SWOT Pre-Validation Meeting, Toulouse, France
19-22 September 2023

Background

The SWOT mission brings together two communities focused on a better understanding of the world's oceans and its terrestrial surface waters. U.S. and French oceanographers and hydrologists and international partners have joined forces to develop this satellite mission to make the first global survey of Earth's surface water, observe the fine details of the ocean's surface topography, and measure how these water bodies change over time.

Workshop Objectives

This 2023 SWOT Science team meeting, organized 9 months after the successful launch of the mission, will be the first opportunity to present and discuss the early results obtained from SWOT data over all surfaces. It will also be an opportunity to discuss the initial field work programs performed in 2023, aimed at collecting independent in-situ and airborne data required for the calibration and validation of the mission products. The project teams from NASA and CNES will provide a detailed review of the current processing algorithms and on-going working plan for the release of initial pre-validated data products. The Science Team members will provide poster overviews of their SWOT preparation studies, and will discuss their validation plans for the key Science Validation Phase starting after the meeting. The objectives of the SWOT Validation Meeting, scheduled for early 2024, will be detailed as well as the calendar for the potential reprocessing of early mission products.

Workshop Format

The workshop will last for 4 days. Two plenary sessions will be held on the 1st and last day, while separate splinter meetings for hydrology and oceanography validation plans will be held on the 2nd and 3rd days of the meeting.

Workshop posters

Space for 50 posters is available in the room used for lunch & coffee breaks.

- Project overviews 2022/23 : posters up for 2 days on Tues-Wed,
- Young Career Scientist : posters up for 2 days on Thurs-Fri
- Format : A0 portrait (vertical)

Coffee/tea served :

- Welcome Coffee/Tea each morning 8h-9h
- morning pause : 10h30-11h,
- lunch : 12h30 - 14h
- Afternoon pause : 15h30-16h or 16h-16h30

SWOT Science Team Preliminary Agenda : 19-22 September 2023

Tuesday 19 Sept - Plenary

8h-9h : Welcome Morning Coffee

SWOT Project overview

09h00 Welcome & Meeting Objectives (R. Morrow & Science Leads; 5 min)
09h05 SWOT NASA/CNES Program status (N. Vinagradova Shiffer and A. Sylvestre-Baron; 10 min)
09h15 SWOT Project Status - Launch to L+9 (P. Vaze and P. Sengenes; 20 min)
09h35 SWOT Platform and Payload Performance (N. Steunou; 15 mins)
09h50 SWOT Algorithms and Products : Status and Plans (S. Desai and N. Picot; 15 mins)
10h05 Nadir altimeter & radiometer products and performance (Francois Bignalet; 20 min)
10h25 Precise Orbit Determination Performance (A. Couhert, Francois Bignalet presenting; 5 mins)

10h30 Morning Pause (30 min)

KaRIn overview I

11h00 KaRIn Instrument Performance (E. Peral, C. Chen presenting; 15 min)
11h15 Karin Calibration : (C. Chen; 15 min)
11h30 KaRIn LR Oceanography Products Status & Examples (A. Bohe; 30 min)
12h00 KaRIn HR Hydrology Products Status & Examples (R. Fjortoft; 30 min)

12h30-14h : Lunch break

KaRIn overview II

14h00 Crossover Calibration Status and Examples (G. Dibarboure; 15 min)
14h10 Features of KaRIn data that Users should be aware of (C. Chen; 60 min)
15h10 Discussion (15 min)

15h30 Afternoon pause (30 min)

SWOT Data Access and Tools

16h00 SWOT Data Access & Tools : PODAAC, hydroweb.next, AVISO (40 mins)
16h40 Discussion (20 min)

17h00 Ocean & Hydrology Poster Session : Part 1 (Project overviews 2022-2023)

