

Abstract Submitted
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Sediment transport modeling using highly resolved Euler-Lagrange LES SUNIL AROLLA, OLIVIER DESJARDINS, Cornell University — We use an explicitly volume-filtered Euler-Lagrange large eddy simulation methodology to investigate the detailed dynamics of turbulent liquid-solid slurry flows through a horizontal pipe. A series of simulations have been performed by varying the superficial liquid velocity to be consistent with the available experimental data by Danielson (2007). From our numerical simulations, the critical deposition velocity below which a static sand bed starts forming is predicted and compared with the experiments. We discuss the dynamics of liquid-solid slurry flow in connection with the Shields diagram. Depending on the Shields number, patterns develop at the surface of the particle bed, in close analogy with patterns discussed in sediment transport research. We also present statistics extracted to evaluate and improve recently proposed RANS based closure modeling ideas in the context of Euler-Euler formalism.

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