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Abstract:

Castalia is a software system that performs multivariate stochastic simulation preserving essential marginal statistics, specifically mean value, standard deviation and skewness, as well as joint second order statistics, namely auto- and cross-correlation. Furthermore, Castalia reproduces long-term persistence. It follows a disaggregation approach, starting from the annual time scale and proceeding to finer scales such as monthly and daily. To assess the performance of the Castalia system we test it for several hydrometeorological processes such as rainfall, sunshine duration, temperature and wind speed. To this aim we retrieve time series of these processes from a large database of daily records and we estimate their statistical properties, including long-term persistence. We generate synthetic time series using the Castalia software and we examine its efficiency in reproducing the important statistical properties of the observed data.

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