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Drop impact on an immersed granular bed HADIS MATINPOUR, ALBAN SAURET, University of California- Santa Barbara, DOUGLAS JEROLMACK, University of Pennsylvania, ECKART MEIBURG, THOMAS DUNNE, University of California- Santa Barbara — Water erosion of natural landscape surfaces is initiated by raindrops penetrating a thin sheet of surface runoff and the underlying granular soil surface. Here, we investigate experimentally the impact of a water drop on an immersed cohesionless granular bed in the presence of a thin, still water layer. We characterize the erosion threshold for varying drop size, water-layer thickness, and substrate particle size. Our experiments reveal two different regimes depending on the ratio between drop diameter and liquid thickness. For a thin film, the deformation of the interface induced by the drop directly lead to the erosion of the granular bed. For sufficiently deep liquid films the impact of the drop is not sufficient to directly trigger the erosion by deforming the free surface but instead generates a vortex ring inside the liquid layer, which triggers the erosion of grains. Coupling the flow generated by the impacting drop with the properties of the grains allows us to describe the erosion threshold and the formation of a suspension during intense rainstorms

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