



## Strong ridge episodes and precipitation deficits in Portugal

J. Santos (1), J. G. Pinto (2), U. Ulbrich (3), G. C. Leckebusch (3), C. Andrade (4,5), S. Leite (1), and J. Corte-Real (5)

(1) CITAB, Universidade de Tras-os-Montes e Alto Douro, 5000-911 Vila Real, Portugal (jsantos@utad.pt/+351 259 350), (2) Institut für Geophysik und Meteorologie, Universität zu Köln, Kerpener Str. 13, 50923 Köln, Germany (jpinto@meteo.uni-koeln.de), (3) Institut für Meteorologie, Freie Universität Berlin, Carl-Heinrich-Becker-Weg 6-10, 12165 (ulbrich@met.fu-berlin.de), (4) Instituto Politécnico de Tomar, ESGT, Quinta do Contador, Estrada da Serra, 2300-313 Tomar, Portugal, (5) ICAM, University of Évora, Núcleo da Mira, Apartado 94, 7002-774 Évora, Portugal

The occurrence and persistence of strong ridge episodes over the Eastern North Atlantic close to the Iberian Peninsula is investigated in order to identify its role in winter drought episodes over Portugal. With this aim, NCEP reanalysis data is analyzed for the period 1957/58-2007/08. The core winter months (December to February) are considered. As a large part of the annual precipitation falls during these three months, occurring deficits implicate severe impacts for the rest of the hydrological year. Results show that the establishment of hydrological droughts over Western/Central Iberia is often associated with the occurrence of strong and persistent ridges (at least 10 days), which in turn correspond to 17% of all ridge episodes. During the dry (wet) winters there is a high (low) frequency of occurrence of strong ridge days that tend to last for long (short) periods of time. This duality is also evident in the composites of the number of cyclone counts and of the storm track densities: these quantities are significantly reduced (increased) close to Iberia for the dry (wet) winters. Finally, the occurrence of these ridges is classified based on two different weather typing approaches, the empirical Grosswetterlagen (GWL) weather regimes and the previously defined five automatic weather regimes for Portugal (k-mean cluster approach on 500 hPa geopotential height field). Results show that the frequencies of occurrence of dry conditions are associated with an enhanced frequency of GWLs 2 (Cyclonic Westerly), 8 (Cyclonic North-Westerly) and 10 (Zonal Ridge across Central Europe). These GWLs correspond to particular cases of the k-means regimes "NAO+" and "E" regimes, which dominate for dry periods, hence documenting the robustness of the results.