

Supplement of **Version 8 IMK/IAA MIPAS measurements of CIO**

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This document serves as reference for the definitions of the representative atmospheres used for the calculation of CIO error budgets, as listed in Tab. S1, and as collection of the respective error budgets for FR data (2002-2004), which are listed in tables S2–S35 and depicted in figures S1–S34, and the respective error budgets for RR data (2005-2012) in the MIPAS nominal measurement mode, which are listed in tables S36–S69 and depicted in figures S35–S68, and in the MIPAS middle atmosphere measurement mode, which are listed in tables S70–S103 and depicted in figures S69–S102

The errors are presented as absolute errors in ppmv.

Table S1. Labels and definitions of the representative atmospheric conditions which were used to calculate the error budget for FR and RR nominal measurement mode data ($\beta_{max} = 95^\circ$) and RR middle atmosphere measurement mode data ($\beta_{max} = 98^\circ$).

representative atmosphere label	month(s) used	latitude range	solar zenith angle range
Northern polar winter day	Jan, Feb	$65^\circ\text{N} - 90^\circ\text{N}$	$< 90^\circ$
Northern polar winter night	Jan, Feb	$65^\circ\text{N} - 90^\circ\text{N}$	$> \beta_{max}$
Northern polar spring day	Apr	$65^\circ\text{N} - 90^\circ\text{N}$	$< 90^\circ$
Northern polar spring night	Apr	$65^\circ\text{N} - 90^\circ\text{N}$	$> \beta_{max}$
Northern polar summer day	Jul, Aug	$65^\circ\text{N} - 90^\circ\text{N}$	$< 90^\circ$
Northern polar summer night	Jul, Aug	$65^\circ\text{N} - 90^\circ\text{N}$	$> \beta_{max}$
Northern polar autumn day	Oct	$65^\circ\text{N} - 90^\circ\text{N}$	$< 90^\circ$
Northern polar autumn night	Oct	$65^\circ\text{N} - 90^\circ\text{N}$	$> \beta_{max}$
Northern midlatitude winter day	Jan, Feb	$40^\circ\text{N} - 60^\circ\text{N}$	$< 90^\circ$
Northern midlatitude winter night	Jan, Feb	$40^\circ\text{N} - 60^\circ\text{N}$	$> \beta_{max}$
Northern midlatitude spring day	Apr	$40^\circ\text{N} - 60^\circ\text{N}$	$< 90^\circ$
Northern midlatitude spring night	Apr	$40^\circ\text{N} - 60^\circ\text{N}$	$> \beta_{max}$
Northern midlatitude summer day	Jul, Aug	$40^\circ\text{N} - 60^\circ\text{N}$	$< 90^\circ$
Northern midlatitude summer night	Jul, Aug	$40^\circ\text{N} - 60^\circ\text{N}$	$> \beta_{max}$
Northern midlatitude autumn day	Oct	$40^\circ\text{N} - 60^\circ\text{N}$	$< 90^\circ$
Northern midlatitude autumn night	Oct	$40^\circ\text{N} - 60^\circ\text{N}$	$> \beta_{max}$
Tropics day	Apr	$20^\circ\text{S} - 20^\circ\text{N}$	$< 90^\circ$
Tropics night	Apr	$20^\circ\text{S} - 20^\circ\text{N}$	$> \beta_{max}$
Southern midlatitude winter day	Jul, Aug	$40^\circ\text{S} - 60^\circ\text{S}$	$< 90^\circ$
Southern midlatitude winter night	Jul, Aug	$40^\circ\text{S} - 60^\circ\text{S}$	$> \beta_{max}$
Southern midlatitude spring day	Oct	$40^\circ\text{S} - 60^\circ\text{S}$	$< 90^\circ$
Southern midlatitude spring night	Oct	$40^\circ\text{S} - 60^\circ\text{S}$	$> \beta_{max}$
Southern midlatitude summer day	Jan, Feb	$40^\circ\text{S} - 60^\circ\text{S}$	$< 90^\circ$
Southern midlatitude summer night	Jan, Feb	$40^\circ\text{S} - 60^\circ\text{S}$	$> \beta_{max}$
Southern midlatitude autumn day	Apr	$40^\circ\text{S} - 60^\circ\text{S}$	$< 90^\circ$
Southern midlatitude autumn night	Apr	$40^\circ\text{S} - 60^\circ\text{S}$	$> \beta_{max}$
Southern polar winter day	Jul, Aug	$65^\circ\text{S} - 90^\circ\text{S}$	$< 90^\circ$
Southern polar winter night	Jul, Aug	$65^\circ\text{S} - 90^\circ\text{S}$	$> \beta_{max}$
Southern polar spring day	Oct	$65^\circ\text{S} - 90^\circ\text{S}$	$< 90^\circ$
Southern polar spring night	Oct	$65^\circ\text{S} - 90^\circ\text{S}$	$> \beta_{max}$
Southern polar summer day	Jan, Feb	$65^\circ\text{S} - 90^\circ\text{S}$	$< 90^\circ$
Southern polar summer night	Jan, Feb	$65^\circ\text{S} - 90^\circ\text{S}$	$> \beta_{max}$
Southern polar autumn day	Apr	$65^\circ\text{S} - 90^\circ\text{S}$	$< 90^\circ$
Southern polar autumn night	Apr	$65^\circ\text{S} - 90^\circ\text{S}$	$> \beta_{max}$

Table S2. CIO error budget for Northern polar winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	21.95	24.46	6.01	1.83	21.19	12.58	17.77	5.15	66.34	74.51	20.92	77.39
9	18.32	25.52	6.83	1.99	22.80	10.73	16.72	4.92	80.01	87.67	18.88	89.68
12	20.55	25.03	6.82	1.99	22.45	10.47	16.34	4.73	79.17	86.65	18.44	88.59
15	111.67	17.95	5.34	2.17	27.36	3.69	19.78	3.70	143.13	147.87	12.03	148.36
18	394.21	29.81	11.32	3.46	51.10	4.32	52.00	6.08	292.91	301.83	33.13	303.64
21	269.97	6.09	16.83	6.82	52.80	7.40	61.58	7.09	369.94	377.97	32.31	379.35
24	79.23	6.53	9.04	13.78	46.80	5.31	35.17	4.60	410.71	414.88	18.50	415.29
27	81.36	6.56	5.67	18.05	51.76	5.83	33.65	3.88	442.75	447.13	19.18	447.54
30	180.00	7.58	4.76	21.12	61.67	6.83	35.21	3.65	486.81	491.87	25.95	492.56
33	286.81	7.69	5.89	14.77	60.05	4.44	40.17	3.29	497.73	502.39	30.01	503.29
36	365.52	7.45	7.01	13.59	75.84	4.23	39.81	2.62	496.23	502.91	31.19	503.88
39	342.59	9.13	7.26	10.26	118.46	4.46	38.05	2.38	551.16	564.43	30.82	565.27
42	244.11	15.22	6.71	5.44	154.46	3.81	36.21	2.23	632.76	651.96	28.69	652.59
45	157.09	16.02	5.60	13.68	169.06	2.89	32.53	2.11	656.55	678.65	24.81	679.10
48	-71.94	14.48	4.96	23.68	163.66	2.51	24.21	2.08	634.93	656.54	16.44	656.75

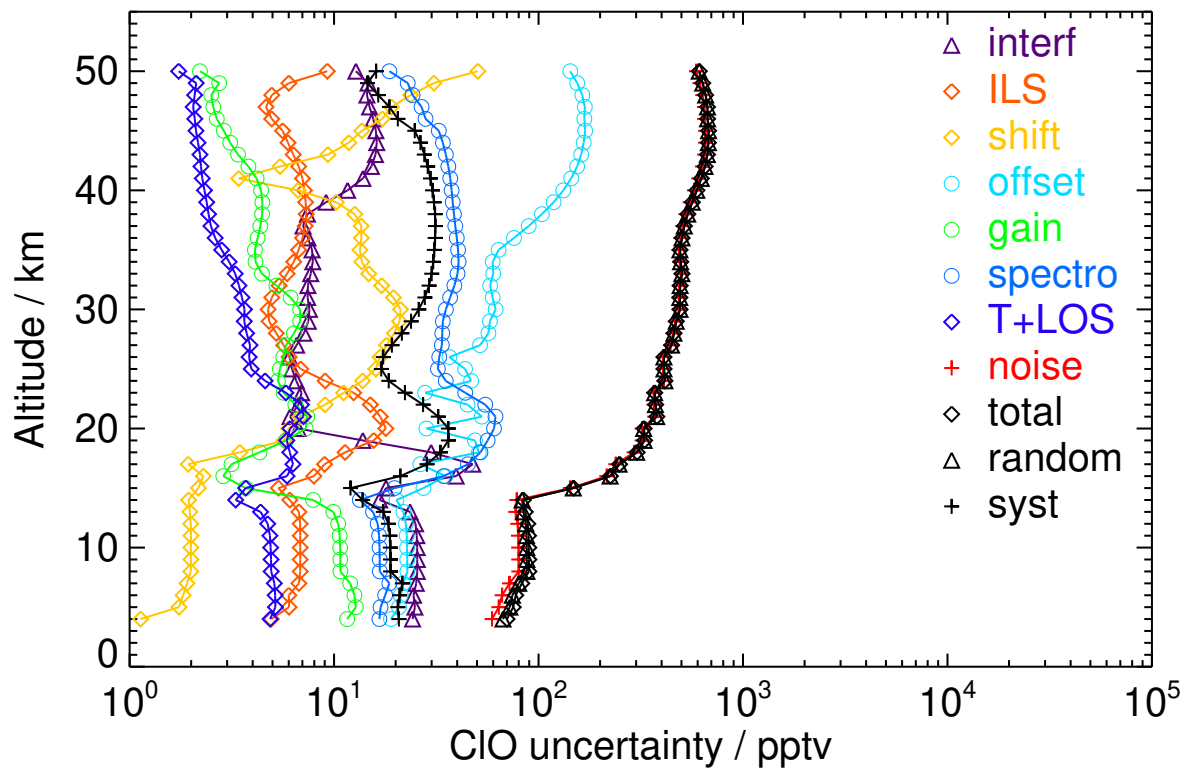
**Figure S1.** V8H_CLO_62 Northern polar winter day

Table S3. CIO error budget for Northern polar winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	10.92	24.24	6.03	2.04	22.06	12.63	16.66	4.88	67.15	75.27	20.47	78.01
9	10.96	24.20	6.03	2.04	22.01	12.60	16.65	4.86	67.11	75.20	20.45	77.93
12	11.89	23.70	6.02	2.04	21.89	12.23	16.26	4.61	66.31	74.28	19.92	76.90
15	102.30	13.99	7.07	1.61	25.99	2.71	19.72	3.87	140.78	145.03	10.93	145.44
18	423.11	33.25	13.03	2.66	40.66	3.24	47.45	6.00	290.24	297.38	32.19	299.12
21	190.70	5.70	14.00	5.84	45.34	5.90	41.67	6.24	373.60	377.87	30.41	379.09
24	-5.06	7.24	6.42	13.49	42.94	4.11	26.64	4.22	410.10	413.38	12.89	413.58
27	-16.77	7.03	5.03	17.77	52.13	4.88	24.47	3.86	443.02	446.98	15.07	447.23
30	-28.58	8.32	3.56	22.24	60.91	7.03	24.76	4.10	477.27	482.10	18.23	482.44
33	-22.99	8.51	4.69	15.64	56.48	3.89	25.95	2.83	480.87	484.89	18.69	485.25
36	74.92	8.14	4.18	14.11	65.23	3.31	27.53	2.14	473.88	478.98	21.28	479.46
39	189.28	9.44	3.43	11.26	106.98	4.30	31.24	1.70	514.29	525.89	24.65	526.47
42	299.84	16.36	4.27	7.33	147.08	4.23	34.62	1.79	600.16	618.60	26.64	619.18
45	317.30	18.00	3.81	16.07	166.05	3.31	33.56	1.94	639.84	661.86	25.39	662.35
48	252.04	16.70	3.22	23.50	165.33	2.52	30.31	1.94	629.73	652.05	22.37	652.43

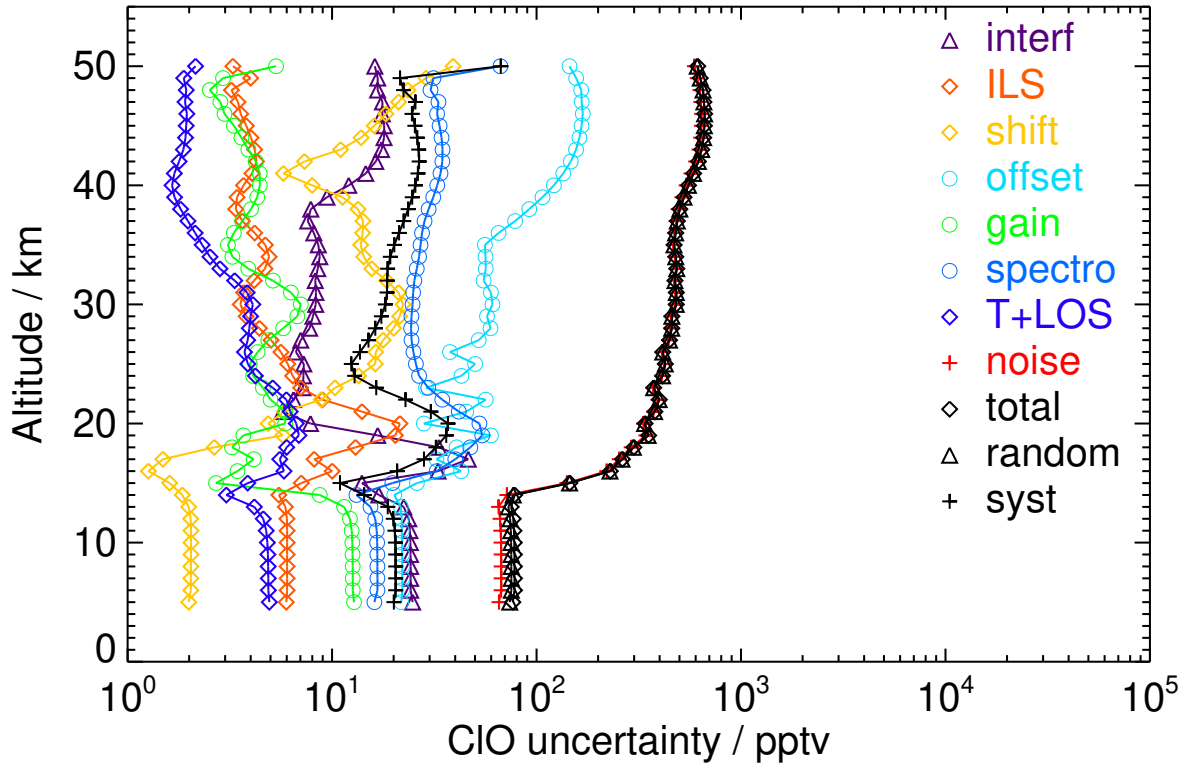
**Figure S2.** V8H_CLO_62 Northern polar winter night

Table S4. CIO error budget for Northern polar spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	23.59	26.08	5.73	1.16	20.69	10.71	12.70	4.74	65.70	74.06	16.49	75.88
9	38.01	26.36	6.18	1.25	21.44	9.80	13.28	4.59	71.17	79.30	16.26	80.95
12	38.47	25.43	6.21	1.27	20.89	9.59	13.17	4.39	70.02	77.81	16.06	79.45
15	35.57	34.91	6.87	3.07	26.09	3.93	15.77	4.65	145.01	151.97	13.24	152.55
18	79.32	23.77	8.13	3.00	53.84	3.52	25.12	4.72	261.00	268.54	14.66	268.94
21	150.85	7.93	9.00	6.02	50.85	4.22	30.48	3.65	306.11	311.61	18.24	312.14
24	157.16	6.11	5.21	14.75	49.36	5.31	26.30	3.50	344.46	349.04	16.73	349.44
27	44.27	6.15	4.33	20.87	57.14	7.10	28.38	3.84	387.55	393.05	18.27	393.48
30	146.68	6.33	5.18	21.60	57.84	7.54	36.91	3.82	423.03	428.27	29.17	429.26
33	419.35	6.80	5.59	12.76	44.34	3.52	45.05	3.24	422.34	425.97	34.33	427.35
36	512.82	9.01	7.88	17.71	48.18	4.96	47.09	2.80	437.54	441.55	38.69	443.25
39	470.64	6.42	9.69	19.40	74.45	6.61	46.34	3.07	441.77	449.34	38.90	451.02
42	357.40	16.24	9.12	3.64	115.95	6.68	44.22	3.01	496.14	510.52	36.51	511.83
45	218.31	18.41	6.62	22.62	148.86	5.46	40.12	2.77	560.09	580.84	32.06	581.73
48	121.45	15.16	4.54	35.23	165.29	4.18	35.62	2.66	609.58	633.20	27.43	633.80
52	102.70	10.44	4.29	39.75	164.96	3.53	30.08	2.26	592.69	616.95	22.44	617.35

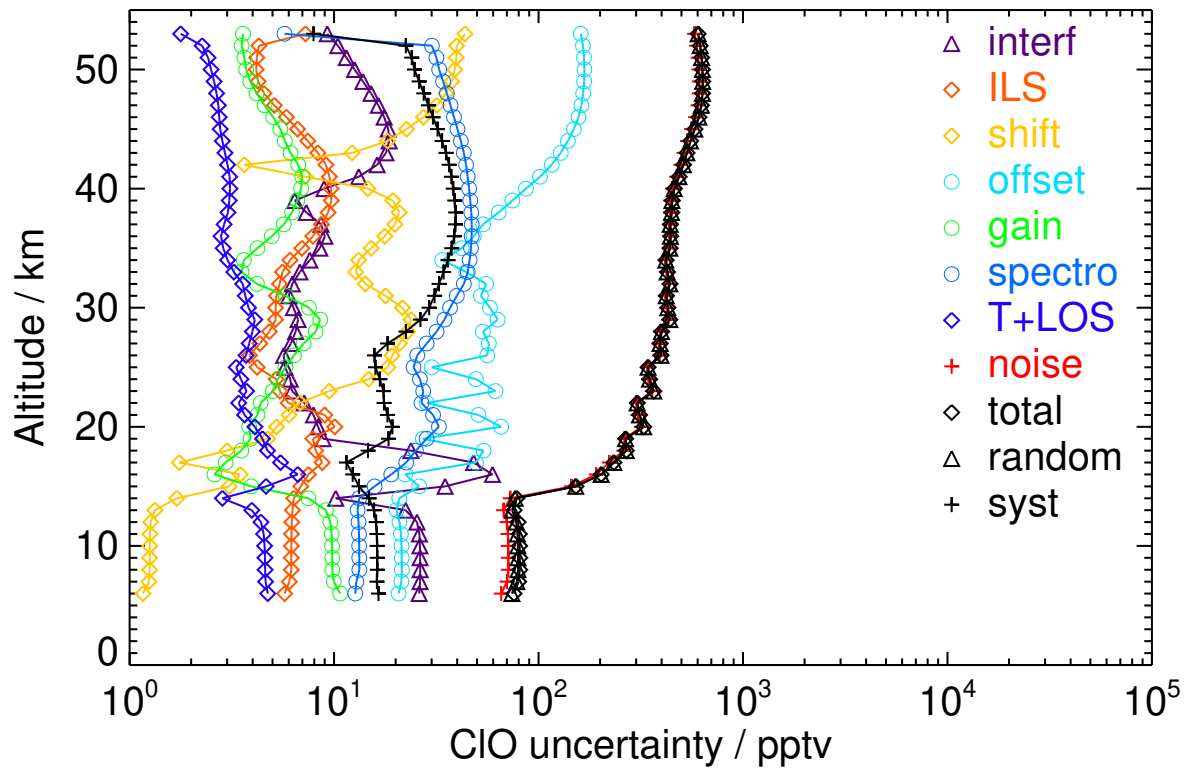
**Figure S3.** V8H_CLO_62 Northern polar spring day

Table S5. CIO error budget for Northern polar spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-7.14	27.33	5.09	0.93	20.77	10.41	10.47	4.66	68.16	76.50	15.47	78.04
9	33.72	26.63	6.62	1.48	22.17	9.15	12.69	4.52	75.01	83.12	15.17	84.49
12	34.67	25.89	6.67	1.47	21.61	8.99	12.54	4.35	73.93	81.74	15.01	83.11
15	42.51	30.16	7.78	2.33	28.02	3.71	15.70	4.33	144.62	150.94	13.15	151.51
18	39.60	24.81	9.21	3.09	59.68	3.26	24.68	4.38	264.95	273.86	10.55	274.06
21	7.93	7.76	5.64	6.31	56.91	3.59	26.71	3.39	315.09	321.27	13.35	321.55
24	-7.11	6.13	3.75	14.80	53.62	4.31	26.27	3.46	357.20	362.35	12.62	362.57
27	18.29	6.08	4.51	19.23	59.70	6.24	26.17	3.55	402.17	407.71	15.48	408.01
30	13.98	6.60	4.57	21.67	61.51	6.71	28.38	3.79	442.86	448.20	20.74	448.68
33	141.63	7.28	5.22	14.09	49.66	3.29	37.39	3.39	442.86	446.80	25.68	447.54
36	332.73	8.66	5.90	18.07	51.56	4.47	39.87	2.66	445.84	450.08	30.11	451.09
39	355.53	7.19	7.72	18.31	79.51	6.07	41.34	2.73	451.78	459.93	33.11	461.12
42	307.66	15.46	8.10	6.21	120.91	6.20	41.39	2.66	505.47	520.71	32.89	521.75
45	259.47	16.95	6.65	21.91	152.90	5.33	38.37	2.55	566.86	588.34	29.58	589.09
48	190.95	13.89	5.20	33.29	168.07	4.25	34.20	2.48	612.53	636.63	25.59	637.15
52	70.73	9.76	4.90	38.35	165.67	3.80	26.32	2.13	591.35	615.70	19.05	615.99

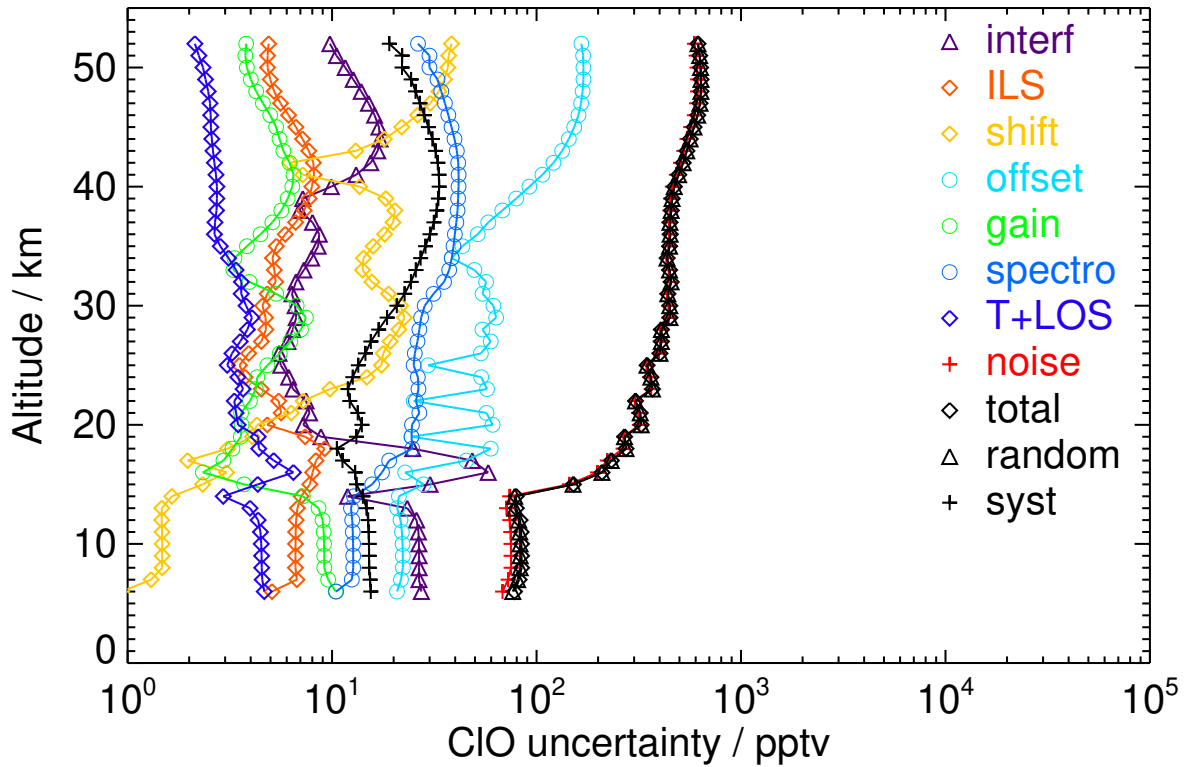
**Figure S4.** V8H_CLO_62 Northern polar spring night

Table S6. ClO error budget for Northern polar summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	97.55	26.16	7.74	0.47	16.75	12.25	13.07	6.30	59.78	67.74	19.26	70.42
9	34.04	28.72	6.49	1.18	20.26	9.09	9.65	5.83	83.71	91.28	12.77	92.17
12	34.10	28.46	6.52	1.18	19.73	8.96	9.61	5.64	82.81	90.25	12.70	91.13
15	17.83	17.88	7.80	3.07	23.83	5.05	12.52	3.75	124.78	128.74	12.25	129.32
18	-18.23	38.37	7.90	3.21	43.87	5.22	22.87	5.06	238.93	247.01	10.93	247.26
21	121.86	5.44	4.43	3.60	49.84	4.44	27.13	3.75	309.11	314.12	13.95	314.43
24	-29.93	6.34	4.17	7.51	44.86	5.56	23.96	3.63	353.33	357.03	10.62	357.19
27	-26.49	5.18	3.71	15.04	43.32	5.72	25.90	3.61	385.66	389.01	16.27	389.35
30	155.41	6.42	5.73	18.89	55.29	9.21	36.46	4.34	431.23	436.02	27.77	436.90
33	371.28	6.35	4.91	12.53	49.34	5.03	44.61	3.36	435.45	439.42	34.80	440.79
36	512.84	8.56	6.82	14.17	37.04	5.29	48.42	2.80	430.54	433.38	40.30	435.25
39	474.36	7.33	7.73	20.05	55.92	7.41	47.05	3.21	429.76	434.64	41.31	436.60
42	418.01	12.77	8.25	7.87	89.52	8.51	44.92	3.09	453.77	463.49	38.64	465.10
45	310.84	17.76	7.96	11.90	121.55	7.86	41.88	2.77	507.32	522.82	33.98	523.92
48	202.31	15.62	6.71	27.74	141.04	6.25	38.32	2.71	571.45	590.07	28.97	590.78
52	118.06	11.34	5.76	38.25	146.62	5.23	33.52	2.49	578.27	598.41	23.94	598.89

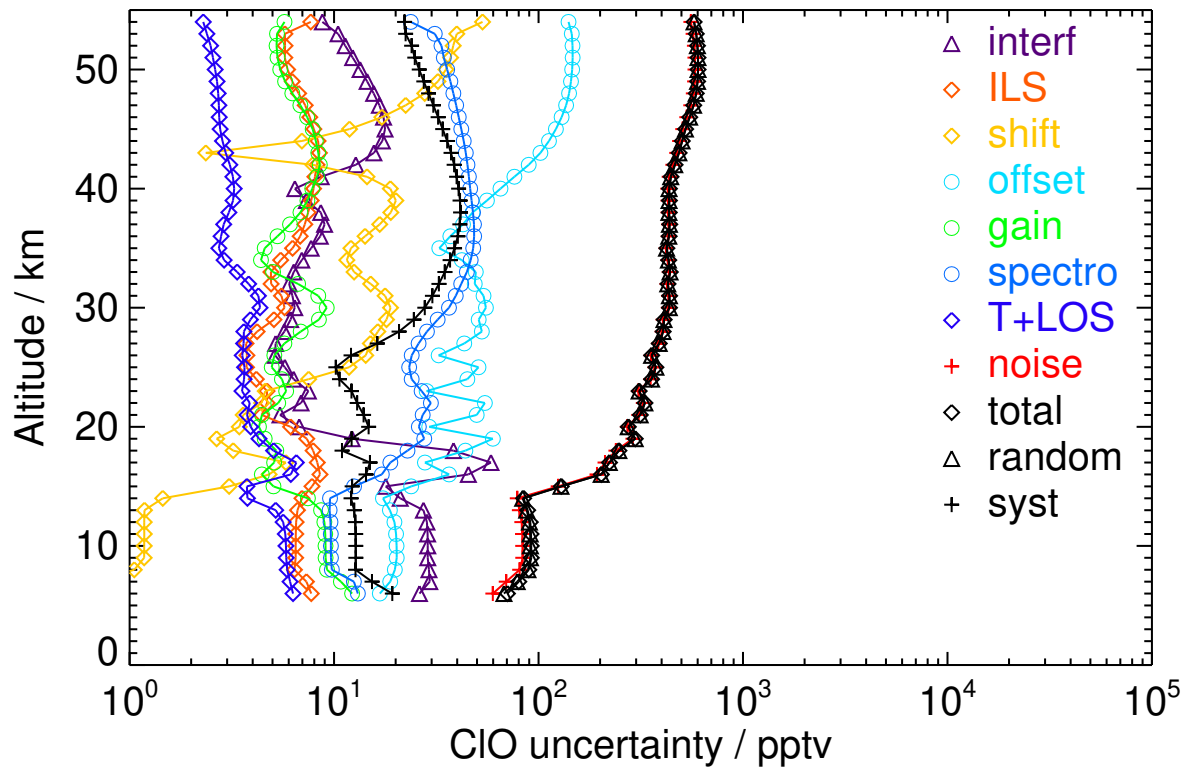
**Figure S5.** V8H_CLO_62 Northern polar summer day

Table S7. CIO error budget for Northern polar summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	28.30	28.24	5.76	1.65	21.70	7.68	9.39	5.71	91.08	98.26	11.15	98.89
12	27.85	28.07	5.81	1.64	21.18	7.60	9.34	5.56	90.24	97.30	11.15	97.94
15	-29.05	10.70	7.65	2.35	21.83	4.66	11.07	3.55	121.10	123.90	11.27	124.41
18	-10.11	40.18	7.25	3.01	35.91	4.69	20.47	4.91	231.46	238.45	11.99	238.76
21	62.82	4.45	4.55	3.53	41.39	4.30	25.28	3.60	307.16	310.79	13.89	311.10
24	4.47	6.15	3.68	8.49	37.51	5.25	22.66	3.42	353.18	355.92	11.99	356.12
27	-15.53	5.10	3.61	16.24	38.95	5.79	21.16	3.52	388.50	391.23	13.60	391.47
30	-3.42	6.43	5.06	22.44	54.11	8.16	25.93	4.17	437.75	442.07	21.23	442.58
33	114.90	6.45	4.43	16.08	49.83	4.28	31.70	2.95	449.45	453.09	23.37	453.69
36	283.89	8.14	4.51	15.32	37.56	4.12	36.88	2.48	437.81	440.52	27.20	441.36
39	400.65	6.79	5.96	18.89	60.53	6.18	40.65	2.62	437.37	442.80	32.02	443.95
42	340.44	12.06	7.91	6.58	96.67	7.49	41.95	2.68	469.43	480.29	33.22	481.43
45	215.93	16.17	8.10	11.49	128.28	6.92	39.77	2.61	530.39	546.75	30.63	547.60
48	138.05	14.54	6.70	24.91	145.74	5.44	36.01	2.62	586.07	605.16	26.56	605.74
52	112.67	11.06	4.83	32.99	148.14	4.37	31.65	2.39	580.84	600.88	22.92	601.32

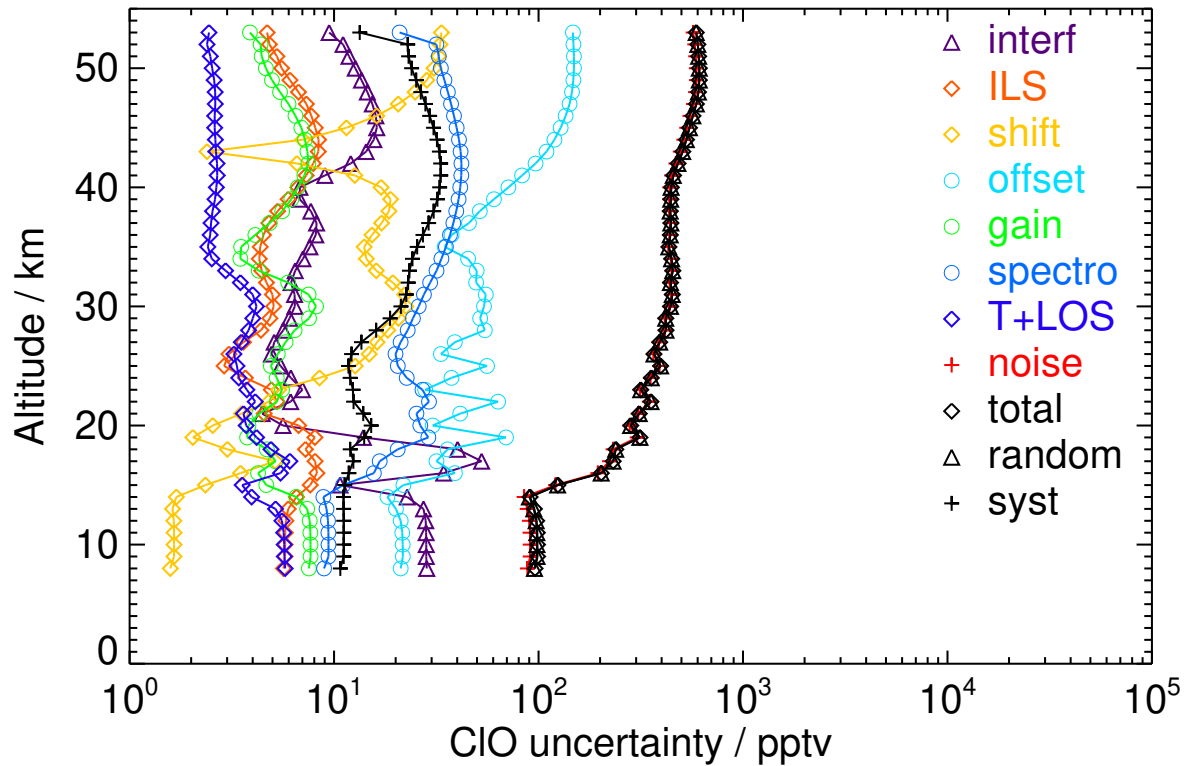
**Figure S6.** V8H_CLO_62 Northern polar summer night

Table S8. CIO error budget for Northern polar autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-13.86	23.67	5.92	1.86	20.19	10.99	9.24	5.15	62.99	70.69	14.46	72.16
9	-1.33	24.41	6.29	1.93	20.87	10.69	10.46	5.05	67.62	75.35	14.81	76.79
12	-1.25	23.45	6.24	1.98	20.43	10.54	10.38	4.75	66.44	73.83	14.67	75.27
15	35.04	33.89	4.83	4.08	20.92	5.85	14.41	4.91	139.66	145.84	11.25	146.27
18	32.06	27.52	8.44	1.33	31.02	4.58	24.64	4.89	249.55	254.05	13.48	254.40
21	143.54	6.86	6.58	4.15	25.18	3.97	28.84	3.42	308.18	310.37	15.63	310.76
24	44.81	5.83	4.54	9.32	31.07	4.10	26.10	3.15	365.13	367.30	14.90	367.60
27	79.91	6.20	3.74	13.30	53.10	3.49	26.08	2.83	434.85	438.85	15.97	439.14
30	197.26	7.59	3.90	13.63	68.68	3.85	33.59	3.13	492.43	498.07	23.17	498.61
33	286.60	7.96	5.03	11.55	68.57	3.35	41.67	3.12	510.40	515.91	31.91	516.90
36	458.00	7.40	8.67	10.27	94.48	3.76	47.65	2.68	522.82	532.41	36.40	533.66
39	447.55	10.13	11.37	7.45	142.28	4.24	49.92	2.80	571.23	589.83	38.12	591.06
42	327.23	16.17	11.46	3.29	182.87	3.89	47.87	2.90	645.77	672.22	36.17	673.19
45	232.29	16.13	9.75	9.43	200.95	2.98	42.73	2.90	678.19	708.25	31.46	708.95
48	64.63	13.75	7.40	14.30	198.63	2.28	35.28	2.60	656.32	686.58	22.88	686.96

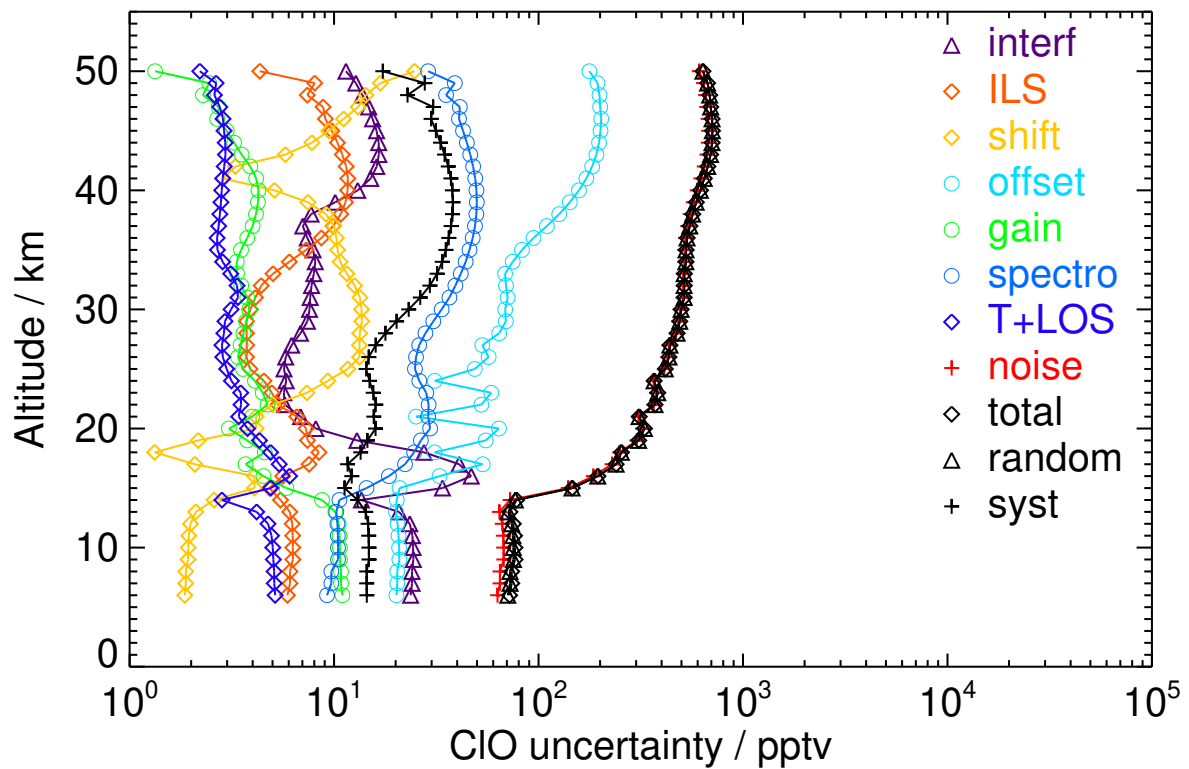
**Figure S7.** V8H_CLO_62 Northern polar autumn day

Table S9. CIO error budget for Northern polar autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-33.17	23.37	5.44	1.90	20.51	10.54	7.65	4.85	64.06	71.54	13.36	72.78
9	-35.40	24.00	5.64	1.94	20.93	10.32	8.10	4.76	67.40	74.88	13.39	76.07
12	-34.33	23.09	5.59	1.99	20.50	10.12	8.01	4.50	66.23	73.40	13.19	74.58
15	57.43	30.68	3.80	3.28	21.56	4.61	13.24	4.48	142.28	147.69	8.79	147.95
18	56.36	26.06	9.28	2.01	36.13	4.55	26.47	5.10	257.91	262.83	16.07	263.32
21	4.62	6.57	8.18	4.43	30.99	4.36	27.31	3.56	317.75	320.48	11.20	320.68
24	-61.92	5.81	3.93	8.98	36.70	3.06	24.29	2.80	374.98	377.59	10.87	377.75
27	-35.18	6.42	3.53	13.47	56.84	3.71	23.16	2.72	440.59	444.93	13.44	445.13
30	55.03	7.52	3.14	14.03	67.72	3.74	25.05	2.79	491.51	496.78	17.04	497.07
33	-12.75	7.76	4.14	11.32	64.55	2.57	31.58	2.78	503.99	508.80	22.47	509.30
36	215.91	7.39	5.81	11.09	90.27	3.15	40.04	2.45	515.55	524.32	29.18	525.14
39	414.53	9.67	8.56	8.58	136.64	4.11	47.25	2.34	560.65	578.18	34.59	579.22
42	460.20	15.54	9.95	2.81	177.66	4.17	49.63	2.55	635.50	661.01	36.39	662.01
45	469.65	15.93	9.28	9.26	196.48	3.51	46.90	2.66	671.76	700.97	33.82	701.79
48	362.23	13.84	7.78	14.48	194.69	2.83	40.65	2.67	649.92	679.40	29.18	680.02

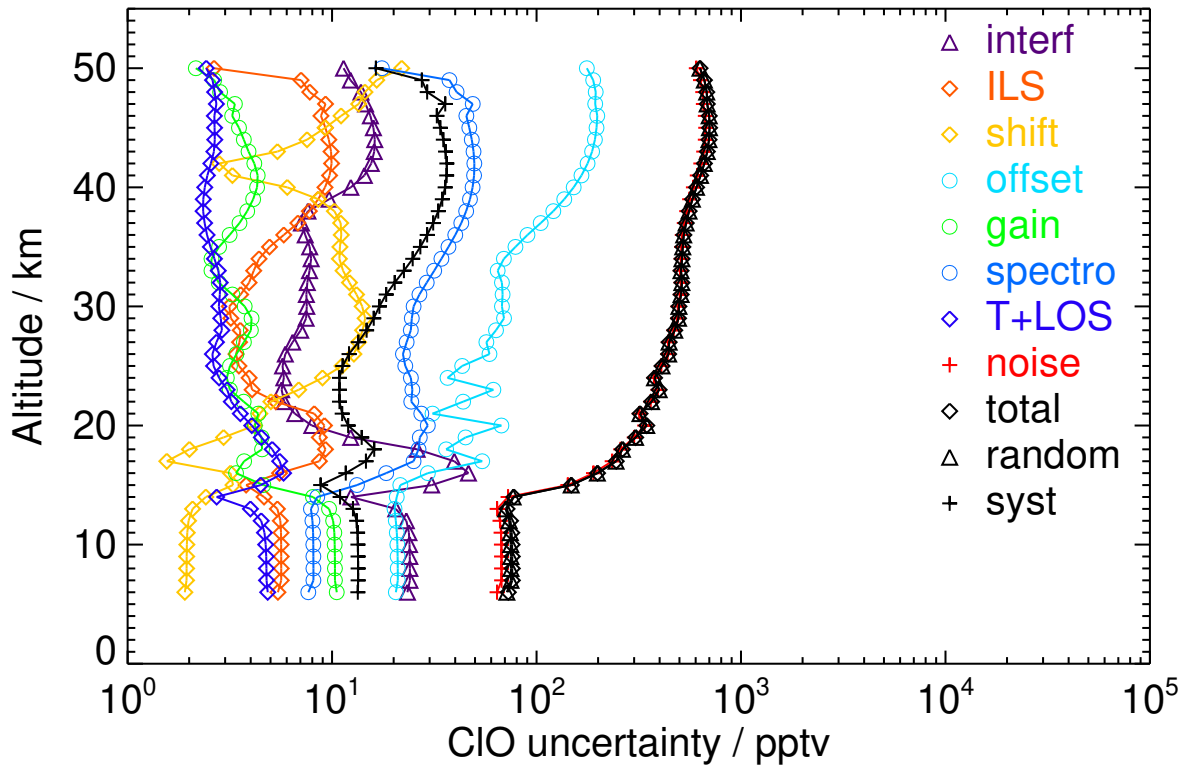
**Figure S8.** V8H_CLO_62 Northern polar autumn night

Table S10. CIO error budget for Northern midlatitude winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	0.19	25.87	6.80	1.79	20.99	13.68	17.73	5.12	63.44	72.25	22.17	75.57
9	-5.57	26.16	7.12	1.94	21.63	12.83	17.76	5.09	71.08	79.32	21.76	82.25
12	-3.44	25.75	7.16	1.94	21.40	12.47	17.29	4.84	70.23	78.33	21.23	81.15
15	62.78	13.17	6.92	2.30	28.51	4.02	13.75	3.58	137.68	141.81	10.06	142.17
18	134.99	32.71	6.74	1.89	53.97	4.13	34.17	4.62	278.50	287.29	16.24	287.75
21	242.86	5.06	8.74	7.17	58.61	4.82	46.91	4.50	361.34	368.49	24.79	369.32
24	229.39	7.07	7.46	13.69	49.99	6.16	39.84	4.49	405.78	410.45	25.08	411.21
27	100.91	6.37	5.99	18.66	52.19	5.92	31.76	3.98	436.26	440.60	20.00	441.06
30	272.69	7.72	4.72	21.64	61.60	6.48	34.93	4.01	479.39	484.50	26.35	485.22
33	320.82	8.08	4.75	15.26	55.42	4.14	41.22	2.79	486.67	490.85	32.10	491.90
36	360.74	8.55	7.59	14.68	61.41	4.63	47.65	2.34	471.68	476.96	37.49	478.43
39	557.66	8.05	9.02	12.95	99.37	5.63	51.41	2.30	500.12	511.10	42.02	512.82
42	515.69	16.84	9.32	4.80	138.56	5.51	52.14	2.32	583.90	601.24	42.32	602.73
45	410.62	19.30	8.12	13.79	159.83	4.34	48.26	2.32	628.82	649.98	38.37	651.11
48	312.49	17.52	6.17	20.71	163.29	3.18	42.12	2.22	631.81	653.71	32.90	654.53

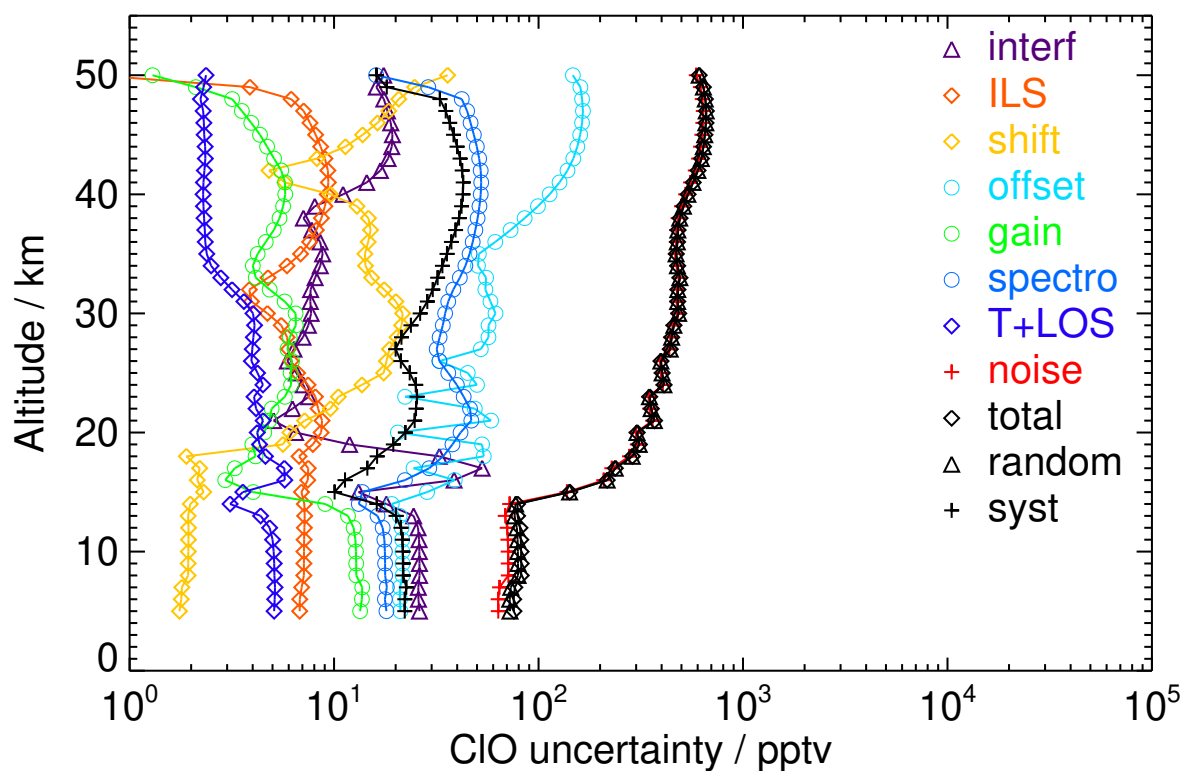
**Figure S9.** V8H_CLO_62 Northern midlatitude winter day

Table S11. CIO error budget for Northern midlatitude winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	21.48	25.70	6.82	1.93	21.26	13.43	22.97	5.15	67.69	77.59	21.43	80.49
9	21.51	25.67	6.83	1.94	21.21	13.40	22.95	5.13	67.64	77.51	21.41	80.42
12	22.59	25.10	6.85	1.94	21.01	12.99	22.24	4.88	66.66	76.26	20.89	79.07
15	61.88	20.25	6.87	1.98	19.23	2.77	13.59	4.26	128.47	132.10	9.86	132.47
18	53.84	39.18	5.81	2.35	24.53	2.61	25.49	4.81	234.32	239.99	12.96	240.34
21	39.18	5.26	5.58	7.70	32.33	4.25	26.04	3.66	307.59	310.39	11.93	310.62
24	-65.75	7.94	4.05	14.21	30.72	3.88	21.93	3.10	357.96	360.22	10.56	360.37
27	-25.90	6.05	2.99	18.68	38.32	4.31	22.93	3.02	402.13	404.89	13.85	405.13
30	6.18	7.61	3.97	23.04	58.58	5.50	28.79	3.42	462.97	467.82	19.98	468.24
33	102.78	8.09	4.06	18.41	56.81	3.77	34.98	2.91	486.12	490.51	24.72	491.13
36	256.52	8.81	5.71	15.99	58.25	3.68	37.37	2.28	471.37	476.11	26.21	476.83
39	215.78	7.25	7.00	14.05	95.90	4.60	36.81	2.28	491.27	501.51	26.72	502.22
42	92.76	16.79	6.96	2.31	135.91	4.74	35.35	2.22	566.92	583.80	25.74	584.36
45	33.44	19.23	5.58	13.83	158.82	3.70	31.96	2.17	618.68	639.60	23.08	640.01
48	17.48	17.28	4.45	21.82	165.53	2.57	28.07	2.13	630.45	652.73	20.16	653.04

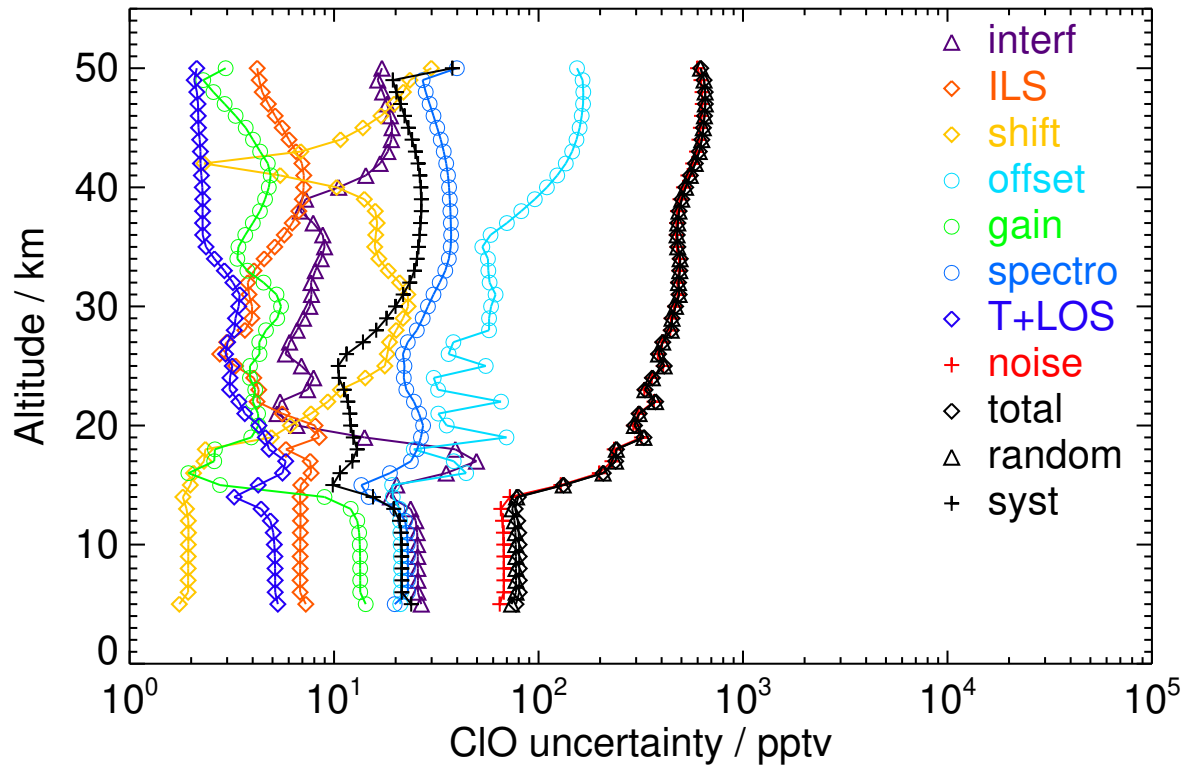
**Figure S10.** V8H_CLO_62 Northern midlatitude winter night

Table S12. CIO error budget for Northern midlatitude spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	66.26	26.97	6.62	1.17	21.25	11.28	16.45	4.86	66.47	75.56	18.83	77.87
9	24.76	26.26	6.82	1.72	21.78	11.62	13.97	5.15	71.98	80.29	17.45	82.17
12	24.71	25.49	6.84	1.74	21.24	11.41	13.78	4.92	70.87	78.88	17.23	80.73
15	53.61	30.24	6.83	3.25	28.01	4.57	17.55	4.52	145.14	151.70	12.56	152.22
18	55.79	23.68	9.62	1.89	59.79	4.15	25.23	4.45	270.91	279.48	13.75	279.82
21	48.45	7.67	7.82	5.93	54.58	3.09	29.90	3.61	321.76	327.53	17.31	327.99
24	225.62	5.88	5.02	13.67	50.32	5.13	33.99	3.52	364.24	369.12	19.76	369.65
27	119.09	6.06	5.09	21.97	58.13	6.66	34.02	4.15	405.92	411.68	20.91	412.21
30	245.69	6.55	4.93	21.76	58.27	7.04	43.12	3.83	437.57	442.88	34.37	444.21
33	599.89	7.09	7.65	14.24	42.89	4.44	55.17	3.80	435.40	439.06	44.99	441.36
36	672.05	9.07	10.95	19.98	49.08	6.33	57.06	3.92	442.45	446.71	50.32	449.54
39	536.58	6.57	11.94	20.51	74.69	7.65	51.95	4.21	441.82	449.51	45.91	451.85
42	346.89	15.37	9.92	5.69	115.67	6.55	44.76	3.70	491.93	506.33	37.90	507.74
45	100.68	16.91	6.42	22.48	148.45	4.71	36.83	3.18	558.90	579.46	29.22	580.20
48	-9.05	13.98	4.45	33.88	164.22	3.07	30.55	2.92	606.21	629.49	22.81	629.90
52	-28.12	9.76	4.88	37.70	163.09	2.42	24.62	2.51	589.17	612.83	17.85	613.09

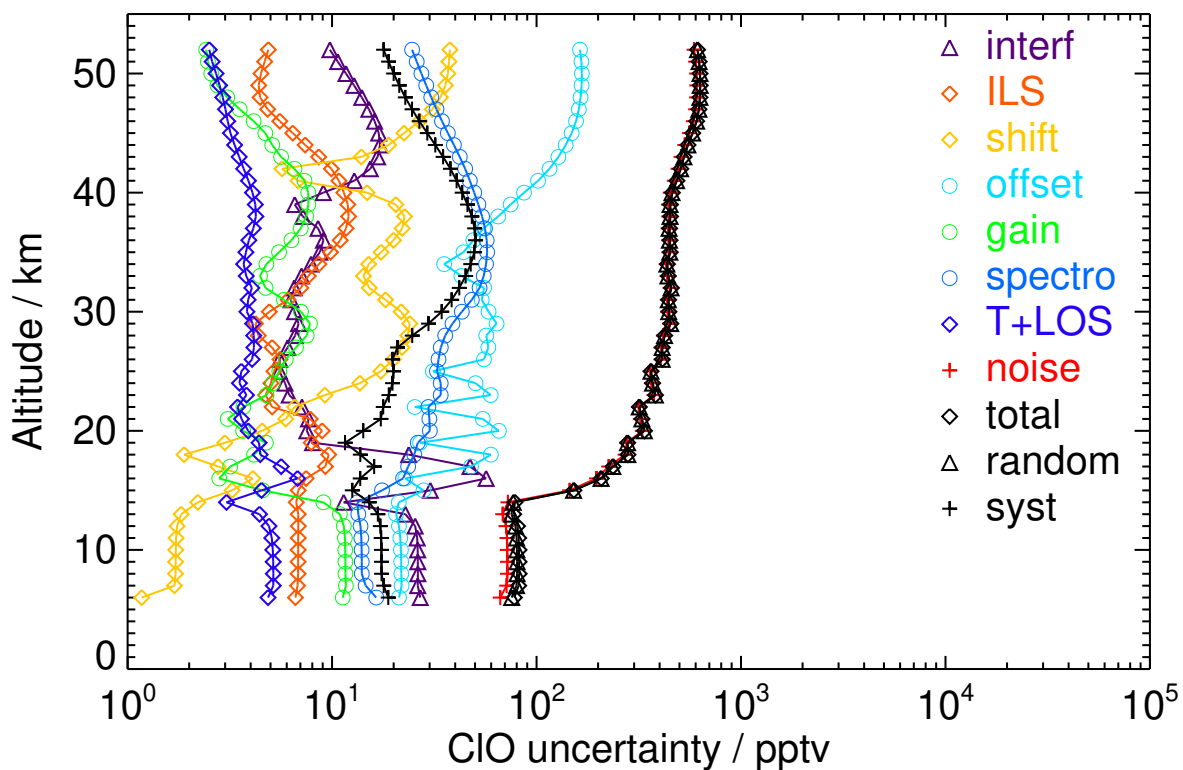
**Figure S11.** V8H_CLO_62 Northern midlatitude spring day

Table S13. CIO error budget for Northern midlatitude spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	15.35	26.70	6.48	1.56	21.24	9.67	11.49	4.96	73.04	81.27	13.75	82.42
12	14.65	26.04	6.50	1.57	20.67	9.50	11.33	4.74	71.98	79.92	13.62	81.07
15	9.33	28.81	5.12	2.97	29.41	4.02	12.94	4.14	143.83	149.98	11.08	150.39
18	63.78	23.86	7.10	2.20	63.60	2.77	23.82	4.24	268.70	278.06	12.00	278.32
21	-46.37	7.82	4.88	6.16	61.34	3.72	24.63	3.44	322.66	329.44	9.65	329.59
24	-4.11	5.95	3.37	14.27	56.92	3.97	21.48	2.92	362.91	368.17	11.47	368.35
27	38.54	5.90	4.75	22.33	59.50	5.71	25.51	3.41	402.87	408.48	15.59	408.77
30	72.08	6.50	4.78	25.07	60.30	6.31	27.95	3.46	441.90	447.25	20.24	447.70
33	76.74	7.05	4.89	15.55	47.72	2.60	30.15	2.93	441.56	445.12	18.80	445.52
36	68.61	9.30	3.71	19.83	47.81	3.22	28.34	2.48	442.58	446.19	19.74	446.63
39	150.66	6.42	4.43	21.26	71.87	5.35	29.94	2.26	439.11	446.08	20.88	446.57
42	60.17	15.62	5.24	3.63	112.22	5.82	32.30	2.12	487.00	500.70	20.70	501.13
45	50.59	17.97	5.16	21.55	145.16	4.95	31.93	2.16	550.78	570.89	19.49	571.22
48	45.44	15.19	5.28	33.37	161.76	3.75	29.66	2.27	602.25	625.17	17.57	625.42
52	45.66	10.82	6.10	37.77	161.42	3.20	26.89	2.04	586.34	609.84	16.47	610.06

