

Atmos. Chem. Phys. Discuss., referee comment RC1  
<https://doi.org/10.5194/acp-2021-601-RC1>, 2021  
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## Comment on acp-2021-601

Anonymous Referee #1

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Referee comment on "Understanding aerosol composition in an inter-Andean valley impacted by sugarcane intensive agriculture and urban emissions" by Lady Mateus-Fontecha et al., Atmos. Chem. Phys. Discuss.,  
<https://doi.org/10.5194/acp-2021-601-RC1>, 2021

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Review of "Understanding aerosol composition in an inter-Andean valley impacted by sugarcane intensive agriculture and urban emissions" by Mateus-Fontecha et al.

### General comment

This study evaluated the chemical composition of PM<sub>2.5</sub> particles in the Cauca River Valley (CRV), an agro-industrial region in Southwest Colombia where sugarcane production is a common activity. Organic material followed by ammonium sulfate and elemental carbon were found as the main components of the PM<sub>2.5</sub> in the region. I consider that the provided information is important for the region and for other countries where sugarcane production is a recurrent practice; however, the current manuscript needs to be significantly improved before it can be accepted for publication. I am wondering if the Editor considers that this manuscript fits into the "Measurement Report" category.

### Major comments

- Although English is not my mother tongue, it is clear that the present manuscript requires to be deeply edited and cleaned as there are several grammatical errors and a significant amount of typos. I encourage the senior coauthors to read the revised manuscript before they submit it.
- The authors need to highlight the novelty of the present study. Additionally, a real scientific discussion is required. Currently, the discussion focussed on indicating if the obtained results are lower, higher or comparable to previous results. This is not enough and I invite the authors to do a better job. At the moment this is more like a description of the results with a lack of a scientific discussion.
- Redundancy needs to be avoided. The authors define the same term/variable several times along the text. In other cases, after a term/variable is defined the authors do not use the defined abbreviations.

- The authors used the Principal component analysis (PCA); however, I am not sure how valid it is. PCA has been highlighted as an obsolete data analysis method, and it is therefore not recommended in our community. I invite the author to provide a strong argument on why this analysis should be included in their manuscript. Please see **Hopke and Jaffe (2020)**.
- Citation along the text needs to be deeply improved. There are several sentences and paragraphs that require to be properly cited.
- Several statements are rather speculative. I invite the authors to be more specific and concise, supporting their conclusions with their results.
- Section 3.7 is extremely long. Please reduce its length focusing on the most important results and highlighting the novel parts.
- Several conclusions are reported for the entire CRV region, although the measurements were performed in one sampling site only, i.e., Palmira.

#### Minor comments

Line 46: "biomass burning" should be "biomass burning (BB)"

Line 63: "emits aerosols of high toxicity". Such as? Please add a reference here.

Line 63: "secondary organic aerosol precursors". Such as? Please add a reference here.

Line 63: "short-lived 63 climate pollutants". Such as? Please add a reference here.

Line 93: "of particulate matter (PM)". Define it the first time it is used.

Line 95: "organic components". Such as?

Line 96: "numerous enough". Provide a number.

Lines 100-101: "putting together disparate source data". What do the authors mean?

Line 110: "This pollutant source". PM2.5?

Lines 113-114: "including elemental carbon (EC), primary and secondary organic carbon (OC)". Already defined in lines 74 and 75.

Line 115: PAH was used previously in line 75.

Line 118: "pre-harvest burning". It was used several times before.

Line 131-132: "2.2 Mhab". It was mentioned in line 83.

Line 132: "123 khab". In line 83 129 khab was mentioned.

Line 133: "across the Western Cordillera , as shown in Figure 1. on the Pacific Ocean coast is one most". Something is wrong here.

Line 152: "Particulate matter" should be "Particulate matter (PM)"

Line 153: "filters were stored". Please add more details such as the containers.

Line 154: "1888 sugarcane pre-harvest burning events". How was this quantified?

Line 154 and along the text: "pre-harvest burning" should be "PHB"

Lines 169-170: "were analyzed from Teflon and quartz filters". In line 159 it is mentioned that the metals were obtained from the Teflon filters only.

Lines 171-172: "Metals were analyzed from three 8-mm circular pieces punched from the 45 filters". As far as i know, Teflon filters cannot be cut in small pieces. How did you do this?

Line 178: "and polycyclic aromatic hydrocarbons (PAH)". Already defined.

