

GOMOS ozone profile

GBMCD-subgroup

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- Contributing stations and GBMCD instruments
- Collocations with GOMOS
- GOMOS ozone profiles (in daylight, twilight, & dark)
 - profiles
 - statistics vs definitions
- Validation results:
 - influence of Star Temperature
 - influence of Star Visual Magnitude
 - influence of Geo-location (latitude region)
 - influence of GBMCD instrument
 - influence of Collocation criteria
- Conclusions of GBMCD assessment

Location	Latitude	Longitude	Instrument	Profiles	AO-id	Instrument PI-name	Institute
Ny-Ålesund (P)	78.92	11.93	Lidar	115	331	P. von der Gathen	AWI
Ny-Ålesund (P)	78.92	11.93	Sonde	74	331	P. von der Gathen	AWI
Thule (P)	76.53	-68.74	Sonde	26	158	S. Andersen	DMI
Scoresbysund (C)	70.48	-21.97	Sonde	34	158	S. Andersen	DMI
Alomar (C)	69.30	16.00	Lidar	54	9079	G. Hansen	NILU
Kiruna (C)	67.84	20.41	Microwave	103	191	U. Raffalski	IRF
Sodankylä (C,W)	67.37	26.63	Sonde	78	429	E. Kyrö	FMI
Keflavik	64.00	-22.00	Sonde	25	191	M. Gil	INTA
Orland	63.40	9.20	Sonde	19	158	A. Vik	NILU
Yakutsk (C)	62.02	129.63	Sonde	4	158	V. Dorokhov	CAO
Jokioinen (W)	60.81	23.50	Sonde	27	429	E. Kyrö	FMI
Legionowo (C)	52.40	20.97	Sonde	48	174	B. Kois	IMWM
De Bilt (C,W)	52.10	5.18	Sonde	47	174	M. Allaart	KNMI
Uccle (C,W)	50.80	4.35	Sonde	114	300	D. De Muer	RMIB
Hohenpeissenberg (C,W)	47.80	11.02	Lidar	24	360	H. Claude	DWD
Hohenpeissenberg (C,W)	47.80	11.02	Sonde (BM)	32	360	H. Claude	DWD

Payerne (C,W)	46.82	6.95	Sonde	113	158	R. Stubi	MeteoSwiss
Payerne (C)	46.82	6.95	Microwave	275	158	N. Kaempfer	MeteoSwiss
Obs. Haute Provence (P)	43.94	5.71	Lidar	83	360	S. Godin-Beekmann	CNRS
Toronto (C)	43.66	-79.4	Lidar	5	153	S. Pal	MSC
L'Aquila	42.34	13.33	Sonde	3	206	G. Visconti	UNIVAQ
Table Mountain (C)	34.40	-117.70	Lidar	76	360	I. S. McDermid	JPL
Mauna Loa (P)	19.54	-155.58	Lidar	87	360	I. S. McDermid	JPL
Mauna Loa (P)	19.54	-155.58	Microwave	257	179	A. Parrish	UMass & NIWA
Paramaribo (C,W,S)	5.75	-55.20	Sonde	39	174	M. Allaart	KNMI
Lauder (P)	-45.04	169.68	Lidar	64	9003	D. Swart	RIVM & NIWA
Lauder (P)	-45.04	169.68	Microwave	214	179	A. Parrish	UMass & NIWA
Lauder (P)	-45.04	169.68	Sonde	57	179	G. Bodeker	NIWA
Marambio (W)	-64.20	-56.70	Sonde	42	429	E. Kyrö	FMI
Dumont d'Urville (P)	-66.67	140.01	Sonde	27	158	F. Goutail	CNRS
Belgrano	-78.00	-38.00	Sonde	28	191	M. Yela	INTA
(P): NDSC primary station (Network for the Detection of Stratospheric Change) (C): NDSC complementary station (W): WOUDC station (World Ozone and Ultraviolet Radiation Data Center) (S): SHADOZ station (Southern Hemisphere Additional Ozonesondes) (BM): Brewer/Mast ozonesonde type							

GOMOS observation, collocation criteria

Spatial criterion:

☞ <800 km around a ground-based station or balloon launch-site

Temporal criterion:

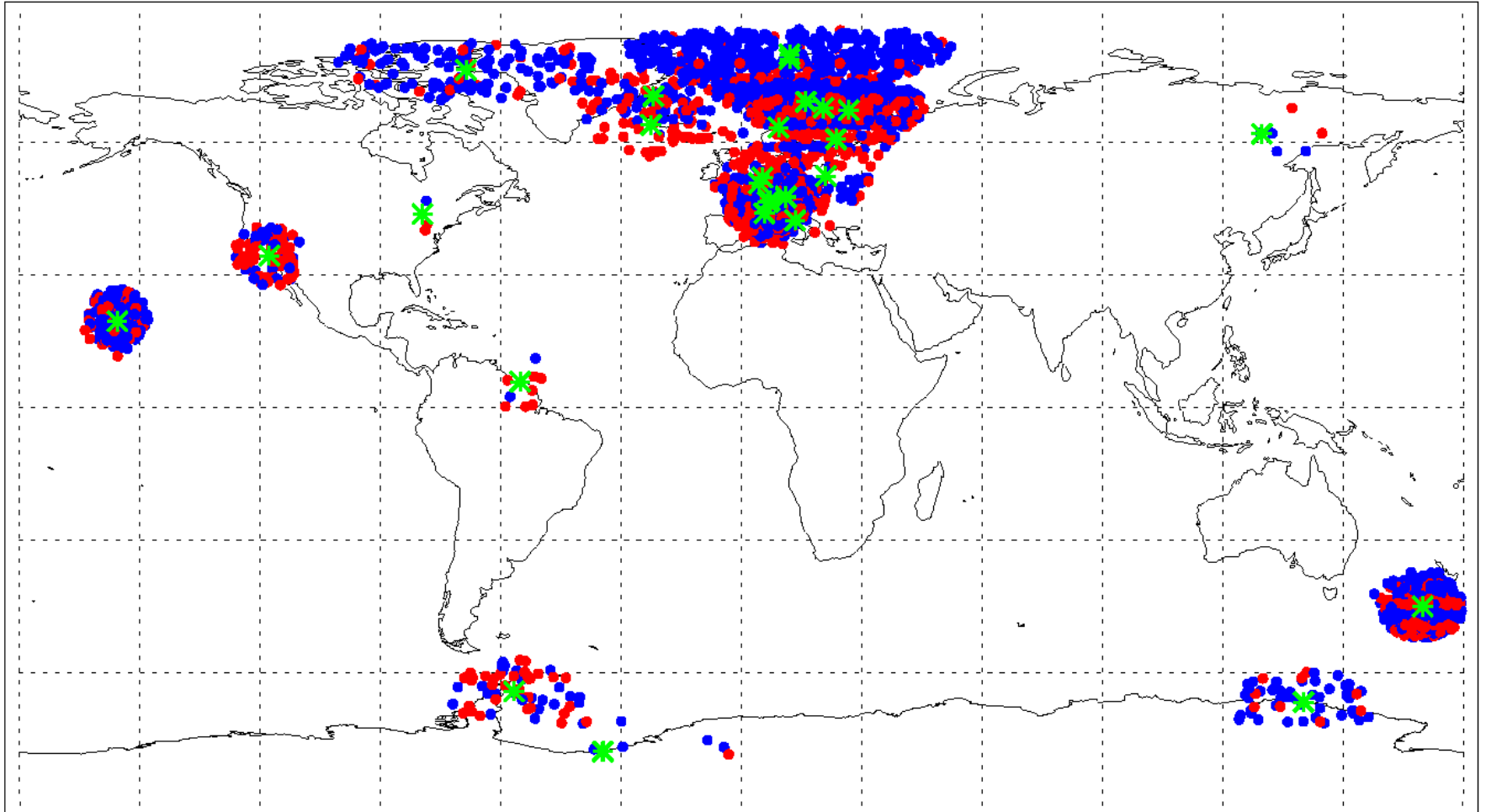
☞ <20 hours, altitudes <50 km
☞ < 4 hours, above this altitude

