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*Supplement of*

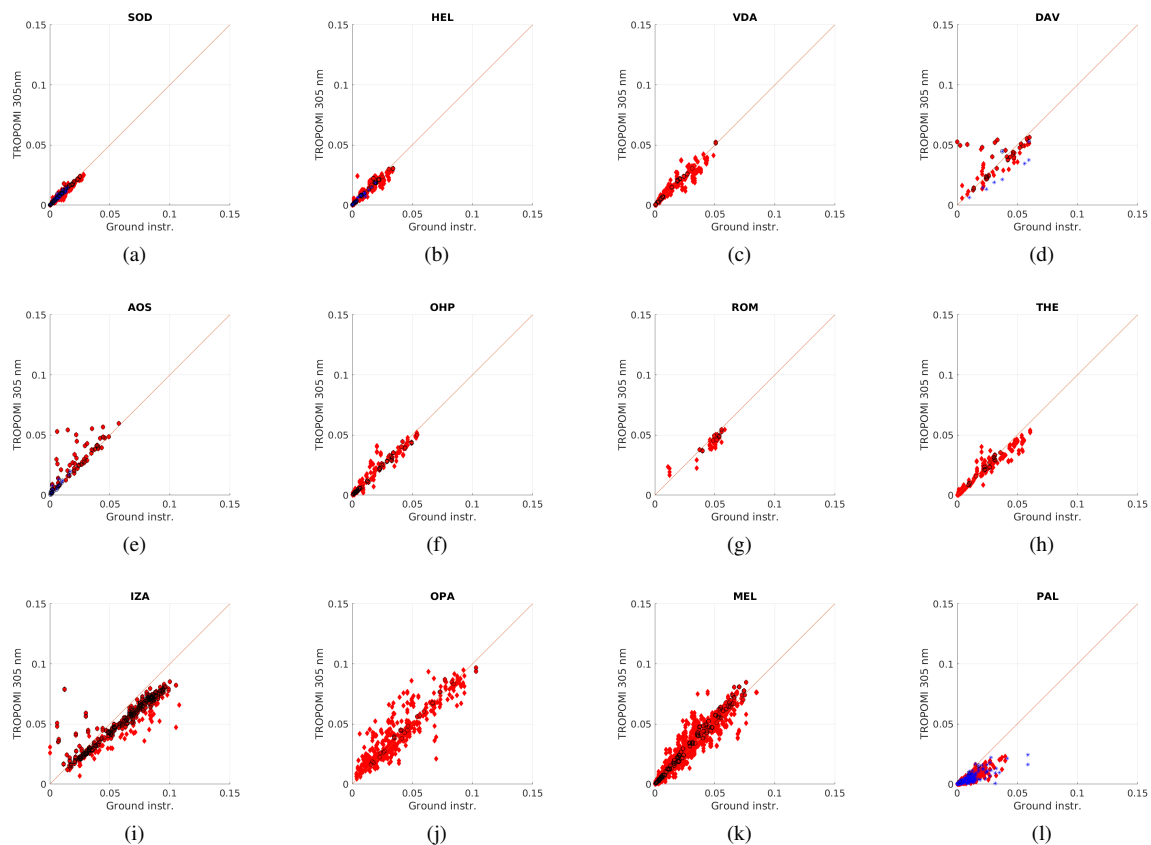
## **Validation of the TROPOspheric Monitoring Instrument (TROPOMI) surface UV radiation product**

**Kaisa Lakkala et al.**

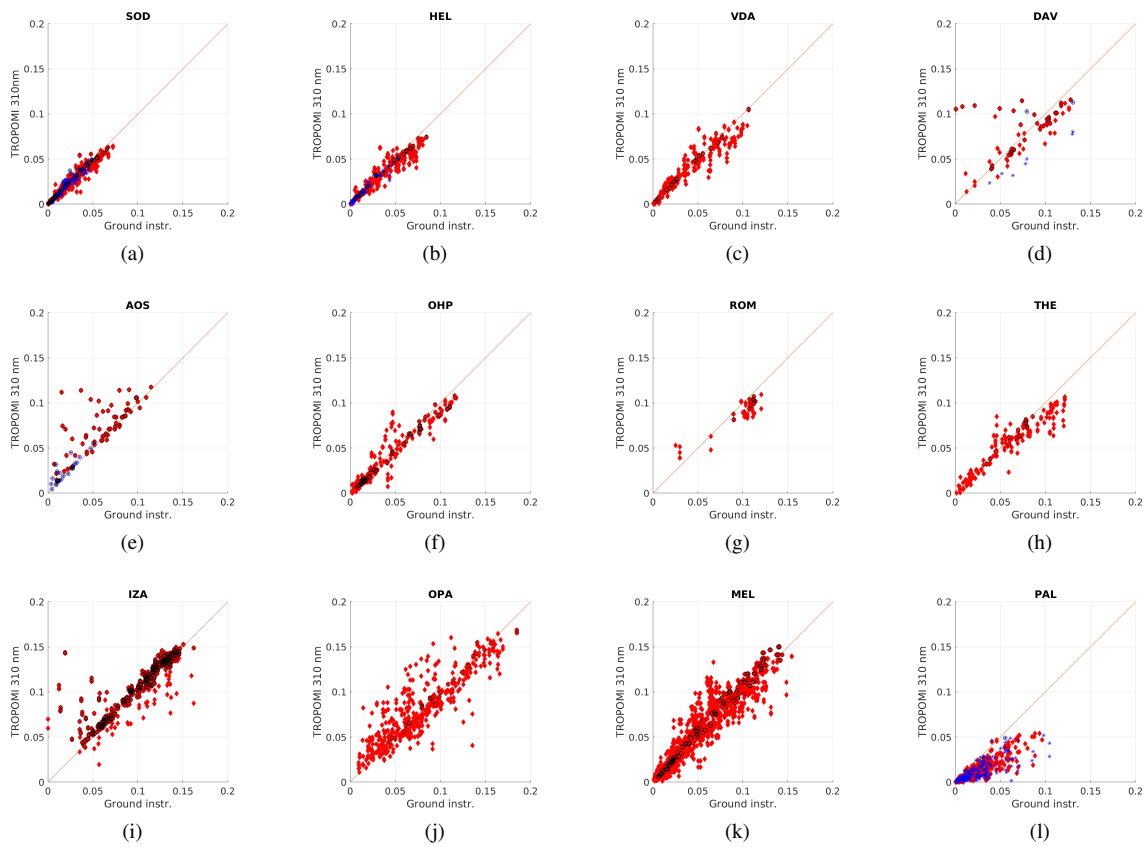
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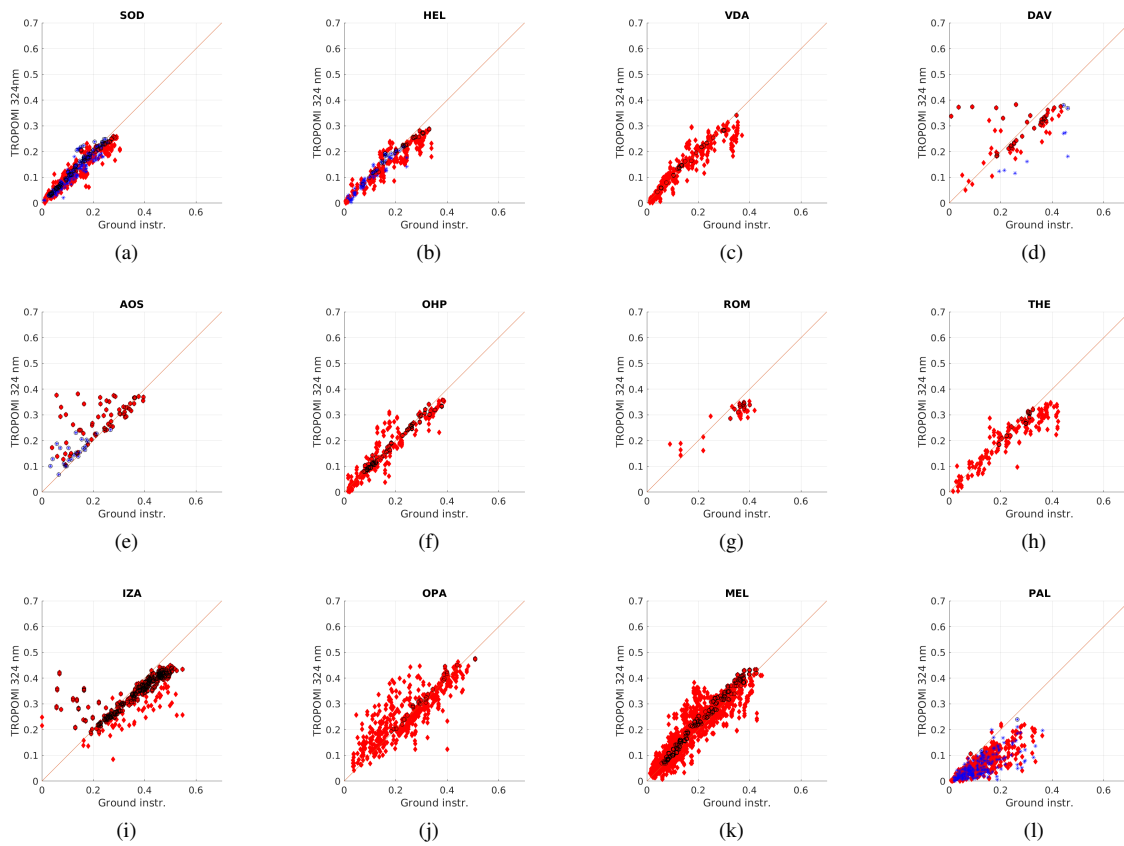
# 1 Spectral irradiance



