

## ***Interactive comment on “Impacts of AMSU-A/MHS and IASI data assimilation on temperature and humidity forecasts with GSI/WRF over the Western United States” by Y. Bao et al.***

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Response to Referee2 General comments Although the manuscript addresses relevant scientific questions, the authors not clearly indicate their own new/original contribution respect to the mentioned references/studies. The novelty against the past should be emerged already in the introduction which is the “business card” of the paper. I appreciate the authors effort of adding more literature, but It would be useful to describe more in details results and improvements reached in these studies (for example pag.6441, lines 5-8) trying to make more rich and robust this part. Also the final discussion needs a deep revision focusing the attention on substantial conclusions reached and efforts

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to be done in the future to improve the results. Finally, the language is not always fluent and precise. I also suggest that the manuscript is read by a native speaker or undergoes professional language editing before being published.

Answer: Actually, there is a lot of introduction usin previous studies. For example, Derber J. C. and W-S Wu. 1998: The use of TOVS cloud-cleared radiances in the NCEP SSI analysis system. Mon. Wea. Rev., 126, 2287–2299. In order to avoid duplication, we only simply gave a short summary. Different from the previous studies, we focus on the different impacts of hyperspectral infrared and microwaves radiance data assimilation on the weather forecasts, especially on the different performance of vertical structures.

Specific comments Pag. 6442, lines 16-18 » Try to better explain the usefulness of outer iterations and why you choose two and not more outer iterations. Answer: The experiment design is based on the suggestion of John Deber’s report, actually the two outer iterations are used in NOAA operational forecasts, which has been verified in the operational forecasts.

Pag. 6444, line 2 » “with an initial time at 18:00 UTC” » of which day?

Answer: The sentence has been changed to “with an initial time at 18:00 UTC of 30 June to 30 July”

Pag. 6444, line 3 » which is the second control experiment? Answer: In order to avoid the confusion, We changed the word 'second' to "continued". Actually the second control experiment means continuing to the first control experiment from 00:00 UTC. The first run initialed from 18:00 UTC and integrated 6 hours. Then the continued run from 00:00 UTC. Pag. 6444, lines 13-18 » please add related literature of the physics schemes Answer: Done.

Pag. 6444, lines 21-23 » please add the source of conventional observations Answer: We gve the source of conventional observations in the revised version.

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Pag. 6445, lines 5-6 » please say when these coverage is refer to, as stated in the caption of figure 1b Answer: We have added the reference times for the radiances in the new version.

Pag. 6447, line 10 » please change the title in something like “Impact of DA on. . .” Answer: Done.

Pag. 6450, line 1 » please change the title in something like “Impact of DA on. . .” Answer: Done.

Pag. 6452, lines 9-10 » Try to better explain the statement “The reason is very complicated, it is partially attributed to the data selection in the processes of the data assimilation.” Answer: It is partially attributed because IASI data has 8461 channels, but we only used 279 channel based on previous studies. Until now, we really don't know what is responsible for the different performances since many factors have contributed to the overall result. More experiments are necessary as part of our future study to try and understand the contributions from the various factors and components used in the analysis..

Pag. 6452, line 19. . . » no next steps for the future? Answer: Actually, we plan to examine longer experiments, using more data channels and more satellite sensors as part of future investigations.

Technical corrections Pag.6441, line 18 » highspectralresoluton » miss the “i” Response: Done

Pag.6441, line 20 » please check “most optimal” in english Response: the word most was removed.

Pag. 6442, line 2 » please write ARW-WRF always in the same way Response: Done.

Pag. 6442, line 13 » “that is from GFS 6h forecast filed in this study” » that comes from GFS 6h forecast for this study Response: done.

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Pag. 6442,line 19 » Remove comma after “function,” Response: done.

Pag. 6442, line 21 » “contains” Response: done.

Pag. 6443, line 7 » Put “:” instead of “.” after “satellite data” Response: done

Pag. 6443, line 19 » Remove “through” Response: done

Pag. 6443, line 23 » Substitute “to the” with “as the” Response: done

Pag. 6443, lines 25-26 » “covered more of the region than at other anytime” » not so clear, try to say better in english Response: we have revised this sentence to make it clear.

