Integrated Arctic Observation System

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Project coordinator:
Nansen Environmental and Remote Sensing Center, Norway

Deliverable 7.10

Science Special Issue

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4	MISU		**27**	NIVA	
5	AWI		**28**	CNRS	
6	IOPAN		**29**	U Helsinki	
7	DTU		**30**	GFZ	
8	AU		**31**	ARMINE	
9	GEUS		**32**	IGPAN	
10	FMI		**33**	U SLASKI	
11	UNIS		**34**	BSC	
12	NORDECO		**35**	DNV GL	
13	SMHI		**36**	RIHMI-WDC	
14	USFD	***2***	**37**	NIERSC	
15	NUIM		**38**	WHOI	
16	IFREMER		**39**	SIO	
17	MPG		**40**	UAF	
18	EUROGOOS		**41**	U Laval	
19	EUROCEAN		**42**	ONC	
20	UPM		**43**	NMEFC	
21	UB		**44**	RADI	
22	UHAM		**45**	KOPRI	
23	NORCE		**46**	NIPR	
			47	PRIC	

DISSEMINATION LEVEL		
PU	Public, fully open	**X**
CO	Confidential, restricted under conditions set out in Model Grant Agreement	
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

EXECUTIVE SUMMARY

The main goal of this special issue is to highlight the project results and provide a link among the wide range of research topics supported by INTAROS. The wide breath of articles included in the Special Issue will allow highlighting the interdisciplinary nature of the INTAROS project. We already have four papers accepted for publication and/or in the final stages of review, and we expect several more manuscripts submitted before the deadline now extended to June 2022. After completion of the submission, researchers from the INTAROS group of WP leads will write a summary of all the science results including all the authors of the papers, which will allow providing a nice overview of the project achievements.

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1. Introduction

An inter-journal Science Special Issue was organized to gather the results of the project. The title of the special issue is: "Towards an integrated Arctic observation system to fill gaps of observing system across the atmosphere, ocean, cryosphere, geosphere, and terrestrial ecosystems" Given that the large majority of the papers involved marine research, Ocean Sciences was selected as the main journal, and when manuscripts are accepted in any Copernicus journal other than Ocean Sciences the chief editor will link the manuscript to the INTAROS OS special issue hosted on Ocean Sciences:

https://www.ocean-science.net/articles_and_preprints/scheduled_sis.html

The main goal of this special issue is to highlight the project results and provide a link among the wide range of research topics supported by INTAROS. The organization of the special issue is concluded, the guest, and executive editors were identified, and some of the manuscripts rom the team have already been submitted, some are in review, and some were accepted. The goals of the Special issues, a full list of the manuscript included, the updated status of these manuscripts, and the timing for the final publications are included in the following section.

2. Inter-journal Science Special Issue on Copernicus journals (OS main journal).

Description of the INTAROS Special issue on EGU journals (Lead journal Ocean Sciences):

https://www.ocean-science.net/special_issues/how_to_apply.html

Proposed start date (March 2021) and end date of submission (June 2022).

Title: Towards an Integrated Arctic Observation System to fill gaps of observing system across the atmosphere, ocean, cryosphere, geosphere and terrestrial ecosystems.

The Arctic is undergoing the most rapid changes in the climate system globally, as shown by the thinning and reduction of sea ice, the melting of ice sheets and glaciers, thawing permafrost, and the potential for more extreme weather events. The warming of the atmosphere and ocean are closely connected and are resulting in increasing risks of extreme events, erosion, probability for landslides, earthquakes and tsunamis. Thawing of permafrost will release greenhouse gases that will further enhance the warming of the atmosphere and ocean. This will have wide implications for the Arctic environment, its ecosystems, and its communities as well as on the global scale, and knowledge-based planning of the future is required to support international assessments of global challenges such as climate change, scarcity of natural resources, and global-scale hazards.

Given the complexity of Arctic ecosystems, to reduce uncertainties in the long-term response of Arctic ecosystems to climate change requires an interdisciplinary study of the relationships among physical, chemical, biological, and human processes with emphasis on the interactions among system components. The cycles of carbon, water, and energy are important to consider in investigating the functioning of the Arctic system. In particular, the knowledge of physical and biological processes in the Arctic Ocean is limited, because the ice cover severely hampers observations, both in the upper layers and deep waters. Given the strong connections among the different parts of the ecosystems, studies of Arctic Oceans should be integrated with marine, terrestrial, and glaciology, natural hazard, and community-based monitoring.

This special issue collects contributions from a wide range of fields supported by the H2020 project INTAROS, including ocean and sea ice, atmosphere, terrestrial sphere (e.g. patterns and controls of greenhouse gas emissions and their response to climate change particularly during the cold season), and cryosphere. As the majority of this effort is focused on the ocean we would like to select Ocean Sciences as the lead journal of this inter-disciplinary special issue. The ocean studies will be complemented by a wide range of other studies with target journals: Biogeosciences, Geoscientific Instrumentation, Methods and Data Systems (GI), Earth Surface Dynamics, The Cryosphere, Earth System Science Data (ESSD), Atmospheric Chemistry and Physics (ACP), etc.

The goal is to produce an integration of multi-disciplinary observations in the Arctic, and report on innovative analysis and methods which can stimulate new products and improved services, and to demonstrate the benefit of a continuous long-term effort in these observations and to report.

Lead journal: Ocean Sciences

Ocean sciences editor

Topic editor: Mario.Hoppema@awi.de

Guest editors:

Ocean:

Marie-Noëlle Houssais marie-noelle.houssais@locean-ipsl.upmc.fr

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Cryosphere or atmosphere:

Roberta Pirazzini Roberta.Pirazzini@fmi.fi

A full list of the manuscripts included in the special issue is available at the following link

https://docs.google.com/spreadsheets/d/1SuKBIRWZLbuPkxb1pv-IZosO6LQeJaZu/edit#gid=839044883

3. Literature

Domine, F., Lackner, G., Sarrazin, D., Poirier, M., and Belke-Brea, M. (2021) Meteorological, snow and soil data (2013–2019) from a herb tundra permafrost site at Bylot Island, Canadian high Arctic, for driving and testing snow and land surface models. Earth Syst. Sci. Data Discuss. https://doi.org/10.5194/essd-2021-54

Mankoff, K. D., Noël, B., Fettweis, X., Ahlstrøm, A. P., Colgan, W., Kondo, K., Langley, K., Sugiyama, S., van As, D., and Fausto, R. S.: Greenland liquid water discharge from 1958 through 2019, Earth Syst. Sci. Data, 12, 2811–2841, https://doi.org/10.5194/essd-12-2811-2020, 2020.

Hansen, C., van der Meeren, G. I., Loeng, H., and Skogen, M. D. (2021) Assessing the state of the Barents Sea using indicators: how, when, and where?, ICES Journal of Marine Science. fsab053, https://doi.org/10.1093/icesjms/fsab053

Pallandt, M., Kumar, J., Mauritz, M., Schuur, E., Virkkala, A. M., Celis, G., Hoffman, F., and Göckede, M. (2021) Representativeness assessment of the pan-Arctic eddy-covariance site network, and optimized future enhancements, Biogeosciences Discuss. 2021, 1-42. https://doi.org/10.5194/bg-2021-133

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INTAROS

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Project partners: