Geophysical Research Abstracts
Vol. 14, EGU2012-13428, 2012
EGU General Assembly 2012

Weather types and precipitation at the Iberian Central System

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An analysis of the observed precipitation for the last 22 years (1989-2010) over Sierra de Guadarrama (center of Iberian Central System) has been done. The analysis, based on both rain gauges and reanalysis, is focused on the search of the atmospheric mechanisms and moisture sources that lead to precipitation in this mountain range. A weather type classification have being performed using a reconstruction of total column water vapour flux fields using Principal Component Analysis, which main modes are used as input of the k-means clustering method in order to find weather types for every season. Results show how this mountain range behaves as an orographic island that rises over an extensive plateau with a marked Atlantic forcing, with mostly of the rain due to advection of moisture from the ocean and small amount of rain due to local sources of humidity and convective precipitation. It also shows the enhancement of precipitation caused by the range due to orographic precipitation and the big differences found at the northern and southern side of the range with a strong directional dependency and different roles played by the weather types. This works gives a climatic framework for future precipitation assessments of this region that will be conducted combining measurements and models.