The transport of 'suspended' sediment by water

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The transport of 'suspended' sediment by water

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Coherent turbulent flow structures, such as eddy-like, macro-turbulent structures and smaller scale bursting events, cause a two-way vertical exchange of momentum between the sediment bed and the water surface. Thus movement of suspended particles in open channel flows has a strong correlation with the advection and propagation of these turbulent flow structures, controlling entrainment , travel and deposition. Consequently, there is an argument in favour of the view that suspended sediment merely travels in suspension, but that its distance of travel is finite, and that between periods of travel it is at rest on the bed of the river. To test his hypothesis we added 25 kg of fluorescent sand, fine enough to be transported in suspension, into a steady flow discharge of 0.95 cumecs in the 160-m-long flume at Tsukuba University. After the flow event, a few grains of the sand were identified less than 5 m from the point of introduction and progressively (but irregularly) more downflume. Although our results are both limited and preliminary due to the nature of the existing flume, they clearly show that suspended sediment has a virtual velocity that is less than that of the flow in which the sediment is suspended. For the sediment-size range and flow velocity used in our experiment this virtual velocity is of the order of 50% of the water velocity.