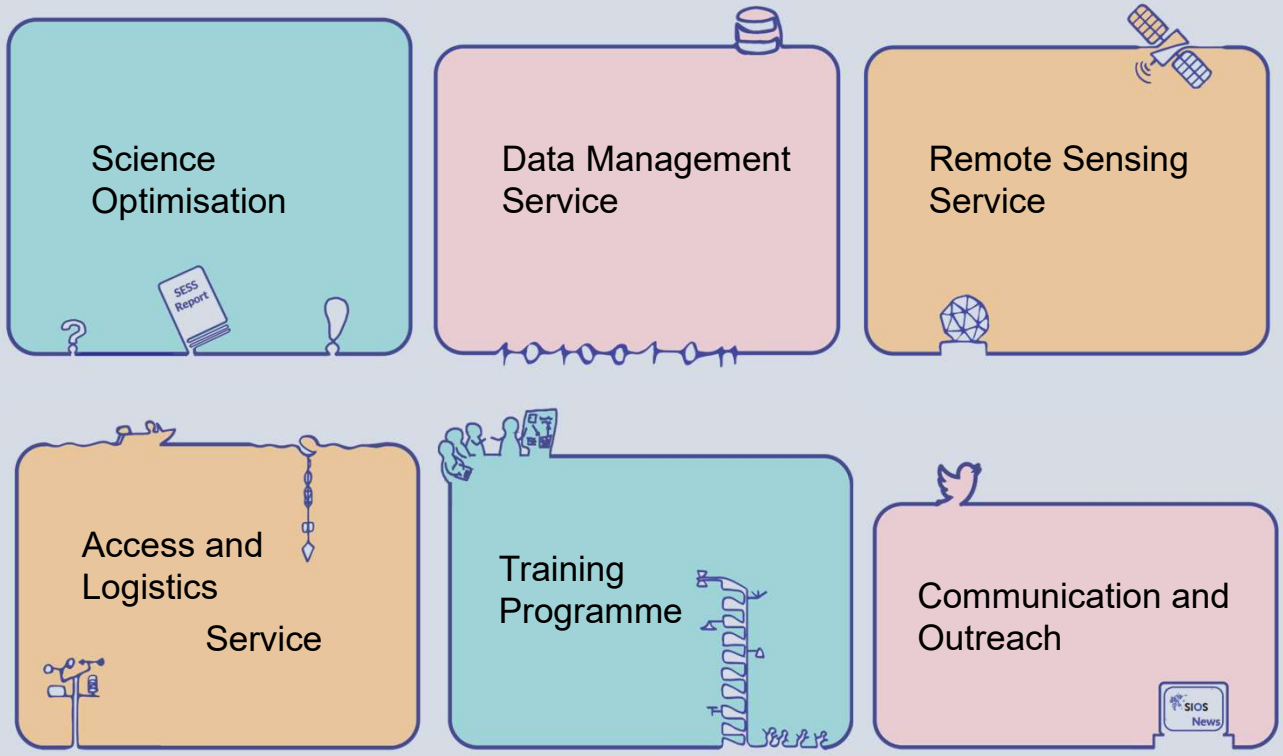
ESS = Earth System Science

www.sios-svalbard.org

SIOS plays an **active role**
in the landscape of European
environmental research infrastructures
and EU Polar Cluster activities

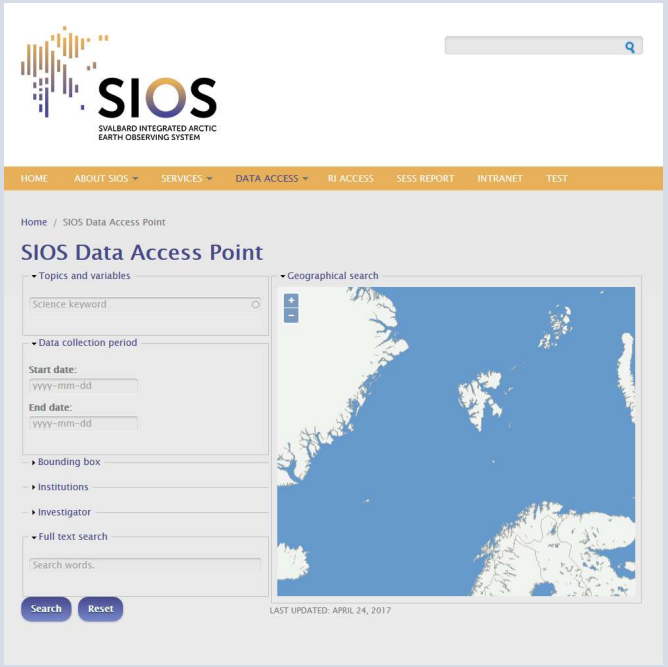
SIOS Knowledge Centre (SIOS-KC)

- The hub of SIOS
- Maintains and coordinates all services
- Administrates working groups
- Located in Longyearbyen
- Staff of 6 + associated members
- Reports to the SIOS consortium
- Funded through 2025 by the Research Council of Norway



