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Transverse Diffusion in Bedload Transport OLIVIER DEVAUCHELLE, ANAIS ABRAMIAN, GREGOIRE SEIZILLES, ERIC LAJEUNESSE, Institut de Physique du Globe de Paris — When a fluid flows over a granular bed, it entrains the grains as bedload. This interaction produces a beautiful variety of shapes and landscapes, such as dunes, ripples and meanders. In this context, Coulomb's law of friction translates into a threshold shear stress, above which the grains are entrained. When the flow-induced stress is barely above this threshold, only a small proportion of the superficial grains move. Their trajectory is then strongly influenced by the layer of static grains below them. They mostly move in the flow direction, but the roughness of the underlying bed causes their velocity to fluctuate, and turns their trajectory into a random walk. As a consequence, bedload diffuses in the direction orthogonal to the flow. Laboratory experiments suggest that this diffusion opposes gravity to maintain the banks of a river. However, quantifying the terms of this balance remains an experimental challenge. We propose to use an instability generated by bedload diffusion to do so.

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