EMS Annual Meeting Abstracts,
Vol. 6, EMS2009-161-1, 2009
9th EMS / 9th ECAM

9th EMS Annual Meeting
9th European Conference on Applications of Meteorology
High resolution meteorology
- applications and services

Actual and future trends of extreme values of temperature for the NW Iberian Peninsula

J. TABOADA (1), S. BRANDS (1), and N. LORENZO (2)

(1) Meteogalicia. CINAM - Consellería de Medio Ambiente. Xunta de Galicia. Santiago de Compostela, Spain., (2) Facultad de Ciencias, Campus de Ourense, Universidade de Vigo. E-32004 Ourense, Spain

It is now very well established that yearly averaged temperatures are increasing due to anthropogenic climate change. In the area of Galicia (NW Spain) this trend has also been determined. The main objective of this work is to assess actual and future trends of different extreme indices of temperature, which are of curcial importance for many impact studies.
Station data for the study was provided by the CLIMA database of the regional government of Galicia (NW Spain). As direct GCM-output significantly underestimates the variance of daily surface temperature variables in NW Spain, these variables are obtained by applying a statistical downscaling technique (analog method), using 850hPa temperature and mean sea level pressure as combined predictors. The predictor fields have been extracted from three GCMs participating in the IPCC AR4 under A1, A1B and A2 scenarios. The definitions of the extreme indices have been taken from the joint CCl/CLIVAR/JCOMM Expert Team (ET) on Climate Change Detection and Indices (ETCCDI) This group has defined a set of standard extreme values to simplify intercomparisons of data from different regions of the world.
For the temperatures in the period 1960-2006, results show a significant increase of the number of days with maximum temperatures above the 90th percentile. Furthermore, a significant decrease of the days with maximum temperatures below the 10th percentile has been found. The tendencies of minimum temperatures are reverse: less nights with minimum temperatures below 10th percentile, and more with minimum temperatures above 90th percentile. Those tendencies can be observed all over the year, but are more pronounced in summer. We have also calculated the relationship between the above mentioned extreme values and different teleconnection patterns appearing in the North Atlantic area. Results show that local tendencies are associated with trends of EA (Eastern Atlantic) and SCA (Scandinavian) patterns. NAO (North Atlantic Oscillation) has also some relationship with these tendencies, but only related with cold days and nights in winter.
The results of the applied statistical downscaling technique indicate that observed trends in maximum and minimum temperatures in NW Spain are expected to continue in the next decades because of anthropogenic climate change. The common tendency is that hot days increase while cold nights diminish all over the year. As expected, these tendencies change between different scenarios: they are more marked for A2 and A1B scenarios than for the for the B1 scenario. Moreover, the three models behave different under the same scenario, leaving a great uncertainty for the future. Nevertheless, we conclude that more frequent hot days, as well as an increasing probability of summertime heat waves are to be expected in the next decades. Cold days tend to diminish, decreasing the probability of wintertime cold waves and leaving a greater part of the area under study without frost days throughout the year.