Scale dependent behavior of the foredune along the Texas coast: Implications for barrier island response to storms and sea level rise

POSTER

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Abstract

There is mounting evidence that driving on the beach has a significant biophysical impact, and it has been suggested in a number of recent studies that driving on the beachface leads to a net loss of sediment from the beach-dune system. Identifying a conclusive link between beach driving and beach erosion is, however, complicated by the natural variability of the environment in both space and time, and it has proven difficult to distinguish the driving signal from this background noise. In this respect, the impacts of beach driving are not clear, making it difficult to develop appropriate management strategies to reduce the impact in either degree or extent. LiDAR data from Padre Island National Seashore is used in the present study to determine if the differences in beach and dune morphology between restricted and open access sections of the beach are associated with beach driving. Results suggest that beach driving does not affect the height and volume of the foredunes, but is responsible for a statistically significant decrease in the elevation of the dune crest and base compared to the control section of beach. The decrease in elevation is ascribed to the compaction and pulverization of seaweed wrack that accumulates along the Texas coast in the spring and summer months, and is responsible for the anchoring of sediment for the growth of new vegetation seaward of the foredune.