Geoid, Mean Sea Surface and Mean Dynamic Topography Splinter.

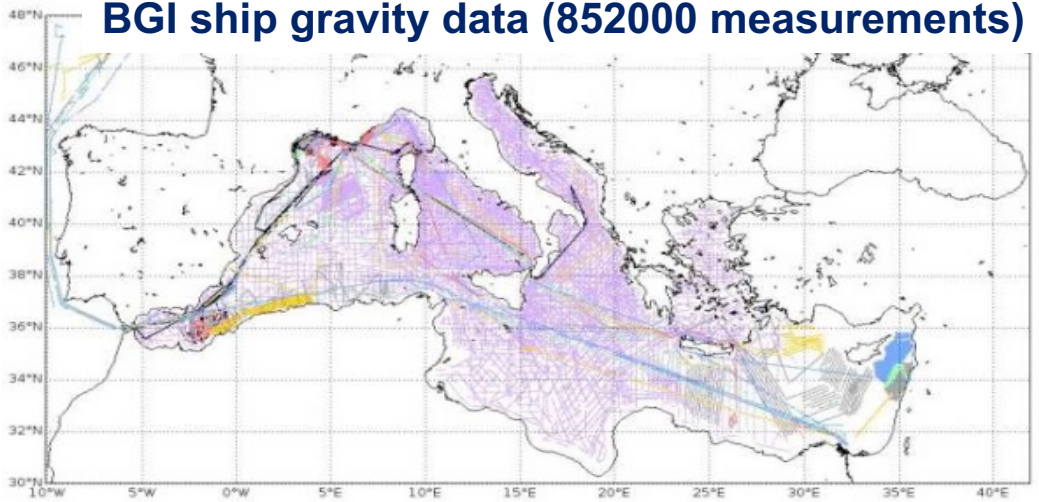
Ole Baltazar Andersen
and Yannice Faugere

- 5 presentations
  - 1 on marine gravity
  - 2 on MSS
  - 2 on MDT
- 4 posters

Assessment of marine gravity models of the Mediterranean (Sean Bruinsma et al)

New CNES/CLS marine gravity solution, close to the reference solutions DTU & USDC

BGI ship gravity data (852000 measurements)

