USE OF ACOUSTIC DOPPLER VELOCIMETERS (ADVS) TO INFER RELATIONSHIPS AMONG FINE SEDIMENT SETTLING, BED ERODIBILITY AND PARTICLE TYPE, YORK RIVER ESTUARY, VA

Bed erodibility and particle settling velocity are key factors influencing fine sediment dynamics in coastal and estuarine environments. In order to better constrain inherently complex, temporally-varying relationships among hydrodynamics, bed properties and particle types, near-bed ADVs have been maintained in the York River Estuary since 2006. The ADVs provide measurements of bottom stress, suspended sediment concentration (C, via calibrated backscatter), and particle settling velocity (Ws, via a Rouse balance). By assuming Ws to be the combined result of rapidly settling fecal pellets plus more slowly settling flocs, the time-varying fraction of pellets versus flocs can be estimated. Vertical integration of C then provides an estimate of total eroded mass as a function of bottom stress (i.e., the erodibility). Results indicate a tendency toward lower erodibility at neap relative to spring tide, perhaps due to less physical disturbance and more opportunity for consolidation. Lower erodibility is observed with higher Ws, presumably when low Ws flocs have been dispersed, leaving behind harder to suspend pellets. Conversely, higher erodibility is observed when Ws is low, following the deposition of more easily suspended flocs.

Abstract Information
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