Reply to comments from the anonymous referee #1

The paper compares two new altimetry products, namely the DT2021 from DUACS and from C3S, respectively, with a previous product (DT2018) and with tide gauge data. Overall, it is well written, with minor grammar mistakes and typos (see corrections in the pdf attached).

Dear Madam/Sir,

We appreciate your careful reading of the manuscript and all your corrections which have been included in a new version improving the quality of the text. Following your suggestion we used the impersonal verb tense in the new version to keep consistency.

However, there are some discrepancies that need to be addressed (for example, lines 288-289 seem to contradict the statement in lines 290-291 – please, refer to the revised pdf for more details).

Discrepancies raised along the text have been corrected by re-wording the sentences and/or providing more information to avoid confusion. In the following there are some examples:

" Thus, closer results were obtained from the DT2021 *all satellites* product with respect to the former DT2018 processing version in most of the Baltic Sea region and the stations located along the North Atlantic European coast."

"On the other hand, almost no improvement of the DT2021 *two satellites* dataset over the previous reprocessing was found when using all available information from the tide gauge dataset (time series of different length) in the computation: errors with tide gauges were reduced by 1%, and the mean distance between the most correlated altimetry point and tide gauges was reduced by 3%. The variance of the differences between the datasets and the number of valid data pairs used to conduct the intercomparison were quite similar among the DT2021 and DT2018 processing versions."

Lines 162-166: also, the DAC does not perform very well along the Atlantic coast. See : (1) Pascual et al (2008) (http://dx.doi.org/10.1029/2007jc004459.) or (2) Laiz et al (2016) (http://dx.doi.org/10.1016/j.jmarsys.2016.03.006)
Also, did you consider the effect of river runoff on the tide gauges located within a river mouth? (ej: Laiz et al, 2013 (http://dx.doi.org/10.1016/j.csr.2012.12.008)).

We included in the text the DAC effect as source of errors in altimetry data and added the corresponding suggested references as follows:

"Such large error could be related to imprecisions of the correction applied (i.e. ocean tide and DAC) to the altimeter data (Pascual et al., 2008; Laíz et al., 2016; Sánchez-Román et al., 2020)"

On the other hand, the impact of river runoff on tide gauge series was taken into account in the tide gauge processing since we reject observations showing values threefold larger than the standard deviation of the time series. We added in the new version the following sentence in Section 2.2 specifying this issue:

"observations with values larger than three times the standard deviation of the time series were rejected as they could not be representative of ocean sea level changes but local features (e.g., river discharge, Laíz et al., 2013)."

Furthermore, the "discussion and conclusions" section should be revised; some paragraphs are merely a description of the methodology used and the results obtained, with no discussion. The paragraph between lines 343-353 only shows methodology and results, but this section corresponds to "discussion and conclusions". Please, change it accordingly

The Discussion and conclusion section has been carefully checked to provide more discussion on the results supported by the proposed literature. The aforementioned paragraph has been updated in the new version with some discussion about the results as follows:

"Linear trends based on monthly observations at each tide gauge site were computed to assess whether the DUACS DT2021 release can be representative of the local sea level along the European coasts and western Mediterranean Sea. To do that, sea level linear trends for the period 2000-2019 were computed from both the *all satellites* and *two satellites* datasets. The analysis was repeated for the DT2018 reprocessing to have a term of comparison. A homogeneous spatial pattern with overall values ranging from 2.30 (2.40) to 4.10 (3.80) mm year^{-1} was obtained for the *all satellites* (*two satellites*) dataset from the DT2021 reprocessing. This promotes a mean trend for the whole domain of 3.14 (3.13) mm year^{-1}. These trends slightly differ from those computed from the tide gauge subset covering the 20 year time period, that show values ranging between less than 1 to 5.06 mm year^{-1}; the mean trend for the whole domain is 1.96 mm/year.

Thus, trends computed from DT2021 products are on average around 1.2 mm year^{-1} larger than those obtained from tide gauges. Similar overestimations in altimetry mean trends were reported by Agha-Karimi et al. (2021) in the Baltic Sea for datasets covering the time period spanning between 1993 and 2020. These discrepancies could be attributed to the heterogeneous distribution of both datasets and also the crustal land uplift due to postglacial rebound resulting from the last glacial age affecting the Baltic Basin, where most of the tide gauge stations are located. This translates in altimetry measurements being not accurate enough in the coastal zone. On the other hand, when using the former DUACS DT2018 processing version we obtained slightly larger discrepancies with tide gauges for the *all satellites* dataset, with a mean trend of 3.18 mm year^{-1}; whilst the *two satellites* product showed closer values to tide gauges with a mean linear trend of 2.85 mm year^{-1}."

