

## Comment on **essd-2022-260**

Anonymous Referee #1

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Referee comment on "Synoptic observations of sediment transport and exchange mechanisms in the turbid Ems Estuary: the EDoM campaign" by Dirk S. van Maren et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-260-RC1>, 2022

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This paper presents an overview of a complex field campaign (multiple vessels, multiple moorings, two seasons) conducted in the lower Ems River, outer Ems Estuary, and dredged navigation channel which connects them. The motivating question is what mechanisms drive the high sediment concentrations and high rates of sedimentation (necessitating annual maintenance dredging) in the channel. This topic has been investigated before in this and other estuarine-tidal river systems, but the authors suggests that mechanisms traditionally cited (tidal asymmetry, residual circulation, etc.) seem too weak in themselves to explain the high SSC/trapping here. Part of the summary notes that exchange between the Dollard and channel may provide a temporary source/sink coupling (which fluctuates with river discharge) which causes the unusually high trapping. The authors note that decomposition of fluxes into residual, tidal pumping, and other terms may help fully explain the dynamics. In similar papers these calculations are usually included already, but this paper has been written to describe the dataset (and submitted accordingly to a journal dedicated to that purpose) and it is suggested that future papers will explore the dynamics in detail.

Specific comments include:

- Line 61 – subject/verb agreement
- Line 81 – grammar/typo – “even though model result that”
- Line 85 – typo “ion”
- Line 89-90 – As written, this sentence is somewhat confusing (based on the sentences which precede it)
- Throughout the paper – estuary should be capitalized in Ems Estuary, just as in Ems River
- 112 – tons (plural)
- Line 131 – this section discusses sediment transfer between the outer Ems Estuary and lower Ems River, and notes that strong flood dominance may promote trapping – but in

line 81 the authors note that tides in the ENC (the navigation channel connecting those two regions) the tides are "asymmetric with higher ebb flow velocities." Is there a spatial switch between flood dominant flows in the outer estuary to ebb dominant flows in the ENC to flood dominant flows in the lower Ems River? Please clarify.

- Line 195 – correct "turbiditymeter sensor"
- 218 – is it possible that the pipette method biases the results toward smaller flocs? (Or did the diameters agree well with what the LISST reported?)
- Line 235-237 – the wording is a bit awkward here
- Line 237-238 – did stratification impact the ADCP calibration? (I.e., by additional distortion of the sound signal which is difficult to correct?)
- Line 425 – interesting result
- Line 449 – sediment concentrations rather than sediment dynamics?