Evaluation and exploitation of CryoSat ocean products for oceanographic studies

Chris Banks, Francisco Mir Calafat,
Christine Gommenginger, Nadim Dayoub (NOC, UK),
Helen Snaith (BODC/NOC, UK), Andrew Shaw (SKYMAT Ltd. UK),
Paolo Cipollini (Telespazio VEGA UK for ESA, UK),
Jérôme Bouffard (ESA) and Marco Meloni (Serco for ESA, Italy)

National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

chris.banks@noc.ac.uk

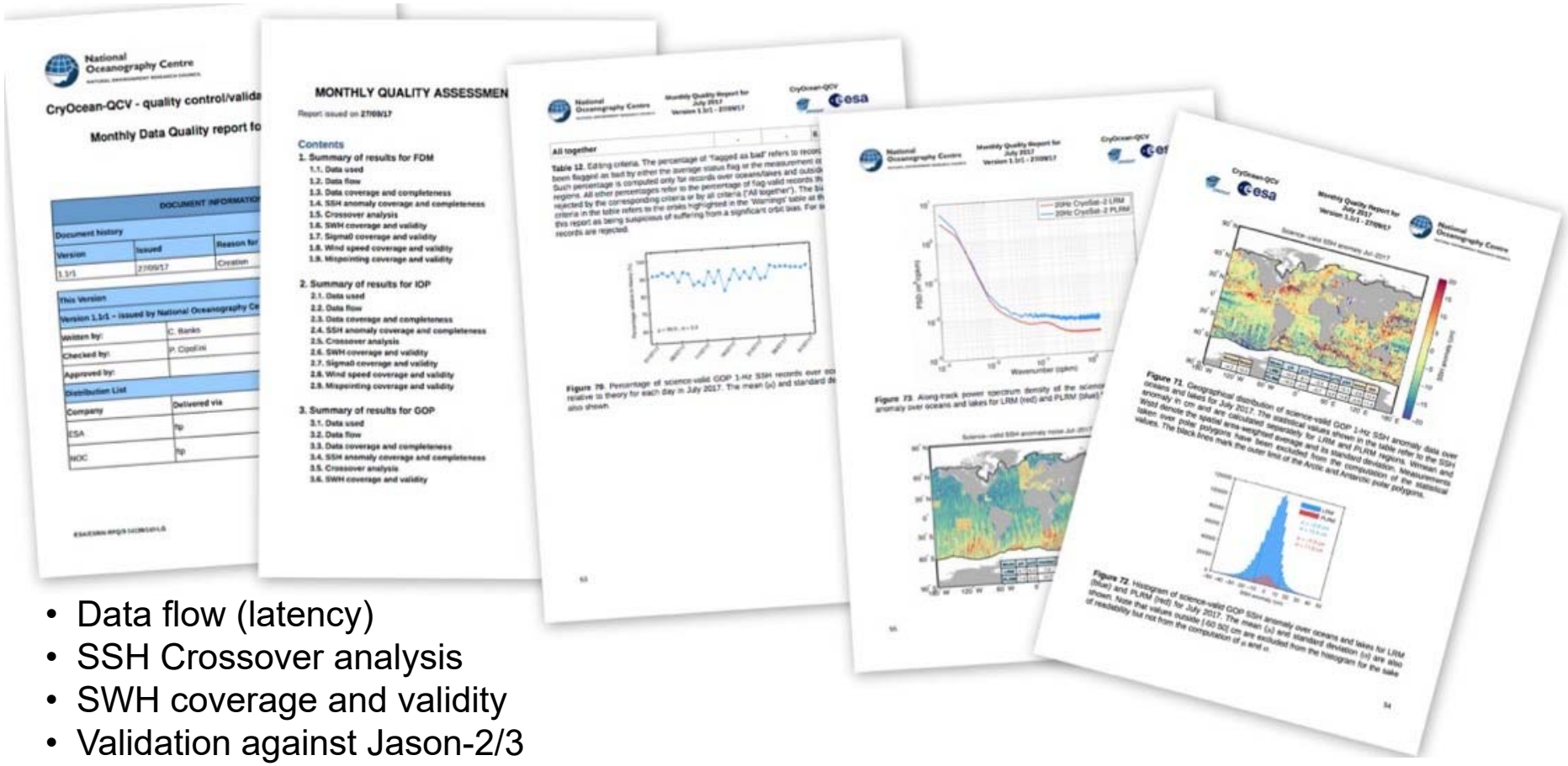
Aims of this talk

- Routine CryoSat ocean products reporting
- Illustrate some examples of validation activity
  - ➢ Both routine and focussed

