Geophysical Research Abstracts,
Vol. 11, EGU2009-4335, 2009
EGU General Assembly 2009

Metrics for quantifying space-time dynamics of flood event types

A. Viglione (1), G. Blöschl (1), M. Borga (2), J. Komma (1), R. Woods (3), and G. B. Chirico (4)

(1) Technische Universität Wien, Institut für Wasserbau und Ingenieurhydrologie, Wien, Austria (viglione@hydro.tuwien.ac.at), (2) Università di Padova, Padova, Italy, (3) National Institute of Water & Atmospheric Research, Christchurch, New Zeland, (4) Università degli Studi Federico II, Napoli, Italy

Catchment hydrology comprises a large number of complex interactions among hydrological inputs and processes that vary in space and time. These interactions are usually treated by distributed simulation modeling that provides outputs (e.g., catchment response) in which the roles of rainfall, runoff generation, and routing cannot be clearly distinguished. We use the analytical framework proposed by Woods and Sivapalan (1999) in order to identify the control of these different hydrological processes on catchment response for different flood event types in a parsimonious way. The assumptions at the base of the method provide, in fact, enough complexity to make the method useful but are simple enough to avoid overwhelming detail. The analytically derived equations quantify the catchment rainfall excess, and the mean and variance of catchment response time. The components of these equations explicitly show the contributions (and the spatio-temporal interactions) of the hydrological inputs and processes on the simulated catchment response time and volume. Different flood event types (i.e., synoptic, convective, rain on snow and snowmelt) are analysed and compared applying the method over a 622 km^2 catchment in northern Austria, the Kamp catchment. It is shown that the components of the aforementioned equations can be used as metrics for classifying flood event types in a comprehensive way, not only based on storm characteristics but coupling storm and catchment processes.

Woods, R. and M. Sivapalan (1999) A synthesis of space-time variability in storm response: Rainfall, runoff generation, and routing, *Water Resourches Research*, *35*(8), 2469-2485.