Assessment of marine gravity models of the Mediterranean

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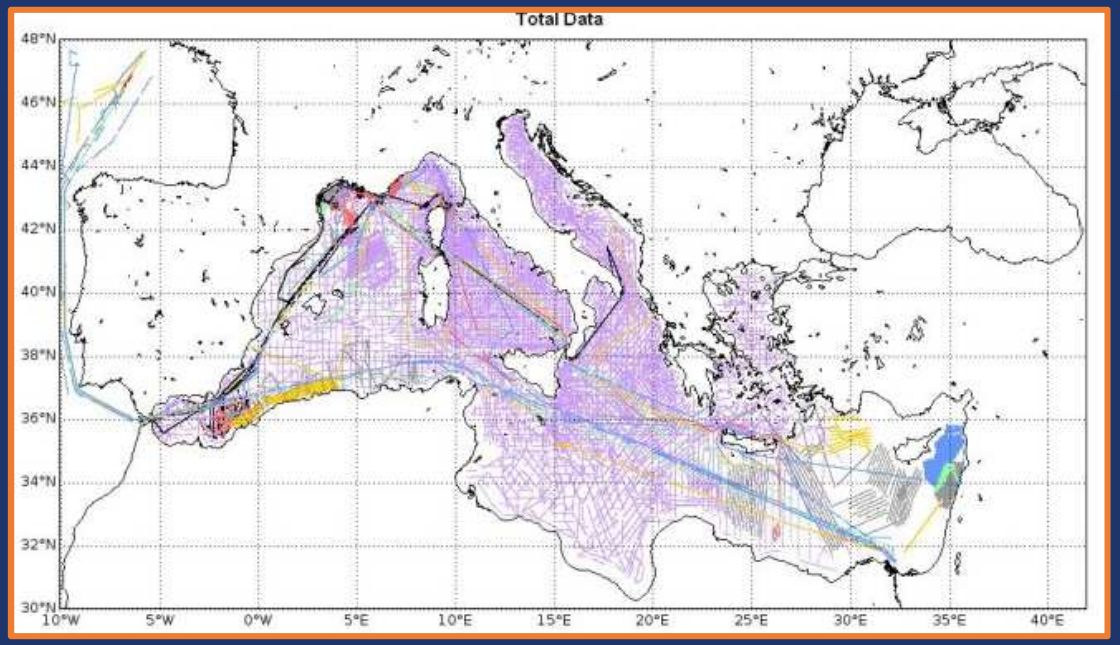
2022 OSTST meeting
Venice, 3 November 2022

MARINE GRAVITY ANOMALY DATA OVER THE MEDITERRANEAN

Data used in the assessment (ship and altimetry):

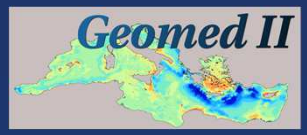
- BGI ship gravity data (852000)



- DTU solutions: 15 and 21
- UCSD solutions: 24, 31, 32
- CLS solution

The following comparisons were done:

- DTU15 – DTU21
- UCSD24 – UCSD31/32
- DTU - UCSD
- BGI – DTU, BGI – UCSD, BGI - CLS



First: *model – model* comparisons

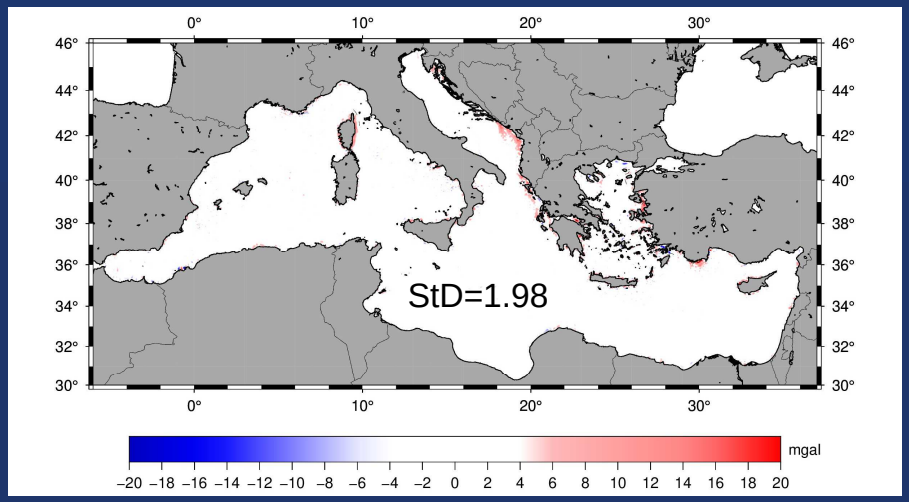
Same family:

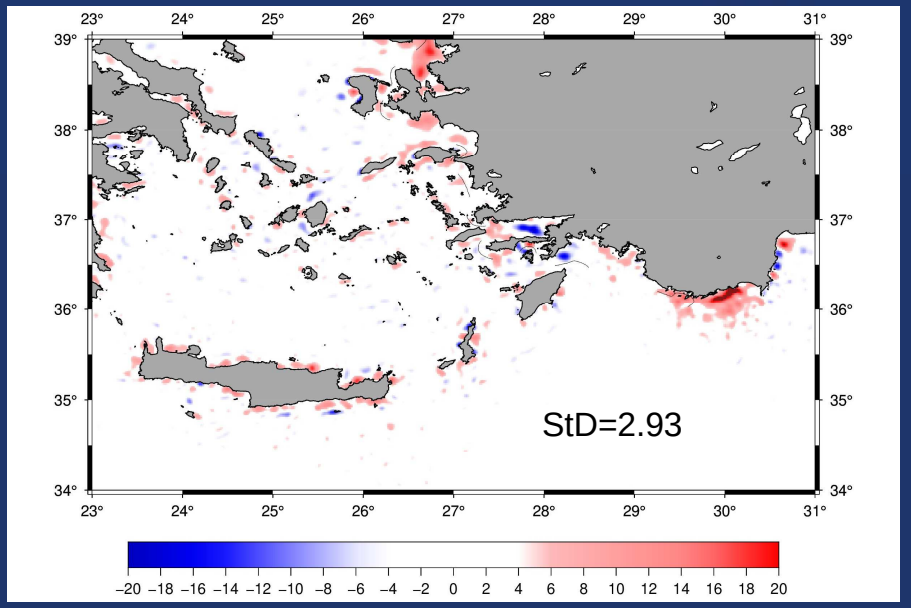
- DTU15 – DTU21
- UCSD24 – UCSD31; UCSD24 – UCSD32

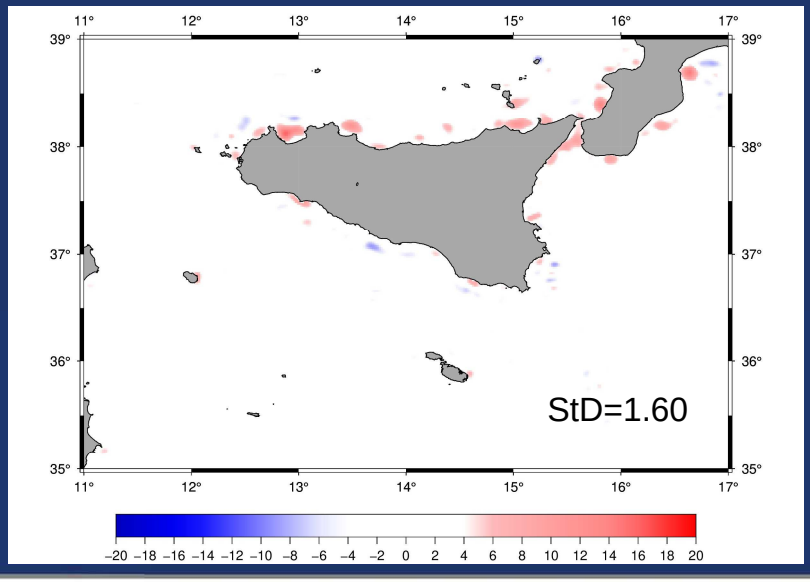
Different models:

