

Reply to Reviewer 1

1) Introduction: Can you add a description of other existing datasets (if any) like the one of Arosa?

There is a long series from Tromsøe and there is Dobson's own record from Oxford going back to 1924 (although ending in the 1970s). A sentence on these two series will be added and corresponding references will be given.

2) Pag. 2 line 61: remove D#17 is not relevant here (it is just the code of the instrument) and replace it with Wellington coordinates. Do the same for Downham Market.

We remove D#17. Coordinates for Wellington are added (though not to the title, but the text). The same is done for Downham Market.

3) Pag. 3 line 90: add C' wavelength values. This is also needed to understand why they have so low ozone influence (as stated in Pag. 6 line 176).4) Pag. 5 line 161: Add wavelength for AD and BD, A... you can also add a table if you prefer. In general, I think you should provide more details on instrument configurations.

Thank you for this comment. Adding a Table is a good suggestion and will be done in the revised paper.

Table 1. Wavelengths (nm) and absorption and scattering coefficients for different wavelength pairs for standard settings (Komhyr et al. 1993, 2007) and for the instrument in Kelburn

Pair	short	long	α - α'	β - β'
A	305.5	325.1	1.806	0.114
B	308.8	329.1	1.192	0.111
C	311.45	332.4	0.833	0.109
C'	332.4	453.6	0.040	-
C (D#17)	311.2	332.4	0.851	0.111
D	317.6	339.8	0.367	0.104

5) Pag. 10: Please give more details on Ozone Office files and the ones from WOUDC (covered period, number of data, reference).

More information will be given in the revised manuscript. Do you mean the PDF file from Environment Canada and the Archive Folder from the UK Met Office (cited in the paper as „Normand, 1961“)? Both go back to the International Ozone Office and both are rather loose collections of data. The file from Environment Canada is a PDF-File with 1527 pages entitled „Early Total Ozone Information“ and a data range on the title page given as 1959-1964 (which is incorrect as there are also earlier data). The „Normand, 1961“ files were sent to me (SB) as photocopies of an archive folder by Stephen Farmer from the UK Met Office back in 2000. There is a large overlap between the two sources, but also unique material in each of them.

This will be detailed in the revised paper.

6) Pag. 10 lines 311-313: “good agreement”: please be more quantitative on the agreement, bias, the number of data used for this comparison or add a plot.

We added in the text the correlations between our reworked data and those from the Ozone Office and WOUDC (after correcting for the date shift, but before excluding two outliers).

7) Pag. 11 line 351: In my opinion the paragraph “Comparisons with...” should be moved into the results section. In addition, I find this section quite confusing, it is not really clear what you compare to what. Possibly it would be better to report the comparisons separately for Wellington and Downham Market in their respective subsections of section 4.

The intention of this paragraph was not to introduce results, but simply to report the data sets (and methods) used. However, we agree that it is not well written (in particular, the last two paragraphs contain a discussion of previous results, which should come later). In the revised paper we will change

the title of the section to „Data sets used for comparisons” and will shorten the last two paragraphs to only a list of data sets compared.

8) Pag. 13 line 412: In my opinion the order should be maintained to help readability, Wellington before Downham Market.

We will swap the results in the revised paper.

9) Pag. 13 lines 422-424: It would be nice to see these plots also.

We will add a second scatterplot showing results of observations against 20CRv3 and CERA-20C (the figure is given below in our reply to comment 13).

10) Pag 14 line 431-432: “good agreement”: once again, please quantify.

We will change the sentences in the following way: „We find a good agreement between Downham Market and neighbouring stations as well as with ERA-PreSAT total column ozone fields in all cases (over the entire record, the standard deviation of differences is 25.9 DU). In fact, most of the stations show a good agreement (in the range of 30 DU), in this sense confirming the value of historical total column ozone data.“

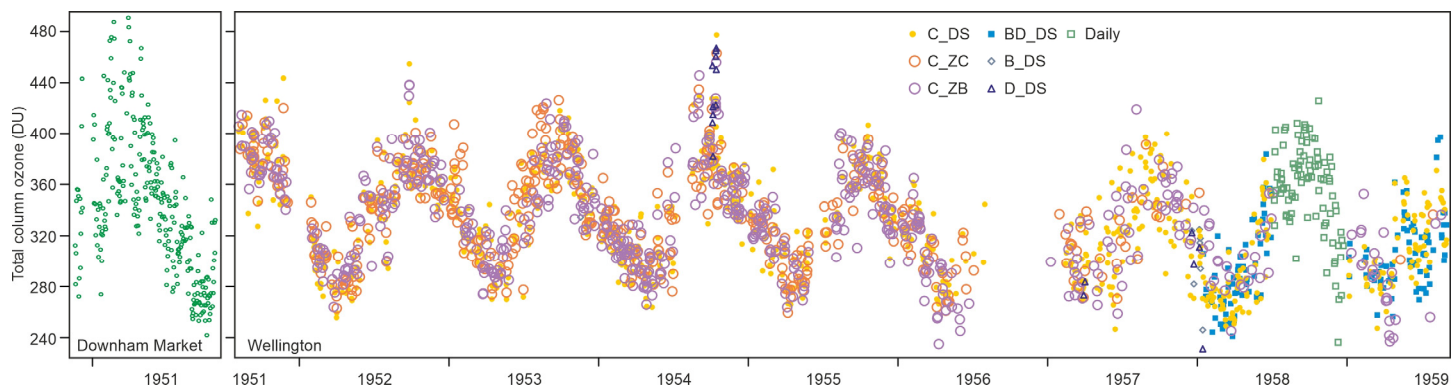
11) Figure 4: Please add correlation and number of points on plots.

