Parametric Beaches README

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ParametricBeaches is a toolbox for estimating equilibrium beach profiles in 1DH and 2DH that include realistic looking sand bars. It is based on three papers. Ruessink et al [2003] introduces parametric equations for equilibrium sand bar profiles. Holman et al [2014] combine the barred with a new background equilibrium profile to produce 1DH bathymetric profiles that compare well with surveys at three beaches. Holman et al [in review] extends this to a 2DH implementation and compares against an extensive Duck survey data set.

The toolbox includes demonstrations for both 1D and 2D cases, called example1DCase.m and example2DCase.m. These come complete with support data. The main routines are make1DBeachEngine.m and make2DBeachEngine.m, as seen in the example cases. The user must supply information on the shoreline location and climatological beach slope (not the instantaneous slope), the sand bar position, and the location, depth and bathymetric slope at some location seaward of the active bar zone. For the 2D case, these are a function of longshore location, y, and should be supplied in only enough detail to reasonably represent the alongshore fluctuations of the shoreline and sand bar (they are smoothed within the routine). There are a number of sub-functions that are needed but the user need not know how they work.

Sensitivities are discussed in the papers. One unexpected sensitivity is to the offshore beach slope. A value too flat will make the active bar zone have a very limited cross-shore extent. This is discussed somewhat in the 2D paper, but to understand it better, try changing the betaOff in example1DCase.m.

Please send comments and improvements to Rob Holman.

References:

Holman, R., D. M. Lalejini, and K. T. Holland (in review), A Parametric Model For Barred Equilibrium Beach Profiles: Two- dimensional Implementation, *Coastal Engineering*.

Holman, R. A., D. M. Lalejini, K. Edwards, and J. Veeramony (2014), A parametric model for barred equilibrium beach profiles, *Coastal Engineering*, *90*, 85-94.

Ruessink, B. G., K. M. Wijnberg, R. A. Holman, Y. Kuriyama, and I. M. J. van Enckevort (2003), Inter-site comparisons of interannual nearshore bar behavior, *Journal of Geophysical Research*, *108*, doi:10.1029/2002JC001505.