



Supplement of

Assessment of 16-year tropospheric ozone trends from the IASI Climate Data Record

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Table S1: Tropospheric ozone IASI–sonde drifts (in DU yr⁻¹ and % yr⁻¹) at individual stations over 2008–2023, based on comparisons between IASI-CDR and both smoothed and raw ozonesonde data. Uncertainties are given at the 2σ level. Statistical significance is indicated by p-values, with values ≤ 0.05 shown in bold.

station	lat	lon	coverage (%)	iasi-smoothed drift (DU/yr)	iasi-smoothed drift (%/yr)	iasi-smoothed p-value	iasi-sd drift (DU/yr)	iasi-sd drift (%/yr)	iasi-sd p-value
alert	82.50	-62.34	65.10	-0.06 ± 0.12	-0.19 ± 0.38	0.31	-0.07 ± 0.15	-0.22 ± 0.49	0.37
eureka	80.05	-86.42	80.70	0.14 ± 0.17	0.41 ± 0.51	0.10	0.21 ± 0.14	0.68 ± 0.46	0.00
nyalesund	78.92	11.92	88.00	-0.11 ± 0.14	-0.31 ± 0.39	0.11	0.02 ± 0.15	0.06 ± 0.45	0.79
resolute	74.72	-94.98	56.80	0.05 ± 0.12	0.14 ± 0.37	0.45	0.14 ± 0.23	0.47 ± 0.79	0.24
scoresbysund	70.48	-21.95	81.80	0.07 ± 0.13	0.20 ± 0.39	0.29	0.34 ± 0.10	1.03 ± 0.32	0.00
sodankyla	67.36	26.63	60.90	-0.21 ± 0.17	-0.58 ± 0.48	0.02	-0.12 ± 0.17	-0.36 ± 0.53	0.18
lerwick	60.13	-1.18	68.20	-0.12 ± 0.16	-0.33 ± 0.43	0.13	-0.15 ± 0.11	-0.43 ± 0.32	0.01
churchill	58.74	-93.82	51.00	-0.17 ± 0.12	-0.49 ± 0.34	0.00	-0.07 ± 0.14	-0.21 ± 0.42	0.33
legionowo	52.40	20.97	82.30	-0.17 ± 0.15	-0.47 ± 0.41	0.02	-0.12 ± 0.18	-0.32 ± 0.49	0.19
debilt	52.10	5.18	85.40	-0.07 ± 0.09	-0.19 ± 0.23	0.11	-0.07 ± 0.18	-0.17 ± 0.46	0.46
uccle	50.80	4.36	100.00	0.03 ± 0.09	0.07 ± 0.23	0.56	0.02 ± 0.15	0.04 ± 0.39	0.82
kelowna	49.94	-119.40	52.10	-0.30 ± 0.20	-0.96 ± 0.63	0.00	-0.23 ± 0.28	-0.73 ± 0.89	0.11
hohenpei	47.80	11.01	100.00	0.00 ± 0.08	0.00 ± 0.24	0.98	-0.01 ± 0.07	-0.04 ± 0.22	0.74
payerne	46.81	6.94	98.40	-0.16 ± 0.08	-0.47 ± 0.25	0.00	-0.18 ± 0.10	-0.54 ± 0.30	0.00
ohp	43.92	5.71	88.50	-0.18 ± 0.10	-0.46 ± 0.27	0.00	-0.21 ± 0.15	-0.56 ± 0.39	0.00
trinidadhead	41.05	-124.15	84.40	-0.04 ± 0.08	-0.11 ± 0.22	0.31	-0.08 ± 0.14	-0.21 ± 0.38	0.27
madrid	40.45	-3.72	96.90	-0.06 ± 0.09	-0.17 ± 0.26	0.18	-0.04 ± 0.15	-0.12 ± 0.40	0.57
boulder	39.99	-105.26	98.40	-0.03 ± 0.07	-0.11 ± 0.24	0.36	-0.03 ± 0.06	-0.09 ± 0.22	0.39
wallops	37.90	-75.70	74.00	-0.07 ± 0.11	-0.17 ± 0.26	0.20	-0.08 ± 0.15	-0.19 ± 0.36	0.31
izana	28.41	-16.53	87.00	-0.13 ± 0.12	-0.32 ± 0.28	0.02	-0.20 ± 0.13	-0.48 ± 0.31	0.00
hilo	19.72	-155.07	92.70	-0.01 ± 0.10	-0.02 ± 0.28	0.91	-0.02 ± 0.14	-0.06 ± 0.39	0.74
costarica	10.00	-84.11	57.30	0.14 ± 0.15	0.52 ± 0.55	0.06	0.08 ± 0.17	0.27 ± 0.58	0.36
paramaribo	5.81	-55.21	57.80	-0.09 ± 0.11	-0.31 ± 0.36	0.09	-0.14 ± 0.15	-0.46 ± 0.50	0.07
nairobi	-1.30	36.80	61.50	-0.07 ± 0.13	-0.23 ± 0.45	0.30	-0.09 ± 0.16	-0.30 ± 0.51	0.25
samoa	-14.25	-170.56	60.90	0.09 ± 0.14	0.38 ± 0.61	0.21	0.11 ± 0.14	0.46 ± 0.59	0.12
reunion	-21.10	55.50	68.80	-0.15 ± 0.12	-0.39 ± 0.32	0.01	-0.13 ± 0.12	-0.32 ± 0.30	0.03
lauder	-45.04	169.68	91.70	-0.10 ± 0.06	-0.40 ± 0.25	0.00	-0.14 ± 0.07	-0.59 ± 0.29	0.00

