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Influence of the North Atlantic sea surface temperature on the teleconnection patterns

I. Iglesias (1), M.N. Lorenzo (1), J.J. Taboada (2) and M. Gomez-Gesteira (1)

(1) Grupo de Física de la Atmósfera y del Océano. Facultad de Ciencias. Universidad de Vigo, 32004 Ourense, Spain. (isaiglesias@uvigo.es) (2) Meteogalicia. Santiago de Compostela, Spain.

The processes of evaporation, precipitation and atmospheric heating 'communicate' sea-surface temperature anomalies (SSTAs) to the atmosphere.

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 (Phillips and Thorpe, 2006; Rodríguez et al. 2006). On the other hand, the influence of the teleconnection patterns on the main meteorological variables is clear and has been extensively studied. In the light of this, the aim of this study is to explore the relationship between monthly North Atlantic SSTAs and teleconnection patterns influencing on Europe. This study assesses the relationship between gridded ($2.0^\circ \times 2.0^\circ$) monthly North Atlantic ($0 - 70^\circ N, 100^\circ W - 20^\circ E$) sea surface temperature anomalies (SSTAs) and the main teleconnection patterns influencing on Europe, (NAO, EA, EA/WR, SCA and POL) over the period 1951-2006. Monthly correlation fields are derived and tested for field-significance between 90 and 95.

The results show a strong influence of the sea surface temperature on the different teleconnection patterns. The influence of this SST is especially relevant in autumn for SCA pattern and winter for EA and NAO patterns. The SST of México Gulf and Gulf Stream are particularly important in winter and the subpolar area plays and important role in autumn. This is important because these are the seasons more rainy in West Europe and these patterns present a strong relation with the rain in the area [Lorenzo

and Taboada, 2005; Decastro et al. 2006].

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