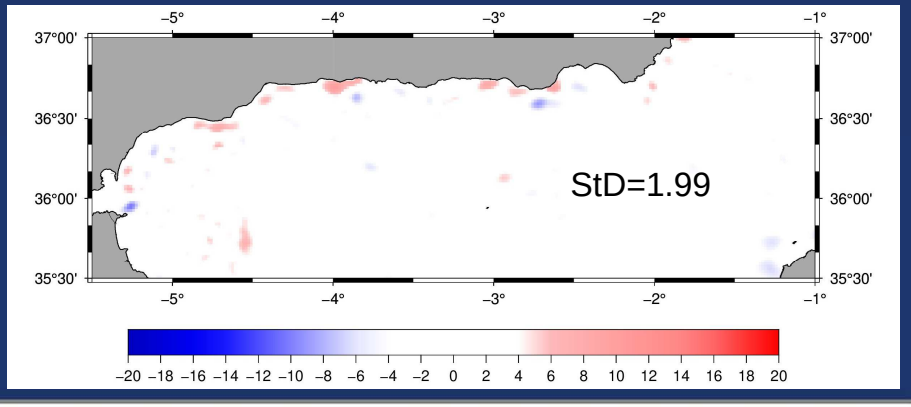
- DTU - UCSD

COMPARISONS: DTU15 – DTU21

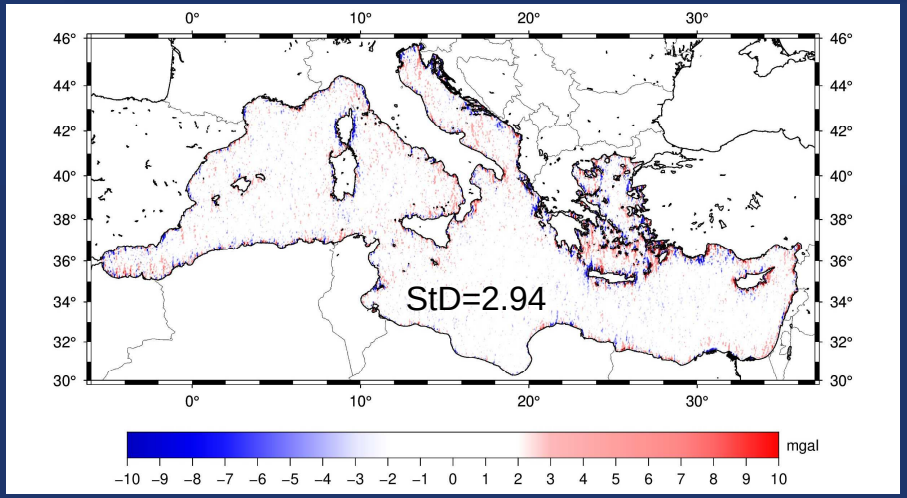


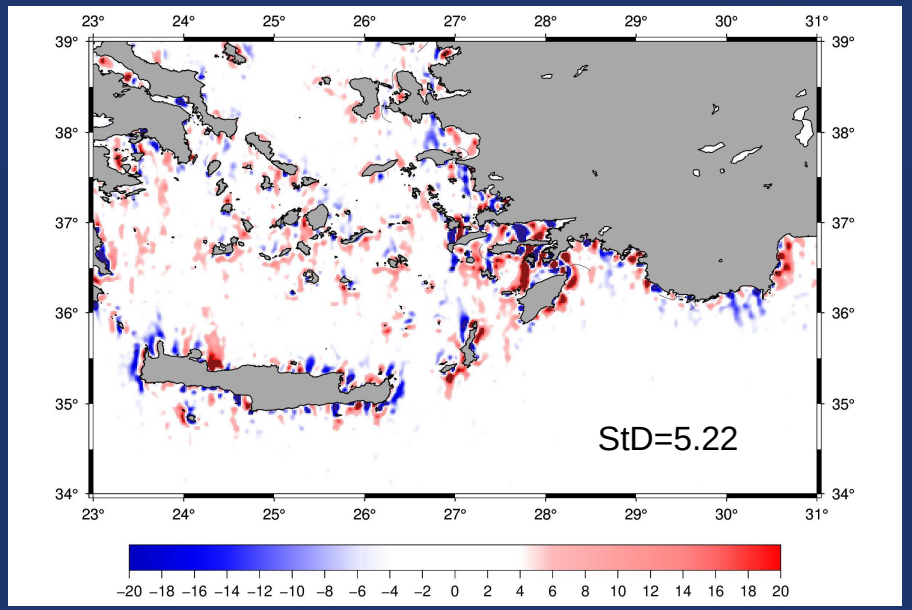


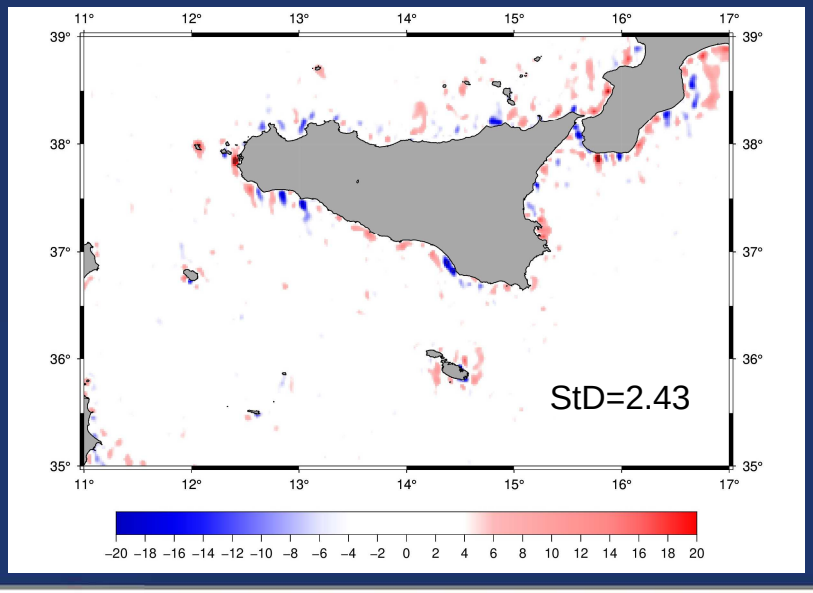


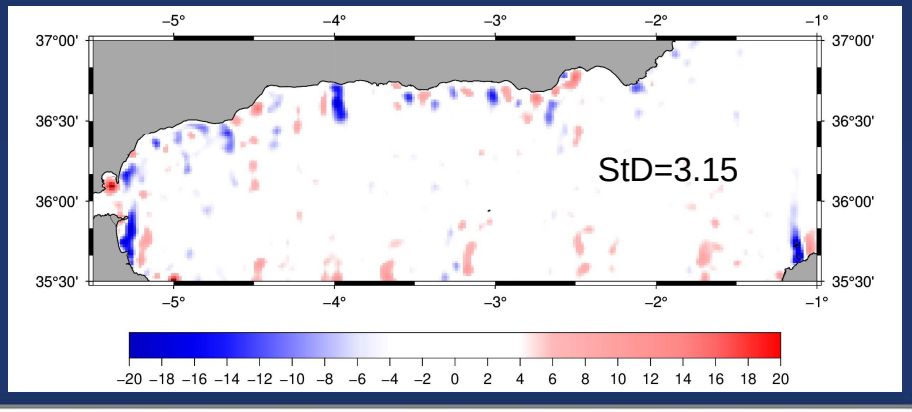


COMPARISONS: UCSD24 – USCD32

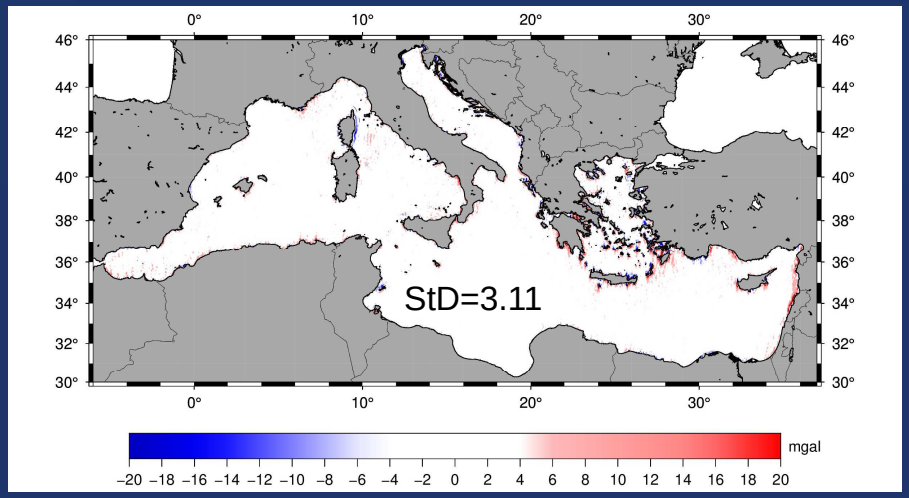


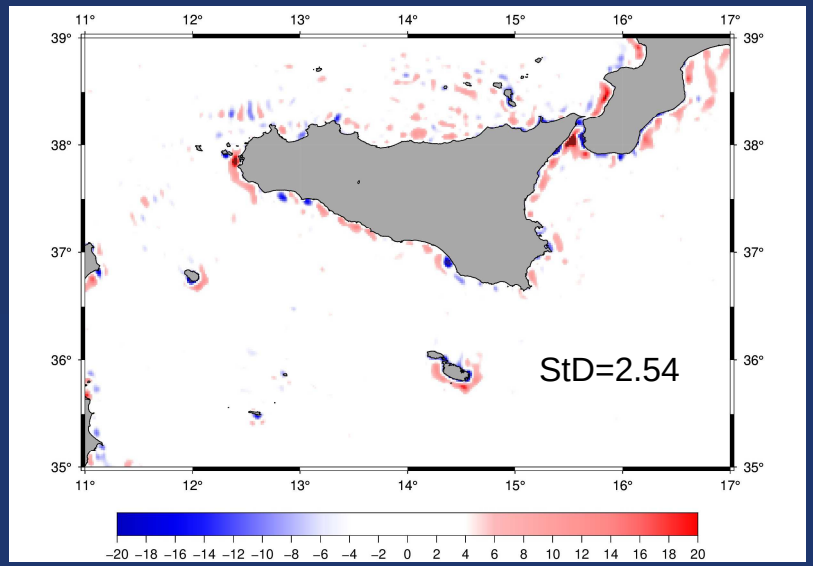


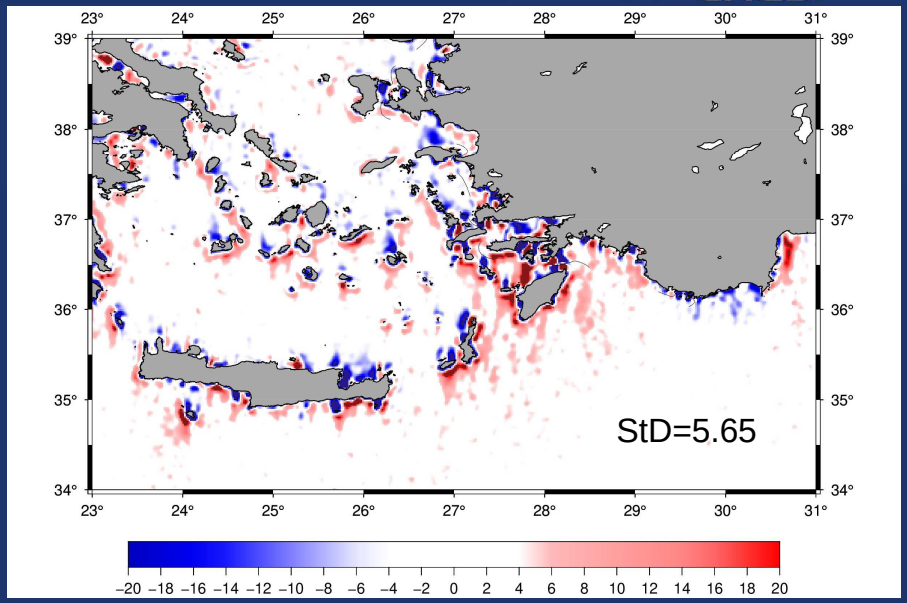


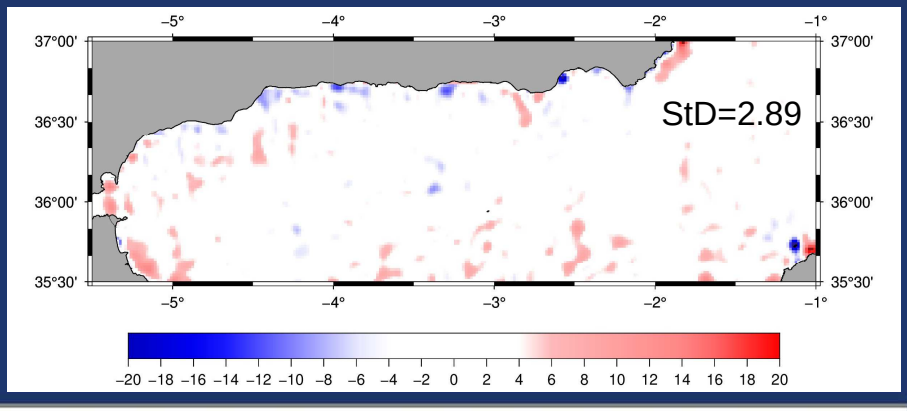


COMPARISONS: DTU21 – UCSD32

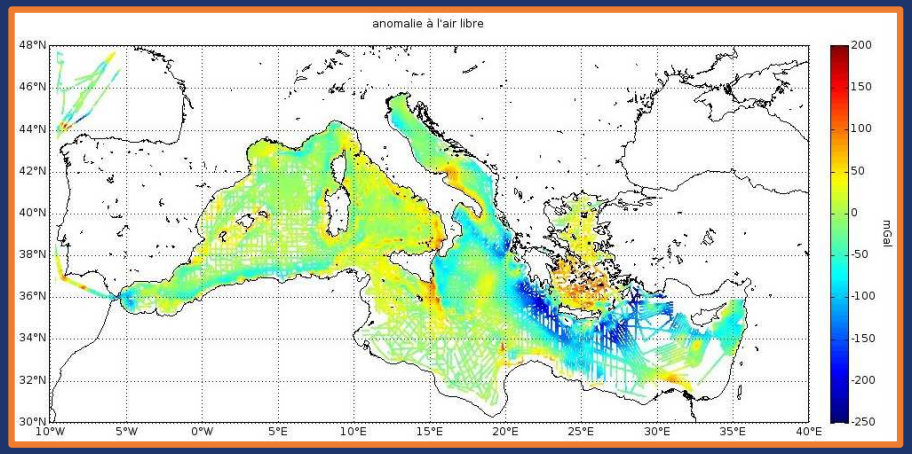




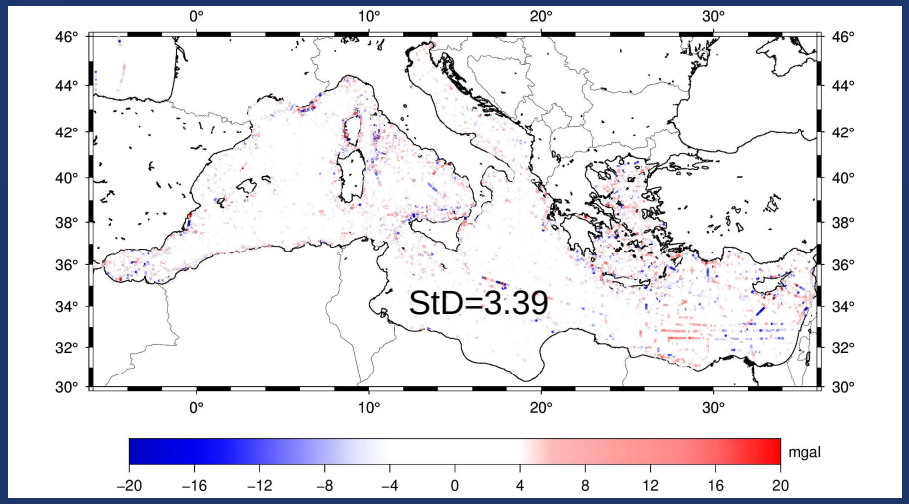


