

THE STATE OF ART OF THE DROUGHT STUDIES IN SPAIN



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WCRP Spanish Committee



1. Introduction: Drought in Spain

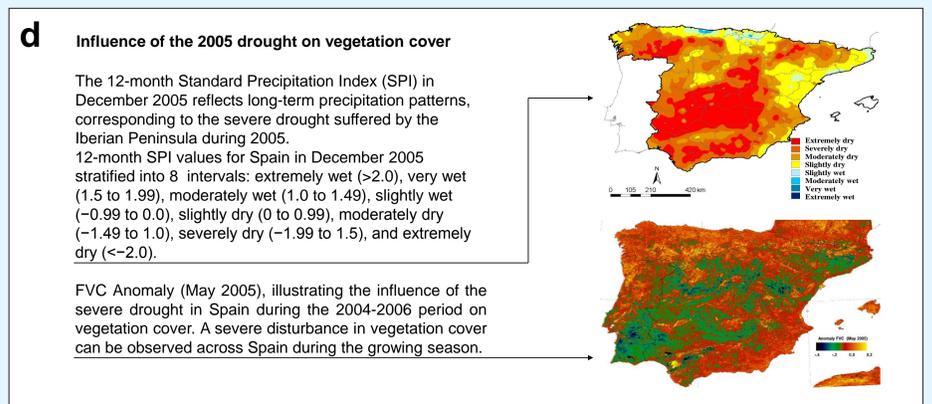
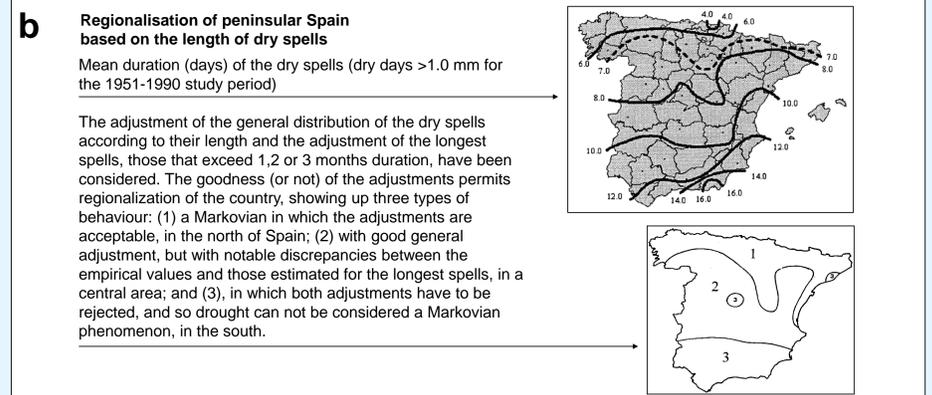
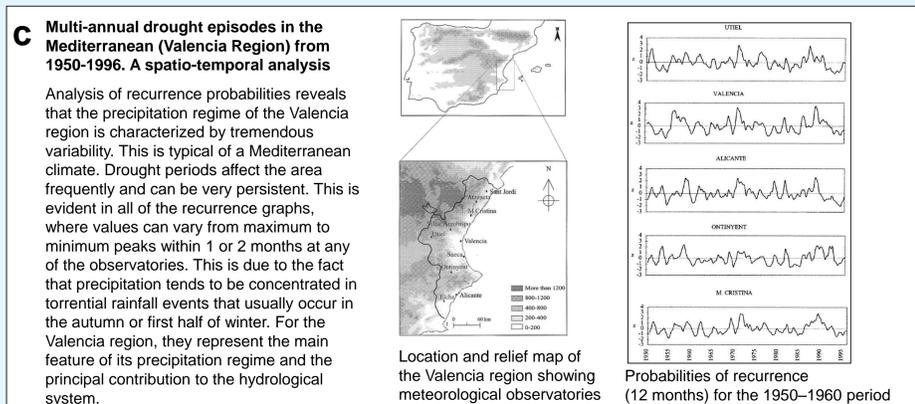
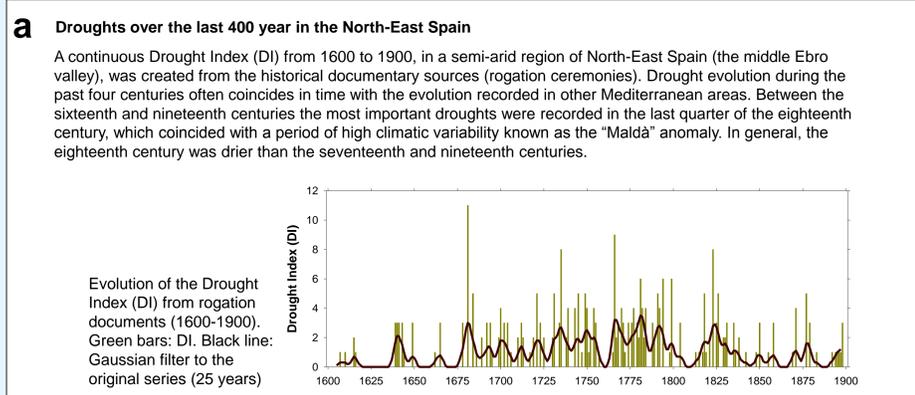
Drought is one of the most important natural hazards in Spain in terms of frequency, severity and economical losses. The drought as a climatic phenomenon has a slow implementation but it spreads throughout vast territories. The longest dry spells (dry day < 0.1 mm) lasted more than 150 days in the south of Iberian Peninsula over 40-years periods. The persistence of the dry days is so high in southern Iberia than the phenomena can not be considered as Markovian, even using Markov-chains of orders higher than 2. That kind of spells occurs in the warm part of the year, but long droughts are recorded also in other seasons. The consequences of this water deficit are alternated by heavy rainfall events, and its harmful impact on society becomes more noticeable by the increasing demands of agriculture with support irrigation and the recent urban development.

