

Supplement to
Version 8 of IMK/IAA MIPAS reactive nitrogen reservoir gases:
Error estimates for NO_y

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July 28, 2026

This document serves as reference for the definitions of the representative atmospheres used for the calculation of NO_y 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 relative errors in percent, even if they are of additive nature, i.e., do not scale with the retrieved volume mixing ratio. They were calculated with respect to the average NO_y profile that was calculated from the single geolocations which contribute to the respective representative atmospheres.

Gaps in the error profiles appear if there exists no valid value for any contributor to NO_y in this altitude range, so that NO_y is effectively zero or unknown.

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 ($\beta_{\text{max}} = 95^\circ$) and RR middle atmosphere measurement mode data ($\beta_{\text{max}} = 98^\circ$).

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	$65^\circ \text{ N} - 90^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern polar spring day	Apr	$65^\circ \text{ N} - 90^\circ \text{ N}$	$< 90^\circ$
Northern polar spring night	Apr	$65^\circ \text{ N} - 90^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern polar summer day	Jul, Aug	$65^\circ \text{ N} - 90^\circ \text{ N}$	$< 90^\circ$
Northern polar summer night	Jul, Aug	$65^\circ \text{ N} - 90^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern polar autumn day	Oct	$65^\circ \text{ N} - 90^\circ \text{ N}$	$< 90^\circ$
Northern polar autumn night	Oct	$65^\circ \text{ N} - 90^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern midlatitude winter day	Jan, Feb	$40^\circ \text{ N} - 60^\circ \text{ N}$	$< 90^\circ$
Northern midlatitude winter night	Jan, Feb	$40^\circ \text{ N} - 60^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern midlatitude spring day	Apr	$40^\circ \text{ N} - 60^\circ \text{ N}$	$< 90^\circ$
Northern midlatitude spring night	Apr	$40^\circ \text{ N} - 60^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern midlatitude summer day	Jul, Aug	$40^\circ \text{ N} - 60^\circ \text{ N}$	$< 90^\circ$
Northern midlatitude summer night	Jul, Aug	$40^\circ \text{ N} - 60^\circ \text{ N}$	$> \beta_{\text{max}}$
Northern midlatitude autumn day	Oct	$40^\circ \text{ N} - 60^\circ \text{ N}$	$< 90^\circ$
Northern midlatitude autumn night	Oct	$40^\circ \text{ N} - 60^\circ \text{ N}$	$> \beta_{\text{max}}$
Tropics day	Apr	$20^\circ \text{ S} - 20^\circ \text{ N}$	$< 90^\circ$
Tropics night	Apr	$20^\circ \text{ S} - 20^\circ \text{ N}$	$> \beta_{\text{max}}$
Southern midlatitude winter day	Jul, Aug	$40^\circ \text{ S} - 60^\circ \text{ S}$	$< 90^\circ$
Southern midlatitude winter night	Jul, Aug	$40^\circ \text{ S} - 60^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern midlatitude spring day	Oct	$40^\circ \text{ S} - 60^\circ \text{ S}$	$< 90^\circ$
Southern midlatitude spring night	Oct	$40^\circ \text{ S} - 60^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern midlatitude summer day	Jan, Feb	$40^\circ \text{ S} - 60^\circ \text{ S}$	$< 90^\circ$
Southern midlatitude summer night	Jan, Feb	$40^\circ \text{ S} - 60^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern midlatitude autumn day	Apr	$40^\circ \text{ S} - 60^\circ \text{ S}$	$< 90^\circ$
Southern midlatitude autumn night	Apr	$40^\circ \text{ S} - 60^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern polar winter day	Jul, Aug	$65^\circ \text{ S} - 90^\circ \text{ S}$	$< 90^\circ$
Southern polar winter night	Jul, Aug	$65^\circ \text{ S} - 90^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern polar spring day	Oct	$65^\circ \text{ S} - 90^\circ \text{ S}$	$< 90^\circ$
Southern polar spring night	Oct	$65^\circ \text{ S} - 90^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern polar summer day	Jan, Feb	$65^\circ \text{ S} - 90^\circ \text{ S}$	$< 90^\circ$
Southern polar summer night	Jan, Feb	$65^\circ \text{ S} - 90^\circ \text{ S}$	$> \beta_{\text{max}}$
Southern polar autumn day	Apr	$65^\circ \text{ S} - 90^\circ \text{ S}$	$< 90^\circ$
Southern polar autumn night	Apr	$65^\circ \text{ S} - 90^\circ \text{ S}$	$> \beta_{\text{max}}$

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.02	> 100	> 100	> 100	64	0.09	52.49	49.37	72.06
8	0.46	73.82	35.42	81.87	68	0.23	45.60	46.86	65.39
11	2.07	13.28	19.72	23.78	70	0.31	45.76	47.92	66.26
14	5.18	7.58	19.14	20.58	72	0.44	43.72	51.84	67.81
17	8.06	5.78	18.88	19.74	77	0.87	40.92	46.44	61.90
20	10.91	3.72	19.01	19.37	80	1.18	37.25	40.82	55.26
23	12.93	2.82	18.67	18.89	82	1.82	36.80	32.45	49.07
26	13.29	4.19	16.66	17.18	85	3.07	38.63	22.56	44.74
29	14.77	6.43	12.66	14.20	87	5.61	38.49	10.83	39.98
32	14.31	11.78	8.59	14.57	92	24.00	51.96	24.52	57.46
35	13.31	16.59	6.32	17.75	95	36.41	47.07	28.99	55.28
38	12.19	20.54	6.50	21.55	97	41.43	40.50	25.58	47.90
41	12.85	27.61	7.96	28.73	100	52.41	34.20	15.66	37.61
44	12.77	36.33	8.67	37.35	102	71.32	32.81	13.29	35.40
47	13.07	45.70	9.91	46.76	107	150.18	30.81	21.91	37.80
50	15.21	46.08	15.25	48.53	110	204.14	33.39	24.28	41.29
53	21.13	48.53	20.62	52.73	112	272.99	36.18	25.09	44.03
56	31.69	46.98	27.68	54.53	115	332.45	35.07	23.98	42.48
59	43.44	59.13	40.39	71.61	120	451.81	27.22	28.93	39.72
62	63.69	60.60	45.99	76.07	120	451.81	27.22	28.93	39.72

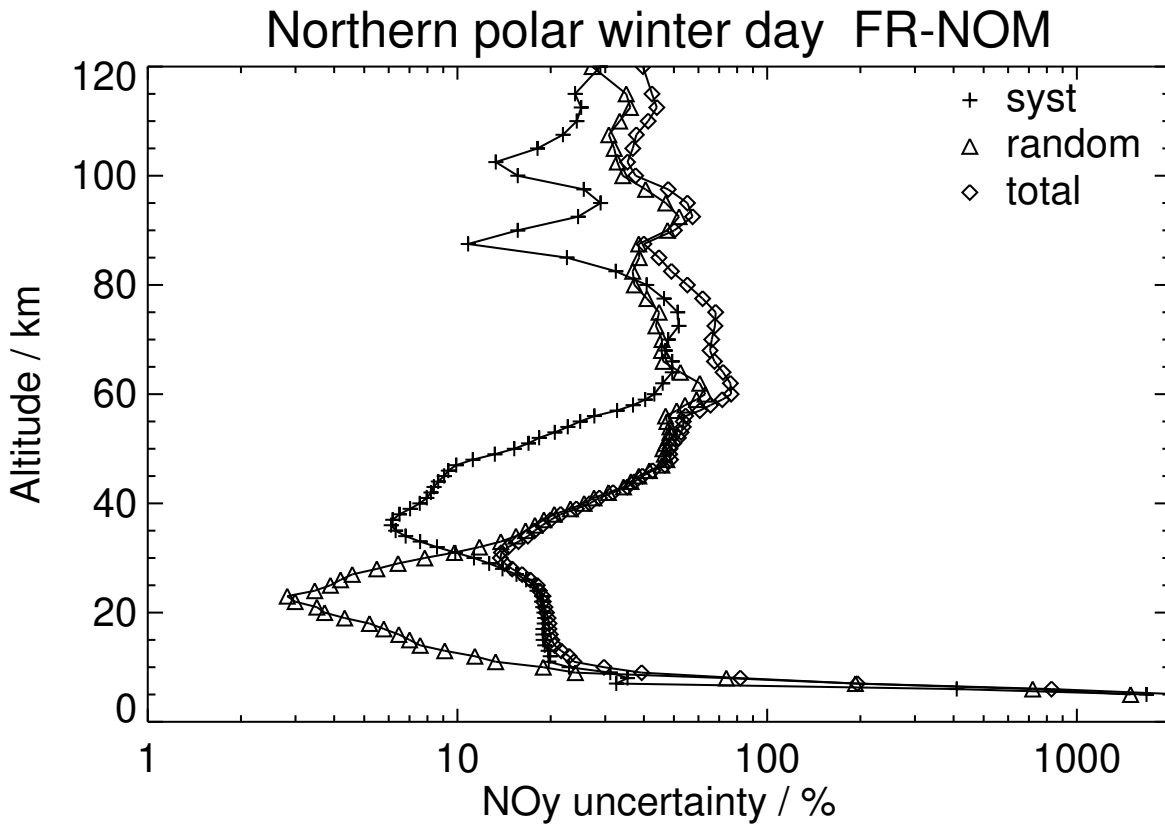


Figure S1: V8H_NOy_6X Northern polar winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	< 0.01	> 100	> 100	> 100	64	0.12	47.34	17.40	50.44
8	0.88	30.39	35.52	46.74	68	0.18	41.48	21.24	46.60
11	1.85	16.47	21.91	27.41	70	0.22	44.59	23.69	50.49
14	6.15	8.47	21.65	23.25	72	0.35	44.58	25.74	51.47
17	10.64	5.84	20.05	20.89	77	0.72	44.15	25.27	50.88
20	10.98	4.30	21.12	21.55	80	1.10	42.46	22.89	48.24
23	13.07	3.00	18.55	18.79	82	1.64	41.66	19.95	46.19
26	13.56	4.14	15.48	16.02	85	2.40	41.10	17.15	44.54
29	12.87	4.24	11.34	12.10	87	3.94	42.06	12.66	43.93
32	13.09	3.92	7.93	8.84	92	9.44	44.74	10.68	46.00
35	11.67	4.84	5.79	7.55	95	15.50	43.00	11.18	44.43
38	10.41	4.58	4.78	6.62	97	24.12	38.65	12.95	40.77
41	9.91	4.74	4.66	6.64	100	40.07	35.58	19.99	40.81
44	9.24	5.97	5.04	7.81	102	61.79	32.14	26.03	41.36
47	8.31	7.30	5.53	9.16	107	128.89	33.77	31.52	46.20
50	7.18	8.96	5.94	10.75	110	158.42	36.47	31.32	48.08
53	15.74	27.01	8.33	28.27	112	192.63	36.68	29.61	47.14
56	58.29	35.71	12.24	37.75	115	212.21	34.52	26.01	43.23
59	63.91	41.15	13.05	43.17	120	260.16	27.05	25.95	37.48
62	71.98	52.23	15.70	54.54	120	260.16	27.05	25.95	37.48

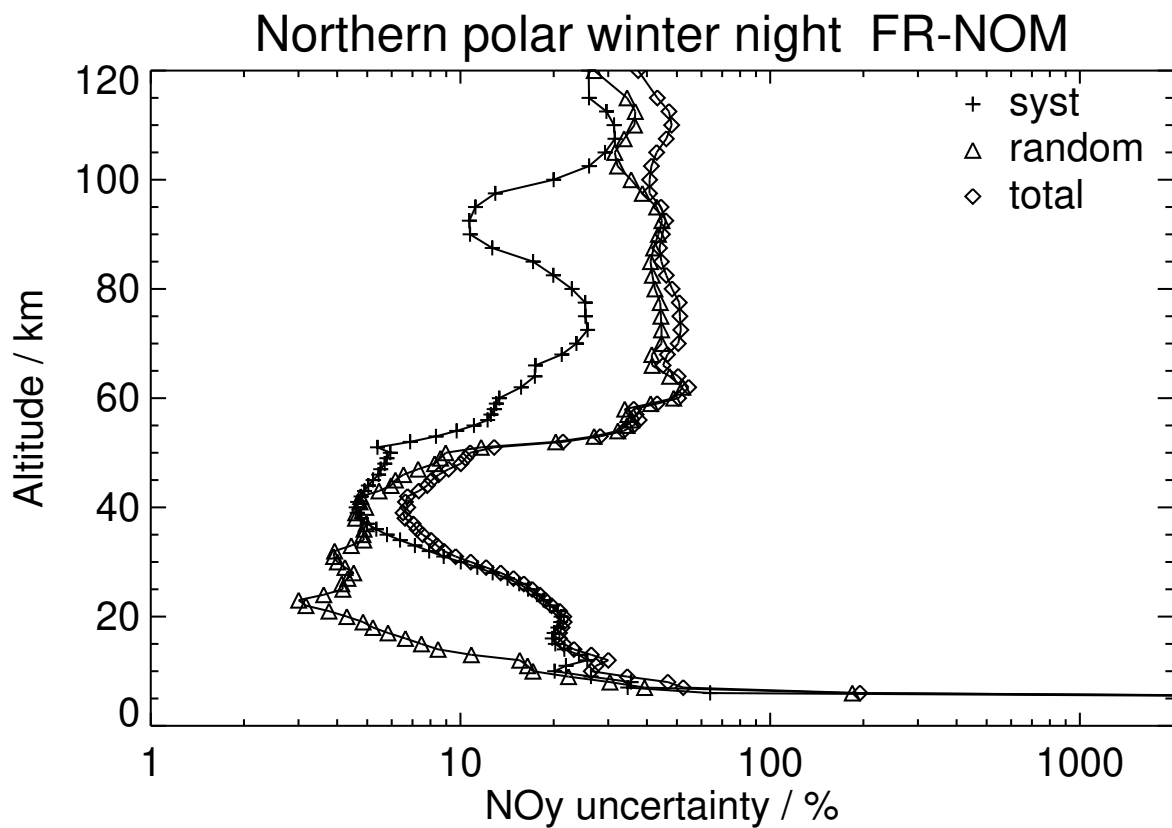


Figure S2: V8H_NOy_6X Northern polar winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	1.10	23.14	28.76	36.91
11	3.52	6.27	18.29	19.34
14	6.14	5.46	18.61	19.40
17	10.37	3.46	17.19	17.53
20	11.46	2.47	16.97	17.14
23	11.77	3.10	15.23	15.54
26	13.21	5.28	12.51	13.57
29	13.60	7.39	9.42	11.97
32	14.00	9.01	7.36	11.64
35	14.14	10.40	7.19	12.64
38	13.21	10.90	7.59	13.28
41	11.20	9.63	8.05	12.56
44	9.44	11.61	8.96	14.66
47	7.14	16.49	9.37	18.96
50	5.45	23.25	10.79	25.63
53	4.30	34.31	17.76	38.63
56	3.50	45.72	30.85	55.16
59	4.16	73.75	49.18	88.64
62	5.40	80.72	60.69	> 100

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
85	0.10	46.44	68.44	82.71
87	0.28	46.29	67.58	81.91
92	1.51	41.55	52.76	67.16
95	3.67	46.43	51.97	69.69
97	6.11	49.58	60.46	78.19
100	12.16	48.01	63.94	79.96
102	23.03	47.26	67.60	82.48
107	62.28	45.15	64.66	78.86
110	86.99	42.82	60.64	74.23
112	107.69	41.98	52.89	67.52
115	131.48	38.46	42.29	57.17
120	219.42	28.72	30.76	42.08
120	219.42	28.72	30.76	42.08

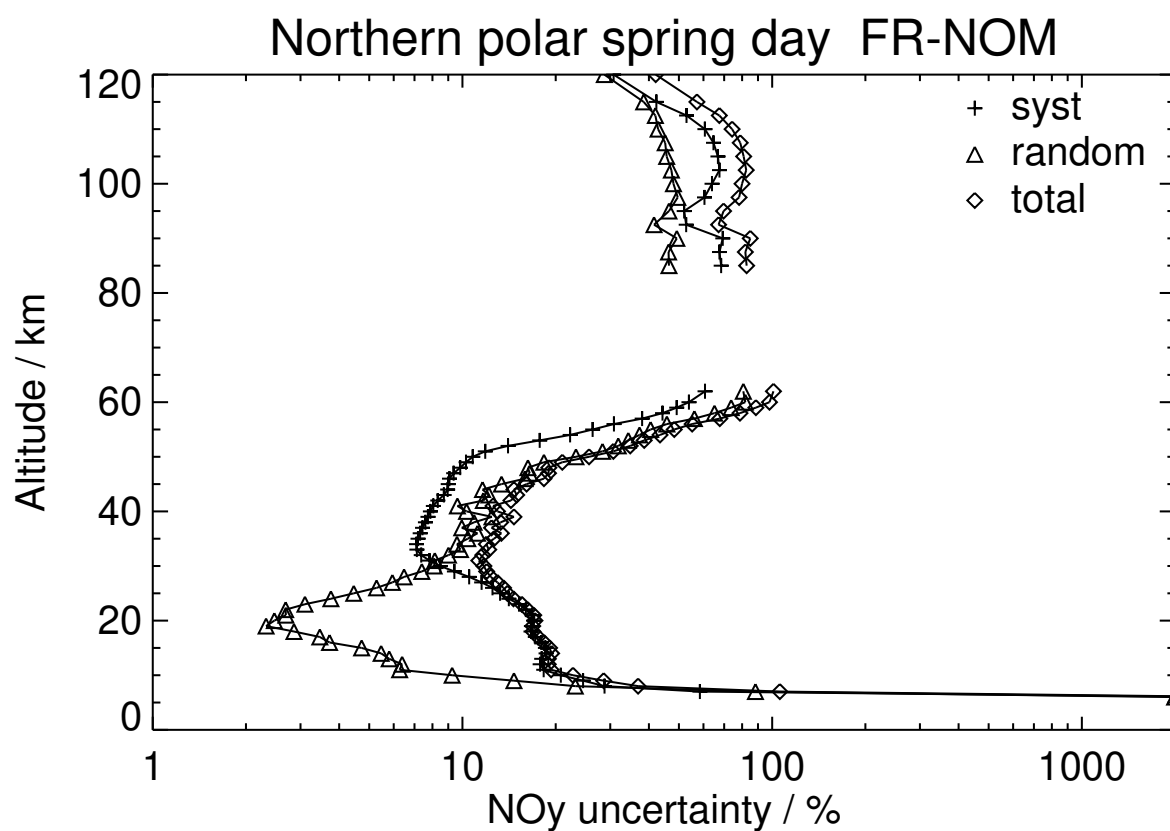


Figure S3: V8H_NOy_6X Northern polar spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.92	28.14	28.45	40.01
11	3.69	6.32	19.18	20.20
14	6.37	4.97	18.55	19.20
17	9.85	3.87	17.45	17.88
20	11.34	2.91	16.96	17.21
23	11.93	3.02	15.27	15.57
26	13.33	3.06	13.09	13.44
29	13.63	3.57	9.57	10.22
32	13.52	4.10	6.51	7.70
35	13.01	4.41	5.45	7.01
38	11.63	4.68	6.33	7.87
41	9.82	5.44	7.18	9.00
44	8.41	6.81	8.52	10.91
47	6.98	7.67	8.27	11.27
50	7.20	12.50	8.10	14.90
53	7.78	22.47	12.47	25.70
56	8.87	33.86	21.98	40.37
59	19.01	37.75	17.54	41.63
62	19.76	52.03	38.10	64.49

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	52.17	64.25	82.77
68	< 0.01	> 100	98.20	> 100
92	1.76	41.88	58.85	72.23
95	3.39	53.82	53.80	76.10
97	7.71	52.75	57.20	77.81
100	14.22	53.14	64.66	83.69
102	29.51	51.22	70.50	87.14
107	99.53	50.04	71.08	86.93
110	156.69	51.63	67.42	84.92
112	226.77	50.05	59.12	77.46
115	314.79	39.87	45.44	60.45
120	519.00	32.26	33.33	46.38
120	519.00	32.26	33.33	46.38

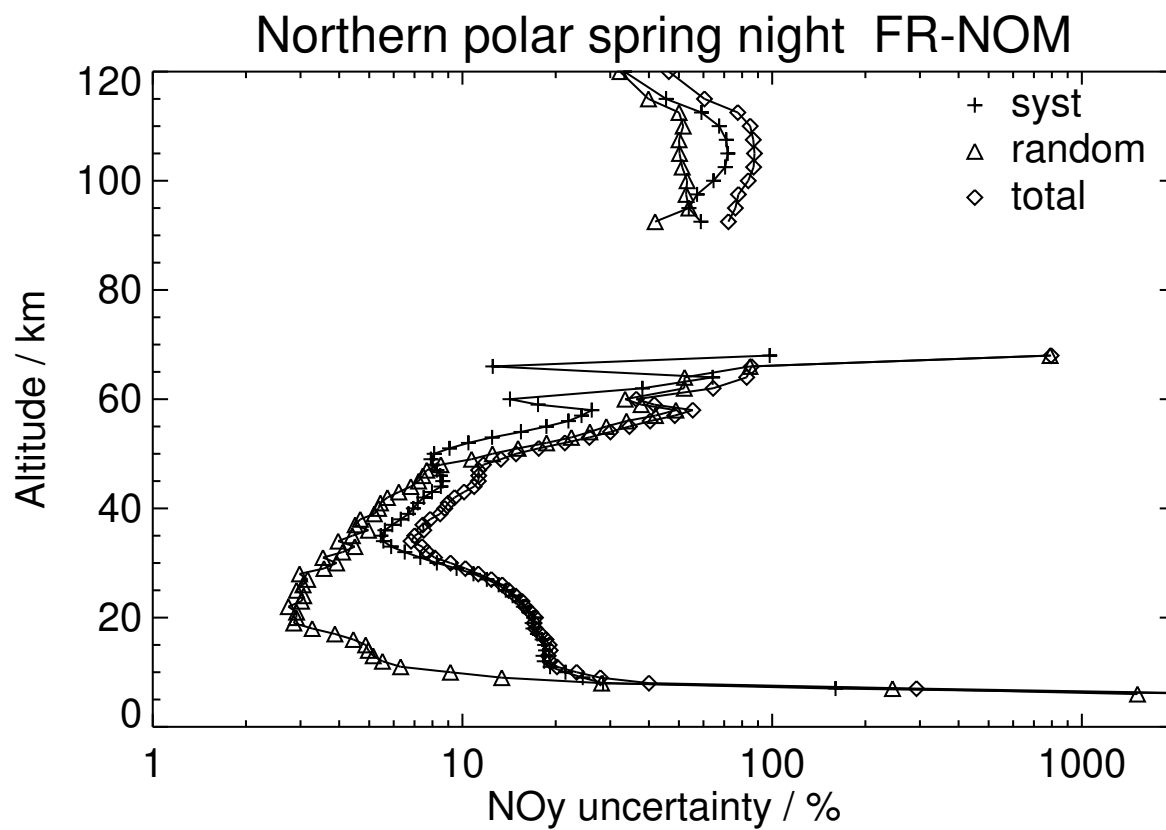


Figure S4: V8H.NOy_6X Northern polar spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.89	61.08	35.28	70.54
11	1.93	13.50	18.93	23.25
14	2.17	10.24	17.34	20.13
17	4.94	4.06	18.72	19.16
20	9.68	2.60	16.16	16.37
23	11.96	3.30	15.17	15.52
26	14.04	5.27	13.24	14.25
29	15.94	7.99	10.23	12.98
32	17.47	9.81	7.76	12.51
35	16.32	10.34	6.67	12.31
38	14.21	9.79	7.40	12.27
41	13.07	10.27	7.63	12.79
44	13.12	9.67	8.31	12.75
47	10.44	10.33	9.05	13.73
50	8.33	11.83	9.49	15.17
53	7.33	20.07	11.43	23.09
56	6.45	25.63	20.58	32.87
59	7.50	46.37	31.98	56.33
62	7.38	63.63	46.43	78.77

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	52.75	54.57	75.90
85	0.14	38.32	54.87	66.93
87	0.39	41.36	66.76	78.54
92	1.96	57.25	97.29	> 100
95	4.63	61.34	99.47	> 100
97	10.28	65.94	95.63	> 100
100	17.55	73.23	91.63	> 100
102	27.26	76.49	88.90	> 100
107	57.02	79.10	77.38	> 100
110	75.67	79.09	69.92	> 100
112	100.99	73.03	58.31	93.45
115	137.26	55.50	43.22	70.34
120	246.41	28.66	31.92	42.90
120	246.41	28.66	31.92	42.90

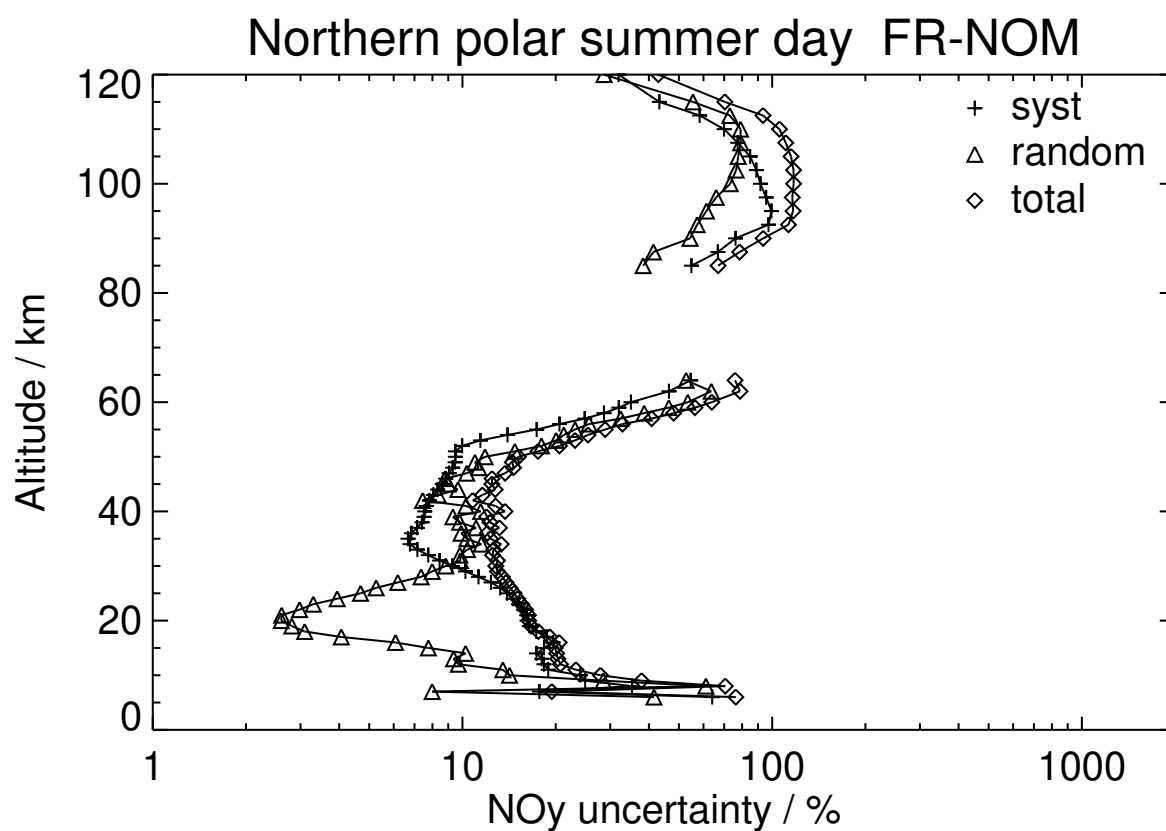


Figure S5: V8H_NOy_6X Northern polar summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.70	64.66	52.73	83.43
11	1.58	15.06	21.20	26.00
14	1.99	9.54	19.07	21.32
17	4.64	4.39	18.90	19.40
20	9.27	2.49	17.25	17.43
23	12.24	2.01	15.66	15.79
26	14.33	2.19	13.25	13.43
29	15.80	2.82	9.47	9.88
32	16.42	3.40	6.66	7.48
35	15.66	3.82	5.79	6.94
38	14.79	4.20	6.32	7.58
41	13.16	5.27	7.43	9.10
44	10.64	5.93	8.82	10.63
47	9.56	7.79	7.62	10.90
50	8.90	11.57	6.60	13.32
53	8.19	16.75	6.89	18.11
56	8.97	27.04	10.75	29.10
59	10.58	43.40	16.64	46.48
62	11.47	55.78	22.56	60.17

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	52.91	26.32	59.10
68	< 0.01	> 100	87.94	> 100
85	0.23	39.26	54.67	67.30
87	0.59	39.01	44.02	58.81
92	3.15	43.25	37.99	57.56
95	7.71	40.88	37.90	55.74
97	15.51	39.78	43.28	58.78
100	31.11	38.14	46.94	60.48
102	52.31	42.18	50.64	65.91
107	114.41	56.41	50.14	75.47
110	147.67	65.18	45.05	79.23
112	190.62	66.99	36.65	76.36
115	244.37	57.76	26.59	63.59
120	368.37	37.46	34.61	51.01
120	368.37	37.46	34.61	51.01

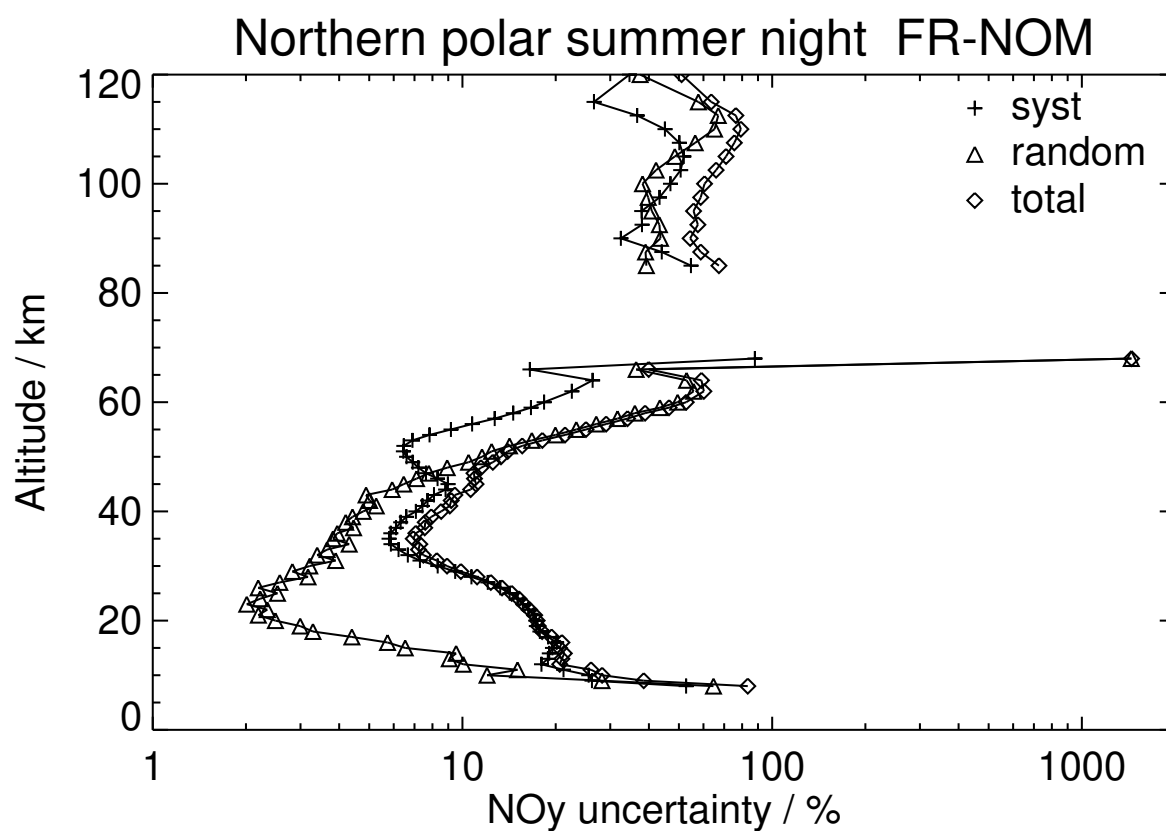


Figure S6: V8H.NOy_6X Northern polar summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.58	37.57	46.38	59.69	64	0.02	81.99	65.26	> 100
11	1.33	14.26	20.03	24.59	72	0.05	58.76	54.25	79.97
14	2.61	9.11	22.37	24.16	77	0.12	66.72	56.33	87.32
17	6.47	5.25	19.57	20.26	80	0.22	64.62	59.02	87.51
20	10.49	2.85	19.30	19.51	82	0.42	59.46	53.25	79.82
23	13.46	2.49	18.78	18.94	85	0.86	52.56	42.94	67.87
26	15.51	3.81	16.48	16.92	87	1.67	47.99	34.28	58.98
29	16.17	7.79	12.40	14.64	92	5.21	52.35	47.64	70.79
32	15.19	13.79	9.29	16.63	95	8.86	51.62	40.92	65.87
35	12.99	21.13	8.92	22.94	97	15.72	50.55	43.22	66.51
38	11.35	28.12	10.40	29.98	100	21.29	56.84	44.05	71.91
41	9.12	32.89	11.11	34.71	102	33.36	57.74	46.69	74.25
44	6.85	44.06	11.59	45.56	107	79.33	59.00	48.30	76.25
47	5.85	52.97	10.28	53.96	110	112.26	60.69	45.76	76.00
50	5.89	50.93	11.89	52.30	112	151.51	60.21	42.07	73.45
53	5.79	58.45	19.52	61.63	115	201.57	54.51	34.20	64.35
56	6.15	66.85	26.48	71.91	120	401.90	40.06	31.53	50.98
59	8.47	74.36	40.39	84.62	120	401.90	40.06	31.53	50.98
62	11.89	85.00	53.55	> 100					

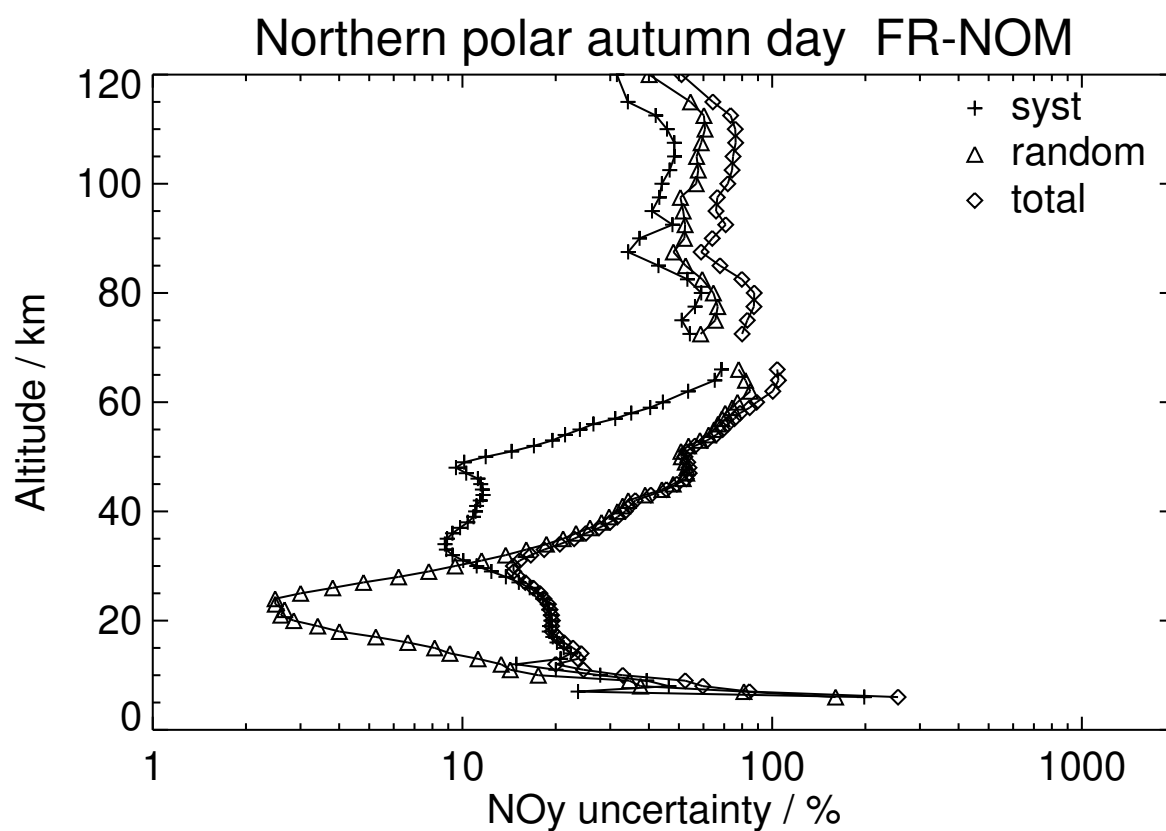


Figure S7: V8H.NOy_6X Northern polar autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.64	30.05	35.08	46.19	64	0.06	> 100	67.68	> 100
11	1.41	14.83	19.54	24.53	68	0.23	64.95	62.17	89.91
14	3.01	7.36	23.07	24.22	70	0.47	62.12	47.98	78.49
17	7.52	4.38	20.31	20.78	72	0.98	27.91	11.53	30.20
20	11.18	2.95	20.49	20.70	77	0.40	91.10	14.19	92.20
23	14.23	2.19	19.62	19.75	80	0.57	93.68	18.27	95.44
26	15.82	2.54	15.96	16.16	82	0.99	77.06	15.94	78.69
29	16.69	3.41	10.74	11.27	85	2.05	55.88	20.15	59.40
32	16.16	4.41	7.21	8.45	87	4.71	55.61	50.75	75.29
35	13.51	4.84	5.95	7.67	92	18.20	82.23	79.40	> 100
38	11.51	6.73	5.71	8.83	95	25.14	96.23	62.47	> 100
41	10.90	14.28	5.67	15.36	97	37.97	80.96	33.74	87.71
44	12.62	28.70	8.27	29.86	100	55.85	71.25	12.33	72.30
47	13.80	47.08	27.22	54.38	102	81.78	59.72	37.13	70.32
50	11.07	39.59	18.75	43.81	107	149.28	75.96	81.51	> 100
53	17.50	37.57	19.73	42.44	110	188.31	> 100	91.15	> 100
56	32.74	38.59	22.46	44.65	112	261.16	> 100	91.62	> 100
59	62.29	63.31	32.64	71.23	115	397.89	> 100	74.39	> 100
62	56.01	> 100	57.70	> 100	120	751.50	99.56	39.43	> 100
					120	751.50	99.56	39.43	> 100

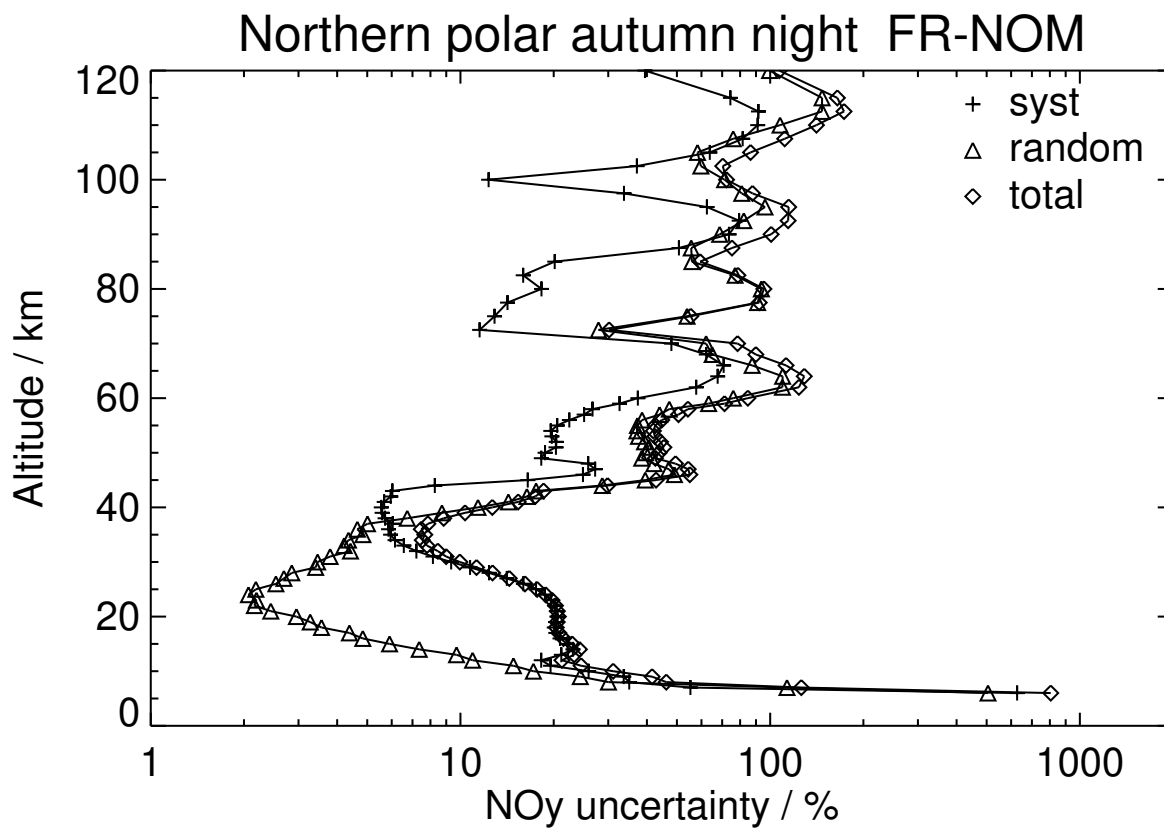


Figure S8: V8H_NOy_6X Northern polar autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.09	> 100	> 100	> 100	64	0.03	51.65	32.39	60.96
8	0.46	73.79	32.47	80.61	68	0.07	48.07	39.01	61.91
11	2.09	13.74	19.86	24.15	70	0.09	50.27	39.96	64.22
14	4.19	9.62	19.76	21.97	72	0.14	50.37	40.79	64.81
17	6.81	5.63	20.13	20.90	77	0.33	48.30	38.85	61.98
20	10.24	2.87	19.13	19.35	80	0.56	43.14	34.65	55.33
23	12.50	2.60	18.76	18.94	82	0.97	37.05	28.80	46.93
26	14.11	3.14	16.41	16.71	85	1.66	32.72	22.00	39.43
29	15.66	4.93	12.09	13.06	87	2.73	32.26	15.59	35.83
32	15.22	7.80	7.98	11.15	92	6.69	34.81	8.73	35.88
35	13.60	10.99	6.66	12.85	95	10.00	33.00	10.43	34.61
38	11.21	14.82	7.26	16.50	97	10.07	29.69	14.74	33.15
41	10.56	16.06	8.85	18.34	100	14.43	28.00	19.22	33.96
44	10.89	19.57	10.94	22.42	102	25.08	29.06	24.19	37.81
47	10.15	25.96	11.33	28.33	107	62.10	27.81	26.12	38.15
50	9.53	27.71	12.63	30.45	110	98.91	26.31	25.45	36.60
53	9.88	40.89	15.52	43.74	112	125.09	28.96	24.16	37.71
56	11.46	43.35	19.39	47.49	115	127.56	31.81	25.70	40.90
59	18.09	54.12	23.12	58.86	120	168.05	33.03	30.13	44.71
62	25.01	55.98	29.58	63.32	120	168.05	33.03	30.13	44.71

