Supplementary Information for:

El Niño heat extremes suppress soil isoprene uptake capacity in the Amazon rainforest

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Table S 1 Soil physiochemical properties measured at spot 1, spot 2, and spot 3 in June 2023.

		SOIL SPOT		
	Units	**1**	**2**	**3**
Texture class		Clay	Clay	Clay
P	mg/dm3	8.5	5.7	6.5
S	mg/dm3	<12	<12	<12
Ca	mmolc/dm3	1.2	0.4	0.5
Mg	mmolc/dm3	2.1	1.1	1.5
K	mmolc/dm3	0.88	0.78	1.11
Al	mmolc/dm3	32.7	19.8	22.2
Potential Acidity (H+Al)	mmolc/dm3	157.6	106.7	116.1
Sum of exchangeable bases	mmolc/dm3	4.2	2.3	3.1
Cation exchange capacity	mmolc/dm3	161.8	109	119.2
Base saturation	%	3	2	3
Aluminum saturation	%	89	90	88
B	mg/dm3	0.45	0.4	0.37
Cu	mg/dm3	<0.1	0.1	<0.1
Fe	mg/dm3	212.6	80	111.6
Mn	mg/dm3	1	1.2	2.2
Zn	mg/dm3	5	5.5	3.5
pH KCl		3.6	3.88	3.78
Soil organic matter	g/kg	105.7	69.9	74.3
Organic Carbon	g/kg	61.3	40.5	43.1
Electrical Conductivity	microS/cm	127.8	52.8	75.57
Total N	mg/Kg	4123	3395	3437
Coarse Sands	%	7	9	9
Fine Sands	%	6	2	3
Total Sands	%	13	11	11
Silt	%	14	19	23
Clay	%	73	70	65
Particle Density	g/cm3	2.54	2.61	2.58
Microbial Biomass Carbon	mg C/g of dry soil	1.76	1.57	1.49