2. Studies on droughts in Spain

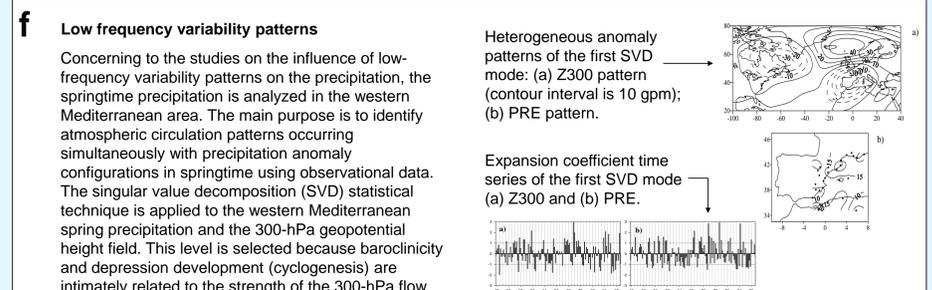
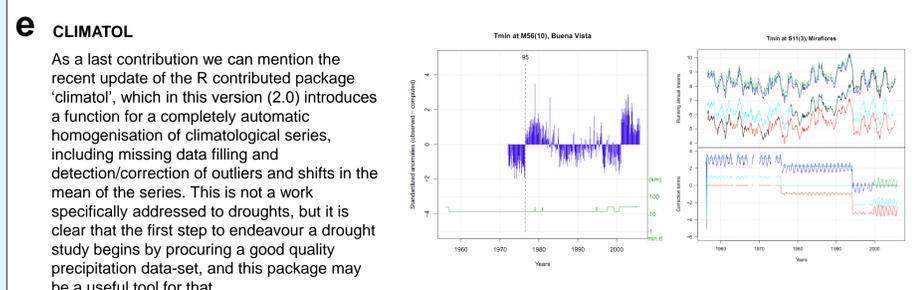
A like-bibliometric analysis over a wide collection of studies on drought in Spain has been made. The studies deal with analysis on drought indices, persistence of dry periods, socio-economical impacts, regional characteristics, synoptic genesis, influence of low-frequency variability patterns, spring precipitation variability, etc. Therefore, we must test the drought indices and times scales in order to achieve a good modelling of the different droughts types under extreme environmental conditions and increasing water demands.

Some examples of several studies on droughts in Spain are shown: Cuadrat (a), Martin-Vide and Gomez (1999) (b), Estrela *et al.* (2000) (c) and García-Haro *et al.* (2010) (d). Some perspectives in the improvement of drought studies are also shown: Guijarro (e) and Valero *et al.* (f).

3. Examples



4. Perspectives



References:

(a) Sergio M. Vicente-Serrano & José M. Cuadrat (2007): North Atlantic oscillation control of droughts in north-east Spain: evaluation since 1600 A.D. *Climatic Change* 85:357-379 DOI 10.1007/s10584-007-9285-9; (b) Martin-Vide, J. and Gomez, L. (1999): Regionalization of peninsular Spain based on the length of dry spells. *Int. J. Climatol.*, 19, 5, 537-555; (c) Estrela, M.J., Peñarocha, D., Millán, M (2000): Multi-annual drought episodes in the Mediterranean (Valencia Region) from 1950-1996. A spatio-temporal analysis. *International Journal of Climatology*, 20: 1599-1618; (d) F.J. García-Haro, A. Moreno, A. Perez-Hoyos, M.A. Gilabert, J. Meliá, F. Belda, D. Poquet, B. Martínez, A. Verger (2010): Assessment of vegetation response to climate variability in Spain. *Proceedings of the RAQRS2010, 3rd International Symposium on Recent Advances in Quantitative Remote Sensing*, Torrem, Spain. (Publ. Univ. Valencia: Valencia), Ed. J. Sobrino, ISBN 978-84-370-7952-3, pp. 568-573; (e) Guijarro JA (2011). *User's guide to climatol*. 40 pp. <http://webs.ond.cimatol.com/climatol/climatol-guide.pdf>; (f) F. Valero, M. Y. Luna, M. L. Martín, A. Morata and F. González-Rouco (2004): Coupled modes of large-scale climatic variables and regional precipitation in the Western Mediterranean in autumn. *Climatic Dynamics* DOI: 10.1007/s00382-003-0382-9) 22, 307-323.

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