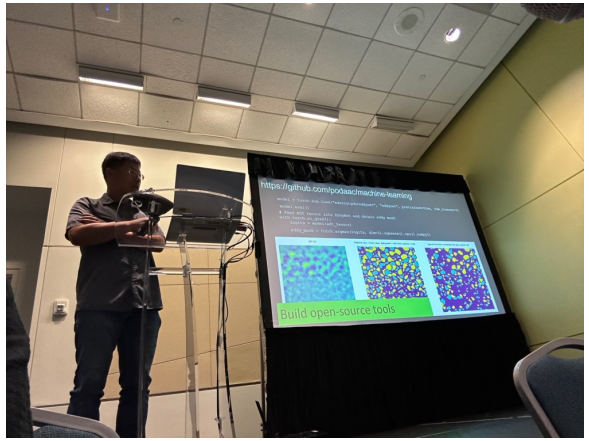
Jet Propulsion Laboratory
California Institute of Technology

Outreach & Data Services Splinter

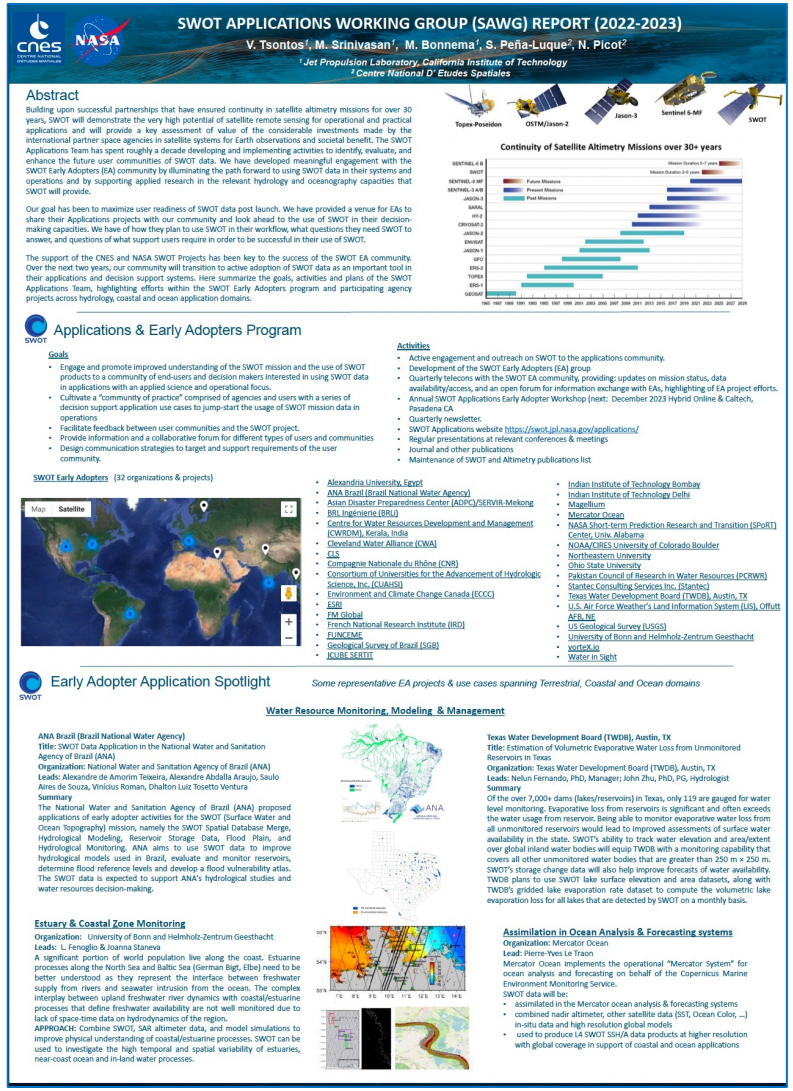
Co-Chairs: M. Srinivasan, V. Rosmorduc, Hayley Evers-King, Jack McNelis

