

Atmos. Chem. Phys. Discuss., referee comment RC1
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Comment on acp-2022-138

Farren L. Herron-Thorpe (Referee)

Referee comment on "Technical note: Use of PM_{2.5} to CO ratio as an indicator of wildfire smoke in urban areas" by Daniel A. Jaffe et al., Atmos. Chem. Phys. Discuss.,
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The manuscript is an excellent contribution to the scientific community for this subject. However, several technical corrections should be made for clarity and consistency. These are: 1) past work should be discussed in the past tense, not present tense; 2) PM_{2.5} should not be referred to as PM, since they are not equivalent (this problem appears in both text and figures); 3) "tracer" and "indicator" should not be used interchangeably. The authors should make sure the three listed items (above) are corrected for the entire manuscript. I have also suggested several technical corrections (below) that could help clarify the writing.

Title: change "a tracer" to "an indicator"

Abstract:

Line 9: remove commas

Line 10: change "lower" to "low"

Line 11: PM_{2.5}

line 12: specify this is in regards to wildfire smoke

Line 14: "extent" is ambiguous; temporal or spatial extent?

Line 14: change to "We use observations at a regulatory surface monitor site..."

Line 15: remove "During this time,"

Line 16: PM to PM2.5; change to "ratio threshold of 30"

Line 19: "in fresh smoke plumes" - provide example range of values

Line 23: change to "...this ratio can also help quantify..."

1.Introduction:

Line 25: change to "... smoke impacts have become more prevalent due to..."

Line 30: change to "diameter less than"

Line 31: change to "...(VOCs) which include many toxic..."

Line 32: change "In addition, secondary" to "Furthermore, atmospheric"

Line 33: change "emissions" to "pollutants"

Line 34: New paragraph

Line 34: change "be transported" to "originate"

Line 40: change "markers" to "tracers"

Line 41: change to "... at surface sites and also have some anthropogenic..."

Line 43: change "anthropogenic" to something like "commercial, institutional, residential". Otherwise it is a redundant statement since industrial and vehicular are already anthropogenic

Line 43: change "in having" to "with"

Line 44: remove "For the US as a whole,"

Line 45: change to "... emission sources in the U.S., excluding..."

Line 46: change "report" to "reported"

Lines 43 to 64: this paragraph could be summarized in a table.

Line 65: change to "...smoke events should allow us to use the observed ratios to derive the smoke..."

Line 68: remove "recently"

Line 69: change "develop" to "developed"

Line 70: include a reference to what a Monte Carlo simulation is

2. Methods and data sources:

Line 73: remove "routine"

Line 74: remove (NV)

Line 80: preliminary data should be finalized and this sentence should be removed

Line 84: remove "Because there were some zero and very low values for"

Line 84: change to "PM2.5 concentrations less than the DL were set..."

Line 86: change to "...we use the daily smoke polygons from..."

Line 87: change to "The smoke polygon product is created by expert image analysts that digitize smoke plume extent a few times per day based on analysis of GOES-16 and GOES-17 ABI True Color Imagery available during daylight hours."

3. Results:

Line 96-97: change to "Washoe County is located due east of the California-Nevada border, so smoke from fires in California..."

Line 98: remove comma at end of line

Table 1 caption last sentence: "ratios" should not be plural; "35" should include units

Line 111: change "(i)" to "(1)"

Line 115: change PM to PM2.5

Lines 116 and 117: both sentences should be changed to past tense

Line 117: remove "So, while"

Line 118: change to "... lower ratio, but the large PM2.5 concentrations..."

Line 120: correct PM to PM2.5 and remove "alone"

Line 121: correct PM to PM2.5; change "as well as using" to "and"; change "alone" to "separately".

Line 122: change "change" to "difference"; change "smoke influenced and non-smoke data" to "segregated data methods"

Line 123: remove "We note that"

Line 124: change "are" to "were"

Line 134: change "use" to "used"

Line 139: change "are only included" to "were non-zero"

Line 140: change "model" to "represent"

Line 145: change "For" to "During"

Line 147: remove "whereas"

Line 162: remove "and"

Line 165: include values for comparison

Line 167: remove "Here, "; change "is more" to "of R-urban was"

Line 168: change PM/CO to PM_{2.5}/CO; change "this parameter" to "R-urban"

Line 169: include units for value of 20

Line 170: remove first occurrence of "and"

Line 172: change Emission to Emissions

Lines 174-176: This sentence need to be consistent with plural and singular usage; change "this approach" to "the Monte Carlo approach"

Line 177: change "remaining" to "rest"; move "for the rest of this analysis" to end of sentence (and remove comma).

Line 185: change "all had significant" to "all had a significant"

Line 191: change PM to PM_{2.5}

4.Summary:

The summary should specify that the conclusions are specific to warm weather (or May-Sept) where RWC is not a factor. Other details about the monitoring details could also be shared. The final paragraph should have at least one instance of "smoke" changed to "wildfire smoke". Last sentence: change "propose" to "conclude".

Figure 2: change "sorted" to "segregated"; two graphs in one figure should be denoted as (a) and (b) on the graphs or referred to as top/bottom in the text; PM to PM_{2.5} in text

Figure 3: R-smoke should use subscript; "Monte Carlo" should come before "simulations"

Figure 4: R-smoke should use subscript

Figure 5: PM to PM2.5 (text and figure)