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# Convective rain cell modelling from radar data and their linking with a hydrological model

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The technology of weather radar systems enables a detailed view of rainstorms over watersheds with high spatial and temporal resolution that was never available before. Nevertheless, the utilization of radar rainfall data in hydrological models has not brought a significant improvement in understanding rainfall-runoff processes, and in prediction capability of watershed responses. There is a need to develop new ways to exploit essential information about spatio-temporal rain structures, and gain greater insights into rainfall and subsequent watershed response behavior. The current study suggests an innovative approach to the above challenge. We emphasize as a key issue the structure in which the data are represented in the hydrological models. Whereas in the standard approach, radar data are utilized in a grid structure, we propose to represent the rainfall data in a model-structure that takes into account the known behavior and properties of the rain system. The spatial and temporal characteristics of the rain system are thus explicitly represented and are linked directly to hydrological responses. The basic distinction between the grid and the currently suggested data model-structures is the presence of a-priori knowledge about the represented system incorporated into the model. The above approach was applied in the analysis of a large flood event in a semi-arid catchment in southern Israel. A model representing the spatio-temporal structure of the derived rain cells was developed and fitted to the radar data. The hydrological model was then fed by the rain cell information rather than the gridded radar data. Using this direct linkage between rain cell features and hydrological features the main controls of the generated flood were determined.