



## **From warming to hiatus (1951-2010): the evolution of temperature in Spain, western mediterranean basin.**

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The most recent debate on global warming is concentrated on the hiatus on global temperature increase for which different explanations have been proposed. By the other hand, variability of temperature evolution has been recognize as a fundamental key point in global change analyses.

In the present study we analyze the evolution of warming rate in the western Mediterranean basin (Iberian Peninsula) during the last 60 years (1951-2010), with special emphasis on the last decades, to identify the eventual detection of hiatus, and to determine its effects on daytime (Tmax) and nighttime (Tmin) records at annual and seasonal scales. The research has been developed by using the new high spatial density of monthly mean temperature dataset of Spanish mainland (MOTEDAS: MOnthly TEMperature Database of Spain) recently developed within the framework of HIDROCAES-01 research project. The dataset is available as anomalies (with respect to the 1951-2010 period) in grid form with a 0.1 x 0.1 deg spatial resolution, and a national serie for both Tmax and Tmin was calculated by averaging the gridded series. Significance of trend were identified by using Mann-Kendall test, and intensity of trend (i.e. slope, or rate) by Sen's mehod; different periods were analysed by considering 30-years, 20-years, and 10-years running windows.

The global results suggest the following conclusions:

- In the Iberian Peninsula maximum warming occurred between 70's and 90's.
  - Warming rates of annual mean Tmax and Tmin have changed along the years, and they decreased for the last decades.
  - During the last decades the warming rate of annual Tmax and Tmin remain positive but not significant in Tmax; then decrease of Tmax warming rate is stronger than that of Tmin and, as a consequence, present warming depends much more on nocturnal temperatures.
  - Seasonal analyses detected a different behavior between seasons. Summer is the only season characterized by a continuous increase in temperature trend. Mean temperature warming rates of Winter, Spring and Autumn decreased at least from 1970s.
  - Different changes in seasonal warming rates suggest that the seasonal contributions to annual warming have varied, with a higher winter contribution in the 1950s and a higher summer-spring contribution during 2000s.
- This study highlights how the warming rate is dependent on the analisis period.