GOMOS Data Statistics

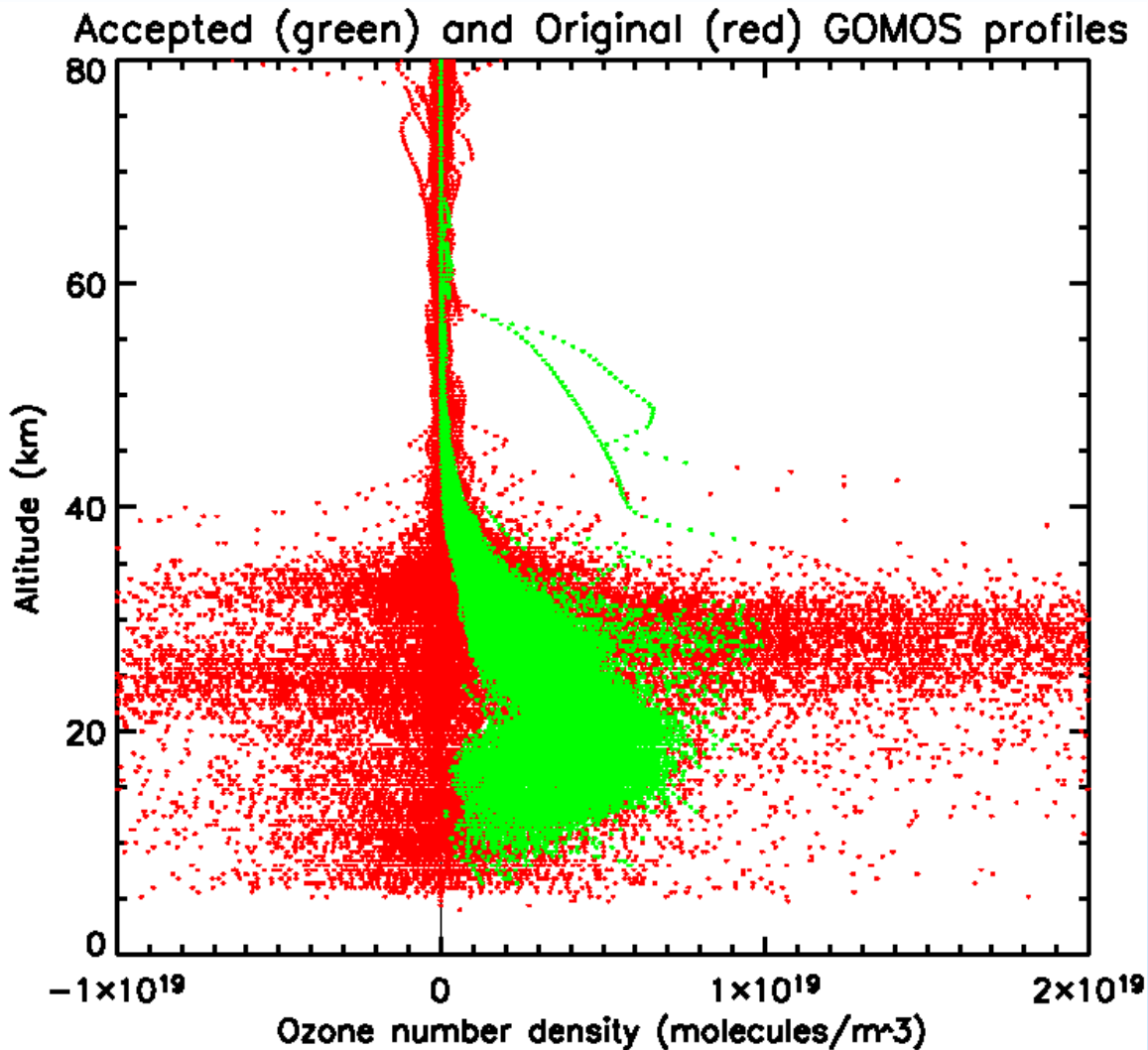
☞ 3713 (!) profile pairs

(Note: 45% of requested data is still unavailable)

