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LES for wind turbulence in canopy layer at large urban area TETSURO TAMURA, HIDENORI KAWAI, Tokyo Institute of Technology, RAHUL BALE, KEIJI ONISHI, MAKOTO TSUBOKURA, Riken, KOJI KONDO, Kajima Corporation, TSUYOSHI NOZU, Shimizu Corporation — In order to accurately predict the wind flow in canopy layer of large urban area, we introduce LES based on BCM, Building Cube Method which is formulated on the very fine Cartesian mesh system. Houses and buildings were not aerodynamically modelled but directly reproduced their shapes in the numerical model, because the wind profile parameterization in cities requires the correct estimation of local flow field in the canopy layer close to the ground. Recent high-performance computing, HPC technique has developed distinctly, so high-resolution computation can apply to flows around a complicated configuration. In this case we have to deal with buildings, vegetation and street etc. as a part of numerical model. Actually LES using the Cartesian coordinate encounters the non-correspondence of directions between the street lines and the discretized mesh lines. Very fine mesh system by BCM can solve this problem, supported by Immersed Boundary Method. Also, in this numerical scheme, the computational process is so simple that the parallel algorithm and the memory access obtain the perfect efficiency. In this study, we have applied LES by BCM to the wind flow estimation over the real complicated urban surface.

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