

## ***Interactive comment on “Measurements of Ozone Deposition to a Coastal Sea by Eddy Covariance” by David C. Loades et al.***

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Title: Measurements of ozone deposition to a coastal sea by eddy covariance

By Loades et al

The study reports about 50 days of ozone (O<sub>3</sub>) fluxes measured by eddy covariance technique over a coastal sea. In particular, the O<sub>3</sub> deposition velocity is investigated with respect to friction velocity, and fairly good comparison is found with the Fairall et al (2007) parameterization as well as with previously reported measured values. The dataset is interesting, the framework analysis and results/discussion comprehensive and well written. I can recommend the final publication in AMT after the following

C1

comments are properly addressed:

- L57. I would name this chapter as 2. Materials and Methods. And then having subchapters 2.1 Measurement location; 2.2. Experimental setup; 2.3 Flux calculation. 2.4. Data selection; etc. ....
- L104-105. There is something missing at the end of the sentence. Please check it.
- L114-127. Why to use such large windows for searching the lag, e.g. from 0 to 10 sec as shown in Fig.4? I would use a very narrow window (e.g.  $4 \pm 1$ ) sec in order to reduce the scatter.
- L130. A minus sign is missing from Eq.1.
- L140 - . Please report the percentage of excluded data for each criteria, and also the total percentage of data left.
- L156-157. Why? I do not understand this point. Footprint doesn't depend on wind speed, rather on stability. I would be interested to see footprint estimates for different stability classes. Did the authors used the estimated roughness length for the footprint calculation?
- L172-174. It is not clear when and where this filter based on wind speed was applied. For example, in Figures 9, 11 and 13 data points with  $U < 3$  m/s are shown. Please clarify it.
- 5.4 Measurement uncertainty. Most of this section describe the approaches to calculate the flux random uncertainty, and then it should be moved under the Materials and Methods chapter.
- L280. For the estimation of total random uncertainty note also the Finkelstein and Sims (2001) method, which do not require the estimate of the integral timescale (which may be not so straightforward). See Rannik et al (2016) for a comprehensive review of existing approaches.

C2

- L284. What do the authors mean by “integral timescale for vertical fluctuations?” This should be the integral timescale of instantaneous covariance timeseries  $w'X'$  (see Rannik et al, 2016)
- L316-317. What about the response time of the O3 analyser and the sensor separation? Could the authors provide more details?
- Figure 14. It is not clear for me how the cospectrum was normalized. Values seems to be one order of magnitude lower than what should be the reference Kaimal cospectrum.
- Units in the figure axis labels could be put between parenthesis.

References:

Rannik, Ü., Peltola, O., and Mammarella, I.: Random uncertainties of flux measurements by the eddy covariance technique, *Atmos. Meas. Tech.*, 9, 5163–5181, <https://doi.org/10.5194/amt-9-5163-2016>, 2016

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