



In situ Datasets from the PO.DAAC – Sairdron, SPURS and OMG

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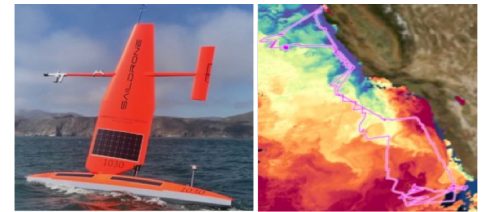


Introduction

In addition to being one of the premier repositories for oceanographic satellite data, the NASA Physical Oceanography DAAC is also increasingly adding *in situ* oceanographic datasets to its catalog. These include datasets from the NASA-funded Salinity Processes in the Upper Ocean Regional Study, (SPURS)-1 and -2 field campaigns, the Oceans Melting Greenland (OMG) field campaign, and recently data from select Sairdron cruises. All of these collections contain a plethora of oceanographic observations including temperature, depth, conductivity, and select meteorological observations. Other conference presentations will describe the science results from campaigns such as Sairdron. Here we present an overview of each mission, the data and metadata models utilized, and discuss related PO.DAAC and other NASA support/services development. Some of the lessons learned and implementation challenges will be documented especially with regard to tool and services integration. Roadmaps to future services to improve upon the documentation, access, visualization, integration and utilization of these and other *in situ* datasets are also presented.

Sairdron is a state-of-the-art, wind and solar powered unmanned surface vehicle (USV) capable of long distance deployments lasting up to 12 months. A recent (summer 2018) Alta/Baja California cruise is one of the first publicly available dataset of its type. Future datasets include the current Arctic 2019 campaign in support of NOPP.

- Measurements of air temperature, skin and bulk SST, conductivity, depth, salinity, oxygen, Chl-A, pressure, wind speed and direction, ADCP currents
- Scientific objectives included studies of upwelling and frontal region dynamics, air-sea interactions, and diurnal warming effects
- PO.DAAC collaborated with Sairdron on data format specifications. All archived data are netCDF/CF standards compliant.
- PODAAC Sairdron Mission Page: <https://podaac.jpl.nasa.gov/sairdron>
- Sairdron Dataset Landing Page (Baja cruise): https://podaac.jpl.nasa.gov/dataset/SAIRDRONE_BAJA_SURFACE



SPURS (Salinity Processes in the Upper Ocean Regional Study)

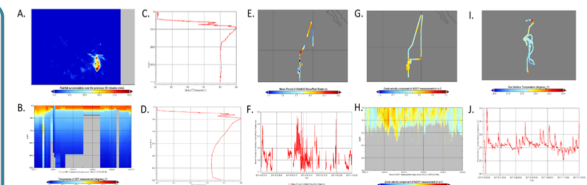
Elucidate key mechanisms responsible for near-surface salinity variations in the oceans employing state-of-the-art *in situ* sampling technologies combined with remotely sensed salinity fields from the Aquarius, SMAP & SMOS satellites.

SPURS-1 Field Campaign (2012-13)

- 5 cruises seeking to resolve the salinity structure and balance in a high salinity, high evaporation, and low rainfall region of the subtropical N. Atlantic
- Archived collection of 15 dataset publicly released 2015-05-11
- <https://podaac.jpl.nasa.gov/datasetlist?ids=&values=&search=spurs1>

SPURS-2 Field Campaign (2016-17)

- 2 cruises focusing on physical processes influencing upper-ocean salinity over the seasonal cycle in a low-salinity, rainfall dominated region of the eastern tropical Pacific.
- First 7 of 28 SPURS2 datasets released 2019-04-09 (rest within 2019)
- <https://podaac.jpl.nasa.gov/datasetlist?ids=&values=&search=spurs2>



SPURS2 Data: A) SEA-POL rain accumulation imagery data, B) XBT temperature profile time series plot, C) lowered CTD station salinity profile plot, D) ARGO float vertical salinity profile, E & F) ADCP u-current velocity trajectory and vertical profile series, and G & H) surface temperature trajectory and time series from Sairdron.

OMG is a 5-year (2015-2020) NASA Earth Venture Suborbital (EVS-2) mission that aims to improve estimates of sea level rise by quantifying the extent are the oceans melting Greenland's ice from below. It involves a series of airborne and oceanographic field campaigns where measurements of the ice shelf extent, mass, bathymetry and water column temperatures are being made using the following instruments:

AIRGrav - Airborne Inertially Referenced Gravimeter, **GLISTIN-A** – Airborne Glacier & Ice Surface Topography Interferometer, **CTD** & Airborne eXpendable CTD (AXTD), **Single & Multi-beam Sonar**
 PODAAC OMG Mission Page: <https://podaac.jpl.nasa.gov/omg>

Metadata & Data Models for In Situ datasets

- Metadata design leveraging NOAA NCEI templates and HDF Product Designer
- CF Discrete Spatial Geometry (DSG) trajectory, profile, point, time series feature types used
- Extensions proposed for “Rich Metadata” support leveraging Groups
- Interoperable in PO.DAAC OPeNDAP and THREDDS servers, and popular tools like Panoply
- Data converted from manufacture formats to netCDF/CF data model standards
- Enhancement of *ROSETTA* web-based conversion tool/API for single and bulk *in-situ* data file transformations

Satellite/*in situ* Match Ups capabilities from Oceanworks & Visualization from OIIP: Future PO.DAAC infusion potential

Satellite to *in situ* observations match ups from Oceanworks

- Satellite to *in situ* instruments including drifting and moored buoys, ships, gliders and other oceanographic assets from the SAMOS, ICOADS and SPURS *in situ* data collections.
- User defined time/space match-up criteria to satellite data from ocean wind, SST and salinity
- An OceanWorks service. Federated queries and responses from distinct satellite and *in situ* data providers.
- Example (right): Difference in satellite (ASCAT-B) and *in situ* (SAMOS) wind observations more than expected likely due to proximity to land affecting satellite measurements
<https://oceanworks.jpl.nasa.gov>

