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Supplement of

Measurement report: Airborne measurements of NO_x fluxes over Los Angeles during the RECAP-CA 2021 campaign

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Figure S1. NPS Twin Otter aircraft, including the mounted inlet for air sampling.

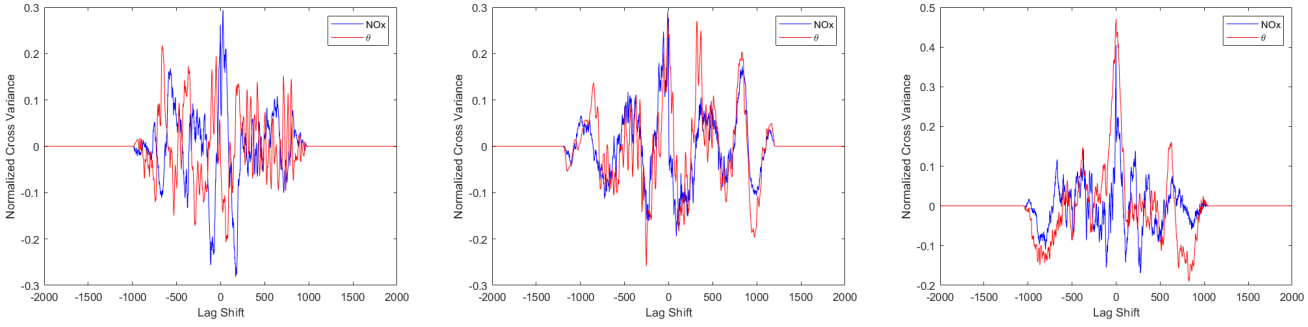


Figure S2. Example covariance peak for NO_x (blue) and potential temperature θ (red) with the vertical windspeed for three segments on June 6.

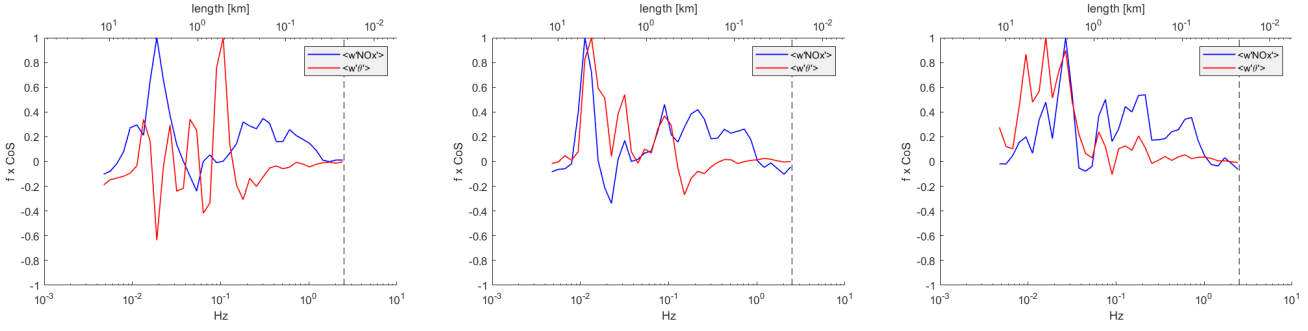


Figure S3. Example co-spectra (normalized) for the NO_x flux (blue) and the heat flux (red) for three segments on June 6.

