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# Measuring soil moisture dynamics at multiple scales and understanding its response to precipitation characteristics in a small catchment in Southern France

Jessica Huza (1), Adriaan J. Teuling (), Isabelle Braud (), and Remko Uijlenhoet ()
(1) Wageningen University, Netherlands (jessica.huza@wur.nl), (2) Irstea, UR-HHLY, France (jessica.huza@irstea.fr)

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The FloodScale initiative contributes to HyMeX (Hydrological Cycle in the Mediterranean Experiment), an international program aimed at understanding the hydrological cycle in the Mediterranean. The FloodScale project aims at understanding the hydrological processes that can contribute to flash flooding, a potentially destructive natural hazard, known to happen in the Cevennes-Vivarais region, a target area of the FloodScale project. A better understanding of the hydrological processes at the catchment scale and how these processes influence runoff generation can improve our understanding of catchment response. Improvement of modelling tools used to predict the occurrence of flash flooding is also expected. Soil moisture is known to be a useful indicator of catchment response, however establishing a meaningful value at the catchment level can be difficult due to it being highly variable in space and time.

In a small gauged catchment in the Cevennes-Vivarais region in southern France, a series of manual soil moisture measurements was taken at both the field and catchment scale during the period October-December 2012. Six field plots were selected within the catchment that followed the trajectory of an installed microwave link, used to measure precipitation. The plots were selected along the trajectory of the microwave link to represent different elevations in the catchment. In addition, rain gauges at each end of the microwave link were also being used to measure precipitation in the catchment. Within each field plot, surface soil moisture was measured along a 50 m-transect at 2 meter intervals. This allows the study of changes in within-field variability as well as between-field variability in response to precipitation events and during drying out.

Here, we investigate relationships between catchment-scale soil moisture and runoff, the dynamics of soil moisture variability at multiple scales, its response to rainfall characteristics, and the changes in spatial organization of soil moisture. Several precipitation events in the period October-December 2012 caused a significant wetting-up of the catchment, allowing to study soil moisture processes over a wide range of wetness conditions.