INTAROS Annual Report 2021

Integrated Arctic Observation System (INTAROS)

Author: Geir Ottersen

1. Selected highlights

1.a.i. Selected scientific highlights since last report

Last report was submitted to SSC meeting, May/June 2020. Each highlight needs to be VERY short, bullet points, with a link to publication if applicable.

Establishment of the INTAROS data catalogue during 2020.

Development of the INTAROS iAOS Cloud Platform and Geostatistical library.

Paper on seasonal-to-decadal predictions of regional Arctic sea ice (Dai et al. 2020, please see Publication list below)

Model-based evaluation of indicators within the Barents Sea environmental management plan (two papers in review)

1.a.ii. Selected scientific highlights over last 5 years

(2016-2021)

Overview and survey of existing Arctic observing systems, and analyses based on it. This includes reports on present ocean, ice, terrestrial and atmospheric observing systems; their capacities, gaps and maturity.

Establishment of the INTAROS integrated Arctic Observation System (iAOS) including data catalogue, portal for accessing data and cloud platform with analysis tools.

Coordinated Arctic Acoustic Thermometry Experiment (Eurasian Basin) lead by INTAROS co-lead H. Sagen was carried out with the Norwegian icebreaker KV Svalbard in August 2019. KV Svalbard reached the North Pole on August 21 2019.

Community-based observing networks in Greenland, Svalbard and Russia have been strengthened and links between community-based observing and international databases explored. The PISUNA network in Greenland was awarded the Nordic Council Environment Prize for 2018, generating very wide media coverage.

1.b. Publications since last report

Please add all publications since last report to the table below (see notes for details on "Class" and "Activity" fields).

***Publication** with DOI*	***Class 1, 2, 3***	***Activity****
Dai P, Gao Y, Counillon F, Wang Y, Kimmritz M, Langehaug HR. (2020). Seasonal to decadal predictions of regional Arctic sea ice by assimilating sea surface temperature in the Norwegian Climate Prediction Model. Climate Dynamics. 54, 3863–3878. https://doi.org/10.1007/s00382-020-05196-4	3	
Brown KA, Holding JM and Carmack EC (2020) Understanding Regional and Seasonal Variability Is Key to Gaining a Pan-Arctic Perspective on Arctic Ocean Freshening. Front. Mar. Sci. 7:606. https://doi.org/10.3389/fmars.2020.00606	3	
Rysgaard, S., Boone, W., Carlson, D.,Sejr, M. K., Bendtsen, J., Juul-Pedersen,T., et al. (2020). An updated view on water masses on the pan-west Greenland continental shelf and their link to proglacial fjords. Journal of Geophysical Research: Oceans. https://doi.org/10.1029/2019JC015564	3	
Acosta Navarro, J. C., Ortega, P., Batté,L., Smith, D., Bretonnière, P. A.,Guemas, V., et al. (2020). Link between autumnal Arctic sea ice and Northern Hemisphere winter forecast skill. Geophysical Research Letters, 47,e2019GL086753. https://doi.org/10.1029/2019GL086753	3	
Welty, E., M. Zemp, F. Navarro, M. Huss, J. J. Fürst, I. Gärtner-Roer, J. Landmann, H. Machguth, K. Naegeli, L. M. Andreassen, D. Farinotti, and H. Li. (2020). Worldwide version-controlled database of glacier thickness observations. Earth Syst. Sci. Data 12:3039-3055. https://doi.org/10.5194/essd-12-3039-2020	3	
Ludwigsen, C. A., Khan, S. A.,Andersen, O. B., & Marzeion, B.(2020). Vertical land motion from present-day deglaciation in the wider Arctic. Geophysical Research Letters, 47, e2020GL088144. https://doi.org/10.1029/2020GL088144	3	
Randelhoff, A., L. Lacour, C. Marec, E. Leymarie, J. Lagunas, X. Xing, G. Darnis, C. Penkerc'h, M. Sampei, L. Fortier, F. D'Ortenzio, H. Claustre, and M. Babin. 2020. Arctic mid-winter phytoplankton growth revealed by autonomous profilers. Science Advances 6, no. 39, eabc2678. https://hal.archives-ouvertes.fr/hal-02959510		

If appropriate, please list the IMBeR activity through / by / from / during which the publication arose

****Notes on publications****

Publications are logged in the IMBeR Zotero library which is publicly accessible online - https://www.zotero.org/groups/2448334/imber_library_2/library

[Due to space limitations, publications from 1999-2017 are in a separate Zotero library - https://www.zotero.org/groups/38770/imber_library_1/library]

Publications are categorised by "Class" and linked to "Activities":

Class 1 publications are specifically generated through/by/from/during ***IMBeR activities*** - for example, arising from IMBIZOs and IMBeR conferences such as the IMBeR open science meeting and the IMBeR CJK symposia and from the activities of the working groups, regional programmes and the SPIS scoping teams.

Class 2 publications are on topics relevant to the IMBeR Science Plan that benefitted from some interaction with IMBeR or ***IMBeR activities***, for example by IMBeR symposium attendees, past and present SSC members, working group, regional programme and endorsed project members, or national contacts.