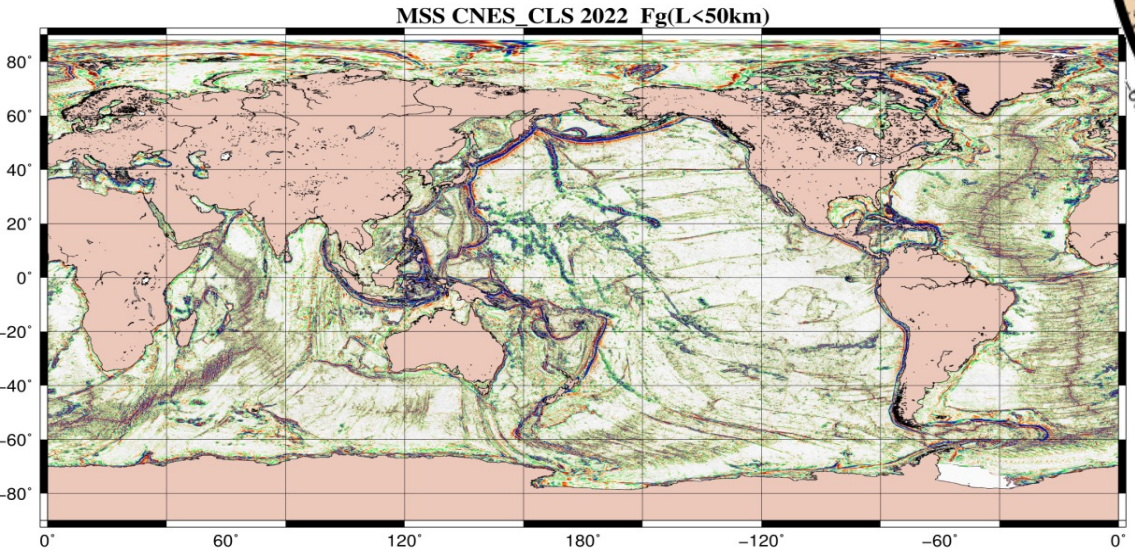


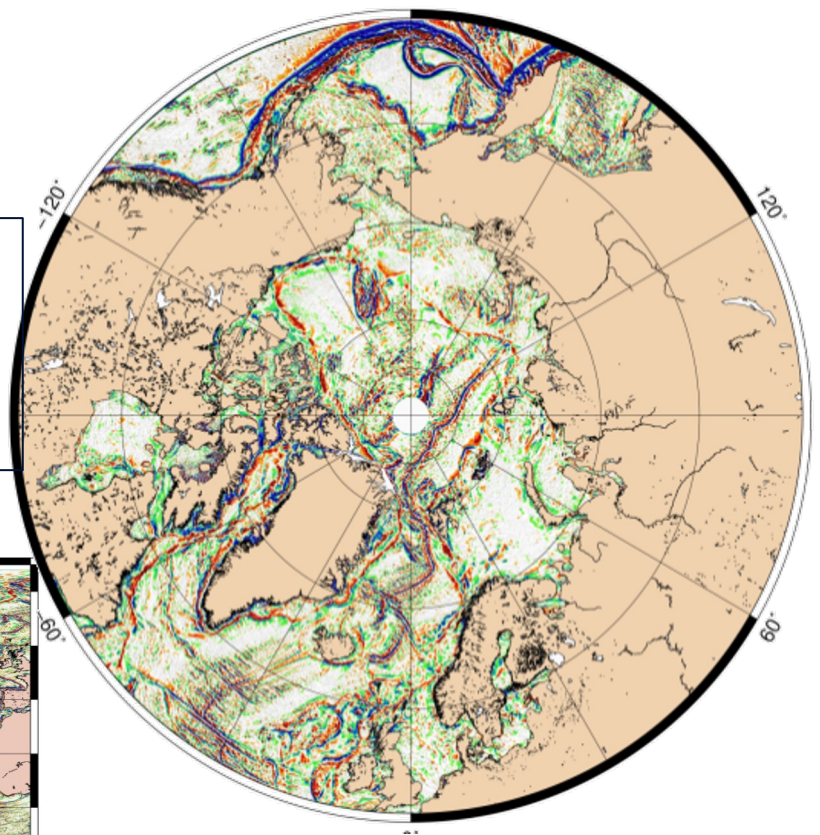
STD [BGI- Model] (mgal)

	Med	Aegean	Sicily	Alboran
BGI-DTU15	3.78	4.27	3.43	3.85
BGI-DTU21	3.39	3.85	3.29	3.62
BGI-UCSD24	3.85	5.13	3.78	3.87
BGI-USCD31	3.97	5.20	3.71	3.60
BGI-UCSD32	3.78	4.86	3.36	3.64
BGI-CLS	3.78	4.56	3.60	3.83

New CNES CLS 2022 mean sea surface (Schaeffer et al)

Use of full rate altimetry (inversion of 6 billions SSH)
Improved short scales (error 15-100km / by 2)
Improved coastal quality
Improved Arctic coverage





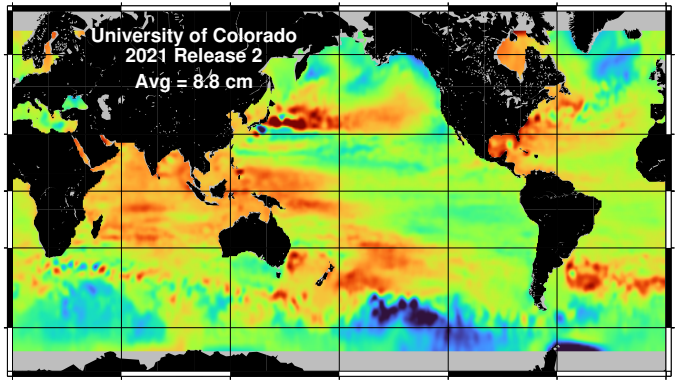
Available in the coming days on Aviso

Rethinking the Modeling of the Mean Sea Surface in the Era of Climate Change (Andersen et al)

