Geophysical Research Abstracts, Vol. 8, 06346, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06346

Effects of floods on hyporheic exchange due to bedforms

F. Boano, R. Revelli and L. Ridolfi

Department of Hydraulics, Transports, and Civil Infrastructures - Politecnico di Torino (fulvio.boano@polito.it)

Surface water quality and downstream transport of nutrients and pollutants are influenced by the exchange between the stream and the hyporheic zone. In recent years, the increasing awareness about this issue has led to the development of mathematical models that have improved our understanding of the hyporheic exchange processes. However, their simplified schematization of stream environments has usually neglected the influence of the variability of river discharge. This can be a major limitation to the correct interpretation of field results, as stream discharge is often subject to considerable changes. In this work, the effects of the unsteadiness of river flow conditions on bedform-driven hyporheic exchange are investigated. A mathematical model is presented that shows how the occurrence of a flood can substantially alter the magnitude of the hyporheic exchange with respect to steady flows. The model considers floods that do not cause significant modifications in the bed profile, but it can also be extended to the case of major floods with higher solid transport.