

Interactive comment on “An overview of measurement comparisons from the INTEX-B/MILAGRO airborne field campaign” by M. M. Kleb et al.

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Comment: The abstract announces a wing-tip to wing-tip comparison of two large research aircraft in several atmospheric conditions (mainly polluted and non-polluted atmospheric flow in the marine boundary layer and the free atmosphere) in order to analyse and reduce measurement differences.

Also, the abstract (as well as the following sections) announces ‘a comprehensive overview’ of about 140 data comparisons, which arouse large interest in the reader. Expectations are even growing when at the end of section 2 it is pronounced ‘to high-

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light the demonstrated instrument performance’.

But also the abstract recommends ‘to consult with the instrument PI’ ‘for interpretation... of these results’, which is quite uncommon, since the reader usually expects such analysis to be main part of the manuscript.

Response: This referee’s comment reminds us to more concisely state the general goal of this manuscript, which is to provide an overview and a record of the measurement consistency demonstrated during the INTEX-B measurement comparison exercises. This manuscript will help readers understand the PI-reported uncertainties and the consistency between different instruments/platforms. This is imperative when conducting integrated analyses of the INTEX-B data sets and also to guide future instrument development.

Comment: Actually, this manuscript looks more like a building block system than a scientific publication that discusses the advances of measurement techniques. The reader is invited to visit certain websites and to collect and to analyse data of interest in a do-it-yourself manner. Actually, none of the announcements above was met.

Response: We agree with referee to some degree. This manuscript does serve as a building block for integrated analyses of the INTEX-B data. This requires an understanding of the measurement consistency between different instruments/platforms. The goal of this manuscript is not to discuss advances in measurement technology, but provide an overview and a record of the level of consistency between the instruments and techniques, which helps the readers to judge if the PI-reported uncertainty is reasonable.

Comment: The main subjects of AMT are ‘development, intercomparison and validation of measurement instruments and techniques of data processing’. The manuscript misses these subjects since no technical information is given (besides the application of Orthogonal Distance Regression ODR). All relevant information is stored in certain web pages of unknown availability and was not further analysed.

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Response: The authors were strongly encouraged to submit this manuscript to AMT by an AMT editor. This manuscript is suitable for AMT because it provides an overview and record for the current status of measurement consistency among different measurement techniques and instruments. The websites listed have been maintained for 20+ years and are part of ongoing data management activities at NASA LaRC.

Comment: The manuscript might be helpful for 1) participants of the flight campaign as an overview; 2) other researchers to find an internet link to the diagrams (measurement vs. altitude; scatter plot with regression; but then, this is not very helpful since any technical details are not published). But (in contrast to the other referee) I doubt that it contains relevant information for other readers.

Response: The purpose of this manuscript is to provide a summary of the intercomparisons during the INTEX-B/MILAGRO campaign. The manuscript again is to provide an objective overview and record of the measurement consistency while providing sufficient information that interested readers can find detailed description of each measurement involved. The intended readers are data users and instrument researchers.

* Section 2: Comment: It should be emphasised that only NASA performed its first two-aircraft comparison in 2001. Such comparisons were already performed by other institutions well before 2000. Response: We will clarify that it was the first NASA intercomparison in 2001.

Comment: 'Wing-tip to wing-tip comparison' is a misleading expression when the aircraft are 1 km apart. I'd call it 'wing-tip to wing-tip' in case the aircraft would fly at identical altitude and on identical track only a few ten metres apart in order to meet identical air masses and flow. On a kilometre scale large differences in the atmospheric flow can be expected.

Response: The 1 kilometer separation occurred during the TRACE-P intercomparison in 2001. It was conducted in very homogeneous air off the island of Hawaii. The separation for this (INTEX-B) wing-tip to wing-tip intercomparison was less than 300

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meters in the horizontal and less than 100 meters in the vertical (see Section 3, Approach/Implementation).

* Section 3: Comment: Flight measurements were carried out on three days off the coasts of the Gulf of Mexico, California and Oregon. It is somewhat disproportionate to call this experimental frame 'a wide variety of conditions'.

Response: We respectfully disagree. Given that the geographical coverage would be limited, the INTEX-B intercomparison exercises were meticulously designed to sample a range of pollution levels, from clean to polluted conditions and in various altitude regimes. This is to provide an adequate range of various species for a meaningful comparison. As shown in the Tables 3 to 5, this goal was largely achieved.

Comment: The measurement technique, the applied type of sensor, its time response or inertia, the corresponding calibration method, as well as the calculation and the source of the listed measurement uncertainties (in Table 2) are probably very interesting for the readers of AMT. Unfortunately, the authors refer to a website for this information, since nothing is written about these important topics in the manuscript. Besides, how long will this website be available?

Response: Most of the information suggested by the referee has been provided by individual PIs in literature. Inclusion of these detailed discussions would make this manuscript unmanageably long. We believe that we have provided sufficient information about the measurement PI through the manuscript and website so that interested readers would be able to contact the PIs directly should they have specific questions/issues related to a given measurement. The websites listed have already been maintained for 20+ years and are part of ongoing data management activities at NASA LaRC.

Comment: 'This overview paper does not attempt to describe the complexities of the various measurement techniques' - but what information gives the manuscript then? The only insight that was given in Section 3 is, that two ozone instruments and two

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water instruments agree well at low sampling frequencies and disagree at high frequencies. Which is not surprising since there were several hundred metres of distance between the measurements. Both instruments remain unknown, as do further technical details of the measurements.

Response: The purpose of the paper is to provide an overview and record of the measurement consistency, so that readers can quickly determine how well the overlapping measurements agreed without knowledge of the details about the measurement technique themselves. As suggested by the other referee, we will provide information, when applicable, if the difference between the measurements falls within the combined uncertainties provided by the PIs. With this information, the manuscript will be useful for a broad community that has interest in using the entire INTEX-B data set for integrated analysis and in understanding of status of the measurement consistency for various techniques and/or instruments.

The aircraft were not 1 kilometer apart as stated previously.

Comment: What does 'LOD' mean?

Response: Limit of Detection. It has been added to the table of acronyms and abbreviations.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 2275, 2010.

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