Interactive comment on “On the compatibility of Brewer total column ozone measurements in two adjacent valleys (Arosa and Davos) in the Swiss Alps” by René Stübi et al.

Anonymous Referee #1

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General comments:

This paper describes the differences of total ozone column (TOC) observations by Brewer spectrophotometers between LKO Arosa (actual facility with a extremely long term record) and PMOG WRC Davos (planned new location for both Brewer and Dobson spectrophotometers). Such an investigation is absolutely necessary to prove, that the relocation of the Arosa Dobsons will not cause a break in the important long term Arosa TOC record. Thus its publication in AMT is recommended, in particular as the results are well presented and confirm the compatibility of the obtained TOC data at both sites. There is however, one issue, which is not addressed and should be discussed as an amendment: The long term Arosa TOC record is based on Dobson measurements since 1926, the investigation of the compatibility is done with a Brewer, which are in operation since 1998. A brief section describing the principal differences and/or good agreement between Dobsons and Brewers would help to accept, that the presented good results for Brewer observations can be transferred to the Dobson long term record too.

Specific comments:


2, 2: Here an additional reference of a relevant Dütsch publication is recommended.

2, 6: The citation of Scarnato 2009 does not make sense at this point.

2, 17: The reference Yang et al. refers to Antarctic ozone recovery, but not to the LKO series.

2, 19 and 18, 18:: Kerr an Mc Elroy is indeed published in 1995 and not in 1989.

4, 9 – 26: As reason for the limitation of observations (mue-values less than 4) stray light interference in the single monochromator is mentioned. This is an incomplete explanation: two straylight effects have influence on the TOC observations. Internal straylight in the instrument (especially in single monochromators like Brewer Mk II) is caused by misrouted light mostly of longer wavelengths. The discussed mue-depending limitation effect, however, is mainly caused by external stray light. This means, that light comes from the sky around the sun disc, which has a different spectral composition (larger fraction of longer wavelengths) than direct sunlight. The hazier the sky is the larger is this effect, resulting in a drop of the TOC value at low sun. Dobsons with a larger field of view around the sun (8 degree) than the Brewer (3 degree) are stronger affected and show an earlier drop of the TOC than Brewers (even than
the single monochromators). This relation should be described a little more in detail. Whether the lower altitude in Davos (1590 m) than in Arosa (1850 m) with potentially larger turbidity leads to a lower mue-limit for good measurements cannot be stated, but is rather supposable in the Dobson data than in Brewer observations.

10, 1 – 12: see section above! The citation of at least one reference for the different straylight effects would be helpful.