

Interactive comment on “Distributed hydrologic modeling of a sparsely-monitored basin in Sardinia, Italy, through hydrometeorological downscaling” by G. Mascaro et al.

Anonymous Referee #2

Received and published: 23 August 2013

Paper summary: The reviewed manuscript presents a methodology to calibrate distributed rainfall-runoff models using scarce hydro-meteorological data. The latter are collected within different historical periods and at diverse temporal resolutions. The methodology is applied and tested using the TIN-based Real-time Integrated Basin Simulator (tRIBS), and hydro-meteorological data from the Rio Mannu Basin (RMB) in Sardinia, Italy.

To bring the data to temporal and spatial resolutions suitable to run the distributed rainfall-runoff model, the authors use: 1) a log-Poisson multifractal model to perform space-time rainfall downscaling to approximately 15 km in space and 1h in time, and

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2) a semi-theoretical approach to calculate hourly estimates of potential evapotranspiration from minimum and maximum daily temperatures. The obtained results show good performance of the multifractal downscaling scheme for precipitation, the statistical approach for temporal downscaling of potential evapotranspiration and, also, the calibration procedure of the hydrological model.

Technical soundness - Contribution and audience: The suggested approach is technically sound, utilizes the most recent advances in statistical rainfall downscaling and hydrological modeling, and addresses the problem of data scarcity common to many Mediterranean catchments.

Prior publication: To my knowledge, neither the same nor very similar work has been published elsewhere.

Recommendation: For the reasons mentioned above, it is recommended that the paper is published in HESS. A short list of minor comments and suggestions is presented below.

Comment 1 (page: 7693; line: 23): Change: of which 94% are concentrated; To: with 94% concentrated

Comment 2 (Section 4.2, page: 7697, lines: 1-25): Multifractal theory has extensively been used to model rainfall statistics. That said, I believe a brief discussion on multifractal rainfall models is needed.

Comment 3 (Section 4.2, Equation 1): Several studies have indicated dependence of multifractal model parameters on the large-scale rainfall intensity. The authors are encouraged to, at least, mention a few of these studies.

Comment 4 (Section 4.2.2, page: 7699, lines:1-15): I do not have a clear understanding on what the velocity parameter U stands for. Please explain.

Comment 5 (page: 7699; line: 19): Change: in the following; To: below

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Comment 6 (page: 7700; lines: 19-20): Change: at the fine scale; To: at fine scales

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 7687, 2013.

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