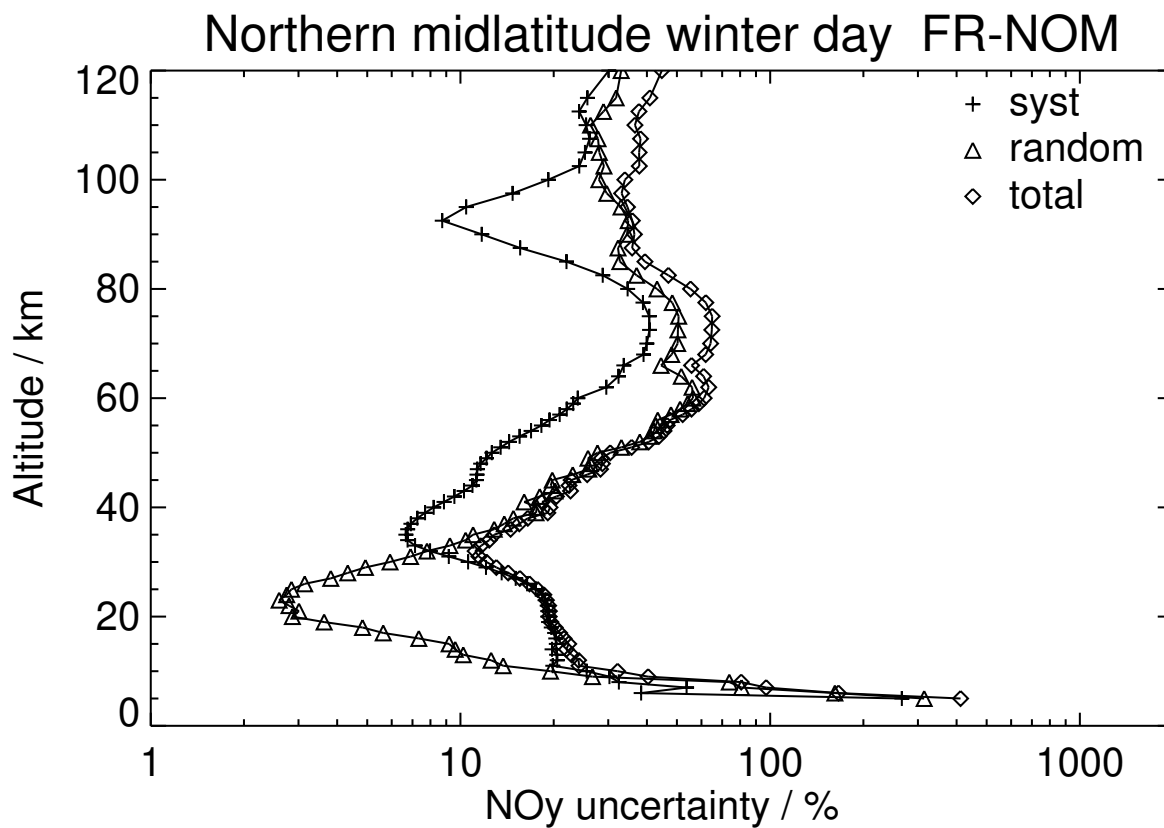


Figure S9: V8H_NO_y.6X Northern midlatitude winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.01	> 100	> 100	> 100	64	0.03	61.91	12.65	63.19
8	0.37	68.26	> 100	> 100	68	0.05	53.99	13.99	55.77
11	2.01	11.49	18.52	21.79	70	0.07	56.84	14.85	58.75
14	4.65	8.56	20.47	22.19	72	0.12	57.09	16.01	59.30
17	7.16	5.47	18.96	19.73	77	0.36	45.13	15.53	47.73
20	9.93	2.82	18.67	18.88	80	0.53	42.54	15.23	45.18
23	12.21	2.30	18.20	18.34	82	0.84	40.54	14.99	43.22
26	14.02	2.46	16.42	16.60	85	1.30	39.64	14.72	42.28
29	15.74	3.00	12.11	12.47	87	2.40	37.35	14.33	40.00
32	16.42	3.46	7.40	8.17	92	8.46	28.14	13.72	31.31
35	14.61	3.99	5.35	6.67	95	8.30	30.39	13.69	33.33
38	10.82	4.29	5.63	7.08	97	7.02	32.39	13.37	35.04
41	9.77	4.97	5.27	7.24	100	9.96	31.17	13.29	33.88
44	9.90	5.54	6.34	8.42	102	12.64	30.96	12.81	33.50
47	8.59	6.49	7.47	9.90	107	27.84	29.25	13.42	32.18
50	7.34	7.90	7.94	11.20	110	34.58	27.42	13.37	30.51
53	10.82	21.86	6.75	22.88	112	40.63	25.27	13.44	28.62
56	16.84	37.13	8.79	38.15	115	42.21	23.22	13.70	26.96
59	17.36	51.46	9.81	52.38	120	55.58	19.39	14.89	24.45
62	20.47	62.71	11.53	63.76	120	55.58	19.39	14.89	24.45

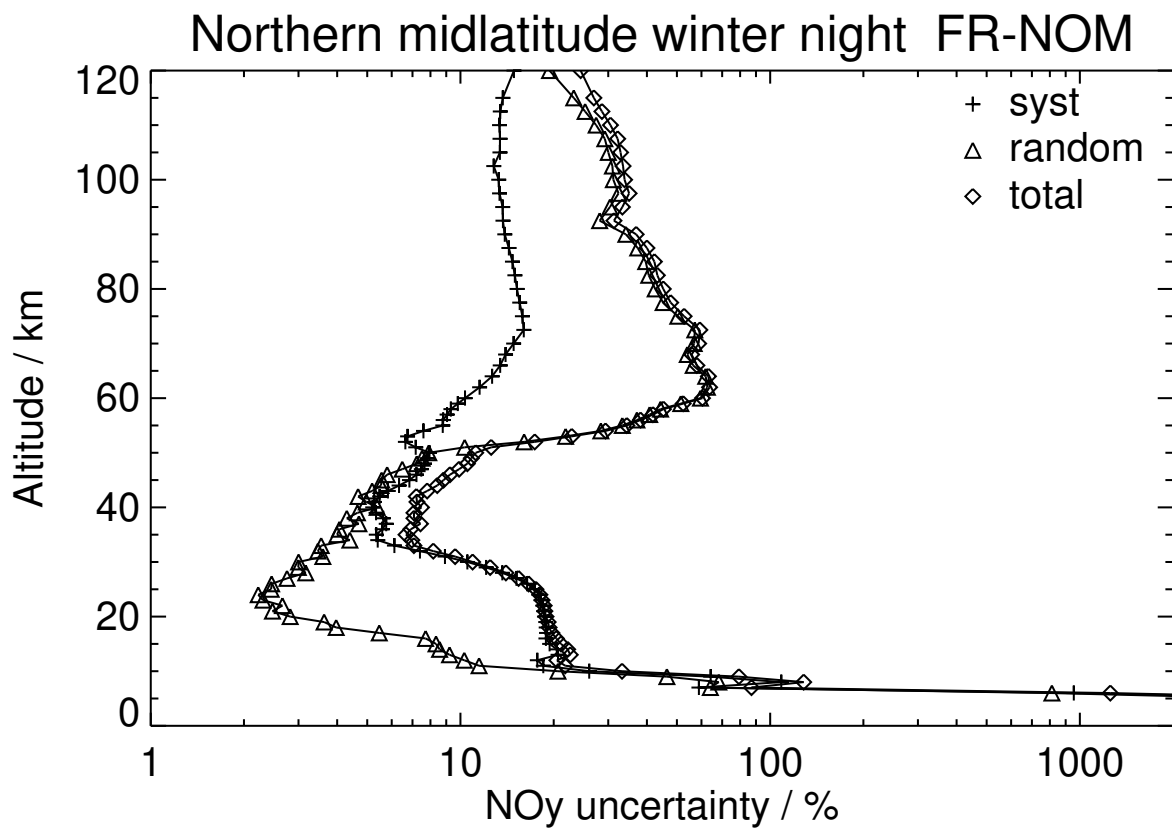


Figure S10: V8H_NOy_6X Northern midlatitude winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.62	37.89	21.56	43.59
11	2.46	11.54	21.86	24.72
14	3.29	11.37	20.09	23.08
17	5.73	7.54	18.67	20.13
20	9.88	3.90	17.45	17.88
23	11.71	3.52	15.71	16.10
26	13.07	5.49	12.98	14.09
29	13.56	10.05	9.19	13.62
32	14.14	11.86	5.97	13.28
35	14.38	15.62	7.74	17.43
38	13.77	16.27	13.41	21.08
41	12.44	11.04	11.10	15.66
44	11.27	18.52	12.66	22.43
47	8.42	17.83	12.00	21.49
50	7.25	31.35	17.77	36.03
53	5.70	57.83	31.18	65.70
56	4.59	> 100	51.04	> 100
59	5.11	> 100	92.59	> 100
62	6.09	> 100	> 100	> 100

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	44.14	> 100	> 100
82	0.06	47.38	35.33	59.10
85	0.13	55.99	57.62	80.35
87	0.29	56.96	61.23	83.62
92	1.19	60.94	75.98	97.40
95	2.10	75.27	85.62	> 100
97	3.99	77.39	86.32	> 100
100	7.77	80.09	87.68	> 100
102	14.68	80.32	86.12	> 100
107	34.60	86.90	74.42	> 100
110	52.07	87.02	72.66	> 100
112	71.93	> 100	77.84	> 100
115	98.80	> 100	70.42	> 100
120	179.10	90.31	46.49	> 100
120	179.10	90.31	46.49	> 100

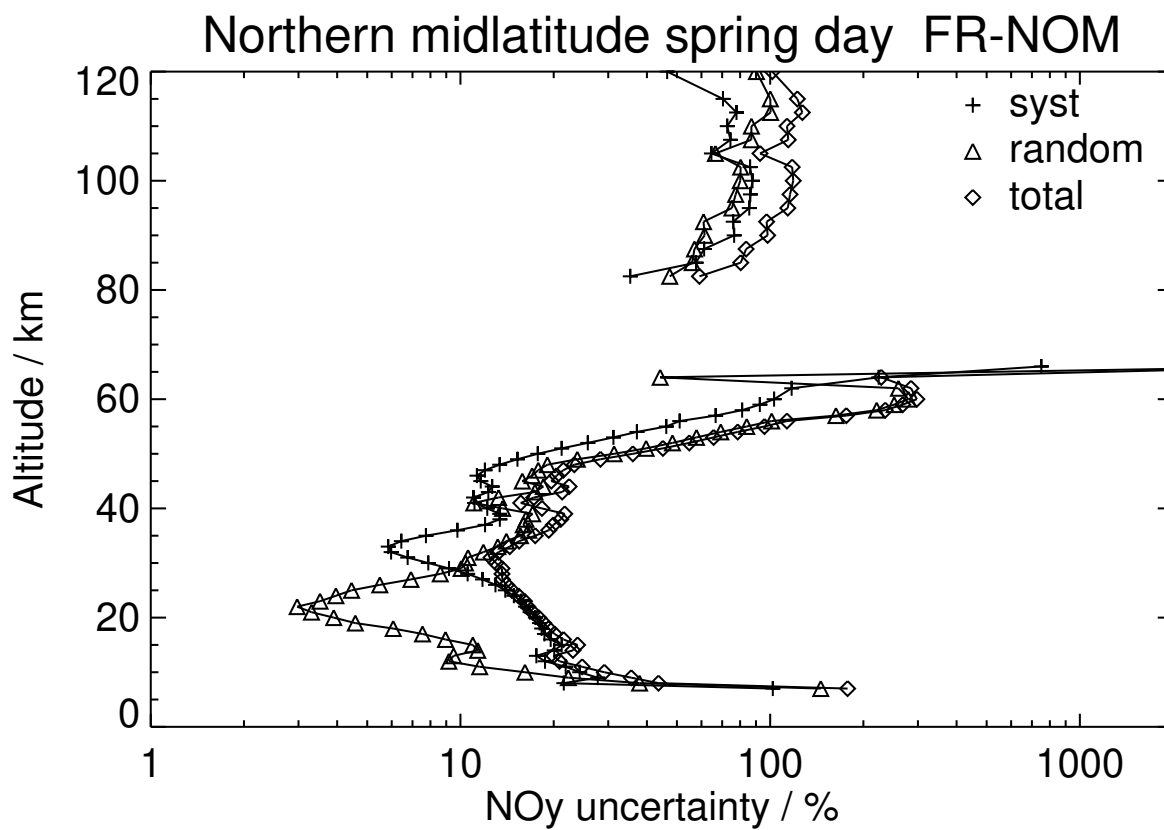


Figure S11: V8H_NOy_6X Northern midlatitude spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.81	41.42	24.51	48.13
11	3.00	7.25	19.64	20.93
14	4.21	8.65	18.72	20.62
17	6.57	6.32	17.89	18.98
20	10.06	3.37	16.94	17.27
23	11.61	2.49	15.47	15.66
26	13.41	2.60	12.40	12.67
29	14.44	3.30	8.64	9.25
32	15.13	3.94	5.90	7.09
35	14.73	4.04	4.77	6.25
38	14.20	4.06	5.15	6.56
41	12.00	4.30	5.66	7.11
44	10.13	5.32	7.65	9.32
47	8.38	5.47	7.16	9.01
50	6.90	6.93	7.50	10.21
53	6.95	13.97	6.61	15.46
56	10.27	34.09	11.06	35.84
59	4.87	54.39	14.49	56.28
62	4.55	72.62	22.81	76.12

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	69.67	18.31	72.04
68	< 0.01	> 100	> 100	> 100
82	0.11	45.82	25.82	52.59
85	0.19	45.16	25.15	51.69
87	0.40	44.55	25.96	51.57
92	1.28	61.22	39.12	72.66
95	1.98	67.21	37.85	77.13
97	3.11	74.29	38.10	83.49
100	5.47	75.10	42.64	86.36
102	10.68	72.86	44.35	85.30
107	30.21	63.27	39.21	74.43
110	43.85	54.84	35.90	65.55
112	63.22	43.14	28.80	51.87
115	101.24	30.43	21.63	37.34
120	142.02	26.08	21.88	34.04
120	142.02	26.08	21.88	34.04

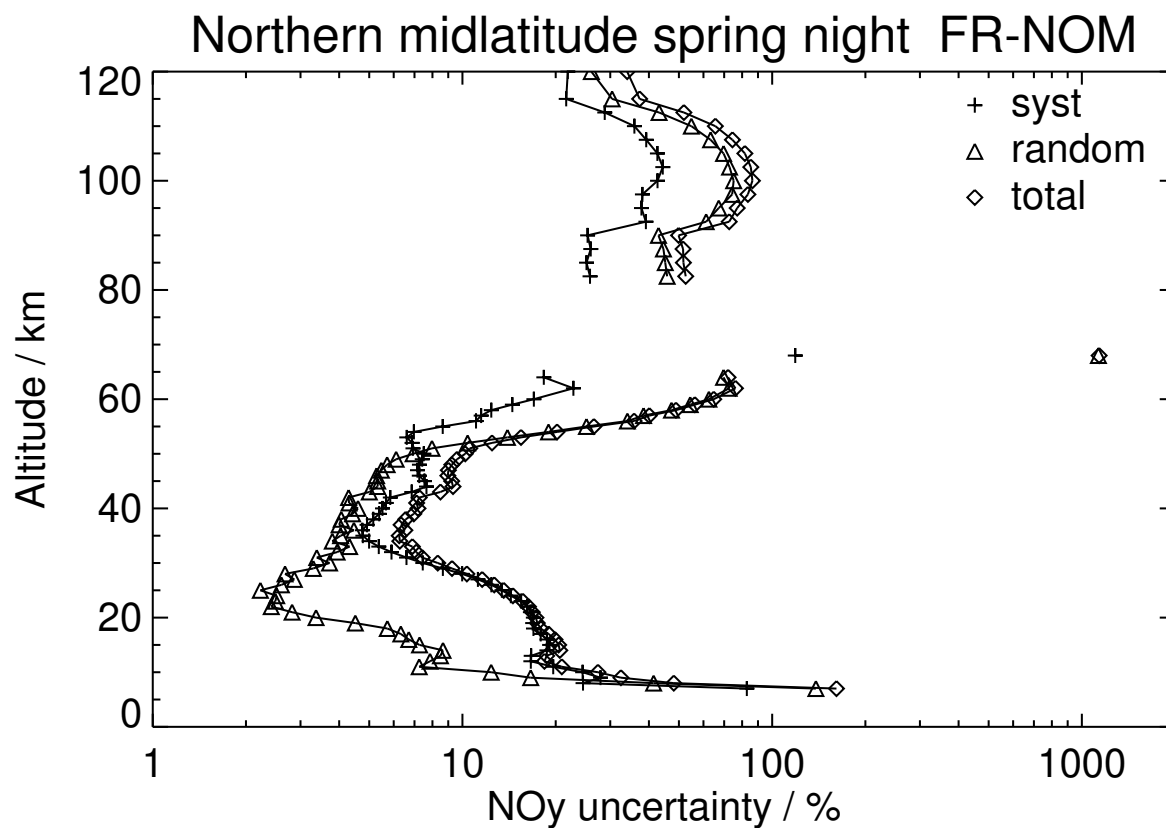


Figure S12: V8H.NO_y.6X Northern midlatitude spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.41	83.56	70.31	> 100
11	1.01	26.01	22.30	34.26
14	1.34	16.70	14.33	22.00
17	2.30	12.35	20.67	24.08
20	6.68	4.50	17.79	18.35
23	10.87	3.12	15.67	15.97
26	12.85	4.41	12.48	13.23
29	14.93	6.24	8.89	10.86
32	15.72	8.49	7.13	11.09
35	15.96	9.58	9.07	13.19
38	15.23	9.57	9.88	13.75
41	13.19	9.08	8.89	12.71
44	11.18	10.55	9.76	14.37
47	9.34	12.72	9.02	15.60
50	7.93	14.24	9.50	17.11
53	7.66	22.23	10.22	24.46
56	7.64	27.68	13.47	30.79
59	8.94	56.06	22.33	60.34
62	8.56	61.59	30.59	68.77

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	55.09	37.33	66.55
68	< 0.01	> 100	20.50	> 100
85	0.18	40.92	55.91	69.28
87	0.41	49.60	60.16	77.96
92	2.53	46.12	44.36	63.99
95	5.01	42.48	43.95	61.13
97	9.27	40.06	44.57	59.93
100	16.00	37.70	45.25	58.90
102	24.75	37.26	47.87	60.66
107	51.47	40.69	46.05	61.45
110	66.83	43.01	42.11	60.19
112	83.30	42.16	36.15	55.53
115	100.97	36.98	29.49	47.30
120	139.03	28.10	28.14	39.77
120	139.03	28.10	28.14	39.77

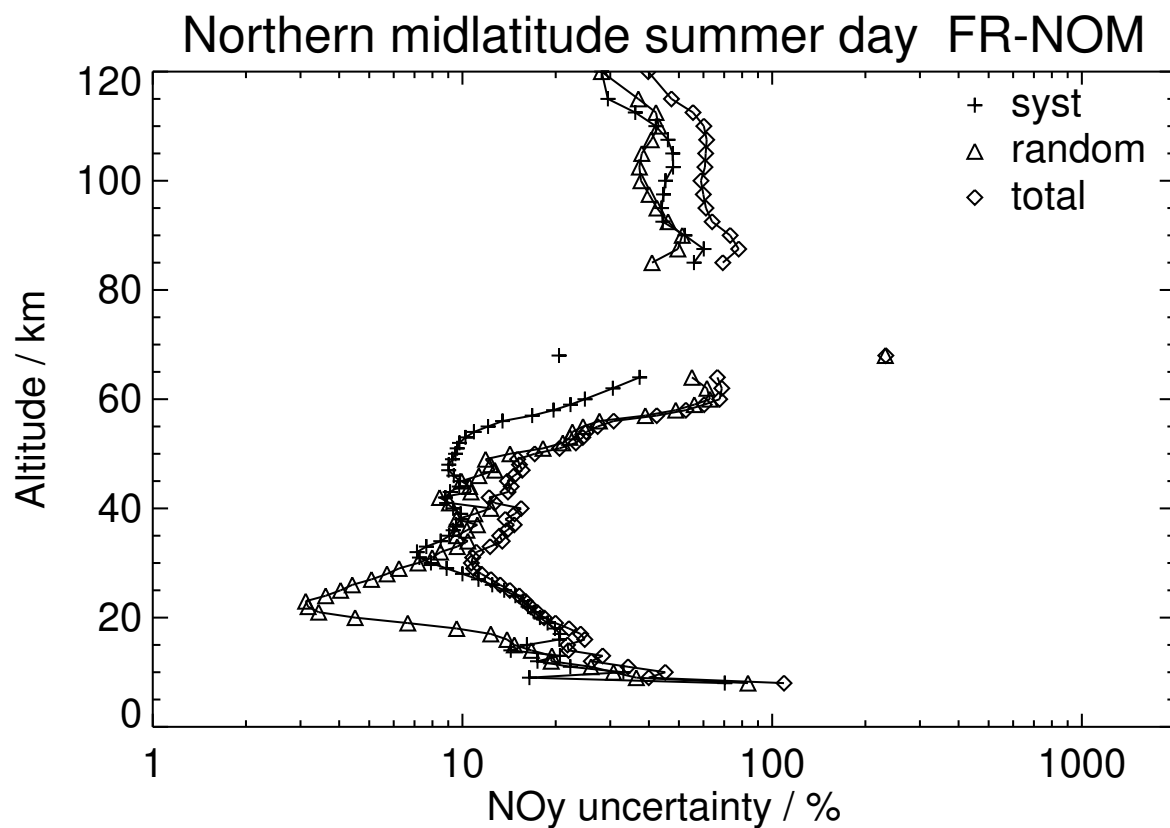


Figure S13: V8H.NOy_6X Northern midlatitude summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.86	46.65	42.56	63.15
11	0.65	42.15	38.51	57.10
14	1.29	16.79	12.48	20.92
17	2.24	11.69	20.95	23.99
20	6.98	4.08	17.28	17.76
23	11.26	2.43	15.63	15.82
26	13.14	2.42	12.66	12.89
29	15.21	2.72	8.84	9.25
32	16.64	3.16	6.07	6.84
35	16.56	3.39	4.90	5.96
38	15.85	3.55	4.97	6.11
41	13.69	4.23	5.45	6.90
44	12.00	4.72	6.81	8.28
47	10.74	4.75	7.19	8.61
50	9.66	5.74	7.34	9.32
53	9.34	10.87	7.93	13.46
56	12.60	34.98	11.43	36.80
59	10.98	64.16	16.86	66.33
62	6.83	68.91	17.66	71.14

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	64.65	18.78	67.33
68	0.01	49.04	13.73	50.92
87	0.14	42.95	16.71	46.08
92	1.61	47.47	28.39	55.31
95	3.15	60.58	45.11	75.54
97	5.12	75.32	49.23	89.98
100	9.44	76.94	54.40	94.23
102	15.17	82.01	59.63	> 100
107	38.72	86.66	56.29	> 100
110	59.76	88.56	53.07	> 100
112	84.60	90.87	50.32	> 100
115	115.69	86.24	44.07	96.85
120	224.29	48.52	27.18	55.61
120	224.29	48.52	27.18	55.61

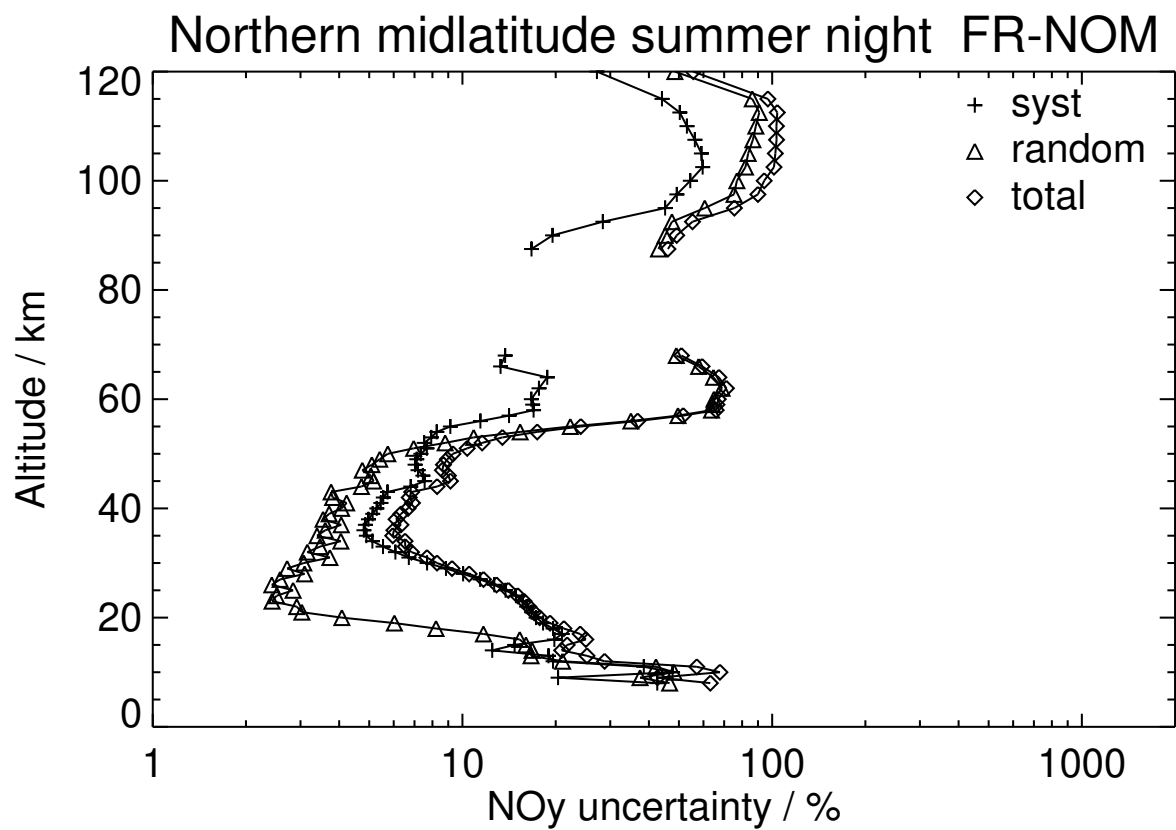


Figure S14: V8H_NOy_6X Northern midlatitude summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.27	> 100	> 100	> 100	64	0.04	41.84	53.79	68.15
11	0.63	34.35	37.45	50.82	77	0.06	57.07	29.58	64.28
14	1.08	22.77	22.41	31.94	80	0.11	70.76	42.60	82.60
17	3.72	10.58	22.47	24.83	82	0.19	70.28	38.84	80.30
20	9.16	4.98	18.56	19.22	85	0.39	57.65	26.30	63.36
23	12.50	3.04	17.13	17.39	87	0.78	53.67	25.96	59.62
26	14.07	4.11	14.07	14.66	92	2.44	43.14	24.92	49.82
29	15.48	6.83	10.00	12.11	95	2.64	51.88	34.33	62.21
32	17.62	10.08	7.75	12.71	97	3.86	68.05	58.46	89.71
35	17.37	12.29	9.51	15.54	100	6.41	80.86	71.07	> 100
38	16.13	13.41	10.54	17.06	102	8.69	81.97	59.54	> 100
41	13.96	14.74	10.60	18.16	107	22.19	78.84	53.14	95.08
44	12.73	16.04	10.60	19.23	110	33.95	72.95	47.33	86.96
47	10.94	18.93	10.36	21.58	112	48.87	67.17	42.91	79.70
50	8.93	21.34	11.09	24.05	115	62.85	59.25	36.23	69.45
53	7.10	39.89	13.42	42.08	120	108.04	41.01	27.05	49.13
56	5.96	39.83	14.40	42.35	120	108.04	41.01	27.05	49.13
59	8.06	55.25	18.36	58.22					
62	12.08	78.16	31.60	84.31					

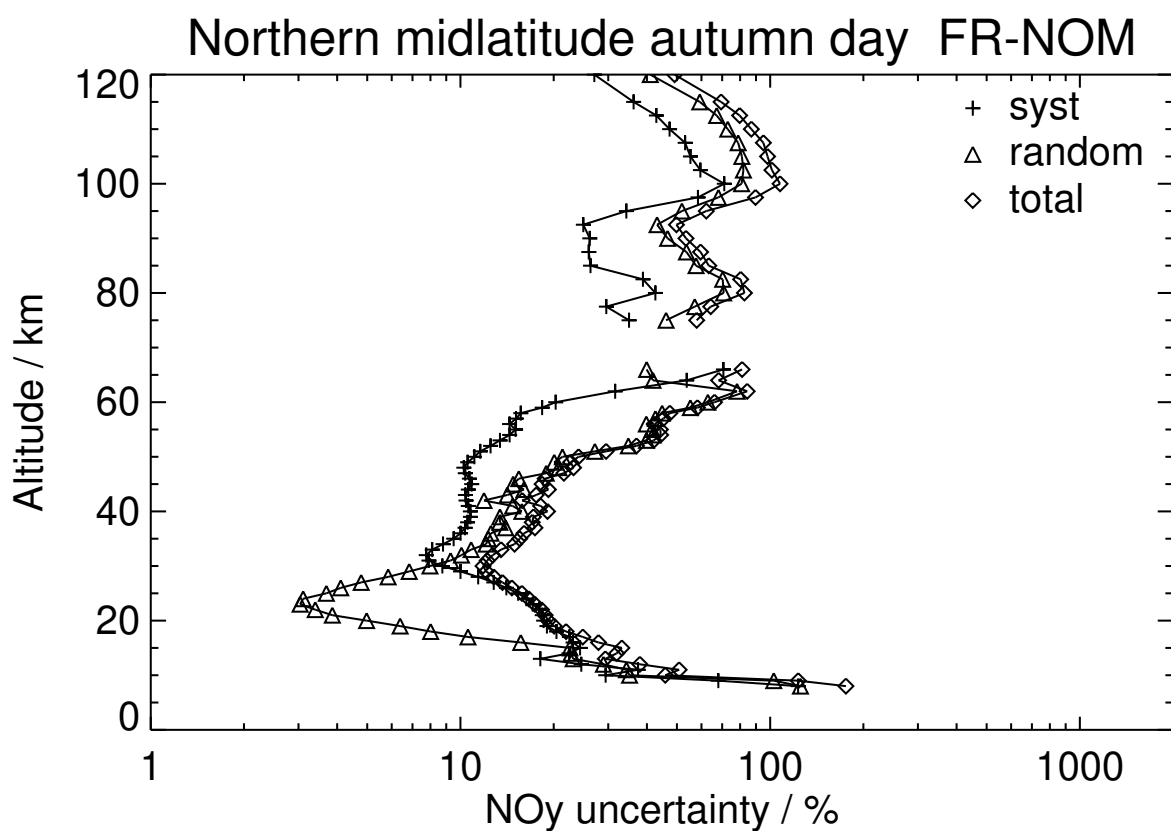


Figure S15: V8H.NO_y.6X Northern midlatitude autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.23	96.94	39.46	> 100	64	0.01	62.38	16.42	64.50
11	1.21	17.22	17.81	24.78	68	0.01	70.32	14.55	71.81
14	1.43	13.92	22.55	26.50	70	0.01	66.86	14.70	68.46
17	4.58	6.90	19.70	20.88	72	0.02	62.70	14.77	64.42
20	8.98	4.29	18.56	19.05	77	0.04	55.94	14.55	57.80
23	12.58	3.04	16.78	17.05	80	0.06	55.28	14.77	57.22
26	14.11	2.82	14.05	14.33	82	0.28	59.94	27.24	65.84
29	16.24	3.26	9.69	10.22	85	0.63	58.65	26.82	64.50
32	17.29	3.96	6.32	7.46	87	1.33	57.11	26.24	62.85
35	17.06	4.33	5.12	6.70	92	5.42	51.13	26.21	57.46
38	15.06	4.42	5.33	6.93	95	6.85	47.31	32.19	57.22
41	13.68	4.52	5.65	7.23	97	11.83	44.37	30.35	53.76
44	11.50	5.16	6.68	8.44	100	17.82	44.55	34.83	56.56
47	9.60	6.19	8.03	10.14	102	23.55	47.05	32.23	57.04
50	12.43	18.11	6.95	19.40	107	62.45	43.26	30.77	53.08
53	10.97	21.57	6.63	22.57	110	100.61	39.93	27.20	48.31
56	11.82	34.09	7.76	34.97	112	140.22	38.66	23.79	45.39
59	13.50	53.60	10.39	54.59	115	144.61	42.39	20.70	47.17
62	12.76	65.24	13.90	66.70	120	208.14	41.12	21.30	46.31
					120	208.14	41.12	21.30	46.31

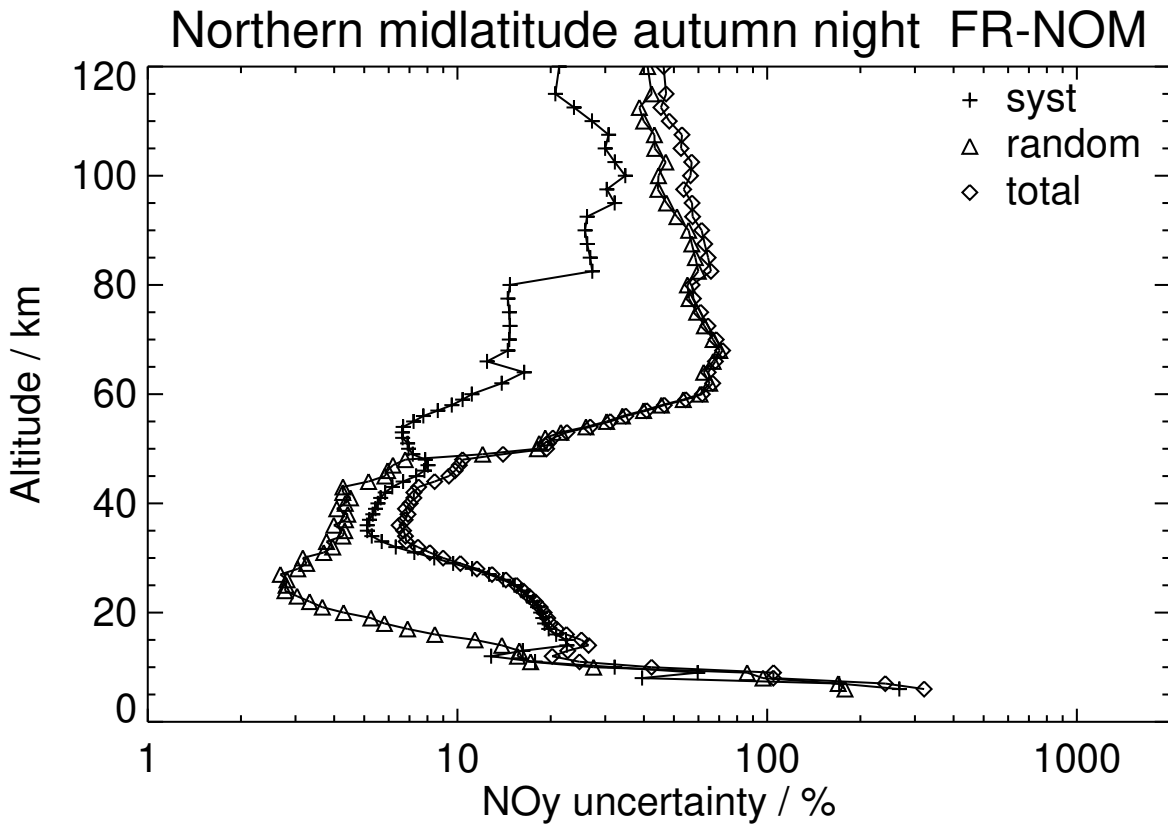


Figure S16: V8H_NOy_6X Northern midlatitude autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.53	70.62	37.37	79.90
11	0.08	> 100	48.79	> 100
14	0.32	42.30	23.30	48.29
17	0.42	41.81	26.79	49.65
20	2.62	9.84	17.18	19.80
23	4.58	6.16	15.62	16.79
26	7.26	5.58	12.46	13.65
29	10.49	6.82	9.06	11.34
32	14.45	8.59	7.65	11.50
35	17.02	8.97	8.88	12.62
38	18.36	8.52	9.05	12.43
41	16.57	6.61	8.37	10.66
44	12.87	8.02	9.55	12.47
47	10.41	9.36	8.53	12.67
50	8.28	16.85	9.22	19.21
53	5.60	23.27	11.07	25.77
56	3.40	39.52	16.29	42.75
59	2.47	65.92	24.21	70.22
62	2.74	71.85	24.92	76.05

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	> 100	46.34	> 100
92	0.65	45.85	40.49	61.16
95	1.43	49.94	44.16	66.67
97	2.93	49.11	45.43	66.90
100	5.44	47.71	44.69	65.37
102	9.16	45.58	42.34	62.21
107	19.07	39.51	37.11	54.20
110	24.75	35.74	34.03	49.35
112	30.55	32.22	30.87	44.62
115	37.87	28.83	28.03	40.21
120	51.58	22.51	25.37	33.92
120	51.58	22.51	25.37	33.92

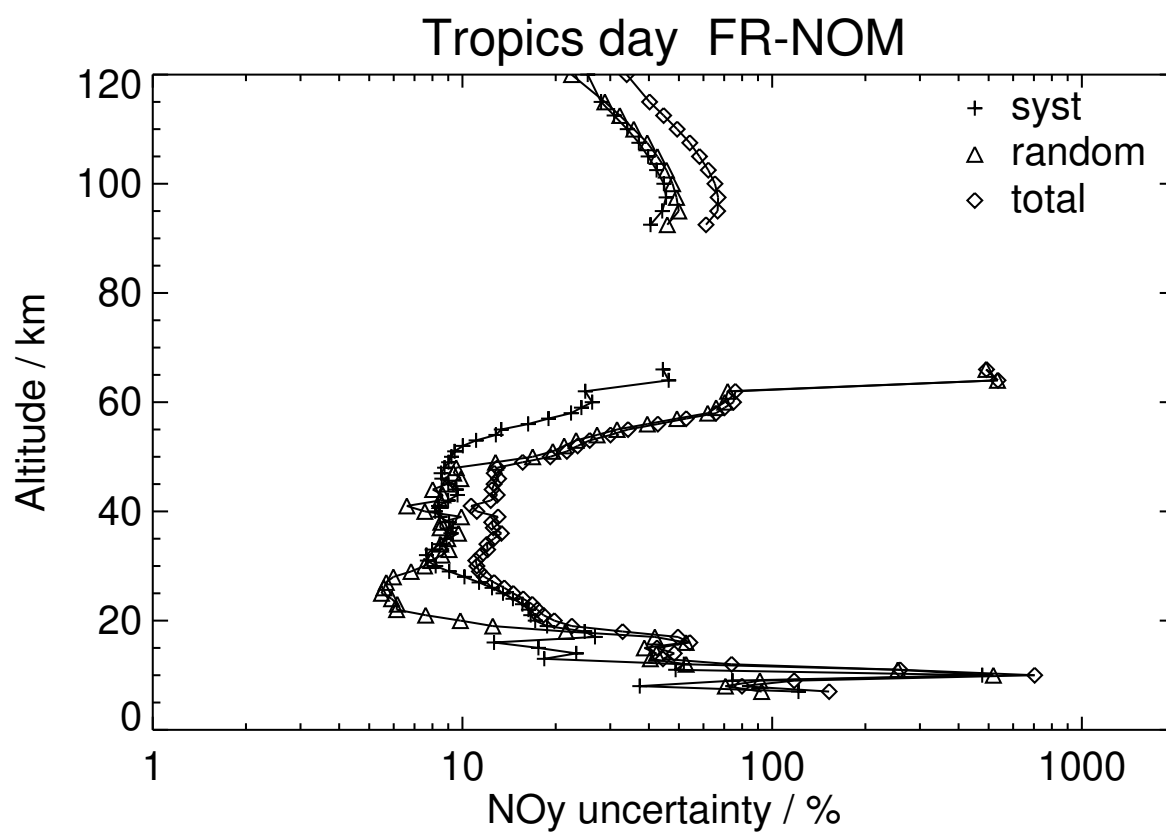


Figure S17: V8H_NOy_6X Tropics day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.33	48.70	15.95	51.25
11	0.09	> 100	23.68	> 100
14	0.25	49.83	17.66	52.86
17	0.36	46.39	17.64	49.63
20	1.54	14.27	18.49	23.36
23	3.62	6.84	16.32	17.70
26	6.39	4.82	12.50	13.39
29	9.25	4.09	8.51	9.44
32	12.78	3.97	5.78	7.01
35	17.13	3.67	4.28	5.64
38	19.20	3.55	4.70	5.89
41	17.46	3.97	5.37	6.67
44	13.97	5.47	8.69	10.27
47	10.19	5.20	8.31	9.81
50	8.02	7.32	7.97	10.82
53	6.01	12.14	7.65	14.35
56	4.64	33.42	7.19	34.18
59	3.29	49.31	7.78	49.92
62	4.26	63.25	9.45	63.96

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	62.27	12.46	63.50
92	0.39	50.89	16.41	53.47
95	0.81	50.09	18.97	53.56
97	1.39	50.35	19.35	53.94
100	2.66	48.25	18.87	51.81
102	4.73	45.34	18.31	48.90
107	12.04	37.06	16.67	40.64
110	16.45	32.58	15.99	36.29
112	20.83	28.44	15.48	32.38
115	27.84	24.32	15.09	28.62
120	38.30	16.99	15.19	22.79
120	38.30	16.99	15.19	22.79

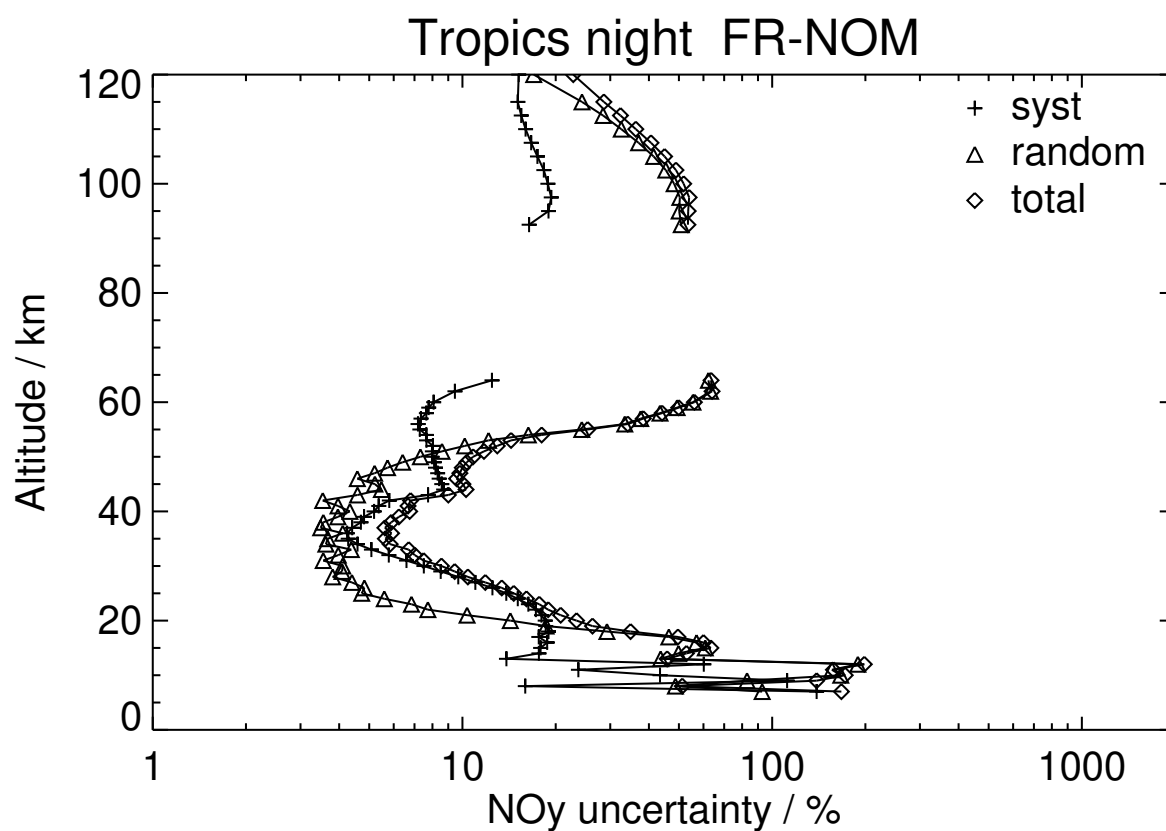


Figure S18: V8H.NOy_6X Tropics night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.23	> 100	> 100	> 100	64	0.02	44.07	23.83	50.10
8	0.46	52.16	42.23	67.11	68	0.03	30.13	21.42	36.97
11	1.90	15.32	21.14	26.11	70	0.04	32.85	25.50	41.58
14	2.54	17.04	21.50	27.43	72	0.05	49.78	35.69	61.25
17	5.33	7.45	19.96	21.30	77	0.11	59.33	41.99	72.69
20	9.33	3.44	19.28	19.59	80	0.19	63.93	45.95	78.73
23	12.49	3.13	18.27	18.54	82	0.36	67.81	44.88	81.32
26	14.92	5.68	15.37	16.39	85	0.68	67.42	48.19	82.87
29	16.99	12.12	10.29	15.90	87	1.30	62.46	41.77	75.14
32	18.74	18.28	8.44	20.13	92	3.16	42.89	36.92	56.59
35	17.82	20.33	9.33	22.37	95	4.15	46.47	44.71	64.49
38	19.53	23.16	10.16	25.29	97	6.17	56.49	51.33	76.33
41	15.01	21.30	9.68	23.40	100	10.96	62.09	63.50	88.81
44	12.94	21.26	9.73	23.38	102	19.45	60.67	60.92	85.98
47	14.68	19.84	9.56	22.03	107	48.34	56.14	48.29	74.05
50	15.12	19.76	9.35	21.86	110	63.21	56.05	40.30	69.03
53	15.97	22.30	9.75	24.34	112	84.93	53.60	32.09	62.47
56	18.03	23.94	11.02	26.36	115	101.47	53.52	27.39	60.12
59	18.51	36.59	14.45	39.34	120	178.68	46.37	30.09	55.28
62	19.06	45.51	19.22	49.40	120	178.68	46.37	30.09	55.28

