



Analysis of near surface atmospheric variables for distributed hydrometeorological models. Validation of the SAFRAN analysis over France.

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SAFRAN is a mesoscale atmospheric analysis system for surface variables. In fact, it is part of the SAFRAN-ISBA-MODCOU (SIM) hydrometeorological suite. SAFRAN produces an analysis at the hourly time step using ground data observations. One of its main originalities is the analysis being based on climatically homogeneous zones and its ability to take vertical variations into account. It uses an optimal interpolation methods for most variables, while radiation terms are deduced from a radiative model. This work focuses on the validation of the extended version over France.

The analysis was tested for five parameters (air temperature and humidity, wind speed, rainfall and incoming radiation), using the Météo-France observation network and data of some well instrumented stations. Temperature and relative humidity were well reproduced, presenting no bias, wind speed was also well reproduced, even though its bias was -0.3 m/s. The interpolation from the six hours step of the analysis to the hourly time step was one of the error sources. The precipitation analysis was robust and not biased, its RMSE was 2.4 mm/d. This error was mainly due to the spatial heterogeneity of the precipitation within the geographical zones of analysis (1000 km²). The analysis of incoming solar radiation presented some biases, specially in coastal areas. The results of the comparison with some well instrumented sites were encouraging.

SAFRAN is being run operationally at Météo-France at a real time basis for various applications. In research, among other applications, it is used to feed the SIM hydrometeorological model with meteorological data and the whole system will be applied to study the effects of climate change over the Mediterranean watersheds of France under the framework of the CYPRIM project.