



## **Relations between the North Atlantic sea surface temperature and the winter rainfall in Galicia (NW Spain)**

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The processes of evaporation, precipitation and atmospheric heating ‘communicate’ sea-surface temperature anomalies (SSTAs) to the atmosphere. Thus, it is thought that fluctuations in sea surface temperature and the strength of the North Atlantic Oscillation (NAO) in the North Atlantic are related. On the other hand, SST anomalies have been thought to be partly responsible for changes in atmospheric circulation over the north Atlantic and Europe in winter or spring. In this way, SST is considered one of the most interrelated factors that control climate (Rodwell et al. 1999).

Previous research has revealed the existence of physical mechanisms linking North Atlantic SSTs to European climate variability. The lagged associations reported between SSTs and rainfall suggest that precipitation may be predictable from SST (Colman and Davey, 1999; Phillips and Thorpe, 2006; Rodríguez et al. 2006). In the light of this, the aim of this study is to explore the relationship between monthly North Atlantic SSTAs and Galician (NW Spain) winter rainfall.

This study assesses the relationship between gridded ( $0.5^\circ \times 0.5^\circ$ ) monthly North Atlantic ( $0 - 70^\circ N, 100^\circ W - 20^\circ E$ ) sea surface temperature anomalies (SSTAs) and the winter rainfall for the different coherent Galician (NW Spain) precipitation regions over the period 1985-2002. Monthly correlation fields are derived and tested for field-significance greater than 90 % and 95 %.

The main results, with small differences for the different regions, show an important negative correlation between the sea surface temperature of July, August and December in the middle of North Atlantic and also with the sea surface temperature of

January in front of Sahara desert. On the other hand, is also important the positive correlation observed with the sea surface temperature of the Mediterranean Sea in December. The results obtained in the summer months, July and August, are really interesting because with the study of the anomalies of temperature in the sea surface in summer we could forecast the precipitation in the next winter. This allow us make a seasonal forecast of the rainfall.

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[2] Phillips I.D. and Thorpe J. 2006. Icelandic precipitation - north atlantic sea-surface temperature associations. *Int. J. Climatol.* 26, 1201-1221.

[3] Rodríguez-Fonseca B., Polo I., Serrano E. and Castro M. 2006 Evaluation of the north atlantic sst forcing on the european and northern african winter climate. *Int. J. Climatol.* 26, 179-191.

[4] Rodwell M.J., Rowell D.P. and Folland C.K. 1999. Oceanic forcing of the winter-time North Atlantic Oscillation and European Climate. *Nature* 398, 320-323.