Geophysical Research Abstracts
Vol. 15, EGU2013-4724-1, 2013
EGU General Assembly 2013

An optimal separation of the year to periods with different number of precipitation days

Jan Hnilica

The Institute of Hydrodynamics, Academy of Sciences of the Czech Republic, Hydrology and Environment, Prague, Czech Republic (hnilica@ih.cas.cz)

A coarse spatial resolution of the climate models leads to a systematic deviation of the model outputs from the observed values and model data must be corrected before their usage in impact studies. One of the characteristics of the raw model data is an unrealistically high number of precipitation days. Thus whether any bias-correction method is used to transform raw model data, high number of precipitation days must be reduced within the transformation process. The common technique to reduce the number of precipitation days consists in setting a threshold value, determining the values of the model precipitation data subsequently reduced to zero.
To improve the correction process, its parameters can be estimated separately for different seasons of the year. A natural way to determine these seasons is to separate twelve month periods or four climatological seasons (spring – winter). Nevertheless, the annual course of precipitation strongly depends on local orography and altitude. Thus to find an optimal separation of the year, the seasons should be determined individually for each geographical point.
The approach is based on the fact, that the number of precipitation days within any period is binomially distributed random variable. Thus when the year is separated into several periods, we can test the homogeneity of binomial distributions with the aim to find differences between probabilities of precipitation day in particular periods. To find an optimal combination of periods at individual meteorological station, the recursive algorithm is created, which tests all possible variants of the separation of the year. The variant with highest differences between particular periods is set as an optimal.
To validate the developed procedure, a daily precipitation data from the REMO climate model are transformed to observed data in the Malse river basin in the Czech Republic. There are four ways used to determine periods within the year: no periods (entire year), months, seasons, and our optimal periods. As a validation criterion the difference of the number of precipitation days between transformed and measured data is used. The results indicate benefit of this approach.

Acknowledgement: The study was supported by the research grant GA AS CR IAA 300600901