A review of physically based models for soil erosion by water

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Physically-based models rely on fundamental physical equations describing stream flow and sediment and associated nutrient generation in a catchment. This paper reviews several existing erosion and sediment transport approaches. The process of erosion include soil detachment, transport and deposition, we present various forms of equations and empirical formulas used when modelling and quantifying each of these processes. In particular, we detail models describing rainfall and infiltration effects and the system of equations to describe the overland flow and the evolution of the topography. We also present the formulas for the flow transport capacity and the erodibility functions. Finally, we present some recent numerical schemes to approach the shallow water equations and it's coupling with infiltration and erosion source terms.