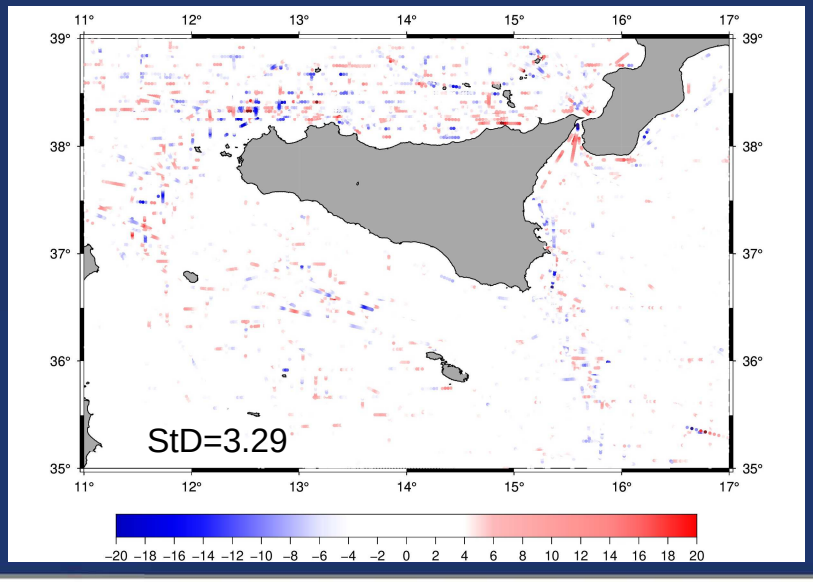


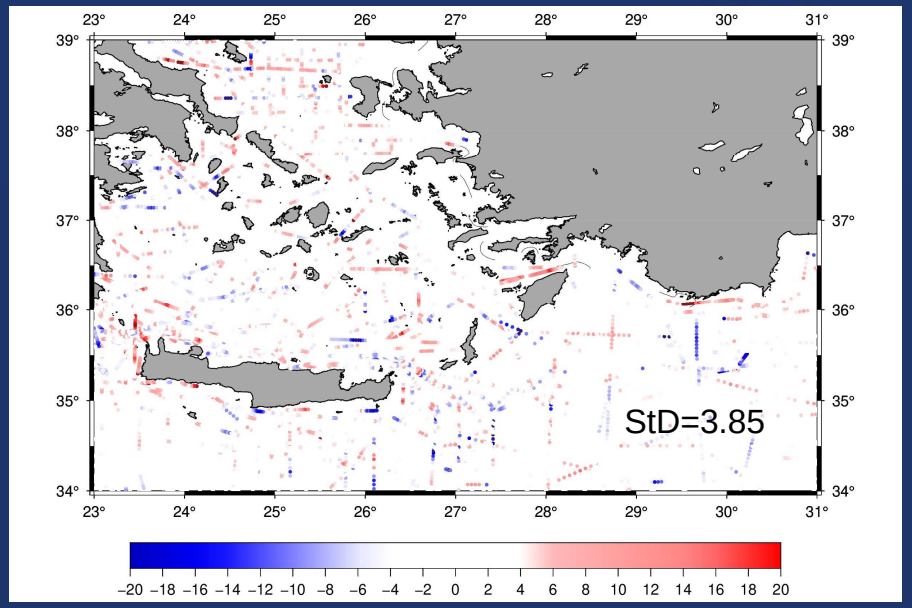
BGI (Geomed2) – model comparisons

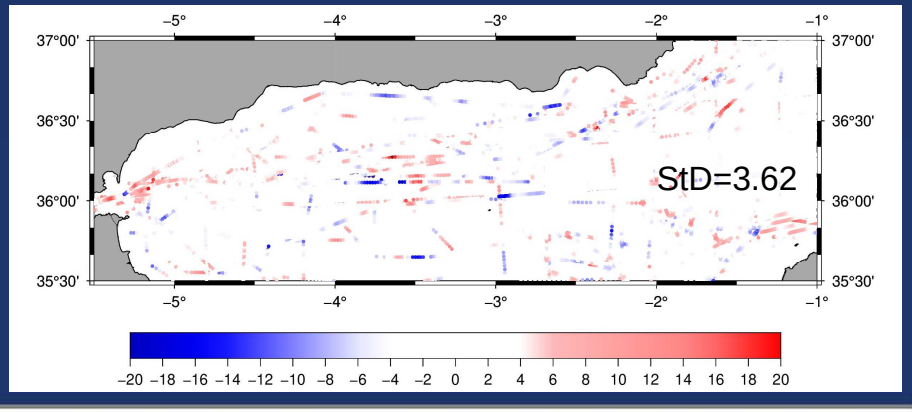


COMPARISONS: BGI – DTU21

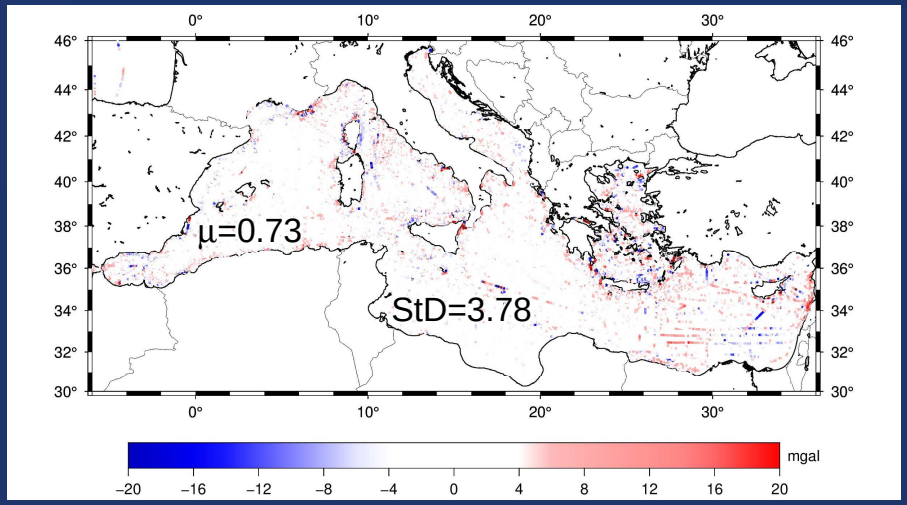


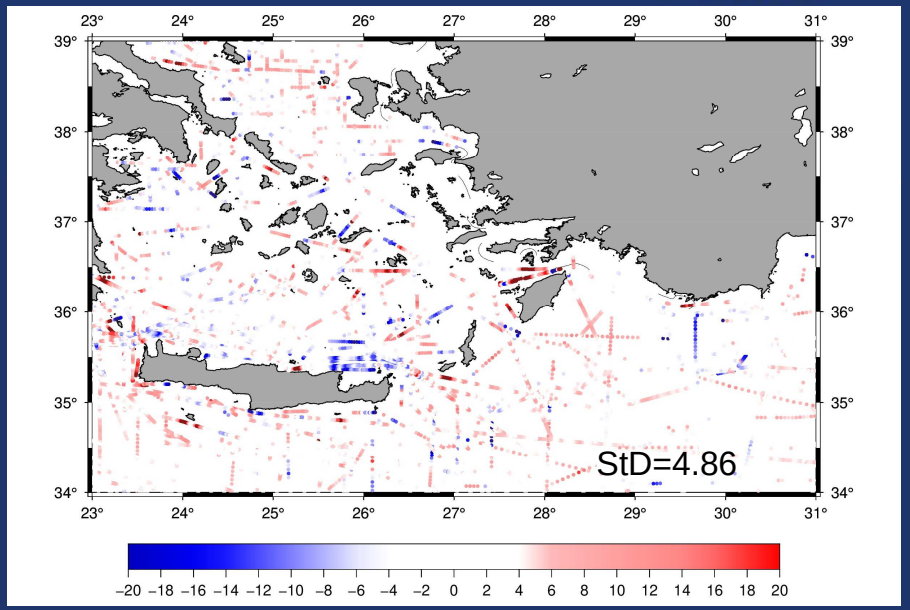


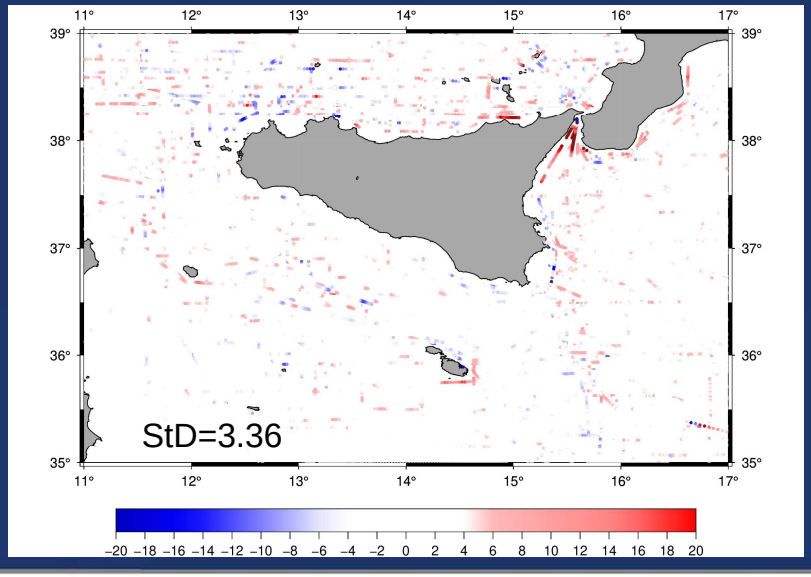


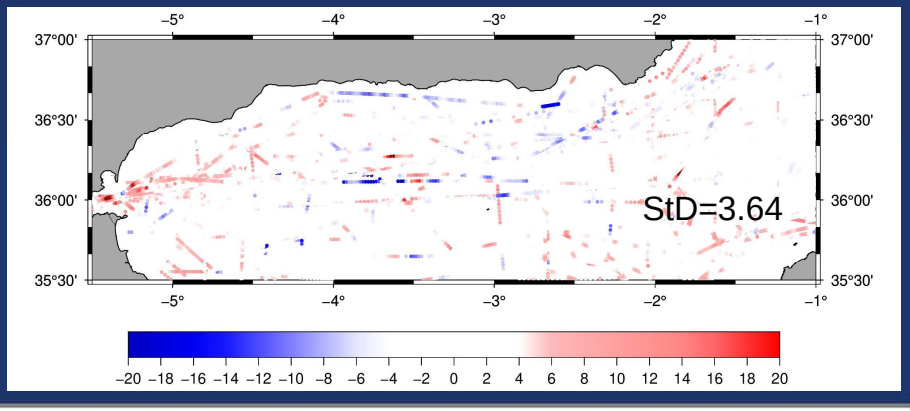


COMPARISONS: BGI – UCSD32









COMPARISONS: SUMMARY

	Med	Aegean	Sicily	Alboran
DTU15-DTU21	1.98	2.93	1.60	1.99
UCSD24-UCSD31	3.04	5.29	2.58	3.23
UCSD24-UCSD32	2.94	5.22	2.43	3.15
DTU15-UCSD24	3.66	5.85	3.26	3.72
