EMS Annual Meeting Abstracts
Vol. 10, EMS2013-218-3, 2013
13th EMS / 11th ECAM

PGECLIMA_R: A Brazilian Weather Generator

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Weather Generators are very important computational tools for the analysis and evaluation of agri-environmental and hydrological models, since they offer, among other functions, surpass short series of climatic data, fill series with missing data and it can also generate climate scenarios. Often, these generators using statistical properties extracted from historical climatic series, which are usually measured on a daily scale, in order to reproduce synthetic data sequences, which approaches satisfactorily when comparing attributes of the distributions as its shape, averages and the variability around them. Many weather generators are cited in the literature as the WGEN, CLIGEN and LARS-WG. However, most often these generators are parameterized and calibrated to reproduce the local climate in the northern hemisphere, which have very different climatic characteristics of places in the southern hemisphere. In this study it is presented a brazilian generator, PGECLIMA_R , which was developed with the goal of matching the best probabilistic modeling for environmental conditions in the Southern Hemisphere. The PGECLIMA_R was developed in the Laboratory of Applied and Computational Statistics at the State University of Ponta Grossa, Parana, Brazil, simulating daily precipitation, solar radiation, temperature and relative humidity. It features a user friendly interface where you can manage the input data, making a consistent historical data, including autocomplete option missing data. Furthermore, a specific module can simulate series with climate change, from the disturbance of the statistical properties of the original series. The PGECLIMA_R automates the validation of statistical series generated through tests that evaluate the average, variability and shape of the distribution, on scales comparing daily and monthly simulated and observed data. In the tests conducted, the PGECLIMA_R revealed a very good performance even higher when compared to other weather generators in the simulation of climate for locations in Brazil.