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Atmospheric Measurement Techniques Discussions

Interactive comment on "GOCI Yonsei Aerosol Retrieval (YAER) algorithm and validation during DRAGON-NE Asia 2012 campaign" *by* M. Choi et al.

Anonymous Referee #2

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1. General comments

This paper presents an improvement of Yonsei Aerosol Retrieval (YAER) algorithm dedicated to the processing of the Geostationnary Ocean Color Imager (GOCI) satellite data and its validation through the DRAGON-NE Asia campaign that took place in spring 2012. The second section of the paper is dedicated to the presentation of the GOCI YAER algorithm and its improvements. The cloud masking is performed by detecting spatial variability or high values of the reflectances. The number of remaining non-cloud pixels is used to determine the quality level of the retrievals, from 0 to 3.The turbid water areas are detected thanks to the difference of reflectivity at 660 nm.

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These regions are then considered as land areas in the data processing, where the minimum reflectivity technique over 30 days is used in order to retrieve the ground reflectance. LUT including 26 aerosol models are used with a radiative transfer model for the aerosols properties inversion, such as AOD, FMF, SSA, AE and the aerosol type (among six options). The third section presents briefly the results of GOCI YAER Âă- for two cases studies during the DRAGON-NE Asia 2012 campaign: a pollution haze and a dust case. The fourth section is about the evaluation of the GOCI YAER retrievals with AERONET measurements/inversions performed during the DRAGON-NE Asia 2012 campaign (40 Sun-photometers) and with MODIS (Dark Target over land and ocean and Deep Blue over land) in order for increasing the spatial coverage. A good agreement is found for AOD between GOCI and AERONET, especially when QA=3 flags are considered, and with MODIS for both DT and DB. The agreement is nevertheless slightly better with DB that uses also the minimum reflectance technique. GOCI is somehow limited by the absence of IR channels that doest not permit an efficient clouds screening. For other retrievals, the validation with AERONET and MODIS is quite low, especially for low AOD in the case of AE, and prevents quantitative studies. The last section focuses on the error analysis of GOCI YAER AOD and reveals a bias of 0.1 for AOD<0.4 and large variability in the retrievals for AOD>0.9. Due to the minimum reflectivity technique in a 30 days window, the error in AOD is higher in areas covered by dense vegetation

The paper presents an improvement of the data processing algorithm as well as the first GOCI retrievals since the algorithm has been previously developed with MODIS measurements. The scope, therefore innovative, is well-addressed. The paper is well written, the Figures of high quality, and the English is precise. I recommend it for publication after the authors respond to the few points listed hereafter.

2. Specific comments/questions

Following, some specific comments: - 2.1: How the thresholds, of 0.4 for the reflectance and of 0.0025 for the variability, have been found? - 2.1, l15-17: How much

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residual clouds possibly remain at this step since. in Sec 2.3, the difference of reflectance at 660nm is used to detect remaining cloud-contaminated pixels? - 2.2, l16-17: Same as 2.1, how these thresholds of 1% and 3% have been calculated? (the following explanation of the 3%, l17-18, is not clear) - 2.4, l18: Why is it important to avoid the overlap between the climatology and the retrieval? - 2.5, l12-13: At this step, is the AOD retrieved among the 9 values presented in the LUT? - 4.3, from l10 p9580: does the QA of 3 have been selected for GOCI (and MODIS?) retrievals in the comparison with MODIS? - 4.3: the use of the same methodology for the surface reflectance calculation implies a better agreement in the retrievals. What about the inversion procedure? Does MODIS use similar LUT for the aerosol properties inversion? - 5: the growth of the vegetation seem to be a crucial point in the retrievals when using the minimum reflectivity technique. It is mentioned also that some AERONET stations are located on mountains and could lead to lower AODs when compared to the GOCI one. If I understand clearly the AOD retrieved by GOCI is above sea level, and not above ground level. In this case, these stations should be filtered from the error analysis, thanks to the altitude of the instruments, in order to isolate the vegetation effect. What would be the cost of adding the altitude of the surface in the LUT?

3. Technical corrections

No major technical correction have been found: 2.4, l19-20: adding a coma could facilitate the understanding of the sentence: “10 times, giving”

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