Large-eddy simulation of atmospheric boundary layer flow through wind farms

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1 INTRODUCTION

With the fast growing number of wind farms being installed worldwide, the interaction between atmospheric boundary layer (ABL) turbulence and wind turbines, and the interference effects among wind turbines, have become important issues in both the wind energy and the atmospheric science communities [1, 2, 3]. Accurate prediction of ABL flow and its interactions with wind turbines at a wide range of spatial and temporal scales is of great importance to optimize the design (turbine siting) of wind energy projects. In particular, flow prediction can used to maximize wind-energy production and minimize fatigue loads in wind farms. Numerical simulations can also provide valuable quantitative insight into the potential impacts of wind farms on local meteorology.

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