ODS Splinter Presentations



1. **Raising awareness of SLA adjustments in the IMOS-Ocean Current website**
   Gabriela Pilo (CSIRO), David Griffin (CSIRO)
2. **A new dataset of relative sea level measurements created using Global Navigation Satellite System (GNSS) receivers**
   Andrew Matthews (National Oceanography Centre), Simon Williams (National Oceanography Centre), Chris Banks (National Oceanography Centre)
3. **CTOH products and altimetry applications over the ocean, coasts, and continental surfaces**
   Fernando Niño (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS), Damien Allain (LEGOS / Univ. Toulouse, CNES, CNRS, IRD, UPS), Florence Birol (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS), Fabien Blarel (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS), Robin Chevrier (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS,), Wassim Fkaier (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS,), Benoît Laurent (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS), Fabien Léger (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS), Rosemary Morrow (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS), Oscar Vergara (Legos / Univ. Toulouse, CNES, CNRS, IRD, UPS)
4. **Altimetry Missions Applications Support: An international collaboration for the Jason-series, Sentinel 6 & SWOT**
   Margaret Srinivasan (JPL), Vardis Tsontos (JPL), Matthew Bonnema (JPL)

ODS Poster



SWOT APPLICATIONS WORKING GROUP (SAWG) REPORT (2022-2023)

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Abstract

Building upon successful partnerships that have ensured continuity in satellite altimetry missions for over 30 years, SWOT will demonstrate the very high potential of satellite remote sensing for operational and practical applications and will provide a key assessment of value of the considerable investments made by the international partner space agencies in satellite systems for Earth observations and societal benefit. The SWOT Applications Team has spent roughly a decade developing and implementing activities to identify, evaluate, and enhance the future user communities of SWOT data. We have developed meaningful engagement with the SWOT Early Adopters (EA) community by illuminating the path forward to using SWOT data in their systems and operations and by supporting applied research in the relevant hydrology and oceanography capacities that SWOT will provide.

Our goal has been to maximize user readiness of SWOT data post launch. We have provided a venue for EAs to share their Applications projects with our community and look ahead to the use of SWOT in their decision-making capacities. We have of how they plan to use SWOT in their workflow, what questions they need SWOT to answer, and questions of what support users require in order to be successful in their use of SWOT.

The support of the CNES and NASA SWOT Projects has been key to the success of the SWOT EA community. Over the next two years, our community will transition to active adoption of SWOT data as an important tool in their applications and decision support systems. Here summarize the goals, activities and plans of the SWOT Applications Team, highlighting efforts within the SWOT Early Adopters program and participating agency projects across hydrology, coastal and ocean application domains.

Topex-Poseidon OSTM/Jason-2 Jason-3 Sentinel 6-MF SWOT

Continuity of Satellite Altimetry Missions over 30+ years

Applications & Early Adopters Program

Goals

- Engage and promote improved understanding of the SWOT mission and the use of SWOT products to a community of end-users and decision makers interested in using SWOT data in applications with an applied science and operational focus.
- Cultivate a "community of practice" comprised of agencies and users with a series of decision support application use cases to jump-start the usage of SWOT mission data in operations
- Facilitate feedback between user communities and the SWOT project.
- Provide information and a collaborative forum for different types of users and communities
- Design communication strategies to target and support requirements of the user community.

Activities

- Active engagement and outreach on SWOT to the applications community.
- Development of the SWOT Early Adopters (EA) group
- Quarterly telecons with the SWOT EA community, providing: updates on mission status, data availability/access, and an open forum for information exchange with EAs, highlighting of EA project efforts.
- Annual SWOT Applications Early Adopter Workshop (next: December 2023 Hybrid Online & Caltech, Pasadena CA
- Quarterly newsletter.
- SWOT Applications website https://swot.jpl.nasa.gov/applications/
- Regular presentations at relevant conferences & meetings
- Journal and other publications
- Maintenance of SWOT and Altimetry publications list

SWOT Early Adopters (32 organizations & projects)

- Alexandria University, Egypt
- ANA Brazil (Brazil National Water Agency)
- Asian Disaster Preparedness Center (ADPC)/SERVIR-Mekong
- BRL Ingénierie (BRLi)
- Centre for Water Resources Development and Management (CWRDM), Kerala, India
- Cleveland Water Alliance (CWA)
- CLS
- Compagnie Nationale du Rhône (CNR)
- Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI)
- Environment and Climate Change Canada (ECCC)
- ESRI
- FM Global
- French National Research Institute (IRD)
- FUNCEME
- Geological Survey of Brazil (SGB)
- ICUBE SERTIT
- Indian Institute of Technology Bombay
- Indian Institute of Technology Delhi
- Magellium
- Mercator Ocean
- NASA Short-term Prediction Research and Transition (SPoRT) Center, Univ. Alabama
- NOAA/CIRES University of Colorado Boulder
- Northeastern University
- Ohio State University
- Pakistan Council of Research in Water Resources (PCRWR)
- Stantec Consulting Services Inc. (Stantec)
- Texas Water Development Board (TWDB), Austin, TX
- U.S. Air Force Weather's Land Information System (LIS), Offutt AFB, NE
- US Geological Survey (USGS)
- University of Bonn and Helmholz-Zentrum Geesthacht
- vorteX.io
- Water in Sight

