

# TROPOMI/S5p total ozone column data: global ground-based validation & consistency with other satellite missions

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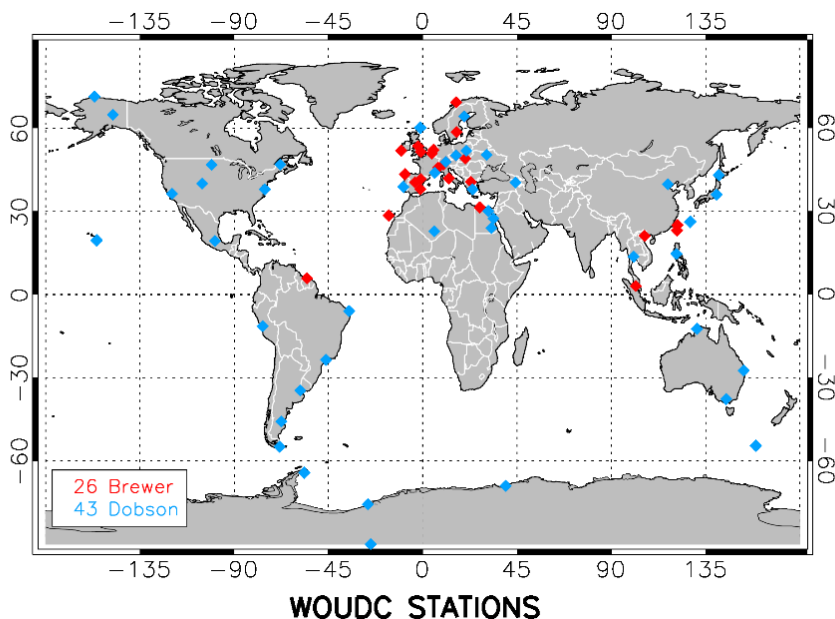
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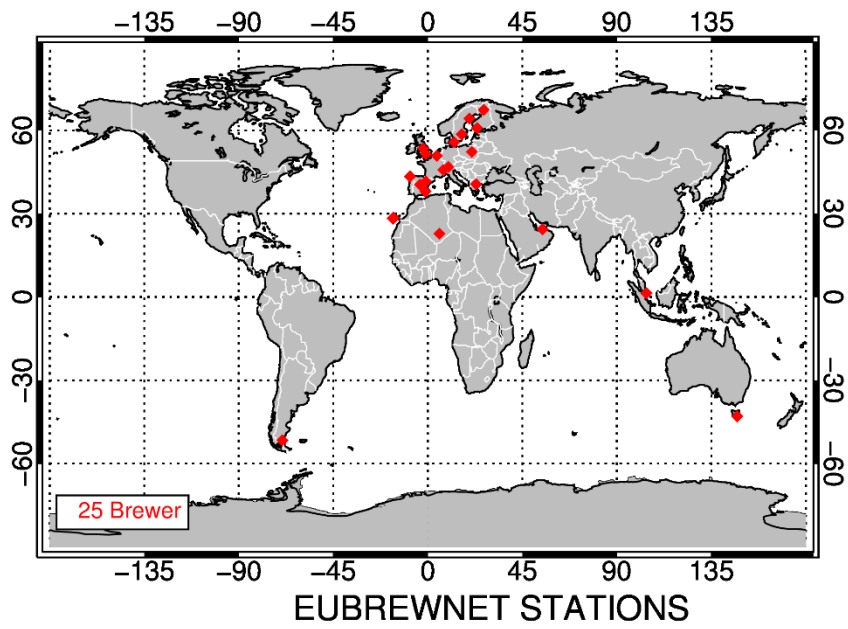
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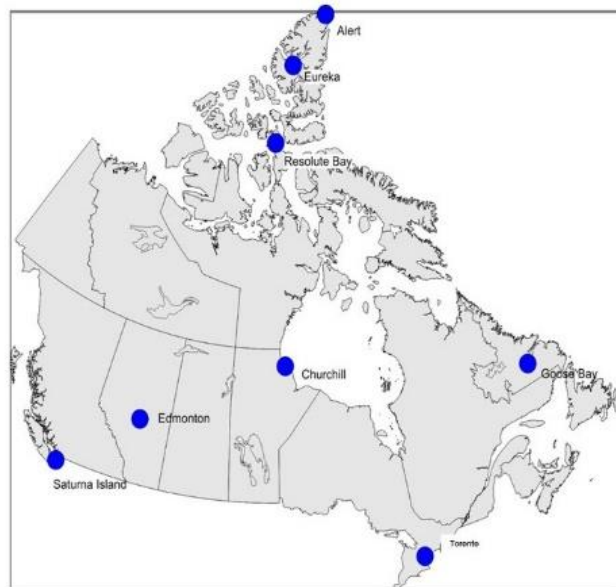
(a)



