Geoscientific
Model Development
Discussions

Open Access

Interactive comment on "Modelling atmospheric dry deposition in urban areas using an urban canopy approach" *by* N. Cherin et al.

Anonymous Referee #1

Received and published: 19 January 2015

General comments

The manuscript developed a coupled urban canopy and dry deposition model. Compared to the traditional bulk roughness-length model, this model permits more accurate calculations of the aerodynamic resistance (Ra) within the complex flow regimes of the urban canopy. This development would improve the dry deposition simulation over urban areas, especially for the Ra-dominated species (e.g., HNO3).

Specific comments

Section 5.1 "Evaluation by comparison with observations":

This section doesn't provide the model-observation comparison. In fact, it summarized the range and uncertainty of measurements in previous studies. I suggest shortening

this section to one paragraph and insert it into Section 5.2.

Section 5.2 "Base Simulation":

Are the surface resistances the same for different urban surfaces (e.g., roof, street, wall) in this new model? If yes, it is better not to use the expression like "resolves three types of surfaces" in Conclusions (page 8733, line 26).

Are the new model and the roughness-length model (ZHANG model) using the same meteorology inputs? It looks that ZHANG model was driven by WRF outputs while the new model utilized meteorology outputs from the Polyphemus platform.

It is unclear about the size of particle of which Vd is outputted as an example. From line 13-14 "The dry deposition velocities are computed for fine particulate matter (PM2.5)", it looks Vd for each size bin was calculated and the averaged Vd for PM2.5 was derived using some pre-assumed size distribution profile. While line 15-16 stated that Vd of PM with a single diameter was simulated.

Fig 7-9: It is better to show the urban area in the figures.

Technical corrections

page 8727, line 1: provide the full name of SD at its first appearance in the text

page 8728, line 18: Delta Vd=(Vanyon-Vroughnes)/Vroughnes x 100%

page 8729, line 4-5: there are no purple and green lines in Figure 11. Remove them in the text

Fig 10: in the legend, lambda -> lambda_p (consistent with the text)

Interactive comment on Geosci. Model Dev. Discuss., 7, 8703, 2014.