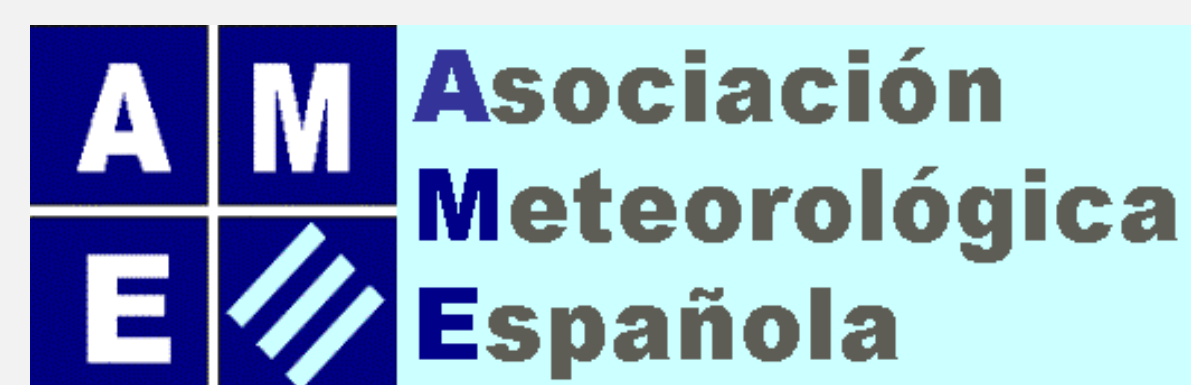


CONNECTION BETWEEN NAO INDEX AND EXTREME PRECIPITATION IN CONTINENTAL SPAIN



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Introduction

The North Atlantic Oscillation (NAO) index is the main parameter used to determine the atmospheric general circulation in the Northern Hemisphere. It is defined as the pressure difference between the Iceland Low and the Azores High. The balance between both action centers determines the direction and strength of the westerlies and the approximate path of the depressions originated in the North Atlantic.

The aim of this study is to find the connection between the NAO index and the number of episodes with extreme precipitations in continental Spain during the period 1982-2011. The seasonal NAO index has been calculated from the monthly index, obtained from the NOAA website (www.noaa.gov).

Methodology

- 45 AEMET stations selected by location and quality of data (period of study: 1982-2011).

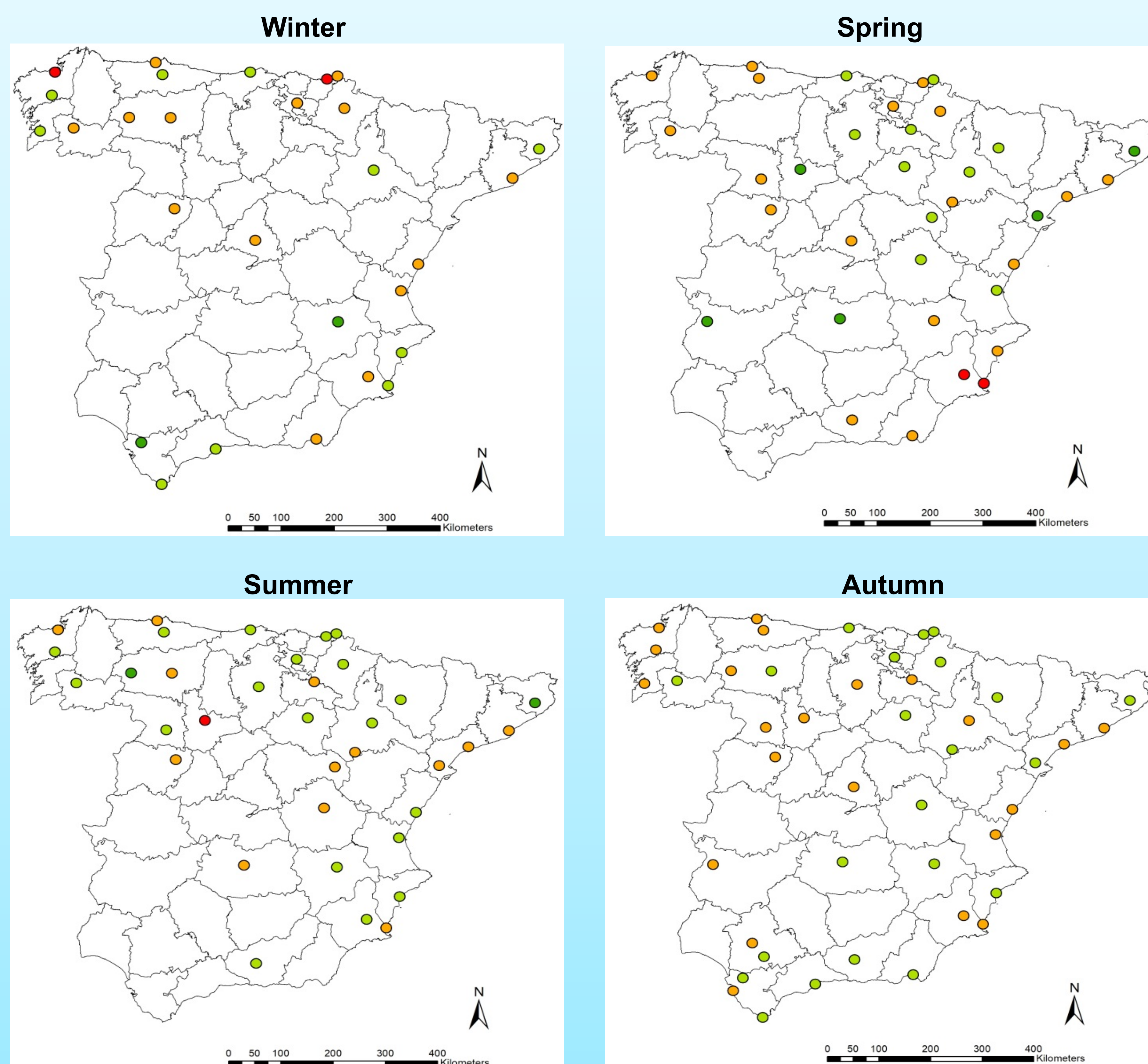
- Extreme precipitation days follow an exponential distribution: the number N of days with precipitation p is:

$$N(p) = N_0 \exp(-p/\theta)$$

- If 1 day of every 400 is considered to be a day with extreme precipitation:

$$N(p_c) / N_0 = \exp(-p_c/\theta) = 2,5 / 1000 \Rightarrow$$
$$-p_c/\theta = \ln(2,5 / 1000) \cong -6 \Rightarrow -p_c = 6\theta$$

Results



Conclusions

- Some observatories show negative correlation coefficients, especially in spring (Badajoz, Ciudad Real, Girona, Tortosa and Valladolid weather stations) and summer (Girona and Ponferrada weather stations).
- This means there is a correlation between the extreme precipitation and the NAO index in those observatories, although a significant tendency is not observed in the rest of observatories.
- Winter results should be taken cautiously, due to the lack of data in many observatories.
- Despite these occasional good correlations, there is not a good correlation between the two variables studied for the whole set of weather stations.
- The most likely reason is that many of these extreme episodes are generated by convective processes, which produce very intense and localized precipitations, and do not depend on the atmospheric pressure in the Atlantic. Castro et al. (2011), in their study in Spain, considered this as the main reason causing the lack of correlation between NAO monthly index and precipitations in summer and winter.

Acknowledgements

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