EGUsphere, referee comment RC1
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Referee comment on egusphere-2022-887

Anonymous Referee #1

Referee comment on "Measurement report: Long-range transport and the fate of dimethyl sulfide oxidation products in the free troposphere derived from observations at the high-altitude research station Chacaltaya (5240□m□a.s.l.) in the Bolivian Andes" by Wiebke Scholz et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-887-RC1, 2022

The paper presents a very rare high altitude data set of state-of-the-art measurements of DMS and its oxidation products from CHC in the Bolivian Andes. A modified FLEXPART scheme was used to identify source regions of the chemical species measured and the degree of influence of the boundary on the measured gas and aerosol phase composition. Strong evidence is presented for long range transport of DMS and oxidation products in the free troposphere across the Pacific to CHC.

Line 110: Why was the figure of the measurement site put into Appendix B rather than the main text? It would be useful to have it in the same section as the station description for those not familiar with the geography surrounding CHC. Also, please label the location of Lake Titicaca and the other lagoons mentioned in line 121.

Table 1: The Q-ACSM species should be labelled as non-refractory in the table.

Line 142: It is stated that the nitrate-CIMS made measurements from April 19th to 25th but based on what is shown in Figure 1, it looks like those data were not analyzed. An

explanation of the reason why not all data was analyzed (for all instruments) would be useful.

Line 200 says the FIGAERO-CIMS was operational April 10th to June 2nd but Figure 1 indicates it became operational in early May. Vertical lines corresponding to dates on the x-axis would help.

Section 3.1: The different panels within Figure 2 should be described in the order they are mentioned in the text. Currently, the order is 2A, 2E, 2C, etc.

Lines 274 – 275: It doesn't seem necessary to say that they "appear anticorrelated". Can't the regression be performed to see what the degree of anticorrelation is?

Lines 297 – 302: The panels within Figure 3 are also mentioned out of order in the text.

Line 300: It is difficult to understand what is being said here since it is not clear what Figures 3 B1 and B2 are. Is this statement based instead on Figure 3F ("during the afternoon of the same day, shown in Fig. 3 B1 and B2, a still small, but larger fraction of the air travelled uphill close to the surface")?

Two methods are used for designating the sampled air masses as primarily FT with little influence from the boundary layer or influenced by the local boundary layer - the FLEXPART analysis and the value of the identifiers listed in Table 2. Some discussion of why two methods were used and the unique information each provided would be useful.

Lines 312 – 315: It would be helpful to include a figure showing the FLEXPART domain when it is discussed in Lines 251 – 254.

Line 314: Should be "Intertropical" Convergence Zone.

Throughout: please use uniform date-time stamps in the text and figure captions.

Figure 4: Again, panels are mentioned out of order in the text.

Figure 5: How many data points are the boxplots constructed from? Would it be more appropriate to use an average and standard deviation?

Figure 7 is mentioned in the text before Figure 6.

Figure 7: Gridlines would help guide the eye to see correlations between peaks and valleys of the plotted parameters.

Figure 6: It would be helpful to add the monthly wind direction to the figure.

Figure 8 could be included earlier in the manuscript to show the FLEXPART domain and the location of CHC and Lake Titicaca.