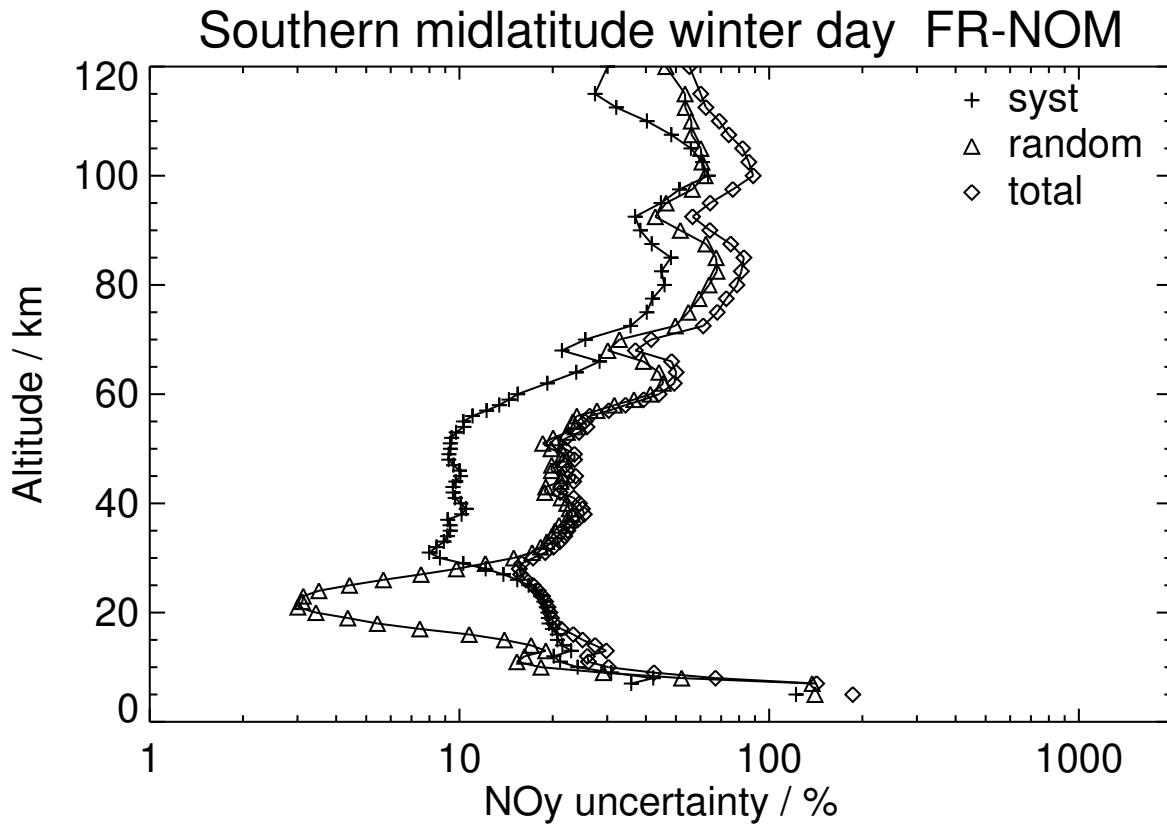


Figure S19: V8H_NO_y_6X Southern midlatitude winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.17	> 100	> 100	> 100	64	0.04	35.85	14.20	38.56
8	0.33	81.68	48.12	94.81	68	0.07	30.59	9.51	32.03
11	1.36	17.43	19.95	26.49	70	0.07	49.93	26.34	56.45
14	1.80	14.08	18.05	22.89	72	0.10	55.33	31.64	63.74
17	4.49	6.70	19.86	20.96	77	0.25	60.33	35.90	70.21
20	8.97	3.42	17.83	18.15	80	0.37	63.93	34.38	72.58
23	12.59	2.53	17.15	17.33	82	0.56	64.83	31.97	72.28
26	14.71	3.25	14.82	15.17	85	1.05	59.63	25.82	64.98
29	15.25	4.54	10.01	11.00	87	1.72	57.12	23.23	61.67
32	16.93	4.93	6.07	7.82	92	3.58	55.75	32.42	64.49
35	15.80	5.48	5.32	7.64	95	4.89	58.31	34.94	67.98
38	14.49	6.54	5.20	8.35	97	7.29	60.34	39.95	72.37
41	14.79	6.79	5.26	8.59	100	9.26	73.88	58.92	94.50
44	14.68	6.14	5.33	8.13	102	15.85	74.63	57.55	94.24
47	15.46	6.38	5.53	8.45	107	38.36	72.88	56.01	91.92
50	18.62	9.88	5.67	11.40	110	62.57	61.61	43.10	75.19
53	21.06	14.09	6.22	15.40	112	68.24	64.15	36.80	73.96
56	26.41	24.46	9.04	26.08	115	84.08	64.75	35.09	73.65
59	35.46	38.01	14.99	40.86	120	151.15	69.48	36.51	78.49
62	38.10	37.20	14.27	39.85	120	151.15	69.48	36.51	78.49

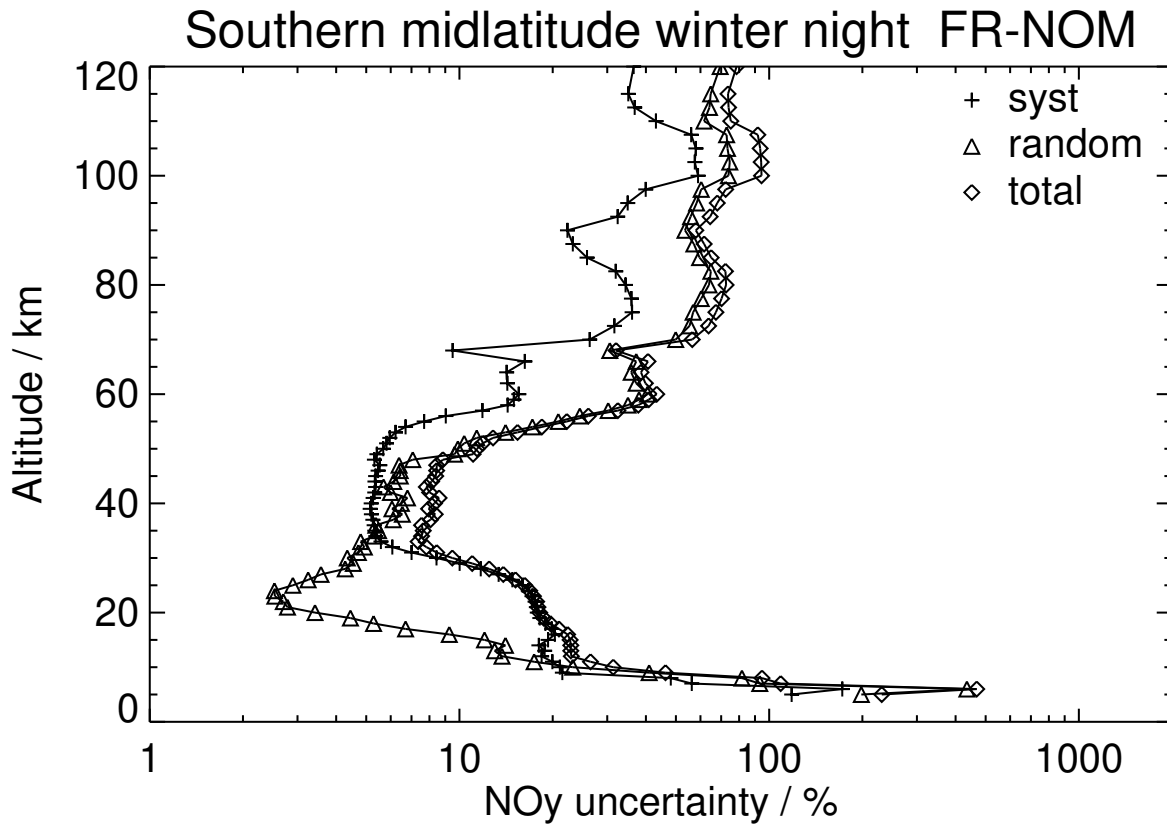


Figure S20: V8H_NOy_6X Southern midlatitude winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.36	75.41	62.32	97.83
11	1.58	13.82	17.97	22.67
14	2.74	11.97	19.84	23.17
17	6.17	6.80	17.61	18.88
20	9.55	5.39	16.86	17.70
23	11.84	4.87	15.57	16.31
26	13.19	8.27	12.91	15.33
29	14.72	9.49	9.90	13.71
32	18.80	12.71	8.50	15.29
35	16.55	13.49	8.41	15.90
38	14.05	14.60	9.56	17.45
41	12.97	14.96	9.53	17.73
44	11.69	13.77	9.60	16.79
47	10.10	17.25	11.05	20.49
50	9.15	22.40	12.21	25.51
53	10.62	32.09	13.84	34.95
56	11.12	29.47	15.34	33.22
59	17.22	45.41	18.14	48.90
62	19.41	60.77	31.54	68.47

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	66.02	51.04	83.45
68	< 0.01	> 100	> 100	> 100
70	0.02	34.29	> 100	> 100
87	1.31	> 100	94.41	> 100
92	2.99	> 100	> 100	> 100
95	4.78	> 100	57.01	> 100
97	8.46	> 100	16.01	> 100
100	13.69	71.87	54.19	90.01
102	22.93	> 100	82.75	> 100
107	54.50	> 100	> 100	> 100
110	72.88	> 100	98.67	> 100
112	103.48	> 100	83.47	> 100
115	135.73	92.04	59.62	> 100
120	218.97	49.74	36.99	61.99
120	218.97	49.74	36.99	61.99

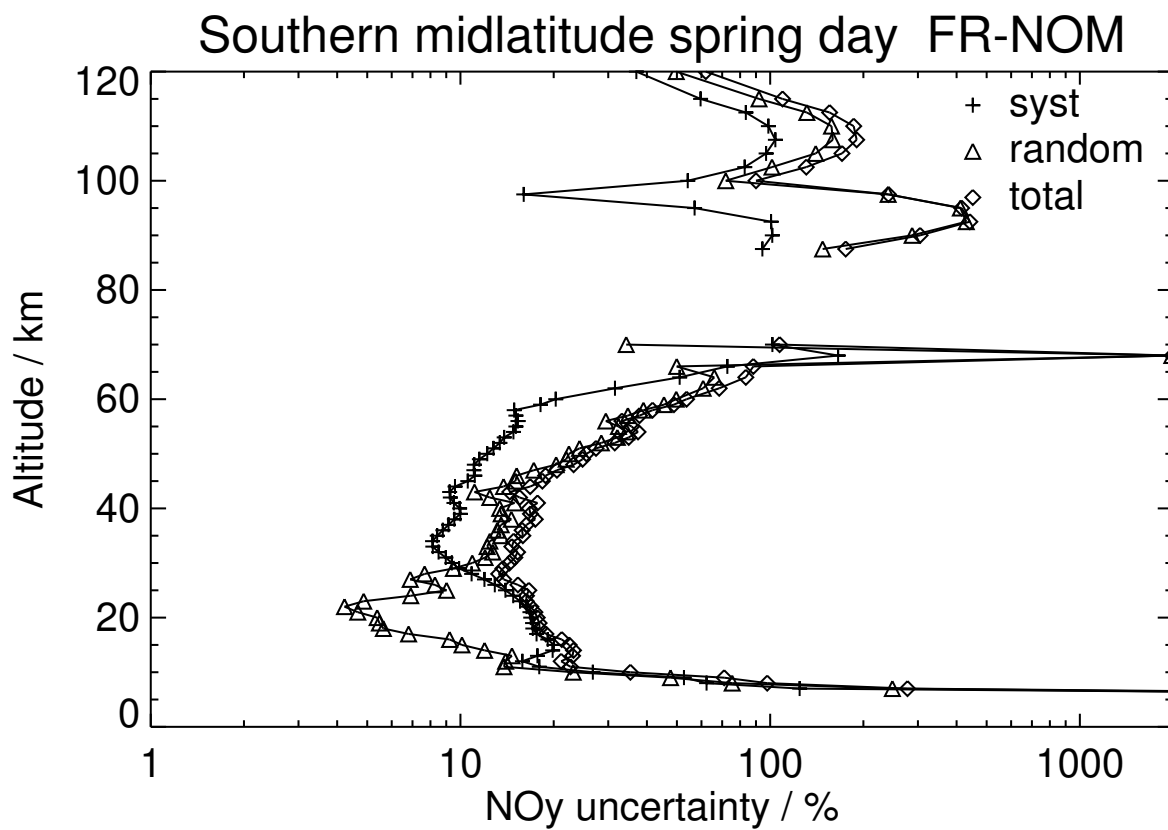


Figure S21: V8H_NOy_6X Southern midlatitude spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.41	53.73	49.23	72.87
11	1.91	10.44	19.11	21.77
14	2.30	11.03	23.74	26.18
17	5.93	5.07	19.48	20.13
20	9.30	2.88	18.60	18.83
23	11.85	2.14	17.30	17.43
26	12.26	2.97	14.55	14.85
29	14.12	3.21	9.62	10.14
32	17.96	3.92	6.29	7.41
35	17.61	4.41	5.81	7.29
38	13.95	4.92	5.50	7.38
41	12.33	4.79	5.40	7.22
44	10.61	4.46	5.81	7.32
47	8.98	5.59	7.23	9.14
50	7.57	6.75	7.92	10.41
53	7.45	12.64	7.92	14.92
56	13.46	39.37	17.08	42.92
59	49.88	50.81	24.30	56.32
62	54.37	41.97	20.16	46.56

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	45.12	22.56	50.45
70	< 0.01	> 100	21.82	> 100
72	< 0.01	> 100	21.82	> 100
87	0.27	63.63	81.46	> 100
92	1.30	54.31	59.45	80.52
95	2.84	51.23	50.51	71.94
97	4.93	51.61	52.51	73.63
100	8.58	52.82	45.72	69.86
102	14.42	51.97	47.29	70.27
107	33.93	49.34	43.93	66.06
110	46.25	49.92	40.31	64.16
112	59.41	48.80	35.56	60.38
115	83.45	40.78	29.70	50.45
120	129.98	30.80	23.60	38.80
120	129.98	30.80	23.60	38.80

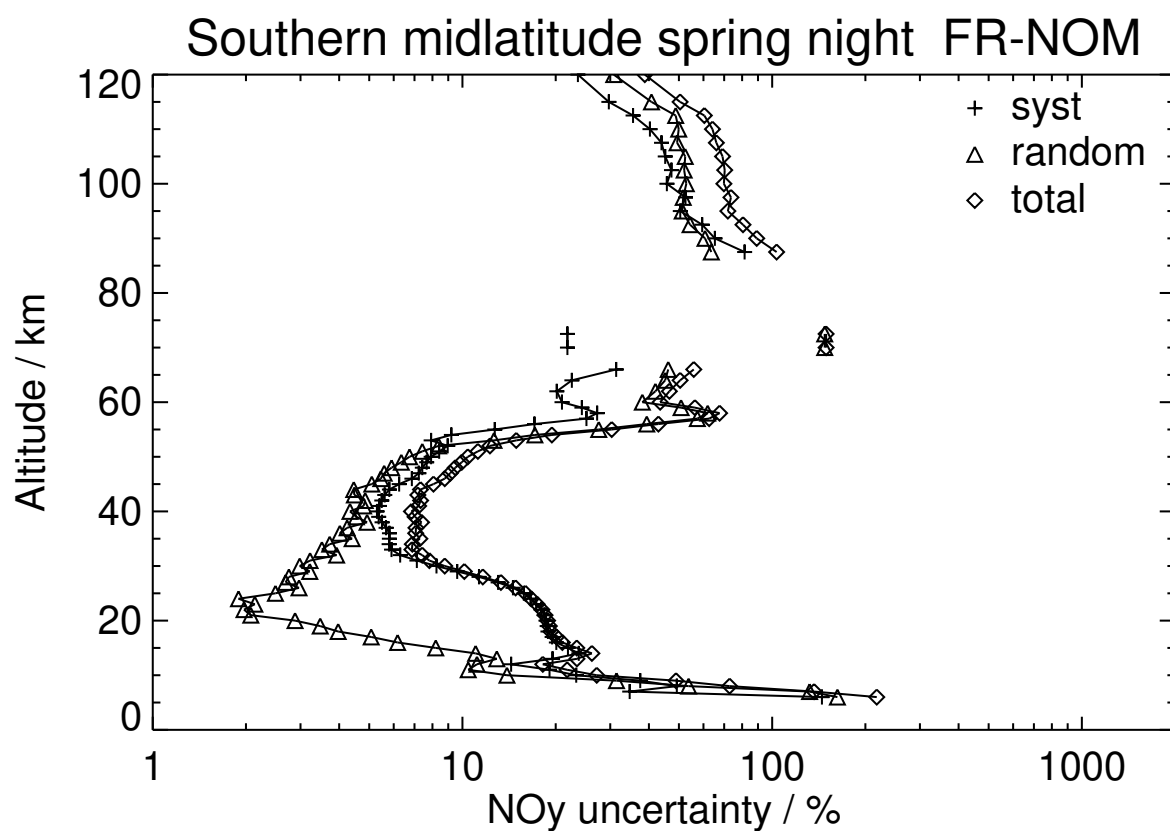


Figure S22: V8H.NOy.6X Southern midlatitude spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.32	> 100	> 100	> 100
8	0.36	87.33	54.37	> 100
11	1.36	16.27	20.72	26.35
14	1.83	11.90	18.42	21.94
17	3.91	6.17	17.93	18.96
20	8.36	3.67	16.48	16.88
23	12.77	3.37	14.65	15.03
26	14.96	4.78	11.85	12.78
29	16.51	6.60	8.69	10.92
32	17.19	8.77	7.28	11.40
35	16.44	9.43	7.42	12.00
38	15.92	8.80	7.59	11.62
41	15.40	8.87	8.39	12.21
44	12.30	8.56	8.86	12.33
47	10.69	9.77	9.02	13.29
50	8.58	10.14	9.14	13.65
53	7.20	20.56	9.77	22.76
56	6.32	23.54	13.30	27.04
59	7.13	49.98	25.51	56.11
62	7.04	68.89	36.27	77.86

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	67.05	42.51	79.39
68	< 0.01	> 100	26.42	> 100
70	< 0.01	> 100	13.24	> 100
72	< 0.01	> 100	13.24	> 100
85	0.32	40.41	25.50	47.78
87	0.68	44.39	34.03	55.93
92	2.29	47.32	48.03	67.43
95	4.46	45.62	47.25	65.68
97	8.23	45.20	49.26	66.86
100	14.54	44.22	53.22	69.19
102	23.78	43.71	56.43	71.38
107	50.60	47.04	62.82	78.49
110	67.90	50.39	62.03	79.91
112	84.41	48.95	56.03	74.41
115	100.51	42.58	44.77	61.78
120	127.24	28.57	26.92	39.25
120	127.24	28.57	26.92	39.25

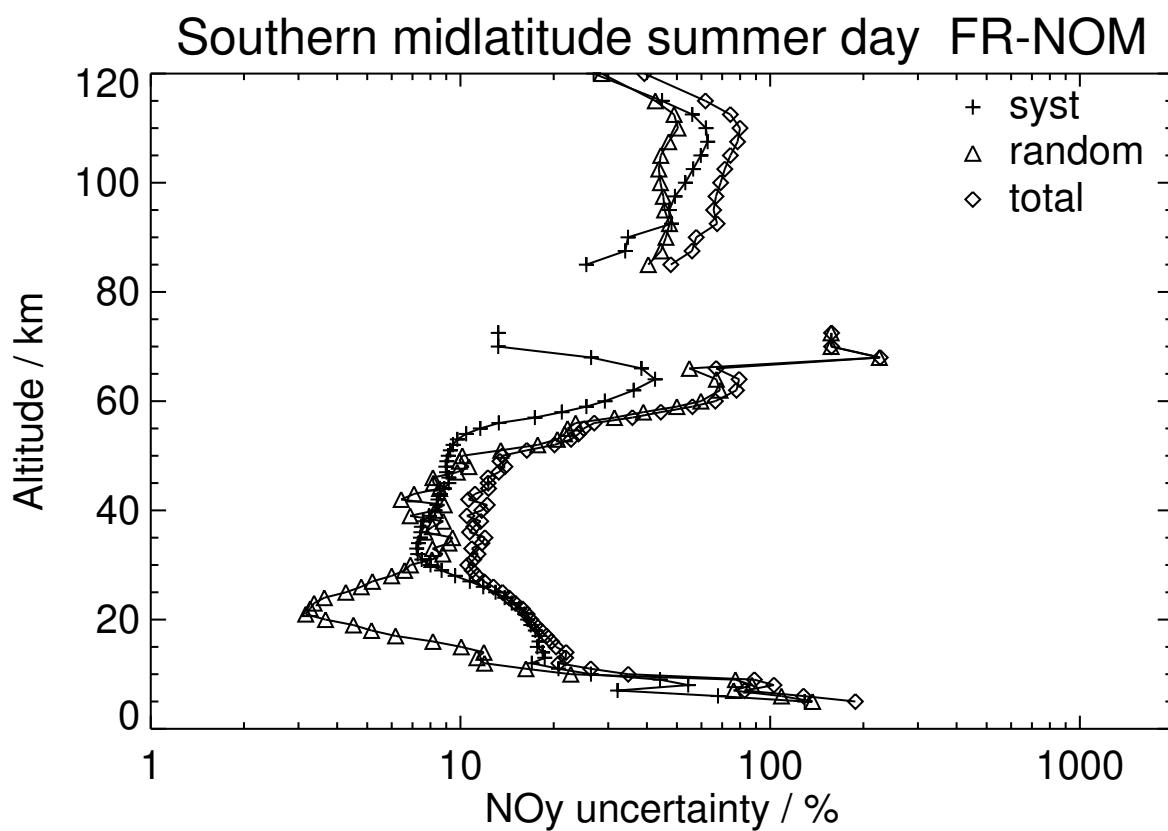


Figure S23: V8H_NOy_6X Southern midlatitude summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.35	89.53	72.78	> 100
8	0.22	> 100	58.23	> 100
11	1.32	19.02	17.86	26.10
14	1.53	15.47	17.57	23.41
17	3.43	7.73	19.63	21.10
20	7.86	4.08	17.14	17.62
23	12.56	2.65	14.73	14.97
26	14.81	2.67	11.60	11.91
29	16.32	3.10	8.16	8.73
32	17.08	3.58	6.13	7.10
35	16.74	3.83	4.96	6.26
38	16.54	3.78	4.97	6.24
41	14.67	4.16	5.57	6.95
44	12.00	4.46	7.04	8.33
47	10.44	4.98	8.68	10.00
50	9.64	5.62	7.72	9.55
53	7.97	10.16	7.55	12.66
56	7.21	21.50	8.17	23.00
59	5.91	40.13	11.63	41.78
62	5.26	64.35	18.35	66.92

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	65.03	21.01	68.34
95	1.82	47.05	15.48	49.54
97	3.60	51.90	39.52	65.23
100	7.90	50.65	39.84	64.44
102	13.69	46.54	37.25	59.61
107	28.69	41.91	33.37	53.57
110	38.78	38.27	30.34	48.84
112	49.33	33.93	26.63	43.13
115	65.22	28.64	23.44	37.01
120	90.70	23.13	23.14	32.71
120	90.70	23.13	23.14	32.71

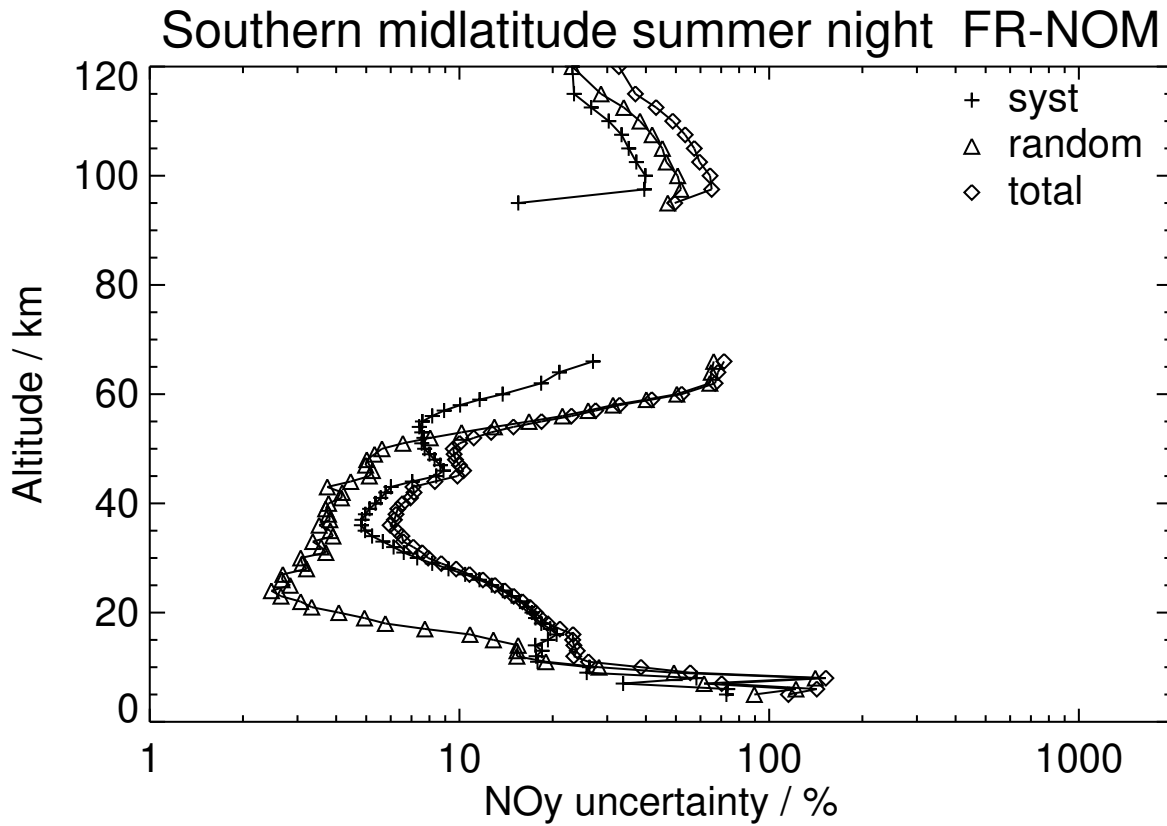


Figure S24: V8H_NOy_6X Southern midlatitude summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.27	> 100	21.46	> 100	64	0.02	88.39	52.52	> 100
11	0.75	25.21	25.17	35.62	68	0.04	36.46	73.09	81.68
14	1.40	21.03	21.73	30.24	70	0.04	39.09	79.27	88.38
17	4.41	11.50	20.46	23.47	72	0.04	41.32	85.11	94.61
20	9.11	6.16	19.39	20.34	77	0.06	> 100	73.94	> 100
23	13.61	3.03	17.98	18.24	80	0.12	83.04	67.81	> 100
26	15.46	3.73	15.03	15.48	82	0.24	77.91	64.87	> 100
29	17.04	7.02	10.51	12.64	85	0.45	75.05	60.49	96.40
32	17.62	10.39	8.13	13.19	87	0.86	70.01	57.78	90.77
35	16.40	13.30	8.30	15.68	92	2.54	56.56	56.30	79.81
38	16.01	16.53	9.37	19.00	95	4.08	55.14	57.00	79.30
41	13.89	14.99	9.81	17.91	97	6.49	55.09	57.06	79.32
44	11.68	16.44	9.82	19.15	100	11.17	51.83	54.05	74.89
47	10.05	20.75	8.68	22.50	102	18.52	50.38	53.12	73.21
50	9.42	24.41	9.19	26.08	107	46.79	45.66	43.47	63.04
53	9.30	35.27	10.01	36.67	110	69.89	41.56	37.41	55.91
56	10.14	41.78	10.68	43.12	112	95.26	37.78	30.15	48.34
59	14.28	55.86	13.60	57.49	115	122.73	33.20	23.90	40.91
62	20.56	80.24	36.09	87.98	120	181.29	28.37	27.21	39.31
					120	181.29	28.37	27.21	39.31

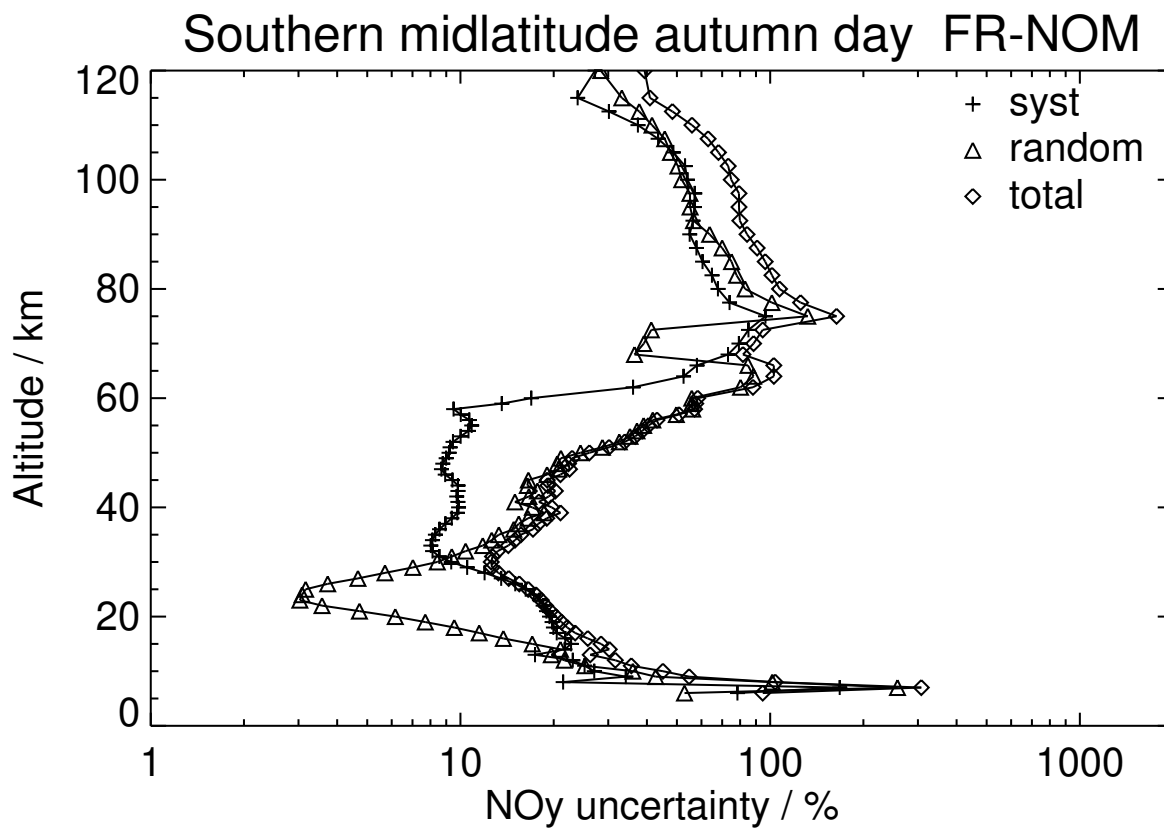


Figure S25: V8H_NOy_6X Southern midlatitude autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.27	68.26	34.53	76.49	64	0.02	57.24	16.67	59.62
11	0.61	27.97	25.69	37.97	68	0.03	53.35	18.29	56.40
14	1.13	21.61	19.71	29.25	70	0.04	52.30	18.53	55.49
17	3.36	11.63	20.65	23.70	72	0.05	51.58	20.83	55.62
20	8.05	5.01	18.64	19.30	77	0.10	49.58	23.59	54.90
23	12.40	3.21	17.40	17.69	80	0.19	47.86	22.20	52.76
26	14.93	2.63	14.50	14.74	82	0.33	47.61	19.43	51.42
29	17.28	3.00	9.85	10.29	85	0.65	43.69	16.77	46.79
32	18.00	3.53	6.41	7.31	87	1.28	39.98	14.76	42.62
35	17.16	3.87	5.03	6.35	92	3.07	36.75	15.50	39.88
38	16.00	3.98	4.99	6.38	95	3.78	40.01	18.67	44.15
41	13.73	4.49	5.56	7.15	97	5.99	41.43	21.67	46.75
44	11.96	5.22	6.41	8.27	100	9.37	41.81	22.21	47.34
47	10.31	5.52	7.31	9.16	102	13.35	44.74	23.21	50.40
50	8.61	7.34	8.68	11.37	107	29.25	46.59	24.80	52.78
53	8.32	23.08	9.82	25.09	110	39.76	45.61	24.65	51.85
56	9.00	54.25	17.79	57.09	112	50.62	42.74	23.15	48.60
59	8.33	59.99	19.54	63.10	115	55.95	39.26	20.72	44.39
62	10.38	64.90	17.74	67.29	120	79.91	34.43	20.45	40.05
					120	79.91	34.43	20.45	40.05

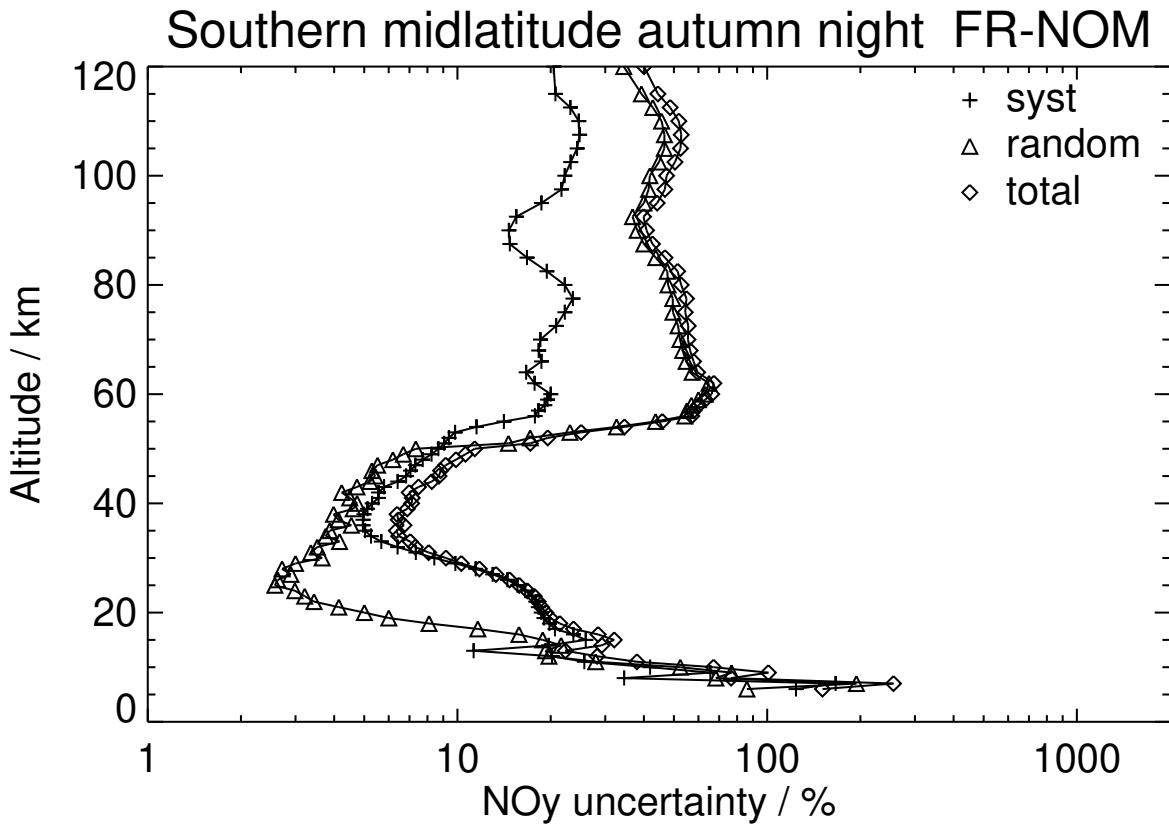


Figure S26: V8H_NOy_6X Southern midlatitude autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.17	> 100	> 100	> 100	64	0.05	41.53	29.68	51.05
8	1.00	32.42	32.17	45.67	68	0.14	56.13	45.25	72.10
11	2.64	9.69	22.83	24.80	70	0.20	65.00	46.29	79.80
14	3.75	11.19	22.00	24.68	72	0.21	57.15	47.43	74.27
17	3.74	18.58	22.55	29.22	77	0.52	39.48	42.91	58.31
20	5.78	12.74	21.65	25.12	80	0.90	38.46	37.98	54.05
23	11.14	9.70	16.74	19.35	82	1.79	36.30	28.44	46.12
26	15.77	15.10	12.52	19.62	85	3.65	38.86	14.53	41.48
29	18.58	23.61	10.04	25.66	87	7.19	60.21	13.94	61.81
32	21.04	18.65	7.49	20.10	92	20.91	> 100	36.48	> 100
35	21.49	18.03	7.24	19.43	95	29.77	97.20	32.75	> 100
38	19.74	15.70	7.65	17.46	97	38.26	62.93	21.96	66.66
41	17.14	16.40	8.13	18.30	100	56.41	39.65	13.56	41.91
44	14.78	16.84	8.43	18.83	102	91.04	26.68	10.28	28.59
47	12.98	18.12	8.46	20.00	107	180.07	23.34	18.11	29.54
50	13.64	20.72	9.70	22.88	110	222.50	27.01	20.06	33.65
53	16.54	28.83	11.88	31.18	112	255.12	31.94	21.66	38.59
56	18.78	33.93	17.43	38.14	115	292.23	35.82	23.66	42.92
59	25.89	36.70	20.07	41.83	120	412.44	32.99	30.50	44.93
62	43.53	42.44	22.96	48.25	120	412.44	32.99	30.50	44.93

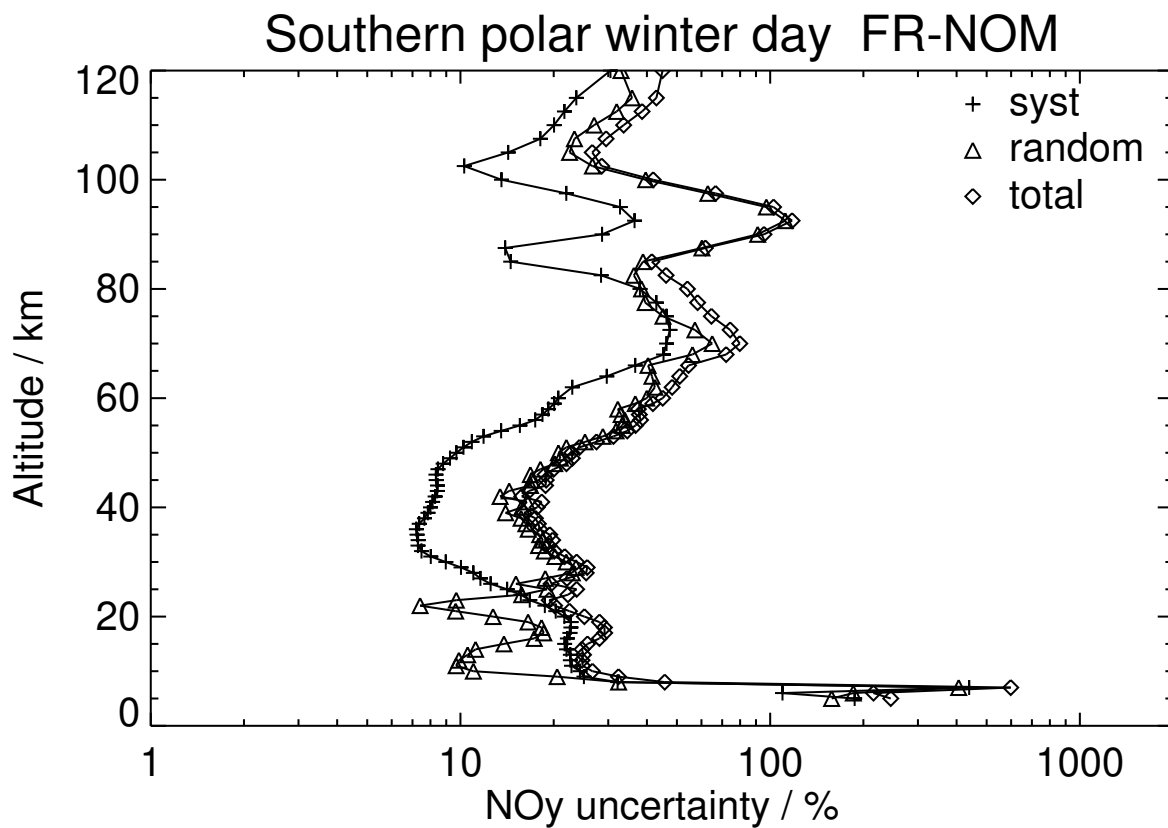


Figure S27: V8H_NO_y_6X Southern polar winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.73	60.51	26.26	65.97	64	0.13	42.33	28.16	50.84
11	2.58	12.31	17.52	21.41	68	0.28	52.80	43.19	68.21
14	5.08	8.05	18.40	20.08	70	0.33	55.62	44.48	71.22
17	7.36	9.97	17.40	20.05	72	0.41	58.21	40.30	70.80
20	8.14	11.14	19.42	22.39	77	0.94	54.83	24.91	60.22
23	11.19	7.11	19.11	20.39	80	1.68	48.51	15.76	51.00
26	14.01	5.31	16.61	17.44	82	3.08	44.18	10.04	45.30
29	12.29	6.80	12.80	14.50	85	5.87	44.77	17.59	48.10
32	14.01	7.53	8.02	11.00	87	10.40	47.56	27.16	54.77
35	16.46	7.24	6.60	9.80	92	20.21	45.94	34.81	57.63
38	19.48	7.06	5.14	8.73	95	23.43	41.55	32.68	52.86
41	24.07	7.16	4.90	8.67	97	27.80	36.94	26.47	45.45
44	28.22	6.03	5.10	7.89	100	37.59	32.64	14.66	35.78
47	30.48	7.60	5.62	9.45	102	60.03	29.09	11.02	31.11
50	33.51	9.36	5.52	10.87	107	113.91	33.38	20.08	38.96
53	38.28	9.37	5.79	11.02	110	143.09	34.07	22.21	40.67
56	50.34	14.47	7.65	16.36	112	192.28	33.29	22.88	40.40
59	61.79	22.68	13.90	26.60	115	291.88	27.96	20.53	34.69
62	92.86	33.08	19.48	38.38	120	319.52	30.78	31.15	43.79
					120	319.52	30.78	31.15	43.79

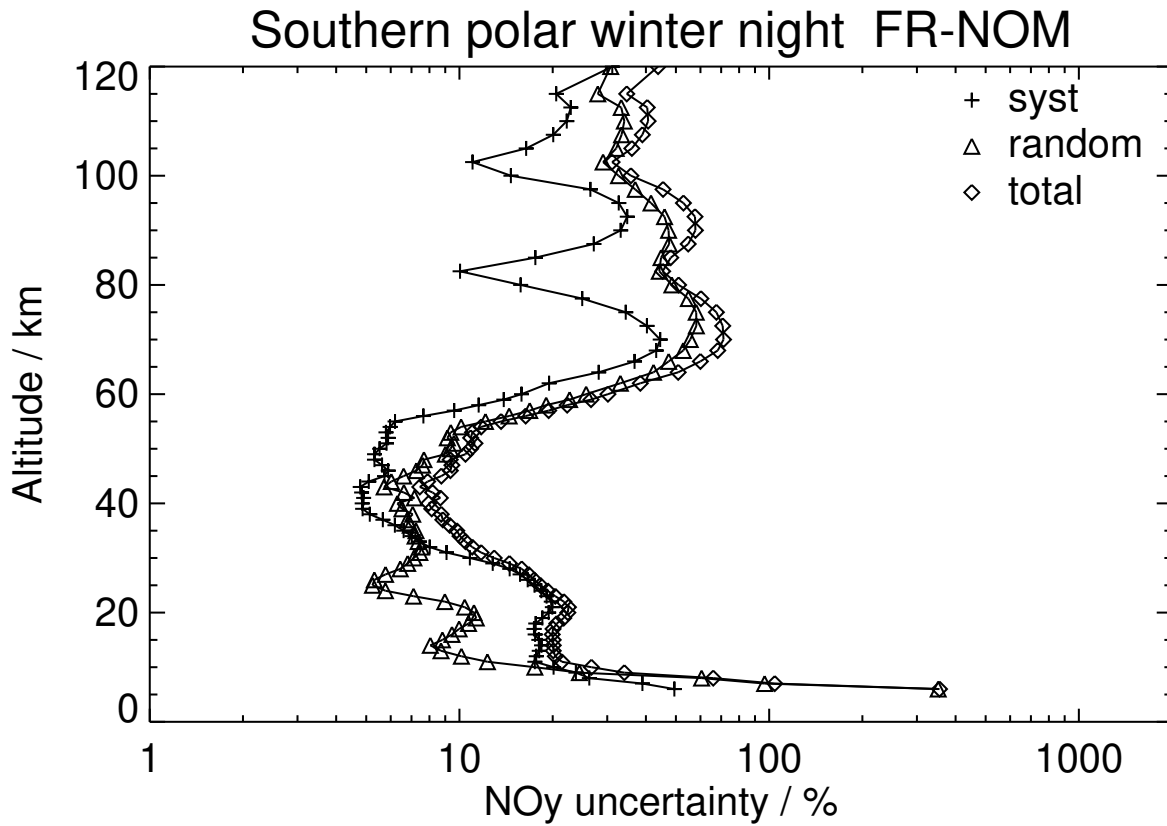


Figure S28: V8H_NOy_6X Southern polar winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.14	> 100	> 100	> 100
11	1.87	8.78	19.56	21.44
14	2.22	9.31	19.58	21.68
17	1.48	15.87	11.20	19.43
20	4.40	7.87	16.05	17.87
23	13.54	5.86	12.82	14.09
26	18.48	7.15	9.34	11.76
29	14.45	6.60	6.49	9.25
32	13.64	5.69	5.37	7.82
35	13.10	6.02	5.88	8.41
38	12.31	6.97	6.61	9.60
41	10.69	8.56	7.31	11.26
44	9.94	8.37	7.78	11.43
47	9.14	10.27	8.14	13.10
50	7.89	15.69	9.60	18.39
53	6.93	27.89	13.94	31.18
56	6.40	37.74	17.47	41.59
59	7.87	46.36	21.86	51.26
62	11.65	61.52	23.75	65.95