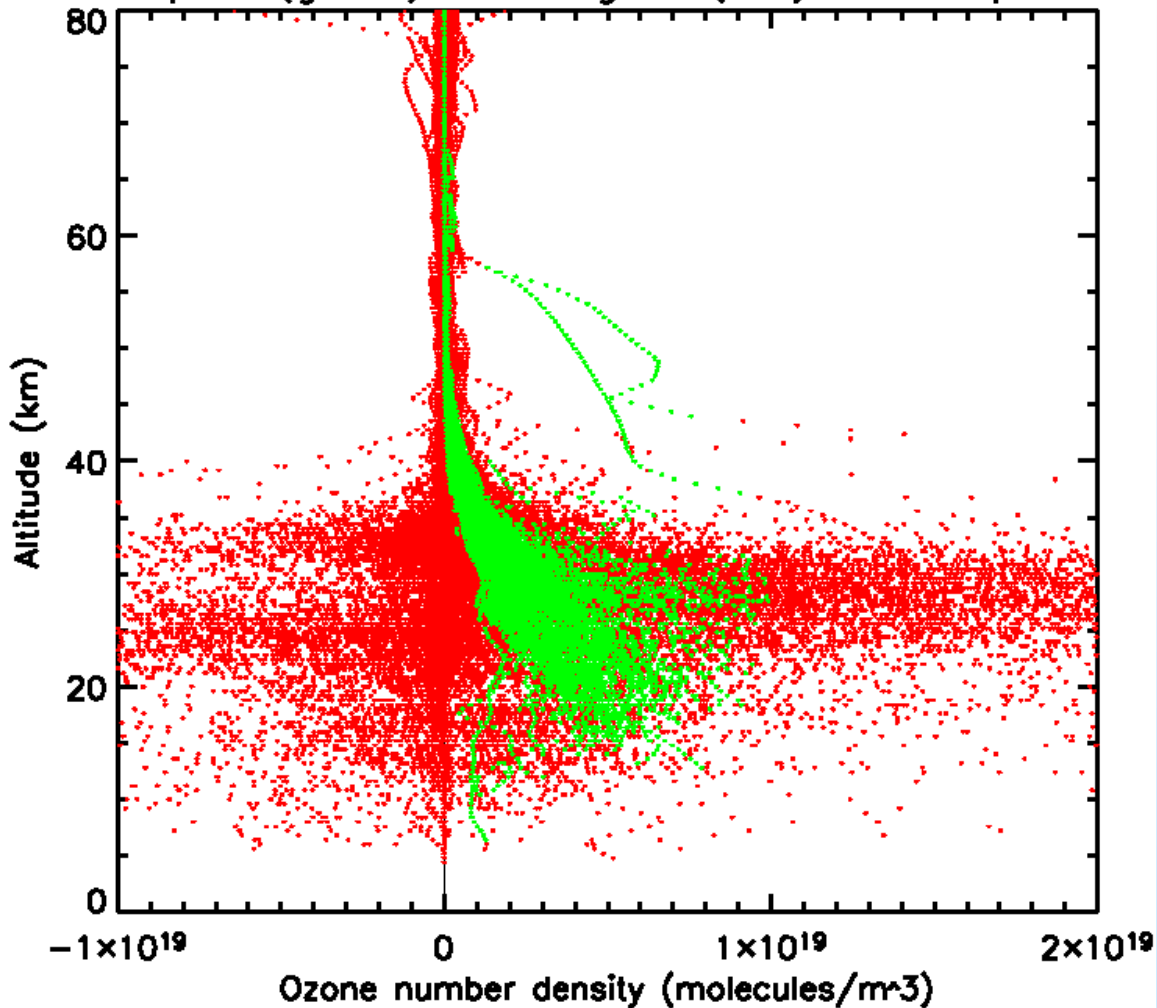
GOMOS collocations used within ACVT-GBMCD analysis (red and blue), and GBMCD stations (green)



