Identification and characterization of « outlier » catchments in the upper part of the Mosel river basin


(1) Centre d’Etudes Géographiques de l’Université de Metz, UFR Sciences Humaines et Art, Ile du Saulcy, 57045 Metz Cedex 1, France.
(2) Centre de Géochimie de la Surface, 1 rue Blessig 67084 Strasbourg, France.
(3) INRA Centre de Nancy, IBEF 54280 Champigneulles, France.
(4) INRA Versailles-Grignon, 78850 Thiverval-Grignon, France.

The submitted poster aims at presenting and characterizing some catchments belonging to the upper part of the Mosel river basin (a mesoscale area of 10 000 km²), for whom the daily continuous conceptual rainfall-runoff (RR) model fails to reproduce properly the rainfall-runoff relationship. Different models are compared: GR3j – GR4j – GR3j modified versions (Lang et al., 2008[1]).

BACKGROUND

The first step of the study was to compute the efficiency of the RR models for a set of 58 catchments located in the investigated area.

The studied area is located in the East of France and 58 basins are concerned.

IDENTIFICATION OF “OUTLIER” CATCHMENTS

In the light of these results, three “types” of problematic catchments were identified as being representative of different sources of model failure in the study area:

- Catchments which are subject to uncertainty in the quantification of RR input data (e.g. orographic rainfall in the Vosges) and discharge data. These catchments were in particular identified with the mean annual runoff deficit calculated as the difference between mean annual rainfall and mean annual runoff.

- Catchments with karstic influences.

- Catchments with a disturbed rainfall-runoff relationship due to mining activities (e.g. drainage from the iron mines).

These different sources of poor model performances and the clustering of outlier catchments in the upper Mosel river basin advocate the necessity of performing specific work on such catchments (e.g. field measurements) for improving the RR model used and better understand the gap between fiction and representation of reality. Further works will also attempt to connect the parameters of the model to physical descriptors.