Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Large Eddy Simulation of suspended sediment transport in wall bounded turbulence[1] VINCENZO ARMENIO, MARJAN DALLALI, University of Trieste — Large eddy simulation is used to investigate suspended sediment transport and its effect on the dynamic of the turbulent boundary layer. We use an Euler-Euler methodology based on single-phase approach. Sediment-induced buoyancy on momentum is considered through a buoyancy term in the Boussinesq form of the *3D* Navier-Stokes equations. We consider four sediment sizes and the simulations are performed for both one-way and two-way coupling approach. The level of stratification for each particle size is qualified by the bulk Richardson number which increases by decreasing the grain size. We calculated first and second order statistics and compared our results with available literature experimental studies. The analysis reveals that the reduction of sediment size produces a larger resuspension and sediment concentration in the flow field, due to the concurrence of increased available concentration at the wall and reduced deposition velocity. Our study also shows that the one-way coupling approach is valid for relatively large sediments, that on the other hand, are more likely transported according to the bed-load mode. For smaller particles, transported according to the suspension-load mode, the two-way coupling approach should be preferred.

[1]Financial support from the University of Trieste under Grant FRA 2013

Vincenzo Armenio
University of Trieste

Date submitted: 28 Jul 2014 Electronic form version 1.4