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Understanding processes that generate flash floods in the arid Judean Desert to the Dead Sea - a measurement network

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Flash floods in (semi-) arid regions are fascinating in their suddenness and can be harmful for humans, infrastructure, industry and tourism. Generated within minutes, an early warning system is essential. A hydrological model is required to quantify flash floods. Current models to predict flash floods are often based on simplified concepts and/or on concepts which were developed for humid regions. To more closely relate such models to local conditions, processes within catchments where flash floods occur require consideration. In this study we present a monitoring approach to decipher different flash flood generating processes in the ephemeral Wadi Arugot on the western side of the Dead Sea. To understand rainfall input a dense rain gauge network was installed. Locations of rain gauges were chosen based on land use, slope and soil cover. The spatiotemporal variation of rain intensity will also be available from radar backscatter. Level pressure sensors located at the outlet of major tributaries have been deployed to analyze in which part of the catchment water is generated. To identify the importance of soil moisture preconditions, two cosmic ray sensors have been deployed. At the outlet of the Arugot water is sampled and level is monitored. To more accurately determine water discharge, water velocity is measured using portable radar velocimetry. A first analysis of flash flood processes will be presented following the FLEX-Topo concept .(Savenije, 2010), where each landscape type is represented using an individual hydrological model according to the processes within the three hydrological response units: plateau, desert and outlet.

References:

Savenije, H. H. G.: HESS Opinions "Topography driven conceptual modelling (FLEX-Topo)", Hydrol. Earth Syst. Sci., 14, 2681–2692, doi:10.5194/hess-14-2681-2010, 2010.