



## **North Atlantic transient eddies and winter precipitation in Portugal**

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Severe winter precipitation deficits in Portugal are related to anomaly patterns in the North Atlantic large-scale atmospheric flow. In fact, during these extreme episodes, a strong warm-core ridge westward of Iberia, with a nearly equivalent barotropic structure and a corresponding double-jet structure, are quite apparent. Such dynamical conditions are clearly unfavorable to the establishment of rain-generating mechanisms over Portugal and have a high potential for triggering drought episodes throughout the country. The atmospheric flow during extremely wet winters contrasts highly with the above described conditions by presenting a single-jet structure. A diagnosis of the main forcing dynamical mechanisms that generate and maintain the anomalous flow is undertaken in two ways: first, by analyzing the Eliassen-Palm fluxes, zonally averaged over a North Atlantic window, and, second, by calculating the third and sixth components of the empirical forcing functions over the Euro-Atlantic sector on constant-pressure surfaces. The former approach enables a quantification of the total contributions made by the transient and stationary eddy transports of enthalpy and angular momentum to the establishment of the double-jet structure. The latter approach allows an analysis of the zonal asymmetries in the distribution of the forcings due to transient enthalpy and momentum fluxes. The results give clear evidence of the relevance of these transports in the generation and maintenance of the double/single-jet structure relevant for the occurrence of droughts in Portugal.