

Antarctica InSync – Q&A Summary

The questions below represent a compilation of those submitted during our first Antarctica InSync Webinar, held across two sessions on May 19 and 22. Each response was provided by the respective presenters, drawing on their specific areas of scientific expertise.

General Questions

1. *Can you elaborate on the data infrastructure and data management?*

Please get in contact with data@soos.aq to join the data task team.

This is a huge project. I am new to this kind of project, so I would like to ask was there any similar project(s) in previous years (decades)? and if so, what makes (e.g., useage of cutting-edge techniques/equipment) this project potentially a big step towards better understanding the Antarctic ice-ocean system? Yes, it is a large international program that is not comparable to an individual project. The initiative is comparable to large community efforts such as MOSAiC (even though different in nature). We will also build on the lessons learned from such former initiatives.

2. *I'm still a little confused about how to get involved? How would you submit a grant under the InSync umbrella? How do individual researchers connect with what is being done in other groups/countries? Are there working groups that we can join?*

This depends on your interest. The Themes provide an overarching science framework. Multiple working groups already exist, or are forming within this framework. We are currently setting up mailing lists for the different working groups and we will share this information in the coming days and weeks through the newsletter list. You can get some idea of the working groups that are forming in the second session. But you are also welcome to propose new ones. In addition, there is no official funding scheme through Antarctica InSync. However, we are working on an official endorsement process. Up to then, we are happy to provide you with Letters of Support from the Coordination team.

3. *As a phd student working on Ice Shelves Stability, how can I connect with other students and academics working on the same topic and doing collaboration?*

We very much welcome initiatives from ECRs. We have been trying to have ECR representatives in the different national committees, in particular as APECS

representatives. We will publish the national committees and the contacts on the website.

4. For those of us who would like to submit a proposal for involvement in InSync, is there a possibility for the coordination team to provide a letter of support?

Yes, certainly.

5. What is the best way to coordinate with others who might be interested in the same measurements to make sure there is not overlap at the same locations, but rather to make sure there is sufficient measurement coverage at the different stations and on the different vessels?

It depends on the measurement. You might also contact some of our speakers from the webinars. Or propose new working groups. These discussions should take place within the working groups and be part of the science plan.

6. Can you comment on coordination between InSync and IPY planning?

For info on IPY5 coordination please visit <https://ipy5.info>. And the IPY5 workshop page with recordings of talks & further info how to get involved: <https://indico.psi.ch/event/15591/>. There is already some joint discussion, but it is certainly important to continue thinking about this strategically to make sure that we can carry on ideas into the IPY.

7. Where will all the data go to, is there any idea for a central archive similar to what was done during MOSAiC?

It is the goal to have a central platform to access the data. We are currently in discussions with SOOS to evolve SOOSmap into a tool that can be used to join multiple Antarctica InSync data sets from different communities. We will certainly try to learn from MOSAiC.

8. Has each working group started to collect the topical ideas and main questions within the communities?

Yes, there is already starting points that are being presented in the second part of the webinar.

9. Are there planned other dedicated and coordinated ship campaigns on board ice breakers (in addition to Polarstern) or is this still pending depending on the national programs? And is any coordination with coastal stations foreseen? For example, can we create a central and constantly updated database with planned observations/campaigns so everyone can search for research&logistic

connections/coordination directly and also cross-disciplinary (beyond the dedicated themes).

Yes, exactly as you say: Dependent on the national infrastructure plans, it is certainly planned to have as many ships as possible as part of this. And yes, it is not only about ship-based work, but also stations around the continent. Also, we are working on it, to get a dedicated overview of all infrastructures involved.

10. Is InSync also focussing on taking an active role on increasing the infrastructure needed for increasing the scale of in-situ measurements?

Antarctica InSync aims to coordinate the different national infrastructure for the observational period (2027-29). We hope that these efforts can be carried on into the future.

Remote Sensing

11. Are the remote sensing measurements of Polar Stratospheric Clouds and precipitation conducted at the Italian Antarctic stations potentially of interest to the InSync community? If so, how could these measurements be shared with or contribute to InSync activities?

I would expect so - this is best judged by the aerosol-cloud theme. Your question also highlights the importance of sharing data between remote-sensing and the thematic groups.

12. Will ESA coordinate remote sensing efforts between ESA and non-ESA countries (third party missions), and are there plans to include commercial providers?

Yes we aim to facilitate coordination with other agencies and providers. This is something we would need to discuss to agree on specifics - please send me an email (martin.wearing@esa.it) if you have specific ideas you'd like to discuss. On a separate note, we are in the process of setting up a cross-cutting EO working group for Antarctica InSync, that could help with these types of discussions.

13. Can you elaborate on your comment on ESA provision of cloud- computing? Is this just ESA produced workflows and products or do you envisage registered users being able to process data and access workflows?

We are still in the early stages of developing this idea. We have an ESA project setting up a similar infrastructure that could be used for this. For Antarctica InSync this would primarily be a data space, but would allow users to do some processing/workflows (the size of this processing capability would be limited, but could be expanded through a request for additional funded access). This would be open to ESA and non-ESA.

