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Cyclic modes of the intra-annual variability of precipitation in Greece

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Abstract. The application of harmonic analysis to the annual variability of precipitation is the object of this study, so that the modes, which compose the annual variability, be elicited. For this purpose, monthly precipitation totals from 30 meteorological stations of the Hellenic National Meteorological Service (HNMS), for the period 1950–2000, were used.

The initial target is to reduce the number of variables and to detect structure in the relationships between the variables. The most commonly used technique for this purpose is the application of Factor Analysis (FA) resulted in five main factors (sub-regions) with common precipitation characteristics, explaining 77% of the total variance. For each sub-region, a representative station is selected for the analyses, mainly, as the station within the sub-region with the highest factor loading. In the process, the Fourier Analysis is applied to the mean monthly precipitation, so that 2 harmonic components are derived, which explain more than 90% of the total variability of each station, and are due to different synoptic and thermodynamic processes associated with Greece's precipitation regime. Finally the calculation of the time of the maximum precipitation, for each harmonic component, gives the spatial distribution of the appearance of the maximum precipitation in the Greek region.

Full Article in PDF (PDF, 1321 KB)

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