

Interactive comment on “A Global Total Column Ozone Climate Data Record” by Greg E. Bodeker et al.

Anonymous Referee #1

Received and published: 3 November 2020

This paper presents two global total ozone data sets based on multiple satellite and ground-based data records. The NIWA-BS data set is a update of a 20 years old data set by Bodeker et al., 2001 and NIWA-BS-filled data set as a new set that is based on NIWA-BS, but has extrapolated values in the areas where no NIWA-BS data exist. These data sets are useful for various applications related to the stratospheric ozone. The paper is well written and can be published after minor revisions.

Major comments:

1. From Figure 7, it appears that the NIWA-BS TCO data set has a negative bias against all validation data sets in the Arctic in winter. This should be investigated further. In addition, how large are the differences for the years with large Arctic depletion (e.g., 1997, 2005, 2011)? Does NIWA-BS TCO capture these events correctly? Per-

haps such comparisons can be added to Figure 8.

2. Validation of the NIWA-BS-filled data set should be done more thoroughly. Why do not you have a day in March of October when global ozone data with no gaps are available. Then keep only data over the areas where data were available on October 31, 1978 and compare the reconstructed field with the real one. This would confirm the uncertainly estimates for the final reconstructed field. The same could be done for November 1, 1978 data to how the algorithm performs in the case of minor gaps.

3. There should be some validation of the NIWA-BS-filled data set in the polar night areas. They are the most interesting regions. Some total ozone data, such as moon measurements by Dobsons and Bowers as well as from integrated ozonesonde profiles are available.

Specific comments:

p.4, Table 1. Do not use tiny.url. They are shorter, but they may not work in a browser. I've checked the links. Some of them do not work, the other require a password.

p. 5, l. 2 Why is it assumed that the drift is linear? Have you done any tests?

p.5, l 15. Some GB stations (e.g. Mauna Loa) have a bias with satellite data due to high elevation that is not properly accounted by large satellite pixels.

p.5, l 15. Dobson and Brewer instrument have different dependence of stratospheric temperature. This introduces a seasonal difference that could be as high as 2%. Ideally, Dobson data should be adjusted using effective stratospheric temperature.

p.5, l 15 What Dobson and Brewer data were used – all data? DS only? What about SAOZ data? They could be very useful at high latitudes.

P. 16-18. Fig 9-11 are not very informative. Perhaps they should be in a supplement

p. 19, Fig 12. It may be better to show some interesting periods/events rather than “twelve selected months/years”

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p. 27, l. 24. Please justify why 2000 was used as the trend turning point.

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