

SWOT Status

***Lee-Lueng Fu
Project Scientist***

Tamlin Pavelsky, US Hydrology Lead

Tom Farrar, US Oceanography Lead

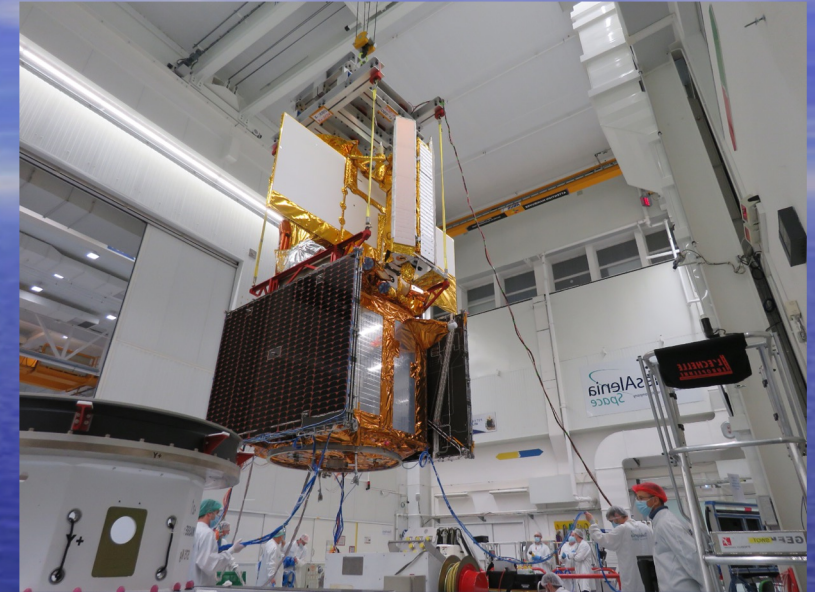
Rosemary Morrow, French Oceanography Lead

Jean-Francois Cretaux, French Hydrology Lead

***OSTST Meeting
Venice, Italy
October 31, 2022***

The mission has started launch campaign

- The payload module of SWOT was completed by JPL in 2021 then integrated with the satellite bus in France and fully tested this year by CNES/Thales teams.
- The fully integrated satellite was transported to US on October 16 for launch at the Vandenberg Space Force Base in California by a Space X Falcon 9 rocket with a launch in early December.



SWOT science teams (2020-2024)

	US	France	International	All
Open Ocean	9	12	9	30
Coastal	1	3	4	8
Hydrology	7	7	6	20
Total	17	22	19	58



- Two virtual meetings were conducted in 2021 to get the team informed of the mission development and connected with each other for coordination and collaboration in terms of working groups.
- Regular monthly working group meetings were conducted.
- An in-person meeting was held in late June 2022 to facilitate the readiness of the team for the mission's launch in December 2022

Getting ready for launch : SWOT Science Team Working Groups

Hydrology Working Groups

River Science	E. Rodriguez, F. Papa
Lakes and Wetlands	B. Laignel, J. Wang, S. Biancamaria
Discharge Algorithms	M. Durand, C. Gleason, P-O Malaterre, K. Larnier
Global Modelling	D. Lettenmeir, A. Boone
Hydrology CalVal	P. Bonnefond, F. Papa, T. Schone

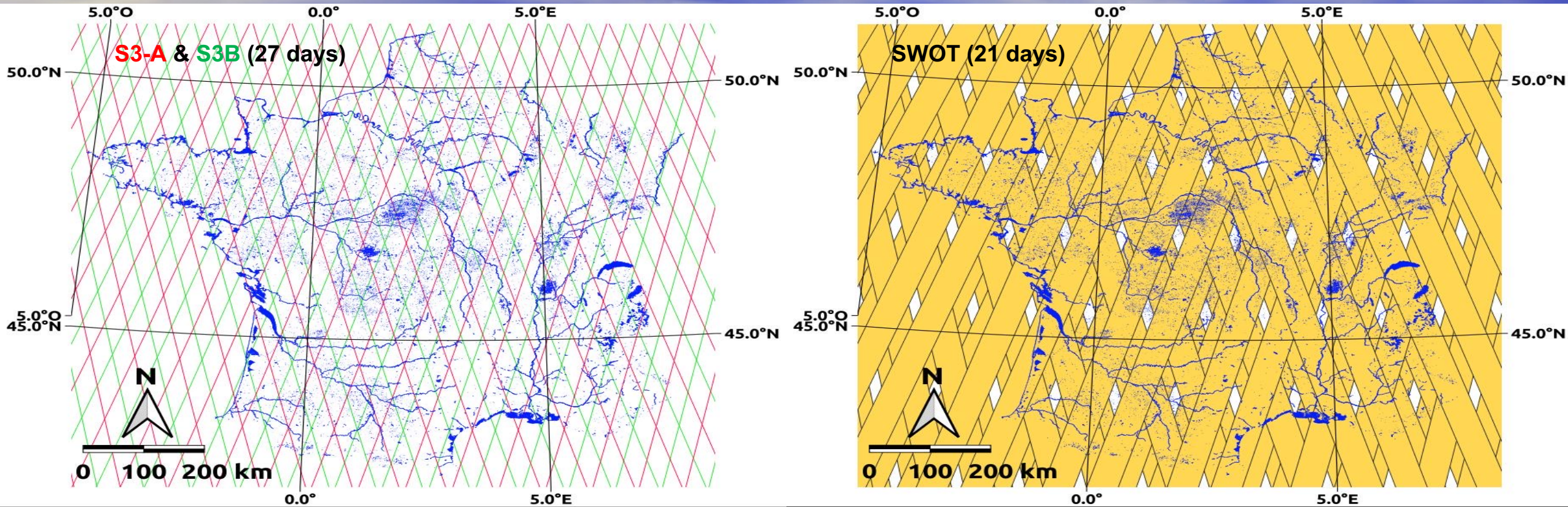
Oceanography Working Groups

Ocean waves & Marine Gravity	F. Ardhuin, F. Nougieur, D. Sandwell, C. Ubelmann, D. Vandemark
Tides and Internal Tides	B. Arbic, F. Lyard, R. Ray, E. Zaron
HR Ocean modelling	B. Arbic, P. Klein, J. Le Sommer, L. Renault
Data inversion & assimilation	E. Cosme, S. Gille, S. Keating, P-Y Le Traon
Regional validation studies	K. Drushka, F. d'Ovidio, A. Pascual, J. Wang