Table S2: Tropospheric ozone trends derived from IASI and ozonesonde data (smoothed and raw) at individual stations over 2008–2023. The thermal tropopause is estimated using the World Meteorological Organization thermal definition (WMO, 1957). Uncertainties are reported at the 2σ level. Statistical significance is indicated by p-values, with values ≤ 0.05 shown in bold.

Station	Lat	Lon	2008–2023 Trend DU yr ⁻¹ (% yr ⁻¹)			2008–2019 Trend DU yr ⁻¹ (% yr ⁻¹)		
			IASI	Smoothed	Sonde	IASI	Smoothed	Sonde
alert	82.50	-62.34	-0.05 ± 0.10 (-0.15 ± 0.33)	0.01 ± 0.12 (0.04 ± 0.38)	0.13 ± 0.15 (0.42 ± 0.51)	0.05 ± 0.14 (0.17 ± 0.43)	-0.07 ± 0.23 (-0.20 ± 0.69)	0.10 ± 0.22 (0.34 ± 0.73)
eureka	80.05	-86.42	0.01 ± 0.14 (0.03 ± 0.46)	-0.06 ± 0.13 (-0.18 ± 0.38)	-0.06 ± 0.14 (-0.18 ± 0.45)	0.09 ± 0.19 (0.30 ± 0.61)	-0.14 ± 0.22 (-0.43 ± 0.67)	-0.15 ± 0.25 (-0.49 ± 0.80)
nyalesund	78.92	11.92	-0.19 ± 0.17 (-0.63 ± 0.56)	-0.04 ± 0.18 (-0.10 ± 0.52)	-0.17 ± 0.14 (-0.53 ± 0.42)	-0.02 ± 0.23 (-0.08 ± 0.74)	0.12 ± 0.30 (0.33 ± 0.85)	-0.07 ± 0.30 (-0.22 ± 0.91)
resolute	74.72	-94.98	0.02 ± 0.08 (0.06 ± 0.26)	0.10 ± 0.16 (0.30 ± 0.49)	-0.07 ± 0.22 (-0.25 ± 0.75)	-0.05 ± 0.20 (-0.14 ± 0.64)	-0.02 ± 0.21 (-0.07 ± 0.66)	-0.20 ± 0.29 (-0.69 ± 0.99)
scoresbysund	70.48	-21.95	-0.13 ± 0.13 (-0.40 ± 0.41)	-0.23 ± 0.13 (-0.66 ± 0.38)	-0.44 ± 0.12 (-1.34 ± 0.37)	-0.02 ± 0.20 (-0.07 ± 0.64)	-0.24 ± 0.24 (-0.67 ± 0.68)	-0.37 ± 0.24 (-1.10 ± 0.72)
sodankyla	67.36	26.63	-0.20 ± 0.16 (-0.63 ± 0.50)	-0.06 ± 0.23 (-0.17 ± 0.64)	-0.03 ± 0.21 (-0.08 ± 0.65)	-0.18 ± 0.30 (-0.56 ± 0.93)	-0.24 ± 0.37 (-0.69 ± 1.04)	-0.19 ± 0.36 (-0.59 ± 1.13)
lerwick	60.13	-1.18	-0.34 ± 0.18 (-1.10 ± 0.58)	-0.23 ± 0.24 (-0.62 ± 0.65)	-0.18 ± 0.19 (-0.52 ± 0.53)	-0.46 ± 0.26 (-1.47 ± 0.81)	-0.31 ± 0.31 (-0.83 ± 0.83)	-0.22 ± 0.24 (-0.60 ± 0.67)
churchill	58.74	-93.82	-0.06 ± 0.11 (-0.19 ± 0.33)	0.06 ± 0.14 (0.16 ± 0.41)	0.03 ± 0.16 (0.08 ± 0.51)	N.A.	N.A.	N.A.
legionowo	52.40	20.97	-0.15 ± 0.15 (-0.44 ± 0.44)	0.05 ± 0.22 (0.12 ± 0.58)	0.06 ± 0.19 (0.17 ± 0.52)	-0.06 ± 0.22 (-0.18 ± 0.65)	0.08 ± 0.23 (0.22 ± 0.63)	0.05 ± 0.27 (0.15 ± 0.73)