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	62.57	23.21	66.74
92	2.69	45.86	17.84	49.21
95	5.02	51.24	11.22	52.45
97	11.55	49.96	10.70	51.09
100	24.40	47.11	17.00	50.09
102	44.84	43.61	31.08	53.55
107	102.77	43.30	65.53	78.54
110	128.99	52.63	73.79	90.64
112	157.75	57.24	72.50	92.37
115	183.89	57.79	60.94	83.99
120	241.86	45.27	31.14	54.94
120	241.86	45.27	31.14	54.94

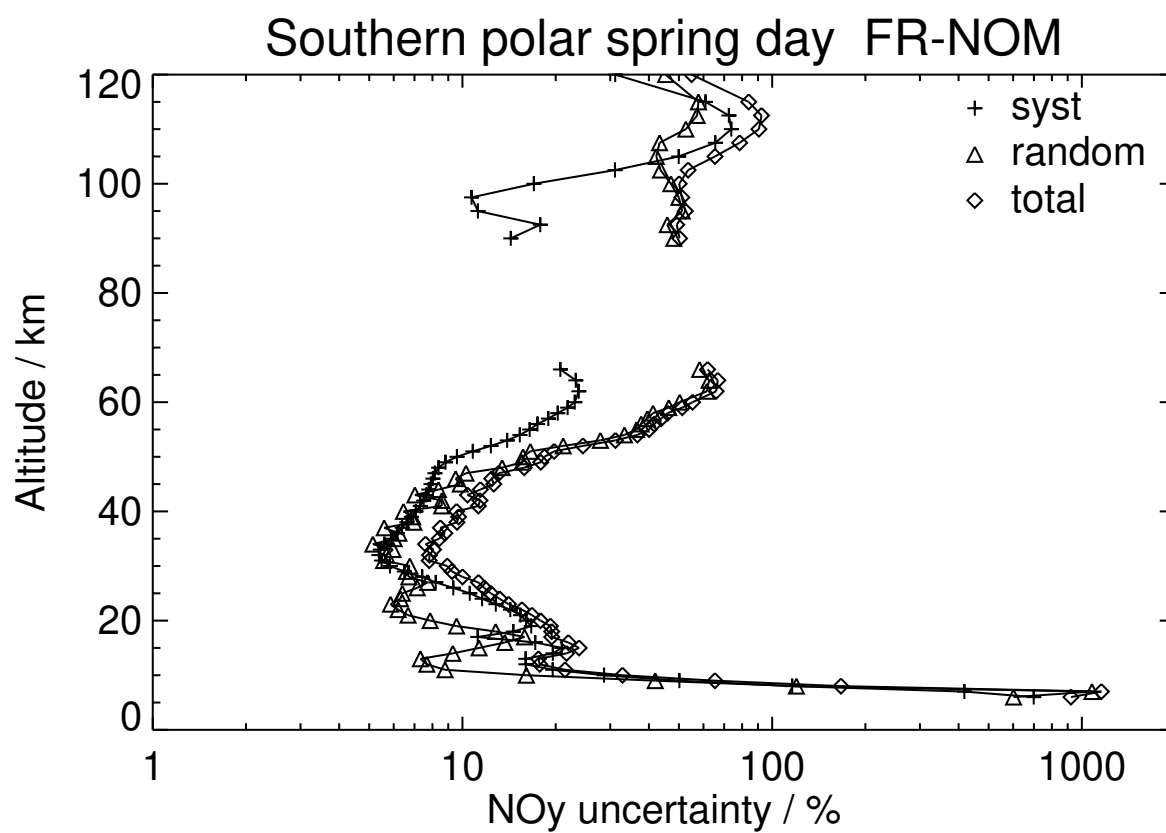


Figure S29: V8H_NOy_6X Southern polar spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.43	44.24	48.31	65.50
11	2.02	9.05	16.76	19.05
14	3.08	11.29	17.41	20.75
17	4.39	15.72	14.99	21.72
20	6.06	13.44	15.44	20.47
23	11.26	5.25	13.95	14.91
26	16.40	4.29	9.89	10.78
29	16.72	4.65	7.16	8.54
32	14.10	4.30	5.63	7.08
35	11.86	4.26	5.15	6.68
38	11.29	4.24	5.58	7.01
41	10.40	4.32	5.72	7.17
44	9.24	4.80	6.21	7.85
47	8.42	9.01	6.78	11.28
50	8.26	11.84	6.56	13.54
53	6.94	16.66	7.72	18.36
56	8.05	40.04	13.17	42.15
59	15.53	47.14	18.30	50.57
62	26.76	48.06	16.94	50.95

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	41.05	12.04	42.78
68	0.03	35.76	15.10	38.81
70	0.02	39.08	16.24	42.32
85	0.18	63.14	13.02	64.47
92	2.12	78.46	38.12	87.23
95	4.26	74.03	23.41	77.65
97	9.24	72.58	22.00	75.84
100	18.42	67.45	24.61	71.80
102	29.92	60.60	31.72	68.40
107	75.57	54.37	39.83	67.40
110	115.18	78.79	46.20	91.34
112	157.70	87.69	45.65	98.86
115	196.81	55.42	33.76	64.89
120	223.26	48.80	28.03	56.28
120	223.26	48.80	28.03	56.28

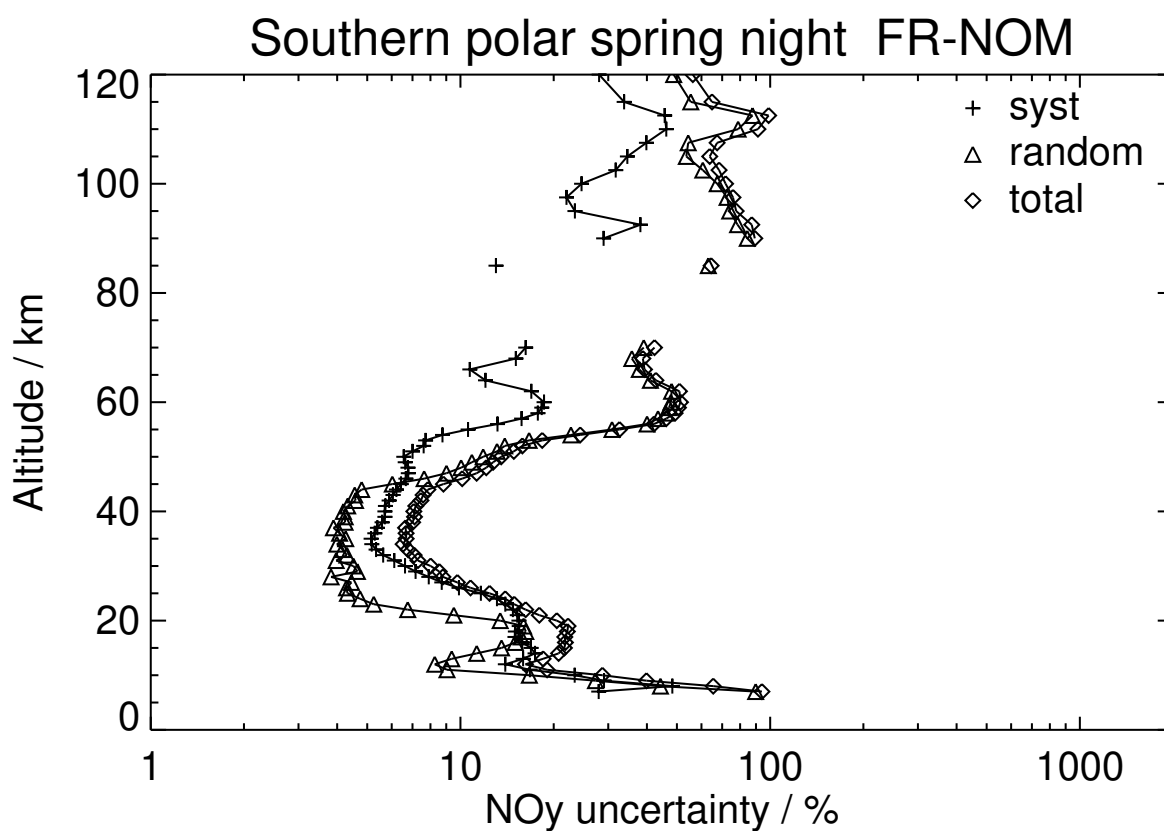


Figure S30: V8H.NOy.6X Southern polar spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.14	> 100	> 100	> 100
8	0.58	41.82	52.57	67.18
11	1.76	10.18	14.21	17.49
14	2.31	8.62	19.72	21.52
17	5.36	4.08	17.02	17.51
20	10.19	2.90	15.30	15.58
23	13.83	3.74	14.17	14.66
26	15.60	6.08	12.08	13.53
29	16.51	8.23	9.20	12.34
32	17.59	9.56	6.82	11.74
35	17.21	9.21	6.31	11.16
38	16.70	8.10	6.90	10.64
41	15.85	7.73	7.68	10.90
44	13.54	6.48	8.07	10.35
47	11.83	6.86	8.62	11.02
50	10.04	7.26	8.68	11.31
53	8.52	13.81	9.31	16.66
56	8.00	15.57	12.28	19.83
59	10.32	39.10	22.34	45.03
62	13.59	48.24	24.42	54.07

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	46.95	25.39	53.38
68	0.02	34.51	21.74	40.79
70	< 0.01	> 100	39.03	> 100
72	< 0.01	> 100	39.03	> 100
92	1.26	39.95	42.73	58.50
95	3.72	40.67	31.42	51.39
97	8.03	39.50	38.51	55.16
100	16.45	38.92	42.04	57.29
102	26.37	36.79	61.53	71.69
107	47.92	40.91	70.71	81.69
110	63.71	37.60	65.68	75.68
112	80.14	32.69	55.06	64.04
115	101.31	28.31	41.31	50.08
120	140.26	24.80	27.72	37.19
120	140.26	24.80	27.72	37.19

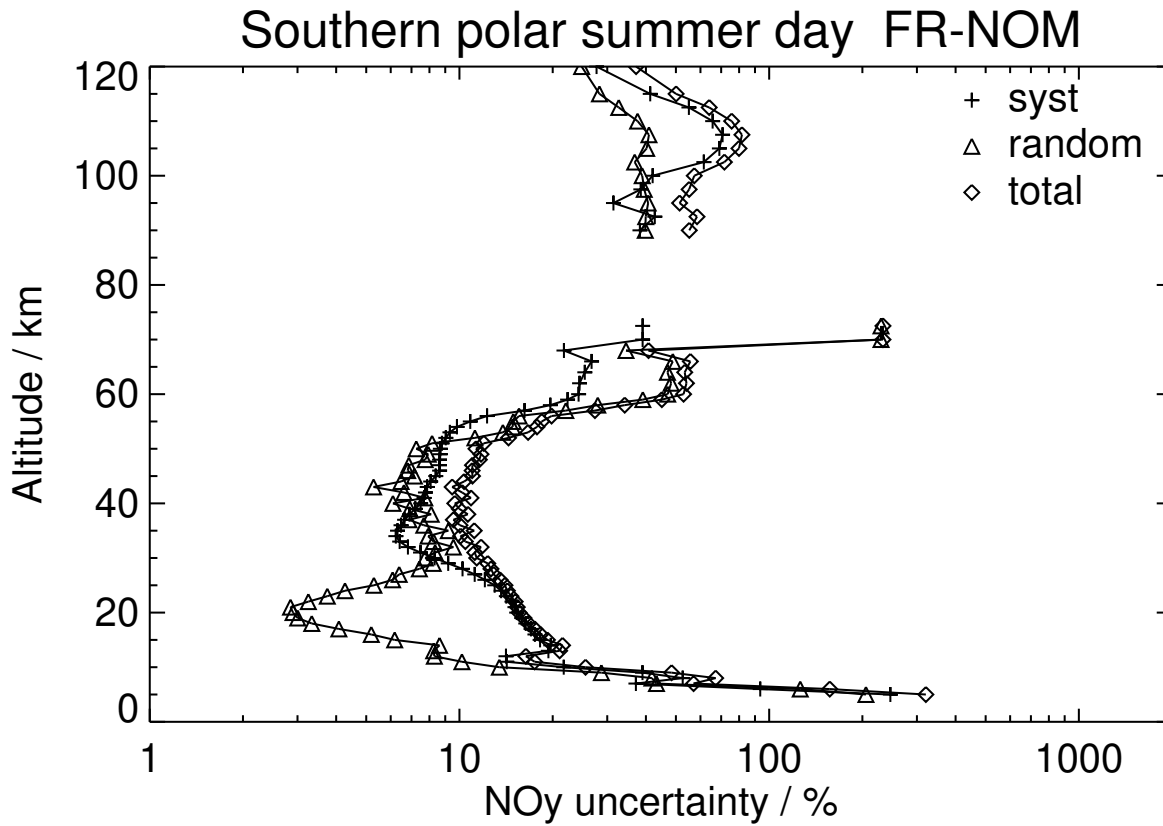


Figure S31: V8H_NOy_6X Southern polar summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.46	54.66	48.84	73.31
11	1.48	13.17	18.21	22.48
14	1.90	10.22	18.82	21.42
17	4.89	4.04	19.46	19.87
20	9.94	2.39	17.00	17.16
23	13.95	2.07	15.02	15.16
26	16.10	2.36	12.24	12.47
29	16.85	2.76	9.18	9.59
32	17.60	3.31	6.37	7.18
35	17.04	3.64	5.28	6.41
38	15.80	3.78	5.44	6.63
41	13.13	4.26	5.84	7.23
44	10.81	4.74	6.13	7.75
47	9.14	5.90	6.92	9.09
50	7.66	8.24	7.28	11.00
53	6.36	15.43	7.42	17.12
56	6.62	24.10	10.65	26.35
59	7.91	48.47	23.23	53.75
62	7.54	69.49	35.31	77.94

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	62.98	40.32	74.78
68	< 0.01	> 100	21.24	> 100
92	1.86	48.83	20.57	52.98
95	4.88	48.97	21.12	53.33
97	6.43	53.13	42.94	68.31
100	10.41	59.16	46.77	75.41
102	17.03	60.85	56.92	83.32
107	34.48	63.14	59.80	86.96
110	46.69	58.95	56.73	81.81
112	59.96	53.87	52.50	75.22
115	79.89	47.40	43.49	64.33
120	127.51	31.64	26.92	41.54
120	127.51	31.64	26.92	41.54

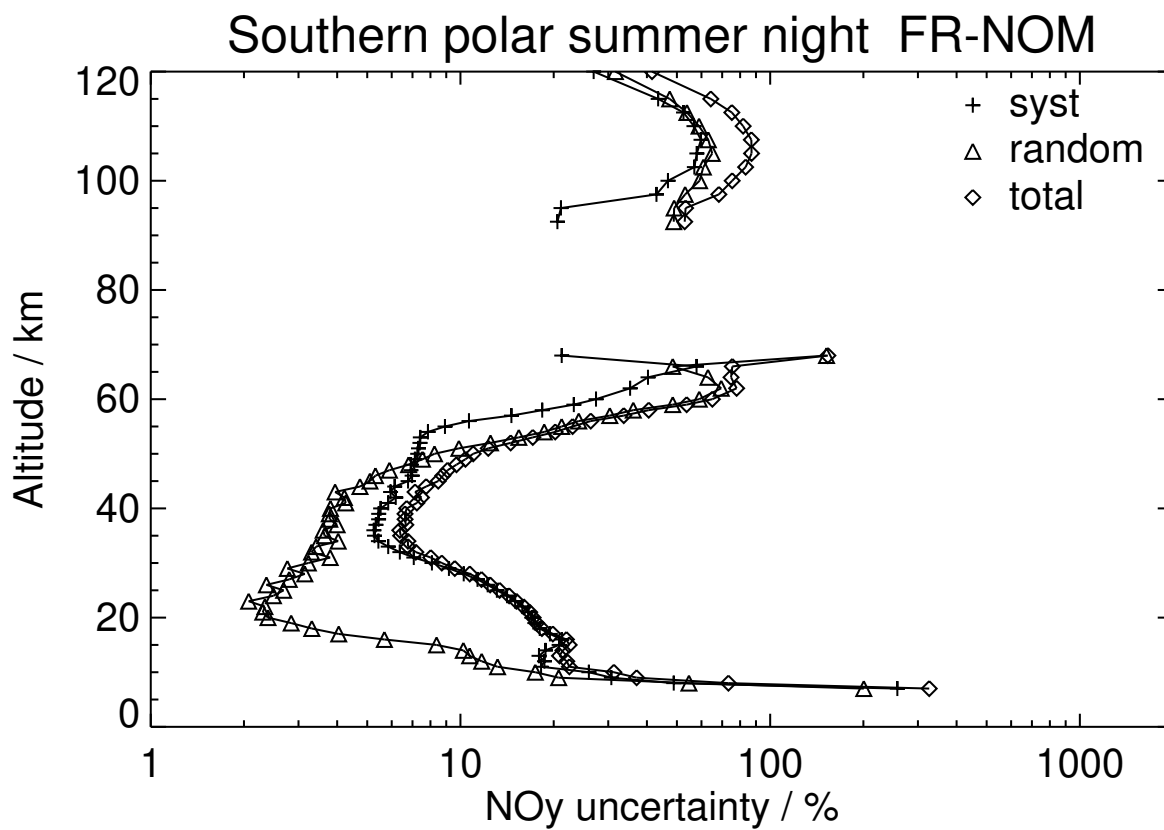


Figure S32: V8H_NOy_6X Southern polar summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	< 0.01	> 100	> 100	> 100	64	0.02	74.84	57.94	94.65
8	0.62	28.95	31.31	42.64	68	< 0.01	> 100	27.67	> 100
11	1.18	12.85	22.10	25.56	72	0.05	49.12	> 100	> 100
14	2.58	8.04	24.07	25.37	77	0.11	75.98	79.63	> 100
17	7.55	3.92	20.82	21.18	80	0.22	61.41	65.54	89.82
20	13.50	2.31	19.74	19.87	82	0.44	57.00	58.42	81.62
23	16.21	2.54	19.01	19.18	85	0.83	58.28	47.28	75.04
26	17.19	5.80	15.78	16.81	87	1.71	57.72	39.61	70.01
29	18.29	12.31	11.54	16.87	92	5.73	55.45	30.77	63.41
32	17.19	17.28	9.39	19.67	95	10.32	51.01	30.70	59.54
35	14.56	22.26	8.79	23.93	97	16.47	46.67	35.77	58.80
38	12.23	25.90	9.27	27.51	100	25.62	43.72	41.05	59.97
41	8.02	25.98	10.59	28.06	102	42.78	40.61	44.48	60.23
44	5.61	30.72	12.59	33.20	107	103.21	40.39	47.64	62.46
47	4.82	39.80	14.09	42.22	110	141.34	42.92	45.20	62.33
50	5.59	35.92	15.07	38.95	112	185.30	41.89	39.30	57.44
53	7.05	43.93	18.16	47.54	115	229.25	35.32	30.93	46.95
56	7.92	45.36	24.73	51.67	120	295.34	24.04	29.49	38.05
59	9.56	66.12	38.32	76.42	120	295.34	24.04	29.49	38.05
62	11.67	76.12	51.26	91.77					

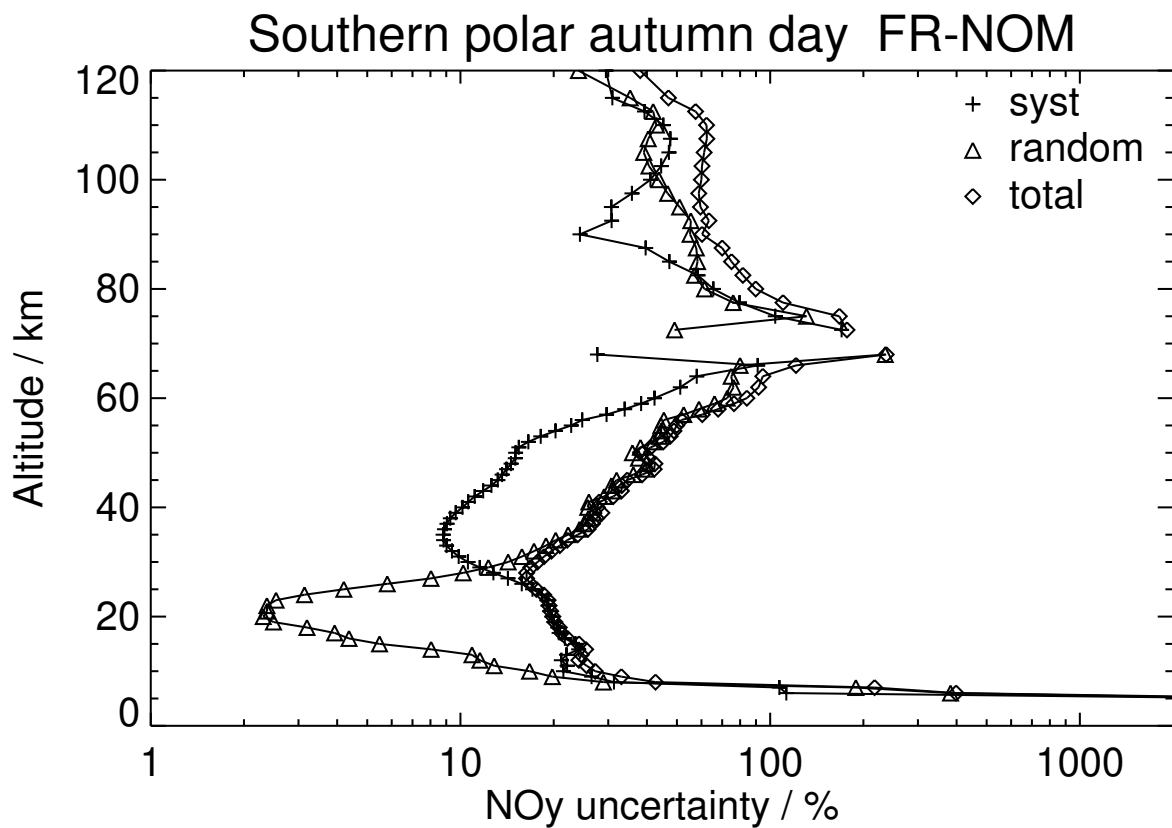


Figure S33: V8H_NOy_6X Southern polar autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.02	> 100	> 100	> 100	64	0.05	60.67	39.70	72.50
8	0.50	55.78	51.40	75.85	68	0.14	75.37	47.62	89.15
11	1.23	15.10	14.61	21.02	70	0.21	84.73	49.83	98.29
14	2.59	9.73	21.90	23.97	72	0.29	84.88	49.19	98.10
17	7.45	4.32	19.81	20.27	77	0.49	62.10	41.53	74.71
20	13.11	3.13	19.44	19.69	80	0.87	52.60	26.28	58.79
23	15.88	2.71	19.24	19.43	82	1.67	50.97	14.91	53.11
26	17.23	2.83	16.23	16.48	85	3.28	55.38	9.79	56.24
29	17.41	3.30	11.81	12.26	87	7.04	60.24	18.96	63.15
32	15.54	4.12	7.66	8.70	92	22.67	52.84	35.29	63.54
35	11.78	5.21	6.37	8.23	95	31.27	47.47	34.68	58.78
38	8.41	6.41	6.34	9.02	97	40.68	40.00	27.49	48.53
41	6.52	19.77	12.58	23.44	100	56.96	34.55	15.24	37.76
44	5.23	17.56	9.82	20.12	102	78.23	33.16	11.40	35.07
47	5.40	19.64	10.16	22.11	107	138.95	37.49	34.59	51.01
50	6.28	24.78	13.92	28.42	110	174.62	41.08	38.08	56.01
53	8.30	28.75	16.04	32.92	112	216.34	44.18	37.13	57.71
56	12.31	35.99	20.56	41.45	115	287.58	45.36	31.75	55.37
59	18.53	49.48	29.26	57.48	120	352.05	42.42	29.87	51.88
62	32.18	58.63	34.04	67.80	120	352.05	42.42	29.87	51.88

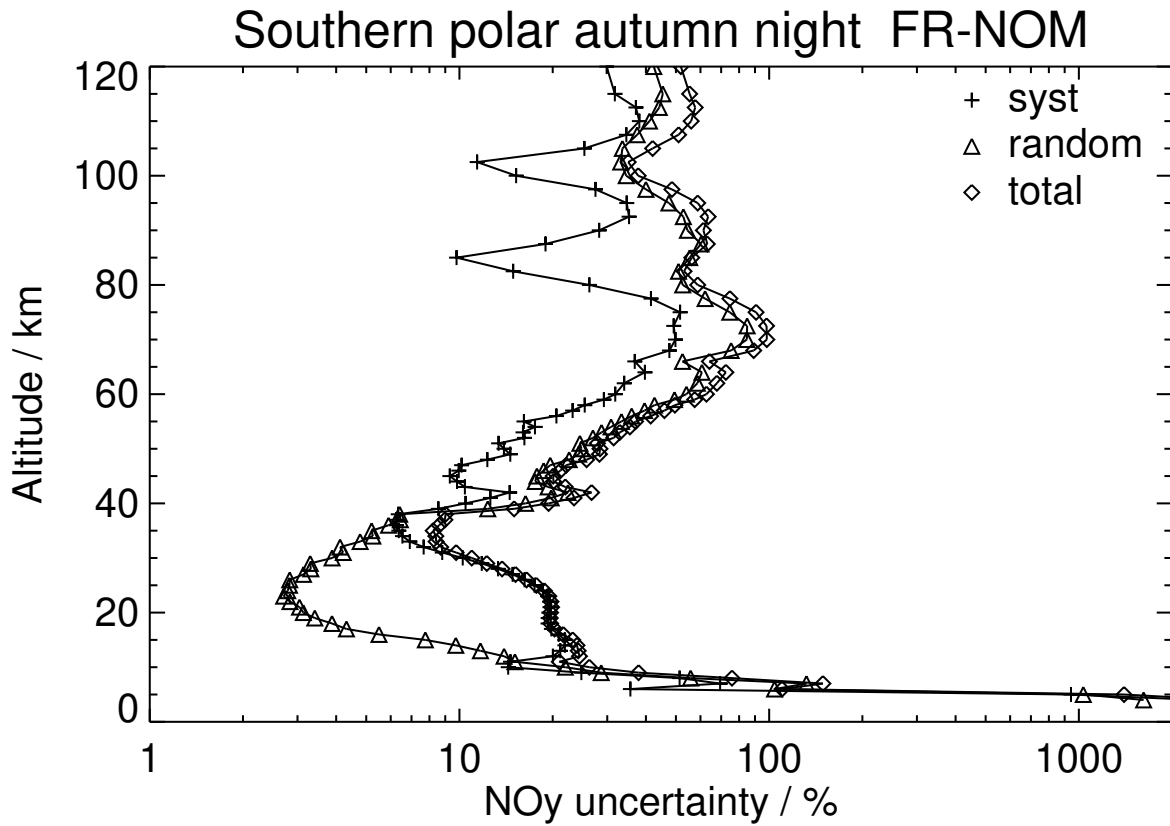


Figure S34: V8H.NOy_6X Southern polar autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.77	28.55	35.97	45.92
11	2.42	10.96	21.45	24.09
14	6.50	8.60	19.76	21.55
17	8.51	8.02	19.53	21.11
20	10.59	3.46	19.27	19.58
23	12.64	2.55	19.41	19.58
26	14.74	2.93	18.06	18.30
29	15.59	4.75	15.02	15.75
32	14.91	5.75	11.20	12.59
35	11.97	8.91	7.55	11.67
38	9.89	16.34	7.66	18.05
41	9.87	26.60	9.72	28.32
44	9.52	35.44	11.16	37.15
47	7.30	47.26	11.71	48.69
50	5.51	58.94	11.83	60.11
53	5.80	66.60	11.36	67.56
56	6.94	70.89	11.37	71.80
59	9.84	70.62	11.38	71.53
62	14.63	67.38	11.16	68.30

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	63.13	10.93	64.07
68	0.04	53.93	10.61	54.96
70	0.05	47.32	10.62	48.50
72	0.08	44.48	10.60	45.73
77	0.20	41.47	10.33	42.73
80	0.32	38.59	10.18	39.91
82	0.53	34.78	9.94	36.17
85	0.87	31.09	9.85	32.61
87	1.65	25.00	9.67	26.80
115	38.91	18.74	16.76	25.14
120	39.24	26.11	17.83	31.62
120	39.24	26.11	17.83	31.62

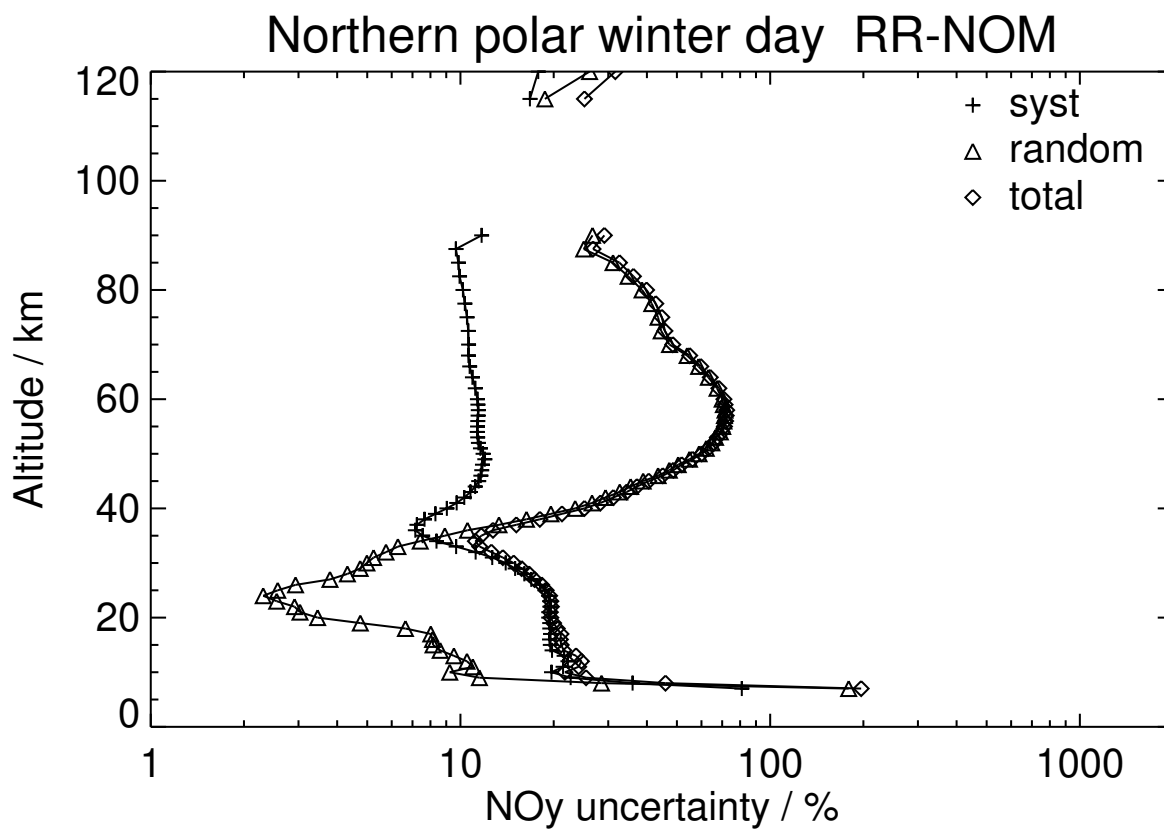


Figure S35: V8R_NO_y.26X Northern polar winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.35	63.67	39.36	74.85	64	0.06	50.12	13.32	51.86
11	1.87	12.52	20.72	24.21	68	0.04	51.07	11.30	52.31
14	5.13	7.53	20.37	21.72	70	0.04	56.45	11.66	57.64
17	10.43	6.14	19.16	20.12	72	0.04	58.65	12.66	60.00
20	12.21	5.72	20.24	21.03	77	0.10	65.81	16.92	67.95
23	13.87	3.24	17.79	18.09	80	0.16	62.05	17.34	64.43
26	13.76	5.77	14.06	15.20	82	0.25	59.76	18.26	62.48
29	14.16	5.26	10.92	12.12	85	0.38	57.09	18.75	60.08
32	12.93	5.28	7.67	9.32	87	0.67	55.42	20.09	58.95
35	9.99	5.09	5.33	7.36	92	1.89	49.61	20.91	53.83
38	8.49	5.21	4.41	6.83	95	3.25	55.45	21.69	59.54
41	8.45	5.25	4.24	6.75	97	6.77	53.17	21.32	57.29
44	9.00	5.70	4.52	7.28	100	15.87	47.15	22.56	52.27
47	8.21	7.01	5.40	8.85	102	22.16	41.84	20.06	46.40
50	6.56	10.80	5.93	12.32	107	27.56	38.10	18.04	42.16
53	4.94	15.92	6.28	17.11	110	32.25	34.98	17.71	39.20
56	5.44	27.73	6.48	28.47	112	31.83	36.02	17.94	40.23
59	9.97	44.94	9.43	45.92	115	32.64	34.40	17.86	38.76
62	39.26	53.68	13.20	55.28	120	44.50	34.62	18.76	39.38
					120	44.50	34.62	18.76	39.38

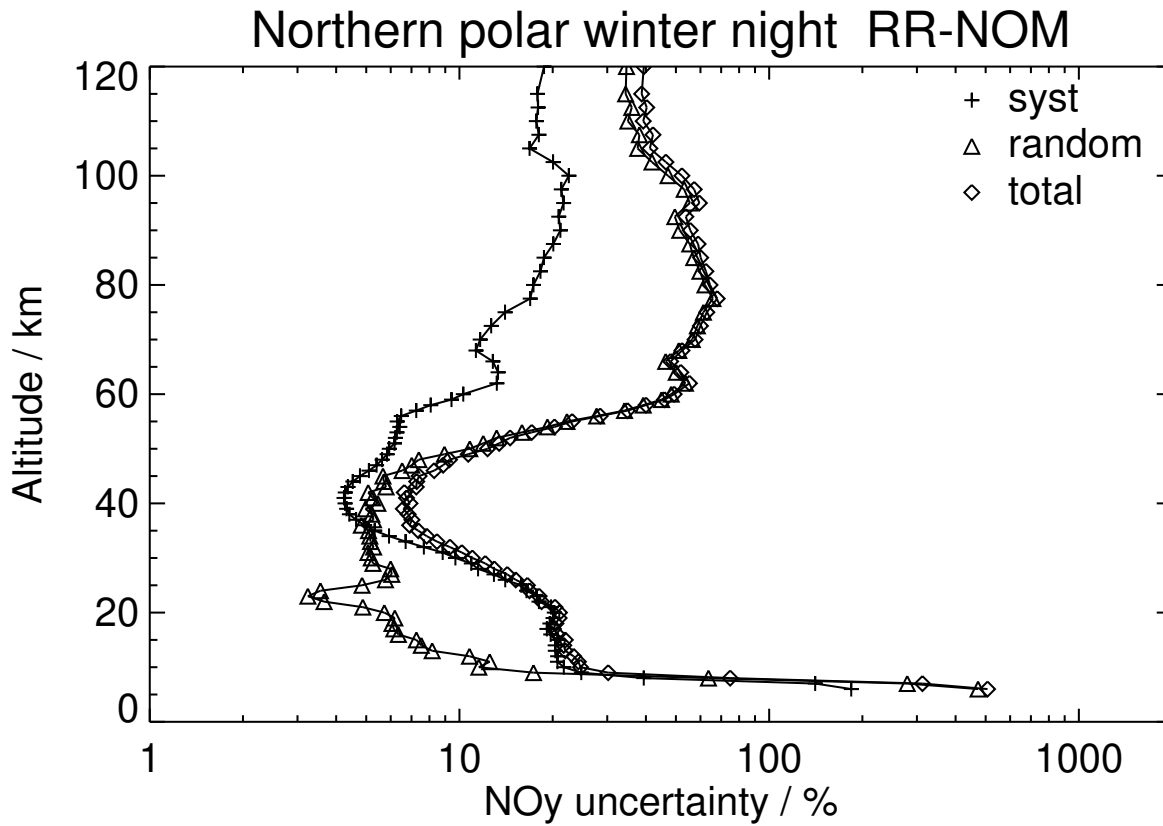


Figure S36: V8R_NOy_26X Northern polar winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	1.41	16.48	24.77	29.75	64	0.01	65.36	15.47	67.17
11	3.13	5.12	18.29	18.99	68	0.01	59.11	14.08	60.77
14	5.06	4.12	19.55	19.98	70	0.01	54.31	13.30	55.91
17	8.68	2.88	18.10	18.33	77	0.05	48.29	21.53	52.87
20	11.89	1.86	17.63	17.73	80	0.09	53.40	20.47	57.19
23	13.40	2.88	16.86	17.11	82	0.19	52.62	19.92	56.26
26	14.54	7.84	13.74	15.82	85	0.36	53.98	18.98	57.22
29	14.22	13.39	11.28	17.51	87	0.59	53.21	22.51	57.77
32	13.02	19.06	9.55	21.32	92	1.83	48.66	23.84	54.19
35	10.99	22.70	10.19	24.88	95	2.45	47.13	25.13	53.41
38	8.51	23.64	10.50	25.87	97	3.60	46.11	28.22	54.06
41	6.19	24.27	9.12	25.92	100	6.59	48.70	31.93	58.23
44	6.60	25.21	9.83	27.06	102	11.63	46.18	30.10	55.12
47	33.80	14.58	7.93	16.60	107	35.00	39.55	27.44	48.13
50	12.12	22.09	11.64	24.97	110	49.81	36.52	25.77	44.69
53	5.46	35.79	10.86	37.41	112	64.14	33.80	24.66	41.84
56	3.94	51.20	11.25	52.42	115	70.94	31.04	22.80	38.52
59	4.32	63.39	14.04	64.92	120	118.70	24.87	22.85	33.77
62	5.42	66.25	15.44	68.02	120	118.70	24.87	22.85	33.77

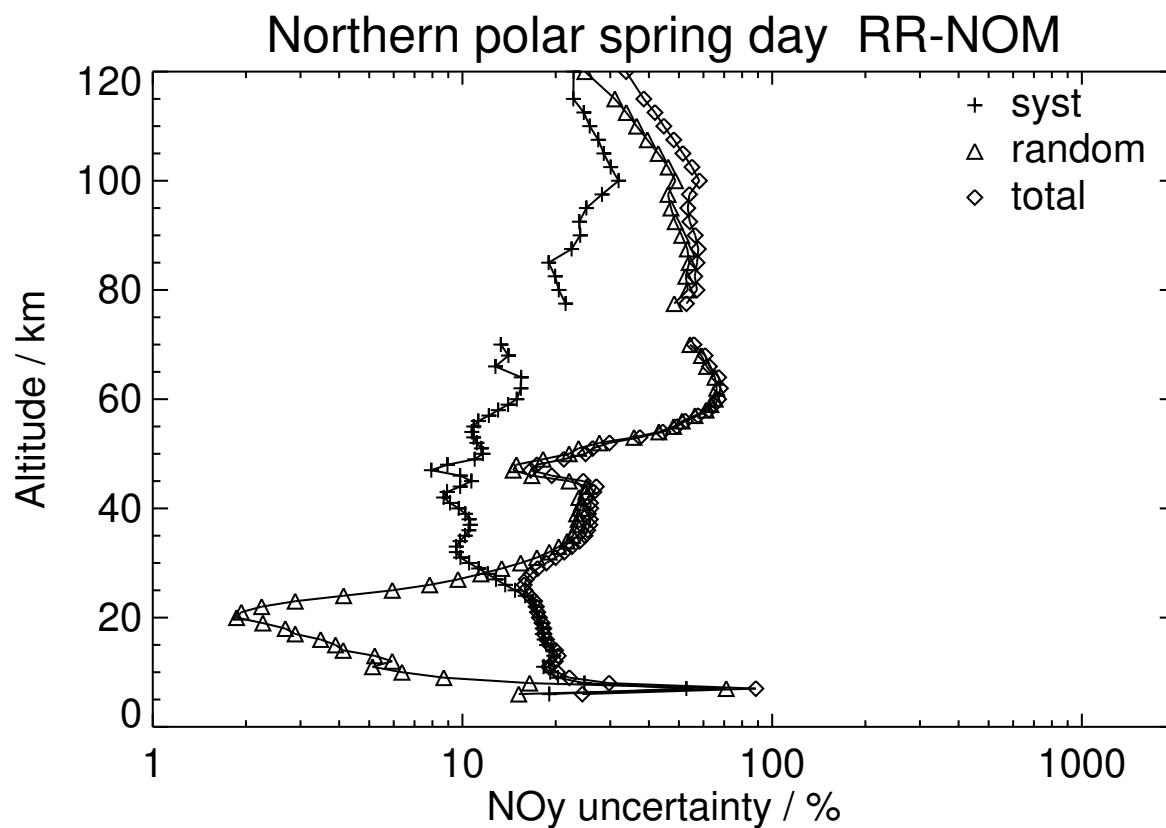


Figure S37: V8R_NOy_26X Northern polar spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	1.09	27.52	25.29	37.38
11	2.91	7.07	18.13	19.46
14	4.42	6.79	19.13	20.30
17	7.43	5.46	18.88	19.65
20	11.65	2.74	18.37	18.57
23	13.52	2.41	17.08	17.25
26	14.34	3.11	14.27	14.61
29	15.09	4.57	9.94	10.94
32	13.25	6.00	7.94	9.95
35	10.17	7.01	7.37	10.17
38	8.65	7.07	7.52	10.32
41	7.14	6.89	8.47	10.92
44	4.63	9.85	8.18	12.80
47	4.84	15.86	5.74	16.87
50	11.10	15.73	4.92	16.48
53	6.62	31.00	6.20	31.61
56	4.64	53.58	7.51	54.10
59	4.22	62.57	9.05	63.22
62	4.78	59.36	10.41	60.26

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	55.93	13.32	57.49
68	< 0.01	> 100	54.38	> 100
70	< 0.01	> 100	59.43	> 100
72	< 0.01	> 100	59.43	> 100
92	1.35	40.89	22.26	46.55
95	1.66	47.26	22.37	52.28
97	3.16	46.07	23.29	51.62
100	7.70	43.68	24.21	49.94
102	11.51	42.80	20.04	47.26
107	25.37	39.03	17.99	42.97
110	36.89	36.13	18.46	40.58
112	43.95	33.99	18.34	38.62
115	52.68	32.01	18.56	37.00
120	73.47	28.04	18.95	33.84
120	73.47	28.04	18.95	33.84

