

Report for the year 2020 and future activities

SOLAS Poland

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This report has two parts:

- **Part 1:** reporting of activities in the period of January 2020 - Jan/Feb 2021
- **Part 2:** reporting on planned activities for 2021 and 2022.

The information provided will be used for reporting, fundraising, networking, strategic development and updating of the live web-based implementation plan. As much as possible, please indicate the specific SOLAS 2015-2025 Science Plan Themes addressed by each activity or specify an overlap between Themes or Cross-Cutting Themes.

- 1 Greenhouse gases and the oceans;
 - 2 Air-sea interfaces and fluxes of mass and energy;
 - 3 Atmospheric deposition and ocean biogeochemistry;
 - 4 Interconnections between aerosols, clouds, and marine ecosystems;
 - 5 Ocean biogeochemical control on atmospheric chemistry;
- Integrated studies of high sensitivity systems;
Environmental impacts of geoengineering;
Science and society.

IMPORTANT: *This report should reflect the efforts of the SOLAS community in the entire country you are representing (all universities, institutes, lab, units, groups, cities).*

First things first...Please tell us what the IPO may do to help you in your current and future SOLAS activities. ?

PART 1 - Activities from January 2020 to Jan/Feb 2021

1. Scientific highlight

Describe one scientific highlight with a title, text (max. 300 words), a figure with legend and full references. Please focus on a result that would not have happened without SOLAS, and we are most interested in results of international collaborations. (If you wish to include more than one highlight, feel free to do so).

The Nordic Seas and the Fram Strait regions are a melting pot of a number of water masses characterized by distinct optical water properties. The warm Atlantic Waters transported from the

south and the Arctic Waters from the north, combined with the melt waters contributing to the Polar Waters, mediate the dynamic changes of the year-to-year large-scale circulation patterns in the area, which often form complex frontal zones. In the last decade, moreover, a significant shift in phytoplankton phenology in the area has been observed, with a certain northward expansion of temperate phytoplankton communities into the Arctic Ocean which could lead to a deterioration in the performance of remote sensing algorithms. In this research, we exploited the capability of the satellite sensors to monitor those inter-annual changes at basin scales. We propose locally adjusted algorithms for retrieving chlorophyll a concentrations $Chla$, absorption by particles ap at 443 and 670 nm, and total absorption $atot$ at 443 and 670 nm developed on the basis of intensive field work conducted in 2013–2015. Measured *in situ* hyper spectral remote sensing reflectance has been used to reconstruct the MODIS and OLCI spectral channels for which the proposed algorithms have been adapted. We obtained $MNB \leq 0.5\%$ for $ap(670)$ and $\leq 3\%$ for $atot(670)$ and $Chla$. RMS was $\leq 30\%$ for most of the retrieved optical water properties except $ap(443)$ and $Chla$. The mean monthly mosaics of $ap(443)$ computed on the basis of the proposed algorithm were used for reconstructing the spatial and temporal changes of the phytoplankton biomass in 2013–2015. The results corresponded very well with *in situ* measurements.

2. Activities/main accomplishments in 2020 (e.g., projects; field campaigns; workshops and conferences; model and data intercomparisons; capacity building; international collaborations; contributions to int. assessments such as IPCC; collaborations with social sciences, humanities, medicine, economics and/or arts; interactions with policy makers, companies, and/or journalists and media).

Sea cruises of r/v Oceania in the Baltic and the Arctic. Interdisciplinary marine and atmospheric studies.

Participation in the Maritime Aerosol Network (https://aeronet.gsfc.nasa.gov/new_web/maritime_aerosol_network.html) activities.

Works within the Re-evaluation and Homogenization of Aerosol Optical Depth Observations in Svalbard (ReHearsol) - RCN project no. 311250.

INES- International School on INtegrated Environmental Studies in the Arctic (<http://www.iopan.pl/Ines/index.html>) with respect to climate changes summer school. A total of 11 webinars were directly attended by over 50 international students in 2020. Recordings have been viewed by thousands.

CommOCEAN 2020- 4th International Marine Science Communication Conference was organized by IOPAN in an online mode.

II Forum Filologiczne (Language Forum)-co-organized by IOPAN. Co-operation with humanities in communication of climate change issues to general public.

Participation in the works of the Scientific Committee of the European Marine Board Communication Panel.

Chairing of the Climate and Ocean Working Group of the EU4Ocean Coalition.

Expertizes for the Polish Ecological Club.

Numerous popular interviews in various media.