Welcome Cocktail

Wednesday 20 Sept -

SWOT Validation activities Splinter sessions

8h-9h : Welcome Morning Coffee

Hydrology Validation activities	Oceanography Regional ocean CalVal	Third splinter Wed : Deltas, Estuaries and Coastal (DEC) WG session
09h00 : Overview of Calval objectives during the fast sampling orbit (N. Picot, C. Gleason; 15 min) Fast Sampling River Validation: 09h15 : Single channel rivers in temperate regions (C. Gleason & J.C. Poisson; 20 min) 09h35 : Braided rivers (T. Pavelsky & T. Rowley; 20 min) 09h55 : Tropical rivers (D. Moreira; 20 min) 10h15 : Discussion (15 min) **10h30 Morning pause** Fast Sampling Lake Validation: 11:00 : small temperate lakes (M. Gosset & T. Minear; 20 min)	09h00 : Overview of mission ocean calval and AdAC (F. d'Ovidio, J. Wang, A. Pascual, 15') SWOT ST Fast Sampling campaigns I : In-person presentations and group summary (5'+5' minutes) 09h15 : ACC-SMT 09h25 : AUSWOT 09h35 : BIOSWOT-Med 09h45 : Fast-SWOT 09h55 : Labrador sea 10h05 : MAB-SWOT 10h15 : Group summary **10h30 Morning pause** SWOT Fast Sampling campaigns II 11h00 : MAEVA-SWOT	**Science needs and challenges (10')** **Details Current cal/val activities and plans:** 09h10 : St-Laurent (Lawrence) Estuary, Québec, Canada (Pascal Matte , Marc Simard) 09h20 : Komo Estuary and Ogooué River wetlands, Gabon: (Marc Simard et al.) Guayas Estuary and mangroves Ecuador: (Marc Simard et al.) 09h30 : Hecate (Western Canada), (Guoqi Han and Charles Hannah) 09h40 Elbe estuary and Baltic Bight, CONWEST Germany: (Luciana Fenoglio-Marc)

11h20: small boreal lakes (M. Trudel & T. Pavelsky; 20 min) 11h40 : Large lakes (J-F Cretaux & T. Schöne, 20 min) 12h00 : Discussion (20-30 min)	11h10 : Marmara and Black sea 11h20 : New Caledonia 11h30 : North West Pacific 11h40 : QUICCHE 11h50 : SONETT 12h00 : South China Sea 12h10 Discussion (20 mins)	09h50 Normandy coasts, France, B. Laignel, L. Froideval, J. Deloffre, E. Salameh 10h00 Severn Estuary, UK: Paul Bell et al. 10h10 : Gironde estuary & CalVal (F. Lyard & N. Ayoub) 10h20 : Round robin on coastal corrections for altimetry (F. Birol, F. Nino) 10h30 Morning pause **11h : DEC WG : Discussion** ● **DEC specific algorithms: e.g. Tides and discharge estimates** ● **Is reported quality (cf project presentations of first day) suitable for coastal & estuarine studies ? Feedback on the appropriateness of SWOT products? Unexpected signals in the first SWOT data ?** ● **Do we have knowledge and ancillary data (incl. other satellite data) to use SWOT data**

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12h30 -14h : Lunch break (including Applications Lunch)

Science Orbit & Plans Going Forward U.S. Science Orbit Validation Activities: 14h00 : Summary of the Northern Swing (T. Rowley, C. Gleason, T. Pavelsky, L. Smith, T. Minear; 20 min) 14h20 : Discussion (10 min) Plans going forward 14h30 : Project perspectives on needs for CalVal going forward (S. Desai/N. Picot; 5 min) 14h35 : US plans moving forward (C. Gleason; 15 min) 14h50 : French Plans (J-F Cretaux/N. Picot; 15 min) 15h05 : Lessons on method intercomparison from 2022 Willamette Experiment (T. Minear, T. Rowley; 10 min) 15h15 : Discussion 15h30 Afternoon pause (30 min) 16h-17:30h Coordination & Discussion **Discussion on methodologies, lessons learned, data sharing,**	**Regional Ocean validation** Project California Campaigns 14h00 : S-Mode campaign (T. Farrar; 15 min) 14h15 : California Xover MASS Lidar results (L. Lenain w/ C. Chen presenting; 20 min) 14h35 : California Xover in-situ oceanography (J. Wang, U. Send et al.; 40 min) 15h15 Discussion (15 min) 15h30 Afternoon pause (30 min) 16h00 : Ocean GPS/GNSS CalVal sites : (15 mins + 5 mins discussion) Bass Strait, California, Corsica, N. Caledonia. (P. Bonnefond) 16h20-17h30 Summary and discussion **on methodologies, lessons learned, data sharing, plans,** SPASSO, future of AdAC (F. d'Ovidio, J. Wang, A. Pascual,...)