Transverse Groups

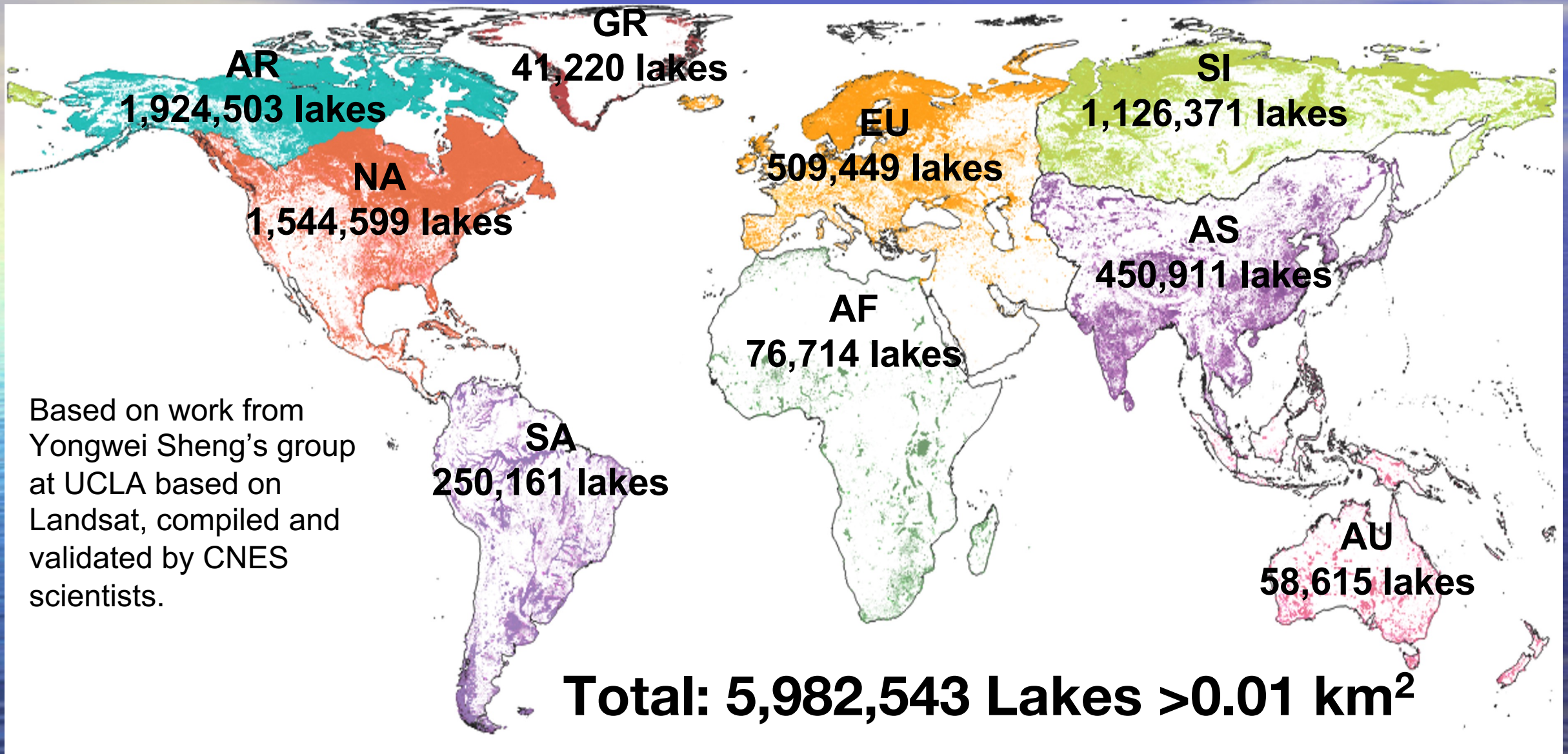
Coastal and Estuarine Studies	N. Ayoub, B. Laignel, M. Simard
Geodetic CalVal	P. Bonnefond, C. Watson, B. Haines

Spatial coverage : SWOT vs Sentinel-3 alongtrack



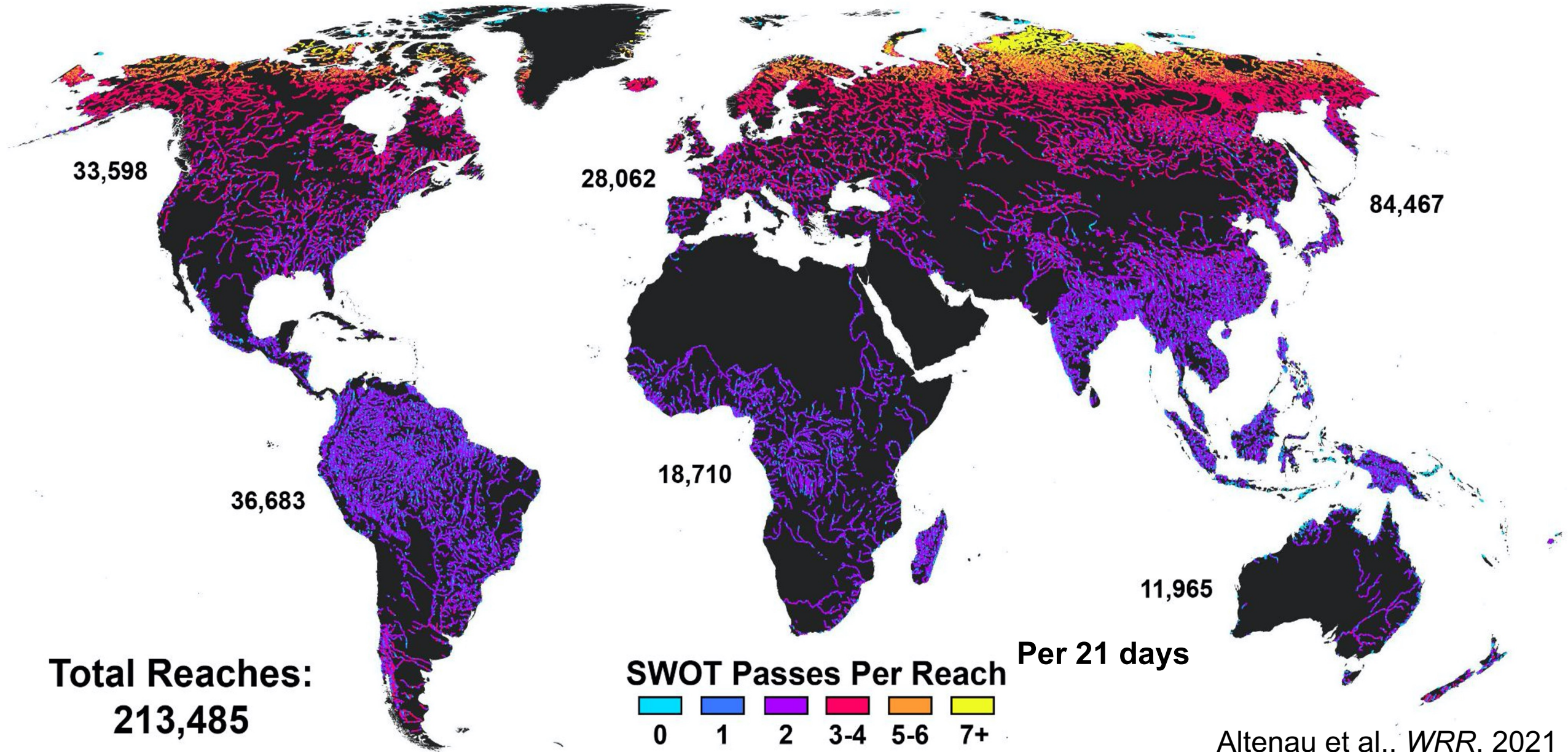
- Nadir altimetry today misses regular sampling of many coastal, open-ocean and inland water sites
- SWOT's global coverage in 2D will measure new zones with simultaneous height and slopes (for river slopes/discharge & ocean currents).
- New corrections & data bases are required to analyse SWOT data

SWOT Prior Lake Database



Based on work from Yongwei Sheng's group at UCLA based on Landsat, compiled and validated by CNES scientists.