Class 3 publications are on topics relevant to the IMBeR Science Plan but for which there is no direct link to or benefit from an IMBeR activity. These might include publications by SSC members, working group, regional programme or endorsed project members or members of the IMBeR international community that were written as part of the normal scientific activity of the authors and would have occurred irrespective of IMBeR's existence. You can report Class 3 publications, but they will no longer be logged in the IMBeR database.

[See https://drive.google.com/open?id=1OQWn41KJvQ-LyWJlkiYnc5qZ2IuNQOrg or https://pan.ecnu.edu.cn/p/DTrpUb4QiFAYoQ4 for further information on "What is an IMBeR publication?".]

Why list 'Class' and 'Activity'? This helps us to declare authentically which publications IMBeR has helped to generate, and it makes it easier for us to demonstrate the value of the Regional Programmes, the Working Groups, the Endorsed Projects, and IMBeR in general, and it helps us to justify support for IMBeR activities when we can list tangible outputs.

1.c. Events, Meetings, and Workshops

List all international and national events, meetings and workshops. Describe the level of participation: e.g. chairing session/workshop, organising meeting. Include Endorsed Project meetings and workshops.

INTAROS General Assembly 2021. The meeting was held online on 12 and 13 January. Presentation slides are available here in pdf or ppt format: INTAROS General Assembly 2021 | Integrated Arctic Observation System (nersc.no)

Dialogue meetings with 12 different Research Infrastructures (ACTRIS, EMBRC, EUROFLEETS, JERICO, EuroARGO ++). A set of online consultation meetings organised by Erich Buch for INTAROS and run

February 4 – February 16 2021. More info at https://intaros.nersc.no/content/dialogue-meetings-research-infrastructures

Arctic Science Summit Week 2021. 19-26 March. Online. INTAROS organized, chaired and gave most of the talks at a session.

Stakeholder seminar - marine resources and fisheries management. January 20 2021. Online. INTAROS organized and led a seminar for a broad range of Norwegian stakeholders from management and industry.

European Polar Science Week 2020. October 28 2020. Online. Session "Cross-weaving Citizen Science, Local Knowledge and Scientific Research in the Arctic" organised by Finn Danielsen (INTAROS) and others. The whole session is available on Youtube: https://youtu.be/ljUTNlw4slM

European Geophysical Union Annual Meeting. 19-30 April 2021. Online. INTAROS co-convenes a special session on "Effective communication of scientific & place-based knowledge of Arctic change: understanding interactions between indigenous & local knowledge, and natural & social science perspectives" and leading INTAROS scientists will give talks in other sessions.

2. International collaboration and links

There are many activities both in Europe and on other continents of relevance to monitoring and observations in the Arctic. A key objective of INTAROS is to collaborate and build synergies with these to ensure complementarity and to ensure that the project learns from and advances on existing achievements. In particular INTAROS is working closely with the Arctic Council´s Sustaining Arctic Observing Networks (SAON), the Global Earth Observations (GEO) Cold Region Initiative (CRI) and programmes such as COPERNICUS, which is establishing a European capacity for Earth Observation and Monitoring as well as the Japanese led Arctic Challenge for Sustainability (ArCS) project and a number of United States and Canadian programmes.

This list is not exhaustive but gives a flavour of some of the relevant projects and initiatives with which INTAROS is collaborating:

https://www.eu-polarnet.eu/ EU-PolarNet

https://applicate-h2020.eu/ Advanced prediction in polar regions and beyond

http://blueaction.eu/index.php?id=3498 Blue Action Arctic Impact on Weather and Climate

https://eu-interact.org/ International Network for Terrestrial Research and Monitoring in the Arctic

https://nunataryuk.org/ NUNATARYUK

https://www.arice.eu/ ARICE and more

3. Input to management, policy and governance

3.a. Input to management and policy over the last year

Add anything that in line with the IMBeR Grand Challenge III: Improving and achieving sustainable ocean governance

Stakeholder seminar - marine resources and fisheries management. January 20 2021. Online. INTAROS organized and led a seminar for a broad range of Norwegian stakeholders from management and industry.

Dialogue with managers on results from model-based evaluation of indicators within the Barents Sea environmental management plan

3.b. Input to management and policy – Highlights from past 5 years

Enhanced dialogue with Norwegian managers of the environment, fisheries, and marine transportation.

Advice to local Svalbard authorities on hazards in connection with avalanches around Longyearbyen

4. Education and outreach

In June 2020, ten MSc students embarked on the coast guard vessel KV Svalbard to participate in the research school cruise near Svalbard, led by the Nansen Environmental and Remote Sensing Center. Their goal was to get hands-on experience during a scientific cruise in the Arctic. Link to more information: 2020 summer research school cruise: Useful Arctic Knowledge

INTAROS has made several short videos openly available on youtube - INTAROS Project - YouTube

INTAROS contributed to an interdisciplinary PhD and Post-Doc summer school on “The Arctic Ocean and the marginal ice zone” in Longyearbyen, Svalbard 31st July – 5th August 2017.