

Interactive comment on “A new study of sea spray optical properties from multi-sensor spaceborne observations” by K. W. Dawson et al.

Anonymous Referee #1

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Review of Manuscript “A new study of sea spray optical properties from multi-sensor spaceborne observations” The above manuscript discusses a new method to retrieve the lidar ratio of sea spray over ocean by using two independent aerosol datasets. The data analysis shows that over most of the ocean surfaces, the calculated lidar ratio is higher than the default value used in CALIOP retrievals. The authors also show that the lidar ratio of sea spray over ocean is inversely related to the mean surface ocean wind speed. This work is important in potentially reducing the uncertainty in the extinction profiles due to the assumption of the lidar ratio. I think this paper will be of great interest to the readers of ACP and to the lidar community in general. I recommend it for publication after the following minor revisions are addressed and incorporated.

Specific Comments Title: The title is a bit misleading because it does not highlight

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what “a new study” means (new observations? new method?). In the abstract and in the conclusions it is specified that a new method is described. Therefore, I suggest to make the title clearer by using “a new method”, “a new algorithm”, etc.. or anything else equivalent.

Abstract: Line 2: Replace the sentence “the assumption of an extinction-to-backscatter ratio” with “the assumption of the extinction-to-backscatter ratio”.

Introduction: General remark: It would be good to provide a list of state-of-art available methods, which allow the retrieval of the lidar ratio. This could be done just in 1-2 sentences.

Page 214, line 23: The acronym SSA sounds misleading in this context because usually it refers to “single scattering albedo”. The authors should find an alternative acronym for the sea spray aerosol. Maybe SS (sea spray) is sufficient.

Page 214, line 24: Replace the sentence “SSA contributes an aerosol optical depth (AOD) of approximately 0.15” with “the contribution of sea salt aerosol to AOD is approximately 0.15”.

Page 216, line 21: Replace the sentence “Because of this” with “For this reason” or something equivalent.

Page 216, line 23: The acronym Sp is introduced here for the first time with no clear meaning of the subscript p. Later in the manuscript, it’s clear that p stands for particulate but it should be explicitly defined here.

Page 217, line 17: Replace the sentence “we present a new method for deriving lidar ratios” with “we present a new method to derive lidar ratios”.

Methods: General remark: The title of this paragraph does not seem consistent with the ones of the sub-paragraphs. Please consider it to change it, or to change the ones of the sub-paragraphs or to re-organize this section.

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Page 218, line 5: Replace the sentence “The CALIPSO mission was launched on April 28, 2006. CALIPSO has been able to provide the scientific community with vertically resolved measurements of both aerosol and cloud optical properties like depolarization ratio (a measure of particle sphericity), AOD, and ice/water phase since June 2006” with “The CALIPSO mission (INSERT A REFERENCE HERE), launched on April 28, 2006, has been able to provide the scientific community with vertically resolved measurements of both aerosol and cloud optical properties like depolarization ratio (a measure of particle sphericity), AOD, and ice/water phase since June 2006”.

Page 219, lines 10, 12: Repetition of “Therefore” at the beginning of the sentences. Please modify.

Page 220, line 14: Replace the sentence “With these assumptions in mind, integration. . .” with “Based on these assumptions, the integration. . .”.

Page 220, line 20: Replace the sentence “we get an equation for a columnar particulate lidar ratio as” with “the equation for a columnar particulate lidar ratio is”.

Page 221, line 1: Replace “The equation” with “Eq. 4”.

Page 225, line 11: Provide a reference.

Page 226, line 9: Replace “this figure” with “Fig. 3”.

Page 231, line 10: Avoid repetition of “that” in the sentence, if possible.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 213, 2014.

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