

Interactive comment on “Decadal-scale relationship between measurements of aerosols, land-use change, and fire over Southeast Asia” by J. B. Cohen and E. LecoEUR

Anonymous Referee #2

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This paper looks at variability in aerosols across Southeast Asia and how this can be explained by changes in land cover, fire occurrence, and precipitation. However, parts of the analysis are unclear to me and need to be revised. I have several concerns about the methodology and presentation of results as outlined below.

General Comments:

Pg. 26896:

-Lines 12-13: Make clear what you'll be focusing on here to address these "as of yet unknown influences."

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-Line 15: Mention briefly here why you're looking at AOD and not another parameter like emissions.

Pg. 26897:

-Line 5: This sentence should indicate what differentiates from previous studies that have looked at similar relationships. This should be made clear to the reader from the beginning. Is the goal to make an AOD forecasting model or to describe relationships between land cover and fire to improve regional emissions inventories? This is not clear as it is written.

-Line 14: I think that this sentence needs to be rephrased. Describe more clearly what these previous studies have found in order to clarify the remaining gaps that the authors are seeking to fill.

Pg. 26898:

Line 20: Check definition of AOD.

Line 27: Please clarify what you mean by one-to-one.

Pg. 26899:

-Line 4-5: This statement is misleading. There are many studies about the spatiotemporal distribution of fires, though they can always be improved with new datasets and methods.

Lines 13-24: This should be revised to more clearly lay out the plans of the analysis. In the previous paragraph, the authors describe problems with clouds in the region, but then here point to several datasets that will also be affected by clouds without describing how this will be addressed.

Line 26: Briefly describe these parameters here—what is the FireMask? What satellites are used for the surface land properties? Were these quantities that the authors derived themselves or published products? This is not clear.

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Pg. 26900:

-Lines 21-22: Incorrect definition of Terra and Aqua.

Pg. 26901:

-Line 13: Further describe cloud contamination. Are these pixels removed from the dataset? How would this impact the results? Did you use QA layers for the FireMask to address or quantify this bias?

Pg. 26902:

-Line 16: What temporal sampling was done with the AERONET data?

-Line 23: How was this threshold determined? Is it standard in the literature?

-Line 25: Describe how MODIS and MISR AOD measurements are expected to differ.

Pg. 26903:

-Line 1: Why 8-day period if your NDVI product was 16-day?

Pg. 26905:

-Lines 4-13: I'm confused by this paragraph. Did the authors look at daily precipitation as a measure of how this would stop/limit fires, and/or a moisture deficit to address the surface wetness changes as it would drive fires? If it's the latter, some cumulative measure probably makes more sense because fires would be impacted by precipitation not just on that day, but in the time period leading up to it (Field and Shen 2009 for example).

-Line 22: So is the goal to develop a predictive model that isn't affected by clouds?

Pg. 26906:

-Line 11: I may have missed this but how were these percentiles chosen?

-Line 16: Is there a reference for the measurement uncertainty?

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Pg. 26907:

-Line 11: What was found as the reason for this disagreement?

-Lines 21-29: This paragraph might be more easily presented/summarized by just listing the % of retrievals.

-Line 29: Pass the 5?

Pg. 26908:

-Line 25: I would refine this statement; previous work has shown that much of the burning is in degraded lands and non-forested areas (see work by Gaveau et al.).

Pg. 26909:

-Lines 6-22: What part of the analysis does this paragraph refer to? Figure 1?

Pg. 26910:

-Line 28: Did the authors consider using FRP or some measure of intensity instead of/in addition to the fire mask?

Pg. 26913:

-Line 13: Are the differences in distance between the different stations and fire source regions addressed at all?

Pg. 26921:

-Lines 24, 26: What qualifies as a "good" representation?

Pg. 26922:

-Line 25: Can you give some indication of how many measurements were affected by clouds?

Pg. 26923:

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-Line 7: What about showing some of the wind patterns in a supplementary figure to make it clear to the reader how fire emissions are transported across the region?

Pg. 26925:

-Like 8: Can the authors better describe the impact that they want this study to have in the final sentences?

Tables+Figures:

-Table 1: Comment on issue of spatial resolution between land cover datasets and AOD vs. precipitation.

-Table 2: What do bolded values mean? Highest correlation?

-Table 3: Could be moved to supplement. Identify locations on figure 3; refer to details about availability in supplement.

-Tables 4+9 would be better as line graphs.

-Tables 6+7 could be shown on a map with the color of dots corresponding to city locations referring to the correlation. Define REC in caption.

-Overall, tables 4-11 could be condensed and/or some information moved to supplement.

-Figure 1: Where is this referenced in the text?

-Figure 2: It might be helpful to have a subset that shows a more zoomed-in version of the time series so that the reader can more easily see the primary and secondary peaks as discussed in the text. Also describe cutoff values in the caption?

-Figure 3: Can you overlay the fire dataset on this map?

-Figures 5-7: Difficult to interpret these plots. Either need to zoom in on dates of overlap, make lines/dates bigger, or instead make scatter plots between the measured and modeled AOD.

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-Figure 8: Missing data coded white in this figure? Please comment on how this impacts results.

Technical Comments:

-Pg. 26896, line 21: Spelling error; cloud-covered

-Pg. 26897: Define southern and northern Southeast Asia either briefly in the text or refer to a figure.

-Pg. 26900: Why is Fig. 3 referenced before any other figures?

-Pg. 26901, line 4: Correct typo "are an expected"

-Pg. 26906, line 8: Typo

-Pg. 26912, line 22: Unless I missed something, why are tables 6+7 referred to before 4+5?

-Pg. 26912: Overall I think that Sections 3.2+3.3 are a little lengthy and that some of the description of AERONET sites is not needed with reference to the corresponding figures.

-Pg. 26918, line 8: Typo "sights"

-Pg. 26922, line 14: Typo.

-Pg. 26925 Lines 1-6: Run-on sentence, please rephrase.

-Overall: Please fix the numbering of tables and figures to match how they are referenced in the text. Also, I think that the text in Section 3 could be condensed, I found that there were several repetitive descriptions.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 26895, 2015.

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