General comments

This paper built an interface for AHI radiance data assimilation on the WRFDA system based on the 3DVAR assimilation method. Two experiments for comparison was designed to examine the effect of AHI water vapor channel radiance data assimilation on the analysis and prediction of the rapid intensification period of Typhoon Soudelor in 2015. To some extent, the assimilation of AHI radiance data is able to improve the analyses of the minimum sea level pressure, the maximum surface wind, as well as the typhoon track. The whole developing stages of Typhoon Soudelor including a rapid intensification, a weakening, a second intensification, then a continuous weakening till disappearing. However, only the first intensification during 1 August to 3 August considered as study period seems insufficient to efficiently prove the advantages of AHI radiance data assimilation. According to the comparison of the two experiments during 48 hours forecasting period (Fig.13), the forecast error of AHI_DA model in the first 30 hours is obviously smaller than the CTNL model's result, however in the later 18 hours the forecast error between these two models is quite close. That means the forecasting error could possibly seriously increase for a longer simulation time. Thus in order to more efficiently prove the advantages of AHI radiance data assimilation and promote the contributions of this paper, I suggest this research to extend the study period at least include the first intensification, a weakening, and the second intensification of Typhoon Soudelor. In addition, some unclear and unprecise descriptions need carefully to be addressed. Overall speaking, this paper can be considered for publication however the major revision is necessary.

Specific comments

1. P. 9, Ln 169-177, please add the references for the procedures for AHI radiance data quality control.
2. P. 9, Ln 182, N_p needs a definition.
3. P. 12, Ln 236, why you use 6 hours spin-up time? Please give more explanation.
4. P. 13, Ln 256-260, please add the sensitivity experiment results or some references.
5. P. 14, Ln 273, how to tell the gradient in Fig. 6b decreases stably with increasing iterations? It keeps decreasing.
6. P. 14, Ln 273-276, The exponential decrease of the cost function and the change trend of its gradient indicate that the effectiveness of AHI radiance DA. What's the optimal value of log(gradient)? How to see the final iterated analytical field is close to the observation?
7. P. 14, Ln 279, what is "analytical brightness temperature"?
8. P. 14, Ln 281-284, "It should be pointed that even only parts of the AHI radiance

data are applied after quality control in the data assimilation, the radiative transfer model is able to simulate the brightness temperature for all the pixels with the background and the analysis respectively for the verification purpose." This description is unprecise, at least how much should AHI radiance data be considered?

9. P. 15, Ln 309-P. 16, Ln 312, the observed and background brightness temperature for ch8 (a→b) and ch9 (d→e) both have significant improvement after the bias correction. However we can't find the similar trend for ch10, please explain.
10. P. 16, Ln 322-324, why the OMB number keeps the same with or without bias correction in Fig. 9(a)? As well as the Stdv(K) of OMB almost keeps the same with or without bias correction in Fig. 9(c).
11. P. 17, Ln 351-352, after the assimilation of AHI radiance data, except the streamlines in the typhoon region become denser, the upper left region somehow showed quite different streamline pattern. Is this also part of improvements?
12. P. 19, Ln 379-380, "the track predicted by AHI_DA match better with the best track". This description is unprecise, only better match at the start point and the end point. There still have not small track error during the middle region.
13. P. 19, Ln 392-393, "It can be seen that the maximum surface wind error predicted by the AHI_DA is much lower than that by the CTNL..", This description is only valid before 30 hours of forecast time, but after 30 hours both models show similar error degree.
14. P. 20, Ln 395-396, "The maximum surface wind predicted by AHI_DA fit closer to the best track data with the maximum difference about 2.6 m/s after 12 hours forecast". This description seems not matching with Fig.13(a).
15. P. 21, Ln 416-418, conclusion 3 "It is found that the track, maximum surface wind, and minimum sea level pressure from the AHI radiance data assimilation experiment match better with the best track than the control experiment does for the subsequent 18-hour forecast". This conclusion doesn't match with the findings from Fig.12 and Fig.13.
16. P. 31, Fig.3, the legend is wrong. The dash line should be maximum surface wind and the solid line should be minimum sea level pressure.
17. P. 32, Fig.4, what the different symbols (triangle and circle) represent?
18. P. 38, Fig.10, please add the trend line for each channel in order for better comparison.
19. P. 40, Fig.12, the unit of track error (m s^{-1}) in the figure caption is wrong, it should be "km".
20. P. 41, Fig.13, the figure caption should be ….maximum surface wind "error" (unit:

m s^{-1}).....minimum sea level pressure “error” (unit: hpa). In addition, the typhoon name “Soudelor” is misspelled as “Soulder”.

Technical corrections

1. P. 1,Ln 2, the typhoon name “Soudelor” was misspells as “Soulder” in the paper title.
2. P. 6, Ln 110, “weather” forecast.
3. P. 3, Ln 57, the cited reference “Pennie, 2010” is not listed in the references.
4. P. 25, Ln 515, this reference is not cited in the article.
5. P. 26, Ln 523, this reference is not cited in the article.