

## ***Interactive comment on “Impact of North America on the aerosol composition in the North Atlantic free troposphere” by M. Isabel García et al.***

### **Anonymous Referee #1**

Received and published: 16 March 2017

In this paper, a 5-year record of chemical composition of PM<sub>2.5</sub> and PM<sub>10</sub> aerosol at Izana Observatory is presented. The composition time series is analyzed in the context of meteorology, calculated back trajectories, and source-receptor plots. The paper shows very clearly that North America is the major source of aerosols sampled at this free tropospheric site. Measured aerosol composition varies seasonally due to the spatial distribution of aerosol sources in North America and seasonally varying large scale meteorology. The paper should be published in ACP once the comments below have been addressed.

Page 2, line 34: Do you mean “evidence of” instead of “interest in”?

Page 3, lines 24 – 25: Change “weighting” to “weighing”. Also “weighted” to “weighed”.

Page 6, lines 27 – 29: Can the hypothesis that  $\frac{3}{4}$  of the non-ammonium sulfate is linked

to soil emissions of gypsum be verified by ratios of calcium or other dust-containing elements to this nss sulfate?

Page 7, line 4: change to “may influence the export”.

Figure 2: A symbol indicating the location of the sampling site should be added to each plot – especially Figure 2A1 – A4 – and all similar plots in the paper.

Figure 3 caption: It is not clear how the monthly average values of the omega vertical wind component at the 850 hPa level is “illustrated in plot (D)”. Figure 3D appears to be satellite derived SO<sub>2</sub> values (based on color bar) and domains.

Page 7, line 17: change to “over most of North America”.

Page 8, line 2: A reference should be cited in the main text for the statement “as reported by NOAA”.

Page 8, line 9: change to “shows the typical eastward track of the cyclones in March-April”

Page 8, line 13: change to “Spring (March-April) is the season of maximum frequency. . .”

Page 10, line 20: I’m not sure that “depleted” is the correct word. Change to “. . .in regions with less nss SO<sub>4</sub> compared to NE-US”

Page 10, line 31: State the source of the high nitrate concentrations in the Central north region of North America.

Page 13, lines 1 – 3: Do you mean to say that there are sources of OM that are not related to combustion but, rather, biogenic in origin?

Figure 8 caption: Supply the full name of “MDAF” shown in the color bar for C3. Also what is “Aerosol Index averaged”?

Page 14, lines 5 – 10 and Figure 9: The size range of sea salt discussed and shown

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should be provided.

Figure 10 caption: Change “mayor” to “major”. Also – it is difficult to see differences in the mass fractions for the non-OM and non-dust components. A logarithmic scale on the y-axis would help.

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