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The preferential erosion and deposition of heavy particles over erodible beds SCOTT SALESKY, MARCO GIOMETTO, University of British Columbia, MICHAEL LEHNING, Swiss Federal Institute of Technology, MARC PARLANGE, University of British Columbia — The erosion, transport, and deposition of heavy particles over erodible beds by turbulent flow is a significant process in the context of sediment transport, aeolian processes, and snow transport in alpine and polar regions. While it is well-known that terrain features can lead to spatially inhomogeneous deposition velocities, a systematic study considering the effects of terrain and particle properties has not been conducted to date using large eddy simulation (LES). Using a recently developed Eulerian finite-volume model for the transport of heavy particles over complex terrain in LES, we perform simulations of the transport, erosion, and deposition of heavy particles over idealized surface topography. A new model for particle ejection in the saltation layer subject to the constraints of energy and momentum conservation is adapted for use in an Eulerian framework. A suite of simulations is conducted in order to explore the governing parameters relevant for erosion and deposition (e.g. Stokes number, Rouse number, Shields number, surface cohesion) and to investigate the influence of the mean flow vs. turbulent fluxes for the observed erosion and deposition patterns. Implications for model development will be highlighted, and numerical considerations will be discussed.

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