Supplemental Information for:

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

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S1 Elevated CO at the Yale Coastal Field Station and additional urban sites

CO data from the urban site located in Queens, NY was also compared to measurements made at the other less urban sites (YCFS, New Haven, Bridgeport, Figure S1). Despite the additional urban sources of CO present at the Queens site, a multi-day peak during the two event periods is consistent across all sites.

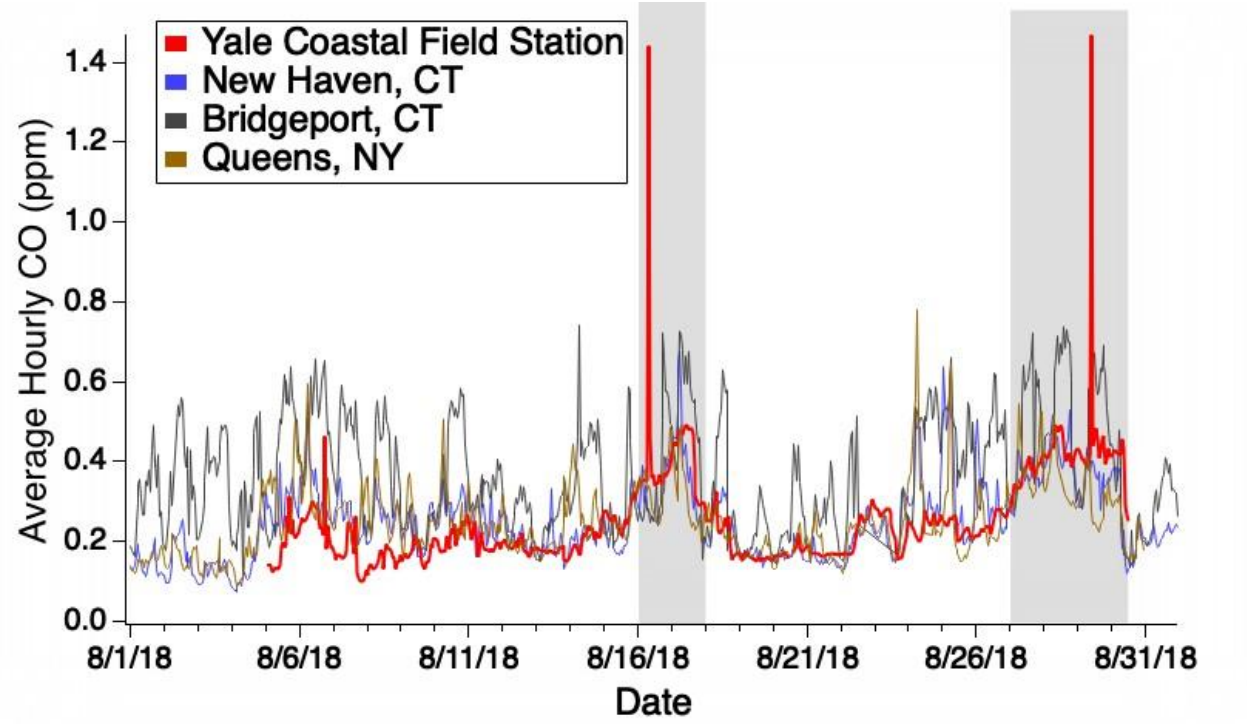

Figure S1: Average hourly surface-level CO. Data from the Queens, NY urban monitoring site has been included. While there are additional urban sources at the Queens site, the trend in increasing CO during the two event periods remains the same.

S2 Satellite Imagery on Non-Event Days

Surface-level concentrations of PM2.5, BC, and CO indicated possible biomass burning pollution events on August 6-7 and August 10, as evident by the periods of slight pollutant enhancement in Figure 2 on these days. NOAA Smoke Maps show minimal smoke plume influence in the NYC Metro area, therefore these two periods in early August were not examined further (Figure S1).