DTU21-UCSD31	3.33	5.75	2.90	3.13
DTU21-UCSD32	3.11	5.65	2.54	2.89
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
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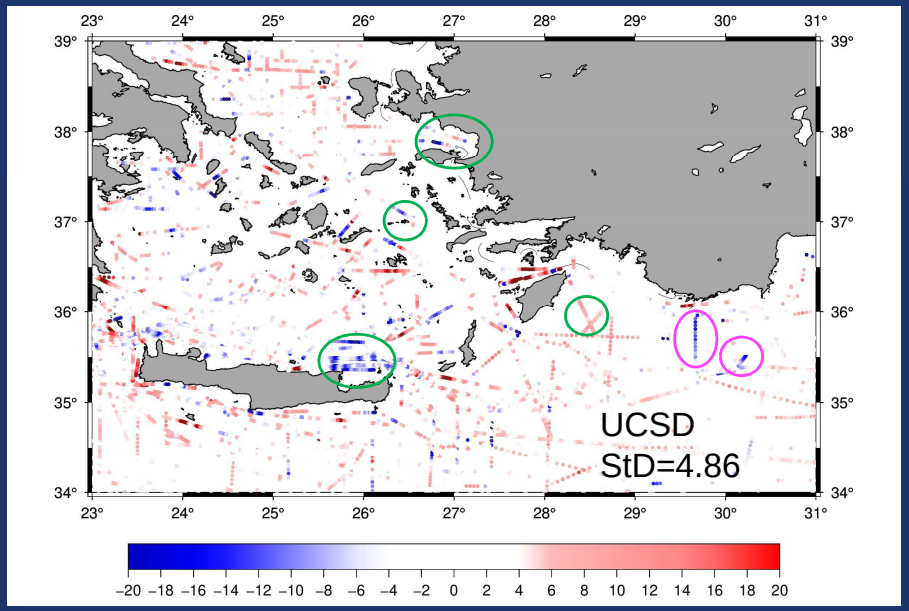
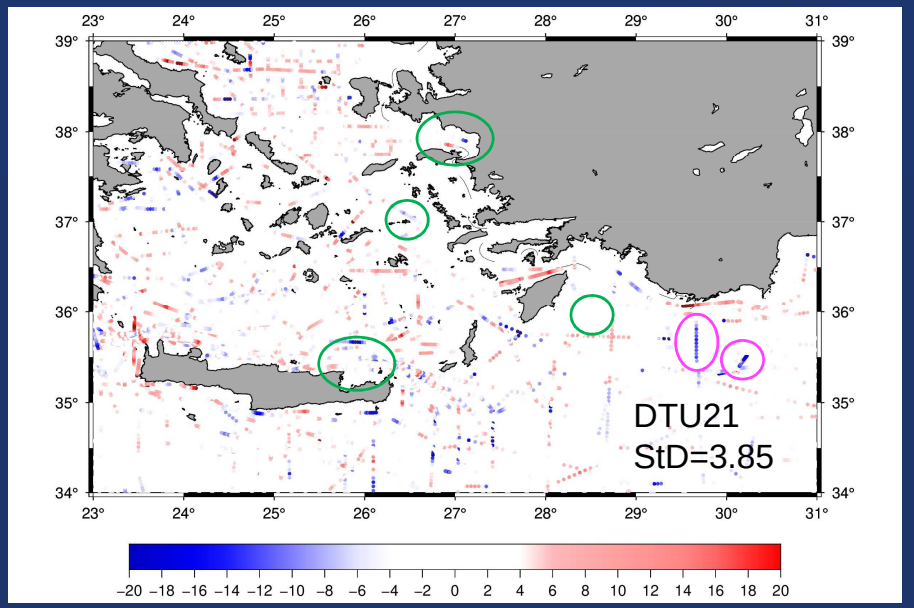
BGI-CLS	3.78	4.56	3.60	3.83

COMPARISONS: BGI – UCSD32 & DTU21





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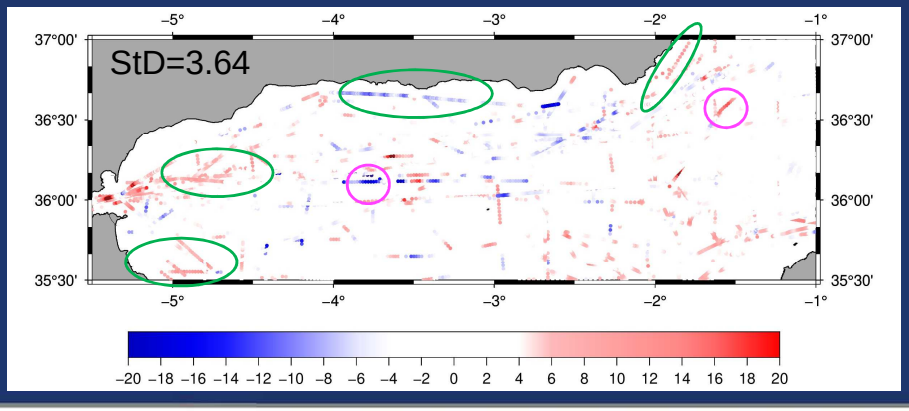
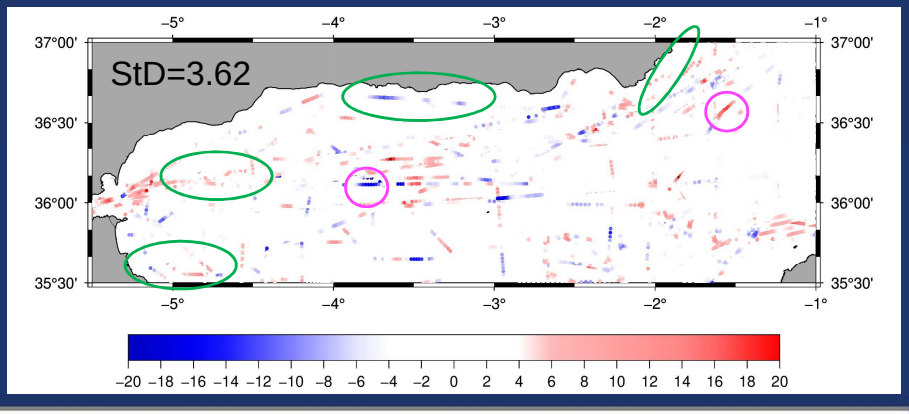
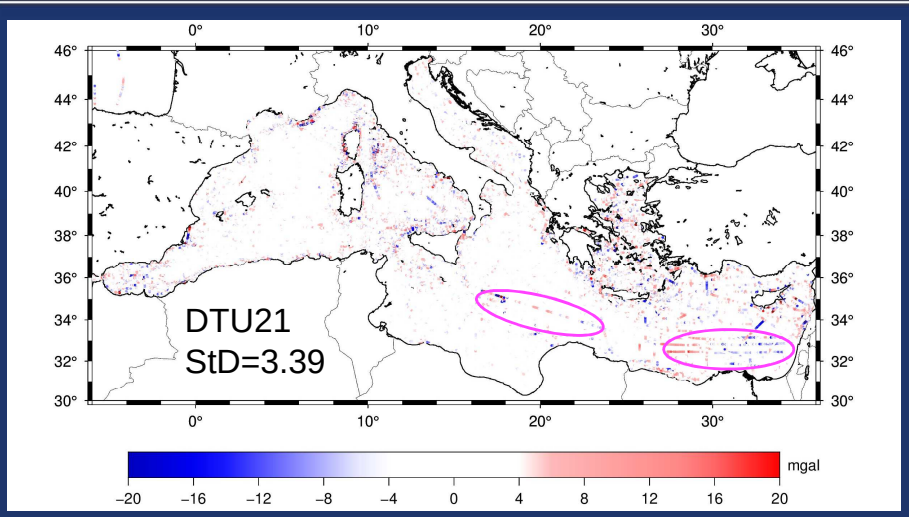
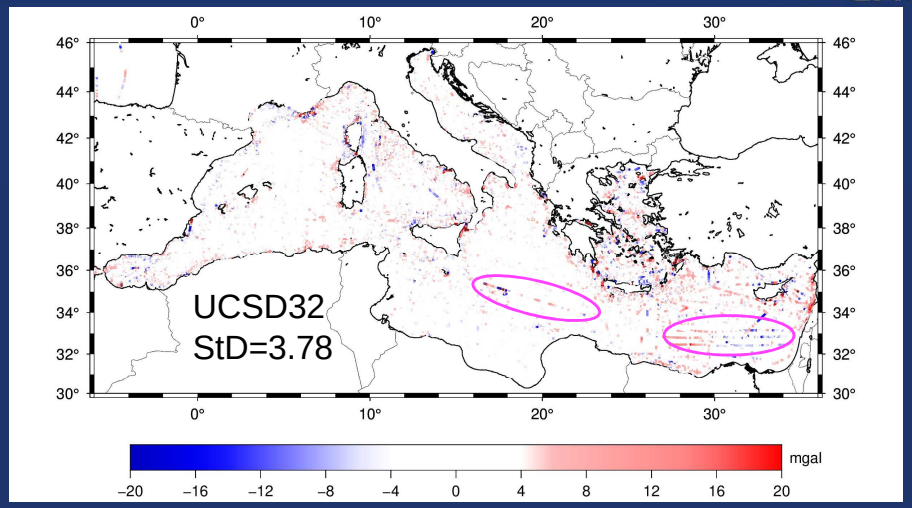
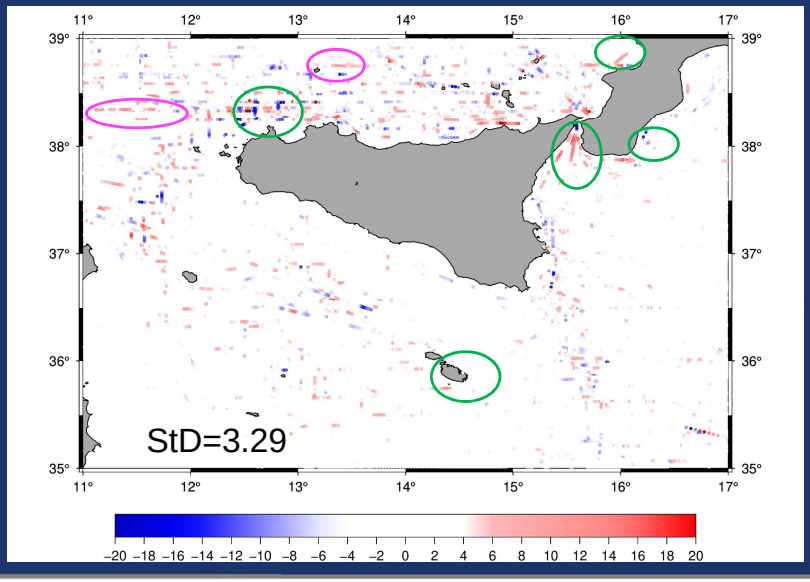


