

Interactive comment on “The impact of air pollutant and methane emission controls on tropospheric ozone and radiative forcing: CTM calculations for the period 1990–2030” by F. Dentener et al.

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General Reply to the reviewers and Dr. Prather.

We appreciate the positive and detailed comments of the two anonymous referees (#2 and #3) and of Dr. M. Prather, who all emphasize different aspects of our paper. In this reply we will address their main comments, whereas in separate comments, we will reply to the numerous comments that were more technical of nature.

All comments emphasize the importance of the evaluating the new “positive” IIASA CLE

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(current legislation) and MFR (maximum feasible reduction) scenarios as compared to the more “pessimistically” flavored SRES scenarios. Despite their general consent both reviewers place some caveats to the two scenarios.

Referee # 2 stresses the importance of our calculations regarding air quality and Radiative Forcing as compared to the IPCC-TAR calculations, especially regarding the role of methane emission reductions. However, referee #2 also recommends clearly distinguishing the CLE scenario from Business-as-Usual, especially since there is little experience with implementing air pollution policies in developing countries. In this context Referee #2 also questions the timing of implementation of new policies.

At this point it is worthwhile to mention that this work is currently being followed up by model exercise performed by a large group of global atmospheric modelers (http://www2.nilu.no/farcry_accent/). In addition to the two scenarios evaluated in this paper; we also contrast them to the most pessimistic SRES A2 scenario. One could summarize these three scenarios as follows: 1. CLE: how will tropospheric ozone develop when currently decided policies are effectively and timely implemented? 2. MFR: what would be the situation if we would implement all technology that we have available nowadays, but do not worry about what it costs? and 3. SRES A2; what if these policies for some reason do not get implemented ?

We expect that these three scenarios provide some guidelines on the importance of implementing policies on regional scales and their hemispheric and global effect on ozone and climate in 2030. Of course in reality some of the currently decided emission reductions (CLE) will in some regions not or with delay be implemented. However, there are clear signs (as discussed in our paper) that especially in S. America and Asia, pollution control measures are taken seriously, simply because the negative effects of air pollution are becoming too large. Continuous monitoring and model verification in the next decades is necessary to assess the effectiveness of the policies.

Referee # 3 emphasizes the importance of methane control strategies to mitigate both

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climate change and air pollution. Also Dr. Prather picked up the message that when classical air pollution controls (NO_x and VOCs) are implemented, it becomes even more important to reduce CH₄ emissions.

We fully agree with the comments above and where necessary we will emphasize these messages more clearly in our ACP paper.

Quite some of the comments by Referee #2 and Referee #3 ask for better explanation of model inaccuracies and model differences. Were possible we will try to do so in the detailed response to the referees, in this general comment we would like to stress again that we choose to perform this pilot study with two markedly different models STOCHEM and TM3; to assess if the models converge in their response to the emission scenarios.

The conclusion is that the two models differ in quite some details, similar to the model differences found in the IPCC-TAR report. They span a range of different model responses, and give a first impression on model uncertainties. However, most importantly, the main conclusions regarding methane and ozone trends, and their associated forcings, seem to be consistent in both models. However, we will have to await further confirmation for the results of the model inter-comparison experiment that is currently performed.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 8471, 2004.

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