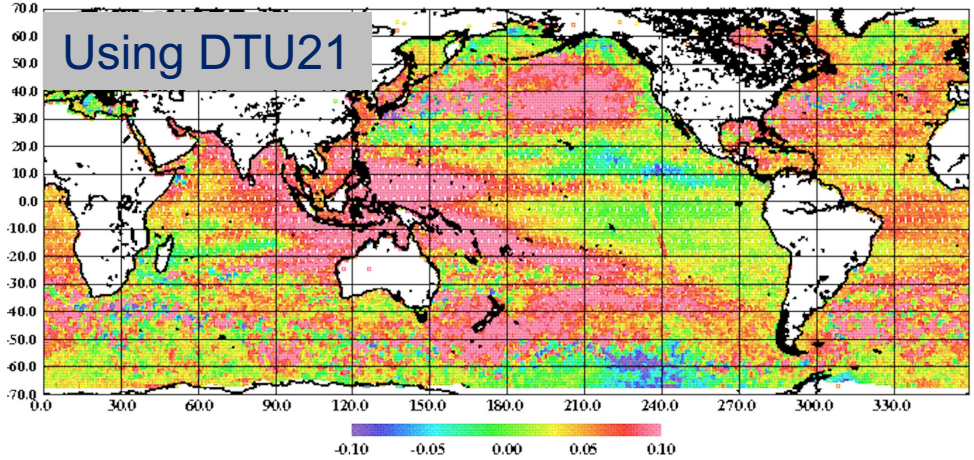
Current reference period: 1992-2012

Suggestion to change the MSS reference period:

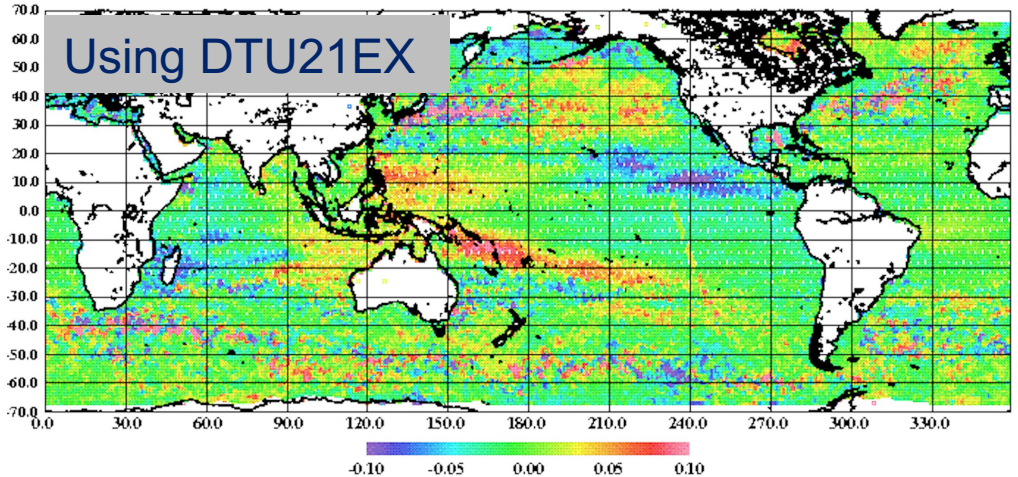
- 1993-2022 (30 years) ?
- 2003-2022 (20 years) ? =>DTU21EX