Data Management Service

- **Main principles**
  - Open and free data sharing (FAIR* data!)
  - Distributed data centres
  - International standards
- **Harmonisation** of the data
- **Cross-disciplinary combinations** of data and products



www.sios-svalbard.org/metadata_search

- Discovery
- Retrieval
- Visualisation
- Transformation

* Findable, Accessible, Interoperable, Resuable

Access and Logistics Service

- Regular **calls** connected to the strategic goals of SIOS
- **Observation facilities catalogue**
- **Coordination** of logistical activities and sharing of resources
- **Special offers** for SIOS members
- Logistics **Sharing Notice Board**

Training Programme

- Target groups: **Scientists, research technicians** and students
- **Portfolio of courses** - related to infrastructure within the SIOS observatory
  - Data management
  - Annual Remote Sensing training courses
  - Others, e.g. metrology

Communication and Outreach

#SIOS

- SIOS web portal **www.sios-svalbard.org**
- Social media
- Information and outreach material

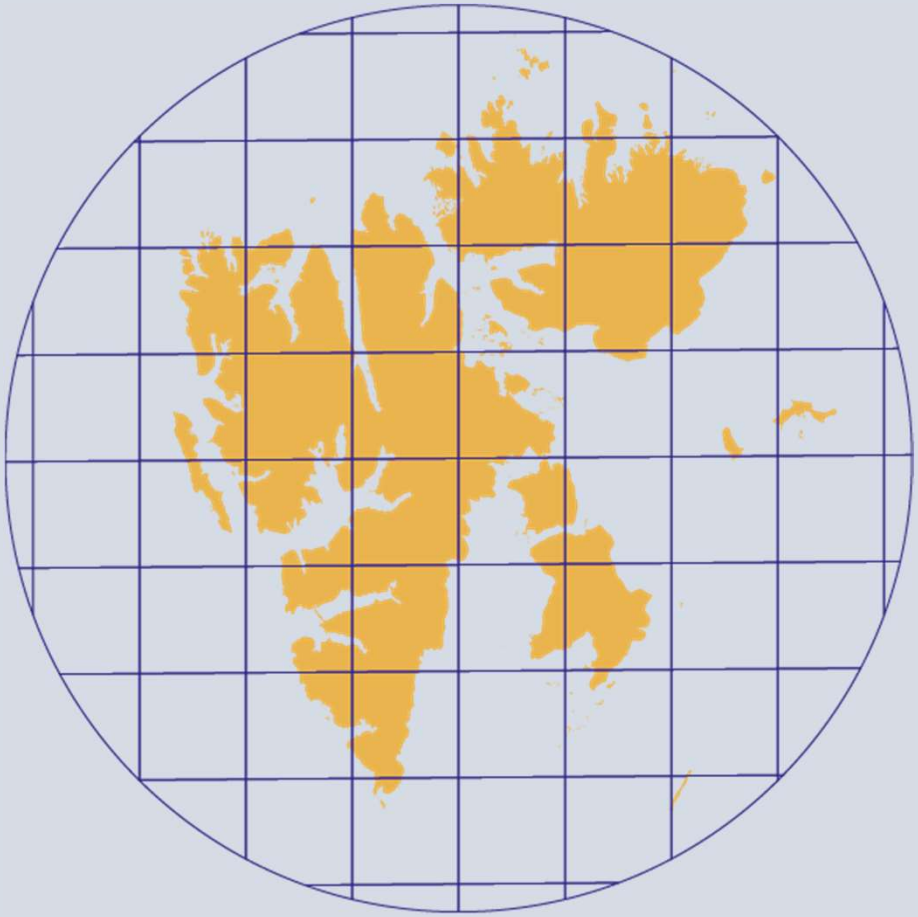
@SIOS_KC

SIOSKnowledgeCentre

Company/sios-svalbard

Science Optimisation

- Common goals – **core data**
- **Optimisation report**
- **Polar Night Week**
- **The SESS report**



Annual State of Environmental Science in Svalbard report

The concept

- **Integrating datasets** over entire Svalbard and connecting measured parameters across several spheres
- Highlighting **research needs** and **recommendations** on how to address them
- Open sharing of **ideas**!

