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Real-time Mediterranean cyclone prediction from NWP models

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At the Spanish State Meteorological Agency (AEMET) a specific procedure for real-time tracking and operational forecast of Mediterranean cyclones has been implemented. It is based on some available automatic tools to detect and characterize cyclones, as a cyclone tracking algorithm and the cyclone phase diagrams. The typology of these cyclones is very varied, from weak to very intense ones, and ranges from extensive extratropical cyclones to small cyclones with tropical characteristics. The objective of the present work is twofold. On one side we are interested in focusing attention on the the role played by different types of cyclones in determining weather in our region. On the other side, special attention is paid to forecast cyclones related to severe weather events, and in particular tropical like cyclones or medicanes, that occasionally cause strong winds and heavy precipitations in the Mediterranean and its coastal areas, in order to warn of the risk with required accuracy and anticipation.

In a first phase of the project, two European Centre for Medium-Range Weather Forecasts (ECMWF) atmospheric models, the high resolution forecast (HRES) and the ensemble prediction (ENS), are used to forecast cyclones over the whole Mediterranean region. In a second phase, the procedure will be applied to higher resolution numerical weather prediction (NWP) models, the HARMONIE-AROME and the $\gamma - SREPS$, both with 2.5 km resolution, over the Western Mediterranean. Higher resolution NWP models presents new challenges to forecast smaller cyclonic structures. The high resolution probabilistic prediction from the EPS is especially suitable to forecast extreme phenomena of small size and low frequency, as the medicanes. Some products are provided in order to present to the forecasters the large amount of information derived from NWP models (especially the EPSs) both in a detailed manner and in a concise and clear way.