

# ***Interactive comment on “Intercomparison of total column ozone data from the Pandora spectrophotometer with Dobson, Brewer, and OMI measurements over Seoul, Korea” by Jiyoung Kim et al.***

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General comments: The paper compares the measurement of total ozone columns measured with the relatively new Pandora instrument with data from other techniques at a specific site. Although similar comparisons have already been published it is of scientific value to have this additional comparison to evaluate the quality of the data obtained with the different techniques. → We really appreciate the reviewer's all comments and suggestions about this manuscript. They are really helpful, thus helped improve the quality of our manuscript. The following is our responses to the reviewer's

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comments and the revised manuscript is attached in supplement. Specific comments: line 21-22: "... are accurate and closely correlated" this is vague and could be more precise from the results. → "... are accurate and closely correlated" is changed more precisely to "the daily TCO values measured by the Pandora during the 2-year study period proved its accuracy showing excellent correlation with R2 greater than 0.95 for other ground-based and satellite measurements". line 49: please reformulate with a separate sentence to make clear that the 1% accuracy holds for direct sun observations only → The sentence is reformulated to make clear that 1% accuracy holds for direct sun observations only as follows. "The accuracy of well calibrated Brewer measurements is estimated to be about 1% for direct-sun observations." line 115: a trend from 1979 to 2004 is mentioned while in line 102 it is mentioned that the instrument became operational in 1984. Please clarify → a trend from 1979 to 2004 is divided into the former trend from 1979 to 1991 measured by TOMS and the latter trend from 1992 to 2004 measured by Dobson in line 115. In the section starting at line 118: please mention, as for the Dobson instrument, the calibrations (and their conclusions) that is relevant for the comparison period. → The sentence was meant to the data quality of Dobson with regular calibration history which is described in the earlier part of the section with references. It is deleted to avoid confusion. line 179: please specify which RMS is meant (of the observations during the day?) and what is meant by uncertainty of ozone amount line 201-204: reformulate (split sentence). → root mean square (RMS) of weighted spectral fitting residuals < 0.05 (Here, RMS means the root mean square value of daily fitting residuals which are differences between fitting values and daily mean value). line 247-248: what is meant by "all () lines () show best fit"? → It means that all linear regression lines between Pandora and the others are close to 1 to 1 line. The sentence is changed to "That is, linear regression lines between Pandora and all others are very close to 1 to 1 line". line 273 : is MSR abbreviation for "mean square regression"? → Thanks. We added Mean Square Regression (MSR) line 303 and following: what would be the estimated effect of each of the possible error sources (eg what is the SO2 effect at Seoul?) → Typical concentration of SO2 in Seoul

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is 0.02 ppm (annual average : 0.005 ppm,  $\sim 1$  DU when SO<sub>2</sub> is assumed to distribute constantly up to 1 km in altitude), which affects O<sub>3</sub> measurements but not significantly. Figure 1 : the 5 panels could be combined in one larger panel, with the different instruments represented in different colors/symbols. The same colors/symbols could then be used in Figure 2 → It would be hard to find each measurement clearly due to the large number of TCO points if the 5 panels are combined in one panel. Figure 3: if colors are used in Figs 1 and 2, the same colors can be used in fig 3. Please mention what is with of the bins of the histogram? → The name of vertical axis of Figure 3 is changed to “frequency” and it stands for the number of data in each TCO interval. Caption fig 6 (line 594): replace "null" by "missing" → “null” is replaced to “missing”.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/amt-2016-146/amt-2016-146-AC1-supplement.pdf>

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2016-146, 2016.

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