Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11354, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11354
EGU General Assembly 2008

ENSO influence on the rotational atmospheric circulation during North Atlantic wintertime

J. Garcia-Serrano (1), B. Rodriguez-Fonseca (1), I. Blade (2)

1. Dept. Geofisica y Meteorologia, UCM, Madrid, Spain
2. Dept. Astronomia y Meteorologia, UB, Barcelona, Spain

javigarcia@fis.ucm.es

The dominant variability modes of the North Atlantic-European rotational flow are examined in this study. To this aim we apply Principal Component Analysis (PCA) to the ERA-40 200hPa streamfunction winter anomalies (ψ200, NDJF) in the 5S-80N/90W-40E spatial domain and for the period 1957/58-2001/02. The associated atmospheric impacts and related SST patterns are also analysed by projecting the principal component on different anomalous fields.

The results reveal that the leading ψ200-EOF mode does not project on the North Atlantic Oscillation (NAO) and it has not a significant impact on the European anomalous precipitation. This regional mode displays a spatially coherent one-signed structure over most of the domain, with some dipolar features over Iberia and Scandinavia. The regression of this mode onto the global SST field exhibits a clear El Niño fingerprint in the tropical Pacific and no signal over the Atlantic basin. When projecting it globally (streamfunction and geopotential), two wavelike patterns appear over the winter Northern Hemisphere: a regional anomaly along the eastern North Atlantic and towards Europe; and another one over the North Pacific-American sector which resembles the Tropical/Northern Hemisphere pattern.

The NAO, which is thought to be the leading mode of variability in the North Atlantic region, appears when projecting the second ψ200 mode. This EOF also has a tropical centre that, added to the NAO-related zonal seesaw, could reflect the contribution

of a Rossby wavetrain from the Caribbean as a recurrent variability mode at these timescales. The global projection shows the Tripole SST-pattern, with no signal over the Pacific, and the zonally symmetric pattern that characterizes the Artic Oscillation-Northern Annular Mode.

These results point out that the leading perturbation of the rotational circulation over the North Atlantic comes from the Pacific-El Niño as well as evidences to explore other possible ENSO-forced atmospheric mechanisms that could, in turn, explain the teleconnections found.