Geophysical Research Abstracts
Vol. 14, EGU2012-5464, 2012
EGU General Assembly 2012

Hydrologic modeling with uncertain input parameters

M. Rousseau (1), O. Cerdan (2), A. Ern (1), O. Le Maître (3), and P. Sochala (2)

(1) CERMICS, ENPC, University Paris-Est, France (m.rousseau@brgm.fr), (2) BRGM, RIS, Orléans, France (o.cerdan@brgm.fr), (3) LIMSI-CNRS, Orsay, France (olm@limsi.fr)

Erosion risk is recognized as a major threat whose consequences affect urbanized and agricultural areas. Recent assessments of the predictive abilities of erosion models show the difficulty to correctly predict the spatial patterns of erosion and deposition. This is due to the high sensibility of the model to input parameters that contain large spatial and temporal variability. Many studies concluded that model outputs are very sensitive to input hydrological parameters, especially to the saturated hydraulic conductivity. Here, we use an erosion model coupling the Shallow Water equations with the Hairsine-Rose soil erosion which can integrate different sediment size classes. As the scale of modeling is different from the scale of observed or measured data, we use a stochastic distribution of relevant input parameters to represent the micro-scale. A first part of the study concerns the rainfall/runoff model in which the saturated hydraulic conductivity is considered as an uncertain input parameter. A second part is dedicated to the influence of soil parameters in the erosion model. For each part, we evaluate how uncertainties on the inputs impact the surface runoff or the erosion model outputs during various types of rainfall events. We test different stochastic tools to quantify the propagation of uncertainties (Monte Carlo method, Karhunen-Loève expansion. . .) and we use numerical test cases representing fields or hillslope to assess the methodology in the context of runoff and soil erosion modeling. Simulation results allow us to know where effort should be concentrated when collecting input parameters and limit output error.