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Rainwater Channelization and Infiltration in Granular Media CESARE MIKHAIL CEJAS, CNRS-Rhodia-UPenn Complex Assemblies of Soft Matter COMPASS UMI3254, Bristol, PA 19007, YULI WEI, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19014, REMI BARROIS, CNRS-Rhodia-UPenn Complex Assemblies of Soft Matter COMPASS, Bristol, PA 19007, DOUGLAS J. DURIAN, Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, PA 19014, REMI DREYFUS, CNRS-Rhodia-UPenn Complex Assemblies of Soft Matter COMPASS, Bristol, PA 19007, COMPASS TEAM — We investigate the formation of fingered flow in dry granular media under simulated rainfall using a quasi-2D experimental set-up composed of a random close packing of mono-disperse glass beads. We determine effects of grain diameter and surface wetting properties on the formation and infiltration of water channels. For hydrophilic granular media, rainwater initially infiltrates a shallow top layer of soil creating a uniform horizontal wetting front before instabilities occur and grow to form water channels. For hydrophobic media, rainwater ponds on the soil surface rather than infiltrates and water channels may still occur at a later time when the hydraulic pressure of the ponding water exceeds the capillary repellency of the soil. We probe the kinetics of the fingering instabilities that serve as precursors for the growth and drainage of water channels. We also examine the effects of several different methods on improving rainwater channelization such as varying the level of pre-saturation, modifying the soil surface flatness, and adding superabsorbent hydrogel particles.

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