EGU2020-9357, updated on 28 Jan 2022
https://doi.org/10.5194/egusphere-egu2020-9357
EGU General Assembly 2020

Clustering mechanisms of flood occurrence; modelling and relevance to insurance practices

Georgios T. Manolis, Konstantinos Papoulakos, Theano Iliopoulou, Panayiotis Dimitriadis, Dimosthenis Tsaknias, and Demetris Koutsoyiannis
National Technical University of Athens, School of Civil Engineering, Department of Water Resources and Enviromental Engineering, Athens, Greece (g.t.manolis@gmail.com)

Population growth, economic development and risk-blind urbanization often increase exposure to risk, including that due to floods. While rural flooding may affect much larger areas of land, urban floods are more challenging to manage, since the higher population and asset density in the urban environment increase the environmental and social impacts of floods and make the potential flood damages more costly. Therefore, the need for integrated flood insurance policy and products on extended parts of the world is pronounced in order to reduce the financial consequences of extreme flood events, which endanger in many cases the environmental, social and economic stability. As the assessment of the so-called collective risk is a typical issue faced in insurance and reinsurance practices, in this study we investigate the stochastic dynamics of daily stream flow series with particular interest to the existence of clustering mechanisms in floods, which is known to increase the potential risk. We analyse collective risk on the US-CAMELS dataset, treating the streamflow exceedances over given thresholds as proxies for insurance claim amounts. Moreover, we develop modelling and simulation approaches of extreme flows as a step towards the deeper understanding of the relationship between the stochastic patterns of flood occurrence and proxies of insurance claims, paving the way for a more efficient use of the available streamflow records.

Acknowledgement: This research is conducted within the frame of the course "Stochastic Methods" of the National Technical University of Athens (NTUA). The School of Civil Engineering of NTUA provided moral support for the participation of the students in the Assembly.