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Exploiting the information content of hydrologica ''outliers'' for goodness-of-fit testing

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Abstract. Validation of probabilistic models based on goodness-of- is an essential step for the frequency analysis of extreme events. T outcome of standard testing techniques, however, is mainly deterr the behavior of the hypothetical model, $F_X(x)$, in the central part of distribution, while the behavior in the tails of the distribution, whic indeed very relevant in hydrological applications, is relatively unim for the results of the tests. The maximum-value test, originally pro a technique for outlier detection, is a suitable, but seldom applied, technique that addresses this problem. The test is specifically targ verify if the maximum (or minimum) values in the sample are consis with the hypothesis that the distribution $F_X(x)$ is the real parent distribution. The application of this test is hindered by the fact that critical values for the test should be numerically obtained when the parameters of $F_X(x)$ are estimated on the same sample used for verification, which is the standard situation in hydrological applicat propose here a simple, analytically explicit, technique to suitably a for this effect, based on the application of censored L-moments es of the parameters. We demonstrate, with an application that uses artificially generated samples, the superiority of this modified maxi value test with respect to the standard version of the test. We als that the test has comparable or larger power with respect to othe goodness-of-fit tests (e.g., chi-squared test, Anderson-Darling tes and Paul test), in particular when dealing with small samples (sam lower than 20–25) and when the parent distribution is similar to th distribution being tested.

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