

Interactive comment on “Operational retrieval of Asian sand and dust storm from FY-2C geostationary meteorological satellite and its application to real time forecast in Asia” by X. Q. Hu et al.

X. Q. Hu et al.

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Dear Editor:

We are sorry for our delaying of the response because the contact author was on business not in his office.

This is the point to point replies to the reviewers’s comments on our manuscript.

Xiuqing Hu _____

Reply to Referee #1

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We would like to thank the anonymous reviewer for giving a high evaluation of our job and addressing an importing issue. In the following we quoted each review question in the square brackets and added our response after each paragraph.

[One important issue still is how to obtain threshold values and cloud masks which are critical parts of this paper. The authors may need to run more case to get to get the better threshold values for future studies and SDS monitoring.]

We have already given the detailed description about how to obtain threshold value in our paper P.8404 L.17 “The first step of dust thresholds construction is to find the training sample for dust area by manual -identification. The threshold of each channel for the dust target is determined by histogram analysis of the target and the identification is conducted automatically using these thresholds. The classification thresholds are modified by validations with actual dust case.” To clarify this issue, we want to add a sentence : “we run several dust cases to construct the threshold values and modified them again and again, finally suitable for all the dust cases ”;after above sentences

As for cloud mask, there are these descriptions “cloud mask is one of the primary operational products of Data Processing Center (DPC) of FY-2C ground application system, but DRAGI does not use this ready-made product because of its confusion between dust and meteorological cloud but generates the cloud mask independently based on a set of the thresholds of meteorological cloud before dust identification. ” in P.8403. We have added following: “The discrimination factors of meteorological cloud are same as dust’s , but the threshold values are different. The threshold values are constructed by using a lot of cloud cases and specially focus on the difference between dust and cloud.”

The referee mentioned three reference papers for us at last. These papers have already read by us and gave us excellent enlightenments. We thank for this suggestion.

Reply to Referee #2

This referee gave our paper many good comments and corrected some deep mistakes. We thank him for his nice advices. The followings are our response to his comments. The general comments referee mentioned encourage us to take more improvements for our paper. It is needed for the paper that a short description of CUACE/Dust would be useful in the introduction. We have added this part in the instruction of our paper as following: The product is used for the assimilation of UACE/Dust as one important source of initiative dust distribution field;..

Specific comment 1:

Reply: The similar technique as volcanic ash detection is applied for dust identification in our algorithm. It is based on the fact that the similar characteristics of airborne dust with the volcanic ash are found in BTD[11,12], BTD[3.7,11] and RAT[3.7,0.65] from the true observation signal of these bands by several dust cases. There are also other several investigations showing the same results. Although this difference of composition maybe involve significant differences between the complex indices and the optical properties of particles of these materials, these factors (BTD[11,12], BTD[3.7,11] and RAT[3.7,0.65]) still show the similar characteristic between dust and volcanic ash.

Specific comment 2: Reply: we adopt completely the comment of the referee. It is more scientific that the brightness temperature of the surface T_s should be replaced by $T_{ref} = T_{bb}(\max)$: maximum value over the 10-day period of the reference image. In fact, T_{ref} is not T_s in most of situation. So T_s is wrong definition here.

Specific comment 3: Reply: it is true that the observations and simulations show that the IR split windows technique provides intricate results, especially the quantitative BTD[11,12] relation to accurate dust loading. It is very complicated from our investigation. But in our algorithm, the negative BTD[11,12] is just used as one identification factor of the dust targets. It is enough for this.

Specific comment 4: Reply: the referee pointed out one mistake of our description. P. 8402 L.13 Reference image(RI) and Difference Image (DI); is re-

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placed by the satellite observation signal of three bands 3.7 μm , 0.65 μm and 11 μm as section 2.3.2;

Specific comment 5: Reply: we use the surface observation to validate the SDS-IDDI just because there are little parameters of volume dust loading at the presence. It doesn't mean that the airborne dust is generally not transported over different altitude in China. We are planning to use better dust quantitative parameters such as Aerosol Index (AI) from TOM or OMI for validation of dust presence and loading.

Specific comment 6: it a nice advice that we have magnified the images of Figure 5 for more informatory show.

We thank the referee #2 give us so many technical corrections in wording and misprints. We have check the whole paper in sentence by sentence, word by word.

Reply to S.Ling's short comments

Comment 1: [In part 2, the description of other people's method may be shortened and summarized clearly, and the author's method practically used should be focused on.]

The viewer's comment is very good. In part 2, we just summarized the several method mechanisms of dust detection, but we conducted some simulations and validated these theories using FY-2C dust cases. So we gave some simulation results and combining methods. Our algorithm implementation is specially detailed to be described. We think we have fulfilled this comment.

Comment 2: [Cloud mask is an important step in dust detection. The specific method should be described with some details.]

This comment is similar comment to the referee #1's second one. We have already replied it and gave the revision.

Comment 3: [The important thresholds or threshold ranges of individual dust detection

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methods, such as BTD[11,12], IDDI, BTD[3.7,11], RAT[3.7,0.65], should be given.]

This comment is also similar comment to the referee #1's first one. We have already added the description about how to obtain threshold value. But the specific threshold ranges of every factor are a experiment values by a lot of dust cases. They are needed to be validated by more dust cases. So we think they are not completely sophisticated and not convenient to be open publicly.

Comment 4: [The dynamic thresholds construction should be described with more details, such as the information about the images used, and the resolution or other related information about the time, geometry, underlying type, surface temperature related thresholds.]

This comment is also similar comment to the referee #1's first one. We have already added the description about how to obtain threshold value.

Comment 5: [How the individual dust detection methods are combined in the practical use should be described.]

In part 2.3 Algorithm implementation, we have already gave the implementation steps of our algorithm. Combining all the dust detection methods refer to combining all dust discrimination factors based on FY-2C observation. The combination philosophy is implied in these procedures

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 8395, 2007.

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