

Development of a daily to hourly rainfall disaggregation model

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SUMMARY

The aim of this work is to develop a statistical model to disaggregate a daily precipitation series into an hourly one, because it is the minimum resolution required by a hydrological-hydraulic model used to evaluate the likely changes in a small basin under a climate change scenario.

In the Ebro basin there are some 15-minute precipitation gauging stations which have been recording data from 1997. These series are too short for fitting downscaling models able to generate local precipitation series in a climate change scenario. So, it was necessary to use longer daily precipitation series and to provide a disaggregating tool for generating the input to the hydrological model.

The proposed disaggregation model is made up of two components: the first is a logistic regression describing the precipitation occurrence every hour; the second is a generalized linear model with a gamma error that gives the hourly precipitation amount when it is positive.

This model has been successfully validated and applied to eight 15-minute gauging stations, representing different rainfall regimes in the Ebro basin. Its results compare favourably with those obtained using the method by Mezghani and Hingray (2009).

Keywords: rainfall disaggregation, hourly precipitation, GLM.

AMS Classification: 62P12, 62J12, 62M10.

References

- [1] MEZGHANI, A., HINGRAY, B. (2009). A combined downscaling-disaggregation weather generator for stochastic generation of multisite hourly weather variables over complex terrain: Development and multi-scale validation for the Upper Rhone River basin. *Journal of Hydrology* **volume**(377), 245–260.

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