Geophysical Research Abstracts
Vol. 13, EGU2011-12451, 2011
EGU General Assembly 2011

Identifying essential space-time information requirements for flood modelling of a mountainous mid-size basin

Efthymios Nikolopoulos (1), Marco Borga (1), Emmanouil Anagnostou (2), Enrique Vivoni (3), and Anastasios Papadopoulos (4)

(1) Department of Land and Agroforest Environment, University of Padova, Padova, Italy (enikolop@engr.uconn.edu), (2) Department of Civil and Environmental Engineering, University of Connecticut, Storrs, CT USA, (3) School of Earth and Space Exploration and School of Sustainable Engineering and the Built Environment, Arizona State University, Tempe, AZ, USA, (4) Institute of Inland Waters, Hellenic Centre for Marine Research, Anavissos, Greece

Space-time variability of rainfall, drainage network structure and local runoff generation properties, including land use – land cover and geologic characteristics, shape the catchment response to storms. However, the importance of the various sources of space-time variability may change with the severity of the flood. In this work we will test the hypothesis that space-time variability of rainfall and drainage network structure dominates over land use – land cover contrasts and geological properties of the basin in determining the flood response. This domination tends to increase with flood severity. The analysis is based on hydro-meteorological data from a number of flood and flash flood events of varying intensity that occurred on the Posina basin, a 116 km2-wide mountainous basin in Northeastern Italy. Runoff data are available at the outlet river section and at two internal stream gauge stations, which provide information on the internal status of the catchment. The analysis is integrated through a physically-based distributed hydrologic model used to simulate the runoff response at several sections of the river network. The study basin is characterized by a marked spatial variability of both land use and geological properties, which are reflected in contrasting local runoff generation properties. We use an analytical framework proposed by Viglione et al. (2010) to identify in a parsimonious way the control of the different sources of space-time variability on the catchment response. The assumptions at the base of the method provide enough complexity to make the method useful, but are simple enough to avoid overwhelming detail. Results from the analytical approach are contrasted with outcomes obtained with the distributed hydrologic model.