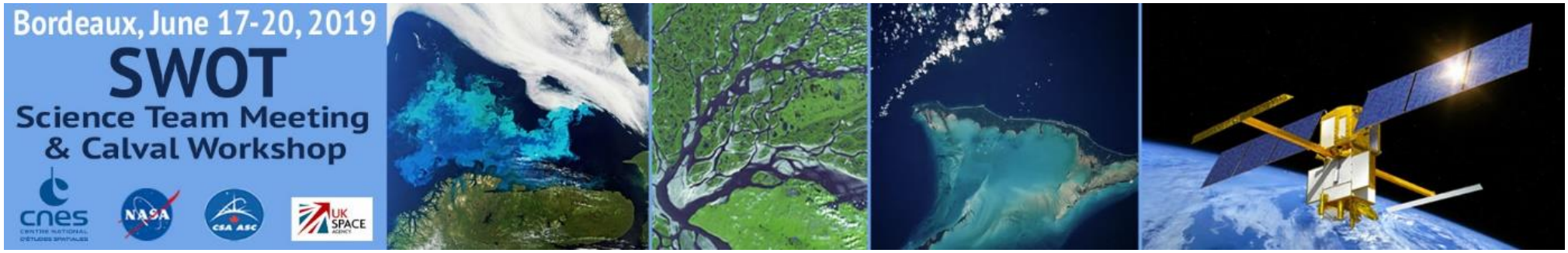
Bordeaux, June 17-20, 2019
SWOT
Science Team Meeting
& Calval Workshop
cnes
NASA
CSA ASC
UK SPACE

PROGRAM

Program at a glance

	Monday 17 June 2019		Tuesday 18 June 2019		Wednesday 19 June 2019		Thursday 20 June 2019	
	SWOT ST Workshops		**SWOT ST Meeting**		**SWOT ST Meeting**		**SWOT ST Meeting**	
8h-9h	**Main hall** **Registration and welcome coffee**							
9h-10h30	**Auditorium Agora** Ocean : SWOT Calval and in-situ science campaigns	**Amphithéatre A29/Amphi F** Hydro: Data Products	**Auditorium Agora** Plenary		**Auditorium Agora** Plenary		**Amphithéatre A29/Amphi F** Ocean	**Auditorium Agora** Hydro
10h30-11h	**Coffee break**							
11h-12h30	**Auditorium Agora** Ocean : SWOT Calval and in-situ science campaigns	**Amphithéatre A29/Amphi F** Hydro: Data Products	**Auditorium Agora** Plenary		**Auditorium Agora** Plenary		**Amphithéatre A29/Amphi F** Ocean	**Auditorium Agora** Hydro
12h30-14h	**Lunch break**							
14h-15h30	**Auditorium Agora** Ocean : SWOT Calval and in-situ science campaigns	**Amphithéatre A29/Amphi F** Hydro: Data Products	**Amphithéatre A29/Amphi F** Ocean	**Auditorium Agora** Hydro	**Auditorium Agora** Ocean	**Amphithéatre A29/Amphi F** Hydro	**Auditorium Agora** Coastal Plenary	
15h30-16h	**Coffee break**							
16h-17h30	**Auditorium Agora** Ocean : SWOT Calval and in-situ science campaigns	**Amphithéatre A29/Amphi F** Hydro: Data Products	**Amphithéatre A29/Amphi F** Ocean	**Auditorium Agora** Hydro	**Auditorium Agora** Ocean	**Amphithéatre A29/Amphi F** Hydro		
17h30-18h30			Poster session in the Cloister					
18h30-19h30			Cocktail in the Badiane room					
19h30					Dinner at Le café Maritime			

