The Geoid,Mean sea surface and mean dynamic topography

Splinter summary & recommendations

O. Andersen and Y. Faugere

5 Presentations

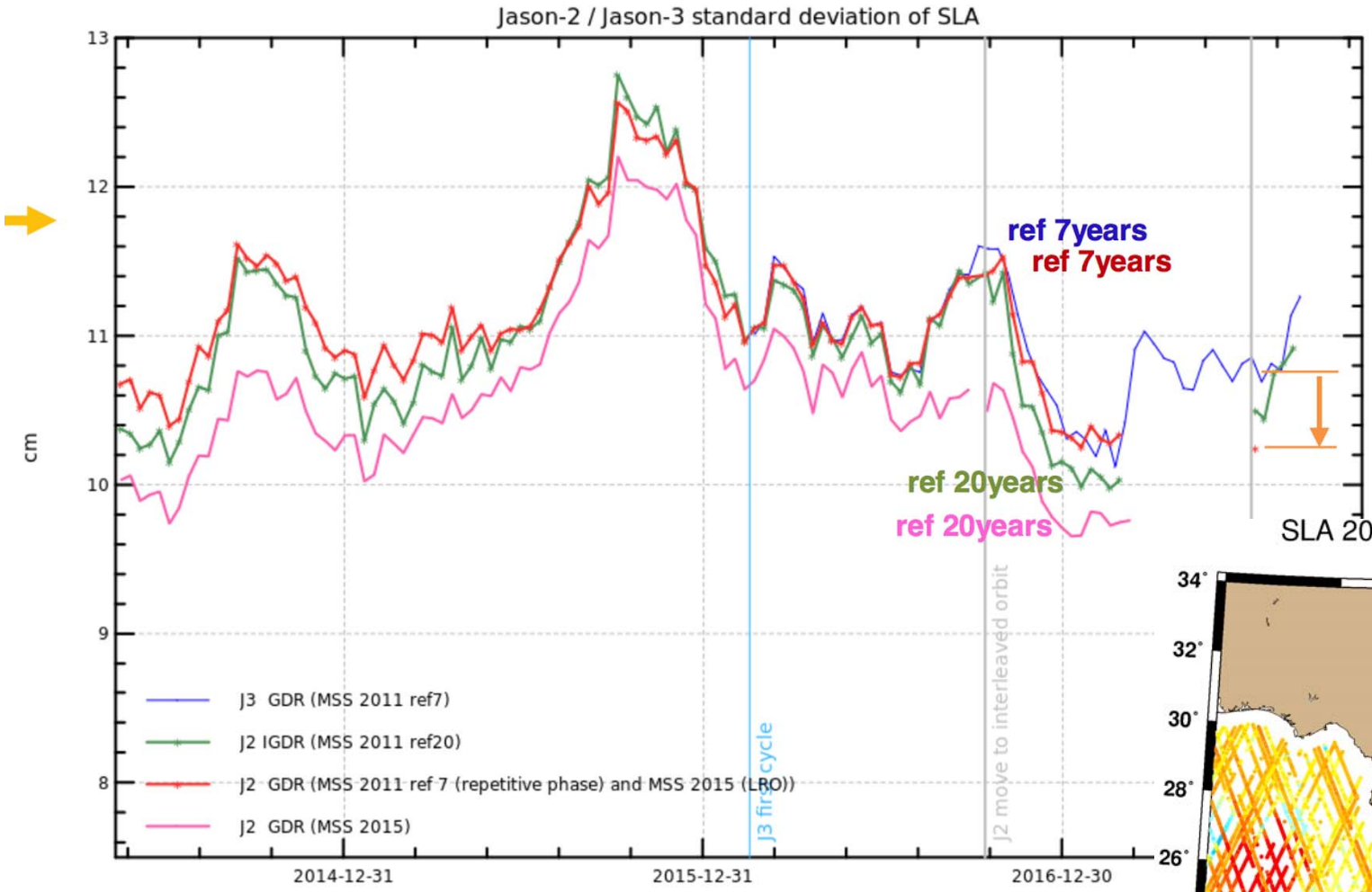
•The Jason-2 Mission Geodetic Phase **(Egido et al)**
•Improvements and limitations of recent mean sea surface models: importance for Sentinel-3 and SWOT **(Pujol et al)**
•GEOMED2: Geoid estimation of the Mediterranean Sea **(Bruinsma et al)**
•A combined mean dynamic topography model – DTU17cMDT **(Knudsen et al)**
•Comparison and synthesis of geodetic and oceanographic data to improve mean dynamic topography products – **(Maximenko et al)**