ALL
data

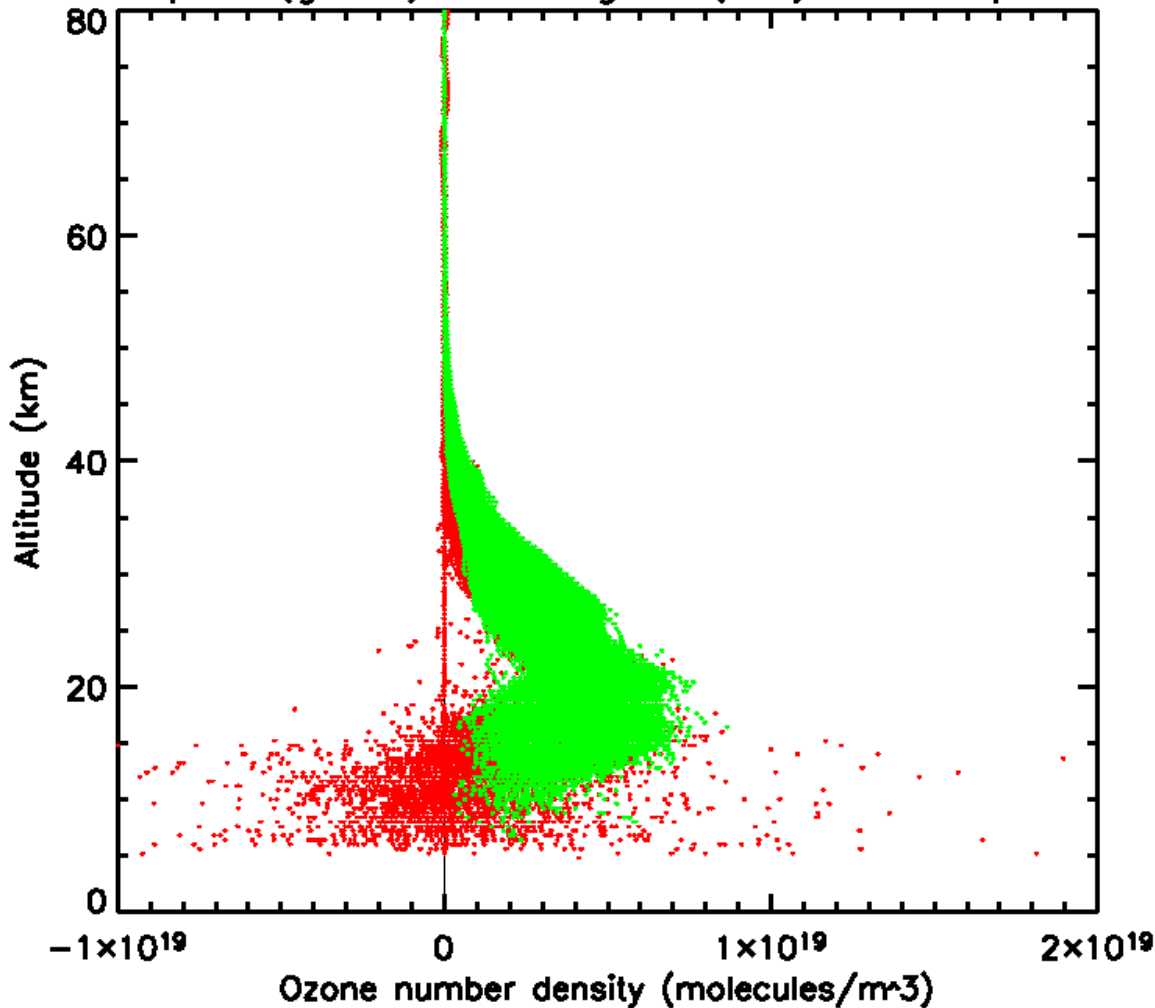


Accepted (green) and Original (red) GOMOS profiles



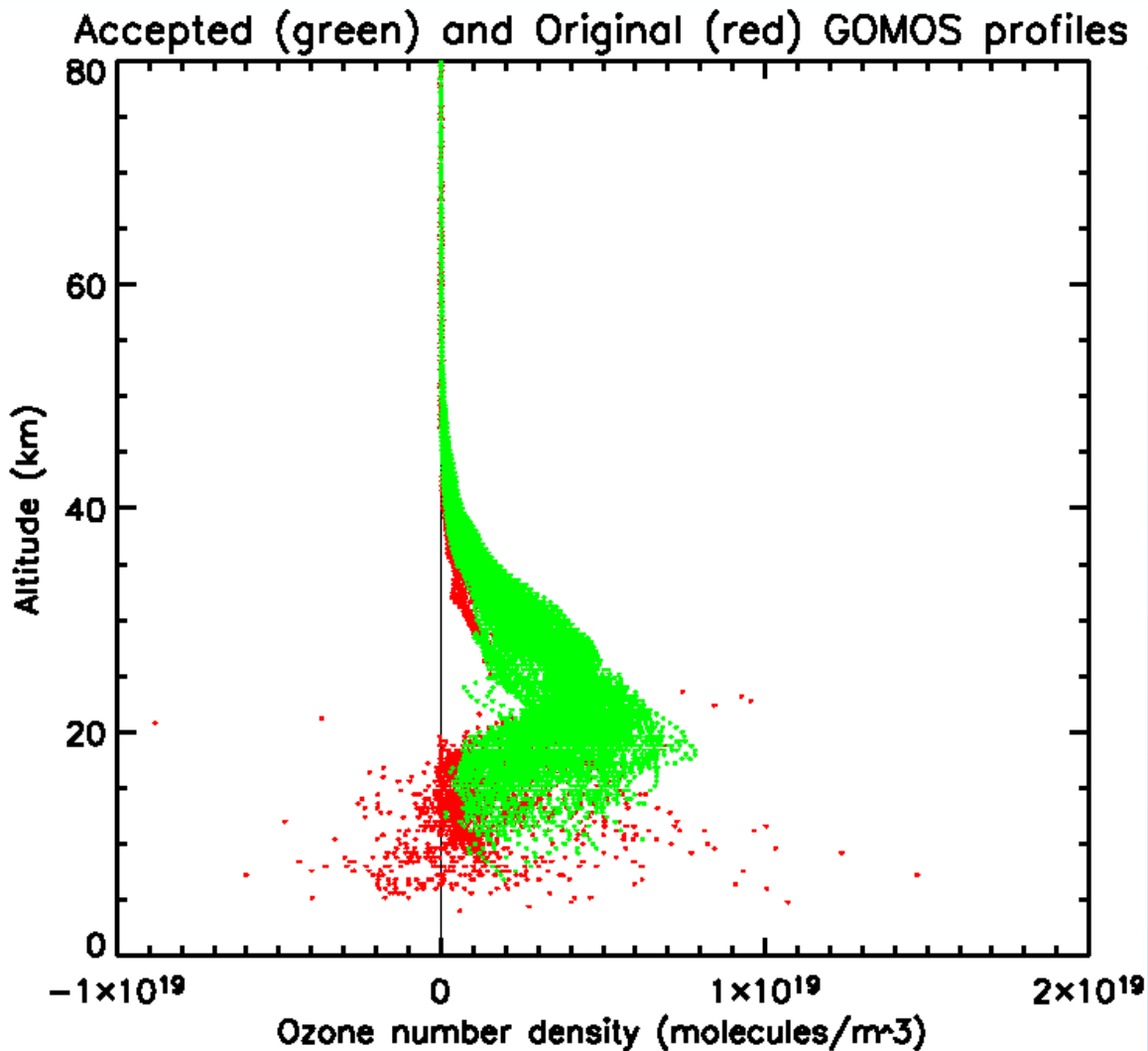
Daylight,
1706
(662)

Accepted (green) and Original (red) GOMOS profiles

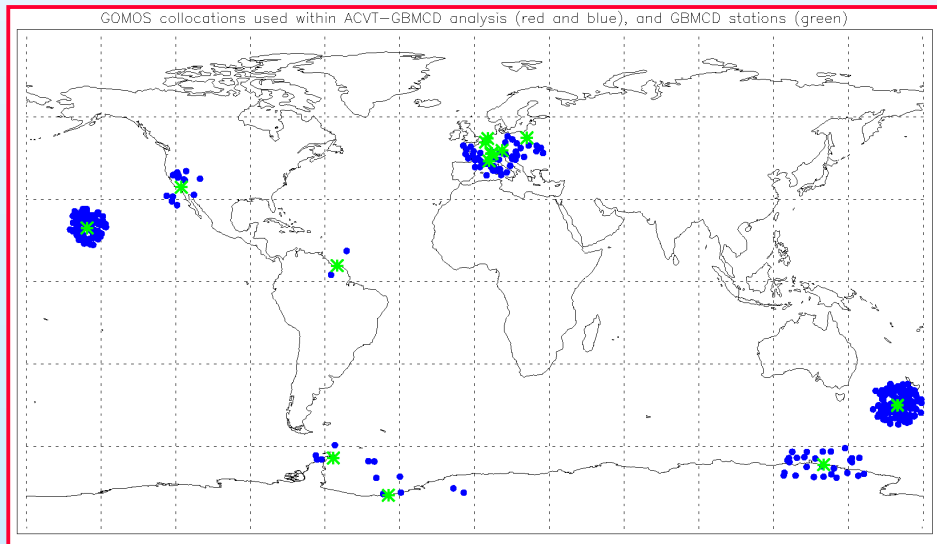


Twilight,
1540
(1502)

**Dark,
467
(462)**



Selection	Daylight	Twilight	Dark	All	Dark&twilight
Available	1706	1540	467	3713	2007
Bad points	72%	25%	16%	45%	24%
Bad profiles	682	6	1	689	7
No overlap	362	32	4	398	36
Useful	662	1502	462	2626	1964 (1387)