Calafat et al., 2017

Bouffard et al., 2018

Daily and monthly reports available

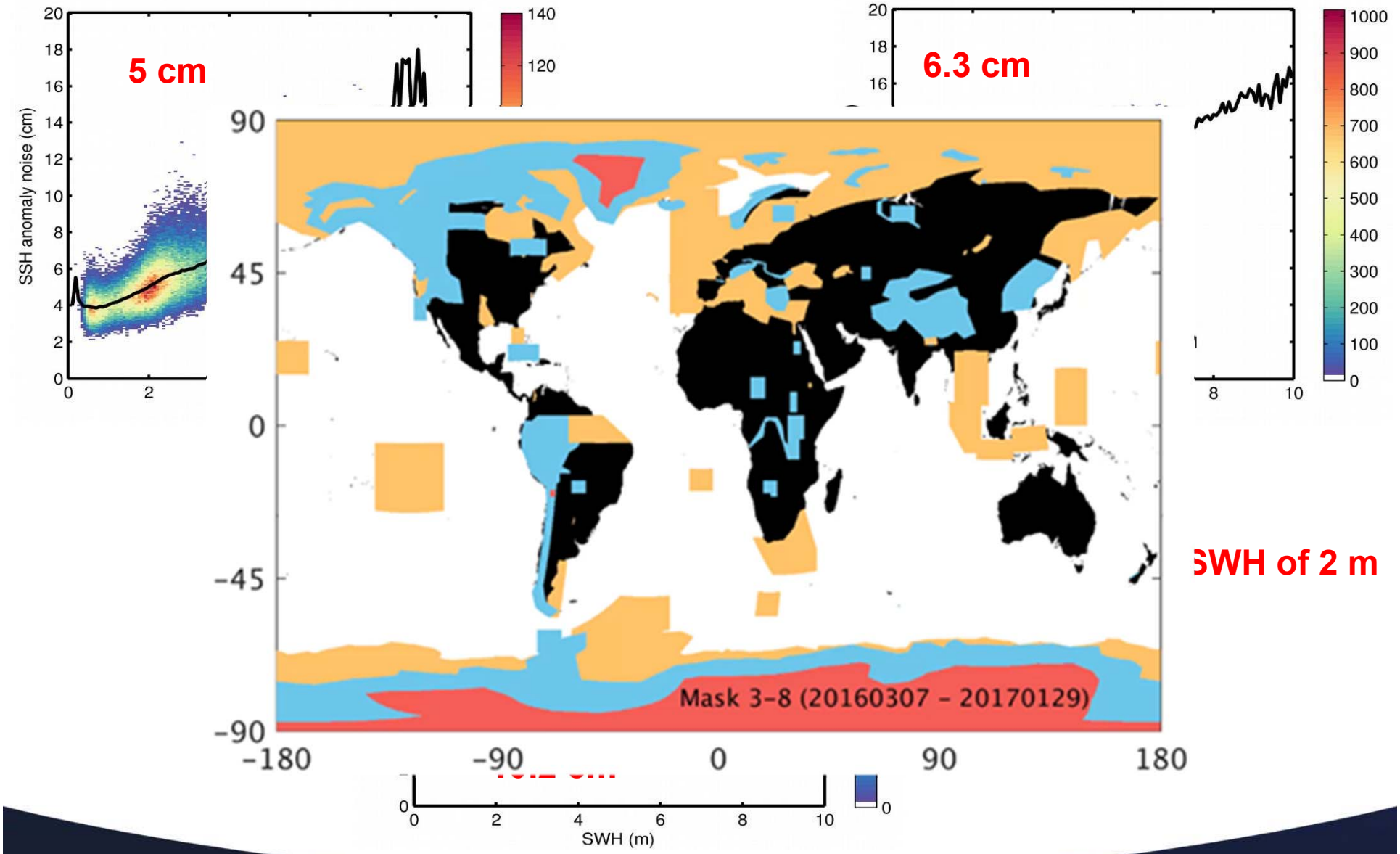


- Data flow (latency)
- SSH Crossover analysis
- SWH coverage and validity
- Validation against Jason-2/3
- Validation against in situ measurements and models

  tide gauges, wind speed against buoy data, WaveWatch III model data, steric heights derived from T/S Argo profiles

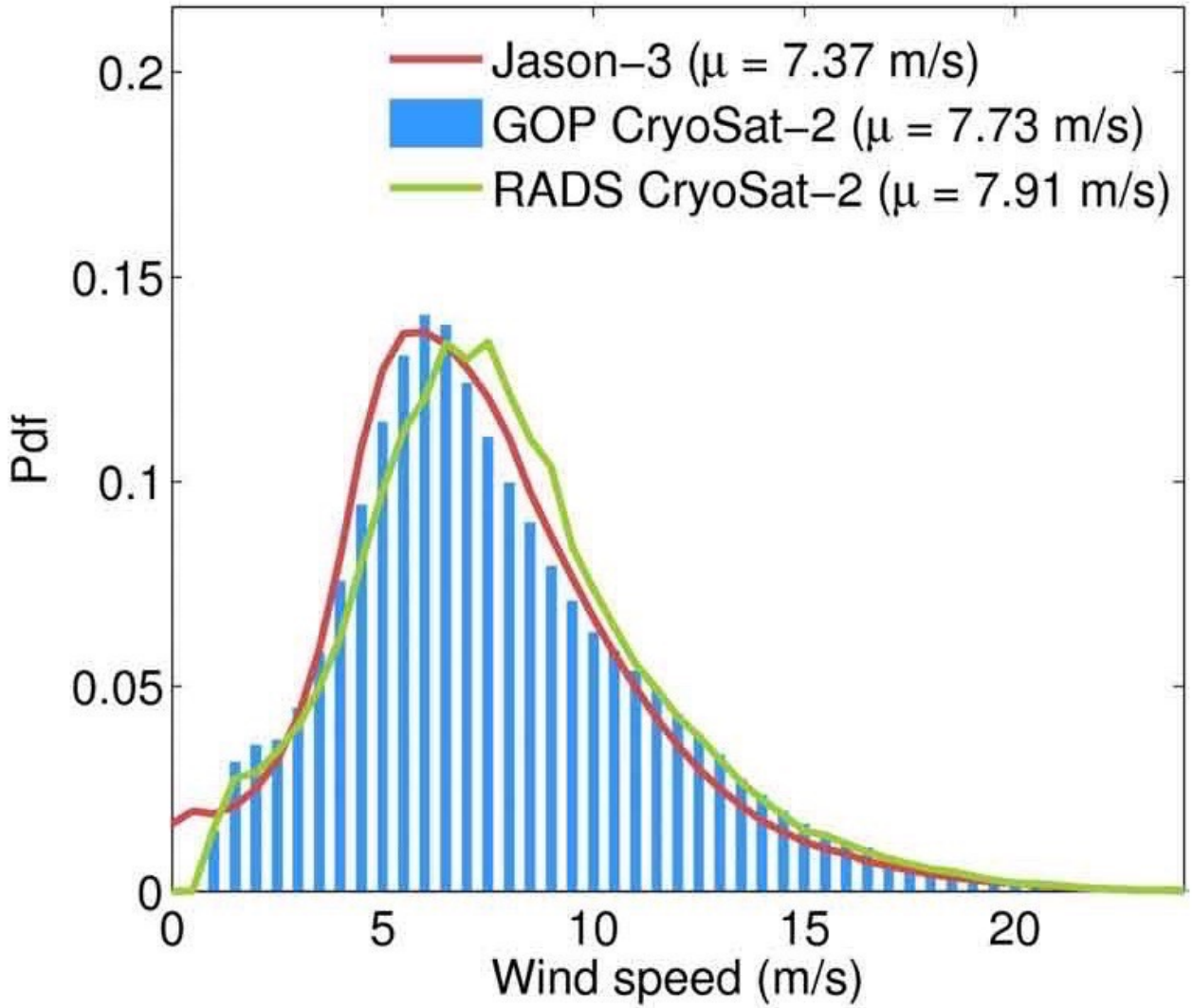
https://earth.esa.int/web/sppa/mission-performance/esa-missions/cryosat/quality-control-reports/ocean-product-quality-reports

