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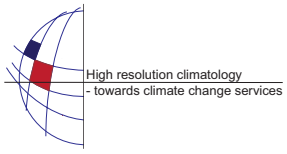

Assessing the capability of high resolution climatic model experiments to simulate Mediterranean cyclonic tracks

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In this study, a comparison of a reanalysis driven simulation to a GCM driven simulation of a regional climate model is performed in order to assess the model's ability to capture the climatic characteristics of cyclonic tracks in the Mediterranean in the present climate. The ultimate scope of the study will be to perform a future climate projection related to cyclonic tracks in order to better understand and assess climate change in the Mediterranean. The climatology of the cyclonic tracks includes inter-monthly variations, classification of tracks according to their origin domain, dynamic and kinematic characteristics, as well as trend analysis.

For this purpose, the ENEA model is employed based on PROTHEUS system composed of the RegCM atmospheric regional model and the MITgcm ocean model, coupled through the OASIS3 flux coupler. These model data became available through the EU Project CIRCE which aims to perform, for the first time, climate change projections with a realistic representation of the Mediterranean Sea. Two experiments are employed; a) the ERA40_2 with lateral Boundary conditions from ERA40 for the 43-year period 1958-2000, and b) the EH5OM_20C3M where the lateral boundary conditions for the atmosphere (1951-2000) are taken from the ECHAM5-MPIOM 20c3m global simulation (run3) included in the IPCC-AR4.

The identification and tracking of cyclones is performed with the aid of the Melbourne University algorithm (MS algorithm), according to the Lagrangian perspective. MS algorithm characterizes a cyclone only if a vorticity maximum could be connected with a local pressure minimum. This approach is considered to be crucial, since open lows are also incorporated into the storm life-cycle, preventing possible inappropriate time series breaks, if a temporary weakening to an open-low state occurs.

The model experiments verify that considerable inter-monthly variations of track density occur in the Mediterranean region, consistent with previous studies. The classification of the tracks according to their origin domain show that the vast majority originate within the examined area itself. The study of the kinematic and dynamic parameters of tracks according to their origin demonstrate that deeper cyclones follow the SW track.

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