Geophysical Research Abstracts, Vol. 9, 03101, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03101

Bootstrap for statistical evaluation of small sample inference for precipitation extreme quantiles

P. S. Lucio (1,2)

(1) Instituto Nacional de Meteorologia (INMET) – Brasília – DF – Brazil, paulo.lucio@inmet.gov.br

(2) Centro de Geofísica de Évora (CGE) – Evora – Portugal, pslucio@uevora.pt

A sufficiently long record of rainfall data is commonly required for most applications concerning Climatology. But, unfortunately, for rainfall prognostic, in general, the number of rain-gauges defining an acceptable meteorological network is often not large enough to sustain asymptotic assumptions. Hence, in this work one inditates the use of the bootstrap approach to approximate the true distribution of the statistic under investigation. The adopted method, employing bootstrap for the estimation of rainfall quantiles at particular observation sites, can be used in order to evaluate time series of rainfall records for those locations for which the existing time series is either discontinued (forward extension) or where the archives have a relatively recent start (backward extension). The bootstrap methods are computer-intensive methods of statistical analysis that use simulation to calculate standard errors, confidence intervals and significance tests. The methods apply for any level of modeling, and so can be used for fully parametric, semiparametric, and completely nonparametric analysis. The bootstrap technique is illustrated by means of some real case studies of precipitation through the state of the Rio Grande do Sul (RS) in Brazil. The prediction error was confined to less than 2% of precipitation, which is considered by meteorologists adequate. The limits of the bootstrap percentile confidence interval was taken as reference level in the bootstrap distribution of the estimator of the extreme quantiles allowing to estimate the empirical distribution. The technique introduced in the present study aims primarily at analyzing series of monthly rainfall at an observation site with a limited set of data. The findings presented in this study show that the decision making in climatology using bootstrap for the intended purpose is adequately acceptable.