Wind forecasting over complex terrain

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Abstract: In this paper we introduce a new methodology for wind field forecasting over complex terrain. The idea is to use the predictions of the HARMONIE mesoscale model as the input data for an adaptive finite element mass consistent wind model [1, 2]. A description of the HARMONIE Non-Hydrostatic Dynamics can be found in [3]. The HARMONIE results (obtained with a maximum resolution about 1 Km) are refined in a local scale (about a few meters). An interface between both models is implemented such that the initial wind field is obtained by a suitable interpolation of the HARMONIE results. In addition, measured data can be considered to improve the reliability of the simulations. An automatic tetrahedral mesh generator, based on the meccano method [4], is applied to adapt the discretization to complex terrains. The main characteristic of the framework is a minimal user intervention. The final goal is to validate our model in several realistic applications in Gran Canaria Island, Spain. These wind simulations can also be used for air pollution modeling [5].

References

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