

Southern Ocean data: A community effort to build a data ecosystem

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I. INTRODUCTION

Data sharing is at the heart of SOOS. It is widely understood that Southern Ocean data is expensive and logistically difficult to collect and that there is never enough of it. However, there is more out there than individual researchers might expect, and we are working to make it all accessible from one place. The aim is that we, as a research community, develop the systems that will allow scientists to maximise the scientific value of observations collected in the Southern Ocean, no matter who collected them, or when, or why. At the same time, SOOS wants to protect researchers' rights to get first use out of data that they collected. In this paper, we share our progress, lessons, and plans for the future, and invite you to join us as we develop our data ecosystem.

II. SOUTHERN OCEAN OBSERVING SYSTEM

SOOS is an international initiative of the Scientific Committee on Antarctic Research (SCAR) and the Scientific Committee on Oceanic Research (SCOR). Developed over many years, SOOS was officially launched at the end of 2011 with the opening of the International Project Office, hosted by the Institute for Marine and Antarctic Studies (IMAS), and the Australian Research Council's Antarctic Gateway Partnership at the University of Tasmania, Australia. Since then, SOOS has built a network of stakeholders and contributors, all working together to achieve the community-defined mission and objectives.

The Southern Ocean Observing System bridges oceanographic and polar science programs and is one of the most intensely internationally integrated scientific communities, thanks to the logistical challenges of conducting science in these remote waters. The users of Southern Ocean data are therefore highly heterogeneous in terms of their needs and expertise.

Serving such a diverse research community requires data management systems that are flexible and focus on integration of existing data products, rather than trying to duplicate existing work. The Southern Ocean Observing System is working with both the science and data communities to design an ecosystem of data management tools, catalogues, and systems for polar oceanographic research.

What makes this system unique, compared with other data aggregators, is that SOOSmap serves an unusual community, with data coming from both a large number of nations and different scientific disciplines, despite being restricted to one geographic region. Instead, most similar portals either serve a limited number of observation types or take data from a limited number of contributing research programs.

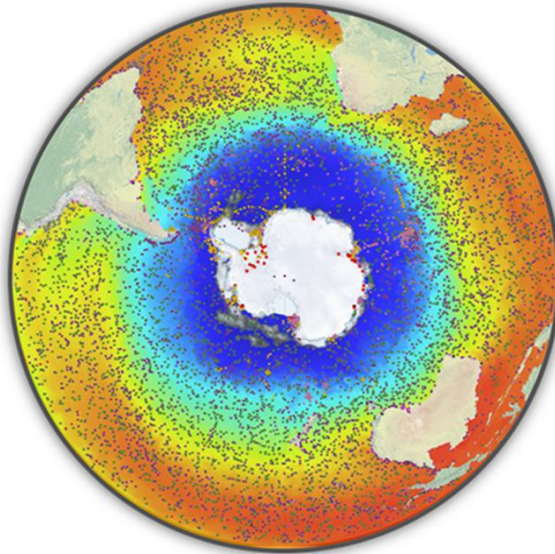


Figure 1: SOOSMAP

Key components of the SOOS data vision include data and metadata discovery tools, fieldwork coordination tools, and linking data collections with analysis tools.

Since data is coming from different sources with different formats, we process the data in order to be able to use ERDDAP as a unique Data Server for all the data we are serving. Since ERDDAP supports a wide range of data types as sources, we are able to maintain the original data in the original format and have an homogeneous point of access for retrieving the data.

Just as important are the people and communities who develop, link, and use these components. We will share, indeed, our experiences in working with EMODnet Physics to develop SOOSmap - a portal to explore, graph, and download curated spatial datasets of key observations.

SOOSmap relies on the EMODnet Physics backend, with a polar-projected map interface. In SOOSmap we added the possibility to manage different types of layers other than platforms, as data layer or background layer. Open Geospatial Consortium standards are supported plus the addition of the geojson standard. In terms of content, SOOSmap has brought in biological data on a range of topics, including birds, plankton, krill, and other key species. In terms of physical data, SOOSmap has brought in key new data sources, including the MEOP seals, which collect CTD data in areas where sea ice interferes with Argo-style floats; global CTD casts from PANGAEA, which is a major host of this data type; and the Saildrone data, which is a good example of a collaboration between EMODnet and a private company. Finally, Data are stored on a redundant Data Server and services are monitored real time for availability with Nagios (Network Monitoring Software)

III. RESULTS

In 2019, SOOSmap received ~8000 page views per month, with ~2500 near-real time data files and 11 long-term repository datasets downloaded each month. While it is difficult to fairly compare the metrics with other Antarctic data repositories, it appears to receive approximately 80 times as many views as the SOOS metadata portal on NASA's Earth Data search tool. For this community, SOOSmap has made it much more enticing to explore and download data. We will keep focusing on the challenges and need for a federated metadata search tool to improve access to a much broader range of polar oceanographic data than can be served directly through SOOSmap.