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The Effect of Wave Intensity on Fine Sediment Transport in Oscillatory Channel CELALETTIN OZDEMIR, TIAN-JIAN HSU, Civ. & Env. Eng. University of Delaware, S. BALACHANDAR, Mech. & Aerosp. Eng University of Florida — Simulations on particle-laden flow in oscillatory channel are critical to further understand suspension and offshore delivery of fine terrestrial sediment in the coastal ocean. In an effort to understand these mechanisms, the degree of sediment induced density stratification quantified by Richardson number, Ri and settling velocity of particles, V_s, have been studied through turbulence resolving simulations with simplified Eulerian-Eulerian two phase model (Ozdemir et al. 2010, 2011). In these studies, moderately energetic wave field is considered given by Stokes Reynolds number, Re, of 1000 where all the scales of turbulence can be resolved. As a result, existence of four regimes of particle transport has been identified and presented in the parametric space defined by V_s and Ri. From low to high Ri (or V_s), these regimes range from well-mixed condition to the formation of lutocline, and eventually a complete flow laminarization. Here, we further demonstrate the impact of lower wave intensity (Re) to the modes of sediment transport. Results show significant changes in the particle transport modes under variable V_s and Ri. The culmination of the results so far yields a comprehensive picture on the nature of transitional turbulence due to different degree of sediment impact and the mode of mixing and transport in the oscillatory channel.

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