

Interactive comment on “Development and validation of satellite based estimates of surface visibility” by J. Brunner et al.

Anonymous Referee #2

Received and published: 27 November 2015

General comments: This study presents surface visibility retrieval by using MODIS data as a proxy for the new geostationary sensor, GOES-R/ABI. Validation also reported that an overall success rate was 64.5% by comparing satellite and ground observation data. The paper presents information that is valuable to the remote sensing community, it should be published after some corrections/improvements. Some significant deficiencies of this paper are found in the analysis of the visibility retrieval equation and its accuracy range. Although parameters used in Eq (3) are the most important for determining the visibility from AOD, it is currently explained by reference journal papers. They should be explained and discussed with sensitivity tests. Because AOD cannot be expressed as an integrated form by a simple extinction (σ) value and fixed layer thickness (x), complex extinction profiles (by different aerosol extinction coeffi-

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cients as a function of aerosol size and chemical composition) should be exploited and their effects on visibility determination. Also, providing tolerable ranges of the accuracy of retrieval is an important to the audiences.

Specific comments: p. 11260, line 15: The GOES-R ABI visibility algorithm assumes that the aerosol resides within the PBL, However, some aerosols are still exists above PBL and transported through the upper troposphere. In these cases, the visibility at the surface is measured as high although the AOD is measured as higher. Consequently, the retrieved visibility from the GOES-R ABI visibility algorithms is not suitable for these cases. The author needs to explain the assumption or limitation of the method in detail.

p. 11260, line 25: The ASOS measurement data were used to validate the retrieved surface visibility. If possible, visibility error vs. AOD error could be interesting and this supports how AOD can affect visibility retrieval.

p. 11260, line 25: Explanations of the collocation between satellite and ground observation data are missing.

p. 11263, line 20 : The author describe the variation of the Heidke Skill Score values according to the monthly mean time series of the ASOS validation statistics for the GOES-R ABI visibility algorithm. The GOES-R ABI visibility algorithm performs the best from the June through September. In contrast “use with caution” skill scores occur in April and May and from October through December. More discussions on these results are required.

p. 11261, line 5 : As mentioned in the manuscript, increment of RH leads to increased aerosol extinction and overestimates in the frequency of Low and Poor visibility relative to ASOS. Please show the changes in the results of CSR when the author removes the cases for the higher RH. The author may remove the cases of the AOGS visibility having large uncertainty.

Figure 3 : Please, combine the top panel and bottom panel to see the relation between

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variation of the surface visibility and the fire occurrence in time series.

Please, unify the form of number in y-axis of the figures (decimal or scientific etc.)

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 11255, 2015.

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