SWOT Pre-launch field campaign 2019-2020 in-situ data - version 1

Version 0. July 31, 2020
    L2 data with limited quality control.
    Hosted on PO.DAAC Drive. Released to the current and previous SWOT Science Teams.
Version 1. December 22, 2021
    L2 data with limited quality control.
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Dataset

SWOT pre-launch in-situ field campaign Level-2 data. It includes hydrographic temperature and conductivity measurements, bottom pressure from bottom pressure recorders (BPRs) and sea surface height (SSH) measurements from GPS buoys.

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Citation

This document describes the datasets collected by the pre-launch field campaign. Each dataset has its own DOI and should be cited as follows:

SWOT pre-launch field campaign, 2020; Datasets of GPS sea surface height, Conductivity, Temperature and Depth (CTD), Pressure-Inverted-Echo-Sounder, and Bottom Pressure from the 2019-2020 SWOT pre-launch field campaign. Version 2. PO.DAAC, CA, USA. [instrument_DOI].

The instrument_DOIs are listed below.

1. NOAA Bottom Pressure Recorders (BPR): https://doi.org/10.5067/SWTPR-BPR01
2. Rutgers Slocum Gliders: https://doi.org/10.5067/SWTPR-GLID1
3. JPL Global Positioning Systems (GPS): https://doi.org/10.5067/SWTPR-GPS01
4. SIO Pressure-sensing Inverted Echo Sounder (PIES): https://doi.org/10.5067/SWTPR-PIES1
5. NOAA Prawlers: https://doi.org/10.5067/SWTPR-PRAW1
6. SIO Moored Fixed-Depth CTDs: https://doi.org/10.5067/SWTPR-CTD01
7. WHOI/NOAA Moored Fixed-Depth CTDs: https://doi.org/10.5067/SWTPR-CTD11
8. SIO Mooring WireWalker (WW): https://doi.org/10.5067/SWTPR-WW001

Data Access

The datasets are distributed by PO.DAAC. Methods of accessing the data can be found on the landing page of each dataset following the DOI.

Contact

General questions regarding data access: podaac@podaac.jpl.nasa.gov.

1. Introduction

SWOT pre-launch field campaign was designed to test the performance of several instruments/platforms in meeting the SWOT CalVal requirement. It was conducted near the SWOT CalVal crossover location, about 300 km west of Monterey, California (Figure 1). Six institutions participated in the campaign: JPL, NOAA/PMEL, WHOI, SIO, Rutgers, and RSS. Three moorings and two bottom pressure recorders were deployed between September 1st and 7th, 2019 by R/V Robert Gordon Sproul, and recovered between January 16th and 21st, 2020 by MV Bold Horizon. In addition, one Slocum glider was deployed off Monterey Bay and piloted to the mooring locations.

The three moorings are (1) PMEL/WHOI configured with a GPS buoy and 18 fixed CTDs below surface (green dot in Figure 1), (2) PMEL GPS mooring with a Prawler sampling the upper 500 m temperature and salinity (T/S) (red dot in Figure 1) and (3) SIO mooring with a WireWalker sampling the top 500 m and 7 fixed CTDs from 500m to the bottom (cyan dot). Rutgers glider sampled a 60-km long section perpendicular to the mooring line marked by the white dashed line. The three moorings are placed under Sentinal-3A (S3A) orbit to examine the small spatial-scale signals not resolved by S3A.

