

Interactive comment on “Evidence for impacts on surface-level air quality in the Northeastern U.S. from long-distance transport of smoke from North American fires during LISTOS 2018” by Haley M. Rogers et al.

Anonymous Referee #1

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This paper presents evidence for impacts on surface-level air quality, specifically PM2.5, BC, and CO, in the Northeastern U.S. from long-distance transport of smoke from North American fires in August 2018. They collected hourly data of PM2.5, BC, and CO concentration at the Yale Coastal Field Station (YCFS). In addition, they used publicly available monitoring data at five other locations. NOAA's smoke maps based on satellite imagery were used to provide information on the horizontal distribution and density of the smoke plumes across North America and the sampling region. The satellite imagery generally suggested that during the two fire episodes, large areas in

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North America were affected by the smoke. Some inconsistencies between the satellite imagery and surface observation were explained as a result of unknown vertical distributions. In order to obtain insights on the origin of the surface air parcels, they further used NOAA HYSPLIT air parcel backward-trajectory models to provide additional information on the horizontally- and vertically-resolved transport pathways. They found that many of trajectories have intercepted locations with wildfire activities observed by satellite imagery. Air parcels in the first episode intercepted fire locations at 2-7 km above the ground level, whereas air parcels in the second episode were closer to the ground level which may also be affected by intentional crop fires in the southeastern U.S. They conclude that this work reinforces the growing need to understand the long-range influence of wildfires.

General comments:

I believe this work is technically sound and publishable, but I am not convinced that ACP is the right venue. Since the observation data is limited to PM2.5, BC, and CO, I must say that the contribution of this work in terms of providing new data beyond what is already available from routine monitoring is limited. Since the majority of the observational data (5 out of 6 sites), Smoke Maps, and back-trajectories are based on publicly available information, I believe there must be substantial merit in data analysis to warrant publication on ACP. However, it is not clear to me how observation of two events based on PM2.5, BC, and CO that may have originated from smoke plumes in the U.S. benefits the research community. Since the Smoke Maps showed nearly the entire U.S. was covered by smoke, it does not seem surprising that back-trajectories intercept with smoke plumes somewhere. I believe the manuscript should substantially expand on data analysis and demonstrate novelty to be considered for publication on ACP or should be published elsewhere.

Specific comments:

- It may be useful to contrast “Event” and “Non-event”. If the same analysis is performed

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on cleaner days between Event 1 and Event 2, do back-trajectories pass through any wildfire locations?

Typo - Line 83. Right parenthesis missing.

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