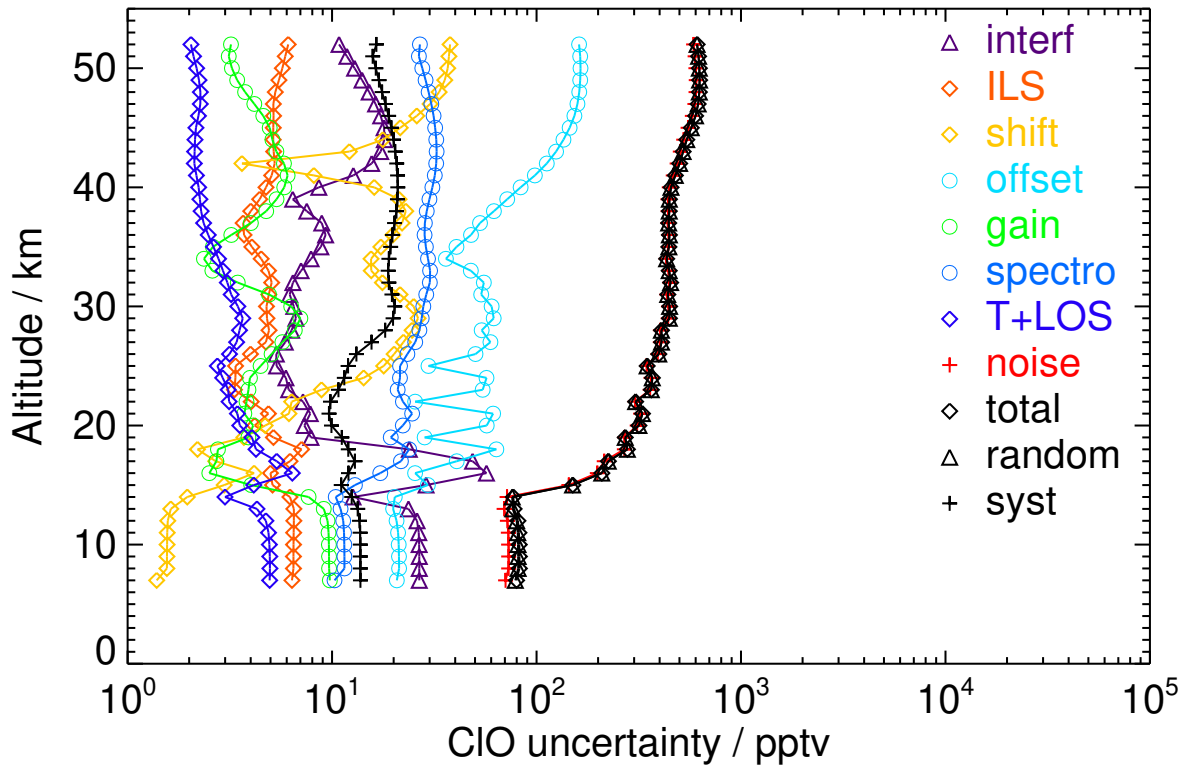
**Figure S12.** V8H_CLO_62 Northern midlatitude spring night

Table S14. CIO error budget for Northern midlatitude summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	64.52	27.64	6.41	2.28	21.43	10.46	12.29	7.33	85.40	93.12	14.36	94.22
12	63.21	27.46	6.46	2.30	20.97	10.41	12.27	7.08	84.58	92.18	14.39	93.30
15	34.47	11.37	9.64	3.41	28.51	7.00	20.71	4.16	135.60	139.85	19.26	141.18
18	-7.67	35.33	9.66	2.98	53.68	3.61	27.90	5.69	269.67	278.36	17.14	278.89
21	95.07	5.93	5.88	3.36	58.00	4.51	31.70	4.36	342.78	349.02	13.16	349.26
24	67.16	5.48	4.32	9.73	51.25	4.60	27.94	3.68	379.95	384.33	15.31	384.64
27	142.00	5.46	5.00	21.86	48.15	6.43	29.96	3.84	401.26	405.54	18.81	405.97
30	103.82	6.55	5.22	27.34	56.60	8.74	36.37	4.23	439.96	445.21	28.19	446.10
33	401.60	6.18	5.92	16.22	50.47	4.58	48.51	3.67	440.65	445.01	37.53	446.59
36	643.22	7.94	7.68	16.28	38.86	5.78	53.36	3.25	433.30	436.47	45.10	438.79
39	505.31	6.88	8.63	20.96	59.09	7.97	50.42	3.51	428.42	433.73	45.69	436.13
42	399.19	11.55	8.14	8.07	95.52	8.44	46.24	3.07	464.67	475.17	41.67	476.99
45	345.72	15.68	6.30	10.79	127.60	7.27	42.24	2.60	524.70	540.83	36.54	542.07
48	288.31	14.07	4.10	25.97	145.17	5.38	38.03	2.46	585.41	604.28	31.47	605.10
52	252.91	10.54	3.68	36.42	147.82	4.01	33.00	2.25	580.19	600.25	27.06	600.86

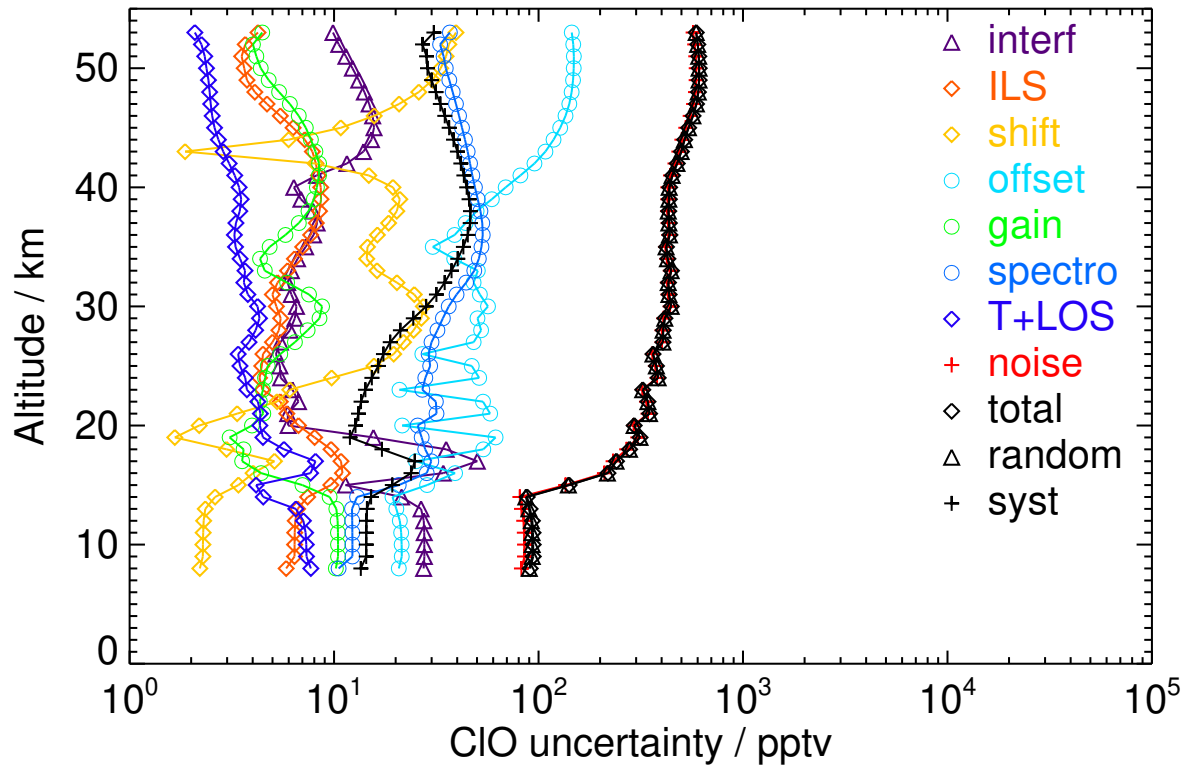
**Figure S13.** V8H_CLO_62 Northern midlatitude summer day

Table S15. CIO error budget for Northern midlatitude summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	34.88	28.15	5.81	2.35	22.33	10.60	10.12	7.52	93.54	100.91	12.97	101.74
12	35.06	28.02	5.85	2.36	21.89	10.52	10.09	7.30	92.75	100.02	12.92	100.86
15	26.37	9.23	7.35	2.95	24.75	6.24	14.67	3.76	128.22	131.44	13.82	132.17
18	15.38	38.32	8.79	2.81	37.31	3.02	27.16	5.77	249.31	256.02	18.20	256.67
21	19.39	4.93	5.40	3.06	41.57	3.63	25.00	4.19	323.82	327.35	12.21	327.57
24	-16.71	5.63	5.27	9.44	37.85	4.43	26.87	3.94	363.99	366.99	11.86	367.19
27	60.46	5.27	3.71	20.07	38.95	5.44	22.81	3.62	393.86	396.82	13.64	397.05
30	-92.90	6.47	5.96	27.13	55.33	7.69	24.07	4.51	442.99	447.75	17.12	448.08
33	-88.84	6.25	4.79	18.02	50.97	3.44	24.61	2.71	452.14	455.73	18.52	456.11
36	194.20	7.73	3.48	16.22	38.65	3.02	29.55	2.19	440.24	442.72	22.88	443.31
39	403.09	6.74	4.27	19.71	62.25	5.20	33.57	2.19	437.29	442.65	27.84	443.52
42	306.83	10.94	5.93	6.99	98.69	6.57	34.29	2.51	474.62	485.41	28.36	486.24
45	167.64	14.71	5.22	10.75	129.59	5.95	31.38	2.43	535.88	552.02	25.08	552.58
48	82.75	13.40	3.75	23.94	145.69	4.48	27.28	2.39	589.58	608.21	21.03	608.58
52	58.52	10.35	3.89	32.56	146.67	3.33	22.95	2.16	578.05	597.56	17.46	597.81

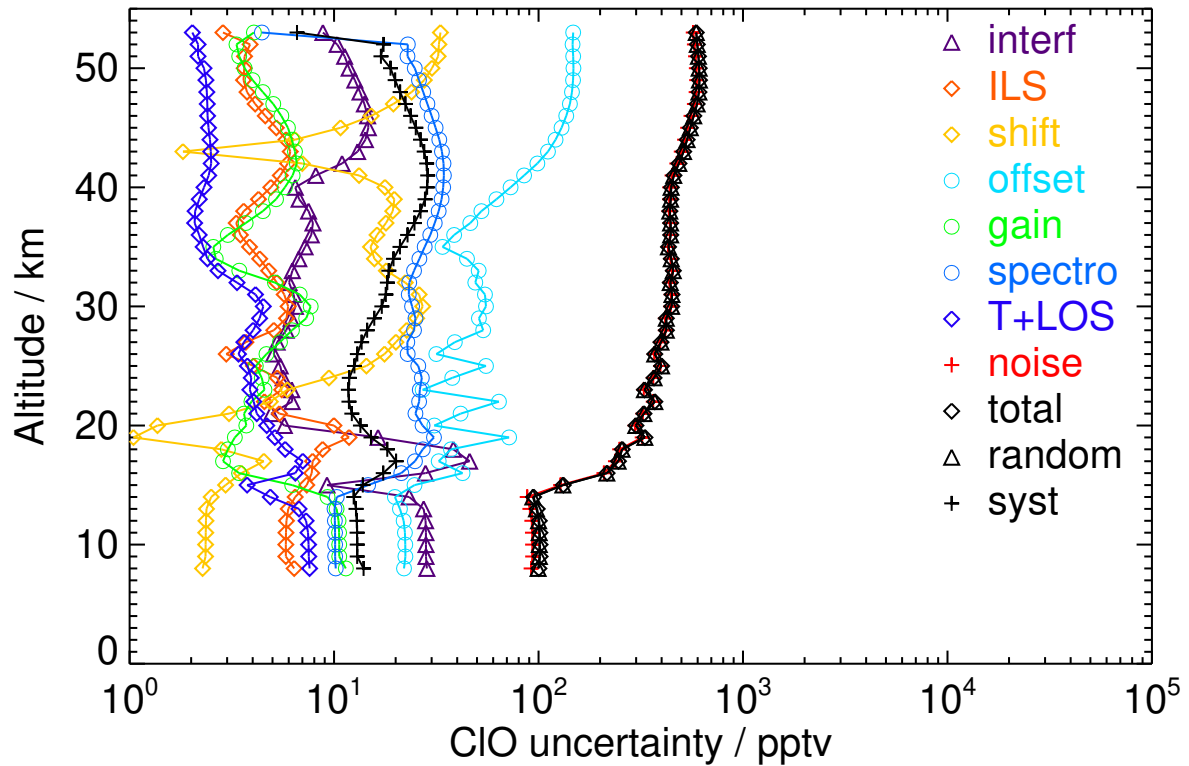
**Figure S14.** V8H_CLO_62 Northern midlatitude summer night

Table S16. CIO error budget for Northern midlatitude autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	42.53	24.64	6.36	2.94	25.07	9.22	13.64	5.85	92.80	99.98	14.35	101.00
12	41.86	24.20	6.44	2.97	24.49	9.23	13.82	5.69	91.93	98.91	14.56	99.98
15	14.61	26.25	9.93	3.85	22.89	7.90	28.58	6.76	132.84	138.83	24.95	141.06
18	78.28	32.55	8.54	1.77	26.06	3.15	26.13	5.35	250.77	255.20	17.06	255.77
21	11.51	5.47	7.09	3.56	24.25	3.27	25.24	3.77	311.10	313.04	11.54	313.25
24	67.96	5.81	4.96	10.11	26.30	3.67	29.28	3.35	351.06	353.10	17.26	353.52
27	295.92	5.45	5.17	17.26	38.39	5.86	37.84	3.55	391.58	394.87	26.85	395.78
30	359.04	6.47	5.06	23.07	60.01	8.22	41.60	4.17	445.29	450.75	33.55	452.00
33	421.96	6.59	6.60	17.95	55.49	5.75	47.27	3.81	460.83	465.47	38.42	467.05
36	591.07	7.64	8.19	15.97	50.71	5.34	49.89	3.21	450.12	454.17	42.53	456.16
39	526.08	6.42	9.72	15.95	85.26	6.38	48.87	3.12	459.66	468.63	42.15	470.52
42	312.56	12.50	9.15	2.80	128.31	6.00	44.82	3.13	520.12	536.60	36.71	537.85
45	127.41	14.09	7.24	12.23	158.55	4.40	38.81	3.11	582.95	604.99	29.79	605.73
48	28.87	12.32	5.25	21.63	171.54	2.94	33.16	3.19	613.23	637.70	23.99	638.15
52	-64.95	7.35	5.14	27.57	166.55	1.02	27.58	3.97	582.40	606.85	16.74	607.08

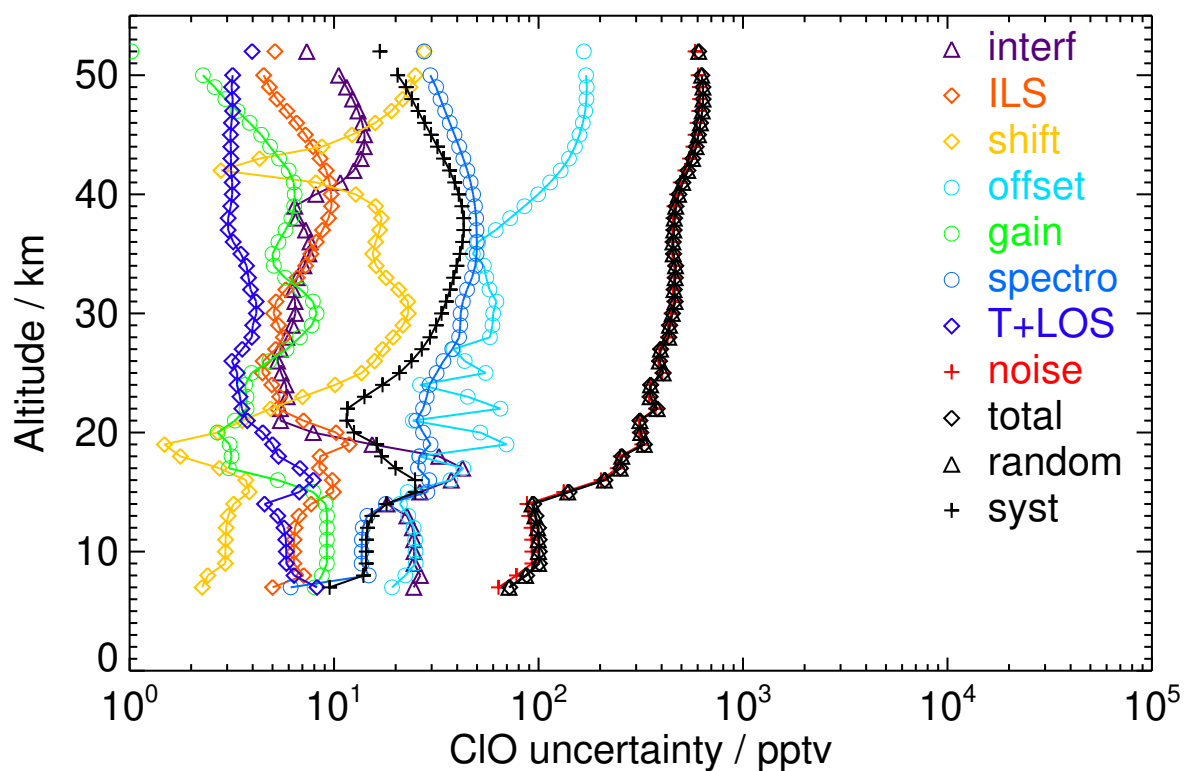
**Figure S15.** V8H_CLO_62 Northern midlatitude autumn day

Table S17. CIO error budget for Northern midlatitude autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-49.38	24.46	5.78	2.08	19.93	12.64	5.26	5.84	62.35	70.39	13.71	71.71
9	12.11	25.44	5.53	2.41	22.22	10.76	8.62	5.49	77.54	85.18	12.41	86.08
12	22.59	24.59	5.86	2.49	22.52	10.36	9.23	5.24	80.32	87.55	12.62	88.45
15	37.84	26.93	6.67	3.60	24.72	5.32	16.94	4.70	138.18	143.59	14.45	144.31
18	-46.11	29.81	9.94	1.31	35.88	4.65	22.09	5.31	251.88	256.80	17.53	257.40
21	9.96	6.59	5.15	3.75	31.39	1.73	24.74	3.21	307.42	309.75	16.02	310.16
24	207.48	5.84	5.53	11.00	31.33	4.71	31.47	3.26	349.08	351.71	18.70	352.21
27	-2.88	5.87	5.09	19.16	46.68	5.98	27.29	4.15	397.33	401.24	16.70	401.59
30	-71.03	6.51	4.01	20.14	58.85	5.33	25.40	3.65	445.18	450.07	15.37	450.33
33	-34.13	6.84	5.22	13.91	47.67	2.98	26.98	3.16	453.66	456.96	16.99	457.27
36	57.08	8.02	3.92	14.65	55.16	2.91	29.21	2.33	458.26	462.39	20.11	462.83
39	150.60	6.72	5.40	15.13	90.24	4.45	35.32	1.91	470.27	479.81	25.52	480.49
42	251.20	13.64	7.33	4.07	132.99	5.31	41.54	2.01	529.86	547.36	29.27	548.14
45	266.34	15.47	7.31	11.23	161.74	4.60	42.36	2.17	591.68	614.54	28.81	615.21
48	252.39	13.76	6.60	19.75	173.31	3.54	39.77	2.32	614.12	639.31	26.22	639.85
52	657.02	10.15	12.22	22.99	164.94	6.32	71.55	2.42	583.80	610.20	40.34	611.53

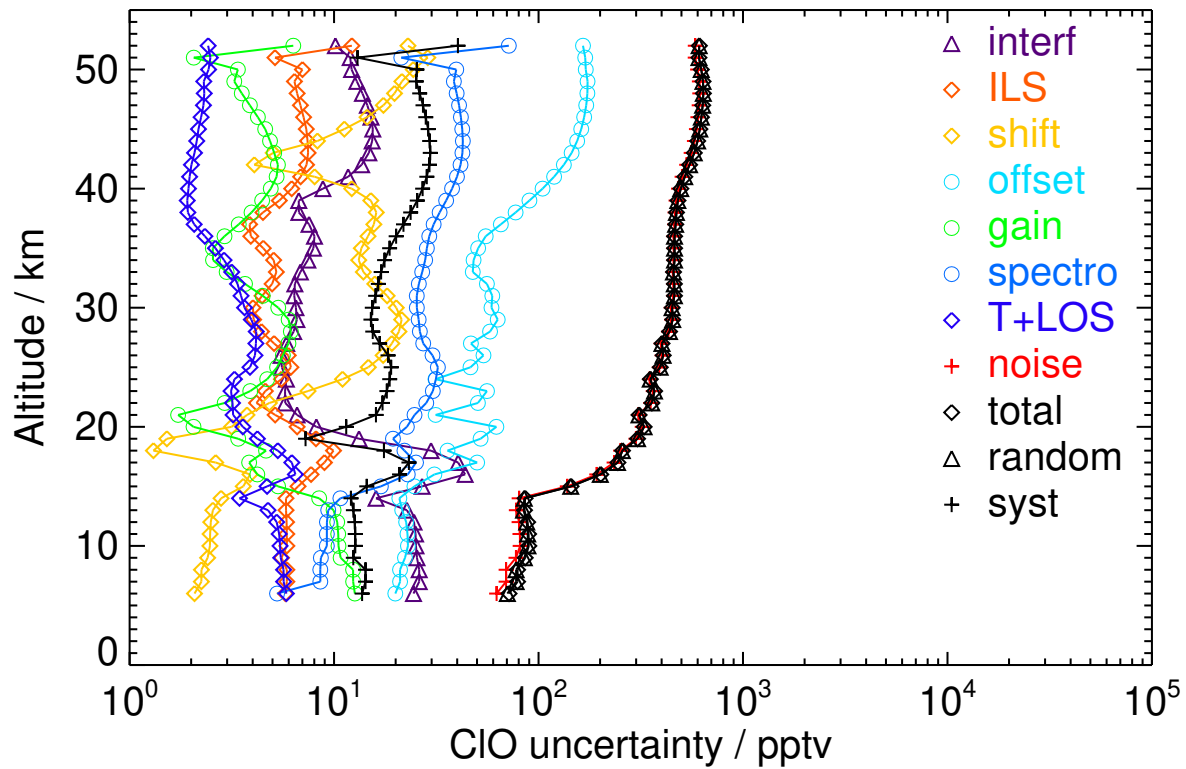
**Figure S16.** V8H_CLO_62 Northern midlatitude autumn night

Table S18. CIO error budget for Tropics day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	8.12	23.54	5.42	2.14	17.71	7.64	8.75	8.25	63.90	71.23	10.67	72.03
12	8.30	23.01	5.28	2.22	17.38	7.79	8.63	7.88	63.07	70.18	10.69	70.99
15	-12.30	19.06	7.42	4.08	32.86	8.50	27.78	6.59	155.04	160.37	26.85	162.61
18	-54.09	31.66	7.40	1.68	64.30	2.10	29.47	6.25	321.79	330.21	24.75	331.14
21	-11.58	8.41	6.37	2.77	56.73	2.44	28.67	4.26	356.86	362.41	13.77	362.67
24	151.91	6.19	4.51	11.96	50.56	4.71	27.03	3.67	376.03	380.27	17.77	380.69
27	146.77	6.72	5.72	25.57	55.10	7.19	31.62	4.40	398.98	404.51	19.92	405.00
30	120.77	6.68	5.51	26.85	55.38	6.87	33.26	3.93	426.07	431.26	24.15	431.93
33	352.33	6.60	5.06	14.44	40.23	2.85	37.89	3.02	421.50	424.40	29.96	425.45
36	472.39	8.78	5.26	18.78	43.88	4.69	42.79	2.75	433.65	436.89	37.71	438.52
39	600.64	6.36	7.87	20.90	66.90	7.30	45.80	2.87	429.32	435.59	41.81	437.60
42	442.45	13.55	7.52	2.17	106.84	7.48	42.70	3.17	474.77	487.34	38.05	488.83
45	241.05	15.66	5.74	17.54	140.22	5.99	35.17	3.10	549.71	568.15	30.18	568.96
48	125.62	13.76	3.95	29.62	156.32	4.01	29.21	3.17	597.99	619.21	23.78	619.67
52	100.02	10.19	4.32	34.50	156.78	2.98	25.25	2.74	584.34	606.30	19.87	606.63

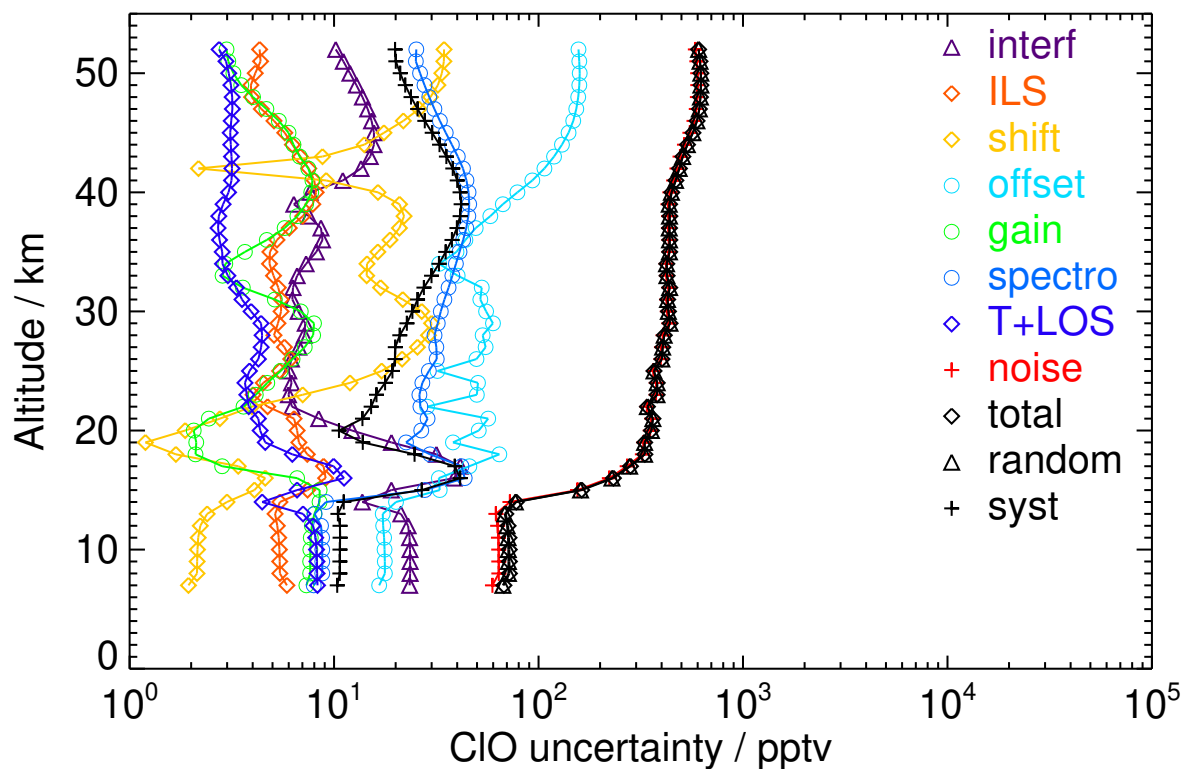
**Figure S17.** V8H_CLO_62 Tropics day

Table S19. CIO error budget for Tropics night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	54.52	22.95	4.78	2.00	16.75	6.47	10.34	8.66	59.79	67.14	11.18	68.06
12	10.89	23.79	4.37	3.18	25.68	7.48	9.48	7.79	90.74	97.88	10.67	98.46
15	-12.20	20.44	10.84	4.73	33.92	9.88	31.60	8.05	151.99	158.49	29.22	161.16
18	-38.88	32.10	9.93	2.12	59.75	2.03	31.49	7.10	321.20	329.13	24.34	330.03
21	1.23	8.73	5.69	3.20	57.21	2.65	27.54	4.42	356.22	361.80	13.22	362.04
24	46.85	5.99	4.63	12.59	51.95	4.41	22.72	3.94	375.59	379.90	14.34	380.17
27	-15.18	6.53	4.22	26.14	56.98	6.57	24.02	4.57	394.05	399.66	13.36	399.89
30	-42.24	6.37	5.69	29.03	55.97	6.43	26.91	3.79	422.88	428.07	20.30	428.55
33	168.38	6.31	4.54	15.06	43.20	2.49	30.49	2.54	421.13	424.27	20.99	424.79
36	149.60	8.08	3.80	19.00	44.38	4.20	29.72	2.44	434.29	437.51	22.65	438.09
39	217.53	6.33	4.11	21.74	65.62	6.26	30.83	2.35	427.00	433.00	25.89	433.77
42	271.75	11.92	4.20	2.50	105.35	6.26	32.38	2.10	470.79	482.97	27.22	483.73
45	257.67	13.67	4.06	18.42	139.76	4.87	31.06	2.57	537.76	556.42	25.70	557.01
48	210.81	11.94	3.46	30.98	157.72	3.10	28.28	3.07	593.58	615.32	22.81	615.74
52	165.29	9.06	4.62	36.01	158.94	2.12	24.28	2.90	582.67	605.29	19.65	605.61

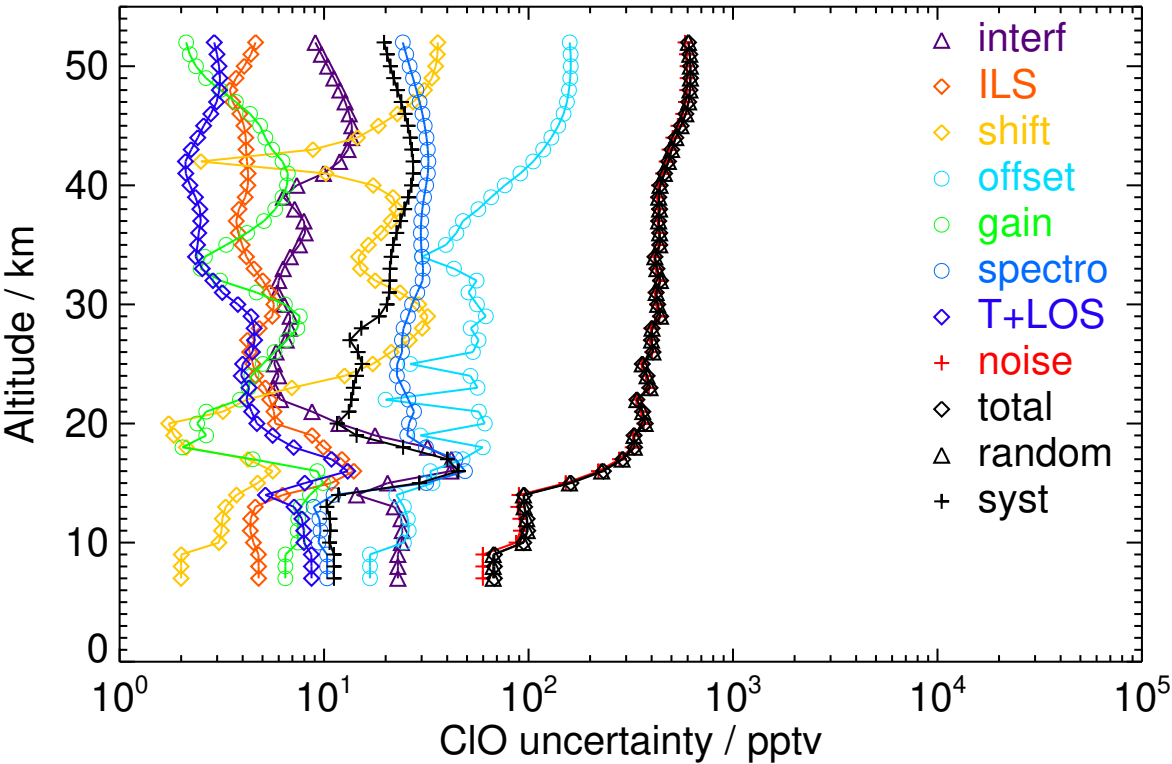


Figure S18. V8H_CLO_62 Tropics night

Table S20. CIO error budget for Southern midlatitude winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	17.56	23.94	5.01	1.88	20.90	9.75	10.23	7.40	67.58	75.65	11.72	76.55
9	6.00	24.10	5.02	1.91	20.89	9.80	9.73	7.30	68.25	76.25	11.62	77.13
12	7.50	23.23	4.99	1.95	20.69	9.66	9.67	6.84	67.24	74.97	11.46	75.84
15	71.38	26.48	4.37	3.27	19.69	5.07	19.82	4.93	138.02	143.03	12.32	143.56
18	123.89	29.43	9.20	1.30	25.22	4.98	35.31	5.26	259.88	264.43	22.42	265.38
21	88.21	5.55	7.91	5.61	24.40	4.57	33.45	4.29	334.42	336.86	15.43	337.21
24	119.64	6.09	4.52	11.16	30.71	4.18	31.37	3.20	389.19	391.46	19.03	391.93
27	169.96	6.69	5.21	17.33	55.73	5.36	37.01	3.95	457.87	462.57	23.89	463.18
30	279.10	7.73	5.67	17.19	67.97	4.89	42.45	3.70	507.07	512.82	31.30	513.77
33	409.57	8.32	8.85	14.35	64.08	4.45	49.12	3.86	516.60	521.89	37.60	523.24
36	445.53	7.99	9.96	14.40	83.42	5.14	48.91	3.82	520.23	528.02	39.93	529.53
39	413.88	9.63	10.35	10.26	121.84	5.61	46.40	3.41	545.61	559.97	38.44	561.28
42	344.37	14.95	9.79	5.65	158.30	4.70	42.88	3.18	612.55	633.48	34.75	634.43
45	275.87	15.33	8.03	14.61	177.11	3.50	37.79	3.03	651.17	675.61	29.91	676.28
48	208.87	13.06	6.47	20.30	177.26	2.68	33.02	2.86	642.70	667.49	25.91	667.99

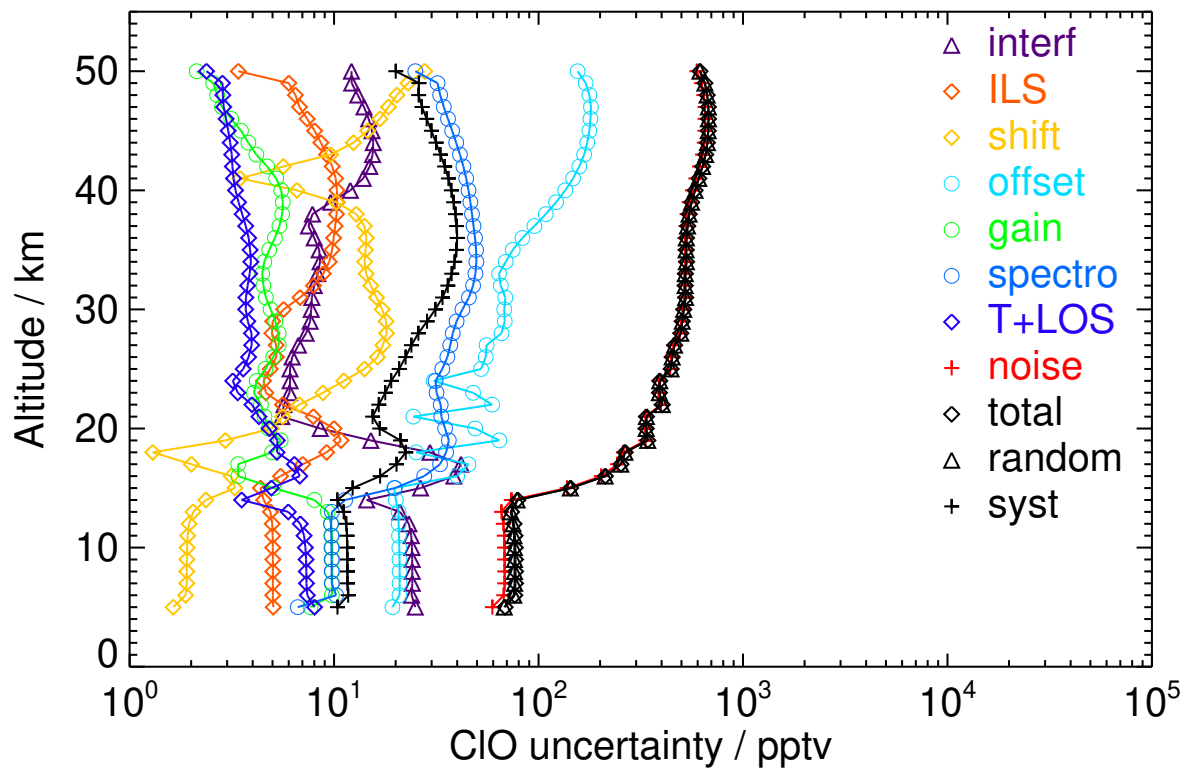
**Figure S19.** V8H_CLO_62 Southern midlatitude winter day

Table S21. CIO error budget for Southern midlatitude winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	26.41	24.12	4.74	1.79	20.06	8.56	8.18	8.24	65.86	73.81	10.37	74.53
9	26.99	24.11	4.68	1.80	20.11	8.49	8.37	8.28	66.13	74.08	10.34	74.80
12	28.60	23.44	4.67	1.84	20.05	8.38	8.23	7.74	65.24	72.98	10.25	73.69
15	36.63	20.82	5.36	3.01	23.50	4.83	15.19	4.87	138.80	142.88	12.37	143.41
18	91.83	31.96	6.89	1.75	32.86	3.05	23.48	5.04	271.51	276.03	16.26	276.51
21	28.62	5.43	6.78	5.34	32.13	3.69	25.34	3.82	347.61	349.92	14.18	350.20
24	-91.30	6.55	4.35	11.35	32.16	3.05	22.70	3.31	394.01	396.09	10.71	396.24
27	81.50	6.81	3.44	17.97	52.69	4.49	25.33	2.96	449.90	453.83	16.63	454.14
30	77.02	7.71	3.62	19.42	63.96	5.03	25.93	3.35	492.16	497.16	17.24	497.46
33	42.34	8.20	4.79	16.00	58.96	3.43	26.12	2.84	500.66	504.90	15.90	505.15
36	1.78	8.08	4.40	15.05	75.53	3.14	24.86	2.32	504.37	510.67	16.01	510.92
39	19.33	9.63	3.88	11.14	114.42	3.97	25.57	1.91	532.22	544.95	17.01	545.21
42	-33.31	15.18	4.15	6.31	153.19	4.09	27.33	1.93	601.08	620.90	17.42	621.15
45	-90.03	15.75	3.79	14.17	173.94	3.44	26.61	2.08	646.94	670.60	16.25	670.80
48	-98.24	13.79	3.33	19.78	176.69	2.78	24.91	2.09	642.48	667.08	15.12	667.25

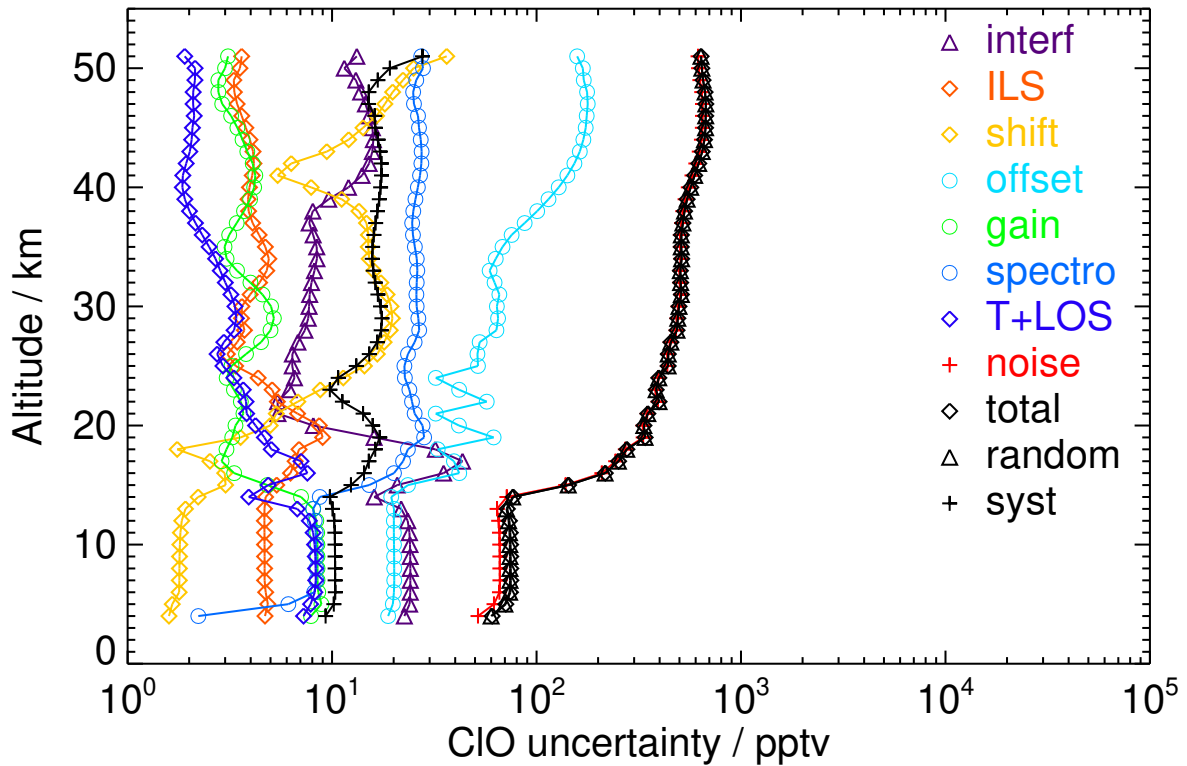
**Figure S20.** V8H_CLO_62 Southern midlatitude winter night

Table S22. CIO error budget for Southern midlatitude spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	24.64	26.45	5.74	1.53	19.61	9.35	6.82	6.71	63.48	72.10	11.41	72.99
9	28.90	25.92	5.22	1.90	21.16	9.24	8.10	6.54	68.99	77.30	11.35	78.13
12	27.97	24.76	5.20	1.95	20.76	9.07	8.03	6.13	67.81	75.71	11.22	76.54
15	25.09	39.14	6.62	4.67	20.59	3.99	17.53	5.48	142.58	149.91	15.19	150.67
18	125.38	27.56	9.26	1.81	33.61	2.93	24.32	5.29	254.22	258.91	14.24	259.30
21	23.39	7.60	8.75	4.77	28.86	4.07	29.52	4.32	295.89	298.75	14.01	299.08
24	215.28	7.03	5.90	13.96	29.70	4.97	35.14	3.74	335.69	338.61	21.65	339.30
27	276.86	6.81	6.34	23.05	47.25	8.01	37.02	4.42	377.63	382.40	25.96	383.28
30	205.19	6.53	5.07	20.55	51.16	6.61	33.73	4.22	412.87	417.32	24.63	418.05
33	327.20	6.89	4.89	12.62	33.48	3.21	39.81	3.15	410.53	412.88	32.01	414.12
36	579.12	9.14	6.41	17.80	43.47	4.66	45.28	2.55	432.11	435.47	38.68	437.19
39	488.98	6.78	8.62	19.70	70.29	6.40	45.17	3.31	440.00	446.76	39.39	448.49
42	247.86	15.22	7.64	5.06	111.22	6.63	41.62	3.18	478.24	491.94	34.40	493.14
45	118.21	17.96	5.54	18.94	144.58	5.52	37.11	2.77	550.21	570.04	28.44	570.75
48	70.94	15.68	4.25	31.95	161.37	4.08	32.66	2.63	588.36	611.57	23.75	612.03
52	18.02	15.13	1.99	32.72	160.70	2.77	12.06	2.05	578.90	601.88	12.52	602.01

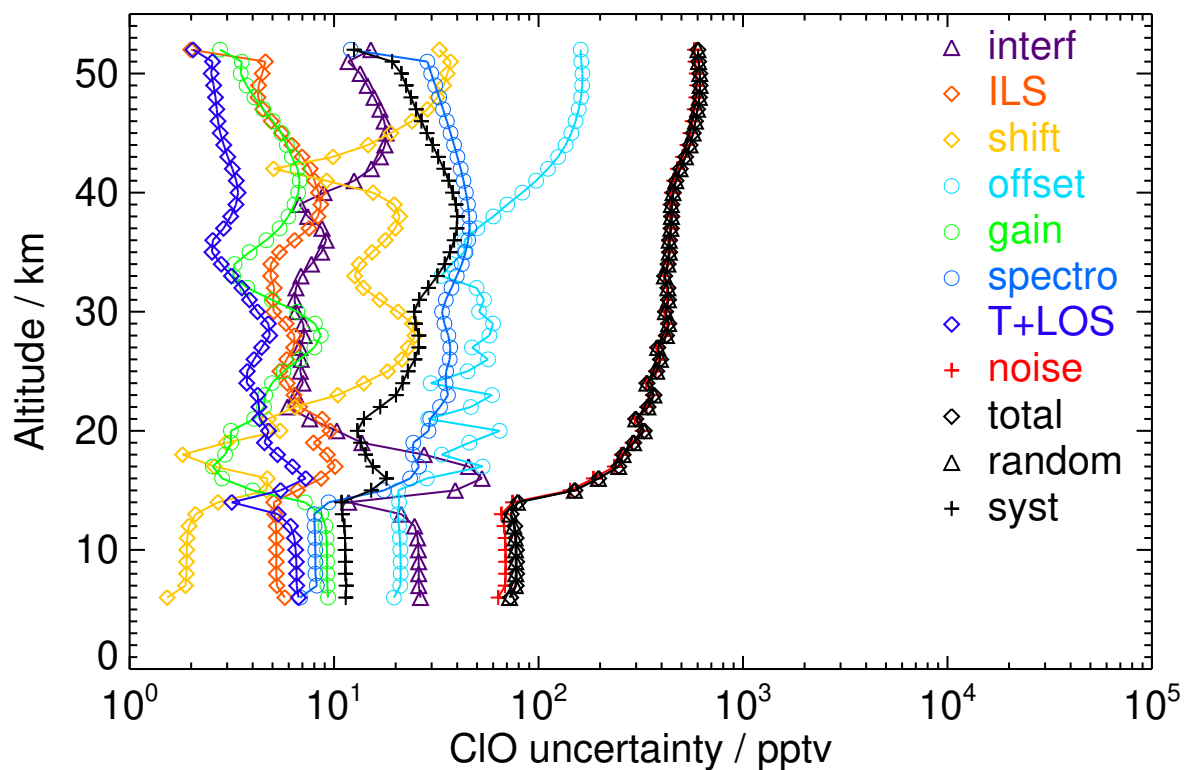
**Figure S21.** V8H_CLO_62 Southern midlatitude spring day

Table S23. CIO error budget for Southern midlatitude spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	34.67	25.91	5.82	1.48	19.23	9.76	8.74	6.49	61.78	70.42	12.24	71.47
9	32.42	26.31	6.14	1.44	19.29	9.79	9.23	6.26	62.48	71.18	12.72	72.31
12	31.85	24.83	6.12	1.52	18.87	9.66	9.29	5.83	61.18	69.33	12.73	70.49
15	8.08	46.85	5.79	5.54	18.88	5.96	17.37	5.98	140.45	149.90	15.65	150.72
18	43.01	22.35	10.06	1.74	30.43	4.88	22.55	5.97	242.76	246.66	13.75	247.04
21	-13.04	6.81	6.43	5.27	23.35	4.90	20.56	3.88	275.23	277.03	11.33	277.26
24	73.27	7.20	4.49	14.78	26.22	4.76	22.94	3.00	313.18	315.20	16.46	315.63
27	10.41	6.55	4.02	25.71	48.31	7.73	25.40	3.72	365.89	370.66	15.97	371.01
30	-114.88	6.05	4.41	19.24	49.80	4.67	24.14	3.51	407.51	411.53	15.13	411.81
33	-12.55	6.73	4.60	9.95	30.89	1.13	27.96	2.86	410.65	412.47	20.22	412.96
36	205.18	9.23	4.24	16.32	46.88	2.32	30.89	1.89	443.95	447.32	23.03	447.91
39	321.90	6.53	5.86	19.21	75.55	4.57	33.38	2.01	452.28	459.47	27.04	460.27
42	308.02	16.38	6.33	4.12	115.73	5.80	35.23	2.25	489.65	503.88	29.40	504.74
45	237.78	19.33	5.50	16.54	148.26	5.34	35.52	2.36	559.23	579.55	28.51	580.25
48	170.79	16.82	4.39	29.67	164.62	4.24	33.58	2.53	592.14	615.95	25.86	616.49

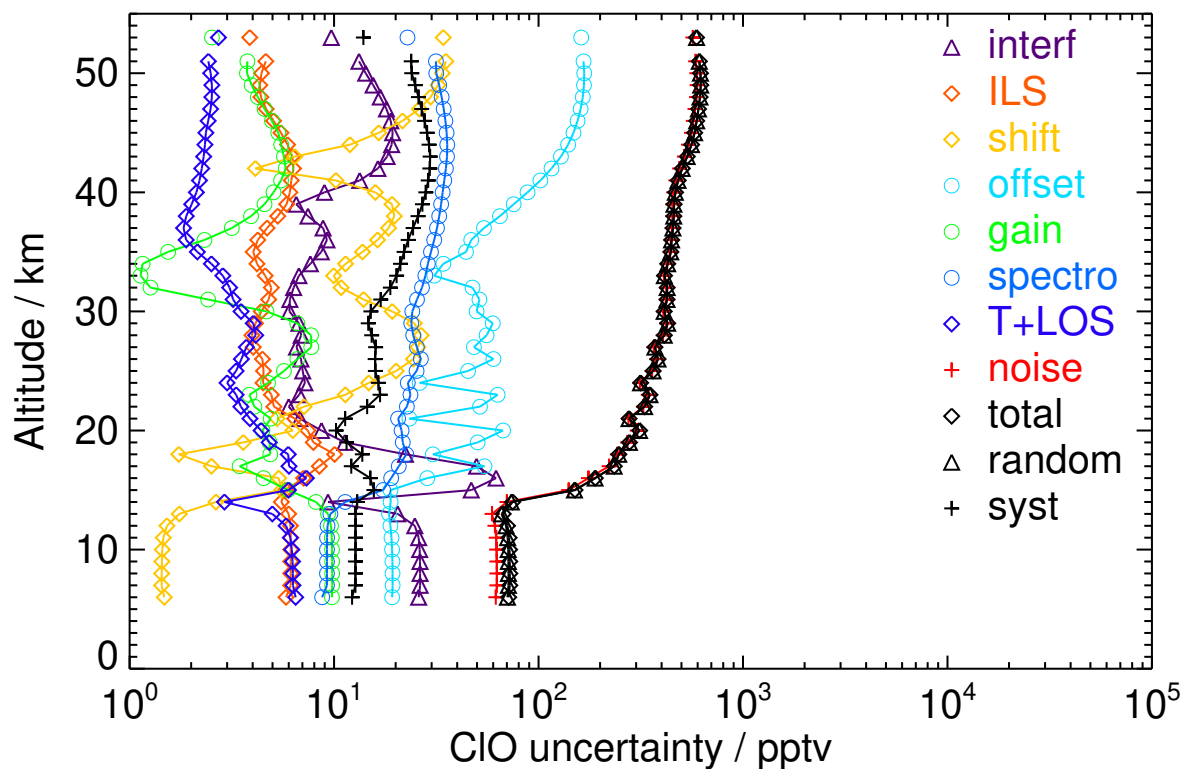
**Figure S22.** V8H_CLO_62 Southern midlatitude spring night

Table S24. CIO error budget for Southern midlatitude summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	15.06	25.40	5.42	1.48	18.55	8.52	11.13	8.02	62.26	70.63	13.03	71.82
9	18.09	25.33	5.44	1.48	18.51	8.35	11.44	7.99	62.35	70.68	13.13	71.89
12	17.48	24.37	5.43	1.55	18.32	8.20	10.78	7.42	61.31	69.30	12.51	70.42
15	-15.48	30.82	7.77	4.29	17.98	4.29	20.35	5.79	134.08	139.47	18.49	140.69
18	-66.76	36.64	7.88	2.11	23.57	2.58	21.78	4.81	240.23	245.09	10.62	245.32
21	52.06	5.20	7.21	4.88	25.28	3.09	30.84	3.89	298.71	301.04	17.90	301.57
24	249.90	8.30	5.96	12.83	25.33	5.61	35.77	4.12	336.58	339.13	22.64	339.89
27	153.27	6.96	4.93	22.68	38.18	8.36	34.15	4.68	375.77	379.51	21.87	380.14
30	202.06	6.99	7.88	23.50	47.03	8.18	43.38	4.28	411.41	416.04	31.77	417.26
33	569.05	7.01	5.83	16.74	34.25	5.16	50.24	3.73	411.58	414.39	42.14	416.53
36	665.47	9.94	7.57	19.35	33.21	5.90	53.59	3.33	420.78	423.51	47.43	426.16
39	448.49	7.27	7.59	25.02	53.46	8.12	47.06	4.06	425.28	430.11	41.93	432.15
42	269.66	14.71	5.27	5.72	87.46	8.46	37.91	3.38	447.69	456.91	33.30	458.12
45	191.25	19.91	4.64	19.63	119.99	7.11	32.83	2.77	511.01	526.04	27.36	526.75
48	135.16	17.96	3.70	37.11	138.99	5.36	29.20	2.77	569.60	588.08	22.89	588.52
52	18.70	13.88	3.66	46.07	143.08	4.81	24.07	2.51	573.32	593.12	17.85	593.39

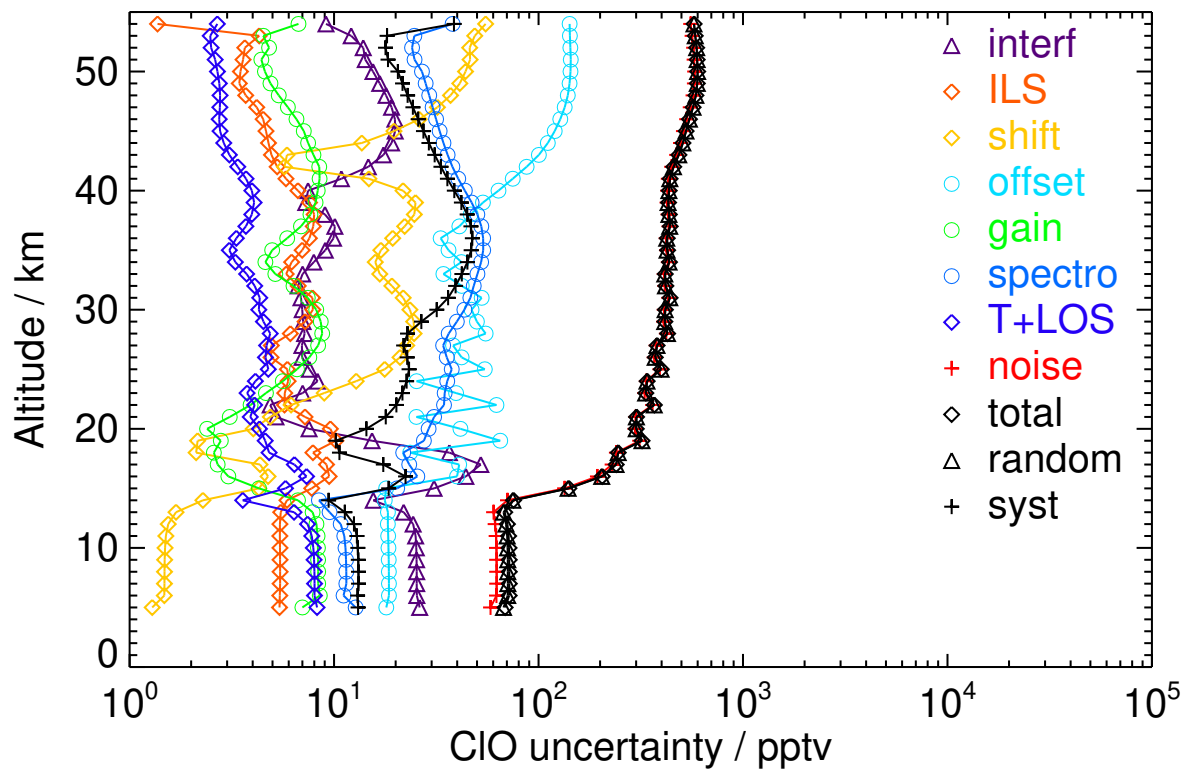
**Figure S23.** V8H_CLO_62 Southern midlatitude summer day

Table S25. CIO error budget for Southern midlatitude summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	10.39	25.03	5.56	1.41	17.96	8.36	6.59	8.51	59.92	68.22	10.23	68.98
9	24.80	25.93	5.82	1.97	20.94	8.45	8.87	7.47	80.39	87.76	10.72	88.41
12	23.78	25.49	5.90	2.00	20.53	8.39	8.84	7.13	79.50	86.69	10.75	87.35
15	-30.28	22.76	9.47	3.86	23.17	5.57	18.65	4.84	133.02	137.92	15.34	138.77
18	12.07	38.02	7.10	2.42	37.75	2.90	22.23	4.91	254.89	261.30	12.11	261.58
21	162.21	5.85	6.72	4.47	37.91	4.68	28.52	3.95	319.88	323.06	18.52	323.59
24	-76.50	7.05	5.54	12.85	34.43	5.31	24.94	4.05	354.18	356.91	12.40	357.13
27	-5.14	6.26	5.73	23.75	43.05	6.97	25.81	3.79	386.63	390.34	18.20	390.77
30	117.68	6.36	5.95	24.38	48.90	7.30	27.51	3.97	416.32	420.41	21.63	420.97
33	55.44	6.46	5.39	15.76	35.21	3.15	26.68	2.68	412.88	415.28	17.30	415.64
36	76.45	8.93	4.09	18.68	32.48	3.08	26.01	2.26	421.84	424.00	19.15	424.43
39	223.72	7.01	3.35	24.72	50.72	5.19	30.44	2.15	422.96	427.21	24.37	427.90
42	263.24	12.98	5.18	6.82	83.44	6.98	36.04	2.20	439.17	447.99	27.03	448.81
45	196.41	16.99	6.26	17.39	116.23	6.93	37.60	2.20	500.50	515.18	26.47	515.86
48	151.88	15.10	6.09	34.97	136.20	5.79	36.09	2.41	561.91	580.12	24.15	580.63
52	71.47	10.75	6.82	47.26	142.12	4.81	31.14	2.35	570.70	590.69	19.59	591.01