Noise of altimetric SLA increases with sea state



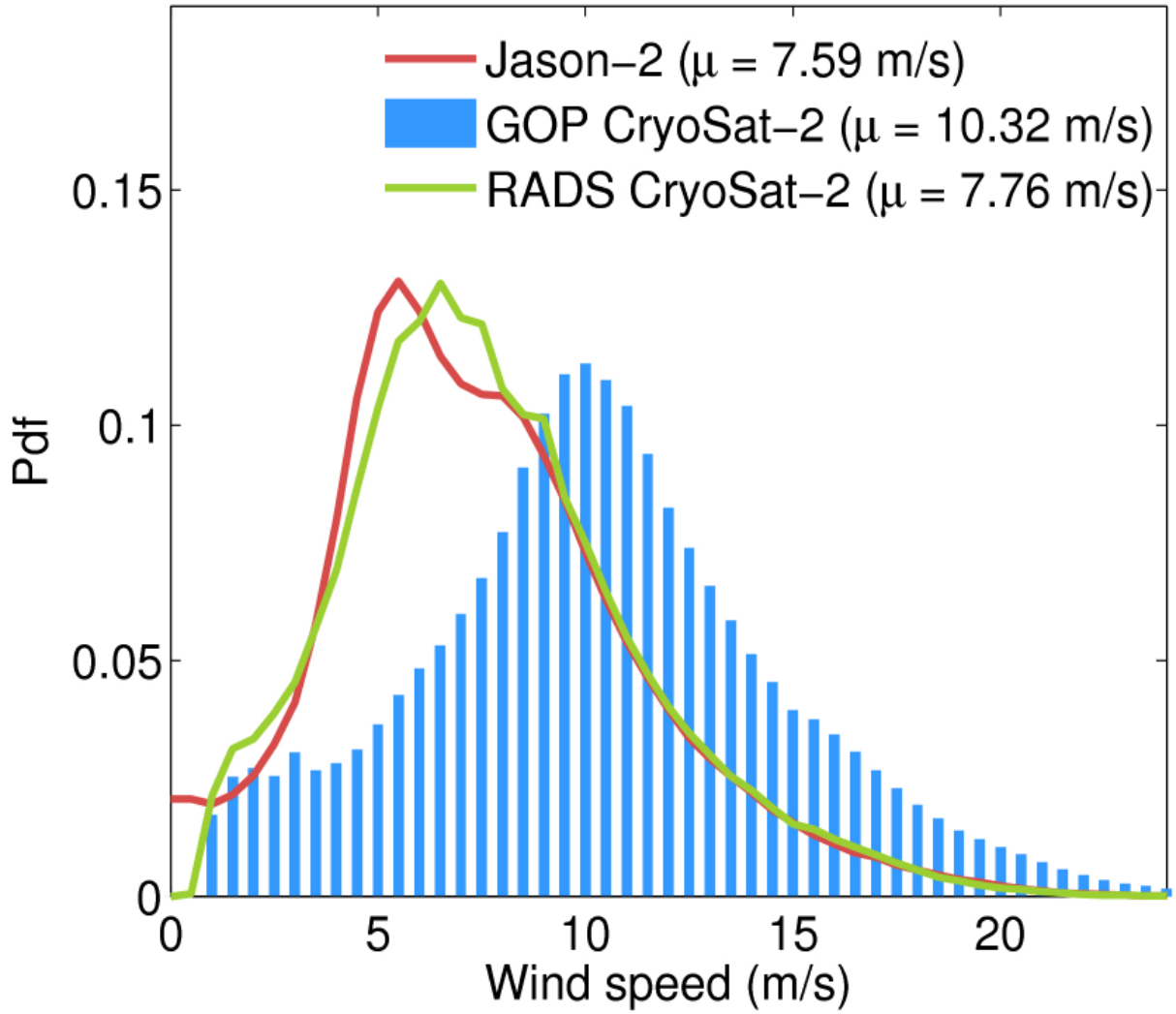
From monthly reports (March 2019)

