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Effects of anomalous (suspicious) data on homogeneity test

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Homogenization of meteorological time series is a fundamental step toward a rigorous climate change analysis. However, before this, the identification and correction of suspicious data is a preliminary and essential work, without it any analyses can be biased. In this poster we present how the suspicious data analysis (and discarding) affects inhomogeneity detection in a high dense database in the conterminous Spain.

To do that we have developed a suspicious data detection following the approach by Gonzalez-Hidalgo et al., (2008 Int. Journal of Climatology) to total stored data of monthly precipitation of AEMET (Spanish National Meteorological Agency, formerly INM) and then we compared the total amount of inhomogeneities detected (from statistical point of view) prior and after discarding suspicious data. Homogeneity test SNHT was applied at monthly and seasonal-annual scale. Detection and processing the results were done by specific software using reference series (Anclim and roclimDB, Stepanek, 2008).

The total amount of monthly precipitation series analyzed is 6821. They are distributed across the study area with a high spatial density (1 observatory /150-200 km2). The total amount of inhomogeneities detected before to discard suspicious data is 9,412 affecting 5,120 series. After discarding a total of 12,399 monthly values (<1% of total original data) the series affected by statistical inhomogeneities were reduce to 2,849 and total amount of inhomogeneities to 3,531. Before and after suspicious data discarding, spatial distribution of inhomogeneities does not show any spatial pattern. Annually total inhomogeneity increase as increase total number of observatories but they decrease in relative terms from 40´s.

We conclude that suspicious data significantly affect inhomogeneities detection in monthly precipitation dataset. Therefore, detection and correction/elimination of anomalous values should be an initial step before applying any homogeneity test.