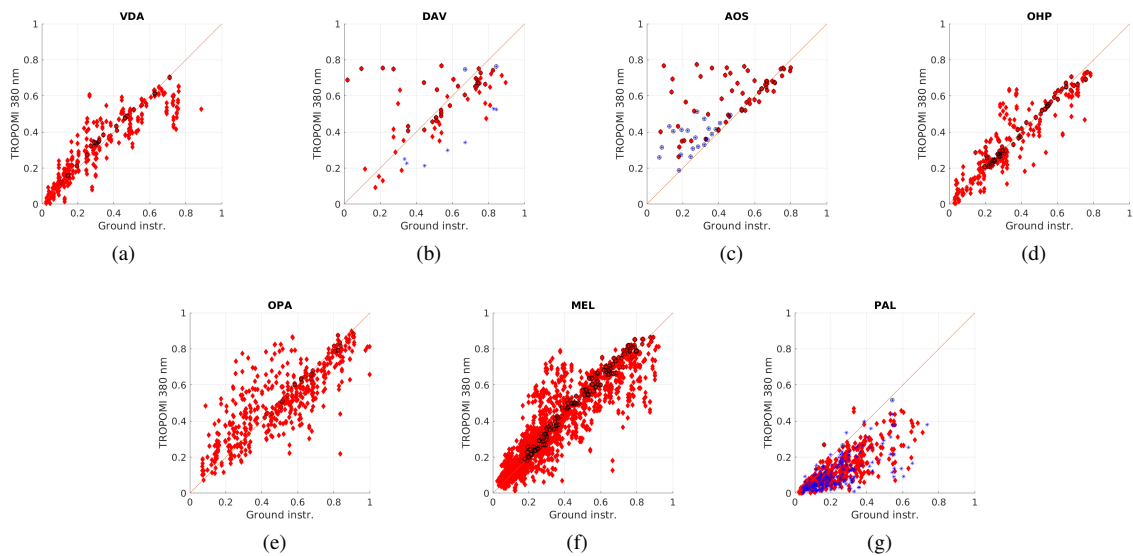
**Figure S1.** TROPOMI overpass Irradiance at 305 nm and spectroradiometer measurements at a) Sodankylä (SOD), b) Helsinki (HEL), c) Villeneuve-d'Ascq (VDA), d) Davos (DAV), e) Aosta (AOS), f) Haute-Provence (OHP), g) Rome (ROM), h) Thessaloniki, i) Izaña (IZA), j) Saint-Denis (OPA), k) Melbourne (MEL) and l) Palmer (PAL). Red diamond denotes snow free surface, blue star snow cover and black circle cloudfree.



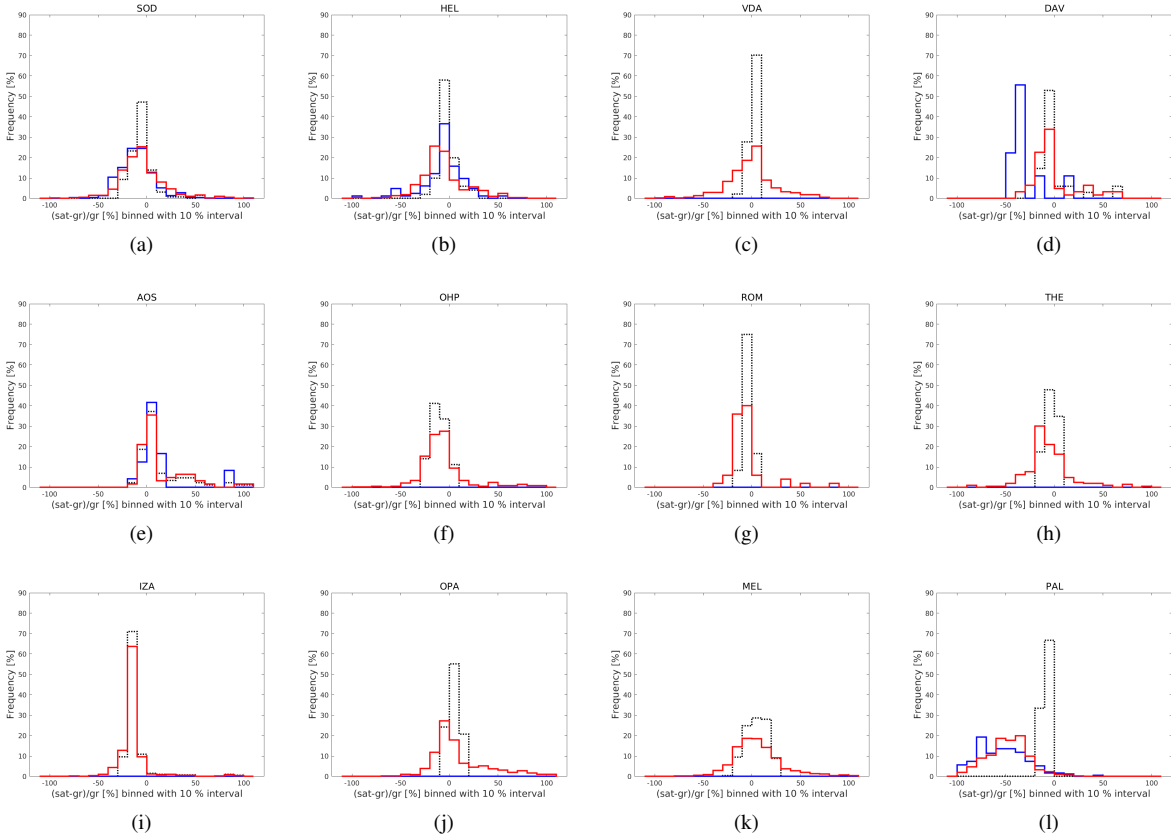
**Figure S2.** TROPOMI overpass Irradiance at 310 nm and spectroradiometer measurements at a) Sodankylä (SOD), b) Helsinki (HEL), c) Villeneuve-d'Ascq (VDA), d) Davos (DAV), e) Aosta (AOS), f) Haute-Provence (OHP), g) Rome (ROM), h) Thessaloniki, i) Izaña (IZA), j) Saint-Denis (OPA), k) Melbourne (MEL) and l) Palmer (PAL). Red diamond denotes snow free surface, blue star snow cover and black circle cloudfree.



