



## **Benchmarking a geostatistical procedure for the homogenisation of annual precipitation series**

Júlio Caineta (1), Sara Ribeiro (1), Roberto Henriques (1), Amílcar Soares (2), and Ana Cristina Costa (1)  
(1) ISEGI, Universidade Nova de Lisboa, Portugal, (2) CERENA, Instituto Superior Técnico, Universidade de Lisboa, Portugal

The European project COST Action ES0601, Advances in homogenisation methods of climate series: an integrated approach (HOME), has brought to attention the importance of establishing reliable homogenisation methods for climate data. In order to achieve that, a benchmark data set, containing monthly and daily temperature and precipitation data, was created to be used as a comparison basis for the effectiveness of those methods. Several contributions were submitted and evaluated by a number of performance metrics, validating the results against realistic inhomogeneous data. HOME also led to the development of new homogenisation software packages, which included feedback and lessons learned during the project.

Preliminary studies have suggested a geostatistical stochastic approach, which uses Direct Sequential Simulation (DSS), as a promising methodology for the homogenisation of precipitation data series. Based on the spatial and temporal correlation between the neighbouring stations, DSS calculates local probability density functions at a candidate station to detect inhomogeneities. The purpose of the current study is to test and compare this geostatistical approach with the methods previously presented in the HOME project, using surrogate precipitation series from the HOME benchmark data set.

The benchmark data set contains monthly precipitation surrogate series, from which annual precipitation data series were derived. These annual precipitation series were subject to exploratory analysis and to a thorough variography study. The geostatistical approach was then applied to the data set, based on different scenarios for the spatial continuity. Implementing this procedure also promoted the development of a computer program that aims to assist on the homogenisation of climate data, while minimising user interaction.

Finally, in order to compare the effectiveness of this methodology with the homogenisation methods submitted during the HOME project, the obtained results were evaluated using the same performance metrics. This comparison opens new perspectives for the development of an innovative procedure based on the geostatistical stochastic approach.

### **Acknowledgements:**

The authors gratefully acknowledge the financial support of “Fundação para a Ciência e Tecnologia” (FCT), Portugal, through the research project PTDC/GEO-MET/4026/2012 (“GSIMCLI - Geostatistical simulation with local distributions for the homogenization and interpolation of climate data”).