debilt	52.10	5.18	-0.10 ± 0.19 (-0.30 ± 0.58)	0.01 ± 0.24 (0.01 ± 0.63)	-0.01 ± 0.22 (-0.04 ± 0.59)	0.03 ± 0.22 (0.09 ± 0.64)	0.15 ± 0.25 (0.39 ± 0.64)	0.06 ± 0.27 (0.16 ± 0.70)
uccle	50.80	4.36	-0.17 ± 0.16 (-0.51 ± 0.49)	-0.32 ± 0.19 (-0.82 ± 0.50)	-0.17 ± 0.18 (-0.46 ± 0.47)	-0.01 ± 0.18 (-0.04 ± 0.54)	-0.11 ± 0.26 (-0.27 ± 0.66)	-0.06 ± 0.24 (-0.15 ± 0.62)
kelowna	49.94	-119.40	0.05 ± 0.28 (0.18 ± 0.96)	0.13 ± 0.35 (0.42 ± 1.11)	0.09 ± 0.43 (0.27 ± 1.37)	0.05 ± 0.28 (0.18 ± 0.95)	0.13 ± 0.33 (0.42 ± 1.06)	0.09 ± 0.43 (0.27 ± 1.37)
hohenpei	47.80	11.01	-0.11 ± 0.09 (-0.37 ± 0.31)	-0.16 ± 0.15 (-0.48 ± 0.45)	-0.10 ± 0.13 (-0.30 ± 0.41)	-0.02 ± 0.16 (-0.07 ± 0.52)	-0.23 ± 0.25 (-0.71 ± 0.77)	-0.06 ± 0.17 (-0.18 ± 0.53)
payerne	46.81	6.94	-0.14 ± 0.13 (-0.45 ± 0.43)	0.01 ± 0.12 (0.02 ± 0.35)	0.03 ± 0.14 (0.09 ± 0.40)	-0.02 ± 0.16 (-0.08 ± 0.51)	0.08 ± 0.17 (0.25 ± 0.52)	0.05 ± 0.18 (0.16 ± 0.54)
ohp	43.92	5.71	-0.21 ± 0.18 (-0.64 ± 0.55)	-0.04 ± 0.16 (-0.11 ± 0.42)	0.02 ± 0.17 (0.05 ± 0.44)	0.21 ± 0.32 (0.60 ± 0.90)	0.14 ± 0.22 (0.37 ± 0.58)	0.16 ± 0.15 (0.41 ± 0.41)
trinidadhead	41.05	-124.15	-0.09 ± 0.24 (-0.31 ± 0.78)	-0.02 ± 0.23 (-0.05 ± 0.68)	0.00 ± 0.18 (0.01 ± 0.49)	0.18 ± 0.38 (0.60 ± 1.24)	0.37 ± 0.36 (1.04 ± 1.02)	0.40 ± 0.28 (1.08 ± 0.75)
madrid	40.45	-3.72	-0.20 ± 0.16 (-0.61 ± 0.48)	-0.06 ± 0.24 (-0.16 ± 0.64)	-0.16 ± 0.19 (-0.44 ± 0.52)	0.14 ± 0.29 (0.41 ± 0.84)	0.12 ± 0.29 (0.32 ± 0.78)	-0.10 ± 0.33 (-0.26 ± 0.87)
boulder	39.99	-105.26	0.02 ± 0.10 (0.09 ± 0.37)	0.04 ± 0.13 (0.13 ± 0.46)	0.03 ± 0.11 (0.11 ± 0.36)	0.15 ± 0.18 (0.54 ± 0.66)	0.13 ± 0.18 (0.46 ± 0.63)	0.07 ± 0.16 (0.25 ± 0.56)