Measuring global ocean winds with CryoSat January 2019



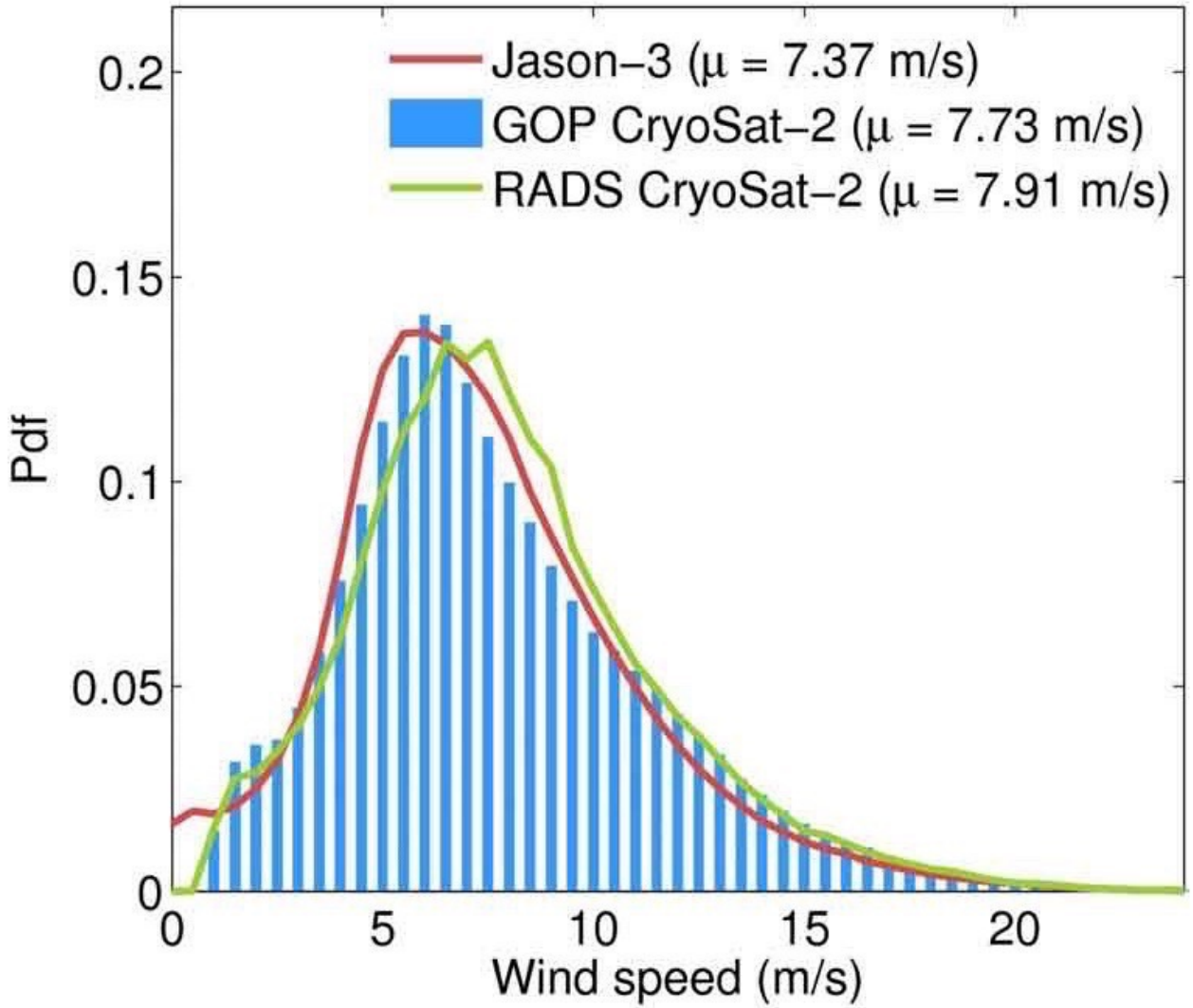
From monthly reports

Measuring global ocean winds with CryoSat
January 2016 BASELINE B



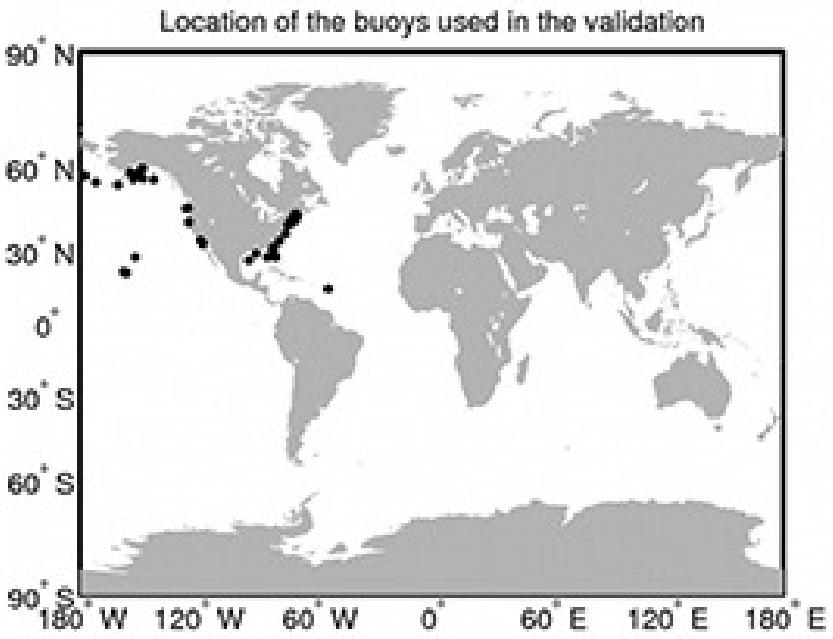
From monthly reports

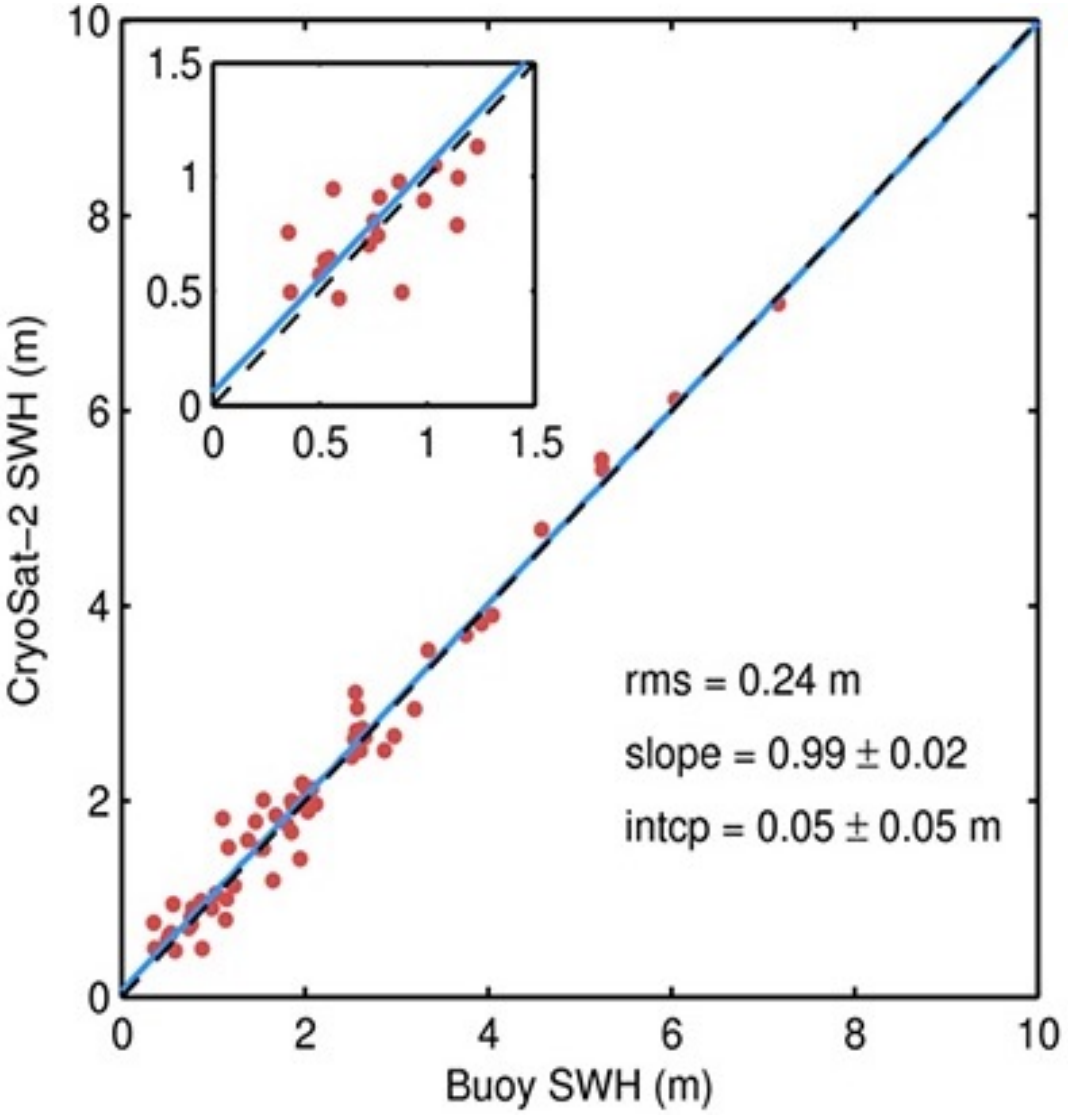
Measuring global ocean winds with CryoSat January 2019



