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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "A revised parameterization for gaseous dry deposition in air-quality models" *by* L. Zhang, J. R. Brook, and R. Vet

**Anonymous Referee #2**

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General Comments: This paper describes the revision of a scheme for calculating dry deposition velocities for a variety of different species. The improvements are a new non-stomatal formulation, better treatment of winter surface resistances, and seasonally dependent input parameters. The improved model is able to reproduce measured deposition velocities for ozone and sulphur dioxide accurately. The paper describes clearly the parameterisations used for the various resistance terms and the values of the variables needed. The authors have also used the model to calculate typical deposition velocities for several compounds under a set of standard conditions, and provide a useful discussion of the results.

Specific Comments: In the Model Description (page 1781, line 6) the authors mention

the mesophyllic resistance R_m, but do not indicate what values were used in their model calculations. Or, is this resistance implicitly included in the calculation of the stomatal resistance, R_st ?

Page 1782, lines 16-23. W_st is dependent on the solar flux - but would the dependence only apply to sunlit leaves at the top of the canopy ? Many of the leaves lower down in the canopy will be shaded.

Page 1789, lines 10-15. The authors state, rightly, that the model predicts the observed deposition velocities over a deciduous forest very well. However, it would be useful to plot the results from the older model (Zhang et al., 2002a) as well on figure 3. Then, the improvement obtained with the new parameterisations would be clearer.

Technical Corrections: Page 1786, line 5. Change sentence from " ... over land surfaces with no dew ..." to "over land surfaces where no dew".

Figure 3. Caption should include the units of the dry deposition velocities.

Y-axis caption for Figure 4. Add a space between "m" and "s-1". The data are not a series, so "joining the dots" isn't appropriate here. The figure would be better without the lines, or perhaps as a bar chart like Figure 5.

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Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1777, 2003.