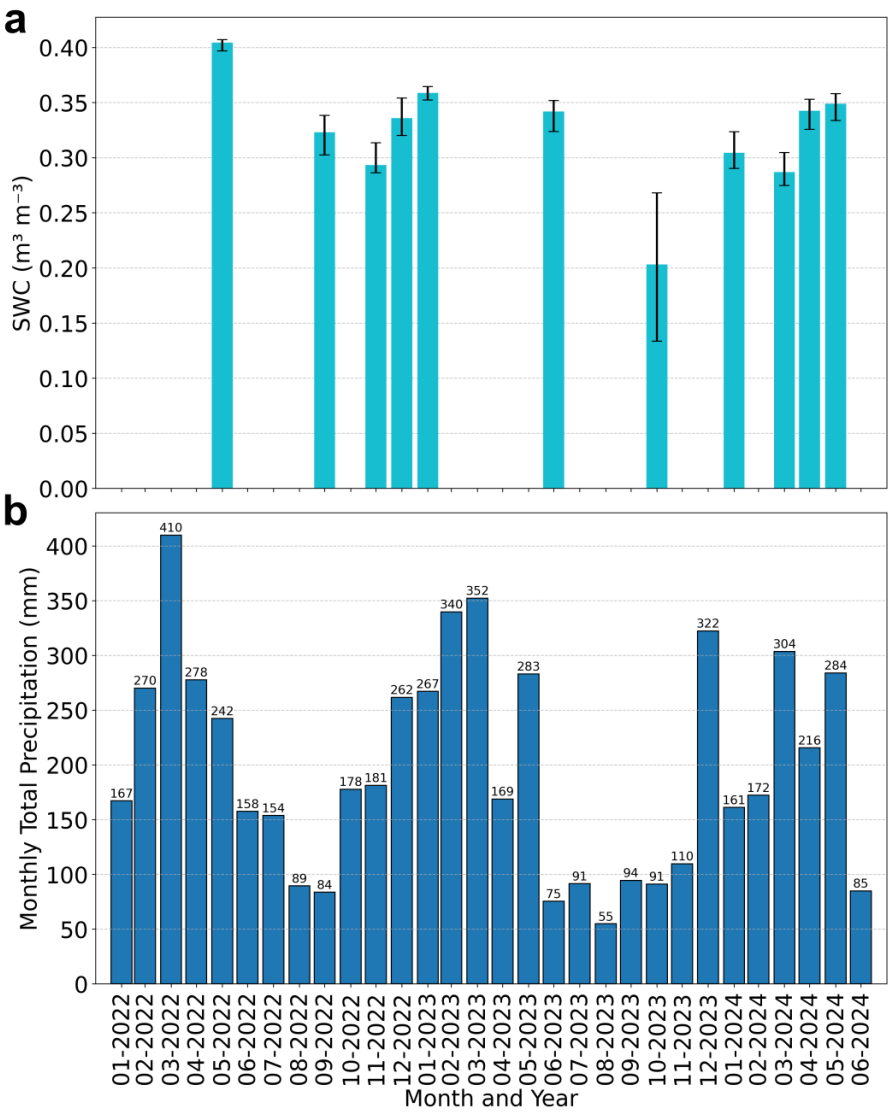

Figure S 1 Soil water content and precipitation to define seasonal periods. a) Median soil water content values (SWC) measured during the field campaigns for each month. b) Monthly total precipitations measured from January 2022 until June 2024.

