

Interactive comment on “Contribution of storms to shoreline changes in mesotidal dissipative beaches. Case study in the Gulf of Cadiz (SW Spain)” by M. Puig et al.

Anonymous Referee #2

Received and published: 14 July 2016

This paper examines the relationship between shoreline change and storm parameters along four beaches in the Bay of Cadiz. Shoreline change is measured by digitizing shorelines from historic orthophotographs dating from 1956 to 2010. Storm parameters are calculated from a synthetic storm record based on observed wave data. Correlation between shoreline change and storminess is determined via the Pearson correlation coefficient. The paper is relevant to ongoing coastal hazard studies and for the most part has a sound methodology, although a few things need clarification. However, I think the paper could benefit from an expanded analysis to further explore the mechanisms driving medium-term shoreline change.

Specific comments:

I am a little confused about the temporal scales used in this study. The authors say they are interested in medium-term shoreline change and have data that spans over ~60 years. However, they calculate shoreline change over periods varying from 1 to 20 years based on the available imagery, which is used to correlate with storm parameters over the same time scales. How did the authors determine the time periods when each shoreline change rate was calculated? How would the results differ if shoreline change rates were calculated over the entire period of record (1956 to 2010) for each Bp and then compared with the storm parameters over the period of record? Likewise, what if the time periods were divided into periods of calm and storminess?

Were temporal outliers identified in the rates of shoreline change for each Bp? If so, what is the source of the outliers? Does removing these outliers improve the correlations?

The main conclusion is that overall there is a low correlation between storm parameters and medium-term (defined here as ~60 years) shoreline changes; previous studies have also concluded that episodic meteorological forcing doesn't directly influence shoreline change over longer time scales (e.g., Fenster et al., 2001, <http://www.jstor.org/stable/4300222>). The authors also conclude that anthropogenic influences and geological structure are the main factors impacting shoreline change in the study area. This is something that could be explored further to make new conclusions about the impacting factors of medium-term shoreline change. For example, the authors point out that when tide state is considered, the correlation improves - what about other diurnal processes such as winds and high water levels? Similarly, what about longer-term processes such as sea level rise or changes in sediment supply? This would also provide a better idea of how these results may be applicable to other study areas.

Technical corrections:

P. 2 Line 10: Define NAO and EA.

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P.2 Line 14: put space between “assessment” and “is”.

P. 5 Equation 5: define E_r in the text.

P. 9 Line 8: should be “except” not “excepting”.

P. 9 Line 9: I would not call these significant correlations, as the r value is pretty low. There are few more instances where the word significant is used – again I would not use this word.

P. 9 Line 26: put a space between “peak” and “energy”.

P. 10 Line 3: should be “except” not “excepting”.

P. 11 Line 1: put a space between “described” and “in”.

P. 12 Line 11: it would be helpful to include the dates of any anthropogenic features in Table 1.

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