



Results of

Towards consistent regional sea level budgets -OSTST_CORB Project

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The **OSTST_CORB** (Towards COnsistent Regional sea level Budgets) Project has addressed the use of LRM and SAR radar altimetry mission data for studying coastal sea level change and establishing regional sea level budgets.

The main common goals are to:

1) Improve the quality of the sea level estimates in the coastal zone

2) Closure of the sea level budget at global and regional scale



Improved Ocean Mass Estimation

- •We have investigated inconsistencies between published ocean mass estimates
- •The largest discrepancies have been identified to be related to a processing issue when restoring the GRACE AOD1B-GAD product to the monthly gravity fields

•The AOD1B effect explained about 0.4 mm/yr of the discrepancies •Other issues are generally related to individual processing details, such as GIA, degree 1, etc.



Uebbing et al. (2019)



•We have improved the global fingerprint inversion (Rietbroek et al., 2016; Uebbing et al., 2019)

•Our sea level budget is derived from a combination of GRACE gravity and satellite altimetry data; the sum of the mass, steric, and residual component is constrained by altimetry.



•For the period 2005-2015 we close the altimetry budget trend in terms of mass, steric and a residual 'ocean dynamics' component

OSTST 2020 – Splinter Salient Results





- improved processing of type RDSAR and unfocused SAR accounting for vertical motion of wave particle (Buchhaupt, 2018, 2020)
- improved accuracy and precision with unfocused SAR SAMOSA+ and SAMOSA++ up to 3 km from coast (Dinardo et al., 2018, 2020).
- spatio-temporal coastal retracker STAR for LRM & RDSAR. Similar quality as SAR-SAMOSA+ for sea level height (Fenoglio et al., 2015, 2020).



Standard deviation of sea surface height anomaly in the GEC for altimeter products and ocean model. Sentinel-3.A from June 2016 to Dec. 2018. BSH and NEMO-WAM corrected for ocean tide model TPXO8. NP is the number of meas..



- SAR waveform and noise floor are different from those in LRM and the surface water slope is a new observable.
- The TUDaBo processor for RDSAR and open ocean SAR altimetry is publicly available in GPOD. Open point is the further improvement of SAR precision, which depends on SWH and wave period (T_{02}), by inclusion of the VLMWP in SAR altimeter processing.
- The synergy with in-situ and models data of these new SAR data is largely superior to the previous LRM data.
- A validation of the newly retracked data was performed in the North-Eastern Atlantic.

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V.4.C. Exploiting CA and DD altimetry in the shallow North Sea universitätbonn



Sea level trends of the merged LRM and SAR altimetry time-series are consistent with the LRM trends over the complete altimeter interval 1993-2019

We have first consider LRM in 1993-2015 & trends tested comparing al-tg to GPS

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alti minus TG [mm/yr] Scatterplot of VLM from altimetry minus tide gauge vrs GPS rates for the GEC region.



Sea level from in-situ, SLCCI multi-mission and CryoSat-2 at Helgoland (top) and Sassnitz (bottom) in 1993-2019.

(see Splinter Coastal)

OSTST 2020 – Splinter Salient Results



- Goal 1: Accuracy and precision improved. data gap reduced to 3 km from coast. New SAR data largely superior to the previous LRM data. Trends consistent with the LRM trends.
- Goal 2: Closure of the global sea level budget within 0.1 mm/yr.





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