new datasets

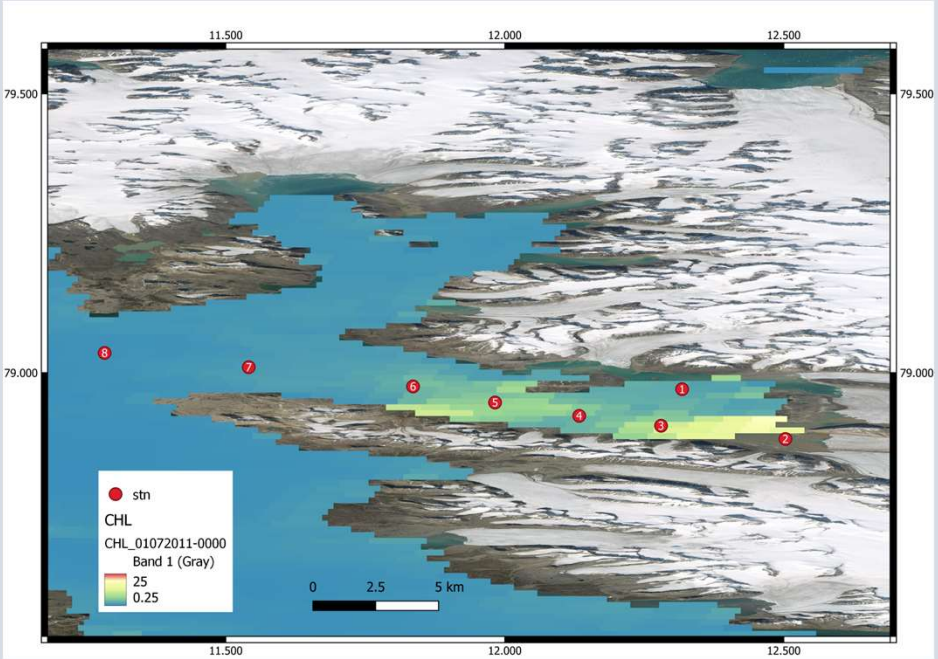
new research infrastructure

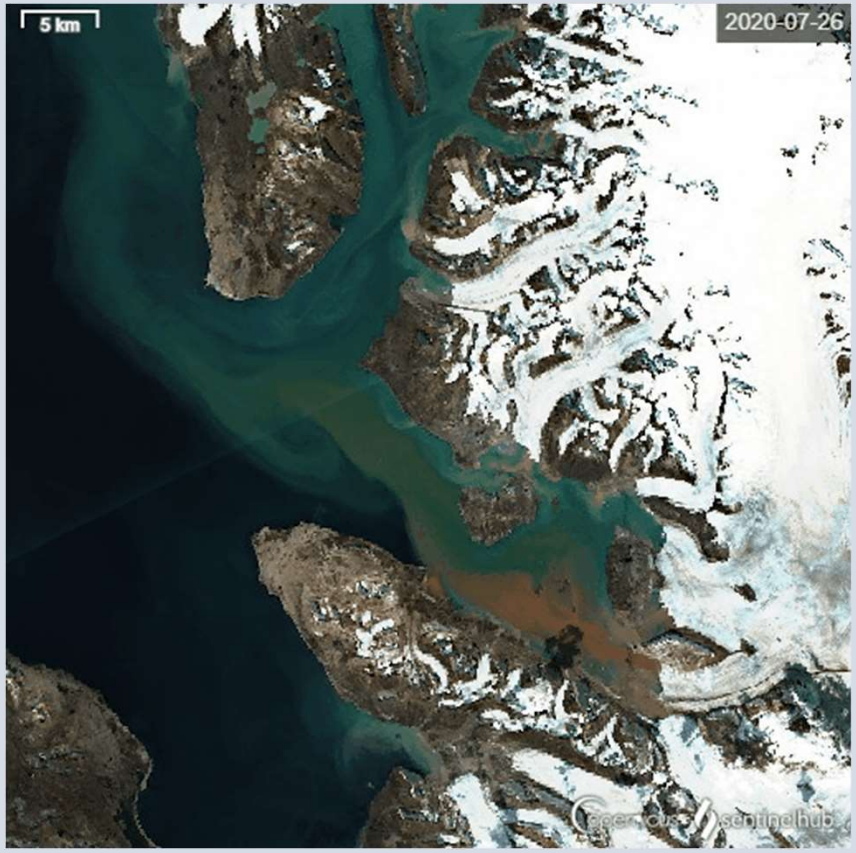
increased international cooperation

Remote Sensing Service

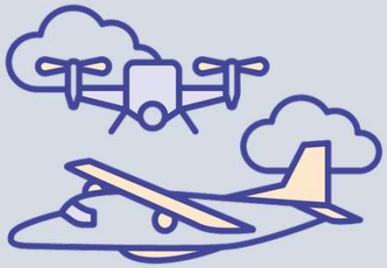
- **Single point of contact** for satellite information for Svalbard
- Information about **opportunities** and on **how to use** satellite data
- Streamlined **access to EC Copernicus** programme satellite data for Svalbard
- Working together with product users and providers **to improve the usability** of satellite data
- Providing **tools** for satelitte data users
- Prioritized **geospatial product** generation

Integration and Cal/Val





Airborne Remote Sensing Campaigns



Sensors

- RGB camera and hyperspectral imager installed on Dornier aircraft stationed in Longyearbyen
- High resolution georeferenced images

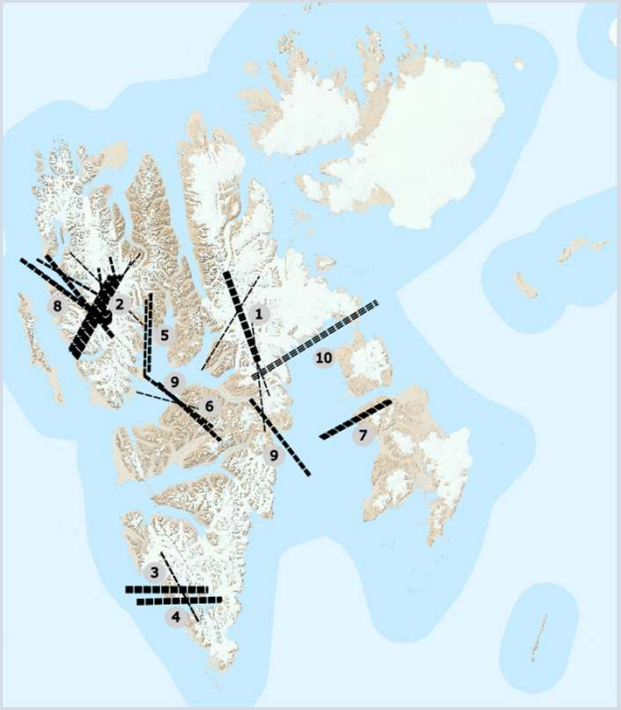
Opportunities

- First call in 2020 resulted in 25 flight hours for 10 projects
- Second call in 2021 resulted in 25 flight hours for 11 projects