We also added the following paragraphs on other comparisons between altimetry and other sources (gliders, HF radar) including the future improvements expected with SWOT:

"SLA and derived geostrophic velocities from altimeter data have been widely compared with in situ multiplatform measurements by the coastal altimetry community in order to both validate altimetry measurements and demonstrate their capabilities to monitor sea level and surface currents in the coastal zone. Heslop et al (2017) provided the first multiplatform evaluation evolving data from the Sentinel-3A altimeter in the Balearic Sea (Western Mediterranean Sea). Their outcomes demonstrated the capacity of this satellite mission to retrieve fine-scale oceanographic features of around 20 km of diameter showing differences between along-track absolute dynamic topography (ADT) from altimetry and glider derived dynamic height (DH) data along the satellite track of 1.23 cm. In the same region, Aulicino et al. (2018) compared along-track ADT data from the SARAL-AltiKa mission with glider derived DH along two satellites tracks. They found a very similar spatial pattern with differences ranging between 1.10 and 2.90 cm. Pascual et al., (2015) also conducted an assessment of SARAL/AltiKa data in the coastal band through the comparison of along-track surface derived geostrophic velocities with surface velocities from a coastal high-frequency (HF) radar system installed in the Ibiza Channel (Balearic Sea). These authors found that the velocities derived from altimetry solved the general mesoscale features in the region with root mean square (rms) differences with the in situ measurements of 13 cm s^{-1}."

"The new Surface Water and Ocean Topography (SWOT) satellite mission, launched in December 2022, is considered to be the next major breakthrough in satellite ocean observation (Morrow et al., 2023). The SWOT mission aims to provide SSH measurements in two dimensions along a wide-swath altimeter track with an expected effective resolution down to wavelengths of 15–30 km (Barceló-Llull et al., 2021). Thus, SWOT observations will fill the gap in our knowledge of the 15–150 km 2D SSH dynamics (Morrow et al., 2019) allowing, in some regions, the observation of the full range of mesoscale features. Their impact on the large scale ocean circulation and climate system will be one of the major challenges for the next decade."

A more thorough literature review might help to explain some of the differences observed between the satellite and in situ data.

We have included the following references in the new version as suggested:

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Reply to comments from the anonymous referee #2

Dear Madam/Sir,

We appreciate your comments which have been useful in improving the manuscript. Below we have responded to each of the specific comments and trust that these clarifications and amendments meet your approval.

The readability is highlighted in the introduction where a lot of 'new' corrections or innovations are done but are not directly referenced in this manuscript. For example, what is the internal tide model? This would be directly solved by expanding on these points and adding citations to them directly within the manuscript, although I realise this is also covered by CMEMS-SL-QUID documentation.

We agree with you that we provided barely information about the innovations of the new DUACS L4 products in the text. Following your suggestions, we added more detailed information about the different corrections applied in the new reprocessing in a new version of the manuscript. We added the following sentences:

"Namely, (i) a **new internal tide correction** that allows the prediction of the two main tidal constituents of both diurnal and semidiurnal tidal frequencies has been applied. The solution proposed by Zaron (2019) is used (HRET 8.1 version). This correction reduces the coherent signal characteristic of internal tide and provides a more precise reconstruction of mesoscale eddies. The use of the internal tide correction induces a reduction of internal tide signature on along-track data improving the precision of the resulting L4 gridded product (CMEMS-SL-QUID, 2022).
(ii) a **new MSS** for non-repetitive missions and recent missions consisting in a hybrid gridded MSS field made up of three different gridded MSS models is used. Namely, SIO MSS model (Sandwell et al., 2017) is used in open ocean, CNES_CLS-2015 model (Pujol et al., 2018) is used in coastal areas (distance to the coast lower than 20 km) and DTU15 model (Andersen et al. 2016) is used in the Arctic region (latitude larger than 80 northern degrees). This hybrid solution contributes to reduce the SLA errors at short wavelengths. A **new mean profile** (precise MSS along the altimeter tracks) is used for historical repetitive missions (CMEMS products). New mean profiles were estimated along the historical repetitive tracks of Topex/Poseidon/Jason, Topex/Poseidon/Jason-interleaved phase, ERS/Envisat/AltiKa, Sentinel-3A and GFO in consistency with the different standards used in DT2021 version. This improves the SLA signal at long wavelengths.
(iii) a **new Mean Dynamic Topography** for the Global (Mulet et al., 2021), and the Mediterranean and Black Seas is applied (Jousset et al., 2020,2022).
(iv) an **improved Long Wavelength Error (LWE) correction**, delivered in L3 product, has been computed as the final step of multi-mission cross-calibration processing. Progress with respect to the previous version has been done by first estimating the LWE correction with higher frequency along the different tracks (100 Km instead of 500 km used previously), then by improving the interpolation methodology (Optimal Interpolation instead of Spline used previously) to retrieve the correction on each along-track position. It is expected to remove local SLA residual biases between neighbouring altimeter tracks.

