

## Referee#2

### 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 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.

### 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.
- **Pag. 6444, line 2** >> “with an initial time at 18:00 UTC” >> of which day?
- **Pag. 6444, line 3** >> which is the second control experiment?
- **Pag. 6444, lines 13-18** >> please add related literature of the physics schemes
- **Pag. 6444, lines 21-23** >> please add the source of conventional observations
- **Pag. 6445, lines 5-6** >> please say when these coverage is refer to, as stated in the caption of figure 1b
- **Pag. 6447, line 10** >> please change the title in something like “Impact of DA on....”
- **Pag. 6450, line 1** >> please change the title in something like “Impact of DA on....”
- **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.”
- **Pag. 6452, line 19...** >> no next steps for the future?

## Technical corrections

- **Pag.6441, line 18** >> high-spectral-resoluton >> miss the “i”
- **Pag.6441, line 20** >> please check “most optimal” in english
- **Pag. 6442, line 2** >> please write ARW-WRF always in the same way
- **Pag. 6442, line 13** >> “that is from GFS 6h forecast filed in this study” >> that comes from GFS 6h forecast for this study
- **Pag. 6442,line 19** >> Remove comma after “function,”
- **Pag. 6442, line 21** >> “contains”
- **Pag. 6443, line 7** >> Put “.” instead of “.” after “satellite data”
- **Pag. 6443, line 19** >> Remove “through”
- **Pag. 6443, line 23** >> Substitute “to the” with “as the”
- **Pag. 6443, lines 25-26** >> “covered more of the region than at other anytime” >> not so clear, try to say better in english
- **Pag. 6444, lines 7-8** >> too many repetitions of “only”
- **Pag. 6444, line 14** >> “Yosei” >> Yonsei
- **Pag. 6444, line 18** >> Pa or hPa ?
- **Pag. 6444, line 25** >> “most of the atmospheric”
- **Pag. 6445, line 1** >> “the most WSP data” >> most of the WSP data
- **Pag. 6445, line 7** >> “In this study the channels from 4 to 14 are assimilated...”
- **Pag. 6445, line 9** >> substitute “by Fig. 2a” with “in Fig. 2a”
- **Pag. 6445, line 12** >> substitute “by Fig. 2b” with “in Fig. 2b”
- **Pag. 6445, lines 13-18** >> too many repetitions of “can detect” >> please find synonymous
- **Pag. 6445, line 22** >> remove the first “i” in “huimidity”
- **Pag. 6445, line 23** >> remove comma before “and”
- **Pag. 6445, line 25** >> substitute “by Fig. 2c” with “in Fig. 2c”
- **Pag. 6445, line 27** >> please define the acronym NESDIS
- **Pag. 6446, line 3** >> “ingested into the data assimilation system”

- **Pag. 6446, line 8** >> “Previous publications.....” >> this period is not clear
- **Pag. 6446, line 11** >> please add a reference for GDAS and define the acronym
- **Pag. 6446, line 11** >> “ and it can be used to correct....”
- **Pag. 6446, line 12** >> “To that purpose in this study....”
- **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)”
- **Pag. 6447, line 6** >> “error” >> “errors”
- **Pag.6447, line 12** >> “The three involved....”
- **Pag.6447, line 13** >> “show” instead of “showing”
- **Pag.6447, line 13** >> “For the first 24 hours it seems that....”
- **Pag.6448, line 4** >> “within” instead of “with”
- **Pag.6448, line 5** >> “give” instead of “make”
- **Pag.6448, line 9** >> “gave” instead of “made”
- **Pag.6449, line 4** >> “and it” instead of “and the RMS error”
- **Pag.6449, line 20** >> “gave” instead of “made”
- **Pag.6449, line 21** >> “gives” instead of “makes”
- **Pag.6449, line 23** >> “impact” instead of “contribution”
- **Pag.6450, line 7** >> “different” instead of “differing”
- **Pag.6450, line 7** >> “in the entire troposphere”
- **Pag.6450, line 18** >> “gave” instead of “made”
- **Pag.6451, line 6** >> “forecasts: in fact, the RMS error profile...”
- **Pag.6451, line 9** >> “gave” instead of “made”
- **Pag.6451, lines 9-10** >> “has a negative impact on the ...”
- **Pag.6451, line 18** >> “give” instead of “make”
- **Pag.6451, line 22** >> “linked to” instead of “linkage with”
- **Pag.6451, lines 22-28** >> This period is too long!
- **Pag.6452, lines 6-7** >> “For the humidity forecast there is a different behavior: the IASI data...”

- **Pag.6452, line 11** >> “showed” instead of “shown”

- **Pag.6452, line 11** >> “the partial impact of ” instead of “the some impacts of”

### **TABLES & FIGURES**

- It would be useful to add the “initial time” of each experiment of Table 1

- Caption of figures 5-7-9-10 >> “Other definitions are the same of Fig.4”

- Caption of figures 6-8 >> “Other definitions can be found in Table 1”