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A first analysis of the large-scale cyclonic environments that lead to medicane development

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Tropical-like storms are occasionally observed over the Mediterranean Sea. These mesoscale vortices are warm-core cyclones and along their mature stage present a clear eye surrounded by an axysymmetric cloud structure. These storms are rare events, but surface winds can sometimes attain near-hurricane force, and therefore coastal regions can be severely affected. Recently, it has been agreed to call these hurricane-like storms as medicanes (Mediterranean hurricanes).

The synoptic analyses of some medicane events coincide to point out that there seems to exist certain atmospheric environments favourable to the development of medicanes. Specifically, the presence of a low-level cyclone and a cold upper troposphere trough or cut-off seem to play a primary role in the development and maintenance of such storms. The main goal of the present study is just to deep into these parent large-scale cyclonic environments that lead to medicane development. To do that, a Mediterranean cyclone dataset, derived from the ERA-40 reanalysis, will be used. This cyclone dataset contains a description of the vertical structure of all the surface cyclones detected in the Mediterranean basin along a large period. A few, but well-known, medicane events will be investigated by means such cyclone dataset. That includes to look for the presence of a primary low-level cyclone and the presence of an upper-level trough or cut-off. The main characteristics of such parent cyclonic structures will be obtained and compared against ordinary cyclonic environments derived from other cyclones detected in the same region and in the same season. It is intended to improve the knowledge about which meteorological conditions are necessary to develop a medicane and to discriminate between precursor and non-precursor cyclonic environments.