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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A climatology of surface ozone in the extra tropics: cluster analysis of observations and model results" *by* O. A. Tarasova et al.

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Thank you very much for your valuable comments. Based on your recommendation we have re-done the analysis using the same number of clusters for measurements and for the model output, which changed slightly the results.

I wonder what the use is of that data reduction beyond the purely statistical results.

This can be considered as an independent test for the models and their ability to reproduce general features of the measurements, unlike site-by-site comparisons, which hardly provide systematic information on the reasons for agreement or discrepancy between model simulations and measurements. Moreover, this approach helps to find out some main important features of the data sets, which can be rather helpful consider-

ing the enormously fast growing number of available data on atmospheric composition, both simulated and measured.

Also I find the diversity of stations within the same cluster surprising, for example, a station in southern South America is in the same cluster as most Central European stations.

This indicates that the observed seasonal-diurnal cycles are comparable, although being possibly (or likely) controlled by rather different processes.

Regarding the difference between the number of clusters obtained from the observations (5) and the model (4), I suppose it would be possible to redo the analysis for the model data, but prescribing the number of clusters needed, namely 5. In this way a one-to-one correspondence could be achieved between the model and measurement clusters.

Following your recommendation, we have re-done the complete analysis using the same number of clusters in the model and in the measurements, but there was no one-by-one correspondence between regimes obtained. Nevertheless, different regimes of photo-chemical productions/destruction could be separated.

The technical corrections are taken into consideration.

p12545 l17: Why do you exclude tropical data?

They have rather different regimes of the surface ozone and the data coverage is poor.

p12547 l8-9: Replace "nmol/mol a year" with "ppbv/year".

The units are nmol/mol everywhere in the paper.

p12547 l9: I guess that stations in the same cluster may have quite a range of different ozone trends associated with them?

Yes. We detected a range of values for particular sites but did not compare trend values

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inside each cluster.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12541, 2007.