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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An exploration of ozone changes and their radiative forcing prior to the chlorofluorocarbon era" *by* D. T. Shindell and G. Faluvegi

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We thank Dr. Bronnimann for his valuable suggestions. His comments primarily refer to our evaluation of the 1957-1975 column ozone data. One of the main points is that the analysis could be improved by using upper level meteorological data as a reference time series for quality control. We fully agree that this would be an improvement upon our technique, but as we discuss in our reply to the similar suggestion offered by Dr. Staehelin, we feel that this is beyond the scope of our investigation. Thus we concur with Dr. Bronnimann that these suggestions would indeed represent a step forward in a future paper. However, even for the present paper, we would like very much for our analysis technique to be completely clear, and will revise the appendix to say explicitly that we used monthly mean data, which we deseasonalized and annually averaged prior to performing our trend analysis. We appreciate Dr. Bronnimann pointing out

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these oversights.

Dr. Bronnimann also comments on the corrections that had to be applied to the earliest data from Bismarck, Srinagar and Quetta. He notes that there is so little data before the large jumps at Quetta and Bismarck that it is difficult to correct accurately. We agree that this is the case, and in hindsight, we feel that it probably would have been best to leave out these first months of data. But since there is so little data before the break, once it is matched to the following years, it has a minimal effect on the trend. As we note in the Appendix, leaving out the data before jumps at all corrected stations changes the overall trend from 3.5 +- 2.2 DU to 4.0 +- 2.4 DU. Leaving out just the Quetta and Bismarck data has no effect on the overall trend estimate.

Another comment is that in some cases two stations located near to each other show quite different trends, and that this may indicate that one is of poor quality. We wanted to avoid any arbitrariness by removing stations for reasons such as that they disagree with their neighbors. While the use of reference time series might allow a rational selection based on inhomogenaity, we continue to believe that for our initial analysis it is most appropriate to include all the stations unless they violate our selection criteria. We note that due to our statistical weighting by uncertainty, the Oxford trend has 6 times the weight of the Bracknell trend, and the Vigna di Valle trend has 3 times the weight of the Cagliari trend. So fortunately, the more reliable stations are dominating the results, at least in the two cases discussed by Dr. Bronnimann, and we expect that a refined analysis, while worthwhile, will only have a small effect on the overall results.

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