14. What's the importance of providing new ice penetrating radar data to Antarctic Peninsula for InSync ?

Ice penetrating radar would be important for determining ice thickness, particularly important at the grounding line for determining ice discharge (in combination with ice velocity) in the context of ice sheet mass balance. Firn properties are particularly important for reducing uncertainties associated with penetration of satellite radar altimetry.

Modelling and Simulations

15. Are you planning to include ecosystem models (i.e. models including species traits, species interactions, species response to environmental variables-sea ice)?

Absolutely. All depends on the individual communities to form a network within InSync. Please be active within the respective themes/working groups but we should also form a platform for modelling across system components.

16. What's the single biggest circumpolar measurement that InSync could contribute that will improve Southern Ocean/Antarctic coupled models?

Because I think there is not "the single biggest" measurement anymore. We need to work on the interactions of the climate components (such as surface fluxes or ice-ocean fluxes) in observations and models to close our knowledge gaps.

17. Thank's for mentioning Remy Laper's paper - one thing that I am thinking about is how one single year of data can contribute to this story. In this the Lapere et al paper we took data from many years to construct a seasonal cycles (which we used to evaluate CMIP6 sea salt aerosols). Understanding how to put the InSync observations into this the multiyear context is one thing I would look forward to discussing with you all in the future.

That's a very important point you raise here. The representation of the seasonal cycle (of many quantities) in models could be a highlight of joint modelling efforts in Antarctica InSync. Existing data could be used to plan activities, InSync obs then should fill gaps identified.

18. How modeling efforts are connected to the themes? how modeling and observations are planned to give the best of both?

It depends on individual modelling efforts to connect to the themes and working groups. There is no general plan yet. Still, we aim for building an InSync modelling network for coordination. I'd perhaps add to this, it is relatively early in the process. As Torge says, coordination and planning will need input from across the whole modelling - and beyond -

spectrum. Then I think I would recommend to not add a layer, but rather intertwine modeling and observation within each theme.... I had the same question. I hope that dedicated modeling activities will be coordinated in each theme

Late addition, sorry: Modelling is not an own theme, so far we just wanted to ensure that modelling is as present in the structure of InSync as the observational infrastructure. To integrate modelling successfully, I agree that modelling efforts need to be embedded in various scientific working groups, as observations will be, and in addition linked across the board. Hopefully this will enable joint efforts and add value to (coupled) model simulations when used by several different groups.

19. Will there be specific deployments of DestinE digital twins for Antarctica InSync?

I'm not aware of activities from DestinE related to Antarctica InSync. However, ESA Digital Twin Earth could be considered if there is community demand for this. At the moment there are no set plans.

Climate Cycles and Biogeochemistry

20. In the carbon cycle, are you planning to consider biological and ecological processes (blue carbon)?

These are absolutely in scope. Whilst planning is still early, these processes will likely be part of UK efforts - following on from the current BIOPOLE programme that is specifically looking at the lipid pump aspect for eg. It is indeed within scope of this theme; biological and ecosystem processes are crucial to understand the Southern Ocean carbon cycle. It is also a great topic that links this theme with the theme on Antarctic life, and as such some of those scientific questions will require practical and scientific coordination between these two themes.

21. It's a great point about targeting observations to where they will reduce uncertainties most. Given that insync aims to observe the entire continent will there be a priority list produced by the working groups/committees for the best locations for additional sampling?

I think this is ongoing by several communities already. I'm aware of workshops for ice shelf basal melts and another for ice covered marginal ocean observations that have/will produce white papers on research priorities and regions to target. It would be nice if the InSync office could gather such recommendations though.

22. Are there any plans regarding sampling and protocols to analyze samples?

Yes, protocols should be used where they exist and new ones need to be developed if they do not exist. This however is a task of each working group that are experts on the sampling.

We also aim to create a list of "essential variables", which should be measured/sampled as consistently as possible across different platforms. Deciding what those variables should be and which protocols to use will, like Alex said, be done within each working group.

23. *Other than collecting data in undersampled regions (which is great!) can we use existing models/assimilation efforts to understand which undersampled regions should be targeted?*

That would be ideal. We should certainly use Observing System Design studies to help identify key regions.

Sea Ice Decline

24. *I hope that the data collected for the vertical sea ice processes will be placed on the GTS/WIS as far as possible. A positive outcome of Antarctica InSync would be widespread use of (any collected) data beyond the groups who target and make such observations.*

Sure! It is part of Antarctica InSync to make data publicly available in order to allow for a maximum benefit.

Ice Sheets and Coastal Processes

25. *Do you have any observational plans for supraglacial hydrological systems? Such features are quite common in Greenland but remain rare in Antarctica, though mature systems have already been documented.*

In Antarctica, surface hydrology is currently relevant in particular near ice-shelf grounding lines (break in surface slopes) and ice shelves. Some initiatives consider transects from the ocean onto the plateau, with a particular focus on atmosphere-ice interaction via surface processes (T, precip, turbulence, ...), crossing such regions and also providing local (ground-based, longer-term obs.) or regional measurements (e.g. airborne). Further upscaling should be done via remote sensing in conjunction with models. An important question is how these system will develop in the future.

