Geophysical Research Abstracts
Vol. 15, EGU2013-3194, 2013
EGU General Assembly 2013

The use of normalized climatological anomalies to rank precipitation events in the Iberian Peninsula

Alexandre M. Ramos (1), Ricardo M. Trigo (1), and Margarida L. R. Liberato (2)

(1) Instituto Dom Luiz, University of Lisbon, Portugal (amramos@fc.ul.pt), (2) Escola de Ciências e Tecnologia, University of Trás-os-Montes e Alto Douro, Portugal

Extreme precipitation events in the Iberian Peninsula during winter months have major socio-economic impacts such as flooding, landslides, extensive property damage and life losses, and are usually associated to deep low pressure systems with Atlantic origin, although some extreme events in summer/autumn months are fed by the Mediterranean. Quite often these events are evaluated on a casuistic base and with relatively few stations.

An objective method for ranking daily precipitation events is presented based on the extensive use of the most comprehensive database of daily precipitation available for the Iberian Peninsula (IB02) and spanning from 1950 to 2003, with a resolution of 0.2° (approximately 16 x 22 km at latitude 40°N), for a total of 1673 pixels. This database is based on a dense network of rain gauges, combining two national data sets, 'Spain02' for peninsular Spain and Balearic islands (Herrera et al., 2012), and 'PT02' for mainland Portugal (Belo-Pereira et al., 2011), with a total of more than two thousand stations over Spain and four hundred stations over Portugal, all quality-controlled and homogenized.

The daily precipitation data from 1950 to 2003 are compared with a 30-year (1961–90) precipitation climatology to achieve a daily normalized departure from the climatology. The magnitude of an event is given daily by an index that is obtained after multiplying 1) the area (in percentage) that has precipitation anomalies above two standard deviations by 2) the mean values of these anomalies over this area. With this criterion we are able to evaluate not only the spatial extent of the precipitation events but also their spatially integrated intensity. In addition, to stress out the hydrological responses to precipitation, rankings taking into account the sum of the normalized anomalies over different time periods (3 days, 5 days and 10 days) were also computed.

Here different precipitation rankings will be presented considering the entire Iberian Peninsula but also most major river basins in the Iberian Peninsula (Minho, Douro, Tejo, Guadiana, Guadalquivir and Ebro). A selection of historical events will allow a quantitative evaluation both of the method and of the meteorological conditions in different regions of the Iberian Peninsula of the most anomalous events.

This work was partially supported by FEDER (Fundo Europeu de Desenvolvimento Regional) funds through the COMPETE (Programa Operacional Factores de Competitividade) and by national funds through FCT (Fundação para a Ciência e a Tecnologia, Portugal) through project STORMEx FCOMP-01-0124-FEDER-019524 (PTDC/AAC-CLI/121339/2010).

Belo-Pereira, M., E. Dutra, and P. Viterbo (2011) Evaluation of global precipitation data sets over the Iberian Peninsula, J. Geophys. Res., 116, D20101, doi:10.1029/2010JD015481.
Herrera et. al. (2012) Development and Analysis of a 50 year high-resolution daily gridded precipitation dataset over Spain (Spain02) International Journal of Climatology 32:74-85 DOI: 10.1002/joc.2256.