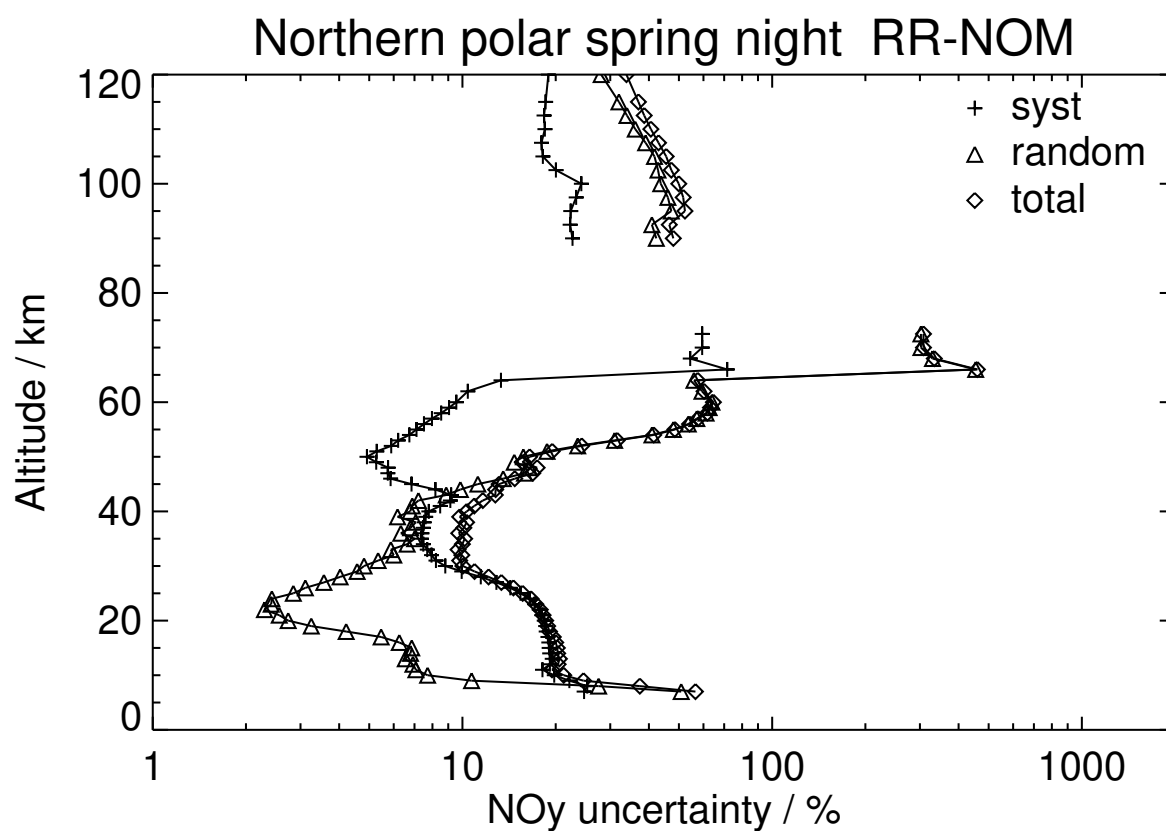


Figure S38: V8R_NOy_26X Northern polar spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
11	2.26	9.71	19.20	21.51
14	2.58	7.15	17.23	18.65
17	4.43	4.79	17.43	18.08
20	8.87	3.23	15.62	15.95
23	12.72	3.29	14.33	14.70
26	14.32	4.58	12.54	13.35
29	15.81	6.25	9.48	11.35
32	15.36	7.71	7.21	10.55
35	14.63	8.57	6.27	10.61
38	11.25	9.28	6.58	11.38
41	9.90	9.97	6.83	12.09
44	8.41	11.30	7.73	13.69
47	6.69	14.65	8.06	16.72
50	5.39	21.26	7.91	22.69
53	5.30	23.10	7.91	24.42
56	4.83	30.41	8.20	31.49
59	4.32	53.59	9.17	54.37
62	4.05	63.13	10.60	64.01

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	62.73	11.54	63.79
68	0.01	51.50	13.00	53.12
70	< 0.01	> 100	57.32	> 100
72	< 0.01	> 100	57.32	> 100
95	3.89	38.65	14.64	41.33
97	8.98	37.97	14.31	40.57
100	10.35	37.61	15.98	40.86
102	16.16	35.90	17.64	40.00
107	33.86	31.90	17.98	36.62
110	44.08	29.12	18.19	34.33
112	54.97	25.93	18.45	31.82
115	67.32	22.70	18.78	29.46
120	90.09	18.33	19.71	26.92
120	90.09	18.33	19.71	26.92

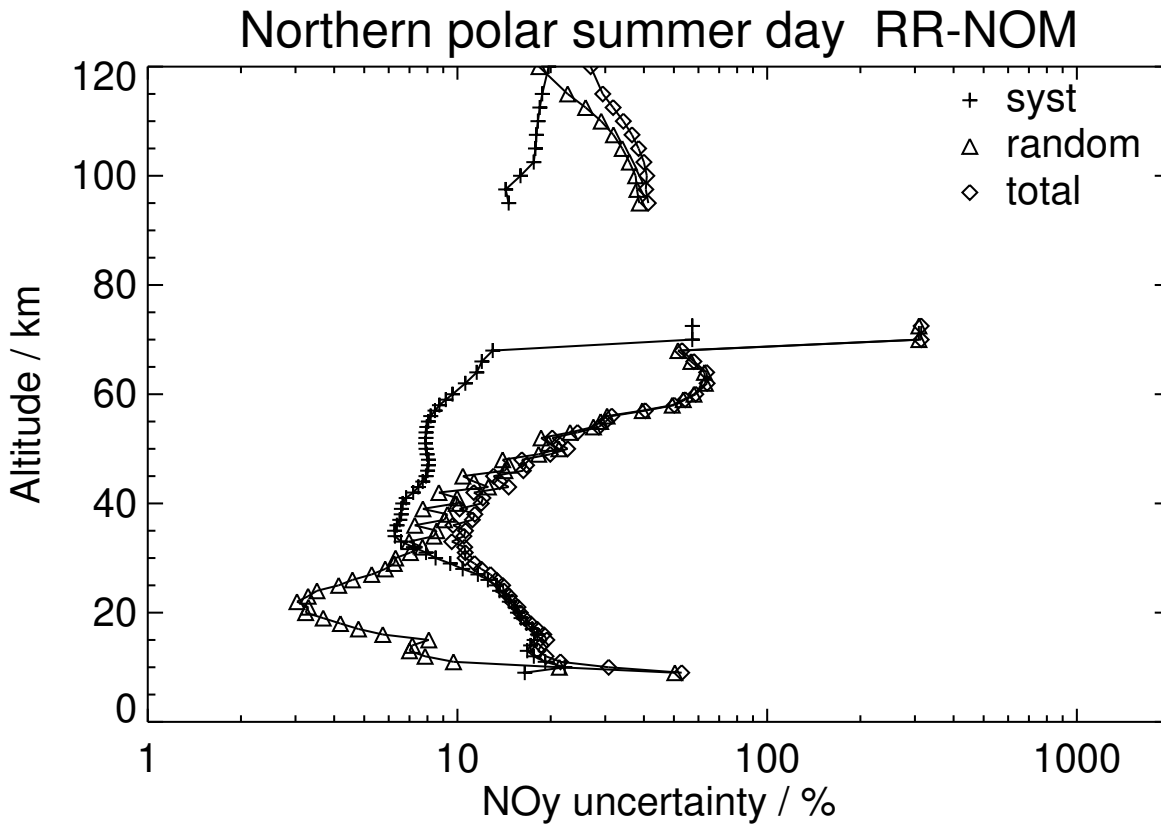


Figure S39: V8R_NOy_26X Northern polar summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
14	2.07	9.56	18.74	21.04	64	0.01	55.69	11.22	56.81
17	4.50	4.50	18.95	19.48	68	0.01	45.18	20.58	49.65
20	9.30	2.64	17.00	17.21	82	0.07	35.80	25.72	44.08
23	13.40	2.69	15.28	15.51	85	0.14	42.38	27.14	50.33
26	15.02	2.60	12.89	13.15	87	0.37	41.49	27.21	49.62
29	16.66	3.21	9.33	9.86	92	1.08	43.54	20.54	48.15
32	15.95	4.09	7.23	8.30	95	2.21	39.88	18.11	43.80
35	13.24	4.18	6.58	7.79	97	4.21	38.17	15.54	41.21
38	10.25	4.64	6.90	8.32	100	6.48	37.05	15.47	40.15
41	8.95	5.05	7.60	9.13	102	10.86	35.59	15.24	38.72
44	7.05	6.04	8.05	10.07	107	24.91	31.94	15.08	35.32
47	6.49	8.63	7.04	11.14	110	34.50	29.85	15.09	33.45
50	6.52	15.53	6.01	16.65	112	46.61	27.67	14.92	31.44
53	5.55	24.39	6.09	25.14	115	57.96	25.90	14.97	29.92
56	4.89	40.06	6.60	40.61	120	84.91	24.22	16.38	29.24
59	5.39	49.27	7.52	49.84	120	84.91	24.22	16.38	29.24
62	10.24	52.35	8.94	53.11					

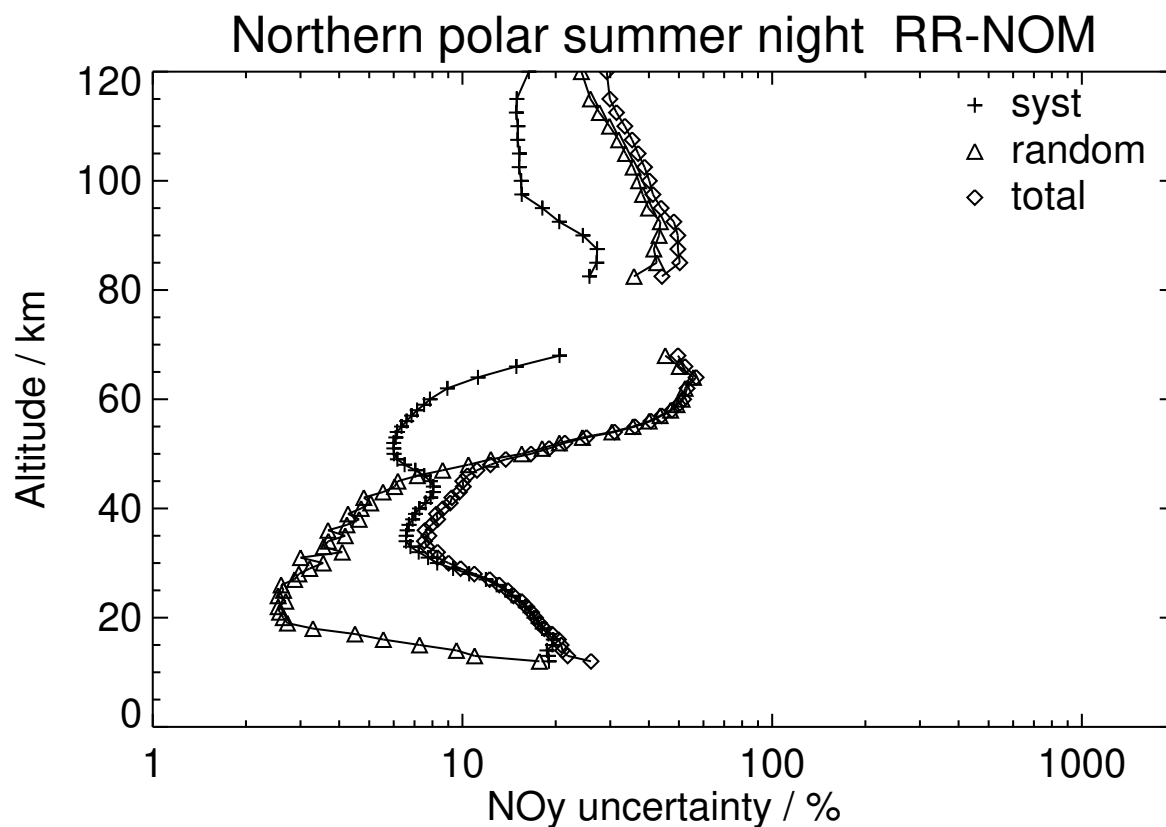


Figure S40: V8R_NOy_26X Northern polar summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
11	1.36	21.52	21.23	30.23	64	0.01	62.86	17.95	65.37
14	2.49	8.50	21.82	23.42	68	0.03	60.47	22.86	64.64
17	7.19	4.37	19.06	19.55	70	0.04	58.71	24.63	63.66
20	12.00	2.71	18.86	19.06	72	0.04	60.33	23.62	64.79
23	15.03	2.19	18.40	18.53	77	0.10	55.61	22.37	59.94
26	16.69	3.95	15.09	15.60	80	0.18	53.44	21.06	57.44
29	16.04	7.25	10.72	12.94	82	0.34	50.74	19.56	54.38
32	13.55	11.28	8.32	14.01	85	0.71	47.43	18.69	50.98
35	10.53	15.91	8.29	17.94	87	1.35	44.10	16.36	47.04
38	8.36	20.37	8.93	22.24	95	4.73	32.70	13.25	35.28
41	6.30	25.66	9.29	27.29	97	6.91	36.10	15.76	39.39
44	5.79	31.34	9.42	32.72	100	11.40	35.34	15.92	38.76
47	5.52	37.55	9.68	38.78	102	20.06	32.15	14.98	35.47
50	3.76	51.78	10.12	52.76	107	51.70	26.28	14.21	29.87
53	3.62	60.54	10.16	61.38	110	69.70	24.10	14.29	28.02
56	4.86	63.61	10.56	64.48	112	90.54	21.65	14.83	26.24
59	6.38	64.46	12.81	65.72	115	66.53	23.43	15.35	28.01
62	11.26	63.42	15.91	65.39	120	74.85	24.09	17.21	29.61
					120	74.85	24.09	17.21	29.61

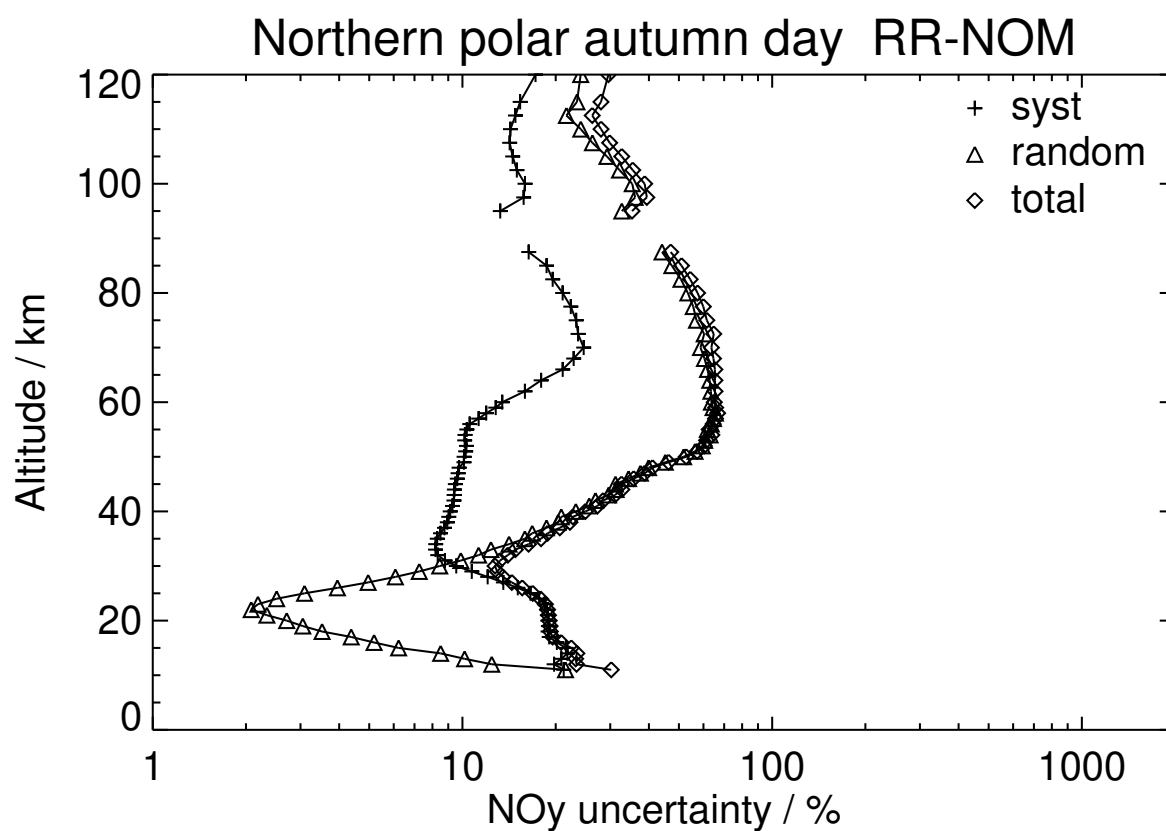


Figure S41: V8R_NOy_26X Northern polar autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
11	1.42	19.71	22.52	29.92	64	0.01	62.33	10.58	63.22
14	2.82	9.55	22.74	24.66	68	0.02	54.60	17.65	57.38
17	7.70	4.83	20.38	20.95	72	0.02	66.61	25.45	71.31
20	11.93	3.73	20.25	20.59	77	0.08	48.37	19.32	52.08
23	14.61	2.83	19.23	19.44	80	0.14	46.51	19.22	50.32
26	16.42	2.66	15.57	15.79	82	0.26	44.54	18.89	48.38
29	16.51	3.98	10.05	10.81	85	0.32	55.03	25.16	60.51
32	12.83	5.07	7.41	8.98	87	0.28	42.20	19.54	46.50
35	10.00	6.26	5.66	8.44	95	7.18	29.84	13.90	32.91
38	8.56	7.15	5.48	9.00	97	13.88	27.91	12.68	30.66
41	7.31	8.49	6.37	10.62	100	24.18	27.90	15.09	31.72
44	5.50	10.25	6.95	12.38	102	21.02	40.32	19.92	44.97
47	4.68	12.08	7.28	14.10	107	48.02	37.83	17.60	41.73
50	5.66	27.70	6.05	28.35	110	69.51	35.34	16.74	39.10
53	9.08	40.12	6.40	40.62	112	86.73	33.63	16.28	37.37
56	7.83	44.52	6.60	45.01	115	83.38	35.33	16.08	38.82
59	7.23	55.49	8.31	56.11	120	126.38	34.47	16.76	38.33
62	9.73	63.44	10.40	64.29	120	126.38	34.47	16.76	38.33

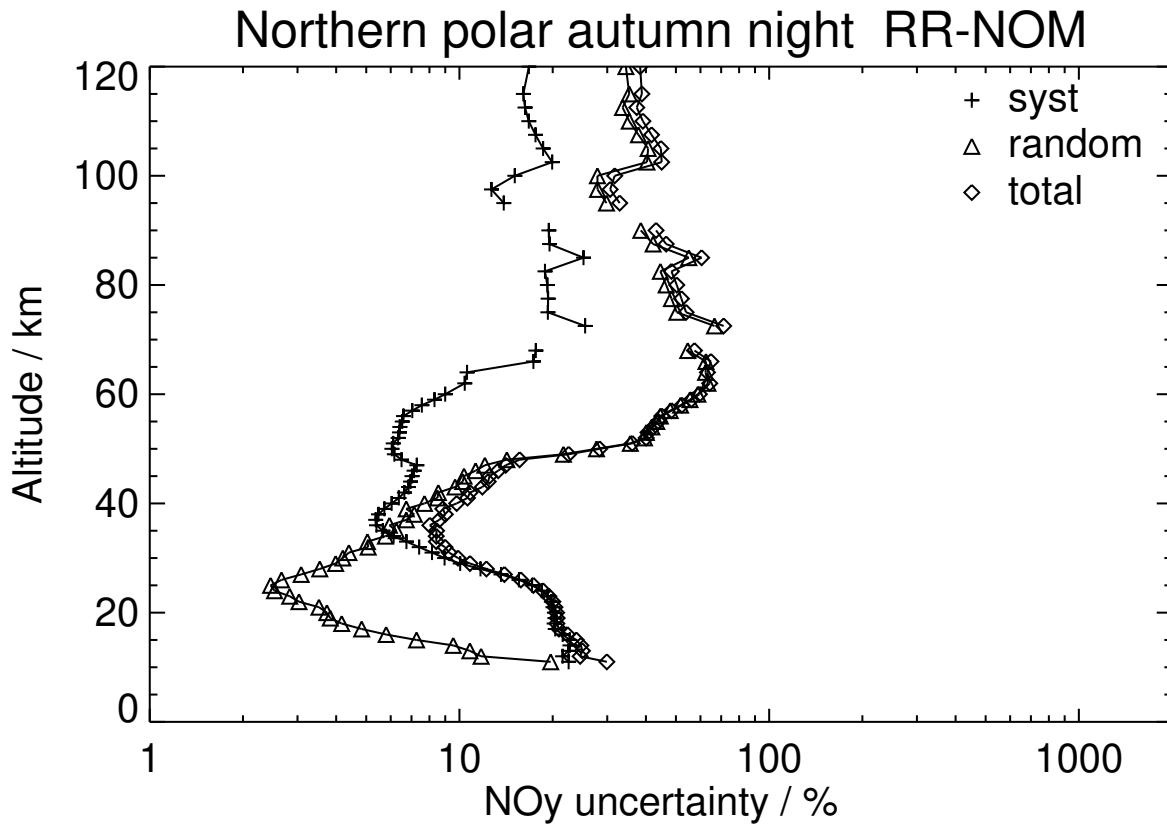


Figure S42: V8R_NOy_26X Northern polar autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.25	84.08	20.88	86.63
11	1.51	15.11	22.64	27.22
14	2.96	13.43	20.47	24.48
17	5.10	8.59	20.69	22.40
20	9.23	3.41	19.06	19.36
23	10.54	3.74	18.79	19.16
26	14.39	3.30	15.27	15.63
29	16.33	4.42	10.54	11.43
32	17.51	5.90	6.49	8.77
35	14.97	8.73	6.27	10.75
38	10.86	12.80	7.35	14.76
41	8.69	16.68	7.95	18.48
44	8.32	22.15	8.90	23.87
47	7.35	26.08	8.99	27.59
50	5.89	33.54	8.85	34.69
53	4.13	50.81	8.82	51.57
56	3.29	60.28	8.99	60.94
59	3.59	64.90	9.94	65.66
62	5.63	66.13	10.58	66.97

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	65.15	10.88	66.06
68	0.01	57.30	11.51	58.44
70	0.01	54.81	11.66	56.04
72	0.02	56.15	12.14	57.45
77	0.04	56.53	12.27	57.84
80	0.07	55.34	12.33	56.70
82	0.13	52.91	12.18	54.30
85	0.25	49.55	11.96	50.97
87	0.45	45.29	11.40	46.70
92	0.94	37.58	11.30	39.24
95	1.11	42.26	10.85	43.63
97	1.61	39.10	10.56	40.50
102	4.15	31.99	10.00	33.52
115	20.12	21.71	11.41	24.53
120	14.38	21.32	12.19	24.55
120	14.38	21.32	12.19	24.55

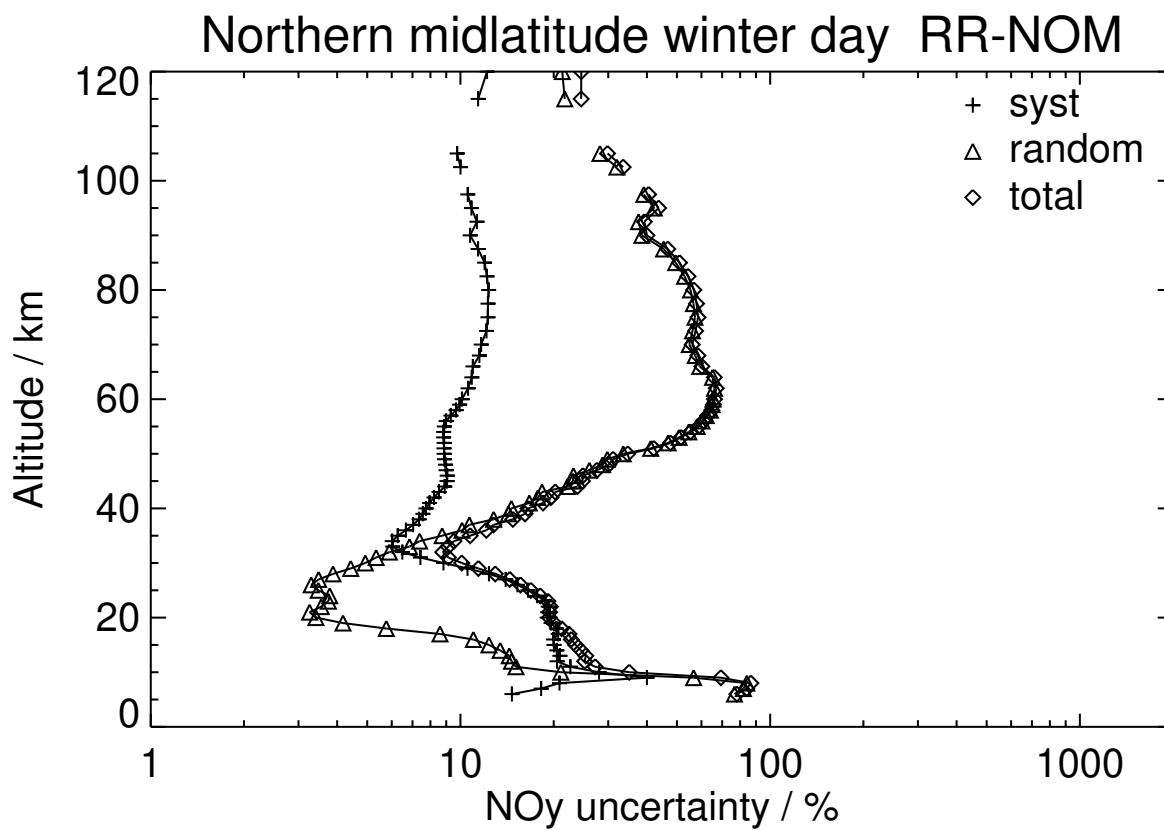


Figure S43: V8R_NOy_26X Northern midlatitude winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.10	> 100	47.72	> 100
11	1.36	15.88	22.02	27.14
14	2.75	12.57	19.86	23.50
17	4.38	9.92	20.73	22.99
20	9.00	4.27	19.10	19.57
23	10.73	4.07	18.38	18.83
26	14.45	2.79	14.78	15.05
29	16.86	3.12	9.35	9.86
32	18.01	3.06	5.71	6.48
35	14.76	3.33	5.16	6.14
38	10.34	4.11	5.48	6.85
41	8.03	4.71	5.55	7.28
44	7.70	5.78	6.13	8.43
47	7.29	6.74	7.31	9.94
50	5.47	8.96	7.78	11.87
53	3.99	15.13	7.12	16.72
56	3.02	24.77	6.94	25.73
59	2.27	37.46	9.29	38.60
62	1.79	51.12	13.98	53.00

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	57.19	15.87	59.35
68	< 0.01	53.29	12.54	54.75
70	0.01	61.36	11.75	62.48
72	0.01	69.65	13.19	70.89
77	0.03	64.86	13.56	66.26
80	0.05	60.04	13.52	61.55
82	0.08	55.84	12.87	57.30
85	0.15	51.16	12.67	52.70
87	0.26	46.91	12.41	48.52
107	5.18	31.14	11.20	33.09
110	5.88	30.32	11.06	32.27
112	6.99	29.44	10.70	31.33
115	7.85	29.95	10.66	31.79
120	10.98	28.39	9.81	30.04
120	10.98	28.39	9.81	30.04

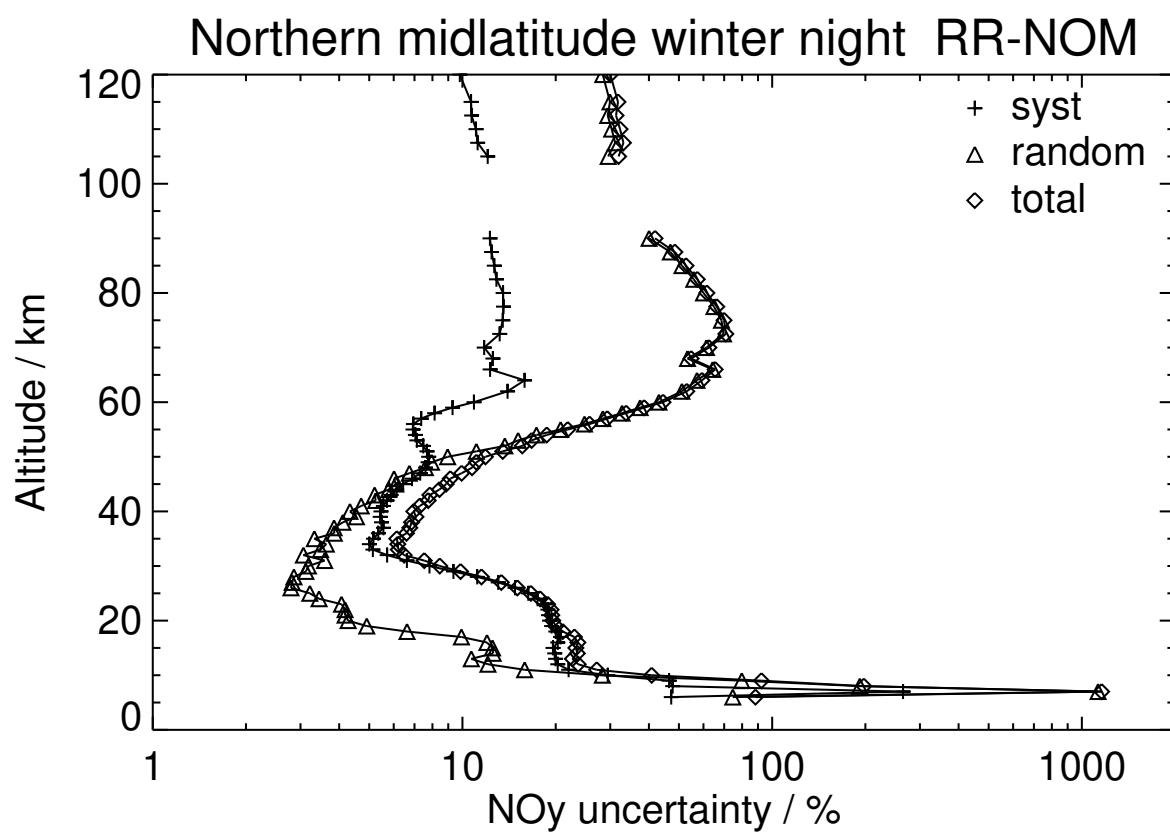


Figure S44: V8R_NOy_26X Northern midlatitude winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.83	34.06	23.50	41.39	64	< 0.01	68.88	11.48	69.83
11	2.15	13.41	19.59	23.74	77	0.02	63.87	14.28	65.44
14	2.99	13.76	18.13	22.76	80	0.04	59.18	14.35	60.90
17	5.44	9.32	18.43	20.66	82	0.09	58.08	14.38	59.84
20	9.41	4.59	17.41	18.00	85	0.17	57.04	14.56	58.87
23	12.32	3.27	15.62	15.96	87	0.35	54.19	14.34	56.06
26	14.03	5.08	12.68	13.66	92	0.83	48.49	15.50	50.91
29	14.56	7.25	9.43	11.90	95	1.23	46.09	16.36	48.90
32	14.84	9.59	8.39	12.74	97	2.30	42.46	18.21	46.20
35	12.03	11.40	8.65	14.31	100	3.96	46.34	25.33	52.82
38	9.96	13.84	8.87	16.44	102	6.65	45.52	20.54	49.94
41	9.31	15.52	8.78	17.83	107	19.15	39.36	19.23	43.81
44	8.09	19.37	9.03	21.37	110	28.69	35.92	18.46	40.38
47	6.66	22.49	8.66	24.10	112	31.73	32.15	17.81	36.76
50	5.78	28.62	8.41	29.83	115	24.04	28.20	16.22	32.53
53	4.89	42.41	8.45	43.24	120	34.07	22.74	16.54	28.12
56	3.83	55.43	8.81	56.13	120	34.07	22.74	16.54	28.12
59	3.18	62.49	10.32	63.33					
62	3.63	65.44	12.09	66.55					

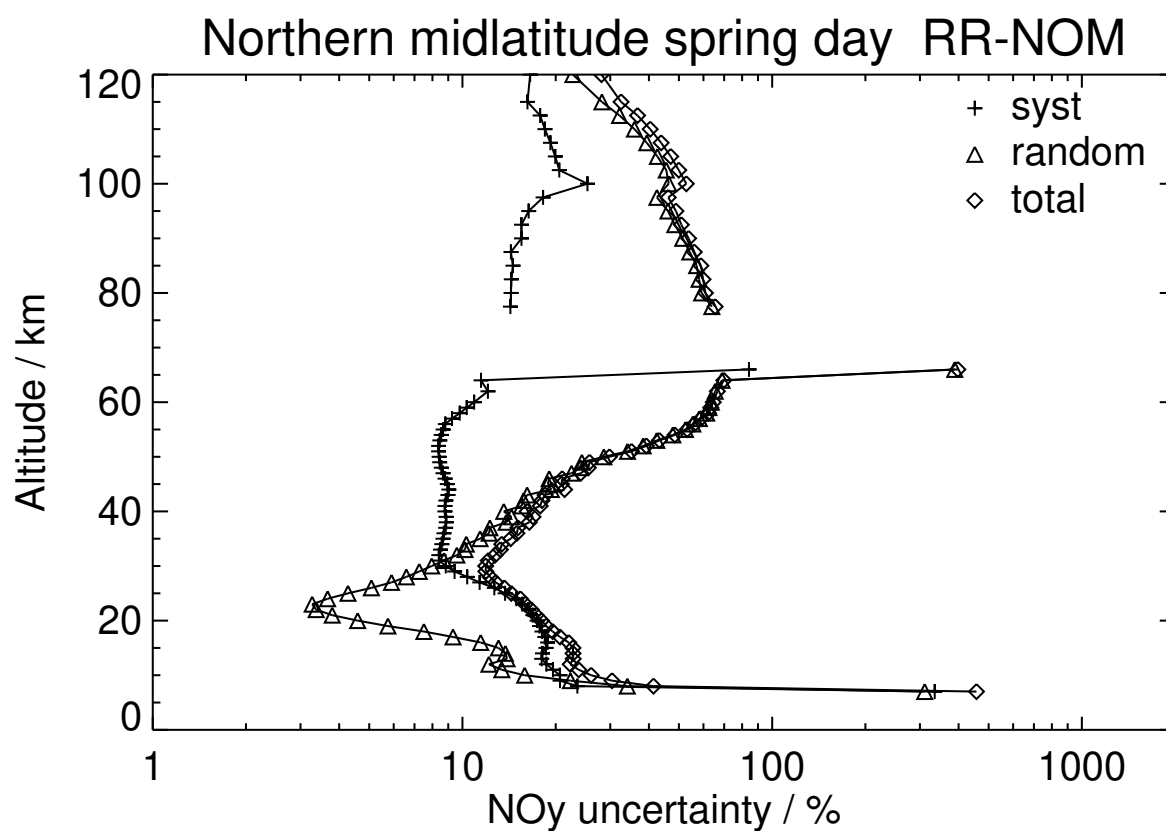


Figure S45: V8R.NOy.26X Northern midlatitude spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.56	55.16	26.57	61.23	64	< 0.01	70.87	10.58	71.66
11	2.20	11.82	18.52	21.97	68	< 0.01	> 100	18.14	> 100
14	3.02	10.75	19.99	22.70	70	< 0.01	60.72	11.26	61.75
17	5.73	6.89	18.54	19.78	72	< 0.01	60.72	11.26	61.75
20	9.21	4.21	17.58	18.07	80	0.02	53.98	12.97	55.51
23	12.32	2.72	15.79	16.02	82	0.04	51.31	13.83	53.14
26	13.66	2.97	12.54	12.89	85	0.09	47.97	13.29	49.77
29	15.50	3.68	8.67	9.42	87	0.18	44.79	13.16	46.68
32	15.03	4.09	6.45	7.63	92	0.47	38.68	13.51	40.97
35	12.26	4.37	5.37	6.92	95	0.51	37.89	14.27	40.49
38	10.40	4.67	5.32	7.07	102	2.33	32.12	13.60	34.88
41	9.34	4.86	6.00	7.72	107	4.87	28.17	12.79	30.94
44	7.75	6.20	6.71	9.14	110	7.09	25.80	12.81	28.80
47	6.56	7.08	6.69	9.74	112	9.00	24.91	12.53	27.88
50	5.47	8.87	7.02	11.31	115	9.57	26.61	12.61	29.45
53	4.26	13.53	7.33	15.39	120	15.18	25.48	12.12	28.21
56	4.15	42.51	6.51	43.01	120	15.18	25.48	12.12	28.21
59	3.37	54.61	7.37	55.11					
62	3.53	69.18	9.48	69.83					

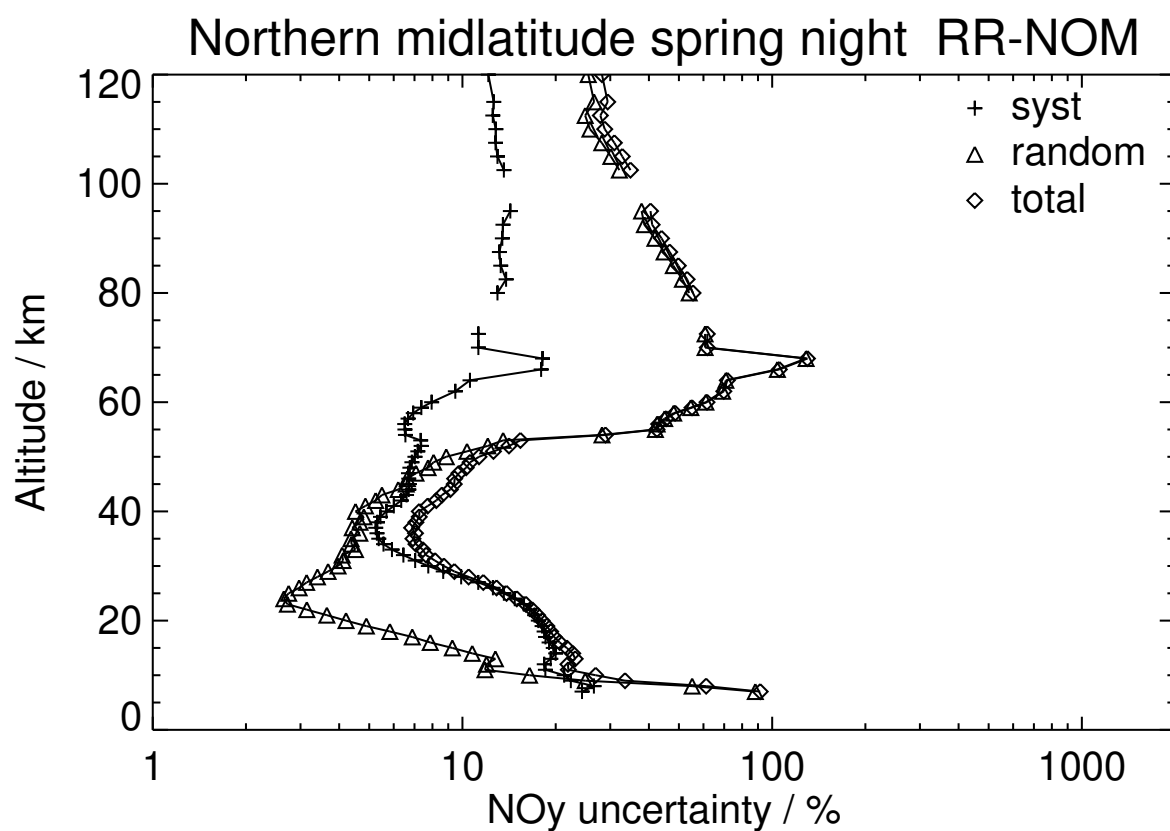


Figure S46: V8R_NOy_26X Northern midlatitude spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.76	28.73	20.58	35.34
11	0.64	24.42	13.44	27.87
14	0.56	29.04	12.47	31.60
17	1.19	17.78	16.40	24.19
20	5.10	5.31	18.18	18.94
23	10.50	3.41	15.67	16.04
26	13.49	3.75	12.60	13.15
29	15.04	5.47	9.25	10.75
32	16.82	7.21	7.79	10.61
35	17.02	8.79	8.17	12.00
38	14.29	10.50	8.55	13.54
41	12.70	12.28	8.57	14.97
44	11.10	14.95	8.63	17.27
47	9.82	16.83	8.40	18.80
50	8.81	19.60	8.18	21.24
53	7.76	25.42	8.02	26.66
56	5.82	43.43	8.47	44.25
59	4.23	60.27	9.81	61.07
62	3.41	68.08	11.48	69.04

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	68.20	11.51	69.17
85	0.06	55.01	15.53	57.16
87	0.17	54.25	14.90	56.26
92	0.84	50.75	15.21	52.98
95	1.46	48.48	15.30	50.84
97	2.20	46.84	15.26	49.27
100	3.30	44.18	15.38	46.78
102	5.42	43.01	17.62	46.48
107	11.48	37.15	16.83	40.78
110	14.83	33.97	16.99	37.98
112	18.74	30.37	17.18	34.90
115	23.30	26.74	17.41	31.91
120	32.24	22.04	18.32	28.66
120	32.24	22.04	18.32	28.66

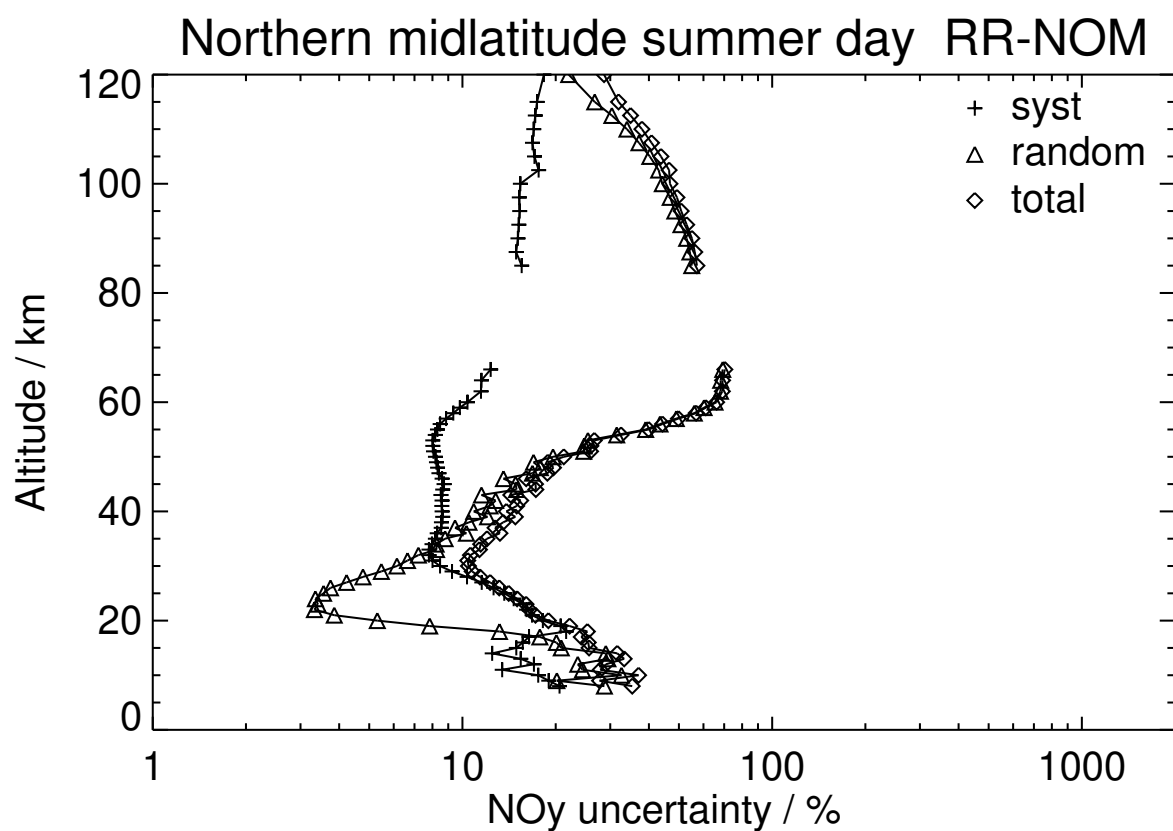


Figure S47: V8R_NOy_26X Northern midlatitude summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.34	65.77	32.24	73.25
11	0.35	44.22	18.46	47.92
14	0.58	30.21	11.85	32.45
17	1.77	12.10	18.24	21.89
20	5.36	5.32	17.55	18.33
23	10.81	2.84	14.90	15.17
26	14.06	2.63	11.93	12.22
29	15.79	3.19	8.51	9.08
32	17.59	3.12	6.38	7.10
35	17.16	3.41	5.09	6.13
38	14.10	3.80	5.29	6.51
41	12.05	4.21	5.68	7.07
44	10.99	4.23	5.94	7.29
47	10.31	4.73	6.51	8.04
50	9.13	5.60	6.79	8.80
53	8.76	13.91	6.53	15.37
56	6.54	19.37	7.17	20.66
59	4.79	36.06	8.13	36.97
62	3.68	55.07	10.29	56.02

