This study evaluated aerosol and gas-phase tracers of transported biomass burning emissions in an industrially influenced location. This work has several unique elements, such as implementing an extended network of low-cost aerosol optical measurements to identify the influence of BB plumes, especially in cities designated as non-attainment or marginal nonattainment of criteria air pollutants. There are a few issues to be addressed before it can be accepted.

Major comments:

1. In your abstract, now that you highlight that both CO and acetonitrile cannot be used as a unique BB tracer for diluting BB plumes in industrially influenced locations, you ought to point out what other superior tracers are. Additionally, it is imperative to emphasize the significance and contribution of this research in this area, by explicitly stating the importance of identifying more precise and effective BB tracers for industrialized locations. This will allow readers to fully appreciate the value and relevance of the study, and make it clearer why this research is a notable and valuable addition to this field.

2. Your manuscript does not address the impacts of transported BB on urban O_3. Various factors such as boundary layer dynamics, transport, mixing, precursors, and local sources can complicate the observed relationship between fire influence and O_3 (as highlighted in references 10.1021/acs.est.2c06157 and 10.1029/2019JD031777), particularly with single-point measurements. Therefore, it would be beneficial to utilize the NOx and PTR data to provide more detailed insights into the impact of BB on O_3. This will greatly help to promote the impact of this manuscript.

3. I appreciate your support for the motivation behind using an extended network of low-cost aerosol optical measurements to identify the influence of BB plumes in cities designated as non-attainment or marginal non-attainment of criteria air pollutants. Nonetheless, the measurement method employed may be low in efficiency and prone to high errors. Although the authors used a combination of multiple measurement instruments, such as TAP for absorption and integrating nephelometer for scattering, they also needed to estimate the mass concentration of BC. Considering this, it is worth exploring alternative measurement instruments and methods, such as AE33 and MA200, to improve the accuracy and efficiency of the measurement process. These technologies offer advanced performance characteristics and can provide more accurate results compared to the instruments used in the present study.

4. Line 375-380, Please add the time series comparison between NO^+, NO_2^+, and AAE, or scatter plot figures, and explore the potential indication of BrC in detail.

5. Line 410-415, Why BB1 data can not be colored as a function of time of the day?

6. Section 2.2.3, Line 385-395,

In your PMF results, how did you determine and identify these factors, including less-oxidized oxygenated OA (LO-OOA), less oxidized OOA, ammonium sulfate (AS-OOA), and acidic sulfate (acidic-OOA)? These factors are not well explained or discussed in the manuscript. It will be useful to add some diagnoses for the PMF results. More discussions on the choice of PMF factors should be given.

7. Figure 6, the mobile measurement shows a significant difference between the estimated acetonitrile on drive day 1 and day 2, did the authors use the average value for the calculation of estimated acetonitrile and what was the error in the calculation?

8. PTR-MS data: It seems like the PTR-MS data are not being well leveraged to explain the temporal trends of plumes. Other VOCs like furans and phenol have been used as the BB tracer, and some carboxylic acid compounds were the main gaseous products. Do the authors consider that these species are more advantageous than acetonitrile as tracers of BB in further studies? These need to be discussed.

9. Previous field and laboratory studies have found rapid modification of aerosol and gas properties of biomass burning emissions within a few hours, such as the regional and nearfield influences of wildfire emissions (10.1021/acs.est.6b01617), the strong SOA formation and evaporation of primary semi-volatile species (10.1029/2021JD034534), change of optical properties (10.1021/acs.est.0c07569), aging effects on biomass burning aerosol mass and composition (10.1021/acs.est.9b02588). These evolutions of BB properties may influence the tracers for tracking BB sources, which may be referenced to aid some of your discussions.

Technical comments:

1. Line 233, delete the first (AAE and f60).
2. Line 46, analyzing
3. Line 55, reactions
4, Line 119, During the campaign,
5, Line 124, using Eq. (1)
6, Line 140, will result
7, Line 310, The influence of BB
8, Line 346, a significant increase
9, Line 413, an increase in f_{44} and a decrease in f_{60}
10, Line513, can be an important factor