

Developing a Regression Relation for Erosion Rate of Cohesive Sediments Using Experimental Data and Numerical Modeling

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Abstract

Cohesive sediments have large specific surfaces which enable them to absorb other cohesive sediments and polar particles such as mud and sodium. Floccules form by joining these particles. The behavior of cohesive sediments in aquatic environments is completely different from that of granular sediments. Under certain value of shear stress, the structure formed from cohesive sediments is divided into smaller particles, which can be eroded easily. Up to now, researchers have proposed empirical formulas which correlate the rate of erosion to the bed shear stress and the rheological characteristics of cohesive sediments. In this study, the calibration and verification tests are performed on Mike21 software to attain the results more adjusted with the experimental data. Afterwards, the data are developed by the model and converted to the dimensionless form. Finally, an exponential function is proposed for the erosion rate in cohesive sediments. It is found that the coefficient of determination is 0.99

Keywords: Concentration, Yielding shear stress, Non-dimensional parameters, Flow and sediment parameters, Exponential formula

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