



EGUsphere, referee comment RC1
<https://doi.org/10.5194/egusphere-2022-730-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on egusphere-2022-730

Zheng Bing Wang (Referee)

Referee comment on "Imminent reversal of the residual flow through the Marsdiep tidal inlet into the Dutch Wadden Sea based on multiyear ferry-borne acoustic Doppler current profiler (ADCP) observations" by Johan van der Molen et al., EGU Sphere,
<https://doi.org/10.5194/egusphere-2022-730-RC1>, 2022

General comments

The paper presents an analysis of the long-term measurements using ADCPs installed on the ferry crossing the Marsdiep tidal inlet in the Dutch Wadden Sea. The analysis finds a significant trend in the residual flow, with decreasing export to the North Sea, and with occasional imports observed in recent years. This is an important finding as the trend has significant effects for the morphodynamics and ecosystem of the western Wadden Sea. Therefore, I support the publication of the paper after proper revision.

The paper also infers that the trend is caused by the change in the tides in the North Sea related to global warming. For me this part is not yet such convincing that it can be presented as conclusion in the paper. As already mentioned in the paper, at least the significant change of the O1 component in the horizontal tide should be verified by analyzing the tidal gauge observations. Moreover, it is still not clear to me why larger O1 amplitude causes the observed trend in the residual flow. The correlation between the residual flux and the air temperature does not say much. Given the fact that the temperature had an increasing trend any trend of any process in the same period would probably show a correlation with the temperature. I would suggest two possible revisions: (1) complete the analysis and present more convincing evidence for the conclusion concerning the cause of the observed trend; (2) admit that the cause of the trend is not yet clear and present a series of possible causes / hypotheses.

Specific comments

Line 43-44: Please specify what type of tidal asymmetry you refer to when saying flood-dominant or ebb-dominant (residual flow, peak velocity, or duration of slack tides?). The same in lines 235-236.

Lines 65-66: The previous research did not conclude that the system reached a new dynamic equilibrium, but concluded that the closure of the Zuiderzee still influences the morphological development of the western Dutch Wadden Sea, see also Wang et al. (2018).

Lines 181-184: I am curious about the development of the other tidal constituents.

Details

Line 11 (and many more through the paper): "sediment balance"? This term was first presented in Dutch (sedimentbalans) and later it is translated as "sediment budget" in English publications. Personally I think that this is the right translation.

Line 53: Please change "the waves" to "the sand waves" to avoid confusion.

Lines 59-60: Please give more elaboration. The sentence is difficult to follow now.

Lines 138-139: Please check the sentence. It seems suggesting that the flow velocity is used through the whole water depth.

Lines 166: reference error.

Line 177: "residual depth"?

Lines 253: Please specify who does "They" refer to.