wallops	37.90	-75.70	-0.23 ± 0.18 (-0.62 ± 0.50)	-0.16 ± 0.21 (-0.38 ± 0.52)	-0.14 ± 0.18 (-0.34 ± 0.43)	0.08 ± 0.24 (0.22 ± 0.64)	0.05 ± 0.27 (0.13 ± 0.66)	-0.02 ± 0.23 (-0.04 ± 0.55)
izana	28.41	-16.53	-0.11 ± 0.26 (-0.32 ± 0.73)	0.04 ± 0.24 (0.11 ± 0.59)	0.05 ± 0.24 (0.13 ± 0.57)	-0.21 ± 0.53 (-0.60 ± 1.50)	0.10 ± 0.48 (0.25 ± 1.17)	-0.02 ± 0.47 (-0.05 ± 1.13)
hilo	19.72	-155.07	-0.13 ± 0.26 (-0.38 ± 0.76)	-0.23 ± 0.30 (-0.67 ± 0.86)	-0.24 ± 0.27 (-0.69 ± 0.78)	0.21 ± 0.32 (0.60 ± 0.90)	0.07 ± 0.59 (0.21 ± 1.65)	0.06 ± 0.62 (0.15 ± 1.72)
costarica	10.00	-84.11	-0.21 ± 0.15 (-0.76 ± 0.55)	-0.33 ± 0.17 (-1.20 ± 0.61)	-0.31 ± 0.17 (-1.07 ± 0.59)	-0.29 ± 0.26 (-1.03 ± 0.92)	-0.26 ± 0.36 (-0.94 ± 1.27)	-0.28 ± 0.36 (-0.97 ± 1.23)
paramaribo	5.81	-55.21	-0.21 ± 0.17 (-0.71 ± 0.60)	-0.12 ± 0.23 (-0.41 ± 0.79)	-0.02 ± 0.26 (-0.07 ± 0.86)	-0.08 ± 0.18 (-0.27 ± 0.59)	-0.07 ± 0.29 (-0.25 ± 0.96)	-0.03 ± 0.34 (-0.08 ± 1.11)
nairobi	-1.30	36.80	0.06 ± 0.20 (0.19 ± 0.62)	0.10 ± 0.25 (0.34 ± 0.87)	0.15 ± 0.23 (0.49 ± 0.77)	0.08 ± 0.24 (0.25 ± 0.74)	0.11 ± 0.31 (0.37 ± 1.05)	0.17 ± 0.24 (0.56 ± 0.80)
natal	-5.40	-35.40	N.A.	N.A.	N.A.	-0.04 ± 0.17 (-0.12 ± 0.47)	-0.02 ± 0.23 (-0.06 ± 0.64)	0.02 ± 0.22 (0.04 ± 0.60)
samoa	-14.25	-170.56	-0.12 ± 0.20 (-0.53 ± 0.90)	-0.29 ± 0.27 (-1.24 ± 1.17)	-0.33 ± 0.27 (-1.39 ± 1.15)	-0.13 ± 0.20 (-0.57 ± 0.90)	-0.36 ± 0.36 (-1.53 ± 1.55)	-0.45 ± 0.38 (-1.85 ± 1.57)
reunion	-21.10	55.50	-0.27 ± 0.30 (-0.73 ± 0.79)	0.00 ± 0.28 (0.00 ± 0.74)	-0.04 ± 0.32 (-0.11 ± 0.82)	-0.34 ± 0.31 (-0.91 ± 0.83)	-0.02 ± 0.32 (-0.06 ± 0.84)	-0.04 ± 0.33 (-0.09 ± 0.87)
lauder	-45.04	169.68	-0.10 ± 0.15 (-0.43 ± 0.62)	-0.08 ± 0.17 (-0.33 ± 0.64)	-0.01 ± 0.13 (-0.03 ± 0.54)	-0.03 ± 0.11 (-0.13 ± 0.45)	0.04 ± 0.19 (0.17 ± 0.71)	0.06 ± 0.15 (0.25 ± 0.61)

