

Comparative assessment of MEGAN v2.1 and v3.2 biogenic VOC emissions over the Qinghai-Tibet Plateau: implications for summertime surface ozone simulations

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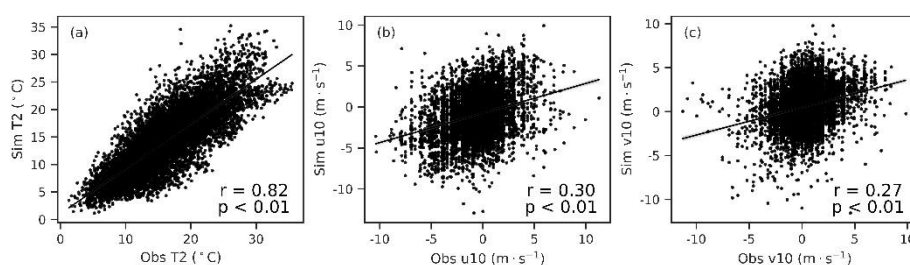


Figure S1: Scatter plot between observations and WRF simulations for (a) T2, (b) u10, and (c) v10 over the QTP for August 2022. The solid lines represent the linear regression fit, and the shaded areas indicate the 95% confidence interval.

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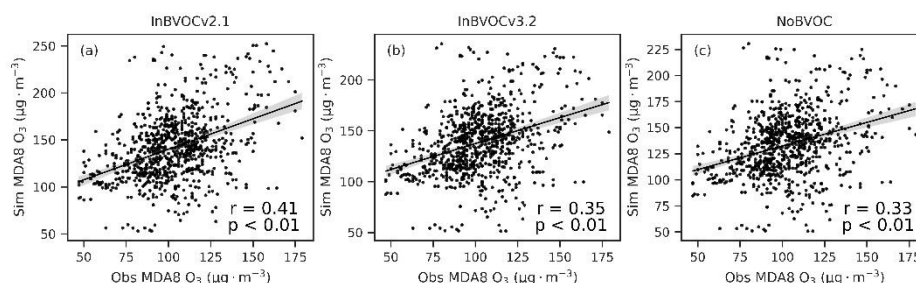


Figure S2: Scatter plot between observations and CMAQ simulations for MDA8 O₃. (a) InBVOCv2.1 (b) InBVOCv3.2 and (c) NoBVOC over the QTP for August 2022. The solid lines represent the linear regression fit, and the shaded areas indicate the 95% confidence interval.

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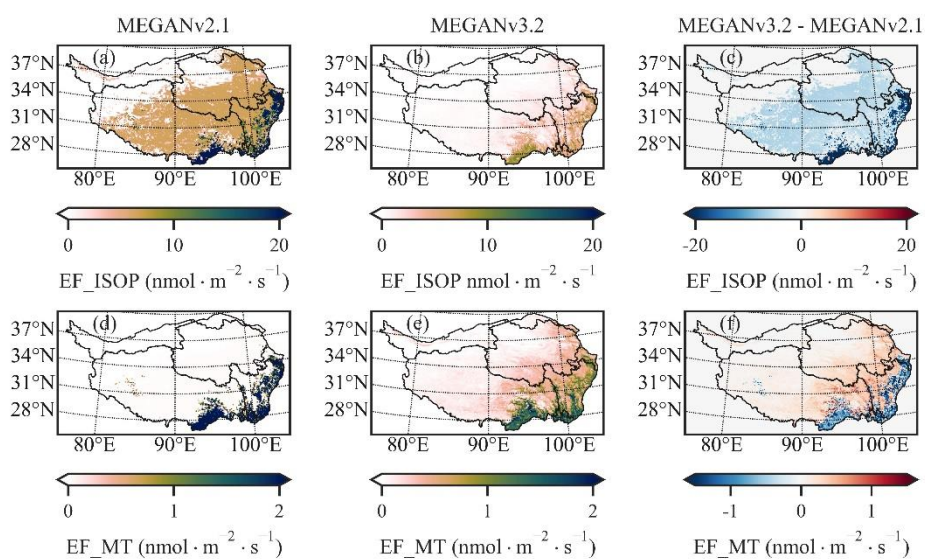


Figure S3: Spatial distribution of average hourly isoprene and monoterpene emission factors (nmol m⁻² s⁻¹) over the QTP for August 2022 simulated by MEGAN v2.1 (a, d), MEGAN v3.2 (b, e), and their differences (c, f).