Prelaunch : The SWOT River Database (SWORD)

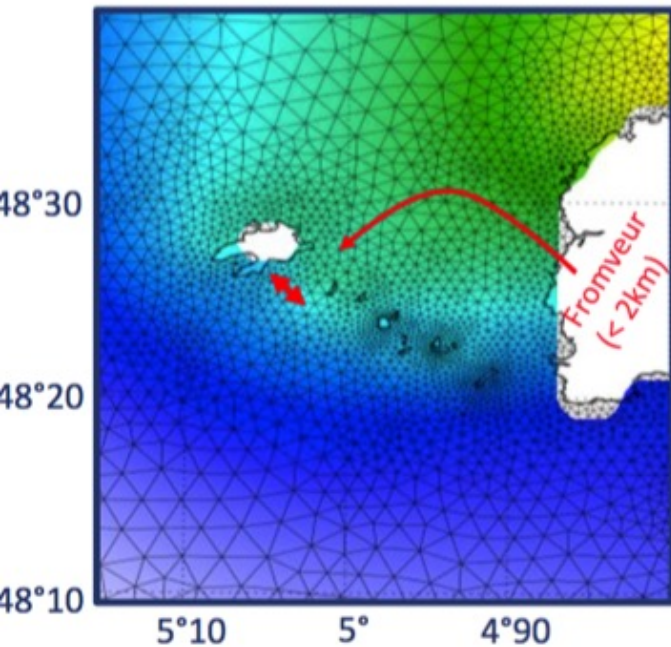


Pre-launch : improved high-resolution ocean corrections

Barotropic Tides – Tides Working Group

Fes2022 barotropic tide

- Improved bathymetry partly through the use of regional bathymetry
- New high resolution mesh: 8 times more elements than on the FES14B grid
- Assimilation of new databases: TG, extension of the altimeter period, etc.
- Improved polar coverage and accuracy



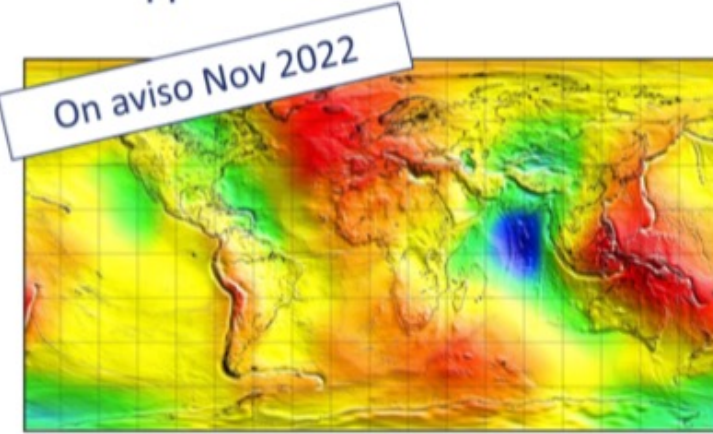
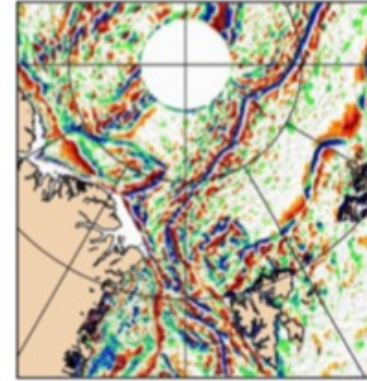
Algo Performance:

- Great improvements: >10% of error reduction on Topography for low bathymetry areas and polar regions
- Very good consistency of FES22 currents with in situ measurements

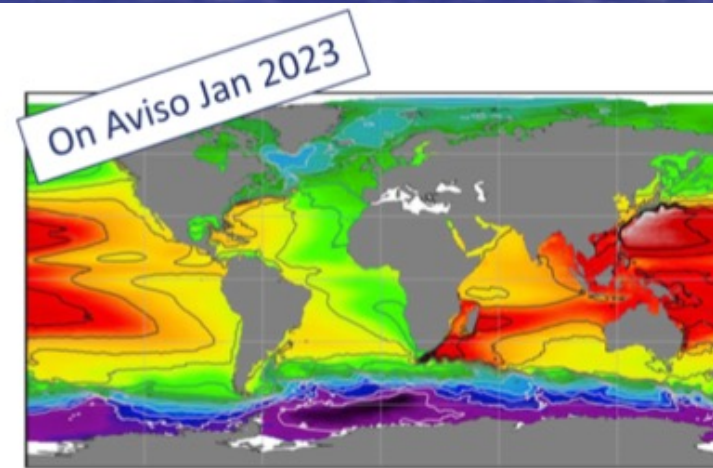
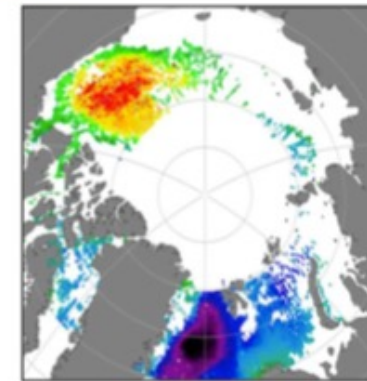
+ Coherent internal tide corrections

- High-resolution corrections available pre-launch, for SWOT and all altimetry missions
- Expect major improvements after 3-years of global 21-day repeat orbit

