



Spatial and temporal drought analysis in susceptible agroecosystems: the case of Thessaly region, Greece

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Drought consists one of the most critical environmental hazards for the viability and productive development of crops. This paper is focused on the application of the Standardized Precipitation Index (SPI) for drought analysis and classification. The SPI is a commonly used drought index that calculates the difference between a given time period's precipitation and its long-term average. The objectives of the study are to conduct a spatiotemporal drought analysis, estimate drought severity using the SPI, identify both dry and wet periods, classify drought using the SPI, classify the degree of drought/wetness conditions using a classification scheme for multiple timescales, and calculate and classify SPI₁₂ for each month from 1981-2020. The study area is Thessaly, Greece, which is the country's largest agricultural productive region facing water availability problems. The innovation of this paper is the spatiotemporal drought analysis through the use of CHIRPS (Climate Hazards Group InfraRed Precipitation with Station data) instead of conventional meteorological data, avoiding the use of a prevailed sparse weather network, and the difficulties arising from that. The study shows that the region has faced two severe years of drought in 1988 and 1989, which led to moderate and extremely drought conditions, respectively. In contrast, extremely wet conditions were observed in 2002-2003, while 2009-2010 experienced moderately wet conditions. In this context, the mapping of spatial and seasonal variability across the study area permits more targeted measures instead of horizontal policies.

Keywords: drought; SPI; CHIRPS; Thessaly; Greece; desertification