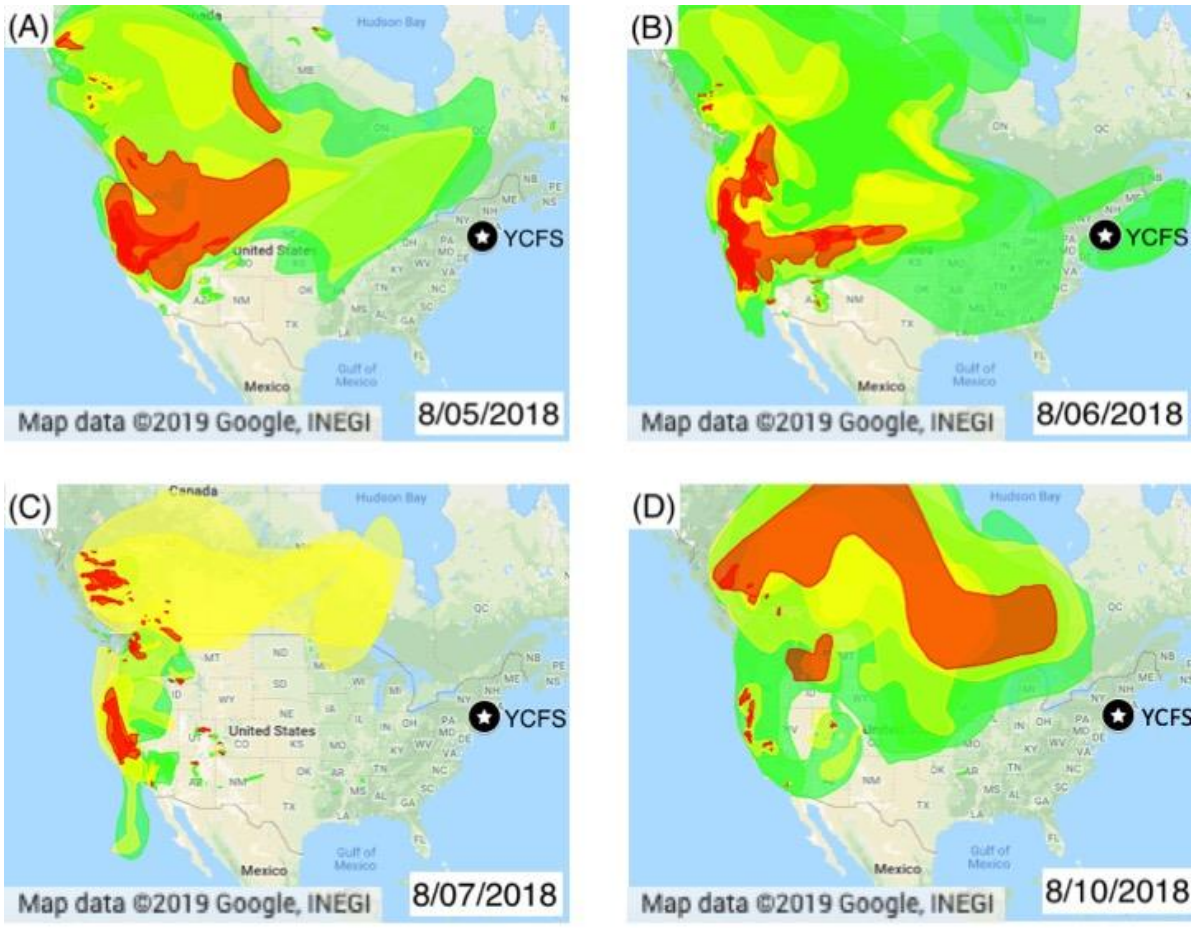

Figure S2: Smoke Maps (NOAA) based on satellite imagery for total column measurements for August 5-7 (panels A-C) and August 10 (panel D) prior to the events. The YCFS is marked by the black star. Colors indicate the density of the smoke cloud, with red the most dense smoke, yellow is intermediate, and green the least dense. This figure is provided as a supplement to Figures 3-4.

S3 Additional Backward-Trajectory Model Results

The second pollution event occurred on August 27-29, based on surface level data. Backward-trajectories for August 27 (Figure S3) show similar travel paths to those on August 28 and 29 (Figure 6), with circulation in the southeastern US over areas of biomass burning. The earliest trajectories on August 27 pass through central and Northern Canada without major interaction with active fires. However, starting around 6:00 am backward-trajectories begin to circulate in the southeastern United States where they pass over areas of biomass burning. This change in backward-trajectory path on the morning of the 27th aligns with the increase in surface level concentrations on the morning of the 27th.