Data will be available eventually through SIOS Data Access Point

Airborne Remote Sensing Campaigns in Svalbard

Campaigns 2020



10 projects, 25 flight hours

Campaigns 2021

11 projects, 25 flight hours

SIOS

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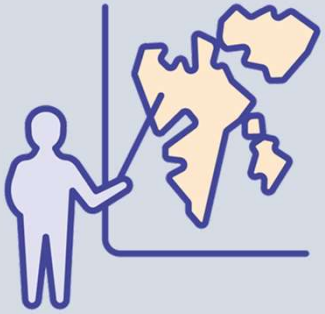
SIOS Training courses



2017: Training workshop on Copernicus Satellite

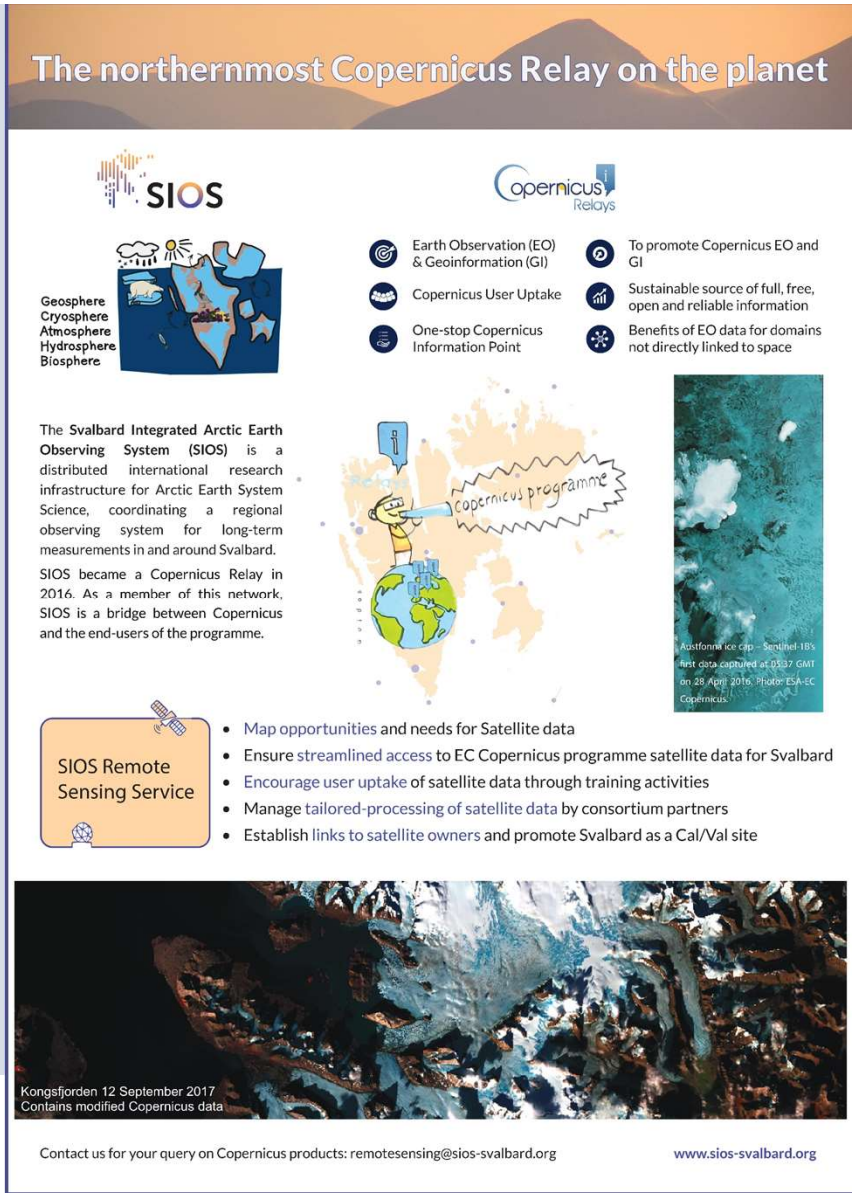
2018: ESA Advanced Cryosphere Training

2019: Marine Remote Sensing Training Course

2020: Terrestrial Remote Sensing Training Course

2021: Hyperspectral Remote Sensing Training Course

SIOS



SIOS Hyperspectral Remote Sensing Training Course -2021

15 teachers
80 applications
35 selected participants

- **17 PhD Students**
- **04 Masters/Bachelors Students**
- **06 Researchers**
- **06 Postdocs**
- **01 Educator**
- **01 Industry**

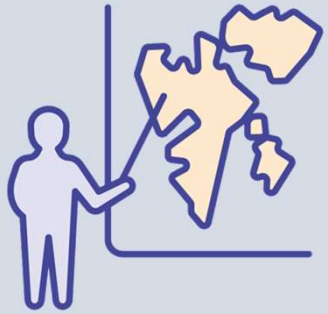
25 institutions from 11 nations

292 lecture series participants

10 mini projects

Manuscript: Potential of hyperspectral sensors in Svalbard (under prep)

#AI4Svalbard



SIOS Webinar series

An anchor point to a drifting world!

