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Comment on essd-2021-32

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Referee comment on "Comprehensive bathymetry and intertidal topography of the Amazon estuary" by Alice César Fassoni-Andrade et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-32-RC4, 2021

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General comments

This is an original and very good technical paper that addresses data collection, compilation and merging of space born survey data, river depth and global topography and bathymetry data to obtain a comprehensive high-resolution grid of the topography and bathymetry of the Amazon estuary. This dataset constitutes the basic knowledge essential to understand the complex dynamics, morphology and related ecological processes of the entire Amazonian estuary environment, the largest in the world.

In general, the manuscript is well organized and well written. The data presented to support the authors' main goals are compelling. The title well represents the content of the paper; the methods and conclusions adequately support the dataset presented. It might be meaningful and appropriate after a minor review for the journal "*Earth System Science Data*". All parts of the manuscript and illustrations are needed to show the results and to understand the main points.

Specific comments

My comments/suggestions are minor and mainly aimed at better clarifying to the reader some aspects of the techniques/methods used:

- Vertical reference level (WSE): the vertical reference levels (WS90 and SYZ) were inferred over the entire study area after the **curvilinear** interpolation of WSE calculated in seven gauge stations along the Amazon River (lines 106:110) and are shown in Fig. 2c. Which polynomial interpolator was used and on how many points did you use for it (Newton, Lagrange, etc.)? Looking at the figure it seems that the values â□□â□□between the stations are linearly interpolated. Furthermore, in the caption of Fig. 2c it should be reported what the dashed blue and black lines represent.
- Ground truth (in situ surveys of the river bathymetry): six cross-sections were acquired for data validation along the river (lines 233:236). River water depths were obtained from an Acoustic Doppler Current Profiler (ACDP). This is not a common technique for offshore bathymetric surveys, thus may be interesting to provide the reader with further details on this technique, i.e., what are the advantages relative to conventional echosounders and/or multibeam systems for using ACDP in rivers? Different parameters affect water column velocity in a river, how about the calibration of the system?
- It is not clear how river bed data from in situ surveys have been corrected for tide amplitudes away from gauge stations, in particular for cross-sections B, C and D. Tide correction depends on time and space. How did you propagate over time values recorded on February 6th, 2007 at the Porto de Moz station located on the South Channel in these cross-section points? Have you assumed the same phase of M2 and S2 tidal components at points B, C and D as that observed at the measured station (only amplitude variations of M2 and S2 may be estimated from the WSE slope in fig. 2c)?
- The vertical reference level (WS90 or SYZ) should not depend from time at a given point, what does it mean that the WSE was measured every 15 minutes at Porto de Santana station? (line 239).
- Ancillary database (GEBCO2020): GEBCO is a bathymetric compilation from different data sources: multibeam, single beam and gravity predicted bathymetry. Lines 254:256, "a low pass filter was applied to reduce in situ multibeam sounding swath edges", this sentence is unclear. There are only few multibeam lines in GEBCO from the study area.
- The main problem with the final merged 30 m grid is the evident noise related to gridding in the offshore part of the study region. When hill-shading is applied to the grid, this noise is the most noticeable feature. Probably, the final grid in the offshore area may be improved applying a smooth interpolation method to GEBCO data in order to reduce grid size from 450 m to 30 m (to avoid aliasing) before merging all the data using the topo-to-raster method.
- The several datasets collected were referred to different geodetic datums. How do you shift all the data to EGM08 reference system.