Establishing relationships with Artificial Neural Networks between geopotential height patterns and heavy rainfall events

Silas Michaelides and Filippos Tymvios

Meteorological Service, Nicosia, Cyprus (silas@ucy.ac.cy, ftymvios@ms.moa.gov.cy)

Dynamically induced rainfall is strongly connected with synoptic atmospheric circulation patterns at the upper levels. This study investigates the relationship between days of high precipitation volume events in the eastern Mediterranean and the associated geopotential height patterns at 500hPa. To reduce the number of different patterns and to simplify the statistical processing, the input days were classified into clusters of synoptic cases having similar characteristics, by utilizing Kohonen' Self Organizing Maps (SOM) architecture. Using this architecture, synoptic patterns were grouped into 9, 18, 27 and 36 clusters which were subsequently used in the analysis. The classification performance was tested by applying the method to extreme rainfall events in the eastern Mediterranean. The relationship of the synoptic upper air patterns (500hPa geopotential height) and surface features (heavy rainfall events) was established. The 36 member classification was proven to be the most efficient system.