African Dust Particles over the Western Caribbean Part I:

Impact on air quality over the Yucatan Peninsula

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Supplementary information

Figure S1. Correlation coefficients between PM_{2.5} and PM₁₀ with each of the 16 elements analyzed by X-ray fluorescence for both field campaigns.

20 **Figure S2.** Correlation coefficients between PM_{2.5} and PM₁₀ with other measured variables for 2017. T, RH, PTT, DIR, SP, RAD, O₃, NO_x, CPC, OPC PPAH, and PSAP refers to temperature, relative humidity, precipitation, wind direction, wind speed, solar radiation, ozone concentration, nitrogen oxides concentration, total particle concentration (>30 nm), “coarse” particle concentration (>500 nm), particle-bound polycyclic aromatic hydrocarbons concentration, and black carbon content, respectively.

25 **Figure S3.** Particle size distribution before (red) and after (blue) the arrival of the African dust for the peak observed between July 22 and 24, 2017.

Figure S4. Correlation coefficients between PM_{2.5} and PM₁₀ with other measured variables for 2018. T, RH, PTT, DIR, SP, RAD, O₃, NO_x, CPC, PPAH, and PSAP refers to temperature, relative humidity, precipitation, wind direction, wind speed, solar radiation, ozone concentration, nitrogen oxides concentration, total particle concentration (>30 nm), particle-bound polycyclic aromatic hydrocarbons concentration, and black carbon content, respectively.

Figure S5. Wind roses of the average speed of the African dust peaks found in left) 2017 and, right) 2018.

Figure S6. HYSPLIT back trajectories run for 13 days at 50 m (green), 250 m (blue), and 500 m (red) agl. Top and bottom trajectories are related to the African dust peaks identified for 2017 and 2018, respectively.

Figure S7. 3-hour time series of the vertical profile of the estimated dust content from MERRA-2 for July 21 to 25, 2017 period (above) and the July 12 to 16, 2018 period (below), showing dust arrival events in Mérida.

45 **Figure S8.** Aerosol optical depth (AOD) detected by the MODIS satellite for July 2017.

Figure S9. Aerosol optical depth (AOD) detected by the MODIS satellite for July 2018.

50 **Figure S10.** 3 h PM_{10} estimated from MERRA-2 (black line), measured by the RUOA station (blue line), and estimated dust mixing ratio content of MERRA-2 (red line).

55 **Figure S11.** Dispersion plot of 3-H surface dust mixing ratio from MERRA-2 (y-axis) vs. the PM_{10} from the RUOA station for the periods shown in Figure 5 for a) 2017 and b) 2018.