

The Identification of the Mediterranean cyclones main classical trajectories towards Romania by using objective methods based on mathematical algorithms

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The importance of knowledge on the trajectories that Mediterranean cyclones follows toward Romania is fundamental because most of the times the weather phenomena that accompany them determine significant economic damage and not only. In the specialized literature, the principal classic trajectories on which the Mediterranean cyclones pass toward the south-east of Europe and by default toward Romania, causing in these areas a crucial weather conditions change in all aspects at any time during the year, have been determined in subjectively mode, many years ago, by C. Sorodoc (1962) E. I. Bordei (1983).

Starting from the known 9 classic trajectories determined subjectively, in this study it was aimed and subsequently carried out their identification by this date, but objectively, using the method based on mathematic algorithms developed by Rasmus E. Benestad, Abdelkader Mezghani, and Kajsa M. Parding (2006). The study was carried out between January 2003 and December 2015, taking into account the fact that the presence of the Mediterranean cyclones may be established almost every month, these representing important links of the atmosphere movement over Europe. The data used by the daily review have contained values, in grid points, of the mean pressure field at sea level (MSLP), with spatial resolution of $0.75^\circ \times 0.75^\circ$ and 6 hours temporal coverage, originating from ECMWF, ERA-Interim project (2006), and the chosen field of interest was between $15^\circ\text{W} - 40^\circ\text{E}$ and $30^\circ\text{N} - 50^\circ\text{N}$. Of the total number of Mediterranean cyclones identified objectively, that followed trajectories toward Romania, were randomly selected only a few cases, which indicates the similarity between the paths of classic subjectively determined and those determined objectively. Validation of the results consisted in the first phase in a comparison between the trajectories identified with the classic trajectories determined subjectively, then was carried out a second validation, by analysis of the MSLP field, geopotential height and potential vorticity. As a conclusion, the results obtained highlights certainly reliability but especially the usefulness of the objective method used, in particular in carrying out the complex Mediterranean climatology studies and not only.