Geophysical Research Abstracts
Vol. 13, EGU2011-12222, 2011
EGU General Assembly 2011

Some relevant aspects on the ability of a regional model in reproducing the observed wind field

Angela Hidalgo (1,4), J. Fidel González-Rouco (1,4), Elena García-Bustamante (1,3,4), Pedro A. Jiménez (1,3,4), Jorge Navarro (3,4), Juan Pedro Montávez (2,4), and Etor E. Lucio Eceiza (1)

(1) Universidad Complutense de Madrid, Spain (angela.hidalgo@fis.ucm.es), (2) Universidad de Murcia, Spain, (3) CIEMAT, Madrid, Spain, (4) Global Forecasters S. L.

The dynamical downscaling techniques applied in the characterization of the wind field over a specific area offers the advantage that once the simulation has proved some ability in reproducing the observed wind, it can be considered reliable to study the wind field in an extended period of time with no longer availability of data. The evaluation of the simulation, assessed through comparison with the observations, allows for understanding potential limitations of the dynamical downscaling approaches. Between some of these limitations one is the fact that the knowledge of the variability of the wind is possible in most cases but determining with accuracy its magnitude is beyond the limit of the information that can be extracted with these techniques that are commonly applied in the context of model simulation. It is also worth mentioning that higher spatial resolutions do not necessarily imply a good representation of the observed variability at the local scales.

This work presents the evaluation of the reliability of the regional model results in reproducing the temporal variability and the climatology of the wind field. A high resolution climate simulation of the wind field over Turkey was performed with the fifth-generation Penn State/NCAR mesoscale model (MM5) for a period of ten years (1998-2007) and at a horizontal resolution of 10 km. An observational dataset providing to some extent a homogeneous coverage of the area of Turkey was compiled in order to evaluate the reliability of the simulated wind field. The available data consists of instantaneous measurements (every 10 and 20 minutes, hour, 3 and 6 hours) of wind module and direction at 10 m above ground level.

The assessment of the temporal agreement between simulation and surface observations revealed that the model reproduces to a good degree the intra- and inter-annual variability of the wind in Turkey at monthly timescales. However, the spatial distribution analysis of the bias showed that the simulation overestimates the magnitude of the wind module in about 1 m/s in most of the sites. In contrast to the reliability of the model to reproduce the observed temporal variability of the wind field, the simulated climatology evidences some discrepancies with the observations and to some extent does not highlight the added value of the donwscaled wind respect to the reanalysis field (ERA40) that feeds the regional model. In order to shed more light on this, it is analysed whether it is associated with the representativity and quality of the observations or whether it is linked to the suitability of the methodology applied in the evaluation of the high resolution simulation. The presence of some tendencies in the reanalysis fields over Turkey and their impact on the simulation are also explored within this context.