plans (moderated by J-F. Cretaux, T. Pavelsky, C. Gleason, N. Picot)	

Ocean & Hydrology Posters up all day : Part 1 (Project overviews 2022-2023)

Thursday 21 Sept -

SWOT Validation activities : Splinter sessions

Welcome Coffee

Hydrology WG Science & Validation Plans - 9a-10:30a Discharge Algorithm WG (M. Durand, P-O. Malaterre, C. Gleason, K. Larnier) 9:00-9:15 SWOT discharge status update overview (Mike Durand) 9:15-9:35 The big picture of SWOT discharge (Hind Oubanas) 9:35-10:10 SWOT Confluence: Status and a tour of early results (Steve Coss & Travis Simmons) 10:10-10:25 Revisit plan for first SWOT discharge paper (Kostas Andreadis) 10:25-10:30 Prompt for discussion (Colin Gleason) 10h30 Coffee 11a-12p Discharge Algorithm WG Discussion (C. Gleason, M. Durand, P-O Mallaterre, K. Larnier) 12:00-12:30p Global Modelling WG (A. Boone, D. Lettenmaier) - 15 min Dennis Lettenmaier: prospects for use of swot data to improve surface water-related water and energy fluxes in numerical weather and climate prediction	**Oceanography Validation plans** Waves/air-sea interaction WG (1h): 8' each - Project - A. Bohe: wave and sig0 effects and wave parameters from L1 data and future L2 products. - small scale wave variability and wave-current interactions in the S-MODE region: Lenain & al. (note there is also a S-MODE talk in another session by Tom) - small scale wave variability and wave-current interactions in the NW Med region: Ardhuin et al. - high-res sig0 signatures of wind, waves & currents (who: TBC) - SWOT attitude calibration: Ubelmann et al. - 20' Discussion **MSS WG (30 min) : 10' each** - Philippe Schaeffer : Hybrid 2023 MSS: Status and Implementation for User Community - Jinbo Wang- Stacking SWOT Data and Residual Geophysical Signals - Isabelle Pujol : MSS Noise and Residual Geophysical Signals

models
- 15 min Simon Munier: Improved understanding of the global continental water cycle using SWOT within a data assimilation framework

12h30-14h : Lunch break

River Science WG (1 h)

1. 5 minutes to summarize our working group activities during the past year
2. 10/15-mn to summarize the progress made in the various ST projects related to River Science.
3. 15-mn to present high-level activities related to early SWOT data analysis and feedback, or other key results to the community.
4. 20-mn discussion and questions, regarding the use of the first data when available, the current algorithms and improvements needed, the ancillary data needed, current in situ data available to the community, what do we expect from the RS WG in the next months/years, which priorities, ideas to share about the next ST team, etc.
5. 5-mn about upcoming publications from our Working Group (subjects/leaders/links with other WGs)

Lake, Estuary, Wetland WG (1 h) (J. Wang, S. Biancamaria)

Item 1 - Overview of WG meetings (5 min)
Item 2 - Progresses of Science Team projects (15 min)
Item 3 - Early SWOT data exploration and feedback (10 min)
Item 4 - Discussion on community questions (25 min)

10h30 Coffee break

MSS WG (cont)
David Sandwell: Moving Forward with SWOT MSS: Discussion (15 min)

Tides / Internal Tides WG (1h15) : 10 min each

- Loren Carrere: Estimating baroclinic tides from and for SWOT, L. Carrere M. Tchilibou, Y. Faugère, F. Lyard, G. Dibarboure and N. Picot
- Florent Lyard: Barotropic corrections for SWOT: FES2022 and DAC, F. Lyard, L. Carrere, M. Dabat, M. Tchilibou, Y. Faugère, G. Dibarboure and N. Picot
- Brian Arbic: Exploring the potential of hydrodynamical models for nadir and swath internal tide corrections, Yadidya Badarvada and Ritabrata Thakur
- Maarten Buijsman : Nonlinear internal tides in global HYCOM
- Noe Lahaye : High-frequency variability, Noé Lahaye, Aurélien Ponte, Zoé Caspar-Cohen, and Xiaolong Yu
- Discussion (20 mins)

12h30-14h : Lunch break

Validation with HR Modelling (1h) (8 min each)

