Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

On the intermittency of sediment transport in conditions near the threshold of motion[1] CHRISTIAN GONZALEZ, CRISTIAN ESCAURIAZA, Pontificia Universidad Catolica de Chile, DAVID RICHTER, DIOGO BOLSTER, University of Notre Dame, JOSEPH CALANTONI, Naval Research Laboratory — The dynamics of sediment particles in a flat bed channel is mainly controlled by the coherent structures of the turbulent boundary layer, as intense velocity fluctuations increase the instantaneous bed shear stress and initiate bedload transport. At low shear stress conditions near the threshold of motion, the bedload transport flux becomes intermittent due to the complex particle motion in close contact with the bed. To understand the physical mechanisms that produce the intermittency, in this investigation we develop a Lagrangian sediment transport model to simulate bedload transport in a flat bed channel. We couple direct numerical simulations (DNS) and the discrete element method (DEM) to solve the particle dynamics using a two-way coupling approach. Numerical results shed light on the nature of the intermittency in the transport flux. We conclude that near the threshold of motion, the cumulative sediment transport is described by a fractal behavior, whose characteristics change as the relative shear stress increases.

[1]supported by Conicyt National-PhD Grant, Fondecyt grant 1130940 and ONR-G NICOP Project N622909-11-1-7041

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Date submitted: 01 Aug 2015 Electronic form version 1.4