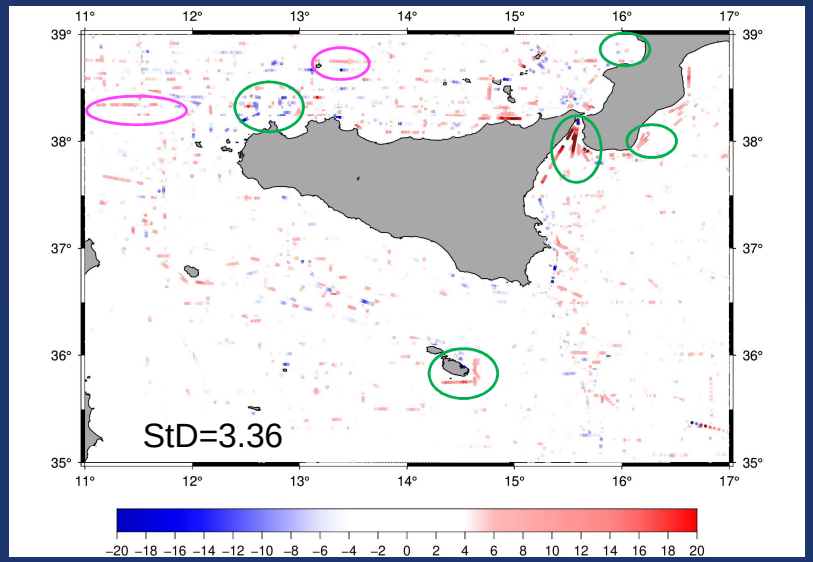


COMPARISONS: BGI – UCSD32 & DTU21

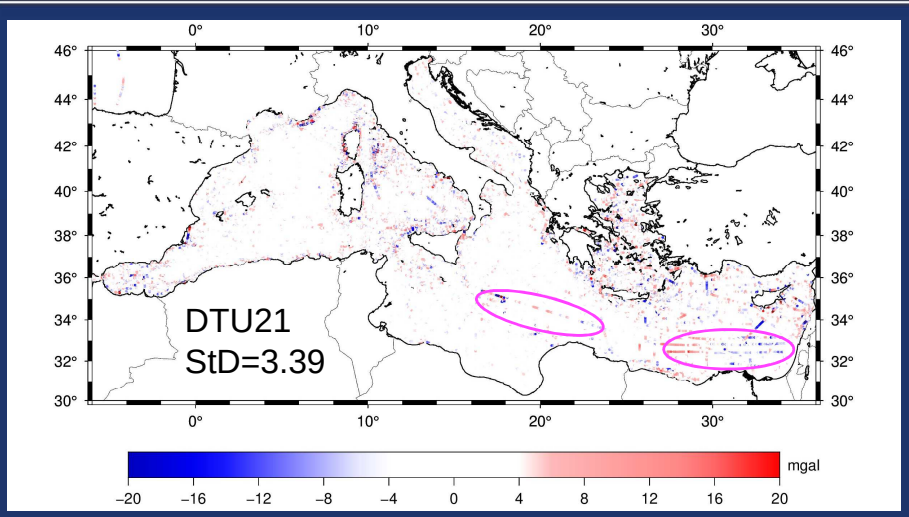


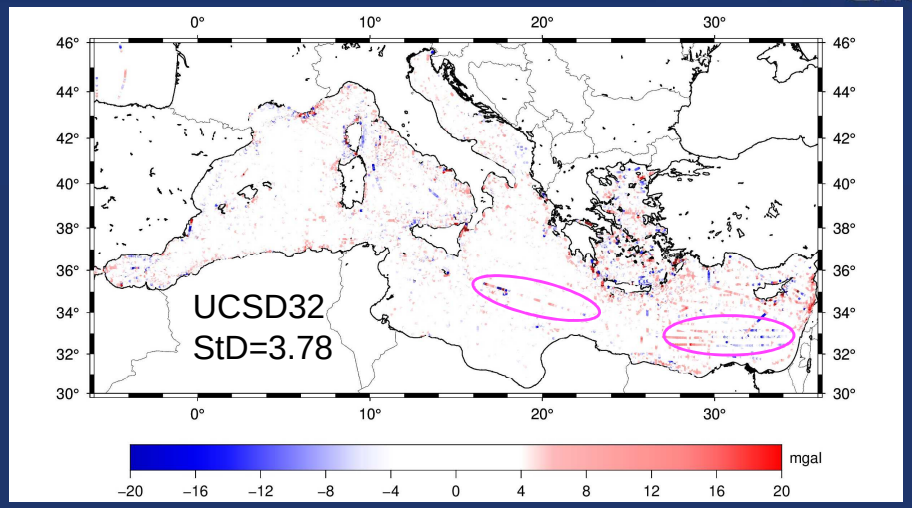


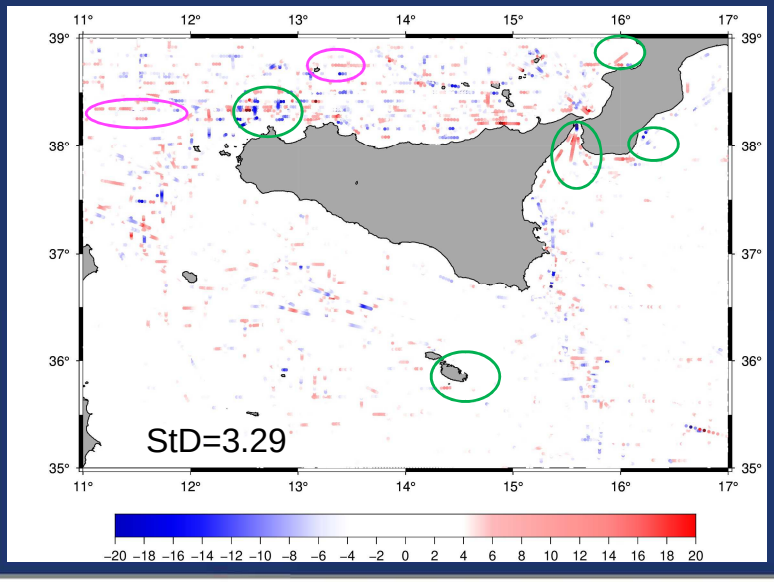


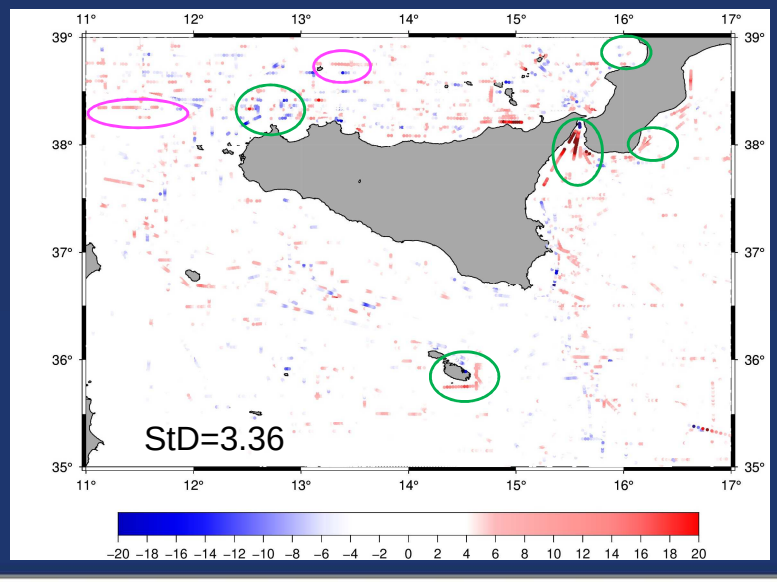


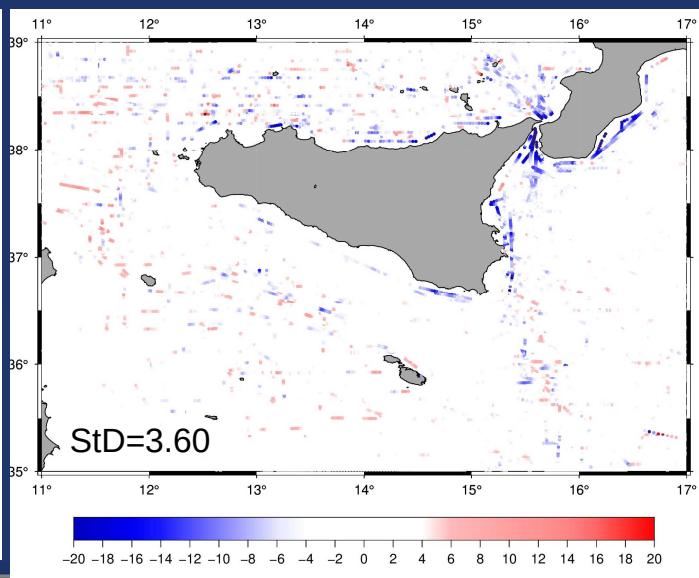
COMPARISONS: BGI – UCSD32 & DTU21 & CLS











CONLUSIONS AND REMAINING WORK

Over the Mediterranean:

- The change in UCSD models is much larger than seen in DTU models;
- DTU21 agrees a little bit better with BGI data than UCSD32 and CLS (*see poster*)

