

## ***Interactive comment on “Detection of dust aerosol by combining CALIPSO active lidar and passive IIR measurements” by B. Chen et al.***

**Anonymous Referee #1**

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General comments: This paper describes a cloud detection algorithm combining the data from CALIOP and Infrared Imaging Radiometer (IIR) both on the CALIPSO satellite. The authors demonstrated the algorithm using only CALIOP data, which is used in the CALIPSO version 2 data, often misclassify dense dust layer as cloud. The algorithm combining CALIOP data and the brightness temperature difference (BTD) data from IIR much improved the accuracy of cloud detection. The coefficients for the algorithm were determined from the CALIPSO data, and the CloudSat and MODIS data in 2007 over Taklamakan desert, and the validation and error analysis were done with the data in 2008. The paper is very well written and may be accepted with minor revisions.

Specific comments: p.3430 l.8: The use of both BTD1 and BTD2 in Eq.(1) should be better explained. BTD between 8 and 11 is not mentioned here. P3431 Eq.(2) and

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p.3432 Eq.(3): Though it is probably common in the remote sensing community to express the cost function as a single equation, summing linear functions of sensitive parameters, it would be better to give some explanation on the method. It is different from the method considering a condition in a multi-dimensional space, and it may have some limitations in the performance.

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