Biodiversity and Antarctic Life

26. *Do you know whether there is interest to include synchronous observations about 'bird flu' (highly pathogenic avian influenza) in wild birds and wild mammals in Antarctica? I could see that it could fit with 'Anthropogenic signatures' since the virus comes from the poultry industry, i.e. due to anthropogenic activities; or it could fit with knowledge/protection of unique*

Antarctic life, since wildlife populations such as subantarctic skuas are hard hit due to high mortality from bird flu. In the Netherlands, we recently obtained funding from the Netherlands Polar Programme for bird flu surveillance in Antarctica in coming three austral summers.

There's an interest and proposal to investigate 'Pathogen Dynamics and Animal Movements in Antarctica and the Southern Ocean' initiated and coordinated by Simeon Lisovski (AWI, Germany), Meagan Dewar (Federation University, Australia) and Amandine Gamble (Cornell University, United States) and also integrated with the SCAR EG-BaMM Working group.

These would be great to get in touch with and to connect.

27. Do you have any idea if there is any interest in starting to actively monitor the gut microbiota of birds and mammals even as a way to detect possible diseases or infections? if so, which groups would be starting with that, is there any possibility of collaboration?

As a start, I would direct you to the same people mentioned in the comment above, as these are currently the only ones that I am aware of who have proposed analyses of disease of top predators.

Anthropogenic Impacts

28. To what extent humanities and social sciences will be take into considerations?

Antarctica InSync recognizes the essential role of the humanities and social sciences in understanding the complex human dimensions of Antarctic and Southern Ocean research. These disciplines contribute crucial insights into governance, history, ethics, perceptions, and the societal impacts of environmental change. As such, Antarctica InSync aims to actively engage experts from the humanities and social sciences to ensure that its scientific vision is not only grounded in natural sciences, but also informed by broader cultural, political, and social perspectives. Collaborative efforts will be fostered to explore topics such as international cooperation, indigenous knowledge systems, and the societal relevance of polar science in addressing global challenges.

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30. Is WG2 thinking of incorporating noise monitoring in Antarctic terrestrial environments? I think this is very important and has passed unnoticed. I would like to contribute in this area.

Thank you very much for this important suggestion. So far, noise monitoring has primarily been considered in the marine context, particularly in relation to its impacts on marine mammals. However, terrestrial noise pollution—including human-generated sounds near research stations and field sites—is a relevant and understudied topic.

WG2 (Focusing on Antarctic biodiversity and ecosystems) is currently identifying critical data gaps and monitoring needs. Your proposal aligns well with the group's goals of broadening the understanding of anthropogenic pressures across Antarctic ecosystems. We strongly encourage you to get involved and share your expertise. Contributions like yours are key to building a more comprehensive and interdisciplinary observation strategy.

Please reach out to the coordination team so we can connect you with WG2 leads and explore how to integrate terrestrial noise monitoring into upcoming plans.

31. It is not clear to me where is the study of precipitation (or role of clouds for the antarctic water cycle) and more generally SMB over the ice sheet in the insync themes. Is it in this theme?

There are strong linkages with Theme I + III (SMB etc), and we are discussing how we can support their science objectives.

Aerosols and Clouds

32. What about collocated and coordinate measurements of both CCN/INP AND droplets/ice crystal inside and outside of clouds.

Thank you for raising this point. Essential & desirable observed parameters will be part of the priority discussion and will be included in some form in the white paper. concurrent ops of CCN/INP and cloud particles & phase are part of this.

What is next? Outreach, Education and Other Topics

33. Are you planning to provide letters of support or similar for anybody planning to apply for funds to different funding agencies?

We can provide Letters of Support from the science coordination team. An official endorsement process is still under development with the international steering team.

34. Are there plans to develop an official training component/ECR field school as part of Antarctica InSync?

Yes, Antarctica InSync places strong emphasis on capacity building and the active involvement of Early Career Researchers (ECRs). Plans are currently being developed to establish dedicated training components, including field schools and workshops, that will provide interdisciplinary, cross-national learning opportunities. These activities aim to equip the next generation of polar scientists with the skills and networks needed to work across disciplines and borders. Collaboration with existing training programs and institutions is also foreseen to ensure complementarity and broader reach.

35. What kind of artistic, outreach, educational, and scientific communication projects and collaborations already exist with insync?

Antarctica InSync actively promotes the integration of education, outreach, and science communication to enhance public understanding and engagement with polar research. Several initiatives have already been developed, including:

- Educational activities such as international webinars, school engagement programs, and partnerships with universities to bring Antarctic science into classrooms across different countries.
- Outreach efforts linked to major international events, such as the UN Ocean Conference and the Living Planet Symposium, where InSync has hosted side events and interactive discussions.
- Science communication projects involving videos, online campaigns, and public talks to communicate research findings in an accessible and engaging manner.
- While artistic collaborations have not yet been implemented, there is strong interest and institutional support within Antarctica InSync to develop activities that bring together art and science in creative and impactful ways.

These efforts reflect Antarctica InSync's commitment to making polar research more inclusive, engaging, and relevant to diverse audiences worldwide.