Pag. 6444, lines 78 » too many repetitions of “only” Response: yes, the only has been deleted

Pag. 6444, line 14 » “Yosei” » Yonsei Response: done

Pag. 6444, line 18 » Pa or hPa ? Response: done

Pag. 6444, line 25 » “most of the atmospheric” Response: done

Pag. 6445, line 1 » “the most WSP data” » most of the WSP data Response: done

Pag. 6445, line 7 » “In this study the channels from 4 to 14 are assimilated. . .” Response: done

Pag. 6445, line 9 » substitute “by Fig. 2a” with “in Fig. 2a” Response: done

Pag. 6445, line 12 » substitute “by Fig. 2b” with “in Fig. 2b” Response: done

Pag. 6445, lines 13-18 » too many repetitions of “can detect” » please find synonymous Response: done

Pag. 6445, line 22 » remove the first “i” in “huimidity” Response: done

Pag. 6445, line 23 » remove comma before “and” Response: done

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Pag. 6445, line 25 » substitute “by Fig. 2c” with “in Fig. 2c” Response: done

Pag. 6445, line 27 » please define the acronym NESDIS Response: done

Pag. 6446, line 3 » “ingested into the data assimilation system” Response: done

Pag. 6446, line 8 » “Previous publications. . . . .” » this period is not clear Response: delete ‘ Previous publications ’

Pag. 6446, line 11 » please add a reference for GDAS and define the acronym Response: done

Pag. 6446, line 11 » “ and it can be used to correct. . . .” Response: done

Pag. 6446, line 12 » “To that purpose in this study. . . .” Response: done

Pag. 6446, lines 15-16 » “surface pressure (Fig. 3a), atmospheric temperature at the height of 2m (Fig. 3b) and wind speed at the height of 10m (Fig. 3c)” Response: done

Pag. 6447, line 6 » “error” » “errors” Response: done

Pag.6447, line 12 » “The three involved. . . .” Response: done

Pag.6447, line 13 » “show” instead of “showing” Response: done

Pag.6447, line 13 » “For the first 24 hours it seems that. . . .” Response: done

Pag.6448, line 4 » “within” instead of “with” Response: done

Pag.6448, line 5 » “give” instead of “make” Response: done

Pag.6448, line 9 » “gave” instead of “made” Response: done

Pag.6449, line 4 » “and it” instead of “and the RMS error” Response: done

Pag.6449, line 20 » “gave” instead of “made” Response: done

Pag.6449, line 21 » “gives” instead of “makes” Response: done

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Pag.6449, line 23 » “impact” instead of “contribution” Response: done

Pag.6450, line 7 » “different” instead of “differing” Response: done

Pag.6450, line 7 » “in the entire troposphere” Response: done

Pag.6450, line 18 » “gave” instead of “made” Response: done

Pag.6451, line 6 » “forecasts: in fact, the RMS error profile. . . .” Response: done

Pag.6451, line 9 » “gave” instead of “made” Response: done

Pag.6451, lines 9-10 » “has a negative impact on the . . . .” Response: done

Pag.6451, line 18 » “give” instead of “make” Response: done

Pag.6451, line 22 » “linked to” instead of “linkage with” Response: done

Pag.6451, lines 22-28 » This period is too long! Response: yes, we have changed the sentence

Pag.6452, lines 6-7 » “For the humidity forecast there is a different behavior: the IASI data. . . .” Response: done

Pag.6452, line 11 » “showed” instead of “shown” Response: done

Pag.6452, line 11 » “the partial impact of ” instead of “the some impacts of” Response: done

TABLES FIGURES It would be useful to add the “initial time” of each experiment of Table 1 Caption of figures 57910 » “Other definitions are the same of Fig.4” Caption of figures 68 » “Other definitions can be found in Table 1”

Response: yes, please check these Figures and table.

Please also note the supplement to this comment:  
<http://www.atmos-meas-tech-discuss.net/8/C2466/2015/amtd-8-C2466-2015->

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