



Harmonic analysis of the precipitation in Greece

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Greece is a country with a big variety of climates due to its geographical position, to the many mountain ranges and also to the multifarious and long coastline. The mountainous volumes are of such orientation that influences the distribution of the precipitation, having as a result, Western Greece to present great differentiations from Central and Eastern Greece.

The application of harmonic analysis to the annual variability of precipitation is the goal of this study, so that the components, which compose the annual variability, be elicited. For this purpose, the mean monthly precipitation data from 30 meteorological stations of National Meteorological Service were used for the time period 1950-2000. The initial target is to reduce the number of variables and to detect structure in the relationships between variables. The most commonly used technique for this purpose is the application of Factor Analysis to a table having as columns the meteorological stations-variables and rows the monthly mean precipitation, so that 2 main factors were calculated, which explain the 98% of total variability of precipitation in Greece. Factor 1, representing the so-called uniform field and interpreting the most of the total variance, refers in fact to the Mediterranean depressions, affecting mainly the West of Greece and also the East Aegean and the Asia Minor coasts.

In the process, the Fourier Analysis was applied to the factor scores extracted from the Factor Analysis, so that 2 harmonic components are resulted, which explain above the 98% of the total variability of each main factor, and are due to different synoptic and thermodynamic processes associated with Greece's precipitation construction.

Finally, the calculation of the time of occurrence of the maximum precipitation, for each harmonic component of each one of the two main factors, gives the spatial distribution of appearance of the maximum precipitation in the Hellenic region.