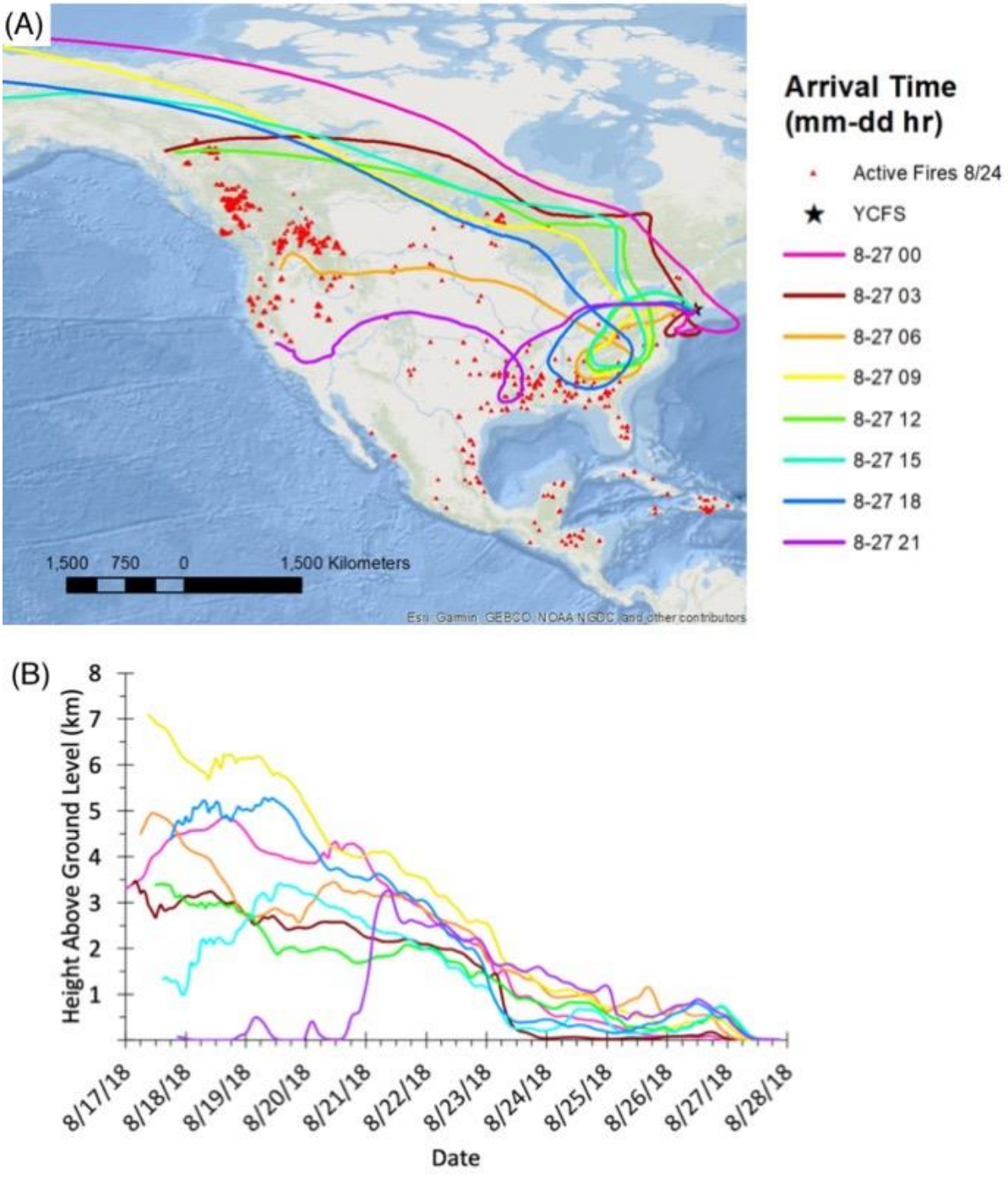

Figure S3: NOAA HYSPLIT Backward-trajectory model results for air parcels arriving on August 27, 2018 to surface-level YCFS site. Each color represents the backward-trajectory for an air parcel arriving every three hours throughout the course of the day. The location of wildfires on August 24 (when most trajectories intersect the wildfire zone in the southeast) is depicted with red triangles (from NOAA HMS fire maps). The top map (A) shows the full 10-day trajectory and the bottom figure (B) shows the vertical height of each air parcel along its trajectory. Backward-trajectory patters shift to circulation in the south east at approximately the same time as surface level concentrations of biomass burning markers increase (Figure 2).