

Supplement of

Satellite Retrieval of Tropospheric NO₂ under Fire Conditions

Mengying Wang et al.

Correspondence to: Jintai Lin (linjt@pku.edu.cn)

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Table S1. Geographic coordinates and altitudes of the PGN sites

PGN site	RichmondCA	MountainViewCA	WrightwoodCA
Location latitude [deg]	37.9130	37.4200	34.3819
Location longitude [deg]	-122.3360	-122.0568	-117.6813
Location altitude [m]	5	50	2207

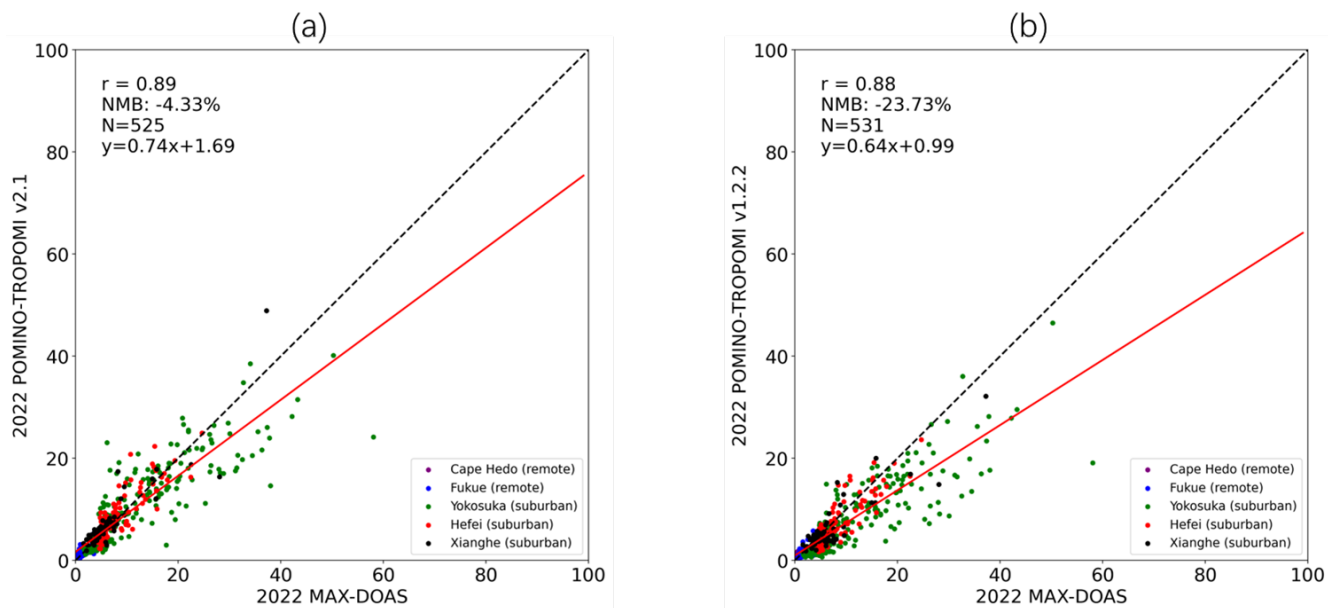
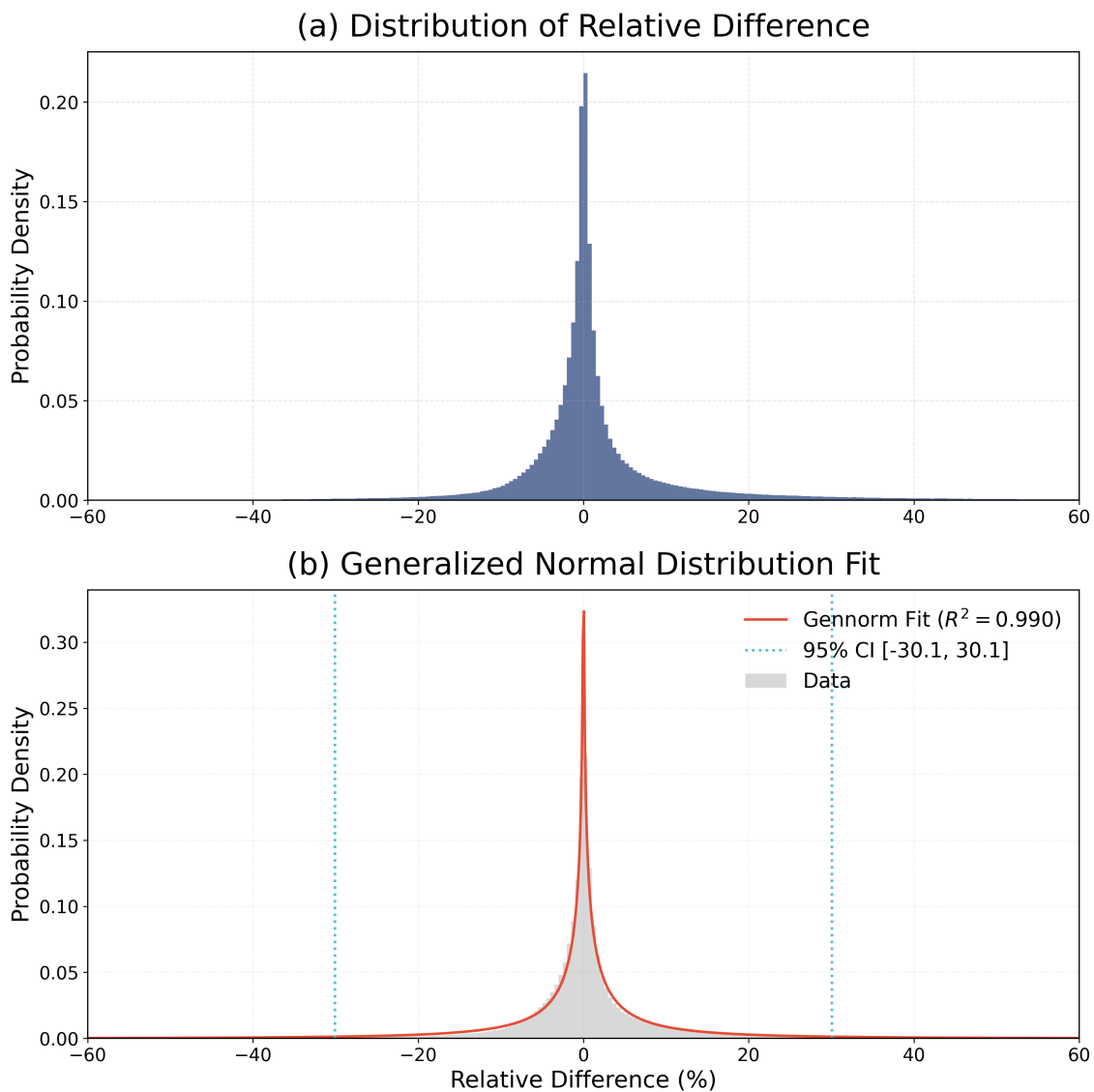


