Erratum to: A Simple Model for the Vertical Transport of Reactive Species in the Convective Atmospheric Boundary Layer

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We have discovered an error in Eq. 76, in our article Kristensen et al. (2010). The factor θ_4 was missing inside the braces in the numerator. Here we present the correct equation.

$$\gamma(\zeta) = \frac{\theta_4 \varphi_T \left\{ \theta_4 \mathcal{D} (F_2 S_1 + F_1 S_2) - \theta_1 (\omega^2 + \theta_4 \varphi_T) \frac{\partial S}{\partial \zeta} \right\}}{\theta_1 \{1 + \mathcal{D} (1 + S_1 + S_2) \theta_4\} \{\omega^2 + \theta_4 \varphi_T\}}. \quad (76)$$

Unfortunately, this mistake created serious errors in Figs. 2, 3, 4, and 5. The corrected figures are shown below. The bottom frames of Fig. 3 show in more detail the diffusivities close to the surface in linear-logarithmic plots.

Comparison with the old figures shows significant differences in all the figures. The most important observation is that the O_3 and NO diffusivities are very similar and never negative. However, the NO_2 diffusivities are considerably modified, in particular in the surface layer. They all have one altitude at which they go to $\pm\infty$. These anomalies are caused by the fact that the NO_2 concentration profiles go through a maximum where the derivatives become zero, while the fluxes, which are negative at the surface, have already become greater than zero.

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Fig. 2 Profiles of concentrations and fluxes with parameters corresponding to the values given in Table 1 in Kristensen et al. (2010)

Fig. 3 The dimensionless diffusivity profiles in a linear–linear form (*top frames*) and in a linear–logarithmic form (*bottom frames*). In each frame the conserved-species diffusivity is shown with a *thin line*

Fig. 4 Profiles of concentration and flux increments ΔS_i and Δf_i due to the covariance $\langle s_1 s_2 \rangle$ in the case labeled “a”

Fig. 5 Profiles of the ratio of production and destruction of NO_2 . The labels correspond to the four boundary conditions in Table 1 in Kristensen et al. (2010)

Reference

Kristensen L, Lenschow DH, Gurarie D, Jensen NO (2010) A simple model for the vertical transport of reactive species in the convective atmospheric boundary layer. *Boundary-Layer Meteorol* 134: 195–221. doi:10.1007/s10546-009-9443-x