

Sediment Trapping by Seagrass Blades under Oscillatory Flow

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Abstract : Seagrass meadows increase the sedimentation within the canopy. However, there is still a lack of knowledge about how seagrasses impact the vertical distribution of sediment coming from external sources and reaches the meadow. This study aims to determine the number of particles retained by a seagrass meadow. Based on the hydrodynamics in the vertical direction, a meadow can be separated into different compartments: the blades, the seabed, within the canopy layer, and the above canopy layer. A set of laboratory experiments were conducted under different hydrodynamic conditions and canopy densities with the purpose to mimic the real field conditions. This study demonstrates and quantifies that seagrass meadows decrease the volume of the suspended sediment by two mechanisms: capturing the suspended sediment by the seagrass blades and promoting the particle sedimentation to the seabed. This study also demonstrates that the number of sediment particles trapped by single seagrass blades decreases with canopy density. However, when considering the trapping by the total number of blades, the sediment captured by all the blades of the meadow increases with canopy density. Furthermore, comparing with the bare seabed, this study demonstrated that there is a reduction in the suspended particles within the canopy, which implies an improvement in the water clarity. In addition, the particle sedimentation on the seabed increases with the canopy density compared with the bare seabed, making evident the contribution of the vegetation in enhancing sedimentation.

Keywords : seagrass, sediment capture, turbulent kinetic energy, oscillatory flow

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