



Entrainment by vortices

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Grid stirred turbulence in a zero-mean-flow environment is used to lift-off a sediment bed of different size particles, variations of the r.m.s. turbulent velocity, the integral length scale of the turbulence and the local vorticity may be varied according to the distance between the grid and the sediment bed. The geometrical characteristics of the entrainment process as well as the scouring patterns are related to the local Richardson number defined in terms of the sediment induced buoyancy. These characteristics may be used in paleo-sedimentology relating geometrical to dynamical aspects of the turbulent forcing.

The quantification of lift-off from zero-mean and shear generated turbulence is compared taking into account the structure of the turbulence as it approaches a sediment laden bed. The cohesive characteristics of the type of sediment as well as its size are important. It is very important to estimate the PDFs and the intermittency associated to the type of flow that entrains the sediments, because in many cases, only the most energetic events are relevant to the sediment transport.