New MSS – MSS Working Group

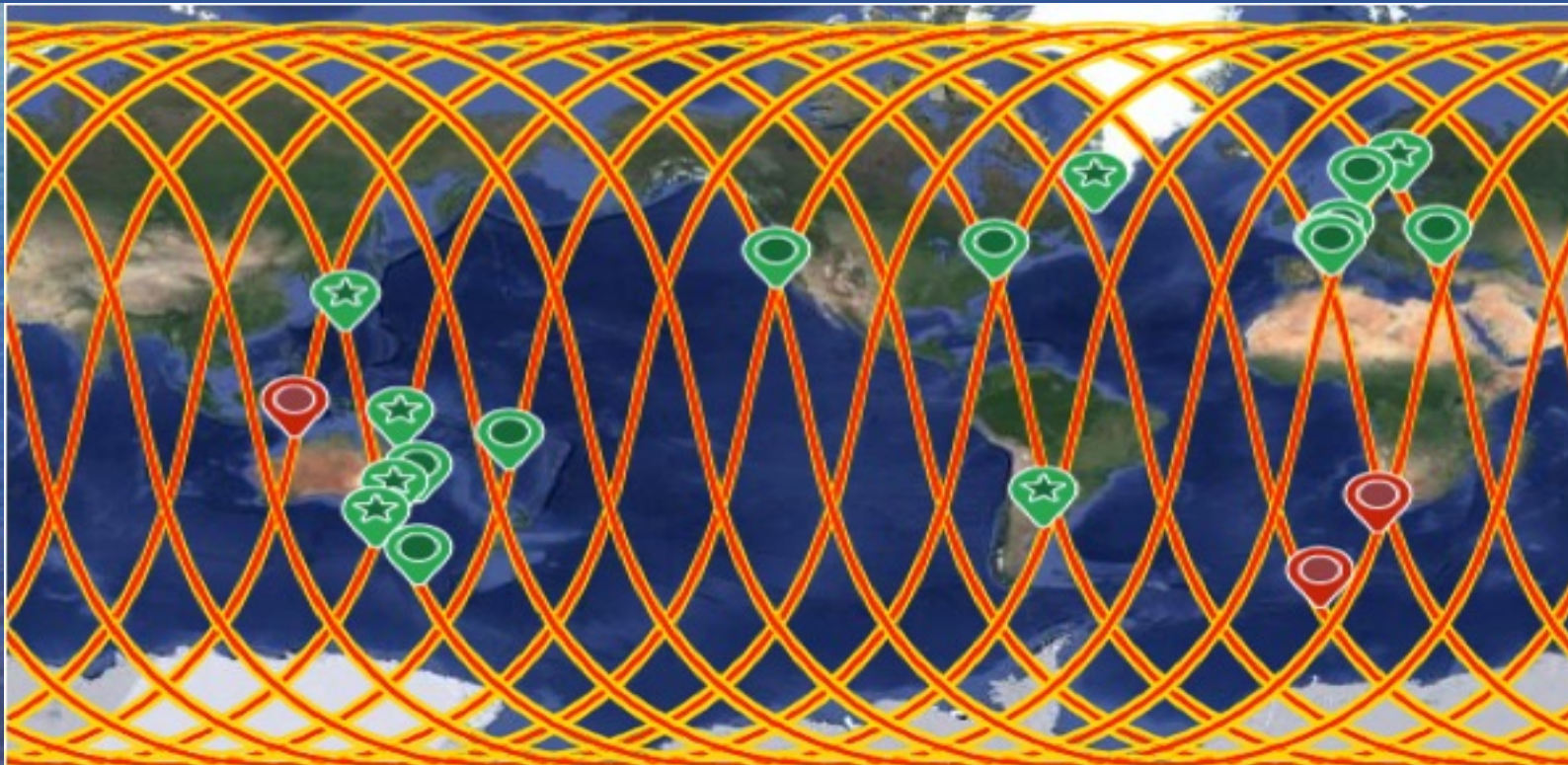



New MDT



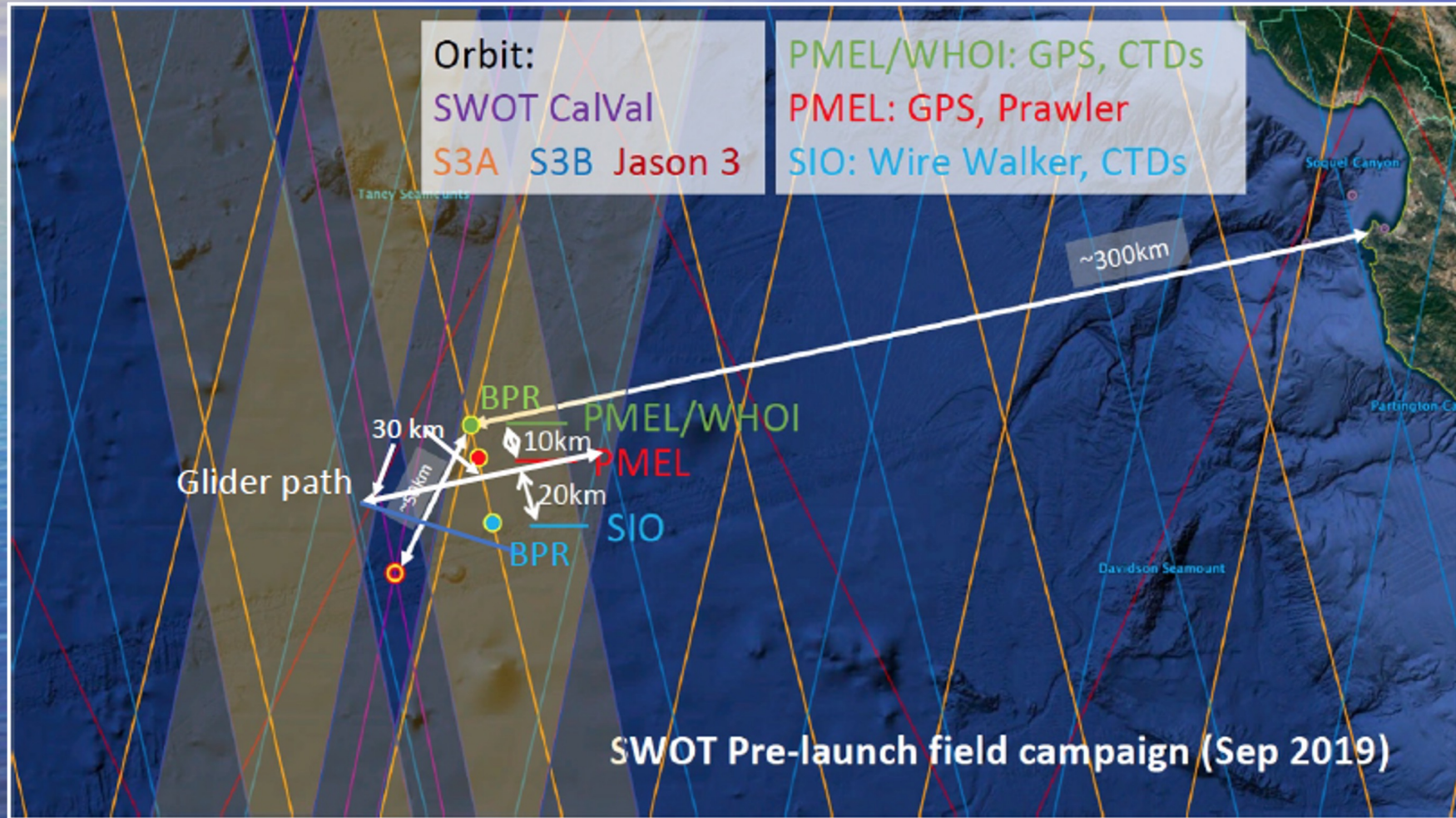
Regional validation : SWOT Adopt-a-Crossover (AdAC) International Consortium

- CLIVAR endorsed project for an **international multi-site in-situ deployment** under SWOT swaths and crossovers
- SWOT-supported in situ strategies for fine-scales dynamics in **different regions and seasons**
- CNES Project support of **multi-satellite packages** at each site
- **In-situ data sets available for validation** of SWOT & other altimetry data, satellite products, ocean models, inversion/assimilation techniques
- *Partners : US, France, UK, Canada, Australia, S Africa, Norway, Turkey, China, Argentina...*