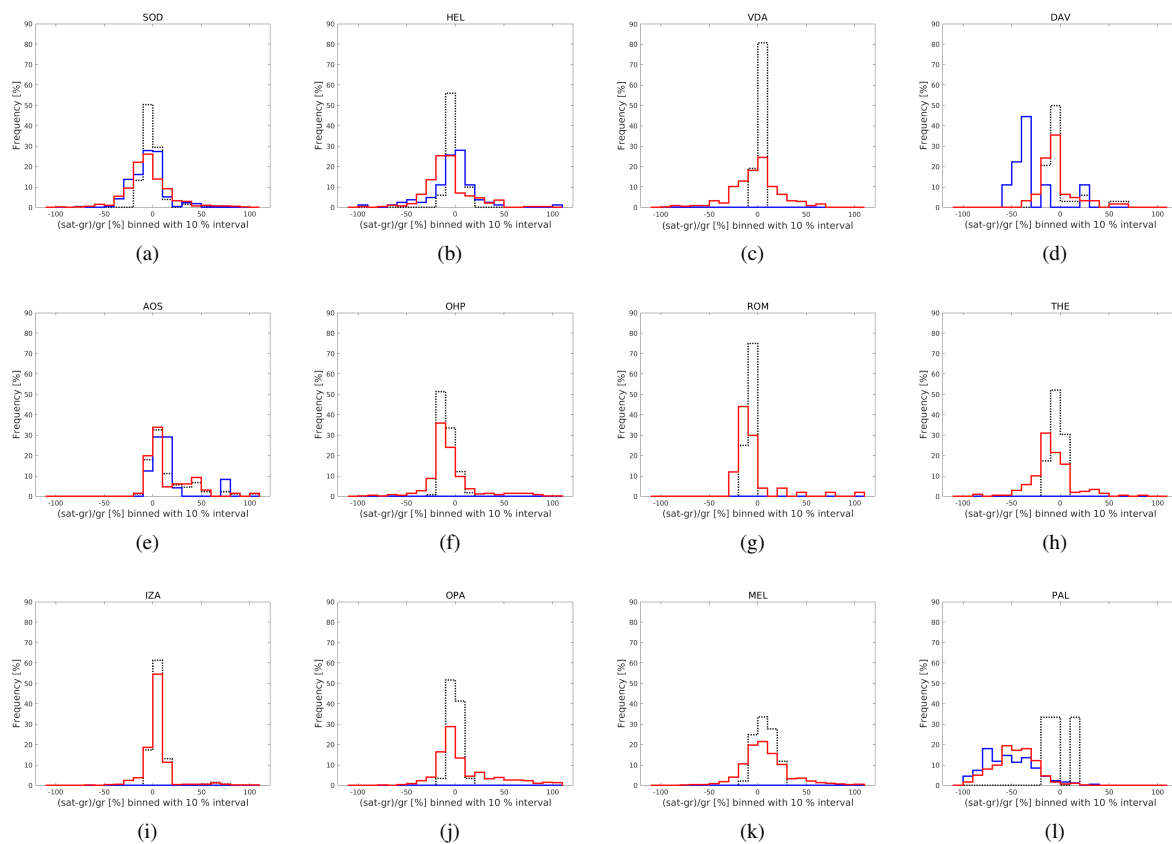
**Figure S3.** TROPOMI overpass Irradiance at 324 nm and spectroradiometer measurements at a) Sodankylä (SOD), b) Helsinki (HEL), c) Villeneuve-d'Ascq (VDA), d) Davos (DAV), e) Aosta (AOS), f) Haute-Provence (OHP), g) Rome (ROM), h) Thessaloniki, i) Izanña (IZA), j) Saint-Denis (OPA), k) Melbourne (MEL) and l) Palmer (PAL). Red diamond denotes snow free surface, blue star snow cover and black circle cloudfree.



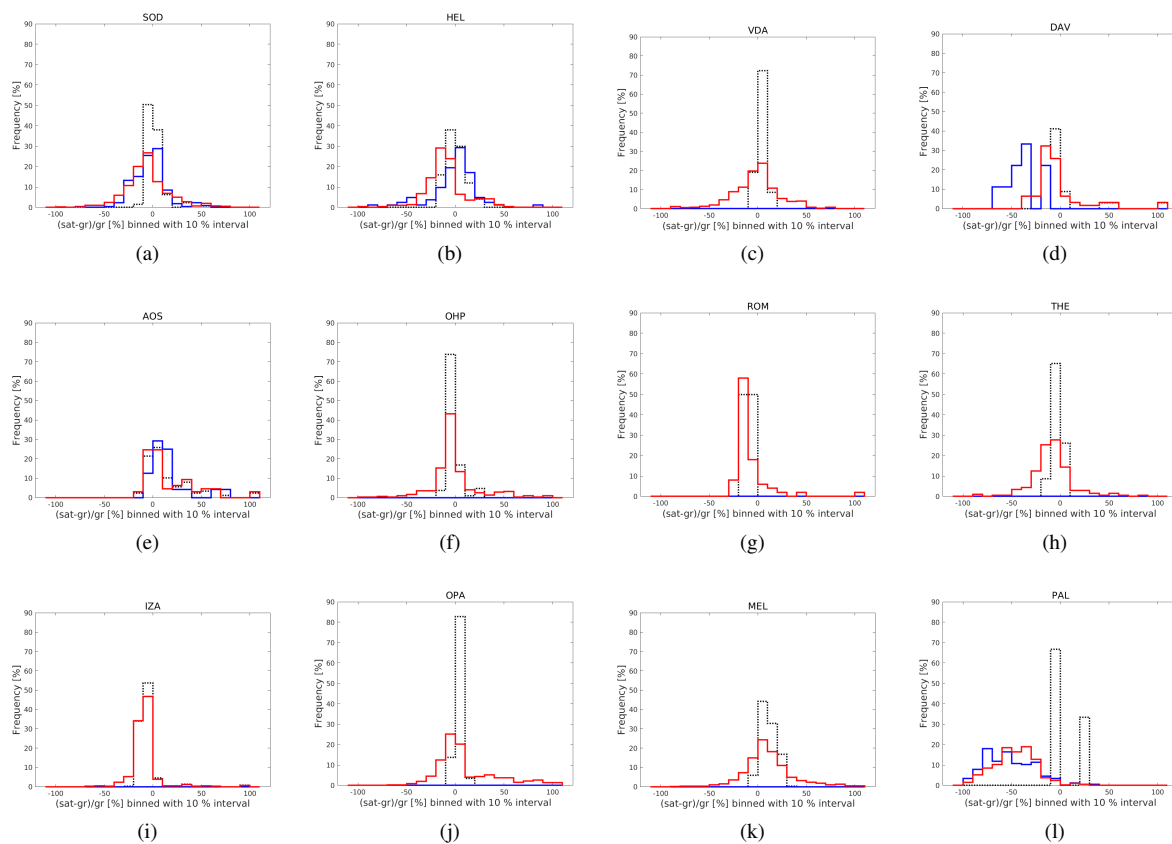
**Figure S4.** TROPOMI overpass Irradiance at 380 nm and spectroradiometer measurements at a) Villeneuve-d’Ascq (VDA), b) Davos (DAV), c) Aosta (AOS) d)Haute-Provence (OHP), e) Saint-Denis (OPA), f) Melbourne (MEL) and g) PALMER (PAL). Red diamond denotes snow free surface, blue star snow cover and black circle cloudfree.



