

Atmospheric patterns for heavy rain events in the Balearic Islands

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The Balearic Islands, as well as other Mediterranean regions, are occasionally affected by heavy rain events, which can produce numerous damages. This study is an attempt to improve the understanding of the dynamical mechanisms that produce heavy rain events by means of a classification of their related atmospheric patterns (hereafter, AP).

A heavy rainfall (HR) dataset for the Balearic Islands and some gridded atmospheric parameters, derived from the HIRLAM-INM 0.5° analyses, are the data used in this study. The HR events were recorded at a set of pluviometric stations along the Balearics for a period of 9 years, from June 1995 to May 2004. The selected atmospheric parameters are the 1000 hPa and 500 hPa geopotential fields as well as the temperature field at 850 hPa.

By means of a principal components analysis (PC) the number of variables was reduced. The cluster analysis (CA) was then applied on those new variables and eight AP were finally obtained. Most of the patterns showed a strong relationship between HR events and cyclones. However, some patterns, not a priori related to heavy rain atmospheric situations, deserve special attention.