**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "Aerosol properties associated with air masses arriving into the North East Atlantic during the 2008 Mace Head EUCAARI intensive observing period: an overview" *by* M. Dall'Osto et al.

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Title: Aerosol properties associated with air masses arriving into the North East Atlantic during the 2008 Mace Head EUCAARI Intensive Observing Period: an overview Author(s): M Dall'Osto et al.

General: This manuscript presents a comprehensive overview of aerosol measurements during EUCAARI intensive observing period at field site in western Ireland. The nature of the paper is sort of an introductory paper. However, the authors present

significant new data which has a clear scientific significance and impact. I would recommend the authors to consider the following minor issues and after that I would recommend this ms to be published in ACP.

One of the main issues, the authors should systematically check and comment are the uncertainty/error/variability limits of the data as expressed in +/- in many places. It is not clear whether the +/- refers to error or just variability of the data. This should be mentionad and also it should be explained how these limits are found. E.g. page 26282 lines 19-20 and fig 8 show an example of this. Another examples can be found at table 2 and table 3 and the corresponding text. I hope the authors go through the whole manuscript with this respect and make the necessary changes. (A good example of this issue can be found on page 26287 line 6, which clearly states that +/- refers to standard deviation.) The +/- stands for plus/minus one standard deviation and applies throughout the paper– this is now clarified.

"The values of wind speed and direction are given ïĆś one standard deviation. In all subsequent values of parameters reported ïĆś a range, the range corresponds to one standard deviation."

Detailed comments: Page 26280, line 9-> and fig 5: It is not obvious that there are four modes in concentration frequency distribution. Visually observing I find only 3 (the one at 800-900 cm-3 being rather unclear). Did you fit some functions to separate modes? There is a clean background mode at 400-500 cm-3.

Page 26281, line 3: Replace Fig 7 with Fig 7b). Corrected to Fig 7a – we reversed the order of the figures.

Page 26282, line 2: Replace Fig 6 with Fig 7a) Corrected to Fig 7b

Page 26183, line 5: add also MSA Done

Page 26285, line 4-5: The sentence starting with "aerosol arriving: : :" has something wrong. Reworded: Within the cP air mass period, some air masses arriving at Mace

Head had travelled across mainland Europe and the UK.

Page 26288, line 15: and -> an Done Page 26291, line 7: Please explain GF-PDF The GF-PDF, c (g,D), is the GF probability density function for particles with dry diameter D, which describes the probability that these particles exhibit a certain GF, g, for a defined treatment (in this case exposure of the sample to 90% relative humidity). The inverted GF-PDFs are by definition normalized to a total probability of unity: , where D is a dry size of particle, g is a hygroscopic growth factor. In other words, it represents the probability (normalized to the total number of particles sampled during a given HTMDMA scan at a given RH) of these particles to have a given GF. The GF channels are 0.05 wide and the range covers 1-2.

Page 26292, line 11: Did you measure GF's up to >2? Since sea salt GF is found at about 2.2. This is not clear from Fig 13.

Unfortunately not, given the set up the second DMA arched and was limited to a GF of 2. Consequently, if present externally-mixed sea salt was not measured.

Fig 3 and 4: Explain the y-scale (km a.g.l. or m a.g.l.) and the x-scale (JD). Explain also the vertical lines at Fig 4.

The y-axis is kilometers above ground level where ground level is approximately 15 m above sea level. The x-axis is Julian Day (JD).

The y-axis is meters above ground level where ground level is approximately 15 m above sea level. The x-axis is Julian Day (JD). The vertical lines separate the different air masses: from left to right, these correspond to cP, cmP, mP, mT, mA, respectively.

Fig 6: The variable at left should be Dp and the size distribution function dN/dlogDp should be next to the colour scale. Corrected

Fig 7. It looks that the periods with nucleation are at plot a), but the caption informs otherwise. Please check. corrected

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