Monday 17 June 2019: Workshops

SWOT Ocean Workshop	SWOT Hydrology Data Products Workshop
Auditorium de l'Agora	**Amphithéatre A29/Amphi F**
SWOT Ocean CalVal and Science In-situ campaigns Workshop Objectives : Update the science team on the recent progress in planning 4D in-situ science campaigns to accompany SWOT SSH observations (science in-situ planning is urgent since we are less than 3-years before the 2022 Fast Sampling Phase). **9h** Introduction & meeting objectives (R. Morrow, L-L Fu, F. d'Ovidio, T. Farrar*)* **9h10** SWOT CalVal plan & global statistical CalVal (C. Chen, N. Picot) **9h20** Use of current altimeter data to characterize SWH and Tropo variabilities within Karin swath (CLS) **9h30** Status of the Californian in-situ calval plan (L. Fu, Y. Chao) • the California site pre-launch ocean in-situ campaign (Y. Chao) - 25' • Preliminary analysis of GPS moorings for geodetic objectives (L-L. Fu, J. Wang, B. Haines) -15' • ocean in-situ oceanographic objectives (L-L. Fu, J. Wang) -25'	Meeting goals: describe all of the SWOT Level 2 hydrology data products to the SWOT Science Team in greater detail than possible in an ordinary ST session. Explore the choices that the Algorithm Team is making in terms of data products and algorithms. Get Science Team feedback and/or approval for these choices. Introduce the Science Team to example data products where possible. **9h-10h30 Intro, Pixel Cloud** • **9h-9h15** Introduction, Meeting Goals (T. Pavelsky) • **9h15-9h45** Overall Data Product Structure: overview of pixC, river and lake data product structure, brief intro to L0 and L1 products (C. Chen, R. Fjortoft) • **9h45-10h15** The Pixel Cloud Product: Format, Contents and Status (B. Williams) • **10h15-10h30** Discussion (T. Pavelsky)
10:30 Coffee break	
11h Update on other CalVal Sites • Update on mooring plans (U. Send, SIO) - 10' • Lidar campaigns (L. Lenain) -40 ' **Discussions** • Next steps for the pre-launch ocean in-situ campaign -10' • Next steps for the lidar experiments - 10' • Next steps for designing the Post-Launch Californian Xover campaign - 10'	**11h-12h30 Rivers** • 11h-11h20 The River A Priori Database (E. Altenau, T. Pavelsky) • 11h20-12h10 The River Data Products: Hands on exercise (M. Hagemann) • 12h10-12h30 Processing the Pixel Cloud to Make River Products: Philosophies and Challenges (M. Durand)
12:30 Lunch	

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Afternoon. SWOT In-situ science validation campaigns (T. Farrar, F. d'Ovidio)
14h Workshop reports - new techniques for observing 100 km2 upper ocean

SWOT Science In-situ Campaign Workshop report (T. Farrar) - 15'
An extended in-situ science campaign in Californian xover - S-MODE (T. Farrar)- 15'
June 2019 Calypso In-situ workshop report (A. Pascual) - 15'
Discussion - sampling small, rapid dynamics over 50-100 km2

15h Adopt-a-crossover Science Validation experiment (Fast sampling Phase)

OceanObs Whitepapers, EOS article & CLIVAR organization update (R. Morrow, F. d'Ovidio) 10'
Package of HR satellite products from Project at each site (CLS)- 10'
Overview of proposed sites (F. d'Ovidio) - 10'

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14h-15:30p Lakes

14h-14h30: The Lake A Priori Database (Y. Sheng, C. Pottier)
14h30-15h: The Lake Data Products: Format, Contents and Status (C. Pottier)
15h-15h30: Interface Between Rivers and Lakes: Philosophies and Challenges (M. Durand and C. Pottier)

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<td colspan="2">15h30 Coffee break</td>
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16h Fine-scale ocean sites : update on preparation campaigns in 2018-2019 :

Bass Strait, ACC south of Tasmania & AUSWOT plans (B. Legresy, C. Watson) (20')
W Mediterranean CalVal updates - (A. Doglioli) - 10'
New Caledonia site (L. Gourdeau, F. Marin) (10 mins)
Internal tides off Amazon (A. Koch-Larrouy) (10 mins)
Observations of (sub)mesoscale bio-physical variability (K. Drushka, P. Gaube) 10'

17h00 : Discussion : (T. Farrar, F. d'Ovidio)

Organisation & future planning of international group
new techniques for in-situ observations & links with SSH

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16h-17h30p Other Data Products & Considerations

16h-16h30 The Raster Product (T. Pavelsky)
16h30-17h Data Quality Flags Panel (L. Smith, C. David, S. Biancamaria)
17h-17h15 The Floodplain DEM Product (D. Desroches)
17h15-17h30 Discussion & Wrap Up (T. Pavelsky)

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17:30 Adjourn
Outcomes :

Roadmap for the post-launch science campaign
Roadmap for setting up a Fast-Sampling Phase CLIVAR-SWOT Ocean in-situ consortium "Adopt-a-crossover"

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Tuesday 18 June 2019: SWOT Science Team Meeting

