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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Eddy covariance measurements of sea spray particles over theAtlantic Ocean" *by* S. Norris et al.

S. Norris et al.

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All the Reviewer's comments have been noted and edits applied where needed. Below are the authors response to the main comments made by the Reviewer. These state the the Reviewers comment then the authors responce.

1. This paper does not mention what sizing convention it uses. The authors therefore need to explain what droplet sizing convention they are using and how they converted the size bins they observed to this sizing convention.

The reviewer notes the importance of maintaining care in expressing the size conventions for particles that change in size with humidity, and notes that the source functions used in figure 6 were originally expressed in a variety of different sizing conventions. The source functions plotted have all been adjusted to 80% relative humidity using the

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approximation rformation = 2r80 = 4rdry (Lewis and Schwartz, 2004). The CLASP data used have been corrected to 80% humidity using the Gerber, 1985 growth model. This is now made clear in the text.

2. The authors are also imprecise in defining their spray generation function.

The flux is now always shown as dF/dr. We have also clarified the fact that we are presenting measurements of the net fluxes not source fluxes; the latter would require correction of the measured flux for particle deposition.

3. It does no mention the bin sizes, although Table 1 lists six of the eight size bins. But the table does not tell whether these are central sizes in the bins or upper or lower limits. Also, what happened to the other two bins, up to 3.5 micrometers, mentioned on page 13248?

The upper and lower limits of size channels have been added to table 1 and a sentence has been added to explain why the 7th size bin has not been included in this analysis.

4. The discussion of averaging period in the second paragraph in Section 3 is useful. Computing ogives is a clear way to evaluate how long the averaging must be (see Figure 2). I would tend to quibble, though, that the ogive traces in Figure 2 do not all seem to "level off" after 20 minutes of averaging, as the authors claim at the top of page 13251. In fact, since these traces stop at 20 minutes, it’s hard to judge just what the behavior is around an averaging period of 20 minutes.

We have decided to still show the cospectra for the particles out to 20 minute Ogives and not extended them as suggested by the reviewer. We have included a graph showing the ogive for the momentum flux for the same period; this shows that the turbulence scales are restricted to periods of less than about 7 minutes. Remaining variability in the particle number flux ogives out at 20 minutes is not due to an inadequate averaging period, but likely results from mesoscale variability or non-stationarity in the particle concentrations. Averaging of multiple 20-minute records will average out

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7, S6624–S6626, 2007

this mesoscale variability. Extending the period of the ogives will reveal longer period mesoscale variability, but add nothing to the selection of averaging time. An alternative approach to reducing the impact of the mesoscale variability would be to high-pass filter the data; however, given the limited data set available, and the objectives of the paper, we feel it more appropriate to show the extent of the variability rather than filter it out. The text has been modified to reflect this.

5. In Figure 6, some of the legend designations do not have lines associated with them: namely, Vignati in panels a and b and de Leeuw in panel c. Why?

All the source functions listed in the figure legend DO have lines associated with them; however some may overlie each other and be difficult to spot. It is also possible that the paler lines do not show clearly on lower resolution printers. The Vignati et al. 2001 curve has been removed from all the plots to reduce the number of curves and to display the other results more clearly.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 13243, 2007.