We will add numbers to the plots (all numbers are already given in the text).

4a: $n = 136$, $r = 0.85$, 4b: $n = 429$, $r = 0.97$, 4c: $n = 65$, $r = 0.76$, 4d: $n = 178$, $r = 0.96$

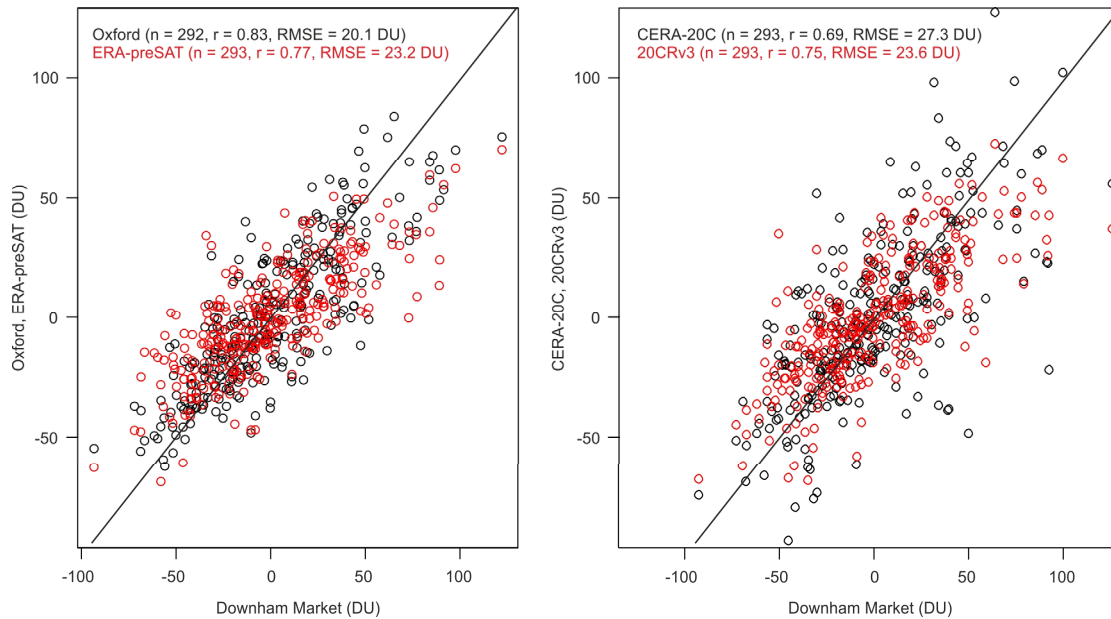
12) Figure5: Figure 5 is ok. However, I have a suggestion. Since the paper is on the two datasets (Wellington and Downham Market) and also the title of the paper refers to both datasets, it would be better if you also show the Downham Market series, even if it is only one year of data. You may add a small panel on the left to this plot with the Downham Market time serie.

Thanks for this suggestion. We will show a figure that includes the Downham Market data (see below).



13) Figure 6: This plot is too qualitative. Please add correlations, bias, RMSE, number of points on plot. Possibly also the use of histograms and/or two different plots for the comparison with Oxford and ERA-presat instead of scattered plots should improve the quality of the plot and give a more quantitative idea of the agreement.

We will add corresponding plots for all reanalyses and including the number of points in the plot, correlations, and RMSE (see below). We prefer scatterplots in order to better spot outliers or systematic behaviour. Comparison is also easier since the x-axis is the same (observations).



Technical comments:

1) Pag.4. line 111: add acronym for NIWA also here
Will do.

2) Pag. 4 line 118: Add coordinate
Will do.

3) Pag. 8 line 227: MICA: add acronym and reference
Will be added.

4) Table 1 and Table 3: this is just a suggestion, possibly you can replace “compared series” in Table 1 with “Downham Market vs”. Something similar can be made in Table3 by filling the first cell with “Wellington vs”

Very good suggestion. This will be introduced in the revised manuscript.

5) Data availability: As far as I understand from the abstract and conclusions, Wellington and Downham market datasets will be available from the World Ozone and Ultraviolet Data Centre (but they are also in the paper supplement). I suggest to add the direct link to WOUDC in the “Data availability” section in the final version.

We will try to do that in the final version if the link is available by then.