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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Distribution and origin of ozone in the eastern Mediterranean free troposphere during MINOS (August 2001)" *by* G.-J. Roelofs et al.

Anonymous Referee #2

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The authors have shown a number of general trends for the estimated contribution of various sources to the ozone distribution observed over Crete during MINOS, and in my assessment this is the main result of this manuscript. While the authors show some examples of comparisons of their model derived ozone distributions from stratospheric and tropospheric sources with measured ozone distributions, they are by no means sufficient to be a validation of their model. They agree in some cases and in others they have significant disagreements. The disagreements are rationalized in most cases, but they leave an uncertainty in the model results that cannot be ignored when using the model to "determine" the contribution from various sources to the ozone distribution. The authors point to several potential "deficiencies" in the model, and this is appropriate. But there are other sources of errors, such as precursor source errors

and efficiency of cloud pumping in source regions that also contribute to uncertainties in the model results. The model can only estimate the relative contribution to the ozone budget from various sources, and in this respect it is a valuable result. However, I would like to see the word "estimated" in the title and throughout the manuscript to more accurately reflect the remaining uncertainties in the model results.

Also, I believe that the "very good agreement" in section 3.1, line 4 should be changed to "good agreement" and the "good agreement" in the Conclusions should be changed to "reasonable agreement".

Section 4, line 10: It is not clear from the ozone plots in Fig. 4 that the "mid-tropospheric ozone maximum is associated with ozone of stratospheric origin when the tropospheric ozone is also peaking in that region with over 50 ppbv rather consistently. Also, it would be helpful to label at the top of each sub-plot the component that is being displayed and show a color bar for the ozone values.

Why use August 3 as the example in Figure 5 when other examples were given and explained previously in the text? For consistency, it would be better to use the same case used in Fig. 1

In conclusion, the manuscript does not provide enough evidence for completely validating their model, and as a result, the model results only provide an "estimate of the relative contributions", which still have some significant uncertainties associated with them. If this is made clear in the title and throughout the paper and the above items are addressed, then I recommend publishing it.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1247, 2003.