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A COUPLED COHESIVE SEDIMENT ENTRAINMENT AND BIOTURBATION MODEL

The cohesive sediment entrainment rate (EB) can be represented by an excess shear stress formulation with linear coefficients that represent physical, biological, and chemical processes; for example, EB = AB*AC*A0*(TAU/TAUC-1)**M, where: TAUC = critical shear stress for entrainment; TAU = the bottom shear stress; and A0 and M are empirical constants. The parameters AB and AC represent biological and physical processes, respectively. The values of AB and AC have been estimated with an entrainment model using published data from sediment slurries at different shear stresses. These physical and biological processes are being studied using hydrodynamic, sedimentation, and bioturbation models that predict the seafloor biogeochemical and physical changes that accompany the activity of infauna, as well as consolidation and hydrodynamic forcing by waves and currents. This paper reports on initial efforts to couple the individual models for physical, chemical, and biological changes to a 1D model of near-bottom hydrodynamics and cohesive sediment entrainment at the seafloor .

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