(v) and finally, the DT2021 products version includes an **upgraded mapping parameterisation** that contributes to improve the mesoscale signal visible on L4 products. Namely, the spatial and temporal correlation scales are optimised improving the reconstruction of the mesoscale signal, a more precise definition of the observation's errors computed with regard to the new altimeter standards is provided, and finally, a more precise estimation and correction of LWE in the mapping process is applied removing local SLA residual biases. A complete description of the different evolutions implemented in the DUACS DT2021 products version can be found in CMEMS-SL-QUID (2022)."

I think it is firstly important to emphasise in the manuscript itself, that this product is not optimised for coastal band estimations. I.e. this is not the main objective of the product. There are several processing steps such as retrackers but also corrections such as ionospheric and tidal corrections that could be improved in the altimetry process pipeline which would improve these results even further. This is not the subject of this dataset, but is this the subject of future versions of the dataset?

As the referee says, CMEMS and C3S global L4 gridded product are not optimised for coastal band estimations. Actually, satellite altimetry was originally designed for the open ocean and temporal resolution of sensor was supposed not to be high enough to retrieve accurate sea levels in the coastal zone. That's the reason why most of the efforts of the international community in the recent past have been focused on the research and development of techniques for coastal altimetry, with substantial support from space agencies such as the European Space Agency (ESA), the Centre National d'Études Spatiales (CNES), and other research institutions.
Efforts are aimed at extending the capabilities of current altimeters closer to the coastal zone. This includes the application of improved geophysical corrections, data recovery strategies near the coast using new editing criteria, and high-frequency along-track sampling associated with updated quality control procedures. Concerning the geophysical corrections, one of the major improvements is in the tide models where the tidal component is not part of the observed signal and needs to be removed.
New reprocessings try to get closer to the coastal zone, solving the lack of meaningful signals of sea level change in this region due to the typically shallower water, bathymetric gradients, and shoreline shapes, among other things. Actually, in the CMEMS-SL-QUID documentation is stated the following:

"The quality of the global gridded SLA products was estimated by comparison with independent altimeter along-track and tide gauge measurements, with focus on mesoscale signal and coastal signal respectively. The methodology is better discussed in Pujol et al. (2016) and Taburet et al. (2019)." This provides an idea about how important are sea level retrievals in the coastal zone in the product's quality.

In any case, we have included in the new version the following sentence to clarify:

"Actually, global and regional products from DT2021 and DT2018 reprocessings are not optimised for the coastal band promoting larger errors in the retrieval of sea level with regard to the open ocean."

We also add the following sentences and references explaining the existing products that are more optimised for the coastal band:

"Nevertheless, the monitoring of sea level changes in coastal areas is an important societal issue (Pujol et al., 2023). Thus, most of the efforts of the international community in the recent past have been focused on the research and development of techniques for coastal altimetry, with substantial support from space agencies such as the European Space Agency (ESA), the Centre National d'Études Spatiales (CNES), and other research institutions (Cipollini et al., 2017). Efforts are aimed at extending the capabilities of current altimeters closer to the coastal zone. This includes the application of improved geophysical corrections, data recovery strategies near the coast using new editing criteria, and high-frequency along-track sampling associated with updated quality control procedures (Vignudelli et al., 2019). As a result, regional altimeter products such as PISTACH (Mercier et al., 2010), X-TRACK (Roblou et al., 2011, Birol et sl., 2017), X-TRACK-ALES (Birol et al., 2021) and ESA EO4SIBS (Grégoire, 2021) focused on the coastal zone have been developed over the last few years (Pujol et al., 2023). These products are disseminated to both the international scientific community and society through regular specific coastal altimetry workshops."

Birol, F.; Fuller, N.; Lyard, F.; Cancet, M.; Niño, F.; Delebecque, C.; Fleury, S.; Toublanc, F.; Melet, A.; Saraceno, M.; et al. Coastal applications from nadir altimetry: Example of the X-TRACK regional products. Adv. Space Res. 59, 936–953, 2017.