From monthly reports

Accurate global SWH - buoys

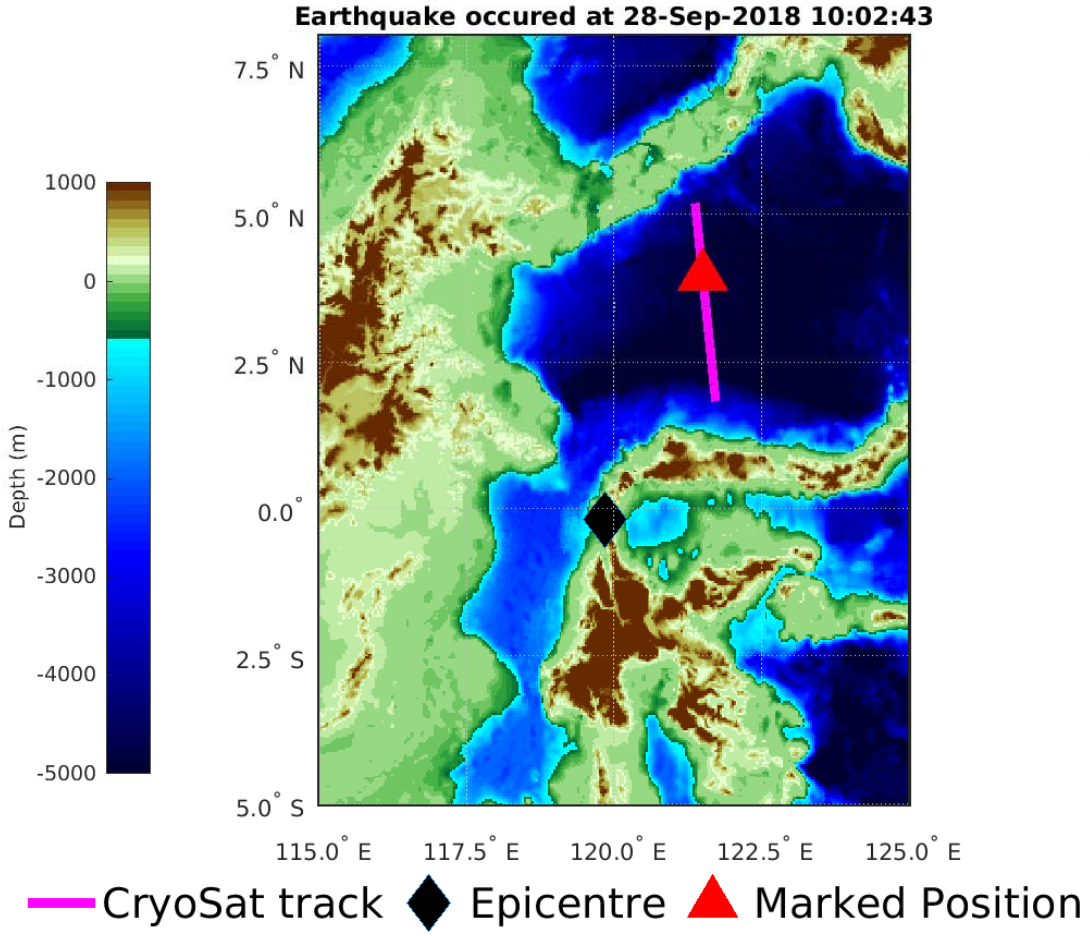


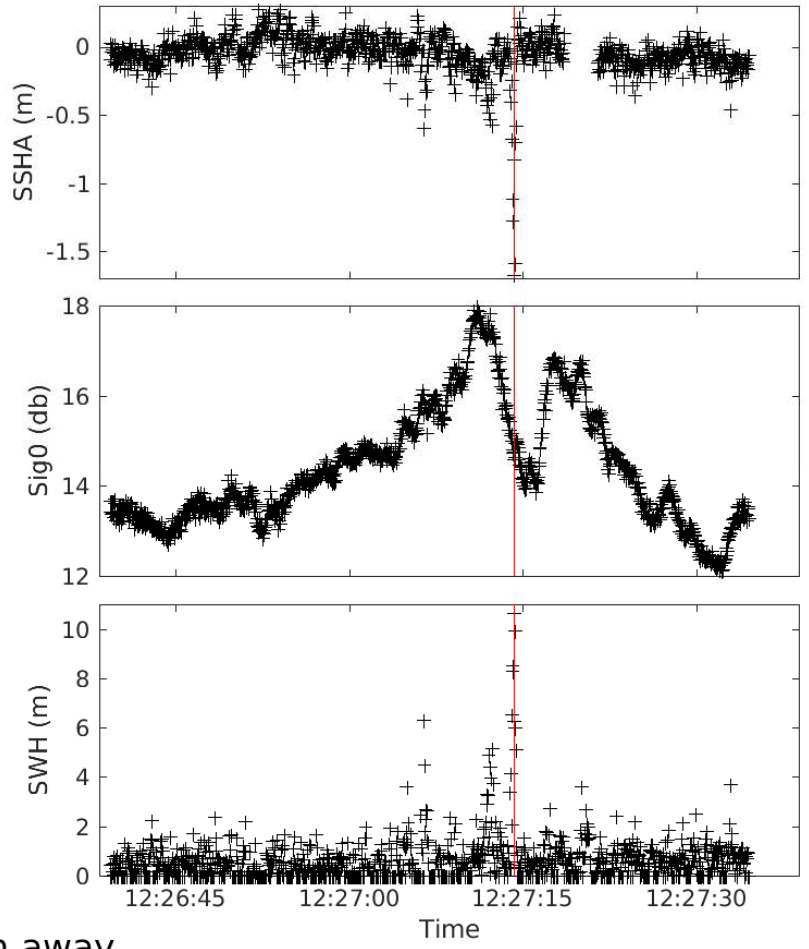


Inset plot zoomed-in for SWH < 1.5 m

From monthly reports

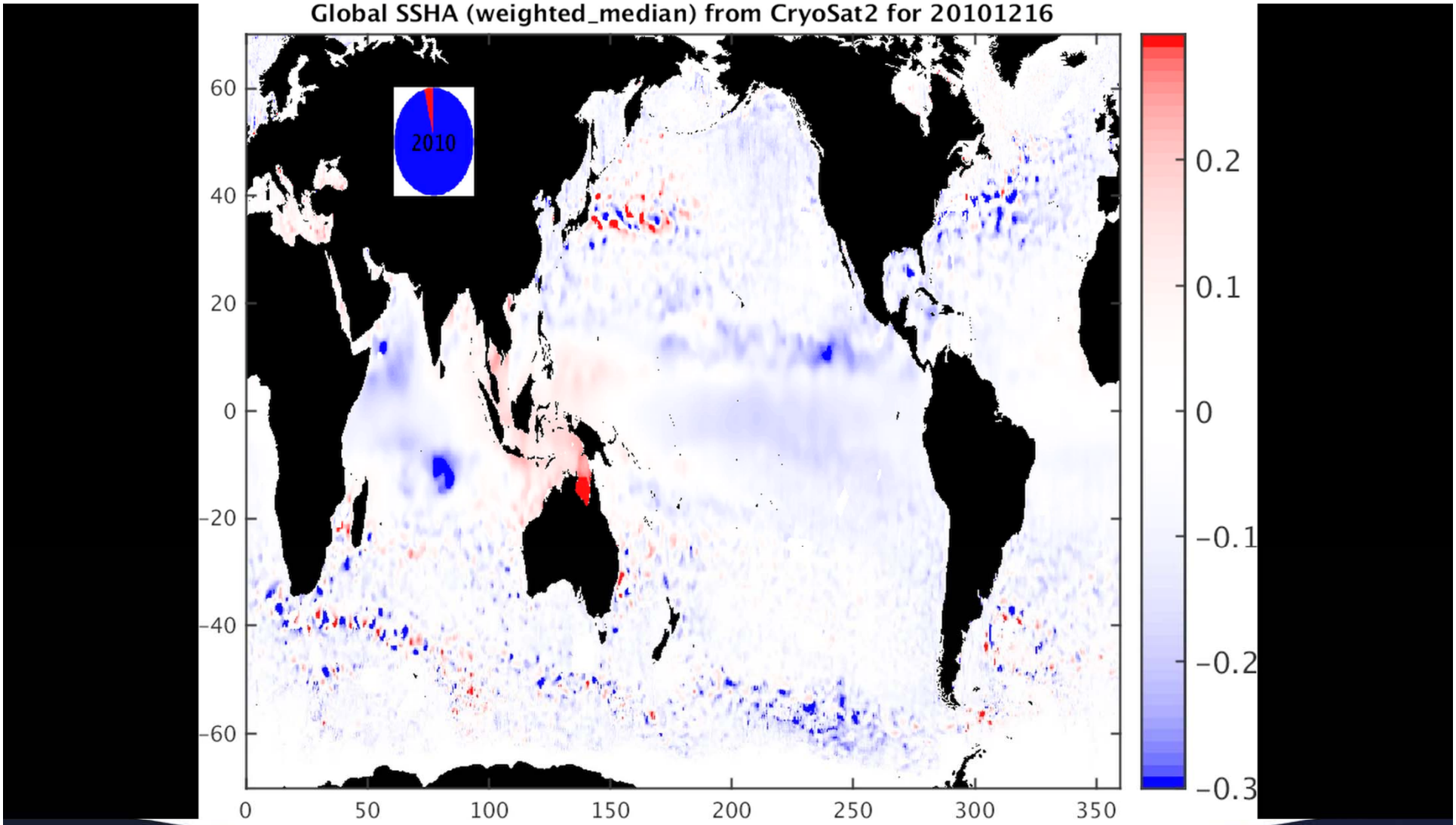
Signal of devastating tsunami observed by CryoSat



