



## **The effect of length and starting year on trend analyses of temperatures in Spanish mainland (1951-2010). Seasonal analysis: Winter (II)**

Celia Salinas Solé (1,2), Dhais Peña Angulo (1,2), Jose Carlos Gonzalez Hidalgo (1,2), and Michele Brunetti (3)  
(1) Department of Geography, University of Zaragoza, Zaragoza, Spain, (2) Institute University of Research in Sciences Environmental (IUCA), University of Zaragoza, Zaragoza, Spain, (3) Institute of Atmospheric Sciences and Climate (ISAC-CNR), Bologna, Italy

In this poster we applied the moving window approach (see Poster I of this collection) to analyze trends of winter and its corresponding months (December, January, February) temperature mean values of maximum (Tmax) and minimum (Tmin) in Spanish mainland to detect the effects of length period and starting year. Monthly series belong to Monthly Temperature dataset of Spanish mainland (MOTEDAS). Database contains in its grid format of 5236 pixels of monthly series (10x10 km).

The threshold used in spatial analyses considers 20% of land under significant trend ( $p < 0.05$ ). The most striking results are as follow:

- Seasonal trend analyses of Tmax shows that global trend 1951-2010 was positive and significant mostly in central-western areas; from 1970 to 2010 there is less than 20% of land with significant trend. In the case of Tmin no relevant significant period is detected.
- Monthly Tmax analyses show that December significant trend changed from positive (>20%) in between 1955-2010 until 1962-2010, to negative from 1976-2010. Meanwhile January does not show relevant period with significant trend; finally Tmax in February shows different periods with positive significant trend (>20% of land) 1951-2010 to 1954-2010 and 1962-2010 to 1968-2010. No significant trend is detected after this data.
- Monthly Tmin trend analyses show that except exceptional period, no months present any significant trend.

As conclusions, we have detected that for winter and winter-months, Tmax trends are not significant from 1970 across Spanish mainland. In the case of Tmin we conclude that no significant trend have been occurred in any temporal windows analyzed. Results differ from what traditionally has been assumed that the increase of the average annual temperature was due to the increase of trends in the winter season. And these analyses also show that seasonal trend values could hide monthly behavior. So extreme caution should be taken into account when seasonal values are offered.