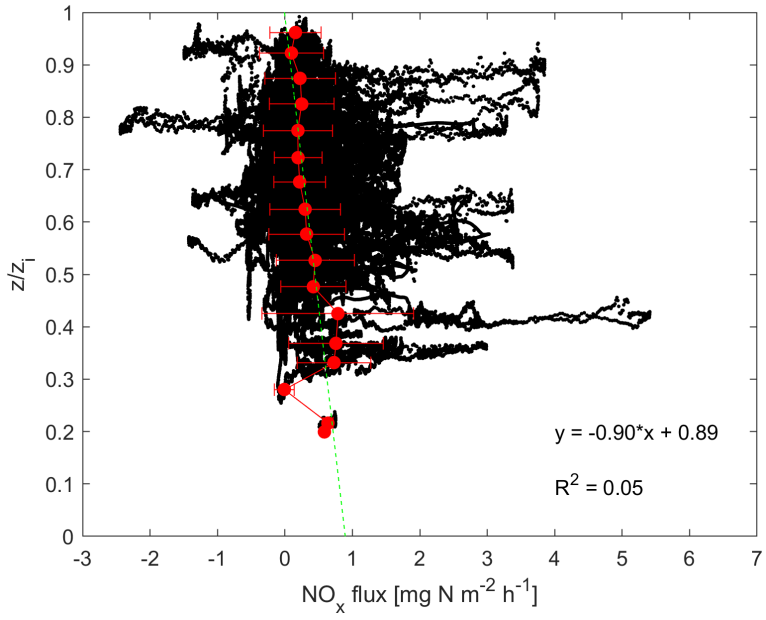


Figure S4. Dimensionless altitude z/z_i versus the NO_x flux to investigate vertical divergence. Black dots represent all data points. The green dashed line shows the linear fit of all data points. The red points and error bars represent the binned means with the 1 σ variability.

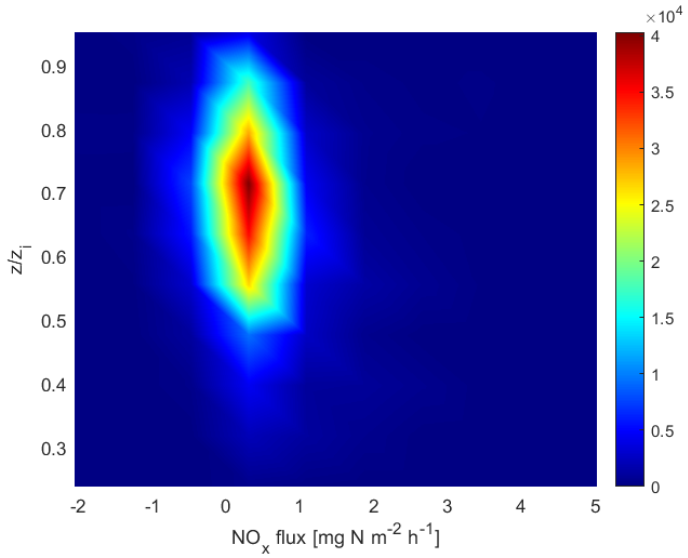


Figure S5. Density plot of the dimensionless altitude z/z_i versus the NO_x flux to show the distribution of the data presented in Figure S4. Plot generated via Changyong He (2023), densityplot(x,y,varargin) (https://www.mathworks.com/matlabcentral/fileexchange/65166-densityplot-x-y-varargin), MATLAB Central File Exchange.

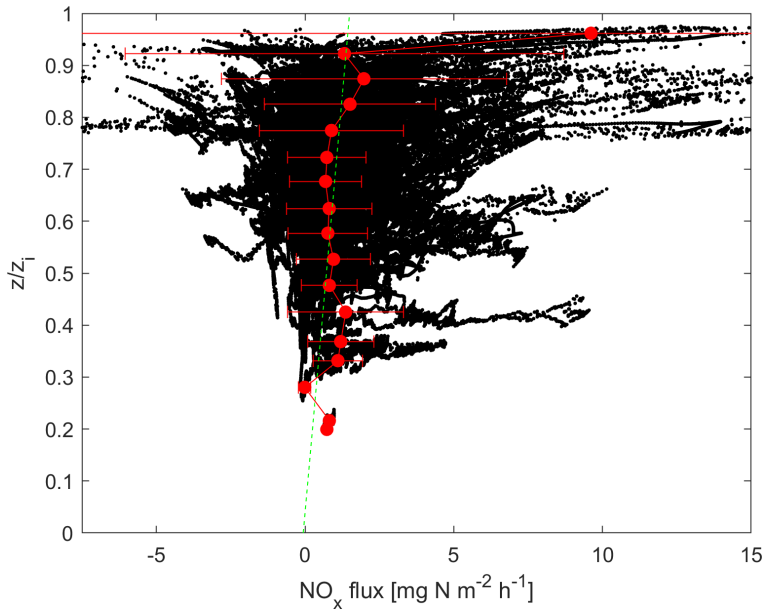


Figure S6. Dimensionless altitude z/z_i versus the corrected NO_x flux according to Figure S4. Black dots represent all data points. The green dashed line shows the linear fit of all data points. The red points and error bars represent the binned means with the 1 σ variability.

