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Analysis of dry periods using the DDSLR index in the Mediterranean southern Spain

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In southern Spain a longitudinal pluviometric gradient occurs under Mediterranean climatic conditions in an area that has at least two months of drought each year and very irregular rainfall. From the Strait of Gibraltar to the Cabo de Gata in Almería there is a reduction of more than 1,000 mmyear^{-1} in the mean annual rainfall. Analysis of the frequency and intensity of drought periods is necessary in regions where water resources are scarce and the ecosystem is highly dependent on water availability. Drought periods in the region described above were analysed using the DDSLR (Dry Days Since Last Rain) index to i) characterize trends in number of dry days and the amount of rainfall along the pluviometric gradient, ii) assess how the DDSLR index changes along the gradient from semiarid to humid Mediterranean regions, and iii)contribute to studies addressing the importance of climatic gradients in relation to the dynamics of various ecosystems. The DDSLR method enables calculation of the probability of the occurrence of dry days (days without rain) at any time of the year, assessment of the risk of water deficits for vegetation during plant growth periods, and evaluation of the temporal variability of hydrological/geomorphological processes that depend on soil moisture throughout the year. The results showed that there is a critical period of rainfall scarcity during September and October, which has implications for the availability of soil water resources for vegetation. In short-term, the major problems are predicted for the Spanish Southern Mediterranean due to the increasing irregularity in precipitations: the number of days with no rains and drought periods are increased, but also a significant increment in the probabilities of extreme rainfalls exceeding 30 mmday^{-1}.