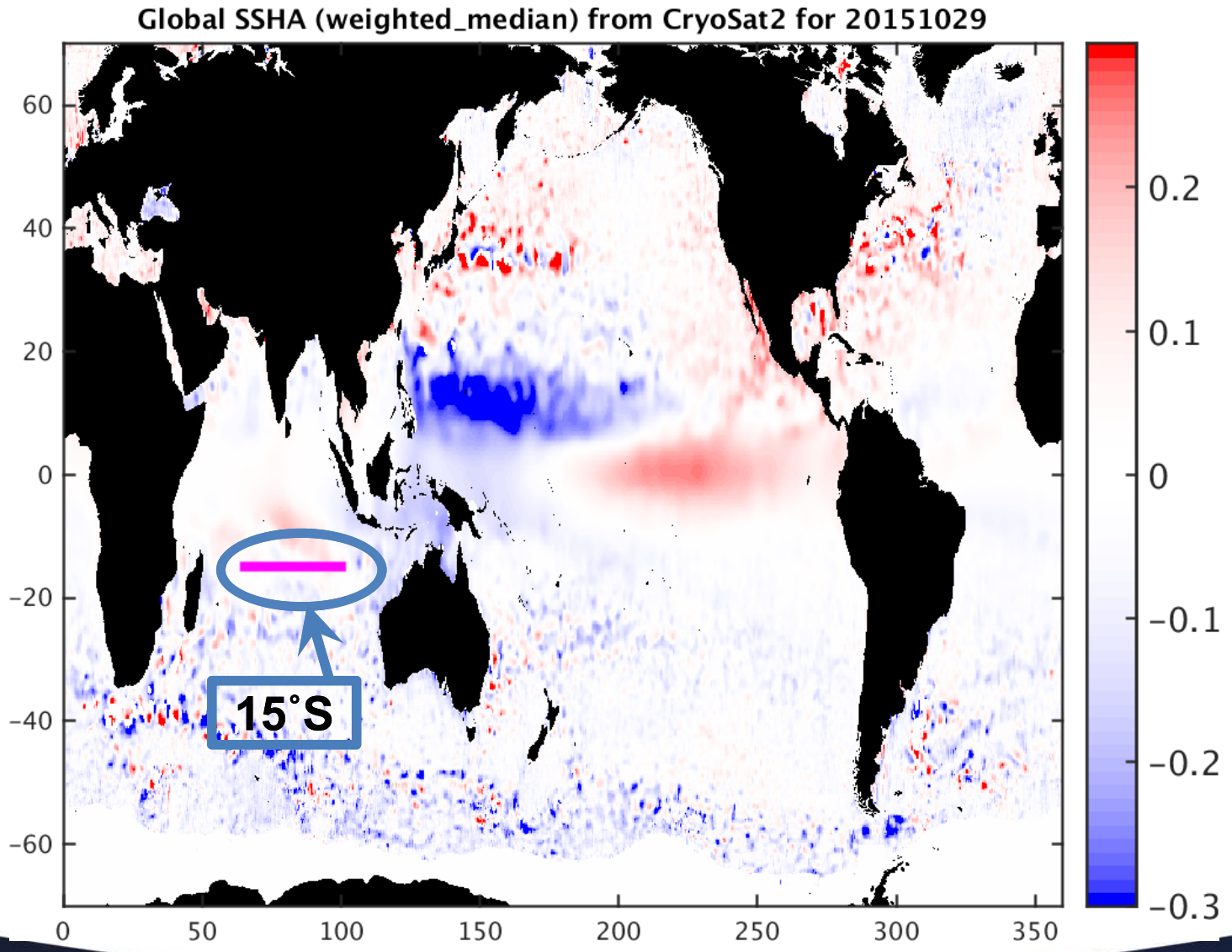


Marked point is 2.4 hours after earthquake and 495.3 km away