Sea Level Change Jan 1993 - Aug 2021



S6-MF – First year average (2021.06->2022.05)

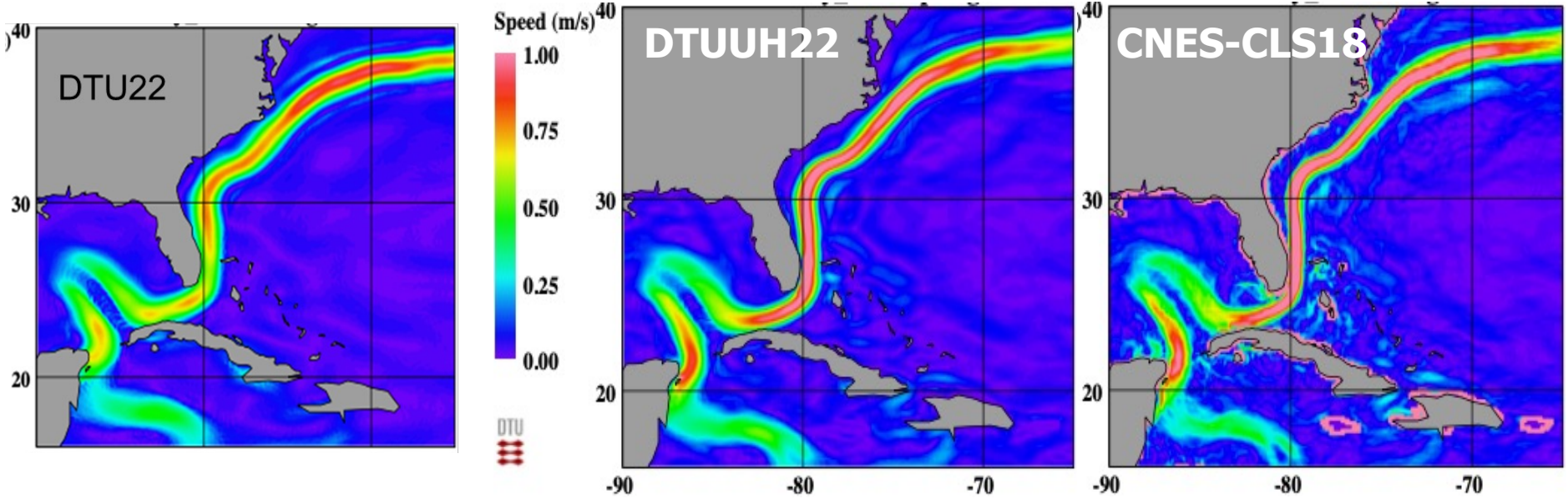


The DTUUH22MDT combined mean dynamic topography model (Knudsen et al)

Resolution improvement thanks to the addition of the in-situ information

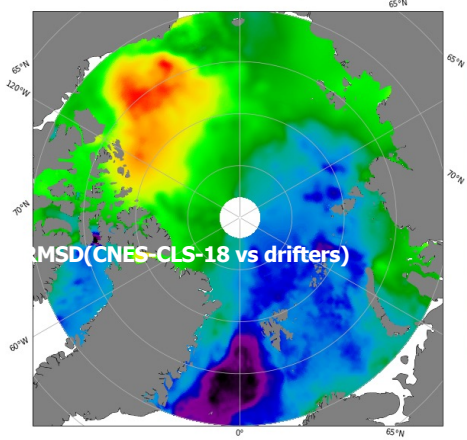
The combination model DTUUH22MDT

- Build on DTU22 - a purely geodetic MDT.
- add mean drifter velocities information
- Processing of drifter velocities (Ekman + Aviso GCA (20y)),