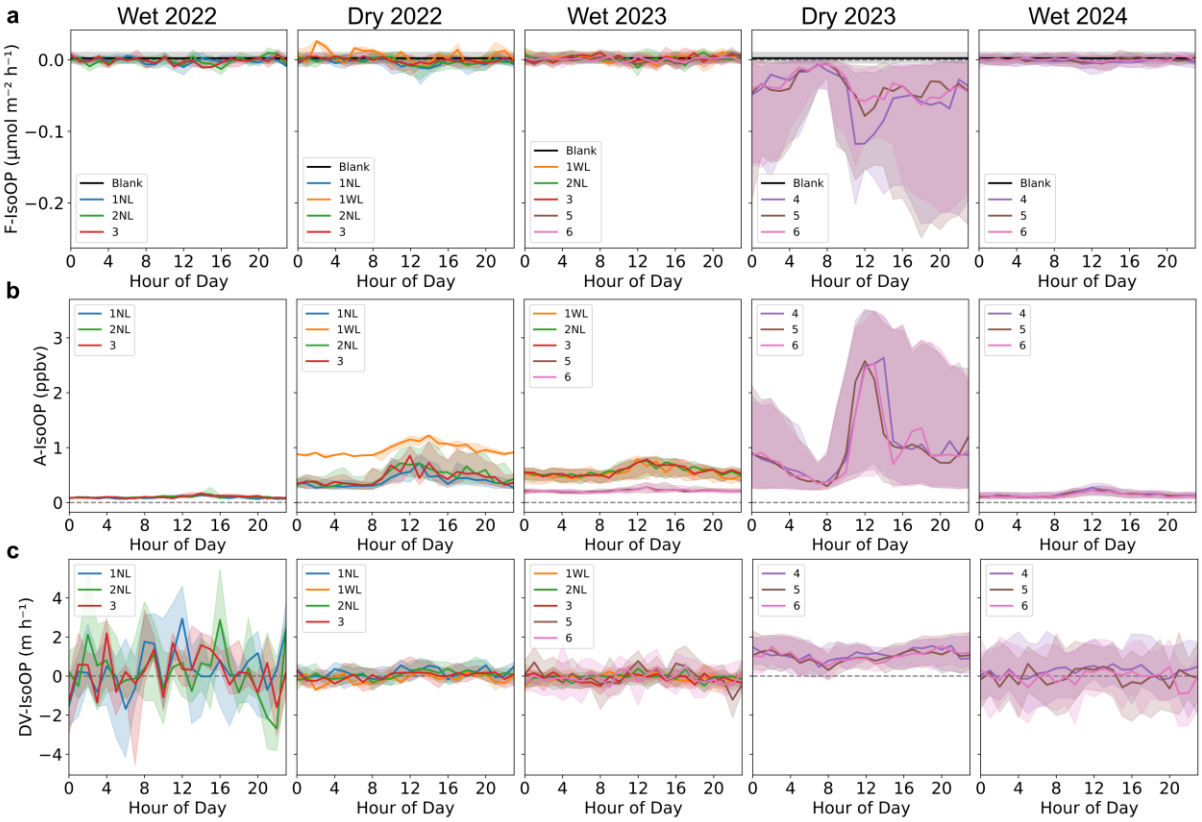

Figure S 2 Diel and seasonal dynamics of isoprene oxidation products. Median diel cycles for a) soil IsoOP fluxes (F-IsoOP), b) ambient IsoOP mixing ratios (A-IsoOP), c) IsoOP deposition velocity (DV-IsoOP), measured across all sampling days within each season: wet 2022, dry 2022, wet 2023, dry 2023, and wet 2024. Lines represent the median values and the shaded areas depict the interquartile range (IQR) (25th–75th percentiles). Diel cycles are shown for each soil spot in different colors. For F-IsoOP, the overall median flux from the blank chamber is plotted as a black line, with the shaded area indicating its IQR (25th–75th percentiles). The wet season was defined from December to June, while the dry season was defined from July to November.

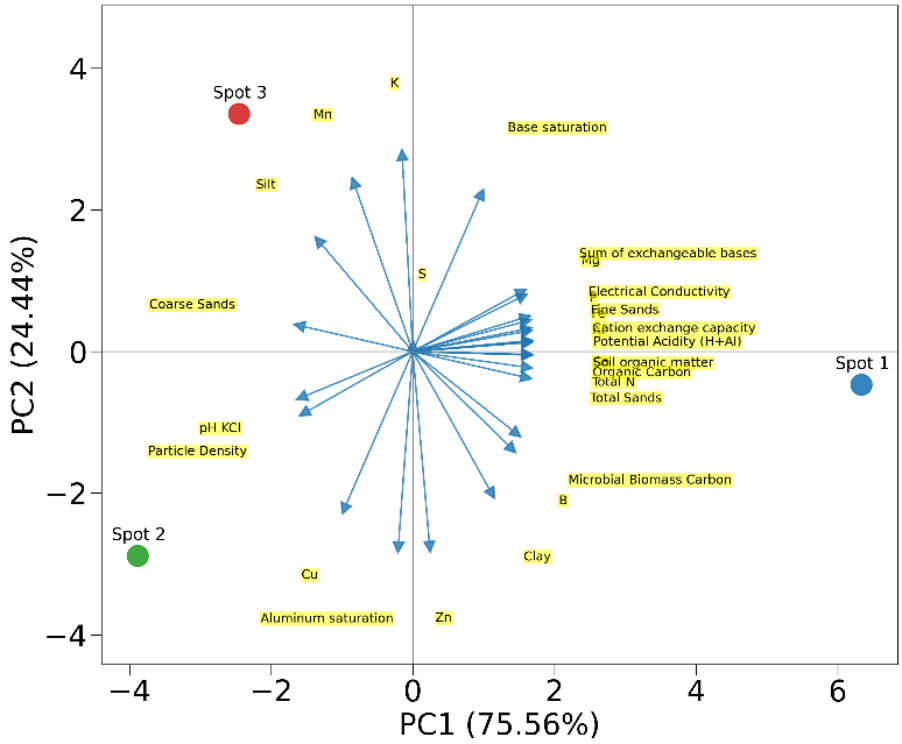

Figure S 3 Differences in soil physicochemical properties between spot 1, spot 2, and spot 3. Exploratory Principal Component Analysis (PCA) showing biplot the distribution of spot 1, spot 2, and spot 3 based on their soil physicochemical properties. Vectors indicate the direction and strength (loadings) of each soil physiochemical property on the principal components.

