



Generation Scenarios of Mediterranean Cyclones

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The aim of this study is to objectively identify relations between formation of Mediterranean cyclones (MCs) and existing cyclones, regarded as 'parent cyclones'. Our hypothesis is that most of the MCs are 'daughter cyclones' of parent European cyclones or of tropical cyclonic systems, such as the Red Sea trough. The cyclone detection is based on 61 years data (for the months October-May, 1950-2010) of sea-level pressure (SLP).

First, the MCs were scanned and tracked. Then they were divided to those formed within the Mediterranean and those entered into the Mediterranean from the Atlantic, Europe or North Africa. For each of the MCs formed within the Mediterranean, we searched for its parent cyclone. This is done by mapping the 'area of influence' (AOI) for the existing cyclones 6 hours prior to the formation of the new MC. The AOI is determined by mapping the curvature of the streamlines on the 1000-hPa level, starting from the cyclone center, and proceeding outwards, through continuous region with positive (cyclonic) curvature and higher SLP values while moving farther from the cyclone center. If the location of a new MC is found within the AOI of existing cyclone, or within a distance of 2° from such, it is regarded as its daughter cyclone. In a case when a new MC is found in an AOI of more than one existing cyclone, the closest one is regarded as its parent cyclone.

An objective analysis of the MCs for the study period indicates that 96.5% of them are daughter cyclones. The parent cyclones of 35.5% of them were found to be older MCs, i.e., within the Mediterranean Basin, 30% are outside and north of the Mediterranean (north of 36°N and west of 40°E) and 16.5% are outside and south of the Mediterranean (south of 36°N and west of 40°E). The rest of the daughter MCs either have parent cyclones east of 40°E (14.4%) or found to have no parent cyclone (3.6%).