**Figure S5.** Histograms of relative difference between TROPOMI overpass irradiance at 305 nm and spectroradiometer measurement at a) Sodankylä (SOD), b) Helsinki (HEL), c) Villeneuve-d'Ascq (VDA), d) Davos (DAV), e) Aosta (AOS), f) Haute-Provence (OHP), g) Rome (ROM), h) Thessaloniki, i) Izanña (IZA), j) Saint-Denis (OPA), k) Melbourne (MEL) and l) Palmer (PAL). Black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.

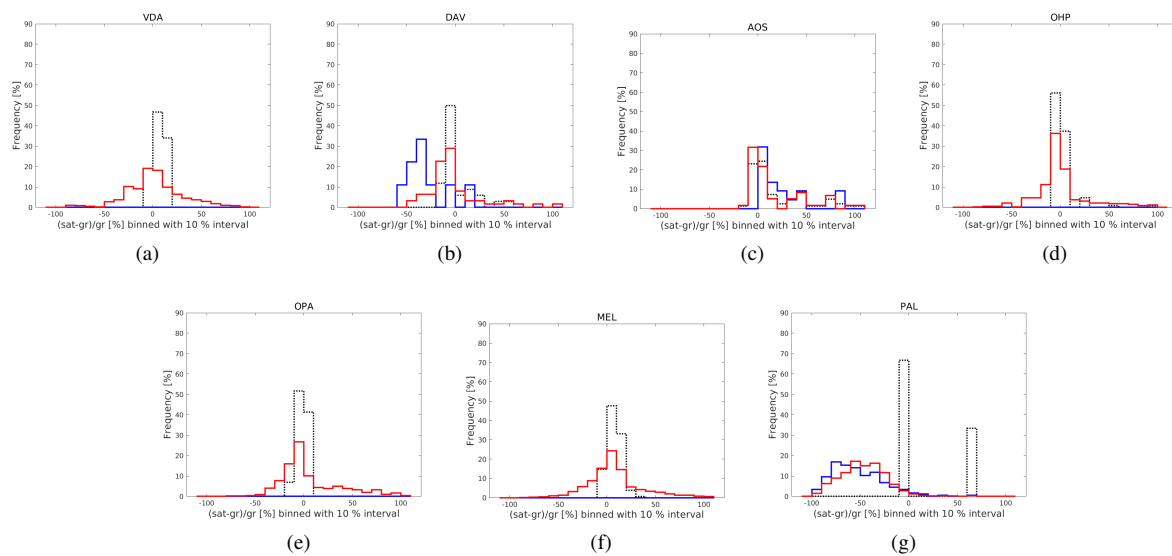


**Figure S6.** Histograms of relative difference between TROPOMI overpass irradiance at 310 nm and spectroradiometer measurement at a) Sodankylä (SOD), b) Helsinki (HEL), c) Villeneuve-d'Ascq (VDA), d) Davos (DAV), e) Aosta (AOS), f) Haute-Provence (OHP), g) Rome (ROM), h) Thessaloniki, i) Izanña (IZA), j) Saint-Denis (OPA), k) Melbourne (MEL) and l) Palmer (PAL). Black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.



**Figure S7.** Histograms of relative difference between TROPOMI overpass irradiance at 324 nm and spectroradiometer measurement at a) Sodankylä (SOD), b) Helsinki (HEL), c) Villeneuve-d'Ascq (VDA), d) Davos (DAV), e) Aosta (AOS), f) Haute-Provence (OHP), g) Rome (ROM), h) Thessaloniki, i) Izanña (IZA), j) Saint-Denis (OPA), k) Melbourne (MEL) and l) Palmer (PAL). Black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.





**Figure S8.** Histograms of relative difference between TROPOMI overpass irradiance at 380 nm and spectroradiometer measurement at a) Villeneuve-d' Ascq (VDA), b) Davos (DAV), c) Aosta (AOS) d) Haute-Provence (OHP), e) Saint-Denis (OPA), f) Melbourne (MEL) and g) PALMER (PAL). Black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.

**Table S1.** TROPOMI overpass irradiances at 305 nm compared to ground based measurements. The percentage relative differences  $100\% \cdot (\text{TROPOMI} - \text{ground}) / \text{ground}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree, SCAS= Snow cover at ground, all sky, SFAS= Snow free ground, all sky.

Station	Conditions	N	median [%]	p25 [%]	p75 [%]	$W_{10}$	$W_{20}$
SOD	CF	129	-4.66	-14.70	-1.26	61.24	87.60
SOD	SCAS	212	-11.38	-21.97	-0.85	37.26	66.98
SOD	SFAS	403	-7.11	-18.28	4.85	37.72	66.00
HEL	CF	50	-2.51	-7.06	2.74	78.00	94.00
HEL	SCAS	82	-4.29	-14.68	6.94	52.44	74.39
HEL	SFAS	281	-9.56	-19.35	2.68	32.03	61.92
VDA	CF	47	1.54	-0.80	5.28	97.87	100.00
VDA	SFAS	370	-0.10	-13.96	9.32	44.32	67.03
DBR	CF	41	-10.94	-15.71	23.47	12.20	58.54
DBR	SCAS	80	-49.89	-65.52	-15.84	1.25	16.25
DBR	SFAS	34	-7.46	-14.22	19.00	20.59	64.71
DAV	CF	34	-5.21	-8.59	13.68	58.82	79.41
DAV	SCAS	9	-38.33	-39.52	-27.39	0.00	22.22
DAV	SFAS	62	-6.26	-12.10	23.25	38.71	62.90
AOS	CF	86	8.23	1.93	42.93	55.81	65.12
AOS	SCAS	24	8.92	5.14	49.21	54.17	75.00
AOS	SFAS	62	5.70	1.15	42.93	56.45	61.29
OHP	CF	107	-11.58	-17.93	-3.52	44.86	85.98
OHP	SFAS	320	-9.88	-19.44	-0.57	36.88	66.25
ROM	CF	12	-6.46	-8.59	-2.73	91.67	100.00
ROM	SFAS	50	-9.11	-14.92	-3.60	46.00	82.00
THE	CF	23	-3.82	-8.61	0.75	82.61	100.00
THE	SFAS	209	-8.97	-17.12	2.34	37.32	72.25
IZA	CF	398	-14.66	-17.18	-11.43	12.31	84.42
IZA	SFAS	477	-15.34	-18.74	-12.02	10.90	75.47
OPA	CF	29	2.59	-0.06	9.43	79.31	100.00
OPA	SFAS	464	1.60	-7.07	31.01	45.04	63.36
MEL	CF	286	5.65	-3.90	14.49	53.50	90.91
MEL	SFAS	2194	3.16	-10.17	18.77	37.06	65.86
PAL	CF	3	-6.55	-12.17	-2.49	66.67	100.00
PAL	SCAS	177	-55.97	-74.44	-35.28	3.39	9.60
PAL	SFAS	401	-46.10	-60.96	-33.83	3.24	7.23

**Table S2.** TROPOMI overpass irradiances at 310 nm compared to ground based measurements. The percentage relative differences  $100\% \cdot (\text{TROPOMI} - \text{ground}) / \text{ground}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree, SCAS= Snow cover at ground, all sky, SFAS= Snow free ground, all sky.

