

Interactive comment on “Global ozone forecasting based on ERS-2 GOME observations” by H. J. Eskes et al.

Anonymous Referee #1

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Referee comment for Eskes et al. (ACPD 2002)

"Global ozone forecasting based on ERS-2 GOME observations" by Eskes, van Velthoven and Kelder.

General comments:

I think this is a very good paper, with high scientific significance. The authors describe a pioneering ozone forecasting system based on the powerful technique of data assimilation. Ozone forecasting is becoming of great interest to both the operational and research community, not least because of the increasing availability of global ozone measurements (e.g. from GOME and, it is expected, from Envisat). The motivation behind this interest includes UV forecasting, tropospheric pollution, and the wish to obtain wind information in the tropics from ozone measurements. Pioneering efforts such

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as those from KNMI will help pave the way to routine ozone forecasting over the next few years.

Overall, my comments are more on some of the details rather than the general tenor of the paper. I think that by addressing the specific comments discussed below, the authors will make the paper clearer and, consequently, more accessible to the scientific community.

Specific comments:

P. 922: lines 15-20: I think there should be more discussion on the nature of the errors, and the treatment of bias. For example, if the measurement errors are Gaussian (as well as unbiased and uncorrelated) the minimum variance and maximum likelihood estimates are the same. What happens if the errors are not Gaussian? Can we expect the errors to be Gaussian? How do we check that the errors are indeed Gaussian?

P. 923: line 19: Please add SODA web-site. P. 923: line 22: It might be useful to add that the ECMWF ozone forecasts are available from April 2002.

P. 925: lines 10-28: Perhaps mention that the Cariolle scheme is used by other groups involved in ozone data assimilation and/or forecasting: ECMWF, the Data Assimilation Research Centre (DARC) at Reading. Presumably the Cariolle scheme is also important when the observations are not available?

P. 926: line 7: retrieval -> retrieved P. 926: lines 22-23 middle panel -> top panel

P. 927: line 3: middle panel -> bottom panel P. 927: line 11: what do you mean by "new" GOME observations? P. 927: lines 11-14: How do the figures quoted compare with the GOME errors? P. 927: line 22: below is -> below are

P. 928: line 20: by "will have a positive contribution to C_t " do you mean "will tend to inflate C_t "?

P. 929: line 3: middle and top panel -> top left and top right panel P. 929: lines 4-21:

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Deque (Tellus 1997) discusses the length climatologies need to be to avoid overestimating anomaly correlations when the same climatology is used for the forecast and the verifying analysis (as Eskes et al. do). Perhaps the authors could discuss this point further. Another thing they could (if possible) is repeat the calculations of anomaly correlations using climatologies of different length in time. P. 929: line 11: Miyakoda et al. (MWR 1972) is usually cited in connection with the cut-off at 0.6.

P. 931: line 2: This in -> This is in P. 931: line 10: Is the characteristic length scale/ time scale relevant to the parameters in the Cariolle parametrization?

P. 932: lines 1-10: Perhaps the authors should comment why Et does not tend to the square root of 2? P. 932: line 19: Is there a reference for the statement about the ozone hole in 2000? P. 932: lines 21-22: top panel -> top left panel; Africa -> Southern Africa P. 932: line 24: second panel -> top right panel

P. 933: line 1: Africa -> Southern Africa P. 933: line 3: lower panel -> bottom panel P. 933: line 5: which depends quite sensitively on details -> which is quite sensitive to P. 933: line 13: Is there a reference to the events of Autumn/Winter 2001/2002 (NH)? P. 933: line 15: top panel -> top left panel P. 933: line 17: verifying analysis -> verifying analysis (bottom panel); three day forecast predicts -> three day forecast (top right panel) predicts

P. 934: line 15: forecasted -> forecast

P. 936: line 32: submitted -> in press

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