



Chenier plain genesis explained by feedbacks between waves, mud, and sand

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Cheniers are sandy ridges parallel to the coast established by high energy waves. Here we discuss ontogeny of chenier plains through dimensional analysis and numerical results from the morphodynamic model Delft3D-SWAN. Our results show that wave energy and inner-shelf slope play an important role in the formation of chenier plains. In our numerical experiments, waves affect chenier plain development in three ways: by winnowing coarse sediment from the mudflat, by eroding mud and accumulating sand over the beach during extreme wave events. We further show that different sediment characteristics and wave climates can lead to three alternative coastal landscapes: strand plains, mudflats, or the more complex chenier plains. Low inner-shelf slopes are the most favorable for strand plain and chenier plain formation, while high slopes decrease the likelihood of mudflat development and preservation.