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Interactive comment on “A re-evaluated Canadian ozonesonde record: measurements of the vertical distribution of ozone over Canada from 1966 to 2013” by D. W. Tarasick et al.

Anonymous Referee #2

Received and published: 17 June 2015

amt-2015-57 A re-evaluated Canadian ozonesonde record: measurements of the vertical distribution of ozone over Canada from 1966 to 2013, Tarasick et al.

The reanalysis of the Canadian ozonesonde record is presented here including trend analysis of the updated data set. The Canadian ozonesonde record has some of the longest balloon borne ozonesonde records going back to 1966 which, during this long time period, also includes the history for sonde type/model changes from the ozonesonde and radiosonde manufacturers along with adjustments in standard operating and data processing procedures. Reviewing, editing and analyzing ozonesonde data from these sites to create a homogenized data set is described here. The

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manuscript also includes the ozone measurement uncertainty calculations with a description of each of the uncertainties. It is important for these long term data site measurements to be reviewed and updated to provide improved data sets for trend analysis. I only have minor revisions and a few questions for clarity.

Page 5220: Section 2.1 Total Ozone Normalization: Line 1: Is the total ozone normalization applied after all other corrections (i.e. pump, background, solution type, etc.) are applied?

Page 5220: Section 2.1 Total Ozone Normalization: Line 1: It would be helpful to mention the altitude a balloon ozonesonde must reach before the sonde total ozone column is compared and the profile normalized to a Brewer or Dobson spectrophotometer.

Page 5225 Section 2.8 Radiosonde Changes: Line 16: This section presents the geopotential height errors from radiosonde pressure offsets or errors. The authors state that there is no correction applied for radiosonde errors. However, are some profiles flagged (or not used) when there is an apparent very large offset (for example balloon burst pressure is at an unrealistic height - maybe 2 hPa), and the ozone profile is skewed?

Page 5226 Section 3 Effects of the corrections: Line 8: “In the 2000s (Fig 4.) the correction for the change to En-Sci sondes. . . .” Is the reference to Deshler in Figure 4 the same as the correction for the change to En-Sci sondes given in this sentence?

Page 5226 Section 3 Effects of the corrections: Line 11: The sentence “The overall effect of the corrections is generally modest,. . .” This seems to be true for the ECC ozonesondes but the tropospheric changes listed in line 13 below mentions “up to 20% correction” applied to the Brewer Mast which is higher than a modest correction for an ozonesonde.

Page 5226 Section 3 Effects of the corrections: Line 15: I don’t understand the summary of the “Stratospheric changes: decreases of up to 4% before 1980, less above

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and below 25 km” It sounds like a maximum decrease of 4% exactly at 25 km but less than a decrease of 4% above and below 25 km?

Page 5228 section 3. Pump calibration: The description in this uncertainty section sounds like surface pump volumetric flow rate measurement here rather than a pump calibration.

Page 5228 section 3. Pump calibration: Line 6: “Torres (1981) found a 1 sigma variation in the speed of individual model 3A pumps. . .” maybe using speed here seems to apply more to the motor characteristics – then the sentence would be better as “speed of individual model 3a pump motors”.

Page 5229 section 10. Iodine Loss: Line 27: rather than “iodine evaporation” it may be better to stay with the section title and complete the sentence as “. . . ., and/or iodine loss from the sensing solution.”

Page 5230 Line 24 and Figure 5 refer to “Same balloon”. If there is there another term or way to describe this would be helpful. From the definition it appears to be all the uncertainties excluding the pressure offset uncertainty.

Page 5233 Section 5 Time Series and trend analysis line 9 - Just a comment here about ground level ozonesonde trends - ozonesondes are good for trends in altitude layers but not sure of designating one of the chart layers to “Ground Level” since it seems like the most uncertainty can appear at the surface. For example, is the ground data point chosen always after the sonde measures ozone for a specific time (i.e. 2 minutes at a 1.5 meter level above the ground) or can weather, wind, time of day for launch give too much variability to make a good trend. Otherwise it is however interesting to see the plotted data.

FIGURES: Figure 4 – Deshler reference misspelled. Figures 9 and 10 – two green color lines are a little hard to discern on computer screen but maybe okay in print. Table 3 - check spelling of “spectrophotometric”.

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