



North Atlantic Oscillation and moisture transport towards the Iberian Peninsula during winter

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The North Atlantic Oscillation (NAO) is the major source of interannual variability in winter precipitation over the Iberian Peninsula (IP). Recent works have identified the most important sources of moisture that supply the IP during different seasons of the year, including the nearby western Mediterranean and the tropical-subtropical North Atlantic corridor that extends from the Gulf of Mexico to the IP, and the IP itself (Gimeno et al., 2010). However, although rainfall is directly related to the moisture supply, the relationship between the water vapor transported towards IP and the NAO phase remains unclear.

In this work the moisture transport towards IP was analyzed using a Lagrangian diagnosis method, which relies on the Lagrangian particle dispersion model FLEXPART. This methodology computes budgets of evaporation minus precipitation (E-P) by evaluating changes in the specific humidity along back-trajectories. Here we have computed (for each day) the evolution of moisture of the particles bound for Iberia up to 10 days prior to their arrival. The analysis was constrained to the winter (DJF) season, responsible for the largest fraction of precipitation, for the 20 years of ECMWF Reanalyses ERA40 dataset from 1980 to 2000. The contribution of the NAO phase on the water budgets is examined using composites of the obtained (E - P) fields for the 5 most extreme positive and negative NAO years of the study period.

Results confirm that the IP is dominated by positive (negative) E-P anomalies during positive (negative) NAO phase. Additionally an anomalous water vapor sink (source) region located approximately over the Gulf Stream is found during positive (negative) NAO phase.

Gimeno L., Nieto R., Trigo R.M. , Vicente-Serrano S.M, Lopes-Moreno J.I., (2010) "Where does the Iberian Peninsula moisture come from? An answer based on a Lagrangian approach". *J. Hydrometeorology*, 11, 421-436
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