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Direct numerical simulation of the erosion of particle beds ZACHARY BORDEN, University of California, Santa Barbara, LUDOVIC MAURIN, French Air Force Acadamey, ECKART MEIBURG, University of California, Santa Barbara, YULIYA KANARSKA, Lawrence Livermore National Laboratory, MICHAEL GLINSKY, ION Geophysical — Any code that attempts to simulate large scale geophysical flows and their effect on topography needs a way to couple local flow properties to a rate of sediment erosion or deposition. But, the mechanisms responsible for a particle's entrainment from a sediment bed into a flow are poorly understood. To better understand these mechanisms, we employ two- and three-dimensional direct numerical simulations that use a Lagrange multiplier method to enforce solid body motion of, and no-slip boundary conditions on spherical particles within our domain. We apply our code to the configuration of a shear flow over a regularly or randomly packed bed of particles. Results from these simulations will be discussed, and in particular, we focus on the effects of Reynolds number, shear velocity, and initial packing fraction.

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