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	62.33	12.10	63.49
87	0.12	38.42	16.72	41.90
97	1.81	31.77	16.57	35.83
100	3.22	28.94	16.36	33.24
102	3.37	29.18	15.32	32.96
107	5.90	26.73	15.08	30.69
110	6.83	26.80	14.65	30.54
112	8.49	26.41	14.43	30.09
115	11.10	26.71	14.53	30.40
120	16.91	25.98	13.99	29.51
120	16.91	25.98	13.99	29.51

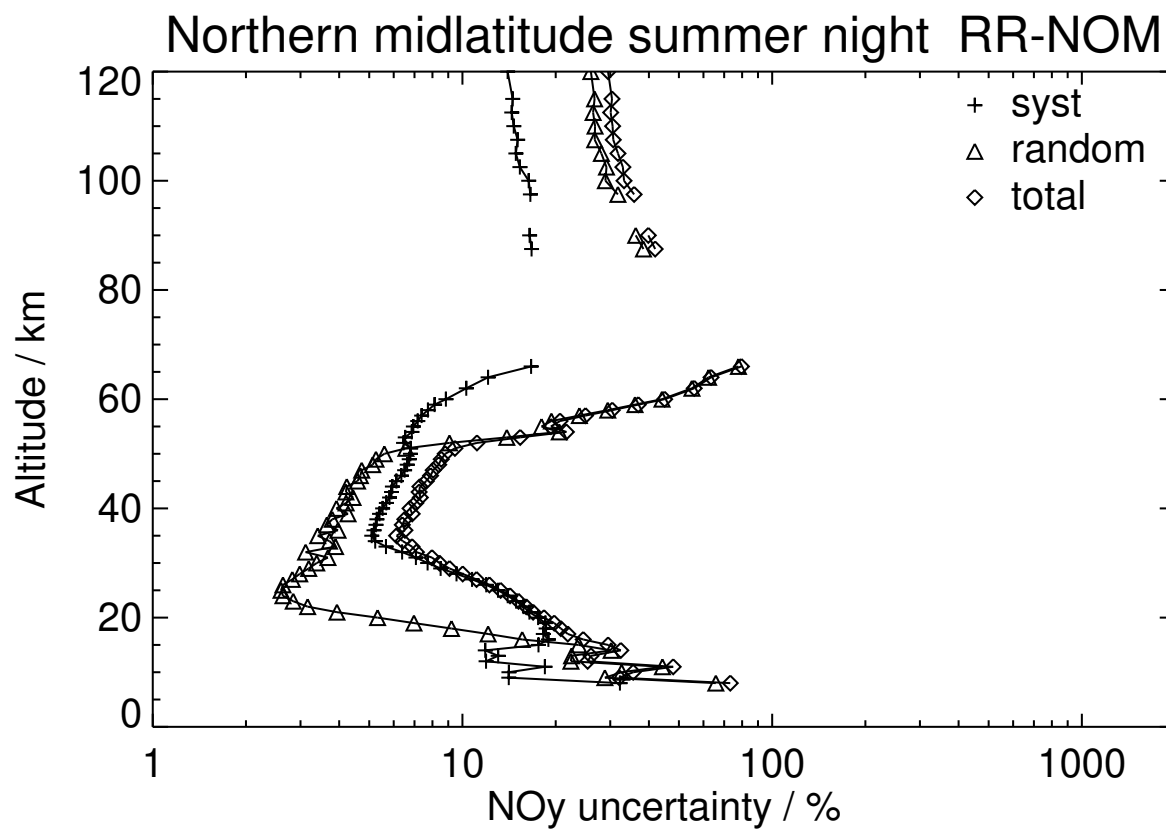


Figure S48: V8R.NOy.26X Northern midlatitude summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.17	> 100	44.31	> 100	64	< 0.01	63.97	11.09	64.92
11	0.44	35.91	15.15	38.98	68	< 0.01	> 100	27.73	> 100
14	0.68	24.06	11.79	26.80	77	0.01	52.57	12.16	53.95
17	1.75	13.70	21.16	25.21	80	0.03	54.83	12.58	56.25
20	5.89	6.43	19.22	20.27	82	0.05	56.43	12.38	57.77
23	10.63	3.75	17.11	17.52	85	0.11	54.93	12.28	56.29
26	13.96	3.70	14.14	14.62	87	0.23	52.92	12.08	54.28
29	16.23	6.12	10.33	12.01	92	0.56	48.32	11.71	49.72
32	17.22	8.79	8.53	12.25	95	0.73	46.65	11.27	47.99
35	17.24	10.75	9.08	14.07	102	3.54	37.42	11.11	39.03
38	16.31	12.63	9.54	15.82	107	6.69	29.65	10.53	31.47
41	15.72	14.32	9.56	17.22	110	8.21	27.69	10.95	29.77
44	13.28	17.49	9.58	19.94	112	12.29	22.87	10.76	25.27
47	9.97	20.55	9.08	22.47	115	11.13	23.20	12.99	26.59
50	8.52	24.41	8.72	25.92	120	11.93	22.74	13.44	26.41
53	6.63	37.45	8.60	38.43	120	11.93	22.74	13.44	26.41
56	4.31	51.62	8.77	52.36					
59	3.31	61.20	9.60	61.95					
62	3.23	63.77	10.37	64.61					

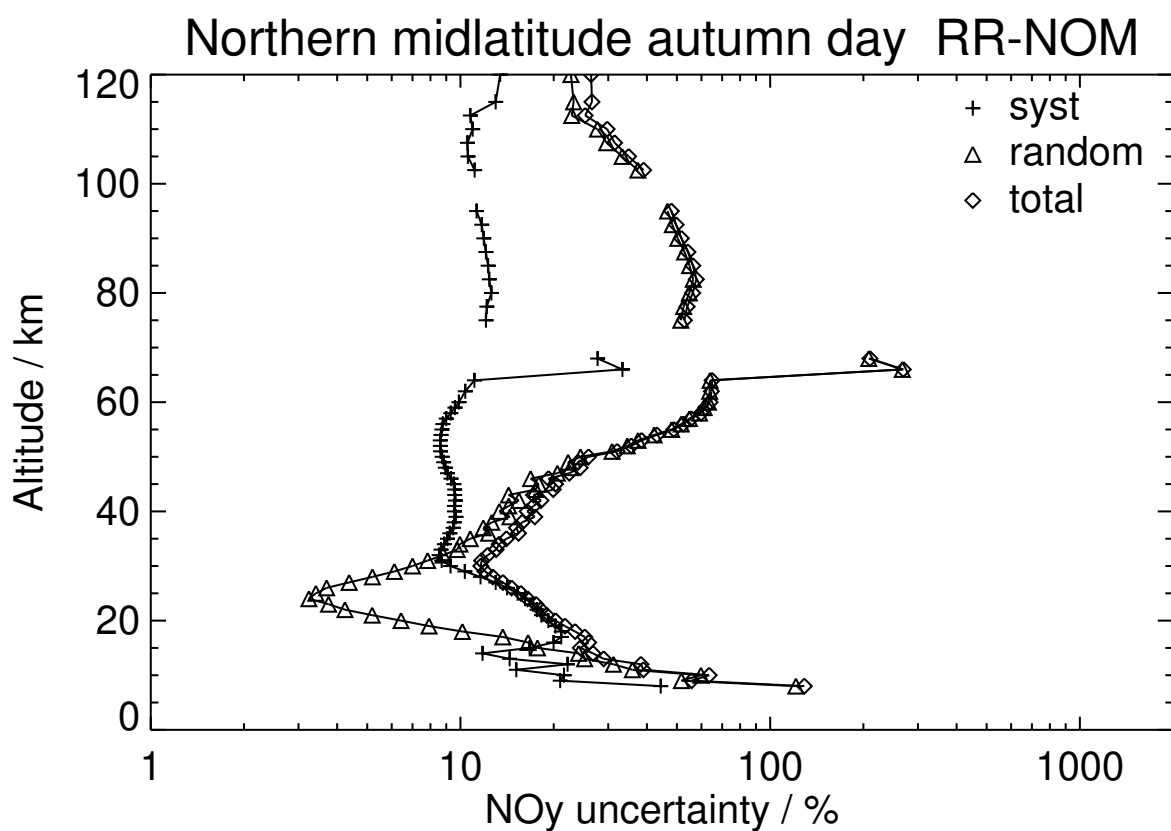


Figure S49: V8R_NO_y_26X Northern midlatitude autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.33	57.83	23.02	62.25
11	0.45	36.39	18.82	40.97
14	0.55	30.71	17.83	35.51
17	2.07	12.33	20.38	23.82
20	6.42	6.14	18.99	19.96
23	11.28	3.35	17.00	17.33
26	14.77	2.82	13.75	14.04
29	16.92	3.43	9.51	10.11
32	18.13	3.63	6.40	7.36
35	17.07	4.17	5.21	6.68
38	15.69	4.32	5.42	6.93
41	13.75	4.35	5.74	7.20
44	12.25	4.46	6.46	7.86
47	10.19	5.15	7.42	9.04
50	8.29	6.51	7.72	10.10
53	6.42	12.28	7.68	14.48
56	4.31	28.20	7.91	29.29
59	2.74	44.55	8.67	45.38
62	1.64	66.40	10.43	67.22

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	> 100	18.98	> 100
82	0.02	55.71	16.04	57.97
85	0.05	51.21	14.72	53.28
87	0.10	49.24	14.51	51.33
92	0.23	41.38	11.76	43.01
100	1.00	35.24	15.63	38.55
102	1.61	36.76	12.93	38.96
107	3.60	33.54	11.47	35.45
110	5.47	31.43	11.41	33.44
112	5.95	32.34	10.83	34.10
115	6.61	33.88	12.29	36.04
120	9.35	34.31	11.61	36.23
120	9.35	34.31	11.61	36.23

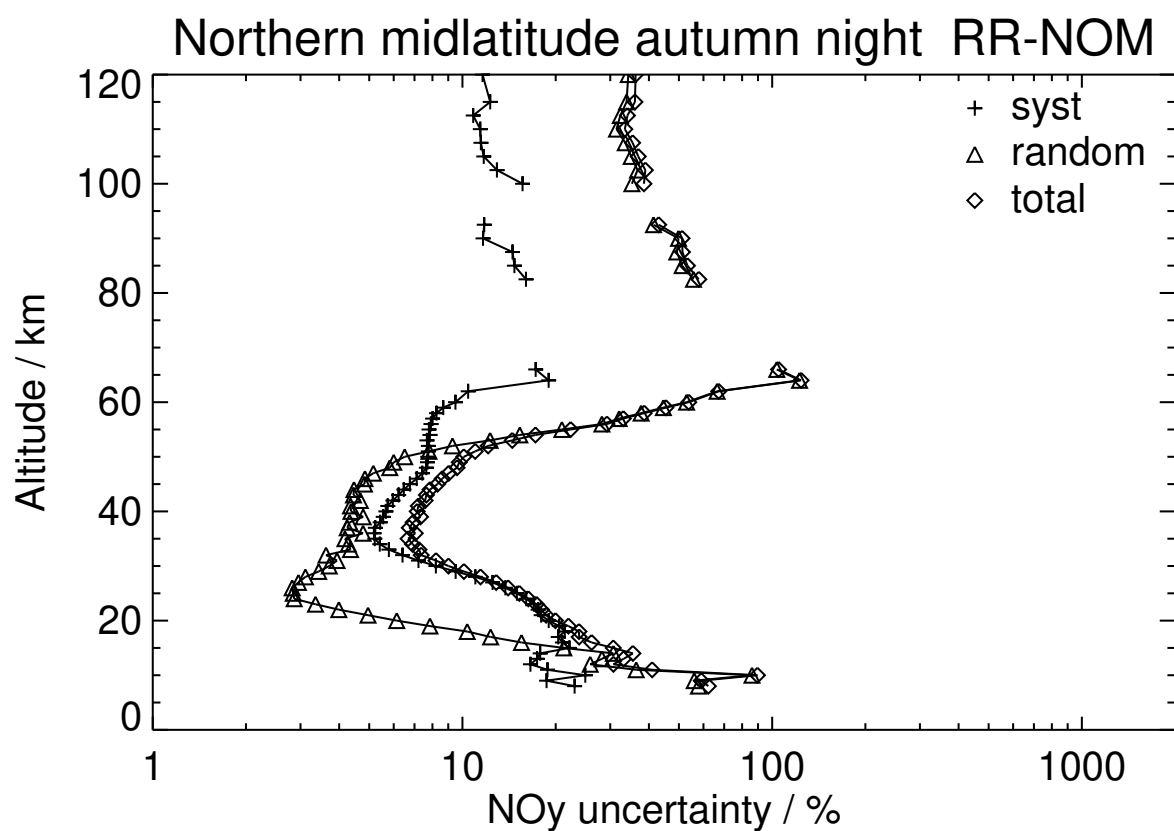


Figure S50: V8R_NOy_26X Northern midlatitude autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
11	0.18	78.62	19.13	80.92
14	0.10	> 100	32.54	> 100
17	0.51	31.54	7.69	32.46
20	2.10	13.02	16.74	21.21
23	5.64	9.28	14.99	17.63
26	6.83	6.97	13.01	14.76
29	9.12	6.69	9.35	11.50
32	12.23	8.06	7.78	11.20
35	17.30	8.80	8.32	12.12
38	17.80	9.52	8.30	12.63
41	15.67	10.58	8.43	13.53
44	12.17	13.02	8.68	15.64
47	9.35	17.47	8.72	19.53
50	6.62	23.47	8.67	25.02
53	4.90	34.83	8.41	35.83
56	2.98	49.80	8.81	50.57
59	2.26	67.09	9.97	67.82
62	2.11	73.85	10.96	74.66

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	77.46	11.58	78.32
68	< 0.01	69.73	4.69	69.89
92	0.41	49.67	13.60	51.50
95	0.83	48.66	13.76	50.56
97	1.27	47.67	14.33	49.78
100	2.28	45.27	14.59	47.56
102	3.67	42.49	14.72	44.97
107	7.83	35.01	14.22	37.79
110	10.82	31.44	13.23	34.11
112	14.80	27.15	12.31	29.81
115	13.48	22.93	15.76	27.82
120	17.83	16.89	16.47	23.59
120	17.83	16.89	16.47	23.59

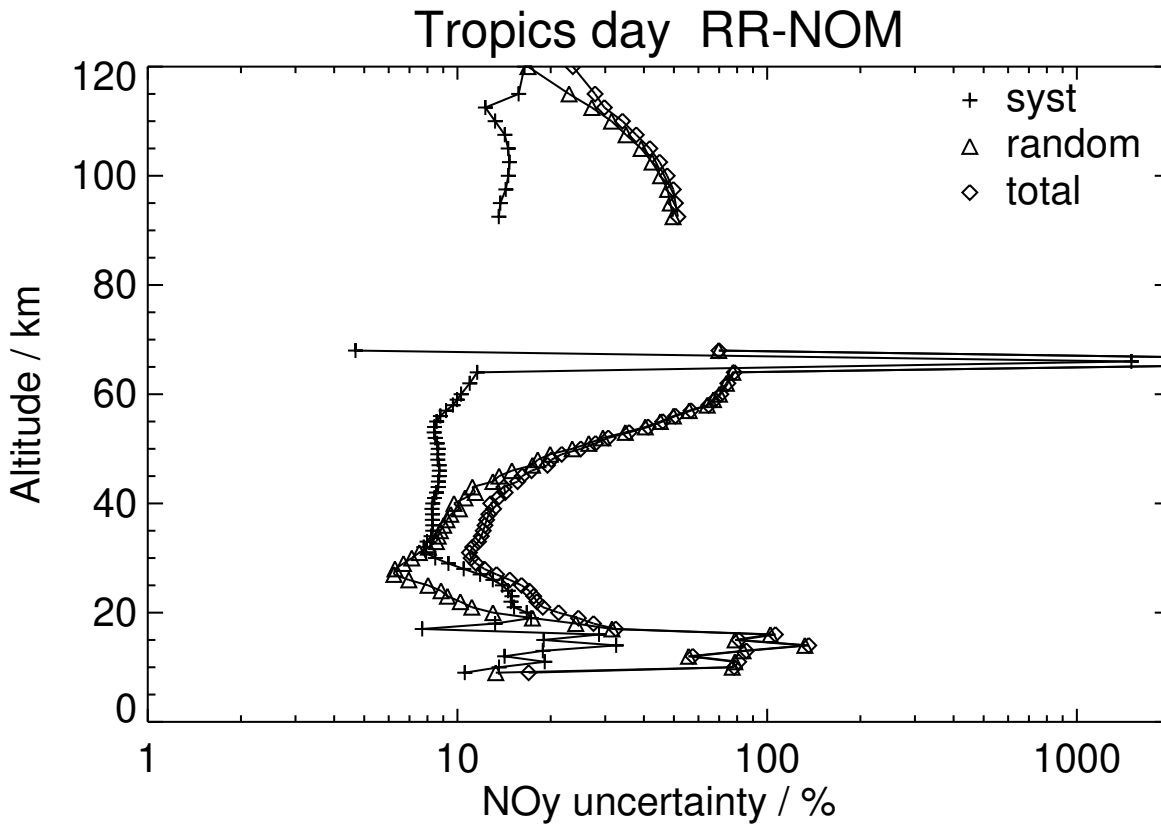


Figure S51: V8R_NOy_26X Tropics day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
11	0.34	38.55	13.15	40.73
14	0.32	43.76	13.29	45.74
17	0.37	44.46	14.39	46.74
20	2.40	12.28	16.02	20.19
23	5.52	7.46	14.82	16.59
26	7.23	4.69	12.26	13.12
29	9.75	3.99	8.62	9.49
32	13.64	3.86	6.10	7.22
35	18.01	3.68	4.41	5.74
38	18.46	3.72	4.84	6.10
41	15.73	3.73	5.78	6.88
44	12.38	4.02	6.76	7.86
47	9.10	5.19	7.54	9.16
50	6.51	7.39	7.56	10.57
53	4.49	12.16	7.65	14.37
56	3.34	24.80	7.13	25.80
59	2.26	42.38	7.61	43.06
62	1.73	63.35	9.45	64.05

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	> 100	13.12	> 100
92	0.25	37.38	15.12	40.32
95	0.40	37.34	15.18	40.31
97	0.57	36.46	14.27	39.16
100	0.90	36.12	14.17	38.80
102	1.68	33.81	14.60	36.83
107	3.77	31.30	13.73	34.18
110	5.46	29.92	14.04	33.05
112	6.28	31.00	14.41	34.18
115	7.71	31.39	14.51	34.58
120	10.66	29.59	13.73	32.62
120	10.66	29.59	13.73	32.62

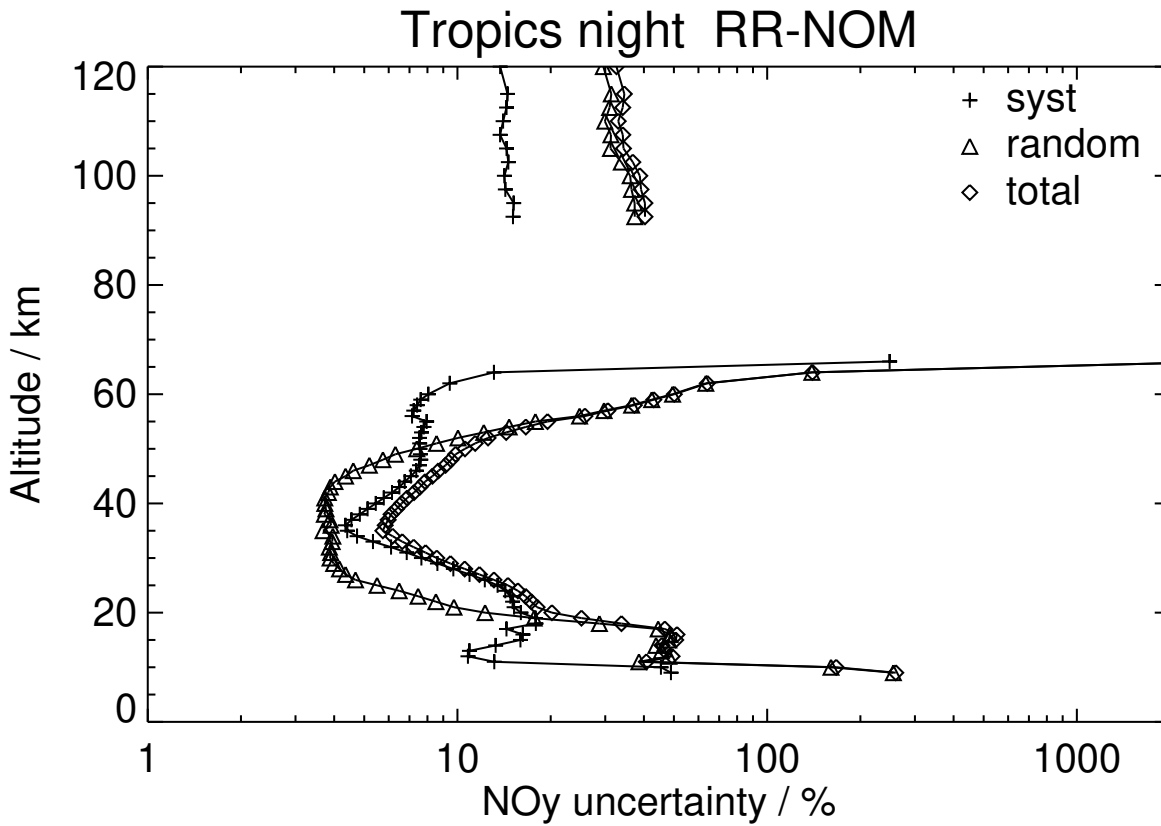


Figure S52: V8R_NOy_26X Tropics night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.10	> 100	66.34	> 100	64	0.01	57.03	10.49	57.99
11	2.10	14.60	22.64	26.94	68	0.02	51.64	11.86	52.98
14	2.40	13.70	21.94	25.87	70	0.02	48.06	12.60	49.69
17	5.48	8.29	20.53	22.14	72	0.03	44.20	13.43	46.19
20	9.63	5.35	20.23	20.93	77	0.05	47.65	14.29	49.75
23	13.30	3.78	19.41	19.77	80	0.08	48.12	14.13	50.15
26	16.53	5.24	16.27	17.09	82	0.15	47.47	13.88	49.46
29	17.52	12.74	12.49	17.84	85	0.30	45.85	13.52	47.81
32	16.40	17.45	11.68	20.99	87	0.56	43.51	13.14	45.45
35	14.42	19.95	12.58	23.59	92	1.45	38.84	12.89	40.93
38	11.01	23.50	12.92	26.81	95	2.43	36.63	13.08	38.89
41	7.37	28.65	11.59	30.91	97	3.97	34.70	12.96	37.04
44	6.07	31.40	9.44	32.79	100	6.80	32.65	12.84	35.09
47	5.57	32.89	8.20	33.90	102	12.06	29.58	12.63	32.16
50	5.49	34.87	7.81	35.73	107	30.35	24.13	12.72	27.28
53	5.25	43.97	7.87	44.67	110	41.61	22.60	13.04	26.09
56	5.40	51.86	8.28	52.52	112	48.95	22.14	13.81	26.09
59	7.30	53.35	9.09	54.12	115	41.85	25.54	13.96	29.11
62	10.07	54.46	9.76	55.33	120	57.09	30.12	15.74	33.98
					120	57.09	30.12	15.74	33.98

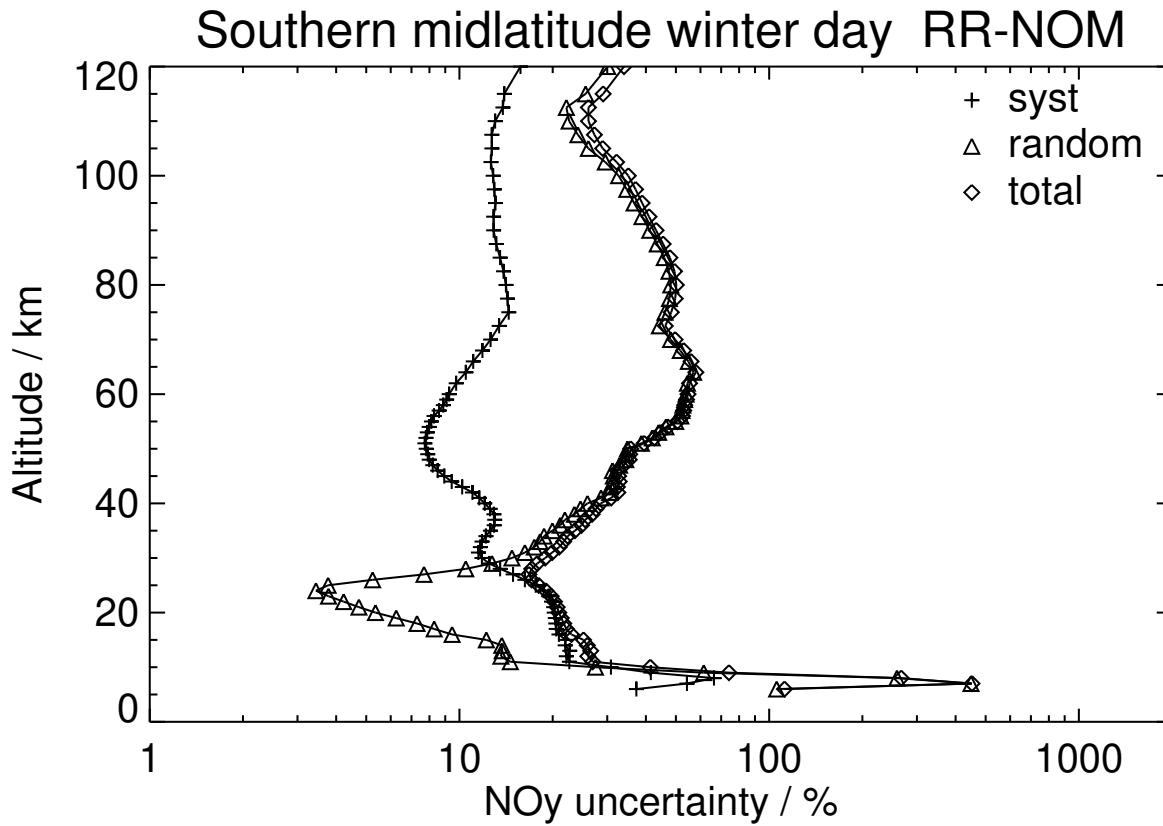


Figure S53: V8R_NO_y_26X Southern midlatitude winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.04	> 100	> 100	> 100	64	0.01	42.68	6.34	43.15
11	2.84	15.36	18.42	23.98	68	0.01	51.89	8.14	52.53
14	2.14	16.02	19.42	25.17	70	0.03	58.38	9.67	59.17
17	5.18	6.54	18.11	19.25	72	0.03	58.77	10.93	59.78
20	9.25	3.42	18.30	18.61	77	0.05	52.85	10.77	53.94
23	13.53	2.61	18.05	18.24	80	0.07	49.70	10.41	50.78
26	17.42	2.96	15.46	15.74	82	0.13	45.86	10.23	46.98
29	18.63	4.26	10.84	11.65	85	0.24	42.93	10.46	44.18
32	16.26	5.58	7.68	9.50	87	0.51	39.17	10.47	40.54
35	14.02	6.35	5.85	8.63	92	1.18	34.60	10.07	36.04
38	11.03	7.03	6.59	9.64	95	1.77	32.03	9.59	33.44
41	7.65	7.90	6.71	10.36	97	3.62	27.16	9.03	28.62
44	5.74	9.60	6.19	11.42	100	5.84	25.39	8.84	26.88
47	5.76	9.68	5.80	11.29	102	6.72	24.99	8.43	26.38
50	6.84	12.40	5.37	13.51	107	12.07	21.94	8.19	23.42
53	8.17	25.65	5.16	26.17	110	13.28	21.09	8.92	22.90
56	8.33	36.01	5.21	36.38	112	13.83	21.07	9.20	22.99
59	8.55	39.14	5.34	39.50	115	14.05	23.28	10.47	25.52
62	8.83	41.02	5.66	41.41	120	18.22	25.78	10.03	27.66
					120	18.22	25.78	10.03	27.66

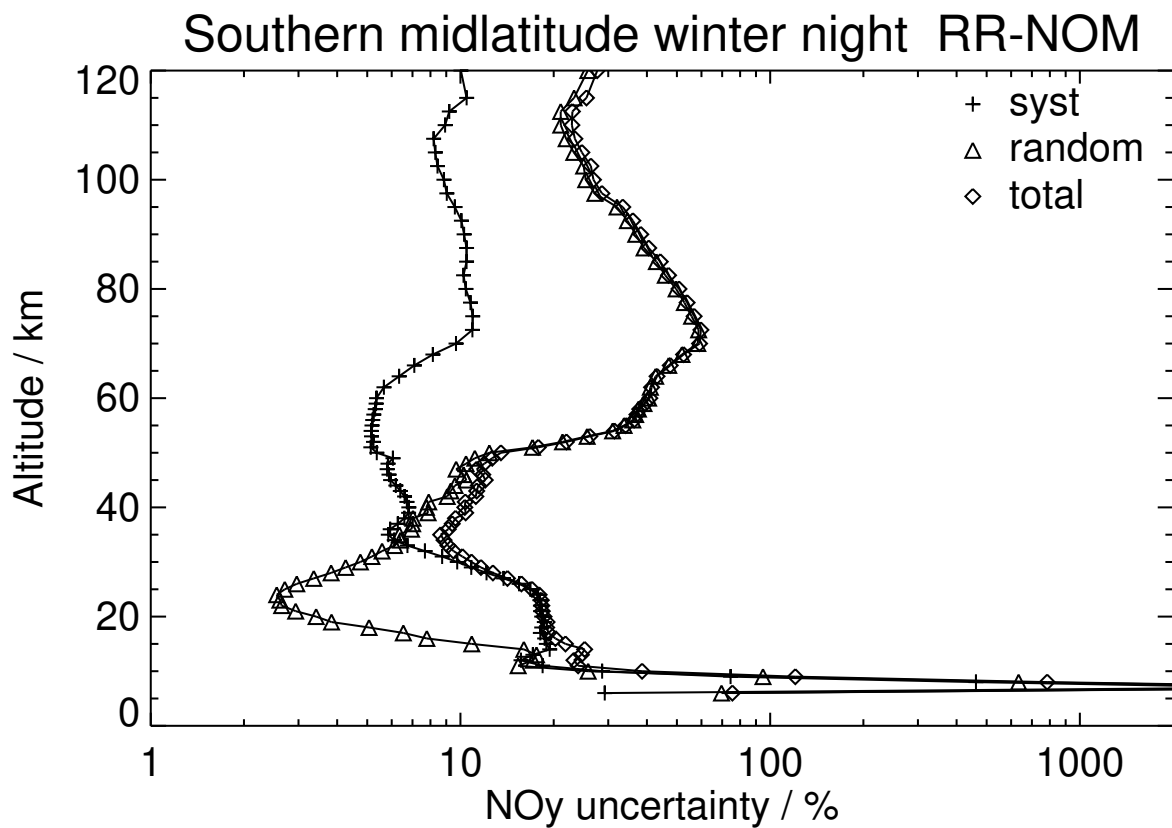


Figure S54: V8R_NOy_26X Southern midlatitude winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.04	> 100	> 100	> 100
11	1.55	15.25	20.26	25.36
14	2.13	15.33	18.81	24.27
17	5.41	8.58	17.18	19.20
20	11.26	3.70	15.43	15.86
23	13.03	3.01	15.20	15.50
26	13.90	3.45	12.65	13.11
29	14.86	4.98	9.03	10.31
32	16.86	7.48	7.58	10.65
35	16.93	10.29	8.07	13.07
38	13.03	12.79	8.92	15.59
41	10.14	15.31	9.01	17.76
44	8.55	19.10	8.86	21.05
47	7.26	21.41	8.57	23.06
50	5.85	27.37	8.46	28.65
53	4.79	42.33	8.58	43.19
56	3.88	53.60	9.35	54.41
59	3.43	66.71	12.16	67.81
62	3.64	69.50	14.00	70.90

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	68.28	14.12	69.72
87	0.16	61.60	20.67	64.97
92	0.48	52.85	19.29	56.26
95	0.86	50.11	19.91	53.92
97	1.57	47.72	20.18	51.81
100	2.66	46.24	20.58	50.61
102	5.17	43.58	20.16	48.02
107	15.34	37.28	19.31	41.98
110	22.04	33.66	18.57	38.44
112	28.02	30.08	18.10	35.11
115	31.89	26.13	18.36	31.93
120	48.99	18.33	18.70	26.19
120	48.99	18.33	18.70	26.19

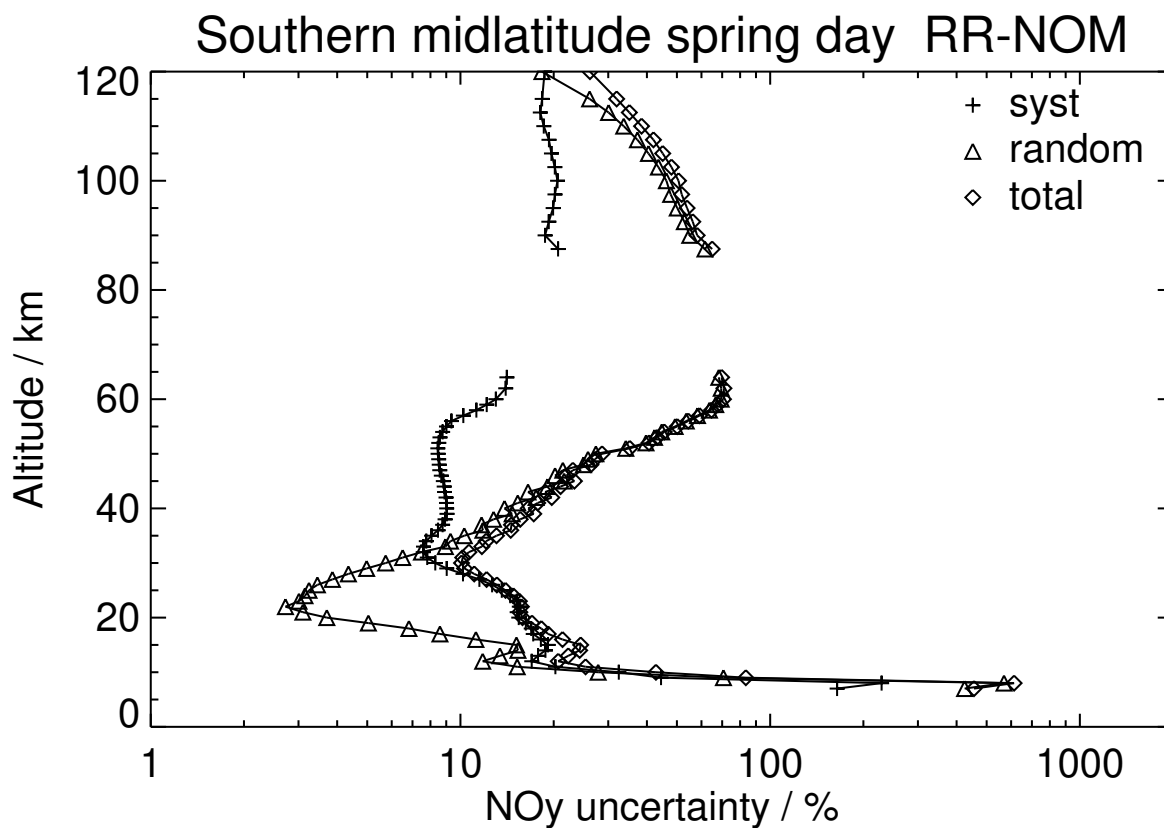


Figure S55: V8R.NO_y.26X Southern midlatitude spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.10	> 100	48.02	> 100
11	1.50	16.60	18.46	24.83
14	1.78	16.07	20.07	25.71
17	5.23	9.27	19.20	21.32
20	10.23	6.35	16.87	18.03
23	13.14	4.17	15.14	15.70
26	13.06	3.98	12.65	13.26
29	13.93	3.98	8.56	9.44
32	16.70	3.61	5.83	6.85
35	16.22	3.78	5.30	6.51
38	12.15	4.17	6.01	7.31
41	8.83	4.70	6.09	7.69
44	7.49	5.56	6.43	8.50
47	7.15	6.20	7.06	9.40
50	6.10	7.69	7.32	10.62
53	4.68	12.73	7.43	14.74
56	3.86	26.88	6.62	27.69
59	2.83	39.37	6.93	39.98
62	2.01	57.57	10.00	58.43

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	67.54	12.57	68.70
68	< 0.01	> 100	84.97	> 100
87	0.06	47.56	12.97	49.30
92	0.25	42.53	13.55	44.64
95	0.53	40.48	14.81	43.10
97	0.99	39.09	16.08	42.26
100	2.12	36.41	16.11	39.82
102	3.69	33.48	15.80	37.02
107	6.12	28.66	13.80	31.82
110	7.79	26.97	13.78	30.28
112	10.20	24.60	13.50	28.06
115	11.32	24.71	14.86	28.83
120	16.99	22.57	14.36	26.75
120	16.99	22.57	14.36	26.75

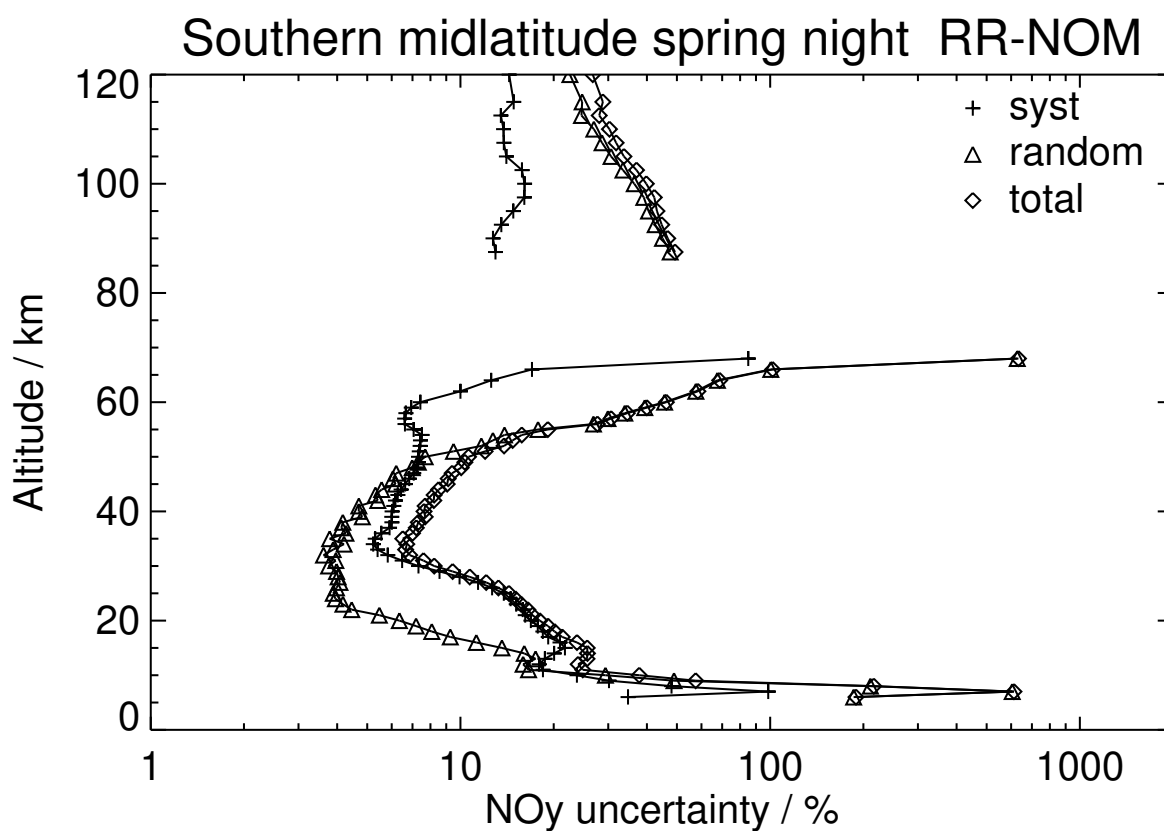


Figure S56: V8R_NOy_26X Southern midlatitude spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.26	71.48	18.69	73.88	64	< 0.01	63.53	12.65	64.78
11	1.42	14.28	16.28	21.65	68	0.01	52.90	11.16	54.07
14	1.84	12.02	15.85	19.89	70	0.01	50.45	11.62	51.77
17	2.72	8.78	15.46	17.78	72	< 0.01	> 100	38.71	> 100
20	6.52	4.54	15.81	16.45	85	0.07	48.98	12.53	50.56
23	11.02	3.81	14.32	14.81	87	0.14	49.66	13.01	51.34
26	14.65	4.87	11.18	12.20	92	1.25	45.85	13.84	47.89
29	17.56	6.46	8.30	10.52	95	2.49	41.42	20.30	46.13
32	18.06	7.58	7.07	10.37	97	4.56	41.45	26.22	49.05
35	17.43	7.98	6.95	10.58	100	8.78	40.55	26.81	48.62
38	15.44	8.23	7.35	11.04	102	13.24	40.55	24.66	47.46
41	13.46	9.10	7.81	11.99	107	21.90	38.50	22.00	44.34
44	11.18	11.27	8.18	13.93	110	28.29	36.06	21.83	42.15
47	9.01	13.80	8.36	16.14	112	36.10	32.94	21.71	39.45
50	6.75	18.27	8.21	20.03	115	45.49	29.65	21.75	36.77
53	5.32	29.61	8.06	30.69	120	62.75	24.52	22.67	33.40
56	4.48	42.80	8.46	43.63	120	62.75	24.52	22.67	33.40
59	4.33	58.30	10.43	59.23					
62	4.03	64.70	12.50	65.89					

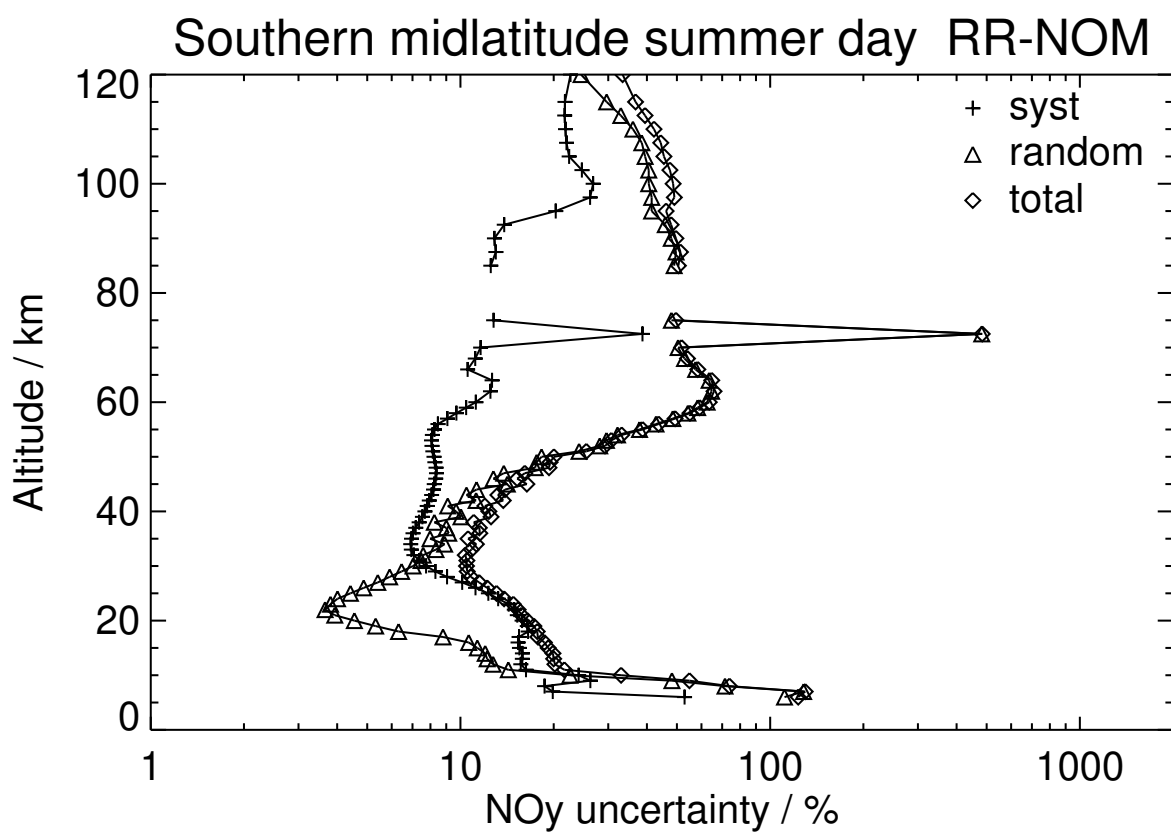


Figure S57: V8R_NOy_26X Southern midlatitude summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
8	0.12	> 100	59.30	> 100
11	1.58	13.28	18.05	22.41
14	1.75	14.11	19.03	23.69
17	2.90	9.00	17.66	19.82
20	6.77	4.93	16.12	16.86
23	11.23	3.15	14.35	14.69
26	15.28	2.83	10.83	11.20
29	17.72	3.29	8.12	8.76
32	19.31	3.57	6.62	7.52
35	17.57	3.40	5.11	6.14
38	15.61	3.38	5.39	6.36
41	12.65	3.57	6.02	6.99
44	10.32	3.95	6.86	7.92
47	8.43	4.79	6.98	8.46
50	7.29	5.99	6.43	8.79
53	6.13	13.08	6.00	14.39
56	4.82	27.77	6.07	28.43
59	4.15	46.87	7.23	47.43
62	3.74	61.75	9.42	62.46