Table S3: Table S3. Tropospheric ozone trends over 2008–2019 at individual stations, derived from IASI and ozonesonde data (smoothed and raw), along with trends from the HEGIFTOM dataset. All values are compiled into a single table for direct comparison. The thermal tropopause is defined according to the WMO thermal definition (WMO, 1957). Uncertainties are reported at the 2σ level. Statistical significance is indicated by p-values ($p \leq 0.05$ shown in bold). HEGIFTOM data were extracted from the supplementary table available at <https://egusphere.copernicus.org/preprints/2025/egusphere-2025-1054/>.

Station	IASI (DU yr ⁻¹ $\pm 2\sigma$)	Smoothed (DU yr ⁻¹ $\pm 2\sigma$)	Sonde (DU yr ⁻¹ $\pm 2\sigma$)	Hegiftom (DU yr ⁻¹ $\pm 2\sigma$)
Boulder	0.15 ± 0.18	0.13 ± 0.18	0.07 ± 0.16	0.023 ± 0.156
De Bilt	0.03 ± 0.22	0.15 ± 0.25	0.06 ± 0.27	0.323 ± 0.200
Hohenpei(s)	-0.02 ± 0.16	-0.23 ± 0.25	-0.06 ± 0.17	0.084 ± 0.080
Izana	-0.21 ± 0.53	0.10 ± 0.60	-0.02 ± 0.57	0.268 ± 0.260
Legionowo	-0.06 ± 0.22	0.08 ± 0.23	0.05 ± 0.23	0.032 ± 0.130
Lerwick	-0.46 ± 0.41	-0.31 ± 0.42	-0.22 ± 0.34	0.177 ± 0.170
Madrid	0.14 ± 0.29	0.12 ± 0.29	-0.10 ± 0.44	0.093 ± 0.166
OHP	0.21 ± 0.15	0.14 ± 0.22	0.16 ± 0.15	0.162 ± 0.152
Payerne	-0.02 ± 0.13	0.08 ± 0.13	0.05 ± 0.14	0.039 ± 0.078
Uccle	-0.01 ± 0.12	-0.11 ± 0.13	-0.06 ± 0.12	-0.011 ± 0.096
Paramaribo	-0.08 ± 0.18	-0.07 ± 0.29	-0.03 ± 0.37	0.059 ± 0.184
Nairobi	0.08 ± 0.24	0.11 ± 0.31	0.17 ± 0.20	0.045 ± 0.182
Samoa	-0.13 ± 0.20	-0.36 ± 0.39	-0.45 ± 0.40	-0.295 ± 0.274
Reunion	-0.34 ± 0.17	-0.02 ± 0.16	-0.04 ± 0.17	0.123 ± 0.254
Lauder	-0.03 ± 0.11	0.04 ± 0.19	0.06 ± 0.15	0.075 ± 0.120