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Investigation of wake characteristics in wind farm varying turbulent inflow condition[1] JISUNG NA, Yonsei Univ, EUNMO KOO, Los Alamos National Lab, MUNOZ-ESPARZA DOMINGO, National Center for Atmospheric Research, EMILIA KYUNG JIN, Korea Institute of Atmospheric Prediction Systems, RODMAN LINN, Los Alamos National Lab, JOON SANG LEE, Yonsei Univ
— In this study, we investigate the wake characteristics in wind farm varying turbulent property at inlet condition. To solve the flow with wind turbines and its wake, we use large eddy simulation (LES) technique with actuator line method (ALM). The wake characteristics in wind farm is important mainly in performance of wind farm because non-fully recovered wake induced by upstream wind turbines interferes power generation at downstream wind turbines. Turbulent inflow which contains the information of turbulence in atmospheric boundary layer is one of the key factors for describing the wake in wind farm accurately. We perform the quantitative analysis of velocity deficit and turbulent intensity in whole cases. In the comparison between cases with and without turbulent inflow, we observe that wake in case with turbulent inflow is more diffused to span-wise direction. And we analyze the coherent structures behind wind turbines at each row. Through above-analysis, we reveal how the wake is interacted with performance of wind farm.

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