

## **EFFECTS OF THE SPATIAL ORGANIZATION OF AGRICULTURAL MANAGEMENT ON THE HYDROLOGICAL BEHAVIOUR OF A FARMED CATCHMENT**

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Field limits, tillage practices and ditch network constitute man-made hydrological discontinuities in farmed catchments, and are expected to influence hydrological response during flood events.

The purpose of this study is to assess the role of human impact, especially the existence of tillage practices and ditch network, on flood events. The study area is the farmed catchment of Roujan (0.91 km<sup>2</sup>) located in Southern France for which a spatially distributed hydrological model MHYDAS was developed and tested. The model considers the catchment as a series of interconnected field parts linked to the ditch network. Descriptions are provided for the main model procedures: computation of Hortonian excess rainfall on fields using the Green and Ampt approach, conversion of excess rainfall to surface runoff, interaction between ditch network and groundwater using a simple Darcian model and flood routing through the ditch network using the diffusive wave model.

To analyse the role of both tillage practices and the ditch network, two sets of sensitivity analysis of the model were applied. The first set studied the role of tillage practices by comparing the actual spatial distribution of tillage practices on the catchment to three hypothetical scenarios. The second set studied the role of the ditch network by comparing the actual man-made ditch network to a hypothetical drainage network automatically extracted from Digital Elevation Model data. Results show the importance of the role of tillage and the ditch network on the form of the hydrograph, the lag time, the runoff volume and the peak discharge. This technique could also be applied to study the impact of land use change on the hydrological behaviour of the catchment.