



Comment on **essd-2021-256**

Anonymous Referee #1

Referee comment on "High-resolution bathymetry models for the Lena Delta and Kolyma Gulf coastal zones" by Matthias Fuchs et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-256-RC1>, 2021

The manuscript presents the 50 m and 200 m resolution bathymetrical models for the Lena Delta and Kolyma Gulf regions based on digitized nautical charts. The authors provide detailed information on the generation of the models and its validation. Additionally, they discuss the comparison with existed data and limitations of the models as well as potential applications and usage of the data sets. The first detailed and seamless digital high resolution models is the best available digital bathymetrical data set with the high accuracy and resolution and therefore is very valuable contribution for Arctic studies. Detailed bathymetry model is necessary for better quantification of fluvial and coastal carbon fluxes to the Arctic Ocean as well as for other studies related to Arctic delta and near-shore dynamics. Great advantage of the models is using field measurements conducted by authors which show a strong correlation between model and field data. Also additional existed data for model validation were used. High resolution of the bathymetry models allows to reveal deeper parts of the Kolyma and Lena Delta river channels and the transition and continuation of the main channels into the near-shore and deeper coastal areas. Additional benefit of the models is the coverage of the coastal near-shore zone which had sparse coverage in other data sets.

The manuscript is well-written and well-structured with good and clearly presented figures and tables. I would consider it to publish in ESSD after a minor revision. My general comments are:

- I recommend for better perception to combine 2.3-2.5 to one section like "3.3 Model validation..." with subsections 3.3.1 Field measurements, 3.3.2. Existed archive data and 3.3.3. Comparison to IBCAO.
- It is not critical but would be great to add the figure to appendix with coverage of the nautical charts as they have different scale. Also it is not clear which areas are covered

by maps of which scale. Or all study area covered by maps of scale from 1:25,000-1:100,000? Then it should be noted in text.

- Some section titles better to name more clear which I'll note in listed below detailed comments.

Detailed comments and suggestions are listed below:

Abstract

22 to add scale of used nautical maps

23 to add the resolution of created models

Introduction

40 to add permafrost temperature rising

62 The usage of "region" should be uniform in the text, while "Region" or "region" are used. I would use "region" with lower case as there is no formal names of Lena Delta or Kolyma Gulf regions.

64 What are this models - are they planned or they are already existed? Add reference if it exists.

Material and Methods

86 Double usage of "input data". Maybe to use the "primary" instead one of them.

88 to add the depth of near-shore zone

89 for which region?

90 Different scale maps were overlapped or there were regions with only of one scale map existence?

105 I would change the section name to smth like "Creation of bathymetry model based on..."

122-123 Add to abstract

130 Not clear section name. I recommend to change it on "Field measurements from the near-shore" or similar.

160 Fig. 2 To add the date of measurements (as for Kolyma Gulf region)

165 I recommend to name this section as "Additional Pangaea archive data for model validation" or similar.

180 Fig.3 Add "from PANGAEA archive data". Red circles are not well seen, better to change to more contrast color.

181 I recommend to change the section name to " Validation of model in comparison with IBCAO" or similar

Validation, comparison, and limitations

258 4.3 I recommend again to change the section name to " Validation of model in comparison with IBCAO" or similar

259-260 second "comparison" is not necessary

338 It is not clear what does mean the "correction to mean sea level" of depth measurements, please explain it

341 Which are the heights of such tides?

348 Delta?

349 Seems that "up to 5" is an extra

351 Double usage of "further". First maybe to change to moreover

361 Add the reference to C1 and C2 figures

384 To add to conclusion the advantages of models such as revealing deeper parts of the river channels and the transition and continuation of the main channels into the near-shore and deeper coastal areas as well as coverage of the coastal near-shore zone which had sparse coverage in other data sets.

387 Field-measured, PANGAEA archive data and IBCAO...