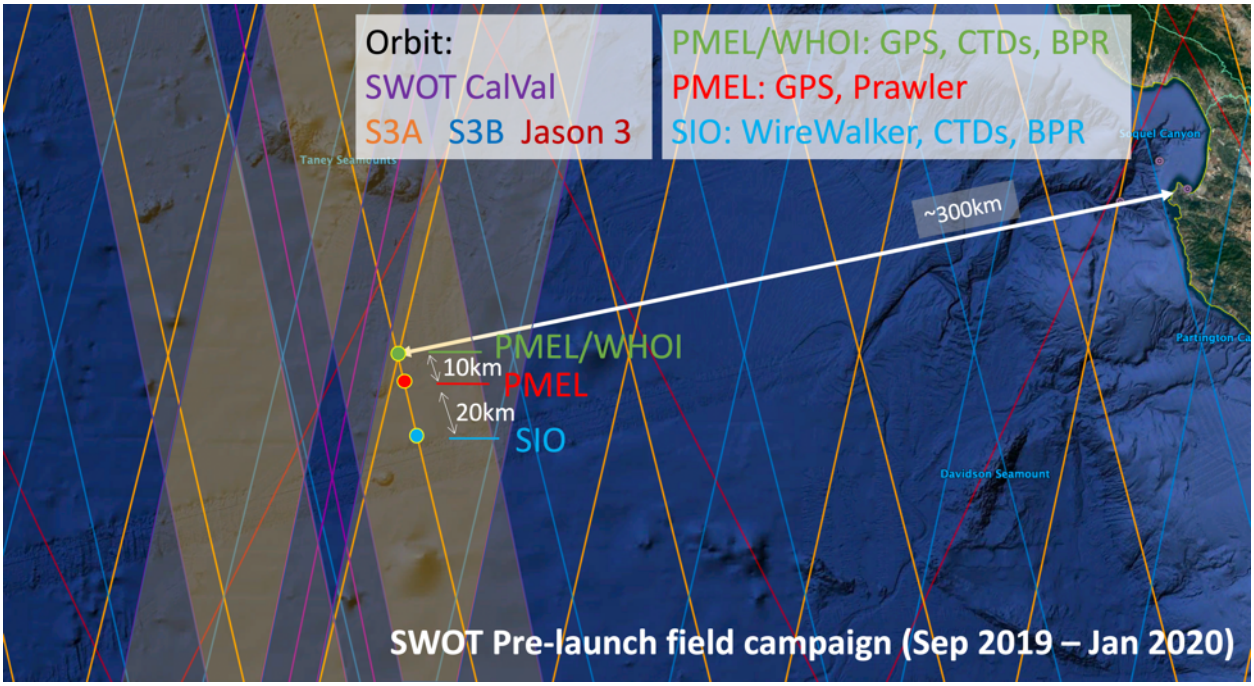

Figure 1. Map of the field campaign instrumentation. The three moorings are marked by the three colored dots. From north to south, they are PMEL/WHOI mooring, PMEL Prawler mooring with GPS on the buoy, SIO full-depth mooring. The separation distance is 10 km and 20 km. The dashed white line is the glider target path. Two bottom pressure recorders were deployed near the PMEL/WHOI and SIO moorings.

The campaign objectives are:

1. Test the SSH closure with GPS buoy, CTD mooring, and BPR
2. Test the sampling of the scales of SSH variability not resolved by S3
3. Evaluate the vertical scale of SSH at the SWOT scales for different frequency bands
4. Evaluate the roles of bottom pressure in SWOT SSH signals
5. Assess the information content of the in-situ observations
6. Continuation of the S3 wavenumber spectrum to SWOT regime
7. Evaluate the reconstruction of the upper ocean circulation
8. Provide information for the design of the post-launch in-situ observing system.

Objectives #1, 2, 3, 5, 8 were investigated by Wang et al. (2022). Objective #7 was addressed in Archer et al. (2022).

Campaign and Participants

The SWOT pre-launch in-situ field campaign was conducted from September, 2019 to January, 2020. Participants from six institutions are listed as follows.

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The team thanks the crew on R/V Sproul and M/V Bold Horizon. Specific thanks to Anna Savage and the crew team on R/V Sally Ride for picking up the adrift WireWalker in early

December, 2019. The JPL team thanks David Sandwell for providing their most recent MSS data near the campaign location, Hong Zhang for providing the ERA5 hourly atmospheric pressure data, and Richard Ray, Marie Eble, George Mungov for early analyses of barotropic tides using BPR data.

2. Data policy

3. Data package content

The proper quality controls have been done by each instrument group to produce Level-2 data at the native temporal and spatial resolutions. The campaign provides this data package with nine files:

1. User guide (this document)
2. NOAA_PRAWLER_L2_20100905_20200106_VER001.nc
3. NOAA_BPR_L2_20190904_20200119_VER001.nc
4. rutgers-ru26d-L2-20190905T1722.nc
5. SIO_CTDFIXED_L2_20190905_20200118_VER001.nc
6. SIO_CTDPROF_L2_20190905_20191203_VER001.nc
7. SIO_PIES_L2_20190906_20200118_VER001.nc
8. WHOI_CTDFIXED_L2_20190904_20200119_VER001.nc
9. JPL_GPS_L2_20190905_20200119_VER001.nc

Reference

Archer, M. R., Z. Li, J. Wang, and L. Fu, 2022: Reconstructing Fine-Scale Ocean Variability via Data Assimilation of the SWOT Pre-Launch In Situ Observing System. *J Geophys Res Oceans*, **127**, https://doi.org/10.1029/2021jc017362.

Wang, J., and Coauthors, 2022: On the Development of SWOT In Situ Calibration/Validation for Short-Wavelength Ocean Topography. *J Atmos Ocean Tech*, **39**, 595–617, https://doi.org/10.1175/jtech-d-21-0039.1.