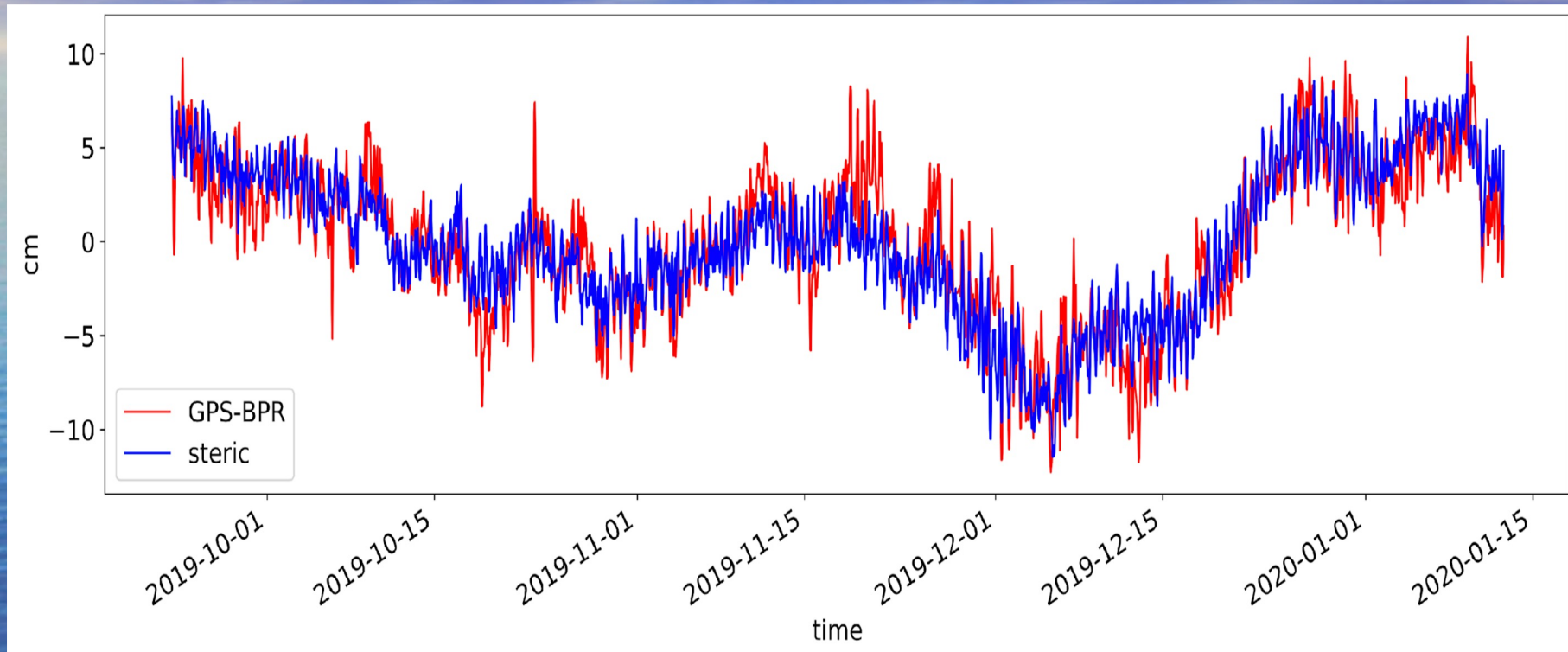


-  ship-based (confirmed)
-  infrastructure (confirmed)
-  ship-based (proposed)

Toward designing the post-launch CalVal: a NASA Project pre-launch experiment (Sept 2019-Jan 2020)



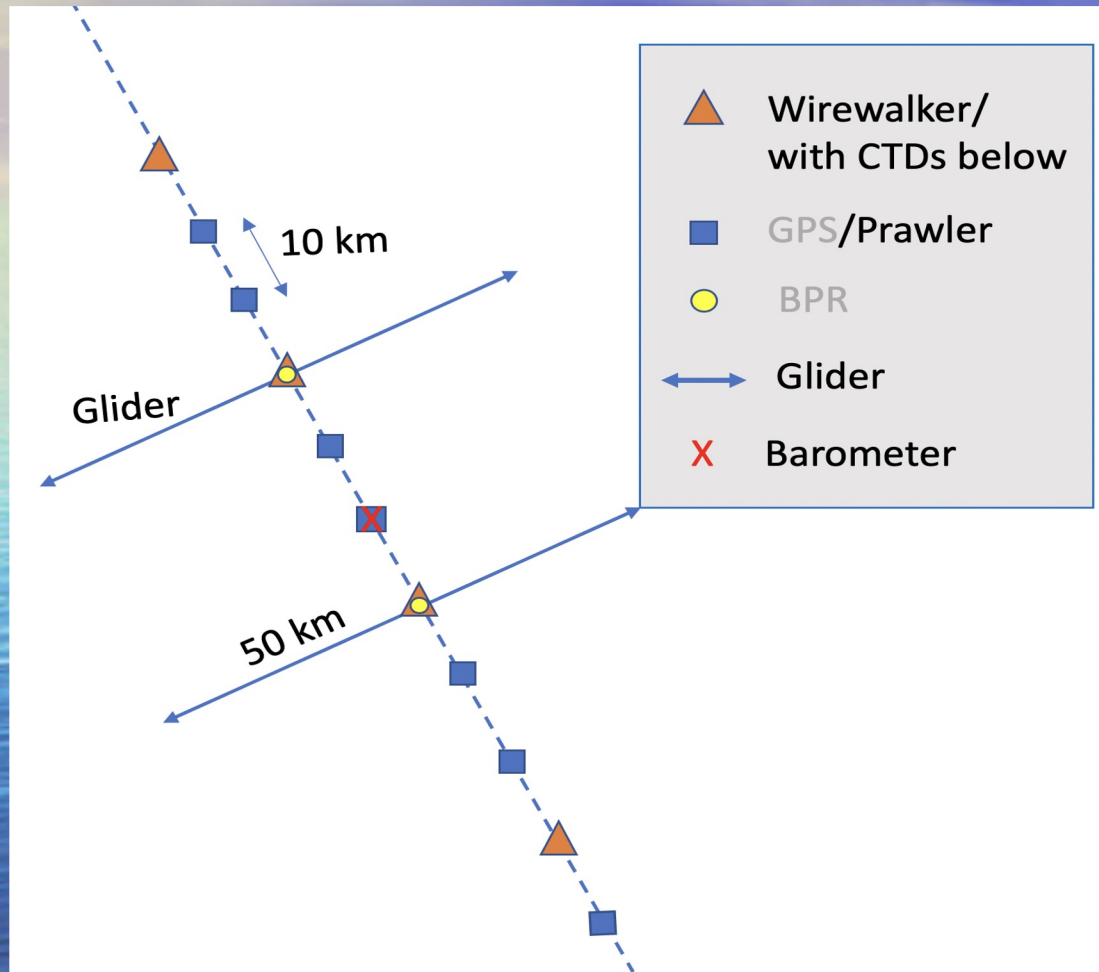
SWOT Ocean calval prelaunch campaign



SSH is equivalent to steric height with negligible bottom pressure contributions at the SWOT scales.

SWOT ocean postlaunch campaign plan (west coast)

