

RESPONSE TO ANONYMOUS REVIEWER #2

We would like to thank reviewer for his/her comments. We have done our best to address each of the points as detailed below.

Note: All reviewer comments in *italics*; all responses by the authors in normal font.

#1. Figure 1: The colour-scale should be changed so that it captures more variability patterns (there is no use in stretching it further than something like 0.11).

We have changed the color scale on Fig. 1

#2. Since one of the important contributions of this work is the information on marine aerosol's vertical distribution, I strongly recommend separating the information presented in Fig. 3 to different regions and seasons. I suspect that in its current form, Fig. 3 filters out much of the spatio-temporal variance in marine aerosol distribution, thus being of little relevance.

We thank the reviewer for bringing up this point. Discussion for the dependence of aerosol layer thickness on both winds speed and seasons has been added to the manuscript.

#3. Given the very low number of samples at very high wind speeds (histogram in Fig. 5 and first paragraph in page 4611) I think it would be more correct not to include data associated with wind speeds higher than 18m/s. The authors statement that "Removal of these points also does not change the conclusions drawn from the data analysis" (page 4611, line 10) is not correct from a physical point of view, since removal of these data-points would prevent having a state of "saturation" in marine aerosol loadings (as hypothesized at line 10 of page 4613). Note that this would also be the case if excluding the last data point in Fig 5.

We have included additional data analysis to extend our time series (and the available data) till April, 2011. We agree with the reviewer that there is less number of data points at wind speeds higher than 18 m s^{-1} . However, notice that the y-axis of the histogram is multiplied by 10^4 . For example, for the wind speed of 18 m s^{-1} , there are over 1500 collocated data point, considerably higher than the data points used by other investigators (e.g., 540 for the total and 2 for 18 m s^{-1} wind, Mulcahy et al. (2008)). Nevertheless, following the reviewer's suggestion we have modified CALIPSO AOD₅₃₂ and AMSR-E wind speed relationship figures and added discussion in text to acknowledge the fact those conclusions for $U_{10} > 24 \text{ m s}^{-1}$ are based on less than 100 data points.

References

Mulcahy, J. P., O'Dowd, C. D., Jennings, S. G. and Ceburnis, D.: Significant enhancement of aerosol optical depth in marine air under high wind conditions, *Geophys. Res. Lett.*, 35, L16810, doi:10.1029/2008GL034303, 2008.