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Earth Surface Dynamics Discussions

Interactive comment on "Intertidal finger bars at El Puntal, Bay of Santander, Spain: observation and forcing analysis" *by* E. Pellón et al.

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Review of Pellon et al.

This manuscript describes observations of small bedforms, referred to as finger bars, on the southern, sheltered side of the El Puntal spit, at the mouth of the Santander Bay. The observations are interesting (2 years of data from video cameras) and include orientation and migration of the finger bars. The extraction of bathymetry data using the shoreline of the rising and falling tide is a particularly elegant analysis (there should be more on the bathymetry obtained in this way, maybe a comparison with measurements to verify it). My biggest criticism is the lack of measurements of the fluid forcing on the bars, but without that I still think the paper is publishable. I feel that the paper needs some revisions, recalculation and some more explanation.

âĂć I wonder about the averaging time. I think that the season-long averages shown in figures 11 and 12 might be smoothing over important events or periods that contribute to the calculations of average bar migration. The bar migration is averaged over the different length chunks, which the authors state is about 70 days on average. It would make more sense to average the variables in Figs 11 and 12 over similar time periods to make them more comparable to the bar migration speeds. (Also the explanation of the calculation of V_k could use clarification.)

âĂć I think that adopting the Soulsby Van Rijn formulation with the wave-stirring factor is definitely better than the constant stirring approach. (In fact the calculation using the 'constant stirring model' is so poor as to not be worth showing.) Clearly tiny little waves like those are not going to be driving a significant alongshore current. I might go even further to not just parameterize wave-stirring effects, but try to look at the transport by wave orbital velocities. I'll bet those finger bars are driven by the small net transport associated with those tiny waves shoaling and breaking. As the tide rises and falls a little mini surf zone moves up and down the beach. In fact, I wonder if the curvature of the bars has to do with the little mini surf zone spending more time along those lower sections of the bars.

âĂć Throughout the paper I was thinking that you needed to include time of submersion (high tide versus low tide). At the end you throw in the tidal factor, which is great, but your explanation is brief and I don't really know how you did it (and if it will capture the tidal effect). It clearly helps your results, but it would help the reader to know what is involved in that factor, since it is clearly important

âĂć To further this, I think an examination of daily tidal fluctuation with the wave height and/or wind speed data might shed some light on the forcing of the bars. For example, the autumn season suggests big forcing but the bars don't see this so much. Could it be that low tide happens during the day, when the winds pick up and blows hard, whereas in late autumn and winter the strong winds begin to coincide with high tide and start to have a stronger effect? There must be a quick and smart way to quantify

this. Maybe give high tide a “1”, give low tide a “0”, and interpolate between them. Then this tidal-like function could be multiplied by the wind or wave signal (like that in Fig 9 or 10) to give a bar-forcing parameter. Something like that?

âĂć Is there a net transport of sand from the western end, where the finger bars form, to the eastern end, where they decay?

âĂć It is not clear to me where the wind time series came from. What is “theSeaWind”? Are these measured winds?

âĂć On page 679, line 25 you say that it was checked that 3 points were sufficient to describe the bars. Maybe one more sentence is needed to say how you did this: “We tried using 2 points, 5 points and 7 points to describe the bars and 3 points were found to be sufficient to describe the bar position and orientation.” Something like that. Similarly, on page 680 you go on to characterize the bars by choosing 4 points (where those 4 y axes cross). I don’t quite understand the two methods, how they are different, and why they are both used. A little more explanation is needed.

âĂć There are many small editorial/English errors. I will communicate with the authors via the editor with those more trivial comments.

Interactive comment on Earth Surf. Dynam. Discuss., 1, 673, 2013.