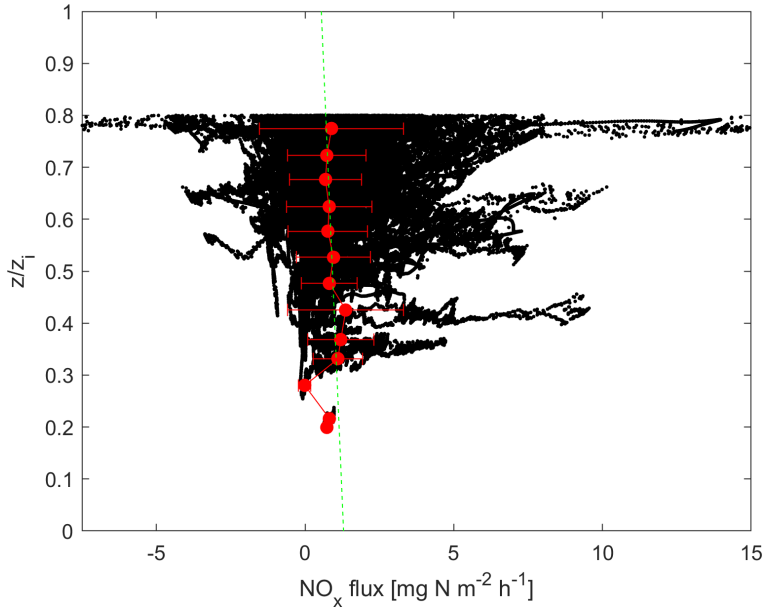
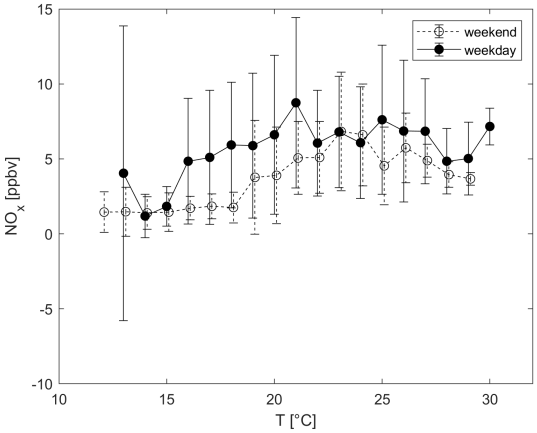
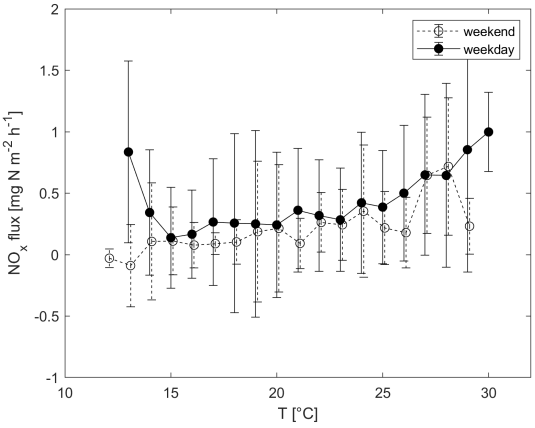


