

Classification of wind scenarios and stochastic downscaling on complex orographical areas

Understanding the spatio-temporal evolution of the wind field in the atmospherical boundary layer is important for many applications in the area of civil protection (pollutants propagation in atmosphere, flame front propagation in forest fires, evaluation of the thermodynamical fluxes between soil and atmosphere).

The aim of the thesis is the classification of the scenarios of event typical of the meteorological variable "wind at 10 m" (horizontal components U and V) in the North-West of Italy. The classification is thought to be performed by the use of the anemometrical national network, radiosoundings and the radar meteorological products (if present) which are available at the CIMA Foundation.

The identified scenarios will be correlated in a first part of the work by applying multivariate regression techniques (Salameh et al. 2009) to appropriate meteorological variables predicted by global modeling (GCM) at limited area (LAM). This will allow to obtain an applied research product for prediction and mitigation of the aforementioned risk.

The second part of the thesis will focus on the developing of a wind stochastic downscaling algorithm based on lagrangian technique (Bernardin et al. 2009).

References

Bernardin, F., M. Bossy, C. Chauvin, P. Drobinski, A. Rousseau, and T. Salameh. Stochastic Downscaling Method: Application to wind refinement. *Stoch. Environ. Res. Risk. Assess.*, 10.1007/s00477-008-0276-9, 2009.

Salameh, T., P. Drobinski, M. Vrac, P. Naveau, Statistical downscaling of near-surface wind over complex terrain in southern France, *Meteorol Atmos Phys* 103, 253–265, 2009.