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Particle-turbulence interaction of suspended load by forced jet impinging jet on a mobile sediment bed[1] RAHUL MULINTI, KYLE CORFMAN, KEN KIGER, University of Maryland — Particle suspension and transport induced by a forced impinging jet on a sediment layer has been investigated experimentally using two-phase particle image velocimetry (PIV). Glass spheres of two size classes, 45-63 micrometers and 120-180 micrometers have been used, with focus on transport characteristics during both the early development time (when the bed is relatively flat and smooth just following the passage of starting transients) and at late times (when a significant erosion bedforms are present in the form of annular wave-like patterns). Preferential mobilization and suspension has been observed at the crests of these waves and deposition due to entrainment of particles by the secondary, counter-rotating vortex formed by boundary layer separation near the surface. The effect of turbulent coupling between the particle and fluid momentum, as based on a point-particle drag law valid for dilute concentrations of particles has also been studied. The effect of the changing sediment bed profile on sediment erosion rates has also been examined briefly.

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