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High-resolution bathymetry models for the Lena Delta and Kolyma Gulf coastal zones

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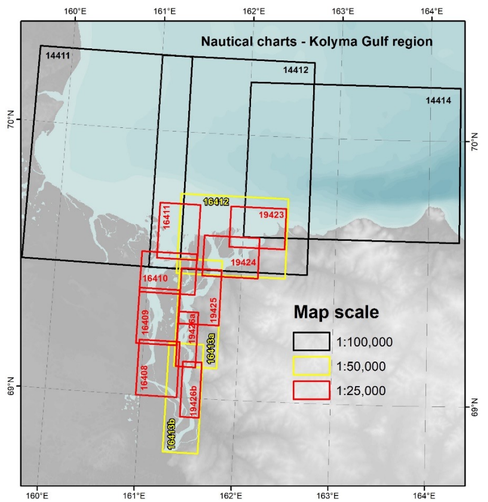
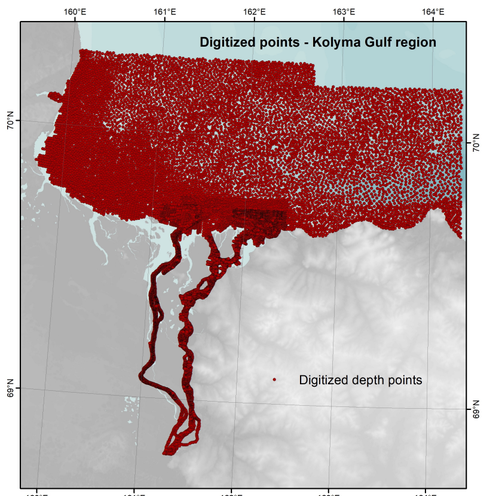
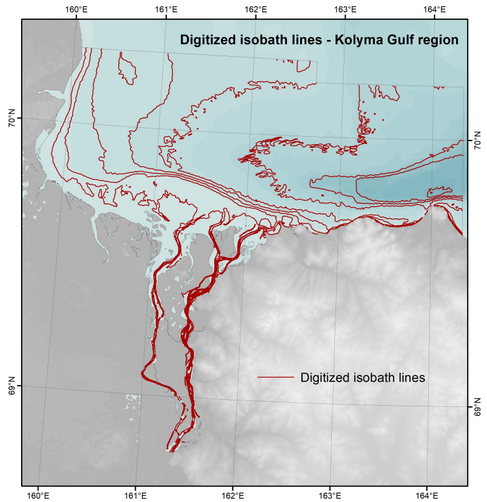
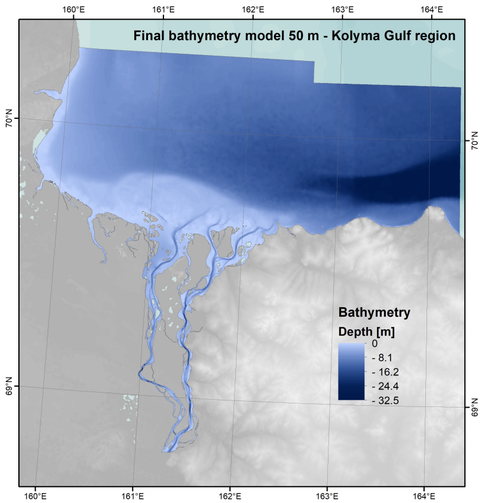
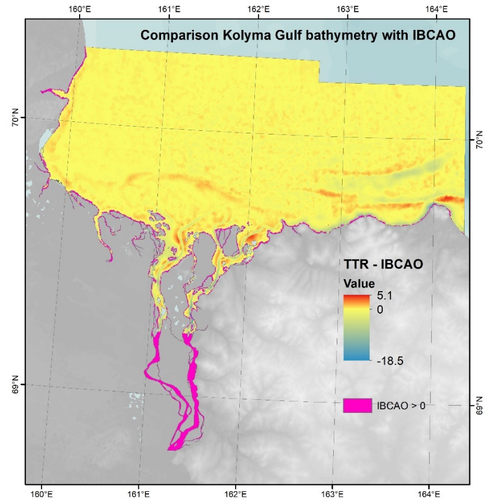










Input data

29 nautical maps with the scale of 1:25,000 – 1:500,000

Methods

Manual digitization of ~75,000 points and 720 isobath lines. These points and lines served as input for a *topo to raster* calculation with ArcGIS.