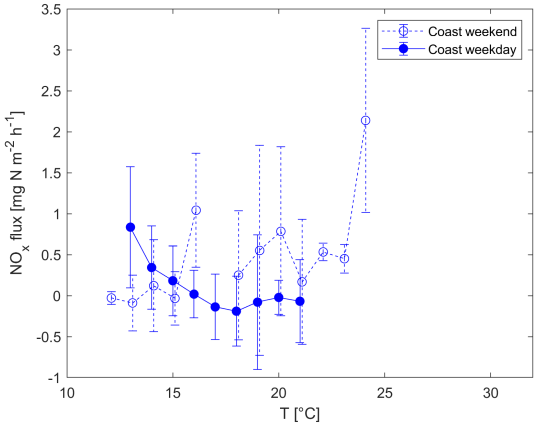
Figure S7. Dimensionless altitude z/z_i versus the corrected NO_x flux according to Figure S4, omitting data in the upper 20% of the boundary layer, which are most strongly affected by uncertainties in the vertical divergence correction. Black dots represent all data points. The green dashed line shows the linear fit of all data points. The red points and error bars represent the binned means with the 1 σ variability.



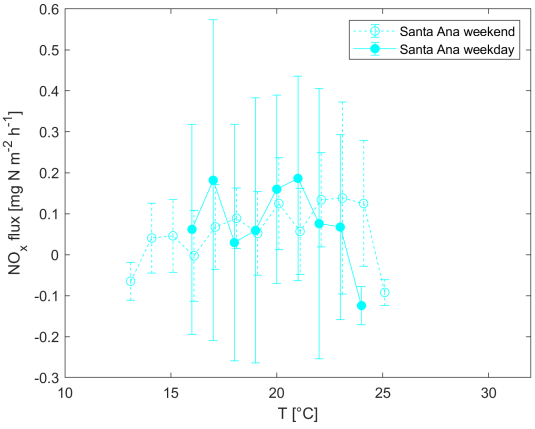
(a) NO_x vs T



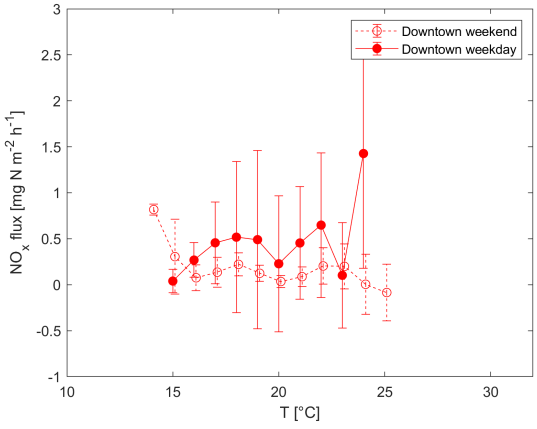
(b) NO_x flux vs T



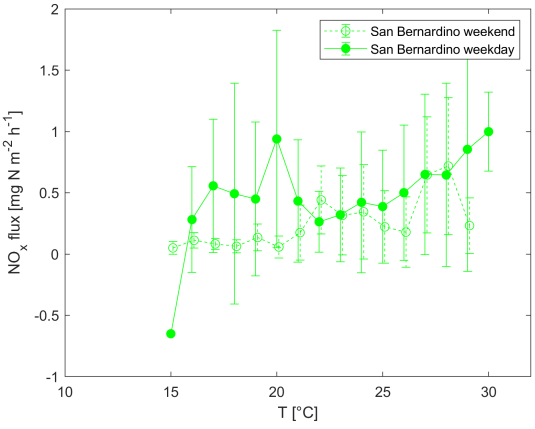
(c) Coast



(d) Santa Ana



(e) Downtown



(f) San Bernardino

Figure S8. Temperature correlation of NO_x concentrations and NO_x fluxes for all data points ((a)&(b)) and separated into the four regions ((c)-(f)).