Figure S1. Comparison of tropospheric NO₂ VCDs between POMINO-TROPOMI retrievals and MAX-DOAS observations in 2022. (a) POMINO-TROPOMI v2.1 versus MAX-DOAS. (b) POMINO-TROPOMI v1.2.2 versus MAX-DOAS.



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Figure S2. Distribution and generalized normal distribution fit of relative differences between POMINO-GC-Fire and POMINO-GC-NoFire NO₂ VCDs. (a) Probability density distribution of the relative differences in NO₂ VCDs between the POMINO-GC-Fire and POMINO-GC-NoFire. (b) Generalized normal distribution (gennorm) fitted to the relative difference distribution. The red curve represents the fitted probability density function, with an $R^2 = 0.99$, indicating an excellent fit. The blue dashed vertical lines denote the 95% confidence interval, and the gray histogram represents the observed data distribution. Data points falling outside the 95% confidence interval are considered to exhibit statistically significant differences.

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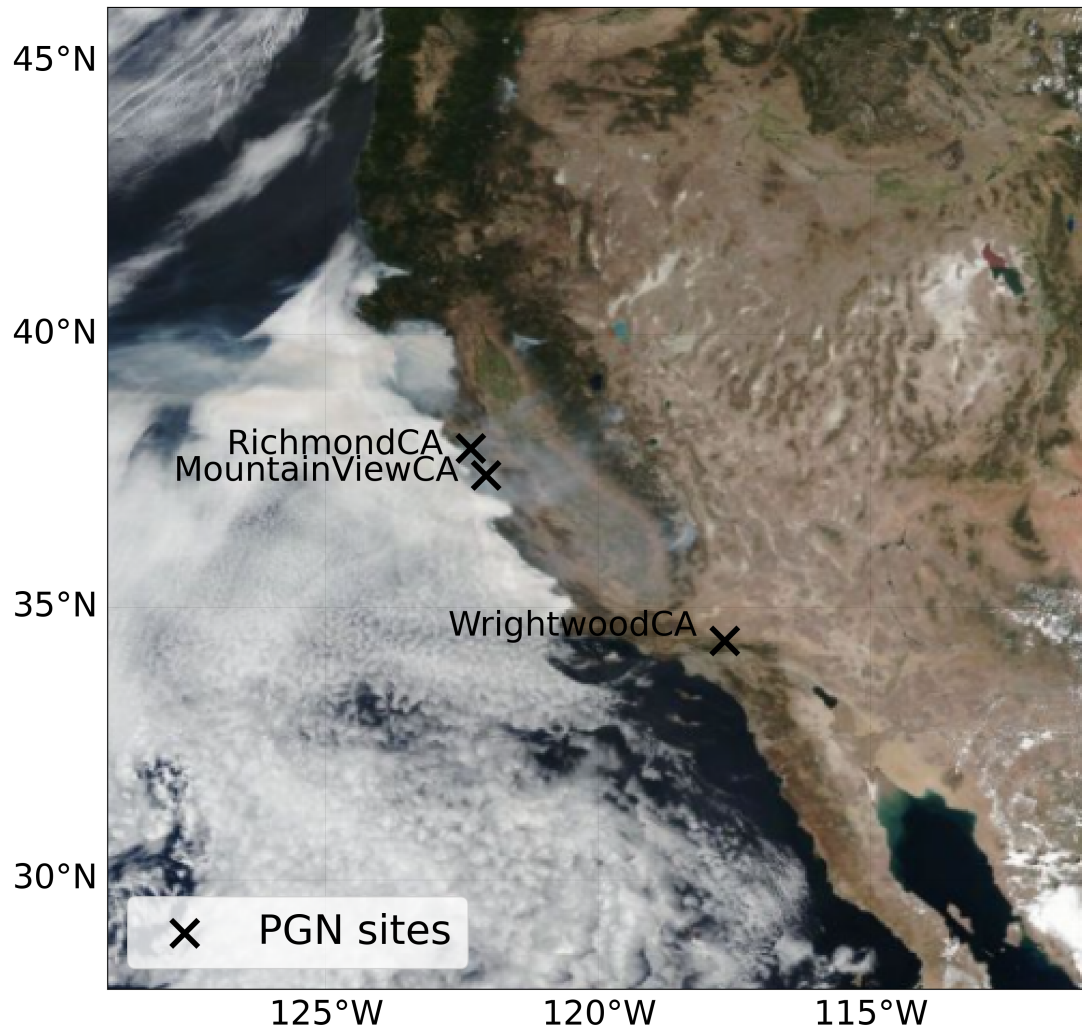


Figure S3. Spatial distribution of the PGN sites listed in Table S1. The true-color satellite basemap is sourced from NASA's Fire Information for Resource Management System (FIRMS) (NASA-FIRMS, 2026).

