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Runoff Generation Mechanisms in an Experimental Basin

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Surface and subsurface runoff mechanisms are a critical aspect in hydrological research and modeling. Their dynamics is strongly influenced by several components such as: basin topography, soil texture and vegetation patterns that can dampen or amplify their temporal and spatial variability by influencing patterns of water loss and water accumulation. The aim of the present research is to better understand the spatial and temporal dynamics of soil moisture and the runoff generation during flood events along an experimental transect of an experimental basin. The research is carried out over the experimental basin "Fiumarella of Corleto" (Basilicata, Southern of Italy), where numerous rainfall and flood events under wet and dry antecedent conditions were recorded. The study site is represented by a subcatchment located on the right-hand side of the Fiumarella of Corleto with an area of about 0.65 Km2 and characterized by a significant homogeneity in soil texture. The subcatchment is equipped with a metallic tank with a Thomson weir for streamflow measurements (with a temporal resolution of two minutes) performed by means of water level sensor positioned at the subcatchment's outlet. The climatic forcing (precipitation, air temperature, air humidity, solar radiation, snow cover depth, snow temperature, etc.) are recorded each ten minutes using a meteo-hydrological station placed within the experimental area. Furthermore, in the subcatchment a TDR (Time Domain Reflectometry) system is installed covering a transect of about 60 meters with 11 sampling points for soil moisture measurements (with sampling frequency of 1 hour) at two different depths (30 and 60 cm). Besides the monitoring system previously described, a land system map elaborated by Santini et al. (1999) and a detailed soil texture map obtained through

granulometric analysis on several samples are also available. The experimental campaign allowed to collect a significant number of flood events that have been analysed one by one in order to classify the flood production mechanisms, define the dynamics of soil moisture along the transect, characterize the dynamics of the saturated portion of the transect during flood events.