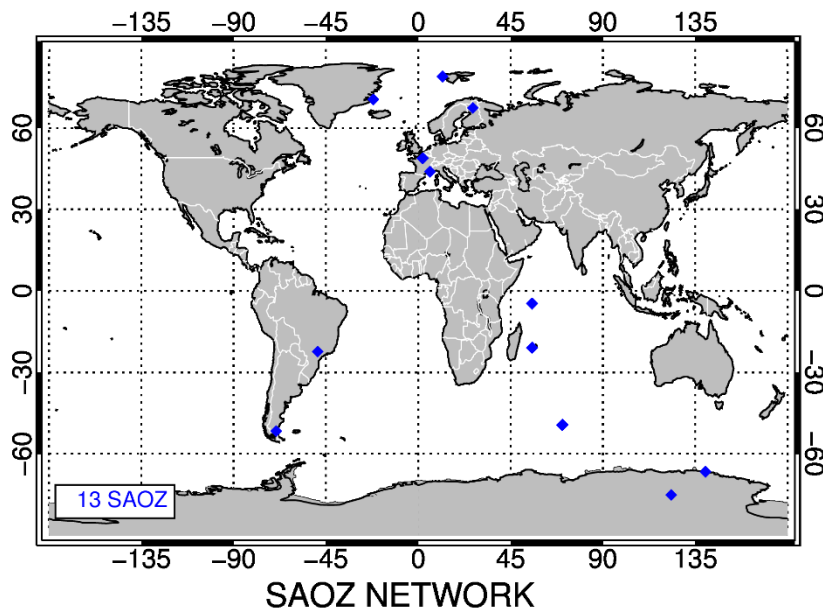
(b)



5 (c)



(d)



5 Figure S 1: Maps of the geographical distribution of the stations used for the validation of the TROPOMI TOC. Panel (a) the WOUDC stations, panel (b) Eubrewnet stations, panel (c) the Canadian Brewer stations and panel (d) the SAOZ network.

Table S 1. The WOUDC Dobson instruments selected for this study.

Station id	Station name	Location	Latitude	Longitude	Elevation (m.a.s.l.)
2	Tamanrasset	Algeria	5.51	22.78	1395
12	Sapporo	Japan	141.33	43.06	19
14	Tateno	Japan	140.13	36.05	31
19	Bismarck	USA	-100.75	46.76	511
20	Caribou	USA	-68.01	46.87	192
27	Brisbane	Australia	153.08	-27.42	5
29	Macquarie_Island	Australia	158.94	-54.49	6
31	Mauna_Loa	USA	-155.58	19.54	3397
40	Haute_Province	France	5.75	43.92	580

43	Lerwick	UK	-1.18	60.13	90
57	Halley_Bay	Antarctica	-26.18	-75.62	31
67	Boulder	USA	-105.26	39.99	1634
68	Belsk	Poland	20.79	51.84	180
82	Lisbon	Portugal	-9.13	38.76	105
84	Darwin	Australia	130.88	-12.42	0
91	Buenos-Aires	Argentina	-58.48	-34.59	25
96	Hradec_Kralove	Czech Republic	15.84	50.18	285
99	Hohenpeissenberg	Germany	11.01	47.80	975
101	Syowa	Antarctica	39.58	-69.00	21
105	Fairbanks	USA	-147.87	64.82	138
107	Wallops_Island	USA	-75.46	37.94	4
111	Amundsen-Scott	Antarctica	-24.8	-89.99	2835
152	Cairo	Egypt	31.28	30.08	35
190	Naha	Japan	127.68	26.20	29
192	Mexico	Mexico	-99.16	19.32	2268
199	Barrow	USA	-156.61	71.32	11
200	Cachoeira-Paulista	Brazil	-46.20	-23.50	573
208	Shianghai	China	116.96	39.75	13
216	Bangkok	Thailand	100.62	13.67	2
218	Manila	Philippines	121.05	14.65	61
219	Natal	Brazil	-35.2	-6.00	32
233	Marambio	Antarctica	-56.62	-64.24	198
245	Aswan	Egypt	32.78	23.96	193
253	Melbourne	Australia	144.83	-37.66	125
284	Vindeln	Sweden	19.76	64.23	0
293	Athens	Greece	23.73	37.98	15
339	Ushuaia	Argentina	-68.31	-54.85	7
341	Hanford	USA	-119.63	36.32	73
342	Comodoro_Rivadavia	Argentina	-67.50	-45.78	43

409	Hurghada	Egypt	33.75	27.41	22
410	Amberd	Armenia	44.25	40.38	2070
429	Marcapomacocha	Peru	-76.33	-11.40	4479
498	Kyiv-Goloseyev	Ukraine	30.49	50.36	221