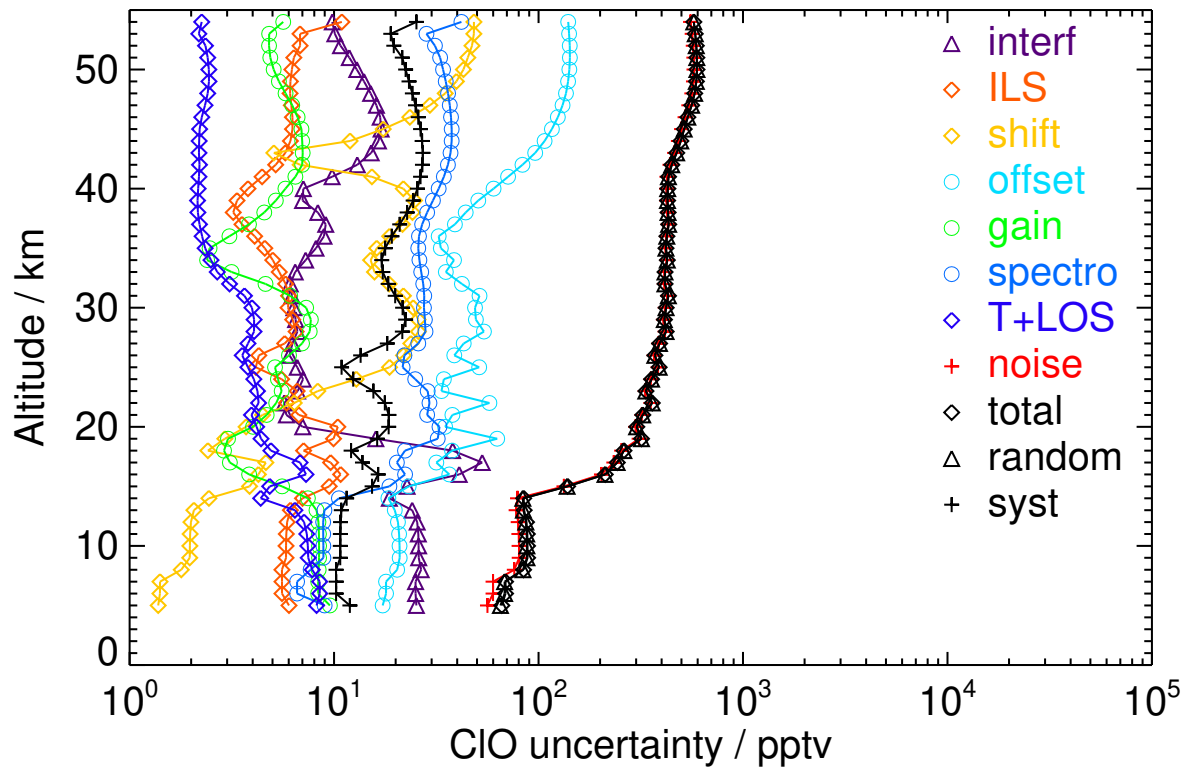
**Figure S24.** V8H_CLO_62 Southern midlatitude summer night

Table S26. ClO error budget for Southern midlatitude autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-89.21	25.62	5.02	1.60	19.03	7.10	6.04	7.81	54.15	63.38	10.43	64.24
9	-9.60	26.22	4.79	2.13	21.52	7.55	8.41	6.57	73.47	81.55	9.81	82.13
12	-9.17	25.68	4.85	2.16	20.98	7.50	8.10	6.25	72.47	80.29	9.68	80.87
15	-1.25	24.33	6.47	3.64	31.03	5.04	16.58	4.30	142.90	148.81	14.39	149.50
18	46.08	24.39	8.34	1.73	68.34	4.37	31.82	4.30	277.16	288.14	13.42	288.45
21	139.17	7.28	6.08	4.43	68.49	6.15	40.26	4.31	343.01	351.79	19.35	352.33
24	43.24	5.78	4.97	11.47	61.36	5.07	32.21	3.70	386.76	392.87	16.26	393.21
27	127.61	5.79	5.12	18.36	60.50	6.00	34.50	3.40	419.32	425.09	20.59	425.59
30	256.40	6.75	4.89	19.80	63.59	6.62	37.30	3.48	462.19	467.88	25.70	468.59
33	273.21	7.19	5.89	12.66	55.60	3.76	42.96	3.18	470.14	474.61	31.41	475.64
36	414.27	8.08	6.62	14.01	63.19	4.57	47.74	2.78	464.55	469.90	40.09	471.61
39	643.82	7.14	8.49	13.77	100.97	5.85	53.59	2.67	486.22	497.54	47.85	499.83
42	660.39	15.07	9.66	3.54	142.83	5.90	56.13	2.64	561.17	579.97	49.71	582.10
45	544.27	17.20	8.65	12.60	168.63	4.71	52.75	2.61	613.05	636.80	45.69	638.44
48	438.95	15.18	6.90	20.07	177.08	3.43	47.28	2.55	632.39	657.73	40.11	658.95
52	524.66	11.12	6.31	30.75	163.45	4.01	51.28	2.84	583.30	607.04	47.18	608.87

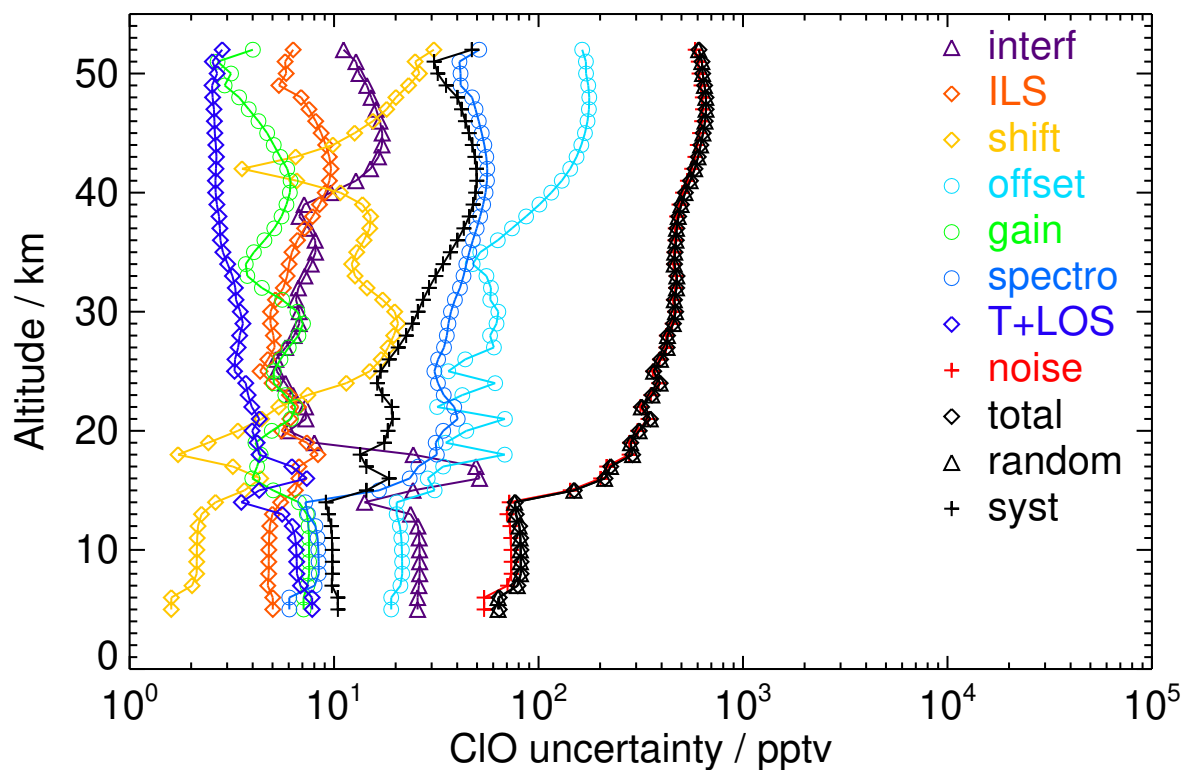
**Figure S25.** V8H_CLO_62 Southern midlatitude autumn day

Table S27. CIO error budget for Southern midlatitude autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	35.66	25.85	5.30	1.75	21.25	8.35	4.14	6.70	65.74	74.14	10.36	74.86
9	9.73	26.14	5.14	2.01	21.03	8.12	6.95	7.47	69.63	77.93	10.06	78.58
12	9.79	25.44	5.21	2.06	20.52	8.09	6.73	7.07	68.56	76.55	10.03	77.21
15	-26.48	27.41	7.22	3.92	29.54	5.37	19.78	5.15	145.89	151.82	19.31	153.04
18	9.77	25.49	6.26	1.41	65.72	2.58	22.68	3.93	273.54	283.34	9.46	283.50
21	36.82	7.66	3.95	4.64	64.75	4.12	26.37	3.65	335.81	342.99	11.85	343.19
24	-17.87	6.01	3.40	12.13	58.95	3.67	22.83	2.99	379.03	384.40	10.70	384.55
27	-32.99	6.07	3.31	18.96	60.76	5.16	23.18	3.25	413.16	418.60	12.28	418.78
30	-112.96	6.96	4.81	21.07	63.84	5.41	23.72	3.36	456.70	462.12	14.57	462.35
33	27.56	7.37	4.68	13.45	54.51	2.07	27.93	2.89	462.38	466.35	18.14	466.71
36	52.50	8.47	2.85	15.30	59.80	2.74	26.12	2.19	458.71	463.29	19.11	463.68
39	161.22	7.18	4.07	15.15	94.07	4.38	28.91	1.85	475.70	485.63	21.32	486.10
42	183.79	15.81	4.58	1.83	135.61	4.69	30.13	1.90	545.37	562.62	21.88	563.05
45	150.75	17.88	3.60	15.28	163.09	3.60	28.22	2.13	599.42	622.00	20.14	622.32
48	111.67	15.49	3.24	23.76	173.65	2.48	25.28	2.27	626.55	651.05	17.78	651.30
52	-918.76	12.11	5.93	33.17	164.40	1.03	10.74	2.37	595.05	618.44	7.12	618.48

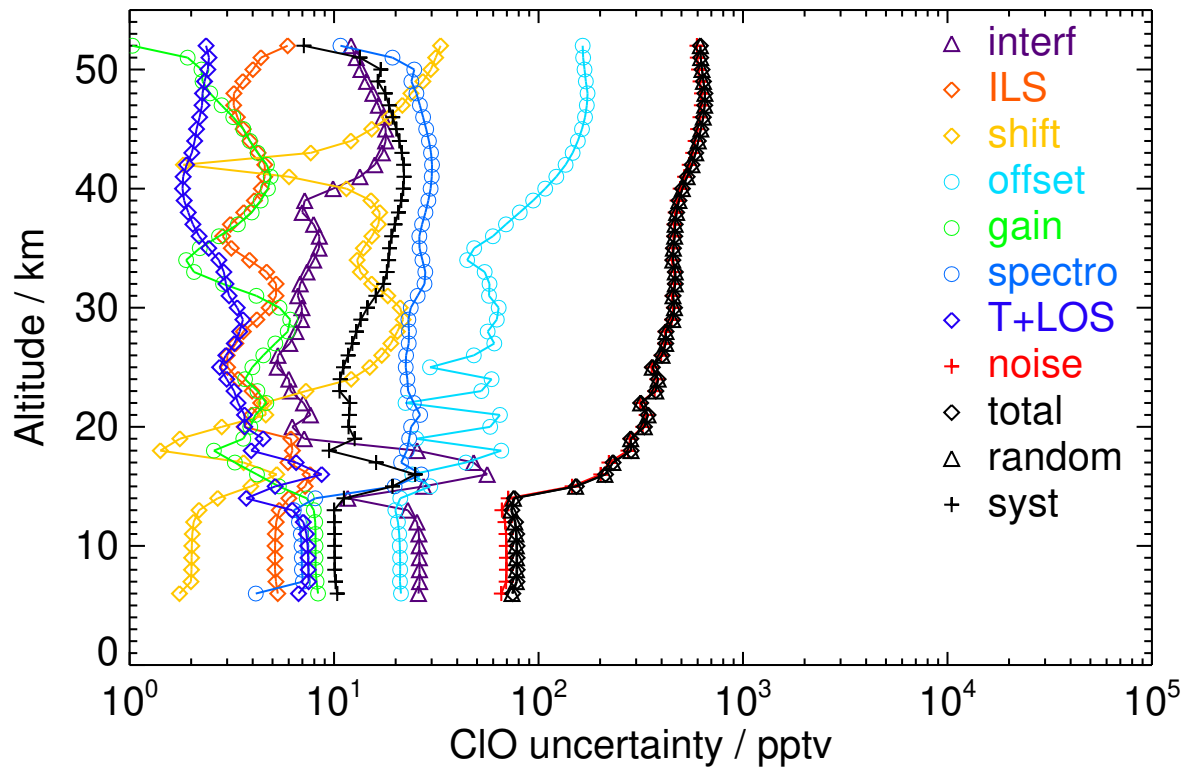
**Figure S26.** V8H_CLO_62 Southern midlatitude autumn night

Table S28. ClO error budget for Southern polar winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	65.96	22.58	3.03	2.07	24.87	8.24	12.84	6.88	74.59	82.59	12.83	83.58
9	81.30	22.13	3.38	2.17	35.34	5.64	17.30	4.65	129.43	136.68	13.31	137.33
12	107.51	22.57	3.36	2.13	39.75	5.48	20.33	4.52	148.92	156.57	15.26	157.31
15	280.40	11.71	5.51	1.66	32.07	4.21	41.52	5.75	163.02	168.54	33.80	171.90
18	1130.72	24.28	9.57	3.34	33.59	7.58	101.95	11.23	352.68	359.70	86.00	369.84
21	1221.29	8.71	27.77	4.15	34.27	10.83	132.32	14.37	446.13	452.57	118.67	467.87
24	723.94	6.83	25.33	7.83	50.51	8.82	109.19	14.79	504.29	510.45	96.29	519.45
27	323.76	7.68	17.86	12.12	77.06	7.23	65.26	10.28	554.00	561.26	52.79	563.74
30	106.31	7.96	11.05	14.72	85.69	6.13	37.06	6.51	573.20	580.54	26.92	581.17
33	119.50	7.70	7.37	13.67	82.67	4.83	28.59	4.02	566.79	573.41	20.87	573.79
36	81.34	7.36	6.70	10.33	101.64	4.44	28.01	3.03	554.60	564.38	20.23	564.74
39	-9.53	9.09	7.20	2.35	141.64	4.56	28.68	2.63	587.63	604.96	19.60	605.28
42	-79.36	9.07	6.99	11.94	175.63	4.25	28.98	2.53	656.93	680.59	18.44	680.84
45	-104.74	8.29	5.97	16.06	188.79	3.90	27.00	2.36	681.89	708.14	16.36	708.33
48	-103.54	7.25	4.76	16.16	186.64	3.56	24.13	2.11	658.76	685.23	14.20	685.37

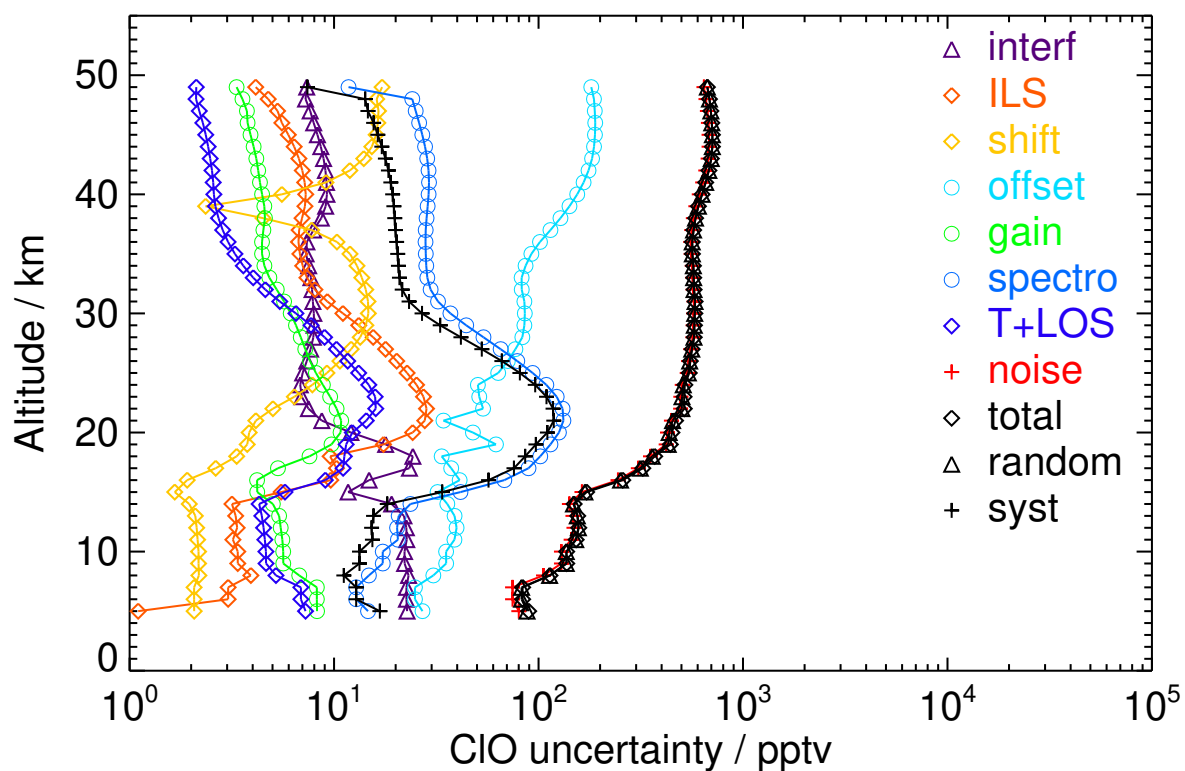
**Figure S27.** V8H_CLO_62 Southern polar winter day

Table S29. CIO error budget for Southern polar winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	33.21	21.95	3.20	1.91	25.11	7.37	7.83	6.36	73.84	81.57	9.03	82.06
9	40.92	21.98	3.29	2.02	27.13	6.65	9.73	5.55	86.06	93.43	9.06	93.87
12	42.10	21.59	3.27	2.01	26.96	6.54	9.72	5.32	85.42	92.67	9.02	93.11
15	104.37	8.58	2.94	1.07	29.65	3.27	14.11	2.56	147.07	150.70	9.84	151.02
18	189.52	26.86	5.62	2.37	38.19	2.21	30.35	5.72	337.38	341.49	19.73	342.06
21	265.22	8.07	6.75	4.30	37.44	2.67	38.54	4.76	438.94	441.64	25.89	442.39
24	263.77	6.82	8.03	7.66	50.50	3.55	41.22	3.99	506.55	510.13	28.55	510.92
27	227.25	8.26	9.52	11.19	81.66	4.83	39.80	4.69	567.94	574.84	26.43	575.44
30	123.38	9.09	9.20	14.10	100.83	5.58	34.44	4.54	600.48	609.72	24.30	610.20
33	14.57	8.42	8.58	13.13	102.40	5.13	33.06	3.83	599.85	609.25	24.00	609.72
36	19.38	7.90	8.04	9.16	120.60	5.22	34.99	3.17	595.07	607.85	25.52	608.38
39	76.13	10.71	7.80	2.78	160.29	5.65	37.71	2.61	625.48	646.39	27.18	646.96
42	104.21	10.68	7.99	10.47	192.56	5.20	38.29	2.41	686.96	714.18	26.90	714.69
45	112.32	9.63	7.34	13.78	202.97	4.75	35.42	2.25	700.97	730.46	24.35	730.87
48	46.17	8.41	6.71	14.41	197.13	4.62	32.85	2.07	667.20	696.40	21.77	696.74

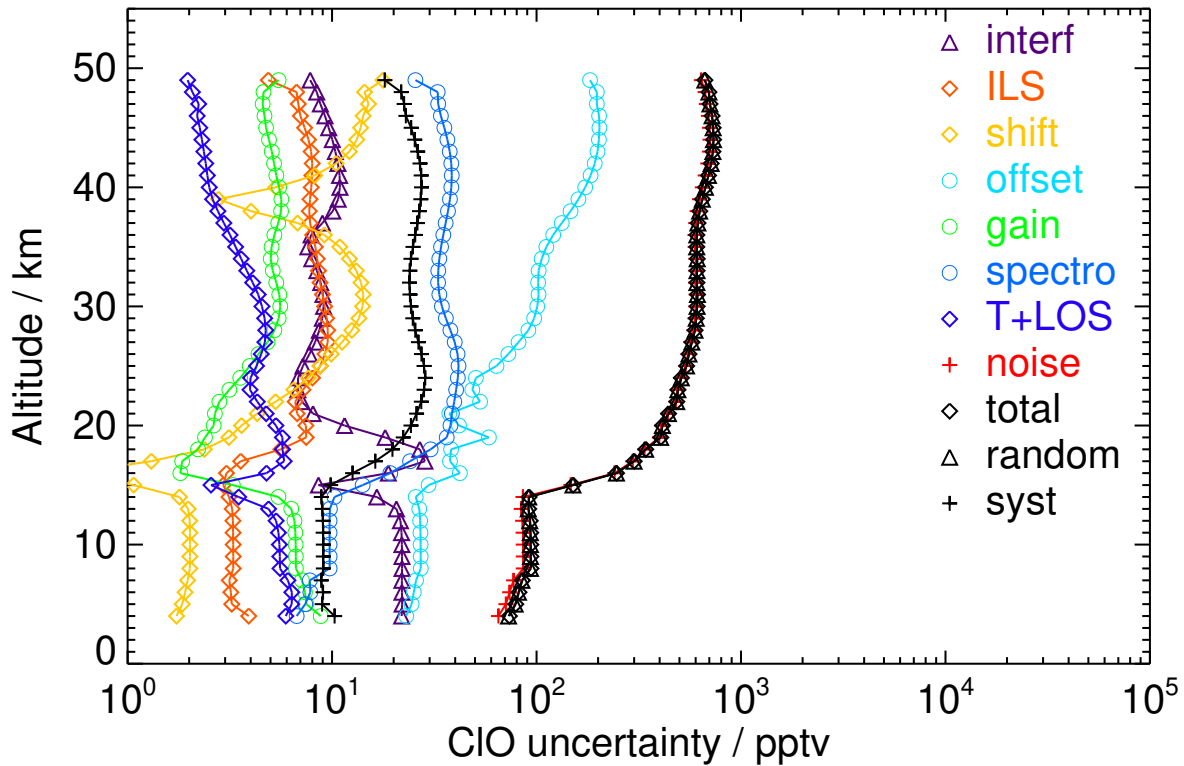
**Figure S28.** V8H_CLO_62 Southern polar winter night

Table S30. CIO error budget for Southern polar spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	12.82	25.04	4.45	2.59	29.46	5.79	9.67	5.41	87.83	96.48	9.15	96.92
9	18.76	24.84	4.87	2.55	30.18	5.46	11.19	5.04	91.43	99.97	10.20	100.49
12	18.43	24.22	5.05	2.57	29.86	5.33	11.21	4.84	90.71	99.03	10.39	99.58
15	22.25	15.61	11.86	3.62	23.81	1.65	17.63	3.90	149.05	152.21	18.50	153.33
18	55.12	38.97	9.75	2.84	43.11	2.85	21.58	4.65	321.66	327.52	12.98	327.78
21	63.98	8.66	13.86	5.35	40.23	2.43	27.67	4.62	356.76	360.25	14.34	360.53
24	209.81	7.99	7.26	12.20	39.66	5.77	32.18	4.86	364.05	367.40	21.94	368.05
27	285.00	7.64	6.54	22.41	49.63	11.28	36.77	5.78	377.31	382.16	29.95	383.33
30	342.41	6.79	8.78	24.50	49.91	11.12	41.39	6.77	395.81	400.68	34.88	402.20
33	509.77	6.55	7.64	13.23	33.20	3.68	46.64	3.55	374.59	377.31	39.27	379.34
36	552.19	7.80	8.40	24.65	38.98	5.61	50.07	3.46	402.76	406.31	43.95	408.68
39	531.04	7.81	8.22	23.68	55.86	7.68	48.55	3.53	418.75	424.03	42.29	426.13
42	354.84	12.17	7.54	19.43	93.83	7.16	43.91	3.21	440.18	451.52	35.65	452.92
45	162.19	12.18	7.20	39.82	129.19	6.28	38.29	2.93	514.89	533.18	28.56	533.95
48	37.03	10.09	8.07	58.15	149.15	5.12	33.37	2.84	559.58	582.67	23.91	583.16
52	-12.18	7.14	9.69	63.62	154.26	4.63	24.09	2.53	565.22	589.67	18.88	589.98

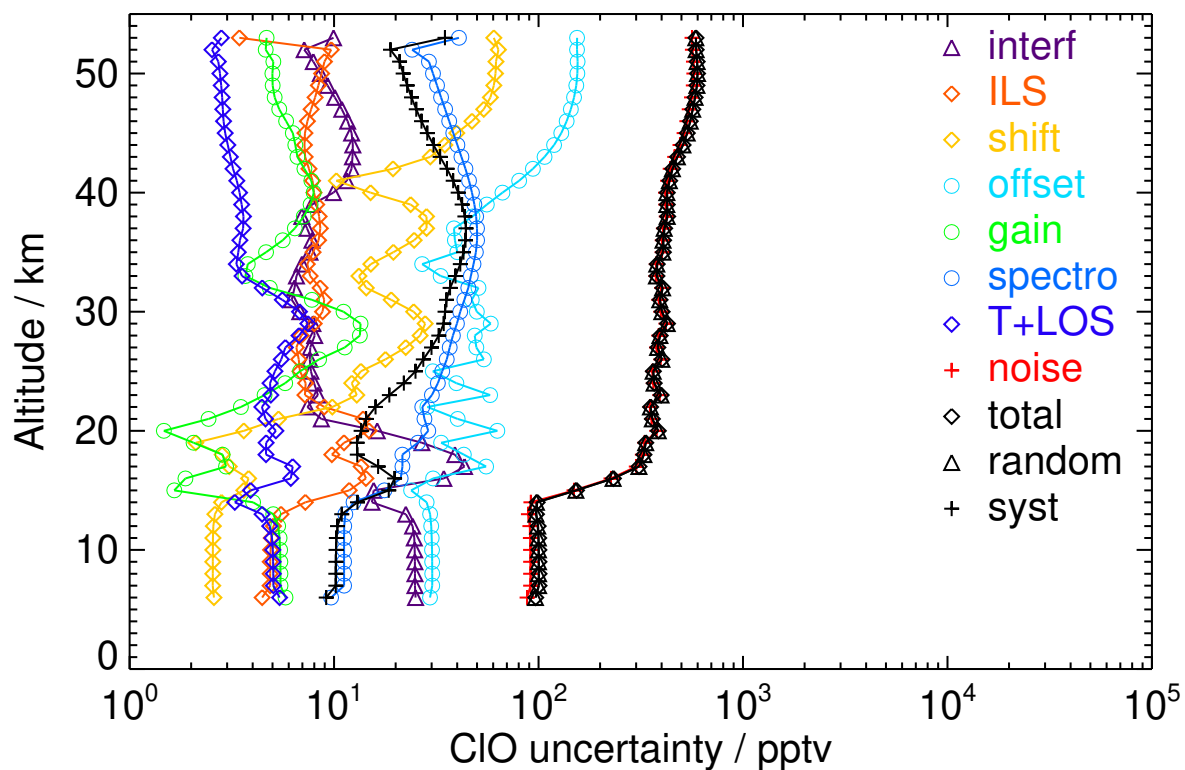
**Figure S29.** V8H_CLO_62 Southern polar spring day

Table S31. CIO error budget for Southern polar spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	36.97	23.21	4.86	2.23	27.20	6.55	11.26	5.35	79.72	87.90	11.56	88.65
9	32.88	24.19	5.01	2.20	26.11	6.61	10.83	5.26	78.76	86.95	11.39	87.69
12	33.27	23.35	5.18	2.22	25.75	6.47	10.95	5.01	77.89	85.80	11.54	86.57
15	35.49	23.83	10.12	3.56	21.36	2.85	17.59	4.50	147.00	150.84	18.30	151.94
18	92.81	34.33	7.99	3.32	36.07	2.79	18.02	4.92	299.61	304.14	13.29	304.44
21	-2.25	8.39	9.27	6.69	31.13	3.25	22.14	4.29	344.21	346.44	12.07	346.65
24	-50.20	7.42	5.46	16.48	35.54	4.56	22.06	3.80	363.68	366.32	14.57	366.61
27	139.72	7.54	5.42	23.50	52.76	9.82	27.28	4.80	390.74	395.55	22.48	396.19
30	77.32	6.58	6.34	23.31	51.20	8.50	30.00	5.07	411.25	415.77	22.54	416.38
33	149.72	6.93	6.59	14.61	32.30	2.91	34.55	3.23	392.95	395.51	23.31	396.20
36	397.62	7.86	7.38	25.35	41.98	4.10	37.22	2.99	417.92	421.57	29.51	422.60
39	388.58	8.69	6.84	18.84	64.94	5.65	36.12	3.11	430.95	436.84	30.51	437.91
42	127.39	12.62	5.50	23.61	105.08	5.26	31.84	2.95	461.19	474.19	25.94	474.90
45	-38.18	13.32	5.86	38.87	139.55	4.69	27.73	2.75	537.98	557.65	21.02	558.04
48	-85.13	11.38	6.98	50.14	157.05	4.19	24.44	2.62	576.18	599.70	17.86	599.96
52	-198.09	7.41	10.41	67.20	150.51	7.11	7.69	2.84	559.80	583.66	12.70	583.80

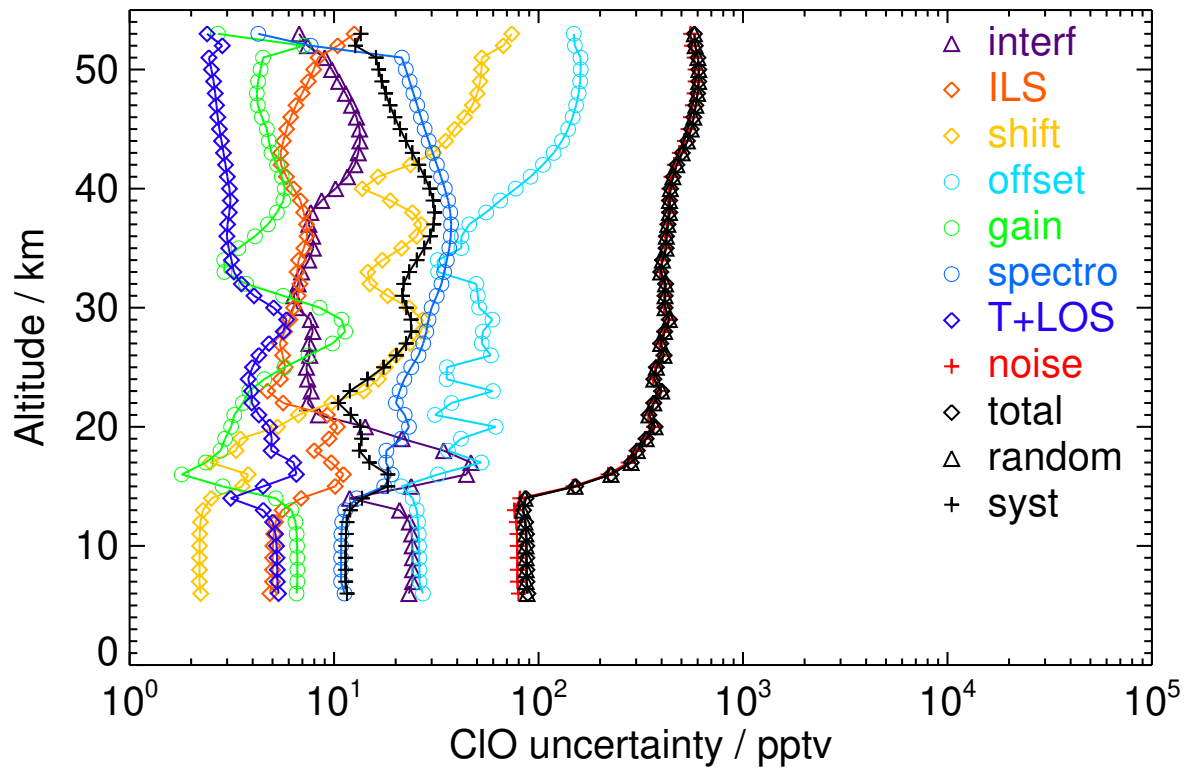
**Figure S30.** V8H_CLO_62 Southern polar spring night

Table S32. CIO error budget for Southern polar summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	6.71	25.66	5.22	0.98	18.09	8.01	6.63	7.38	61.49	69.67	10.15	70.41
9	6.77	25.62	5.22	0.98	18.04	8.00	6.60	7.33	61.43	69.59	10.13	70.32
12	7.17	24.60	5.24	1.03	17.81	7.86	6.24	6.80	60.34	68.13	9.89	68.84
15	-2.34	36.38	6.89	4.59	16.39	3.98	14.71	5.52	130.63	137.12	13.62	137.80
18	30.30	34.94	6.45	1.84	19.91	3.33	19.99	5.18	225.20	229.48	12.54	229.82
21	11.87	6.01	6.03	3.61	19.78	5.07	21.57	3.77	274.28	275.82	11.51	276.06
24	45.85	7.46	4.34	9.80	20.57	4.98	20.19	3.36	312.72	314.18	11.08	314.37
27	-38.96	7.71	4.52	18.15	41.10	9.22	21.86	4.18	359.23	362.57	16.34	362.94
30	95.56	6.18	5.85	13.82	42.68	6.22	32.27	3.84	384.89	388.13	25.87	388.99
33	348.83	6.17	4.77	8.62	22.11	2.36	40.89	3.33	376.67	378.39	31.82	379.73
36	459.45	10.09	6.17	17.61	30.80	4.52	46.49	2.97	410.59	413.13	38.62	414.93
39	551.21	8.42	5.09	26.10	45.42	7.60	46.06	3.35	419.64	423.54	41.69	425.59
42	424.75	14.32	5.50	8.72	74.78	9.13	41.61	3.57	421.32	428.74	37.74	430.40
45	236.62	20.58	6.24	19.29	107.92	8.48	36.78	3.16	478.60	491.91	31.61	492.92
48	137.29	18.27	5.36	41.33	129.32	7.10	32.93	3.04	538.95	556.52	26.24	557.13
52	92.85	12.57	4.08	54.74	138.47	6.89	28.39	2.94	562.34	582.22	21.28	582.60

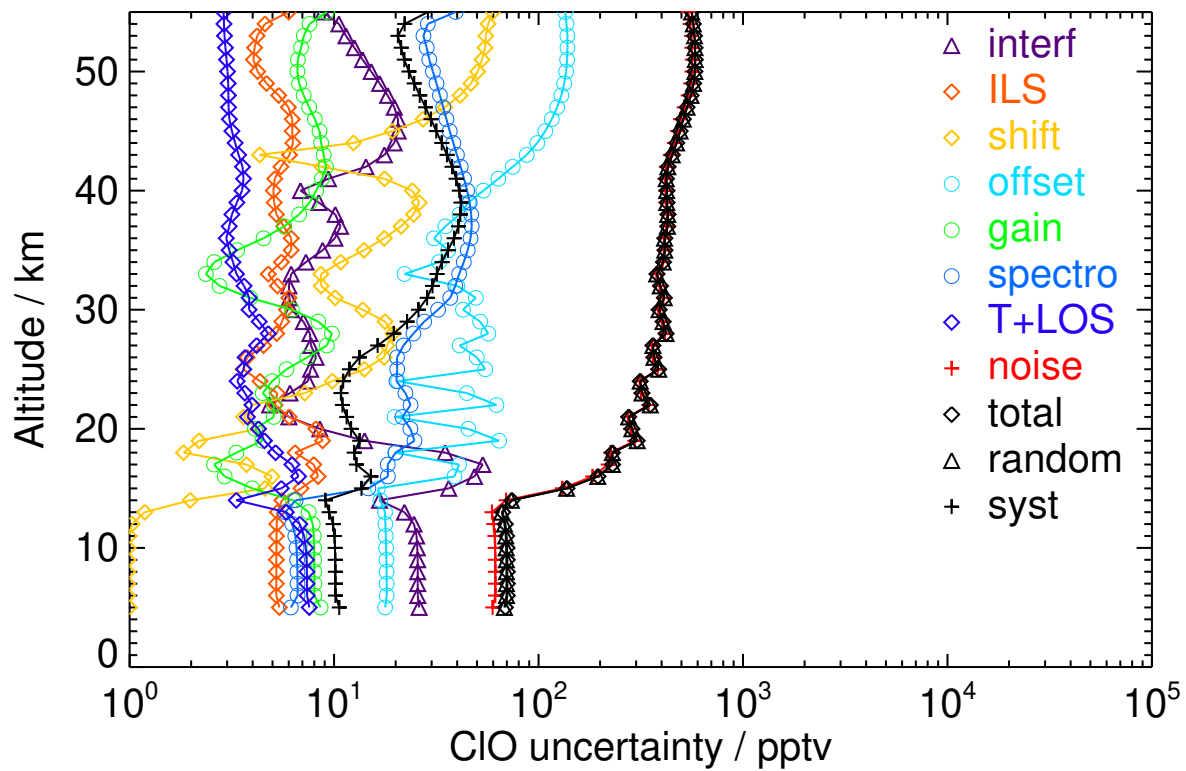
**Figure S31.** V8H_CLO_62 Southern polar summer day

Table S33. CIO error budget for Southern polar summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-43.12	25.93	5.46	1.32	18.51	8.96	2.36	7.17	63.25	71.26	10.35	72.00
9	-15.71	27.10	5.61	1.53	19.96	7.23	6.19	5.81	81.43	88.50	9.39	89.00
12	-15.21	26.80	5.65	1.54	19.45	7.13	6.13	5.60	80.56	87.48	9.33	87.98
15	-21.01	16.71	6.89	3.25	25.66	4.27	10.78	3.36	131.08	135.07	8.93	135.37
18	122.02	35.94	8.19	2.45	51.38	5.21	22.42	4.71	260.96	269.06	16.14	269.54
21	-88.71	5.20	4.23	4.01	53.68	3.98	21.74	3.47	335.05	340.02	9.39	340.15
24	21.24	6.52	3.64	9.89	45.26	4.22	24.73	3.16	375.70	379.23	13.19	379.46
27	113.54	5.70	3.78	15.16	42.78	6.34	26.17	3.47	402.49	405.63	17.37	406.00
30	92.40	6.82	4.67	21.07	53.28	8.71	29.65	4.18	443.09	447.37	22.73	447.94
33	220.71	7.27	4.93	16.20	46.35	5.11	33.06	3.46	449.69	453.04	24.53	453.70
36	284.23	9.05	3.83	16.75	38.03	4.41	34.28	2.45	441.23	443.78	27.59	444.64
39	372.19	6.43	5.37	19.37	61.71	6.16	36.55	2.48	442.71	447.99	30.54	449.03
42	341.98	14.84	6.62	3.40	97.18	7.17	37.48	2.40	476.89	487.50	30.89	488.48
45	258.61	17.35	7.48	16.67	127.30	6.52	36.26	2.29	540.11	555.95	29.02	556.70
48	193.62	15.12	6.76	29.58	143.59	5.37	33.51	2.39	588.99	607.58	26.00	608.14
52	106.95	10.97	4.54	38.53	143.26	5.10	29.22	2.28	579.78	598.91	22.05	599.31

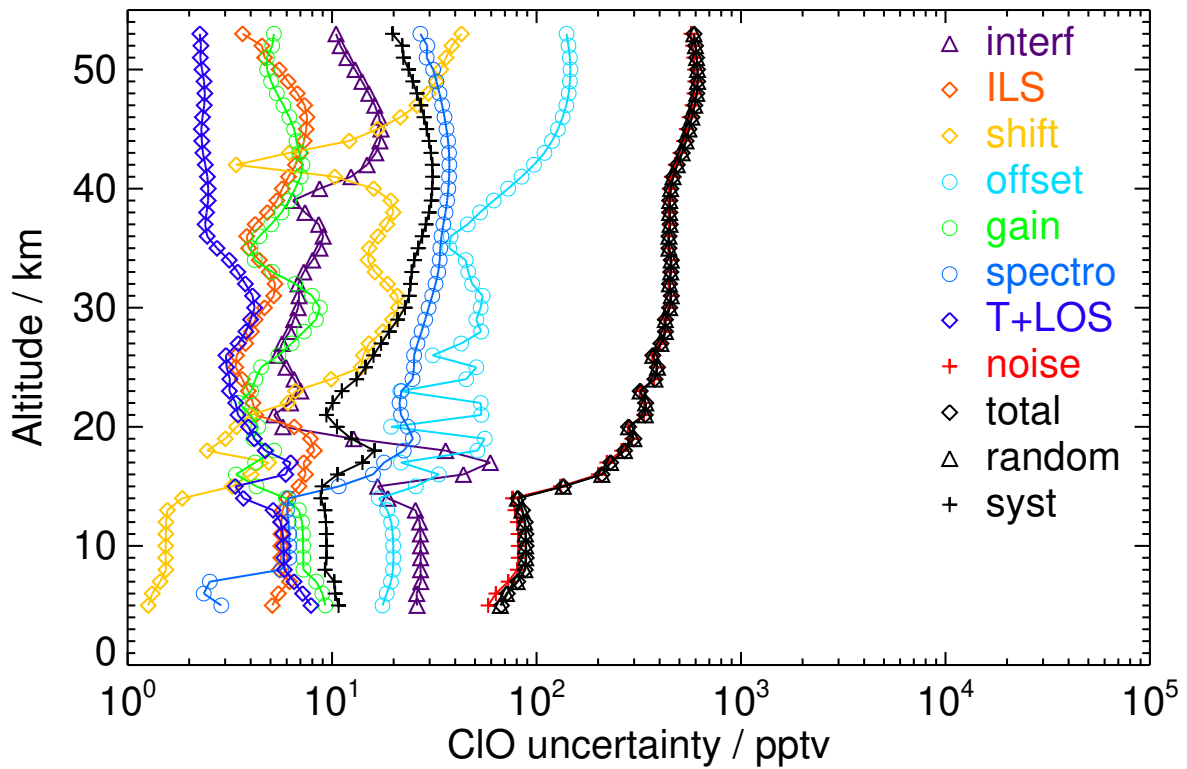
**Figure S32.** V8H_CLO_62 Southern polar summer night

Table S34. CIO error budget for Southern polar autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-30.33	23.53	4.37	1.77	20.79	7.23	11.57	5.32	60.05	68.74	10.17	69.49
9	9.31	23.60	5.17	1.97	21.69	7.78	7.88	4.54	70.31	77.79	9.73	78.39
12	10.98	22.92	5.21	2.00	21.17	7.70	7.71	4.31	69.30	76.49	9.72	77.10
15	10.85	25.62	5.84	2.69	30.49	5.14	15.53	3.85	145.93	151.67	14.24	152.33
18	70.48	22.42	6.60	2.39	66.61	3.39	29.22	3.53	285.12	294.86	14.78	295.23
21	144.95	6.59	4.46	4.20	67.33	4.98	30.60	3.09	362.18	369.38	17.90	369.81
24	-30.40	5.87	4.46	8.68	61.59	4.39	25.63	3.16	416.29	421.59	12.97	421.79
27	-155.16	6.65	3.34	11.43	66.85	3.69	23.06	2.85	463.84	469.27	11.92	469.42
30	39.74	7.87	3.23	13.02	74.28	4.21	30.59	2.76	506.09	512.17	23.03	512.68
33	297.82	8.30	5.06	10.34	71.61	3.63	42.75	2.85	520.35	526.11	33.96	527.20
36	546.39	7.31	8.77	10.30	91.96	4.71	50.46	2.61	512.69	521.87	42.03	523.56
39	632.86	10.85	11.78	6.32	138.37	5.49	54.82	2.88	555.87	573.74	47.94	575.74
42	559.80	15.56	12.51	5.46	178.15	4.92	54.17	3.13	633.64	659.04	47.95	660.78
45	432.40	15.04	11.02	11.82	197.42	4.05	49.09	3.10	664.64	694.11	43.01	695.45
48	344.78	12.40	9.03	14.82	199.18	3.35	43.09	2.85	657.50	687.70	37.22	688.70

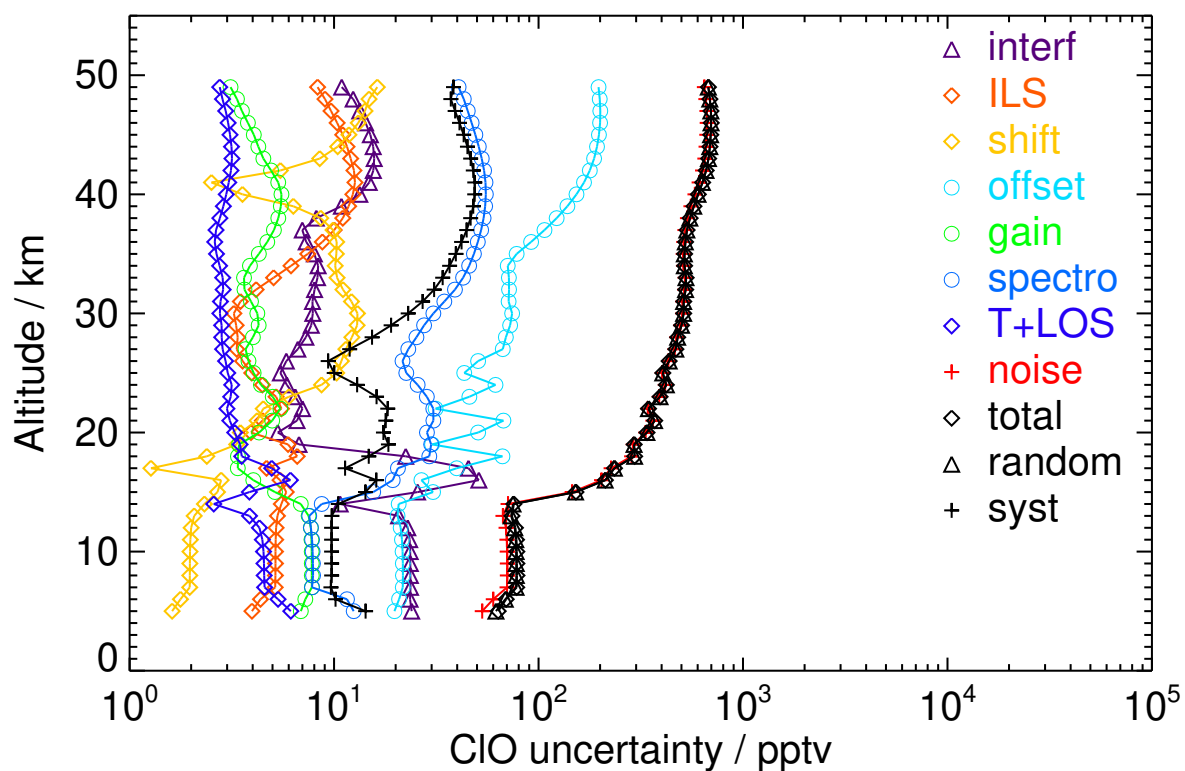
**Figure S33.** V8H_CLO_62 Southern polar autumn day

Table S35. CIO error budget for Southern polar autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-16.83	23.31	4.47	1.69	20.15	7.99	7.07	5.61	55.74	64.32	9.32	64.99
9	-14.03	22.96	4.56	1.89	21.23	7.43	6.26	5.12	64.69	72.33	8.78	72.86
12	-11.52	22.35	4.55	1.92	20.89	7.29	6.04	4.80	63.82	71.21	8.67	71.74
15	49.16	19.68	3.75	2.52	32.34	3.92	12.61	3.44	143.14	148.47	9.29	148.76
18	36.68	25.53	7.26	2.05	64.39	4.14	28.66	4.25	291.40	300.76	12.96	301.04
21	91.02	5.48	4.49	4.00	65.43	3.58	27.89	2.76	383.26	389.60	15.61	389.91
24	-99.92	6.16	4.10	7.86	54.29	3.44	25.70	3.26	433.58	437.74	10.86	437.88
27	-76.85	7.18	2.79	10.22	64.88	2.65	19.75	2.57	483.15	487.94	11.24	488.07
30	-59.65	8.80	2.97	12.36	82.22	3.38	25.14	2.69	533.75	540.60	17.03	540.87
33	58.58	8.97	4.39	10.49	86.31	3.26	33.03	2.44	554.11	561.45	23.84	561.96
36	197.12	7.34	7.48	8.87	108.63	3.85	41.18	2.29	554.25	565.70	29.70	566.48
39	343.26	12.42	9.75	4.48	156.49	4.58	46.58	2.27	601.25	622.30	34.67	623.26
42	390.03	16.30	10.32	5.09	194.17	4.40	47.76	2.48	671.61	700.12	36.12	701.05
45	402.62	15.66	9.40	9.51	208.75	3.82	44.55	2.56	690.63	722.39	33.57	723.17
48	426.57	13.59	8.07	12.10	205.94	3.42	40.35	2.31	667.19	699.08	29.74	699.71

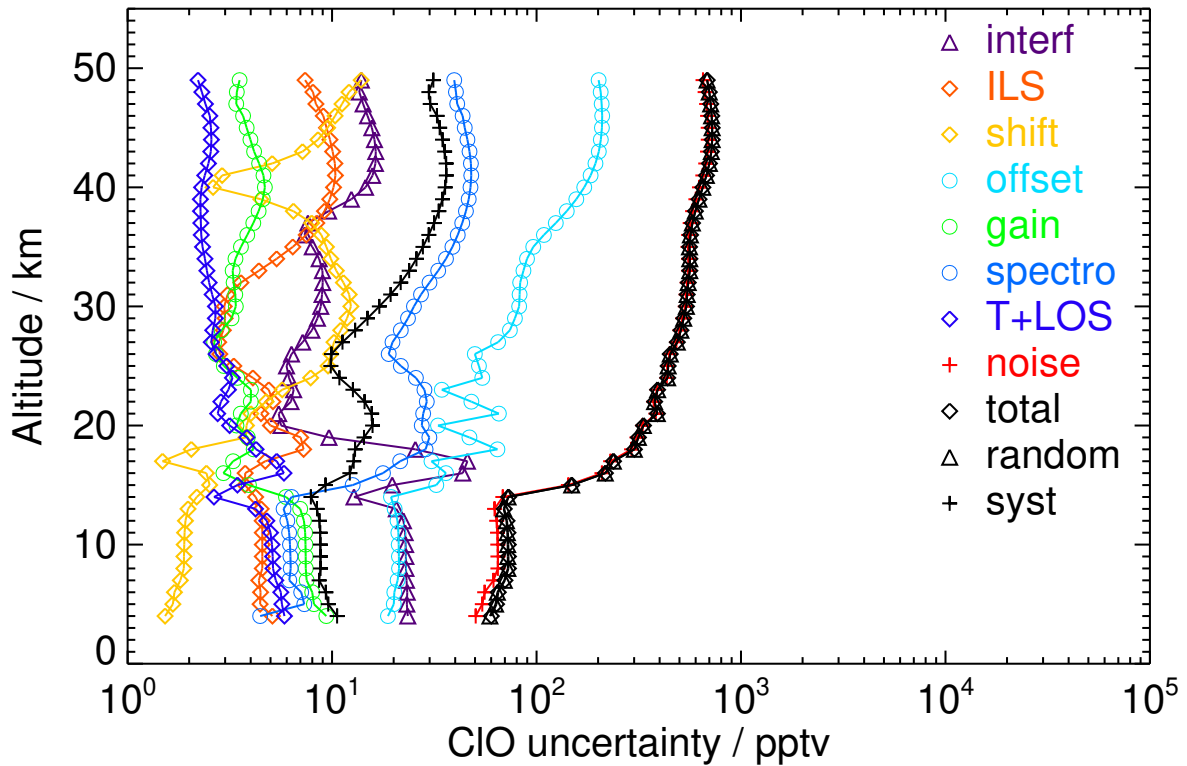
**Figure S34.** V8H_CLO_62 Southern polar autumn night

Table S36. CIO error budget for Northern polar winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	-5.99	27.10	19.62	1.45	14.81	13.10	15.91	5.54	69.24	76.45	27.29	81.18
12	-2.00	26.71	19.51	1.44	14.67	12.95	15.43	5.41	68.12	75.27	26.86	79.92
15	85.47	22.08	13.96	1.96	9.42	6.25	18.72	4.41	136.56	139.82	16.80	140.82
18	242.82	33.44	12.53	1.85	10.29	6.05	37.66	7.81	260.55	264.94	24.40	266.06
21	43.15	11.69	5.67	1.93	18.03	6.02	29.00	10.29	331.47	333.34	15.50	333.70
24	171.16	17.68	4.99	5.32	23.99	3.28	36.02	8.13	387.29	389.67	21.67	390.27
27	223.32	11.33	4.09	4.43	56.04	2.87	33.78	5.16	442.54	447.05	21.71	447.57
30	173.02	11.96	5.05	2.68	68.78	2.13	33.55	2.38	475.79	481.56	22.75	482.10
33	227.42	11.31	5.19	1.93	74.27	1.79	33.21	1.84	510.68	516.69	24.69	517.28
36	210.21	9.26	3.50	2.44	121.04	2.08	33.22	1.51	591.97	604.75	23.87	605.23
39	171.25	17.55	7.51	2.98	172.68	2.37	34.71	1.31	687.93	709.91	25.89	710.39
42	162.75	32.98	14.99	3.87	206.07	2.60	36.76	1.65	739.56	768.81	32.21	769.48
45	160.12	35.94	21.28	3.49	213.53	2.27	37.88	1.94	727.08	758.99	37.14	759.90

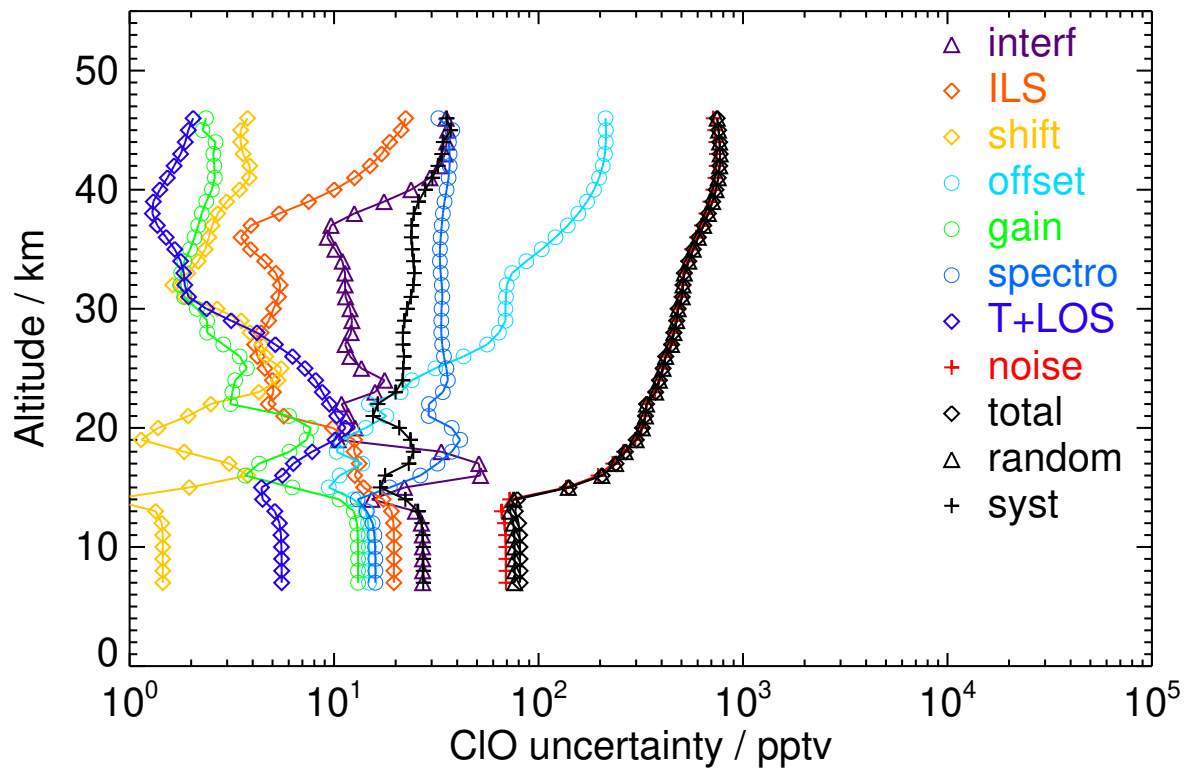
**Figure S35.** V8R_CLO_262 Northern polar winter day

Table S37. CIO error budget for Northern polar winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-62.63	26.06	19.79	1.19	15.59	11.81	20.95	6.06	68.99	76.07	30.07	81.79
9	-22.89	25.97	19.55	1.07	15.97	11.48	20.19	6.03	71.01	77.86	29.47	83.25
12	-19.85	25.43	19.46	1.05	15.84	11.28	19.88	5.83	69.98	76.70	29.13	82.04
15	88.95	25.83	12.34	1.96	10.71	4.95	16.76	4.68	144.01	147.40	16.60	148.33
18	371.39	29.94	10.54	2.50	14.48	4.41	41.72	9.22	295.38	299.02	30.01	300.53
21	93.64	9.69	17.54	3.02	20.02	4.62	42.14	11.53	368.15	371.01	24.92	371.85
24	54.55	17.11	6.88	5.62	21.93	3.40	29.44	9.64	390.48	392.42	17.49	392.81
27	84.52	11.46	7.47	4.60	42.52	3.46	32.31	6.08	436.87	439.84	22.57	440.41
30	214.88	14.16	15.45	5.81	65.98	7.34	35.52	3.89	454.09	459.91	28.82	460.82
33	86.26	15.72	10.30	3.67	62.57	6.27	36.03	2.73	480.20	485.31	26.22	486.02
36	143.24	12.16	5.27	2.05	71.16	4.87	36.92	1.65	499.13	505.17	23.99	505.73
39	242.66	13.32	12.72	4.61	114.60	4.42	37.04	1.09	549.57	562.32	26.67	562.95
42	195.40	31.55	28.37	7.49	161.16	2.73	38.88	1.80	625.02	646.95	38.15	648.08
45	122.70	35.46	34.00	7.19	185.15	2.61	38.19	2.39	666.28	693.04	42.89	694.37
48	-29.86	28.94	47.17	8.82	180.75	2.77	31.59	3.27	636.97	663.15	52.92	665.26

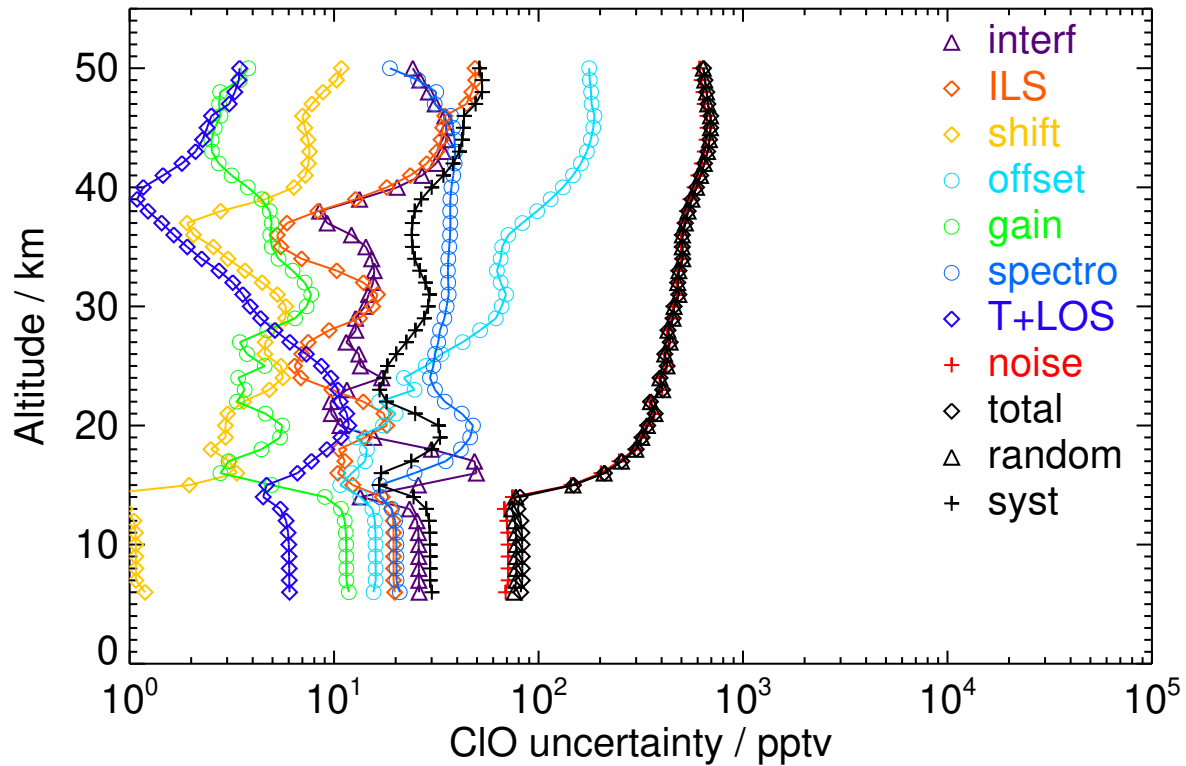
**Figure S36.** V8R_CLO_262 Northern polar winter night

