

PolarWatch - A NOAA initiative to increase access to ocean remote sensing data products for the Arctic and Southern Oceans

Cara Wilson¹, Sinead L. Farrell², Dale Robinson³, Jennifer Sevadjian³, Veronica Lance²

1. National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center (SWFSC), Environmental Research Division (ERD), 99 Pacific Street, Suite 255A, Monterey, CA, 93940, USA. **Email:** cara.wilson@noaa.gov
2. NOAA, National Environmental Satellite Data and Information Service (NESDIS), Center for Satellite Applications and Research (STAR), Satellite Oceanography and Climatology Division (SOCD), College Park, MD, USA
3. NOAA/NMFS/SWFSC, Santa Cruz, CA, USA

Executive Summary: PolarWatch is a new initiative of the United States (US) National Oceanic and Atmospheric Administration (NOAA) to deliver multi-sensor physical and biological ocean remote sensing data to diverse end-users, and across disciplines, in support of broad applications in the Arctic and Southern Oceans. The primary goals of PolarWatch are to enable data discovery and broader use of publicly-available high-latitude ocean remote sensing datasets. The Arctic is currently undergoing rapid environmental change, including accelerated ice loss from the Greenland Ice Sheet and Arctic glaciers, rising permafrost and sea surface temperatures, and long-term losses in the extent and thickness of the sea ice cover (*Richter-Menge et al., 2017*). These environmental changes influence resource management protocols and regional commerce, and directly impact Arctic residents. NOAA's Arctic vision and strategy (*NOAA, 2014*) includes strengthening foundational science to understand and detect Arctic climate and ecosystem changes, and improving stewardship and management of ocean and coastal resources in the Arctic. PolarWatch advances the priorities outlined in NOAA's Arctic Action Plan by providing a systematic method to monitor Arctic change, and easily access relevant data sets. NOAA PolarWatch is relevant to the Arctic Observing Summit 2018 as an example of a new initiative, that demonstrates the use of data and information derived from satellite remote sensing systems in support of sustained, pan-Arctic observing. PolarWatch is particularly relevant to *Sub-Theme 3 "Operating Observing Systems and Networks" (Working Group 5)* as an emerging example of the value derived from the generation and distribution of public-domain satellite data products to address societal needs.

A joint initiative between the NOAA National Environmental Satellite, Data, and Information Service (NESDIS) / Center for Satellite Applications and Research (STAR) and the NOAA National Marine Fisheries Service (NMFS) / Southwest Fisheries Science Center (SWFSC), PolarWatch builds upon and leverages the NOAA CoastWatch/OceanWatch program (coastwatch.noaa.gov). PolarWatch was created as a "node" of CoastWatch that serves both the Arctic and Antarctic regions, leveraging existing CoastWatch data services and data management capabilities. PolarWatch data products are available in a variety of file formats, accessible via a common protocol, and fully documented following established metadata standards. PolarWatch distributes data using an "ERDDAP" data server (*Simons, 2017*) that provides a simple, consistent way to download subsets of gridded, scientific datasets, in standardized machine-readable formats (e.g. netCDF, MATLAB, geoJSON, XML) and includes metadata that follows the standards for COARDS, Climate Forecast (CF), and Attribute Conventions for Data Discovery (ACDD). Download formats also include images (geoTIF, PNG, KML, PDF) and various text formats.