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Mercier, F.; Rosmorduc, V.; Carrere, L.; Thibaut, P. Coastal and Hydrology Altimetry Product (PISTACH) Handbook. 2010. Available online: https://www.aviso.altimetry.fr/fileadmin/documents/data/tools/hdbk_Pistach.pdf (accessed on 12 April 2023).

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At 110, it is stated that the annual and semi-annual frequencies are not included in the tidal correction as they are included in the altimetry data. What does this exactly mean? In the CMEMS-SL-QUID documentation, this is not referred to at all? I assume the authors refer to the SA and SSA tides? This is again why I am in favour of more descriptions to the data creation being used within this manuscript.

The annual and semi-annual frequencies are not removed from the tide gauge time series during their processing prior to the comparison with altimetry because these frequencies are included in the altimetry data so they are needed in order to have comparable time series to altimetry. To avoid confusion, we have re-worded the sentence in the new version as follows y adding more specific information about the tidal frequencies removed and kept in the analysis:

"**Correction of oceanic tidal effects** by filtering tidal components (mainly diurnal and semidiurnal tidal constituents). The u-tide software (Codiga, 2011) is used. The annual and semiannual frequencies, mainly driven by steric effect, are kept in the tidal residuals since they are included in the altimetry data."

The annual and semiannual frequencies are, as mentioned by the referee, the SA and SSA. Such frequencies are mainly driven by steric effect, which is captured by the altimetry measurements. It is not specified in the QUID of the product but it can be clearly seen when plotting altimetry time series at a given grid point.

Can you provide a brief description as to how the "valid data pairs" are determined? I.e. what are the criteria here? And why would this differ relative to the DT2018?

Once altimetry and tide gauge time series are processed by applying the different corrections described in the text, we apply the following procedure according to Sánchez-Román et al. (2020): We collocate both datasets in time and space. It means that, for each tide gauge site we identify the altimetry grid points within a radius of 1 degree and extract the altimetry time series at each grid point for the time period covered by the tide gauge time series. We only use tide gauge series with a length larger than three years to allow statistical significance. Then we compute the Pearson linear correlation between each altimetry time series and the tide gauge record, and select the most correlated altimetry time series (this usually does not correspond to the closest grid point to the tide gauge due to the problems of altimetry solving the signal close to coast). Then we remove outliers (data values larger than 3 times the standard deviation of the time series) from the collocated time series (altimetry and tide gauges) at each tide gauge site during the processing. These outliers can be associated with errors in the altimetry products and/or tide gauge records. It is expected that DT2021 products will have a low number of outliers due to the improved corrections applied to altimetry with regards to the DT2018 processing and thus, a larger number of valid data pairs (altimetry-tide gauge) will be available for the statistical analysis.
We repeat this process for the 213 tide gauge sites used in this study and then we construct a single tide gauge record by concatenating the time series of each single tide gauge site. The same applies to the most correlated altimetry time series identified at each tide gauge site. We compute the statistics shown in the different tables in the text

from these concatenated series. Also, a bootstrap method is used to estimate the accuracy of the results.

In Taburet et al 2019, the DT2018 dataset only uses data up to 2015. Is this the case in the dataset used here? If so, how is this adjusted for when comparing their resultant variances with the tide gauges? Are the same data periods used for both DT2018 and DT2021 for the tide gauges? If so, the results of DT2018 would probably be better when comparing apples with apples in terms of time-series length. This is simply because the data in DT2018 will not be able to see the variability shown in the data past 2015 (until 2020) particularly when you include the annual and semi-annual frequencies in the tide gauges. So the tide gauges should be restricted, in terms of total variance estimations to the same period as the respective products.

In Taburet et al. (2019) the DT2018 dataset covers the time period spanning from 1993 to 2017. Here, the datasets used for both the DT2021 and DT2018 reprocessings cover a common time period spanning from January 1993 to May 2020. This time gap was chosen due the present availability of the DT2018 products. It is stated in the abstract and in the last part of the paragraph of section 2.1 in the new version as follows to avoid confusion:

" This paper describes the assessment of this new release through the comparison of both *all satellites* and *two satellites* products with external in situ tide gauge measurements in the coastal areas of the European Seas for a time period spanning from 1 January 1993 to 31 May 2020. The aim is to quantify the improvements on the previous DT2018 processing version on the retrieval of sea level in the coastal zone."

