

Interactive comment on “Systematic lumping of complex tropospheric chemical mechanisms using a time-scale based approach” by L. E. Whitehouse et al.

L. E. Whitehouse et al.

Received and published: 28 August 2004

In the method, the size of the lumps is controlled in order to minimize the propagation of errors. Species are added into the lumped group in order of decreasing similarity of lifetimes. When the addition of a new species to the lump leads to a significant increase in overall error of selected important species, growth of the lump is terminated and a new lump started. The lumps are therefore of differing sizes with varying ranges of reaction rates for species within the lump. The range of reaction rates for the lumped compounds within each group are shown in Tables 2 and 3 of the paper. Most of the rates are equivalent and in each case it is the reaction rates with OH that differ between the component species within the lump. In some cases the range of reaction rates with OH vary by only a few percent but in other cases, such as with the two large groups of peracids, the rate constants may vary by almost a factor of 10 without significant degra-

dition in accuracy of the final lumped scheme. This suggests a lower sensitivity to the individual rates of reaction with OH for these compounds. For peroxy acyl nitrates, the lumps tend to be smaller with lower relative differences between the smallest and largest rates of each compound within the lump suggesting higher sensitivities.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 3785, 2004.

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