

Interactive comment on “The use of QBO, ENSO and NAO perturbations in the evaluation of GOME-2/MetopA total ozone measurements” by Kostas Eleftheratos et al.

Anonymous Referee #2

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General comments

The study of Eleftheratos et al. evaluates the performance of different satellite datasets, giving particular emphasis on the GOME2/MetOpA, of the total ozone column (TOC) based on their ability to depict natural fluctuations, such as QBO, ENSO and NAO. In addition it provides an updated validation of the satellite datasets by comparison with ground based TOC measurements, using all the available networks and instruments at WOUDC (i.e. Brewer, Dobson, Filter radiometers etc). The paper is well written overall, making extensive use of the available literature and the results are visualized in an appropriate way, although they could have improvements (see specific comments

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below). It is an interesting addition in the studies for the continuous evaluation of the good performance of satellite platforms, fits well on the scope of the journal and thus I suggest to be accepted after some minor changes.

Specific comments

Figures 1 and 2: Maybe you could select a different combination of colors since now it is hard the differences between the different datasets to be distinguished. Alternatively you could plot the monthly differences, instead of the actual total ozone column values.

Page 6 lines 214-215: It is mentioned that the highest differences are found over the southern high latitudes, however from Figures 1 and 2 it is depicted that these are presented over the Northern high latitudes (60 – 80 N) and the highest variability (standard deviation of the mean difference) is observed over the latitude belt (60 – 80 S). In addition, these differences (especially at the high latitudes) can be affected by the fact that you have not used the same days for the construction of the monthly mean values for the different datasets.

Page 7 lines 220-226: Which statistical test did you use to check the statistical significance?

Page 8 lines 269 – 271: I don't think that you see the amplitude of QBO effect on your total ozone column. The times series are just deseasonalized, but still contain the effect of other signals such as the 11 year solar cycle, ENSO etc and thus not all the variation can be attributed to QBO.

Figures 5 and 6: You could possible superimpose the QBO proxy on the ozone anomalies.

Section 3.3: You removed the effect of the annual cycle and QBO, before you correlate your ozone time series with ENSO but the effect of solar cycle could also affect your results.

Page 9 lines 306-307: Which statistical test did you use for checking the statistical

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significance?

Section 3.4: Here you discuss the correlations between total ozone column and the NAO during winter months, evaluating the known anti-correlation between those two factors. Maybe it would be of interest to look also the correlations during summer, following the study of Osso et al. who reported a reversal in the correlation pattern between NAO and TOC from winter to summer for southern Europe.

Ossó A, Sola Y, Bech J, Lorente J (2011) Evidence for the influence of the North Atlantic Oscillation on the total ozone column at northern low latitudes and midlatitudes during winter and summer seasons. *J Geophys Res Atmos* 116:D24122. doi: 10.1029/2011JD016539

Typos:

Page 5, line 146: 5o -> 5°

Page 5, line 149: all offsets where -> all offsets were

Page 5, line 179: we made use of the monthly -> we used the monthly

Page 6, line 181: we made use of the monthly -> we used the monthly

Page 6, lines 187 – 190: “Use was made of the principal . . .” doesn’t sound very nice maybe you could change to: “The principal component (PC)-based NAO index (DJF) provided by the . . . (last access: 15 June 2018) was used (or analyzed).

Page 6, line 190: After dynamical variability add “,”

Page 6, line 192: The impact of tropopause variability on -> The impact of the tropopause height variations on

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