Sentinel 3A track



+ Site of an S-MODE surface current campaign in spring 2023



Airborne
MASS Lidar for 2D
SSH & SWH

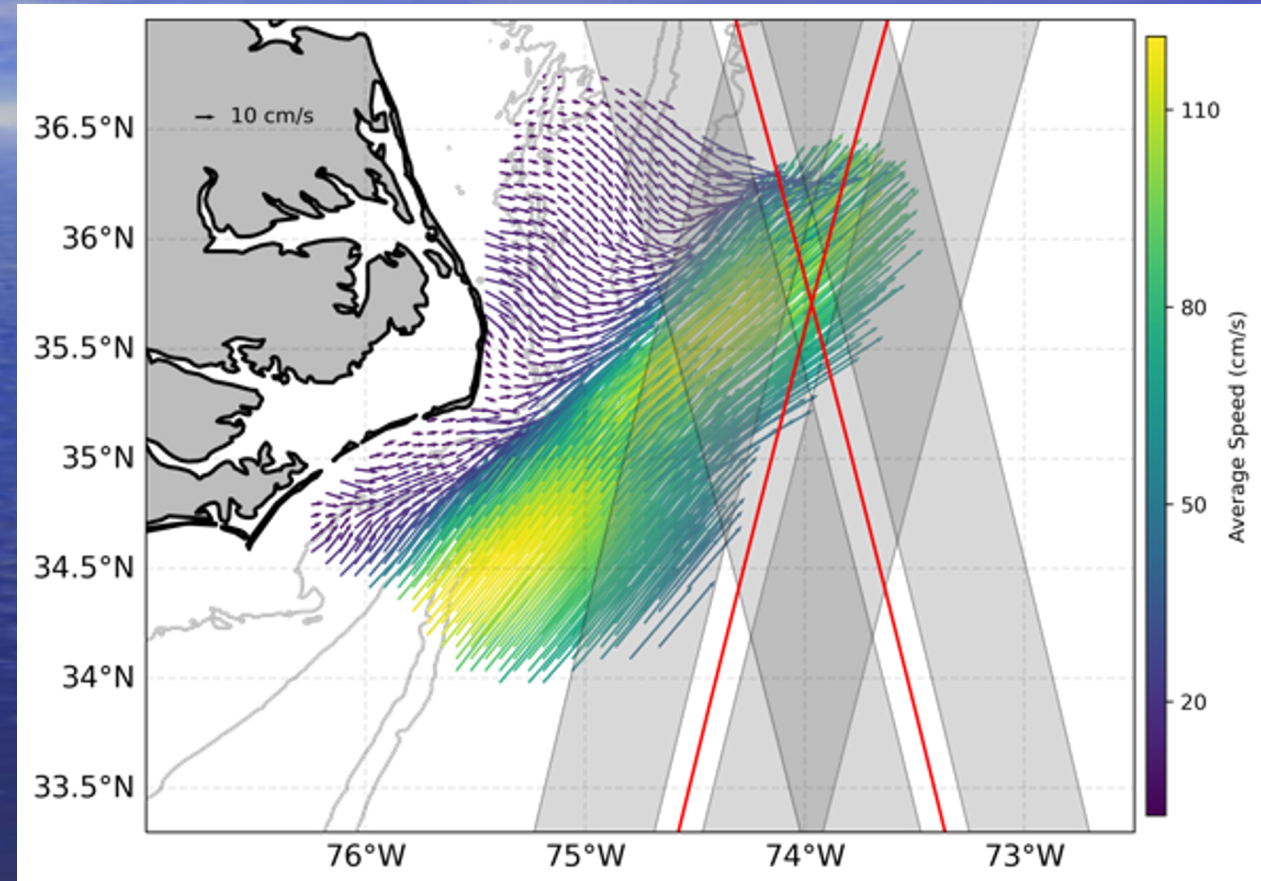
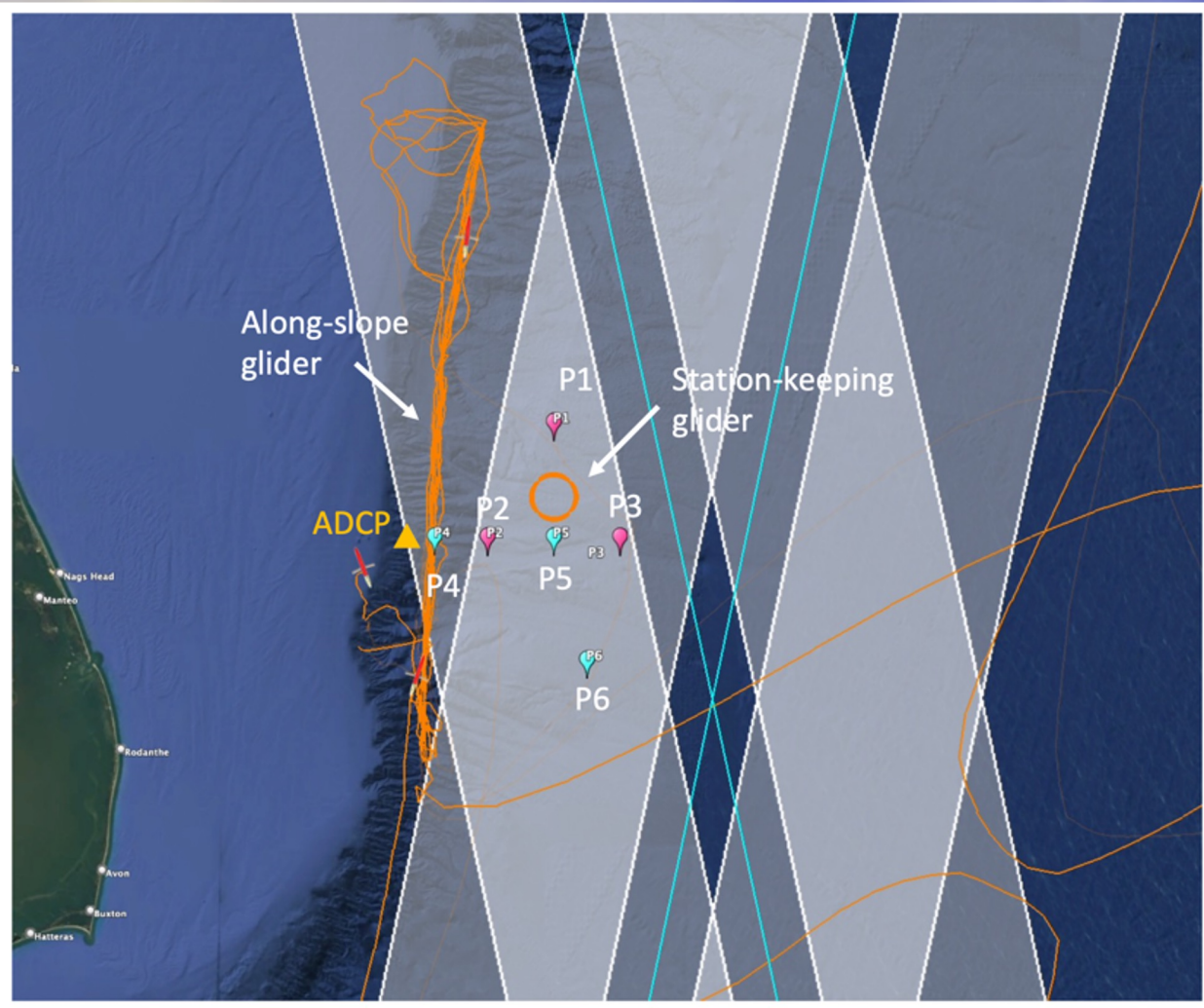


11 Moorings



Designed to validate the SWOT wavenumber spectral requirements
The 4 deep moorings are aimed to sample the vertical structure of internal tides

Example : SWOT ocean postlaunch campaign plan (east coast)



Science activities

- Aug/Sep 2022: FilaChange international conference on fine-scale ocean dynamics and Climate Change (4 sites)
- SWOT Session at AGU Fall Meeting
- Mar/May 2023: Cal/Val campaigns during 1-day orbit
- Sept 2023 (L+9): ST meeting for data debrief, and training sessions with real L2 data (To be held in France)
- Feb 2024 (L+14): SWOT Validation Meeting

Summary

- The mission has started launch campaign with a launch in early December.
- The mission's science team has been renewed for 2020-2024.
- Two virtual meetings were held in 2021 to get the team organized in working groups addressing common science investigations.
- An in-person meeting was conducted in June 2022 to facilitate the team's readiness for the mission's launch.
- The process of forming the next science team meeting will start in 2023.

A wide-angle photograph of a calm ocean under a vast, blue sky. The sun is positioned on the far left, creating a bright, glowing horizon line and casting a shimmering reflection across the water's surface. The sky is filled with soft, wispy clouds. The word "extras" is centered in the middle of the image in a clean, white, sans-serif font.