Result

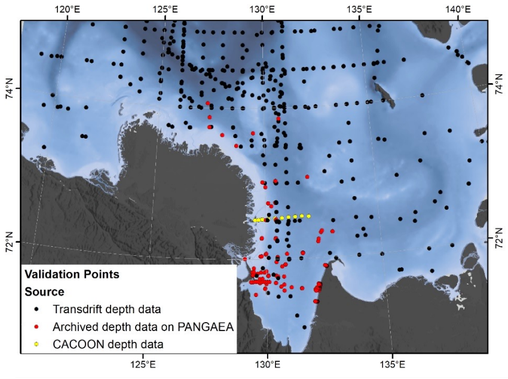
50m and a 200m grid bathymetry available for the Kolyma Gulf and Lena Delta region.

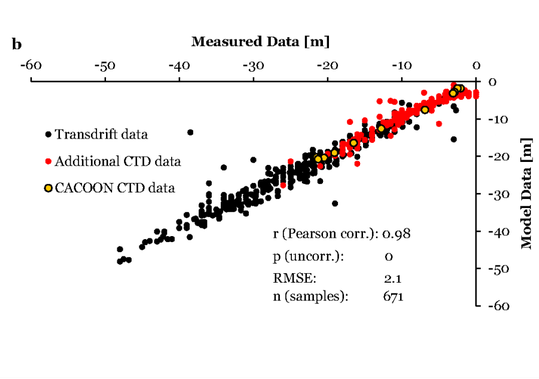
Comparison

The 200m bathymetry model was compared to the most recent IBCAO bathymetry (Jakobsson et al. 2020).

Validation

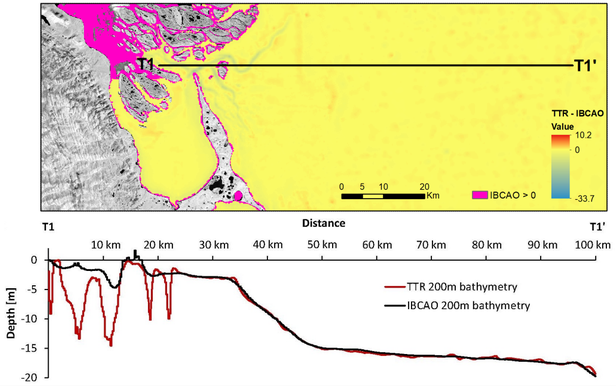
We collected CTD data during two CACOON expeditions in Spring and Summer 2019. Additionally, available depth data was synthesized for validating the bathymetry model.





Benefits

Near-shore zones are more accurately mapped with the new bathymetrical models.



Conclusion

We created the first, seamless high-resolution (50m and 200m) **open access** bathymetry data sets for the Kolyma Gulf and Lena Delta region.

The new bathymetrical models showed a good agreement to the compared depth data, in particular, the models reveal the location and continuation of the larger, deeper river channels in the transition from the river mouth to offshore areas for both regions.

The models help to quantify fluvial and coastal carbon fluxes as it transitions from land to ocean

Data availability

Paper (in discussion) : https://doi.org/10.5194/essd-2021-256
Dataset: https://doi.pangaea.de/10.1594/PANGAEA.934050

References:

Fuchs et al.: High-resolution bathymetry models for the Lena Delta and Kolyma Gulf coastal zones, Earth Syst. Sci. Data Discuss. [preprint], https://doi.org/10.5194/essd-2021-256, in review, 2021
Jakobsson et al.: The International Bathymetric Chart of the Arctic Ocean Version 4.0, Scientific Data, 7(1), 176, https://doi.org/10.1038/s41597-020-0520-9, 2020.

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