6 Posters

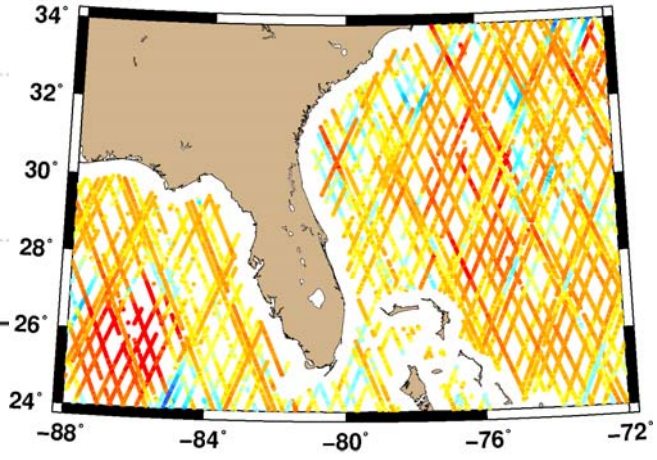
•GEO_001 - Results from GOCE++ Dynamical Coastal Topography and tide gauge
•GEO_002 - Geomed2: gravimetric versus combined geoid model
•GEO_003 - A new OGMOC mean dynamic topography model – DTU17MDT.
•GEO_004 - GOCE User Toolbox and Tutorial.
•GEO_005 - State-of-the-Art Mean Sea Surface and Geoid Model assessment in the Arctic and implications for Sea Ice Freeboard Retrieval
•GEO_006 - Global and regional evaluation of recent Mean Sea Surfaces using the first year of Sentinel-3 and impact for updating the DTU15MSS

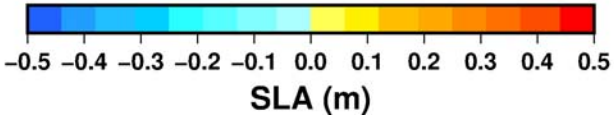
+ MSS issues discussed in many splinters this year (instrumental, calval, coastal, errors)

Egido & al



SLA 20170712 to 20171026





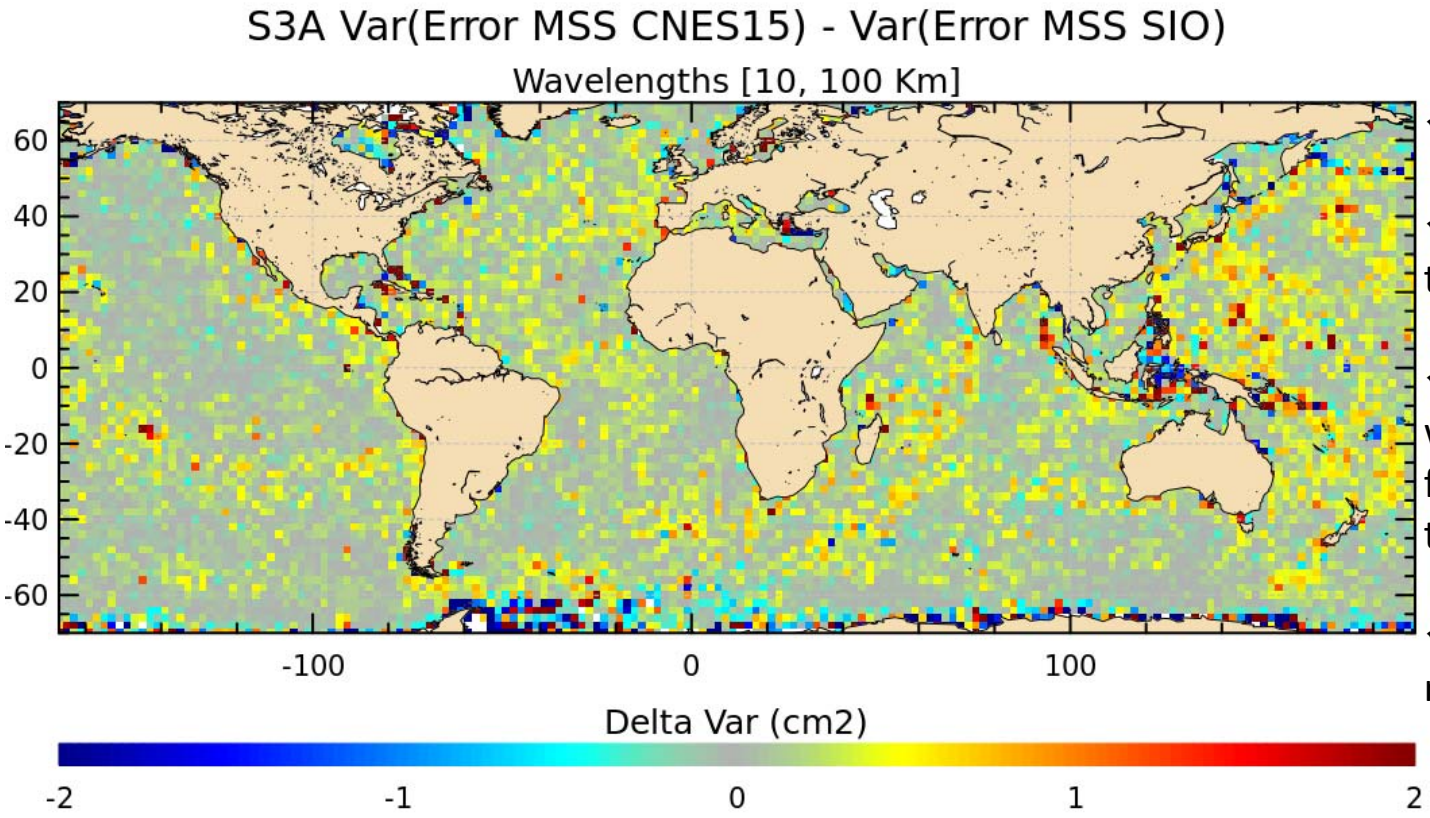
Global Jason-2 Data Quality Assessment on the new Long Repeat Orbit

