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Interactive Comment

# *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 #2**

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The manuscript analyses simultaneous video-derived shoreline changes and wave data to obtain a simple parameter to predict storm impacts on shorelines. The main contribution is related to the proposed simple predictive relationship which due to the empiric adopted approach is only valid at the analysed site. Although, this methodology could be applied in other sites to derive ad-hoc predictive relationships, there are some points in the work that needs to be clarified before accepting its validity. In what follows some specific questions/comments are given.

Section 4 Methods & Analysis Section 4.1 Storm identification Using the criteria selected for storm definition (lines 11-14), authors identify 31 storms in just one year (lines 23-24). This is not a typical number for extreme events. Probably, a larger threshold should be required for more effective storm identification.

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Interactive Discussion

Discussion Paper

Section 4.3 Shoreline detection Authors discuss about shoreline rotation (lines 24-29). However, this behaviour should mainly be expected in pocket or embayed beaches (as those covered in Ojeda et al. 2008). Is this the case of the study area?

Authors use Fig 10 to illustrate an accretive shoreline behaviour after the impact of a storm (lines 11-12, pages 7103). This corresponds to the local response to the storm No. 9. If we look to the wave height during this storm (Fig 2) we can see that this is one of the small storms ($Hs \leq 1m$ ) that although exceed the imposed threshold they have a very low power (in fact it is the 2nd lowest storm power, Table 1). Maybe this serves to illustrate the effect of defining storms by using relatively low thresholds. Thus, actual waves should be more energetic that calm conditions but they cannot be considered as storms (storms defined in morphodynamic terms should induced beach erosion).

Section 5.4 Index related to storm energy Authors mention that S11 was one of the few cases where sea water reached the protective artificial dune [lines 23-26]. If this is true, this implies that the presence of the protection did not influence the shoreline behaviour for most of the storms. It should be relevant to identify under which events the water level reached the dune to assess its potential influence on shoreline response. Unless this information is taking in consideration, the statement on the effectiveness of dune protection is not justified.

Authors propose a simple relationship to do a first and rapid assessment of the expected storm impact on shoreline response. Although the correlation coefficient obtained for relationship (5) was reasonably good, it is apparent from Fig 14 that the scatter in data is relatively large, especially for low energetic storms. This means that the uncertainty in the magnitude of the expected shoreline retreat will be large when using eq. 5. In fact, we can identify two populations: (i) data for low energy storms (<300) with a large scatter and uncertainty; (ii) data for high energy storms (>300) with a small scatter and uncertainty. This could question the predictability skill of the proposed equation (even for the analysed site).



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Authors mention in section 5.3 that the shoreline behaviour may depend on antecedent beach conditions (lines 19-22). Also in lines 15 to 17 discuss about the potential effect of the impact of successive storms. However proposed simple predictive equation 5 does not take into account any of these effects. Is it possible to include in a simple relationship a parameter or functional relationship accounting for any of these effects?

Formal comments

Figure legends

Modify legends of Figure 13 and 14. They are the same but figures present different variables. Please include the corresponding " wave energy" you are plotting (wave energy storm peak and total energy respectively).

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