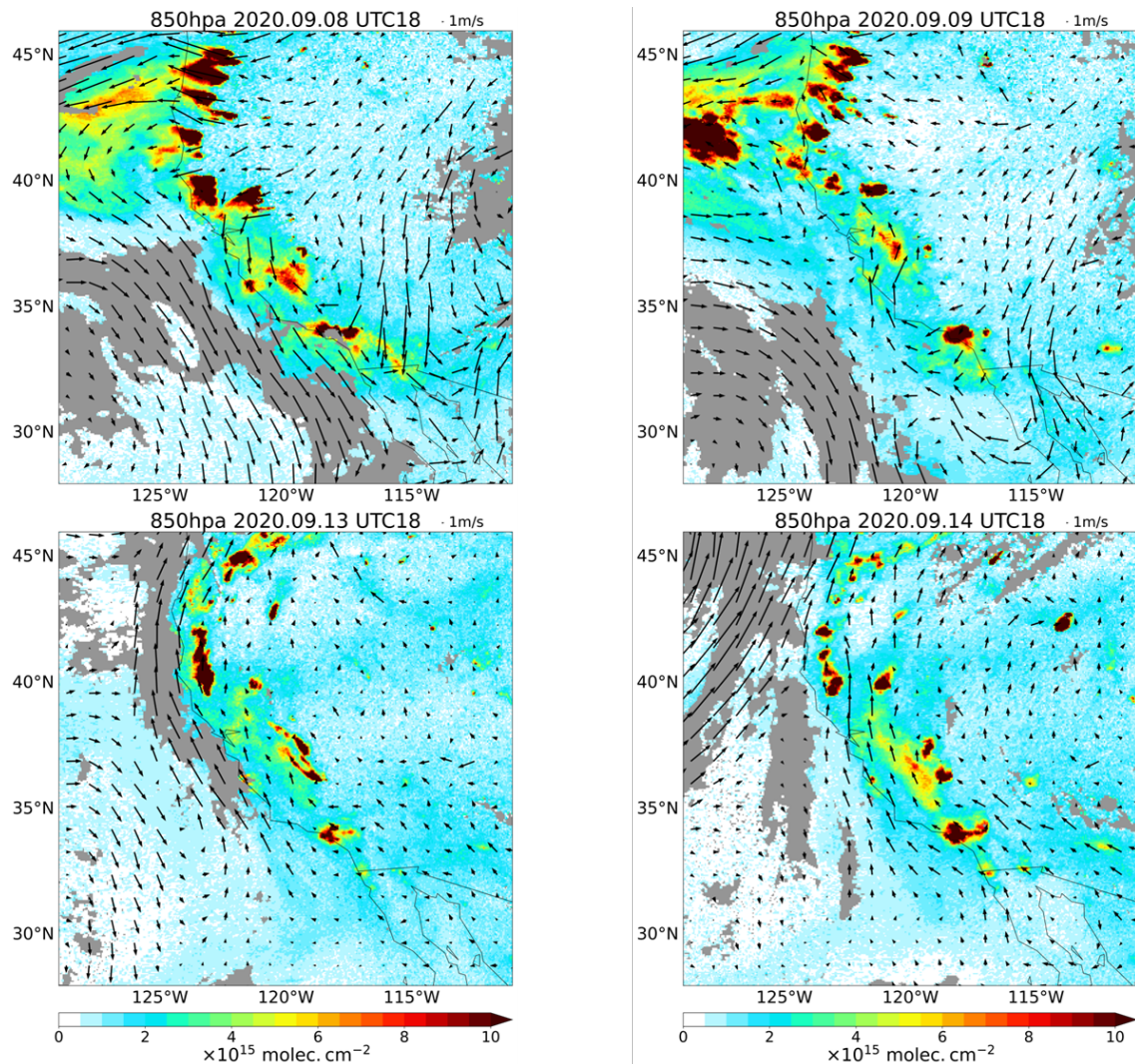
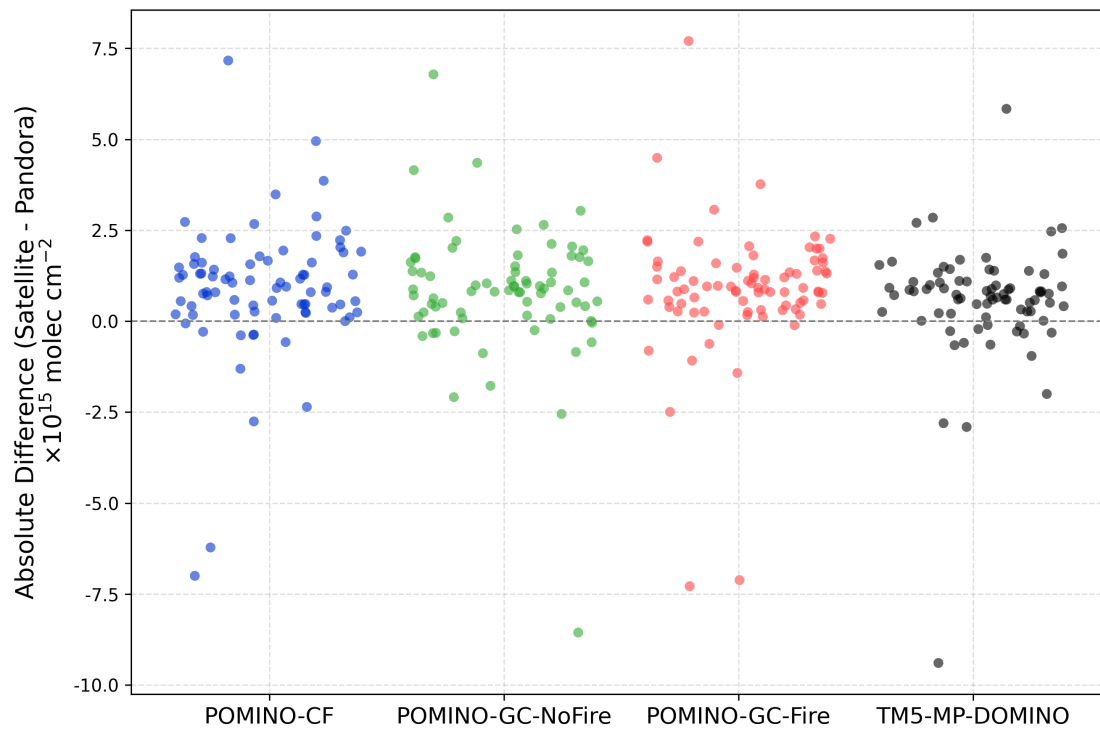


Figure S4. European Center for Medium Weather Forecasting (ECMWF) real-time analysis 850hpa wind fields with a horizontal resolution of 9 km (subsamped to 90 km for visualization) overlaid on POMINO-GC-Fire daily NO₂ VCDs. The spatial distribution of retrieved NO₂ VCDs demonstrates clear downwind transport from fire regions, consistent with the ECMWF wind fields.



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Figure S5. Scatter plot of absolute differences between satellite-derived and PGN NO₂ VCDs

References

35 NASA-FIRMS: <https://firms.modaps.eosdis.nasa.gov/map/>, last access: 13 May 2026.