H. Roinard[1], S. Labroue[1], N. Picot[2]
Contact: equipe-calval-jason@cls.fr
1. CLS, Toulouse, France
2. CNES, Toulouse, France

A collaborative approach with D Sandwell (SIO) for preparing MSS for SWOT.

Approach:

- Use CNES_CLS15 MSS model to constrain large scales (> 30 km).
- Use in addition slope profiles from 20Hz J1G and Cryosat-2 to constrain small scales



✓ no impact on large scale

✓improvement of finest topographic structures

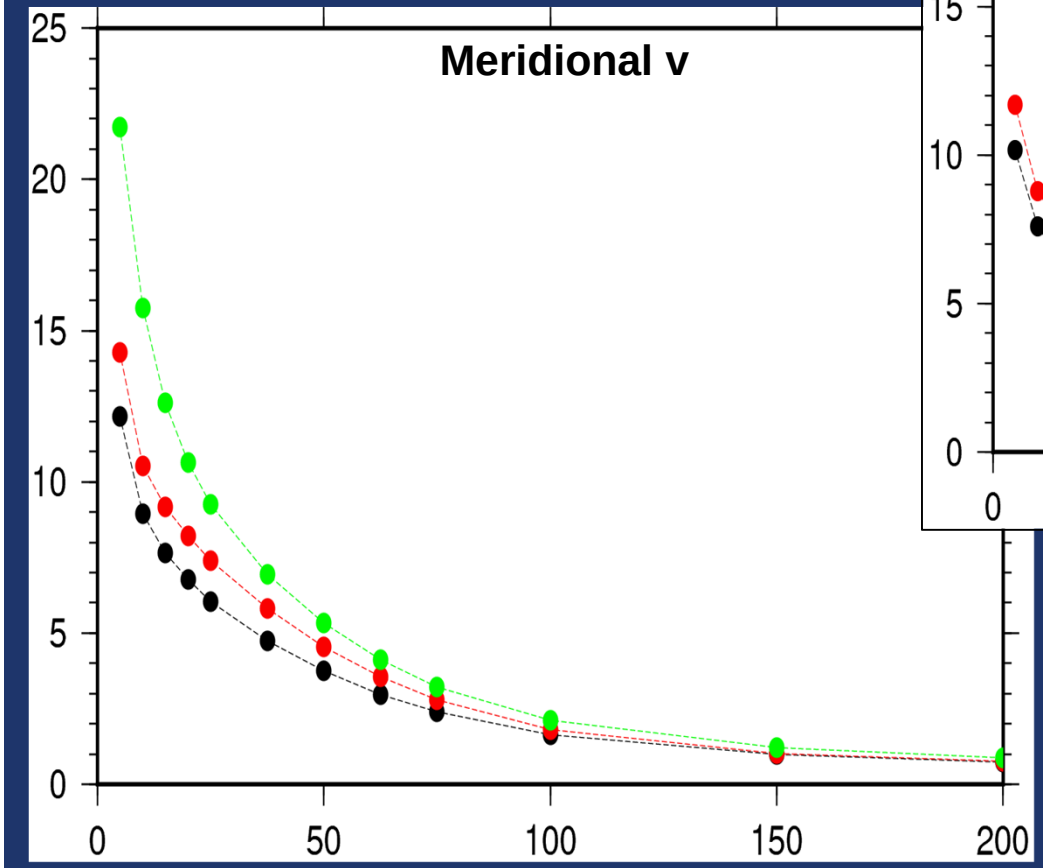
✓omission errors reduction wavelengths < 100km by a factor ~1/3 compared to the CNES_CLS15 model.

