Supporting Information of

Five-channel TD–CEAS measurements of gaseous and particulate organic nitrates with NO/NO_2 interference correction under high-NO_x conditions

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Text S1 Details of NO and NO_2 interference correction experiment

The experimental setup for calibration is shown in Figure S2. A transparent FEP-Teflon bag (~16 L) was employed as a photochemical reactor. Acetone vapor, NO, and dry air were continuously introduced into the reactor under irradiation from a 285 nm UV lamp. Acetone vapor was generated by bubbling dry air at 2 mL min^{-1} through liquid acetone, with the resulting vapor carried into the reactor. NO (20–110 ppbv) was supplied by a Thermo Scientific 146i multi-gas calibrator using a certified NO standard (9.96 ppmv) diluted with dry air. The total flow rate into the reactor was maintained at 4.5 L min^{-1}, corresponding to a gas residence time of approximately 3.5 min. The effluent from the reactor was analyzed simultaneously by a TD-CEAS system for NO_2 and gΣPNs, a Thermo Scientific 42i-TL analyzer for NO, and a GC-ECD for PAN quantification.

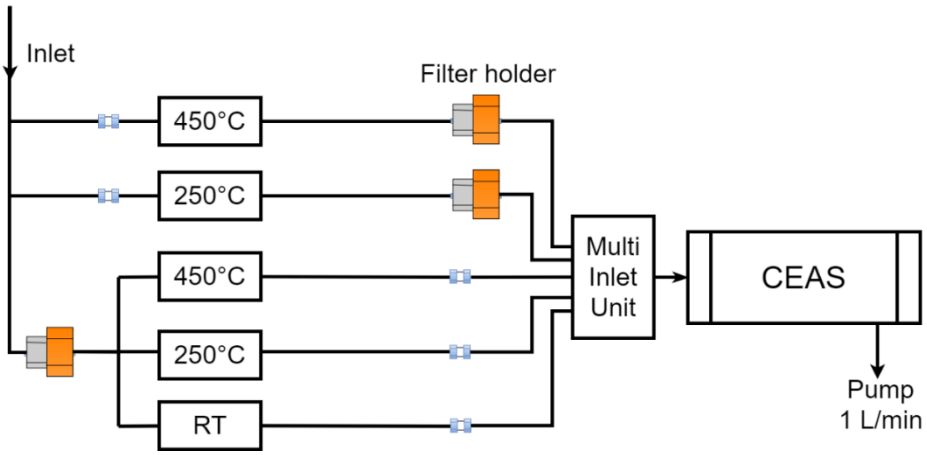

Figure S1 Schematic diagram of the five-channel TD-CEAS instrument.

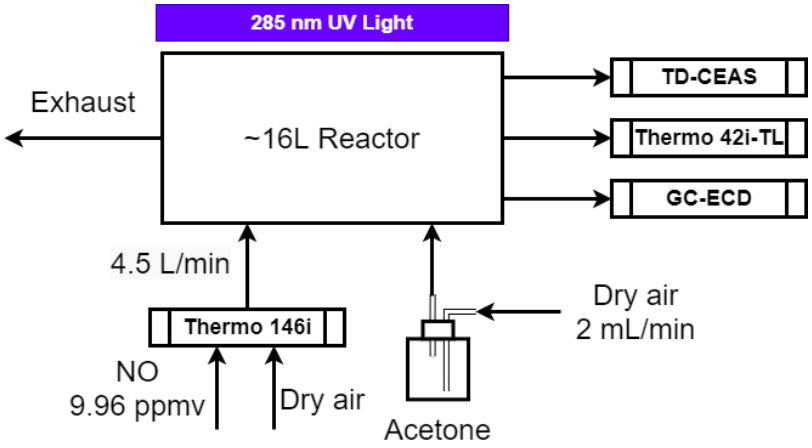

Figure S2 Schematic diagram of NO and NO_2 interference correction experiment.

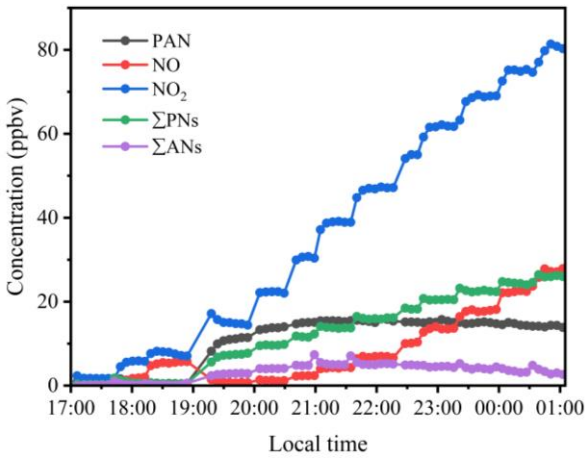

Figure S3 Measurements of PAN, NO, NO_2, ΣPNs and ΣANs when different NO gradients are introduced into acetone/air gas under 285 nm UV lamp irradiation. ΣPNs is calculated as $[NO_2]_{250}$ — $[NO_2]_{RT}$, ΣANs is calculated as $[NO_2]_{450}$ — $[NO_2]_{250}$.

