

Answer to reviewer n.2 of the paper “Stochastic fields method for sub-grid scale emission heterogeneity in mesoscale atmospheric dispersion models” by Cassiani M, Vinuesa J. F., Galamarini S. and Denby B.

We thank the reviewer for the comments and suggestions, specific answers follow after the unabridged reviewer comments (reported in italics).

*General comment: the paper addresses an important problem in the actual modeling activity. I recommend the publication after some revision as follows. Specific comments:*

*1) The stress on the absence of closure assumption (see for instance in the Abstract) may be misleading. Turbulent convection is parameterised in eq. 2 and the source distribution is parameterised via the assumption of a specified pdf, for instance. Closures are required for the micro-mixing models. Other closures are avoided, as those concerning chemistry. This aspect is worth to be best written.*

We thank the reviewer for pointing out this issue. We clarified the point in the revised abstract.

*2) Looking at atmospheric applications, it is necessary to evaluate the impact of the subgrid variability of the sources changing the boundary layer stability and steadyness. Although this point is beyond the scope of the actual paper, it is necessary to make explicit mention to the atmospheric conditions simulated (a CBL, I guess) or to demonstrate that the results are independent on stability.*

We agree with the reviewer. In the present case a CBL was simulated and this is now explicitly stated. Different stability conditions could modify the results although we expect that near neutral conditions would give similar successful results. The applicability of the present method for simulating very stable conditions would need a thorough investigation.