A survey of modelling methods for high-fidelity wind farm simulations using large eddy simulation

Large eddy simulations (LES) of wind farms have the capability to provide valuable and detailed information about the dynamics of wind turbine wakes. For this reason, their use within the wind energy research community is on the rise, spurring the development of new models and methods. This review surveys the most common schemes available to model the rotor, atmospheric conditions and terrain effects within current state-of-the-art LES codes, of which an overview is provided. A summary of the experimental research data available for validation of LES codes within the context of single and multiple wake situations is also supplied. Some typical results for wind turbine and wind farm flows are presented to illustrate best practices for carrying out high-fidelity LES of wind farms under various atmospheric and terrain conditions. This article is part of the themed issue 'Wind energy in complex terrains'.

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