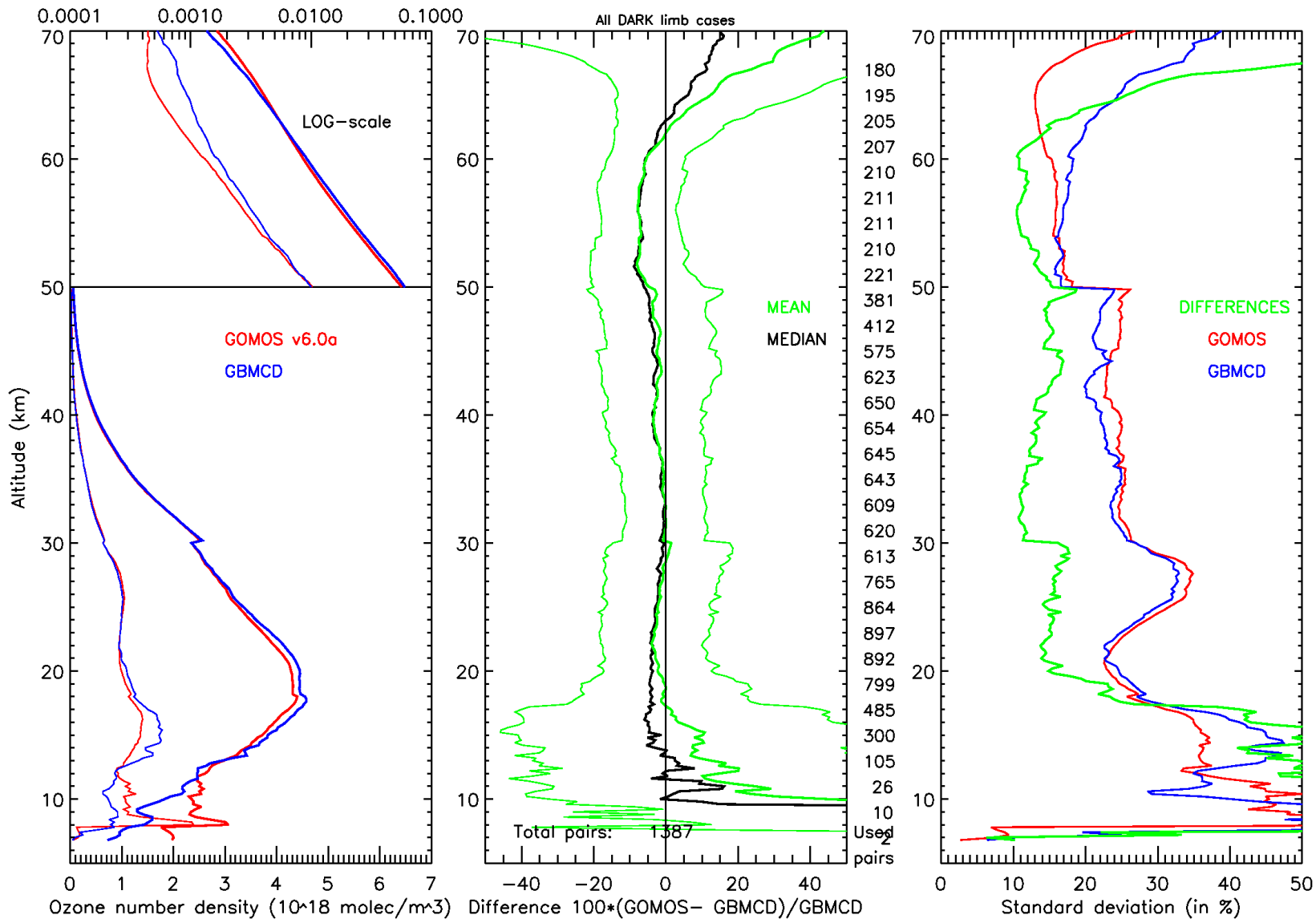


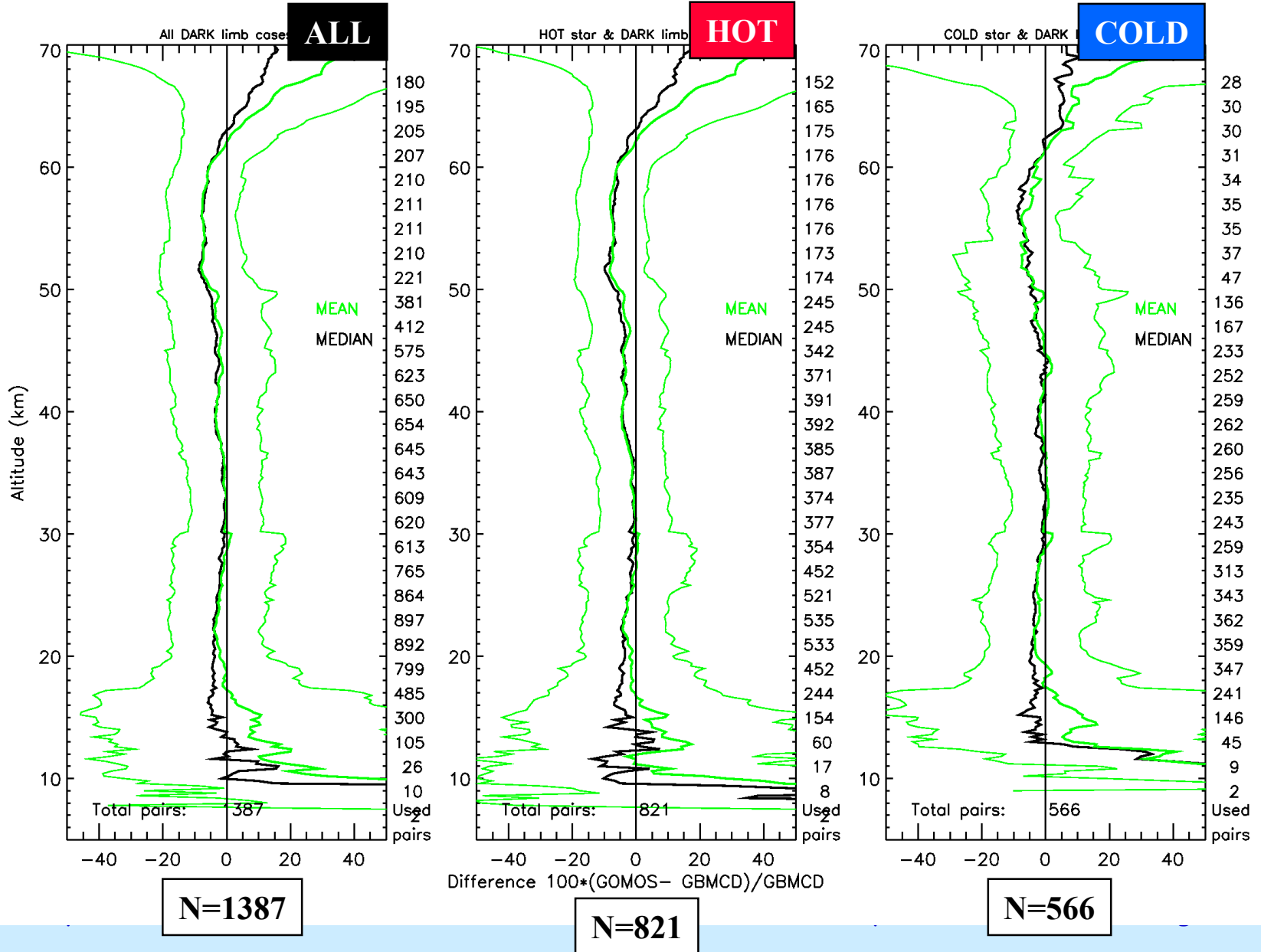
Dark ESA 6.0