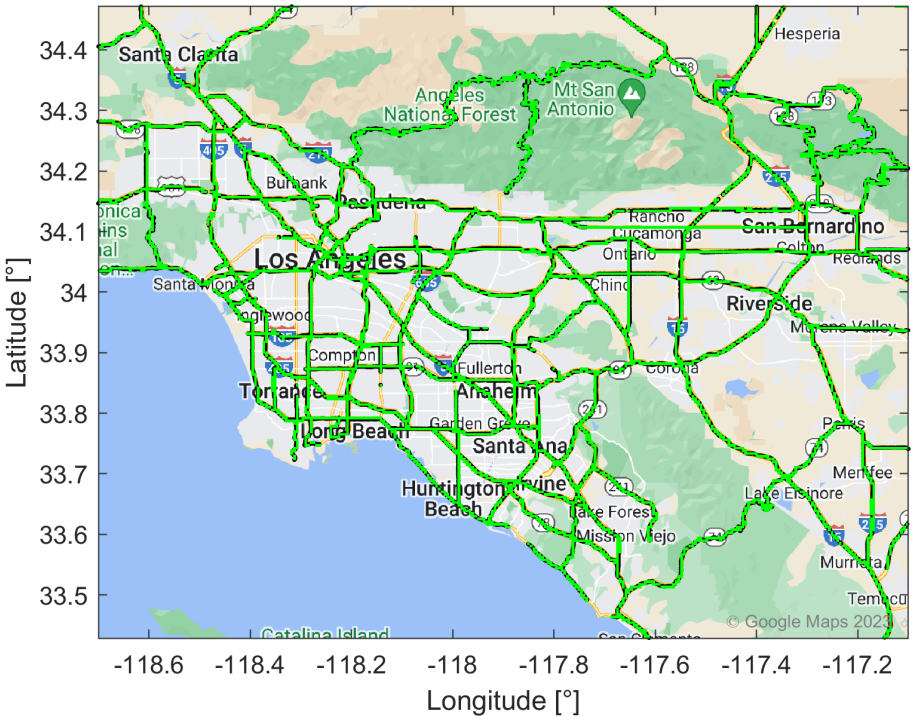


Figure S9. Highway emission grid based on the information from the California Department of Transportation (2015). Highway grid cells are shown in green. © Google Maps 2023.