Station	Conditions	N	median [%]	p25 [%]	p75 [%]	$W_{10}$	$W_{20}$
SOD	CF	129	-2.52	-6.70	2.15	79.84	96.90
SOD	SCAS	212	-4.18	-15.40	4.03	55.19	76.42
SOD	SFAS	403	-6.67	-15.97	6.25	39.95	71.22
HEL	CF	50	-2.44	-6.57	3.42	84.00	100.00
HEL	SCAS	82	-0.45	-10.57	6.18	53.66	75.61
HEL	SFAS	281	-9.93	-19.41	0.10	32.38	63.35
VDA	CF	47	3.16	0.55	4.74	100.00	100.00
VDA	SFAS	370	-0.05	-15.62	10.20	42.70	65.95
DBR	CF	41	-10.28	-15.32	24.67	12.20	60.98
DBR	SCAS	80	-52.11	-64.25	-15.33	5.00	21.25
DBR	SFAS	34	-10.32	-16.28	35.54	11.76	58.82
DAV	CF	34	-7.09	-9.61	12.93	52.94	76.47
DAV	SCAS	9	-38.45	-40.79	-29.40	0.00	11.11
DAV	SFAS	62	-7.50	-11.79	10.00	41.94	70.97
AOS	CF	89	7.89	1.57	41.83	50.56	62.92
AOS	SCAS	24	11.27	4.68	47.16	41.67	70.83
AOS	SFAS	65	7.50	1.27	41.83	53.85	60.00
OHP	CF	107	-11.27	-13.82	-3.53	45.79	99.07
OHP	SFAS	320	-10.47	-16.63	-0.86	33.75	73.44
ROM	CF	12	-9.28	-10.33	-5.32	75.00	100.00
ROM	SFAS	50	-10.98	-14.16	-5.60	34.00	78.00
THE	CF	23	-3.08	-8.40	0.47	82.61	100.00
THE	SFAS	209	-10.19	-16.71	0.55	37.32	70.33
IZA	CF	398	4.65	1.66	9.10	78.64	91.71
IZA	SFAS	477	3.91	-0.23	8.49	73.17	88.26
OPA	CF	29	-0.40	-2.19	4.02	93.10	100.00
OPA	SFAS	464	-1.29	-9.62	25.86	42.24	63.15
MEL	CF	286	7.13	-0.40	15.33	58.39	88.11
MEL	SFAS	2194	5.36	-6.45	19.72	41.20	67.37
PAL	CF	3	-6.84	-10.30	7.47	33.33	100.00
PAL	SCAS	177	-56.21	-72.86	-34.31	3.95	9.60
PAL	SFAS	401	-45.46	-59.96	-31.88	2.49	8.23

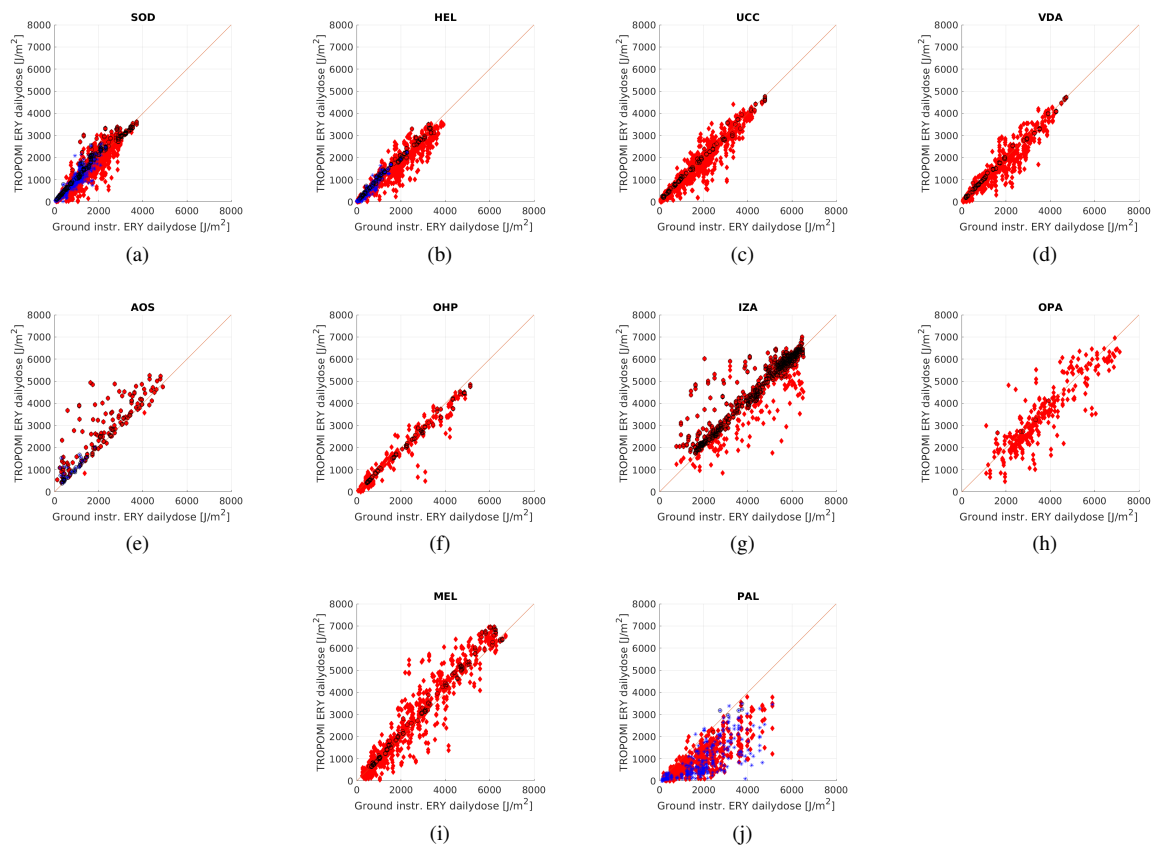
**Table S3.** TROPOMI overpass irradiances at 324 nm compared to ground based measurements. The percentage relative differences  $100\% \cdot (\text{TROPOMI} - \text{ground}) / \text{ground}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree, SCAS= Snow cover at ground, all sky, SFAS= Snow free ground, all sky.

Station	Conditions	N	median [%]	p25 [%]	p75 [%]	$W_{10}$	$W_{20}$
SOD	CF	129	-0.24	-5.49	3.37	88.37	96.12
SOD	SCAS	212	-1.52	-14.67	4.00	54.25	77.83
SOD	SFAS	403	-7.08	-18.08	5.14	39.45	66.50
HEL	CF	50	-0.83	-6.78	4.62	68.00	96.00
HEL	SCAS	82	1.13	-9.62	11.10	48.78	75.61
HEL	SFAS	281	-11.61	-20.51	-2.45	30.25	62.99
VDA	CF	47	5.42	1.17	8.19	91.49	100.00
VDA	SFAS	370	-0.39	-14.41	11.35	43.51	65.68
DBR	CF	41	-8.17	-16.00	16.50	26.83	68.29
DBR	SCAS	80	-52.02	-63.98	-17.27	7.50	23.75
DBR	SFAS	34	-2.24	-14.11	25.33	23.53	61.76
DAV	CF	34	-8.15	-11.47	3.75	50.00	82.35
DAV	SCAS	9	-39.44	-48.48	-32.27	0.00	22.22
DAV	SFAS	62	-9.42	-15.87	8.00	32.26	67.74
AOS	CF	89	10.11	0.32	43.30	47.19	59.55
AOS	SCAS	24	12.60	4.95	48.12	41.67	66.67
AOS	SFAS	65	9.31	-0.71	43.30	49.23	56.92
OHP	CF	107	-2.52	-6.75	-0.06	90.65	95.33
OHP	SFAS	320	-4.60	-10.40	2.26	56.56	75.94
ROM	CF	12	-10.55	-12.30	-8.11	50.00	100.00
ROM	SFAS	50	-12.14	-15.98	-6.28	24.00	86.00
THE	CF	23	-2.82	-7.52	0.29	91.30	100.00
THE	SFAS	209	-9.23	-18.58	-0.47	42.11	70.33
IZA	CF	398	-7.80	-11.13	-3.81	58.29	92.46
IZA	SFAS	477	-8.86	-12.96	-4.43	50.52	85.12
OPA	CF	29	3.83	1.39	5.82	96.55	100.00
OPA	SFAS	464	1.38	-7.80	30.94	45.47	62.07
MEL	CF	287	9.92	5.07	16.75	50.17	82.93
MEL	SFAS	2201	8.36	-2.61	22.35	39.25	64.61
PAL	CF	3	-5.48	-8.70	19.30	66.67	66.67
PAL	SCAS	177	-57.11	-72.83	-34.09	3.39	9.04
PAL	SFAS	401	-45.98	-60.41	-31.55	2.74	7.48

