

Application Development for Operations Splinter

Splinter Chairs:

Carolina Nogueira Loddó, Gregg Jacobs, Deirdre Byrne and Gérard Dibarboure (in absentia)

A poster for the Ocean Surface Topography Science Team Meeting (OSTST). The background is a dark blue space scene with the Earth's horizon on the right, the Moon in the upper center, and a series of satellite orbits on the right. The satellites are labeled with their names and years: TOPEX/Poseidon (1992-2006), Jason 1 (2001-2013), OSTM/Jason 2 (2008), Jason 3 (2016), Sentinel-6A (2020), and Sentinel-6B (2025). On the left, the text reads "Ocean Surface Topography Science Team Meeting (OSTST)", "21-25 October, 2019", and "Chicago, Illinois". At the bottom, there are logos for CNES, NOAA, NASA, EUMETSAT, and ESA. A small number "1" is in the bottom left corner.

Ocean Surface Topography Science Team Meeting (OSTST)

21-25 October, 2019
Chicago, Illinois

Logos: cnes, NOAA, NASA, EUMETSAT, esa

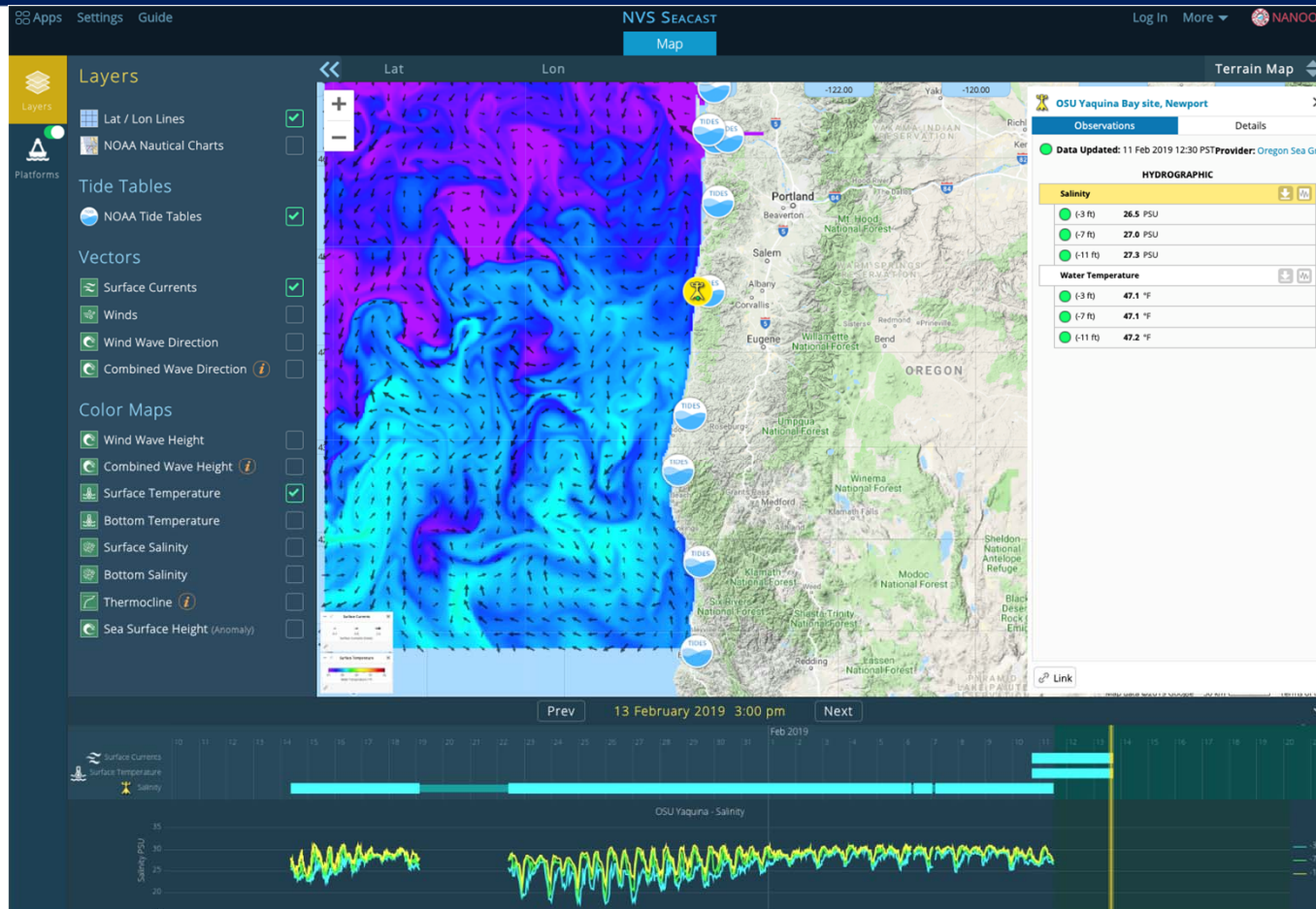
Satellites shown in orbit: TOPEX/Poseidon (1992-2006), Jason 1 (2001-2013), OSTM/Jason 2 (2008), Jason 3 (2016), Sentinel-6A (2020), Sentinel-6B (2025)