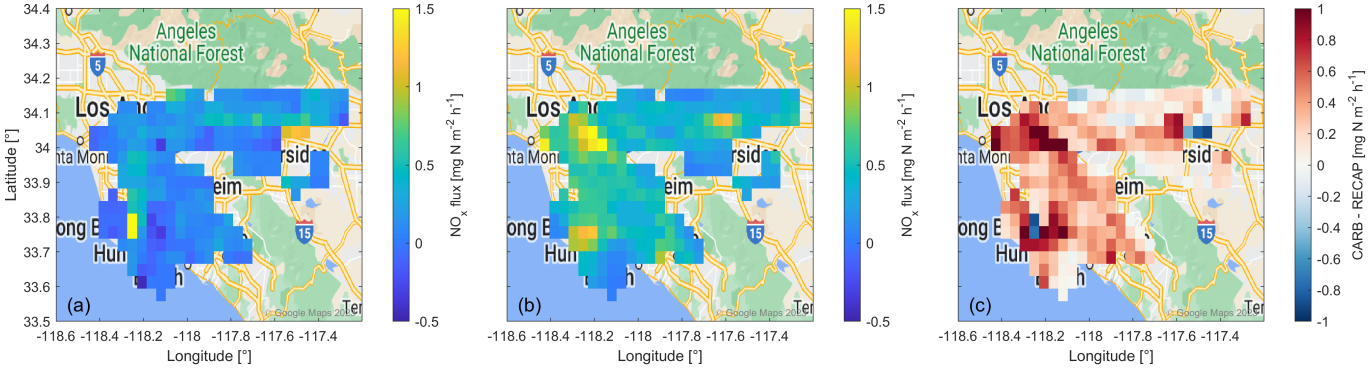
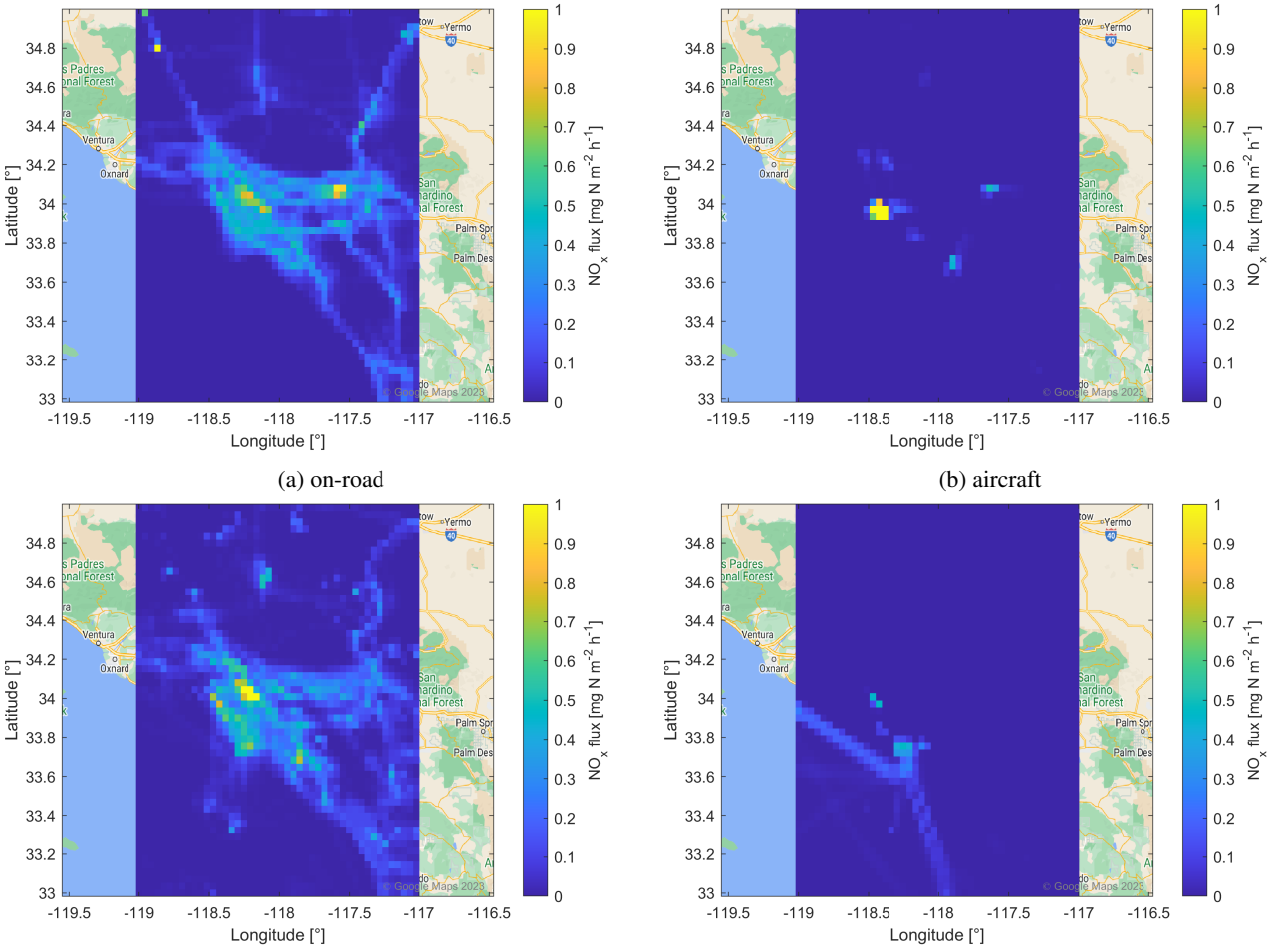


Figure S10. Weekend averages of NO_x emissions across Los Angeles with a 4 km × 4 km spatial resolution (a) during the RECAP-CA campaign, (b) from the CARB emission inventory and (c) the difference between CARB and RECAP-CA NO_x fluxes. © Google Maps 2023.



(a) on-road (b) aircraft

(c) area (d) ocean going vessels

Figure S11. CARB emission inventory, separated into different sectors. © Google Maps 2023.