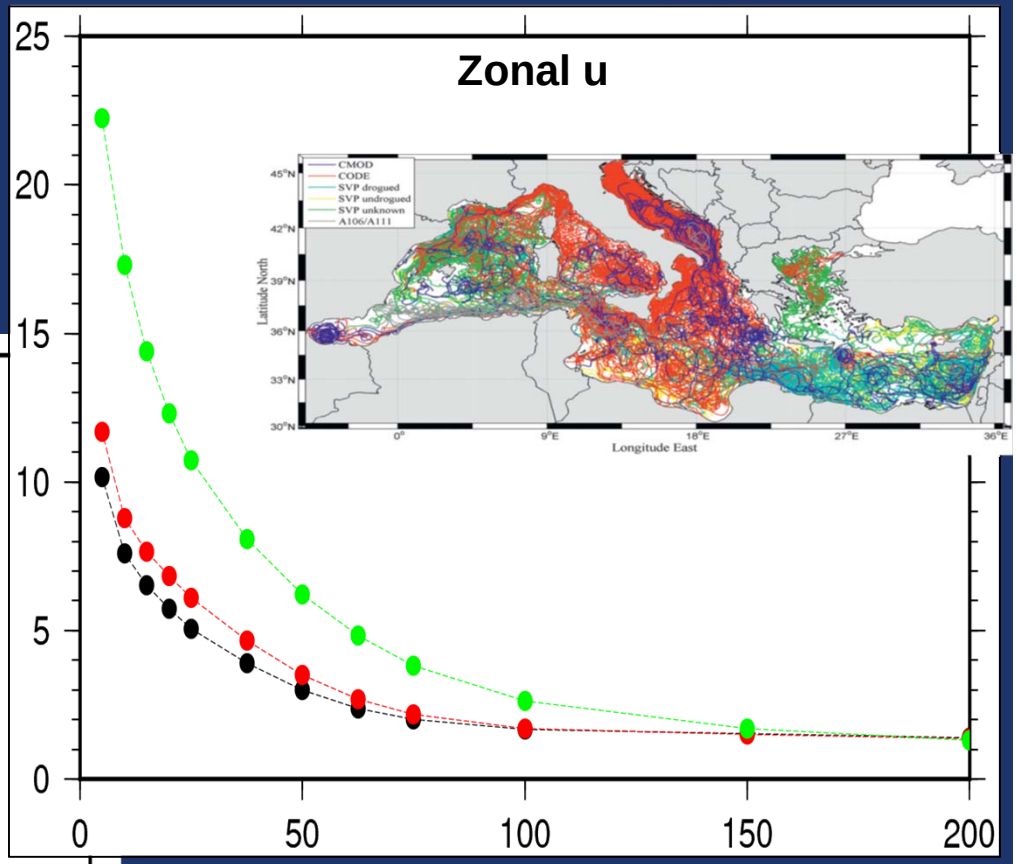
✓Locally up to 2 cm² reduction.