Table S38. CIO error budget for Northern polar spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	93.11	23.05	16.20	1.14	12.84	13.27	18.42	4.54	60.41	67.70	23.70	71.73
9	56.43	23.91	16.37	0.80	14.78	11.43	13.36	4.72	75.24	81.04	22.00	83.97
12	55.99	23.59	16.36	0.77	14.68	11.34	13.14	4.54	74.26	79.98	21.89	82.92
15	7.57	17.39	14.93	1.90	11.07	7.46	18.11	3.84	143.46	145.50	21.45	147.08
18	111.61	28.15	4.70	1.65	13.61	3.60	22.39	3.92	292.64	295.03	11.52	295.25
21	3.50	8.09	3.67	0.89	17.76	4.87	28.63	6.81	371.56	373.03	13.80	373.28
24	122.48	10.43	5.04	0.92	31.77	2.22	35.57	5.62	438.22	440.46	21.87	441.00
27	251.42	11.34	7.11	2.49	70.94	2.51	43.66	2.64	506.42	512.53	30.18	513.41
30	406.42	13.79	7.03	4.33	97.62	2.43	47.95	1.81	563.58	573.01	37.24	574.22
33	442.57	14.02	6.39	4.73	98.19	3.32	51.69	1.28	594.23	603.28	41.88	604.73
36	470.49	10.34	9.89	3.06	116.59	4.90	55.00	1.21	614.04	626.02	44.78	627.62
39	458.88	18.43	20.18	1.47	155.79	5.99	56.79	1.67	648.92	668.55	49.25	670.36
42	337.71	28.11	32.68	8.96	191.89	5.83	55.55	2.65	698.26	725.57	54.83	727.63
45	202.80	27.47	37.01	12.52	209.40	5.02	51.06	3.05	722.65	753.66	54.64	755.64
48	121.56	23.28	36.55	12.95	208.40	3.92	45.65	2.95	698.41	729.89	51.19	731.68

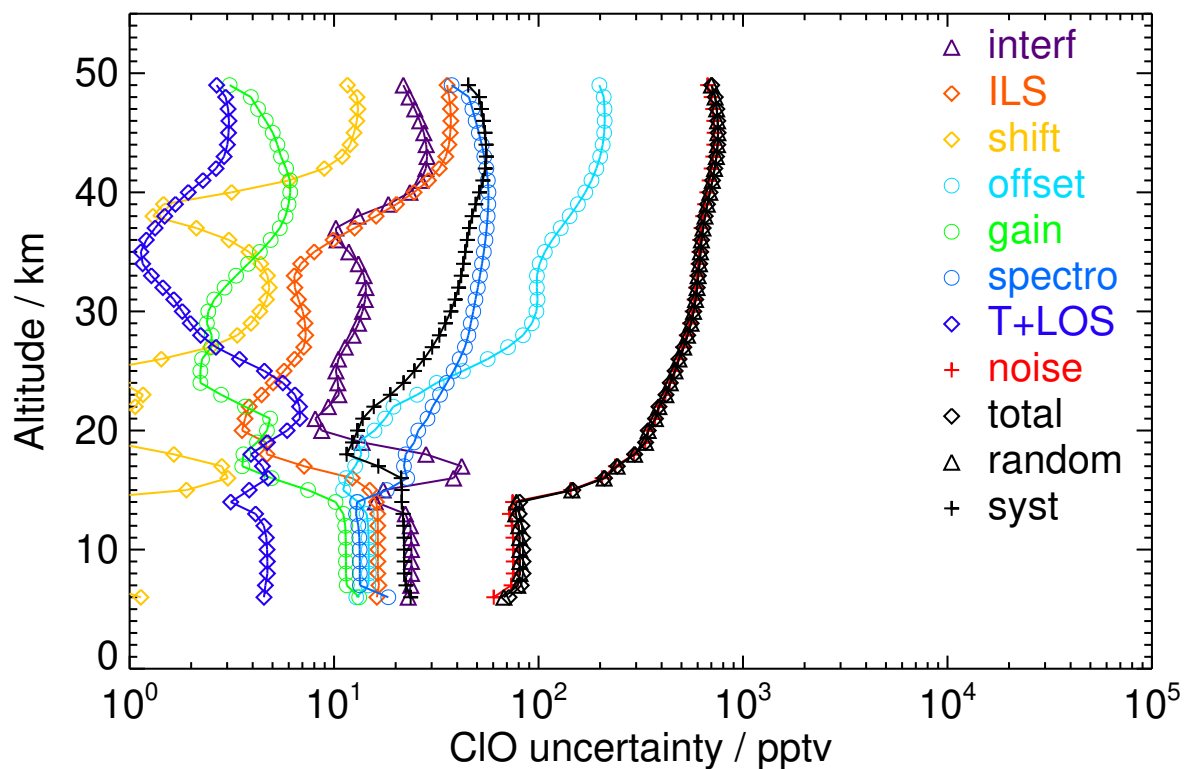
**Figure S37.** V8R_CLO_262 Northern polar spring day

Table S39. CIO error budget for Northern polar spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	57.61	24.31	16.85	0.57	15.62	11.10	14.89	4.65	81.60	87.39	22.51	90.25
12	57.35	23.80	16.83	0.55	15.43	11.03	14.82	4.50	80.60	86.27	22.44	89.14
15	-6.77	24.36	15.35	2.87	10.16	7.33	19.62	3.18	141.23	144.23	23.03	146.06
18	95.96	24.93	7.53	2.00	13.31	4.12	25.61	3.90	292.70	294.97	14.61	295.33
21	44.90	8.25	5.13	0.92	19.32	5.00	28.07	7.05	375.81	377.27	15.19	377.58
24	-130.75	10.76	5.03	1.08	33.71	2.02	27.60	5.65	435.03	437.21	13.23	437.41
27	34.89	11.52	6.21	1.55	73.18	2.07	29.17	2.49	508.24	514.12	19.55	514.49
30	161.87	13.45	5.93	2.94	95.53	1.76	33.07	1.65	556.96	565.79	23.29	566.26
33	217.49	13.33	4.72	3.26	95.12	2.22	37.51	1.14	582.81	591.32	26.05	591.90
36	210.54	10.00	7.20	1.80	116.49	3.77	40.57	1.25	606.65	618.59	27.52	619.20
39	94.44	17.86	17.04	2.23	156.52	4.59	41.06	1.82	647.71	667.35	31.70	668.10
42	7.08	26.06	29.17	9.92	193.15	4.33	39.22	2.94	700.60	727.89	39.01	728.93
45	-37.39	25.02	33.31	13.18	210.28	3.72	35.38	3.37	723.48	754.44	40.66	755.53
48	26.10	21.37	33.98	13.10	206.20	3.13	34.71	3.16	693.10	724.01	41.57	725.20

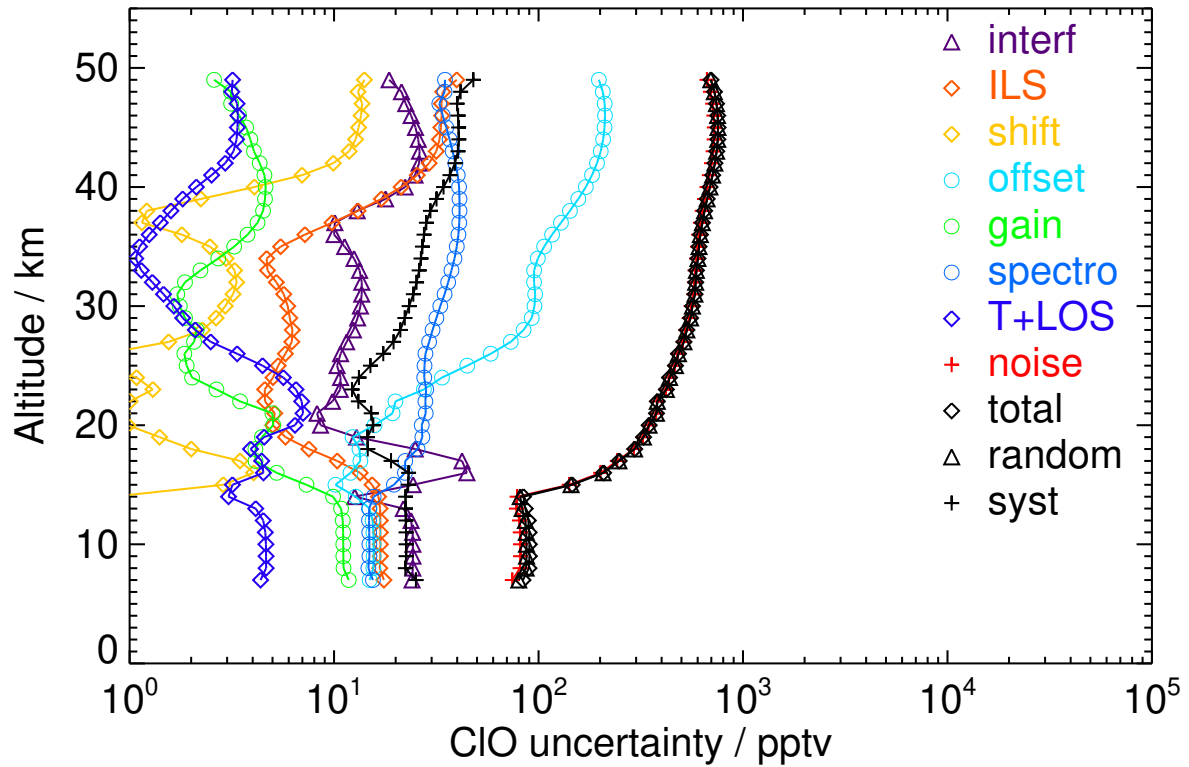
**Figure S38.** V8R_CLO_262 Northern polar spring night

Table S40. CIO error budget for Northern polar summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	18.10	31.44	20.93	2.27	15.96	10.16	12.47	6.17	96.54	103.45	24.55	106.32
12	30.25	31.07	21.10	2.24	15.84	10.46	13.07	6.06	96.14	102.98	24.93	105.95
15	-29.39	17.35	20.59	2.19	10.27	7.62	16.39	4.64	136.95	139.06	24.51	141.21
18	73.58	31.76	10.15	4.37	15.11	5.07	22.28	4.70	278.06	280.98	16.53	281.46
21	11.19	8.42	6.74	3.06	15.57	6.18	29.13	2.32	340.79	342.21	17.03	342.64
24	-47.38	11.48	3.90	1.31	16.36	2.09	24.80	1.83	361.89	363.00	15.42	363.33
27	243.13	8.72	6.08	3.28	37.48	4.10	38.27	1.88	423.75	426.30	29.14	427.29
30	474.61	11.17	12.62	3.65	62.34	4.86	46.58	2.25	448.77	454.20	38.53	455.83
33	432.80	12.38	10.16	3.02	53.18	5.23	47.79	1.76	478.11	482.05	40.37	483.73
36	509.59	12.87	4.78	1.82	43.69	5.67	49.87	1.16	479.01	482.00	41.78	483.81
39	555.46	7.14	5.19	2.38	69.67	7.13	51.20	1.82	478.99	484.92	43.58	486.87
42	524.99	22.07	22.41	7.45	110.16	6.11	51.28	1.95	509.68	522.77	48.24	524.99
45	404.72	28.16	36.86	5.67	145.92	4.00	49.63	2.21	572.66	592.36	54.84	594.89
48	249.99	25.19	47.31	4.04	164.45	2.31	46.24	2.64	605.52	628.56	60.47	631.46
52	-61.32	19.12	51.05	10.80	168.27	1.99	41.55	2.80	595.28	619.50	60.92	622.49

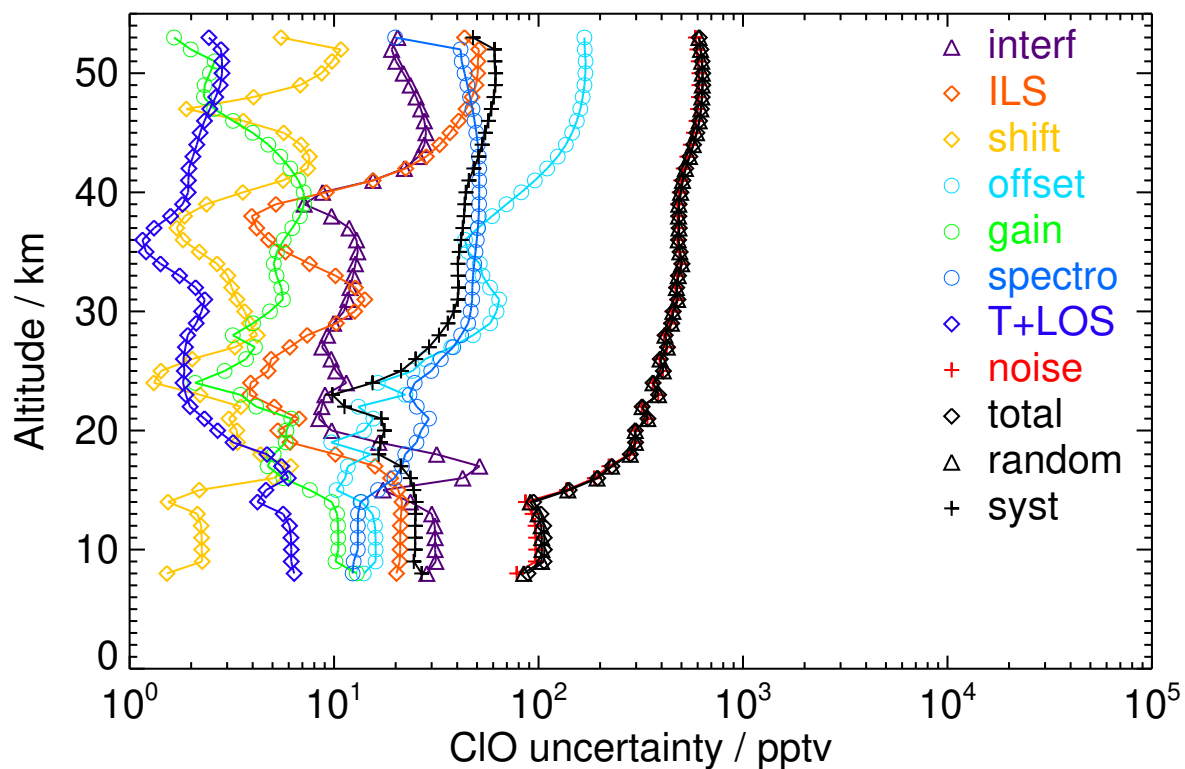
**Figure S39.** V8R_CLO_262 Northern polar summer day

Table S41. CIO error budget for Northern polar summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
12	-65.98	36.92	14.96	3.63	24.48	7.33	18.63	5.18	189.56	194.93	23.71	196.37
15	-24.91	35.79	15.33	4.34	11.72	7.08	19.33	4.66	147.49	152.74	23.30	154.50
18	14.77	22.52	11.11	3.83	11.19	5.35	20.91	3.98	275.80	277.43	18.70	278.06
21	47.25	8.71	4.80	2.40	17.15	4.61	20.99	2.01	344.64	345.69	11.87	345.89
24	67.76	9.67	4.33	1.37	20.74	3.30	21.92	1.69	385.94	387.04	13.83	387.29
27	81.21	8.44	5.27	1.99	43.53	2.92	24.28	1.73	436.89	439.58	15.51	439.86
30	89.32	9.77	6.90	1.65	66.81	3.02	25.32	1.93	470.12	475.33	18.49	475.69
33	11.64	9.31	5.38	1.44	59.00	3.34	26.58	1.57	497.01	500.94	20.03	501.34
36	110.08	8.18	3.63	1.05	60.32	4.17	34.13	0.86	510.13	514.21	26.82	514.91
39	373.93	7.50	7.63	1.11	93.43	4.87	44.86	1.37	521.86	530.94	36.46	532.19
42	563.31	12.28	18.31	4.19	136.28	3.84	51.93	2.01	573.02	590.00	45.19	591.73
45	611.78	13.24	26.36	3.35	167.06	3.02	52.99	2.60	633.01	655.64	49.52	657.51
48	574.20	11.30	31.39	2.34	178.21	3.05	49.79	3.01	645.48	670.44	50.24	672.32

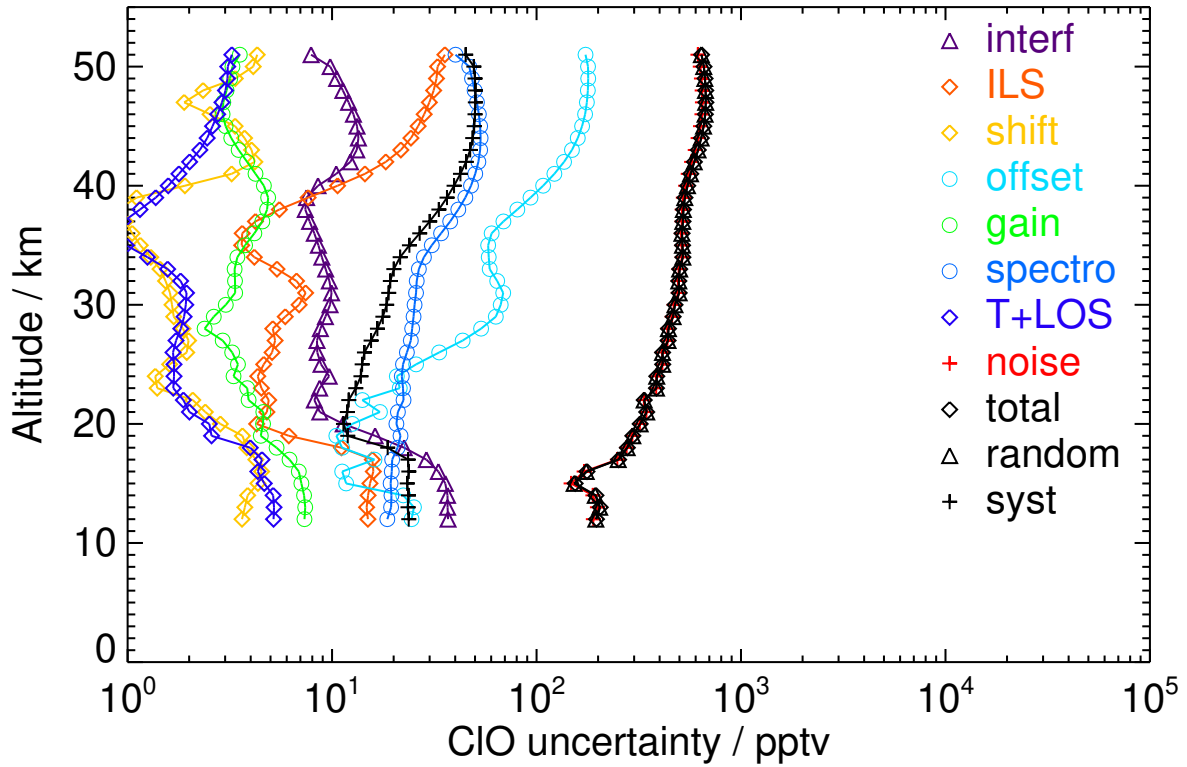
**Figure S40.** V8R_CLO_262 Northern polar summer night

Table S42. ClO error budget for Northern polar autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	2.14	27.22	18.59	1.12	17.90	12.54	9.47	7.21	100.35	106.05	22.99	108.52
12	53.27	21.22	19.12	1.38	22.37	8.96	16.08	6.99	161.86	165.43	23.17	167.05
15	36.33	19.83	16.47	3.22	11.19	7.69	23.21	4.77	137.58	140.27	25.96	142.65
18	150.20	25.65	8.65	3.26	12.57	4.66	30.03	4.08	286.87	289.47	18.42	290.06
21	54.42	8.23	6.60	1.38	19.21	5.59	31.72	1.54	371.56	373.15	18.31	373.60
24	107.20	9.40	5.15	1.11	32.63	2.85	30.35	1.29	438.62	440.72	16.36	441.02
27	164.30	10.12	4.68	1.47	68.69	2.41	33.12	1.35	500.76	506.13	23.36	506.67
30	288.05	11.70	6.50	1.72	95.72	3.30	38.84	1.31	550.42	559.41	29.65	560.20
33	407.37	11.14	6.09	1.66	105.88	3.85	41.27	1.05	590.38	600.44	33.41	601.37
36	433.43	9.97	8.07	1.19	134.78	3.95	42.87	0.83	646.78	661.28	34.89	662.20
39	348.67	12.94	12.76	1.23	175.22	3.23	41.84	1.40	707.57	729.54	34.99	730.38
42	201.98	16.58	18.27	3.64	205.16	2.22	38.57	2.36	751.08	779.18	34.68	779.95
45	117.08	15.77	20.63	5.45	212.59	1.65	34.77	2.84	744.98	775.25	33.17	775.96
48	9.76	12.57	29.59	9.01	196.80	2.82	59.83	3.20	689.10	718.40	46.89	719.93

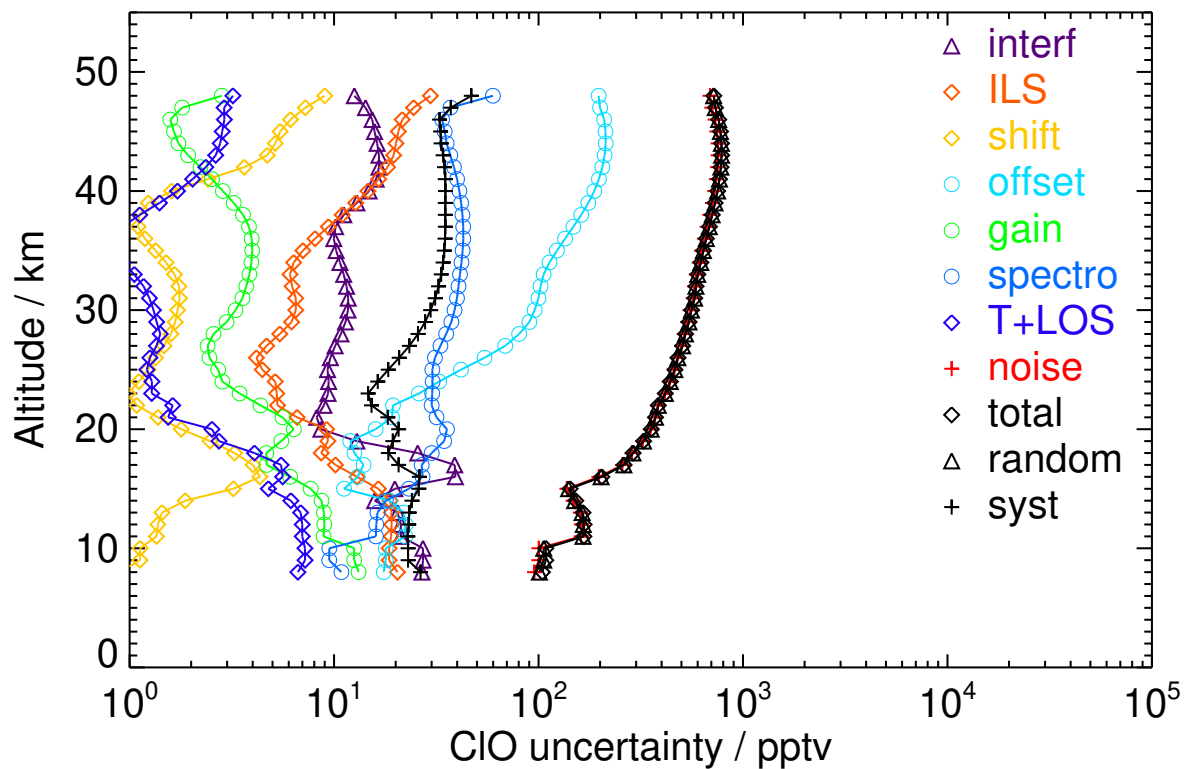
**Figure S41.** V8R_CLO_262 Northern polar autumn day

Table S43. CIO error budget for Northern polar autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	-116.75	26.50	14.19	1.12	17.05	12.22	3.81	7.59	95.86	101.23	18.94	102.99
12	45.16	20.30	18.89	1.43	21.73	9.57	16.55	6.77	157.96	161.45	23.23	163.11
15	24.91	21.76	17.97	3.25	10.99	8.38	25.30	4.57	136.72	139.77	28.59	142.66
18	64.58	24.65	7.19	2.98	13.06	4.12	24.78	3.82	290.15	292.30	15.28	292.70
21	27.75	8.36	4.45	1.32	19.99	4.52	27.51	1.53	372.91	374.34	14.33	374.61
24	88.67	9.50	4.66	1.28	33.37	2.98	28.30	1.32	436.40	438.47	15.08	438.73
27	1.86	10.18	5.38	2.13	68.98	2.34	27.91	1.40	501.59	506.99	15.16	507.22
30	24.84	11.57	5.20	3.27	93.03	2.33	28.44	1.33	543.98	552.50	17.30	552.77
33	132.94	10.97	3.71	2.57	100.49	2.53	30.74	1.03	581.94	591.12	20.49	591.48
36	199.67	9.79	5.70	1.43	128.94	2.92	36.18	0.84	633.54	647.21	23.74	647.64
39	188.98	12.42	10.95	1.22	169.99	2.74	39.69	1.46	693.29	714.61	27.19	715.13
42	152.02	16.11	17.63	3.68	201.24	2.42	40.50	2.37	739.74	767.47	30.63	768.08
45	109.18	15.39	21.14	5.44	210.75	2.33	38.84	2.82	740.69	770.90	31.36	771.54
48	-28.62	13.71	27.35	7.24	196.29	3.09	40.97	2.81	689.26	717.62	36.13	718.53

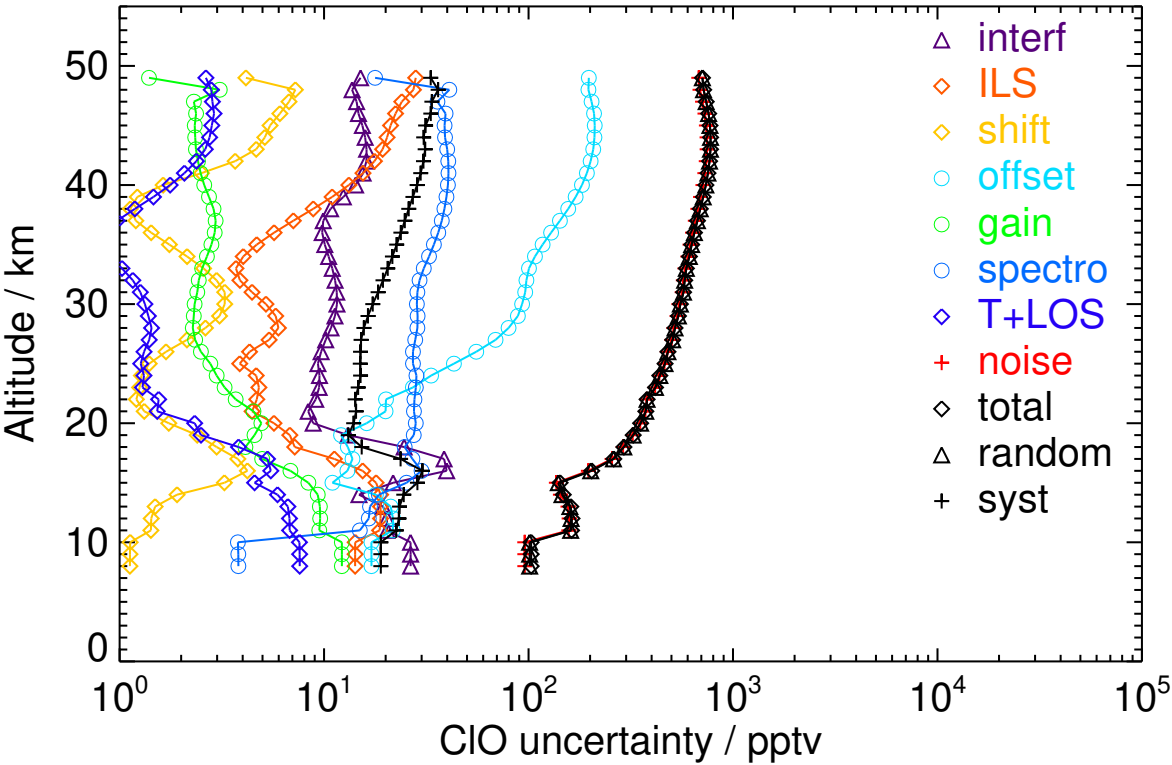


Figure S42. V8R_CLO_262 Northern polar autumn night

Table S44. CIO error budget for Northern midlatitude winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-50.09	25.07	17.82	0.79	14.71	13.20	15.21	5.06	64.72	71.36	26.28	76.04
9	-14.66	25.41	19.60	0.65	15.19	12.83	17.79	4.87	71.23	77.79	28.09	82.70
12	-9.54	25.05	19.62	0.65	15.08	12.68	17.68	4.60	70.15	76.64	27.96	81.58
15	74.69	20.78	15.03	2.96	11.11	6.94	20.48	4.69	140.10	143.15	20.41	144.59
18	103.06	28.97	10.69	3.41	12.36	4.51	33.06	3.77	274.23	277.75	17.46	278.29
21	176.08	8.95	8.96	1.30	16.53	5.65	37.75	2.00	345.73	347.74	22.40	348.46
24	90.87	11.67	7.08	3.42	23.79	2.98	34.61	1.52	386.09	388.19	18.52	388.63
27	170.45	10.33	7.96	2.67	51.83	1.92	39.08	1.52	445.93	450.18	24.23	450.83
30	278.01	12.46	6.41	3.62	72.62	2.88	43.87	1.63	476.05	482.61	33.60	483.78
33	456.68	13.57	7.98	2.47	64.13	3.84	52.24	1.17	501.67	507.05	40.99	508.71
36	618.72	11.81	7.16	2.02	81.57	5.05	55.79	1.07	516.27	523.86	45.71	525.85
39	522.49	12.99	12.57	1.56	126.75	5.55	56.23	1.23	570.88	585.85	47.68	587.79
42	221.95	33.01	24.39	3.27	173.35	4.39	54.88	1.65	643.41	667.88	51.99	669.90
45	57.32	36.72	30.94	6.43	198.66	2.97	50.05	2.23	684.82	714.55	52.32	716.46
48	97.12	32.98	34.63	10.55	200.69	1.88	46.23	2.70	669.88	700.56	52.69	702.53

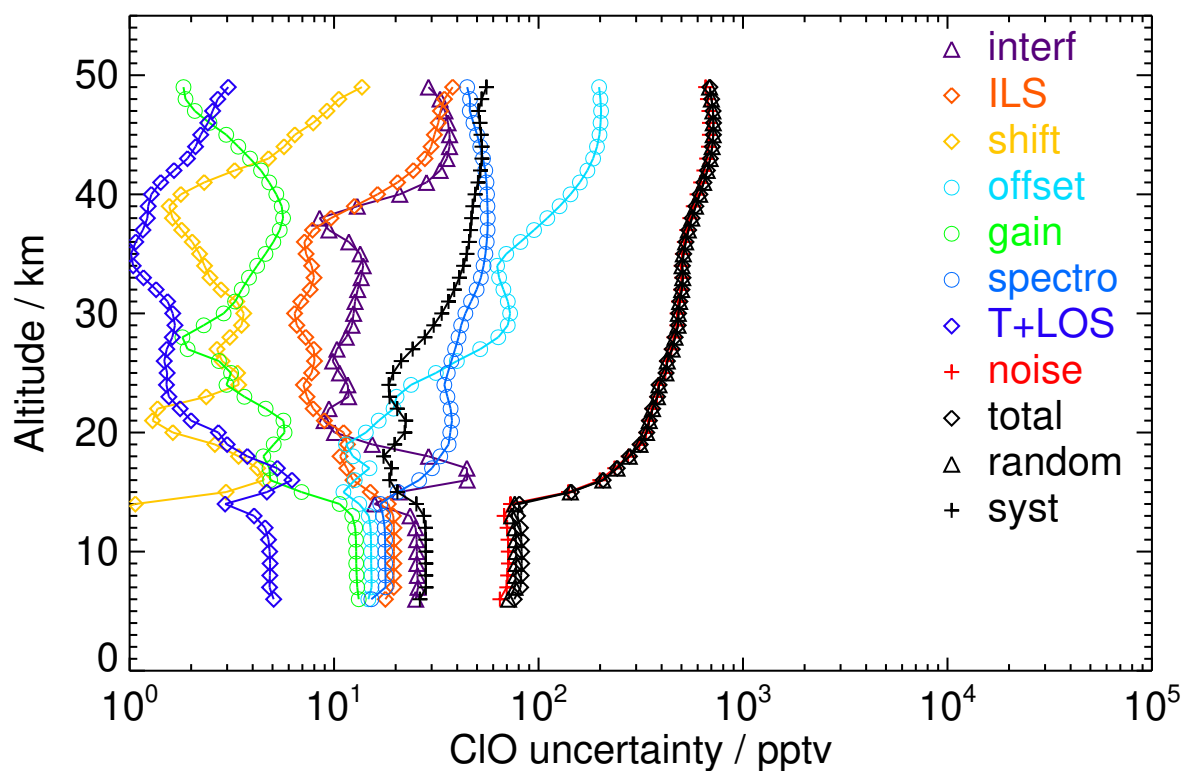
**Figure S43.** V8R_CLO_262 Northern midlatitude winter day

Table S45. CIO error budget for Northern midlatitude winter night. All uncertainties are 1 σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	23.29	26.31	23.17	0.56	15.41	14.82	26.95	4.17	65.93	73.13	37.81	82.33
9	-24.67	25.59	18.45	0.56	14.90	13.64	15.38	4.89	68.44	75.56	25.29	79.68
12	-23.52	25.16	18.45	0.55	14.80	13.42	15.21	4.60	67.34	74.35	25.13	78.48
15	-21.23	22.55	13.32	3.32	10.34	6.03	16.26	4.51	141.05	143.77	18.70	144.98
18	110.39	27.38	8.33	3.44	12.50	3.69	27.36	3.75	278.46	281.00	18.46	281.61
21	-33.65	8.71	6.64	1.03	16.37	4.37	27.63	1.86	349.57	350.96	14.18	351.25
24	84.88	11.37	5.50	3.11	24.70	2.30	28.78	1.45	389.40	391.16	15.50	391.47
27	68.16	10.47	6.20	2.07	53.66	1.85	26.39	1.45	450.90	454.72	16.52	455.02
30	85.48	12.74	4.39	2.82	73.33	2.29	32.16	1.67	479.23	485.43	25.21	486.08
33	297.70	14.33	5.19	1.73	59.67	3.13	40.10	1.20	499.01	503.49	30.46	504.41
36	377.65	12.95	4.72	1.57	71.48	4.60	44.30	1.31	503.48	509.45	35.12	510.66
39	439.74	11.90	11.34	1.37	114.14	5.66	45.99	1.47	545.89	558.47	39.34	559.86
42	350.64	32.55	26.14	3.68	161.92	4.99	48.05	1.89	614.65	637.08	47.36	638.84
45	214.85	36.35	33.79	7.46	190.46	3.66	46.15	2.49	666.01	694.24	50.44	696.07
48	120.08	32.78	36.53	11.38	196.70	2.43	41.81	2.86	662.92	692.82	49.53	694.59

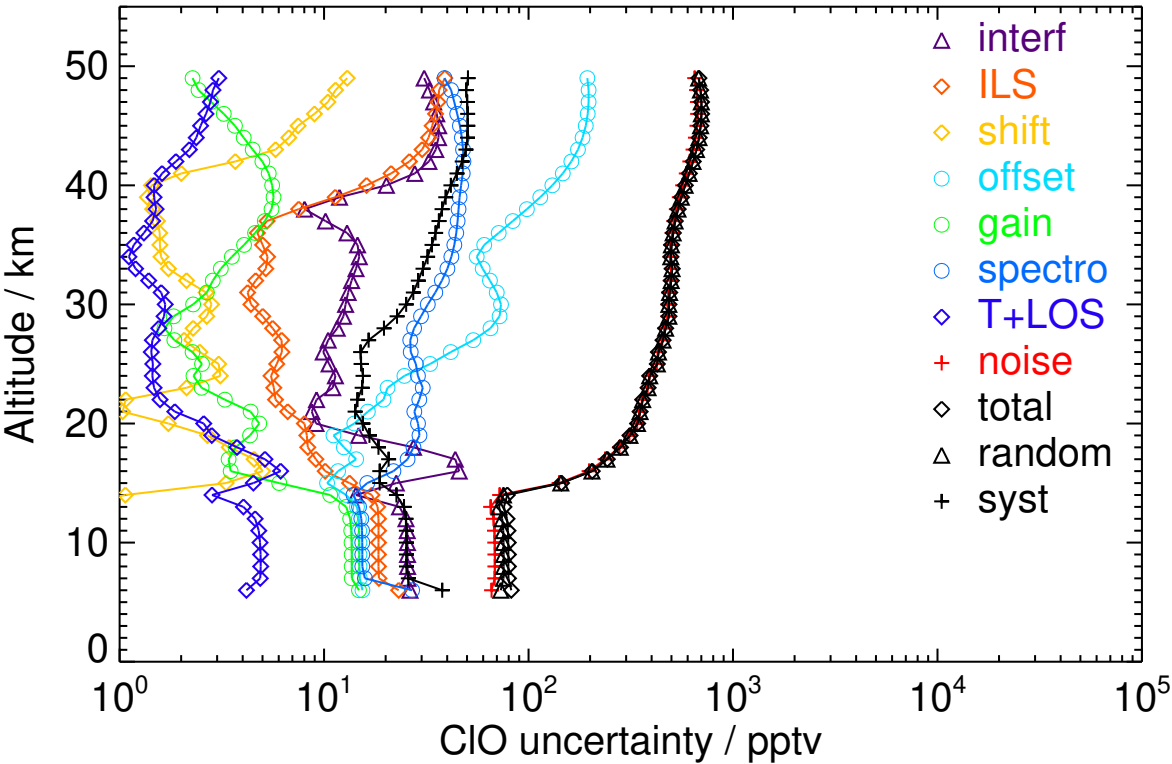


Figure S44. V8R_CLO_262 Northern midlatitude winter night

Table S46. CIO error budget for Northern midlatitude spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	16.87	25.96	19.45	0.79	15.69	12.59	14.63	5.61	84.45	90.62	24.96	94.00
12	16.91	25.52	19.42	0.77	15.53	12.49	14.56	5.42	83.47	89.53	24.88	92.92
15	7.14	24.35	16.01	3.62	10.60	7.54	21.10	4.51	140.38	143.62	24.00	145.61
18	-0.09	26.94	7.09	3.72	13.07	3.83	24.79	3.76	284.69	287.22	12.57	287.49
21	287.74	8.34	6.34	1.40	16.90	5.86	33.79	2.01	355.02	356.50	22.92	357.24
24	102.60	10.13	4.49	2.48	27.45	3.06	30.91	1.36	408.97	410.71	20.59	411.22
27	238.48	10.67	6.51	3.75	58.84	2.10	38.59	1.52	461.72	466.41	27.87	467.24
30	456.64	12.28	6.54	4.43	74.30	2.82	47.66	1.40	500.29	506.81	38.06	508.24
33	584.82	12.74	8.25	2.77	60.05	3.67	54.23	0.89	516.71	521.33	44.82	523.25
36	507.07	10.90	9.03	2.66	77.21	5.20	56.82	1.37	522.06	528.88	47.56	531.01
39	354.97	11.54	14.60	1.89	118.08	5.99	59.22	1.73	561.49	575.12	48.49	577.16
42	224.49	26.28	25.52	4.26	161.81	5.34	60.71	2.03	626.46	648.85	52.05	650.94
45	158.62	28.71	31.87	7.08	187.82	4.28	57.47	2.48	674.19	701.61	52.60	703.58
48	129.46	25.78	34.26	10.12	193.38	3.29	51.93	2.77	669.64	698.50	50.59	700.33

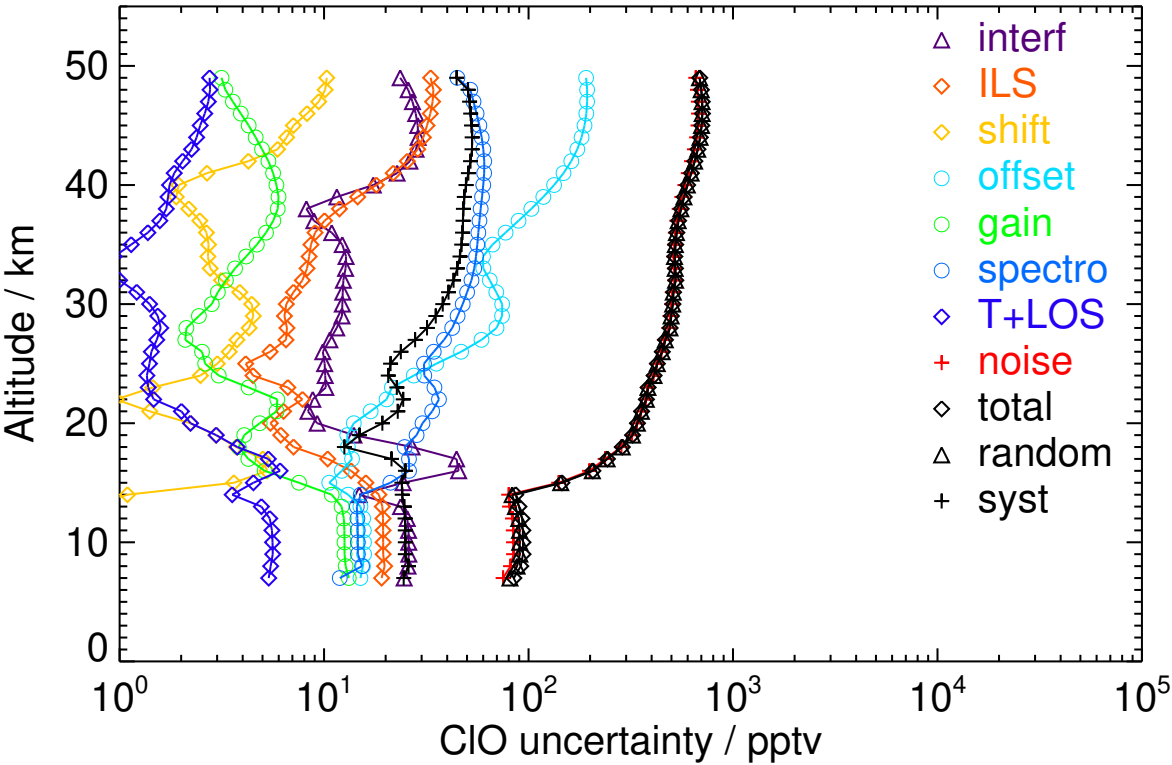


Figure S45. V8R_CLO_262 Northern midlatitude spring day

Table S47. CIO error budget for Northern midlatitude spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	32.01	25.74	17.73	0.67	15.59	11.51	13.04	5.28	83.98	89.93	22.71	92.75
12	35.68	25.35	18.13	0.63	15.54	11.43	13.54	5.13	83.89	89.75	23.15	92.69
15	3.66	24.22	16.36	3.17	10.55	7.40	21.55	4.43	140.70	143.82	25.08	145.99
18	72.44	26.43	6.76	3.01	12.22	3.90	26.69	3.76	281.60	284.11	14.86	284.50
21	35.78	8.48	5.19	1.25	16.31	5.23	26.13	1.95	351.12	352.37	14.12	352.65
24	94.62	10.17	5.13	2.55	26.77	2.96	28.93	1.42	403.21	404.95	17.08	405.31
27	82.41	10.51	6.67	3.37	58.74	2.12	32.12	1.59	462.32	466.86	20.90	467.33
30	171.60	12.30	8.05	3.98	73.99	2.18	35.15	1.44	498.26	504.57	24.86	505.18
33	235.09	12.89	6.03	2.21	59.60	2.82	37.79	0.94	515.07	519.36	27.52	520.09
36	234.92	10.87	4.38	1.88	76.63	4.18	40.02	1.48	520.37	526.84	29.21	527.65
39	206.13	12.19	11.70	1.57	117.23	4.84	41.31	1.82	560.73	573.74	31.82	574.62
42	222.99	27.44	25.92	4.70	161.51	4.24	42.13	2.27	626.33	648.05	40.56	649.32
45	233.83	29.46	33.57	8.27	187.82	3.20	40.45	2.78	673.99	700.85	45.44	702.32
48	206.96	25.76	36.34	11.83	193.50	2.38	36.82	3.09	669.92	698.31	45.88	699.81

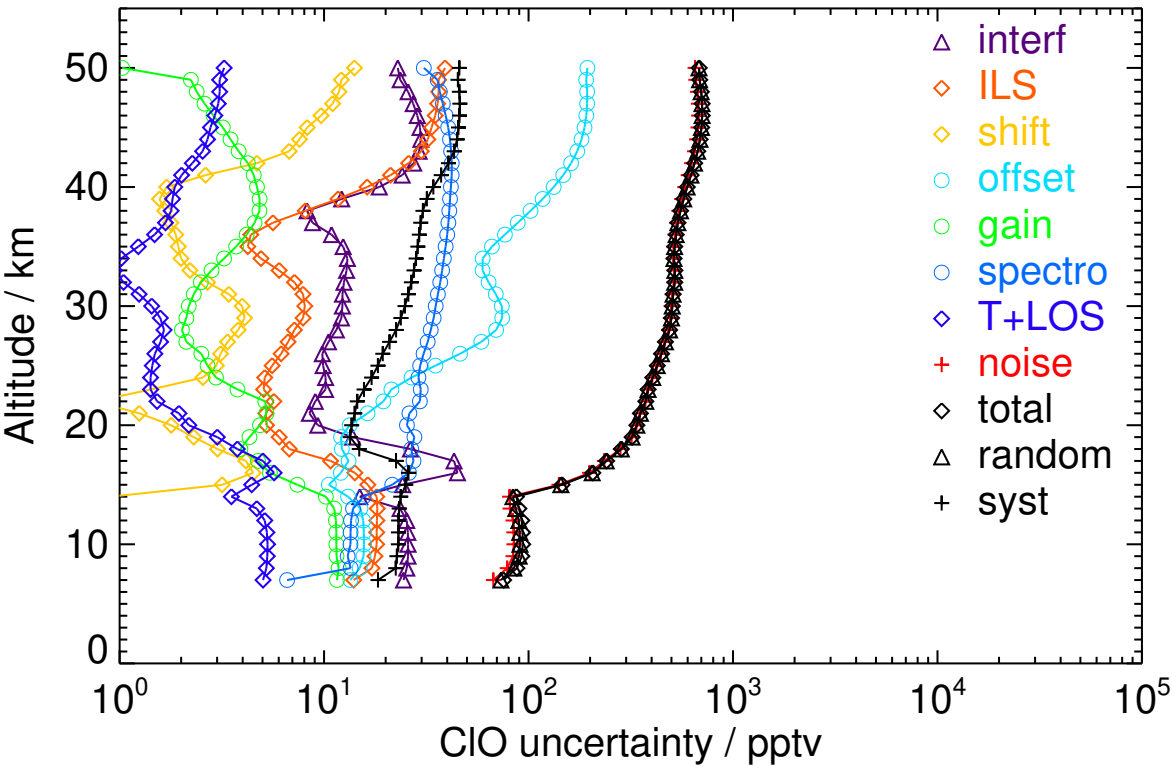


Figure S46. V8R_CLO_262 Northern midlatitude spring night

Table S48. ClO error budget for Northern midlatitude summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	37.04	24.74	14.36	0.74	13.88	12.62	9.75	8.61	80.10	85.81	19.82	88.07
12	36.41	24.39	14.47	0.72	13.80	12.63	9.51	8.29	79.13	84.75	19.83	87.04
15	-38.46	19.73	17.57	4.76	11.72	11.13	28.49	5.67	140.76	143.28	33.35	147.11
18	-8.39	28.83	9.13	4.59	17.71	4.62	32.77	4.69	292.84	295.33	30.02	296.85
21	34.65	8.71	6.51	3.29	15.55	5.33	25.33	1.87	355.92	357.03	15.78	357.38
24	123.62	10.22	5.45	1.81	21.68	3.12	24.50	1.45	380.03	381.34	15.06	381.63
27	96.56	9.75	5.57	4.60	47.41	2.27	29.80	1.50	436.75	439.99	21.15	440.50
30	278.78	11.11	6.46	5.70	65.87	2.32	39.03	1.59	468.00	473.37	31.80	474.44
33	387.20	10.62	5.73	3.20	51.08	3.29	48.86	0.99	490.44	494.05	40.07	495.67
36	636.28	11.28	5.96	2.21	59.61	5.06	58.82	1.05	492.77	497.62	49.02	500.03
39	738.81	7.44	10.81	1.20	96.18	6.69	64.11	1.71	520.55	530.74	53.58	533.44
42	608.83	20.42	21.05	3.00	141.26	6.34	63.82	1.93	579.61	598.16	55.67	600.74
45	444.35	25.95	28.36	2.36	172.66	4.87	59.30	2.34	639.20	663.63	54.94	665.90
48	327.93	24.29	32.13	3.66	183.13	3.20	53.07	2.73	650.22	676.78	52.51	678.81

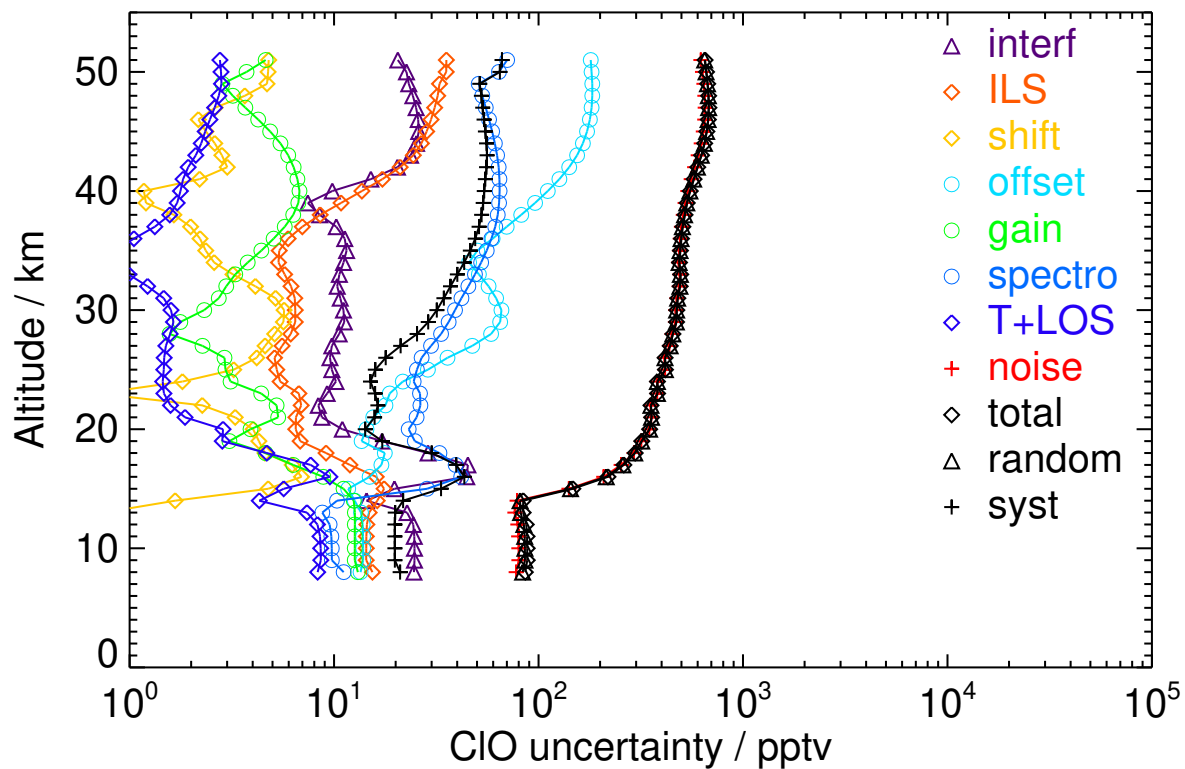
**Figure S47.** V8R_CLO_262 Northern midlatitude summer day

Table S49. CIO error budget for Northern midlatitude summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	9.52	25.80	12.76	0.84	15.19	11.78	15.32	8.60	90.90	96.75	20.26	98.85
12	31.49	25.58	13.42	0.81	15.55	11.69	14.40	8.37	95.95	101.57	19.51	103.42
15	20.93	19.35	20.08	4.46	11.82	10.39	36.51	7.85	141.49	144.78	38.68	149.86
18	-90.99	29.01	9.62	4.46	15.24	4.67	31.07	4.50	289.26	291.65	28.42	293.03
21	101.30	8.89	4.86	3.05	14.90	4.53	23.27	1.91	351.02	351.99	14.63	352.29
24	114.03	9.82	6.68	1.40	22.40	3.69	28.17	1.46	388.46	389.92	17.70	390.32
27	59.72	9.74	4.77	4.09	47.77	2.05	27.83	1.62	437.08	440.32	18.69	440.72
30	117.16	11.11	6.58	5.38	65.66	1.84	33.39	1.75	468.59	473.93	24.30	474.56
33	156.04	10.48	6.25	3.02	50.95	2.31	33.53	1.01	491.14	494.47	24.51	495.08
36	311.88	10.70	3.68	1.93	58.30	3.47	34.91	1.12	494.64	498.68	27.34	499.43
39	322.88	7.35	6.80	0.98	94.03	4.43	38.05	1.86	520.53	529.58	30.24	530.44
42	265.65	18.98	17.74	3.47	138.36	3.84	40.17	2.09	574.98	592.30	35.37	593.35
45	240.34	23.85	25.89	2.32	170.00	2.61	39.06	2.61	634.04	657.39	39.20	658.56
48	176.55	21.97	30.03	3.09	180.97	1.89	35.32	3.19	647.06	672.69	39.85	673.87

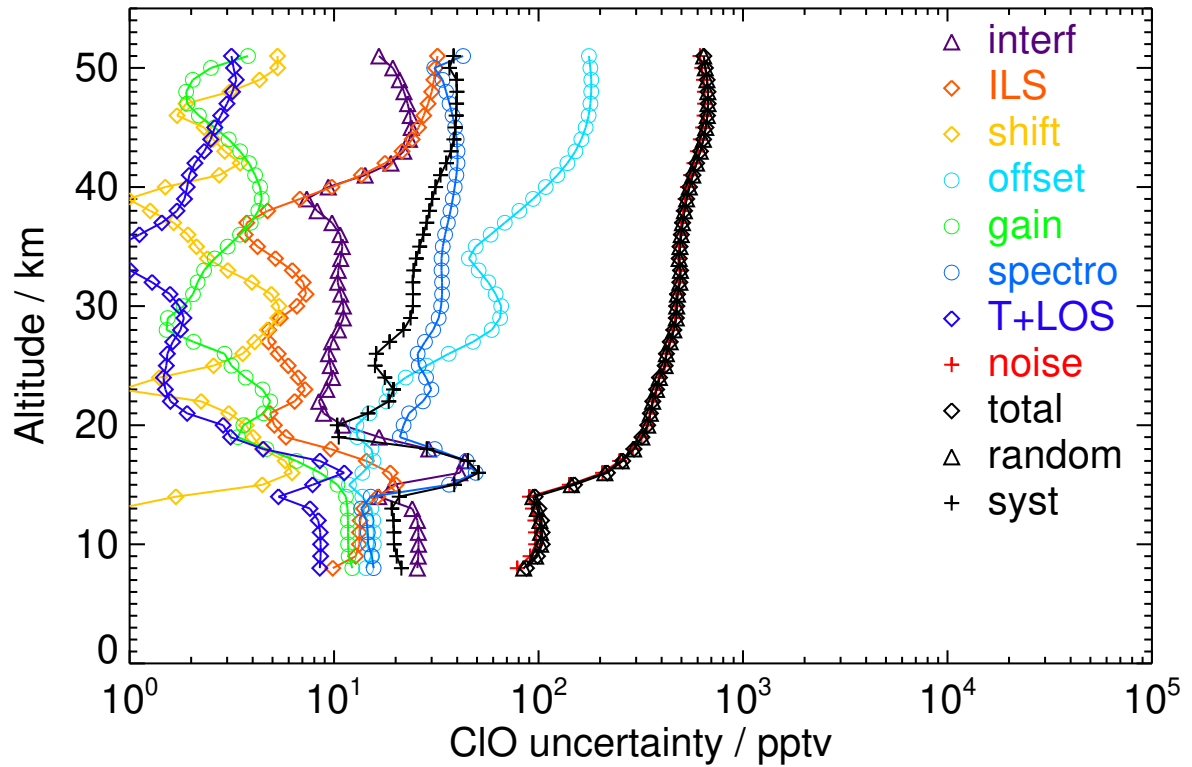
**Figure S48.** V8R_CLO_262 Northern midlatitude summer night

Table S50. CIO error budget for Northern midlatitude autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	12.87	25.70	14.92	0.96	16.20	11.50	10.01	8.07	91.92	97.64	18.98	99.47
12	12.69	25.41	15.01	1.00	16.12	11.48	9.85	7.81	91.06	96.70	19.01	98.55
15	1.60	15.16	16.75	4.29	12.25	9.64	26.94	5.26	140.60	142.46	31.61	145.92
18	-30.17	30.00	8.30	5.00	15.28	4.52	28.84	4.48	285.74	288.44	23.36	289.39
21	151.75	8.30	7.57	2.88	16.47	5.49	35.64	1.71	362.30	364.19	18.29	364.65
24	276.08	10.28	7.31	1.71	24.75	4.02	36.83	1.29	393.10	395.12	23.62	395.82
27	129.85	10.05	7.04	3.66	55.00	2.36	34.12	1.30	464.63	468.84	20.69	469.30
30	106.91	11.90	5.55	4.02	76.02	1.98	37.14	1.39	498.43	505.04	26.74	505.75
33	352.36	11.67	5.00	1.94	67.62	2.80	45.72	0.99	527.47	532.77	34.75	533.91
36	561.16	9.94	5.69	1.27	85.99	4.17	51.84	0.87	538.12	546.05	40.42	547.54
39	507.34	10.95	11.60	1.40	129.32	4.98	54.21	1.22	591.09	606.16	43.56	607.73
42	397.29	23.16	20.80	2.98	171.41	4.52	53.34	1.93	659.83	682.99	46.21	684.55
45	284.89	25.54	25.98	6.02	193.82	3.55	48.90	2.64	698.01	725.59	45.49	727.02
48	223.29	23.03	27.48	8.75	195.71	2.48	43.71	3.08	681.86	710.40	43.08	711.71

