Geophysical Research Abstracts, Vol. 9, 09328, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09328

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Among other kinds of renewable energy, the role of wind energy is growing even in Brazil. State Ceará - located 3-5 degrees south to the Equator - has an area of 160 thousands km2. The installation of new Wind Turbine Generators initiated in the past few years in the costal area. The speed-up of this process is expected in the next couple of years: installation of new plants with a nominal power of more than 1000 MW is planned. The aim of our bilateral scientific cooperation is to estimate the amount of available wind energy potential, its vertical variation and temporal (annual and among each year) fluctuations for the prospective wind energy farms near the coast line. For this reason, we developed a statistical scheme using the wind speed and meteorological data set from standard and tower measurements and from numerical model output. The structure of the local wind field has been investigated with numerical weather prediction models as well: two different mesoscale models were applied (the NCEP/Eta and the RAMS) which are being run on a daily basis and wind data is interpolated to the location of the planed sites to obtain the precision of the model for wind energy estimation. Downscaling of local wind field and the accuracy of the models compare with measurements are being analyzed. Structure the model system and our preliminary results will be presented.