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	63.32	11.44	64.34
68	< 0.01	> 100	86.54	> 100
70	< 0.01	> 100	> 100	> 100
72	< 0.01	> 100	> 100	> 100
100	3.48	41.44	16.32	44.54
102	6.01	37.95	15.99	41.18
107	7.66	31.07	17.08	35.45
110	8.62	28.68	17.37	33.53
112	10.80	27.02	17.40	32.13
115	13.74	25.80	17.33	31.08
120	19.71	23.15	17.13	28.80
120	19.71	23.15	17.13	28.80

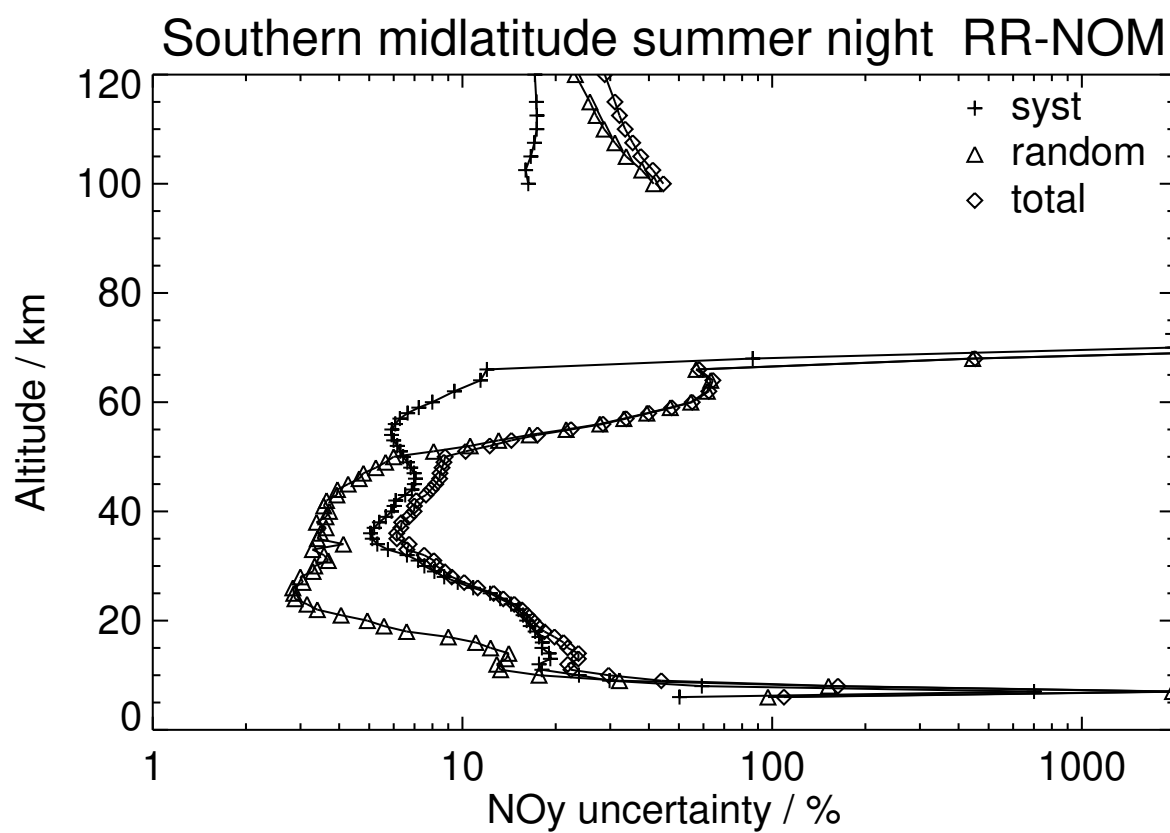


Figure S58: V8R.NOy.26X Southern midlatitude summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.34	57.14	22.94	61.57	64	0.01	64.89	13.81	66.34
11	0.85	19.46	21.65	29.11	68	0.02	57.96	13.14	59.43
14	1.41	15.56	21.08	26.20	70	0.02	51.89	13.41	53.59
17	3.70	9.69	20.12	22.33	72	0.03	44.87	13.73	46.92
20	8.19	5.64	19.09	19.90	77	0.05	44.63	18.45	48.29
23	12.65	3.79	17.71	18.11	80	0.09	44.93	20.59	49.43
26	16.12	3.91	14.35	14.87	82	0.21	44.16	21.00	48.90
29	18.14	6.53	10.23	12.13	85	0.36	44.84	20.51	49.31
32	18.98	9.95	8.70	13.22	87	0.70	42.71	19.92	47.13
35	16.01	12.82	9.13	15.74	92	1.64	39.34	19.18	43.76
38	13.47	14.76	9.32	17.46	95	2.70	36.59	19.00	41.23
41	12.12	17.29	9.35	19.66	97	4.10	34.93	18.70	39.62
44	10.18	21.02	9.17	22.94	100	6.93	33.13	19.03	38.21
47	9.43	23.41	8.75	24.99	102	11.60	30.83	18.34	35.87
50	7.19	31.93	8.37	33.01	107	30.55	26.19	16.99	31.22
53	4.99	49.89	8.38	50.59	110	45.97	24.14	16.48	29.23
56	3.41	57.80	8.79	58.47	112	61.40	22.58	16.61	28.03
59	3.42	63.88	10.58	64.75	115	35.71	27.85	16.46	32.35
62	4.94	66.22	12.45	67.38	120	52.85	27.54	18.22	33.02
					120	52.85	27.54	18.22	33.02

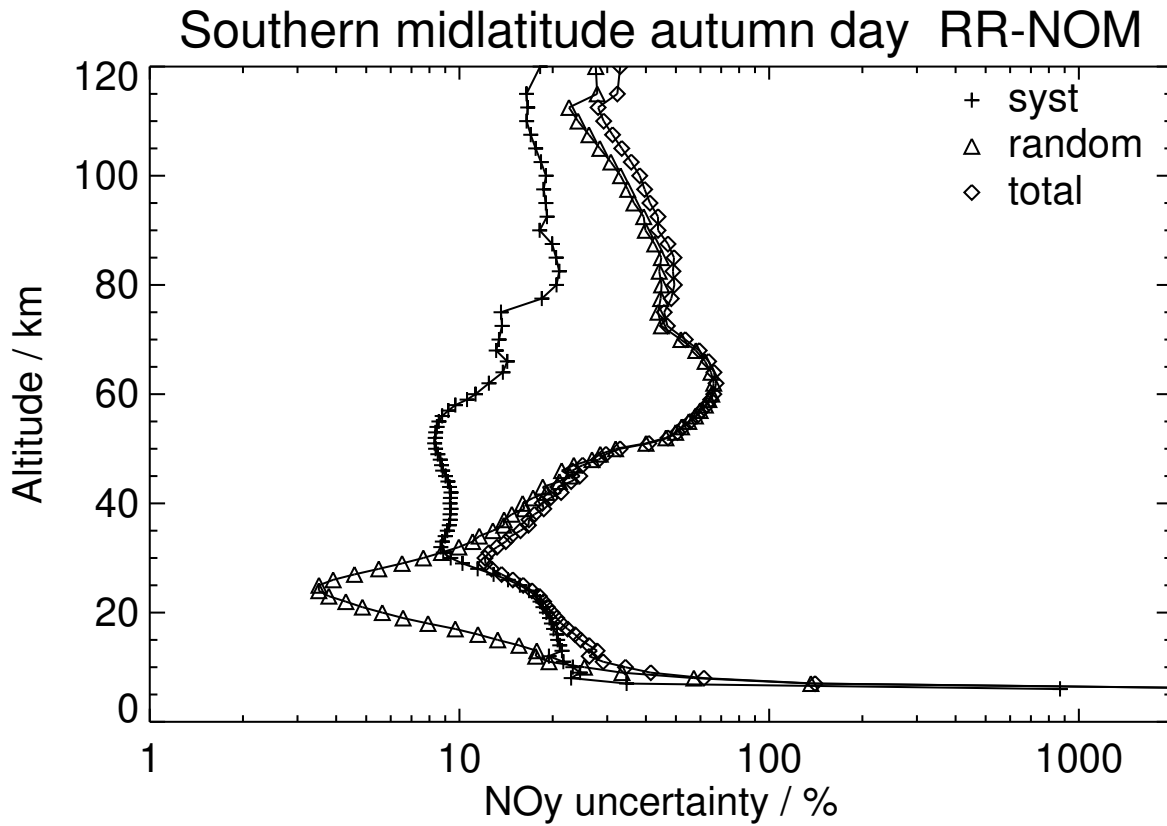


Figure S59: V8R_NOy_26X Southern midlatitude autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
8	0.07	> 100	77.98	> 100	64	0.02	73.83	16.49	75.65
11	0.88	19.09	15.75	24.75	68	< 0.01	> 100	63.76	> 100
14	1.27	17.23	21.23	27.34	70	< 0.01	> 100	> 100	> 100
17	3.48	7.37	19.44	20.79	72	< 0.01	> 100	> 100	> 100
20	8.12	5.16	18.84	19.53	77	0.05	68.04	22.20	71.57
23	13.64	3.46	16.99	17.34	80	0.09	65.36	20.30	68.44
26	16.77	2.66	14.06	14.31	82	0.16	64.29	18.25	66.83
29	19.14	3.26	9.36	9.91	85	0.36	62.91	19.20	65.77
32	19.28	3.95	6.38	7.50	87	1.21	55.28	21.87	59.45
35	16.49	4.26	5.25	6.76	92	5.26	39.56	22.72	45.62
38	13.59	4.44	5.29	6.91	95	7.89	36.66	22.12	42.81
41	11.86	4.69	5.68	7.37	97	6.64	42.36	22.22	47.83
44	10.35	5.37	6.30	8.27	100	10.68	39.00	22.15	44.86
47	9.16	6.06	6.79	9.10	102	8.56	42.16	16.77	45.38
50	7.62	7.52	7.15	10.37	107	15.10	38.36	14.80	41.12
53	7.95	36.13	6.80	36.77	110	18.83	37.22	14.44	39.92
56	7.02	60.32	7.89	60.84	112	24.32	35.44	14.34	38.23
59	8.77	75.49	11.02	76.29	115	21.56	36.51	15.92	39.84
62	13.37	79.34	14.22	80.61	120	29.33	35.28	16.40	38.90
					120	29.33	35.28	16.40	38.90

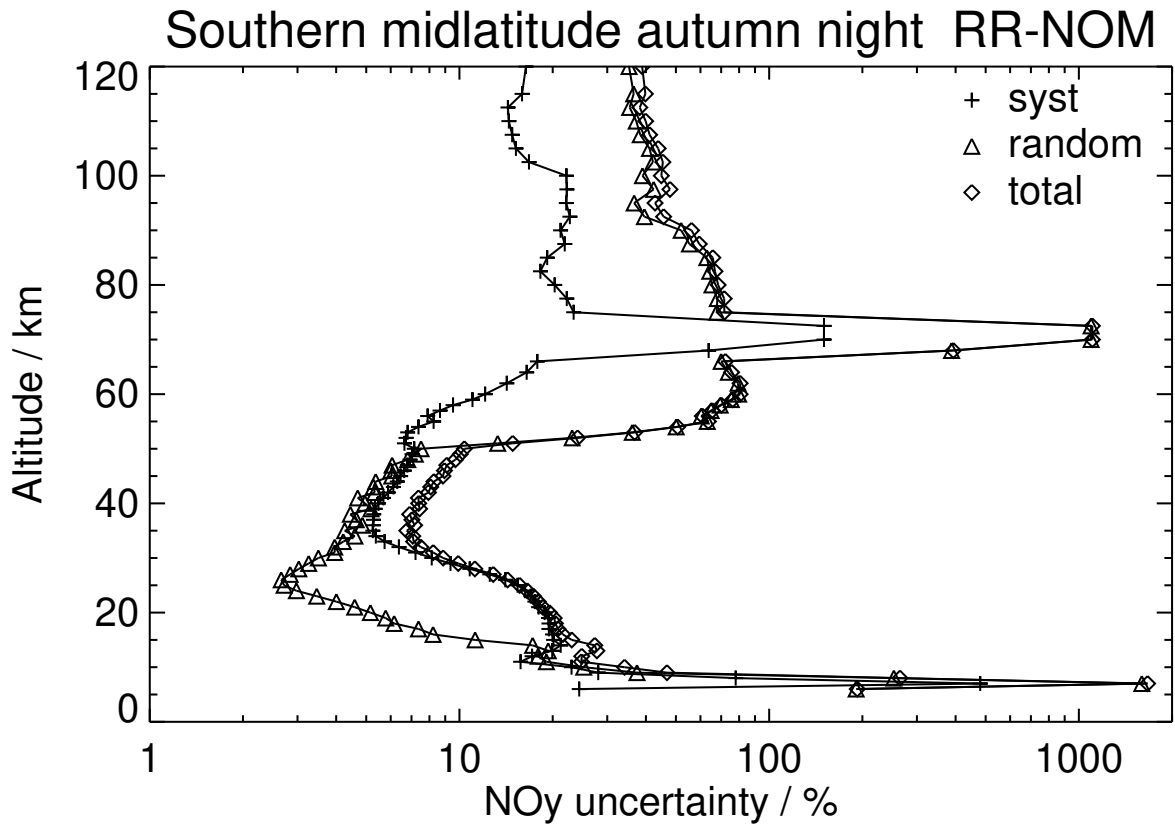


Figure S60: V8R_NOy_26X Southern midlatitude autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.24	95.30	40.10	> 100	64	0.02	64.20	10.93	65.12
8	1.02	28.03	26.51	38.58	68	0.03	55.47	11.90	56.73
11	2.73	9.13	23.21	24.95	70	0.04	52.87	13.02	54.45
14	3.69	10.88	22.02	24.56	72	0.05	48.69	13.69	50.58
17	6.60	9.81	20.28	22.53	77	0.13	48.24	13.93	50.21
20	8.08	12.27	20.64	24.01	80	0.22	47.92	13.62	49.82
23	11.57	7.37	18.00	19.46	82	0.37	45.82	13.42	47.74
26	12.55	6.36	14.62	15.94	85	0.65	42.55	13.20	44.55
29	10.69	13.41	10.04	16.75	87	1.54	34.87	11.30	36.66
32	9.54	19.38	7.82	20.90	92	2.37	31.42	11.95	33.61
35	7.48	20.72	7.41	22.01	95	4.69	32.35	11.90	34.47
38	6.01	23.41	7.31	24.52	97	7.84	33.37	12.76	35.73
41	5.74	27.16	7.75	28.25	100	11.77	32.72	12.90	35.17
44	5.54	28.73	7.87	29.79	102	20.47	29.76	12.69	32.35
47	5.28	30.54	7.71	31.49	107	46.75	23.69	12.75	26.90
50	5.20	33.77	7.62	34.62	110	60.64	21.58	12.87	25.13
53	5.07	43.46	7.96	44.18	112	68.35	20.58	13.56	24.65
56	5.85	52.37	8.34	53.03	115	74.38	20.29	13.63	24.44
59	6.86	62.77	9.25	63.45	120	115.83	19.75	13.68	24.02
62	10.62	65.00	10.14	65.79	120	115.83	19.75	13.68	24.02

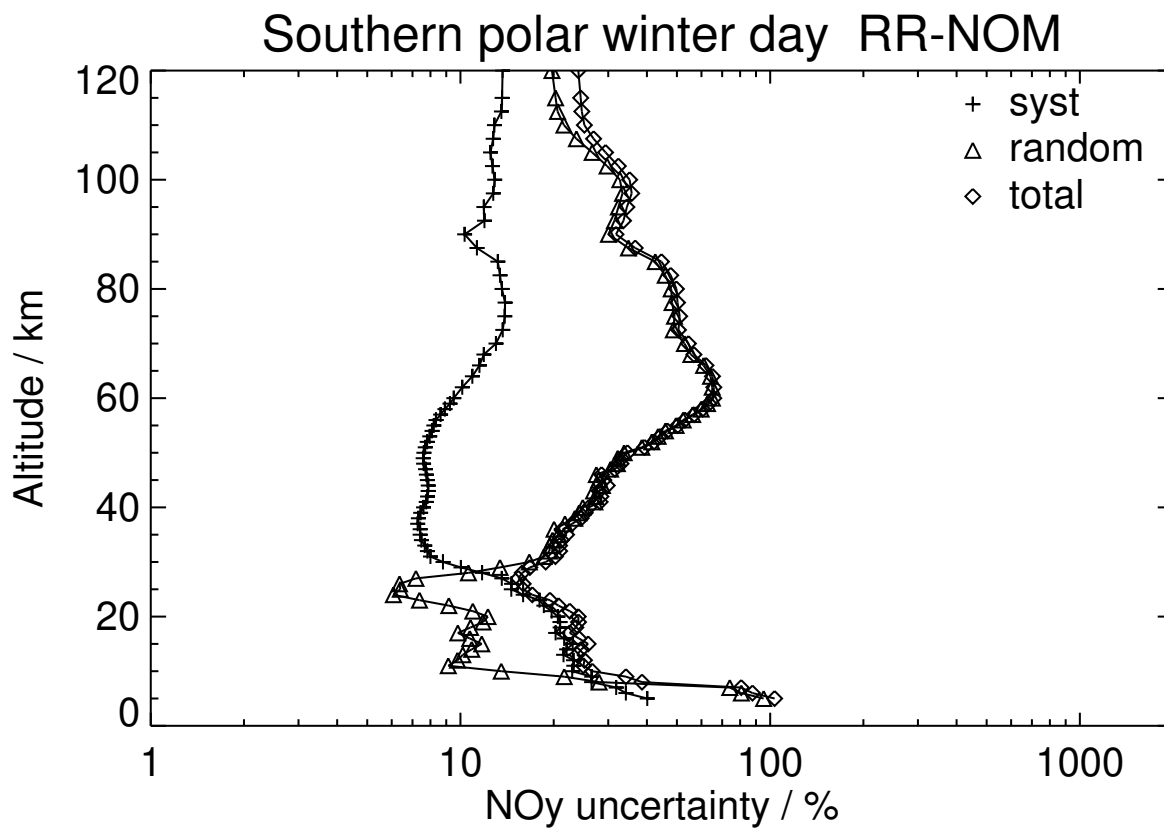


Figure S61: V8R_NOy_26X Southern polar winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.12	> 100	54.59	> 100	64	0.02	63.79	9.73	64.53
8	0.80	38.02	21.76	43.81	68	0.05	53.58	9.35	54.39
11	2.28	12.09	17.91	21.61	70	0.08	47.84	9.34	48.75
14	3.40	7.77	17.67	19.30	72	0.11	43.26	9.41	44.27
17	6.75	7.13	17.28	18.69	77	0.24	43.94	10.25	45.12
20	9.25	9.10	18.15	20.31	80	0.25	43.59	10.64	44.87
23	12.80	7.49	17.36	18.90	82	0.39	41.35	10.78	42.73
26	14.59	5.88	14.45	15.60	85	0.61	39.07	10.87	40.55
29	12.59	5.99	10.28	11.90	92	2.13	32.92	12.78	35.32
32	9.46	6.66	7.97	10.38	95	3.60	29.99	12.58	32.52
35	6.99	7.92	6.34	10.14	97	6.39	27.92	11.55	30.22
38	6.07	8.55	5.27	10.05	100	11.80	31.89	11.67	33.96
41	5.80	9.00	6.16	10.91	102	19.44	34.88	15.28	38.08
44	5.95	10.23	5.47	11.60	107	36.91	31.02	17.03	35.39
47	6.00	12.03	5.38	13.18	110	42.13	28.51	16.69	33.04
50	7.01	18.09	5.20	18.82	112	47.91	26.36	16.75	31.23
53	7.51	27.58	5.84	28.19	115	50.41	25.61	17.12	30.81
56	8.70	38.63	6.32	39.15	120	70.63	22.83	17.66	28.86
59	8.21	43.43	7.06	44.00	120	70.63	22.83	17.66	28.86
62	11.45	53.02	9.29	53.83					

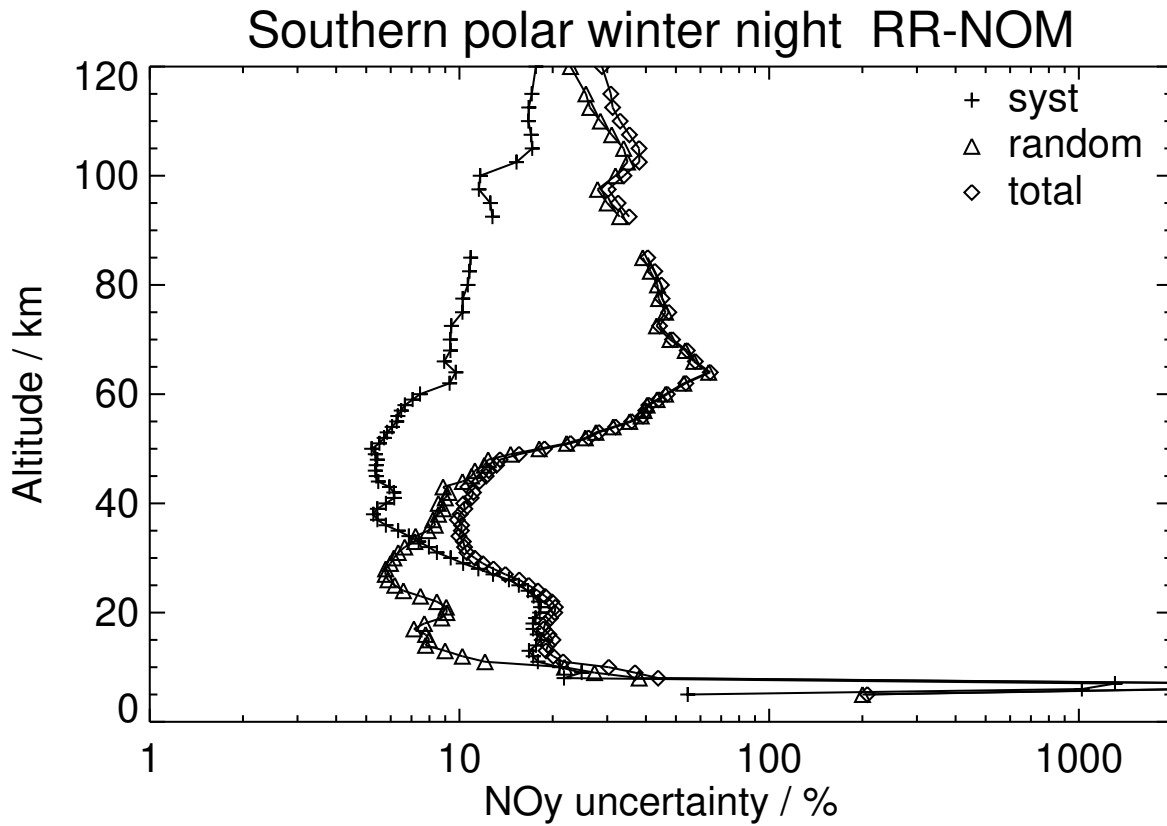


Figure S62: V8R_NOy_26X Southern polar winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.15	> 100	27.40	> 100
8	0.30	81.80	46.44	94.06
11	2.01	10.26	20.59	23.01
14	3.36	12.90	18.54	22.58
17	5.75	13.44	17.15	21.79
20	8.29	12.14	15.39	19.60
23	11.82	5.54	13.57	14.66
26	11.07	6.19	11.88	13.40
29	10.91	7.18	8.16	10.86
32	12.97	7.33	6.24	9.62
35	13.51	9.54	6.25	11.40
38	10.89	12.10	7.23	14.10
41	8.73	15.19	7.75	17.06
44	7.63	18.77	8.14	20.46
47	7.35	20.44	7.98	21.95
50	6.77	23.78	8.04	25.11
53	5.95	32.21	8.22	33.24
56	5.15	47.40	8.82	48.21
59	4.69	62.31	10.95	63.27
62	5.59	69.55	13.27	70.81

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	69.55	15.26	71.21
68	< 0.01	> 100	17.72	> 100
87	0.27	51.75	17.86	54.74
92	1.20	48.89	17.26	51.85
95	2.26	47.10	16.99	50.07
97	3.87	44.63	16.69	47.65
100	7.27	41.92	16.37	45.01
102	13.00	39.12	16.33	42.40
107	26.30	33.07	16.92	37.15
110	32.18	30.05	17.98	35.02
112	35.09	26.68	19.23	32.89
115	40.72	23.55	19.96	30.87
120	52.81	16.82	21.17	27.04
120	52.81	16.82	21.17	27.04

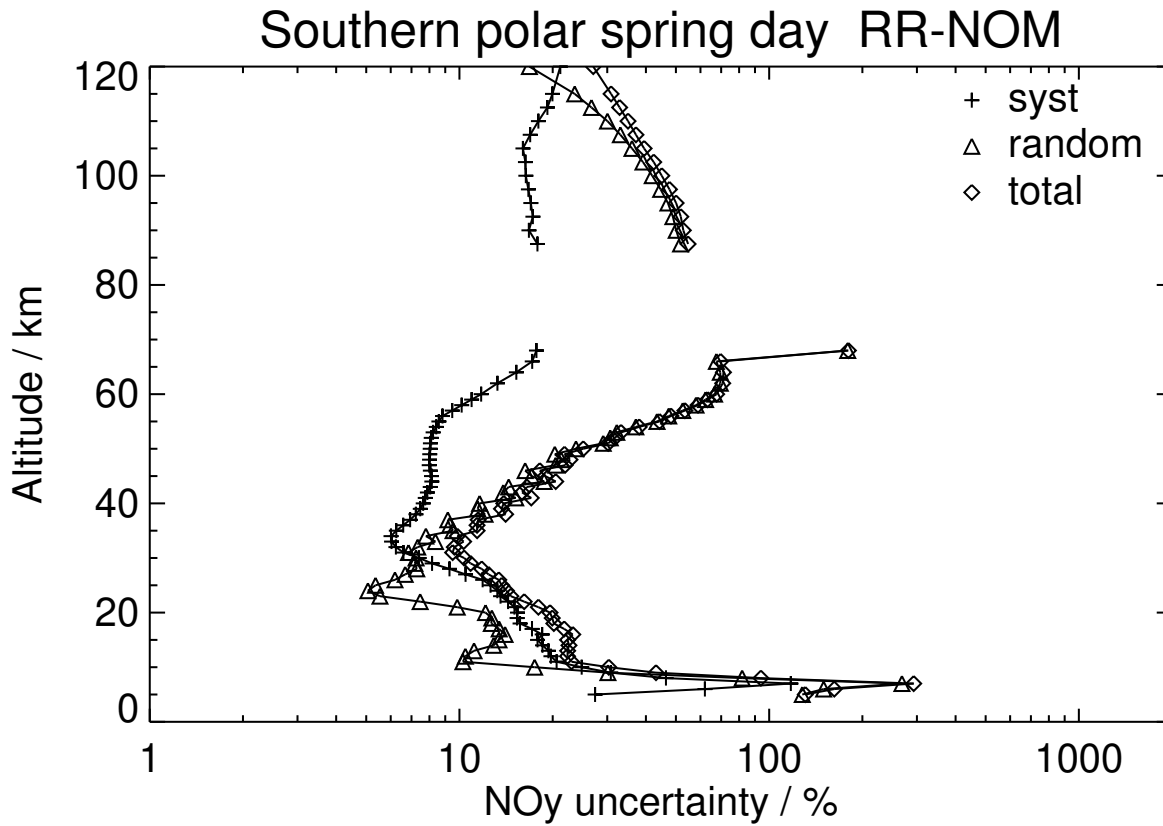


Figure S63: V8R_NOy_26X Southern polar spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.12	> 100	25.89	> 100
8	0.54	46.81	29.12	55.13
11	2.28	8.58	16.19	18.32
14	4.32	11.86	16.85	20.60
17	7.40	9.05	17.24	19.47
20	11.41	7.89	15.43	17.33
23	12.34	5.07	14.01	14.90
26	12.18	4.53	12.01	12.84
29	12.31	4.93	7.80	9.23
32	14.02	4.15	5.95	7.25
35	12.80	4.38	5.36	6.92
38	10.19	4.79	5.75	7.48
41	9.09	5.14	6.41	8.21
44	7.49	6.42	7.06	9.54
47	6.83	7.58	7.69	10.80
50	6.58	9.21	8.24	12.36
53	6.47	17.04	7.04	18.44
56	6.68	38.97	6.81	39.56
59	5.73	55.24	8.86	55.95
62	6.60	57.65	10.58	58.61

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	58.99	10.79	59.97
68	< 0.01	59.37	5.69	59.64
92	1.32	48.30	16.22	50.95
95	3.26	46.44	16.22	49.20
97	7.41	43.64	16.19	46.54
100	9.75	42.58	18.90	46.58
102	13.48	41.93	21.21	46.99
107	29.67	36.13	20.54	41.57
110	30.01	47.99	26.29	54.72
112	34.57	48.99	25.25	55.11
115	38.30	52.92	24.16	58.18
120	59.65	52.06	23.36	57.06
120	59.65	52.06	23.36	57.06

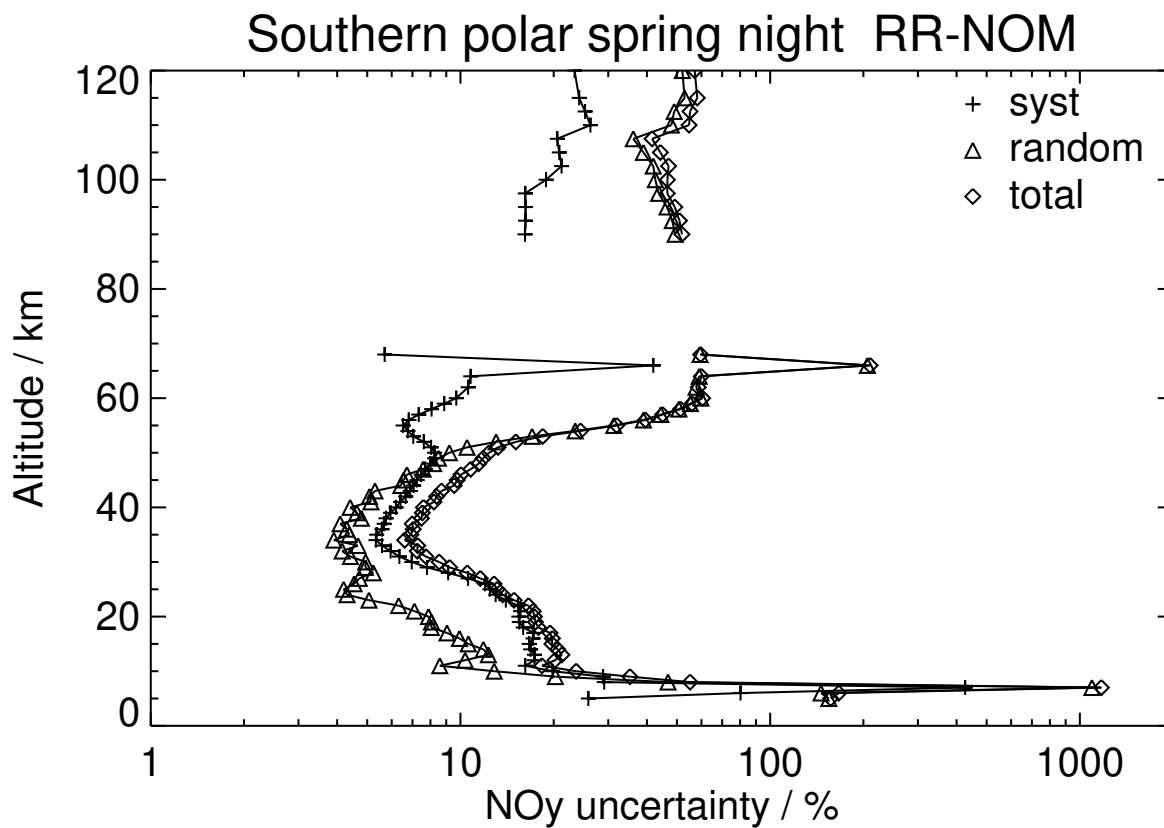


Figure S64: V8R_NOy_26X Southern polar spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.16	> 100	56.02	> 100
8	0.63	36.33	40.99	54.77
11	1.95	9.60	16.58	19.16
14	2.26	7.75	16.96	18.64
17	4.17	4.10	17.44	17.92
20	8.91	2.82	15.85	16.10
23	13.19	3.20	13.97	14.33
26	16.89	4.82	12.07	13.00
29	18.24	6.77	9.65	11.79
32	19.01	8.28	7.45	11.13
35	17.64	9.15	6.65	11.31
38	16.51	9.28	7.23	11.76
41	13.38	10.39	7.70	12.93
44	11.57	12.40	8.17	14.85
47	8.93	14.56	8.46	16.84
50	6.67	17.83	8.11	19.59
53	5.91	20.87	7.96	22.34
56	5.83	34.07	8.20	35.04
59	5.25	51.60	8.87	52.36
62	4.78	61.52	9.74	62.28

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	< 0.01	63.59	10.46	64.45
70	< 0.01	> 100	72.44	> 100
72	< 0.01	> 100	72.44	> 100
92	1.03	46.09	14.65	48.36
95	2.02	42.92	15.27	45.56
97	3.64	41.41	16.36	44.52
100	11.39	33.89	15.25	37.17
102	15.86	33.26	15.45	36.68
107	19.15	30.93	17.32	35.45
110	22.14	28.89	18.57	34.34
112	27.03	26.35	19.25	32.64
115	34.14	23.79	19.80	30.95
120	41.41	19.61	20.90	28.66
120	41.41	19.61	20.90	28.66

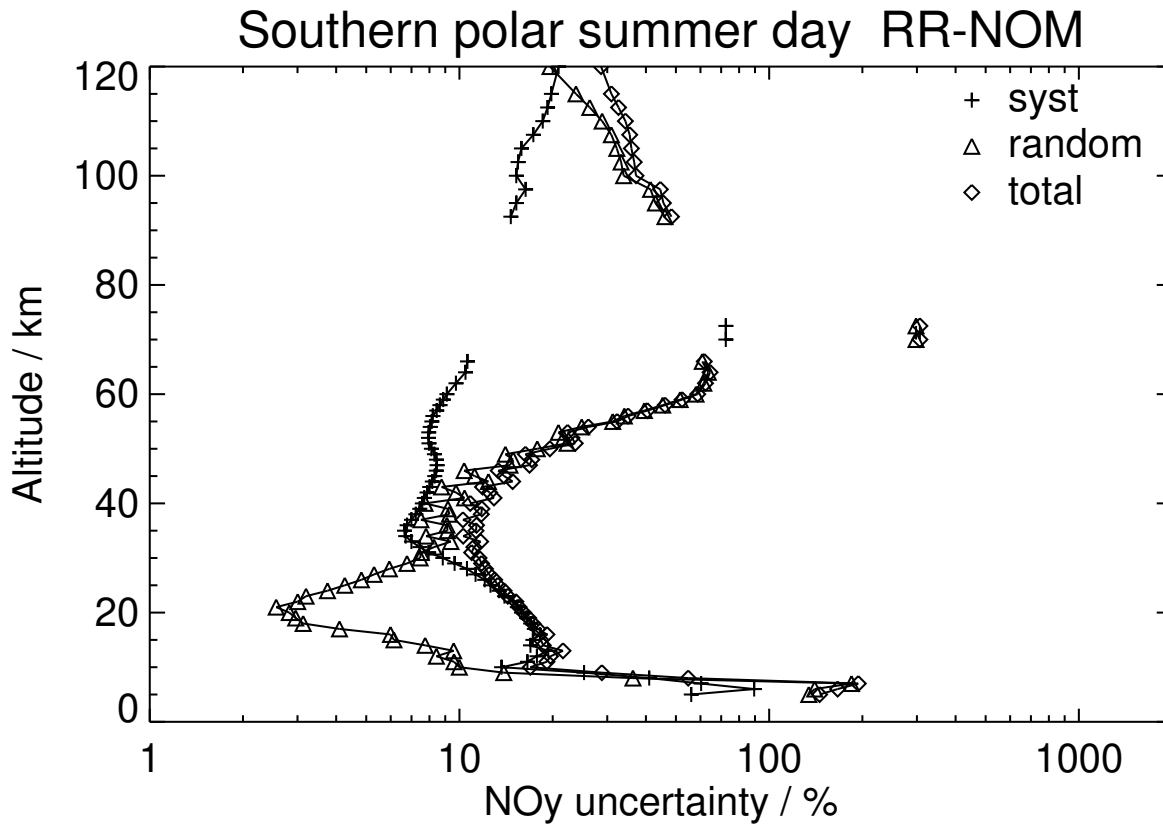


Figure S65: V8R_NOy_26X Southern polar summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
5	0.18	> 100	62.67	> 100
8	0.45	39.45	52.51	65.68
11	1.85	9.97	16.51	19.28
14	2.04	9.41	18.25	20.53
17	4.30	4.31	18.51	19.01
20	8.97	2.87	16.96	17.20
23	12.70	2.58	15.06	15.28
26	17.24	2.79	11.83	12.15
29	19.64	3.23	8.54	9.13
32	19.34	2.91	6.69	7.29
35	17.09	3.46	5.40	6.41
38	14.86	3.69	5.78	6.86
41	11.74	3.86	6.17	7.27
44	8.96	4.57	6.69	8.10
47	7.14	5.98	6.68	8.96
50	6.01	9.50	6.30	11.40
53	4.68	19.45	5.60	20.24
56	4.07	38.84	5.62	39.24
59	3.42	52.64	6.88	53.09
62	3.50	57.51	8.03	58.06

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	57.89	7.52	58.37
68	< 0.01	> 100	> 100	> 100
97	1.99	39.99	12.53	41.91
100	2.45	40.16	12.46	42.04
102	4.28	38.33	13.55	40.66
107	9.10	34.74	14.77	37.75
110	10.57	33.36	15.10	36.62
112	11.06	31.96	15.60	35.56
115	13.02	29.89	16.09	33.95
120	17.78	27.99	16.49	32.49
120	17.78	27.99	16.49	32.49

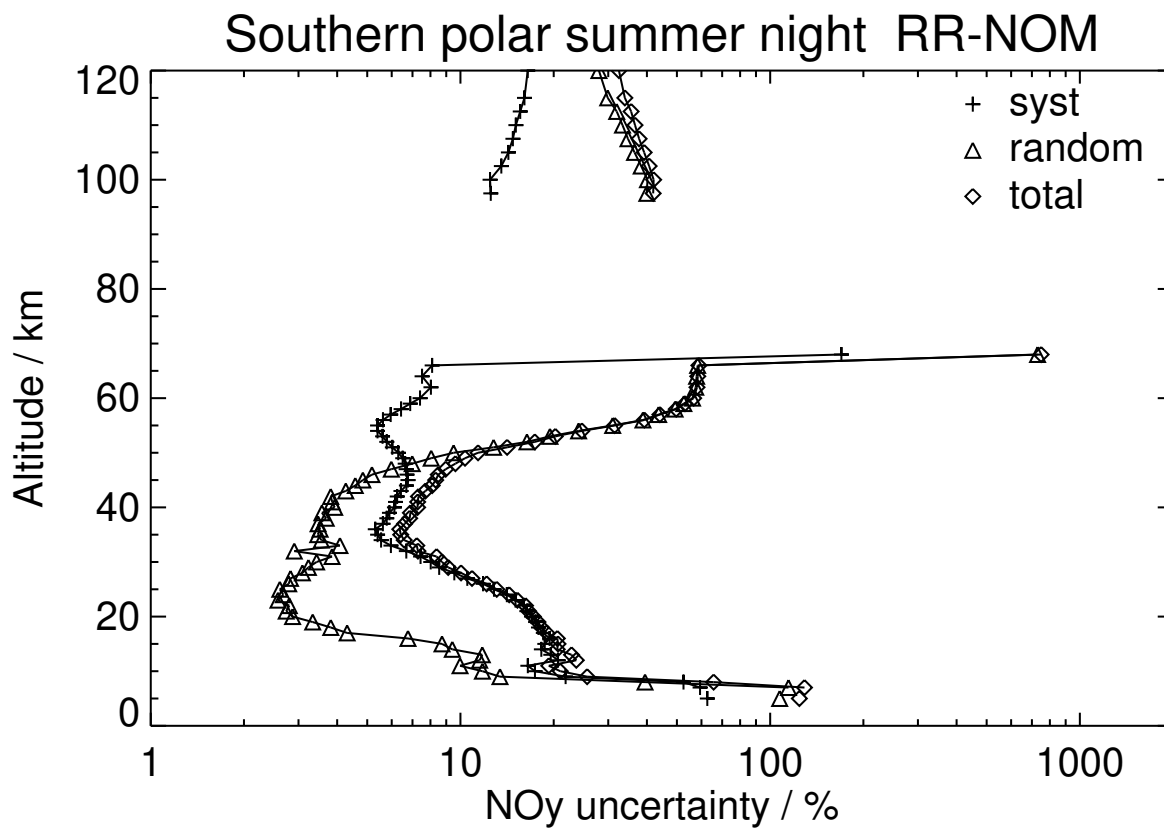


Figure S66: V8R_NOy_26X Southern polar summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.14	> 100	21.49	> 100	64	0.02	65.91	12.56	67.09
8	0.62	32.87	25.54	41.63	68	0.04	57.16	13.62	58.76
11	1.14	14.20	22.19	26.34	70	0.04	54.38	14.46	56.27
14	1.97	12.27	23.25	26.29	72	0.05	51.02	14.85	53.14
17	5.64	7.11	20.67	21.86	77	0.10	54.20	14.87	56.21
20	10.51	4.85	20.12	20.70	80	0.18	53.05	15.35	55.22
23	15.74	2.67	18.33	18.53	82	0.33	50.24	15.43	52.55
26	18.70	4.61	14.89	15.58	85	0.58	46.12	14.60	48.37
29	18.39	8.65	11.09	14.07	87	0.85	41.13	13.92	43.42
32	17.07	13.78	8.76	16.33	92	2.94	35.14	15.25	38.30
35	13.14	19.07	8.66	20.94	95	3.88	34.46	14.55	37.41
38	8.49	24.29	8.98	25.89	97	9.05	37.44	16.44	40.89
41	5.76	30.70	9.03	32.00	100	12.93	39.24	18.32	43.31
44	4.26	37.05	8.65	38.04	102	20.89	37.05	17.47	40.96
47	3.72	43.00	8.14	43.77	107	45.05	31.44	16.40	35.46
50	3.91	48.74	8.25	49.43	110	66.70	27.78	16.22	32.17
53	4.55	56.49	8.47	57.12	112	73.81	25.40	15.84	29.93
56	4.97	64.21	9.11	64.86	115	69.85	24.56	15.81	29.20
59	6.53	68.37	11.05	69.26	120	85.56	22.74	17.68	28.80
62	12.45	66.47	11.95	67.53	120	85.56	22.74	17.68	28.80

