

## ***Interactive comment on “The CALIPSO Version 4 Automated Aerosol Classification and Lidar Ratio Selection Algorithm” by Man-Hae Kim et al.***

**Anonymous Referee #2**

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The authors have put together a very well-written and easy-to-follow description of the CALIPSO Version 4 automatic aerosol classification and lidar ratio selection algorithm. There have been some significant changes from the previous version including: updates to the lidar ratios for several aerosol types, the inclusion of a new dusty marine subtype, full use of the aerosol classification algorithm over all surfaces, aerosol classification in the stratosphere, and the addition of a new algorithm, SCAARF, to homogenize aerosol types when "fringes" occur. Additionally, the manuscript validates the updated algorithm by showing how the resulting AOD is in closer agreement with both MODIS and AERONET.

The authors must be applauded for presenting such a strong manuscript, that there is not much to be asked in way of revisions. If I were to make one complaint (and I

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won't... at least not fully) it is the use of 2.5 km as a standard approximation for the planetary boundary layer without regard to latitude, surface, time of day, or season. Understandably, there are some practical reasons for doing so, and the decision is based on results from published literature and largely consistent with Version 3. Each change in the aerosol classification and lidar ratio selection algorithm from V3 to V4 is justified and appropriately referenced based on the most current understanding within the aerosol community. The manuscript should be published after some very minor technical corrections.

Page 6, Line 12: "AODdifferences" should be "AOD differences"

Figure 3: Upon my first inspection of this figure, I was drawn to the differences in the number of aerosol retrievals both within and without the white dashed ellipse. Fortunately, the causes of these differences are thoroughly discussed later in section 3.3. However, as a courtesy for the inquisitive reader, it would be nice to add a sentence to the text informing that this topic will be addressed later in the manuscript.

Page 11, Line 20: "aa" should be "a"

Page 12, Line4: .. should be .

Page 14, Line7: "releasesreleases" should be "releases"

Page 15, Line 22: ;; should be ;

Page 15, Line 22: The overlines should be removed for the fringe variables delta and chi to match the format in equation 3

Page 20, Line 4: "demonstratesan" should be "demonstrates an"

Page 24, Line 18: "WhileWhile" should be "While"

Page 25, Line 21: "subtypes in reported in" should be "subtypes reported in"