

COMPARATIVE LARGE EDDY SIMULATION STUDY OF FLOW DYNAMICS IN URBAN-LIKE ENVIRONMENTS

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ABSTRACT

Particle pollution constitutes a major concern in urban environments. Effective urban design and evacuation planning require a thorough understanding of fluid dynamics around buildings.

This study evaluates several Large Eddy Simulation (LES) algorithms [1] using different configurations. We first simulate flow around a square cylinder embedded in two distinct setups -a channel flow and an atmospheric boundary layer [2]- to assess its validity and perform a detailed comparison of the resulting flow fields and turbulence statistics. Subsequently, we extend the simulations to a regular array of buildings to investigate urban canopy effects.

The ultimate goal is to perform high-fidelity simulations of a realistic urban environment, incorporating passive scalar transport to model the dispersion of particulate pollutants. These results aim to provide insights into LES accuracy and reliability for urban airflow and air quality applications.

REFERENCES

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