

EXAMINING SPRING-NEAP CYCLE VARIATION IN BED ERODIBILITY IN THE YORK RIVER ESTUARY, VA: A NUMERICAL STUDY.

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The York River estuary is categorized as micro-tidal with a tidal range ~ 0.8 m; however, periodically produce enough shear stress to erode sediment from the bed and redistribute it along the estuary. However, the supply of mobile sediment differs over various temporal and spatial scales. The primary focus here is to examine the tidal variation in bed mobility by comparing variations in bed erodibility over the spring-neap cycle. To accomplish this goal, the Community Sediment Transport Modeling System (CSTMS) is implemented in a three-dimensional domain using the Regional Ocean Modeling System (ROMS). This version of the CSTMS accounts for suspended transport, erosion, deposition and cohesive processes via consolidation and swelling of the sediment bed, which changes the critical shear stress of the seafloor in response to sedimentation. In this way, the model tracks changes to the erodibility of the seabed that can be characterized as the amount of sediment that could be resuspended under a given bed shear stress, i.e. 0.2 Pa. Past observations from the York River have shown good agreement with tidal variations in modeled bed stress and the shoal to be more erodible than the channel. We expect the model to reproduce patterns in erodibility that are similar to the observed patterns, and that the modeled time of peak erodibility will be associated with the onset of the spring tide, possibly with a lag time related to the model's time-scale of consolidation.

Key words: Bed erodibility, ROMS