Line 178: "circular pieces of filter". Please clarify the type of filter you are referring to.

Line 189: "blank filters". This was not mentioned before. Can the authors elaborate more on how those filters were collected/treated/processed?

Line 194: "elemental carbon (EC)". Already defined.

Line 198: "equations (Chow et al., 2015). See Table 1. Also, this reconstruction". Something is wrong here.

Line 200: "particle bounded water" should be "PBW"

Lines 282-283, 285: "(Lopez and Howell, 1967)". Is this the up to date knowledge?

Line 286: Add a reference after "basis"? Is there something recent to show that this applies nowadays?

Line 290: "first at 14.5 m". Above the ground?

Line 299: "were very likely controlled by solar radiation". What other mechanisms could work in the region?

Line 442: "Levoglucosan is a highly specific biomass burning organic tracer". Add a reference and explain why.

Line 449: "samples". How many?

Lines 463-464: "The large levoglucosan/mannosan ratio variability in our study suggest that Palmira was impacted by sugarcane pre-harvest burning most of the time". I suggest to add a time series of PM2.5 and the levoglucosan levels?

Figure 1S. How was this information obtained?

Figure 2. Indicate the time period used to build these figures, is it the sampling period as indicated in the figure caption of it includes the 1 previous year as mentioned in line 290

Table 3. "hy there are no decimals? What is the resolution of the used method?"

Table 3: I suggest adding a column indicating the number of samples on which each element/ion was detected.

Table 3 (last arrow). How can it be possible as in line 334 it is mentioned that "while V was not found in any sample"

Figure 4: I do not find this a key figure to be in the main text

Table 1S: "in Ton year". Fix it.

Figure 2S. What is the time resolution? 24 h?

Figure 4S is not mentioned/discussed in the main text.

All figures: Increase the font of the axis.

#### Technical comments

Line 41: Add a reference after "areas".

Line 42: Add additional references to Majra (2011).

Line 45: I doubt that Majra (2011) is the only and the pioneering study reporting this.

Line 45: Line 41: Add a reference after "(SOA)".

Line 47: Add additional references to Yadav and Devi (2019).

Line 49: Add additional references to Sutton et al. (2011).

Line 52: Add a reference after "factors".

Line 43: Add a reference after "exposed".

Line 55: Add a reference after "Australia".

Line 61: Add a reference after "USA".

Line 62: Add a reference after "worldwide".

Line 64: Add a reference after "contaminants".

Line 78: Add a reference after "CRV".

Line 84: Add a reference after "plantations".

Line 88: Add a reference after "owners".

Line 89: Add a reference after "biofuel".

Line 124: Add a reference after "sparce".

Line 134: Add a reference after "Colombia".

Line 135: Add a reference after "countries".

Line 201: "described by (Clegg et al., 1998)" should be "described by Clegg et al. (1998)"

Line 225: "As per Table 1". This is not correct.

Line 229: "out site". Fix it.

Line 232: Add a reference after "aerosols".

Line 276: "The Cauca River Valley (CRV)". Already defined.

Lines 276-277: " valley at ~985 m altitude located ~120 km from the Pacific Ocean". Already mentioned.

Lines 278 and 281: "(Rojo H. and Mesa O., 2020)" should be "(Rojo and Mesa, 2020)"

Line 280: Add a reference after "conditions".

Line 287: "this time period". Do the authors mean during the day?

Line 289: Add a reference after "out".

Line 318: Add a reference after "Brazil".

Line 321: Add a reference after "Mexico".

Line 326: "NO<sub>3</sub>" Fix it.

Line 333: "Tracer". Trace?

Line 355: "by ammoniated sulphate". Fix it.

Line 359: Add additional references to Snider et al. (2016).

Line 369: "24.4 and 31.0". Units?

Lines 371-372: "trace element oxides (TEO)". Already defined.

Line 376: "Particle-bound water (PBW)". Already defined.

Line 415: Add a reference after "dust".

Line 417: "profile, , thus an". Fix it.

Line 419: "substantiates"???

Line 425: "It must be bear in mind"???

Line 465: "have not been reported so far". Where?

Line 674: "(52.99%here)" and "(16.12%here)". Fix it.

Line 675: "(6.95%here)". Fix it.

Line 676: "practices and estimated secondary aerosol formation was estimation of." Something is wrong here.