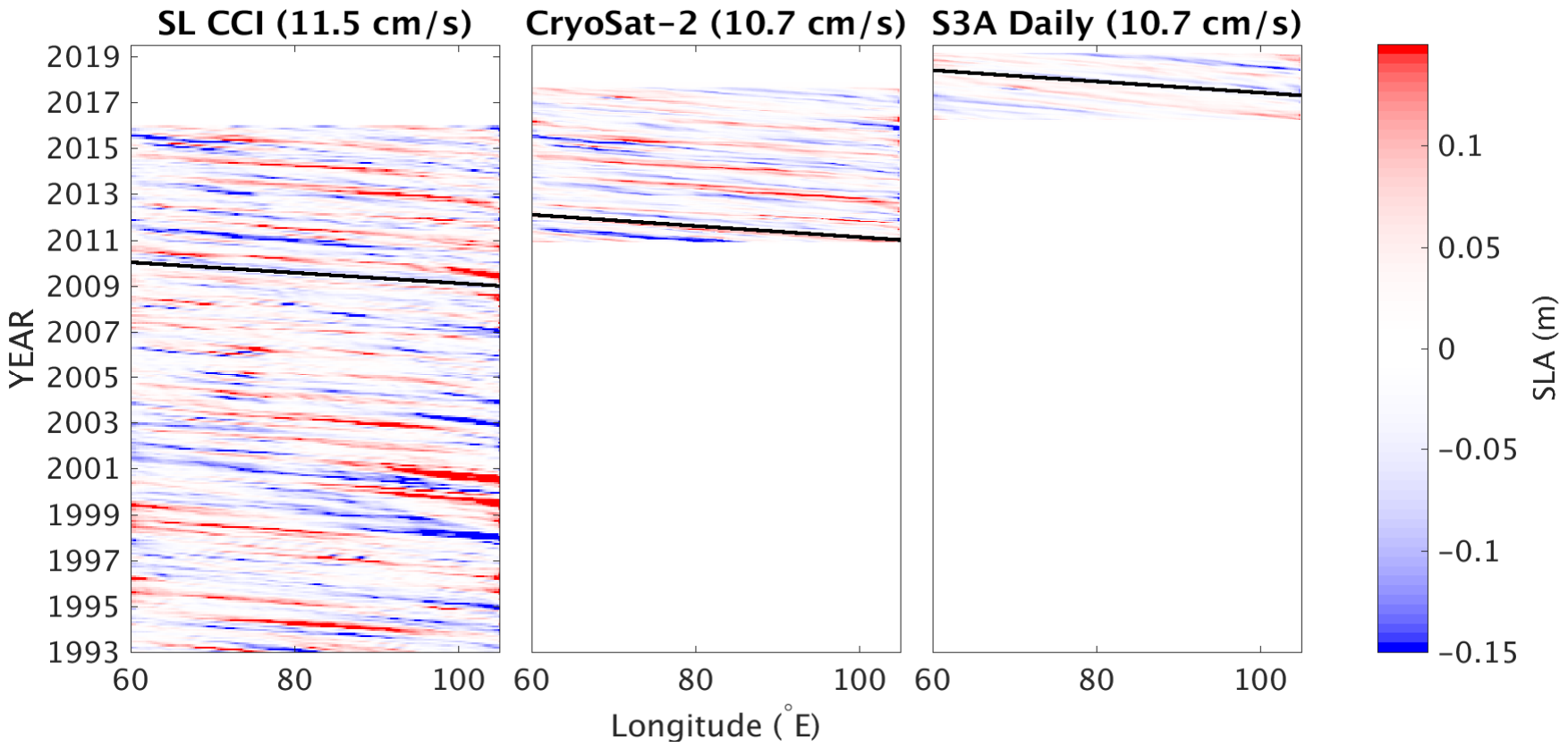
Building a L3 SSHA Product



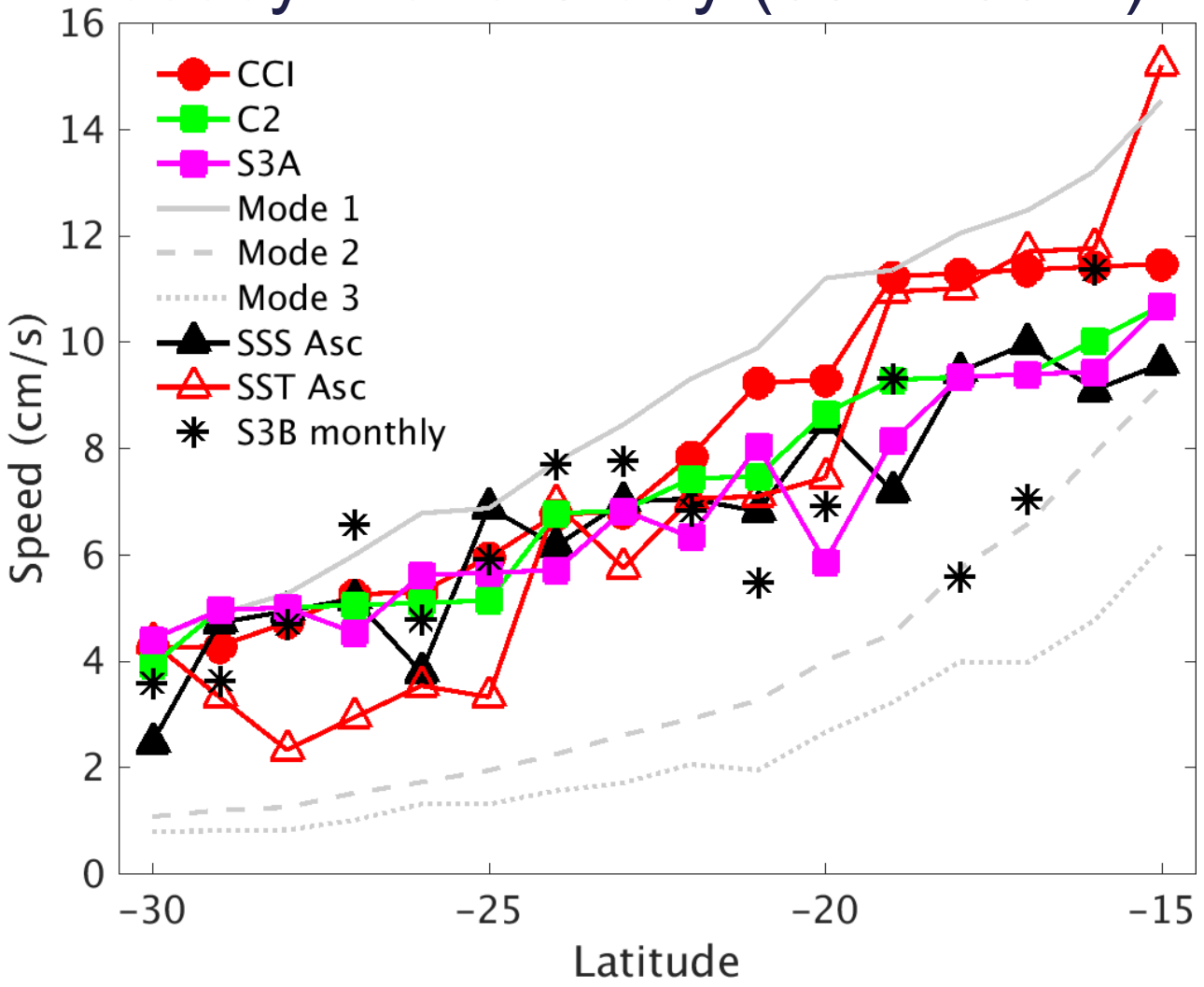
Rossby Wave Study (65˚–100˚E)