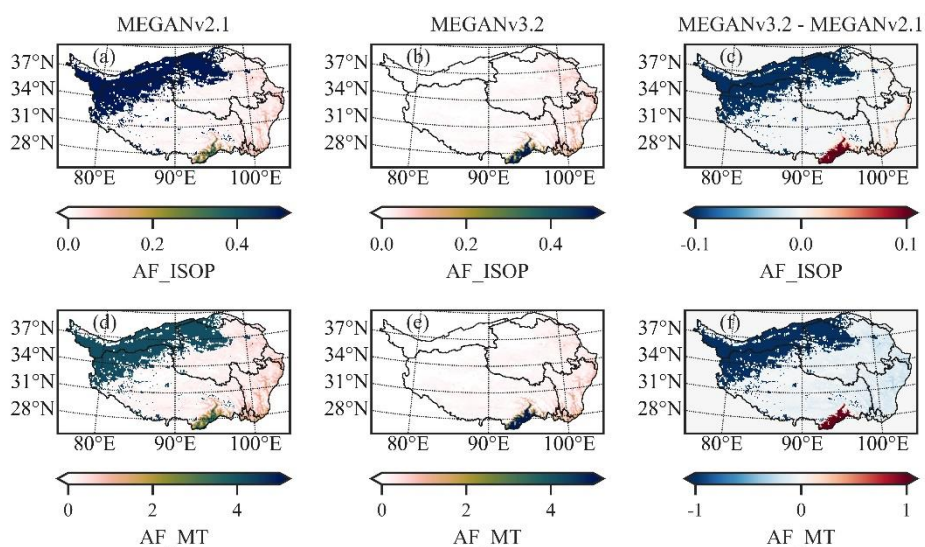


Figure S4: Spatial distribution of average hourly isoprene and monoterpene activity factors over the QTP for August 2022 simulated by MEGAN v2.1 (a, d), MEGAN v3.2 (b, e), and their differences (c, f).

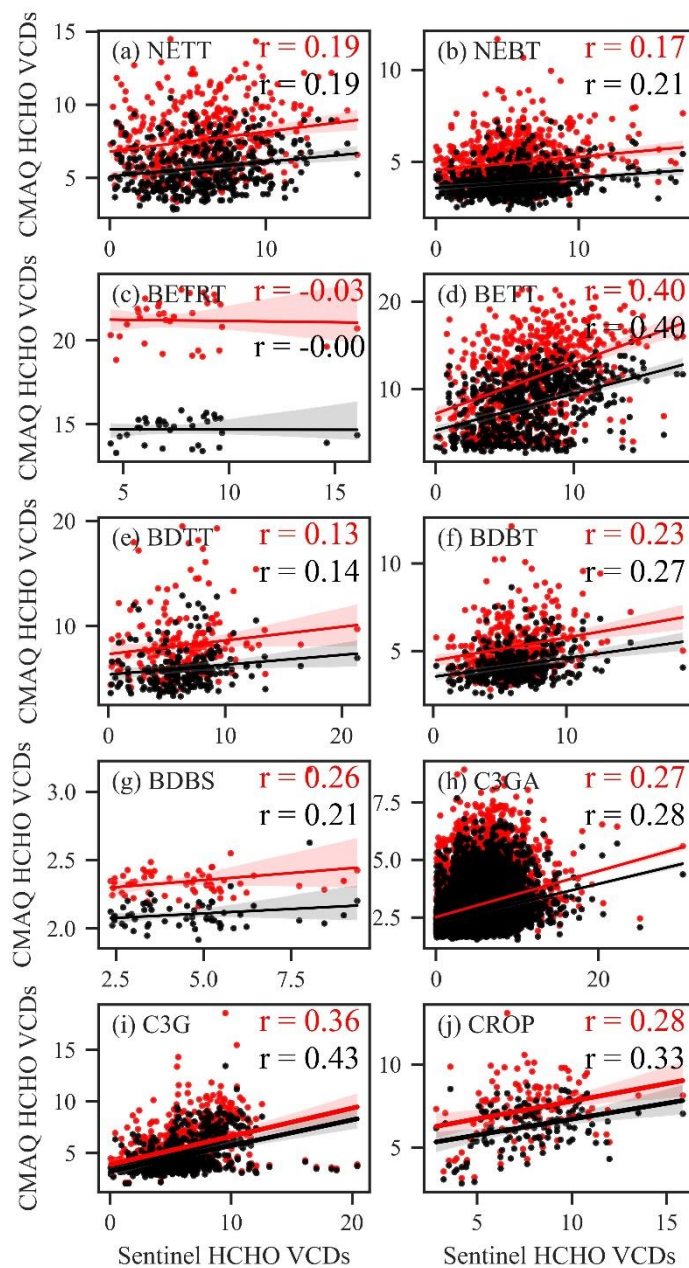


Figure S5: Correlation between CMAQ-simulated and Sentinel-5P observed HCHO VCDs for each PFTs. Red for experiment InBVOCv2.1 and black for experiment InBVOCv3.2. The solid lines represent the linear regression fit, and the shaded areas indicate the 95% confidence interval. (a) Needleleaf Evergreen Temperate Tree (NETT), (b) Needleleaf Evergreen Boreal Tree (NEBT), (c) Broadleaf Evergreen Tropical Tree (BETRT), (d) Broadleaf Evergreen Temperate Tree (BETT), (e) Broadleaf Deciduous Tropical Tree (BDTT), (f) Broadleaf Deciduous Boreal Tree (BDBT), (g) Broadleaf Deciduous Boreal Shrub (BDBS), (h) Arctic C3 Grass (C3GA), (i) Cool C3 Grass (C3G), and (j) Crop (CROP).

