Sensitivity analysis on a Mediterranean tropical - like cyclone over southwestern Greece

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In the frame of the project "Modelling the Vertical Structure of Tropical-like Mediterranean Cyclones using WRF Ensemble Forecasting and the impact of Climate Change (MEDICANE)" carried out by the Laboratory of Climatology and Atmospheric Environment, University of Athens (LACAE), WRF-ARW is used to simulate a Tropical-like Cyclone (TLC) event in south-west of Greece in October 30-31, 2016.

The scope of the present study is to find the optimal physics configuration of the model for the representation of the thermodynamic structure of the TLC. Therefore, different deterministic simulations of the cyclone are tested, in order to assess the influence of different cloud microphysics, planetary boundary layer, SW and LW radiation and convection (cumulus) parameterization schemes.

The 31 km grid resolution data of ERA5 Reanalysis from the ECMWF is dynamically downscaled to 9 km. The model output of each configuration setup is validated against nearby surface observations and upper air soundings. In addition to that, model cyclone trajectories are compared to the satellite imagery trajectories derived from EUMETSAT Spinning Enhanced Visible and Infrared Imager (SEVIRI) gridded data.

The findings of the study will be used in the next steps of the project for the simulation of a series of TLC events in order to further understand the phenomenon and contribute to the efforts for better forecasts.