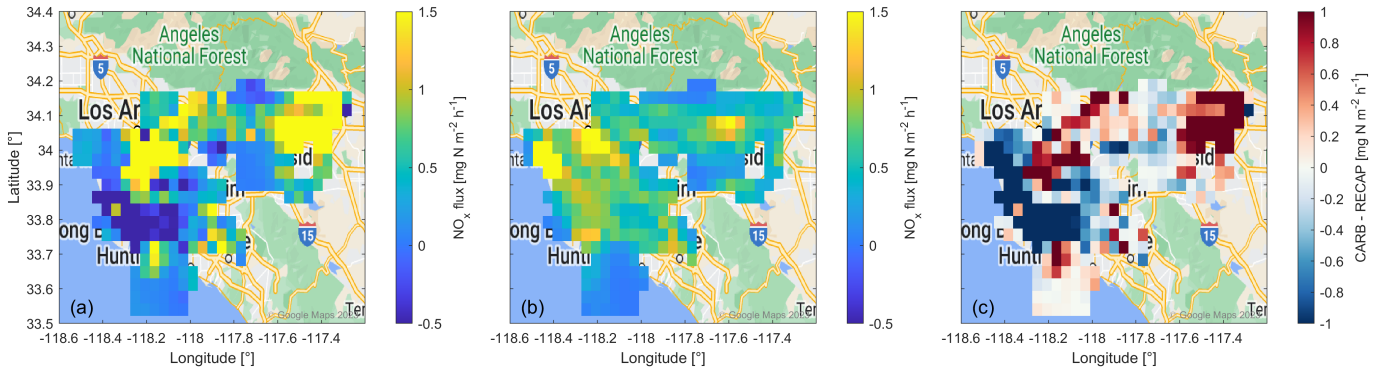


Figure S12. Weekday averages of vertical divergence corrected NO_x emissions across Los Angeles with a 4 km × 4 km spatial resolution (a) during the RECAP-CA campaign, (b) from the CARB emission inventory and (c) the difference between RECAP-CA and CARB NO_x fluxes. © Google Maps 2023.

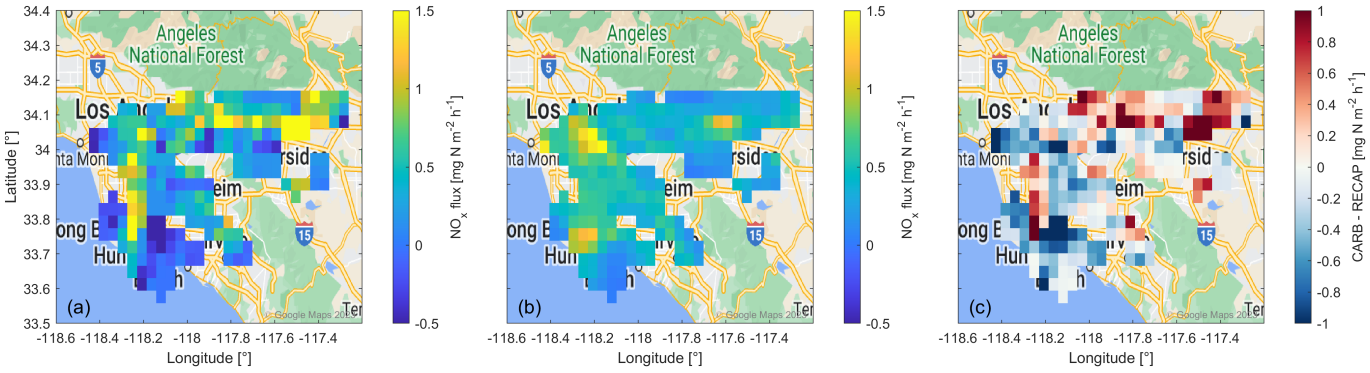


Figure S13. Weekend averages of vertical divergence corrected NO_x emissions across Los Angeles with a 4 km × 4 km spatial resolution (a) during the RECAP-CA campaign, (b) from the CARB emission inventory and (c) the difference between RECAP-CA and CARB NO_x fluxes. © Google Maps 2023.