Atmos. Chem. Phys. Discuss., 14, C1729–C1731, 2014
www.atmos-chem-phys-discuss.net/14/C1729/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "A new parameterization of dust dry deposition over rough surfaces" *by* J. Zhang and Y. Shao

Anonymous Referee #1

Received and published: 23 April 2014

This study presents a new particle dry deposition scheme applying to rough surfaces and provides an alternative for the community to deal with an important process in air quality sciences. It is worth to be published after considering the following concerns.

1. The study states that the new scheme is an improvement compared to existing ones and compared the model results with Slinn and Slinn (1980) and Slin (1982). Note that the model of Slinn and Slinn (1980) was developed for water surfaces, not for smooth or rough land surfaces. Thus, the comparison of Slinn and Slinn (1980) shown in Figure 1 does not make sense to me.

2. The study stated that earlier models predict reasonable deposition velocity over smooth surfaces but underpredict over rough surfaces. Note that the model of Zhang

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

et al. (2001) actually predicts reasonable deposition velocity over rough surfaces and possibly overprecits deposition velocity over smooth surfaces (as shown in Petroff and Zhang, 2010). If the study really wants to demonstrate that earlier models are not suitable for rough or smooth surface, it should include comparisons with some of these earlier models (codes of these models should be available from those authors).

3. The study took wind-tunnel measurements as the basis for evaluating their new scheme and a few existing schemes. Field flux measurements suggested much higher deposition velocity than chamber or wind-tunnel measurements, especially over rough tall surfaces (e.g., forests). This study should first assess if the wind-tunnel measurements used here represent the real-world situation. Are the deposition velocities values from wind tunnel measurements similar to filed generated ones under similar (canopy, friction velocity) conditions? This should be briefly discussed in the paper. 4. Most collection efficiencies proposed in this new scheme are the same as or similar to those used in literature. But the final formulas in this scheme are actually more complex. It should be realized that a more complex scheme does not warrant more accurate results due to more input parameters involved (which had potential of introducing more uncertainties).

5. “Dust” is typically referred to road or soil derived particles in literature and is mostly in coarse particles. Secondary aerosol particles do not belong to dust. The scheme developed here applies to all sizes of particles and is not limited to dust particles. I would recommend replacing “dust” by “aerosol” or “particle” throughout the text.

6. Editorial comments. Only some examples are given and the authors should proofread the whole paper. P8064. L1: the first sentence of the abstract is not appropriate and does not reflect the status of all the existing schemes. Abstract: The abstract could summarize some quantitative results to demonstrate it improvement to exiting schemes. L15: “in the absence of precipitation” should be deleted since dry deposition happens all the time even (and generally faster) during precipitation. L17-18: the method is commonly called “inferential method”, dry deposition velocity (or resistance)

ACPD
14, C1729–C1731, 2014

are parameters of this method. P8065. L1: first sentence repeats information in previous page and is not needed. L9 and L16: use “firstly”, “secondly”. P8067. L10 repeats L23 in the previous page.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 8063, 2014.

ACPD

14, C1729–C1731, 2014