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An IB-LBM for modeling heat transfer and bushfire[1] FANG-BAO TIAN, LI WANG, School of Engineering & IT, University of New South Wales, Australia, JASON JOHN SHARPLES, School of Science, University of New South Wales, Australia — Catastrophic bushfire has happened many times over the world in the last two decades, destroying many assets and multiple facilities. The most devastating bushfires normally involve wind and terrain interactions. In order to predict the spreading process of bushfire in various geographical and weather conditions, it is necessary to improve understanding of the physical mechanisms of bushfireterrain-wind interaction. In this work, an immersed boundary method is developed for the numerical simulation of bushfire spreading mechanisms over complex terrains under different wind conditions. In this method, the lattice-Boltzmann method is used for the fluid dynamics. Large eddy simulation and wall model have been incorporated to handle the turbulence. The heat transfer is solved by using a finite difference method. The complex terrain is modeled by using an immersed boundary method. The numerical solver is validated by several benchmark cases, including heat transfer around a cylinder in a uniform flow, flow around a sphere at Re=10,000, and bushfire burning over a lee slope which is a typical terrain configuration.

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