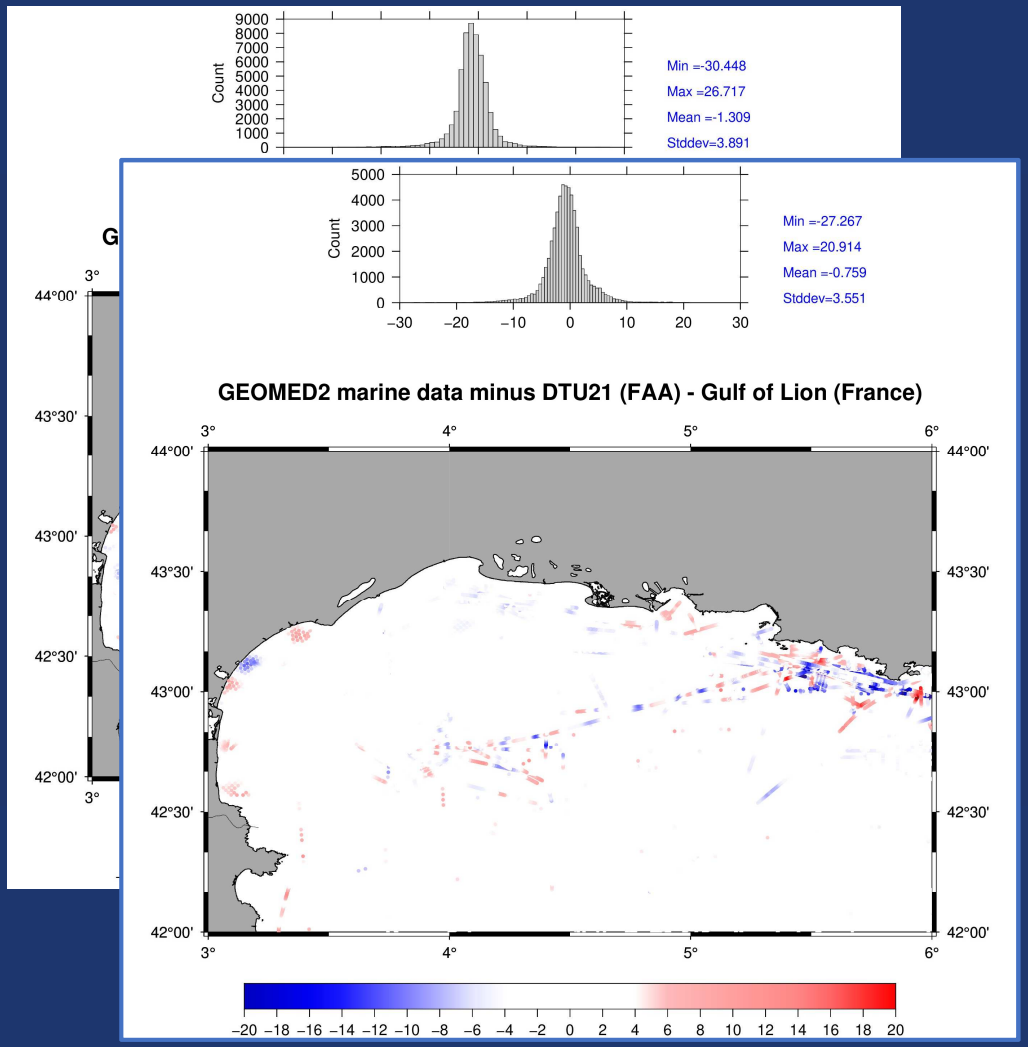
- Many ‘old’ BGI ship gravity observations appear to be at least at the precision level of the altimeter-inferred gravities (*~3-4 mGal in Gulf of Lion*);
- But biased/noisy ship profiles are clearly visible in the differences (even if these are not as unambiguously identified as one might think);
- Ship data coverage is far from complete and calculation of hybrid grids is required.

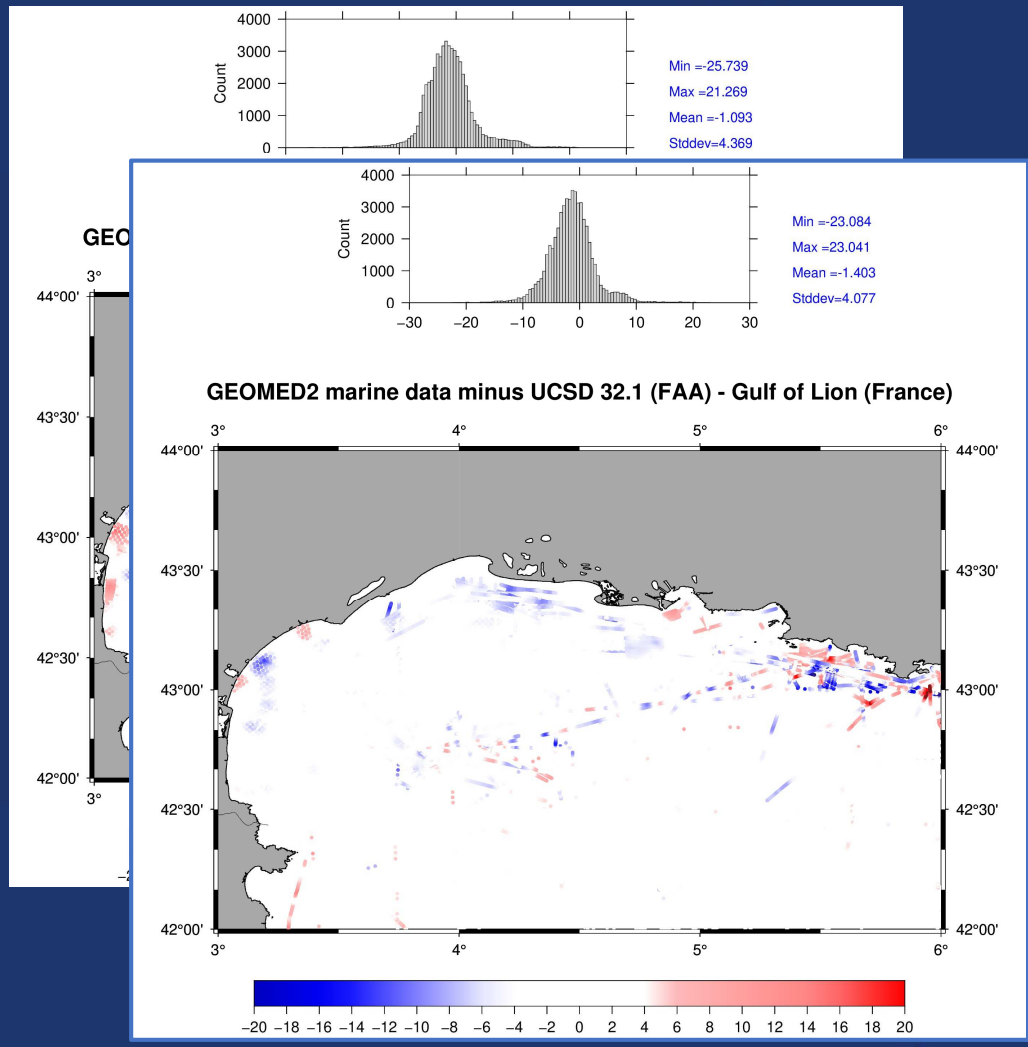
To do:

- ➢ Debiasing per profile of the entire Geomed2 database, better data rejection criteria
- ➢ Construction of hybrid gravity anomaly grid (pure fill-in, averaging, interpolation, ….)

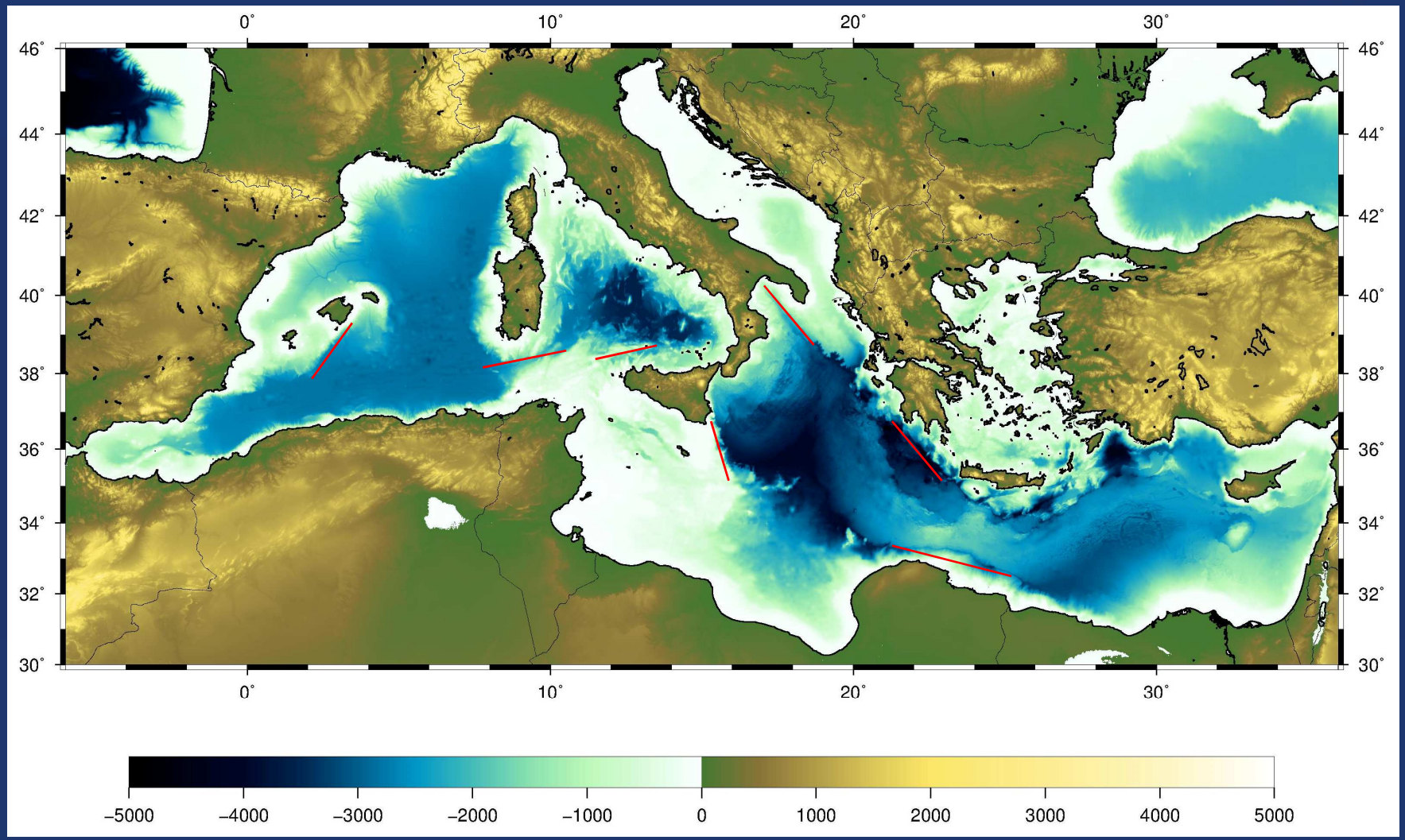
BACKUP

COMPARISONS: GULF OF LION (HIGH-QUALITY SHOM DATA)

