

Estimation of hydrological response of small Mediterranean watershed to fire by data analysis and modelling approach

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Though the problem of changing environment is widely discussed in hydrological community most of hydrological model still rely on the hypothesis of stationarity. The aim of presented study is developing a tool to cope with non-stationary conditions based on process-based hydrological model. The study object is the Rimbaud watershed (1.46 km²) which was destroyed by fire in August 1990. It is located in south-eastern France and characterized by Mediterranean climate. The Hydrograph model is used as the base of this study. It has such an advantage that observable properties of a basin are used as the model parameters without common calibration procedure. Abrupt change of land cover properties due to the fire and their gradual succession afterwards could be described explicitly by dynamic set of the model parameters. The tasks of the study include the detection of fire-induced changes of land cover and hydrological regime, the development of dynamic set of the model parameters and the validation of developed parameterization in non-stationary post-fire conditions of the Rimbaud watershed. Neither conventional statistical analysis nor hydrological modelling with fixed model parameters detected any significant change in hydrological regime of the Rimbaud watershed after the fire in 1990 on daily temporal scale. The assessment of the fire effects on discharge using hourly data and development of dynamic set of the model parameters are still in progress. The results of the application of dynamic set of parameters to post fire conditions will be presented. If validated, the approach is supposed to be an effective tool to assess and predict runoff characteristics and basin variable states in non-stationary conditions in past and future.
