

Detection of inhomogeneities in daily data: a test based in the Kolmogorov-Smirnov goodness-of-fit test

Authors: Robert Monjo, Javier Pórtolas, and Jaime Ribalaygua

Institute: Climate Research Foundation (FIC, Fundación para la Investigación del Clima), Madrid

Country: Spain

At present, more and more climatological works use daily data to analyze climate extremes and the typical daily variability (cold/ heat waves, dry/ wet spells ...).

Therefore, an analysis of the quality of the data is required to filter the series. However, there are difficulties in assessing the inhomogeneities present at a daily scale. Generally, the daily data are aggregated at a monthly scale and then it is applied a homogeneity test (like the SNHT by Alexandersson).

In this work we propose a method for detecting inhomogeneities at a daily scale by using the non-parametric test of Kolmogorov-Smirnov (KS). The method consists of two steps: First, potential candidates of inhomogeneity are detected by analyzing the p-value of the N mutual days between two consecutive years. The candidate years are chosen from a p-value equal or less than the one obtained from an artificially introduced inhomogeneity. Second, we analyze the similarity of the data sets that are cut by the candidates. In this way we distinguish between isolated odd years (possible outliers) and inhomogeneous time segments.

Some advantages of this method are that it does not only detect the changes in the mean but it is also capable of detecting changes in the daily deviation and even other changes in the form of the probability distribution.