Plenary (chair : R. Morrow)

Auditorium de l'Agora

9h00 Meeting introduction and objectives (Science Leads)
9h20 Program Status (N. Vinogradova-Shiffer, S. Cherchali)
9h40 Project status (P. Vaze, T.Lafon)
10h10 Applications : Hydro & Oceans (A. Andral, M. Srinvasan, F. Houssain, N. Picot)

10h30 coffee break

Keynote talks - Summary of Key ST results (chair : JF Cretaux)

11h00 Ocean Splinter key results : 4 x 10 min :

- Ocean HR modelling for SWOT - Klein, Arbic, Le Sommer;
- Ocean observations for SWOT - K. Drushka
- Ocean Tides and HF motions - E. Zaron;
- 2D/3D reconstruction of SSH and currents - E. Cosme;

11:45 Hydro splinter key results talks : 4 x 10 min

- Lakes sciences and progress - J-F Cretaux, Y. Sheng
- Discharge algorithm and science -DAWG Team
- SWOT and Hydrologic Modeling - E. Beighley, P. Lemoigne
- Cal/val on lakes, rivers and estuaries -Minear, Calmant, Pavelsky

12h30 Lunch

Ocean Splinter 1 **Amphithéatre A29/Amphi F**	**Hydro Splinter 1** **Auditorium de l'Agora**
14h-15h30 : High-resolution ocean general circulation models (P. Klein, B. Arbic, J. Le Sommer) • Brian Arbic: "Comparison of internal tides and gravity waves in global models and observations." • Sarah Gille, M. Mazloff, B. Cornuelle, J. Wang.: "Regional modeling challenges in the California Current" • Laurent Brodeau and J Le Sommer: "Simulating energy exchanges down to 10km scale in the North Atlantic : results from eNATL60 simulations at IGE/Ocean Next" • Dhruv Balwada, T Uchida, R Abernathey, S Smith: "Tracer transport at SWOT scales" • JPL group: "New results from LLC4320 simulation and new questions". • Arin Nelson and B Arbic: "Can We Increase the Realism of a Simulated Ocean's Internal Wave Spectrum by Increasing Resolution?"	**14h-15h30 SWOT Lake Algorithms, Science & Processes (Cretaux, Sheng)** • -20 mins: Lake storage variations algorithm update (J-F. Cretaux) • -20 mins: Arctic lake science (L. Smith) • -20 mins: Sahel lake results (M. Grippa) • -20 mins: Global lake patterns (Y. Sheng) • 10 mins backup for discussion

<table>
<tr><th colspan="2">15h30 coffee break</th></tr>
<tr><th>Ocean Splinter 2</th><th>Hydro Splinter 2</th></tr>
<tr><td>16h - 17h30 : Observation of SSH, currents at small mesoscales In-situ & Multi-satellite studies (Convenors: A. Ponte, A. Pascual)
12’ each : 10’ presentation & 2’ questions

• Pascual et al. Horizontal and vertical fine-scale currents - Med SWOT experiment (2018) - 12’
• Doglioli et al., Med-sea, bioSWOT - 12’
• Farrar et al., directional internal waves - 12’
• Gille et al., ADCP, balanced vs waves - 12’
• Siegelman et al., Deep reaching submesoscales: elephant seals provide insight towards reconstructing vertical velocities from altimetry observations - 12’
• Rodriguez, Dopplerscatt - 12’</td><td>16h-17:30 Discharge Algorithms & Science (Durand, Gleason, POM, PAG)

• -15 mins: Hydraulic visibility: depicting hydraulic variabilities from water surface signatures (Garambois, Montazem et al.)
• -40 mins: Estimating discharge from SWOT at reach scale (Pepsi2) (R. Frasson, K. Larnier, and H. Oubanas)
• -35 mins: Science team proposal for SWOT discharge estimation (M. Durand, C. Gleason, POM, PAG)</td></tr>
<tr><td colspan="2">17h30-18h30 Posters session in the Cloister</td></tr>
<tr><td colspan="2">18h30-19h30 Cocktail in the Badiane room</td></tr>
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Wednesday 19 June 2019: "Practical advancement"

