

Interactive comment on “Long-term coastal openness variation and its impact on sediment grain-size distribution: a case study from the Baltic Sea” by Wenxin Ning et al.

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Reviewer’s comments: I would like to see a few more notes about the setting: are there only rocky coasts, or are there also patches of sandy shores? And what about shallow waters? All rocks? Some notes are found in 3.2, but more notes could be added to 2.1. I also wonder how sand is transported to the core site. Does it happen during storms as storm sand layers? Is sand blown out on the sea ice during cold winters? Is sand transported by drifting sea weed or by drifting sea ice? I would also like to see a few notes on the chronology of the core, at least a reference to Ning et al. (2016). The main control on grain size distribution is distance to the shore, but this is apparently not mentioned. The closer to the shore – the more coarse-grained

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sediments. In Gåsfjärden, however, the sediments become more and more fine grained as the core site moves closer to the shore. This is not surprising, because the core site at the same time becomes more and more protected. The authors have developed a novel GIS-based approach that allows them to quantify down-core changes in grain size distributions in relation to changing fetch.

Reply: The coastal region is characterized with rocky coasts, with sandy patches in the offshore water. Inside the inlet, there is so far no data about spatial sediment grain size distribution. Even so, the sand content in the inlet must be relatively low, due to the lack of large rivers and enclosed setting. The sand content is generally lower than 1% and we cannot presently determine how important storm events or sea ice are for the transport and abundance. During periods with relatively high openness, storm events would most likely transport higher amount of sand into the inlet. The chronology of the core will be added. We agree with the argument from the reviewer on the water depth-grain size relationship.

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