

Report for the year 2021 and future activities

SOLAS Poland

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This report has two parts:

- **Part 1:** reporting of activities in the period of January 2021 - Jan/Feb 2022
- **Part 2:** reporting on planned activities for 2022 and 2023.

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 2021 to Jan/Feb 2022

1. Scientific highlight

In their work, David McKee and Jacek Piskozub (McKee D., Piskozub J., 2021, Transmission across the water-air interface: resolving the impact of multiple interactions at the sea surface, Optics Express, 2(29), 1296-1303, <https://doi.org/10.1364/OE.414085>) run a series of Monte Carlo and HydroLight radiative transfer simulations to demonstrate that the traditional form of the Fresnel transmission across the water-air interface is accurate. This contradicts assertions to the contrary in a recent paper [Opt. Express 25, 27086 (2017) that suggested that the impact of multiple surface

interactions had previously been ignored and that the transmission factor was dependent upon the turbidity of the water.

Monte Carlo simulations that explicitly include the effects of multiple interactions at the sea surface have demonstrated that the standard approach to simulating light transmission through the sea surface are valid. These results were further confirmed using the HydroLight simulation software package which also resolves multiple interactions.

2. Activities/main accomplishments in 2021 (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. Five days of lectures and activities for international students.

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. List SOLAS-related publications published in 2021 (only PUBLISHED articles). If any, please also list weblinks to models, datasets, products, etc.

1. McKee D., Piskozub J., 2021, Transmission across the water-air interface: resolving the impact of multiple interactions at the sea surface, Optics Express, 2(29), 1296-1303, <https://doi.org/10.1364/OE.414085>
2. Małgorzata Kitowska and Tomasz Petelski, Svalbard's Mesoscale Environmental Factor Impact on the Wind Field. Atmosphere. (2021) 12(9), 1165, <https://doi.org/10.3390/atmos12091165>
3. Nilsson ED, Hultin KAH, Martensson EM, Markuszewski P, Rosman K, Krejci R. Baltic Sea Spray Emissions: In Situ Eddy Covariance Fluxes vs. Simulated Tank Sea Spray. Atmosphere. (2021); 12(2):274. <https://doi.org/10.3390/atmos12020274>
4. An update of Ocean Climate Change Indicators: Sea Surface Temperature, Ocean Heat Content, Ocean pH, Arctic Sea Ice Extent, Sea Level and strength of the AMOC (Atlantic Meridional Overturning Circulation). C. Garcia-Soto, L. Cheng, L. Caesar, E. B. Jewett, A. Cheripka, I. Ganzon Rigor, A. Caballero, S. Chiba, J. C. Báez, T. Zielinski, J. P. Abraham. Frontiers in Marine Science. DOI: 10.3389/fmars.2021.642372. 2021.
5. Abundance of environmental data vs. low public interest in ocean and climate issues. Where is the missing link? T. Zielinski, E. Bolzacchini, K. Evans, L. Ferrero, K. Gregorczyk, T. Kijewski, I. Kotynska-Zielinska, P. Mrowiec, B. Oleszczuk, P. Pakszys, E. Piechowska, J. Piwowarczyk, J. Sobieszczanski, M. Wichorowski. Frontiers in Marine Science, doi: 10.3389/fmars.2021.619638 2021.

4. Did you engage any stakeholders/societal partners/external research users in order to co-produce knowledge in 2021? If yes, who? How did you engage?

The Ocean-Non Textbook – 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 2022 and 2023

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.

Organization and co-organization of many scientific and outreach events, such as:

- CommOcean Conference 2022,
- Open Science Days 2023,
- European Maritime Days 2023,
- And more.

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.

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>).

Participation in numerous, other conferences is planned, however, due to the still uncertain 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. AERONET.
3. International Ocean Carbon Coordination Project (IOCCP; www.ioccp.org).
4. MARBEFES.
5. LOAD-RIS.
6. SURETY.

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Comments