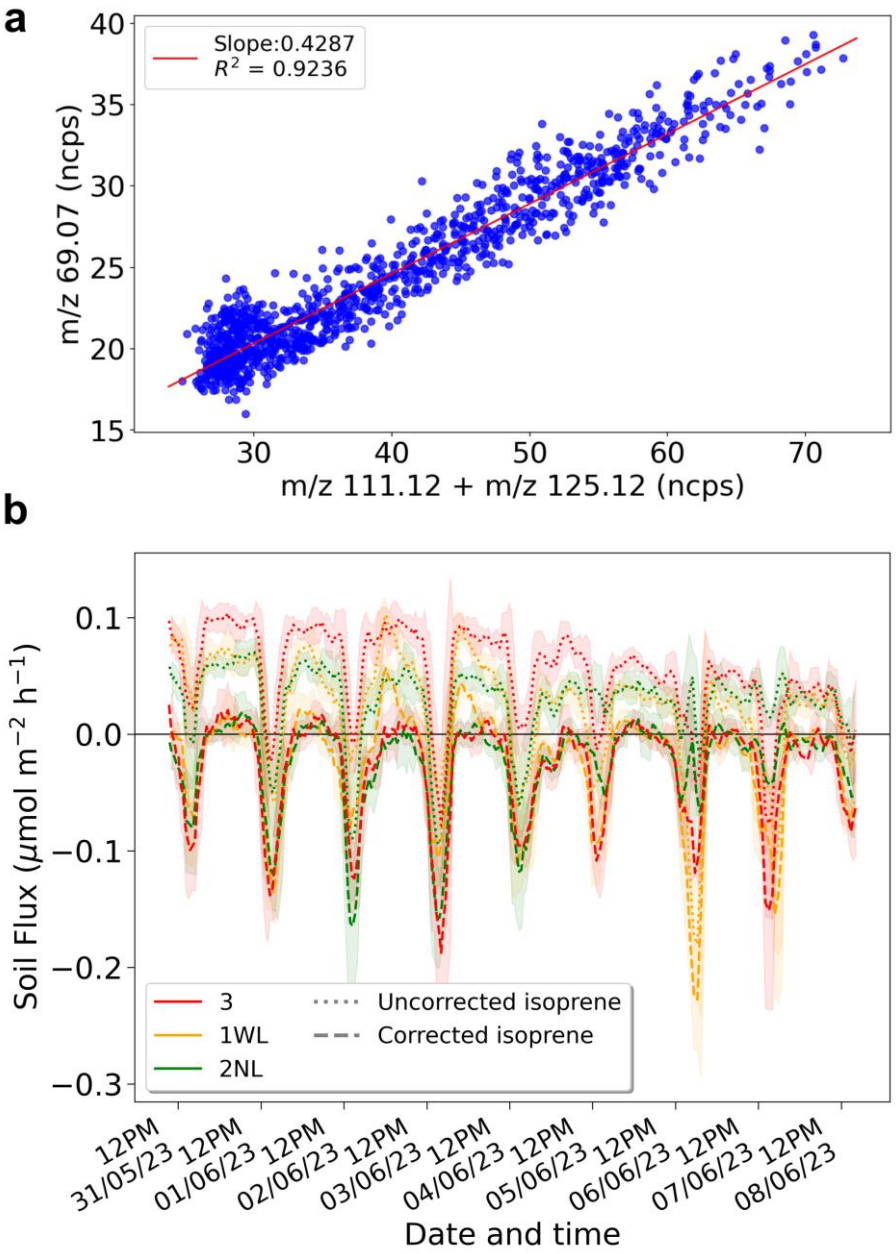

Figure S 4 Correction of the PTR-MS isoprene (m/z 69.07) signal for cycloalkanes interference. a) Relationship between the isoprene (m/z 69.07) signal and the sum of cycloalkanes (m/z 111.12+m/z 125.13) signals, used to derive the interference ratio from nighttime data measured in June 2023. The interference ratio was determined using an orthogonal linear regression analysis. b) effect of the correction on soil isoprene fluxes measured in June 2023. Soil fluxes are plotted as a 3-hour rolling mean, with shaded area representing the standard deviation of the rolling mean. Corrected soil isoprene fluxes are represented by dashed lines and uncorrected soil isoprene fluxes by dotted lines, with fluxes from the three spots plotted in different colors.