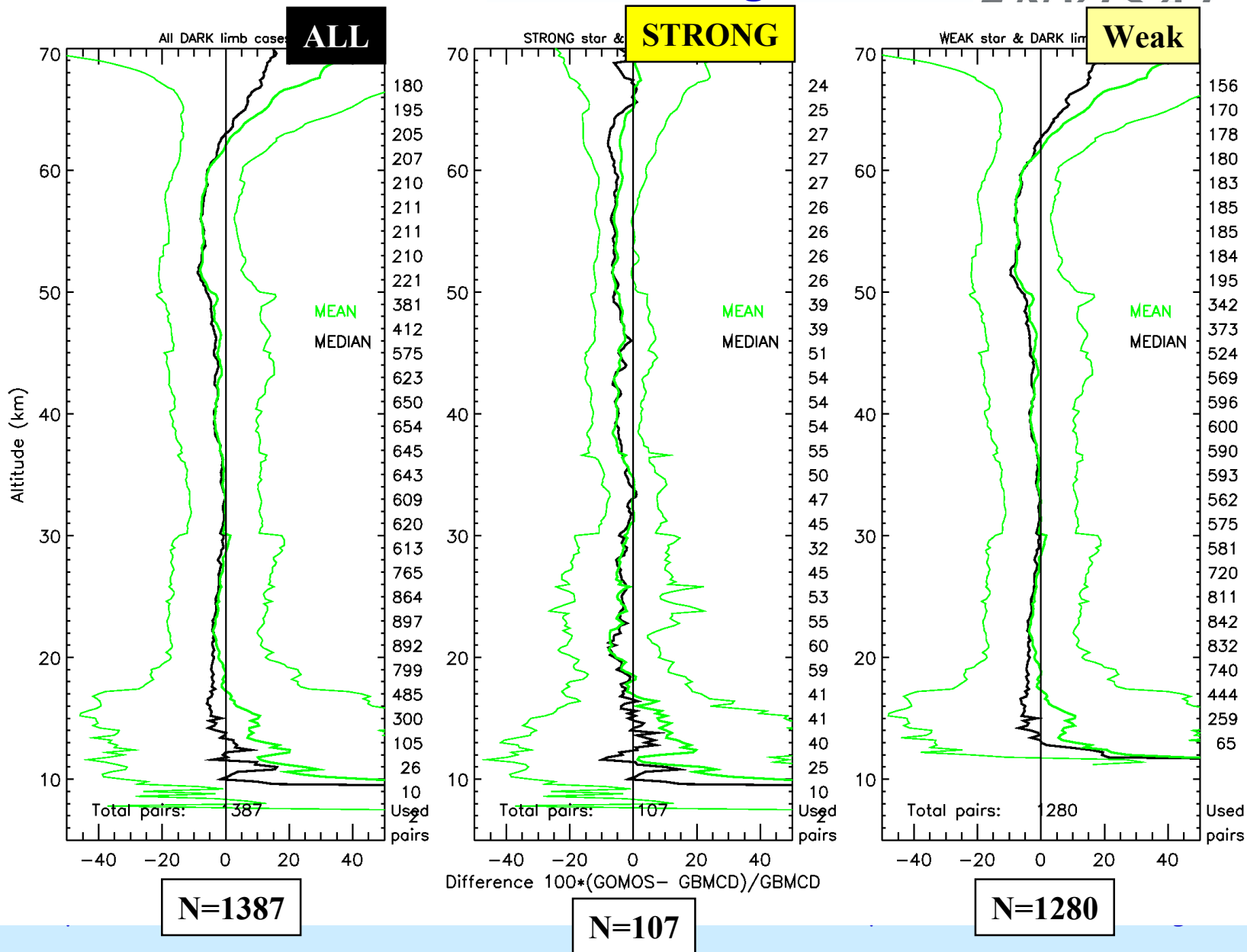
- ESA definition:
- SZA > 110°
 - Satellite in Dark