Early Adopter Application Spotlight

Some representative EA projects & use cases spanning Terrestrial, Coastal and Ocean domains

Water Resource Monitoring, Modeling & Management

ANA Brazil (Brazil National Water Agency)
Title: SWOT Data Application in the National Water and Sanitation Agency of Brazil (ANA)
Organization: National Water and Sanitation Agency of Brazil (ANA)
Leads: Alexandre de Amorim Teixeira, Alexandre Abdalla Araujo, Saulo Aires de Souza, Vinicius Roman, Dhalton Luiz Tosetto Ventura
Summary
The National Water and Sanitation Agency of Brazil (ANA) proposed applications of early adopter activities for the SWOT (Surface Water and Ocean Topography) mission, namely the SWOT Spatial Database Merge, Hydrological Modeling, Reservoir Storage Data, Flood Plain, and Hydrological Monitoring. ANA aims to use SWOT data to improve hydrological models used in Brazil, evaluate and monitor reservoirs, determine flood reference levels and develop a flood vulnerability atlas. The SWOT data is expected to support ANA's hydrological studies and water resources decision-making.

Texas Water Development Board (TWDB), Austin, TX
Title: Estimation of Volumetric Evaporative Water Loss from Unmonitored Reservoirs in Texas
Organization: Texas Water Development Board (TWDB), Austin, TX
Leads: Nelun Fernando, PhD, Manager; John Zhu, PhD, PG, Hydrologist
Summary
Of the over 7,000+ dams (lakes/reservoirs) in Texas, only 119 are gauged for water level monitoring. Evaporative loss from reservoirs is significant and often exceeds the water usage from reservoir. Being able to monitor evaporative water loss from all unmonitored reservoirs would lead to improved assessments of surface water availability in the state. SWOT's ability to track water elevation and area/extent over global inland water bodies will equip TWDB with a monitoring capability that covers all other unmonitored water bodies that are greater than 250 m × 250 m. SWOT's storage change data will also help improve forecasts of water availability. TWDB plans to use SWOT lake surface elevation and area datasets, along with TWDB's gridded lake evaporation rate dataset to compute the volumetric lake evaporation loss for all lakes that are detected by SWOT on a monthly basis.

Estuary & Coastal Zone Monitoring
Organization: University of Bonn and Helmholz-Zentrum Geesthacht
Leads: L. Fenoglio & Joanna Staneva
A significant portion of world population live along the coast. Estuarine processes along the North Sea and Baltic Sea (German Bight, Elbe) need to be better understood as they represent the interface between freshwater supply from rivers and seawater intrusion from the ocean. The complex interplay between upland freshwater river dynamics with coastal/estuarine processes that define freshwater availability are not well monitored due to lack of space-time data on hydrodynamics of the region.
APPROACH: Combine SWOT, SAR altimeter data, and model simulations to improve physical understanding of coastal/estuarine processes. SWOT can be used to investigate the high temporal and spatial variability of estuaries, near-coast ocean and in-land water processes.

Assimilation in Ocean Analysis & Forecasting systems
Organization: Mercator Ocean
Lead: Pierre-Yves Le Traon
Mercator Ocean implements the operational "Mercator System" for ocean analysis and forecasting on behalf of the Copernicus Marine Environment Monitoring Service.
SWOT data will be:
- assimilated in the Mercator ocean analysis & forecasting systems
- combined nadir altimeter, other satellite data (SST, Ocean Color, ...) in-situ data and high resolution global models
- used to produce L4 SWOT SSH/A data products at higher resolution with global coverage in support of coastal and ocean applications

1. **SWOT Applications Working Group (SAWG) Annual Report (2022-2023)**

   Margaret Srinivasan (JPL), Vardis Tsontos (JPL), Matthew Bonnema (JPL), Santiago Peña-Luque (CNES), Nicolas Picot (CNES)