Rossby Wave Study (65˚–100˚E)
15˚S



Rossby Wave Study (65˚–100˚E)

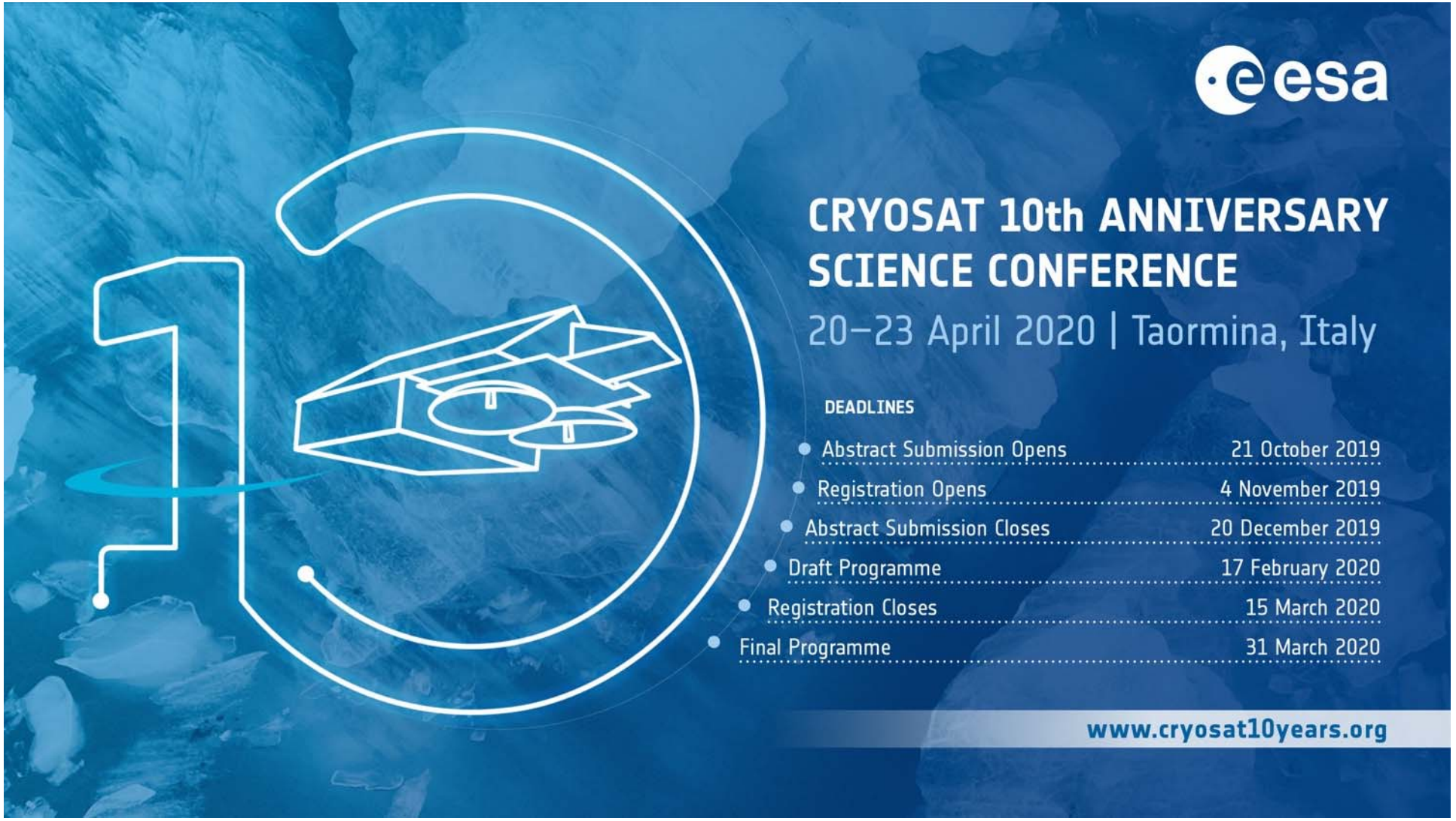


Propagation speeds derived using the Radon transform for the products given in the legend. The Mode 1–3 are the speeds calculated for the first 3 baroclinic modes using World Ocean Atlas 2013 data (2005–2012) as detailed in Banks *et al.* (2016).

Summary

- CryoSat Ocean Products available operationally since April 2014 from ESA
  then reprocessed from start of the mission (~9 years of data)
- Excellent performance over ocean
  - in terms of noise, compares well with TGs, ARGO, Jason products and other validation sources
- Operational change to Baseline C – including SAR and SARIn full dataset currently being reprocessed
- CryoSat Ocean products ready for oceanographic studies and applications
- **CryoSat Ocean Products complement the ocean altimetry record from repeat-orbit missions**

THANK YOU



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