1

Some Highlights ...

- 5 oral presentations
 - ~50 attendees
- 12 posters

From Altimetry all the way to End Users (T Strub, OSU)



Emails from fishermen describe the benefits (*what follows is a description of the product's impact on a \$2 million crab catch*):

When we crossed (the bar) 2 hours after low water, the salinity was at 11%, 12% and 13% (at 3', 7', & 11' depth): all toxic numbers for crab. We shut off our pump and held the crab in good water until we could unload. Zero dead / lost. Zero weak crab. Excellent!"

From Altimetry all the way to End Users (C Birkett, NASA)



The Global Water Monitor

Charon M. Birkett
Martina Ricko and Hunter Yang
NASA/GSFC

Contact: Charon.M.Birkett@nasa.gov

End User Focus

Include agriculture (water supply for irrigation) and fisheries (catch potential), natural hazards (drought and flood), and “stress indicators” associated with dwindling food, water, and power supply – highlighting regional stresses that may have national and international implications.



Data Requirements are variable Stakeholders also look for.....

A Long Heritage with Validated Techniques

Real Time *and* archived data

Monthly resolution or better

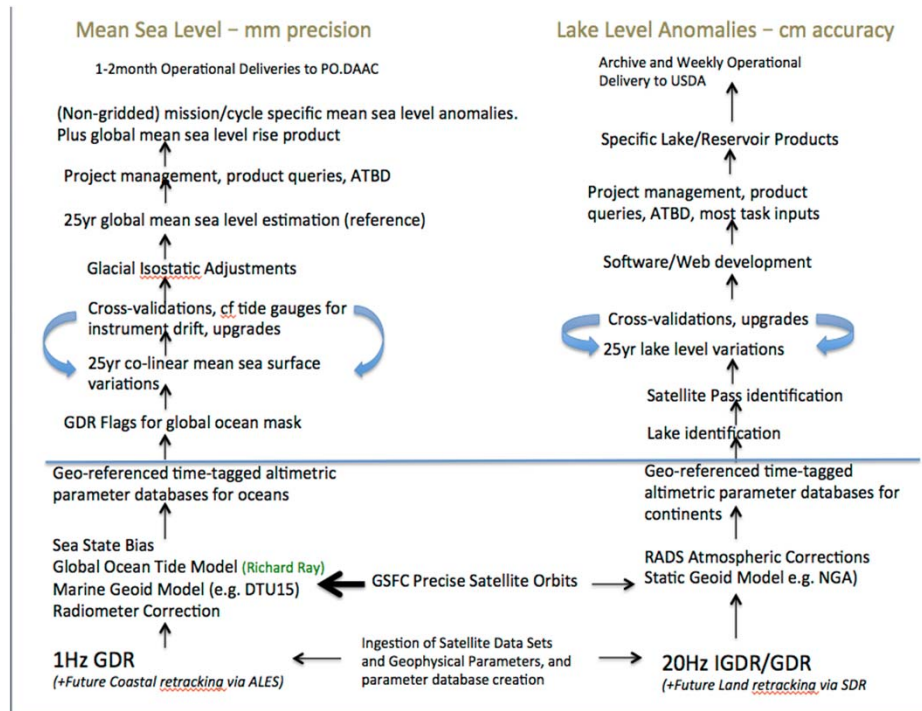
Continuous Global Monitoring

Fast response to data issues

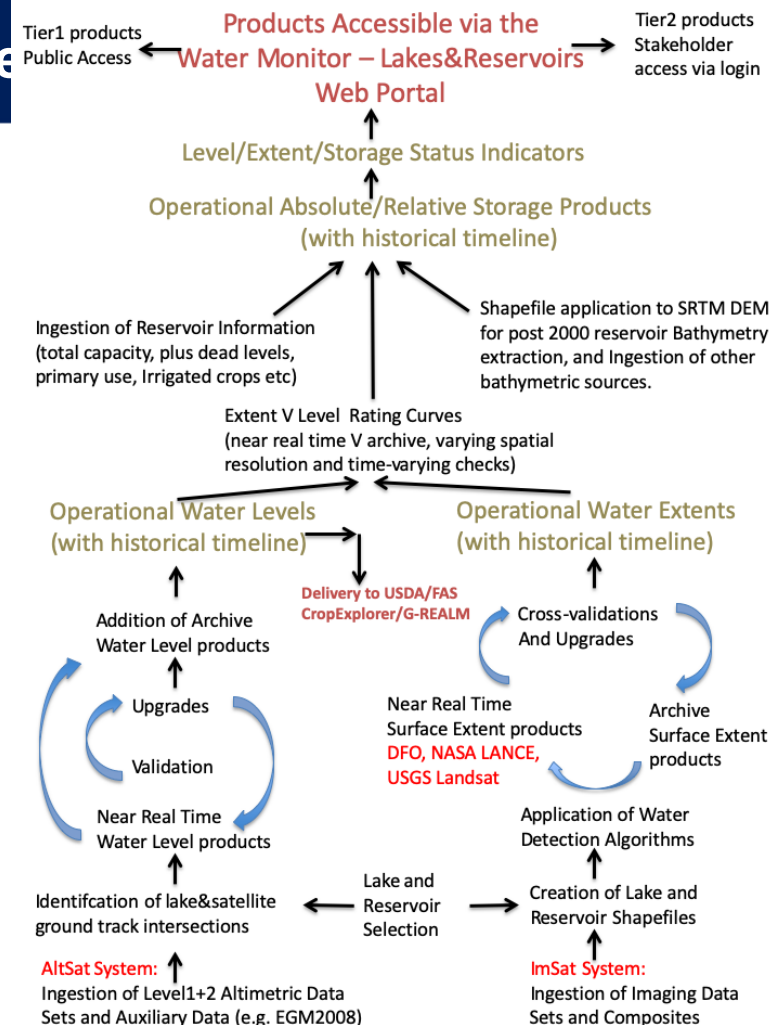
&

Mission Continuity

Meeting End User needs can require



Numerous processing steps are required to obtain a finished scientific product But that's still not the end!