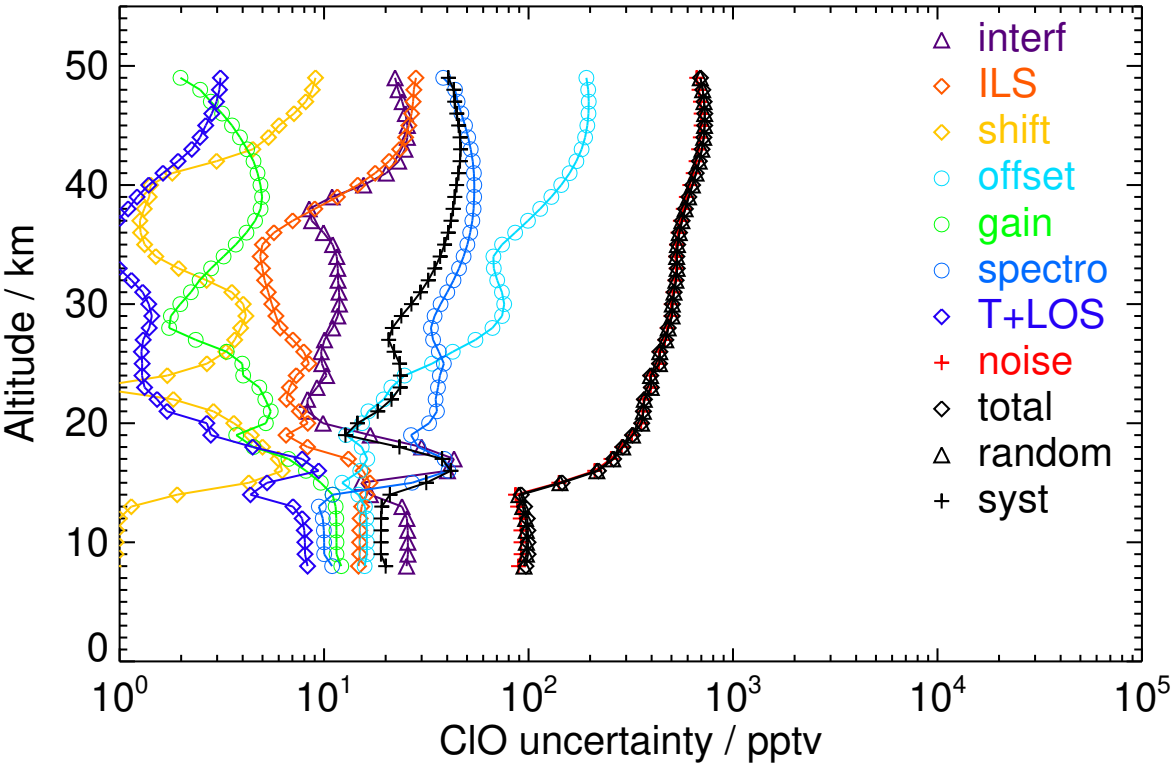


Figure S49. V8R_CLO_262 Northern midlatitude autumn day

Table S51. CIO error budget for Northern midlatitude autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	2.33	25.71	14.62	1.07	16.04	12.42	12.21	7.71	89.40	95.35	19.92	97.41
12	2.52	25.33	14.72	1.10	15.95	12.37	11.89	7.42	88.50	94.35	19.82	96.41
15	-41.86	18.96	17.22	4.37	11.90	9.72	30.23	5.54	142.59	145.19	33.28	148.96
18	23.45	28.36	7.90	4.59	14.92	4.11	28.46	4.38	289.37	292.01	20.57	292.73
21	34.37	8.46	7.52	2.64	16.72	5.55	33.49	1.75	362.84	364.34	21.88	364.99
24	19.51	10.31	5.76	1.58	25.12	2.93	29.92	1.30	398.40	400.15	16.74	400.50
27	179.19	10.24	5.63	3.11	55.03	2.32	33.00	1.32	464.37	468.41	22.42	468.95
30	177.14	12.07	6.52	3.42	75.91	1.98	32.94	1.38	499.59	506.11	22.31	506.60
33	-0.33	11.95	5.34	1.65	66.24	2.11	32.06	0.97	527.09	531.98	20.57	532.37
36	15.21	10.18	4.57	1.02	83.17	2.86	33.97	0.93	534.87	542.04	22.16	542.49
39	195.78	10.86	10.04	0.98	125.23	3.71	36.95	1.37	581.50	595.59	26.42	596.17
42	275.00	23.44	20.51	3.04	167.51	3.52	38.55	2.08	648.21	670.52	33.62	671.36
45	222.94	25.75	26.36	6.22	190.92	2.78	36.82	2.79	689.95	716.87	36.70	717.81
48	163.43	23.12	27.95	9.22	194.15	2.11	33.05	3.21	678.28	706.39	35.83	707.30

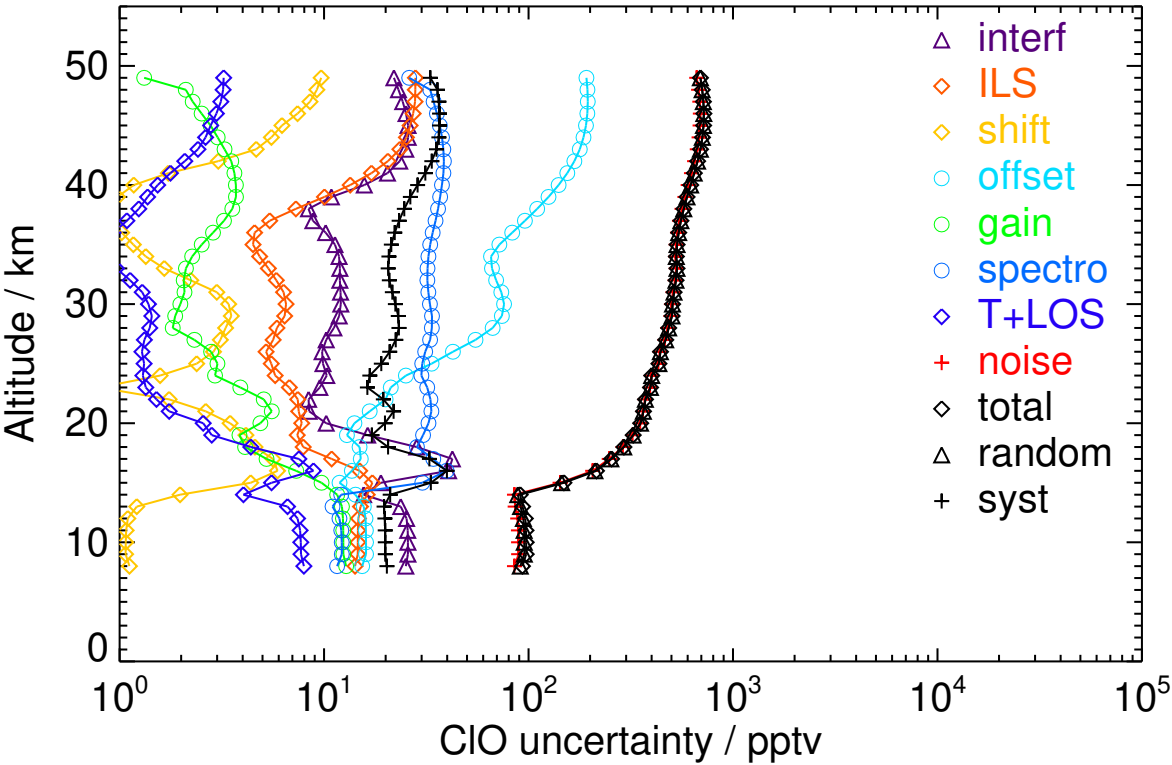


Figure S50. V8R_CLO_262 Northern midlatitude autumn night

Table S52. ClO error budget for Tropics day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	-4.09	22.15	13.63	1.25	15.38	11.57	16.04	7.93	98.22	103.15	19.40	104.95
12	35.15	22.41	17.59	2.01	19.34	10.03	19.26	8.41	132.69	137.38	21.60	139.06
15	26.92	20.82	18.84	4.73	13.78	9.22	38.38	9.25	145.29	148.88	39.88	154.13
18	3.70	29.19	8.01	5.07	23.34	4.67	33.58	5.74	326.41	329.19	29.03	330.47
21	61.67	10.62	7.56	3.59	16.90	3.75	26.87	1.90	372.45	373.72	16.15	374.07
24	113.47	9.07	6.48	1.77	26.51	3.56	30.71	1.22	401.01	402.84	17.69	403.23
27	241.07	9.56	8.79	6.78	54.32	3.60	40.41	1.69	437.63	442.24	27.59	443.10
30	410.15	10.84	11.03	9.44	68.69	3.63	45.04	2.09	484.78	490.83	34.54	492.05
33	378.10	9.77	9.99	4.90	48.32	3.46	44.62	1.18	487.35	490.80	34.42	492.00
36	312.88	8.73	6.60	3.17	61.96	4.26	43.50	1.13	480.93	485.80	34.30	487.01
39	312.88	8.00	9.69	1.51	99.85	4.78	46.43	1.25	512.12	522.69	36.96	524.00
42	337.92	16.35	20.04	2.55	146.57	3.91	49.50	1.97	580.23	599.60	42.19	601.08
45	447.94	17.91	26.55	2.64	179.15	3.09	48.34	3.08	641.45	667.05	44.44	668.53
48	510.03	16.11	29.51	6.13	190.77	2.40	44.44	3.86	654.31	682.48	43.68	683.87

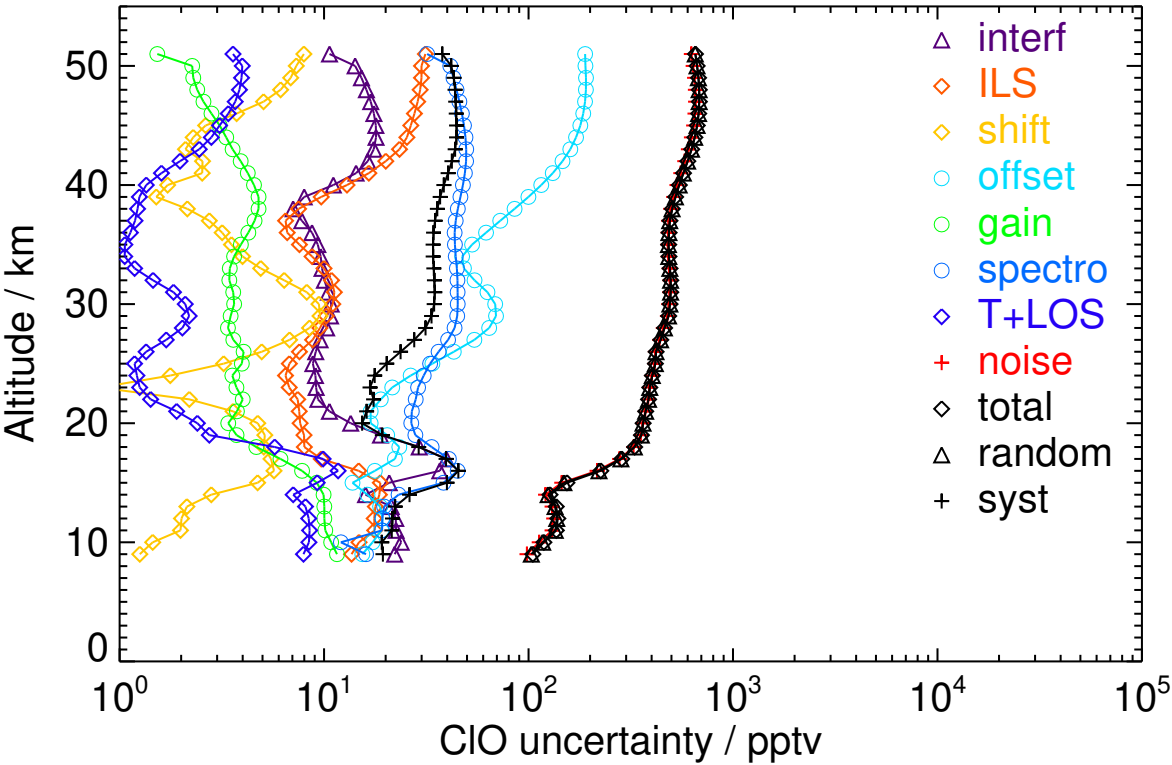


Figure S51. V8R_CLO_262 Tropics day

Table S53. ClO error budget for Tropics night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
9	23.48	21.04	12.93	1.33	15.21	10.62	7.26	8.77	103.60	107.26	17.72	108.71
12	73.83	21.76	17.60	2.04	18.42	10.54	22.82	8.96	128.68	133.77	22.41	135.64
15	-13.04	20.95	20.93	4.94	13.81	10.09	45.63	10.95	145.70	149.79	46.77	156.92
18	-54.20	29.81	7.10	4.88	24.01	4.53	30.68	6.19	327.84	330.51	27.98	331.70
21	15.82	10.68	6.47	3.61	17.24	3.35	21.06	2.11	377.04	378.02	13.76	378.27
24	-82.30	9.22	4.79	2.18	25.88	2.44	18.86	1.30	398.83	400.14	10.08	400.27
27	114.68	9.64	4.63	6.75	54.78	2.20	26.23	1.74	436.43	440.42	18.86	440.83
30	29.39	10.66	6.15	8.69	65.84	2.61	33.24	2.07	486.70	491.91	24.01	492.50
33	111.84	9.76	6.37	4.33	46.39	2.90	35.73	1.05	486.19	489.25	24.64	489.87
36	224.67	8.76	5.38	2.57	62.54	3.96	37.08	0.95	483.40	488.18	27.80	488.97
39	175.61	8.17	9.36	1.18	100.85	4.25	38.89	1.24	516.02	526.46	31.23	527.39
42	164.28	16.28	19.49	2.65	146.48	3.10	42.31	2.15	585.39	604.36	36.65	605.47
45	196.24	17.51	25.21	2.32	177.91	2.50	42.36	3.29	645.22	670.23	38.88	671.36
48	209.27	15.58	27.68	4.91	188.99	2.17	39.33	4.07	656.90	684.37	38.37	685.45

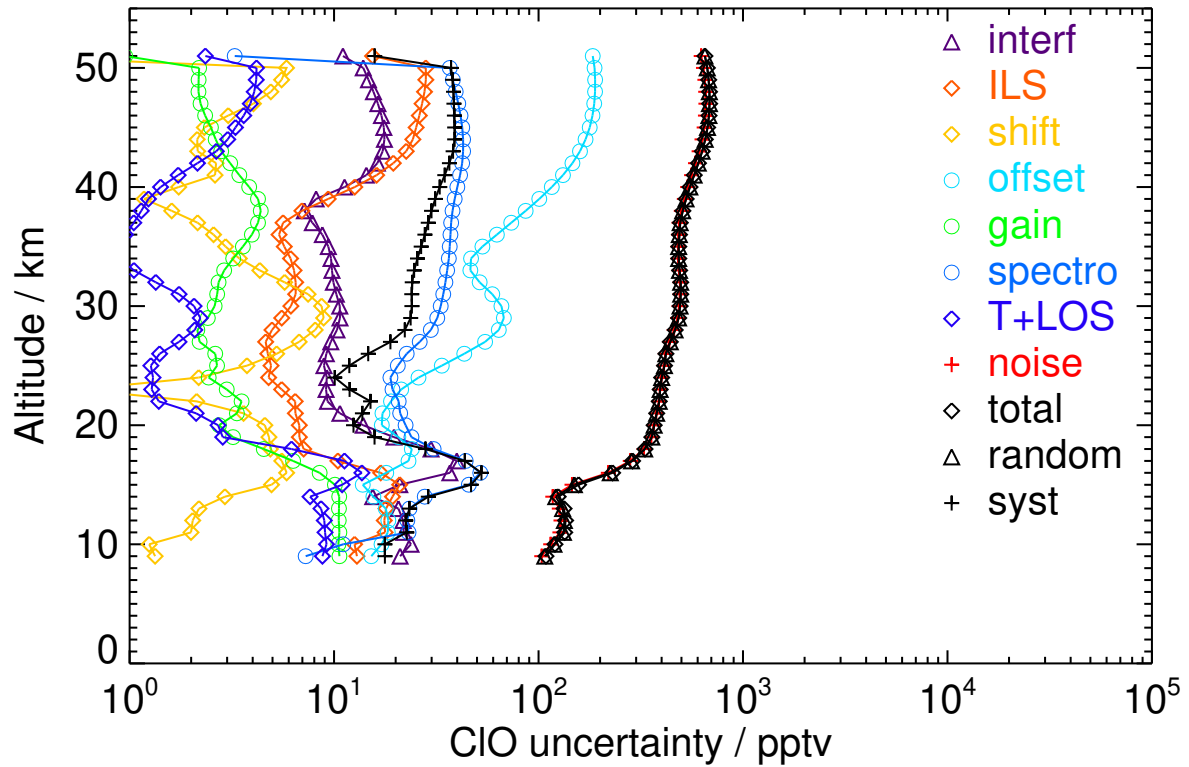
**Figure S52.** V8R_CLO_262 Tropics night

Table S54. CIO error budget for Southern midlatitude winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	17.49	22.33	11.95	1.05	14.68	11.71	9.77	5.91	65.82	71.69	17.84	73.88
9	19.58	23.47	12.40	0.90	14.40	11.73	9.46	6.09	67.29	73.37	17.94	75.53
12	21.67	22.98	12.56	0.92	14.40	11.60	9.09	5.67	66.26	72.22	17.82	74.38
15	40.85	21.50	12.74	3.59	11.41	7.20	20.24	4.84	145.06	147.70	21.91	149.31
18	124.41	26.07	5.29	3.18	13.81	3.84	32.33	3.79	296.63	299.30	19.76	299.95
21	209.00	8.90	6.62	0.88	20.43	6.40	39.54	1.66	380.72	382.75	24.46	383.53
24	131.64	11.10	5.54	1.26	40.80	3.30	35.68	1.37	448.99	451.96	20.89	452.44
27	109.91	12.60	6.12	1.82	85.14	3.72	33.58	1.69	534.72	542.24	22.20	542.69
30	243.70	14.13	4.84	2.67	114.40	2.70	34.44	1.76	590.01	601.61	26.25	602.18
33	299.04	13.10	4.09	2.70	124.64	1.99	37.70	1.48	639.32	651.94	29.34	652.60
36	288.28	12.24	7.85	1.15	155.01	3.47	39.42	1.33	679.62	697.63	31.67	698.35
39	314.82	23.24	16.81	2.97	194.66	4.83	40.13	1.76	733.08	759.28	35.46	760.11
42	252.36	29.96	25.54	8.27	222.84	4.83	38.47	2.72	767.56	800.26	38.90	801.21
45	244.33	28.83	29.04	10.48	227.30	4.45	34.19	3.04	755.78	790.16	38.73	791.11
48	550.12	25.61	34.21	10.63	205.86	4.02	43.37	3.00	695.40	726.06	51.43	727.88

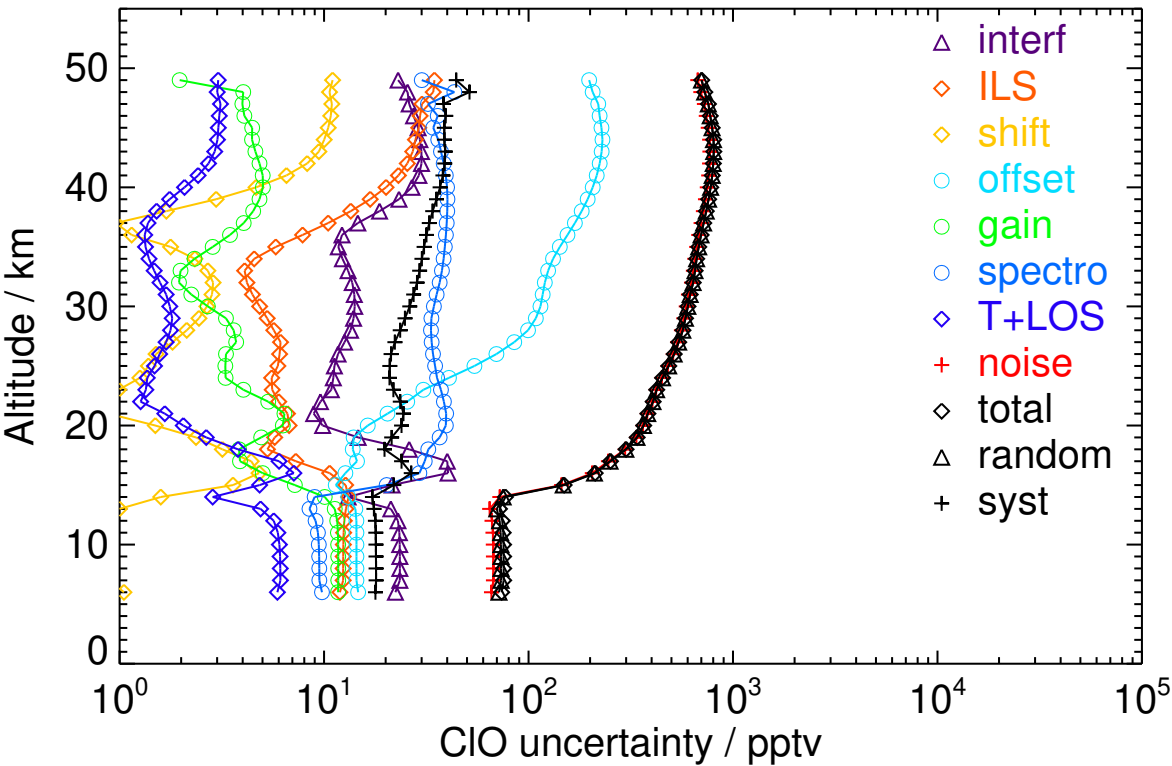


Figure S53. V8R_CLO_262 Southern midlatitude winter day

Table S55. CIO error budget for Southern midlatitude winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-33.29	22.10	11.25	1.10	14.34	10.33	7.40	5.92	65.35	71.00	15.73	72.72
9	-21.66	23.33	12.13	0.90	14.32	10.30	6.67	6.21	68.13	73.94	16.16	75.68
12	-17.91	22.87	12.28	0.93	14.27	10.23	6.49	5.80	67.08	72.77	16.19	74.55
15	-14.99	19.69	12.69	3.55	10.92	7.03	17.15	4.87	143.10	145.30	20.28	146.71
18	79.55	26.64	7.31	3.52	13.26	4.16	28.67	3.81	291.35	293.98	16.20	294.43
21	107.58	8.41	6.50	0.89	18.86	5.48	32.35	1.66	379.99	381.47	20.47	382.02
24	103.37	11.04	3.63	1.20	37.39	1.85	27.00	1.38	437.67	439.97	15.74	440.25
27	79.56	12.45	5.15	1.45	81.11	2.56	28.76	1.54	535.24	541.99	17.86	542.29
30	-60.53	14.68	5.56	2.45	113.64	2.88	31.89	1.66	583.88	595.55	20.74	595.91
33	19.50	13.94	4.61	2.69	123.98	2.43	36.55	1.37	632.05	644.82	24.99	645.31
36	168.91	11.39	7.53	1.56	150.11	3.64	41.75	1.34	668.28	685.69	30.10	686.35
39	228.31	22.52	16.13	2.71	190.09	4.99	44.63	1.73	719.77	745.44	36.35	746.33
42	226.02	30.78	24.82	7.90	219.34	5.15	44.42	2.59	756.65	789.02	41.23	790.10
45	219.78	30.33	28.66	10.30	225.58	4.72	43.80	2.96	748.04	782.55	43.18	783.74
48	330.00	25.65	33.53	12.01	213.41	4.06	45.36	3.17	705.00	737.77	47.78	739.31

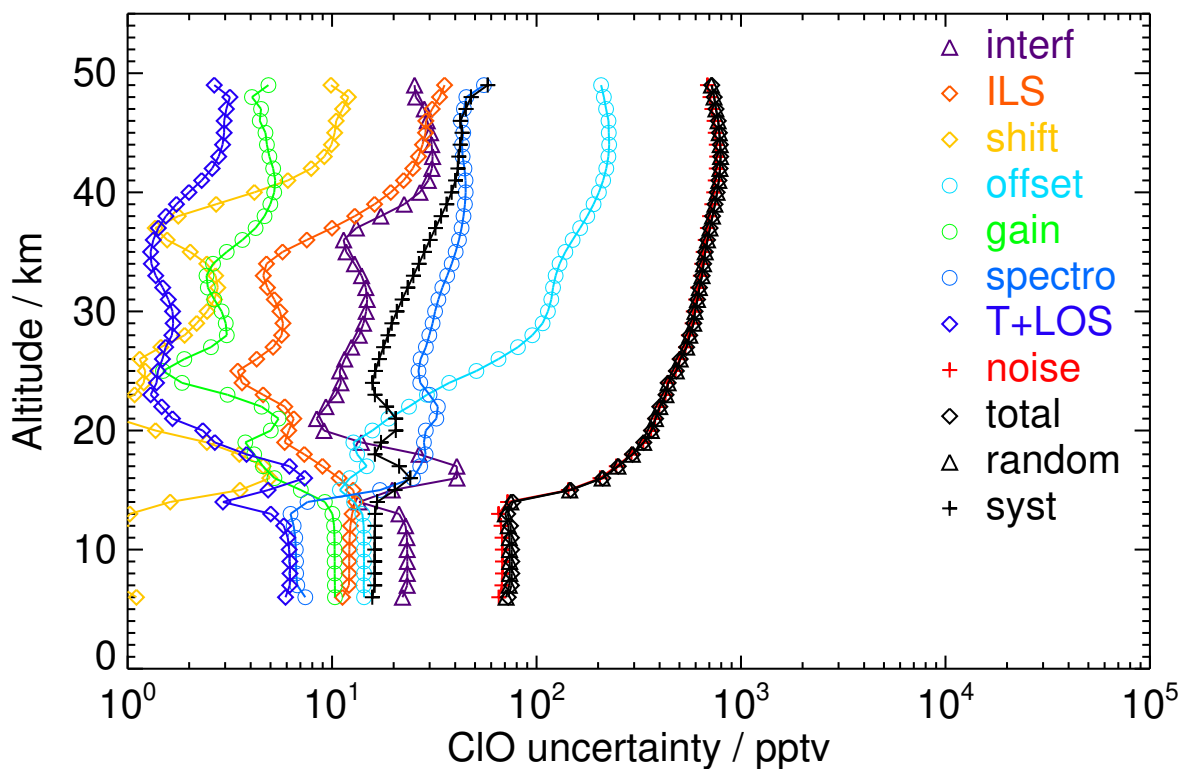
**Figure S54.** V8R_CLO_262 Southern midlatitude winter night

Table S56. CIO error budget for Southern midlatitude spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	16.75	27.16	13.64	1.21	14.14	11.00	7.33	5.96	67.85	74.96	17.87	77.07
9	10.84	26.71	12.57	1.06	13.94	10.76	8.06	6.09	68.90	75.86	16.63	77.66
12	11.22	26.21	12.81	1.00	13.87	10.61	7.82	5.69	67.84	74.66	16.69	76.50
15	-33.60	26.02	16.17	3.60	9.79	6.21	18.44	4.76	142.74	145.97	22.70	147.73
18	194.72	29.75	7.72	3.85	11.70	4.21	29.61	3.96	281.53	284.49	18.11	285.07
21	128.10	10.04	7.94	1.15	14.51	5.69	38.18	2.23	344.27	346.36	20.55	346.97
24	293.50	15.34	6.45	4.07	21.96	3.90	37.01	1.93	385.77	387.92	22.40	388.57
27	40.17	13.33	6.47	5.31	48.13	2.62	34.75	1.86	439.80	443.67	19.23	444.08
30	149.04	13.60	4.91	5.56	68.34	2.42	36.45	1.80	481.31	486.99	27.31	487.75
33	443.94	14.09	5.00	2.33	58.97	2.89	45.32	1.20	512.78	517.10	36.27	518.37
36	521.14	12.29	5.31	1.35	74.19	4.30	50.92	1.12	522.70	528.94	41.75	530.58
39	522.44	11.74	11.90	1.13	115.15	5.20	52.16	1.35	564.86	577.36	44.76	579.10
42	467.70	31.62	25.45	3.30	158.87	4.69	51.90	1.87	629.92	651.04	50.57	653.01
45	353.53	36.01	33.78	6.05	185.03	3.70	49.04	2.52	677.03	703.32	53.33	705.34
48	222.93	32.67	37.26	10.23	190.68	2.73	44.41	2.88	672.85	700.62	52.63	702.59

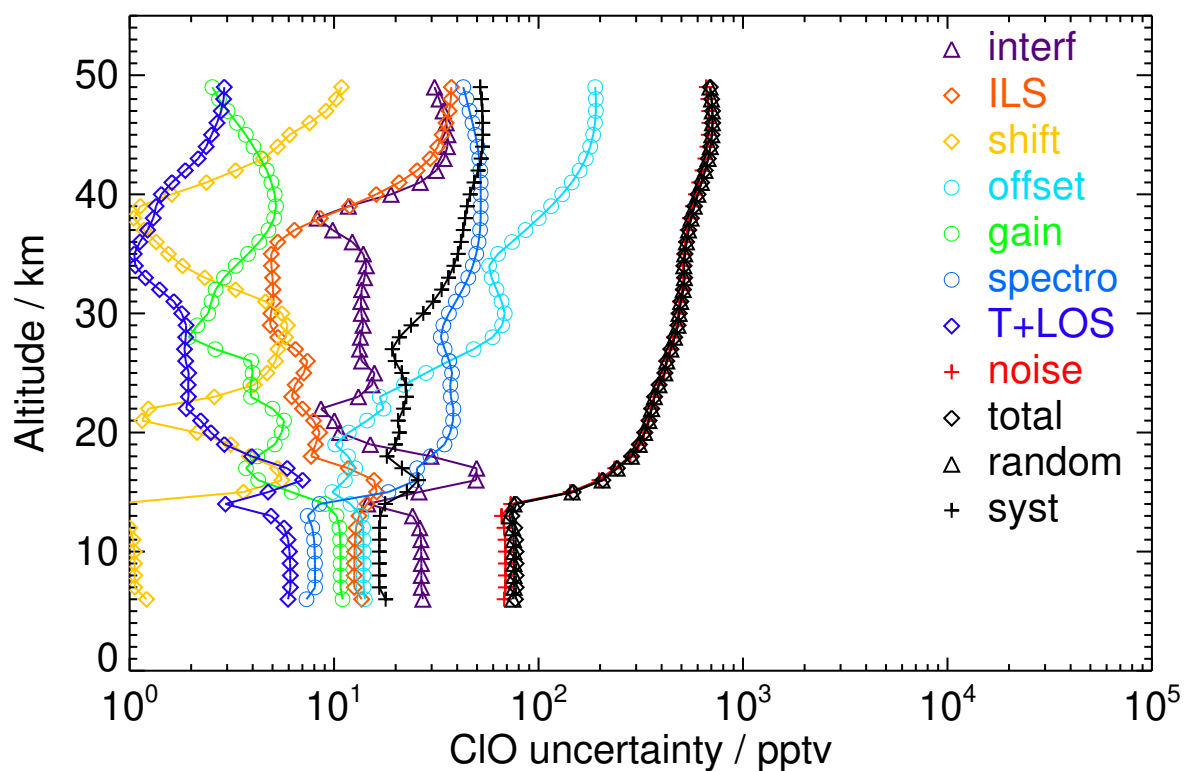
**Figure S55.** V8R_CLO_262 Southern midlatitude spring day

Table S57. CIO error budget for Southern midlatitude spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	42.87	24.96	12.77	1.01	13.24	10.99	9.50	6.08	63.15	69.96	17.46	72.10
9	34.82	25.01	12.66	0.84	13.74	11.10	8.79	6.58	68.11	74.56	17.28	76.54
12	34.31	24.50	12.88	0.78	13.69	11.02	8.70	6.14	67.09	73.40	17.41	75.43
15	18.80	24.16	16.61	3.74	10.76	7.92	23.69	4.89	143.93	146.87	27.96	149.51
18	60.13	32.40	9.28	4.08	13.15	3.56	27.42	4.11	287.93	290.95	18.98	291.57
21	86.39	10.78	6.07	2.39	15.72	4.86	26.43	1.99	354.10	355.41	14.31	355.69
24	42.64	13.68	4.74	3.22	23.01	2.75	28.05	1.80	390.86	392.53	15.52	392.83
27	141.66	12.47	6.42	4.73	50.04	2.75	33.45	1.81	444.91	448.79	19.75	449.22
30	75.36	13.27	7.21	5.47	67.08	3.00	33.28	1.82	477.51	483.13	21.79	483.62
33	38.12	13.78	6.30	2.56	57.29	2.77	32.39	1.23	507.15	511.18	21.71	511.64
36	115.08	11.79	3.65	1.78	72.78	3.57	32.88	1.27	516.28	522.04	23.88	522.59
39	128.98	12.34	10.91	1.76	113.71	4.53	37.20	1.47	558.67	570.88	28.64	571.60
42	174.62	31.04	26.61	4.18	157.92	4.23	42.30	1.95	624.11	645.25	40.19	646.50
45	208.31	34.26	35.47	7.31	184.42	3.58	43.02	2.54	672.81	699.18	46.75	700.74
48	187.41	30.79	38.90	11.44	190.64	2.82	40.26	2.86	670.25	698.21	48.09	699.86

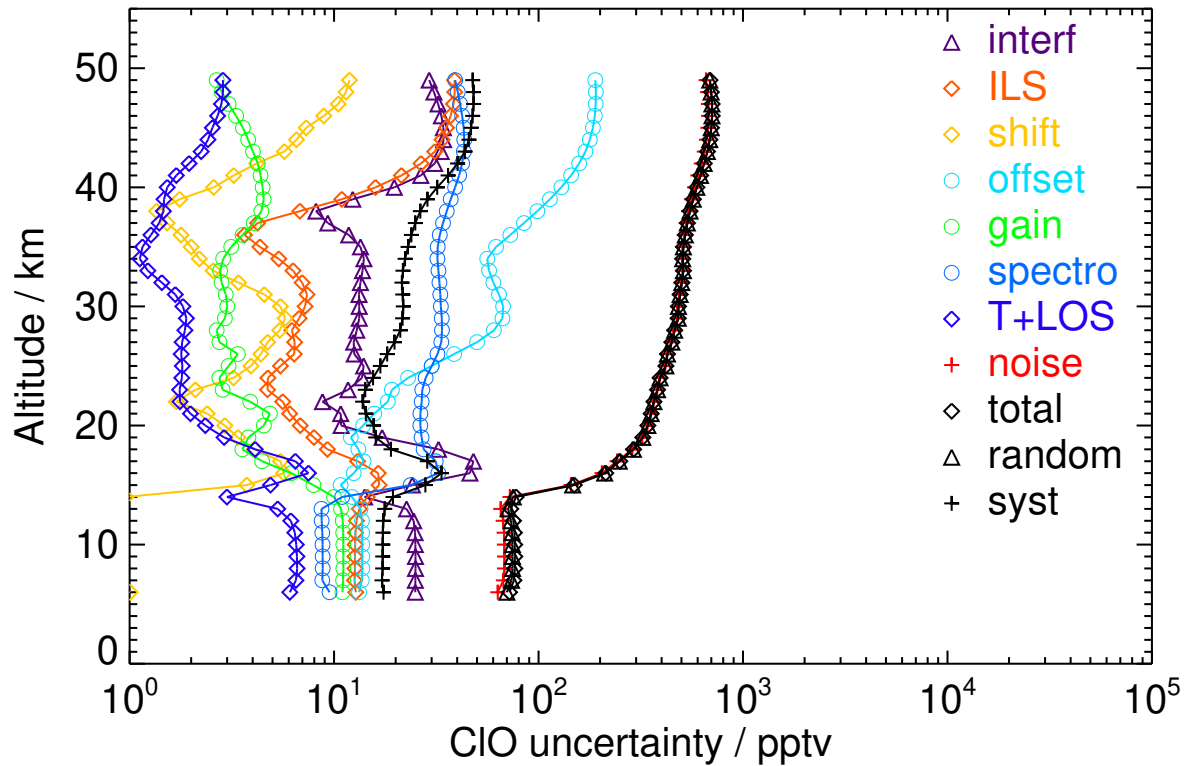
**Figure S56.** V8R_CLO_262 Southern midlatitude spring night

Table S58. CIO error budget for Southern midlatitude summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-62.76	26.48	10.70	1.35	12.72	9.80	8.13	6.37	59.82	67.28	15.30	69.00
9	-6.40	25.73	9.34	1.15	13.15	9.69	13.14	6.62	67.41	74.08	17.02	76.01
12	-5.14	25.31	9.64	1.07	13.09	9.59	12.38	6.19	66.27	72.83	16.66	74.71
15	5.06	25.47	15.75	3.89	10.51	6.36	19.70	5.30	139.59	143.00	22.70	144.79
18	82.33	29.11	9.76	4.75	12.14	3.21	26.17	3.96	272.81	275.48	18.96	276.13
21	47.04	9.53	7.92	2.90	14.97	4.50	29.04	2.18	339.92	341.22	19.25	341.76
24	82.65	13.47	6.33	2.05	20.48	2.17	28.24	1.66	371.52	373.16	15.06	373.47
27	112.17	11.40	6.68	2.70	44.73	1.86	31.05	1.71	430.26	433.40	20.94	433.91
30	189.86	12.42	7.80	3.47	65.46	3.05	39.42	1.95	457.12	462.72	30.51	463.72
33	496.70	13.82	6.98	2.02	54.56	4.06	47.81	1.46	482.66	486.79	38.93	488.35
36	581.35	15.32	6.69	1.99	55.16	5.42	52.06	1.67	483.12	487.26	45.37	489.36
39	632.56	8.28	10.09	2.38	85.59	6.91	53.51	2.03	500.30	508.29	48.60	510.60
42	538.40	30.77	26.49	4.56	132.26	6.24	55.60	1.83	544.08	561.53	54.81	564.20
45	450.64	36.23	38.01	3.48	168.30	5.02	54.27	2.37	607.05	631.74	59.03	634.49
48	368.41	32.56	44.05	9.79	183.74	3.42	50.07	2.86	632.41	660.11	59.91	662.82

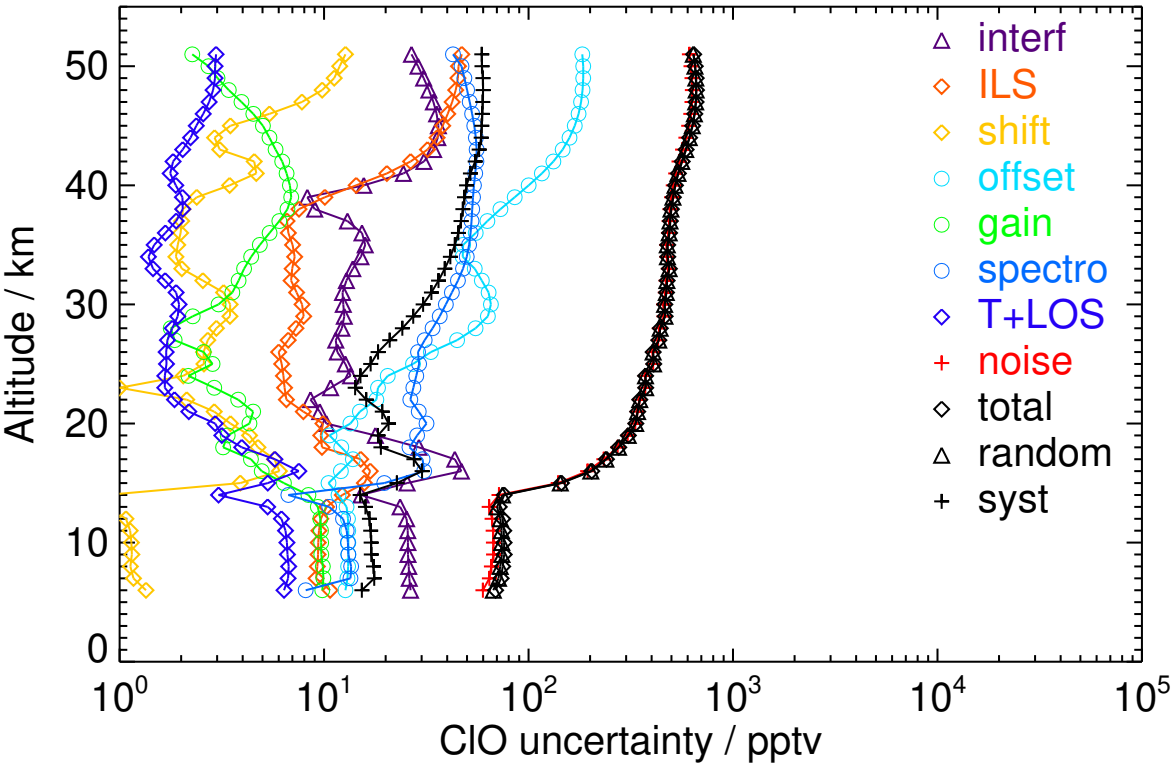


Figure S57. V8R_CLO_262 Southern midlatitude summer day

Table S59. CIO error budget for Southern midlatitude summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-13.36	26.43	11.98	1.51	12.21	10.84	5.01	6.39	60.20	67.33	16.35	69.29
9	23.96	25.87	12.05	1.14	12.88	10.28	8.98	6.57	65.35	72.17	16.53	74.04
12	20.41	25.21	12.85	1.04	12.99	10.20	8.86	6.09	67.00	73.48	16.71	75.36
15	29.43	25.64	18.57	3.86	10.69	7.87	21.41	5.27	139.16	142.72	25.96	145.07
18	-27.54	30.37	8.93	4.63	12.88	4.01	24.65	3.96	271.88	274.81	15.15	275.22
21	79.91	10.22	6.18	3.05	15.01	4.53	24.69	2.17	338.48	339.61	15.85	339.98
24	-82.56	13.84	6.26	2.23	20.88	2.45	23.73	1.68	367.14	368.65	11.21	368.83
27	45.03	11.66	4.99	2.49	46.61	1.75	22.94	1.73	426.97	429.99	16.91	430.32
30	-67.61	11.99	5.56	2.50	61.59	2.04	25.62	1.81	450.86	455.51	20.48	455.97
33	-70.69	13.09	5.31	1.46	47.63	2.79	29.01	1.24	469.90	472.88	22.69	473.42
36	286.50	15.22	4.39	1.35	51.51	4.75	36.49	1.56	475.31	478.79	30.74	479.77
39	533.42	8.02	8.12	2.64	80.80	6.81	43.86	2.12	491.29	498.54	38.24	500.00
42	470.98	30.39	28.73	5.90	127.06	5.59	49.54	1.88	531.40	547.90	51.09	550.27
45	349.06	35.43	42.58	3.55	163.80	3.89	50.79	2.24	594.62	618.39	60.68	621.36
48	244.82	31.19	49.47	8.24	180.68	2.38	48.18	2.61	624.16	651.11	64.07	654.25
52	454.62	22.24	56.95	12.89	179.20	4.22	43.33	2.71	595.55	622.80	68.66	626.58

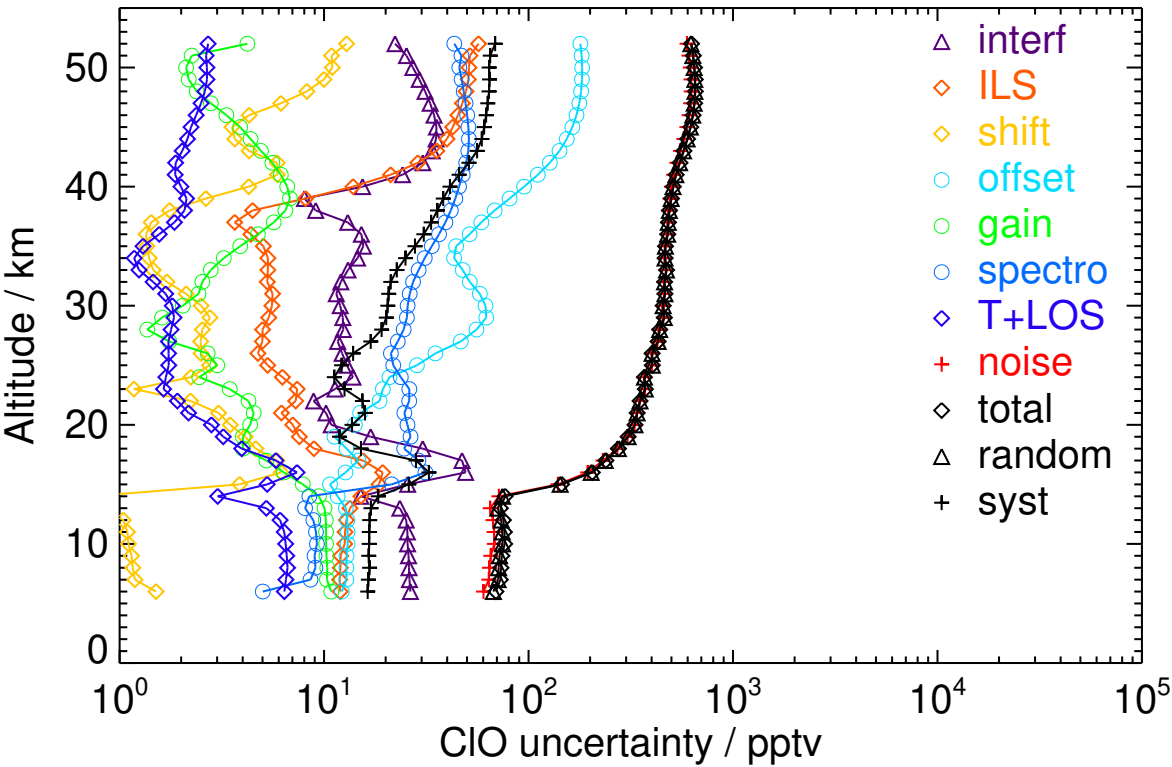


Figure S58. V8R_CLO_262 Southern midlatitude summer night

Table S60. CIO error budget for Southern midlatitude autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-28.31	23.74	10.85	0.78	12.61	10.62	9.47	5.64	59.70	65.97	16.93	68.11
9	-14.84	24.31	10.50	0.80	13.07	10.47	11.39	6.30	64.25	70.54	17.42	72.66
12	-11.28	23.65	10.77	0.77	13.00	10.40	10.60	5.86	63.16	69.25	17.13	71.34
15	22.76	27.94	14.78	4.27	9.74	7.47	22.44	5.09	143.68	147.46	24.43	149.47
18	107.68	26.21	8.39	3.95	12.34	4.85	30.71	3.73	286.75	289.42	19.25	290.06
21	28.46	8.45	5.71	1.82	16.99	5.60	30.46	1.95	358.48	359.90	18.55	360.37
24	71.10	11.14	5.61	1.74	28.42	2.99	29.88	1.49	414.37	416.31	16.18	416.62
27	93.49	11.57	5.29	2.35	60.42	2.21	32.64	1.48	473.70	478.34	21.80	478.84
30	215.99	13.53	5.46	2.45	79.64	1.87	38.94	1.48	514.07	521.12	28.01	521.87
33	369.30	13.68	5.20	1.65	75.97	2.33	45.78	1.15	543.03	549.45	32.76	550.42
36	353.48	10.27	6.61	0.91	102.42	3.72	49.43	0.88	568.24	578.58	35.17	579.65
39	269.17	16.63	12.59	1.49	147.66	4.58	49.34	1.17	632.66	650.84	36.90	651.89
42	119.41	32.43	21.67	5.02	186.55	4.20	46.92	1.98	697.85	723.82	40.60	724.96
45	10.84	34.60	25.86	7.74	203.98	3.16	42.02	2.48	720.48	750.18	40.63	751.28
48	-17.95	31.34	27.35	9.07	198.34	2.23	38.83	2.56	685.73	715.00	40.88	716.17

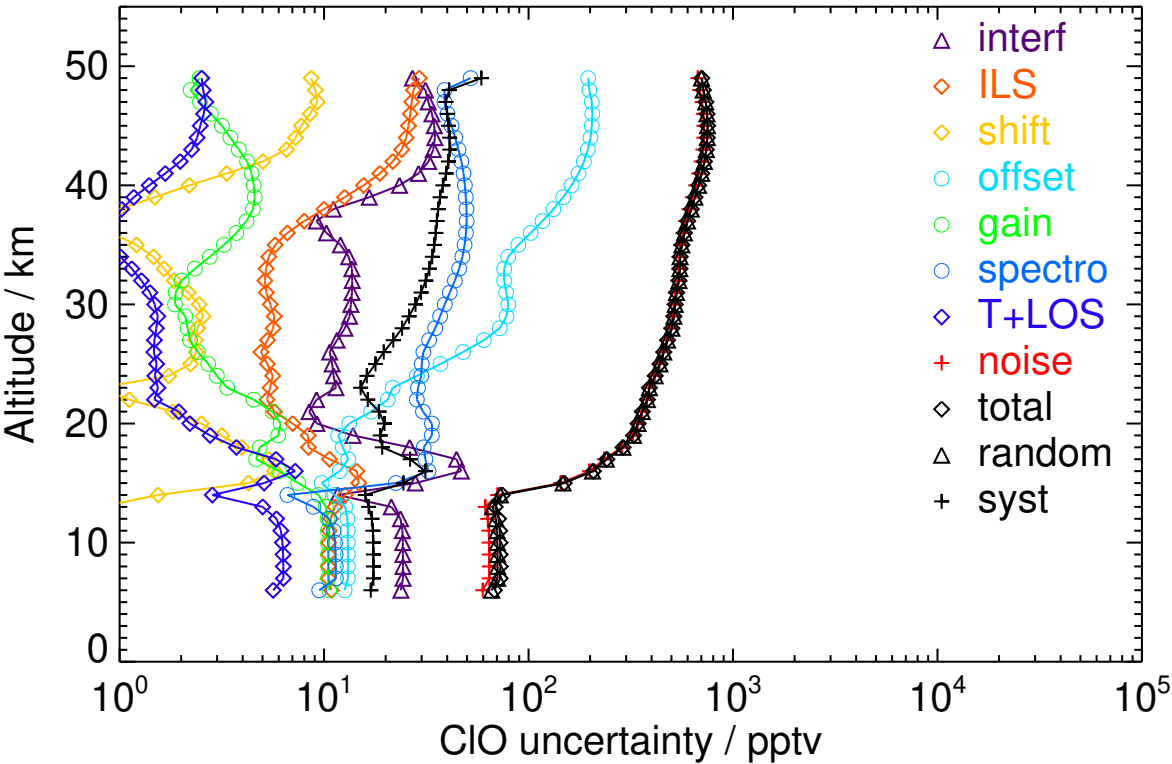


Figure S59. V8R_CLO_262 Southern midlatitude autumn day

Table S61. CIO error budget for Southern midlatitude autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	9.88	24.11	12.40	0.58	13.01	10.77	6.71	5.96	62.28	68.53	16.82	70.57
9	-2.33	24.45	12.65	0.61	13.28	10.86	7.16	6.52	66.16	72.35	17.04	74.32
12	-2.17	23.90	12.86	0.60	13.21	10.80	6.81	6.07	65.07	71.09	17.08	73.11
15	-14.88	25.38	15.09	4.32	9.90	7.52	19.15	5.14	142.12	145.19	23.57	147.09
18	42.23	27.73	6.82	4.12	12.34	3.86	26.23	3.76	282.71	285.19	17.20	285.71
21	66.45	8.01	6.06	1.84	16.30	5.70	28.56	1.87	358.77	360.02	18.03	360.47
24	-8.16	11.04	4.10	1.86	26.26	2.19	25.54	1.48	398.41	400.03	13.96	400.27
27	121.17	11.28	4.92	2.12	59.41	1.47	32.79	1.40	475.88	480.35	22.19	480.86
30	201.58	13.47	5.94	1.77	76.56	1.83	35.35	1.46	505.08	511.72	24.28	512.29
33	122.20	13.86	5.21	1.75	70.44	2.13	34.91	1.16	532.88	538.34	23.66	538.86
36	83.23	10.36	5.09	1.20	94.12	3.24	33.31	1.03	548.68	557.32	23.63	557.82
39	148.33	16.85	12.44	1.14	138.71	3.98	33.81	1.32	609.22	625.49	27.45	626.09
42	159.97	33.06	24.03	4.89	179.64	3.88	35.87	2.08	677.09	701.70	36.54	702.65
45	147.29	34.76	29.39	8.11	199.43	2.92	35.05	2.58	707.26	736.04	40.18	737.14
48	177.79	30.81	30.87	10.67	197.87	2.16	30.95	2.75	683.35	712.45	38.87	713.51

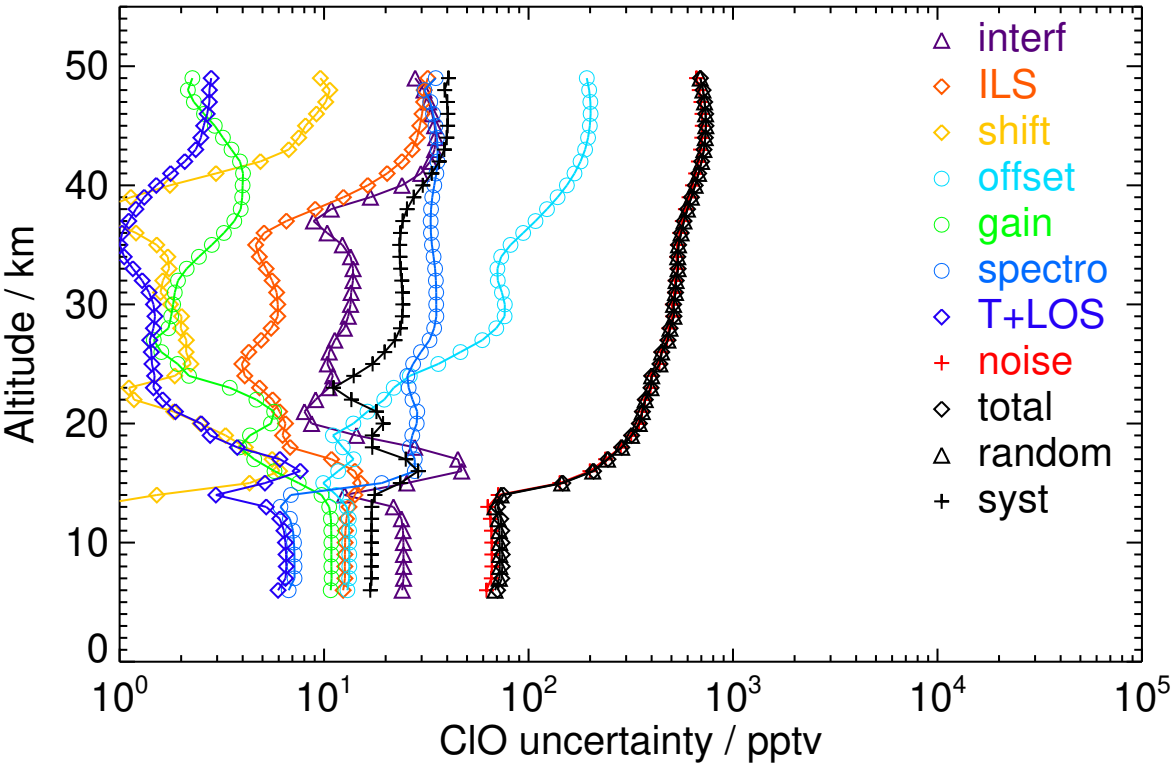


Figure S60. V8R_CLO_262 Southern midlatitude autumn night

Table S62. CIO error budget for Southern polar winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	7.27	21.03	8.93	1.33	16.41	10.11	11.00	7.63	68.06	74.00	15.19	75.54
9	21.10	20.99	8.99	1.40	17.03	9.84	11.78	7.58	71.77	77.64	15.13	79.10
12	29.14	20.63	8.99	1.42	17.11	9.68	11.65	7.32	71.01	76.82	14.99	78.27
15	329.73	10.09	6.98	2.46	15.98	5.08	31.96	5.64	149.27	152.56	22.33	154.19
18	901.31	28.64	10.40	2.66	21.82	6.54	87.54	10.40	336.42	342.79	70.01	349.86
21	815.05	12.07	30.26	2.13	36.67	9.57	111.70	14.43	444.60	452.55	89.76	461.36
24	538.10	11.59	28.70	3.06	68.74	5.55	90.56	13.15	530.96	539.62	69.48	544.08
27	436.61	14.40	19.35	4.21	109.58	3.27	64.20	8.89	593.05	604.97	50.36	607.06
30	378.41	15.98	12.90	4.87	125.34	3.88	54.38	4.93	623.60	637.36	42.39	638.77
33	298.44	13.37	11.83	4.33	128.73	4.66	53.09	2.53	649.17	663.12	38.18	664.21
36	238.19	12.68	15.89	2.62	159.03	5.85	51.55	1.61	682.47	702.00	36.94	702.97
39	172.52	23.86	23.59	2.87	199.91	6.35	49.01	1.78	737.73	765.65	39.64	766.67
42	74.86	26.22	29.26	7.33	227.23	5.62	44.08	2.30	775.76	809.53	40.92	810.56
45	1.11	23.70	29.15	8.06	232.61	4.81	38.21	2.28	766.55	802.00	38.24	802.91
48	161.15	23.44	34.30	10.64	208.57	2.87	30.29	2.48	701.87	732.82	43.21	734.09

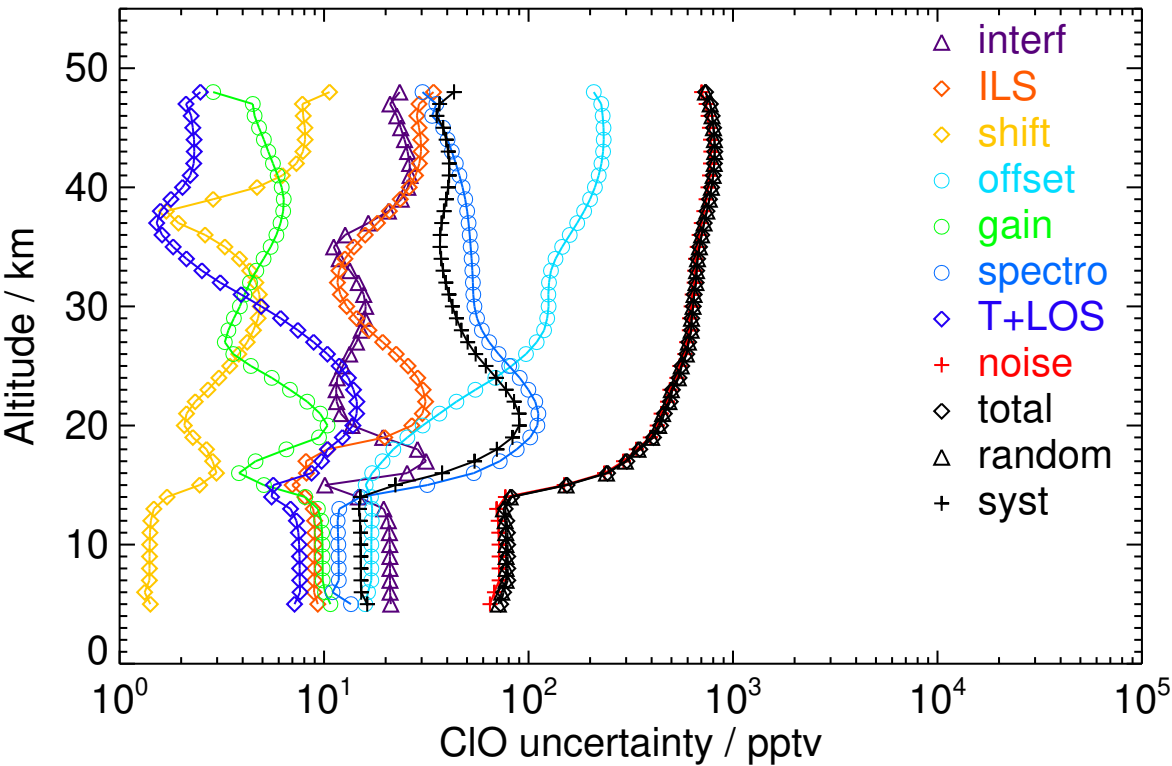


Figure S61. V8R_CLO_262 Southern polar winter day

Table S63. CIO error budget for Southern polar winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	10.37	20.56	8.95	1.25	15.92	9.16	8.88	8.39	67.45	73.23	13.34	74.43
9	10.63	20.54	8.96	1.25	15.92	9.15	8.84	8.36	67.41	73.18	13.33	74.38
12	14.20	20.19	9.00	1.28	16.03	8.99	8.40	8.04	66.64	72.34	13.12	73.52
15	60.45	9.50	8.90	2.38	15.69	4.86	17.53	5.43	149.81	151.38	17.59	152.40
18	193.75	29.12	5.88	2.69	19.24	2.03	33.46	10.35	334.44	337.35	23.14	338.14
21	241.48	11.85	9.53	1.88	33.60	4.01	44.01	14.04	441.94	444.92	29.52	445.90
24	265.23	10.99	8.85	2.78	65.43	2.49	38.89	13.21	526.46	531.54	28.57	532.30
27	255.12	13.86	8.07	4.33	108.42	2.39	37.23	8.99	591.67	602.34	27.69	602.97
30	193.26	15.64	8.48	5.05	130.65	3.22	38.98	5.09	625.43	639.75	29.05	640.41
33	158.99	13.49	9.85	4.42	133.63	4.22	42.01	2.65	652.49	666.85	31.59	667.60
36	157.63	13.25	14.84	2.66	158.96	5.82	44.27	1.59	682.12	701.18	36.03	702.11
39	208.09	23.91	23.86	2.40	198.10	6.62	45.64	1.74	730.82	758.19	42.05	759.35
42	285.32	26.19	30.54	7.19	225.20	5.97	44.09	2.31	766.11	799.56	44.73	800.81
45	398.48	24.00	32.22	8.41	227.81	5.47	42.78	2.34	752.99	787.60	46.05	788.95
48	841.55	22.17	39.72	9.11	203.22	3.76	58.18	2.30	686.76	717.10	65.28	720.07