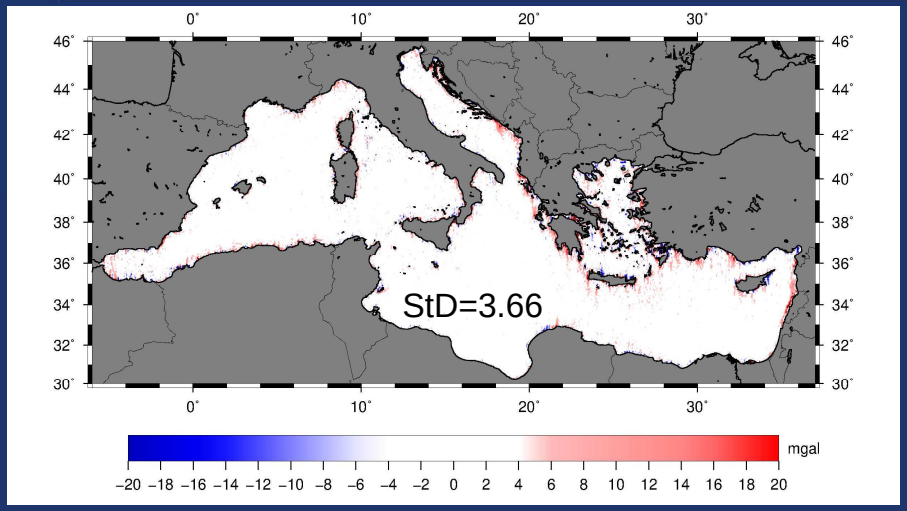


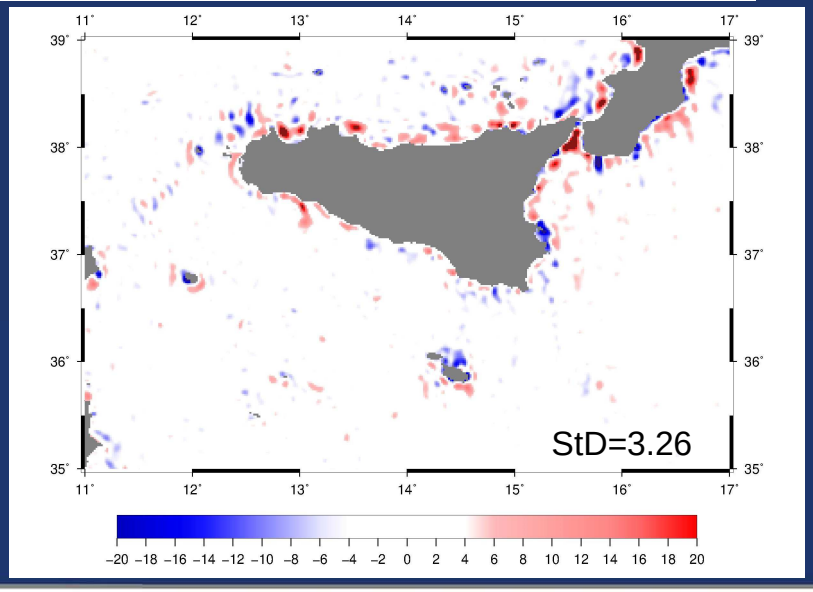


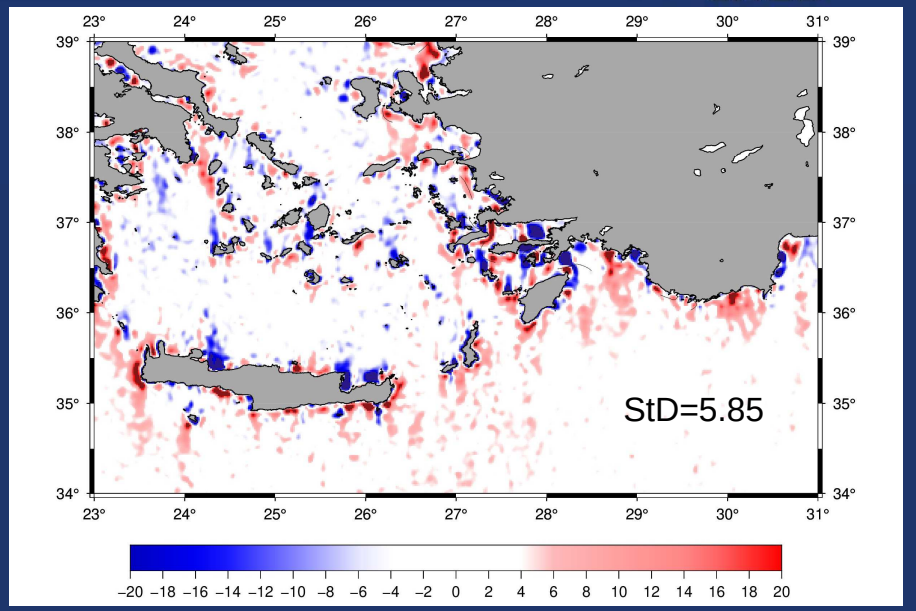
BATHYMETRIE: GEBCO 2014

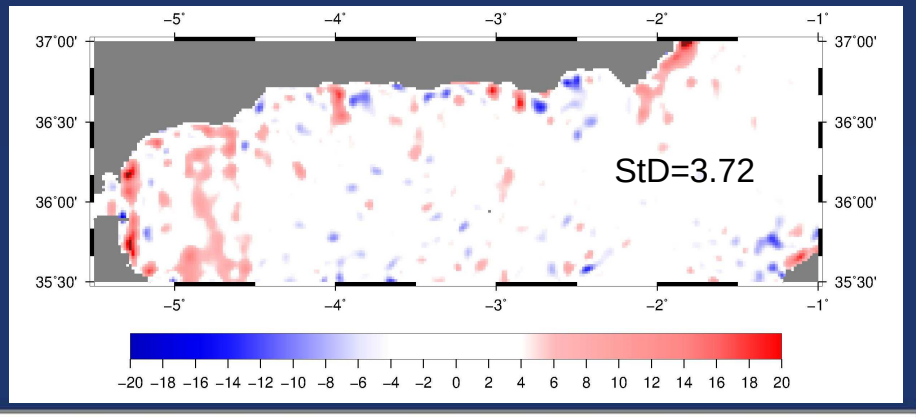


COMPARISONS: DTU15 – UCSD24

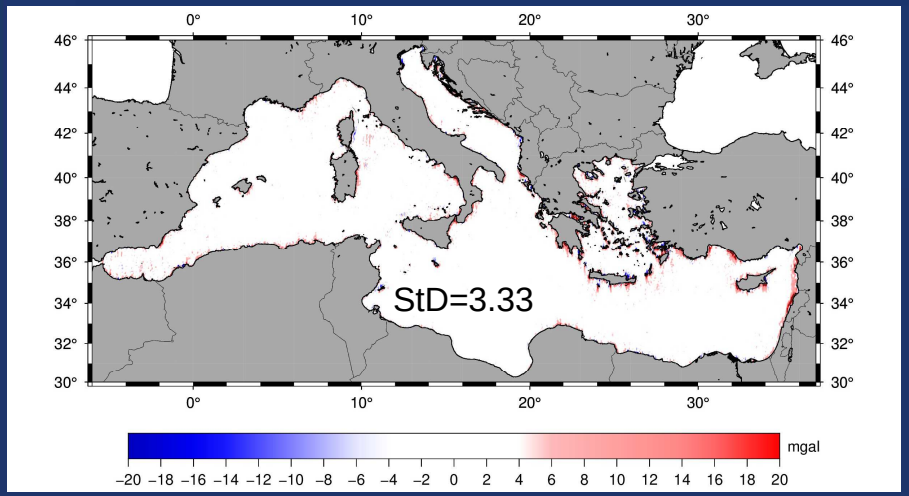


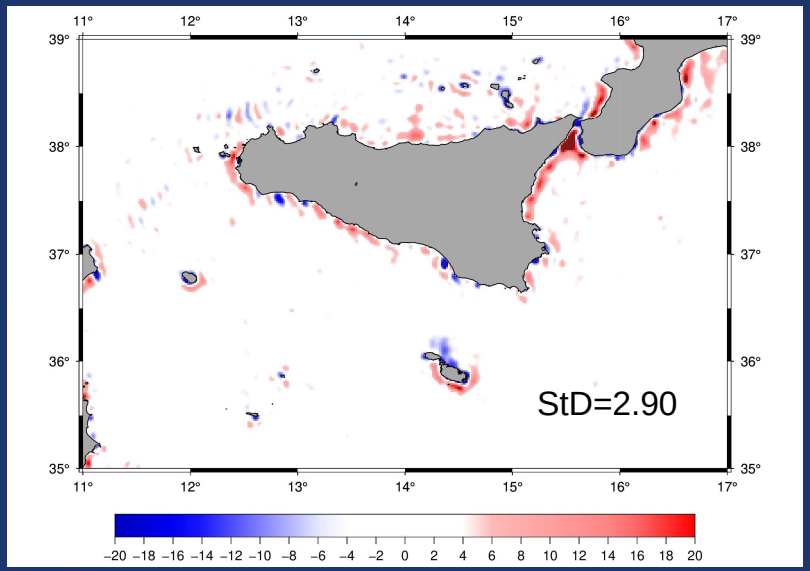


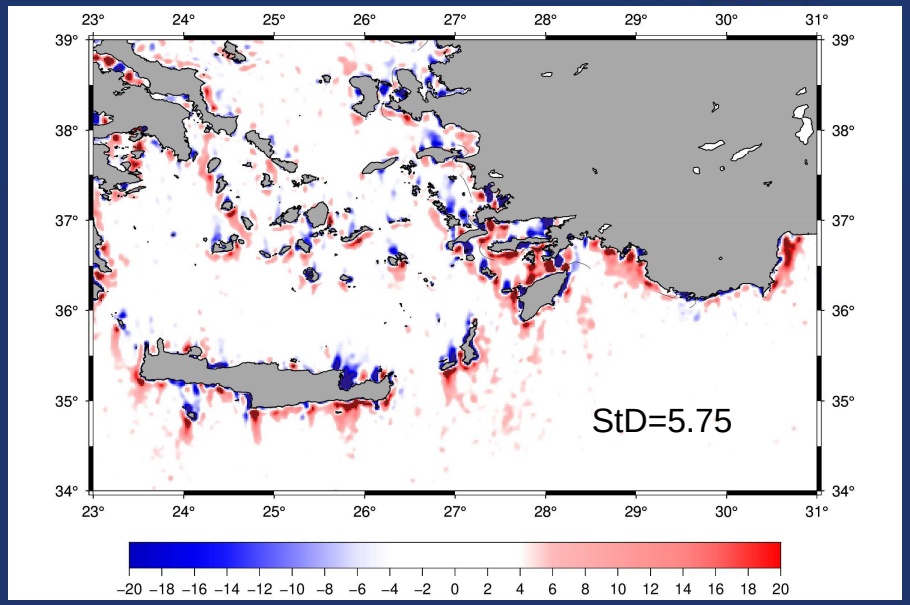


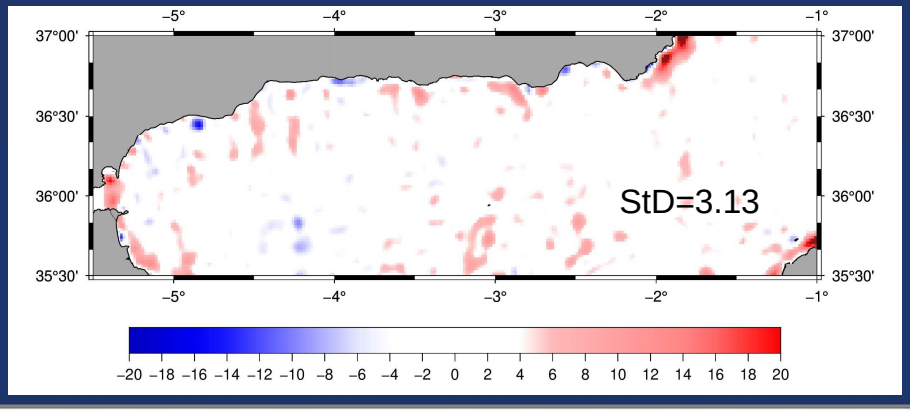


COMPARISONS: DTU21 – UCSD31

