

Interactive comment on “Development of synthetic GOES-R ABI aerosol products” by R. M. Hoff et al.

Anonymous Referee #1

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Manuscript presents an overview of the process to simulate GOES-R ABI imagery in order to have end users evaluate the utility of future air quality products. The WRF and CMAQ are used to provide the meteorology source and transport of aerosols and smoke as input to the CRTM radiative transfer model to generate simulated ABI imagery in appropriate channels.

The manuscript lacks a scientific focus or problem and merely attempts to describe the process to produce simulated ABI imagery used in the retrieval of air quality products from simulated GOES-R ABI imagery. Feedback provided by end users viewing the simulated products over a web page was cosmetic (in terms of changes in the display) and did not address the utility of the products. The reader is expecting an evaluation of the utility of the GOES-R ABI baseline air quality products as viewed from simulated or proxy imagery. They do not get this. No comparison is made between products

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derived from simulated imagery and ground observed, not to a similar product derived from MODIS or SEVIRI. Authors need to present an end user evaluation of the baseline products from several case studies.

The authors call this approach an OSSE, but merely simulate radiances (for subsequent product retrievals) from prescribed conditions. OSSEs use a data assimilation approach to evaluate the impact of a new observation on weather prediction and the impact is compared to a nature run generated by a separate system that pushes the state of the art capabilities. The authors are performing more of a “proving ground” activity preparing potential end users for the new data products. Removing references to this terminology throughout the paper is recommended.

The research and assessment described in the manuscript seems to be cast in a near real-time environment needlessly constraining the approach. There is no need for this constraint given that the evaluation of the utility was seemingly not done in real time (there was no description of this real-time evaluation process). Therefore higher resolution simulations which better mimic ABI characteristics could have been done, reducing the impact of coarse resolution imagery on continuous cloud fields depicted by the model, and enhancing the conclusions about the utility of the products.

The manuscript also suffers from poor organization and often mixes grammatical tenses, describes and shows examples of several approaches to generate a simulated or proxy products when one is ultimately used, includes an irrelevant discussion of SBDART, and describes the generation of natural color RGB imagery from simulated ABI imagery when it is not even shown.

It would be helpful if the authors provided more information on the utility of AOD from SEVIRI and demonstrated how using the additional 2.25 micrometer channel information improves AOD retrievals over land and how the time continuity of geostationary view adds significant value over the twice daily product from polar orbit. Dust is included in the input data but not included from the simulation – The impact of this needs

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to be discussed.

Table 1 should contrast channels from SEVIRI and ABI and MODIS. Limit information to channels used in algorithm, and cite a reference to a table of all ABI characteristics. Don't see value of Fig 1. Showing proxy image not based on radiative transfer but from combining SEVIRI, and MODIS imagery. Don't see what it shows/ use it is.

3.1 MODIS proxy imagery – This paragraph and its relation to figure 2 is unclear. The description of Fig 2 in the text is different than in figure caption causing confusion. The figure needs more description. Maybe separate land from water statistics. Clarify times of MODIS data used (obviously more than one swath used to get coverage, but caption says 1645UTC). – Unclear the value of this section when it is not used for evaluation.

3.2 Modeling approach. In this research, computer time and latency to generate the simulated imager is not an issue. When GOES-R ABI is operational, the need to simulate the imagery is not present, and therefore documenting the time to produce this product is irrelevant. The simulated imagery should be generated at the spatial resolution closest to that of ABI, regardless of how much computer time it takes in this per-operational study, or a convincing justification needs to be presented (which has not been). Availability of near real time simulated products does not relevant to this study.

Tables 2-4 only briefly discussed. They do not add value to the manuscript. Figures 4 and 5 only briefly discussed. The authors should enhance the scale on the nitrate and dust images to show detail, or exclude them because of low values and show only the other four parameters.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 10131, 2014.