



Variability and trends of migratory anticyclones affecting the Mediterranean

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A comprehensive climatology of migratory anticyclones affecting the Mediterranean was generated with the aid of the University of Melbourne finding and tracking algorithm, applied to 34 years (1979-2012) of ERA-Interim mean sea level pressures. The algorithm is employed for the first time to study anticyclones in this region, thus, its robustness and reliability in efficiently capturing the individual characteristics of the anticyclonic tracks in the Mediterranean were checked and verified.

The tracks and the statistical properties of the migratory systems revealed two major anticyclonic routes: over the northern (i.e. from the Iberian towards the Balkan Peninsula) and over the southern (i.e. the North Africa coast) Mediterranean barriers. A transition of the system density and anticyclogenesis maxima is evident throughout the year from solely continental environments in winter and autumn to also maritime in spring and summer. These variations can be attributed to the seasonal variability of the major anticyclonic systems that are involved in this region.

The interannual variability of synoptic systems can be attributed to natural low frequency variability. The interannual variations of the system density and strength were linked to the Northern Hemisphere modes of atmospheric variability; e.g. more (less) anticyclonic tracks are observed around the Mediterranean basin during periods of positive (negative) NAO, with a consequent enhancement (decline) of the pressure field.

Moreover, possible trends in the frequency and intensity of the anticyclonic systems were explored in an attempt to examine any impacts of recent global warming conditions. Positive trends of system density, genesis and intensity prevail during the cold period over the greater area around the Mediterranean basin. During summer, the general increase in system density is not followed by a corresponding tendency in the number of the generating systems and the intensity. Regarding the depth of the anticyclonic systems, a negative tendency seems to prevail throughout the year. For the transient seasons, no clear pattern can be established.

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