Geophysical Research Abstracts,
Vol. 11, EGU2009-11087, 2009
EGU General Assembly 2009

Downscaling precipitation and wind in the complex French Mediterranean region.

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Understanding the relationship between the large scale variables from the Global Climatological Model (GCM) and local observations is a challenge for applications like the prediction of extremes natural hazards, of the wind energy production and among others.

This study presents a statistical downscaling approach which provide local cumulative distribution functions (CDFs) of surface climate variables from large scale fields. This method is based on the probabilistic downscaling method and suggests there exits a transformation T allowing us to transform the CDFs of a GCM simulated variable into the CDF local-scale climate variable.

The first step of this study is the calibration of the T transformation of the observed, from several meteorological stations located in the South of France, and ECMWF ERA-40 reanalysis wind and precipitation CDFs during the 1981-1990 period. Then, we validate this transformation with the comparison between the downscaling CDF provides by the transformations and the observed CDF during the 1991-2000 period.

The same T transformation is also used with the IPCC GCM during the same period. This comparison allows us to evaluating the use of this method to predict CDFs of wind and precipitation for IPCC scenarii in the context of global change.