

Interactive comment on “Large-eddy simulation and stochastic modelling of Lagrangian particles for footprint determination in stable boundary layer” by Andrey Glazunov et al.

Anonymous Referee #1

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The reviewed manuscript is generally well written, structured and provides all necessary details for the reproduction of the presented simulations.

I found just a few places where minor corrections would be desirable.

- 1) In Introduction, it is difficult to comprehend notations with regards to particles and model coordinates.
- 2) A new figure would help to explain the analysis and experiment set up. E.g. it is unclear why x_M is a vector but x, y not in Eq. (1). It is hard to understand what the coordinates of particles are and how the weight areas are computed. The figure should refer to Eq. (1) (2) and (3) and to the description on the page 4 lines 20-35.

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- 3) Explain what "ensemble average" means in the context of the study.
- 4) Why is the index "p" used both as subscript and superscript in Eq. (7) and later on. Could you make notations more homogeneous?
- 5) Page 6, lines 2-3. The sentence is not quite clear. What will happen if a particle leaves the volume and then reappears again in the same volume during the unit time interval? Will it be counted as a new particle? Or do you mean something different under "appearing ... during unit time interval".
- 6) The sentence between Eqs. (8) and (9) is impossible to understand.
- 7) Page 9, line 25. Use "provides better agreement" instead of "leads to better coincidence".
- 8) Section 4.2.3, also 5.1.4 and 5.1.5. It would be useful to place a discussion here into some experimental context referring to correlations between resolved and unresolved velocities (or velocities and stresses on different spatial scales), e.g. the work by Charles Meneveau and co-authors (Meneveau and Katz in *Annu. Rev. Fluid Mech.* 2000. 32:1–32).
- 9) Use Figures instead of Pictures in the paper.
- 10) General remark in connection to Figure 6. Figure 6 shows a negative footprint. It is hard to understand the physical meaning of the negative values. Could you include a paragraph discussion this aspect?
- 11) in several places, e.g. line 24 at the page 11, the Equation number is referred without "Eq." so that it is difficult to understand what those numbers are for.

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