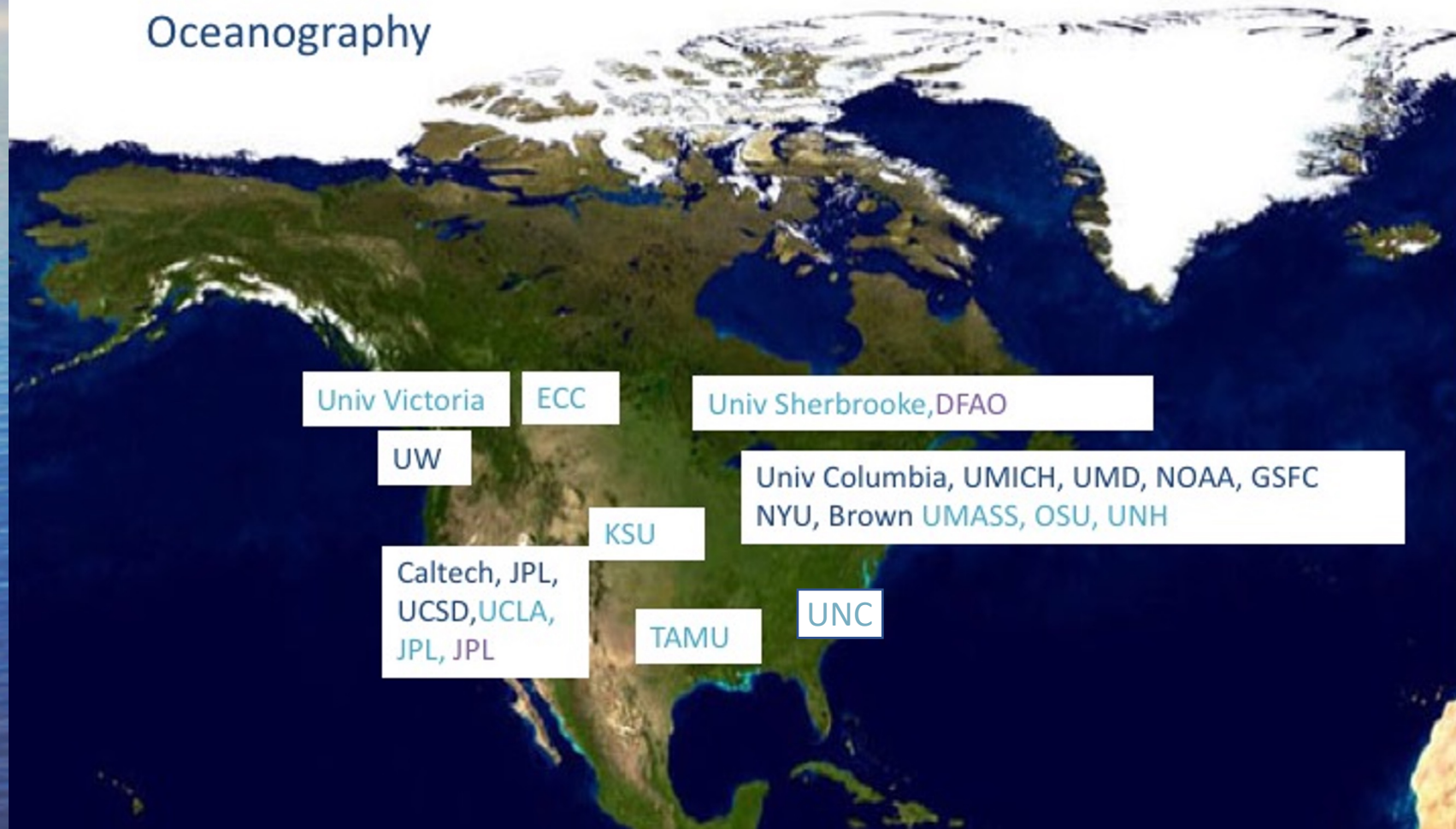
extras

Canadian & USA organizations

Hydrology

Coastal

Oceanography



Univ Victoria

ECC

Univ Sherbrooke, DFAO

UW

Univ Columbia, UMICH, UMD, NOAA, GSFC
NYU, Brown, UMASS, OSU, UNH

KSU

Caltech, JPL,
UCSD, UCLA,
JPL, JPL

TAMU

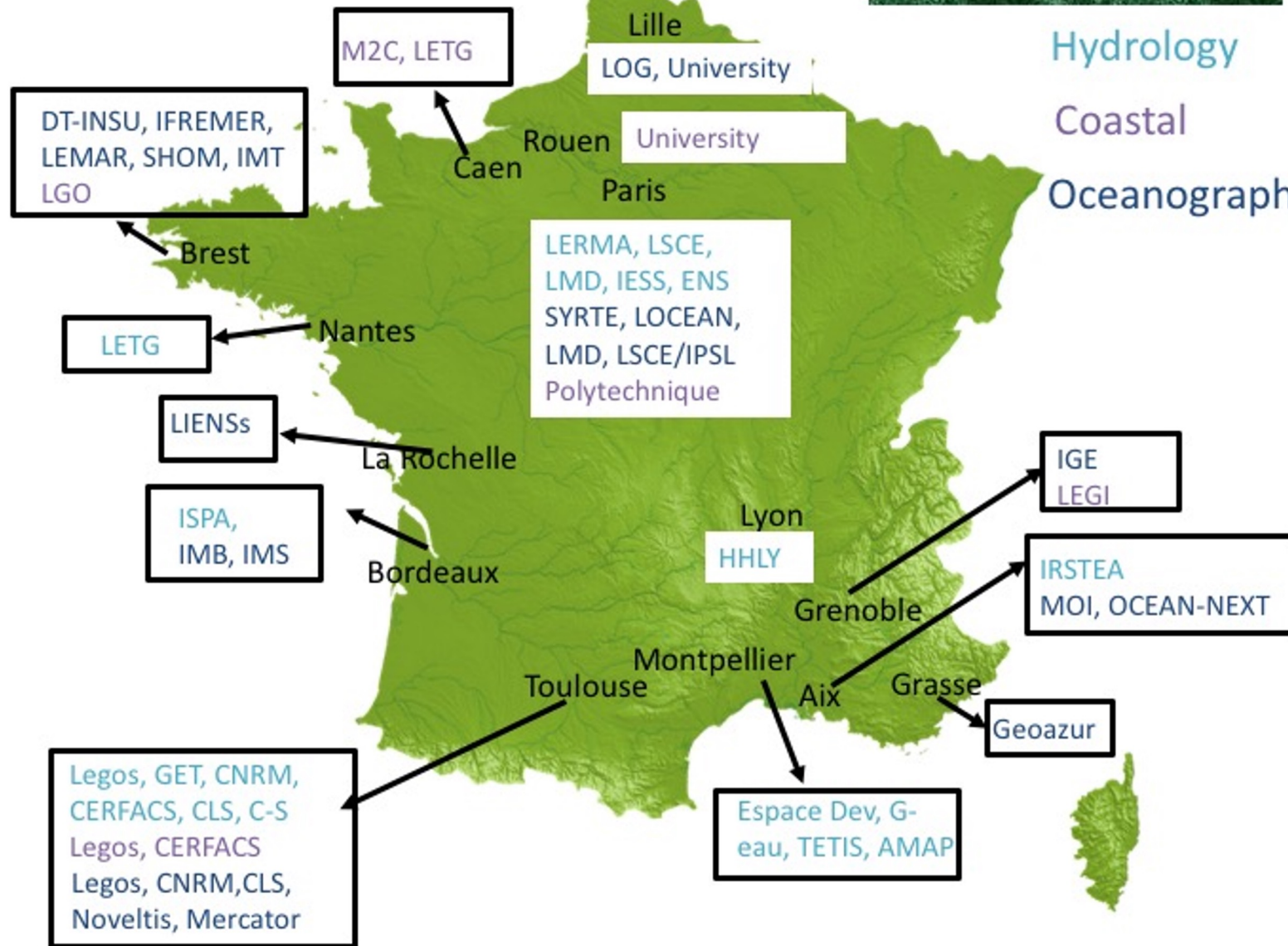
UNC

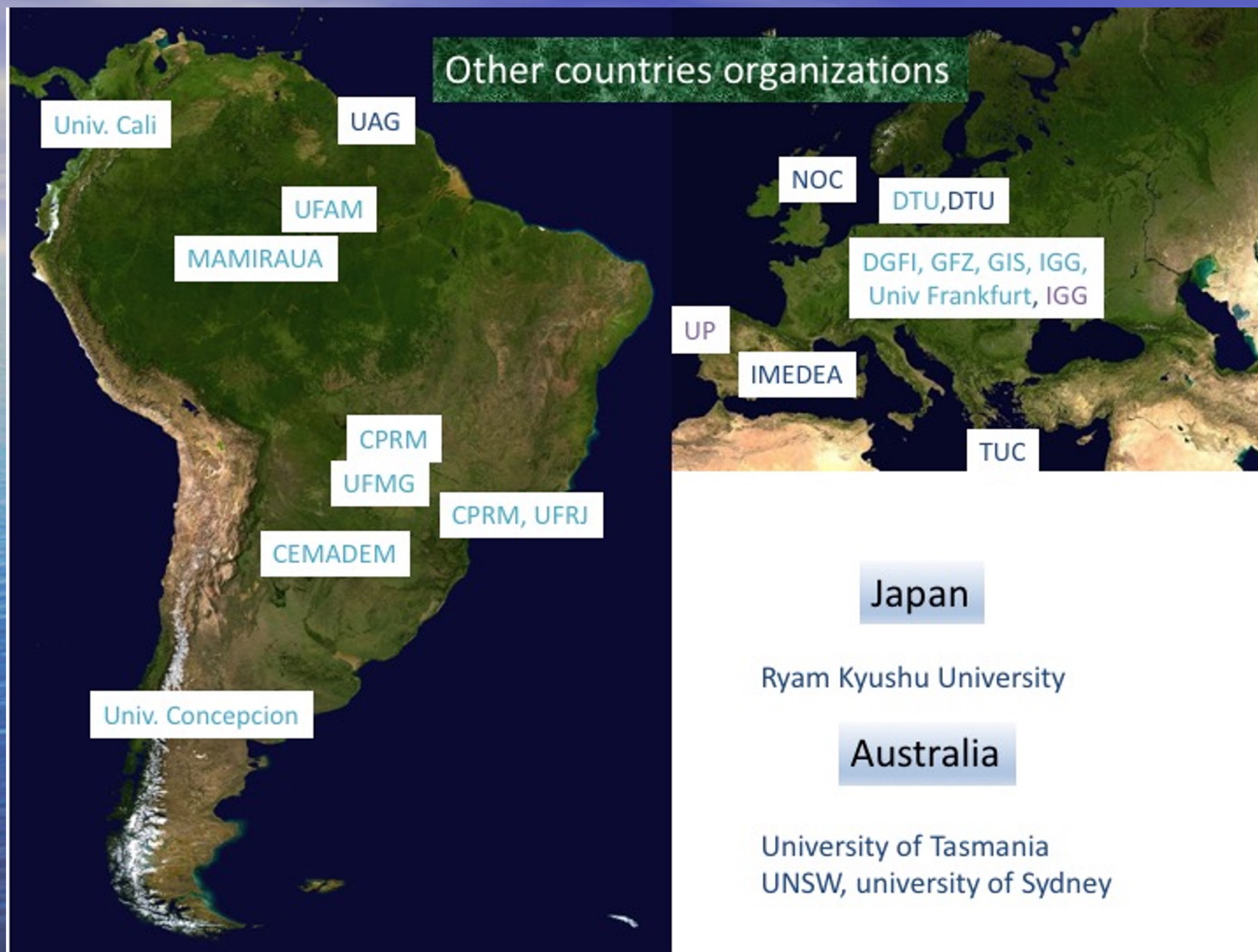
French organizations

Hydrology

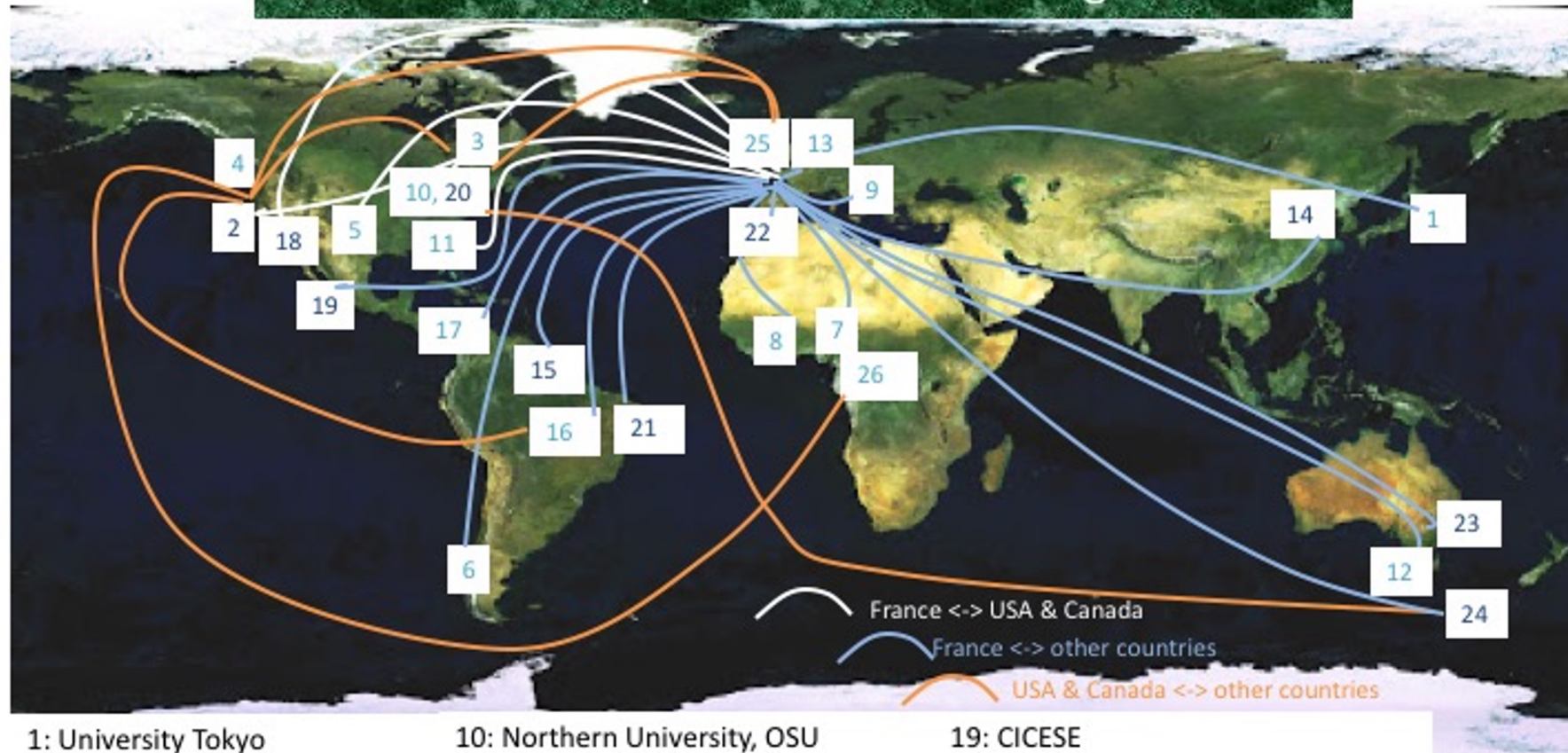
Coastal

Oceanography





International cooperation between organizations



1: University Tokyo
 2: JPL, UCLA
 3: University Sherbrooke, ECCC,
 McGill University
 4: University Victoria
 5: University Kansas
 6: Univ Concepcion
 7: University Niamey
 8: University Ouagadougou
 9: University Bologna

10: Northern University, OSU
 11: UNC
 12: Monash University
 13: University Stuttgart & Munich
 14: University of Tsinghua
 15: Université des Antilles & Guyanne
 16: CEMADEN, UFAM, CPRM,
 UFMG, UFRJ, MAMIRAUÁ,
 17: University of Cali
 18: SIO

19: CICESE
 20: NOAA, University Michigan
 & Columbia & Brown & Rhodes Island
 21: UFPE
 22: University Porto
 23: ANU, Canberra
 24: University of Tasmania & CSIRO
 25: Univ Bristol & Leeds
 26: Univ Kinshasa