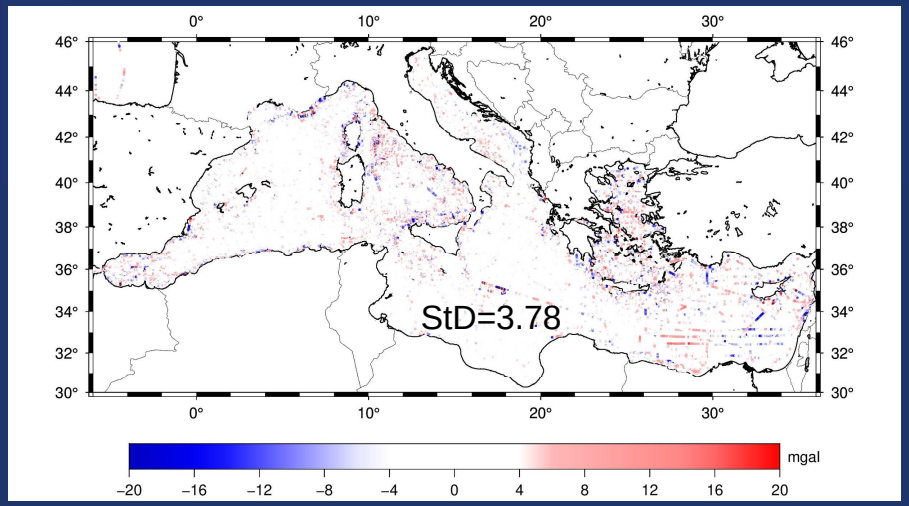


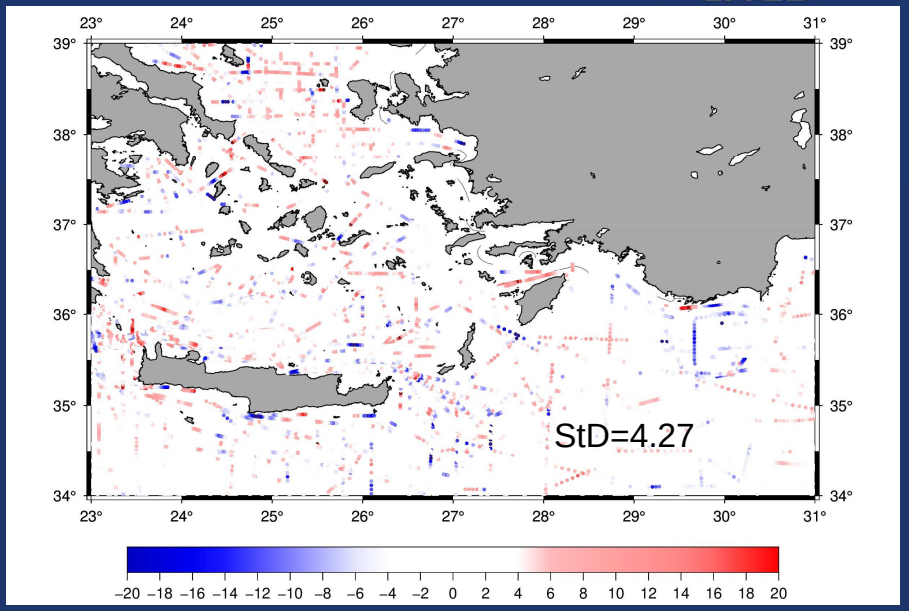


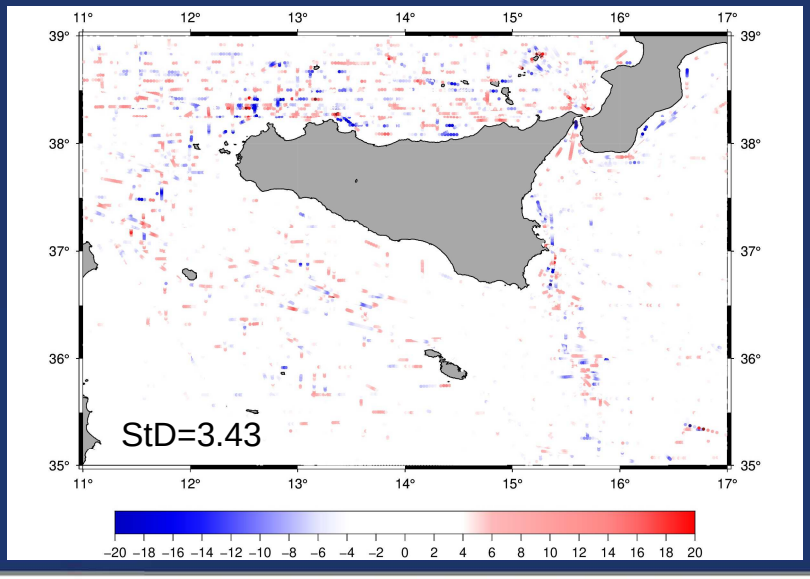


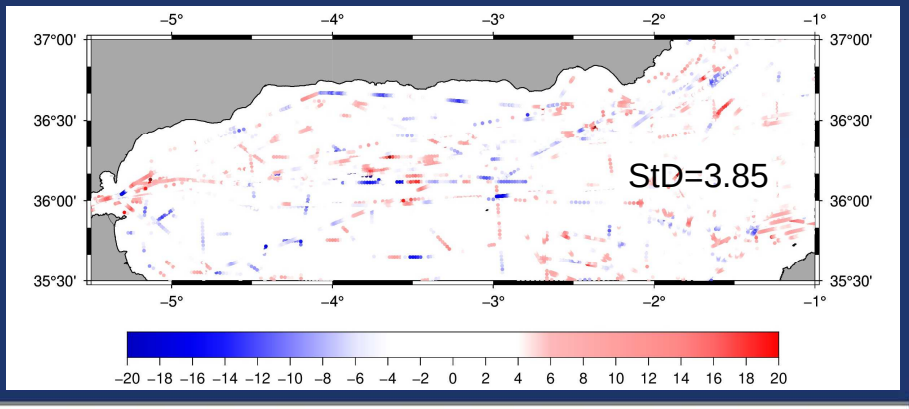


COMPARISONS: BGI – DTU15

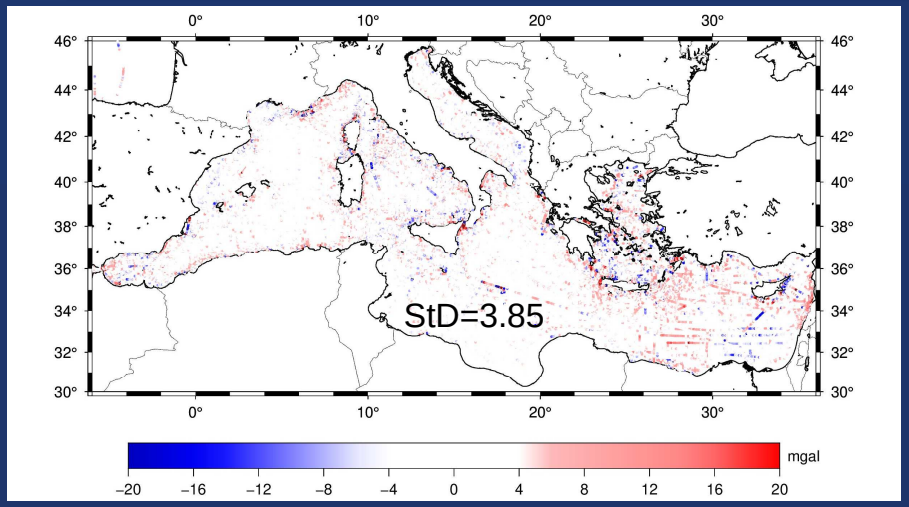


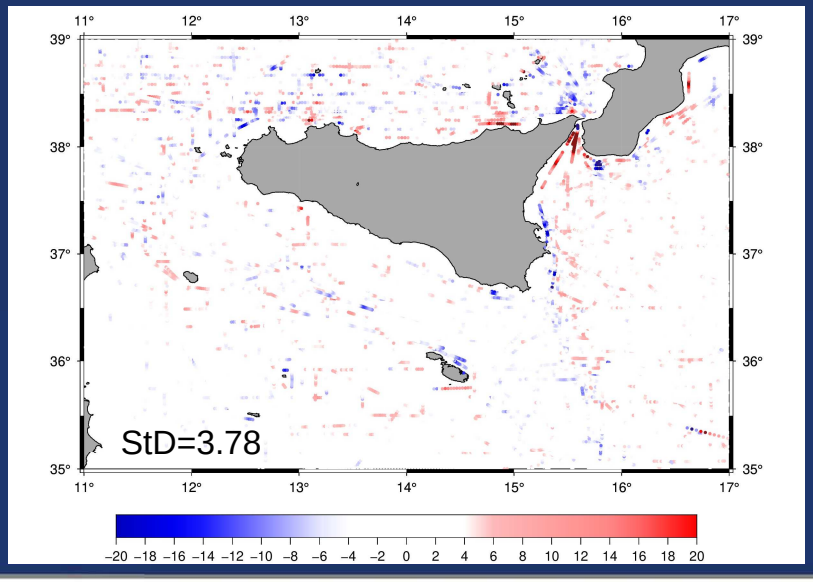


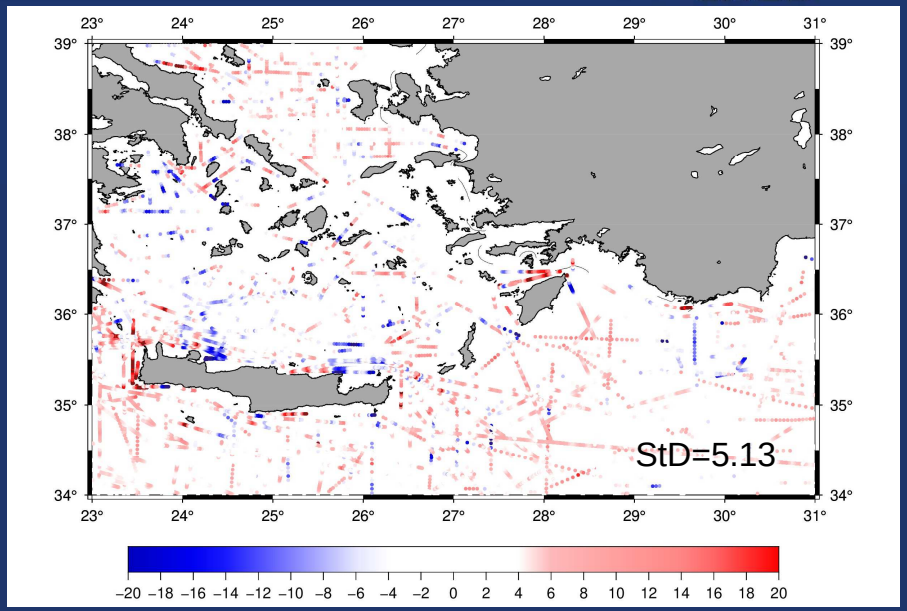


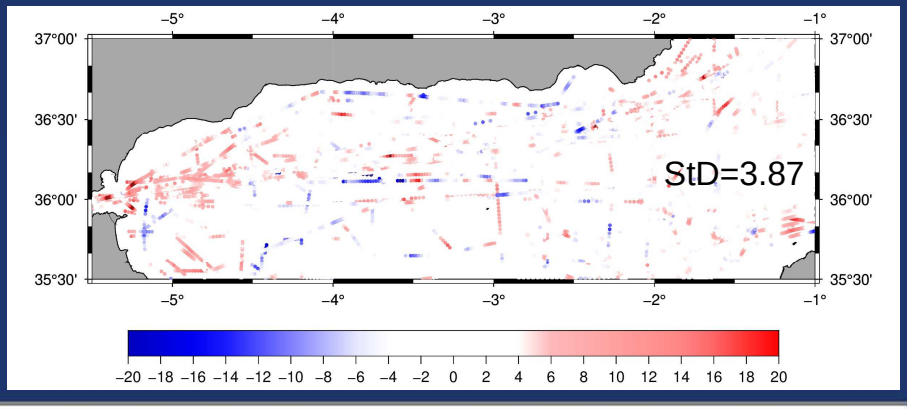


COMPARISONS: BGI – UCSD24









COMPARISONS: BGI – UCSD31