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On the drivers of Mediterranean migratory anticyclones genesis and evolution

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Transient anticyclonic activity is determinant of climate variability and together with cyclonic activity and the topographic characteristics of a region determines the local high-frequency climatic variations. This study is an effort to improve our knowledge on the structural features of Mediterranean anticyclones by examining the suggested forcing mechanisms of formation and intensification of sea-level incipient anticyclonic centers, which are not widely followed by climatological analyses.

A database of objectively identified migratory anticyclones over the greater Mediterranean area on seasonal time-scale, produced with 6 hourly ERA-Interim MSLPs, is employed. The horizontal distribution and the vertical profile of various dynamic and thermodynamic parameters, such as potential temperatures, vertical velocity, wind speed, energy transport and vorticity and temperature advection is examined, using a system-centered compositing methodology that permits the statistical comparison between the different regions of the Mediterranean exhibiting maxima of anticyclogenesis. Furthermore, the relationship with their cyclonic counterparts, identified with the same objective methodology and datasets, is investigated. The important role of the jets is confirmed, which along with the low-level processes, determine the anticyclone development and its subsequent evolution.