COMP… …FTER DATA (I.E. GEOSTROPHIC CURRENT)

Bruisma & al

RMS of the difference (in cm/s) over the entire Mediterranean basin as a function of spatial scale (km)





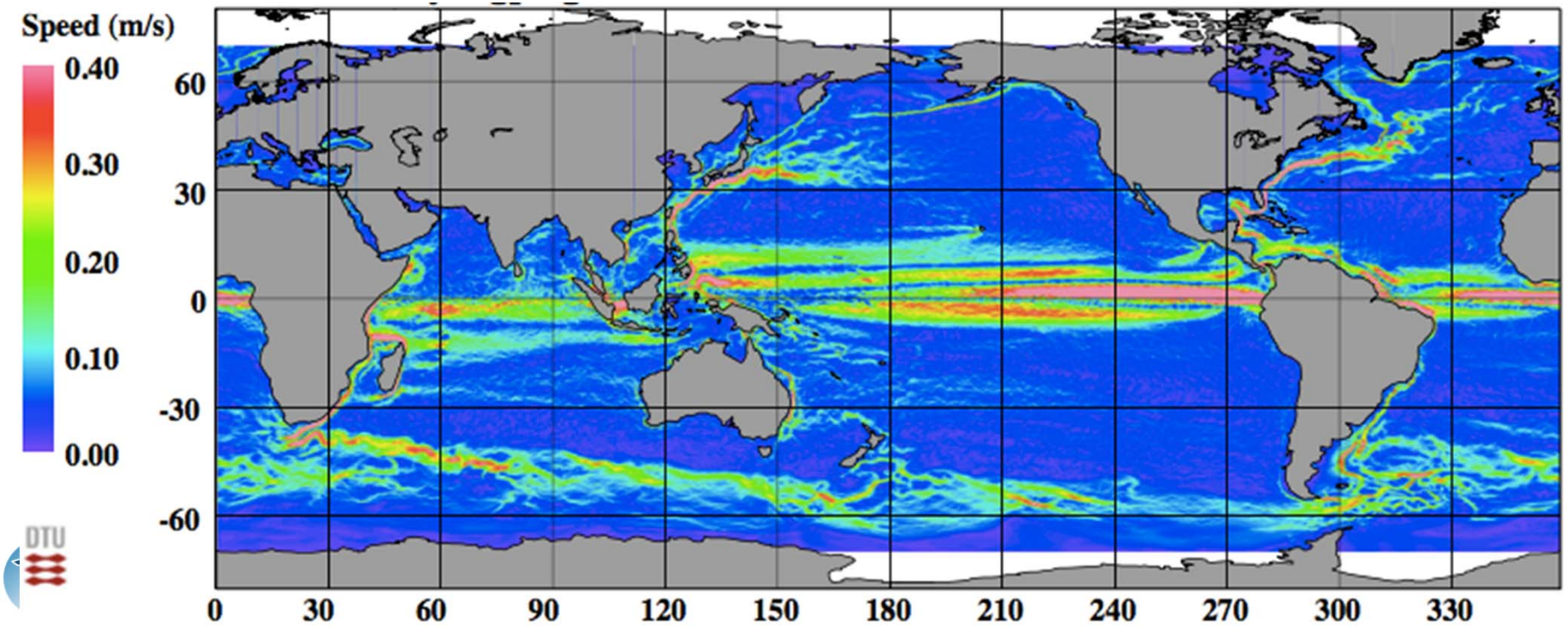
Gravimetric geoid

EIGEN6C4 geoid

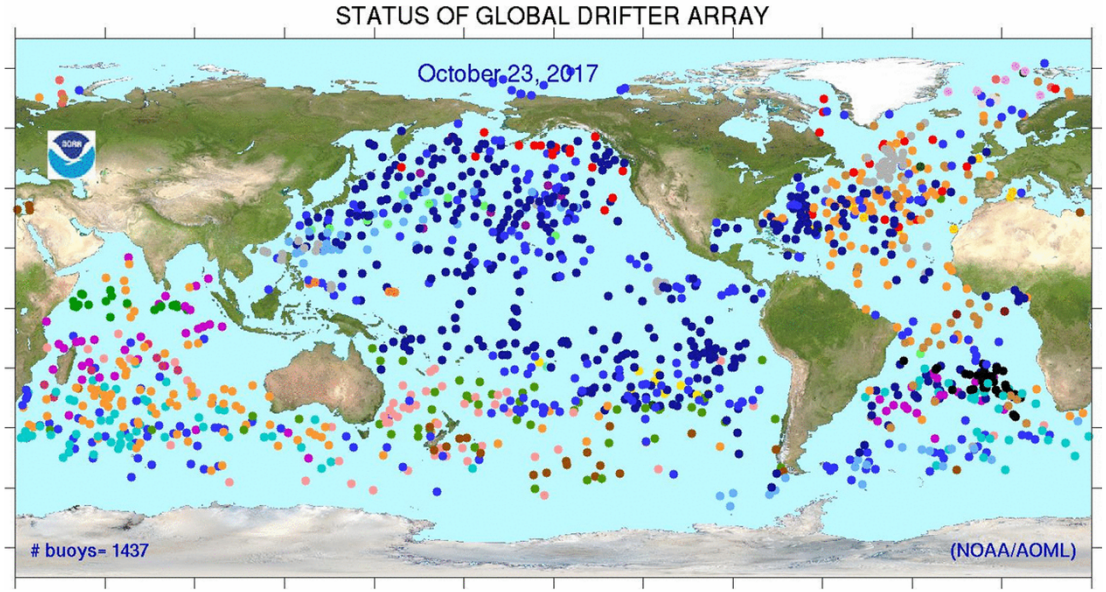
Altimetric geoid (with UCSD V24.1)

