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Granular impact cratering by liquid drops: Understanding rain-drop imprints through an analogy of asteroid strikes XIANG CHENG, RUNCHEN ZHAO, QIANYUN ZHANG, HENDRO TJUGITO, University of Minnesota — When a granular material is impacted by a sphere, its surface deforms like a liquid yet it preserves a circular crater like a solid. Although the mechanism of granular impact cratering by solid spheres is well understood, our knowledge on granular impact cratering by liquid drops is still very limited. Using high-speed photography, we investigate liquid-drop impact dynamics on granular media. Surprisingly, we find that granular impact cratering by liquid drops follows the same energy scaling as that of asteroid impact cratering. Inspired by this similarity, we develop a simple model that quantitatively describes the observed crater morphologies. Our study sheds light on the mechanisms governing raindrop impacts on granular surfaces and reveals an interesting analogy between familiar phenomena of raining and catastrophic asteroid strikes.

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