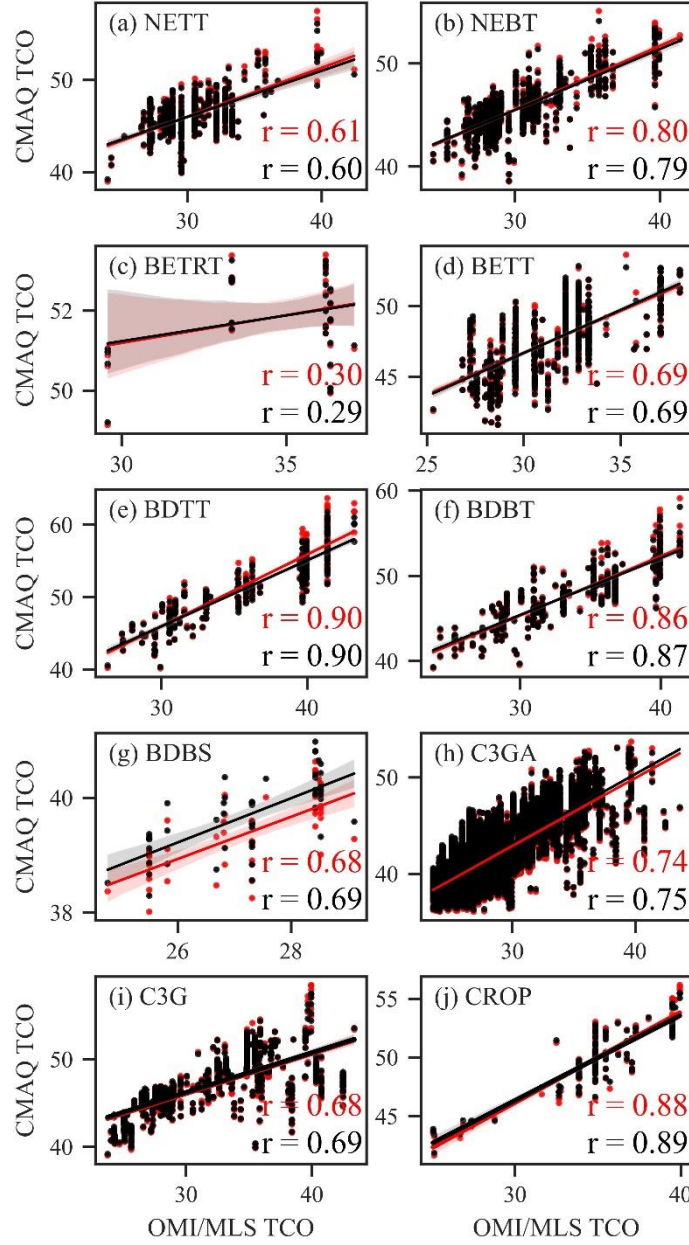


Figure S6: The Correlation between CMAQ-simulated and OMI/MLS derived TCO for each PFTs. Red for experiment MEGAN v2.1 and black for experiment MEGAN v3.2. The solid lines represent the linear regression fit, and the shaded areas indicate the 95% confidence interval. (a) Needleleaf Evergreen Temperate Tree (NETT), (b) Needleleaf Evergreen Boreal Tree (NEBT), (c) Broadleaf Evergreen Tropical Tree (BETRT), (d) Broadleaf Evergreen Temperate Tree (BETT), (e) Broadleaf Deciduous Tropical Tree (BDTT), (f) Broadleaf Deciduous Boreal Tree (BDBT), (g) Broadleaf Deciduous Boreal Shrub (BDBS), (h) Arctic C3 Grass (C3GA), (i) Cool C3 Grass (C3G), and (j) Crop (CROP).

Table S1 BVOC emissions from different studies

Site	Isoprene	Monoterpene	Total BVOCs	unit	Date	Method	Reference
Qinghai	8.27	0.33	17.78	Gg	August 2022	MEGAN v2.1	This study
Qinghai	1.46	1.26	5.77	Gg	August 2022	MEGAN v3.2	This study
Qinghai			1160	Gg	July 2020	Top- down	(Li et al., 2023)
Qinghai	267.72		440.55	Gg	July 2021	G95	(Wang et al., 2023)
Qinghai	56.50	53.10	455.60	Gg C	2001	G95	(Klinger et al., 2002)
Qinghai	9.70	1.00	10.70	Gg C	2018	WRF– CLM– MEGAN	(Yin et al., 2020)
Tibet	80.63	16.15	135.33	Gg	August 2022	MEGAN v2.1	This study
Tibet	34.39	25.81	90.40	Gg	August 2022	MEGAN v3.2	This study
Tibet	61.10	92.70	577.80	Gg C	2001	G95	(Klinger et al., 2002)
Tibet	134.50	52.45	187.00	Gg C	2018	WRF– CLM– MEGAN	(Yin et al., 2020)

References

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