3. Top 5 publications in 2020 (only PUBLISHED articles) and if any, weblinks to models, datasets, products, etc.

1. Zielinski T., L. Ferrero, S. Grassl, G. H. Hansen, D. Mateos, M. Mazzola, R. Neuber, P. Pakszys, M. Posyniak, Ch. Ritter, M. Severi, P. Sobolewski, R. Traversi, C. Velasco-Merino, 2020. Study of aerosol optical and chemical properties during a long-range transport of biomass burning particles towards Spitsbergen in summer 2017. *Atmosphere*, 11, 84; doi:10.3390/atmos11010084.
2. Kokhanovsky A., C. Tomasi, A. Smirnov, A. Herber, R. Neuber, A. Ehrlich, A. Lupi, B. H.

- Petkov, M. Mazzola, Ch. Ritter, C. Toledano, T. Carlund, V. Vitale, B. Holben, T. Zielinski, S. Bélanger, P. Larouche, S. Kinne, V. Radionov, M. Wendisch, J. L. Tackett, D. M. Winker, 2020. Remote Sensing of Arctic Atmospheric Aerosols. Physics and Chemistry of the Arctic Atmosphere in Springer Polar Sciences, <https://doi.org/10.1007/978-3-030-33566-3>, 2020.
3. Kitowska M., Makuch P., Petelski T., Piskozub J., 2020. The influence of mesoscale land-seabreeze circulation on local wind climatology in the Svalbard fjords of Kongsfjorden and Hornsund. International Journal of Climatology, <https://doi.org/10.1002/joc.6731>.
 4. Konik, M., P. Kowalczyk, M. Zabłocka, A. Makarewicz, J. Meler, A. Zdun, and M. Darecki. 2020. Empirical Relationships between Remote-Sensing Reflectance and Selected Inherent Optical Properties in Nordic Sea Surface Waters for the MODIS and OLCI Ocean Colour Sensors. Remote Sens., 12, 2774, <https://doi.org/10.3390/rs12172774>.
 5. She J, Meier HEM, Darecki M, Gorringer P, Huess V, Kouts T, Reissmann JH and Tuomi L (2020) Baltic Sea Operational Oceanography—A Stimulant for Regional Earth System Research. Front. Earth Sci. 8:7. doi: 10.3389/feart.2020.00007.

4. Did you engage any stakeholders/societal partners/external research users in order to co-produce knowledge in 2020? If yes, who? How did you engage?

The Ocean-Non Textbook – 100 short popular science films on the role of the ocean and atmosphere (climate issues) in co-operation with Gdynia Aquarium and Today We Have (public and private sector).

PART 2 - Planned activities for 2021 and 2022

1. Planned major national and international field studies and collaborative laboratory and modelling studies (incl. all information possible, dates, locations, teams, work, etc.).

Continued research activities, with use of the r/v Oceania, whenever possible. We plan both the Baltic and the Arctic cruises.

Continued works within the Re-evaluation and Homogenization of Aerosol Optical Depth Observations in Svalbard (ReHearsol) - RCN project no. 311250.

2. Events like conferences, workshops, meetings, summer schools, capacity building etc. (incl. all information possible).

Continued conference and educational activities, mostly in an online mode.

IO PAN will organize the First International Ocean Data Conference (IODE) (https://iode.org/index.php?option=com_content&view=article&id=645&Itemid=100407#scientific) in November 2021.

INES- International School on INtegrated Environmental Studies in the Arctic (<http://www.iopan.pl/Ines/index.html>) with respect to climate changes summer school, as well as Open Science Days (<http://www.iopan.pl/odn2021/index-eng.html>), both within the framework of the EU4Ocean Coalition (<https://webgate.ec.europa.eu/maritimeforum/en>) will be organized by IO PAN.

Participation in numerous, other conferences is planned, however, due to the pandemic situation, it is difficult to list them all.

3. Funded national and international projects/activities underway.

There are a number of projects being run.

4. Plans / ideas for future national or international projects, programmes, proposals, etc. (please indicate the funding agencies and potential submission dates).

A number of Horizon 2020 proposals have been submitted and are under evaluation. Other projects are planned for submissions at relevant dates.

5. Engagements with other international projects, organisations, programmes, etc.

There are a number of projects being run. Some include:

1. Marine Knowledge Sharing Platform for Federating Responsible Research and Innovation Communities - MARINA.
2. INTAROS: Integrated Arctic Observation System.
3. AERONET.
4. International Ocean Carbon Coordination Project (IOCCP; www.ioccp.org).

Comments