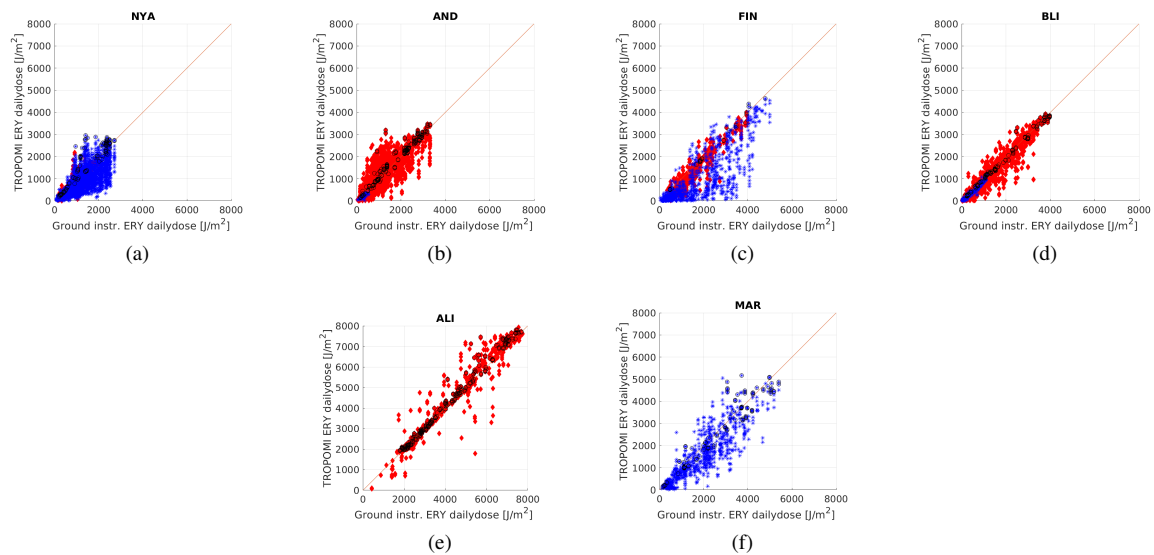
**Table S4.** TROPOMI overpass irradiances at 380 nm compared to ground based measurements. The percentage relative differences  $100\% \cdot (\text{TROPOMI} - \text{ground}) / \text{ground}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree, SCAS= Snow cover at ground, all sky, SFAS= Snow free ground, all sky.

Station	Conditions	N	median [%]	p25 [%]	p75 [%]	$W_{10}$	$W_{20}$
VDA	CF	47	8.43	2.78	11.91	65.96	100.00
VDA	SFAS	370	1.06	-15.28	18.22	37.30	56.49
DAV	CF	34	-5.73	-9.23	14.41	55.88	76.47
DAV	SCAS	9	-36.18	-48.15	-21.42	11.11	22.22
DAV	SFAS	62	-7.35	-16.11	7.33	37.10	62.90
AOS	CF	82	10.22	0.27	70.12	47.56	56.10
AOS	SCAS	22	21.01	7.71	83.07	31.82	45.45
AOS	SFAS	60	4.24	-1.56	60.30	53.33	60.00
OHP	CF	107	-0.36	-5.16	2.52	93.46	93.46
OHP	SFAS	320	-2.86	-9.88	6.09	55.00	70.00
OPA	CF	29	-0.44	-2.93	1.74	93.10	100.00
OPA	SFAS	464	-2.48	-12.31	32.05	36.85	57.11
MEL	CF	286	7.31	2.23	13.06	62.24	95.45
MEL	SFAS	2190	5.24	-6.58	19.84	39.59	63.06
PAL	CF	3	-0.47	-3.52	48.59	66.67	66.67
PAL	SCAS	177	-58.80	-73.61	-34.67	5.08	10.73
PAL	SFAS	401	-46.40	-63.31	-31.63	3.99	10.47

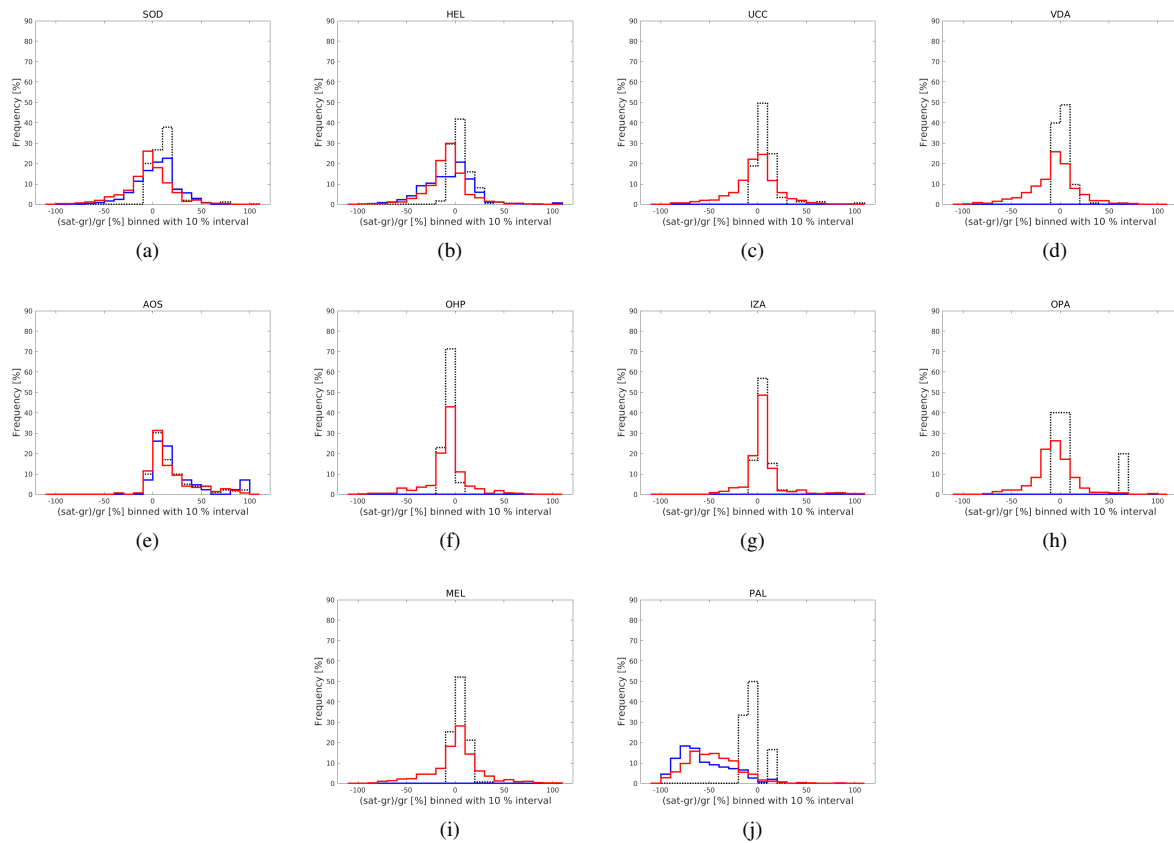
## 2 Erythemally weighted daily dose



**Figure S9.** TROPOMI erythemally weighted daily doses and spectroradiometer measurements at a) Sodankylä, b) Helsinki, c) Uccle, d) Villeneuve d'Ascq, e) Aosta, f) Haute-Provence, g) Izaña, h) Saint-Denis, i) Melbourne and j) Palmer. Red diamond denotes snow free surface, blue star snow cover and black circle cloudfree.

