



Influence of snow accumulation and melting processes in Apennine watersheds using ANN streamflow forecasting models

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In high altitude mountain watersheds, snow accumulation and melting processes may have a strong influence on the runoff generation mechanism. In Alpine areas such phenomena are simulated by means of specific modules in physically-based or conceptual rainfall-runoff models. On the other hand, they are rarely kept into account in lower altitude watersheds, such as Apennine watersheds, where nonetheless, as proved also by flood events occurred in the last years, snow may play a fundamental role.

The present analysis aims at testing the importance of the snow accumulation and melting processes in the Northern Apennines region when modelling the rainfall-runoff transformation with an artificial neural network. In Apennine watersheds the instrumentation for measuring solid precipitation and snow cover is often lacking and the only information available on the snow-driven hydrological processes, in addition to rainfall measurements, is the air temperature.

It is therefore foreseen to feed the ANN models (providing in output the streamflow forecasts) with the following variables: past streamflow (needed for assessing the antecedent conditions of the basin) and both rainfall and temperature measurements, either lumped over the entire catchment or aggregated in a semi-distributed scheme.

Saliency and sensitivity analyses will then allow to identify the spatial and temporal scales of the input variables that are most relevant for streamflow forecasting under the influence of snow accumulation and melting phenomena.