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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A discussion on the determination of atmospheric OH and its trends" *by* P. Jöckel et al.

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The authors describe a computer experiment that can be used to learn about global OH and its trends, and potentially prepare for a real tracer-release experiment. It is a good first step to make us all thinking about how such an experiment could look like. A number of issues come to my mind, already partly reflected in the comments by Krol and Singh.

- The choice of tracer should reflect the specific trace gas your are interested in: CH4 lifetime is strongly dependent on the high OH concentrations and temperatures in the tropics. CO will also react in the upper troposphere. The IPCC aircraft assessment (1998) learned that changes in OH in the upper troposphere will affect CO and through transport again CH4 in the tropics. Thus it is important to have a number of tracers

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which reflect different parts of the atmosphere.

- So far the paper has focussed on using one model to optimize the sampling strategy. However all models have their own strengths and weaknesses. Some feel for the robustness of a particular design may be obtained by testing it in another model.

- Model calculations indicate that global OH (as methane lifetime) has an inter-annual variability of at least 2 % and probably higher. It would be wise to design an experiment including an artificial global OH variability of 2-4%. Likewise if there were an OH trend of the order of 1 % per year is your sampling strategy adequate to retrieve this trend?

- Any artificial tracer will have other removal mechanisms than only OH. Issues may be uptake in the oceans and terrestrial biosphere, removal by clouds, reactions (e.g. photolysis) in the stratosphere. It seems imperative that parameters like HenryŠs law constant, hydrolysis rates and photolysis rates are determined for potential tracers. The procedure followed by AFEAS in the beginning of the 1990s to test the new generation of HCFCs and HFCs may serve as an example of the screening for potential ŚotherŠ processes.

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 1261, 2002.