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Application of BCM-LES model to flow and pressure fields over urban roughness TETSURO TAMURA, HIDENORI KAWAI, Tokyo Institute of Technology, RAHUL BALE, KEIJI ONISHI, MAKOTO TSUBOKURA, Riken — BCM (Building Cube Method) enables high-resolution CFD (Computational Fluid Dynamics) simulation by high parallelization performance. This study discusses the applicability of LES (Large Eddy Simulation) based on BCM to prediction of wind velocity and pressure around various building blocks in urban area. First, we validate the computed results of flows past 3D square cylinder in turbulent boundary layer. Fundamental accuracy of the surface pressure distribution on square cylinder is investigated by high-resolution BCM simulation with IBM (Immersed Boundary Method). Next, the BCM is applied to flow simulation of real urban area (Domain size: 25x12km). As a result of this simulation, the development process of urban boundary layer from coastal area to Tokyo central area is examined. Accordingly we show the present numerical model based on BCM-LES can represent sufficiently spatially fine structures and temporally unsteady fluctuations of turbulent flows with good accuracy. It is clarified that the complex pressure distributions acting on the buildings have been also reproduced from the sense of wind-resistance design of buildings in cities

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