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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Hydroxyl radicals maintain the self-cleansing capacity of the troposphere" *by* J. Lelieveld et al.

J. Lelieveld et al.

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We have not reorganised the paper (as indicated by referee 2), since the review did not provide suggestions. Nevertheless, we have added text to the abstract and section 1 to better explain the motivation and provide a roadmap.

Abstract: p. 3700, l. 1: Thousands of megatons natural and. . .

p. 3700, l. 7 (sentence added): Global models and observations of trace gas distributions from global networks have been used to study geographical and temporal changes in tropospheric OH.

Section 1 (end) presents the following roadmap:

p. 3701, l. 22: In section 2 we discuss the main factors that determine the stability of the OH chemical system. Section 3 evaluates modelling results, indicating regional

OH redistributions and global mean OH changes in the 20th century. In section 4 we analyse to what extent measurements from global networks are consistent with these modelling results in view of OH responses to tropospheric changes on a decadal time scale. Section 5 summarises our conclusions, highlights main uncertainties, and presents suggestions for future research.

Section 2: p. 3701, l. 24 (reformulated sentence): A characteristic of chain reactions is that the radicals are recycled, and the length of the chain – i.e. propagation or termination – is of key importance.

Section 3: p. 3703, l. 22 (remark added): In the marine environment NO_x emissions are generally low or absent, and O_3 loss dominates O_3 formation. Therefore the OH chemical system is strongly dependent on O_3 transport from the stratosphere and on transport of pollutant O_3 . . .

p. 3704, l. 2 (remark added): In contrast, the lifetime of O_3 is typically a few weeks to a few months, therefore, O_3 can be effectively transported over large distances.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 3699, 2004.

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Interactive Comment