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Numerical simulation of a bidisperse turbidity current interacting with a Gaussian bump MOHAMAD M. NASR-AZADANI, ECKART MEIBURG, UC Santa Barbara — We study a particle-laden lock-exchange current interacting with a Gaussian bump by means of DNS simulations. Our software package TURBINS employs an immersed boundary implementation of the Boussinesq Navier-Stokes equations for the fluid motion, coupled to transport equations for the particle concentration fields. The suspension includes two particle sizes with a settling velocity ratio of 10. As the current travels over the bottom topography, we record instantaneous deposit profiles and wall shear stress contours. As the current impinges on the obstacle, it becomes strongly three-dimensional. Comparison of the final deposit profiles near the Gaussian bump against the case of a flat surface shows a smaller influence of the topography on the fine particles than on the coarse ones. Due to lateral deflection, deposition generally decreases near the bump, while increasing away from it. Some distance downstream of the obstacle, the deposit profiles lose their memory of the bump and become nearly uniform again. Instantaneous wall shear stress profiles are employed in order to estimate the critical conditions at which bedload transport and/or particle resuspension can occur in various regions.

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