Geophysical Research Abstracts, Vol. 8, 02355, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02355


# Impact of climate change upon wind energy resources in France using a statistical downscaling scheme based on weather types

**J. Najac**, J. Boe, L. Terray
Climate Modelling and Climate Change Team, CERFACS, France (najac@cerfacs.fr)

A statistical downscaling methodology is developed in order to carry out an impact assessment study of global warming on wind energy resources in France. Local observations of daily wind speed from 79 stations over France for the period 1972-2003 are used to implement and validate the downscaling scheme. Weather types are constructed from the local variables over half of the period. Statistical criteria on intra-type and inter-type variability, spatial correlation, as well as several robustness tests of the clustering method, enable to define an adequate number of weather types and to validate the clustering algorithm. Then different large scale variables such as the geopotential height, pressure, vorticity or wind speed, are considered and the one that is the most discriminating for the local variables within each weather type is retained. The methodology is validated using reanalysis fields as predictors, focusing on the statistical properties of the local wind speed and direction. The weather type method is then compared to other statistical downscaling methodologies such as the analog method. Subsequently, data from the ARPEGE AGCM are used as predictors. A first ensemble of three time-slice experiments has been performed for the current climate (1960-99) where the model is forced by monthly mean observed sea surface temperature (SST) and historical greenhouse gas (GHG) and sulfate aerosol concentrations. A second ensemble of three time-slice climate change (2070-99) experiments has been performed using the IPCC A2 Special Report on Emissions Scenarios (SRES) scenarios of future GHG and sulphur emissions. The mean SST changes are derived from transient simulations with the Third Hadley Centre Coupled GCM, which has been forced by the A2 SRES scenarios. Thus, a comparative study is carried out for present and future climates, and the evolution of the wind energy resources in France is discussed.