

CLIMATIC AND BASIN FACTOR EFFECTS ON THE FLOOD FREQUENCY CURVE ANALYSED THROUGH A FACTORIAL EXPERIMENTAL DESIGN

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The sensitivity analysis based on one-at-a-time perturbations to the model parameters (Hashemi et al., this issue) cannot highlight the presence of parameter interactions which might indeed affect the characteristics of the flood frequency curve (ffc) even more than the individual parameters. For this reason, the effects on the ffc of the parameters of the rainfall, rainfall runoff models and of the potential evapotranspiration demand considered in Hashemi et al. (this issue) have been investigated through an analysis of the results obtained from a factorial experimental design, where all the parameters are allowed to vary simultaneously. Overall, this latter more complex analysis confirms the results obtained through the analysis where the parameters are perturbed one-at-a-time. However, it is shown that two-factor interactions are present not only between different pairs of parameters of an individual model, but also between pairs of parameters of different models, such as rainfall and rainfall-runoff models, thus demonstrating the complex interaction between climate and basin characteristics affecting the ffc and in particular its curvature. Furthermore, the wider range of climatic regime behaviour produced within the factorial experimental design shows that the probability distribution of soil moisture content at the storm arrival time is not anymore sufficient to explain the link between the perturbations to the parameters and their effects on the ffc, as suggested in Hashemi et al. (this issue). Other factors have to be considered, such as the probability distribution of the soil moisture capacity, and the rainfall regime, expressed through the annual maximum rainfalls over different durations.