Continued progress on accuracy and resolution feeds new applications: M.- I. Pujol (CLS) et al. (see below)

**Toward Higher
resolution Level3
altimeter products for
Assimilation Systems**

M.-I. Pujol, S. Dupuy, M. Lievin,
O. Vergara, Y. Faugère (CLS),

M. Benkiran (MOI),

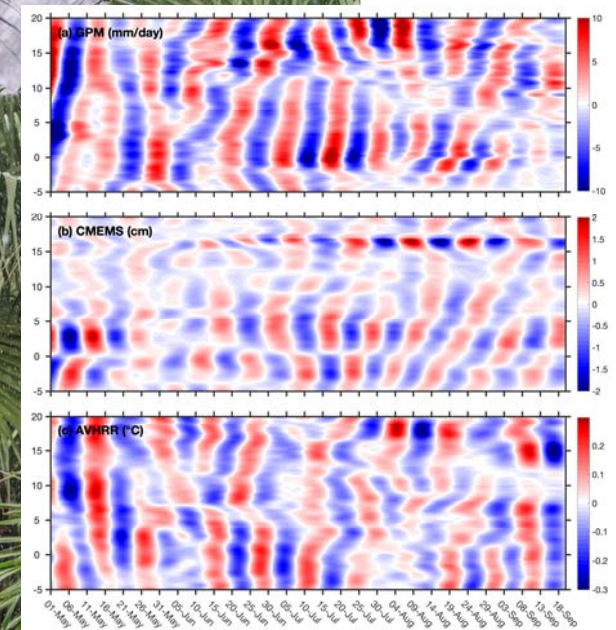
G. Dibarboure (CNES),

**5 Hz sampling:
a good
compromise
between
observing
capabilities and
sampling needs**

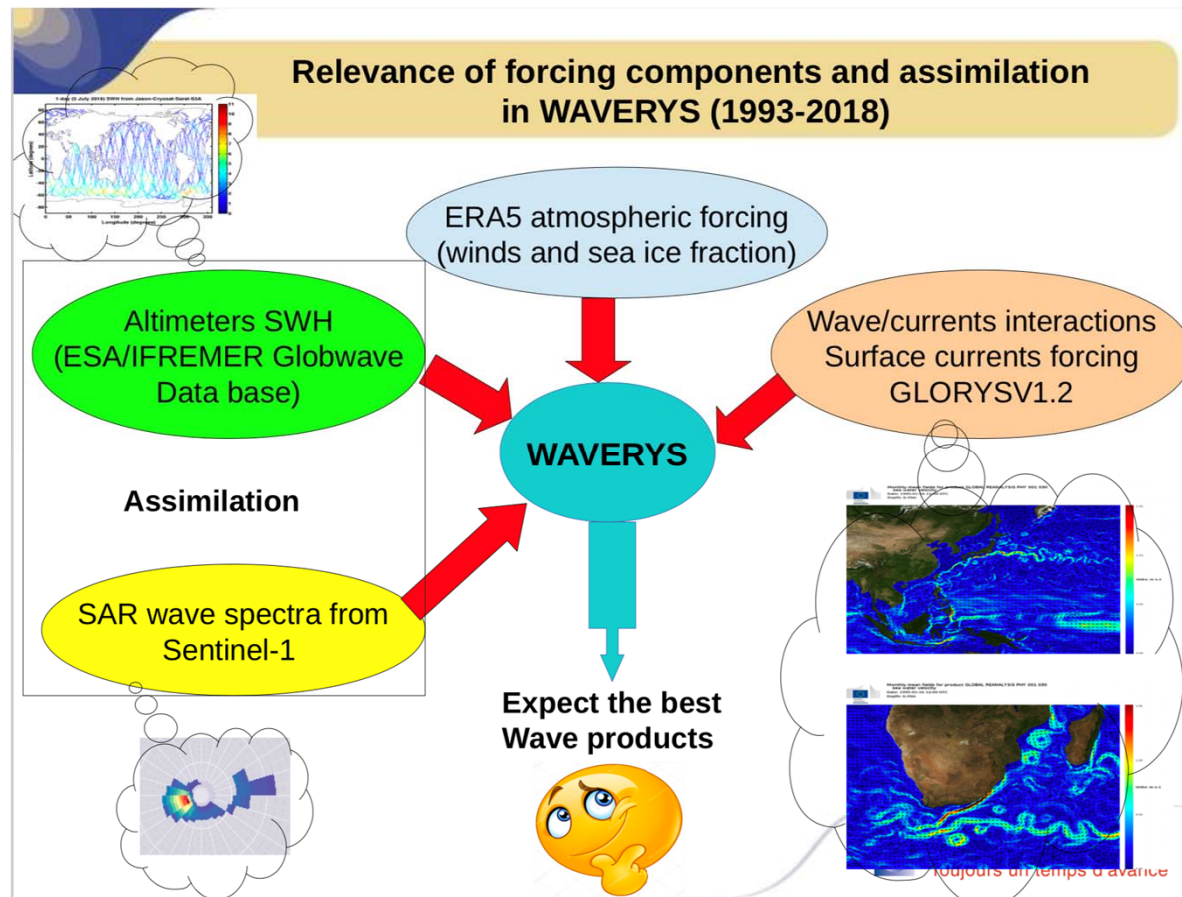
IntraSeasonal Oscillations (ISO) and the Monsoon: S. Rulusu, H Roman-Stork, & C Trott (U South Carolina)

