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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sea Spray Fluxes from the Southwest Coast of the United Kingdom – Dependence on Wind Speed and Wave Height" *by* Mingxi Yang et al.

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This paper is a description of an analysis of aerosol measurements made at Penlee Pt (PPAO) on the coast of the UK. Eddy correlation aerosol fluxes are computed and are interpreted as the sum of source and deposition fluxes. An effective aerosol source strength is computed and analyzed with considerations of wind direction, etc.. The authors find the source strength correlations better with wave height and/or wave parameters than with wind speed. The source is stronger than expected for open ocean but weaker than that observed directly from a surf zone. The interpretation is that wave breaking is more intense (or something) in a shallow zone close to shore than the open

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Discussion paper

ocean. Most of the number flux occurs for aerosols greater than .1 and less than 1 micron. The paper is well written and the authors have carefully considered a number of experimental and physical aspects of the analysis and interpretation. In my view it can be published in its present form. I have a few comments the authors may with to consider.

*I suggest the authors make it painfully clear that their results are not affected by surf generation and the enhanced production they see is associated with enhanced breaking in shallow water but external to the shore break. Maybe they thought it was obvious but I pondered this.

*I suggest they carefully check terminology of net, source, and total aerosols. I found myself wondering if they were consistent. A number of figures say 'total aerosol number flux' but I am not confident I know if it is net or source.

Line 91. I don't think the turbulent flux is the same as the net flux. To me, net=turb-VgC, where Vg is the gravitational fall velocity.

Net=Source-VdC=turb-VgC

For the sizes they are considering, it may be that Vg is much less than Vd. They should state this. If Vg is negligible, then Source=turb+VdC

On line 94 they state that source is obtained by subtracting deposition from net Source=turb-VdC

Doesn't seem consistent with Fig 5, where source is greater than net. Please check this and get it straight.

Also suggest they read Andreas et al. JGR, vol 115, C12065, 2010; Freire et al BLM 160:249, 2016; and Nissanka et al. JGR, 9688:9702, 2018.

Figure 11 is certainly interesting. It is surprising that aerosol spectral concentration and source flux is independent of wind speed. The graphs might be a little easier to

use of the vertical axis was multiplied by R (are conserving).

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