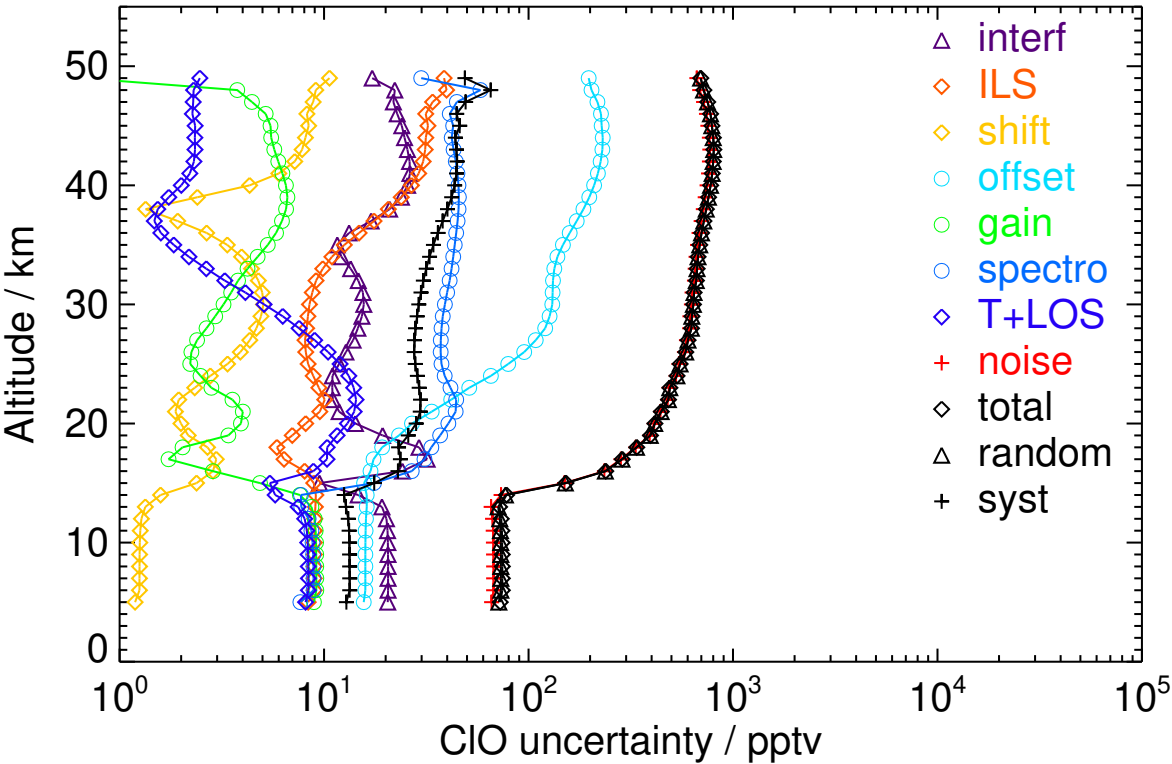


Figure S62. V8R_CLO_262 Southern polar winter night

Table S64. CIO error budget for Southern polar spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	15.97	26.58	11.66	1.29	15.48	9.63	8.15	5.99	69.06	76.22	15.42	77.77
9	16.20	26.57	11.69	1.29	15.48	9.62	8.15	5.95	69.01	76.18	15.43	77.72
12	19.03	26.30	11.96	1.26	15.50	9.46	8.13	5.63	68.13	75.26	15.56	76.85
15	96.87	15.14	16.73	2.24	12.72	5.18	18.90	3.47	144.76	146.92	21.01	148.42
18	61.96	32.08	9.89	4.70	14.07	3.59	28.70	5.14	291.66	294.84	18.67	295.43
21	120.14	11.37	6.38	4.18	19.58	3.77	30.92	6.84	356.75	358.49	18.45	358.97
24	238.31	16.09	9.26	5.73	27.90	4.16	37.59	6.42	419.65	422.01	25.26	422.77
27	225.75	15.87	14.13	5.36	51.63	4.51	35.40	3.54	432.62	436.91	26.49	437.71
30	232.37	13.79	13.96	5.30	59.19	6.70	40.27	2.89	464.38	469.21	32.92	470.36
33	463.49	14.30	10.41	2.74	42.96	4.90	48.80	1.85	472.21	475.50	38.11	477.03
36	557.42	12.20	11.51	4.01	61.78	5.78	51.39	1.68	495.28	500.28	42.57	502.08
39	539.69	14.06	20.97	5.11	103.14	5.99	53.03	1.46	538.14	549.09	47.31	551.13
42	436.47	32.34	37.55	6.61	148.56	4.55	54.73	1.86	605.27	624.99	57.76	627.65
45	302.15	36.58	45.92	8.57	176.63	3.33	52.62	2.37	660.25	685.18	62.96	688.06
48	169.58	32.83	49.42	11.92	183.99	2.36	48.30	2.64	662.41	688.91	63.58	691.84

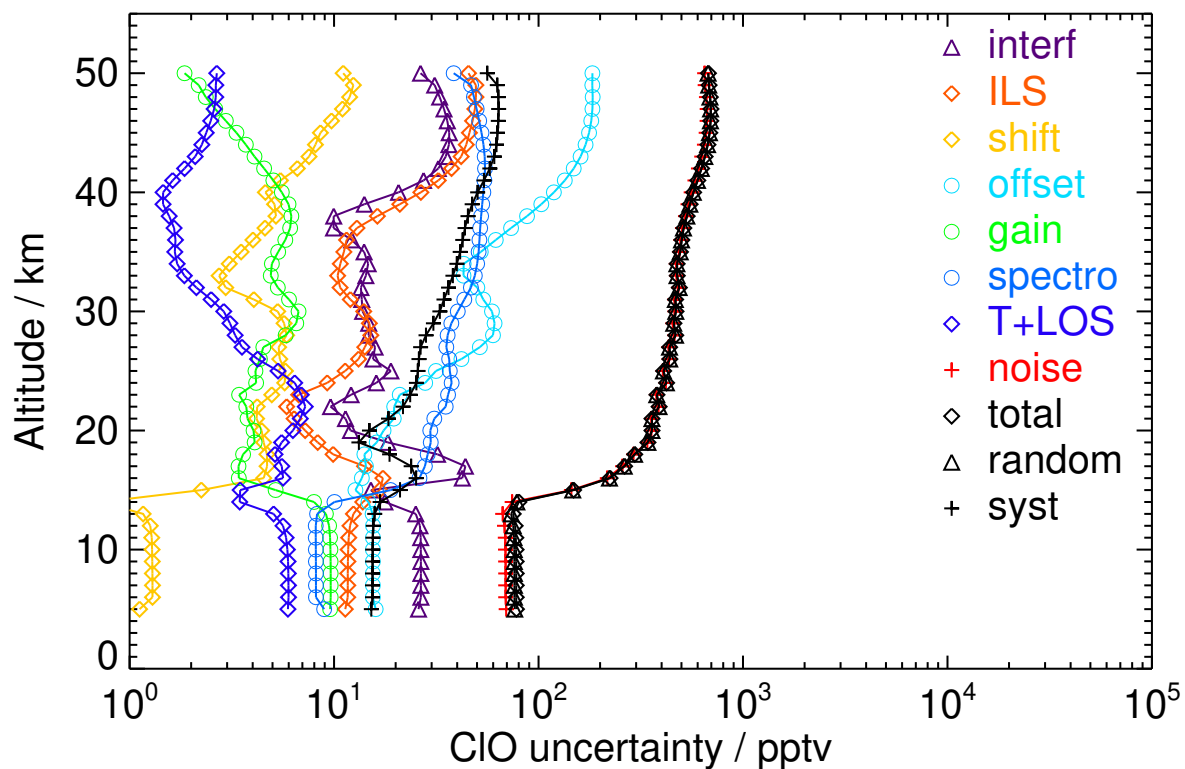
**Figure S63.** V8R_CLO_262 Southern polar spring day

Table S65. CIO error budget for Southern polar spring night. All uncertainties are 1 σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	34.93	25.82	12.00	1.39	13.99	10.10	9.10	5.87	62.78	69.91	16.75	71.89
9	35.13	25.81	12.03	1.38	13.98	10.09	9.11	5.83	62.73	69.86	16.78	71.85
12	37.14	25.49	12.38	1.35	13.98	9.97	9.24	5.46	61.76	68.83	17.08	70.92
15	37.88	19.47	18.74	2.40	11.03	6.32	20.13	3.71	141.19	143.39	26.23	145.77
18	44.97	29.32	9.18	3.53	10.67	3.23	23.22	4.21	270.89	273.60	12.80	273.90
21	69.19	10.92	7.97	2.47	18.54	5.65	29.46	6.30	338.68	340.54	14.40	340.85
24	-18.10	17.12	6.24	5.84	26.30	2.79	24.35	5.85	410.61	412.37	15.50	412.66
27	86.58	16.19	6.28	6.11	50.95	1.76	27.70	3.05	426.35	430.19	20.59	430.68
30	-22.52	13.30	6.09	5.58	58.93	3.78	30.91	2.43	461.58	466.08	22.89	466.64
33	146.59	14.24	7.17	2.62	42.39	3.36	33.72	1.50	471.25	474.01	24.51	474.64
36	294.16	13.39	6.26	3.14	62.51	4.13	36.74	1.29	496.24	500.87	29.75	501.75
39	367.92	13.30	15.23	2.62	103.82	4.71	43.49	1.42	540.07	550.80	37.39	552.07
42	363.48	33.78	32.19	7.32	149.29	3.94	50.81	1.80	607.75	627.57	51.32	629.67
45	339.81	39.50	42.57	8.56	177.27	3.10	52.61	2.28	662.20	687.43	59.98	690.04
48	294.44	36.17	47.34	11.03	184.34	2.31	50.16	2.53	663.03	689.84	62.59	692.67

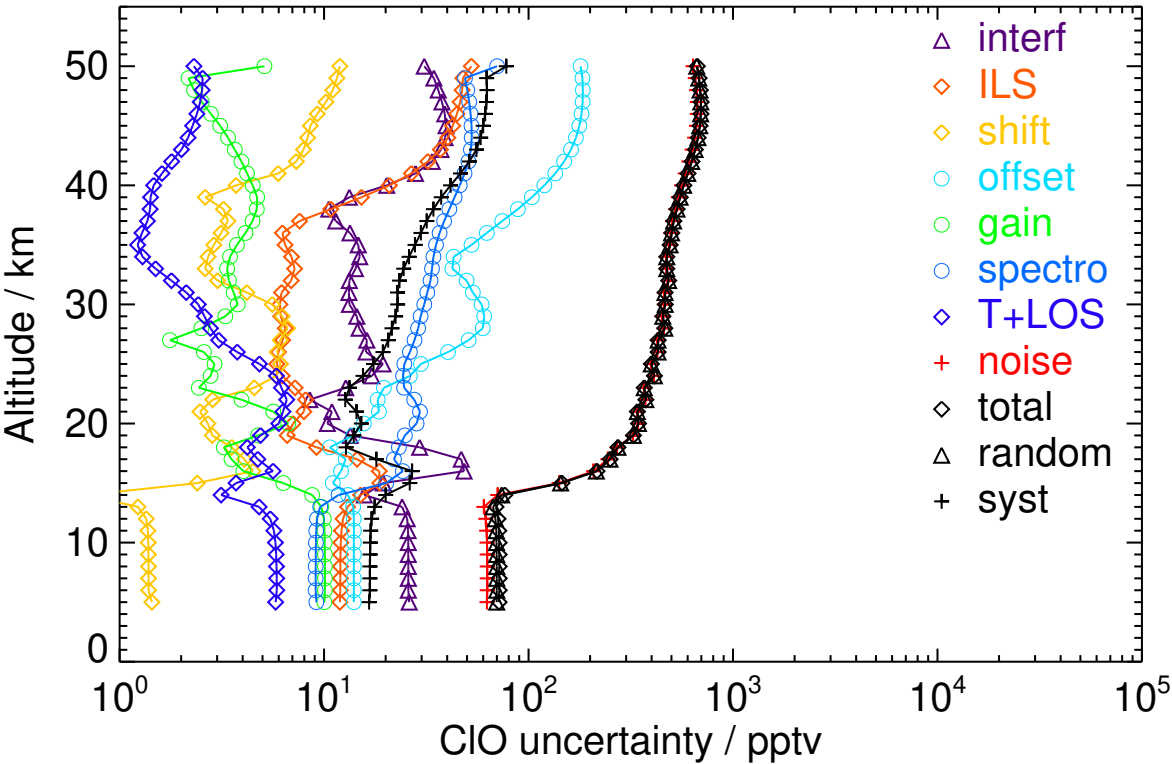


Figure S64. V8R_CLO_262 Southern polar spring night

Table S66. CIO error budget for Southern polar summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-10.55	26.22	10.17	1.69	11.80	9.71	8.56	5.42	53.61	61.52	14.83	63.28
9	-10.44	26.22	10.21	1.69	11.79	9.71	8.49	5.37	53.55	61.45	14.83	63.22
12	-7.85	25.93	10.74	1.65	11.76	9.60	7.71	4.90	52.38	60.21	14.91	62.03
15	7.03	24.57	20.84	3.28	8.59	6.43	20.11	5.49	137.64	140.67	27.47	143.33
18	71.27	22.90	6.83	4.70	9.12	3.44	26.33	3.33	250.94	253.37	12.89	253.70
21	97.68	11.99	7.44	2.06	15.82	6.96	32.69	2.21	306.47	308.39	19.96	309.03
24	93.61	19.34	5.23	1.49	24.40	4.52	29.00	1.99	394.14	396.18	15.75	396.50
27	64.09	15.46	7.14	6.02	48.15	2.77	30.26	2.10	402.91	406.83	19.93	407.32
30	202.40	13.09	7.67	5.87	60.56	3.66	37.68	2.10	450.84	455.86	28.76	456.76
33	409.96	15.75	7.47	4.97	40.16	3.48	45.24	1.67	459.92	462.91	35.23	464.25
36	429.83	18.45	6.36	4.58	51.97	5.26	48.28	1.35	479.54	483.53	40.22	485.20
39	512.60	10.31	7.99	5.23	83.76	7.24	50.49	1.45	497.89	505.80	43.38	507.65
42	491.13	38.89	30.03	5.95	129.42	6.08	53.97	1.65	539.89	557.37	54.56	560.03
45	396.08	44.80	46.54	5.87	164.80	4.43	53.45	2.57	602.11	626.57	64.82	629.91
48	338.68	39.06	55.53	14.67	180.77	2.42	49.44	3.17	628.66	656.00	69.53	659.68
52	144.40	27.59	57.58	12.54	174.37	0.81	33.10	2.68	592.13	618.27	64.03	621.58

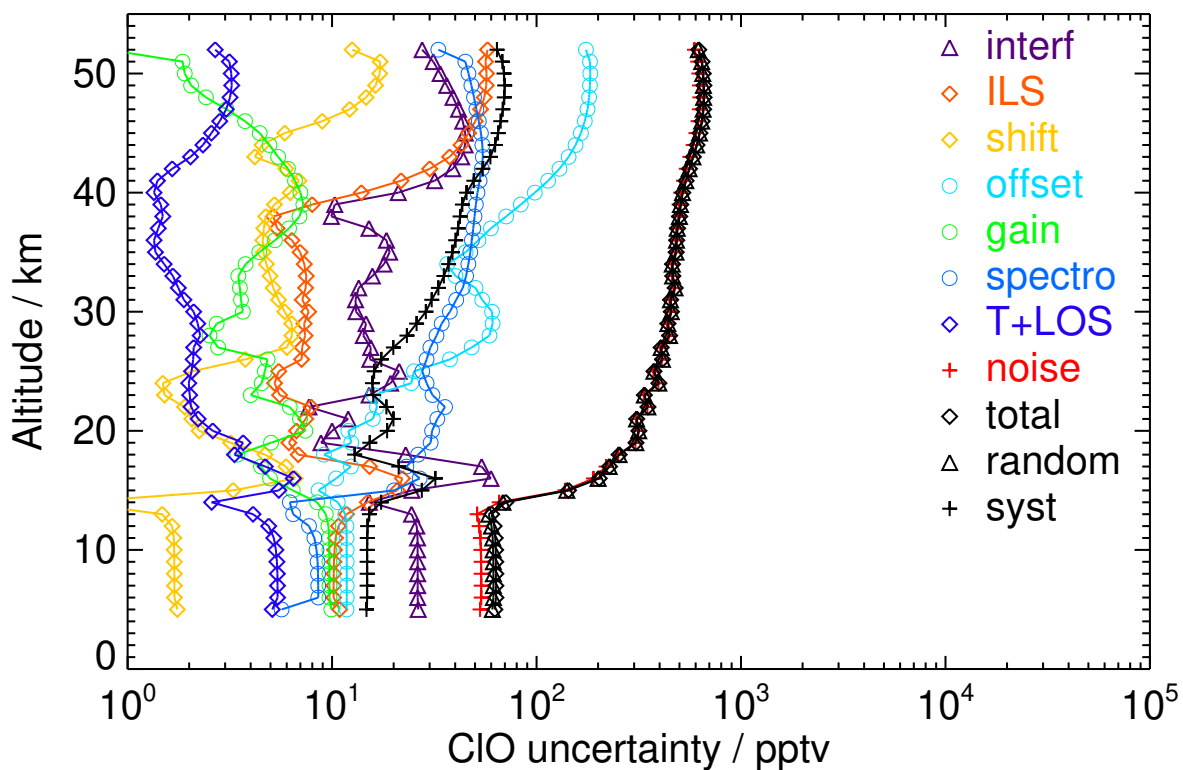
**Figure S65.** V8R_CLO_262 Southern polar summer day

Table S67. CIO error budget for Southern polar summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-9.98	25.70	10.34	1.36	12.05	9.64	7.61	5.79	56.24	63.48	15.24	65.28
9	-9.83	25.69	10.37	1.36	12.04	9.64	7.56	5.75	56.19	63.42	15.24	65.23
12	-6.48	25.22	10.85	1.28	11.98	9.57	6.96	5.24	55.03	62.14	15.28	63.99
15	36.43	27.94	19.56	3.90	9.29	6.75	20.47	5.64	141.44	145.11	26.62	147.53
18	19.65	29.63	7.42	4.37	11.13	4.15	23.23	3.79	267.28	269.83	16.79	270.35
21	-80.75	13.81	3.87	2.14	15.60	4.27	23.55	2.62	323.54	324.98	9.86	325.13
24	109.43	19.13	4.78	1.60	24.28	2.94	28.66	1.85	394.45	396.35	17.61	396.74
27	67.98	14.87	7.13	3.33	48.42	2.53	27.80	1.87	412.97	416.78	15.69	417.08
30	-62.03	13.07	6.48	3.34	64.77	2.06	24.00	1.95	460.26	465.35	17.08	465.66
33	-10.71	15.42	5.19	3.46	47.30	1.94	26.62	1.41	472.61	475.58	20.34	476.01
36	294.41	16.80	5.12	3.16	55.92	4.01	33.23	1.16	483.88	487.85	26.71	488.58
39	350.83	10.04	8.09	3.65	90.65	5.98	40.99	1.35	506.92	515.78	32.46	516.80
42	353.32	36.71	29.57	4.64	137.59	5.25	48.44	1.73	556.95	575.74	47.57	577.70
45	363.03	41.95	43.87	6.46	171.91	4.09	50.69	2.54	618.18	643.84	59.07	646.54
48	285.61	37.21	50.73	13.96	186.18	2.75	48.15	3.02	638.88	667.32	63.25	670.31

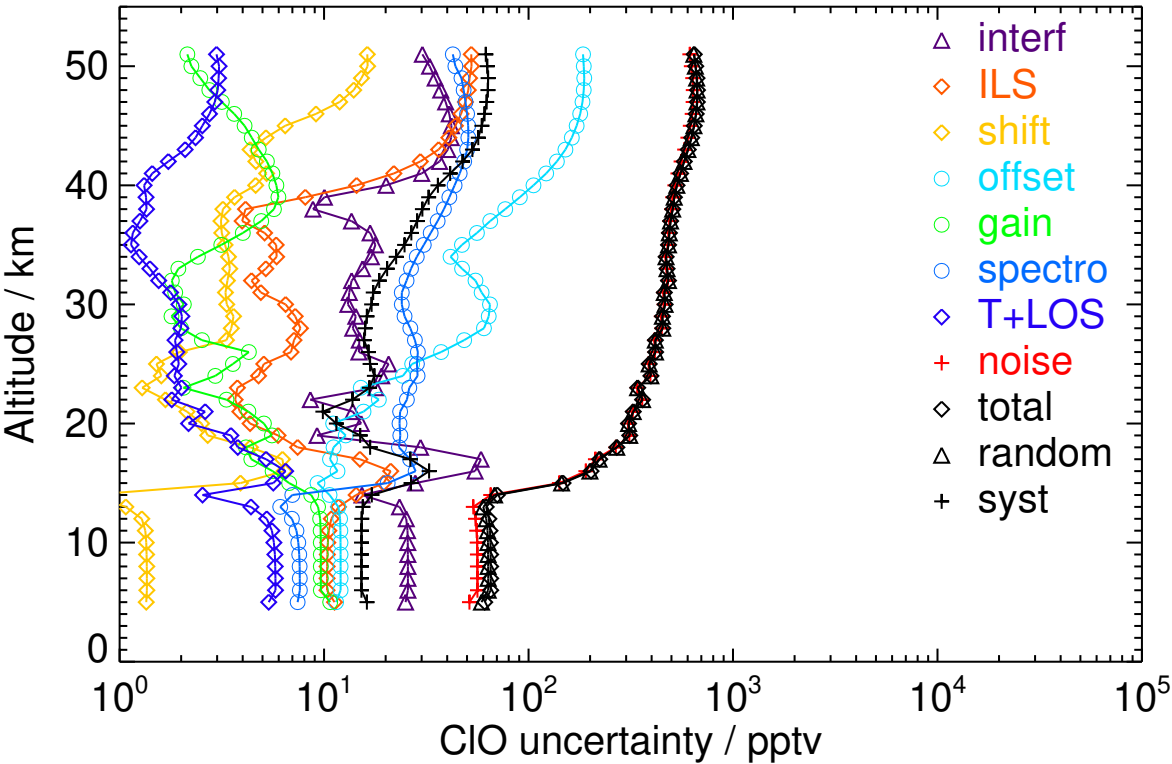


Figure S66. V8R_CLO_262 Southern polar summer night

Table S68. CIO error budget for Southern polar autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-20.06	22.59	10.76	0.86	12.87	10.53	9.02	5.10	56.34	62.54	16.57	64.69
9	-19.86	22.57	10.78	0.86	12.86	10.53	8.96	5.07	56.29	62.47	16.56	64.63
12	-16.47	22.15	11.08	0.85	12.86	10.44	8.23	4.66	55.27	61.35	16.40	63.50
15	31.51	16.53	13.84	3.61	10.33	7.28	18.50	4.81	142.17	143.86	22.80	145.66
18	77.97	29.13	4.26	3.73	11.86	3.56	27.57	3.26	279.88	282.70	14.76	283.09
21	207.31	8.30	5.06	1.55	19.82	5.57	35.47	1.45	366.79	368.55	21.93	369.21
24	64.94	11.27	3.53	0.93	39.36	2.79	32.00	1.44	458.02	460.54	20.19	460.98
27	43.00	12.71	5.21	2.02	79.22	3.04	32.71	1.57	515.60	522.41	21.84	522.87
30	165.62	14.53	5.46	3.01	98.97	2.64	40.67	1.51	565.73	575.21	29.85	575.98
33	369.73	13.49	4.76	3.37	108.63	1.79	51.48	1.15	608.71	619.46	38.44	620.65
36	551.71	10.87	8.94	1.89	147.03	3.47	60.69	1.02	664.26	681.68	45.53	683.20
39	609.20	25.09	17.38	2.51	190.53	5.30	64.79	1.46	733.35	759.37	51.19	761.10
42	524.06	35.65	25.09	7.80	218.83	5.97	63.14	2.32	772.05	804.39	53.82	806.19
45	428.63	35.25	27.45	10.33	225.43	5.67	57.43	2.67	761.60	796.03	51.35	797.68

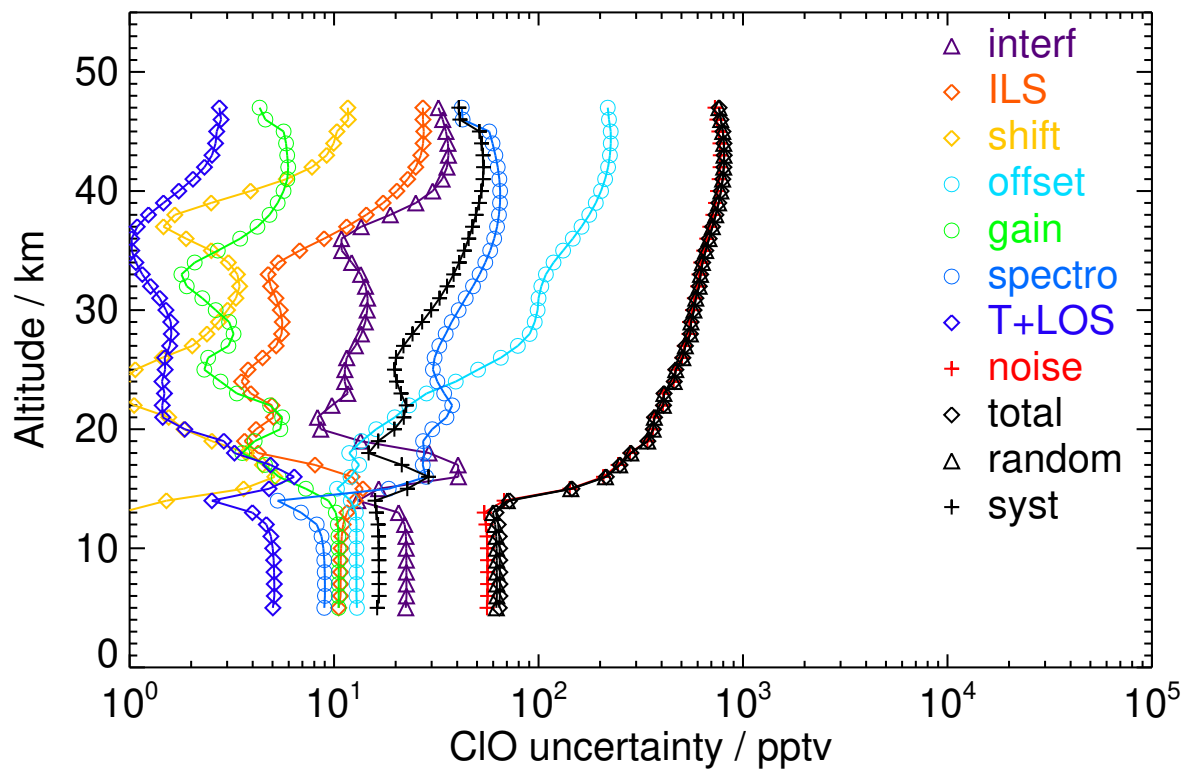
**Figure S67.** V8R_CLO_262 Southern polar autumn day

Table S69. CIO error budget for Southern polar autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
6	-18.01	22.12	10.86	0.96	13.41	10.08	8.07	5.25	57.80	63.93	15.35	65.75
9	-17.92	22.09	10.88	0.96	13.40	10.08	8.02	5.21	57.74	63.87	15.34	65.68
12	-16.13	21.56	11.13	0.99	13.38	9.99	7.48	4.81	56.76	62.72	15.32	64.57
15	49.71	18.07	12.84	3.51	10.77	6.71	19.37	4.77	143.72	145.72	22.04	147.37
18	31.90	29.42	5.88	3.14	12.77	4.05	29.60	3.51	290.19	292.71	22.54	293.58
21	2.53	8.46	5.03	1.47	21.06	4.22	30.85	1.49	380.90	382.64	13.78	382.89
24	107.08	11.05	4.49	1.49	42.47	2.40	32.11	1.45	468.56	471.30	20.30	471.74
27	234.16	13.51	5.43	3.21	83.69	2.77	34.90	1.58	529.63	537.04	23.47	537.55
30	119.52	15.19	4.57	4.05	106.15	1.77	31.16	1.51	580.57	590.84	22.17	591.25
33	-123.78	13.57	4.09	3.84	117.19	1.71	29.38	1.25	625.35	636.79	19.65	637.09
36	-214.95	11.35	6.88	2.01	154.31	2.89	30.26	1.24	679.65	697.45	19.96	697.74
39	-195.46	26.47	14.44	2.29	197.04	4.06	32.14	1.72	744.85	771.33	25.17	771.75
42	-159.28	34.90	21.66	7.84	224.41	4.53	31.88	2.63	780.55	813.32	30.34	813.88
45	-129.58	33.70	23.55	10.13	229.73	4.25	29.24	2.91	766.17	800.96	30.67	801.54
48	-69.08	29.21	26.06	13.39	212.70	1.66	11.97	3.07	711.15	743.00	28.12	743.53

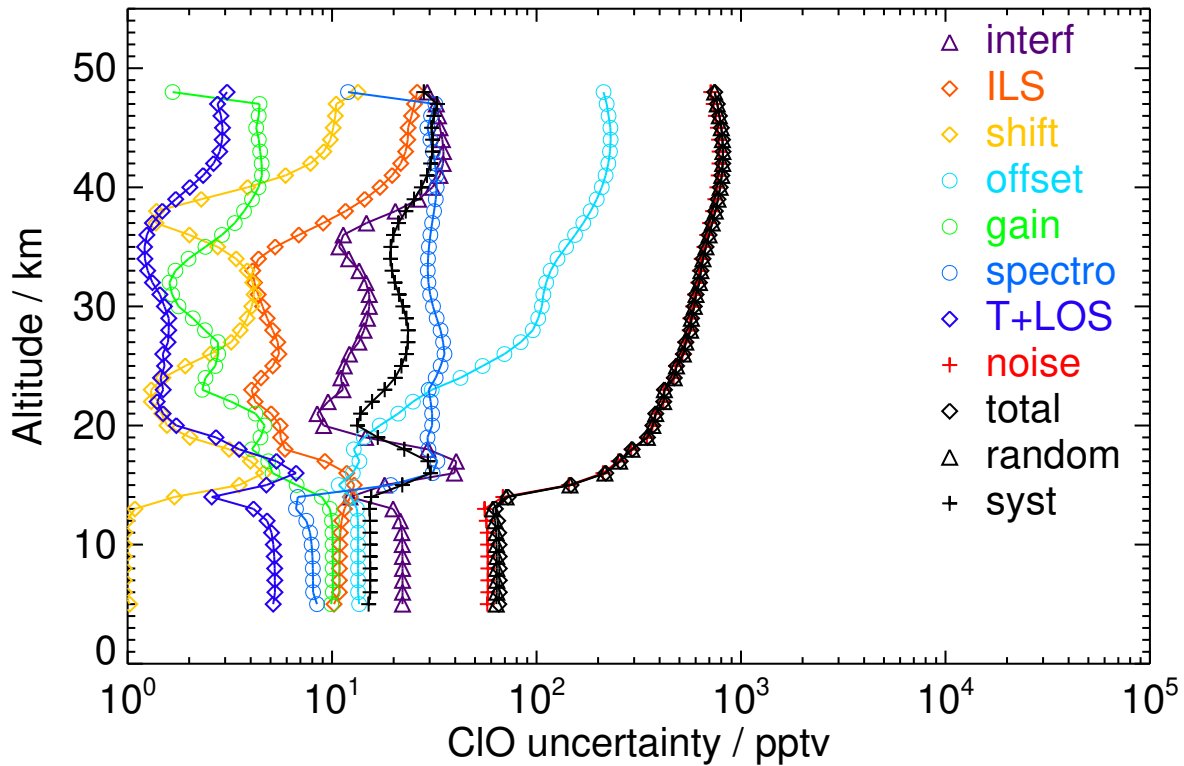
**Figure S68.** V8R_CLO_262 Southern polar autumn night

Table S70. CIO error budget for Northern polar winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
15	23.38	44.36	5.88	1.98	67.89	8.56	34.93	4.06	306.01	318.32	15.59	318.70
18	136.12	27.62	5.98	1.76	52.14	7.59	35.94	3.46	309.45	316.51	21.45	317.24
21	8.08	18.60	3.41	2.01	29.06	5.00	26.70	2.39	332.01	334.68	13.05	334.93
24	145.79	15.89	2.97	3.78	33.34	3.26	30.33	2.30	401.88	404.25	20.50	404.77
27	326.86	11.72	4.58	4.00	60.95	3.30	38.03	1.98	481.84	486.56	27.90	487.36
30	285.40	10.17	5.67	2.75	74.31	3.71	43.03	1.92	535.39	541.41	32.50	542.38
33	320.97	9.39	5.69	1.70	94.51	3.70	47.16	1.92	573.98	582.63	35.91	583.74
36	359.25	9.47	7.00	1.15	142.42	3.64	50.20	1.63	645.66	662.10	38.19	663.20
39	399.93	11.22	8.80	1.04	191.43	3.32	50.38	1.52	726.93	752.55	38.59	753.54
42	383.79	12.63	10.34	1.29	220.11	2.74	47.24	1.49	759.87	791.83	37.02	792.69
45	378.44	11.10	11.82	1.24	224.23	2.45	44.19	1.22	735.19	769.28	34.89	770.07

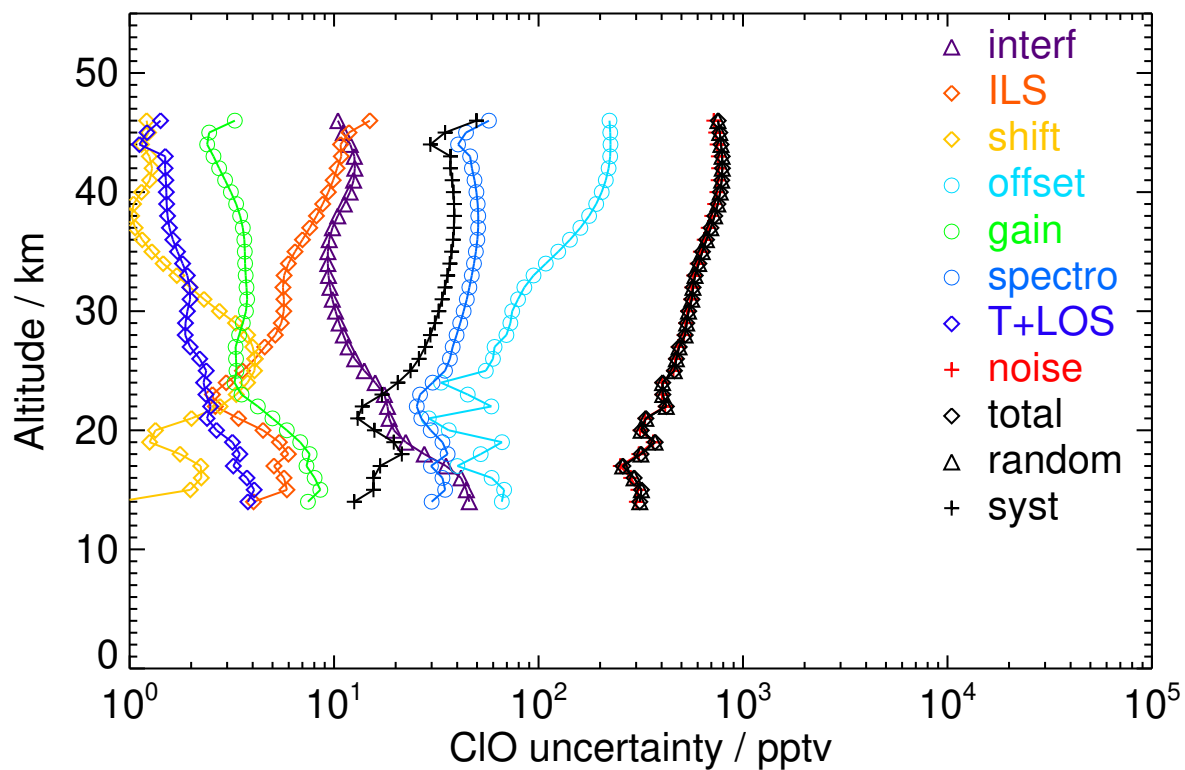
**Figure S69.** V8R_CLO_562 Northern polar winter day

Table S71. CIO error budget for Northern polar winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
15	-46.74	42.73	4.44	2.23	70.45	6.03	20.63	3.57	321.08	332.14	8.14	332.24
18	190.47	27.81	16.55	1.52	81.67	7.92	63.46	6.41	485.94	496.76	34.88	497.99
21	132.91	21.84	11.12	1.50	36.21	5.46	44.32	5.14	407.77	411.70	26.73	412.57
24	83.16	18.45	5.74	2.05	56.62	3.35	31.89	3.14	511.77	515.87	20.20	516.27
27	20.40	14.79	5.97	2.23	95.84	3.12	32.30	2.21	587.52	596.06	19.83	596.39
30	77.18	13.32	5.99	1.57	122.18	3.42	36.10	2.19	635.25	647.66	23.25	648.08
33	236.40	12.08	6.44	1.64	143.54	3.56	41.13	1.86	676.23	692.08	28.45	692.66
36	351.27	11.63	8.60	1.63	180.48	3.64	45.90	1.68	734.60	757.28	32.72	757.99
39	332.31	11.88	11.21	1.48	220.01	3.40	46.81	1.65	785.93	816.93	34.58	817.66
42	280.30	11.63	13.25	1.19	243.20	2.98	43.95	1.64	801.99	838.71	33.83	839.40
45	244.70	10.15	14.56	0.97	252.49	2.73	39.76	1.70	784.66	824.79	32.55	825.44

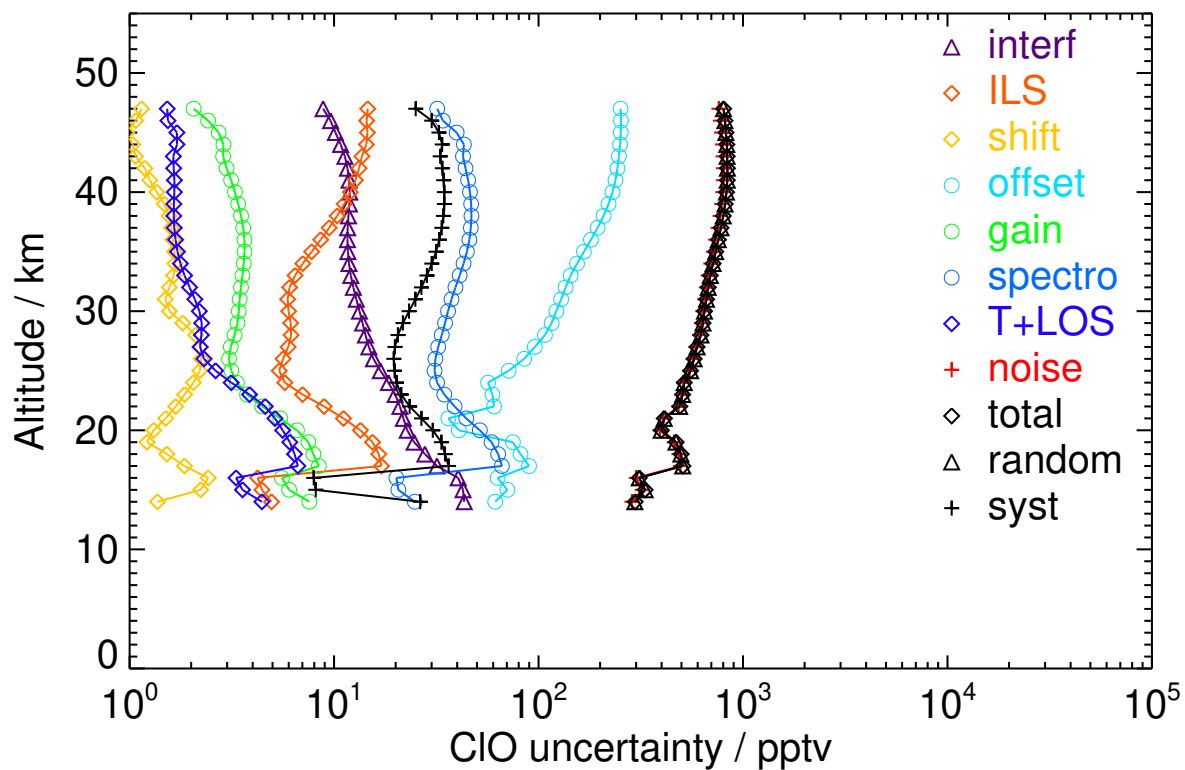
**Figure S70.** V8R_CLO_562 Northern polar winter night

Table S72. CIO error budget for Northern polar spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	71.47	29.46	8.72	0.91	89.99	7.33	47.42	5.68	478.79	490.04	21.86	490.53
21	82.99	19.74	3.96	1.01	52.12	4.57	27.77	2.71	397.07	401.62	16.85	401.98
24	151.65	17.03	4.73	0.80	36.61	3.61	30.36	2.41	453.20	455.66	18.91	456.06
27	158.41	12.57	4.91	1.45	67.20	3.36	31.17	1.93	525.78	530.63	23.76	531.16
30	272.26	11.71	7.55	2.70	93.34	4.35	37.03	1.97	586.70	594.65	30.27	595.42
33	401.47	10.32	7.94	2.61	94.24	4.83	44.20	1.86	608.05	615.98	36.53	617.06
36	516.01	9.41	9.43	1.96	105.83	5.16	51.52	1.86	606.83	616.85	42.44	618.30
39	571.81	9.63	13.49	1.54	143.75	5.01	55.64	2.01	625.73	643.02	46.09	644.67
42	465.96	10.21	19.14	1.75	182.16	4.10	55.21	2.12	671.94	697.17	46.83	698.74
45	354.29	9.75	21.94	1.73	206.29	3.29	51.04	2.09	704.36	734.79	44.38	736.13
48	272.71	8.72	22.56	1.77	212.44	2.65	45.63	1.90	694.41	726.88	40.74	728.02

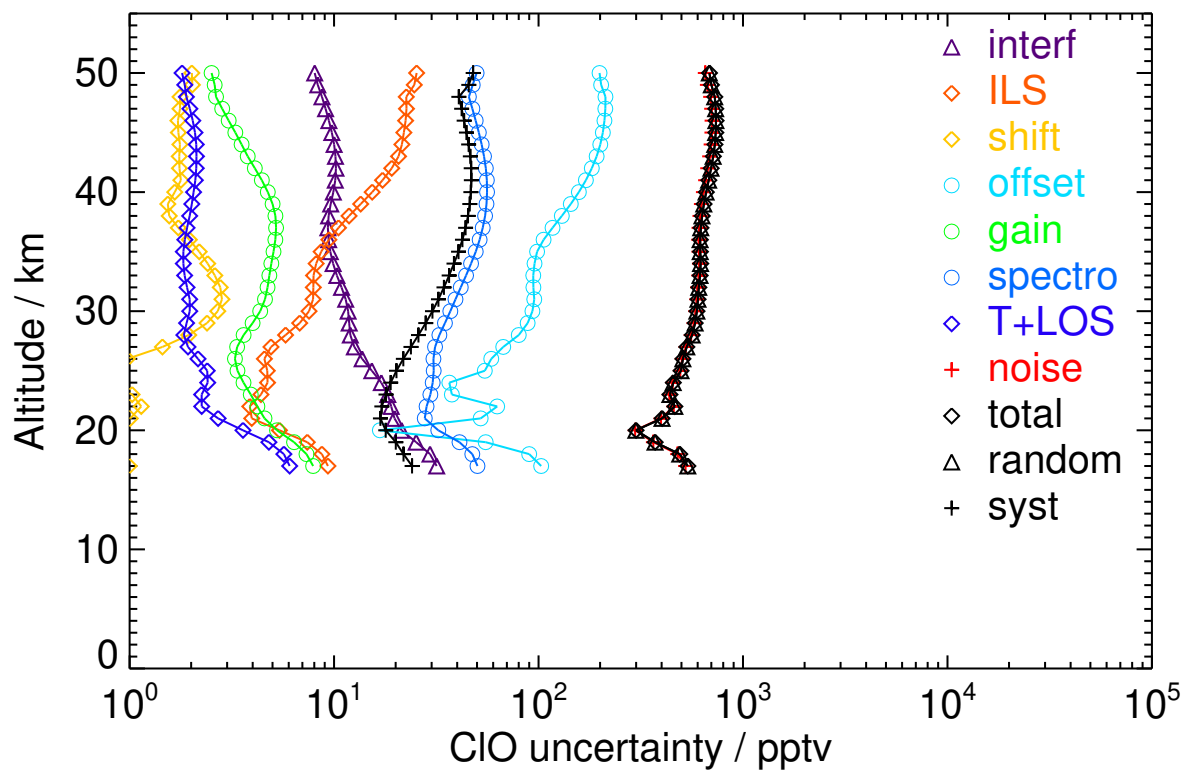
**Figure S71.** V8R_CLO_562 Northern polar spring day

Table S73. CIO error budget for Northern polar spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	97.60	29.61	9.13	0.97	90.30	7.38	47.87	5.39	474.99	486.39	23.05	486.94
21	68.21	19.68	5.27	0.94	50.26	5.10	30.24	3.10	389.32	393.96	16.24	394.29
24	-24.30	16.89	4.33	1.12	35.76	3.37	25.98	2.37	450.30	452.57	15.14	452.82
27	86.86	12.34	5.22	1.37	65.27	2.55	29.42	2.08	521.53	526.23	19.87	526.61
30	177.72	11.63	7.12	2.32	90.75	3.56	34.73	2.11	580.86	588.54	25.96	589.11
33	227.10	10.26	7.11	1.93	89.38	4.28	42.17	1.94	598.17	605.50	33.57	606.43
36	402.71	9.28	8.99	1.29	100.49	4.99	52.12	1.88	594.93	604.22	43.20	605.77
39	651.71	9.42	13.49	0.81	139.55	5.23	60.17	1.91	615.10	631.77	51.12	633.83
42	716.10	10.05	19.15	1.98	179.25	4.60	62.63	2.06	665.47	690.24	54.51	692.39
45	655.26	9.62	22.04	2.30	204.10	3.79	59.43	2.10	699.49	729.58	52.82	731.49
48	571.21	8.64	22.69	2.21	210.63	3.09	53.84	1.96	690.35	722.55	48.76	724.19

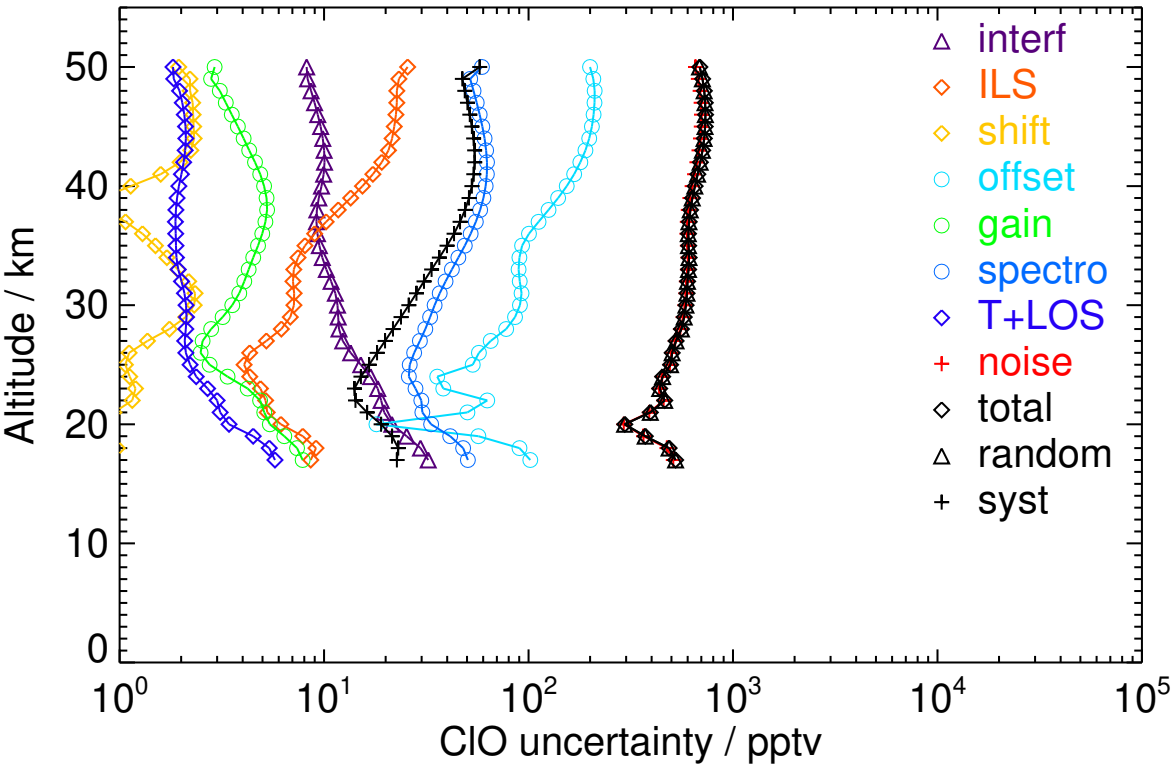


Figure S72. V8R_CLO_562 Northern polar spring night

Table S74. ClO error budget for Northern polar summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	37.41	30.51	10.30	2.98	79.27	10.35	54.51	6.65	405.77	417.47	28.69	418.46
21	118.09	16.84	4.86	2.73	52.61	5.71	27.05	2.97	349.99	354.89	20.04	355.46
24	77.92	15.69	4.78	2.75	30.63	4.46	24.73	2.59	383.42	385.55	14.60	385.83
27	-25.23	10.39	6.66	3.31	40.47	3.42	24.02	2.33	428.33	430.77	17.29	431.11
30	118.45	9.97	10.26	2.58	62.20	3.94	32.24	2.74	485.13	489.71	26.16	490.41
33	365.29	8.19	8.68	1.80	52.92	4.37	39.62	2.25	499.45	502.92	32.53	503.97
36	446.91	6.98	6.40	1.35	42.50	4.83	46.48	1.87	482.75	485.38	39.20	486.96
39	528.48	6.76	7.93	2.26	71.09	5.14	50.56	2.11	486.76	492.67	44.28	494.66
42	534.58	8.65	15.29	6.19	112.97	4.09	52.44	2.09	518.28	531.30	46.99	533.38
45	480.24	9.45	23.11	6.83	152.25	3.11	51.88	2.14	575.61	596.28	48.33	598.24
48	414.42	9.01	28.65	3.82	176.08	2.54	49.19	2.08	613.48	639.02	48.64	640.86
52	326.31	7.84	30.53	1.67	185.32	2.27	42.81	1.89	608.48	636.70	45.24	638.31

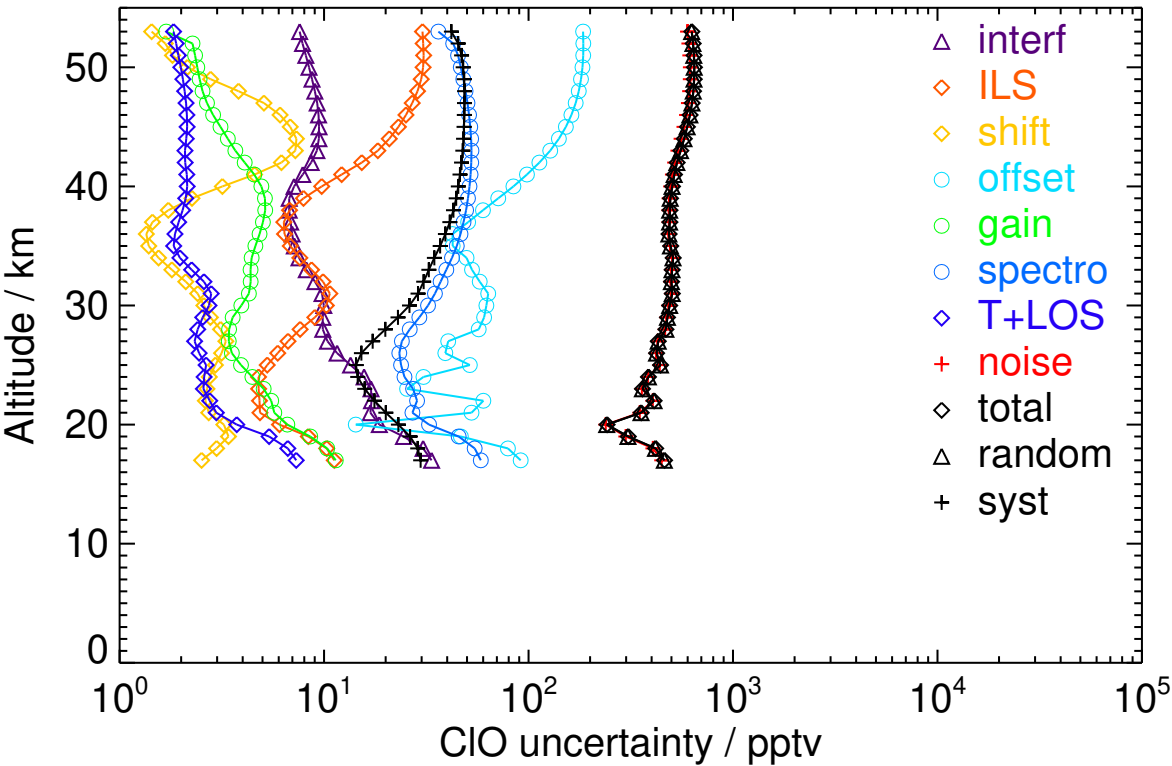


Figure S73. V8R_CLO_562 Northern polar summer day

Table S75. ClO error budget for Northern polar summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	107.79	30.80	9.89	2.67	85.48	9.38	49.02	5.89	423.92	435.58	29.51	436.58
21	-10.49	18.10	4.02	1.98	50.77	5.17	24.20	3.14	352.60	357.27	15.37	357.60
24	-15.52	16.11	3.67	1.33	28.72	3.70	24.64	2.22	398.33	400.26	13.48	400.49
27	-14.53	10.87	6.21	1.53	46.58	3.24	29.35	2.27	453.35	456.51	18.06	456.87
30	99.25	10.42	6.81	2.03	70.30	3.44	34.64	2.67	514.04	519.46	26.72	520.15
33	363.77	9.14	7.47	1.74	63.75	4.71	46.05	2.34	533.48	538.18	36.31	539.41
36	444.40	7.99	9.21	1.14	64.97	5.82	57.15	1.96	524.31	529.62	45.61	531.58
39	552.91	7.94	12.00	1.11	102.38	6.08	62.60	2.06	539.28	550.27	51.75	552.70
42	665.48	9.80	16.97	3.32	147.09	5.12	63.04	2.09	592.96	612.12	54.27	614.52
45	632.39	10.03	20.80	3.47	180.61	3.98	59.68	2.11	647.48	673.16	53.20	675.26
48	560.50	9.03	22.93	1.66	195.18	3.03	54.45	1.99	660.84	689.83	50.24	691.66

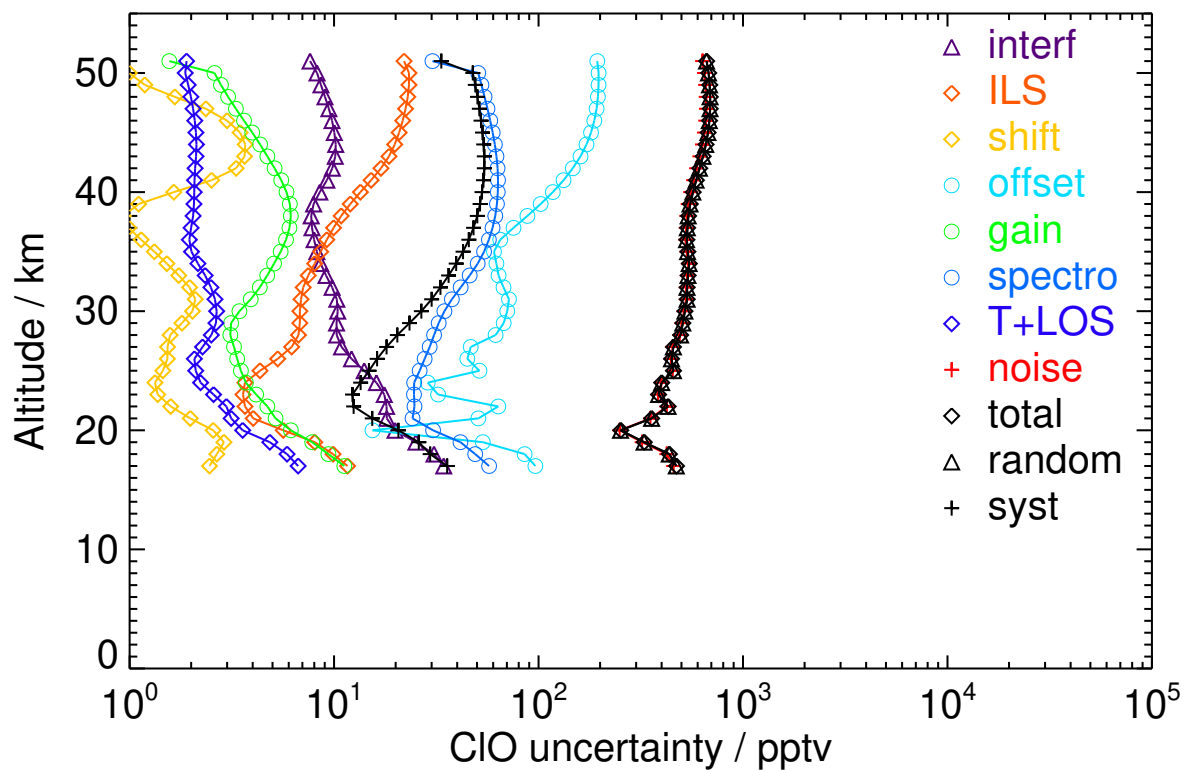


Figure S74. V8R_CLO_562 Northern polar summer night

Table S76. CIO error budget for Northern polar autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	188.16	29.28	11.75	1.96	92.39	10.12	61.64	6.46	488.53	500.84	36.03	502.13
21	145.27	19.92	5.55	1.55	44.52	6.21	35.69	3.80	374.28	378.47	24.23	379.24
24	93.16	17.25	4.85	1.11	33.03	4.32	31.71	2.31	449.00	451.35	18.05	451.71
27	153.23	12.56	4.99	1.86	65.14	3.61	34.71	2.31	521.14	526.01	23.36	526.53
30	253.84	11.87	5.68	2.27	94.72	4.13	41.17	2.11	586.95	595.27	32.02	596.13
33	426.78	10.84	7.51	1.73	104.65	4.85	49.95	1.88	620.62	630.20	40.76	631.52
36	561.22	10.10	9.89	1.18	128.40	5.15	56.40	1.92	648.64	662.15	46.90	663.81
39	582.94	10.34	12.22	0.82	170.52	4.85	57.37	2.11	691.68	713.24	48.59	714.90
42	520.47	10.59	14.43	1.02	204.94	4.18	54.31	2.17	736.23	764.95	46.72	766.37
45	440.87	9.87	15.22	1.32	220.53	3.54	48.93	2.05	743.74	776.35	42.60	777.51
48	351.66	8.84	15.58	2.00	216.03	2.44	37.42	1.59	705.72	738.45	33.86	739.22

