

Interactive comment on “Propagation of radiosonde pressure sensor errors to ozonesonde measurements” by R. M. Stauffer et al.

Anonymous Referee #2

Received and published: 10 October 2013

The paper addresses an important issue that operators of ozone sondes need to be aware of. This issue is particularly important for long time series of ozone sonde observations since the pressure data impact the derivation of ozone observations in several different ways.

I would recommend publishing this paper after my comments have been addressed.

This Vaisala RS92 radiosonde is equipped with both pressure sensor as well as GPS. The Digicora software can be configured such that the pressure is calculated from GPS already within the software. If the software has been configured to do that, then the agreement between the Vaisala pressure and the pressure derived by the authors using the GPS altitude would not show the quality of the pressure sensor, but rather

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show some minor inconsistencies in the math used to calculate the pressure. Although the most common setting is to use the pressure from the pressure sensor, the authors need to verify the source of the pressure observations from the Vaisala RS92 and state so explicitly.

The data for the Internet radiosonde are grouped by letter of the serial number (see page 7777, line 8). Although suggestive, the letter of the serial number for Internet sondes has no relation to the pressure sensor or GPS unit contained in the sondes. The accuracy of the pressure measurements furthermore depend on the firm ware used by the sonde, which is not accessible to the user. Therefore, all Internet radiosonde data should be grouped together and not treated as distinct models.

The authors should discuss how the pressure measurements are being treated in the Vaisala System compared to the Internet System. Vaisala applies a ground check correction, which is not done for the Internet radiosonde. In the Vaisala RS80 the ground check correction depends on whether the radiosonde is received with the Vaisala receiving system or using any of the other interface telemetry systems. These details should be pointed out. The authors should also point out, that the meta data must have the information how the pressure measurement was treated, so that users can determine, whether a further correction is required or not.

Can the authors verify that all Vaisala RS80 and Internet soundings have been processed without pressure offset correction? Some sounding software has to option to correct for pressure offsets. The paper assumes that no pressure offset correction has been done, but this should be verified.

The authors should indicate, which GPS data were used on the Vaisala RS80. Some models of the RS80 were equipped with their own GPS, but for some ozone sondes soundings the GPS unit provided with the ozone sonde was used.

The authors should briefly explain how the constant mixing ratio extrapolation is calculated. This will immediately illustrate the strong impact of any pressure error on the

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extrapolation.

An important detail in equation 2 is the gravitational constant, which not only depends on geographic latitude, but also on altitude. The authors should elaborate how the gravitational constant is being calculated and should cite a reference. For example the paper by Inai et al. shows one method of calculation.

The authors should point out that for an accurate pressure profile based on GPS an accurate surface pressure is required if the radiosonde itself does not measure pressure at launch.

The authors focus on the impact of the pressure measurement errors in the upper parts of the ozone sonde profile. However, at lower altitudes the GPS derived pressure is inferior to the measured pressure, leading to increased uncertainties in the lower troposphere. The authors should mention that GPS derived pressure improves only the upper parts of the profile, while decreasing the accuracy in the lower parts of the profile.

Minor comments:

P7772, Line 20: Please rephrase this sentence. I believe the authors mean the difference in the total ozone column between pressure derived geopotential altitude and GPS derived geopotential altitude. The satellite climatology is used in both cases.

P7773, Line 8: Nash 2011 should be included as reference.

P7773, Line 16: There are only two manufacturers. One of them bought was bought by another company, but the sonde is basically the same.

P7774, Line 2: Change 'fixed parameter' to 'free of biases'.

P7774, Line 5: Delete 'can'

P7775, Line 7,8: Delete '(~10 m or less)'. Ozone sondes have a high vertical resolution, but due to their response time it is not that good.

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P7777, Line 7: Please make sure and specify that only RS92 SGP was launched. The RS92 K does not have a GPS.

P7784, Line 8: Change 'an' to 'of'

P7785, Line 27: What do the authors mean by 'the agreement improved'?

P7786, Line 7: Add 'at the top of the profile'

Figure A3 is very hard to read in a printout. Those sites that have only few soundings are particularly hard to see.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7771, 2013.

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