Why?

Cancelled field campaigns
Cancelled conferences
To provide a social experience to the Svalbard research community in difficult times

13 Webinars
2 Online conferences
2 Online training courses
4 Panel discussions

SIOS

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First SIOS Online Conference

Earth Observation, Remote Sensing and Geoinformation applications in Svalbard

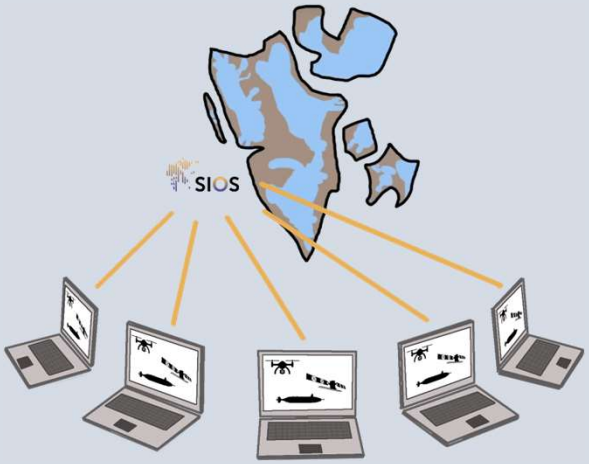
4-5 June 2020

Why?

- to promote the PhD students, postdocs, researchers, and academicians to contribute in the **SIOS's special issue on EO/RS/GI.**
- to review the state-of-the-art EO/RS/GI applications in Svalbard and;
- to provide social experience to the Svalbard scientific community

Awards for Early Career Researchers:

Top 5 papers presented by ECRs (Masters, PhD, postdocs, within 7 years after PhD)



Quick facts

- More than 350 registered participants
- 37 submitted abstracts
- More than 50 talks
- Presenters from ≈ 24 institutions in 12 countries

SIOS

More information: https://sios-svalbard.org/SIOS_RS_OnlineConference2020

www.sios-svalbard.org

Second SIOS Online Conference

Earth Observation, Remote Sensing and Geoinformation applications in Svalbard

08-10 June 2021

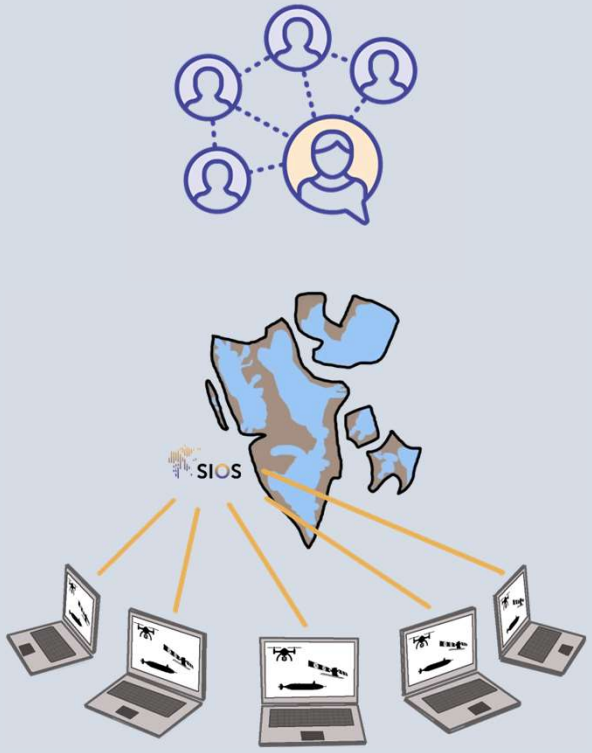
- 39 submitted abstracts
- Around 50 talks

Keynotes and invited talks
7 keynote talks

SIOS sessions
- SESS and InfraNor
- airborne campaigns in Svalbard
- Hack the Arctic Winners

Online Networking events
9th June: Zoom Quiz
10th June: Gathertown

with EGU Cryosphere Division, EGU Atmospheric Sciences Division and EGU Ocean Sciences Division.



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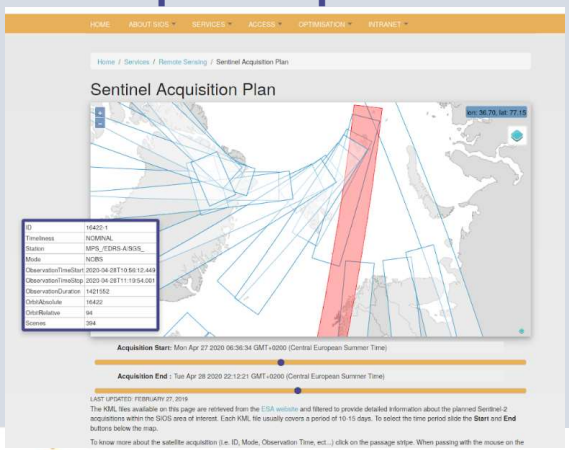
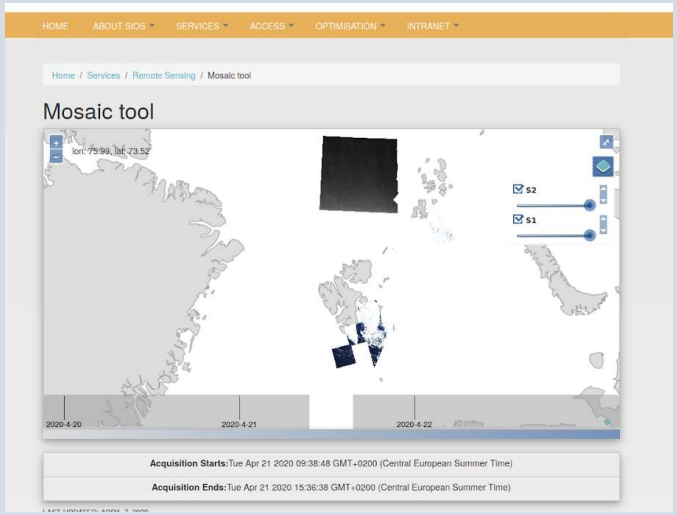
Remote Sensing tools

