

## ***Interactive comment on “Dynamic Ocean Topography of the Greenland Sea: A comparison between satellite altimetry and ocean modeling” by Felix L. Müller et al.***

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General comments: An important and interesting study. Well written manuscript with few improvements needed. The study still needs some clarifications and justification before publication can be recommended.

Specific comments: - The manuscript needs more detail regarding the sea-ice/lead classification. Please explain more about the reason for choosing the method of Müller et al 2017 over other procedures using waveform parameters. - The discussion and use of geoid model to reduce the altimetry derived sea level heights to dynamic ocean topography needs more investigation. As a minimum other geoid models should be

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included in the analysis e.g the EIGEN, EGM, or Arctic Gravity project geoids or similar. Also, elaborate more in the statement in line 15 p.17. I am not convinced that the pattern is due to the geoid model but rather the issued with sea ice present in the Envisat footprint and melt-ponds on top of the sea ice in Summer. - The discussion of seasonal cycle/mean annual amplitude needs to include more about the uneven sampling from Envisat Altimetry in Summer. How does this affect the study and conclusions - The figures 6, 8, and 9 all suffer from the fact that the color intensity is dependent on the change in spacing between satellite tracks with latitude. I suggest to try alternative plots. Also, the plots need titles and numbering (a,b,..) and the phase difference does not make sense with 0-360 degrees (change to +-180 degrees) - The discussion lacks an evaluation of the different sampling of the model versus the altimetry. How does this affect the conclusions? What are the advantages and disadvantages of the choices in section 3.

Technical corrections: P 2 | 19 “in spite of the difficult. . .” P 2 | 23 “impression of the model accuracy. . .” P 2 | 30 “ocean model grids with local refinements in the region of complex. . .” P 2 | 32 “spatial representation for other regions. . .” P 2 | 33 “It includes, besides. . .” P 2 | 34 “salinity), a sea-ice. . .” P 3 | 13 “In addition, more. . .” P 3 | 16 “Figure 1. The study. . .” P 4 Figure1 also add mean sea-ice extent to the plot e.g. from NSIDC or P 5 | 10 “that the model performed well in simulating. . .” P 6 | 20 “to develop Arctic and. . .” P 6 | 25 “. . .various missions. BUT only one mission is used here; Envisat P 6 | 27 What is meant by “long-temporal”? P 7 | 3 “the high resolution Optimal Geoid. . .” P 9 | 7-19 and Figure 4 could be placed in supplementary material P 9 | 19 “to more variability due to more. . .” P 14 | 10 “and phases as obtained by. . .” or rephrase sentence P 16 | 5 “,which act as kind of. . .” rephrase sentence P 16 | 12 “areas are significantly more noisy than. . .” P 17 | 23 “The present paper shows basic. . .”

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