10-20-DAY ISO

- 2019 Monsoon in the Bay of Bengal
- Strong precipitation signal in northern Bay of Bengal
- Slight northward propagation in precipitation, absolute dynamic topography



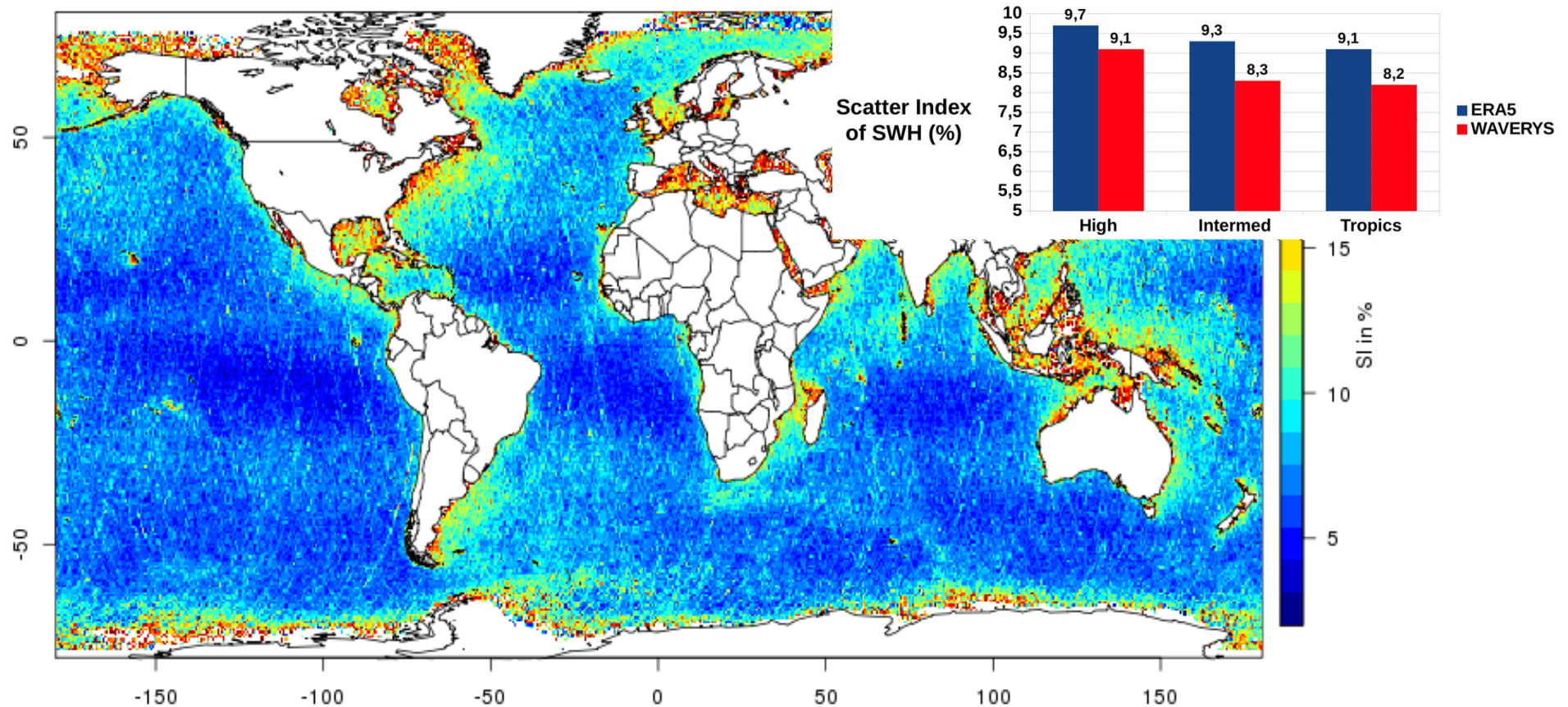
WAVERYYS: marine service wave reanalysis (L. Aouf et al.)