SIOS Remote Sensing Tools

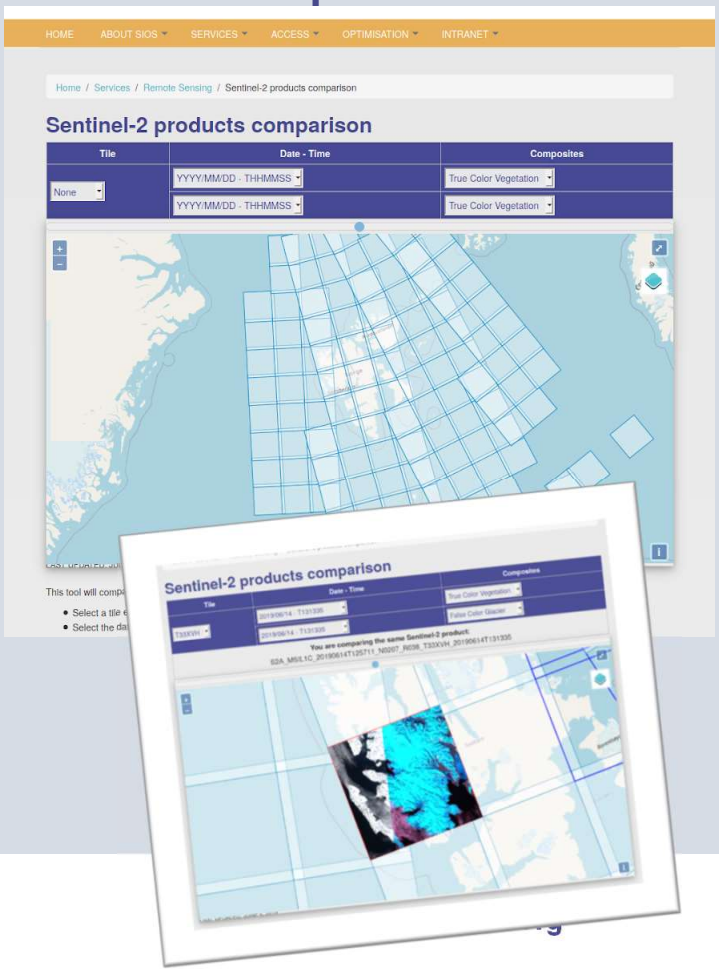
Acquisition plans



Sentinel mosaic

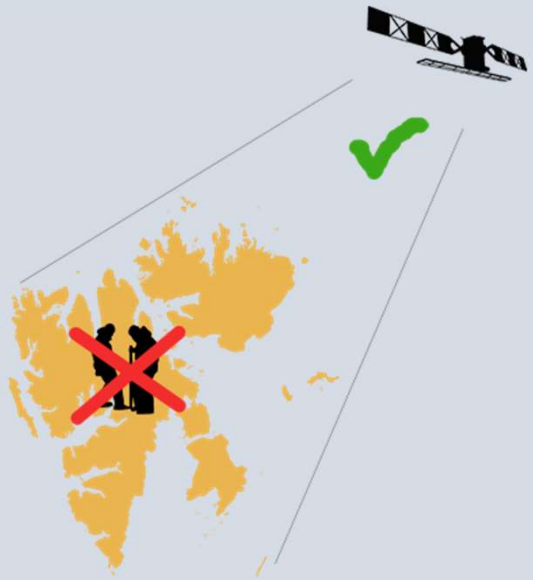


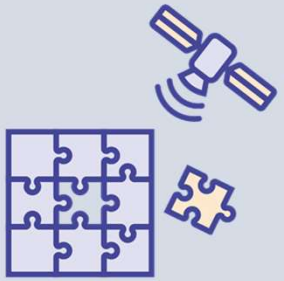
S2 comparison tool



www.sios-svalbard.org/RemoteSensing

Patch up your field data gaps with remote sensing





Most of our members had to cancel planned field campaigns to Svalbard since March 2020 leading to further gaps in observations.

Some of these data gaps can be filled with remote sensing observations.

Mapping the needs of researchers and evaluate the possibilities to provide remote sensing observations in the absence of field campaigns in Svalbard.