"The time period investigated common to both DT2021 and DT2018 reprocessings spans from 1 January 1993 to 31 May 2020 due to the presently availability of DUACS DT2018 products"

On the other hand, the tide gauge time series were interpolated in time to the altimetry measurements so they cover the same temporal lag than altimetry data. The time period analysed for each tide gauge record can be seen in Table B2 in Appendix B in the new version. Notice that there are tide gauge sites covering the whole altimetry time period (Jan 1993 – May 2020) but others not. In these cases, altimetry time series covering the same time period that these tide gauge sites were used to keep consistency.

In your results, what are the main causes for the differences between DT2018 and DT2021? Is it related to processing technique or is it related to more satellite altimetry [i.e. better spatial coverage] or is it related to different corrections used? Again, a table of which altimeters and which corrections are used in DT2018 and DT2021 would make it easy to contrast this. Motivated again by line 195 - 196.

The differences observed between DT2021 and DT2018 processing versions are mostly related to the new standards and updated geophysical corrections applied to the DUACS DT2021 reprocessing compared to the previous DT2018 version. Also, we observed a larger improvement of the CMEMS DT2021 product (all satellite) with respect to the previous reprocessing than that observed for the C3S (two satellite) product (improvement 60% lower). This is due to the different mapping parameters used for the CMEMS and C3S products. It is explained in the text in the following sentence:

"This fact could be explained by differences in the mapping parameters used for the two products: DT2021 mapping parameters (i.e., spatial and temporal correlation scales, a priori errors on the measurements) are evolved in CMEMS products (CMEMS QUID, 2022) with the objective to better retrieve mesoscale signals, whilst no evolution of the mapping parameter was implemented in C3S DT2021 product (C3S PUG, 2022)."

To avoid confusion about the corrections and improvements of the new reprocessing respect to the former one, we have included in the new version the table A1 in appendix A showing a table with the standards applied to the new reprocessing and added the following sentence:

"In the latest release, new up-to-date standards have been applied and various geophysical correction parameters have been updated compared to the previous DT2018 version (Table A1 in Appendix A)."

The distance to the nearest satellite grid point estimation is not clear. Why would the gridded product have different 'valid' points? The grid spatial resolution hasn't changed, right? What would make the gridded product have valid or invalid points?

In this work we do not consider the nearest satellite grid point to tide gauge sites but, following Sánchez-Román et al., 2020, the altimetry point exhibiting a largest Pearson linear correlation with the tide gauge time series within a radius of 1 degree around the tide gauge site (see response to a previous comment). Distance (km) between the tide gauge location and the altimetry grid point is computed by applying the formula to estimate distances on a coordinate plane.
Altimetry grid points in the coastal band have valid or invalid data (different QC values assigned to each grid point) according to the corrections applied. This makes, for instance that one grid point could be valid in the all satellites product and invalid in the two satellite one. This is the reason why we obtain different mean distances between altimetry and tide gauges for the different altimetry products investigated.
Apart from this, we remove outliers (data values larger than 3 times the standard deviation of the time series) from the collocated time series (altimetry and tide gauges) at each tide gauge site during the processing. These outliers can be associated with errors in the altimetry products and/or tide gauge records. Therefore, depending on the corrections applied to the different products, altimetry values will be close or not to the tide gauge ones and thus will be removed accordingly. This makes that the final number of data pairs at a given tide gauge site will be different for the different altimetry products used.

What are the reasons for the spatial differences discussed in 197 - 204? Is this processing or altimetry correction based? Or data length? Could some of the errors be related to the processing differences between the tide gauge and the altimetry data? The biggest suggestion to test and potentially improve your validations would be to correct the tide gauges themselves with the FES2014 model to be consistent with the altimetry processing. This is because the utide correcting of the tide gauge is more 'accurately' removing the tides than what the models are able to for the altimetry (and in fact utide uses a lot more constituents than FES2014). So when using the FES2014 correction for the gauges, your altimetry and tide gauges would be more consistent and have the same 'error'.

