



Grain size dependence on turbulence entrainment in coastal beach areas

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Sediment samples and beach profile evolution data have been collected at several sites (in Vilanova and the Ebro delta, Spain, and near Marseille, France), analyzing the structure of the grain size distribution variability and its relationship with the beach morphology. Measurement of the samples are performed in a detailed laboratory experiment using oscillating grid turbulence to compare the behaviour of sediment in presence of turbulence. Particular interest is shown on the initiation of sediment motion and in the measurements of effective sediment lift - off.

A turbulent velocity u' lower than that u estimated by the Shield diagram is required to start sediment motion for samples of uniform size. The minimum u' required to start sediment lift - off, is a function of sediment size, cohesivity and resting time. The lutocline height depends on u' , but the vorticity at the lutocline seems constant for a fixed sediment size. On the other hand when real distributions are used, combining the grid stirring with image analysis, vertical mass fluxes are seen to correlate well with the cross-shore position of the samples. The variations are shown to be related to morphological changes in the beach profiles with high fluxes corresponding to the most unstable positions.