Qhz #GWX4:fP GW#

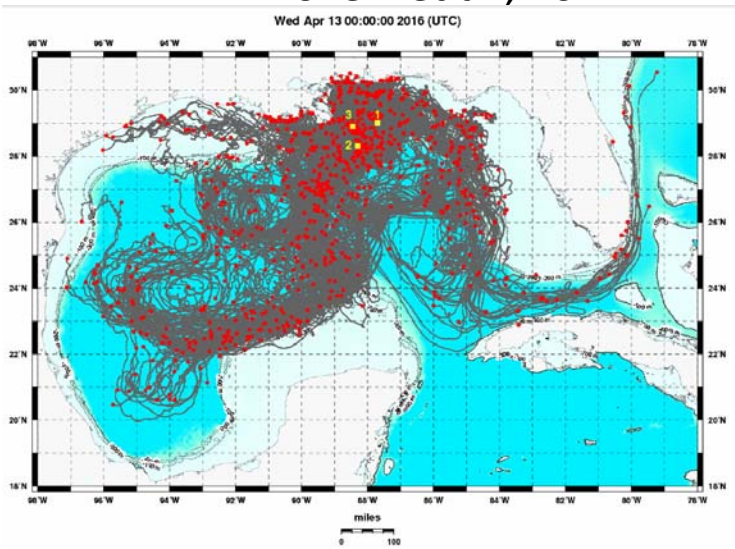
-
-
-
-
-
-



Maximenko & al



Novelli et al., 2017



To exceed their quality, oceanographic observations (such as drifter trajectories) need to be carefully planned and processed, including:

- *Accuracy and frequency of fixes*
- *Density and timing of deployments*
- *Quality of ancillary data (such as collocated SLA, wind, etc.)*
- *Filters and parameterizations*

Geoid/MSS/MDT
(still) improve resolution and coastal quality !

- MSS errors are greater than the signal below 30km wavelength

- Improvement of Instrumental processing (eg LR LRM) makes the MSS errors more predominant

  =>Need to improve the resolution of MSS which will improve also MDT/Geoid => need of HR geodetic measurements

- Coastal MSS errors have been reduced (by more than 20%) in the last versions.

- But they remain too high for many applications (outcome of coastal session)

  =>Recommand further studies on the quality of the MSS in the coastal zone
  =>Stress the need of a **consistent multimission dataset at high resolution in input of the MSS computation** (retracking T/P+JA1+JA2+JA3, corrections, …)
  =>Stress the need of **improving the methodology of extrapolation of MSS** at the coasts

Geoid/MSS/MDT recommendations for Jason-2 EoL

- Considering the **importance of Jason-2 EoL for geodetic applications** and for
  - Improving the MSS for further improving the quality of oceanographic/operational use of satellite altimetry.
  - Improving the MSS in preparation for future high resolution missions (i.e., SWOT)

- The Splinter recommends the following:
  1. The Splinter encourages efforts to **maximize the operating time** of Jason-2 and the importance of completing at least 2 sub-cycles of 369 days (preferably more).
  2. The Splinter stresses the importance to **maximize coverage** even in the case of degradation of the accuracy.
  3. The Splinter urge the space agencies to **restart the mission as soon as possible in case of safehold** episodes to minimize data gaps
  4. If Jason-2 lives through its first geodetic cycle the splinter **recommends to avoid data gaps in the second sub-cycle close to the data gaps during the first sub-cycle.**
  5. Stressing the importance for **further simulation s**tudies to anticipate and mitigate possible safe-holds
  6. Stressing the importance of maintaining a Jason-2 “scientific group” for off-line discussion of detailed and ad-hoc recommendation