

General comments

The manuscript seems to address relevant scientific questions within the scope of AMT. It presents the substantial novel concept to assess the impact of the assimilation of data coming from two instruments (the advanced technology microwave sounder (ATMS) and cross-track infrared sounder (CrIS)) with high resolution onboard the SUOMI NPP spacecraft, over a complex terrain with heterogeneous characteristics such as the Tibetan Plateau. Also methods and data proposed are quite new and interesting. Nevertheless, the scientific and presentation quality are poor and need an improvement and a further review.

The introduction is well written, rich of related works and references and it focuses the attention on the novelty of the topic. Paragraphs 2 and 3 have to be reorganized to better present both the data and methods. Section 4 about results is difficult to read in some parts probably also due to the poor quality of english language that is not always fluent and precise. Summary and discussion are quite well done.

Last, but not the least, presentation quality of figures together with their captions have to be necessarily improved.

Specific comments

-**Line 108:** the content of section 2.1.1 has to be moved into section 2.2.1 of WRF-ARW regional model

-**Line 110:** Is $0.5^\circ \times 0.5^\circ$ the finest GFS horizontal resolution available?

-**Pag.7, line 116:** change the title of section 2.1.2 in "Data used for the evaluation/verification" (2.1.2)

-**Pag.8, line 137:** change the title of section 2.1.3 in "Data used for the assimilation" (new 2.1.1)

-**Pag.10, line 171:** change the title of section 2.2.1 in "The GSI 3D-Var system and the Community Radiative Transfer Model"; please give in this paragraph some theory concepts on GSI 3D-Var system

-**Line 185:** in my opinion this paragraph would follow the one on assimilation data becoming 2.1.3

-**Line 210 section 3.1:** please indicate in this section which is the best value for each score

-**Lines 242-245:** the sentences here are not so clear

-**Pag.15 lines 275-277:** the values in brackets are referred to L24h, is it right? If yes, please specify it in the text

-**Pag.17 lines 313-316:** please indicate on figure 8 (for example using circles or arrows) the overestimated and underestimated events

-**Pag.18 lines 325-326:** please add a reference figure

- **It would be useful to consider bootstrap confidence intervals when discussing the results.**

Technical corrections

-**Line 36:** a space has to be added between "hours" and "and"

-**Line 52:** "influences" rather than "influence"; "causes" rather than "cause"

-**Line 64:** "offers" rather than "offer"

-**Line 127:** "several" rather than "Several"

-**Lines 138-141-142-143:** please specify the acronyms: GDAS, pibal, SSM/I and TCW

- Line 201:** (Table 1) instead of (Table 2)
- Line 206:** "Figures 1c and 1d display the distribution..."
- Line 211:** "(Table 2)" instead of "(Table 1)"
- Line 280:** "(Table 2)" instead of "(Table 1)"
- Line 313:** "It can be seen in the time series of Figure 8a that...."
- Line 317:** "The L24H forecasts (fig. 8b) showed a...."
- Line 322:** "the CONV (blue line) experiment..."
- Line 324:** "the ATMS (red line) performed the worst..... the 24h precipitation maxima"
- Line 349:** a space has to be added between "experiments" and "data"
- Line 354:** "but the results are not the same..."
- Line 377:** "(bottom left in Fig. 11m)"
- Line 408:** delete the double comma
- Line 409:** a space has to be added between "25" and "July"
- Line 445:** "we choose" rather than "we chose"
- Table 1:** New Table 1 will be the one about ATMS and CrIS channels and the caption could be modified as follows:
"The channels for ATMS and CrIS data that have been selected for the data assimilation procedure"
- Table 2:** New Table 2 will be the one about contingency table; please add also more details in the caption
- Figure 1:** please add more details into the caption of figure 1a (resolution of the domains for example)
- Figure 2:** clarify into the caption the difference between "observations kept and used"
- Figure 3:** in the caption there are no info about the part of the figure at the top; please also mention into the caption the initial time of each experiment
- Figure 4:** put the unit also close to the colour bar; "black contours are altitude"
- Figure 5:** put the unit also close to the colour bar
- Figure 7:** please list into the caption the validation statistics presented in the figure
- Figure 8:** please add more details into the caption
- Figure 11:** put the unit also close to the colour bar
- Can be figures 4-5-6-10-11 a little bit bigger?