8th. World Congress on Computational Mechanics (WCCM8)
5th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2008)
June 30 –July 5, 2008
Venice, Italy

A COMBINED APPROACH TO LOCAL SCALE WIND PREDICTION

*** E. Rodríguez[1], G. Montero[1], R. Montenegro[1], J.M. Escobar[1] and E. Rodríguez-Jiménez[1]**

[1] IUSIANI-ULPGC
Edif. Central del Parque Científico-Tecnológico,
Campus Univ. de Tafira. 35017 - Las Palmas de G.C., Spain
barrera@dma.ulpgc.es, http://www.dca.iusiani.ulpgc.es/proyecto0507

Key Words: *Wind Modelling, MM5, Mass Consistent Model.*

ABSTRACT

Environmental pollution is one of today's greatest world concerns. Using renewable energies, like wind-power generated electricity, is encorauged by governments all over the world and will demand better strategies of both placing and exploiting wind farms. One of the issues that wind farm companies must face is the accurate prediction of the power they will produce in the near future, tipically next 24-48 hours. MM5 is a widely extended mesoscale atmospheric predictive model of atmospheric circulation. We have focused on its wind prediction capabilities, which allows a maximal resolution of 1×1 km^2. This resolution is not enough for solving problems in local areas, like location of wind farms. In contrast, mass consistent models (MCM) belong to the category of diagnostic models. They can be used to obtain wind fields over complex terrain, represented with adapted meshes by means of finite element method, but they can't predict at all. In this work we propose the use of MM5 predictions as input wind field to a mass consistent model in order to obtain a more accurate prediction in a local area. This, in turn, would lead to a better prevision of electrical power generation of wind farms in the short term. We also present a comparison between some MM5 raw wind predictions versus MM5-MCM corrected predictions over Gran Canaria Island.

REFERENCES

[1] MM5 Community Model, "http://box.mmm.ucar.edu/mm5".

[2] G. Montero, E. Rodríguez, R. Montenegro, J.M. Escobar and J.M. González-Yuste. "Genetic algorithms for an improved parameter estimation with local refinement of tetrahedral meshes in a wind model.". *Adv. Engng. Soft.*, Vol. **36**, 3–10, 2005.

[3] J.M. Escobar, E. Rodríguez, R. Montenegro, G. Montero and J.M. González-Yuste. "Velocity field modelling for pollutant plume using 3-D adaptive finite element method". *Lec. Not. Comp. Sci.*, Vol. **3037**, 642–645, 2004.

[4] R. Montenegro, G. Montero, J.M. Escobar and E. Rodríguez. "Efficient strategies for adaptive 3-D mesh generation over complex orography". *Neur. Par. and Sci. Comp.*, Vol. **10**, 57–76, 2002.