



Ensemble forecasting and analysis of "Cleopatra" medicane by using AR-WRF model

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Towards the investigation and further understanding of the development and propagation of the Medicanes, the tropical-like low pressure systems of the Mediterranean, from a thermodynamic point of view, the Laboratory of Climatology and Atmospheric Environment, National and Kapodistrian University of Athens explores the forecasting capability of WRF in an event that affected the south of Italy and Greece in 2013.

Medicane Cleopatra was developed in Sardinia, Italy on Monday 18th November 2013 accompanied by gale winds and torrential rain which led to flash floods and 17 casualties. The methodology of the current study consists of two major components; firstly, an extensive physical parameterization schemes sensitivity test and consequently, a short range ensemble forecasting implementation based on the highest statistical scored physics configuration. AR-WRF is used to downscale ERA5 from 31 km spatial horizontal resolution to 9 km and 3 km and ECMWF operational data from \sim 13.5 km to 3 km for the first and the second part respectively.

In all phases the modeled products are verified against nearby surface observations and upper air soundings. Subsequently, the modeled cyclone trajectories are compared to satellite imagery derived from EUMETSAT-SEVIRI gridded data.

The findings of the conducted analysis illustrate that the ensemble average displays a significant difference in performance compared to any of the deterministic runs individually, suggesting that ensemble forecasts will be beneficial in studies assessing cyclonic events in the Mediterranean region.

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