

Interactive comment on “Assessing the influence of sea walls on the coastal vulnerability of a pinned, soft-cliff, sandy coastline” by A. Barkwith et al.

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The paper describes the use of a numerical model to simulate coastal response on defended and undefended sections of an eroding coast. The ensemble approach generates a very interesting and useful model dataset for analysis.

I enjoyed reading the paper but found it quite difficult to critique in the sense that readers are directed to another paper in ESURF by Barkwith et al for the details of model development (Earth Surf. Dynam. Discuss., 1, 855-889, 2013). My view is that further description of the model within the present paper is needed. A full description is not necessary given previous work by Ashton, Murray, Valvo, Limber etc, but much

C389

of this previous work focused on geomorphic pattern development, whereas this work looks at management timescales and so raises questions around calibration and validation. The text for this paper does not make it clear whether model behaviour is compared against historical data. I gather from a skim of Barkwith et al (Earth Surf. Dynam. Discuss., 1, 855-889, 2013, Fig. 4) that a comparison has been made, yet the question of whether this comparison represents 'validation' for the purposes of the present paper is not clear. The paper explains that the analyses focus on comparing patterns and rates of coastline change between defended and undefended model runs. However, the question of the extent to which model runs replicate observed patterns seems important given that the results are described in practical terms (e.g. 100m in 90 years etc) that might find use in planning. I have not closely read Barkwith et al (Earth Surf. Dynam. Discuss., 1, 855-889, 2013) but some specific questions come to mind: to what extent is model comparison against historical data necessary for this sort of study; what defines the models dynamic steady state, which is achieved very quickly (ten years); why was erosion simulated for 15 rather than 50 or 100 years; why should coast with a seawall have the same erosion rate as a section of chalk cliffs (shoreline behind a revetment might erode, but not usually behind a seawall. . . perhaps the chalk erosion rate means this is inconsequential)?

Please clarify the use of the term 'pinned'. In GENESIS modelling a pinned boundary refers to a boundary with no observable change in historical shoreline positions. Is the paper referring to a pinned boundary at the chalk headland? Please also check that locations referred to in the text are clearly marked – e.g. Skipsea on Fig 3a?

The results are very interesting and well presented. The ensemble approach generates a very useful model dataset. It was a little surprising, given the similarities in the problem-space and approaches taken, to see no reference to the meso-scale modelling work of the East Anglia coast using the SCAPE model? For instance the interesting experiments on wave height and wave climate rotation presented in Fig 4 and 5 from a glacial till shore with sandy beach are in some ways similar to the modelling experi-

C390

ments on wave height and wave climate rotation also on a glacial till shore with sandy beach in Norfolk (see Dickson et al. 2007 in Climatic Change).

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