- Patrice Klein: Dynamical Balance of Submesoscales
- Maarten Buijsman: Internal tides in global HYCOM
- Eric Chassignet: Using SWOT to assess the realism of km-scale models
- Brian Arbic: Preliminary computation of spectral kinetic energy

Item 5 - Publication plans (5 min)	cascades - Luc Rainville: Contributions to steric height around Luzon Strait in a high-resolution ocean model and glider observation - Discussion (20 mins) **Data Inversion & assimilation (1h) (8 min each)** - Mounir Benkiran:First comparisons between SWOT and the MOI system. M. Benkiran, E. Rémy and P.-Y. Le Traon - Joseph D'Addezio: Assimilative ocean modelling during SWOT cal/val and next steps. J D'Addezio and G Jacobs - Sarah Gille: California Current CalVal state estimation using the MITgcm M Mazloff, A Verdy, B Cornuelle, G Gopalakrishnan and S Gille - Maxime Ballarotta: Experimental Mapping of Ocean Surface Topography using SWOT Altimetry: Ongoing and Future Studies M. Ballarotta, C. Ubelmann, G. Meda, A. Tréboutte, Y. Faugere, G. Dibarboure and R. Fablet - Spencer Jones or Shafer Smith: Learning non-wave surface divergence from sea surface height using neural networks. Q. Xiao, D. Balwada, C. S. Jones, M. Herrero-Gonzalez, K. S. Smith, R. Abernathey - Emmanuel Cosme: High-resolution Sea Surface Height mapping with assimilative simple models: status and plans A. Stella, V. Bellemin-Laponnaz, F. Le Guillou, S. Metref, C. Ubelmann, A. Barboni and E. Cosme

	- Discussions (12 mins)

16h00 Afternoon pause (30 min)

16h30 Ocean & Hydrology Poster Session : Part 2 (SWOT Post-Docs/PhDs …)

17h45 Social event (departure by bus at about 17h45)

Friday 22 Sept - Plenary

Welcome Coffee

Morning Plenary : Going Forward

09h00 : The NASA Women's Aqua Boost project (T. Amer, 10 mins)
09h10 : Early SWOT 21-day data assessment (August -mid Sept) (Matthias Raynal) (20 min)
09h30 : LR data on different surfaces : inland waters, sea-ice, land ice, etc (Gerald) (20 mins)
09h50 : Discussion
10h00 : Seasonal HR mask in Science orbit (Sylvain, Claire, Tamlin, Rosemary)
10h15 : Discussion
10h30 : Group Photo

10h30 Morning pause (30 min)

Validation splinter overviews : key issues going forward (11h-12h30)

- 30m: Hydrology Validation & WG splinter discussion (WG Leads)
    - 10 mins Validation: N. Picot, C. Gleason
    - 5 mins DAWG: M. Durand, P-O Malaterre
    - 5 mins Global Modeling: D. Lettermaier, S. Munier
    - 5 mins SLEW: S. Biancamaria, J. Wang
    - 5 mins River Science: F. Papa, E. Rodriguez
- 30m: Oceanography Validation & WG splinter discussion (WG Leads)
    - 10 mins Regional validation (J. Wang, F. d'Ovidio)
    - 5 mins Waves / MSSS : F. Arduin, D. Vandemark, D. Sandwell
    - 5 mins Tides / Internal Tides : R. Ray, E. Zaron, F. Lyard
    - 5 mins HR modelling : B. Arabic, L. Renault
    - 5 mins Inversion : E. Cosme, S. Gille
- 15m: Coastal Validation splinter discussion (WG leads)…

12H30 -14h : Lunch break

Afternoon Plenary : Planning Oct 23 - Mar 24

14h00 Update on SWOT Applications (M. Srinvasan, 20 mins)…

14h20 : Plans for ongoing operational data processing (Nicolas, Shailen) (10 min)

14h30 : Ocean Science Data & analysis tool sharing discussion (S. Gille, J. Wang, R. Morrow, C. Germineaud) (15 min)
14h45 : Hydrology Science Data & analysis tool sharing discussion (C. Gleason, L. Zawadzki) (15 min)

15h00 Discussion on questions/concerns arising from meeting (T. Farrar & T. Pavelsky & Science Leads)
15h30 Discussion & Planning for Validation Meeting - early 2024 (LL Fu & Science Leads)
SWOT Validation publications,
future communication & meetings

16h00 End of meeting