Fill application here: https://sios-svalbard.org/RS_patches-FirstSurvey

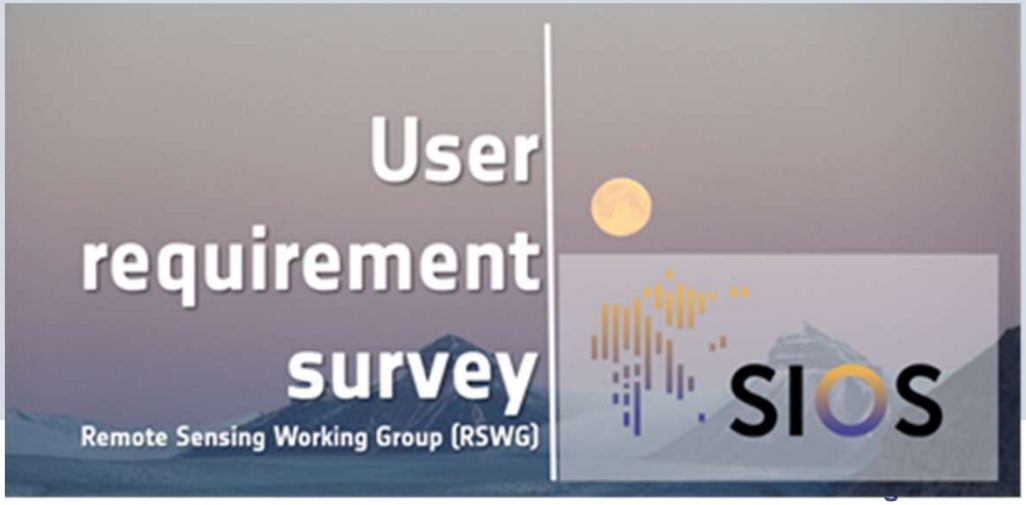
SIOS Earth observation and Remote Sensing user requirement survey

We need your feedback!

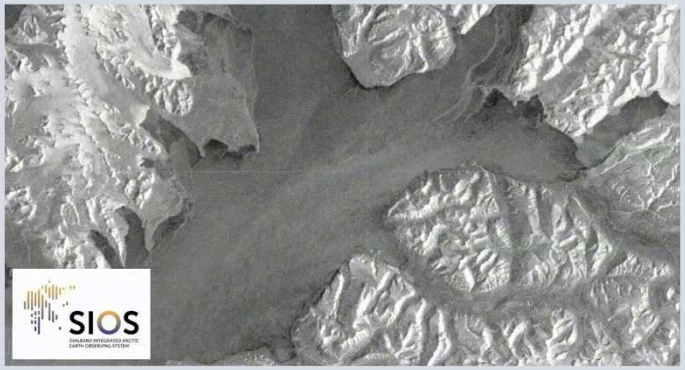
This survey aims to collect information on Earth Observation and Remote Sensing based data, geospatial products, information, and training requirements by the diverse Arctic science community.

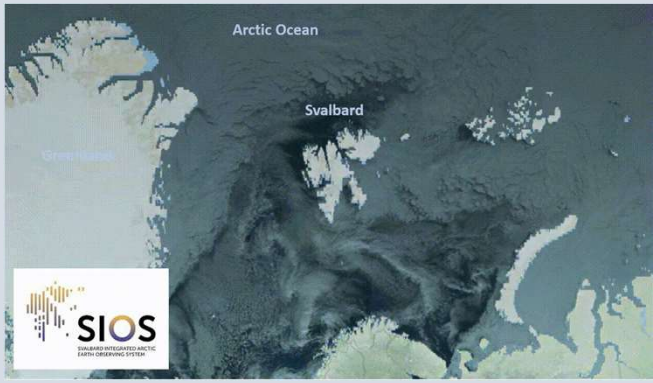
Encourage your colleagues to respond!

Participate here

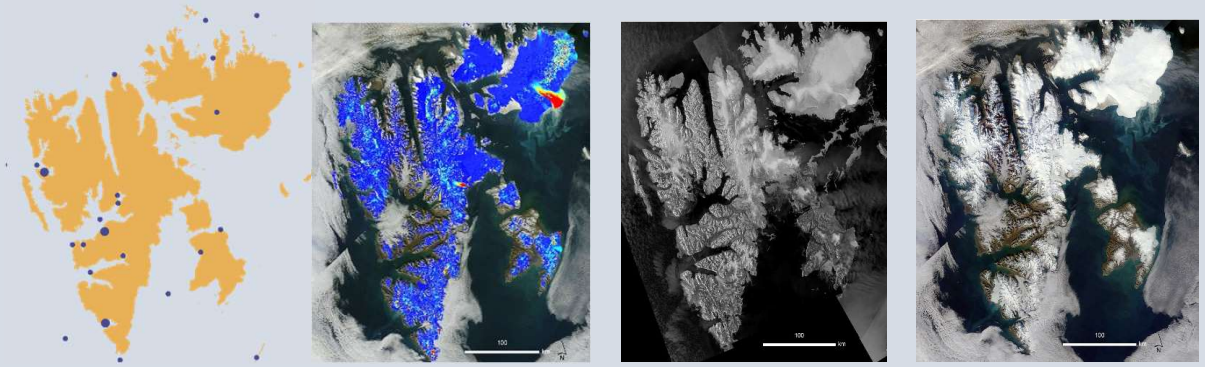


RSWG Outreach: Image of the week!