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<tr><th colspan="2">Plenary (N Picot, S. Desai)</th></tr>
<tr><th colspan="2">Auditorium de l'Agora</th></tr>
<tr><td colspan="2">9h00 Products and Science Data Algorithms
Status of Product Definitions and Plans for Algorithm Theoretical Basis (20') (S. Desai and N. Picot)
Level 2 Ocean Products (10') (B. Stiles, N. Steunou)
Level 2 Hydrology Products
Pixel Cloud (8') (B. Williams and D. Desroches)
River (7') (J. Turk and C. Pottier)
Lake (7') (C. Pottier and J. Turk)
Raster (8') (T. Pavelsky)
High Resolution Mask (20') (T. Pavelsky, M. SImard, B. Laignel, and C. Pottier)
Discussion (10')</td></tr>
<tr><th colspan="2">10h30 coffee break</th></tr>
<tr><td colspan="2">11h00 Data access and facilities
NASA PODAAC Data Access, Status, and Plans (20')
CNES AVISO ocean and THEIA hydrology Data Access, Status, and Plans (20')
Seascope (Rome presentation- L. Gaultier) with F. Briol (20')
Discussion (10')
12h10 SWOT Error performance
Update on SWOT Error performance and estimation (D. Esteban-Fernandez, JPL) - 20'</td></tr>
<tr><th colspan="2">12:30 Lunch</th></tr>
<tr><th>Ocean Splinter 3
Auditorium de l'Agora</th><th>Hydro Splinter 3
Amphithéatre A29/Amphi F</th></tr>
<tr><td>14h Tides, internal tides, internal gravity waves, DAC (R. Ray, F. Lyard , B. Arbic, E Zaron)
Jay Shriver - HYCOM recent results and plans -12'
Kyla Drushka - Analysis of tide/mesoscale/submesocale components in MITgcm off California - 12'
Ed Zaron - Predictability of baroclinic tides in AMSEAS model - 12'
Sam Kelly - Dynamical separation of coherent vs non-coherent tides - 12'
Gary Egbert - An approach to handling nonstationary tides - 12'
Florent Lyard/Michel Tchilibou - Internal tide variability Soloman Sea - 12'
Roger Wu - Resolution of SWOT for observing balanced motions vs internal waves - 12'
Discussion 20'</td><td>14h-15:30 HR Data Access & Online Facilities (C. David, R. Fjortoft)
30 mins: PO.DAAC Plans (S. Vannan, M. Gierach, M. Gangl)
30 mins: THEIA Plans (F. Gouillon)
30 mins: Discussion</td></tr>
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15h45 Coffee Break	
Ocean Splinter 4	**Hydro Splinter 4**
16h15 Techniques for separating dynamics and noise in SWOT SSH images? (E. Cosme, J. Le Sommer) 30 to 45 min presentations • Ronan Fablet (IMT-Atlantique) on how domain scientists and ML experts can interact through collaborative Data Challenges • Aurélien Ponte : on existing theoretical frameworks for separating waves and non-waves signals • Jean-François Giovannelli: Image separation, basic concepts 30 min discussion	**16h-17:30** Integration of SWOT with Global Hydro Models/Assimilation (Beighley,, Lemoigne) 15 minutes each: • "Underlying Fundamentals of Uncertainty Quantification and Kalman Filtering for River Network Modeling," C. David, C. Emery, M. Turmon, J. Hobbs, J. Reager, J. Famiglietti, M. Pan, E. Beighley, M. Rodell • "Global High-resolution River Discharge Modeling for SWOT Mission: Long-term Analysis and Near Real-time Implementation," P. Lin, M. Pan, H. Beck, Y. Yang, D. Yamazaki, R. Frasson, C. David, M. Durand, T. Pavelsky, G. Allen, C. Gleason, E. Wood • "Recent advances in global hydrological modeling at CNRM," S. Munier, M. Lesaffre, S. Saysset, T. Guinaldot, A. Boone, P. Le Moigne • "Variance based sensitivity analysis of FLake lake model for global land surface modeling," C. Ottlé, A. Bernus • "Retrieving baseflow of large rivers from space," N. Flipo, F. Baratelli, S. Biancamaria, A. Rivière • "Using Landsat as a template for SWOT: getting the best discharge possible by combined big-data remote sensing, global hydrologic modelling, and river routing," C. Gleason, M. Hagemann, E. Beighley, G. Allen, Y. Ishitsuka, D. Feng, P. Lin, T. Pavelsky
19:30 Dinner at Le café Maritime, Bordeaux	

