Review of "Towards validation of ammonia (NH_3) measurements from the IASI satellite" by Martin Van Damme

This paper describes several comparisons of IASI NH_3 measurements with surface and aircraft measurements in various regions and periods. It presents a good evaluation of the difficulties inherent in these comparisons: spatial and temporal sampling differences, sparseness of in situ data, lack of sensitivity of the satellite instrument to smaller NH_3 concentrations, the lack of knowledge of the NH_3 profile structure. The comparison results are not very robust, and the author at times overstates the agreement between the in situ measurements and the IASI data, but the results do provide a valuable snapshot of the state of the satellite NH_3 validation efforts. This is an important and active area of research in the study of reactive nitrogen, and fits well within the scope of Atmospheric Measurement Techniques: some related work for the TES instrument has been described by Sun et al. (JGR, submitted) and briefly for the CrIS instrument in Shephard and Cady-Pereira (AMTD, 2014). I recommend that the paper be published after the minor revisions listed below.

Technical issues:

Page 12132:

Please define the coefficient of variation: is it the standard deviation divided by the mean times 100?

Pages 12137-12138:

Estimating the surface concentration from the IASI total column is fraught with issues, as the author himself states. Any conclusions on the biases seen if Figure 3 are extremely tentative, and should be more qualified. The biases basically just serve as an illustration of the issues. I suggest that the author also show the scatter plots of the IASI total columns vs the surface measurements; these would demonstrate that at least the correlations are somewhat meaningful.

Page 12138:

Please clarify which statistical test was used to determine the p value of the correlation coefficient.

Page 12139:

Why is the range is surface measurements (0-10) over China not matched by the range in the IASI data (0-3)? The surface range is much higher in this region than in Europe or Africa, but the IASI range is the same.

The time series comparison is very interesting, but the peak listed by the author for October is not at all evident. Could these peaks be highlighted with special symbols? Similarly for the January 2013 peak.

Page 1240:

The use of the P value on line 8 is very confusing: I believe the author would like to state: "the r values are all significant at the 0.01 confidence level" or "the p value for these sites is less than 0.01".

How much time does the aircraft spend in each IASI pixel? How is the mistime computed?

Page 12144:

Line 17: The high values in Colorado are not at all apparent in the airborne data.

Lines 25-27: Is the IASI data shown in this footprint an average over the CalNex period? Please clarify.

Suggested wording changes:

Page 12127:

Line 15: allows investigations of

Line 25: "agricultural activities" instead of "food production"

Page 12128:

Line 2: on ecosystems

Page 12129:

Line 5: Even as the NH_3 cycle becomes more integrated in …

Page 12131:

Line 11: …and compared to previous algorithms

Line 22: … an error estimate

Page 12132:

Line 8: The IASI instrument is on board….

Page 12135:

Line 1: … of providing

Line 24: … reaching as high as xxx

Page 12136:

Line 21: Except for …

Line 24: The surface measurements are too sparse to state that " we find the same general pattern in the surface measurements….".

Page 12138:

Line 10: Saying that overall IASI observes a similar pattern to the surface instruments is an overstatement. There are low surface values near both the Ebro and Po valleys, where IASI sees high concentrations.

Line 15: analysis

Page 12140:

Line 20: The sentence starting with "The high density…" is not clearly written and confusing.

Line 26: … during the wet season (June-July); conversely,

Line 29: … are grouped. This …

Page 12142:

Line 18: Six of the sites ….

Page12144:

Line 12: … is consistent… (not highly though)

Line 23: … pairs of observations

Page 12145:

Line 8: … considering pairs of ….

Page 12146:

Line 26: … obtained, as they were with …

Page 12147:

Line 8: acquire

Line 13: … which are becoming available

Table 2: … and the mean of the satellite observations …

Table 3: n corresponds to the number of pairs ….

Table A1: … for each station. … Only values with relative IASI …

Table A2: … for each station. … Only monthly values with relative IASI …

Table A3: … for each station. … Only monthly values with relative IASI …

Figure 3: What does "Stations with less than two third of the monthly concentrations available have been excluded." mean? This is not clear.

Figure 6: Only column means…