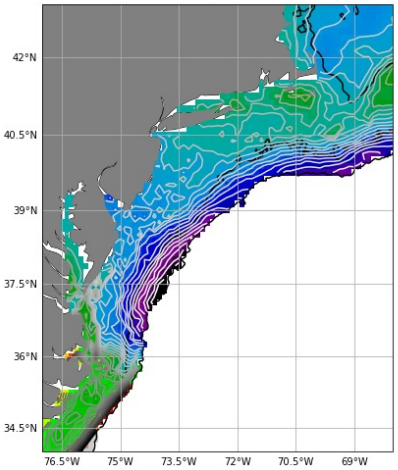
New global MDT CNES-CLS-22 combining drifters, hydrological profiles and High Frequency radar data (Jousset et al)

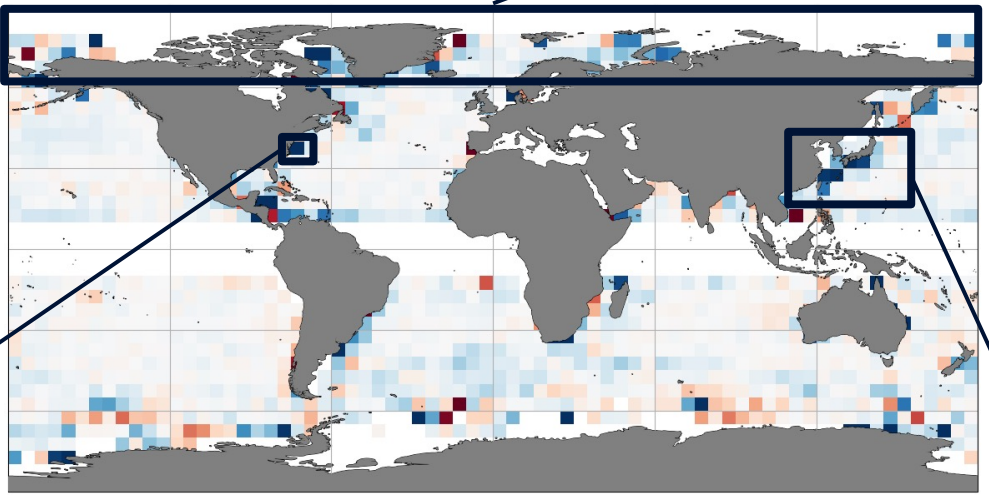
Improvement compared to CNESCLS18 previous solution
Available on Aviso end 2022



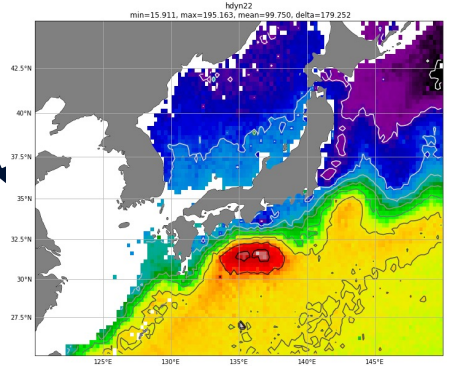
coverage improved

HF Radar used





More Argo ingested



Validation with independent drifters current modulus

Summary, recommendations & open question

- Recent/new/coming products
  - 1 Regional Marine gravity model (Med)
  - 3 MSS models
  - 2 MDT models

=> Performances improved, recommendation to use these new MSS & MDT fields as soon as they are published. Feedbacks from users are needed!

=>which reference period for next fields?

- Regarding MSS: 3 models from 3 teams, each one having its strength
  - DTU 21: the most accurate along the Greenland coast.
  - CNES/CLS 22: globally the most accurate near the coast
  - Scripps: improvement of the shortest wavelengths in open ocean

=> Interest of an Hybrid solution combining them

=> Interest to strengthen the collaboration: MSS workshop early 2023 on various aspects: altimetry processing, reference period, inversion method, assessment techniques, …

- Non repeat dataset still needed for MSS & marine gravity**=> Altika/Cryosat-2 to be continued, future Jason-3 EOL, Sentinel3-A EOL?**