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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Reconstructing patterns of coastal risk in space and time along the US Atlantic Coast, 1970–2016" *by* S. B. Armstrong and E. D. Lazarus

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Amstrong and Lazarus discuss the evolution of risk in coastal communities along the East coast of the US. The authors defining risk as the product of hazard, exposure and vulnerability. In turn, they define each of these factors as a function of metrics that can be extracted from open source databases. This analysis, allows the authors to infer insightful information about the evolution of risk over the last few decades. Among other things, the authors find that there is significant correlation between the different factors that define risk, suggesting that feedbacks between hazard, exposure and vulnerability play an important role and should be taken into account. This manuscript conveys an

important message for the scientific community, as well as coastal managers and stake holders. I have a few comments aimed at improving the clarity:

Page 4-Line31: . . . that tracks the vulnerability associated with beach width (Vbw) and beach nourishment (Vbn). . . Page 5-Lines 5-10: Equation (3) suggests that Vbw is equal to 1 when x=xo. Is 1 just an arbitrary value? If this is the case, I suggest the authors clarify this in the text. Additionally, the authors normalize Vbw by the min and max of Vbw (as we can see in Figure 3 and 6, for instance). Being this the case, would it be easier to write the normalized expression as Vbw = 1-x/xo? Page 5-Line 7: . . . in 1970 all counties had the same beach width (x). . .. The use of "x" in this case might be misleading. I believe "x" is the beach width at any point in time, not just in 1970. Line 15-20: I suggest the authors include the equation used to calculate Vbn. Including this expression will also help to better understand lines 20-32 in the results section (page 7). Additionally, I suggest the authors better explaining why as beach nourishment volume and frequency increases, the vulnerability of a coastal community increases. I can see why this is the case, but it might not be intuitive. Is it perhaps due to the community becoming dependent on such practices, which in turn depend on the availability of a limited resource? Page 7 – Line 15: Would it be useful to mention here that the shoreline erosion rate predicted by bathtub models often underestimates the natural rate of erosion? This is particularly the case in barrier island environments, which are quite common in the region of study included in this manuscript. Page 7 – Line 18: . . .we ranked each county by its risk. . .

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