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A probabilistic description of sediment rest and motion regimes under varying shear stress[1] MINGXIAO LIU, Xian University of Technology, State Key Laboratory Base of Eco-hydraulic Engineering in Arid Area , MICHELE GUALA, University of Minnesota, St Anthony Falls Laboratory — The kinematics of sand grain particles is investigated experimentally to provide a statistical description of bedload transport under varying shear stress, close to critical mobility conditions. In particular, we focus on the continuous sequence of particle steps and rests to provide a Lagrangian statistical description of particle kinematics. Within the limitations of the spatio-temporal domain of our submerged camera, we are able to identify the probability distributions of the particle step time and length, velocity, acceleration, and waiting time. The tail thickness of these distributions allow us to identify quantities, characterized by an exponential distribution, and exhibiting well converged mean values, as opposed to, e.g. the waiting (or rest) time, characterized by a power law distribution and converging very slowly. The experimental results shown here for four different shear stress conditions highlight the importance of the waiting time distribution in the stochastic description and modeling of particle transport. A distinction between active and deep waiting times is also discussed, and related to the effect of turbulent structures at the wall.

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Michele Guala
University of Minnesota, St Anthony Falls Laboratory

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