Geophysical Research Abstracts
Vol. 19, EGU2017-4823, 2017
EGU General Assembly 2017


# A bilayer model for bedload sediment transport as generalization of Exner models

Cipriano Escalante (1), Enrique Fernandez-Nieto (2,4), Tomas Morales de Luna (3), Gladys Narbona Reina (2,5)

(1) Dpto. de Analisis Matematico. Universidad de Malaga. Malaga, Spain (escalante@uma.es), (2) Dpto. Matemática Aplicada I. Universidad de Sevilla. Sevilla, Spain , (3) Dpto. de Matematicas. Universidad de Cordoba. Cordoba, Spain (tomas.morales@uco.es), (4) (edofer@us.es), (5) (gnarbona@us.es)

Sediment can be transported in several ways by the action of a river. During low transport stages, particles move by sliding and rolling over the surface of the bed. This type of transport is usually called bedload transport. The usual approach to model these phenomena is to use the Saint-Venant-Exner model (SVE) which consists in a shallow water model coupled with a morphodynamical component for the bedload transport. The bedload transport depends on an empirical flux. Nevertheless, this approach presents some drawbacks, for instance, gravitational effects for bedload transport is neglected and the momentum equation for the sediment is missing.

In this work we present a two-layer shallow water type model in order to better describe bedload transport. We consider an upper layer consisting in clear water and a lower layer which accounts for the sediment material. This allows to better describe the phenomena. The key point is the definition of the friction laws between the two layers. The model is a generalization of classic models as it allows to recover SVE system when the ratio between the hydrodynamic and morphodynamic time scales is small, as commonly done to derive SVE models.