
Wave and Bottom Sediment Interactions over a Submerged Sand Bank during the Winter Cold-Front Season, Western Louisiana

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ABSTRACT

The Louisiana coast is experiencing severe coastal land losses due to geological processes and human intervention. Replenishing the eroded beaches and the barrier islands with sand from offshore borrow sites is a plausible way to restore them. To assess the potential effects of sand mining from these offshore banks, in terms of physical processes, a field survey was conducted on March 2004 at Sabine Bank, 15 km offshore in western Louisiana. Some of the data from the survey are presented here. The results show that waves strongly affect the bottom sediment re-suspension rather than currents, during cold front and post-frontal phases that occurred during the deployment. Shear velocity and turbidity have a positive correlation, although the linear coefficient of determination (R^2) was 0.43. Maximum normalized cross-correlation coefficient between the two parameters was 0.82. The above results suggest that the waves greatly affect the bottom sediment and both parameters have some degree of positive correlation, which is not necessarily linear. The non-linear correlation may be associated with bottom roughness and sediment type as well as wave parameters. A simplification of the relationship using a stability parameter is also examined.