Atmos. Chem. Phys. Discuss., 13, C11038–C11040, 2014
www.atmos-chem-phys-discuss.net/13/C11038/2014/


Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Development of a parameterization scheme for calculating dry deposition velocity of fine, coarse and giant particles" *by* L. Zhang and Z. He

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Received and published: 14 January 2014

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The discussion paper presents an attempt to make a simple parameterization for particle dry deposition in atmospheric transport models. Unfortunately, we faced several confusing points in the paper, which seem to question its value.

1. The Eq.1, which underlies the considerations, is wrong and has been disproven



in several publications. Already Slinn and Slinn (1980) derived a more appropriate equation for dry deposition velocity with an artificial virtual resistance, which, unlike the Eq.1, satisfies the mass conservation requirement between the surface and reference height. However, it did not resolve the principal problem demonstrated by Venkatram and Pleim (1999). The essence is that the electrical analogy is not applicable to particles with noticeable sedimentation and cannot be made to comply by any means. This paradigm is valid exclusively for gases. With correct solutions available from recent publications, partly quoted by the authors, reviving the obsolete approach seems confusing.

2. The new parameterization is shown to reproduce the results of old Zhang (2001) approach. However, that scheme has about as many fitting parameters (4 parameters x 15 landuse categories x 5 seasons, with some omissions) as there are experimental data points generally available from wind tunnels and field studies. How can that number of parameters be verified? Moreover, comparison made against a few wind-tunnel observations suggested strong over-estimation of dry deposition velocity – see Kouznetsov Sofiev (2012), quoted by the authors. Unfortunately, we are not aware about any comprehensive evaluation of Zhang et al (2001) parameterization. Thus the agreement of the new parameterization with it can hardly be a justification. Measurements have to be used instead.

## References

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 31289, 2013.