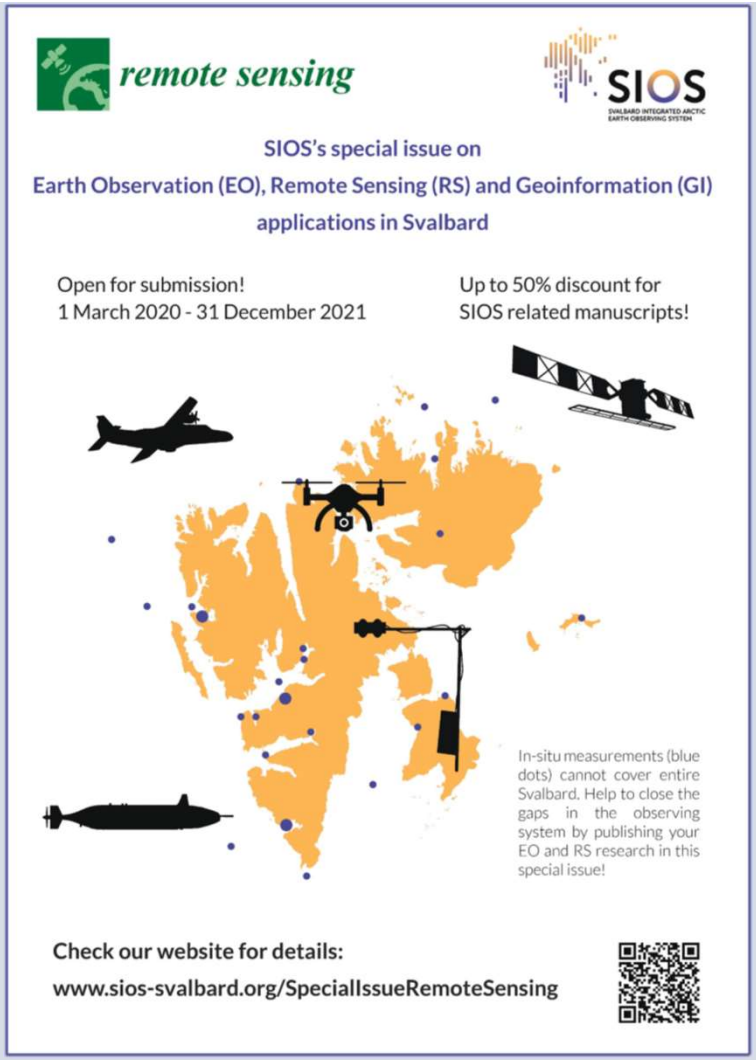
SIOS Special Issue



Special Discount on Article Processing Charge (APC)

50% discount for manuscripts
- from SIOS activities, e.g. InfraNor, SESS report, and SIOS Access Projects.

19 submissions
14 published
05 rejected
Hard deadline: 30th June 2022



SI Website: www.mdpi.com/si/42749 **Contact: shridhar.jawak@sios-svalbard.org** **Timeline: 01 March 2020 - 30 June 2022**

First ECR observer in the SIOS working group

University of St Andrews

William D. Harcourt

@will_harcourt

www.williamharcourt.co.uk

Funders

UKRI Engineering and Physical Sciences Research Council

SAGES Scottish Alliance for Geoscience, Environment and Society

SIOS

ECR Observer to the Remote Sensing Working Group (RSWG) of SIOS

Develop a unified platform for satellite data availability across Svalbard

Encouraging the participation of ECRs in SIOS activities

Meet the Early Career researchers active in SIOS

PhD Student, University of St Andrews

"The application of millimetre-wave radar to the study of the cryosphere"

SIOS Access Project

Radar Monitoring of Calving at Hansbreen (RaMoCH)

www.sios-svalbard.org

Second ECR observer in the SIOS working group

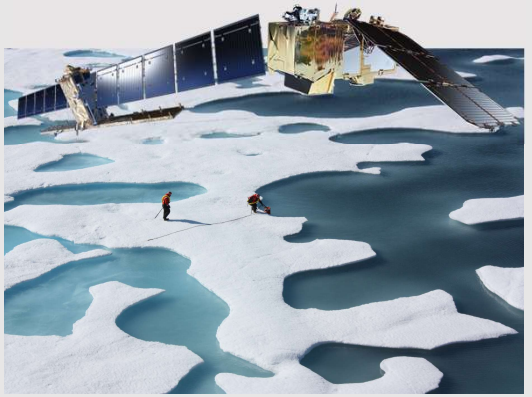
Sara Aparício

@_SaraAparicio_

saraaparicio/

ECR Observer to the Remote Sensing Working Group (RSWG) of SIOS	Support to outreach activities of SIOS Support to course development
Earth observation data scientist, Solenix for ESA	Support ESA on EO and AI-related activities
PhD Student, NOVA University	"Multi sensor and AI-based approach to sea ice climate change retrievals"

Meet the Early Career researchers active in SIOS



You can be the next ECR observer in the SIOS working group

ECR Observer to the Remote Sensing Working Group (RSWG) of SIOS

SIOS

SIOS

Opportunities for Svalbard researchers

- Annual RS Training course
- Annual RS ECR observer
- Use of Dornier and drones: regular calls and data
- SIOS RS tools: open to use for everyone
- SIOS Online conference: ECR awards
- SIOS webinar series: welcome to participate
- Patch up your field data with RS

An international partnership of researchers studying the environment and climate in and around Svalbard to

- Develop an efficient observing system
- Share technology, experience and data
- Close knowledge gaps
- Decrease the environmental footprint of science

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