



MHYDAS : Modélisation Hydrologique Spatialisée des AgroSystèmes - Spatially Distributed Hydrological Modelling of AgroSystems

R. Moussa (1), M. Voltz (1), P. Lagacherie (1), X. Louchart (1), F. Colin (1), J.C. Fabre (1)

(1) Laboratoire d'étude des Interactions entre Sol, Agrosystème et Hydrosystème, UMR LISAH ENSA-INRA-IRD, 2 Place Pierre Viala, 34060 Montpellier Cedex 1, France

In agricultural catchments, hydrological processes are largely variable in space due to human impact causing hydrological discontinuities such as ditches network, field limits, drains, and tillage practices. MHYDAS, an event-based distributed hydrological model, was especially developed to take into account these hydrological discontinuities. MHYDAS is based on a segmentation of the basin surface into “hydrological units” taking into account hydrological discontinuities, a segmentation of the aquifer into “aquifer units” and a segmentation of the channel network into reaches. Runoff from each hydrological unit is estimated using a deterministic model based on the pounding-time algorithm and then routed through the ditches network using the diffusive wave equation. Detailed descriptions are provided for the main model procedures: subdivision of the catchment into units, computation of rainfall excess, infiltration, baseflow, exchange between channel network and groundwater, and routing flow on hillslopes and through the channel network. A pollutant transfer module is under development. Three kinds of parameters can be distinguished : geometrical characteristics of fields and ditches extracted from DEMs, soil hydrodynamic properties measured in-situ and parameters to be calibrated. MHYDAS enables to simulate the part of rainfall infiltrated on hydrological units, the part of flow exchanged between the ditch network and the groundwater and the hydrograph at the fields and the catchment outlets. The model is now being used to simulate flood events in farmed basins in France, Germany, Tunisia and Guadeloupe. A friendly graphical user interface is under development. Demonstrations of MHYDAS will be presented on a laptop during the session.