

Interactive comment on “Residual circulation and fresh-water transport in the Dutch Wadden Sea: a numerical modeling study” by M. Duran-Matute et al.

Anonymous Referee #1

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This paper describes a multi-year numerical simulation of the Wadden Sea using GETM. The paper is thorough in its description of the model, and in the analyses performed. The main research result of the paper is that wind can significantly influence the character and magnitude of transport in and out of the Wadden Sea. I think this is an important and under-appreciated result that is most likely true for many systems. There are a few places where the manuscript could use some clarification, but in general I believe only very minor edits are required to make this an acceptable publication. These minor points are outlined below.

Page 218, line 3: I think that the phrase "the term tidal prism should not be thought of as a quantity characterized by the tides alone.." is on the right track, but should

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perhaps be changed to include a general concept of a 'prism'. For example, I would think of the tidal prism as being exclusively related to the tides – tides are in the name after all. Perhaps the idea of an 'exchange' or 'wind' prism can be introduced, to make the analogy with the tidal prism clear, but to also make it clear that these are not tidal processes.

Later the idea of the exchange caused by wind and tides is re-introduced, around the top of page 222. I like this section, and feel it is the main novel point of the paper, besides just a detailed model description and validation. Is it possible to separate these effects out? Perhaps doing a tidal analysis on the transport can isolate those exchanges due to each tidal constituent. The residual would be due to the wind. If this is not possible, for some reason, it should be explained in the text.

There are places where the wording is unclear or awkward. Here are some examples:

Page 198, line 22: "For pathways of fresh water, the same watershed turns out to be.." It is not immediately clear what the 'same' watershed is here.

Page 199, line 9: should be 'estuarine dynamic'. The whole phrase is a bit awkward, and should be rewritten.

Page 201, line 28: "(neither from measurements or numerical)" is grammatically incorrect. The whole phrase is awkward and should be rewritten.

Page 217, line 3: "accidentally" is perhaps better as 'coincidentally'

Page 219, line 18: "flood matches" is not clear to me. Explain this in more detail.

Page 219, line 24: Just say 'and vice versa.'

Page 223, line 5: "Speaking of ..." is awkward. Perhaps 'In describing ...' is better.

Page 224, line 5: "... but the freshness itself" What on earth does this mean?

Page 227, equation 17: Why use the inverse flushing time? Especially, when these are

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all converted and discussed in terms of residence times below?

Page 230, equation A1: Note that W mean a weight here, but in Appendix B means a width. Perhaps use another variable name.

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