Thursday 20 June 2019

Ocean Splinter 5
Amphithéatre A29/Amphi F

9h Understanding, specifying and removing the measurement errors & corrections (C. Ubelmann, E. Zaron)

- Note on wavenumber spectra and uncorrelated errors (D. Chelton, R. Samelson) - 12'
- SWOT simulator advancement & use (C. Ubelmann, L. Gautier) - 12'
- Geoid/MSS product improvements - D. Sandwell, - 12'
- Contamination of the 24GHz channel - impact on Wet tropo correction (S. Brown)- 12'
- Discussion - 10'

Ocean Splinter 6

10h 2D/3D reconstruction of SSH and currents - Part 1 (B. Qiu, PY Le Traon, S. Gille, E. Cosme)

- Manucharyan et al.: Machine learning techniques for dynamical SSH reconstruction in a context of the SWOT mission - 15'
- Sinha & Abernathey Estimating High resolution Global Surface Currents with Machine Learning - 15'

Hydro Splinter 5
Auditorium de l'Agora

9h-10h30 Hydrology Cal/Val I (Minear, S. Calmant)
45 mins: presentation from the projects on project plans for cal/val (C. Chen, S. Desai, N. Picot)

45 mins: presentation from science/validation team on field validation plans
-15 mins: France Lakes (Cretaux)
-15 mins: U.S. Lakes (Minear)

15 mins discussion

10:35 Coffee breaks

11h00 2D/3D reconstruction of SSH and currents - Part 2 (B. Qiu, PY Le Traon, S. Gille, E. Cosme)

- Archer et al.: On maximizing the resolution of gridded SSH: A new method applied to the California Current system - 15'
- Benkiran et al.: Impact of SWOT data assimilation in Mercator Ocean regional and global high resolution data assimilation systems - 15'
- Heimback et al.: A regional subtropical North Atlantic Ocean adjoint-based state & parameter estimation testbed in support of SWOT -15'
- Le Guillou et al.: Mapping SSH from SWOT using simple data assimilation - 15'
- Qiu et al.: Reconstructing upper ocean vertical velocity from SSH in the presence of unbalanced motion - 15'

Discussion (15 mins)

Hydro Splinter 6

11h-12:30 Hydrology Cal/Val II (Minear, J. Indu)

Half hour: presentation from science/validation team on field validation plans
-15 mins: France Rivers (Calmant)
-15 mins: U.S. Rivers (Pavelsky/Minear)

15 mins: LOCSS: Citizen Science for Lake Validation (Pavelsky)

45 mins: discussion (Minear, Calmant)

12:30 Lunch

Coastal/Estuarine Plenary (chair: T. Pavelsky)

Auditorium de l'Agora

14h00- A global perspective of coastal regions (10')

Summarize series of issues (e.g. small scales, shallow slopes, varying discharge, seasonal trends, SWOT mask, tide, vegetation and describe how they are addressed in next section) (Marc Simard, Benoit Laignel, Nadia Ayoub)

14h10- SWOT observations and simulation in Coastal and estuarine regions (50').

i) Hydrodynamic modelling of a tidal delta wetland: case of the Wax Lake delta, part of Mississippi delta (Imen Turki)
ii) SWOT Simulation in the Mississippi delta (Marc Simard)
iii) Estuarine tides and discharge reconstruction from SWOT (Pascal Matte)
iv) SWOT Simulation in the Seine estuary (Benoit Laignel)
v) Estuarine modeling of river and tides interactions (Florent Lyard)
vi) Observability of the coastal dynamics in SSH data (Nadia Ayoub)
vii) Assimilation of SWOT data in a coastal circulation model (Guoqi Han)

15h00- Cal/Val sites and experimental design in deltas and estuaries (45')

i) The global list of delta and estuarine HR and cal/val site **(**Benoit Laignel, Marc Simard, Pascal Matte) (10')
ii) The Gironde Experiment (Octobre 2018) (Pascal Bonnefond) (10')
iii) Pre- and post- launch (1-day) cal/val activities in the St-Laurent estuary" (Pascal Matte) (10')
iv) Delta-X (Marc Simard) (10')
v) Questions (5')

15h45- Panel discussion on capabilities of SWOT in coastal environments and estuaries (15')

Panel (Benoit Laignel, Nadia Ayoub, Marc Simard, Pascal Matte, Han Guoqi)

16:00 Meeting conclusion by Science Leads.

16:30 End of Meeting