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Comment

## ***Interactive comment on “Trajectory matching of ozonesondes and MOZAIC measurements in the UTLS – Part 2: Application to the global ozonesonde network” by J. Staufer et al.***

**Anonymous Referee #1**

Received and published: 17 September 2013

This paper is well written and certainly appropriate for AMT. An evaluation of balloon ozone sonde performance is of significant interest to the atmospheric composition and climate research communities. There has been considerable effort to understand the performance of ozone sondes, and this paper provides new results that should be accounted for in this overall effort.

The authors have methodically collected an array of ozone sonde data from various archives and documented their performance characteristics. The authors should be commended for compiling these large amounts of data. In order to perform the comparisons between the balloon soundings and the aircraft measurements, well estab-

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lished trajectory models were employed to insure comparisons were performed in the same air mass.

The verification of this procedure appears in a companion paper being reviewed by AMT, but is not available to this reviewer. For this review, it is assumed that the matching procedure is valid and accurate. However the authors might consider narrowing their 450 hpa criteria since the ozone vertical gradients could be large in this range. The criteria for distance and “altitude” (potential temperature) might be tightened somewhat also. The authors should at least comment on the validity of their matching criteria. The authors claim that their method is robust although biases were found in comparing forward and backward trajectories. The quality of match was determined by the value of the comparison. This is not an independent method. Perhaps this is all explained in the companion paper. Perhaps the trajectory discussion appearing in Section 3.1.7 should be moved to Section 2.3 which describes the matching technique.

Section 3.1.2. The authors describe a time dependent background signal. The background signal is established in the sonde launch preparation. Do the authors mean trend in the background signal? Why should this be?

There is a large array of sonde data taken at various stations using varying operational procedures which are summarized in the Table 1. The comparison results are comparably complex, and are represented in subsequent figures and described in the text. It would be useful to the reader if these results could also be tabulated in a format similar to Table 1, but also include the time component (e.g. before and after 1998)

Section 3.3.1. The differences shown at Izana are puzzling. Could this result from a Background Correction error (too large)?

An interesting finding, but with no conclusion unfortunately, is that the authors analysis indicate that there could be systematic, and possibly time dependent errors, in the MOZAIC UV photometers. These measurements have not been questioned before to the knowledge of this reviewer. Some discussion about MOZAIC comparability appears

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in Section 3.1.6. Perhaps there might evidence elsewhere which might justify a Section on this separately. This is important issue and therefore should be stated in the Abstract so that this finding will get more attention.

Minor editing problems to be addressed by Author: Abstract: The acronym “ERA” appears but is not defined. Introduction, 12 lines down: “...are longer...” should be, “...are no longer...” Section 3.1.3, second sentence should not use “but”. Summary and conclusions, near the bottom of page 7121. “...but rather annual...” Annual” normally means year to year. In this case the author is referring to two time periods in 16 years. Figure 8: Why are trajectory distributions only shown for Izana? What about other stations at mid latitudes. Why do the Figure numbers change to a letter and a number after Figure 9?

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Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7099, 2013.

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