Dark RIVM

- RIVM definition:
- SZA > 108°



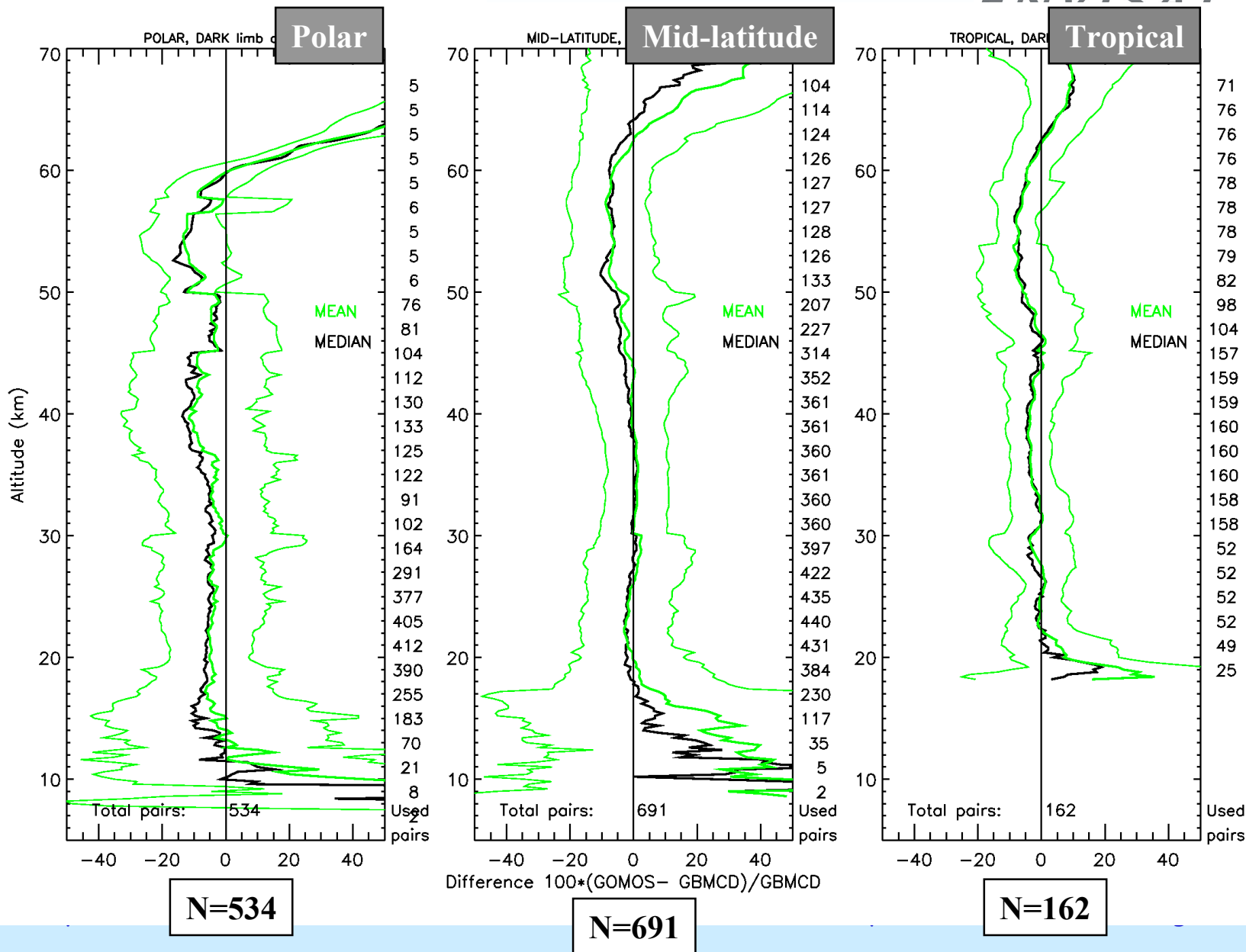


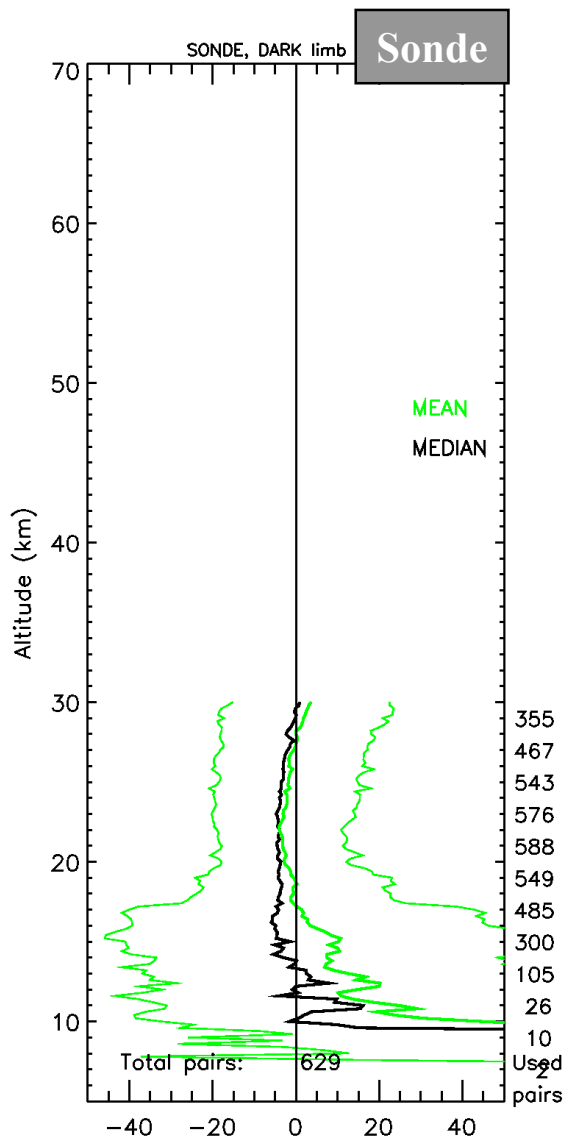


N=1387

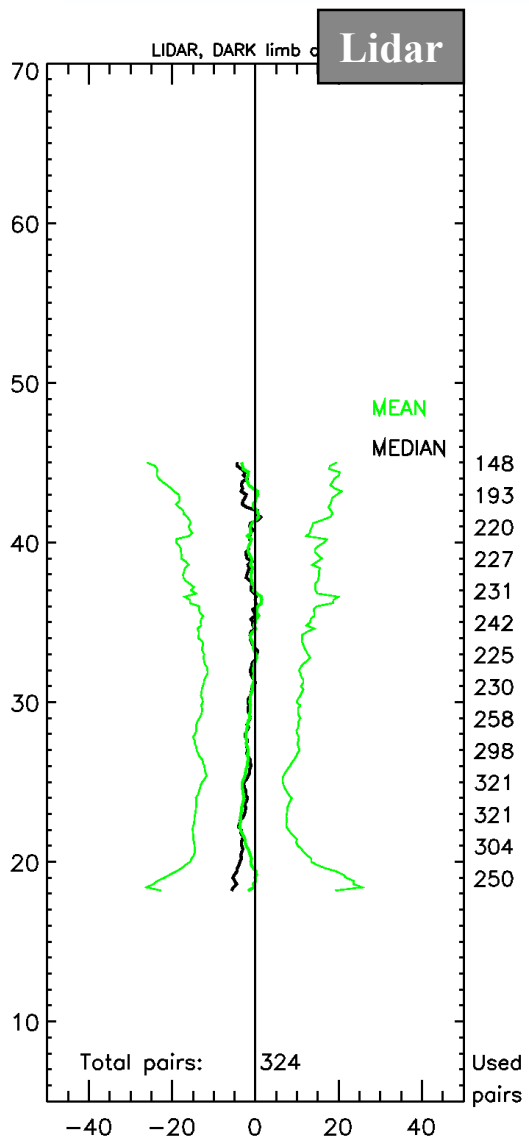
N=107

N=1280

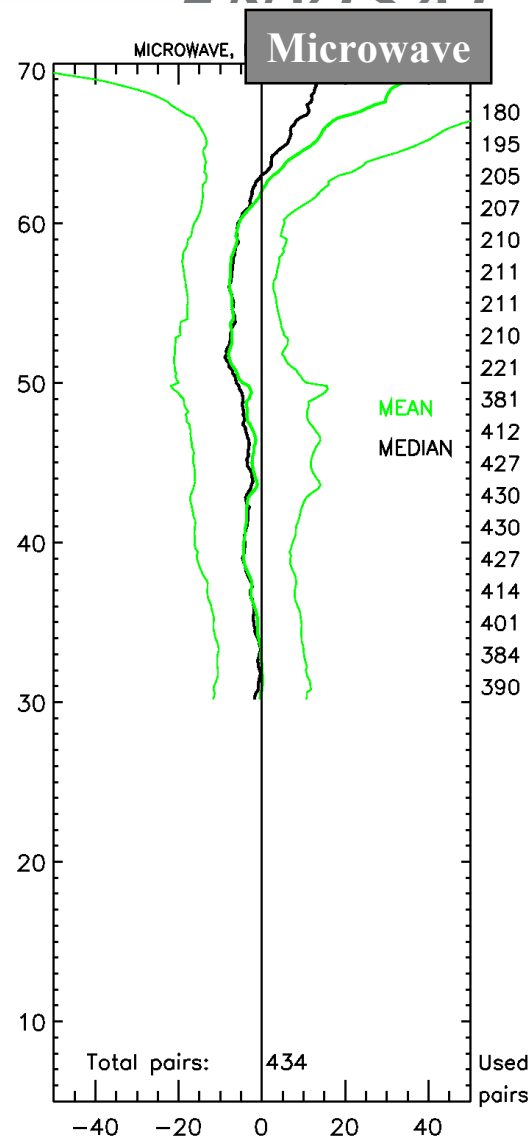




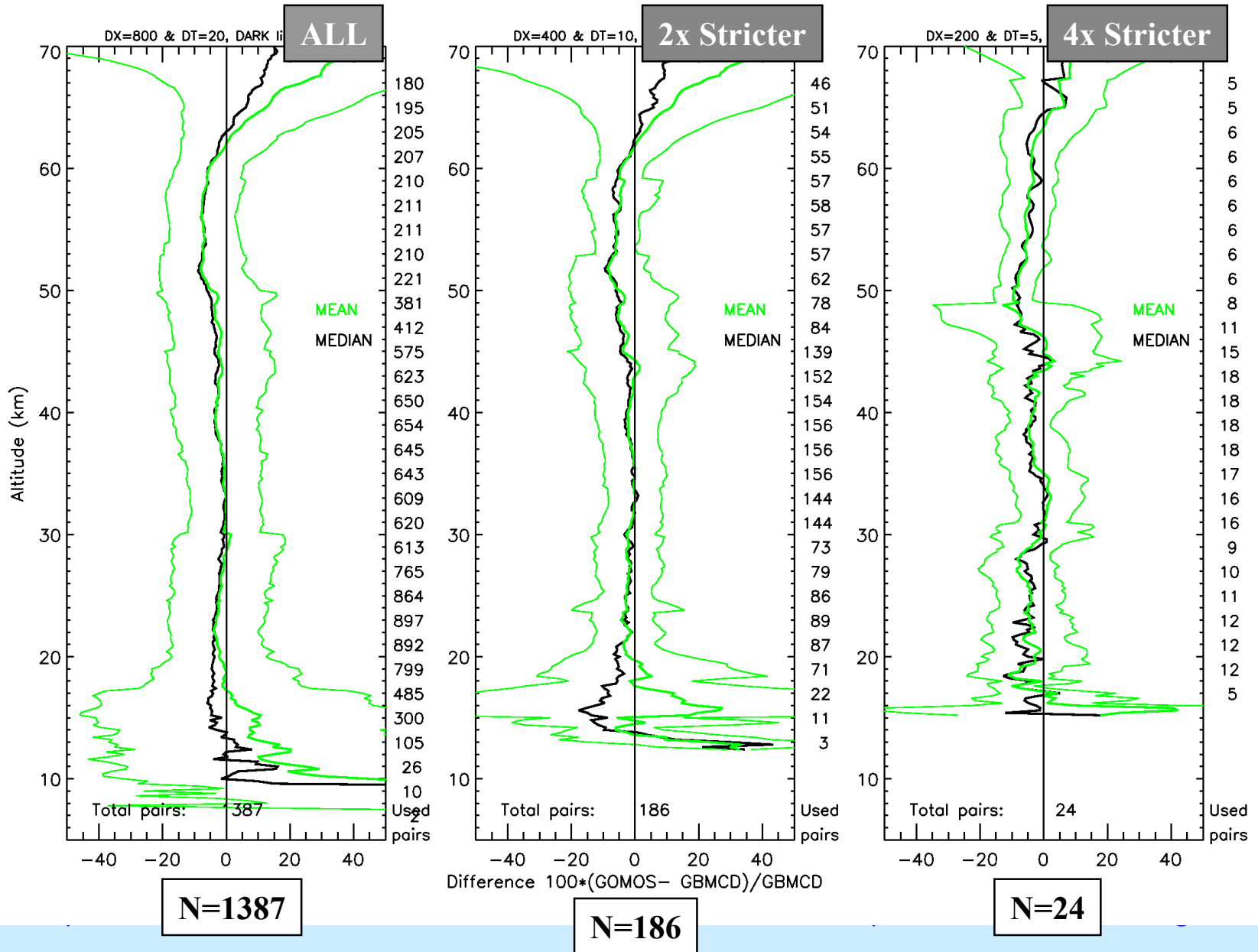
N=629



N=324



N=434



Conclusions on GOMOS O₃(r)

- Selected GOMOS data: $SZA > 108^\circ$
- Between 18-62 km altitude, bias -10 to 0%, std. dev. 11-15%
- Analyzed parameters:
 - Star T: NO influence on bias. Data of cold stars have less data points > 50 km
 - Star M_v : NO influence on bias. Smaller std. dev. of differences with strong stars
 - Geo-location: in Polar regions GOMOS has slightly larger negative bias
 - Correlative instrument: NO influence on bias.
 - Collocation criteria: NO influence on bias.
- More details in recently submitted paper:
JGR-D, no. 2004JD004834
'Pole-to-pole validation of ENVISAT/GOMOS ozone profiles using data from ground-based and balloon-sonde measurements'
- Recommendations: 1) reconsider twilight definition
2) in daylight select hot stars