



## **Extreme Floods in the Continental US: Analyses of Long Streamflow Records**

G. Villarini (1), J.A. Smith (2), F. Serinaldi (3), and W.F. Krajewski (4)

(1) Princeton University, Civil and Environmental Engineering, Princeton, United States (gvillari@princeton.edu), (2) Princeton University, Civil and Environmental Engineering, Princeton, United States (jsmith@princeton.edu), (3) “Sapienza” University of Rome, Department of Hydraulics Transportation and Highways, Rome, Italy, (4) The University of Iowa, , IIHR-Hydroscience & Engineering, Iowa City, Iowa

Annual peak discharge records from 50 stations in the continental United States with at least 100 years of record are used to investigate distributional properties of US flood peaks during the 20th century. We also use discharge records with more than 75 years of records from the eastern US to examine spatial variations of flood peak distributions from a regional perspective. Two central issues are nonstationarities of annual peak records and “upper tail” properties of floods peaks. We examine temporal trends in flood peaks and abrupt changes in the mean and/or variance of flood peak distributions. Change-point analysis for detecting abrupt changes in flood distributions is performed using the non-parametric Pettitt test. Two non-parametric (Mann-Kendall and Spearman) tests and one parametric (Pearson) test are used to detect the presence of temporal trends. The presence of long-term persistence is investigated through analyses of estimates of the Hurst exponent. A special focus of analyses of upper tail properties of flood peak distributions concerns the role of landfalling tropical cyclones.