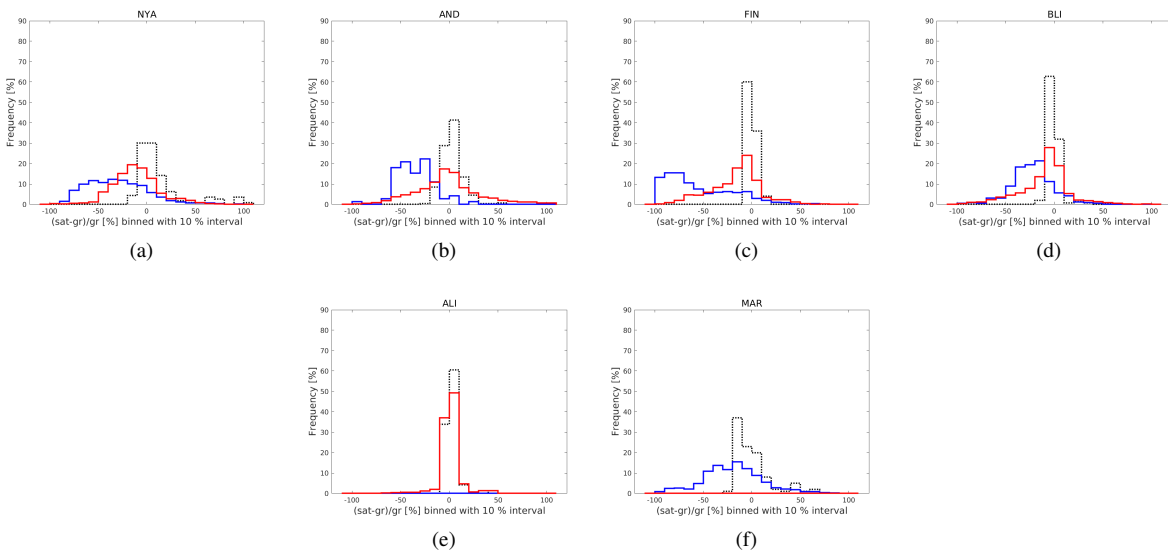


**Figure S10.** TROPOMI erythemally weighted daily doses and broadband/multichannel radiometer measurements at a) Ny-Ålesund, b) Andøya, c) Finse, d) Blindern, e) Alice Springs and f) Marambio. Red diamond denotes snow free surface, blue star snow cover and black circle cloudfree.



**Figure S11.** Histograms of relative difference between TROPOMI erythemally weighted daily doses and spectroradiometer measurements at a) Sodankylä, b) Helsinki, c) Uccle, d) Villeneuve d'Ascq, e) Aosta, f) Haute-Provence, g) Izaña, h) Saint-Denis, i) Melbourne and j) Palmer. Black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.



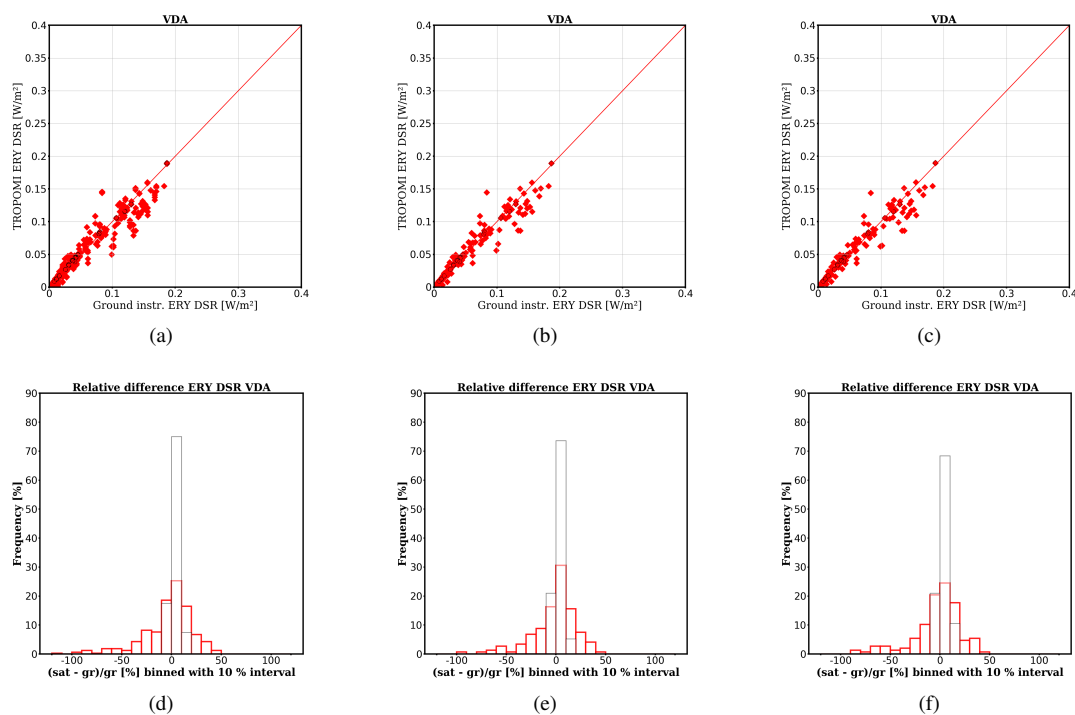


**Figure S12.** Histograms of relative difference between TROPOMI erythemally weighted daily doses and broadband/multichannel radiometer measurements at a) Ny-Ålesund, b) Andøya, c) Finse, d) Blindern, e) Alice Springs and f) Marambio. Black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.

**Table S5.** Erythemally weighted daily doses compared to ground based measurements. The percentage relative differences  $100\% \cdot (\text{TROPOMI-ground})/\text{ground}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree, SCAS= Snow cover at ground, all sky, SFAS= Snow free ground, all sky.

Station	Conditions	N	median [%]	p25 [%]	p75 [%]	$W_{10}$	$W_{20}$
NYA	CF	113	5.77	-4.21	17.37	60.18	78.76
NYA	SCAS	3421	-32.97	-54.40	-10.30	15.08	28.73
NYA	SFAS	840	-12.17	-26.07	2.15	30.60	55.60
AND	CF	261	1.80	-2.42	7.63	70.11	91.95
AND	SCAS	72	-36.19	-48.19	-23.45	6.94	18.06
AND	SFAS	2787	-1.91	-20.55	16.67	32.97	52.03
SOD	CF	348	10.71	2.85	16.30	46.84	84.77
SOD	SCAS	656	6.08	-8.23	16.00	37.35	71.19
SOD	SFAS	1302	-3.37	-15.92	7.77	44.09	68.28
FIN	CF	25	-0.99	-3.47	3.28	96.00	100.00
FIN	SCAS	1095	-65.52	-82.22	-27.11	9.13	16.99
FIN	SFAS	448	-11.72	-32.87	-1.71	35.94	57.14
HEL	CF	182	5.96	-1.81	10.60	71.43	89.01
HEL	SCAS	425	-4.43	-23.88	9.40	34.35	60.47
HEL	SFAS	1192	-7.43	-17.22	1.09	45.22	71.48
BLI	CF	153	-2.33	-5.47	1.91	94.77	97.39
BLI	SCAS	355	-22.25	-35.68	-10.58	16.90	42.54
BLI	SFAS	1341	-5.56	-21.88	2.86	46.91	65.92
UCC	CF	149	5.99	1.58	13.45	68.46	93.29
UCC	SFAS	1181	-0.21	-12.61	9.89	46.66	70.03
VDA	CF	133	1.73	-1.36	4.66	88.72	98.50
VDA	SFAS	986	-3.44	-18.76	4.70	45.74	66.13
AOS	CF	182	14.88	5.36	43.99	40.11	57.14
AOS	SCAS	42	14.19	8.00	43.99	33.33	57.14
AOS	SFAS	147	14.52	3.34	43.19	42.86	57.82
OHP	CF	122	-6.97	-9.86	-3.61	77.05	100.00
OHP	SFAS	389	-7.16	-12.24	-1.33	53.98	78.41
IZA	CF	693	4.82	1.27	10.42	73.59	88.74
IZA	SFAS	846	3.25	-0.72	9.28	67.49	83.81
OPA	CF	43	4.25	1.22	8.09	83.72	97.67
OPA	SFAS	571	-2.95	-13.69	5.10	51.84	76.53
ALI	CF	286	1.29	-0.74	5.14	94.41	98.60
ALI	SFAS	898	0.74	-2.03	5.00	86.30	92.98
MEL	CF	142	4.35	-0.42	9.35	77.46	98.59
MEL	SFAS	1074	2.98	-8.50	11.99	46.37	68.25
MAR	CF	100	-6.27	-13.66	3.70	43.00	88.00
MAR	SCAS	879	-19.20	-38.42	-2.19	20.93	41.87
PAL	CF	6	-8.16	-11.31	-4.45	50.00	100.00
PAL	SCAS	261	-61.57	-76.66	-34.47	3.45	11.88
PAL	SFAS	584	-48.90	-65.38	-30.55	6.16	12.67