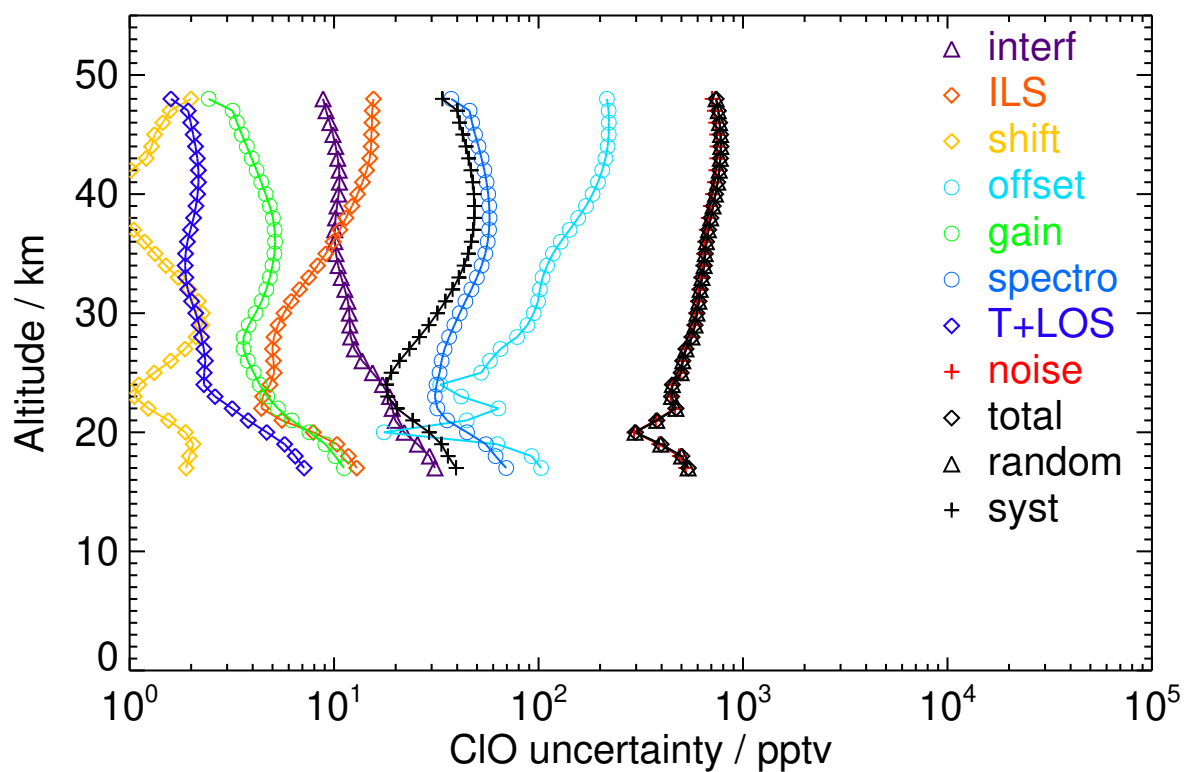
**Figure S75.** V8R_CLO_562 Northern polar autumn day

Table S77. CIO error budget for Northern polar autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-1.44	29.07	7.65	1.81	95.84	6.70	44.58	4.96	504.62	516.23	17.01	516.51
21	218.86	20.35	4.68	1.62	40.16	4.99	31.36	3.08	368.79	372.41	19.74	372.93
24	32.93	17.78	3.84	1.31	35.81	4.15	30.63	2.49	460.91	463.30	19.10	463.69
27	39.06	13.26	4.79	1.64	70.77	3.78	33.10	2.06	539.27	544.67	21.71	545.10
30	201.83	12.43	6.21	1.93	103.63	4.27	36.71	1.97	607.55	617.06	25.86	617.60
33	153.25	11.49	6.64	1.89	119.13	4.26	38.77	1.91	646.53	658.11	28.16	658.71
36	82.76	10.80	7.86	1.58	145.79	4.06	41.54	1.95	687.60	703.65	29.19	704.25
39	112.69	10.86	9.61	1.38	186.02	3.63	41.88	1.92	730.81	754.86	29.28	755.43
42	152.00	10.75	11.52	1.18	216.77	3.10	39.68	1.86	764.40	795.19	28.49	795.70
45	141.00	9.84	12.30	1.15	228.87	2.63	35.79	1.73	760.94	795.14	26.47	795.58
48	437.20	8.87	13.97	1.79	217.38	1.84	30.04	1.54	709.62	742.53	25.62	742.97

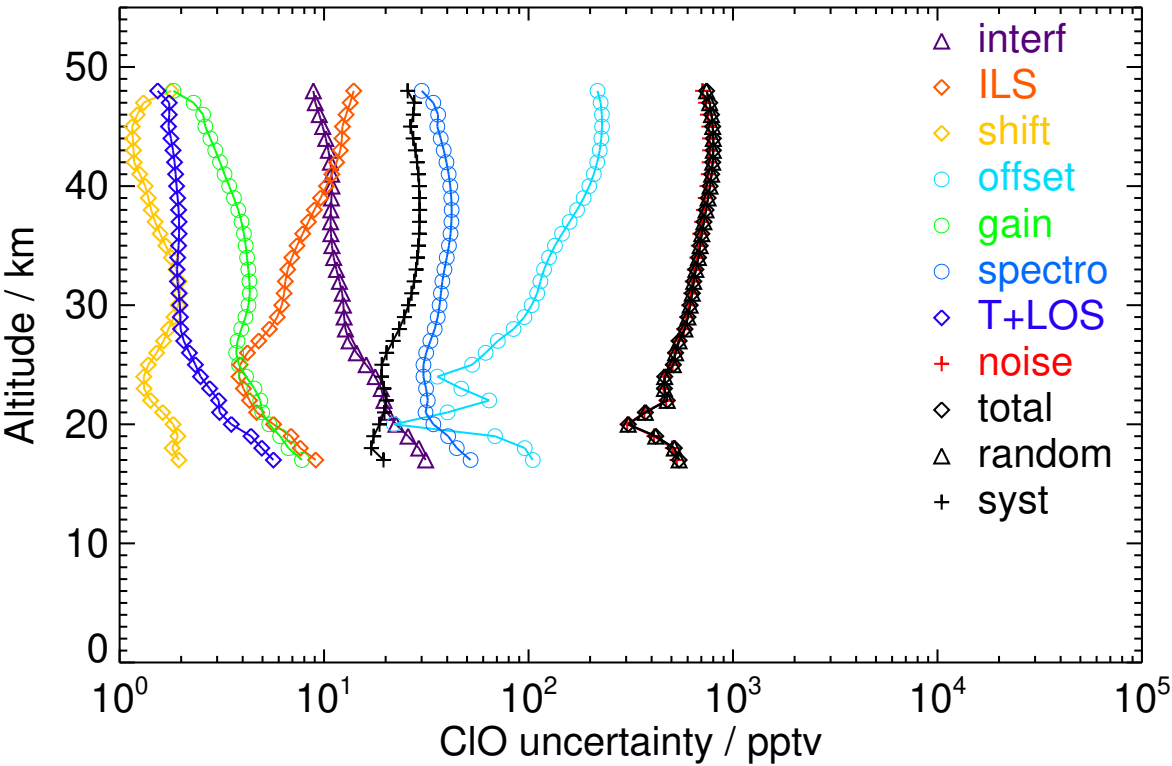


Figure S76. V8R_CLO_562 Northern polar autumn night

Table S78. ClO error budget for Northern midlatitude winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
15	-47.13	45.12	5.83	2.90	73.47	8.82	32.76	3.91	335.16	347.21	20.57	347.81
18	163.12	29.47	7.57	3.01	31.27	8.01	40.66	3.81	260.04	265.63	26.52	266.95
21	202.81	23.15	4.57	0.87	23.11	5.40	36.47	2.90	363.43	366.06	23.28	366.80
24	168.41	16.93	5.24	2.53	36.90	5.04	33.87	2.21	425.16	427.92	22.36	428.51
27	252.07	13.02	6.35	4.03	65.85	3.83	37.61	2.28	498.73	504.04	25.88	504.70
30	338.13	10.47	5.74	2.65	64.61	3.24	41.55	2.02	530.61	535.31	32.53	536.29
33	416.01	9.02	6.31	1.41	63.28	3.73	50.23	2.00	535.09	539.83	39.72	541.29
36	521.39	8.47	8.10	1.38	102.03	4.55	58.03	1.93	562.78	573.19	46.01	575.03
39	520.59	9.79	11.49	1.14	152.32	4.68	62.77	1.94	626.10	645.74	49.07	647.61
42	458.61	12.24	15.30	1.06	194.79	4.10	62.17	1.92	690.21	718.48	48.88	720.14
45	393.76	12.06	17.32	1.60	216.84	3.41	57.17	1.85	715.61	748.84	45.62	750.23
48	255.91	10.87	17.92	2.49	216.68	1.89	41.13	1.49	689.70	723.52	35.96	724.42

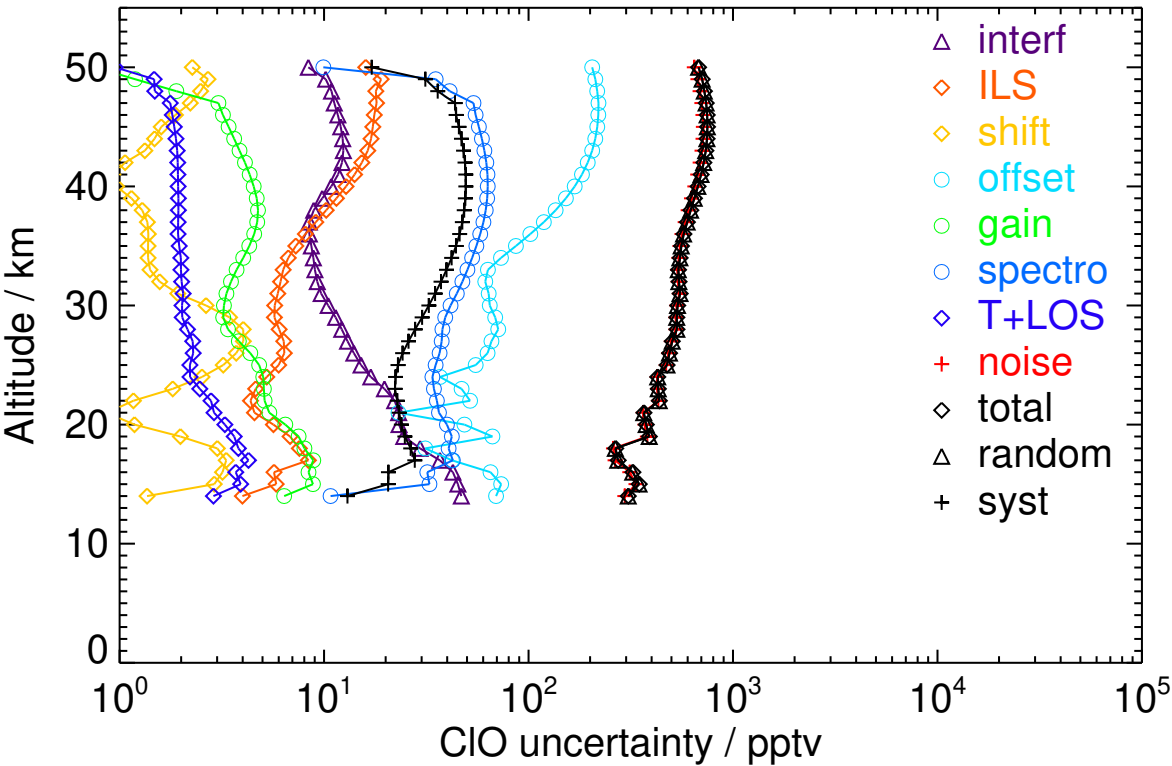


Figure S77. V8R_CLO_562 Northern midlatitude winter day

Table S79. CIO error budget for Northern midlatitude winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
15	118.61	43.54	6.46	2.15	78.04	8.20	33.70	3.98	362.21	373.88	25.76	374.76
18	121.00	29.90	8.06	1.99	43.83	7.54	38.41	4.50	302.63	308.85	25.23	309.88
21	43.78	20.41	4.98	1.31	43.28	4.65	26.68	2.83	378.18	381.96	13.58	382.20
24	119.60	16.34	4.49	2.74	43.92	3.78	28.56	2.04	434.70	437.92	15.86	438.20
27	101.45	11.99	6.17	3.94	66.08	3.32	30.14	2.27	498.22	503.36	18.58	503.70
30	16.05	10.43	5.30	3.18	73.35	3.01	31.68	1.99	539.71	545.35	20.64	545.74
33	28.15	9.01	5.03	1.53	70.63	3.04	34.79	1.74	555.18	560.35	23.54	560.84
36	150.77	8.57	5.88	1.28	99.39	3.43	38.42	1.50	567.76	577.11	27.86	577.78
39	254.46	9.58	9.47	0.88	146.24	3.41	42.49	1.46	615.89	633.80	31.81	634.60
42	281.06	11.54	14.22	1.08	188.33	2.93	43.94	1.51	677.52	703.98	34.43	704.82
45	269.62	11.39	16.77	1.47	211.85	2.52	41.81	1.52	708.34	740.02	34.13	740.81
48	189.48	10.13	17.94	2.22	212.88	2.13	36.37	1.38	685.93	718.76	30.97	719.42

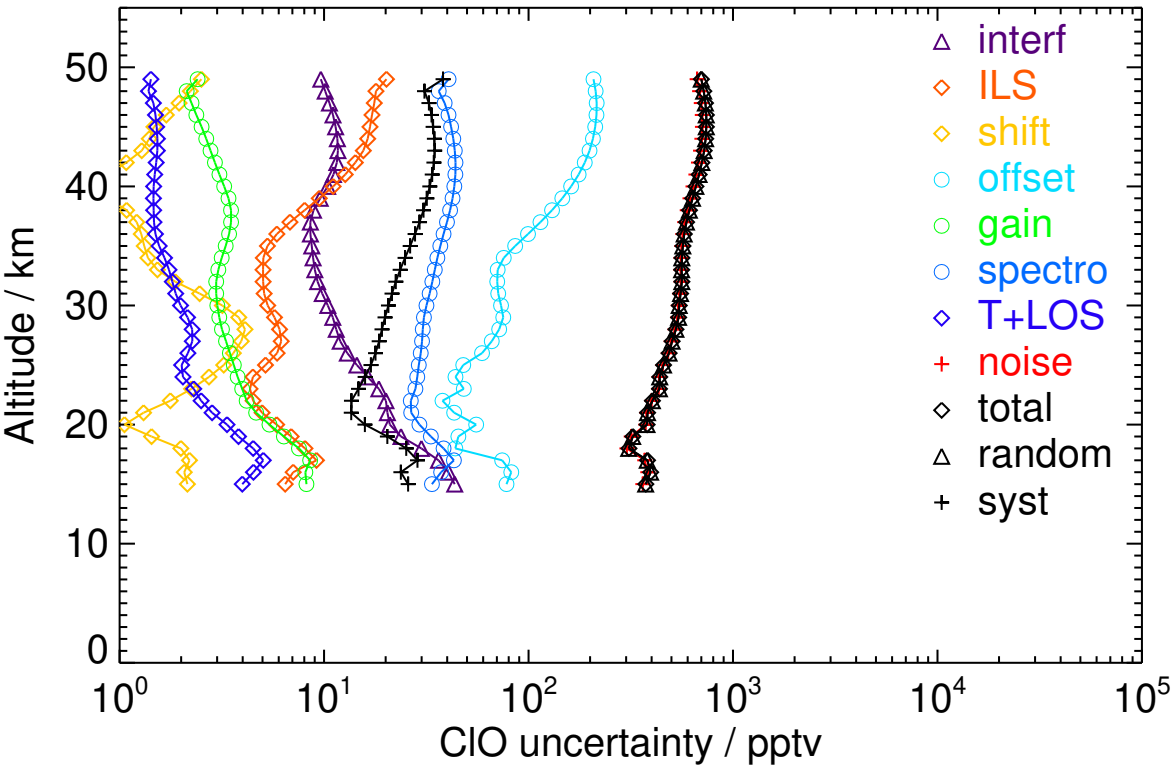


Figure S78. V8R_CLO_562 Northern midlatitude winter night

Table S80. CIO error budget for Northern midlatitude spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	8.06	30.78	9.15	2.26	89.88	6.94	43.26	5.31	474.69	485.47	26.68	486.20
21	37.62	20.04	4.97	0.99	51.23	4.79	25.81	3.03	386.75	391.30	14.27	391.56
24	192.54	16.84	4.47	1.85	31.89	3.57	31.15	2.32	433.16	435.36	20.07	435.82
27	232.73	11.63	7.73	4.46	54.39	3.40	38.78	2.30	486.24	490.27	27.54	491.04
30	334.22	10.83	8.93	6.36	75.61	4.24	45.78	2.47	539.65	545.80	37.44	547.08
33	587.75	9.13	9.16	4.83	67.95	5.25	56.76	2.07	553.33	558.36	49.71	560.57
36	833.79	8.09	10.88	3.14	73.21	6.19	66.53	1.99	538.06	544.00	59.99	547.29
39	811.38	8.29	13.93	1.37	113.11	6.21	69.24	2.41	558.29	570.61	63.17	574.10
42	657.57	9.84	18.30	2.09	157.24	4.94	65.72	2.53	616.50	637.12	60.53	639.99
45	539.24	9.98	21.00	2.33	187.99	3.80	59.17	2.40	666.35	693.09	55.19	695.29
48	447.86	9.11	22.13	1.82	199.16	2.93	52.43	2.14	670.31	699.88	49.88	701.65

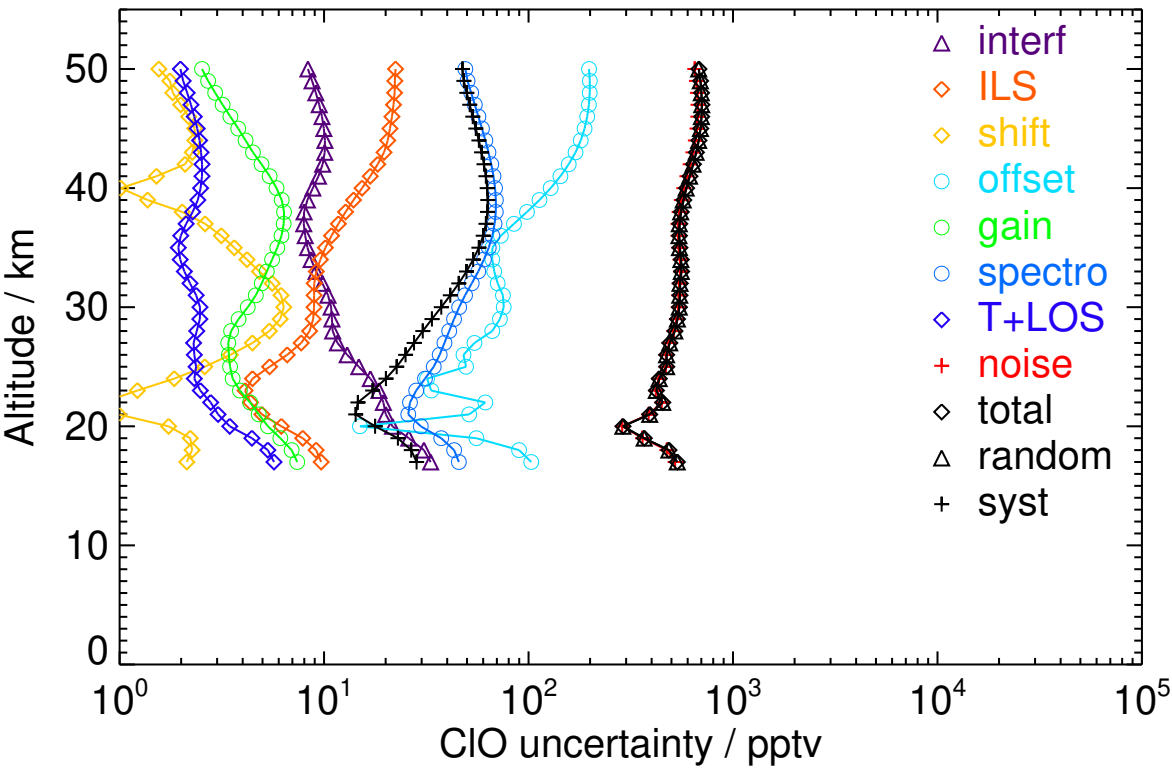


Figure S79. V8R_CLO_562 Northern midlatitude spring day

Table S81. CIO error budget for Northern midlatitude spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	66.86	30.44	10.27	2.07	89.50	8.16	50.03	6.13	466.43	477.91	28.40	478.76
21	-37.57	19.39	5.03	0.92	50.83	4.56	28.77	3.13	381.31	386.04	14.54	386.31
24	225.73	16.67	4.47	1.47	32.74	3.80	34.53	2.47	434.78	437.17	22.45	437.75
27	188.86	11.91	8.52	3.54	57.04	3.80	36.65	2.40	495.77	500.02	24.71	500.63
30	97.23	11.08	8.67	5.23	79.99	3.38	34.10	2.61	551.75	558.26	24.09	558.78
33	129.36	9.65	6.26	4.19	74.01	3.61	36.82	2.01	564.97	570.48	27.14	571.13
36	210.15	8.58	7.42	2.80	79.91	4.31	44.45	1.82	552.69	559.40	32.61	560.35
39	318.70	8.62	10.91	1.20	119.09	4.51	49.96	1.79	571.05	584.45	37.54	585.66
42	397.13	9.99	15.86	1.98	162.20	3.97	51.56	1.80	627.76	649.47	40.23	650.71
45	374.46	10.05	18.95	2.26	191.34	3.37	49.22	1.84	673.78	701.36	39.78	702.49
48	349.76	9.13	20.23	1.76	201.32	2.82	44.92	1.74	674.37	704.57	37.58	705.57

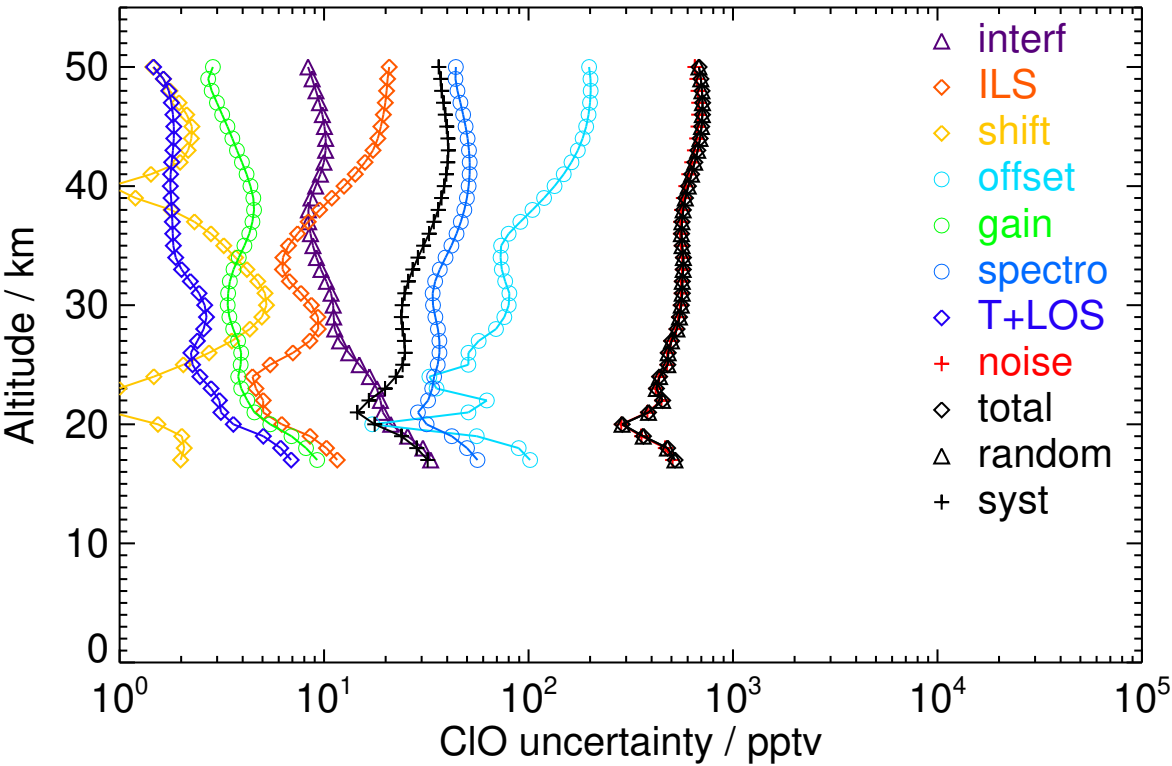


Figure S80. V8R_CLO_562 Northern midlatitude spring night

Table S82. CIO error budget for Northern midlatitude summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	39.01	31.61	8.11	3.22	85.07	7.73	38.75	5.02	439.69	450.15	24.26	450.81
21	144.27	18.93	5.22	2.03	51.40	5.55	29.63	3.30	365.14	370.02	19.12	370.51
24	88.61	16.23	5.02	0.96	29.45	4.44	25.57	2.54	403.48	405.44	15.71	405.75
27	-3.68	10.92	5.81	2.71	44.97	3.28	29.58	2.35	449.42	452.38	20.18	452.83
30	223.53	10.33	7.68	4.97	65.72	3.59	38.08	2.45	503.02	508.00	30.69	508.92
33	455.33	8.49	8.61	3.68	56.29	4.40	45.61	2.21	517.48	521.28	38.55	522.70
36	529.76	7.37	8.20	2.26	52.32	5.07	50.47	2.02	499.92	503.40	44.15	505.33
39	554.95	7.26	9.67	1.04	86.72	5.03	50.63	2.19	510.04	518.04	45.17	520.00
42	486.96	9.12	14.88	4.33	131.30	3.78	48.95	2.02	557.43	573.38	44.03	575.07
45	378.83	9.79	19.71	4.87	168.12	2.84	46.14	1.94	616.92	640.09	42.27	641.49
48	286.66	9.17	22.78	2.40	186.66	2.32	42.49	1.83	641.77	668.96	40.50	670.18
52	*****	8.83	22.58	2.55	187.90	1.54	9.07	1.47	616.70	644.76	24.38	645.22

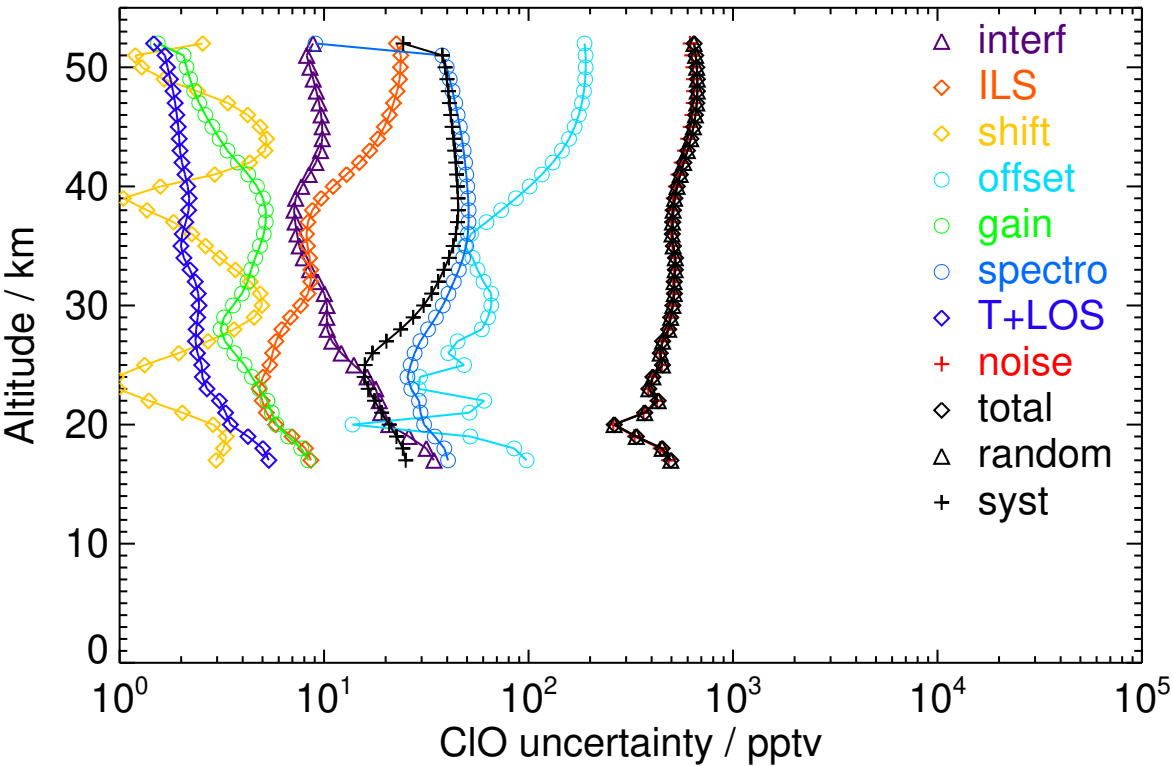


Figure S81. V8R_CLO_562 Northern midlatitude summer day

Table S83. CIO error budget for Northern midlatitude summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-102.38	30.93	6.90	3.02	85.23	6.05	31.42	4.52	436.63	446.69	20.86	447.17
21	-54.28	18.39	2.50	1.89	50.00	3.22	17.62	2.21	357.20	361.47	10.14	361.61
24	142.56	16.02	4.86	0.80	28.03	3.56	25.59	2.10	398.34	400.20	15.79	400.52
27	52.65	10.71	6.67	2.12	43.30	2.80	25.07	2.38	444.38	447.06	16.93	447.38
30	-41.52	10.34	7.40	4.41	64.89	2.62	26.88	2.59	498.89	503.58	20.82	504.01
33	92.74	8.62	6.23	3.28	55.77	3.25	31.66	2.02	512.35	515.85	25.49	516.48
36	354.33	7.41	5.64	1.85	49.57	4.13	40.06	1.75	495.57	498.59	34.24	499.76
39	567.08	7.19	9.00	1.13	82.25	4.89	48.68	1.74	501.88	509.22	43.26	511.05
42	589.15	8.96	16.57	5.00	126.22	4.05	52.85	1.79	545.42	560.62	48.05	562.68
45	521.83	9.59	22.86	5.44	163.53	2.86	51.63	1.92	606.27	628.68	48.87	630.58
48	412.54	8.97	26.48	2.66	183.01	1.98	47.54	1.89	634.26	660.74	47.49	662.44
52	-245.00	7.88	27.69	1.97	185.43	1.50	41.80	2.00	609.60	637.88	41.22	639.21

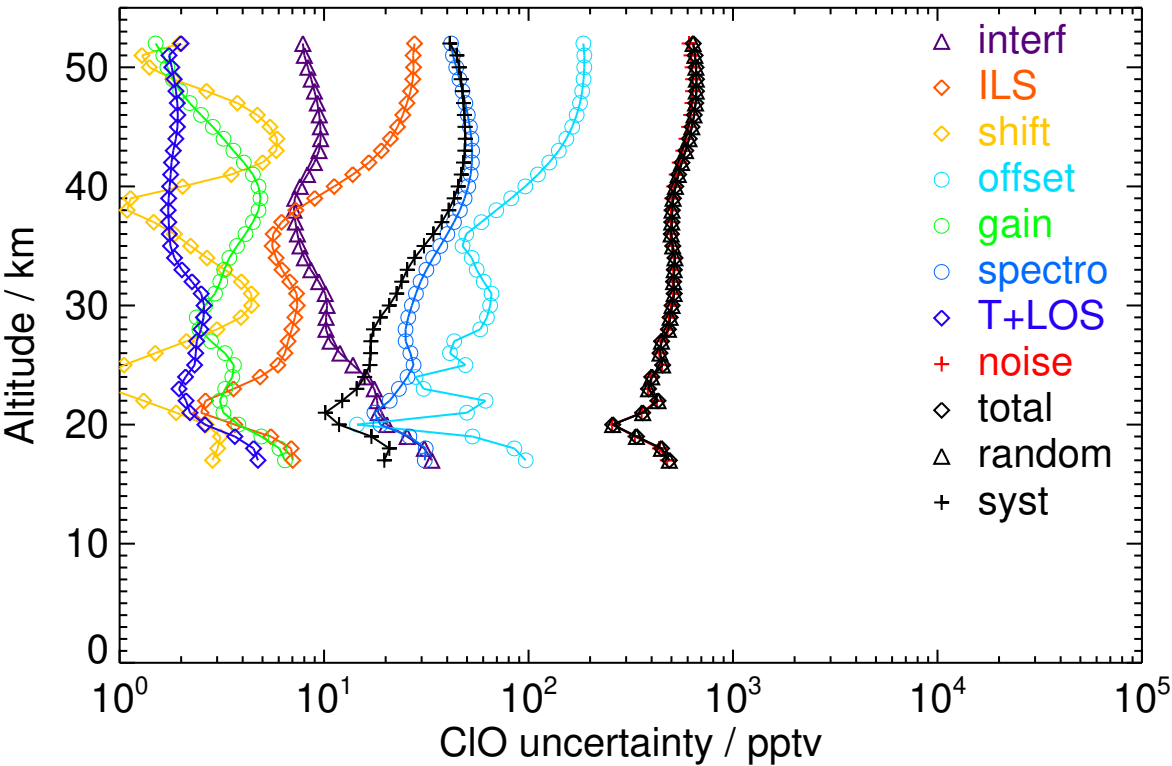


Figure S82. V8R_CLO_562 Northern midlatitude summer night

Table S84. CIO error budget for Northern midlatitude autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	43.32	30.43	10.83	2.91	93.41	8.39	52.95	5.75	486.18	498.39	25.73	499.05
21	149.26	20.22	5.22	1.74	43.07	5.63	32.64	3.34	361.60	365.59	22.27	366.27
24	203.12	17.18	5.89	1.15	29.26	5.25	35.78	2.67	431.79	434.04	23.58	434.68
27	140.57	11.95	6.47	3.06	55.34	3.93	34.11	2.46	491.25	495.22	22.90	495.75
30	131.32	11.03	6.78	4.39	79.85	3.64	37.39	2.41	549.57	556.09	27.78	556.78
33	346.87	9.74	7.07	3.35	78.37	4.25	47.57	2.01	568.51	574.78	37.67	576.01
36	577.05	8.78	9.09	2.23	91.18	5.16	59.20	1.79	570.65	579.16	47.27	581.08
39	638.93	8.93	12.25	1.29	133.49	5.51	65.90	1.88	603.56	619.62	52.67	621.86
42	627.53	9.96	15.51	1.07	174.92	4.94	66.15	1.95	663.81	687.87	53.11	689.92
45	556.37	9.88	17.18	1.23	199.69	4.17	61.57	1.95	699.30	728.43	49.82	730.14
48	408.38	8.96	17.47	1.25	204.52	3.26	52.76	1.77	685.48	716.29	42.74	717.56

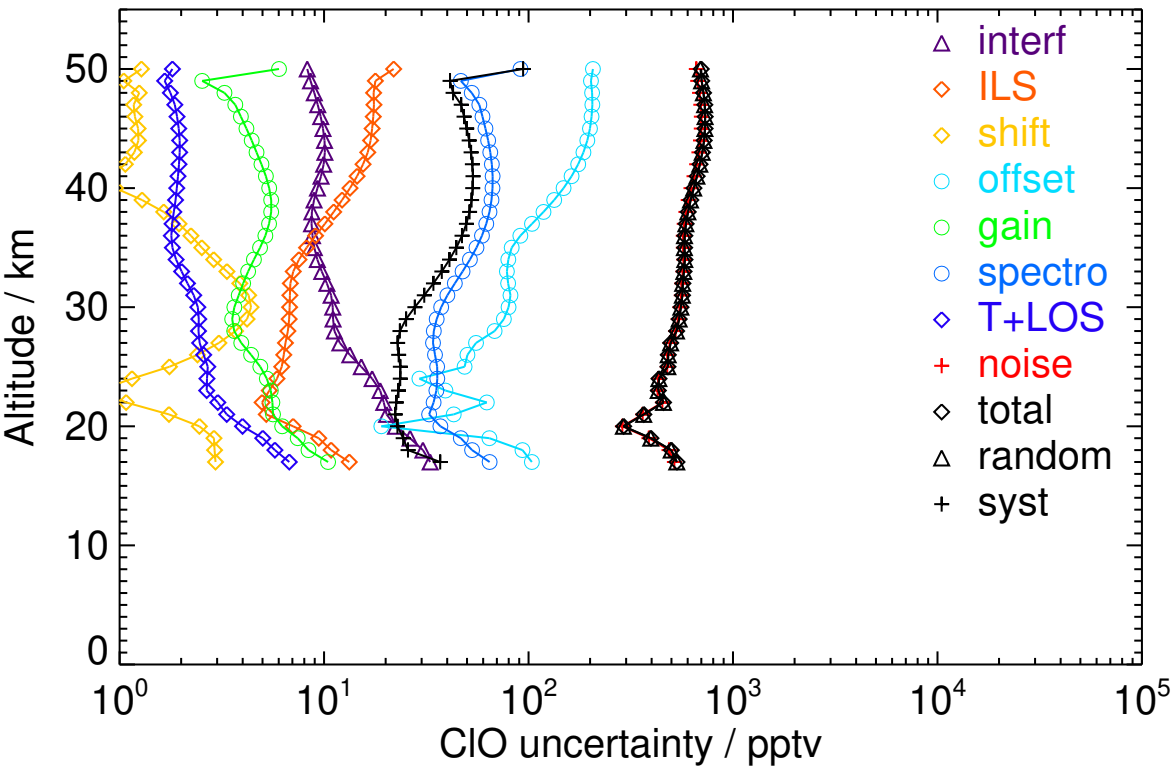


Figure S83. V8R_CLO_562 Northern midlatitude autumn day

Table S85. CIO error budget for Northern midlatitude autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	72.72	30.13	9.13	2.74	92.05	7.31	43.97	5.02	480.65	491.96	21.96	492.45
21	257.09	19.78	6.44	1.54	44.04	6.30	34.35	3.40	360.09	364.19	25.22	365.06
24	139.43	16.75	6.12	1.38	28.98	5.42	32.56	3.03	422.96	425.09	21.20	425.62
27	-65.26	11.66	5.06	3.44	53.08	3.31	24.77	2.26	484.38	487.90	13.91	488.10
30	-43.03	11.03	4.45	4.56	78.47	2.76	24.59	2.04	545.42	551.48	17.05	551.74
33	64.64	9.89	4.22	3.22	77.93	2.89	27.43	1.68	566.68	572.42	20.52	572.79
36	156.40	8.95	5.63	1.86	91.66	3.25	33.18	1.40	571.29	579.13	24.78	579.66
39	180.11	9.11	8.51	0.91	134.35	3.41	38.20	1.32	607.18	622.50	28.98	623.17
42	214.57	10.20	12.11	1.01	175.70	3.02	40.44	1.31	668.28	691.64	31.49	692.36
45	211.45	10.06	14.21	1.10	199.71	2.61	39.23	1.33	701.52	729.99	31.42	730.66
48	235.74	9.07	15.13	1.16	204.36	2.20	36.52	1.26	686.35	716.65	30.20	717.29

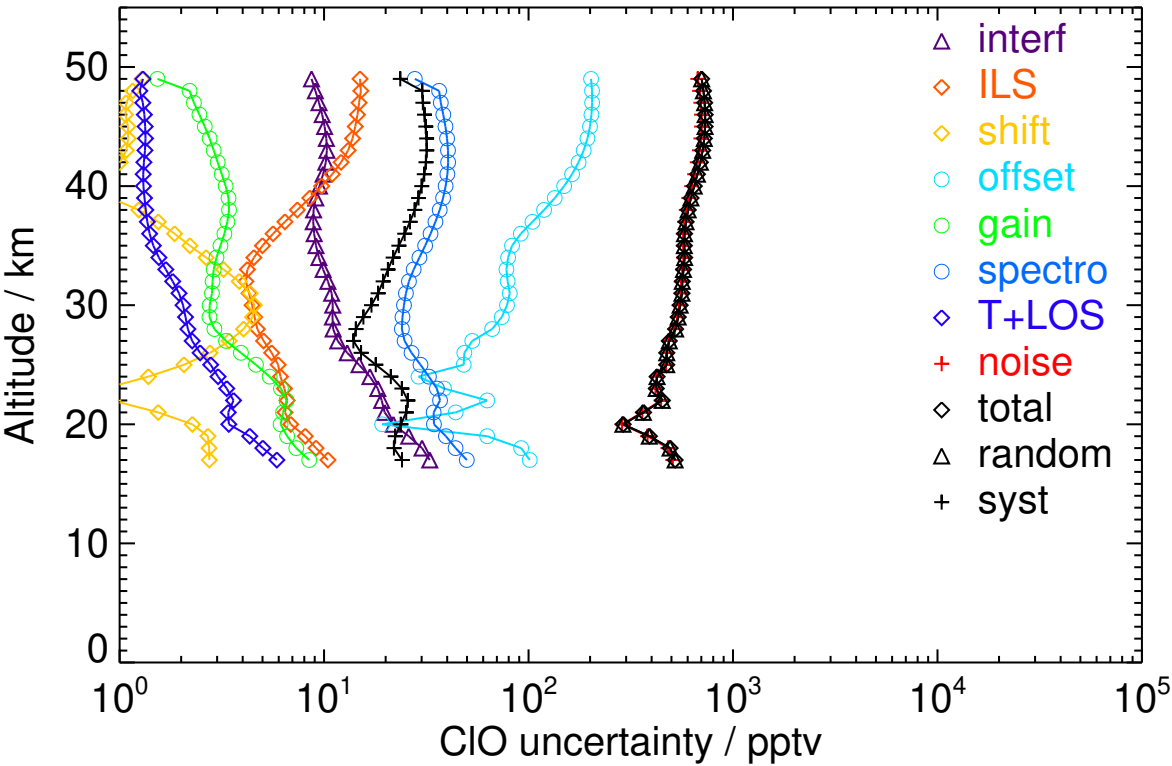


Figure S84. V8R_CLO_562 Northern midlatitude autumn night

Table S86. CIO error budget for Tropics day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-110.90	31.85	13.52	4.24	109.84	6.56	42.71	5.23	593.39	605.60	23.14	606.05
21	111.89	24.15	10.43	2.81	42.03	4.92	34.78	3.72	390.63	394.73	22.23	395.36
24	163.80	18.23	7.41	1.36	29.65	4.07	32.78	2.71	439.23	441.34	22.58	441.92
27	207.72	11.68	9.64	7.23	51.64	3.61	39.54	2.84	474.31	478.32	26.82	479.07
30	358.54	10.67	10.63	10.52	71.48	3.78	43.36	2.85	524.92	530.84	33.19	531.88
33	395.45	8.73	9.82	7.07	62.34	4.17	46.81	2.36	539.07	543.58	37.92	544.91
36	519.49	7.70	9.26	3.60	63.98	4.77	50.26	1.99	521.20	526.02	41.83	527.68
39	518.84	7.81	10.86	1.24	102.01	4.72	51.31	2.19	535.39	545.93	42.96	547.62
42	355.47	9.39	14.80	2.91	146.97	4.02	51.12	1.99	590.89	609.86	42.05	611.31
45	265.04	9.55	17.95	3.30	180.32	3.42	49.13	1.83	645.96	671.59	40.04	672.78
48	204.61	8.63	19.74	2.02	194.28	2.83	45.43	1.67	657.82	686.73	37.71	687.76

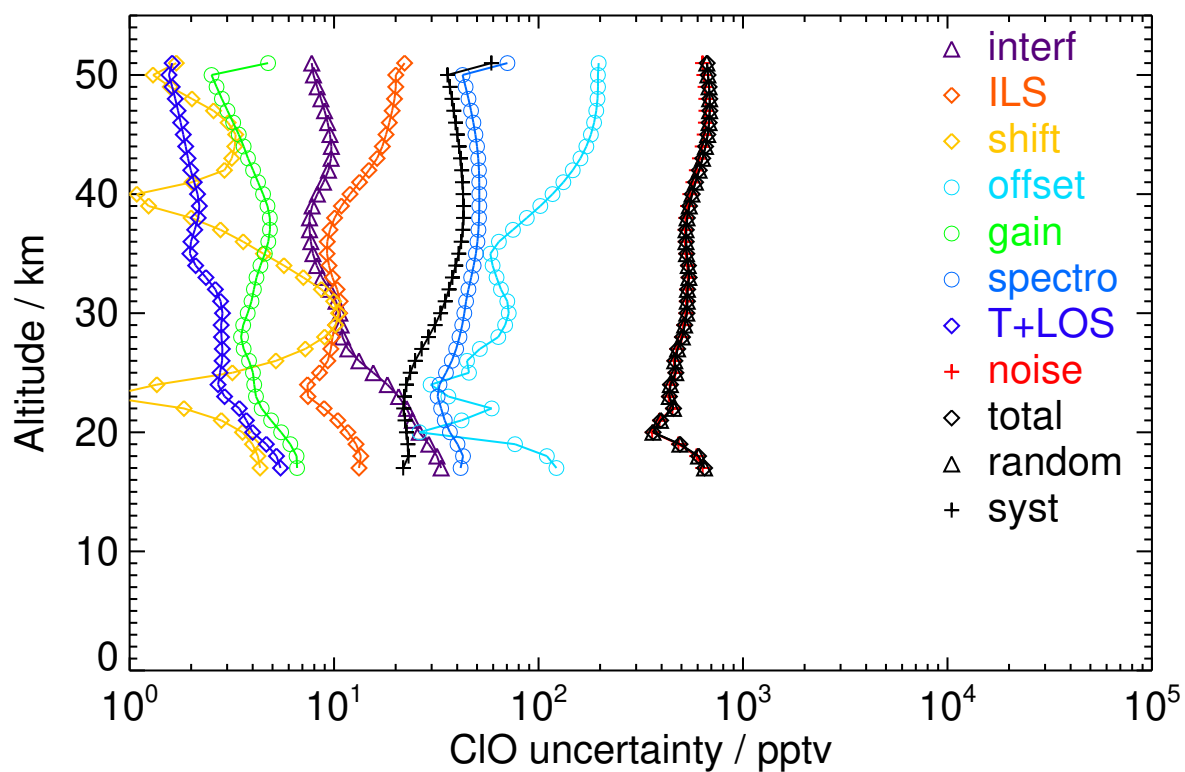
**Figure S85.** V8R_CLO_562 Tropics day

Table S87. CIO error budget for Tropics night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-18.75	31.78	16.38	4.07	110.14	6.86	48.87	6.42	591.36	603.67	34.40	604.65
21	-9.38	23.47	10.29	2.78	39.68	4.93	32.53	4.11	383.68	387.19	25.14	388.00
24	38.81	17.93	6.45	1.46	29.05	3.29	25.27	2.71	434.94	436.83	14.90	437.08
27	181.24	11.68	6.41	7.30	51.24	2.70	31.21	2.33	470.93	474.53	20.91	474.99
30	241.67	10.48	8.90	10.13	68.98	3.05	35.88	2.75	519.38	524.85	25.32	525.47
33	196.91	8.68	8.34	6.73	59.96	3.38	36.59	2.26	531.73	535.92	25.70	536.54
36	23.02	7.79	7.99	3.18	63.69	3.75	37.83	1.95	519.88	524.61	26.44	525.27
39	-3.88	7.93	9.75	0.97	101.82	3.76	38.85	1.90	535.58	545.96	28.74	546.72
42	147.74	9.51	14.36	3.51	146.81	3.38	41.58	1.61	590.85	609.64	32.47	610.50
45	262.54	9.65	18.05	3.85	180.03	3.08	42.48	1.55	646.63	672.02	34.49	672.90
48	298.44	8.67	20.13	2.38	193.95	2.67	40.46	1.49	659.03	687.67	34.31	688.53

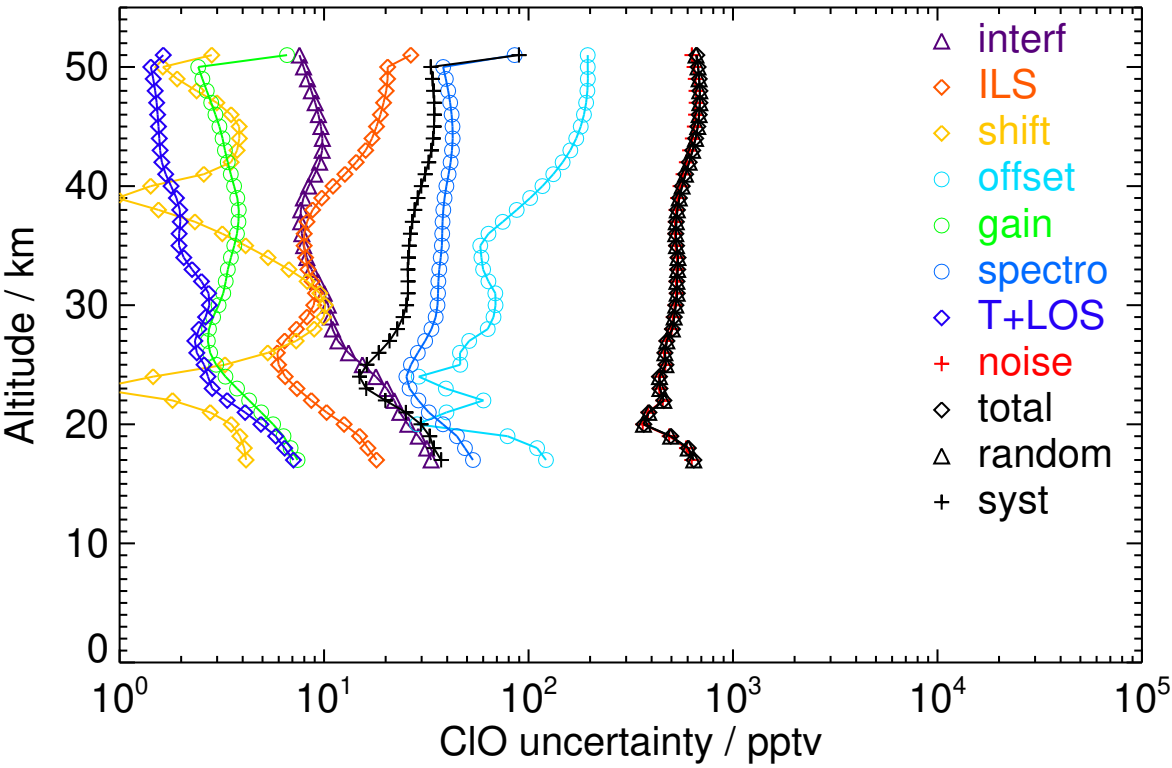


Figure S86. V8R_CLO_562 Tropics night

Table S88. ClO error budget for Southern midlatitude winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	173.47	28.60	11.87	1.40	99.84	10.17	57.91	6.48	527.14	539.49	35.49	540.65
21	70.13	19.93	6.72	0.69	27.98	6.32	33.97	3.65	325.26	328.27	21.53	328.98
24	53.70	16.97	4.12	2.34	38.13	3.41	26.57	2.46	434.01	436.58	15.63	436.86
27	192.16	12.77	5.31	4.32	66.40	3.29	36.36	2.48	511.39	516.49	26.83	517.19
30	414.88	9.96	6.27	3.76	69.86	3.81	45.36	2.31	547.03	552.30	36.36	553.49
33	583.62	8.41	8.21	2.21	66.03	4.45	51.78	2.21	553.58	558.42	42.70	560.05
36	563.15	8.43	9.91	1.73	95.17	4.73	52.03	2.46	566.69	575.48	43.98	577.15
39	406.82	8.99	11.90	1.15	139.19	4.24	48.64	2.53	611.61	627.99	41.12	629.33
42	198.15	9.87	15.08	1.37	179.58	3.36	44.71	2.32	671.40	695.65	38.01	696.69
45	78.43	9.64	16.67	1.52	202.75	2.72	39.96	2.10	704.23	733.38	34.44	734.19
48	76.28	8.72	17.71	1.41	205.39	2.30	37.14	1.92	686.71	717.23	33.54	718.01

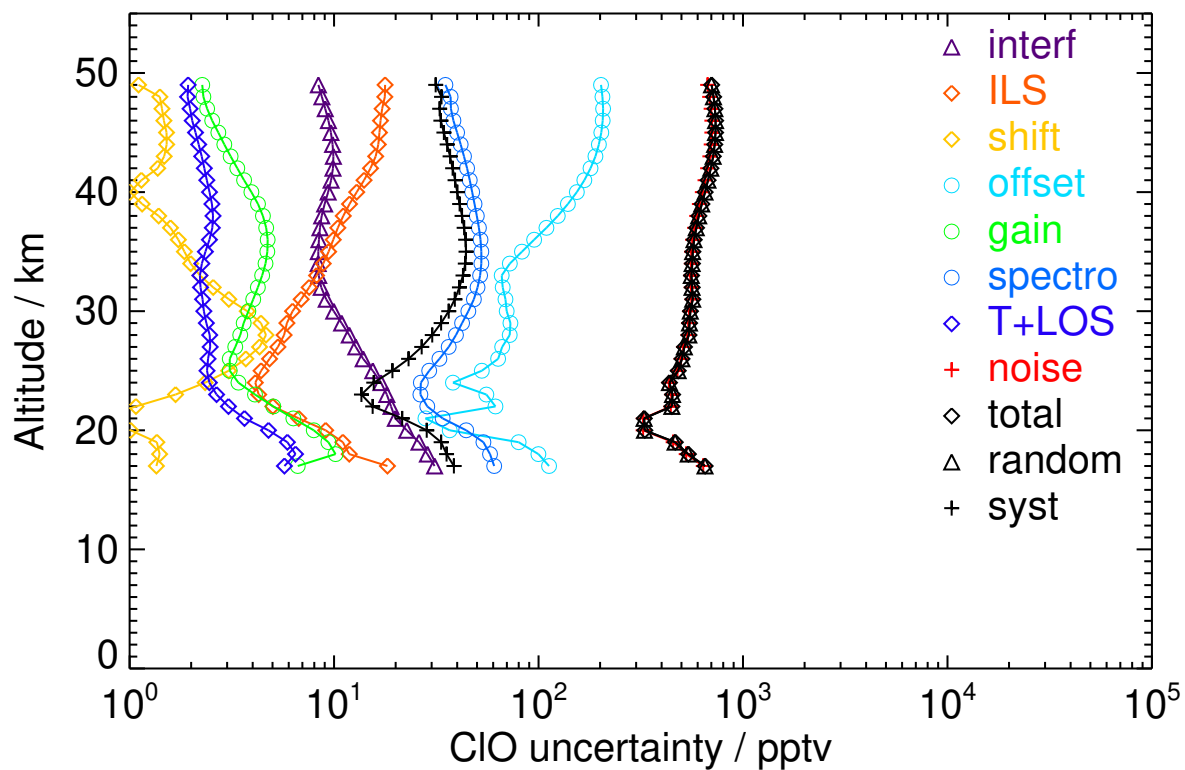
**Figure S87.** V8R_CLO_562 Southern midlatitude winter day

Table S89. CIO error budget for Southern midlatitude winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-103.60	28.56	9.68	1.55	101.62	5.26	40.95	5.46	544.45	556.08	13.37	556.24
21	148.87	20.40	5.77	0.89	33.69	3.82	30.18	2.91	359.33	362.36	18.34	362.82
24	135.50	17.57	6.04	1.70	41.73	4.28	32.14	2.52	466.21	469.09	21.17	469.57
27	-25.36	13.43	6.42	2.85	73.43	3.84	30.04	2.63	543.18	548.86	18.72	549.18
30	44.84	11.69	5.21	3.09	94.09	3.40	30.40	2.15	598.69	606.60	20.85	606.96
33	178.44	10.48	6.54	2.49	101.02	3.61	36.52	1.93	619.27	628.13	25.71	628.66
36	237.23	9.98	9.09	2.12	124.99	3.74	41.16	1.99	637.08	650.01	29.60	650.69
39	236.75	10.13	12.46	1.85	165.13	3.55	42.33	1.94	671.53	692.31	31.41	693.03
42	193.27	10.22	16.24	1.62	200.26	3.07	40.77	1.89	716.54	744.70	31.78	745.38
45	158.85	9.58	17.49	1.71	218.27	2.57	36.99	1.80	733.74	766.09	30.09	766.68
48	169.95	8.58	18.65	1.82	214.57	2.17	35.81	1.66	701.88	734.50	29.88	735.11

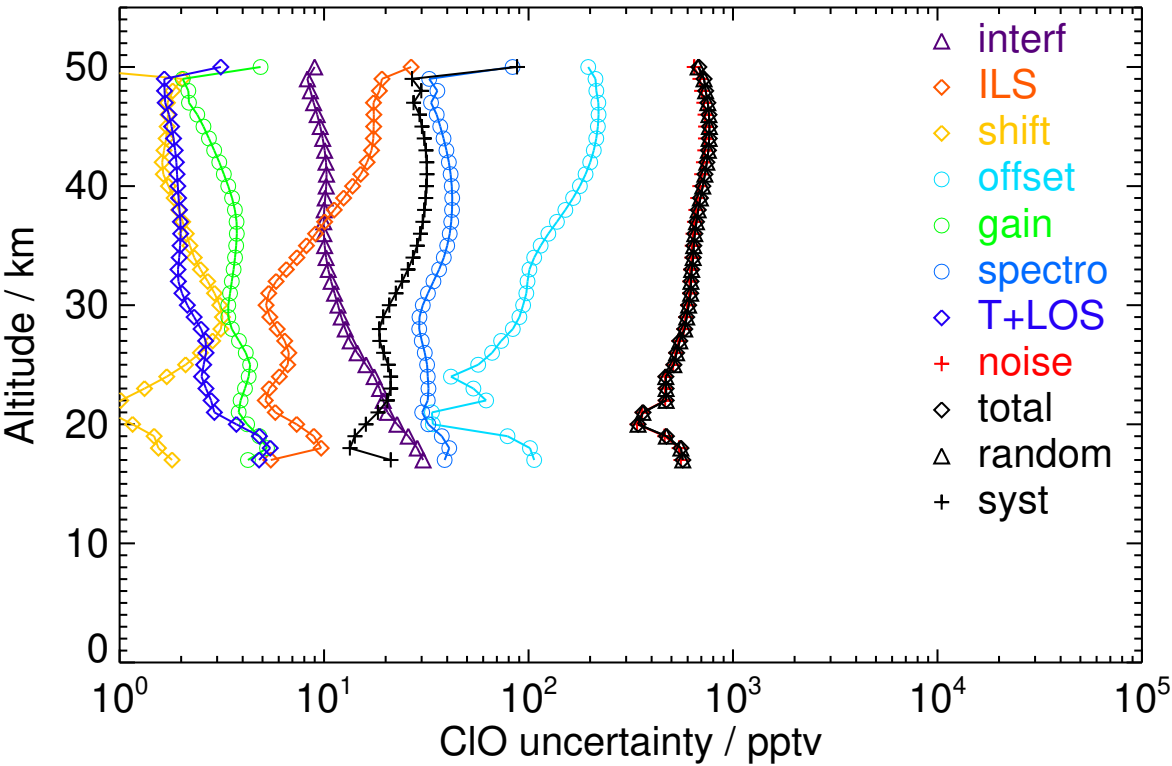


Figure S88. V8R_CLO_562 Southern midlatitude winter night

Table S90. CIO error budget for Southern midlatitude spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	111.67	28.57	10.82	1.64	96.91	7.61	54.75	6.70	507.37	519.89	23.81	520.44
21	201.41	18.83	6.60	0.96	25.78	5.13	34.03	3.73	305.06	307.93	22.40	308.75
24	181.30	15.51	6.08	3.04	29.95	4.60	31.04	2.76	401.48	403.73	19.11	404.18
27	37.42	11.45	6.19	5.95	55.09	3.36	30.44	2.73	469.39	473.44	19.07	473.83
30	180.57	9.33	5.72	5.02	60.27	3.18	37.67	2.32	509.18	513.55	27.28	514.27
33	459.99	7.72	6.58	2.53	51.89	3.92	44.98	1.84	518.31	521.83	34.41	522.97
36	540.08	7.74	8.28	1.70	75.32	4.31	47.52	1.97	532.61	538.79	38.31	540.15
39	409.49	8.46	10.47	1.41	117.96	3.91	44.99	2.24	571.67	584.40	37.66	585.62
42	212.60	9.97	14.25	2.69	161.58	2.91	41.29	2.15	634.44	655.27	35.75	656.24
45	90.65	10.01	16.78	2.61	189.92	2.19	37.27	2.00	680.16	706.65	33.39	707.44
48	12.81	9.11	18.19	1.40	199.00	1.67	33.36	1.80	678.73	707.69	31.31	708.39