**Table S 2. The WOUDC Brewer instruments selected for this study.**

<b>Station id</b>	<b>Station name</b>	<b>Location</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Elevation (m.a.s.l.)</b>
53	Uccle	Belgium	4.36	50.79	100
95	Taipei	Taiwan	121.48	25.02	22
96	Hradec_Kralove	Czech Republic	15.84	50.18	285
99	Hohenpeissenberg	Germany	11.01	47.80	975
261	Thessaloniki	Greece	22.96	40.63	4
279	Norkoping	Sweden	16.15	58.58	0
284	Vindeln	Sweden	19.77	64.23	0
305	Rome_University	Italy	12.52	41.90	0
306	Chengkung	Taiwan	121.37	23.10	0
308	Madrid	Spain	-3.72	40.45	0
316	Debilt	Netherlands	5.18	52.10	0
318	Valentia	Ireland	-10.25	51.94	0
322	Petaling_Jaya	Malaysia	101.65	3.10	46
330	Hanoi	Vietnam	105.80	21.20	0
331	Poprad-Ganovce	Slovakia	20.32	49.03	0
346	Murcia	Spain	-1.17	38.00	69
352	Manchester	UK	-2.23	53.47	61
353	Reading	UK	-0.94	51.44	51
376	Mrsa_Mtrouh	Egypt	27.22	31.33	35
401	Santa_Cruz	Spain	-16.25	28.47	50
405	La_Coruna	Spain	-8.47	43.33	62

411	Zaragoza	Spain	-0.91	41.63	235
435	Paramaribo	Suriname	-55.21	5.81	5
476	Andoya	Norway	16.01	69.28	395
479	Aosta	Italy	7.357	45.74	585
501	Davos	Switzerland	9.84	46.81	1605

**Table S 3. The SAOZ DOAS UV-Visible instruments selected for this study.**

<b>Station id</b>	<b>Station name</b>	<b>Location</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Elevation (m.a.s.l.)</b>	<b>Instrument</b>
---	Guyancourt	France	48.78	2.03	165	SAOZ
28	Dumont D' Urville	Antarctica	-66.67	140.02	20	SAOZ
40	Observatoire De Haute Provence	France	43.94	5.71	650	SAOZ
49	Paris	France	48.85	2.35	65	SAOZ
89	Ny Alesund	Spitsbergen	78.92	11.93	15	DOAS
207	Mahe	Victoria, Seychelles	-4.68	55.53	15	SAOZ
262	Sodankyla	Finland	67.37	26.63	179	SAOZ
436	St. Denis – La Reunion	France	-20.90	55.48	110	SAOZ
459	Scoresbysund	Eastern Greenland	70.48	-21.95	68	SAOZ
614	Bauru	Brazil	-22.35	-49.03	640	SAOZ
641	Dome Concorde	Antarctica	-75.10	123.32	3233	SAOZ
674	Kerguelen	Kerguelen Island	-49.35	70.26	10	SAOZ
817	Rio Gallegos	Argentina	-51.60	-69.32	650	SAOZ

**Table S 4. The Canadian Brewer Network stations selected for this study.**

Station id	Station name	Location	Latitude	Longitude	Elevation (m.a.s.l.)
18	Alert	Canada	82.45	-62.51	220
21	Edmonton	Canada	53.51	-114.11	752
24	Resolute	Canada	74.70	-94.97	68
65	Toronto	Canada	43.78	-79.47	202
76	Goose Bay	Canada	53.31	-60.36	26
77	Churchill	Canada	58.74	-94.07	26
111	Amundsen Scott (South Pole)	Antarctica	-90.00	70.24	3507
290	Saturna Island	Canada	48.77	-123.13	202
315	Eureka	Canada	79.99	-85.93	9

**5 Table S 5. The Eubrewnet Network stations selected for this study.**

Station id	Station name	Location	Latitude	Longitude	Elevation (m.a.s.l.)
2	Tamanrasset	Algeria	5.53	22.79	1320
53	Uccle	Belgium	4.36	50.79	100
92	Hobart	Australia	147.33	-42.90	20
214	Singapore	SGP	103.98	1.37	14
262	Sodankyla	Finland	26.63	67.37	100
279	Norrkoping	Sweden	16.15	58.58	43
284	Vindeln	Sweden	19.77	64.24	225
300	Izana	Spain	-16.49	28.31	2370
308	Madrid	Spain	-3.72	40.45	680
346	Murcia	Spain	-1.17	38.00	69
352	Manchester	GBR	-2.23	53.47	76
353	Reading	GBR	-0.94	51.44	61

397	Abu Dhabi	United. Arab.Emirates	54.64	24.34	20
401	Santa_Cruz (Tenerife)	Spain	-16.25	28.47	52
404	Jokioinen	Finland	23.49	60.81	106
405	La Coruna	Spain	-8.47	43.33	62
411	Zaragoza	Spain	-0.91	41.63	250
479	Aosta	Italy	7.36	45.74	569
493	Rio Gallegos	Argentina	-69.32	-51.60	5
501	Davos	Switzerland	9.83	46.80	1560
934	Copenhagen	Denmark	12.57	55.72	90
945	Warsaw	Poland	20.94	52.25	120