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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Monitoring tidal hydrology in coastal wetlands with the "Mini Buoy": applications for mangrove restoration" *by* Thorsten Balke et al.

Anonymous Referee #2

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General comments

The device that is presented in this paper is novel, and very relevant for the restoration of coastal wetlands. The paper is easy to read and well structured. I have a few minor comments that could easily be addressed. But otherwise, I think this paper is suitable for publication, and hopefully the mini-buoy will be implemented in restoration projects as soon as possible.

Specific comments

Title: The initial thought that came to mind thinking of a mini-buoy, was a surface buoy. The deployment and functioning of the device is well explained. However, since the

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mini-buoy is meant for deployment in restoration projects in SE Asia where buoys and other visible devices are often stolen (as already pointed out by the authors), a more intuitive name such as mini-mooring might not scare managers off purely based on the name. Alternatively, add a short description of the device or that it is submerged to the title.

L49: why specifically for SE Asian mangrove restoration? From the abstract I understand that the buoy has been deployed in an abandoned aquaculture pond system in Sumatra. But the specific application for SE Asian mangroves seems out of the blue here in the intro. I miss the link between the need for hydrology assessment and why this is specifically applicable to SE Asia in the intro. A general description of aquaculture hydrology, importance of aquaculture in terms of surface area and why abandoned aquaculture is interesting for mangrove restoration would be useful background information for a wider audience. In addition, I think that the mini-buoy could also be useful at many other target restoration sites like de-embanked polders and saltpans. Why the focus on aquaculture?

L195: "The Mini Buoys were considered 'flooded' when fully submerged (i.e. bed elevation + 20 cm). " → So sites without inundation detection in the app could in fact still be inundated, just with less than 20 cm of water, which might still be a significant amount of water for a seedling.

L219: "influence of outliers: (e.g. due to passing boats, waves or turbulence)." Passing boats would indeed create outliers. But at ocean facing sites I can imagine that waves have a large influence on the current velocities measured by the mini-buoy in a more regular manner. How was the effect of waves handled / are the current velocities by waves included in the net current velocity reported?

L 415: The authors acknowledge that long term deployment of the buoy would capture more hydrological accuracy, though the average conditions could be estimated within a spring neap cycle. I think that it would be could to mention that the timing

of that short measurement period matters, especially if ecological mangrove restoration is the target. Especially in the java sea, inundation free periods can vary greatly in length throughout the year. There can be a seasonal difference in average water level of 10 cm (see local tide stations for long term fluctuations http://www.ioc-sealevelmonitoring.org/list.php), driven by the monsoon winds. It is important to address that the hydrodynamic characteristics of an intended restoration site should especially be sufficient during the fruiting season of the targeted species.

Figure 5: What is the explanation for the velocity minimum at L3, and subsequent increase in current velocities at higher elevations? Could that be an effect of lower accuracy when the water levels became lower, or is it an expected effect at this site. Why is there no velocity graph for figure 5b?

L462:" The Mini Buoy concept design and data analysis could also be applied for hydrological monitoring of river floodplain/riparian systems." seems a rather offhand comment, not a nice wrap up of the story or take home message.

Technical corrections

Figure 4: blue being flood and green being ebb? Figure 5: b, scale numbers and units are hard to read. Figure 6: very nice to see an example of an aquaculture pond with stagnant water and partially operational sluice system in here as an example of a very unsuitable site for restoration Figure A2: Orange letters instead of orange dots?

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