

Reply to reviewer # 1 comments on the manuscript AMT-2017-158

The reviewer considered our manuscript to be accepted for publication with minor revisions. We thank the reviewer for the careful reading and the suggestions that allows us to improve our manuscript.

Referee RC 1

- Comment 1 The discussion section could well stand for “conclusions” as it summarizes the findings of the study. Therefore, the conclusions section is a more brief repetition of the discussion section. I suggest to consider the possibility of merging the two sections as “Discussion and conclusions”.
- Reply 1 We agree with this comment that there are many repetitions in the two sections. However from our own experience, many readers like to read the more synthetic conclusions with lower interest to details given in the discussions. Therefore, we prefer to keep the two sections separated.
- Comment 2 Some of the figures show markers with error bars but not in all of them is defined whether they correspond to one or two standard deviations. This becomes confusing when in Fig. 10 the error bars represent 2 standard deviations. Please make figures consistent.
- Reply 2 The definition of the errors bars has been added when missing e.g. in Figures 4 and 9. We have used the standard deviations where the distributions were close to normal and the interquartile where the distribution were skewed.
- Comment 3 4, 19-21: This sentence is not well written and could confuse the inexperienced reader. Also confusing is the use of two SC values (1000 and 1200). I am not sure if the introduction of the “slant column” makes any sense here. I would suggest to move it later to page 10 where SC is actually used and rephrase the sentence to something like: “However, the longer sun exposure of Arosa is not important as the observations are limited to air mass values ≤ 4 (Christodoulakis et al., 2015) in order to reduce the effect of the stray light interference in the single monochromator Brewer instruments. “.
- Reply 3 The suggested sentence from the referee is clearer and we agree that the introduction of the slant column concept is more appropriate at page 10. We have introduced the suggested sentence on page 4 and extended the stray light discussion on page 10.
- Comment 4 4, 32: Please clarify “a-six week interruption end of January 2013”: Is it “a six-week interruption starting at the end of January 2013” or something different?
- Reply 4 We have corrected the sentence introducing the exact time period which were in fact 5 weeks long.
- Comment 5 5, 8: Please specify briefly what other (except the ETC) minor corrections have been necessary.
- Reply 5 Changes of the dead time and the temperature coefficients have been added at page 5. These are the other two main parameters influencing the ozone measurements.
- Comment 6 11, 3-4: I miss some discussion on the effect of stray light. This section discusses the problem and presents a method to determine the stray light effect, but it ends without addressing the importance of this effect on the comparison results.
- Reply 6 Additional sentences have been added to develop this point at pages 10-11 (see also comment 7 of the second referee)

- Comment 7 11, 9: Can you elaborate on the causes of observed seasonal component in the differences and standard deviation of B072?
- Reply 7 We suggested in the previous paragraph that the stray light induced low ozone bias in winter produces an annual cycle in the difference. The discussion on the cause of the annual variation on the standard deviations is also mentioned in page 15-16.
- Comment 8 15, 7-8: This is the first time that the effect of neutral density filters is mentioned. I would suggest to expand briefly the discussion so that an inexperienced reader can understand the topic.
- Reply 8 We have added a sentence explaining the use of the neutral density filters in the Brewer which could be a potential source of the increase of the standard deviation in summer (comment 7 above).
- Comment 9 Technical comments
- Reply 9 All technical comments have been introduced in the manuscript. We thank the referee for the careful reading of the manuscript.
- Comment 10 1, 17: **Corrected** "From the 1920s onwards" to "Since the 1920s"
- Comment 11 1, 21: **Corrected** "low polluted" to "low-pollution"
- Comment 12 2, 9: **Corrected** "have" to "has" (assuming that "series" refers to one series)
- Comment 13 2, 12: **Corrected** "The ozone hole problem" with "The depletion of stratospheric ozone"
- Comment 14 2, 13: **Corrected** "of the total ozone" with "in the total ozone"
- Comment 15 2, 14: **Corrected** "consequences" with "effects", as consequences implies a negative effect which is not true for the MP.
- Comment 16 3, 2: **Corrected** "before the 1970s, respectively after the 1997s." with "before 1970 and after 1997, respectively."
- Comment 17 3, 14: **Corrected** "section 4 and followed" with "section 4, followed"
- Comment 18 4, 11: **Corrected** "12'500" with "12,500"
- Comment 19 4, 19-21: **Slant** columns (_1000 and _1200) are not unitless; please use DU. This has been introduced.
- Comment 20 5, 3: **Remove** "one"
- Comment 21 5,6: **Corrected** "instruments" with "instruments"
- Comment 22 5,7: **Insert** "the" before "ETC"
- Comment 23 6,1: **Delete** "Parameters"
- Comment 24 7, last line: **Corrected** "were operated" with "was operating"
- Comment 25 9, 19: **Corrected** "extrema" with extremes
- Comment 26 9, 20: **Corrected** "instruments" with "instrument"
- Comment 27 10, 5: **Corrected** "are" with "is"
- Comment 28 10, 13: There are no "red lines" in Figure 8. These lines have been added.
- Comment 29 11, 9: **Corrected** "location" with "locations"