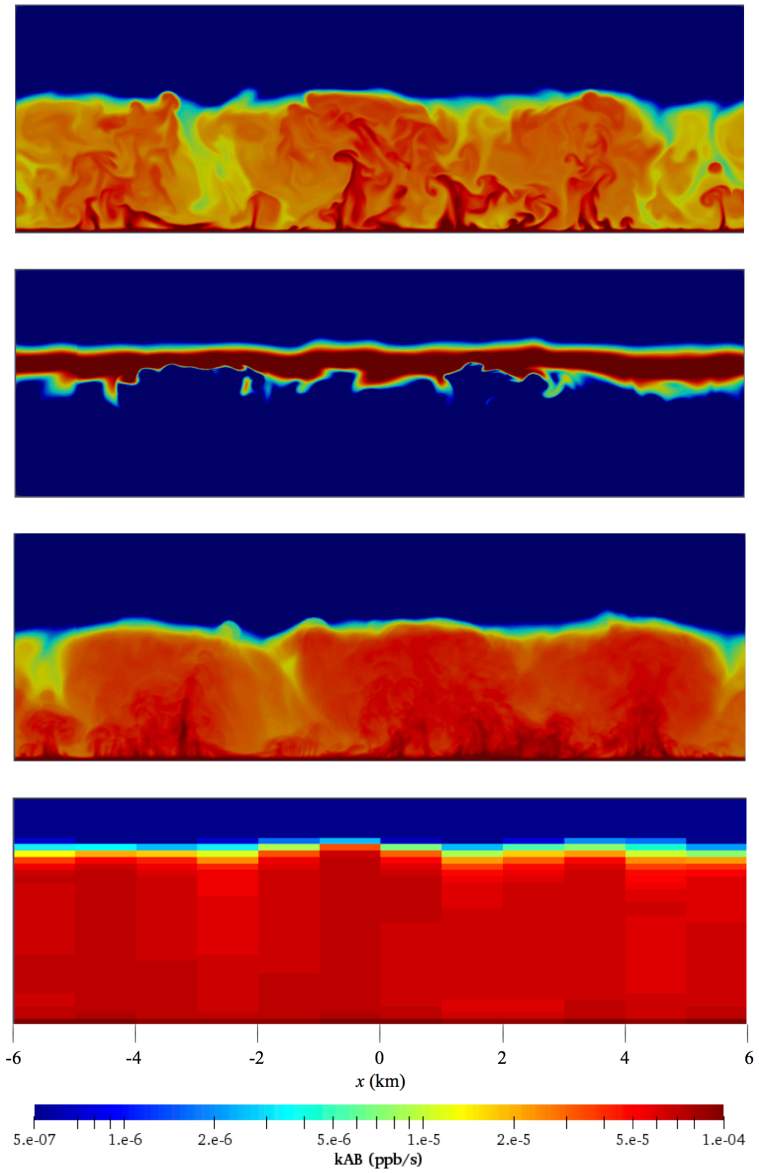
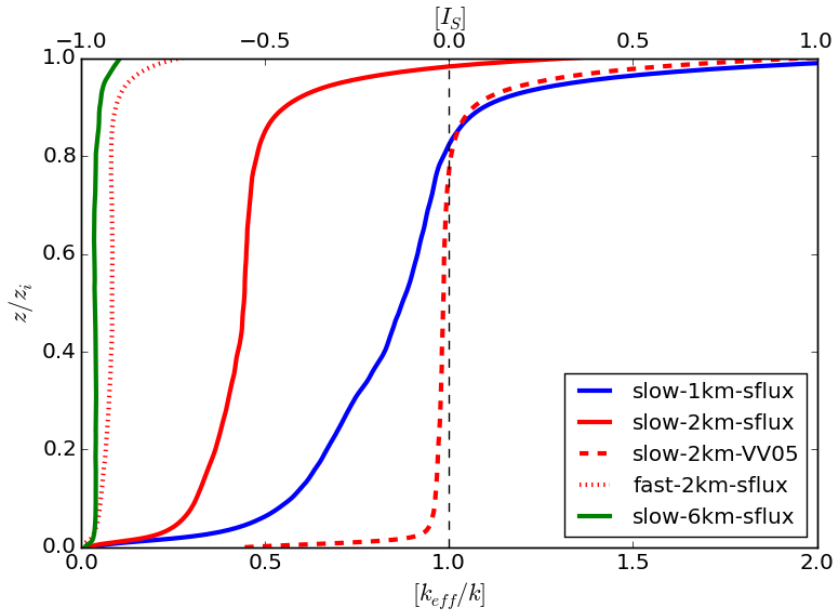
We first would like to thank you for your positive comments to our manuscript. It is good to learn that our manuscript has acknowledged most of your main concerns on the topic.

