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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Organic carbon and non-refractory aerosol over the remote Southeast Pacific: oceanic and combustion sources" *by* L. M. Shank et al.

Anonymous Referee #1

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This manuscript is a well written analysis that uses data from several projects to conclude that the remote oceanic background aerosol has a very small organic content. This conclusion is at odds with recent evidence for a significant marine source of submicron organic mass–evidence obtained mostly in the more polluted northern hemisphere. The manuscript carefully combines data from the varying sensors on each project, and makes a strong case that there is little organic matter found when the data are parsed to remove anthropogenic signatures. I find it suitable for publication in ACP with minor, mostly technical, revisions.

Comments p. 16901 line15. Was the DMA operated in a scanning mode? What was

the scan time? How was the inversion done?

p. 16903 line 25. Please explain the wind lines in Fig. 4 caption. Are they pointing into the wind or from the wind? Is the length proportional to speed?

p. 16904 line 16-18. CO is also produced by VOC oxidation. This could *conceivably* (but not likely) be an issue if VOCs were emitted in some biologically active areas of the ocean.

p. 16904 lines 23-25. How were the 2 ng/m3 and 56.5 ppbv values chosen? Were any objective criteria used? BC has a sink term, scavenging, that is the same as for the Org and SO4 components, so it does not really make an independent screening tool. It would be preferred if multiple VOCs were available to use to screen the aerosol data by using only gas-phase components. CO is most valuable here, but I'd like to see some justification for the 56.5 ppbv threshold value. In Table 1 there is very little difference between the "clean MBL" and the "natural MBL" results (only BC varies a little), so this level of division seems to be too fine. It would also be very helpful to include uncertainty ranges in Table 1 so that we can see if the differences in the various classifications are significant. (Note–real uncertainty ranges that include instrumental accuracy as well as measurement variation.)

p. 16905 line 28, does SO4 contribute to 87% of the non-refractory submicron mass, or all mass?

p. 16906 line 5. This figure (3) shows slopes spanning most of the width of the graph, far exceeding the range of the data. The various data markers are very hard to distinguish. I would prefer a table for this presentation, since ranges, uncertainties, slopes, intercepts, and correlation coefficients could be shown and compared. It would be much more quantitative that the "visual representation of the relationships" that is now shown. If needed, the slopes for each classification could be presented as a box plot showing variability as well as median value.

p. 16908 line 9. Is the "signal to noise level" not *lower* for the C2H4O2 fragments?

p. 16908 line 12. I would suggest showing the levoglucosan fraction of organic mass, rather than the absolute concentration, since the latter mostly follows the total organic mass so that it is hard to see the biomass burning influence.

p. 169112 line 4. Is the "clean Org/SO4 ratio" from the VOCALS measurements? Please be specific since you are discussing both IMPEX and VOCALS here.

Technical corrections

p. 16900 line 25 replace "frag" with "fragmentation"

p. 16900 line 28 subscript the "4" in "NH4"

p. 16918 line 10, change to "air-sea interface"

p. 16927, fig. 5a. The aspect ratio is poor, the colors faint, and the symbols are hard to read because the symbol size/line thickness is too small.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 16895, 2011.