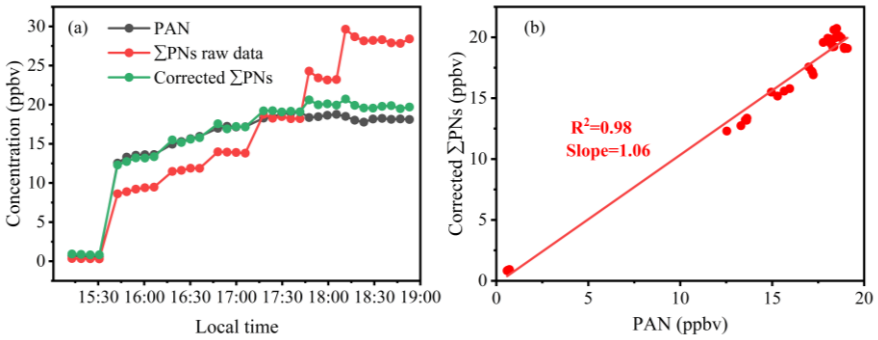

Figure S4 (a) Comparison of corrected ΣPNs with measured PAN and ΣPNs in the validation experiment; (b) Linear fitting of corrected ΣPNs and measured PAN in the validation experiment.

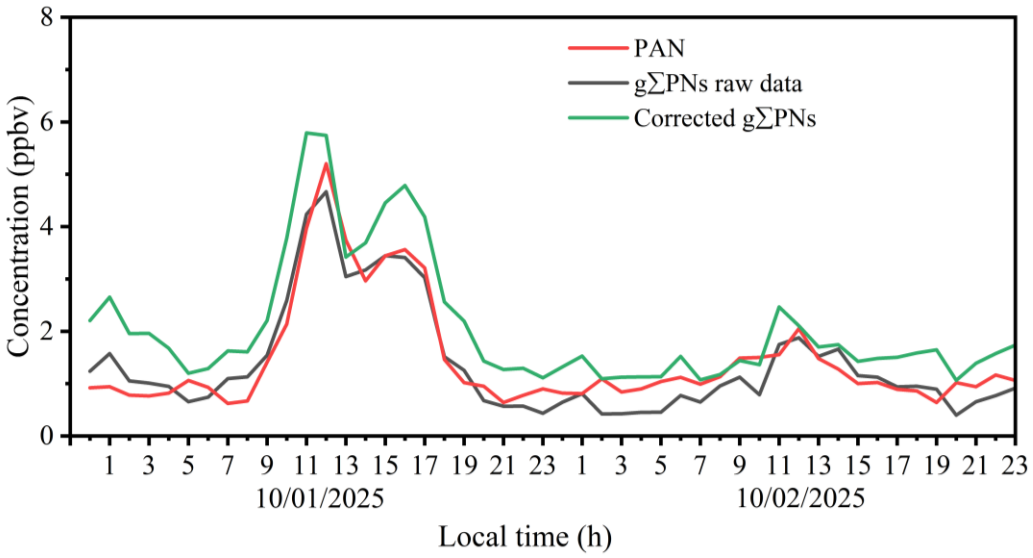

Figure S5 Comparison of gΣPNs raw data, correction results from two models, and measured PAN. The red line represents PAN measured by GC-ECD, the gray line shows raw gΣPNs measured by TD-CEAS, the green line indicates gΣPNs corrected by correction model.

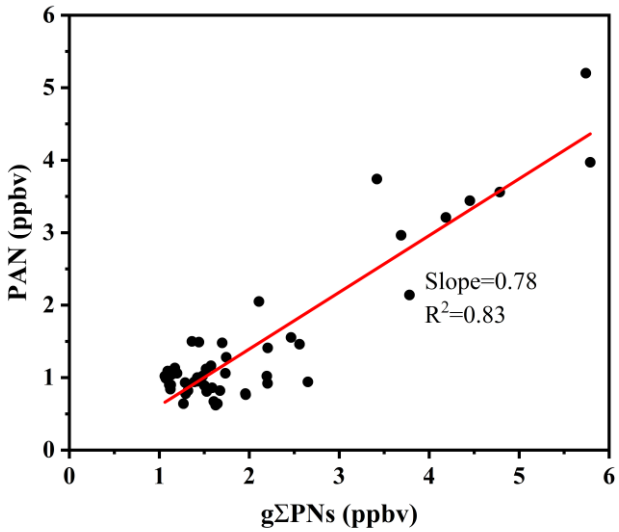

Figure S6 Linear fitting of gΣPNs and PAN during the observation in October 2025. Gas-phase ΣPNs (gΣPNs) were derived from the TD-CEAS signal by applying the developed correction model, while PAN were quantified using a GC-ECD.

Table S1 Comparison of correction-factor lookup-table and correction model evaluation metrics.

Indicators	Lookup table	Correction model (This study)
R^2	0.975	0.993
RMSE (ppbv)	25.011	0.493
RRSE (%)	411.6%	8.1%