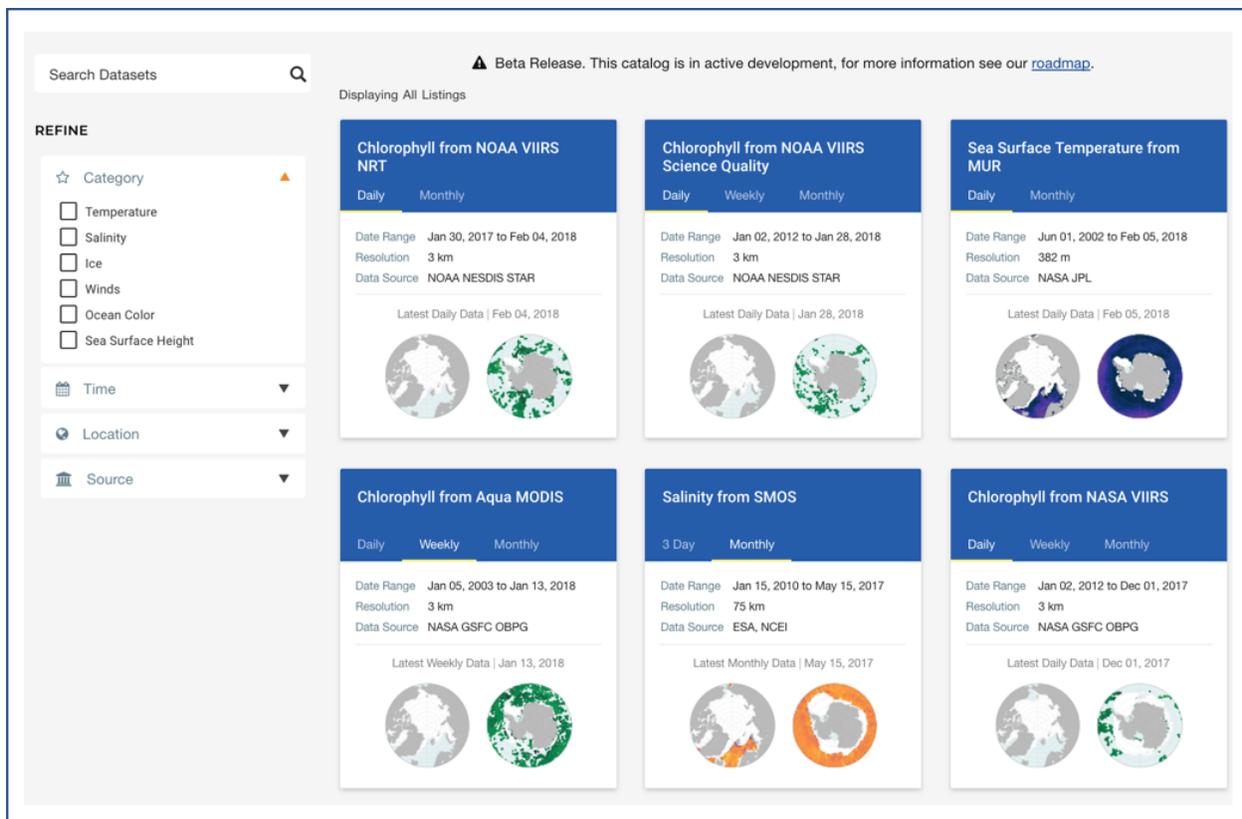


Figure 1. Interface of the NOAA PolarWatch catalogue (beta version) used to search and filter satellite ocean remote sensing datasets. The portal highlights data availability in a polarstereographic projection, for both the Arctic and Southern Oceans. Additional data products are available online at polarwatch.noaa.gov.

A primary feature of PolarWatch is an online catalogue that delivers a suite of satellite data products from a variety of sensors and data providers (Figure 1). The catalogue provides data preview and access pages, including details and background information about each data product. Previews are provided for both the Arctic and Southern Oceans in polarstereographic projection. Data downloads may be customized by area, date, parameter, and file format. The Polarwatch portal delivers both near-real-time data products, as well as science quality data products, spanning the full temporal range of the dataset. Initial datasets include sea ice concentration, sea surface height, salinity, sea surface temperature, ocean surface winds, and ocean color. During the pilot effort, we are engaging with users at the following NOAA centers: the Alaska Fisheries Science Center, the Antarctic Ecosystem Research Division, the Environmental Modeling Center, the Earth System Research Laboratory, the NOAA Climate Program Office, the Center for Satellite Applications and Research, as well as the National Ice Center.

PolarWatch also aims to provide new satellite data products to existing and emerging Arctic and Antarctic data portals. We plan to leverage existing collaborations with NOAA's National Centers for Environmental Information (NCEI) Arctic Team and the U.S. National Snow and Ice Data Center (NSIDC) to ensure PolarWatch is a complimentary service to existing national polar data services and portals. We also look forward to working with others engaged in polar data distribution to help ensure PolarWatch provides needed datasets that are interoperable with existing systems. A long-term objective of PolarWatch is to engage a diversity of stakeholders including local, state, and federal agencies, and international partners, to maximize the value of high-latitude, satellite data products.

References:

NOAA. 2014. NOAA's Arctic Action Plan – Supporting the National Strategy for the Arctic Region, U.S. Dep. Commer., Natl. Oceanic Atmos. Admin., Silver Spring, Md. 30 p.

Richter-Menge, J., Overland, J. E., Mathis, J. T. and Osborne, E. Eds. 2017. Arctic Report Card 2017, <http://www.arctic.noaa.gov/Report-Card>.

Simons, R.A. 2017. ERDDAP, <https://coastwatch.pfeg.noaa.gov/erddap>, NOAA/NMFS/SWFSC/ERD Monterey, CA