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Joint drivers of floods and droughts?

G. Blöschl (1), R. Merz (1), and G. Laaha (2)

(1) Vienna University of Technology, Institute for Hydraulic and Water Resources Engineering, Austria , (2) Institute of Applied Statistics and Computing, University of Natural Resources and Applied Life Sciences, BOKU Vienna, Austria (gregor.laaha@boku.ac.at)

The generating mechanisms of floods and droughts tend to be vastly different both in terms of processes and space-time scales. Depending on scale and flood type, floods are related to fast or very fast processes (commensurate with atmospheric velocities of 10 m/s down to velocities of catchment surface runoff of 1 m/s). In contrast, droughts are related to the occurrence of large scale weather patterns the may prolong over months, and catchment processes tend to be much slower than in the flood case as much of the water movement is in the (deep) groundwater with velocities on the order of 1 mm/s or less. In spite of this scale contrast, one may argue that both are linked to the hydrological cycle so, at a fundamental level, one would expect some similarity. In this presentation we will examine the similarity of floods and droughts at the regional scale. Based on the example of Austria, the analysis compares the regional patterns of flood characteristics with those of low flow characteristics. Also, the most important controls on floods and low flows are compared by a data based analysis. There are surprising similarities in the spatial patterns of floods and low flows as well as in the controls. It is argued that much of the similarity comes from the key role of soil moisture in both cases. However, there are also differences that are related to the space-time scales and the generating mechanisms.