Regarding your specific comments, we would like to address them point-by-point:

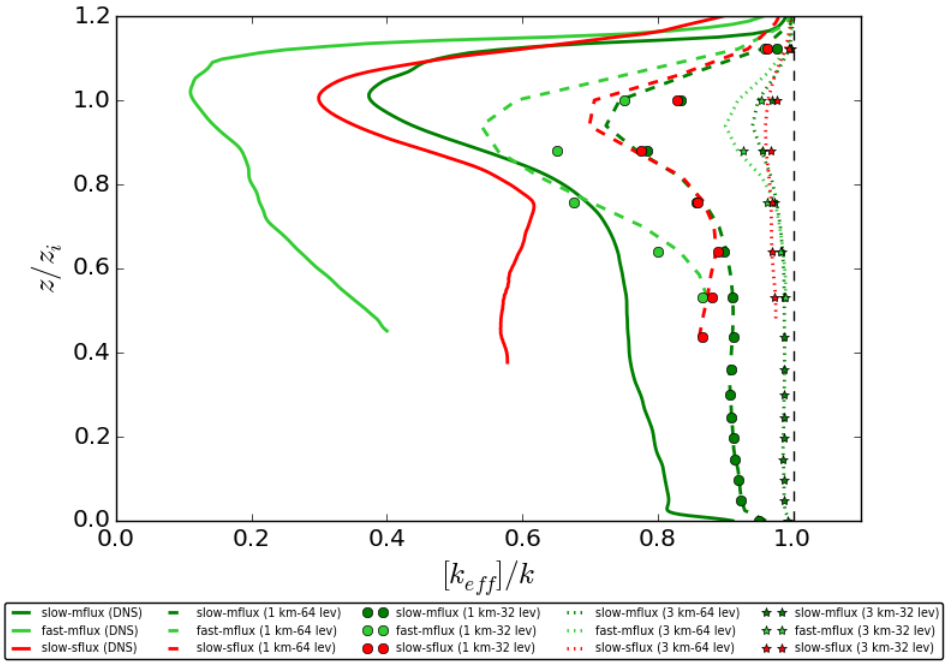
(1) The *x*-axis refers to the horizontal dimension of the simulation domain. We will add the label of the *x*-axis to indicate that in the next revision of the manuscript as in the following figure:



(2) The segregation coefficient I_S is presented in Figure 5 to match with the description in Section 3.2. We think that it will be easier to explain that the flows of Tracer A and B are co-related in the situation with $I_S > 0$ with the expression of I_S instead of k_{eff}. We suggest to keep the *x*-axis in I_S but to add an additional *x*-axis in k_{eff} in Figure 5 for consistency as the below figure:



(3) We have also performed similar runs for the fast chemistry cases in Figure 9. With fast chemistry, the underestimation of $[E]$ would be more significant, but the locations with the most prominent underestimation are still at the top of the surface layer and at the top of the boundary layer. We will present the fast chemistry case with the mflux emission flux scenario in Figure 9 for a comparison in the next revision of the manuscript as in the following figure:



(4) F_b is in fact defined on Page 5 Line 8.

(5) Thanks for the reminder. We will add the definition of the acronym CBL when the term "convective boundary layer" first appears on Page 2 Line 21:

> Many of these LES studies focus on the convective boundary layer (CBL), in which the imbalance between updraft and downdraft transport produces a large segregation of the reactants (Wyngaard and Brost, 1984; Chatfield and A. Brost, 1987).

(6) The high-resolution grids of the DNS simulations are mapped onto the lower-resolution grids of the coarse-grid models. The concentration fields obtained from the DNS simulations are then interpolated from the high-resolution DNS model grids to the lower-resolution coarse-grid model grids using local-area averaging. We have rephrased the description of the coarse-grid model method in Page 13 Line 4-6:

> ~~The tracer concentration fields are taken from the corresponding DNS simulations, and interpolated onto the grids of the respective coarse-grid models.~~ The tracer concentration fields obtained from the DNS simulations are interpolated from the high-resolution DNS model grids to the lower-resolution coarse-grid model grids. The volumetric averages of tracer concentrations in each model grid are then calculated. The statistics of these resolution-degraded concentration fields are then calculated as in Section 3.

We truly hope you agree that these revisions can improve the presentation of the manuscript.