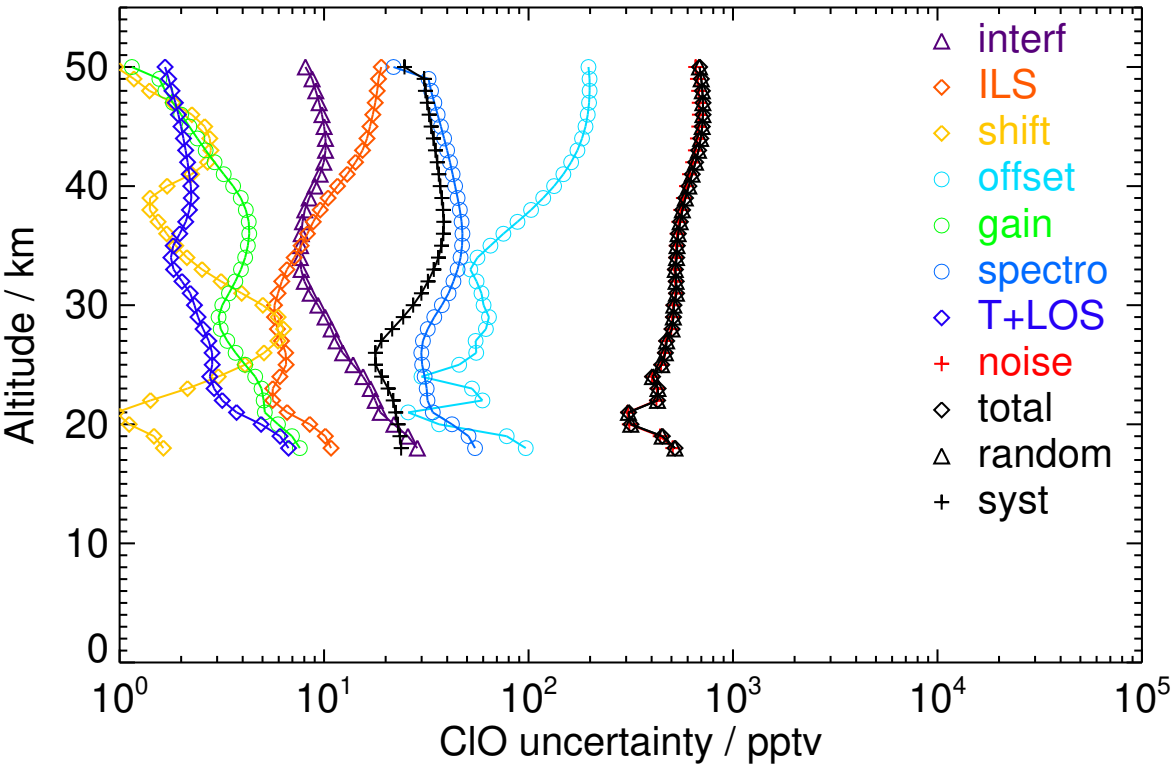


Figure S89. V8R_CLO_562 Southern midlatitude spring day

Table S91. CIO error budget for Southern midlatitude spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	65.04	29.77	14.19	1.88	91.59	8.56	49.91	6.18	476.44	488.36	24.17	488.95
21	86.13	18.26	7.58	0.88	39.40	4.73	28.60	2.91	338.36	342.05	16.71	342.46
24	96.24	15.82	5.20	2.49	27.45	4.38	28.53	2.44	408.25	410.18	17.12	410.54
27	48.76	11.25	5.31	5.16	49.84	3.23	26.04	2.29	466.41	469.71	16.55	470.00
30	-31.38	10.24	6.15	6.39	68.12	3.02	26.78	2.26	518.89	523.93	17.43	524.22
33	-5.44	8.93	5.69	4.22	63.37	2.97	29.92	2.00	535.57	539.89	20.28	540.27
36	182.14	8.15	5.92	2.28	74.93	3.36	35.68	1.43	537.03	542.92	25.45	543.52
39	342.71	8.47	9.53	1.10	115.58	3.77	42.38	1.34	566.44	578.98	31.24	579.82
42	397.71	10.04	14.57	2.40	159.06	3.41	45.37	1.44	628.53	649.24	35.10	650.19
45	378.67	10.13	17.82	2.52	187.99	2.92	44.02	1.57	675.17	701.63	35.86	702.55
48	332.89	9.19	19.55	1.38	197.76	2.43	40.47	1.54	675.28	704.29	34.81	705.15

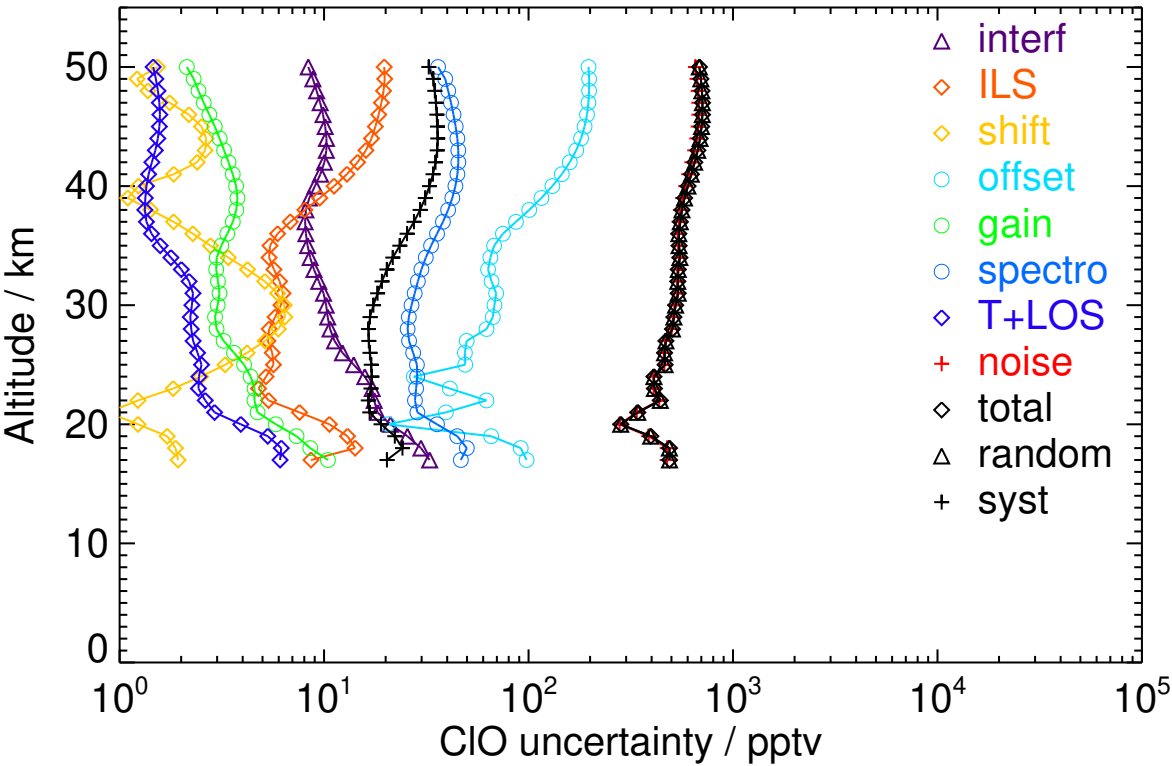


Figure S90. V8R_CLO_562 Southern midlatitude spring night

Table S92. CIO error budget for Southern midlatitude summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	72.83	31.83	9.90	3.41	75.04	7.17	45.95	5.50	386.63	397.26	24.77	398.04
21	223.38	19.70	6.94	1.55	64.92	5.90	33.09	3.43	404.38	410.69	25.55	411.48
24	79.80	16.19	6.57	1.78	51.50	4.26	27.91	2.77	424.14	428.15	18.60	428.56
27	164.20	11.33	7.97	4.49	61.02	3.10	31.79	2.61	474.39	479.10	21.87	479.60
30	263.66	7.30	6.75	1.85	48.58	2.47	39.95	2.40	481.31	484.66	28.85	485.52
33	425.97	6.62	6.75	1.11	33.49	3.54	45.50	1.83	472.89	475.12	34.46	476.37
36	486.42	7.05	7.08	1.43	54.66	4.41	47.13	2.04	489.75	493.77	37.16	495.17
39	319.64	7.41	8.79	1.33	92.58	4.41	46.42	2.18	512.93	522.18	36.11	523.43
42	237.85	10.27	14.66	4.51	139.21	3.65	46.80	1.89	564.67	582.65	36.07	583.76
45	200.55	10.57	19.58	4.74	176.04	2.99	45.52	1.77	624.79	650.10	36.41	651.11
48	174.85	9.28	22.73	2.30	193.30	2.51	42.45	1.66	646.12	675.24	36.28	676.21
52	148.65	7.34	22.74	0.24	193.10	1.78	6.78	1.22	612.00	641.78	23.80	642.23

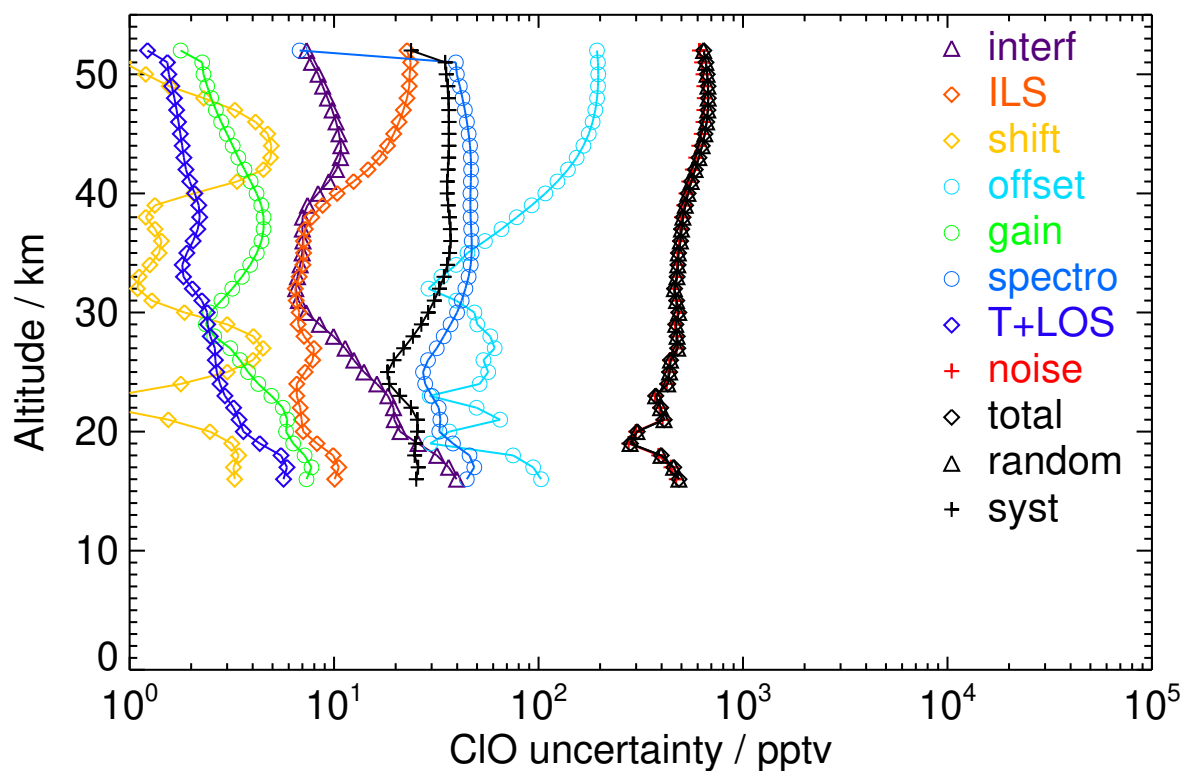
**Figure S91.** V8R_CLO_562 Southern midlatitude summer day

Table S93. CIO error budget for Southern midlatitude summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-8.07	31.89	8.92	3.31	86.56	6.98	36.70	4.78	427.89	438.89	22.01	439.44
21	-0.61	19.19	5.08	1.90	56.31	4.60	24.45	2.92	375.68	380.99	13.18	381.22
24	51.67	15.78	5.55	1.23	40.93	3.64	27.27	2.48	405.35	408.36	16.62	408.69
27	115.62	11.24	9.78	3.76	58.57	3.30	30.67	2.60	464.03	468.61	18.81	468.99
30	-67.42	7.77	9.16	1.93	49.31	2.07	26.65	2.21	477.13	480.38	13.51	480.57
33	-151.20	6.83	5.63	0.99	30.39	1.62	21.80	1.80	466.90	468.28	13.64	468.48
36	42.36	7.13	3.15	0.87	50.41	2.81	27.38	1.45	483.92	486.90	21.61	487.38
39	308.45	7.25	8.08	1.54	85.71	3.95	40.07	1.43	502.66	510.58	32.57	511.62
42	452.96	9.74	16.95	5.48	130.98	4.01	49.99	1.50	546.69	563.21	41.88	564.76
45	497.52	10.15	23.51	6.06	168.96	3.75	53.34	1.69	606.64	630.85	46.41	632.55
48	480.74	9.13	27.18	3.91	188.63	3.33	51.63	1.71	633.58	662.05	47.01	663.72
52	707.46	7.94	32.54	3.70	190.14	4.31	61.72	1.79	604.15	634.78	56.27	637.27

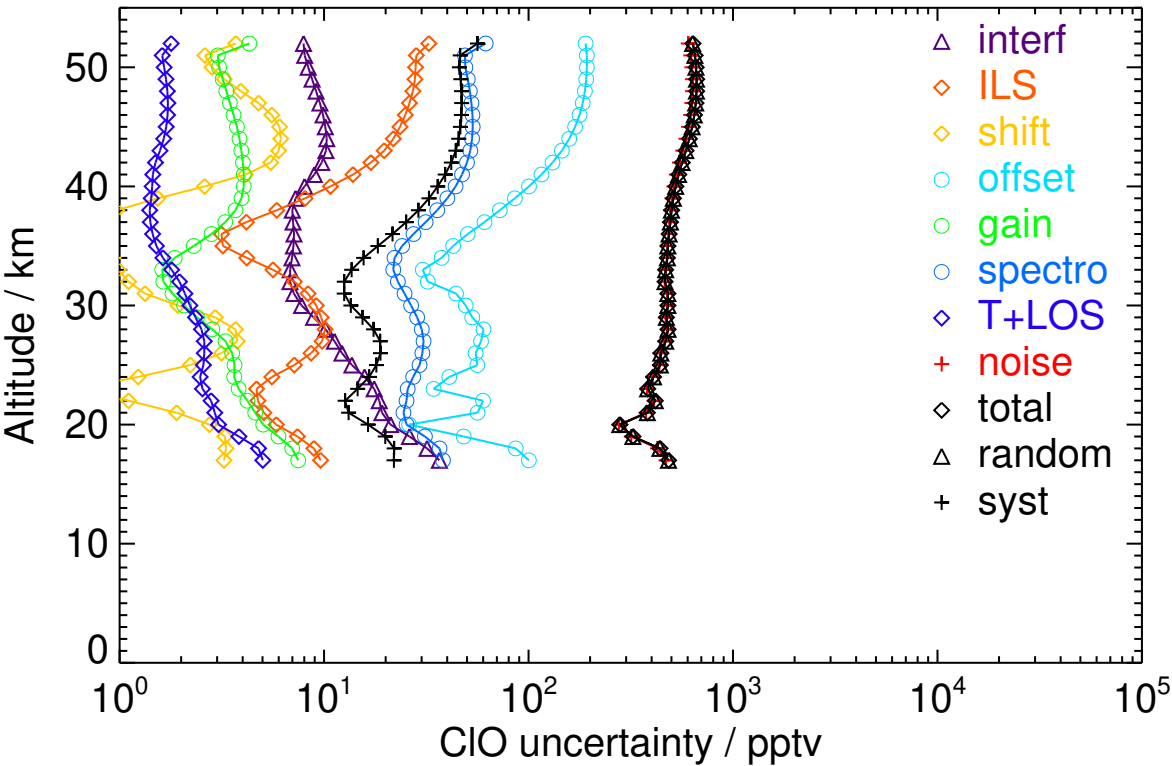


Figure S92. V8R_CLO_562 Southern midlatitude summer night

Table S94. CIO error budget for Southern midlatitude autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-51.22	29.14	9.29	2.91	101.95	6.79	40.97	4.84	520.37	532.47	18.40	532.79
21	185.48	20.31	7.13	1.67	28.62	5.87	33.87	3.29	320.71	323.72	23.12	324.55
24	277.45	17.07	7.62	1.69	35.21	5.93	37.60	2.93	417.73	420.52	26.64	421.37
27	125.82	12.17	8.44	4.21	62.08	5.11	36.72	2.76	490.79	495.74	24.23	496.33
30	107.10	9.17	6.76	3.21	60.88	3.45	35.53	2.51	524.89	529.18	24.63	529.76
33	263.97	7.73	5.31	1.61	54.53	3.06	40.42	2.27	527.26	530.81	30.84	531.71
36	413.30	7.98	6.56	1.29	86.51	4.09	48.18	1.64	542.24	550.01	38.07	551.32
39	484.67	8.68	10.23	0.81	132.76	4.54	52.94	1.58	595.49	611.10	42.49	612.57
42	483.55	9.84	13.91	1.09	175.33	3.93	52.25	1.73	662.33	685.99	43.40	687.36
45	435.23	9.77	15.92	1.09	199.92	3.15	47.92	1.76	698.95	727.64	41.18	728.80
48	350.69	8.81	16.68	0.91	204.52	2.48	42.87	1.65	684.67	715.11	37.87	716.11

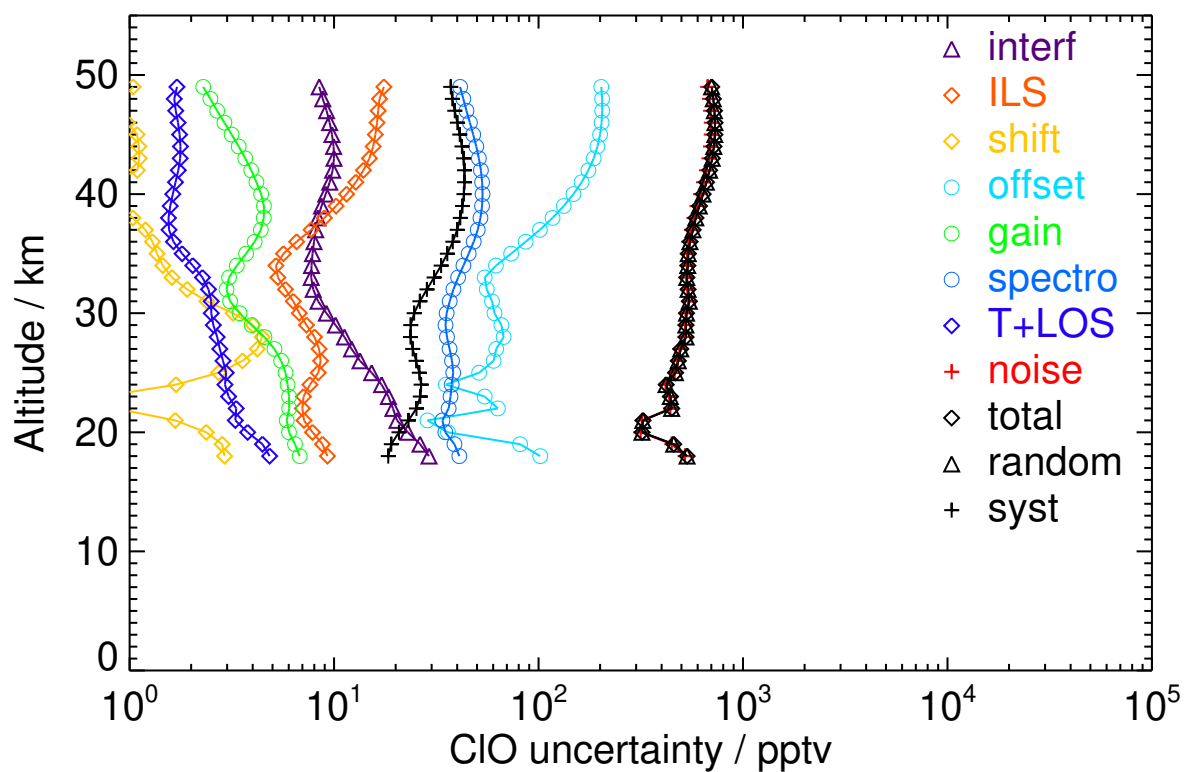
**Figure S93.** V8R_CLO_562 Southern midlatitude autumn day

Table S95. CIO error budget for Southern midlatitude autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	253.45	29.82	14.53	2.96	100.94	9.92	62.34	6.79	523.87	536.54	43.48	538.30
21	-7.03	20.21	8.06	1.65	30.29	6.57	36.21	4.26	326.97	330.25	24.71	331.17
24	-65.41	16.69	4.00	1.42	35.07	3.84	22.85	2.10	419.13	421.43	11.71	421.59
27	35.74	12.18	5.64	3.58	62.77	3.03	29.34	2.29	492.14	496.89	17.84	497.21
30	31.36	9.23	4.28	2.46	60.64	2.55	31.24	1.94	525.43	529.50	21.89	529.96
33	95.25	7.98	5.64	1.08	54.24	3.11	35.56	1.75	528.03	531.55	24.39	532.10
36	105.23	8.16	6.85	0.92	86.44	3.49	36.51	1.63	543.69	551.18	27.28	551.85
39	145.89	8.76	9.37	0.62	132.05	3.43	37.59	1.60	595.31	610.36	29.75	611.09
42	236.82	9.89	13.22	1.44	174.29	3.04	38.72	1.54	661.73	684.86	31.71	685.60
45	283.04	9.78	15.41	1.30	198.81	2.69	37.50	1.50	698.03	726.31	31.51	727.00
48	259.23	8.85	16.09	1.10	203.85	2.26	34.52	1.40	684.26	714.43	29.84	715.06

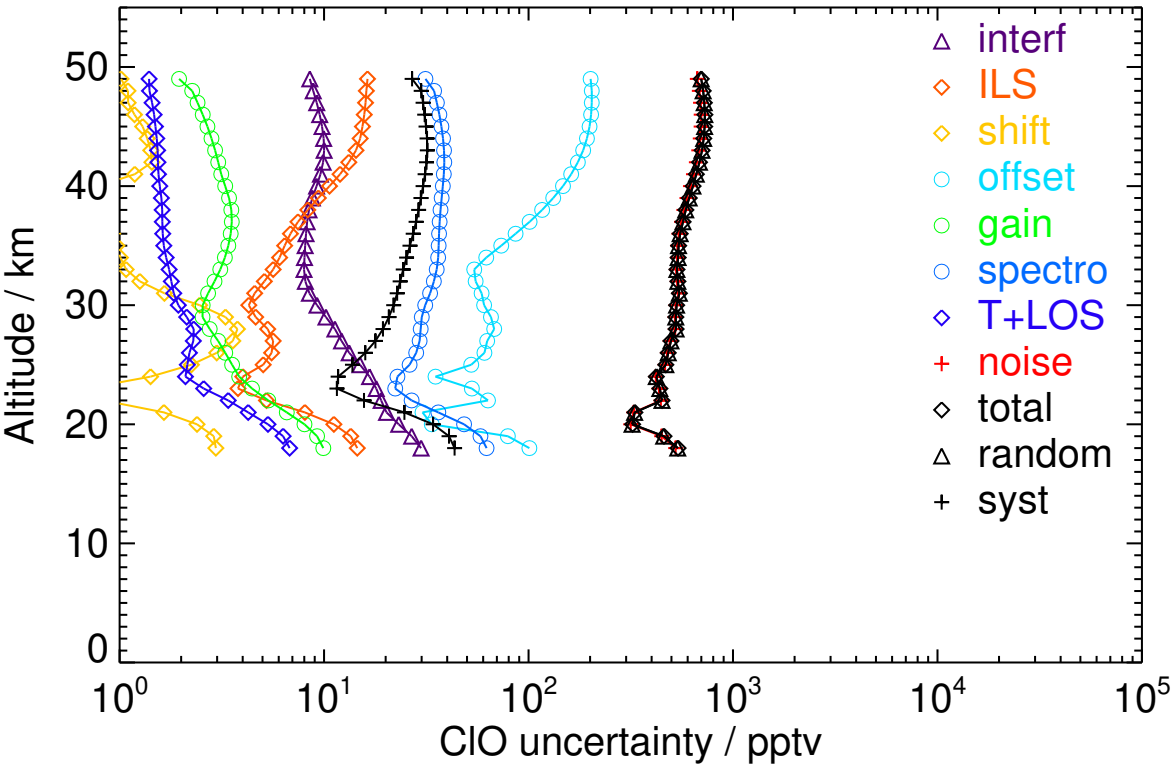


Figure S94. V8R_CLO_562 Southern midlatitude autumn night

Table S96. CIO error budget for Southern polar winter day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	1342.15	28.37	58.94	4.00	124.77	13.81	156.55	22.17	755.62	772.92	136.43	784.86
21	928.45	24.05	48.82	3.73	49.27	9.87	124.80	17.55	495.92	504.64	112.52	517.03
24	417.78	20.99	32.58	3.55	82.06	5.90	82.79	11.11	594.28	602.58	72.98	606.99
27	254.66	17.13	20.66	3.56	106.67	5.03	59.35	6.03	646.74	657.04	47.57	658.76
30	329.87	13.06	14.65	3.32	105.33	4.87	53.20	3.67	649.81	659.50	40.77	660.76
33	470.11	10.60	12.10	3.08	104.65	4.76	53.44	2.82	641.99	651.51	42.27	652.88
36	542.43	10.15	13.89	3.02	134.11	4.58	54.70	2.63	643.47	658.26	45.46	659.82
39	512.85	10.20	19.11	2.91	173.62	3.95	53.91	2.61	684.38	706.90	47.14	708.47
42	424.12	9.83	23.84	2.51	205.09	3.27	50.22	2.46	729.19	758.20	46.16	759.60
45	347.01	9.09	24.11	2.50	219.18	2.78	44.74	2.24	738.31	770.75	42.03	771.89
48	413.24	8.18	25.05	2.49	211.51	2.55	43.15	1.99	700.33	732.11	42.19	733.33

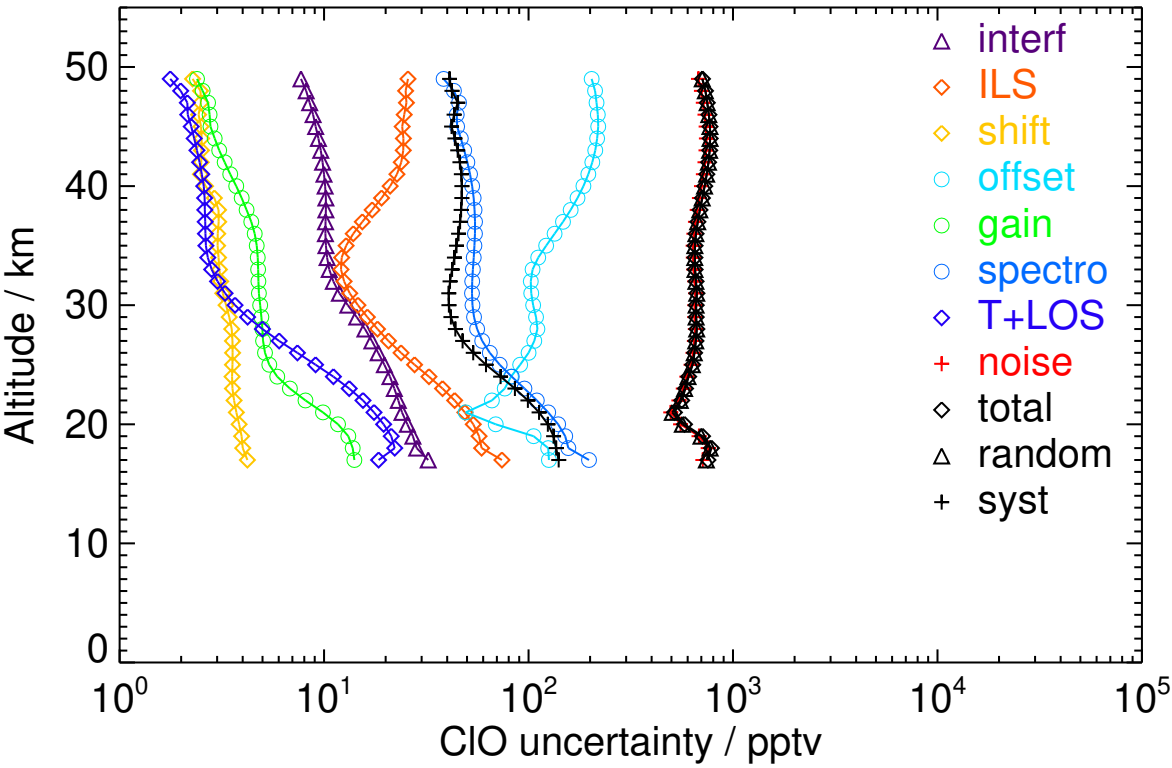


Figure S95. V8R_CLO_562 Southern polar winter day

Table S97. CIO error budget for Southern polar winter night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	193.74	25.74	36.03	3.34	127.59	6.36	78.98	10.26	769.45	783.65	50.82	785.29
21	151.86	22.08	28.43	3.35	49.61	4.46	59.03	7.82	498.50	504.23	39.87	505.80
24	6.61	19.51	16.04	3.66	77.67	3.20	34.77	4.66	576.95	583.22	25.44	583.78
27	-35.13	16.22	9.96	4.17	103.48	3.73	31.21	3.05	635.60	644.62	23.22	645.03
30	264.63	12.85	9.18	4.04	106.14	4.23	37.14	2.58	643.67	652.99	29.06	653.64
33	472.31	10.54	10.07	3.61	104.34	4.33	43.24	2.59	642.05	651.15	35.22	652.10
36	458.83	10.07	13.41	3.60	131.64	4.26	45.59	2.76	639.26	653.37	38.58	654.51
39	331.26	10.07	19.01	3.35	170.88	3.73	44.97	2.64	676.03	697.97	39.56	699.09
42	160.20	9.73	23.99	2.51	203.19	3.15	42.14	2.35	721.70	750.39	39.00	751.40
45	65.09	9.02	24.41	2.51	218.52	2.70	37.68	2.09	734.24	766.61	35.82	767.44
48	10.01	8.07	25.07	2.34	211.10	2.47	34.78	1.85	694.16	726.06	34.31	726.87

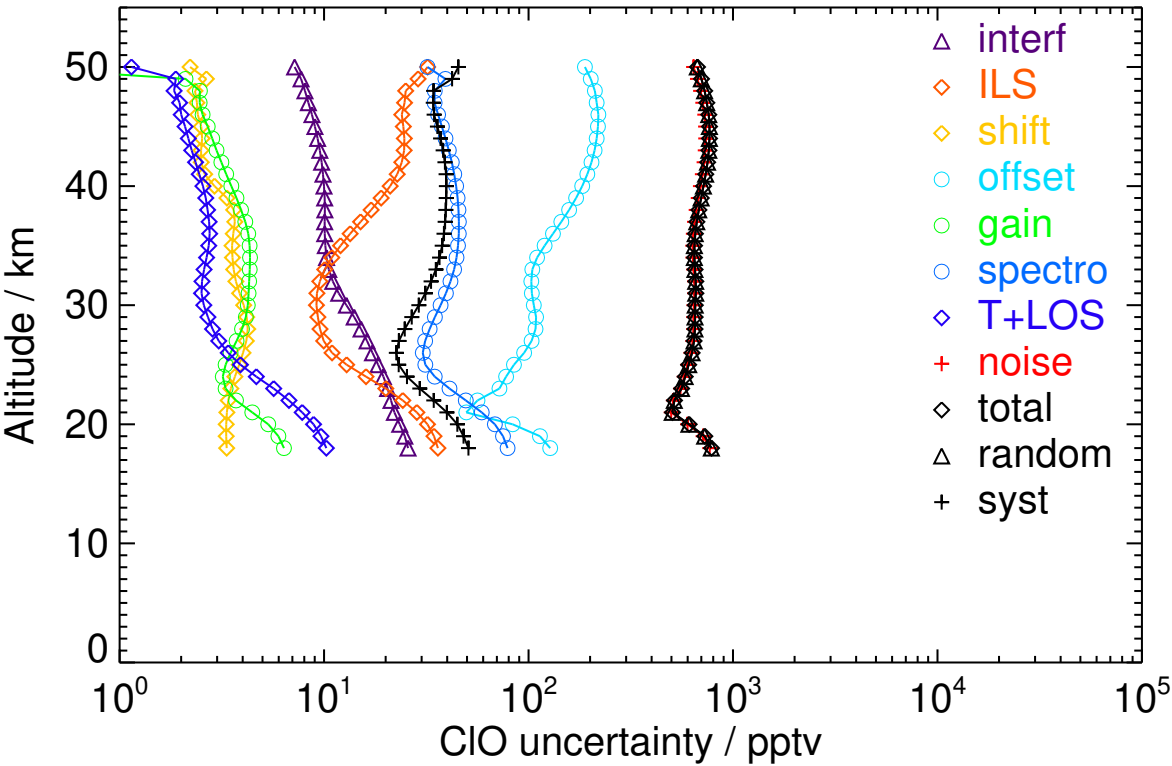


Figure S96. V8R_CLO_562 Southern polar winter night

Table S98. CIO error budget for Southern polar spring day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	11.31	29.29	21.01	6.10	113.17	4.60	42.03	5.21	657.35	668.92	24.86	669.38
21	113.76	21.59	15.08	4.82	26.80	3.54	31.99	3.50	380.22	382.94	20.28	383.47
24	233.77	15.72	8.88	5.85	36.46	4.97	33.60	3.20	427.87	430.25	28.45	431.19
27	411.23	11.92	14.73	7.02	56.67	6.83	44.52	3.63	467.38	471.79	38.95	473.39
30	521.89	8.69	21.29	4.20	50.85	6.12	49.16	3.79	478.06	481.90	43.73	483.88
33	500.20	6.52	19.25	2.91	33.86	4.74	49.84	3.34	466.21	468.58	43.32	470.57
36	465.69	6.75	15.03	3.83	56.01	5.13	47.68	3.03	485.22	489.21	42.91	491.09
39	396.13	8.06	17.33	6.76	96.93	4.79	49.93	2.17	526.64	536.40	44.25	538.22
42	384.79	9.72	24.76	7.53	143.05	3.73	52.09	1.81	593.76	611.81	46.92	613.60
45	380.94	9.79	28.33	5.68	175.49	3.25	50.56	1.98	651.55	675.74	46.84	677.36
48	376.79	8.97	29.85	2.90	188.42	2.87	46.59	2.00	661.71	688.83	45.10	690.31

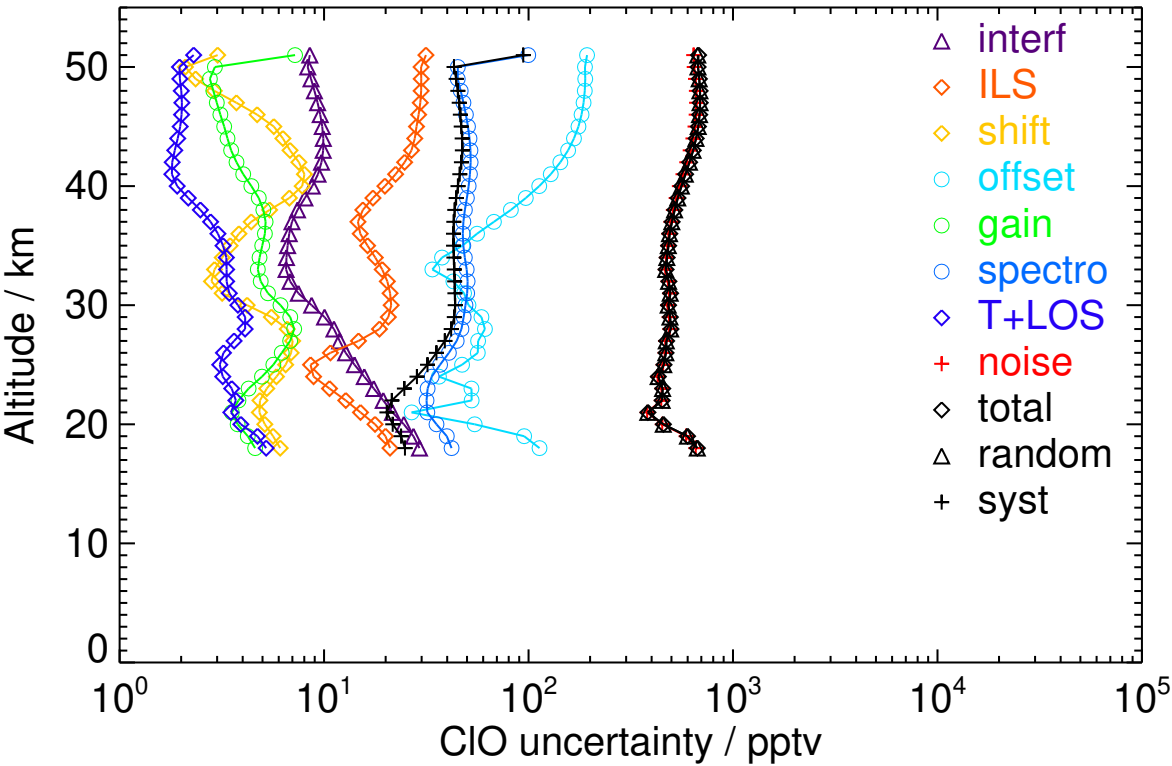


Figure S97. V8R_CLO_562 Southern polar spring day

Table S99. CIO error budget for Southern polar spring night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	36.10	27.96	20.15	4.02	105.85	4.76	37.09	5.81	609.15	620.02	21.86	620.41
21	92.82	20.13	14.07	3.40	29.25	3.30	29.40	3.70	365.40	368.12	18.96	368.61
24	205.22	15.23	10.29	4.04	32.86	4.84	30.64	2.89	423.45	425.66	22.93	426.28
27	148.65	11.57	12.74	6.48	54.27	5.29	29.15	3.35	465.99	469.87	23.24	470.45
30	5.38	9.13	11.39	5.29	55.37	4.32	27.32	3.13	491.38	495.01	22.24	495.51
33	98.75	7.21	8.95	2.88	41.96	3.65	30.88	2.45	488.69	490.99	25.07	491.63
36	331.93	7.06	8.48	2.15	60.16	4.64	42.85	1.85	498.68	502.97	36.17	504.27
39	589.17	8.06	14.80	4.74	100.86	5.20	54.64	1.48	534.18	544.63	47.07	546.66
42	708.48	9.70	22.71	6.73	146.43	4.59	59.57	1.62	599.64	618.40	53.09	620.67
45	656.23	9.75	26.52	5.91	178.08	3.94	57.93	1.89	655.13	679.92	53.14	681.99
48	542.18	8.93	28.10	4.17	190.30	3.19	53.18	1.92	663.29	690.90	50.47	692.75

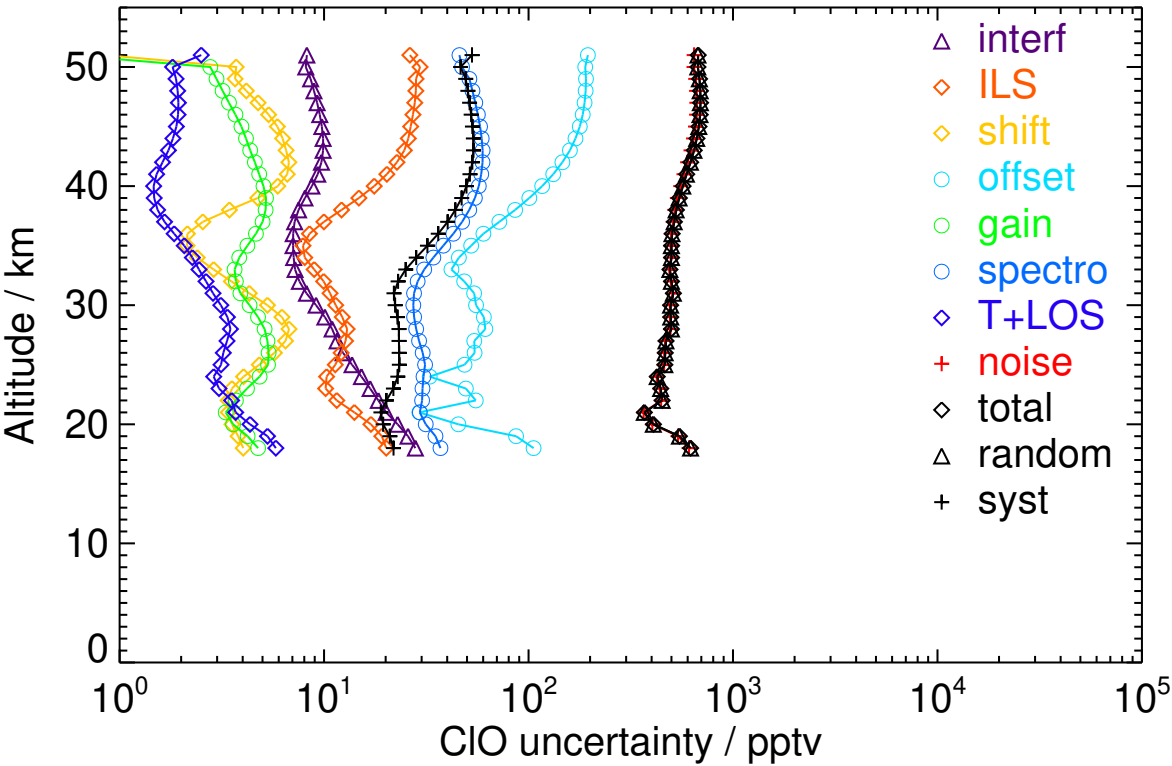


Figure S98. V8R_CLO_562 Southern polar spring night

Table S100. CIO error budget for Southern polar summer day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	73.78	28.86	11.34	2.32	90.06	9.52	51.78	6.27	437.58	450.29	24.45	450.96
21	34.69	16.40	6.14	1.59	33.35	5.29	25.31	2.94	287.05	290.27	15.43	290.68
24	26.30	14.22	5.81	1.96	28.16	4.16	26.56	2.58	358.95	360.99	17.22	361.40
27	169.14	10.77	11.44	3.64	53.01	4.49	29.90	2.79	427.43	431.44	23.38	432.08
30	245.67	8.01	10.75	3.38	50.01	3.50	33.12	2.67	454.72	458.16	25.87	458.89
33	270.89	6.12	6.96	2.64	28.52	3.02	35.42	1.84	448.85	450.43	27.36	451.26
36	324.90	6.48	5.07	2.31	41.99	3.93	37.12	1.92	467.43	469.87	30.72	470.87
39	378.30	6.79	6.27	3.84	71.08	4.02	37.91	2.22	482.59	488.31	32.55	489.39
42	349.09	9.14	15.72	9.13	113.93	2.67	37.71	2.09	511.23	524.38	34.83	525.53
45	221.64	9.67	25.53	9.37	154.29	1.66	36.41	2.08	567.42	588.60	38.61	589.86
48	157.78	8.94	32.71	4.43	179.00	1.66	34.46	2.00	606.53	632.84	42.35	634.26
52	183.27	7.87	36.97	0.84	187.60	1.93	30.86	1.83	600.16	629.16	43.99	630.69

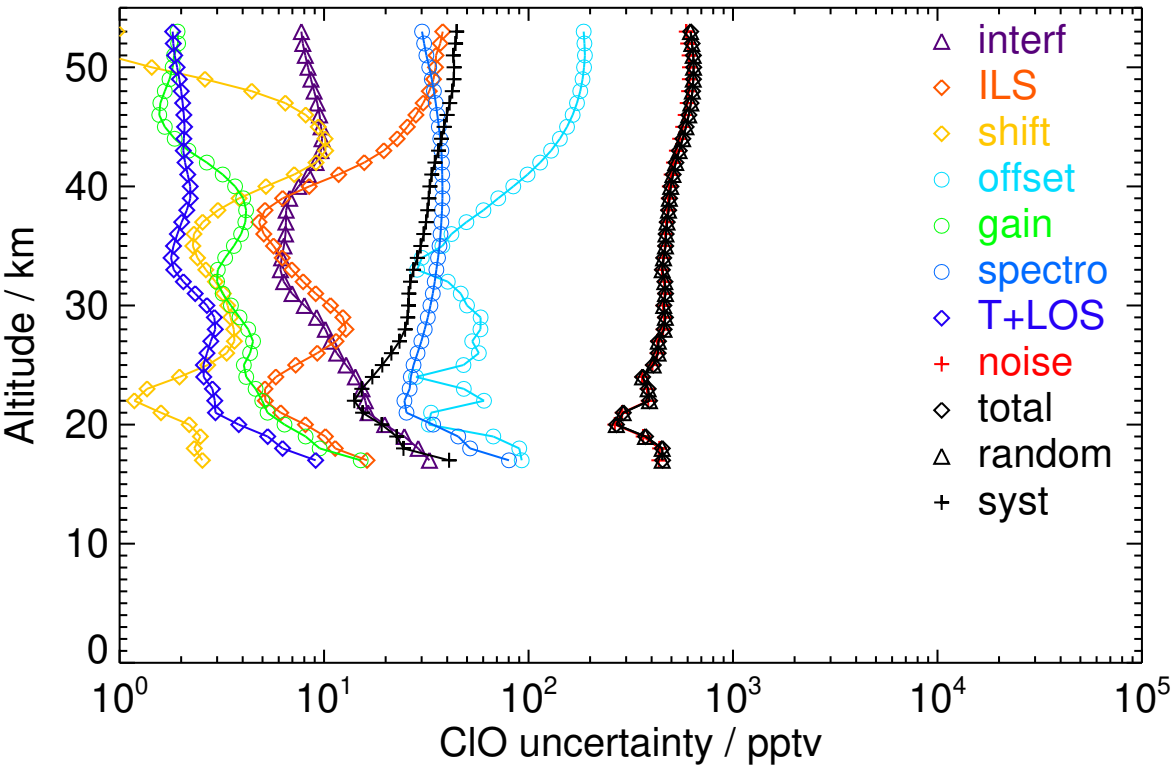


Figure S99. V8R_CLO_562 Southern polar summer day

Table S101. CIO error budget for Southern polar summer night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	66.48	27.98	9.14	2.16	92.94	8.05	40.91	5.16	475.57	486.70	23.73	487.28
21	41.10	17.19	4.40	1.66	31.50	4.89	22.29	2.70	309.66	312.31	13.64	312.61
24	-16.11	14.61	4.71	1.39	34.22	3.83	21.98	2.18	394.27	396.48	12.59	396.68
27	-102.73	11.18	6.98	1.42	58.26	3.23	21.40	2.27	461.02	465.18	13.64	465.38
30	-104.56	8.48	4.95	1.06	54.07	2.07	22.78	2.05	485.96	489.31	16.75	489.60
33	116.05	7.02	3.37	1.44	36.61	2.42	29.27	1.69	484.64	486.47	22.23	486.98
36	350.62	7.19	5.15	1.15	57.81	4.06	39.17	1.23	495.97	500.02	30.62	500.96
39	444.01	7.63	9.76	2.03	97.12	4.90	47.97	1.56	521.84	531.75	38.39	533.13
42	474.44	9.61	16.34	4.66	143.39	4.55	52.65	1.67	574.26	592.98	43.41	594.56
45	482.56	9.81	21.17	4.60	179.21	3.93	52.87	1.80	632.00	657.95	45.05	659.49
48	462.60	8.89	24.04	2.71	195.90	3.24	50.00	1.77	651.12	680.84	44.37	682.28

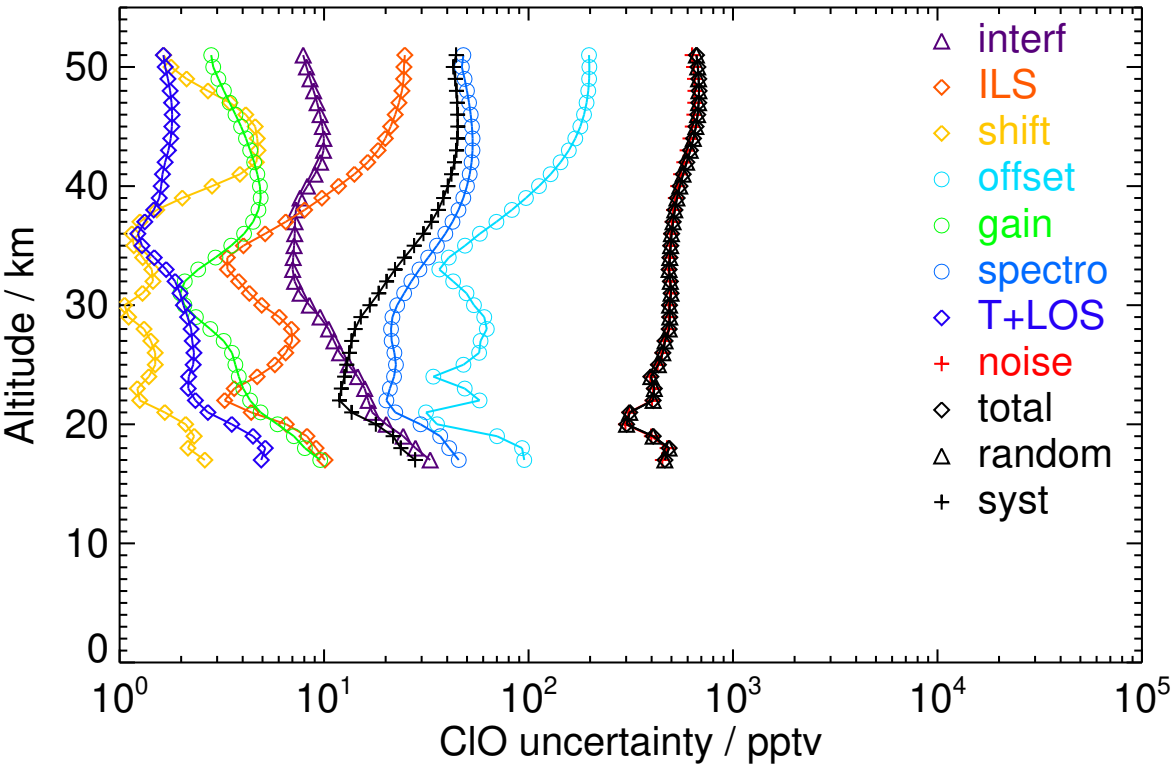


Figure S100. V8R_CLO_562 Southern polar summer night

Table S102. CIO error budget for Southern polar autumn day. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	76.28	28.29	11.31	1.25	106.40	9.54	59.08	6.20	562.04	575.20	30.10	575.98
21	42.24	20.61	6.45	1.05	23.35	6.10	34.92	3.43	332.57	335.36	20.38	335.98
24	91.59	17.62	4.83	1.24	49.00	4.27	33.38	2.74	468.64	472.34	19.79	472.76
27	221.77	13.77	5.28	1.49	78.37	4.04	39.20	2.26	550.91	557.39	27.19	558.06
30	271.79	11.05	6.83	1.39	86.00	4.42	46.16	2.29	591.38	598.58	33.87	599.54
33	353.76	9.66	7.59	1.43	98.21	4.47	52.75	2.58	619.34	628.16	40.04	629.43
36	473.30	9.79	9.48	1.16	140.35	4.73	58.28	2.31	655.43	671.44	45.48	672.98
39	564.15	10.21	12.09	1.05	185.81	4.65	60.78	2.22	717.72	742.51	47.93	744.06
42	577.04	10.21	14.21	1.09	217.03	4.23	58.82	2.24	759.64	791.04	46.92	792.43
45	526.64	9.42	14.80	1.11	228.22	3.71	53.57	2.15	756.32	790.85	43.14	792.02
48	442.70	8.44	17.83	1.92	222.15	2.59	47.59	2.89	716.35	750.12	49.98	751.79

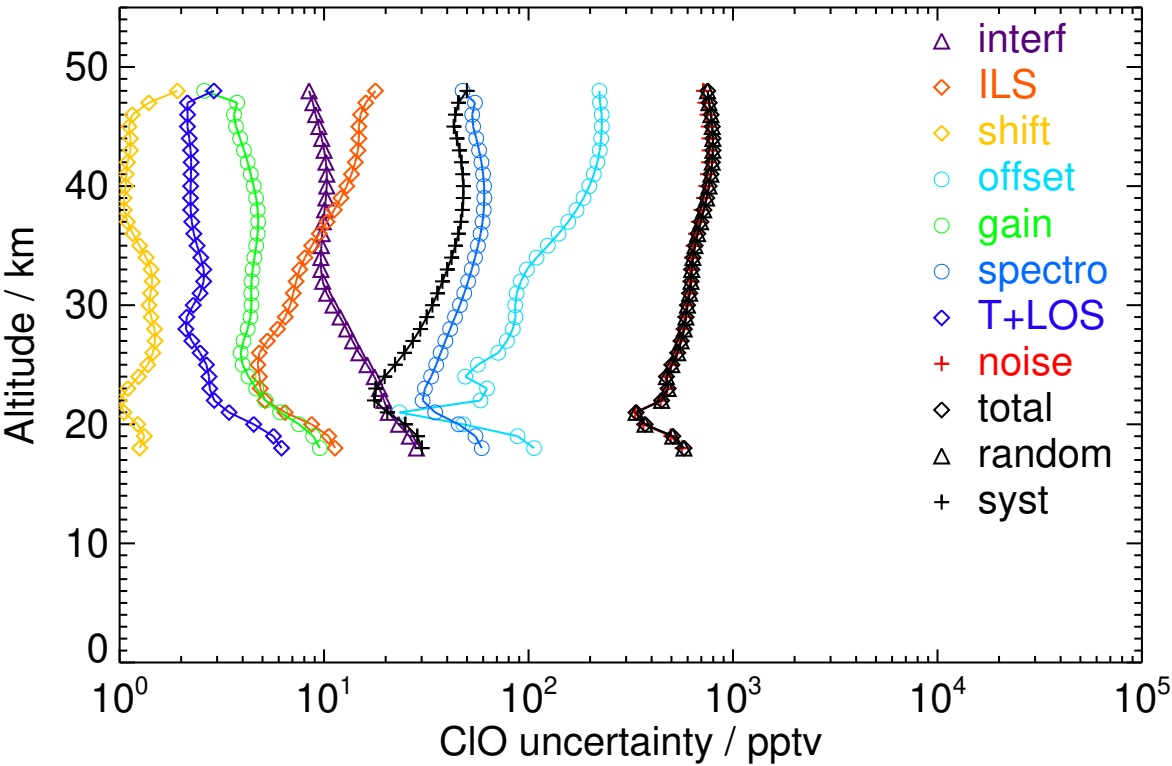


Figure S101. V8R_CLO_562 Southern polar autumn day

Table S103. CIO error budget for Southern polar autumn night. All uncertainties are 1σ .

altitude (km)	mean target (pptv)	interf (pptv)	ILS (pptv)	shift (pptv)	offset (pptv)	gain (pptv)	spectro (pptv)	T+LOS (pptv)	noise (pptv)	random (pptv)	syst (pptv)	total (pptv)
18	-45.58	27.30	11.93	1.27	106.86	7.94	55.31	6.41	577.54	590.06	29.23	590.78
21	19.26	20.63	6.99	1.24	25.76	5.19	35.04	4.13	347.95	350.90	18.80	351.40
24	27.90	17.87	3.63	1.42	51.97	3.41	27.34	2.25	483.68	487.31	16.68	487.59
27	-7.44	14.17	5.38	1.69	82.19	3.68	33.53	2.21	563.20	569.98	21.01	570.37
30	55.23	11.45	5.52	1.82	91.47	3.66	39.20	1.99	605.02	612.70	26.93	613.30
33	205.17	10.13	6.82	1.89	106.44	3.97	47.11	2.01	637.14	646.95	33.67	647.82
36	396.37	10.18	9.17	1.59	148.75	4.35	52.59	2.07	675.41	692.63	39.37	693.75
39	499.33	10.41	11.91	1.32	192.87	4.31	54.34	2.12	734.21	760.08	42.13	761.25
42	461.26	10.12	14.12	1.05	221.88	3.97	52.02	2.18	770.63	802.75	41.50	803.83
45	401.11	9.19	14.57	1.08	230.94	3.51	46.96	2.09	761.31	796.24	38.09	797.15
48	769.13	8.57	18.09	1.48	221.16	3.87	57.98	2.18	715.84	750.02	50.87	751.75

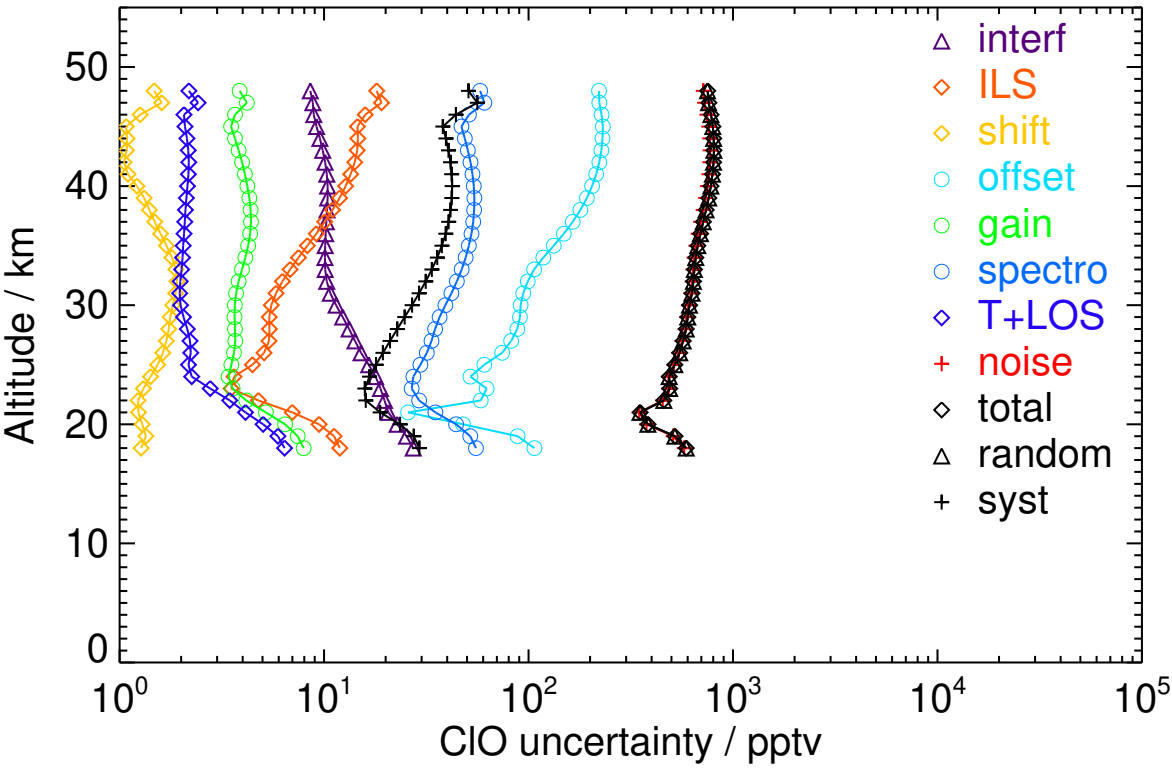


Figure S102. V8R_CLO_562 Southern polar autumn night