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Monitoring multiscale drought using remote sensing in a Mediterranean arid region.

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During the last few decades, the frequency of drought has significantly increased in Morocco especially for arid and semi-arid regions, leading to a rising of several environmental and economic issues. In this work, we analyse the spatial and temporal relationship between vegetation activity and drought severity at different moments of the year, across an arid area in the western Haouz plain in Morocco. Our approach is based on the use of a set of more than thirty satellite Landsat images data acquired for the period from 2008 to 2017, combined with the Standardized Precipitation Index (SPI) at different time scales and Standardized water-level Index (SWI). The Mann-Kendall and Sen's slopes methods were used to estimate SPI trends and the Pearson correlation between NDVI and SPI were calculated to assess the sensitivity of vegetation types to drought. Results demonstrated that SPI experienced an overall upward trend in the Chichaoua-Mejjate region, except for 3-months time scale SPI in summer. The vegetation activity is largely controlled by the drought with clear differences between seasons and timesclaes at which drought is assessed. Positives correlations between the NDVI and SPI are dominant across the entire study area except in June when almost half of correlations is negative. More than 80% of the study domain exhibit a correlation exceeding 0.4 for SPI3 and SPI6 in March. Importantly, this study stresses that the irrigation status of land can introduce some uncertainties on the remote sensing drought monitoring. A weak correlation between the SPI and the SWI was observed at different time-scale. The fluctuations of the piezometric levels are strongly affected by the anthropogenic overexploitation of aquifers and proliferation of irrigated plots.