Atmos. Chem. Phys. Discuss., 8, S11035–S11038, 2009
www.atmos-chem-phys-discuss.net/8/S11035/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Integrated water vapor above Ny Ålesund, Spitsbergen: a multisensor intercomparison" *by* M. Palm et al.

Anonymous Referee #1

Received and published: 8 February 2009

General Comments

This paper presents a succinct and interesting comparison of total water vapour measurements made over Ny Alesund by in situ radiosondes, ground-based FTIR and microwave instruments, and the space-based SCIAMACHY and AMSU-B. Despite the differences between the techniques, the agreement between the integrated water vapour measured by the instruments is good. The paper provides a useful overview of the strengths and weaknesses of each technique, describing the different information that each provides about integrated water vapour.

Specific Comments

Page 21174, Section 2.1.1 - Add a brief discussion of the differences between the

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

Vaisala RS-80, RS-90, and RS-92 radio-sondes. Has the accuracy increased with each new type? What are the typical accuracies for the radio-sonde water vapour measurements? State exactly what water vapour parameter the radio-sondes measure.

Page 21175, line 13 - The spectrometer is not adjusted using the LINEFIT program itself, as implied by the text. Clarify how the lineshape information derived from LINEFIT is used to adjust the FTIR.

Page 21175, line 15 - Figure 2 shows large gaps in the RAM data after 2001, with no data after 2004. Did the instrument stop working, or do no RAM data match the radio-sondes after these dates?

Page 21180, lines 2-3 and 21-23 - The descriptions of the coincidence criteria for AMSU-B differ in these two paragraphs. Clarify how the distance criterion is applied, and to how many pixels.

Page 21178, Section 2.4 - This section is very brief. Add some discussion of typical values of these noise errors for each of the instruments. Also, on page 21181, Section 3.2.1 - The errors are accounted for in the calculation of the errors on m and b; what are they, how have they been used? using standard methods for calculating errors on linear regressions? Is any error-weighting done in the derivation of the IWV?

Table 1 - Also on the topic of errors, the caption of Table 1 states that the remote sensor errors have been used - does this point belong in the figure caption? It would be more helpful for the figure caption to state explicitly what is given in the table, including defining the errors on m and b. Add some commentary in the text on the magnitude of these errors - they seem small given the scatter in the data.

Page 21181, Section 3.2.1 and Table 1 - Why aren't correlation coefficients provided for the comparisons? Either add them or explain why they are not included.

Page 21182, line 9 - It is not clear how the deviation of 20 percent from the fitted line

ACPD

8, S11035–S11038, 2009

Interactive Comment

corresponds to a slope of 0.73. This is also the case for the 20-30 percent in line 17 compared to the slope for AMSU-B.

Page 21183, line 3 - Explain why this two-step process was used, with satellite vs. FTIR, followed by the subset of these that also match radio-sonde launches. The reason for this approach is not stated clearly.

Technical Corrections

There are numerous places where comma would help clarify the flow. For example, Page 21173, line 11 - add comma after IWV

Correct the inconsistent use of capitalization of molecules throughout. For example, page 21175, line 3 does not capitalize "nitrogen", but lines 23 and 26 do capitalize "Oxygen", while water vapour is not capitalized.

Page 21174, line 11 - Change "has been" to "was" - ambiguous whether RS-90 is still in use.

Page 21175, line 3 - Is the detector Indium Gallium Arsenide or InSb (Indium Antimonide)?

Page 21175, line 16 - Change "is operated" to "has been operated".

Page 21175, lines 21 and 26 - Is optical depth a more appropriate term than opacity here?

Page 21175, lines 24, 25 and page 21176, lines 3, 6, 7 - These use capital "C" for the column, but elsewhere (page 21181, 21183, 21184, etc.), lower case "c" is used. Notation should be consistent.

Page 21183, line 22 - Delete "Comparing" (compare is used again later in this sentence).

Page 21184, line 11 - This sentence would be clearer as "The RAM measurements are

ACPD

8, S11035–S11038, 2009

best suited for analysis of the variation of the IWV above Ny Alesund because they are nearly continuous."

Page 21184, line 15 - Change "in the period of May" to "during May".

Page 21185, line 6 - Change to "In this work, IWV measured by four remote sensing instruments is compared to IWV derived from radio-sondes."

Page 21186, line 19 - "but IT relies on ..."

Page 21187, line 1 - Change "fast" to "rapidly". This sentence could be revised to "Due to the fact that the IWV above Ny Alesund changes rapidly, it is unlikely that the agreement between the instruments used in this work could be significantly improved."

Page 21188, line 1 - Remove last letters from Coffeyb, Jonesd, and Rinslande.

Figure 4 - Change the x-axis label for the lower left panel to "FTIR Solar" for consistency with the upper left panel. Change the caption to "Comparison of two satellite remote sensing instruments to the results derived from FTIR and sonde measurements. ..." Restate what the red and black lines represent or refer back to Figure 3.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 21171, 2008.

ACPD

8, S11035–S11038, 2009

Interactive Comment