

## **Assessing the influence of long-range transport of aerosols on the PM<sub>2.5</sub> chemical composition and concentration in the Aburrá Valley**

In general, the manuscript shows the results of the chemical characterization of PM<sub>2.5</sub> by different techniques in addition to the identification of emission sources by using receptor models and back trajectory in the Aburrá Valley, in Colombia.

Specific chemical characterization during biomass burning and volcanic degassing processes were included in addition to dust events.

In general, the manuscript should be revised for minor errors.

The Introduction should provide context for the work in reference to past efforts to characterized fine particles and identify their sources in the Aburrá Valley.

I found quite confusing the way that the authors explain the modeled dates in Table 1, as they mentioned that is the samples number, but if it is the case, having 30 days is not enough for reliable PMF results. In addition, I do not understand why they eliminate the carbon fractions and trace elements and running the model just with anions which I do not think is enough for the biomass burning and dust events.

Please give more details for the validation of the PMF results, specifically, some sensitivity analysis is needed to better assess the robustness of the results.

The number of samples used for each site in each year should be presented. It is unclear if the number of samples is sufficient to draw the conclusions about trends across the sites and across years. If the meteorology is different for a majority of the samples in different years and there are different sources, then the comparison across years needs to be qualified.

### **Specific comments:**

L12. Are the three dust events enough for the conclusions of the work. Consider re-writing.

L 90. A table with the days exceeding the PM<sub>2.5</sub> should be included for each year and clarify if you are using the average the authors mean.

Authors should clarify what do they mean by official concentrations?

L 125: Secondary organic carbon can not be measured, as author stated, so this should be clarified.

Are the results statistically significant?

Figure 8 show the profiles identified, but they are not clear as the one identified as a Dust and volcanic have similar composition, how can the authors make sure of the name of the profile. More details should be given.

What is the purpose of the results in Figure 9?

I recommend the manuscript to be published after addressing these minor comments.