Lines 197 – 204 describe the spatial differences between consistency (altimetry – tide gauges) computed for all satellites datasets from DT2021 and DT2018 reprocessings. This paragraph does not describe consistency (and thus errors) between altimetry and tide gauges. Tide gauge time series in both computations are the same and also the processing applied to both datasets to perform the inter-comparisons. Thus, the observed differences in Figure 2 (showing an overall improvement of DT2021 product) are strictly due to the different corrections applied to both DT2021 and DT2018 reprocessings.
On the other hand, as the referee mentions, FES2014 model is used to apply a tidal correction to DT2021 and DT2018 reprocessings. FES2014 model is not only used to correct the main diurnal (O1, K1) and semi-diurnal (M2, S2) tidal constituents but 34 ones including linear (K1, M2, N2, O1, P1, Q1, S1, S2, K2, 2N2, EPS2, J1, L2, T2, La2, Mu2, Nu2, R2), non-linear (M3, M4, M6, M8, MKS2, MN4, MS4, N4, S4) and long-period (MSf, Mf, Mm, MSqm, Mtm, Sa, Ssa) components (Lyard et al., 2021, https://doi.org/10.5194/os-17-615-2021). Thus, it is similar to the correction applied by the utide software.

Have the authors compared the results in terms of linear trends to that of other products? There are other institutions that produce global and regional (particularly in the North Sea and Baltic Sea) estimations of trends using differing techniques. This would be a nice value add to this manuscript.

We thank the referee for the suggestion. We have included in the new version of the text a comparison with linear trends estimated in the Baltic Sea (where most of the long-term tide gauge stations are located) by Agha-Karimi et al., 2021, https://doi.org/10.3389/fmars.2021.702512. These authors reported a mean overestimation of trends from altimetry of 1 mm/year for the time period spanning between 1993 and 2020 when comparing with tide gauges, this being quite similar to the overestimation obtained here (1.2 mm/year) in the region. We added the following sentence:

"trends computed from DT2021 products are on average around 1.2 mm year^{-1} larger than those obtained from tide gauges. Similar overestimations in altimetry mean trends were reported by Agha-Karimi et al. (2021) in the Baltic Sea for datasets covering the time period spanning between 1993 and 2020. These discrepancies could be attributed to the heterogeneous distribution of both datasets and also the crustal land uplift due to postglacial rebound resulting from the last glacial age affecting the Baltic Basin, where most of the tide gauge stations are located. This translates in altimetry measurements being not accurate enough in the coastal zone."

Line 354 onwards in the Conclusion, maybe this is misunderstood, but these statements don't match the results presented in the appendix. E.g. 3.14 mm/yr - 1.96 mm/yr = 1.18 mm/yr not 1.43 mm/yr? Also, in the Appendix, the results for linear trends are considerably better for the DT2018 2 sats? My direct calculations based on the table itself don't match, i.e. I get these differences: 1.177, 1.166, 1.216, 0.889 mm/yr respectively for DT2021_all, DT2021_two, DT2021_all, DT2021_two relative to tide gauges.

The referee did not misunderstand the text. The values provided in Table B2 in the new version (last row) and discussed in the text correspond to the mean linear trend estimated for the altimetry products and also tide gauges in the region. However, the values reported later in the text correspond to the analysis of the differences in trends between altimetry and tide gauges.
The values provided by the referee for the DT2021 all satellites product is a good example: we obtained a mean value for satellite of 3.14 mm/year, and for tide gauges of 1.96 mm/year. This provides a difference of 1.18 mm/year (~ 1.2 mm/year). This difference (altimetry overestimation) is explained in terms of the heterogeneous distribution of the datasets and other processes affecting the region (see response to the previous comment). However, the aforementioned computation relates to the spatial distribution of trends, not the differences in trend between altimetry and tide gauges. If we compute the difference at each tide gauge site and then compute the mean of such differences we obtain a mean value of the differences of 1.43 mm/year, which is discussed in the text and shown in Figure 7. We think that this is the most appropriate way to assess the differences in trend: to perform the computation at each tide gauge site and then provide the mean value, instead of computing the mean value in the basin and then provide the difference of such mean value.
On the other hand, the referee is right with respect to the results reported for the two satellites product from the DT2018 processing version: we obtained results 0.5 mm/year closer to tide gauges on average from this reprocessing with respect to the new one. This can be seen in Figure 5 lower panel. Thus, it seems that the C3S DT2018 processing performs better than the new one on the retrieval of long-term sea level when comparing with altimetry in the region investigated.

The authors refer a couple of times to an Abstract (Faugere et al 2022), but this is not an actual reference for the dataset.

Faugère et al. (2022) is not a reference of the dataset in the sense of a report or paper but this presentation showed for the first time the new DT2021 reprocessing and first results so we think that can be used as a valid reference for the new reprocessing. In any case, we added in the revised version of the manuscript the references of the technical reports for the *all satellites* (CMEMS-SL-QUID, 2022)and *two satellites* (C3S-PUG, 2022) DT2021 products to avoid confusion and provide a more robust reference.