L. Aouf⁽¹⁾, A. Dalphinet⁽¹⁾, S. Law-Chune⁽¹⁾, B. Levier⁽²⁾, Y. Drillet⁽²⁾ ⁽¹⁾
Météo-France⁽²⁾

Mercator-Ocean International

WAVERYYS: marine service wave reanalysis (L Aouf et al)



WAVERYYS : significantly better in mid lats and tropics. 10% improvement over ERA5

Discussion Questions

Current products and systems

- What are the user requirements for accuracy, precision, coverage?
 - MSSH off of reference tracks needs to be improved, particularly for coastal altimetry.
 - Need RELIABLE product – ensure continuity to get end-user buy-in.
 - We would benefit from establishing an end-user focus group
- What are the product levels mostly used for operational applications (L2, L2P, L3)?
 - Higher level products for the most part in the open ocean (e.g., RADS, CMEMS). Inland waters definitely using non-gridded (along-track) altimetry.
- What is the preferred access point and protocol for retrieving your data?
 - A single sources is preferred, providing consistent formats between missions. One user noted that RADS has had huge impact. **We need a similar, homogeneous interface to the higher frequency data.**
- Are the flags currently provided in the NRT products adequate for your use, or do they flag out too much or too little?
 - OGDR should contain variables that allow flagging of bad SWH.
- Nominal 3h timeliness for NRT products is indeed considered appropriate.

Future products and systems

- Coastal / regional modelling community would use coastally enhanced 5 Hz data. But 1 Hz data is sufficient for ocean applications, including assimilation. Keep the 1 Hz. Continue to improve the *entire* time series.
- Other missions/ HY-2A/B/C/D (altimeter) and CFOSAT (nadir beam) data are just as important as any other mission.

Additional Questions from program scientists

Comment on possible impacts of 5G interference (23.8 GHz).

- No comments received.

Roughly annual reprocessing planned for JCS. J1 – J3 may be "left behind" if not reprocessed.
Should these be done regularly as well?

- **Yes**, because the entire time series is important.

What orbit do we recommend for J3 after JCS tandem phase is over?

- **Interleaved!**

How should we best advance **ALL** of radar altimetry (coastal, hydrology, cryosphere)? Should we try to meet jointly with Argo? SWOT?

- In principle - sure but the devil is in the details.

How can we lower the carbon footprint of the OSTST?

- 1) Livestream the meeting. 2) Perhaps in alternate years, have two meeting venues, one on each side of the Atlantic. 3) Insist on local foods. 4) Find meeting venues that are sustainably built and run (think, solar-powered straw bale/adobe "ranch" in AZ or NV).