

Interactive comment on “Response of tidal flow regime and sediment transport in North Male’ Atoll, Maldives to coastal modification and sea level rise” by Shuaib Rasheed et al.

Anonymous Referee #2

Received and published: 16 November 2020

The paper reads well and the overall methodology seems ok. I share most the comments addressed by reviewer #1 but would like to add the following:

Wind forcing is either not included in your model or simply not described. From the remaining text I understood the first thing, as e.g. "... wind driven sediment can be incorporated into the model, however this requires field data currently not available for model setup and calibration." However, throughout chapter 2 it is often stated that wind dominates the sediment transport in the study area, e.g. "... studies suggest a wind dominated sediment transport pattern for shallow lagoon areas of the Maldives archipelago". How can you come up with results like "The grain sizes predicted by the

C1

model compare well with qualitative and quantitative data reported at the coral atolls of the Maldives archipelago, demonstrating that correctly configured tidal models can be effectively used to determine dominant grain size in coral atolls at the atoll scale.", if the major driver is not considered? Do you have a tide-only observation available that allows to draw these conclusions? At this point I would expect a more critical and transparent discussion of the issues/drawbacks related to your setup.

You also mention that "The combined tidal- and wind-driven currents can exceed speeds of 2 m s^{-1} ." Any idea regarding the magnitude of tide-only induced currents? Maybe this allows to estimate the proportion of sediments transported from tide-only runs.

More specific comments are as follows:

Line 30: Haigh et al. (2019) should be cited as it provides the most comprehensive review on tides and tidal changes...
<https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2018RG000636>

Line 173/177 and elsewhere: add Yr or in review to ref. (Rasheed et al.)

Line 184: check if this sentence is correct. Seems to be wrong... At least I do not get the message!

Line 313: "Next, we classified the bottom bed sediment for the simulations carried out using the 1997 coastline scenario, as well as under SLR of 2 m." Why did you choose a SLR of 2m? Any justification?

Line 343: "... in global mean sea level"

General comments on the SLR part: The references are rather old and a lot of progress has recently been made regarding SLR projections and individual contributors. You should at least refer to the latest SLR projection from the AR5 and additionally taking recent process understanding (see e.g. Frederikse et al., 2020; <https://www.nature.com/articles/s41586-020-2591-3>) on ice sheet contributions into

C2

account (see e.g. Edwards et al., 2019; <https://pubmed.ncbi.nlm.nih.gov/30728522/>).
The entire part on SLR seems a bit antiquated.

Line 348: "...which represents an upper limit of current predictions of SLR to be reached
in a century." Says who?

Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2020-80>, 2020.