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Interactive comment on "Medium-term dynamics of a Middle Adriatic barred beach" *by* Matteo Postacchini et al.

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We thank Reviewer #1 for their useful comments and suggestions which will help to improve our manuscript. The comments from the Reviewer below are in italic font and our point-by-point responses are in bold.

General comments

The paper focuses on the morphodynamic analysis of a natural sandy littoral stretch located along the highly urbanized coastal sector of the Western Adriatic Sea. Morphologic variability of submerged sandbars is quantitatively analysed and compared with in situ wave data to evaluate the near-shore medium-term dynamics. The study domain is located in a semi-enclosed and elongated basin whose coastal dynamics are deeply

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influenced by the physiographical setting. The paper furnishes new insight on local (Central Adriatic) and general (semi-enclosed basin) bars behaviour in medium-term. For this reason, and with the aim to extend the local findings to more general ones, the authors use proper conceptual and analytical methods to describe data and results. However, in order to fully constrain the reached conclusions, a better description of some evidences on the sandbars morphologic variability is needed.

We thank the Reviewer for their appreciation of our analysis. As suggested below, the new version of the manuscript will better describe the evidences of sandbar migration and morphological variability of the beach.

Specific comments
"Sandbar cross-shore migration evidences"
In the section 4.2 "bathymetric surveys", the proposed seaward/shoreward sandbars migration patterns between consecutive surveys (2006, 2010, 2011, 2012, 2013) are not clearly detectable. Considering the importance of this phenomenon in relation to the paper objective, a better description and presentation are required. Referring to Figure 5, some considerations are reported below. The 2006-2010 shoreward migration is highly localized around the "rotonda sections", the southernmost transects on the contrary seem not to highlight any kind of real net cross-shore displacement. The 2010-2011 evolution is represented by a detectable sandbars cross-shore displacement but not uniform alongshore. The Authors propose a shoreward migration, thus assuming that the sand volume stored in 2010 on the middle-bar had contributed to the upper profile evolution and the large sand volume stored in 2011 on the outer-bar would be alongshore derived (see for example Figure 2). On the contrary, a seaward displacement would imply that the sand volume stored in 2010 on the middle-bar had contributed to the lower profile evolution and the net alongshore sand movement would be located in shallower depth. Even if this is a very limited example, qualitatively detected by a single transect, a volumetric approach could be fundamental to evaluate

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the "cross-transect and along-transect" sedimentary mobility, thus improving the alongshore consistency of interpreted cross-shore sandbars displacement.

Following Reviewer's suggestions, the description of the sandbar cross-shore migration will be improved by i) better illustrating Figs.4 and 5, ii) including new cross-shore profiles at different alongshore locations, to both clearly illustrate bar-migration evidence and highlight the influence of existing structures on morphological changes, iii) plotting and describing volume changes along different cross-shore profiles.

"Sandbar alongshore variability"
As stated by the Authors, since the area is located close to the jetty and characterized by complex hydrodynamics, it could be likely to develop complex sandbar morphologies. Moreover during particular storm events, the coupling of complex hydrodynamics and morphologies could induce cross-shore beach profile response, not necessary in phase with areas farther away from "jetty-rotonda" (see for example Shand et alii, 2001), thus the generalization on the bars behaviour along the whole area could be more complex to define. In this framework, as noted by the Authors, the stabilization of the "bar features" along the southernmost transects could testify the boundary between the near-shore area influenced and "not directly influenced" by the jetty and the "rotonda" structures. The same applies to the cross-shore limits of "rotonda" influence on sandbar characteristics, as well evidenced and described in Figure 5b.

About this point, the three-dimensional bar behavior and the influence of the existing structures will be better discussed. Following Shand et al. (2001)'s[1] findings, the three-dimensional patterns developing along the coast should be ascribed to complex hydrodynamics, hence not always to high-energy conditions,

[1]Shand, R. D., Bailey, D. G., & Shepherd, M. J. (2001). Longshore realignment of shore-parallel sand-bars at Wanganui, New Zealand. Marine Geology, 179(3), 147-161.

but also to other factors, like low-frequency waves and morphological variations. In addition, the above-mentioned cross-shore profiles and volume changes will be used to improve the discussion on such a point.

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