**Ocean Science
Discussions**

Interactive comment on "First evaluation of MyOcean altimetric data in the Arctic Ocean" *by* Y. Cheng et al.

Anonymous Referee #1

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Review of 'First evaluation of MyOcean altimetric data in the Arctic Ocean' by Cheng et al.

The manuscript presents a preliminary evaluation of the new MyOcean Arctic Ocean altimetry reanalysis. This new product is compared with standard altimeter fields (DU-ACS) as well as some tide gauge records, RADS altimeter data and SODA reanalysis (model). The evaluation is based on sea level anomaly variance, intra-annual variability, anual cycle and trends.

The article is well written and the topic fits within the MyOcean R&D special issue. However, there are several major issues that need to be addressed before the article can be accepted for publication. My first concern deals with the statistically significance of some results. Including other metrics and computations would add robustness (see

below for more details). Second, some relevant information on the new product is missing and it should be given. Third, I found the article too basic, more in line with a technical report rather than a scientific paper. Fourth, I am not sure this MyOcean product has been specifically designed for sea level trends. I have the impression that the main target was to improve correct representation mesoscale features as well as to enhance the data coverage close to the coast (in areas covered by ice during an important part of the year). This should be clarified and eventually corrected. And finally, the authors need to do a major effort to expand the evaluation of the new product, including, for example, power spectra analysis and mean eddy kinetic energy estimation as well as comparison with independent data such as drifters, or other sources of remote sensing (e.g. SST).

Specific comments:

1. Introduction: I do not think RADS data can be considered as fully independent as it is also altimetric data.

2. Data Set: many details on the new MyOcean V2p products are missing. It is not clear who has developed this product. If the authors have done so, this needs to be stated. Please provide information on:

- Editing criteria - Tidal model and other geophysical corrections - Retracking - Along track data filtering and sub-sampling - Spatial and temporal correlation scale of the objective analysis scheme - Error budget (instrumental and long-wavelength error correction)

3. Data Set -SODA reanalysis: A sentence on the reliability of SODA sea level trends would be acknowledged. I do not have any objection against using SODA although it would have been nice comparing also with other MyOcean reanalysis (e.g. GLORYS).

4. Results - Sea Level Variance: 'The MyOcean data set clearly has higher zonally averaged SLA variance, particularly along the coastal regions and around the Queen

Elizabeth Islands, which means the quality of the data set is even worse over these regions'. This is not necessary true and needs to be justified. If the new product has shorter spatial and temporal scales (as I guess it may have given the higher resolution grid) it is expected that the variance is going to be higher than the standard product but this does not mean that the quality of the data is worse. This should be validated against independent data. And also I recommend to perform an estimation of the statistically significance (e.g. confidence intervals) of the variance differences between different products. Power spectra analysis, rms differences between the different products and/or eddy kinetic energy estimates would also provide additional interesting information.

5. Results - Intra-annual sea level signal: some details on the estimation of the intra-annual variability are missing. Are the seasonal cycle and interannual variability removed?

6. Results – Figure 5: I would suggest plotting the temporal series of tide gauge and altimetry (DUACS and MyOCean) interpolated at the tide gauge location only, rather than computing the spatial variability of the temporal correlation.

7. Results - Annual signal: Please, give more information on how the annual cycle is estimated. Add errors.

8. Results - Inter-Annual signal: Same comments as above. How are the trends estimated? Estimate statistical errors. Is this product suitable for trends?

9. Summary: the summary and conclusions are based on very poor statistics. This definitely needs to be expanded by including a more complete evaluation including other metrics.

10. References: the list of references clearly lacks of many relevant studies closely linked to the topic of this manuscript.