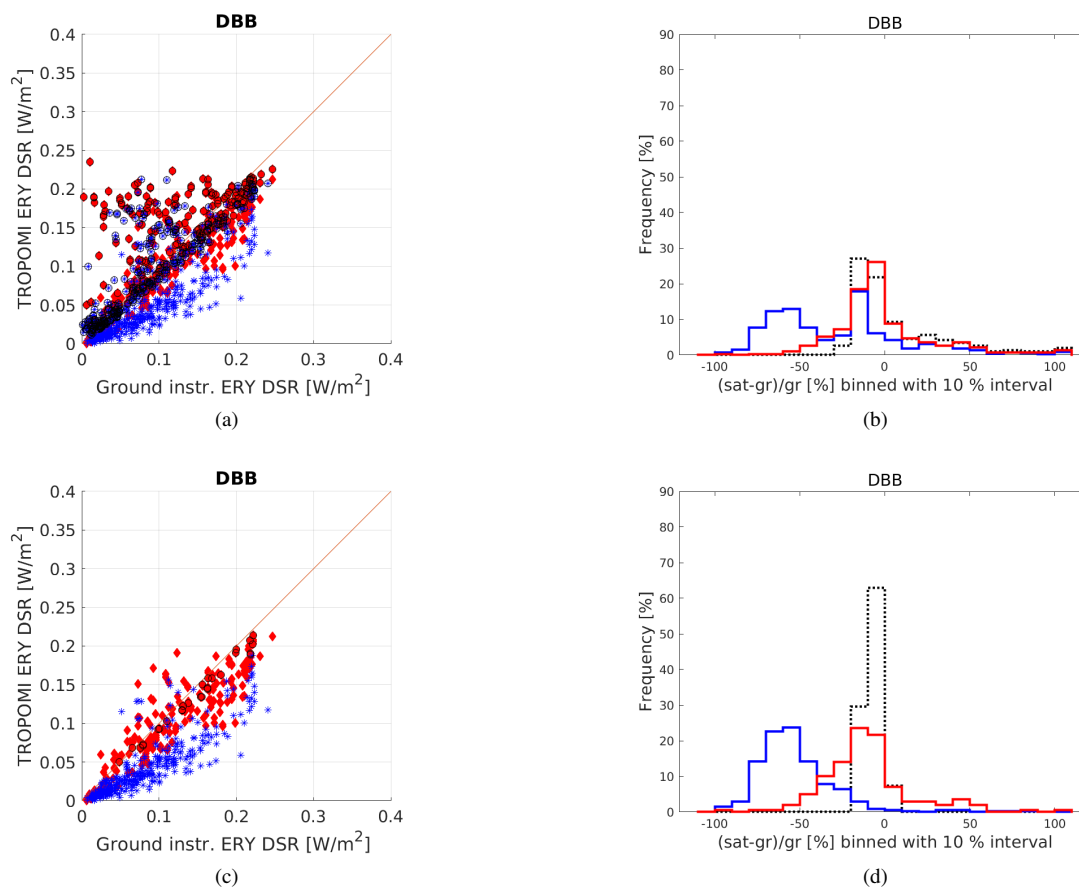
### 3 Pixel test



**Figure S13.** Erythemally weighted dose rates measured by the spectroradiometer (gr) and retrieved by TROPOMI (sat). A and d) each TROPOMI pixel was treated as individual measurement, b and e) the average of the TROPOMI pixels fulfilling the chosen limitations (time difference, SZA, altitude, distance) was used, and c) and f) the pixel nearest of the site was chosen. In scatter plots, black circle denotes cloudfree. In histograms, black dotted line denotes cloudfree.

**Table S6.** The statistics of the pixel test. TROPOMI overpass erythemally weighted dose rates compared to spectroradiometer measurements. The percentage relative differences  $100\% \cdot (\text{sat} - \text{gr}) / \text{gr}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree and SFAS=Snow free ground, all sky.

Station	Conditions	N	median [%]	p25 [%]	p75 [%]	$W_{10}$	$W_{20}$
VDA all pixel	CF	40	6.65	3.60	7.83	87.50	100.00
VDA all pixel	SFAS	337	1.63	-13.17	14.14	41.84	64.39
VDA average of pixels	CF	19	6.68	1.60	8.23	84.21	100.00
VDA average of pixels	SFAS	151	2.12	-10.85	12.56	42.38	67.55
VDA nearest pixel	CF	19	6.62	2.03	7.83	84.21	100.00
VDA nearest pixel	SFAS	151	1.20	-10.70	13.78	42.38	68.21



**Figure S14.** Erythemally weighted UV dose rates calculated from the average of broadband measurements (DBB, ground) and from the TROPOMI retrievals (sat) at Davos. TROPOMI data from pixels within 5 km from the site have been used. A) and b) all TROPOMI data are used, c) and d) TROPOMI data which UVQAV value is less than 0.5 have been excluded. In scatter plots, red diamond denotes snow free surface, blue star snow cover and black circle cloudfree. In histograms, black dotted line denotes cloudfree, red snow free surface and blue snow cover on the ground.

**Table S7.** The statistics of the UV quality flag test for Davos broadband data. Erythemally weighted UV dose rates calculated from the average of broadband measurements (DBB) and from the TROPOMI retrievals at Davos. TROPOMI data from pixels within 5 km from the site have been used. A) all TROPOMI data are used, B) TROPOMI data which UVQAV value is less than 0.5 have been excluded. The percentage relative differences  $100\% \cdot (\text{sat-gr})/\text{gr}$ , their medians (median) and 25th (p25) and 75th (p75) percentiles were calculated. N is the number of measurement days included in the study.  $W_{10}$  and  $W_{20}$  are percentage of satellite data which are within 10% and 20% from ground measurements. CF=Cloudfree, SCAS= Snow cover at ground, all sky, SFAS= Snow free ground, all sky.

<b>Station</b>	<b>Conditions</b>	<b>N</b>	<b>median [%]</b>	<b>p25 [%]</b>	<b>p75 [%]</b>	<b>W<sub>10</sub></b>	<b>W<sub>20</sub></b>
A) DBB	CF	503	-1.96	-10.98	39.56	31.21	62.82
A) DBB	SCAS	637	-24.02	-58.23	-4.30	10.36	30.14
A) DBB	SFAS	384	-5.70	-13.85	19.92	34.90	58.07
B) DBB	CF	27	-8.39	-10.04	-4.22	70.37	100.00
B) DBB	SCAS	346	-56.44	-67.39	-44.46	1.45	4.62
B) DBB	SFAS	199	-12.89	-23.66	-3.84	28.64	55.28