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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Best index related to the shoreline dynamics during a storm: the case of Jesolo beach" *by* R. Archetti et al.

Anonymous Referee #1

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The main original contribution of this paper lies in the determination of a method to predict shoreline changes after storms: a potential equation of the total wave energy during a storm (Etot) is calibrated by means of a dataset of in situ wave measurements and shoreline video monitoring to estimate the variation of shoreline position before and after the storm (Dx).

The paper clearly outlines the methodology to obtain the observed data set of waves and shoreline response. Furthermore, the obtained dataset is of potential great interest to describe the coastal morphodynamics of the study area. However, the adequacy of the methods followed in the framework of the original investigation of this paper (as summarized in the paragraph above) remains unclear.

Publication of this article is recommended after reconsideration of the following mayor

suggestions:

1. Although calibration of equation (5) shows a high correlation by means of the Pearson's coefficient, the scattered data in Figure 13 suggest that the RMSE between observed and predicted Dx could be of the same order of magnitude that the observed Dx. The RMSE should be proven to be small enough. 2. It is well known that a moderate wave energy, which erodes an accreted beach, can accrete an eroded beach, as the shoreline response to a storm depend not only on the wave energy but also on the shoreline position before the storm (as the very same authors state in page 7105 line 21-22). However, these considerations are disregarded in the proposed method to estimate the shoreline response. The analysis of the influence of the initial shoreline position in the shoreline response is to be included in the paper (at least qualitatively). 3. The influence of the artificial dunes in the backshore is not adequately demonstrated. E.g. in page 7107 line 20-22 it is stated that shoreline response to storm S8 is less than expected due to the presence of such dune. However, there is no a similar storm without backshore dune to compare the corresponding response and therefore the cause of the reduced response to storm S8 cannot be really related to the presence of the artificial dune. Actually, there are several individual examples of storms with similar total wave energy or similar wave height that causes larger shoreline displacement with dune than without it (e.g S27 in comparison to S20). It is suggested that the authors analyze the efficacy of the artificial dune in shoreline response reduction by means of two different calibrations of equation (5): one fitted only to the storms with dune and another without or some other method.

In addition, the following minor suggestions should be addressed:

1. The colored bar on top of figure 2 is related to wave or wind directions? Should it be wind direction, then the lower plot is redundant. 2. The actual extent of the study area is not clear. The 300 m coastal stretch analyzed should be framed in figure 1, 6, 7, 8, 9, 10 and 11. 3. Axis in figure 7 are not well defined. Almost every label in the Y axis in Figure 7a has the same value. The reference value of the X axis in

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Figure 7b is not defined at all. Furthermore, X axis in figure 7a has a total length of 200 m whereas the X axis in Figure 7b has 300 m, why are they plotted one on top of the other if they are not equivalent? 4. 31 storms were identified, however apparently not all of these 31 storms were considered in the study due to different reasons (lack of pictures, renourisments,. . .) E.g.: in page 7101 Line 8-9 it is said that there were no video recordings during storm 28, hoewever in table 1 a Dx=-13.6 m is related to such storm, then why is this data not quoted in the analysis? On the other hand, talbe 1. Does not show results for storms 22 and 30, why are these storms missing? The discarded storms should be clearly listed in section 4.1 and the reasons to exclude them should be explained. 5. Page 7103 Line 10-11. Consider "retreat" instead of "retreave". 6. Figures 8, 9 and 10 does not show a clear behavior of the beach response as the shoreline before and after the storm intersect several times in the picture. A zoom to the actual study stripe is necessary to correctly interpret the pictures. 7. Page 7104 Line 18. Consider "intertidal" instead of "inter-anual" 8. Page 7104 Line 12. The "average distance" is related to what reference? 9. Page 7104 Line 15. The range -0.2 to -1.40 m does not match Figure 7b, where over 4 m of difference are observed at around 150 m in the x axis. 10. Page 7107 Line 11-15. The correlation between the bora wind and the most energetic storms is not that obvious from Figures 12-15 as all blueish, greenish and redish bullets seem randomly distributed in these figures. Some indicator to prove this correlation is necessary. 11. The results obtained for the wave Energy, E, and the storm power index, Ps, seem to be irrelevant for the discussion. For clarity purposes, it is suggested to reconsider excluding them from the paper. 12. Caption in Figure 14. Consider "Total wave energy" instead of "wave energy flux". 13. Figure 14. It is suggested to consider presenting the x axis in logarithmic scale for an improved visualization of the lower energy storms.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 7089, 2015.