

Interactive comment on “Evaluation of the Lattice Boltzmann Method for wind modelling in complex terrain” by Alain Schubiger et al.

Anonymous Referee #1

Received and published: 19 February 2020

Review of WES-2019-106, “ Evaluation of the lattice Boltzmann method for wind modelling in complex terrain”. by Schubiger et al.

Over all, this manuscript has good quality. The description and presentation of the results are very clear. I have some small comments:

Abstract, Line 5, Please spell out the acronym WAsP .

Abstract, Line 6, LBM is a mesoscopic level method, not microscopic method if one follows the standard definition.

In Introduction section, there are three articles should be cited. One and two are LES for Bolund Hill. The third is using MRT-LBM large eddy simulation for a stable stratified flow over a ridge for a laboratory test case.

C1

Ma, Y., Liu, H. Large-Eddy Simulations of Atmospheric Flows Over Complex Terrain Using the Immersed-Boundary Method in the Weather Research and Forecasting Model. *Boundary-Layer Meteorol* 165, 421–445 (2017). <https://doi.org/10.1007/s10546-017-0283-9>.

DeLeon, R., Sandusky, M. & Senocak, I. Simulations of Turbulent Flow Over Complex Terrain Using an Immersed-Boundary Method. *Boundary-Layer Meteorol* 167, 399–420 (2018). <https://doi.org/10.1007/s10546-018-0336-8>

Wang, Y., MacCall, B.T., Hocut, C.M. Zeng, X, Fernando, H.J.S. Simulation of stratified flows over a ridge using a lattice Boltzmann model. *Environ Fluid Mech* (2018). <https://doi.org/10.1007/s10652-018-9599-3>

Section 2.2, In your regularized-BGK LBM method, do you compute the strain rate tensor for LES using the fluid particle PDF? If so, it is worthwhile to write out the equations for computing the strain rate based on the PDF of the particle because this is critically important.

Section 3.1, In this section, you noted three westerly wind observational cases. It is probably good to point out that only the 270o case was simulated. It is also good to add some description on lateral (North, South) and outflow boundary conditions.

How about the turbulence (such as TKE) comparison? That will substantially improve the paper.

Interactive comment on Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2019-106>, 2020.

C2