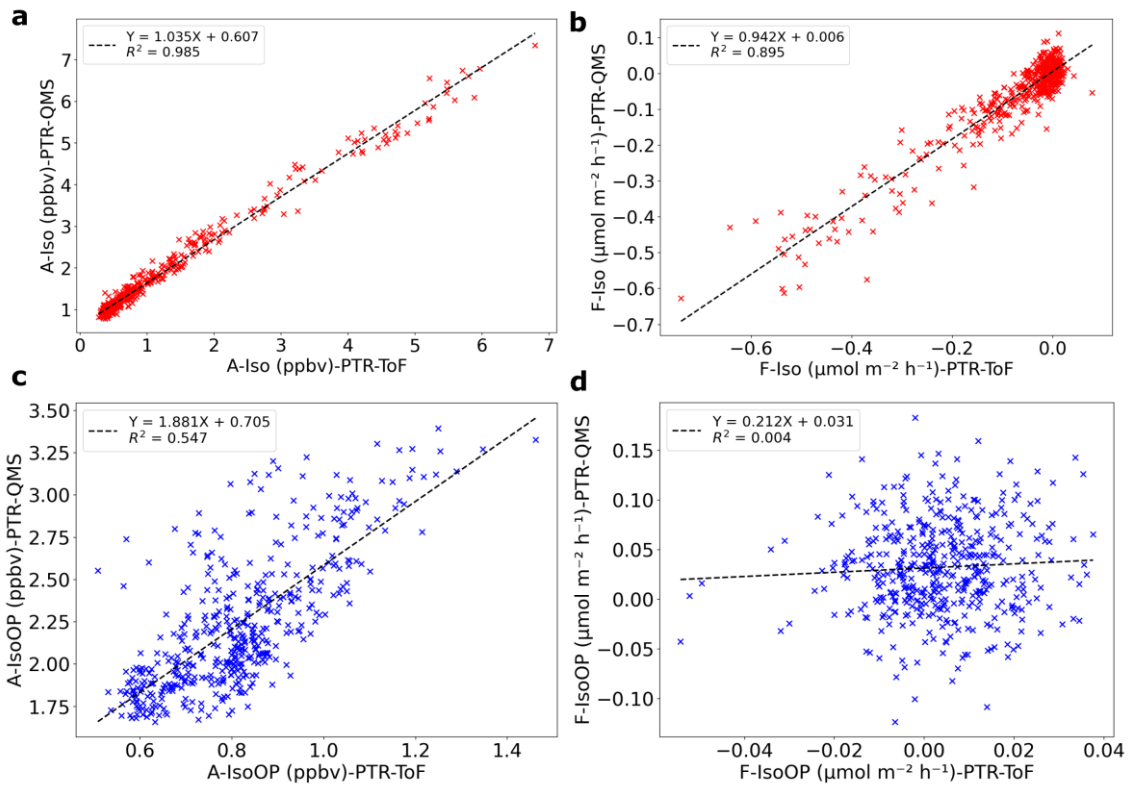

Figure S 5 PTR-QMS and PTR-ToF intercomparison from 28 November to 3 December 2022. Relationship between PTR-QMS and PTR-TOF measurements for: a) ambient isoprene mixing ratios (A-Iso), b) soil isoprene fluxes (F-Iso), c) ambient IsoOP mixing ratios (A-IsoOP), d) soil IsoOP fluxes (F-IsoOP).