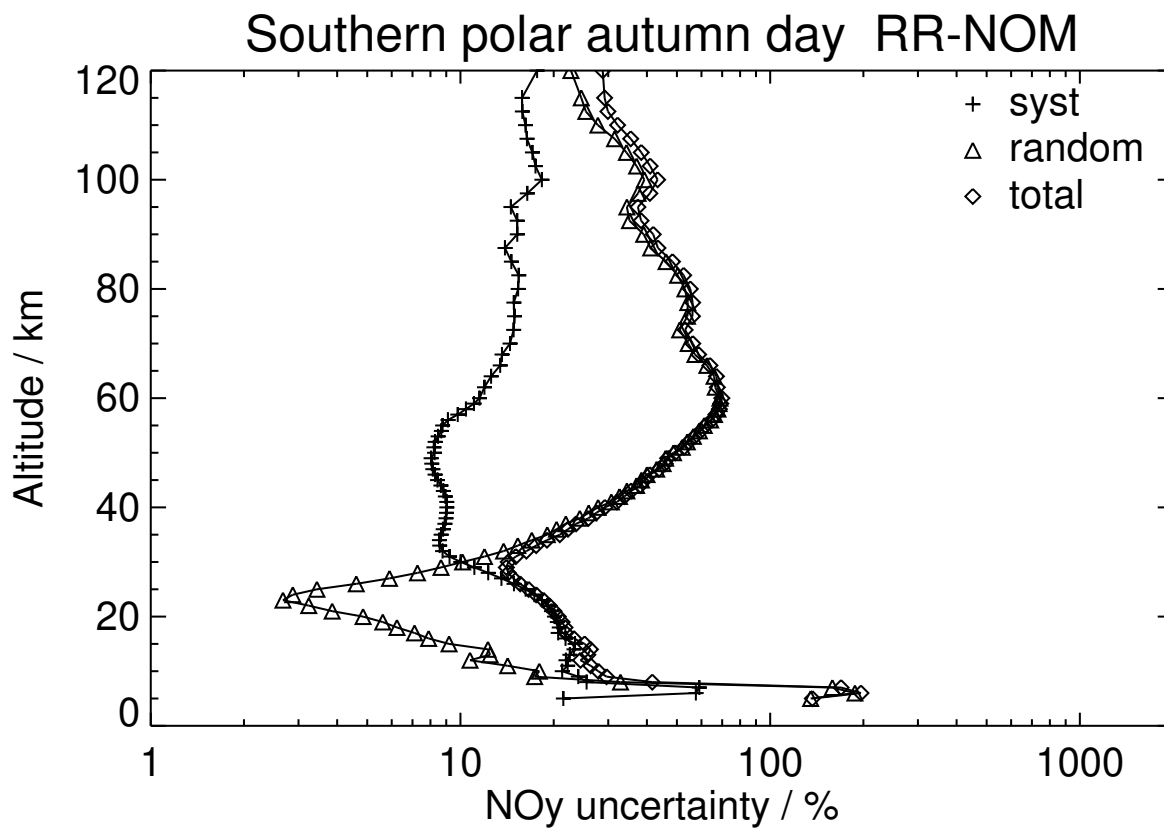


Figure S67: V8R_NOy_26X Southern polar autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
5	0.08	> 100	36.90	> 100	64	0.02	72.35	14.69	73.82
8	0.40	54.79	37.78	66.55	68	0.08	64.74	16.85	66.90
11	1.14	14.27	17.44	22.53	70	0.14	59.80	17.12	62.20
14	2.10	11.08	21.64	24.31	72	0.20	57.66	17.49	60.26
17	6.76	5.38	19.08	19.82	77	0.42	59.15	19.29	62.22
20	12.08	3.28	19.53	19.81	80	0.64	57.53	19.62	60.78
23	16.83	2.51	18.18	18.36	82	1.01	56.29	19.93	59.72
26	19.50	2.88	14.54	14.82	85	1.72	51.89	18.92	55.23
29	19.19	3.92	10.00	10.74	87	2.90	48.37	18.06	51.63
32	16.00	4.96	7.63	9.10	92	7.67	33.70	17.47	37.96
35	10.84	6.58	6.68	9.37	95	5.78	33.05	26.80	42.55
38	7.03	8.30	6.84	10.76	97	10.90	30.93	25.34	39.98
41	4.96	10.50	6.98	12.61	100	21.34	28.56	23.69	37.10
44	3.63	14.08	6.94	15.70	102	34.73	37.67	20.61	42.94
47	3.24	16.77	6.37	17.94	107	61.88	31.70	17.94	36.42
50	2.96	22.43	6.65	23.39	110	82.19	29.09	18.13	34.28
53	5.56	50.10	7.50	50.66	112	92.40	26.54	18.18	32.17
56	7.80	60.76	9.00	61.43	115	87.07	24.86	18.21	30.82
59	9.20	66.35	11.01	67.26	120	101.92	22.41	19.62	29.79
62	15.25	71.49	13.34	72.72	120	101.92	22.41	19.62	29.79

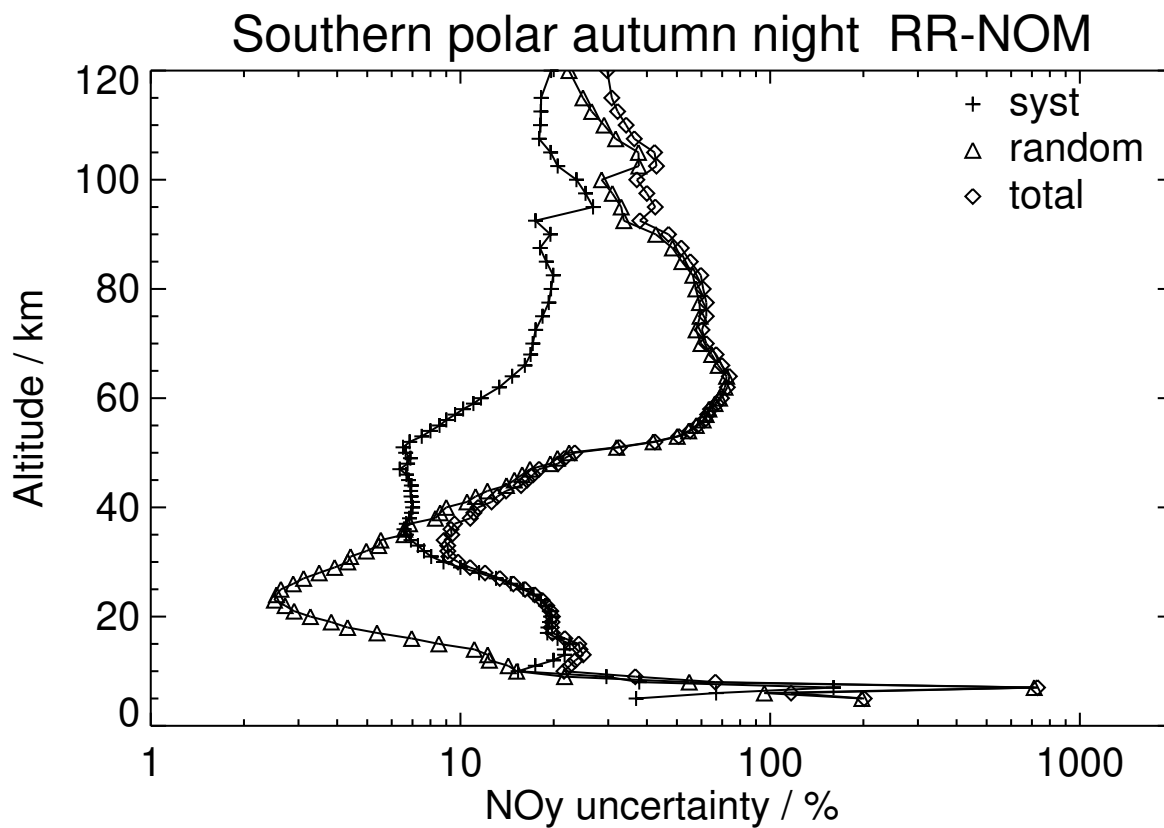


Figure S68: V8R_NOy_26X Southern polar autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
14	14.24	2.69	23.03	23.19
17	8.30	7.16	18.80	20.12
20	9.83	4.75	19.69	20.25
23	13.45	2.50	18.88	19.05
26	14.13	3.10	18.25	18.51
29	15.17	4.34	15.65	16.24
32	14.72	10.17	10.84	14.87
35	12.52	17.42	8.48	19.37
38	10.80	26.05	10.18	27.97
41	10.04	35.46	12.24	37.51
44	8.52	44.52	13.55	46.53
47	6.99	50.88	14.44	52.89
50	7.04	59.26	14.35	60.97
53	8.52	61.65	13.91	63.20
56	11.18	61.52	13.65	63.02
59	14.63	58.47	14.13	60.16
62	22.13	54.03	13.70	55.74

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	49.83	13.24	51.55
68	0.07	41.02	11.85	42.69
70	0.11	37.71	11.35	39.38
72	0.18	34.63	10.90	36.31
77	0.39	31.71	10.82	33.51
80	0.58	31.01	11.04	32.91
82	0.89	30.89	11.50	32.96
85	1.36	31.75	12.43	34.10
87	2.20	32.50	13.56	35.21
92	5.17	31.93	16.11	35.76
95	7.95	30.19	17.03	34.67
97	13.26	28.12	17.60	33.17
100	22.92	25.64	17.77	31.20
102	39.73	23.40	17.36	29.14
107	95.08	22.88	14.93	27.33
110	127.92	26.12	13.30	29.31
112	156.46	30.84	12.37	33.23
115	173.79	34.17	13.18	36.62
120	193.97	31.75	18.52	36.76
120	193.97	31.75	18.52	36.76

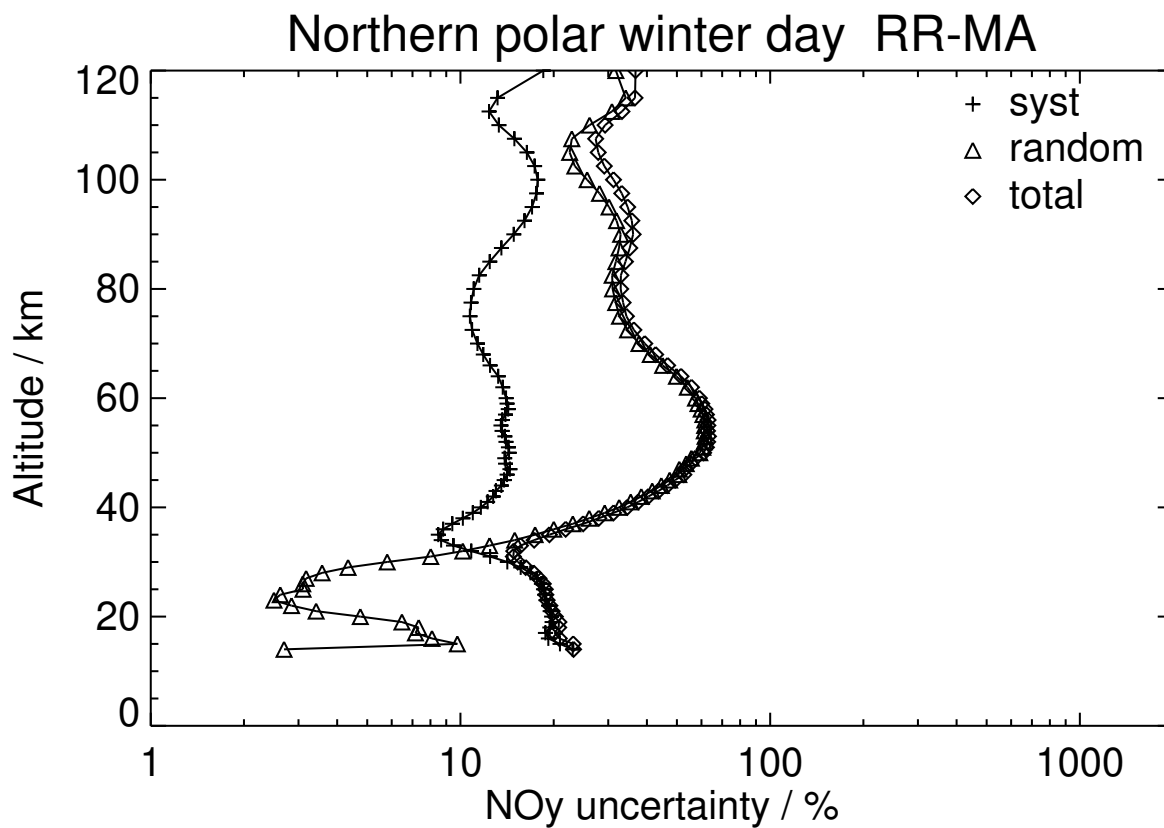


Figure S69: V8R_NOy_56X Northern polar winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
14	5.95	3.73	20.05	20.40
17	10.64	7.72	20.38	21.80
20	11.73	5.93	20.62	21.45
23	14.11	4.08	19.80	20.22
26	13.51	4.09	16.98	17.47
29	11.25	7.62	13.16	15.20
32	8.72	7.83	10.06	12.75
35	7.39	7.38	7.47	10.50
38	6.40	8.97	6.05	10.82
41	5.87	10.62	5.75	12.07
44	5.37	11.73	5.71	13.05
47	5.36	11.82	5.75	13.14
50	7.47	20.94	5.30	21.60
53	15.87	35.45	7.16	36.16
56	39.37	45.53	7.82	46.19
59	44.69	43.07	7.40	43.70
62	62.11	43.76	7.48	44.40

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.10	44.26	7.53	44.89
68	0.21	45.14	7.79	45.81
70	0.22	46.25	8.46	47.02
72	0.20	47.00	10.61	48.18
77	0.36	55.13	14.91	57.11
80	0.62	57.94	15.51	59.97
82	0.97	49.80	14.57	51.89
85	1.61	45.20	14.01	47.32
87	2.74	42.73	14.18	45.02
92	6.38	41.05	15.66	43.94
95	9.71	39.89	16.38	43.12
97	14.48	38.49	17.19	42.15
100	22.65	37.02	18.67	41.46
102	35.30	35.66	18.76	40.29
107	86.07	34.87	17.69	39.10
110	117.09	35.40	16.82	39.19
112	145.48	36.50	15.91	39.82
115	159.93	36.94	15.53	40.07
120	205.55	33.34	17.38	37.59
120	205.55	33.34	17.38	37.59

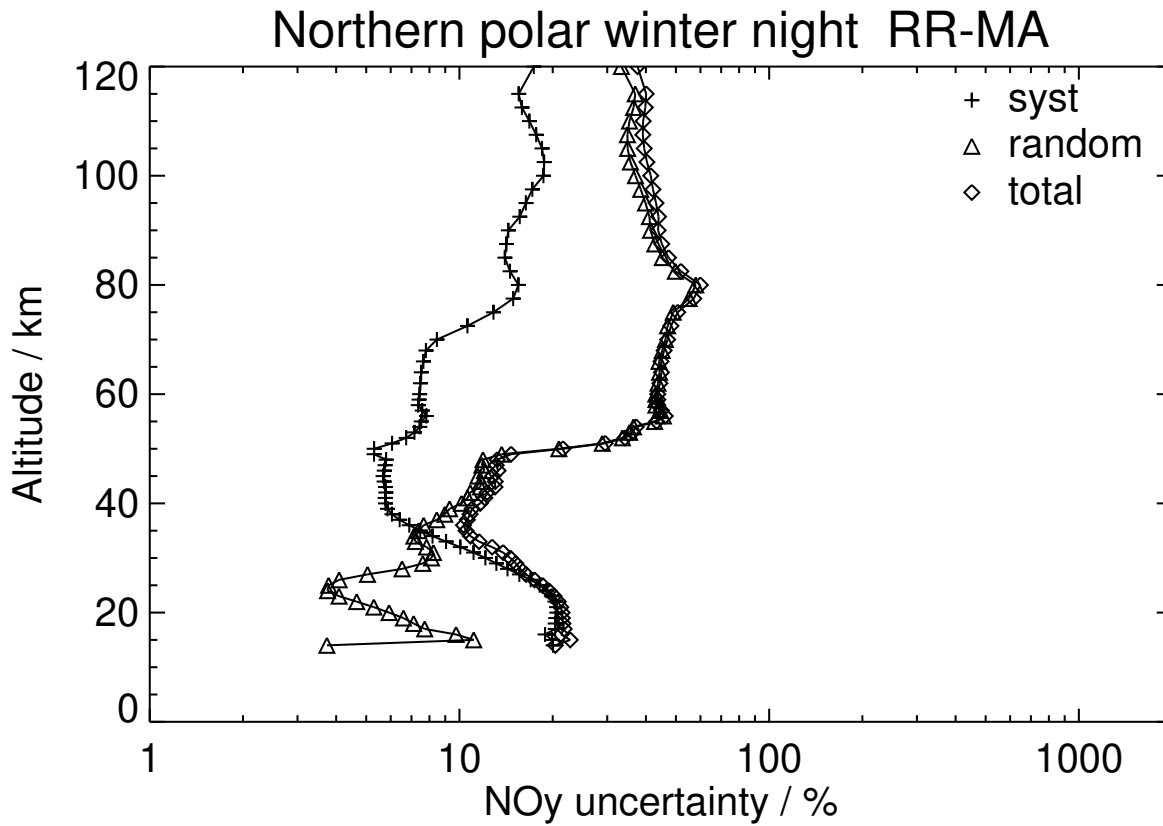


Figure S70: V8R_NOy_56X Northern polar winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	9.53	3.27	19.74	20.00
20	11.52	1.75	16.95	17.04
23	13.94	3.21	15.95	16.27
26	15.52	9.15	12.66	15.62
29	15.30	14.29	10.22	17.57
32	13.33	18.27	8.75	20.26
35	10.98	20.47	8.62	22.21
38	8.53	19.25	8.42	21.01
41	6.18	19.93	8.08	21.51
44	6.12	24.49	8.32	25.87
47	24.13	19.60	8.84	21.50
50	11.15	22.59	11.38	25.29
53	5.51	30.73	8.89	31.99
56	5.26	38.42	9.44	39.56
59	7.44	48.83	11.95	50.27
62	10.37	52.15	13.84	53.95

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	50.86	14.51	52.89
68	0.02	49.54	15.37	51.87
70	0.02	51.06	15.02	53.22
72	0.02	52.42	17.59	55.29
77	0.04	58.53	20.66	62.07
80	0.06	60.64	22.70	64.74
82	0.10	62.90	25.83	67.99
85	0.18	63.72	26.80	69.13
87	0.31	61.45	27.14	67.18
92	0.87	52.03	25.16	57.80
95	1.43	48.66	29.81	57.06
97	2.83	47.06	34.73	58.49
100	5.41	45.18	36.40	58.02
102	9.79	44.57	35.91	57.24
107	27.90	39.51	30.54	49.94
110	40.63	37.93	26.82	46.46
112	55.37	37.53	23.44	44.25
115	70.39	37.41	21.59	43.20
120	104.20	35.52	22.89	42.25
120	104.20	35.52	22.89	42.25

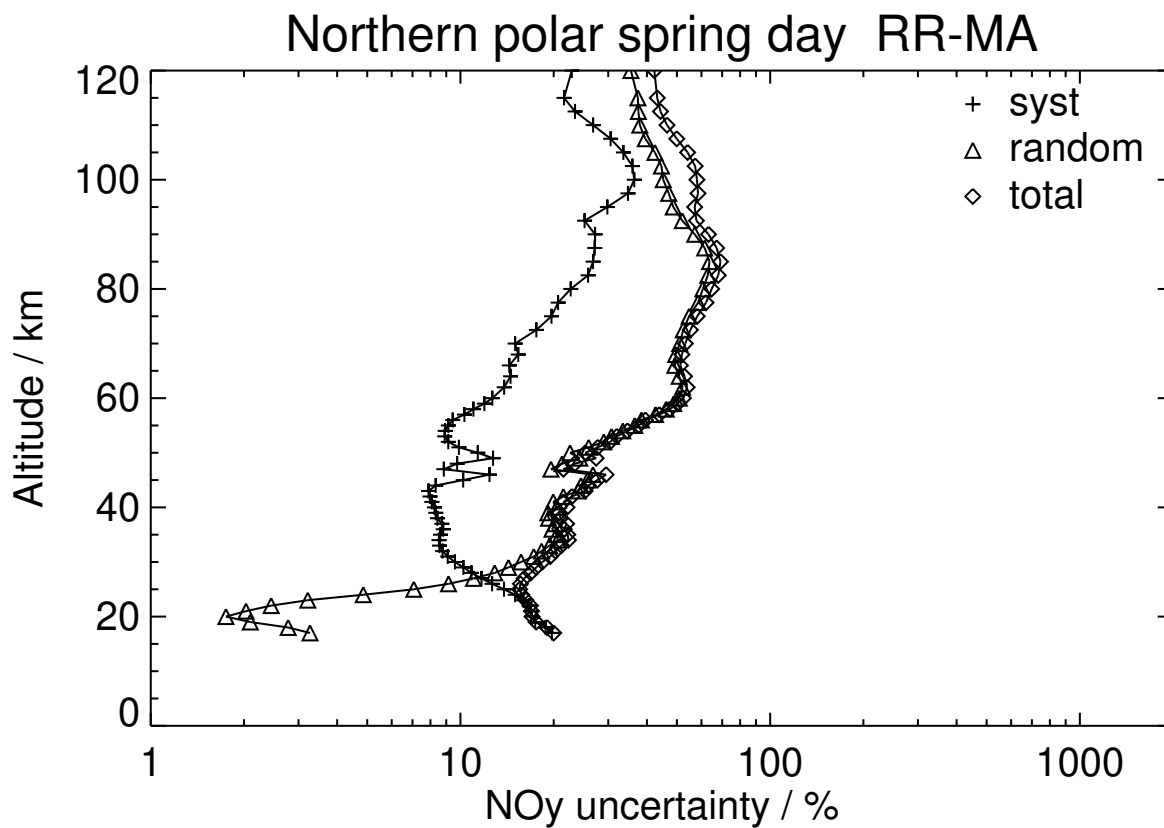


Figure S71: V8R_NOy_56X Northern polar spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	8.62	4.23	19.89	20.34
20	10.83	2.44	17.52	17.69
23	13.48	2.05	16.55	16.68
26	14.14	2.79	13.59	13.87
29	14.73	4.04	9.54	10.36
32	13.59	5.03	7.27	8.84
35	10.71	5.57	6.08	8.24
38	9.04	5.53	5.75	7.97
41	7.45	6.09	6.81	9.14
44	4.83	8.22	6.51	10.49
47	5.00	10.30	4.85	11.39
50	7.75	12.76	5.50	13.89
53	4.70	25.28	6.05	25.99
56	4.54	44.02	6.71	44.53
59	5.48	46.87	8.02	47.55
62	12.19	46.16	8.59	46.95

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	43.57	8.47	44.38
68	0.07	41.01	7.05	41.61
70	0.12	41.38	6.76	41.93
72	0.14	44.53	6.77	45.04
77	0.15	50.31	6.78	50.76
80	0.17	51.49	6.83	51.94
82	0.20	51.31	12.49	52.81
85	0.32	50.28	15.12	52.50
87	0.48	49.33	20.37	53.37
92	1.81	44.65	24.70	51.03
95	2.74	43.60	25.98	50.75
97	4.60	40.61	27.34	48.96
100	5.23	43.36	27.78	51.50
102	9.74	40.41	26.53	48.34
107	26.90	36.71	23.79	43.75
110	40.04	35.38	22.15	41.74
112	44.72	35.74	20.09	41.00
115	50.97	35.70	19.06	40.47
120	81.66	33.81	20.18	39.37
120	81.66	33.81	20.18	39.37

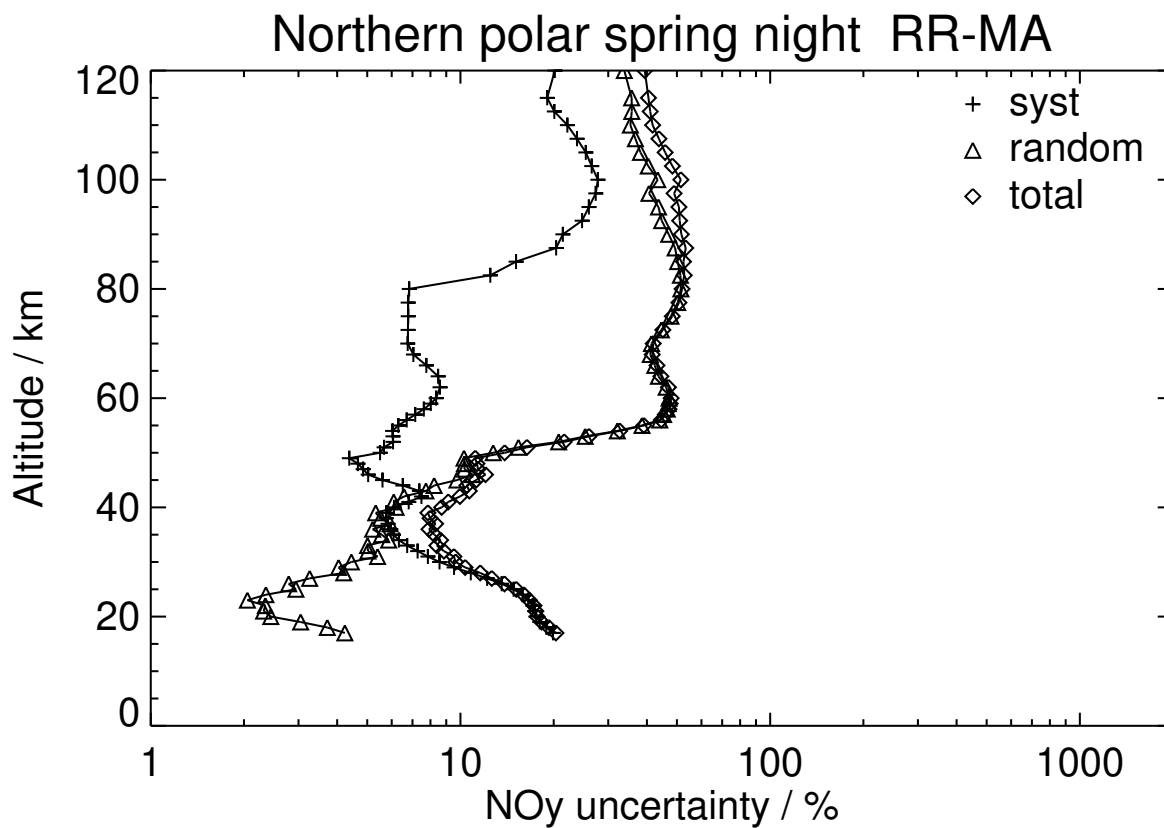


Figure S72: V8R_NOy_56X Northern polar spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	5.61	4.11	18.32	18.77
20	8.71	2.70	14.94	15.19
23	13.18	3.13	14.33	14.66
26	14.52	4.75	12.60	13.47
29	15.93	6.31	9.94	11.77
32	16.65	7.91	7.30	10.76
35	15.10	8.69	6.26	10.71
38	11.59	9.11	6.34	11.10
41	9.82	10.44	6.63	12.37
44	8.40	11.66	7.30	13.76
47	6.98	14.37	7.64	16.28
50	5.97	18.25	7.78	19.83
53	5.46	22.73	7.87	24.05
56	5.36	28.70	7.97	29.79
59	5.87	39.29	9.17	40.35
62	7.25	44.45	10.27	45.62

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	45.61	10.94	46.90
68	0.02	42.12	11.62	43.69
70	0.03	39.53	12.05	41.33
72	0.03	41.64	13.74	43.85
77	0.03	44.09	17.53	47.45
80	0.04	42.39	18.80	46.37
82	0.04	41.16	19.92	45.72
85	0.06	42.25	22.09	47.68
87	0.19	43.89	22.17	49.17
92	2.37	40.91	20.23	45.64
95	5.86	36.50	18.61	40.98
97	11.99	31.79	17.21	36.15
100	20.13	28.03	16.11	32.33
102	30.08	24.45	15.55	28.98
107	48.61	26.46	13.99	29.93
110	54.50	28.97	14.88	32.57
112	60.27	30.50	16.58	34.72
115	68.63	30.95	18.30	35.95
120	82.47	30.98	20.91	37.38
120	82.47	30.98	20.91	37.38

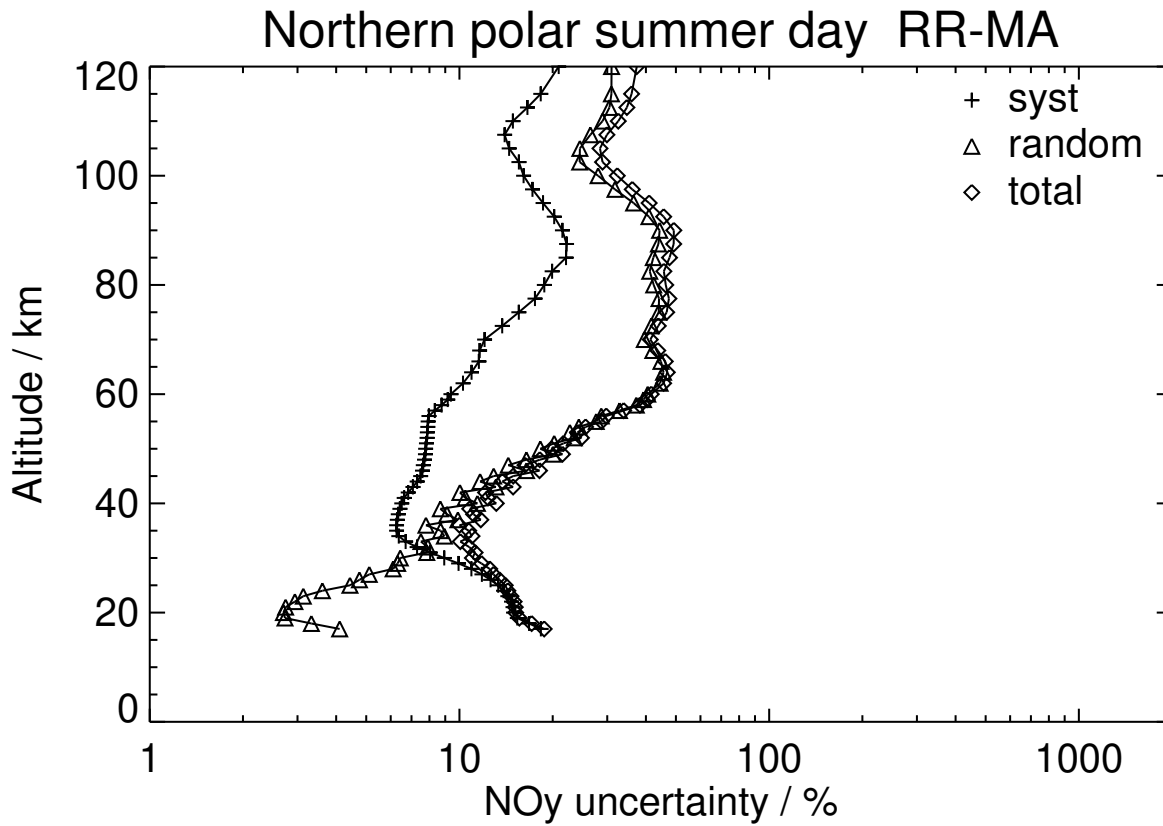


Figure S73: V8R_NOy_56X Northern polar summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
17	5.42	5.28	19.69	20.39	64	0.01	53.02	10.07	53.97
20	8.65	2.15	16.93	17.07	68	< 0.01	> 100	19.40	> 100
23	13.16	1.88	15.68	15.80	70	< 0.01	> 100	10.54	> 100
26	15.39	2.11	13.02	13.19	72	< 0.01	> 100	10.54	> 100
29	16.97	2.68	9.53	9.90	82	0.02	57.09	9.52	57.88
32	16.72	3.25	6.98	7.70	85	0.11	54.26	16.66	56.76
35	13.24	3.70	5.99	7.04	87	0.26	51.73	17.50	54.61
38	10.11	4.24	5.57	7.00	92	1.31	45.78	15.95	48.48
41	8.54	4.71	5.41	7.18	95	3.06	42.55	15.46	45.27
44	7.09	5.37	5.83	7.93	97	6.73	38.63	14.92	41.41
47	5.60	6.93	5.86	9.07	100	11.28	35.05	15.06	38.15
50	5.21	8.57	5.56	10.21	102	18.81	32.60	14.77	35.79
53	5.06	17.32	5.30	18.11	107	38.81	32.63	14.41	35.67
56	5.50	33.78	5.50	34.22	110	48.69	32.92	14.57	35.99
59	5.61	46.63	6.71	47.11	112	57.92	32.29	15.00	35.60
62	7.23	54.13	8.42	54.78	115	67.42	30.90	15.59	34.62
					120	87.19	28.63	16.65	33.12
					120	87.19	28.63	16.65	33.12

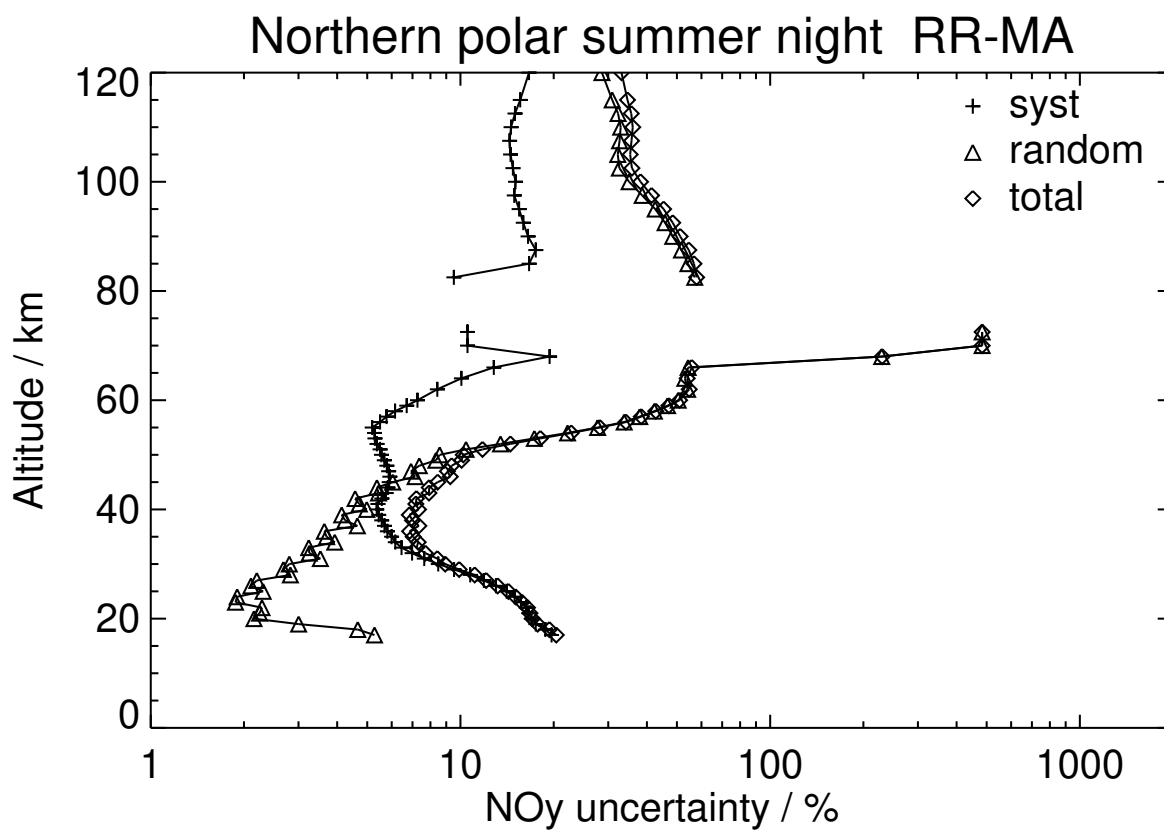


Figure S74: V8R_NOy_56X Northern polar summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	8.10	5.51	20.79	21.51
20	10.38	3.00	18.45	18.69
23	14.11	2.30	17.93	18.07
26	16.36	4.66	14.81	15.52
29	17.43	8.66	10.57	13.66
32	14.48	12.99	8.91	15.76
35	10.02	17.06	8.73	19.17
38	7.36	21.25	9.26	23.18
41	5.76	25.93	9.57	27.63
44	4.52	30.40	9.23	31.77
47	3.81	35.71	9.16	36.87
50	3.25	45.30	9.59	46.31
53	2.73	57.28	10.34	58.20
56	2.61	61.29	10.69	62.21
59	3.28	66.53	12.12	67.62
62	4.51	70.32	13.87	71.67

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	70.87	14.40	72.32
68	0.01	68.47	15.08	70.11
70	0.01	66.81	14.92	68.46
72	0.01	66.85	15.66	68.66
77	0.03	67.11	16.24	69.05
80	0.05	67.30	16.72	69.34
82	0.09	65.54	16.94	67.70
85	0.18	62.71	17.12	65.00
87	0.34	59.16	17.32	61.64
92	0.98	50.95	17.22	53.78
95	1.50	47.83	17.17	50.82
97	2.40	45.47	16.88	48.50
100	4.27	43.21	16.64	46.31
102	7.67	40.76	16.51	43.98
107	20.19	34.05	15.63	37.46
110	28.13	30.64	15.41	34.30
112	36.90	28.32	15.52	32.29
115	38.08	27.25	16.22	31.71
120	51.88	24.77	17.97	30.60
120	51.88	24.77	17.97	30.60

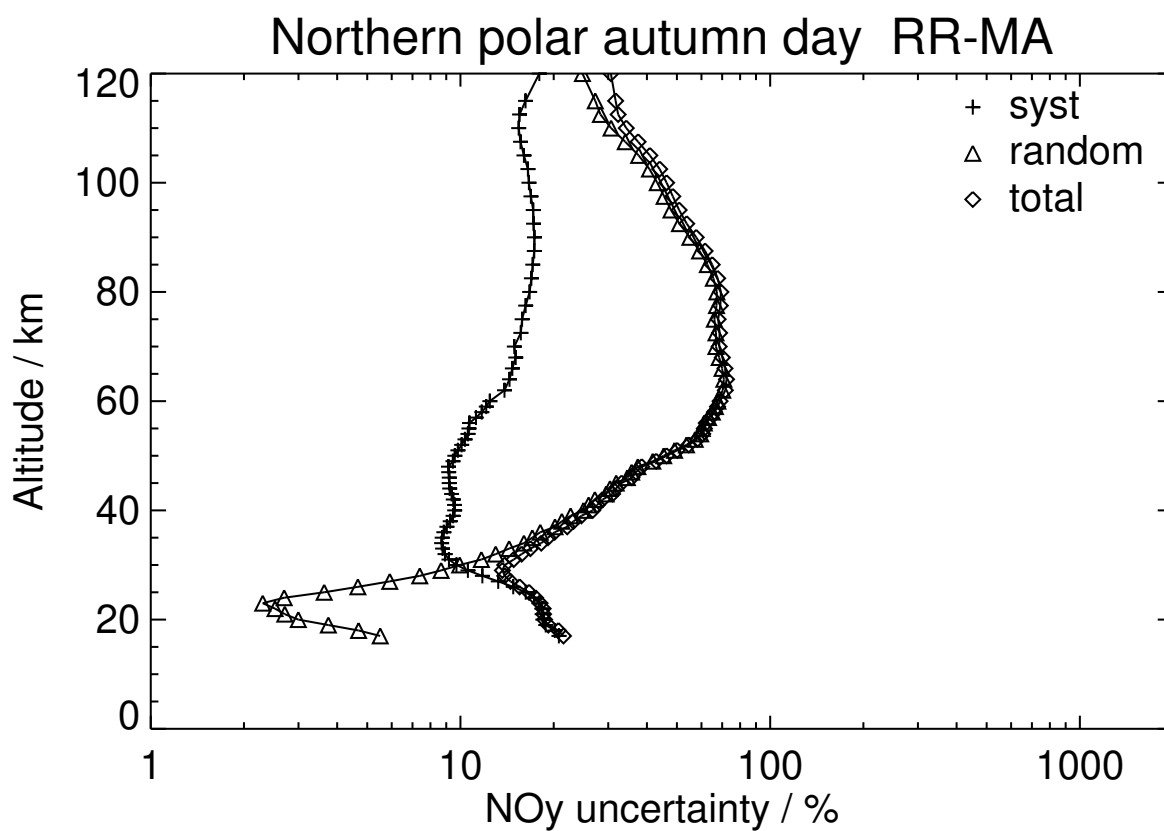


Figure S75: V8R_NOy_56X Northern polar autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	8.44	4.03	21.21	21.59
20	11.11	2.17	19.68	19.80
23	14.74	1.72	18.96	19.04
26	16.46	2.37	15.69	15.87
29	16.34	3.66	10.84	11.44
32	12.63	5.00	8.24	9.64
35	8.96	6.65	6.61	9.38
38	7.93	12.47	5.40	13.59
41	6.26	14.45	5.21	15.36
44	5.05	16.34	5.08	17.11
47	3.88	20.88	4.91	21.45
50	3.76	27.25	4.70	27.65
53	4.12	35.00	5.18	35.39
56	4.47	45.21	5.99	45.61
59	6.02	53.10	7.78	53.66
62	9.75	56.81	9.21	57.55

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	56.24	9.81	57.09
68	0.03	55.16	10.32	56.12
70	0.04	54.46	10.28	55.43
72	0.05	59.39	11.58	60.50
77	0.09	61.02	13.13	62.42
80	0.15	59.14	13.97	60.76
82	0.28	56.82	14.48	58.64
85	0.50	55.03	14.89	57.01
87	0.86	52.74	15.56	54.98
92	2.08	46.83	16.88	49.78
95	2.72	45.59	17.92	48.99
97	4.56	42.50	17.48	45.95
100	6.96	41.08	17.08	44.49
102	11.87	39.45	16.83	42.89
107	29.21	35.45	16.37	39.04
110	38.02	34.55	16.37	38.23
112	45.25	34.25	16.69	38.10
115	47.01	33.34	17.08	37.46
120	64.11	30.89	18.86	36.19
120	64.11	30.89	18.86	36.19

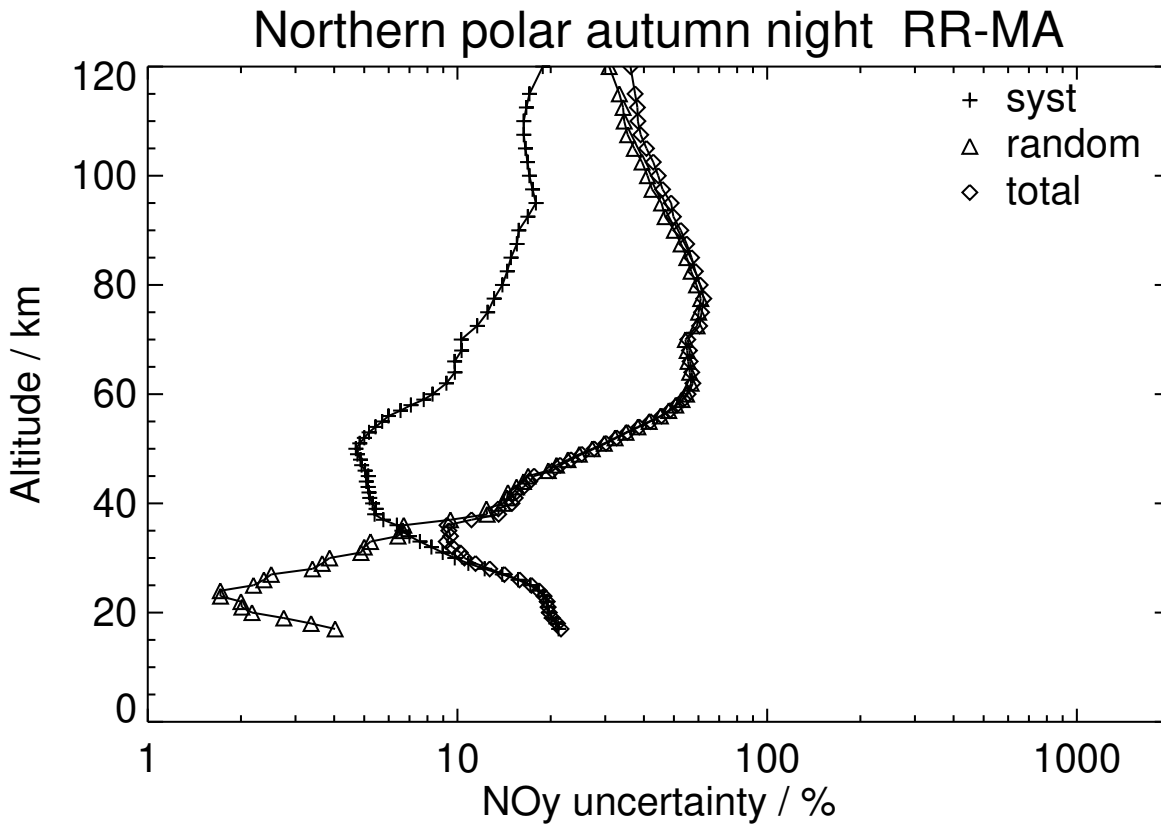


Figure S76: V8R_NOy_56X Northern polar autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
14	4.76	4.28	22.05	22.46
17	4.91	6.44	19.18	20.23
20	9.02	3.98	18.51	18.93
23	12.59	2.74	17.08	17.30
26	13.90	4.48	15.04	15.69
29	14.95	6.79	11.63	13.47
32	14.65	10.26	8.53	13.34
35	12.81	13.87	8.82	16.44
38	10.84	17.74	9.79	20.26
41	10.54	20.02	9.96	22.36
44	9.25	23.14	10.33	25.34
47	6.77	28.64	9.84	30.29
50	5.54	36.29	9.07	37.41
53	4.76	47.84	9.06	48.69
56	4.63	55.86	9.65	56.69
59	5.44	62.84	10.59	63.73
62	7.24	66.27	11.44	67.25

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	66.86	12.07	67.94
68	0.01	66.66	13.28	67.97
70	0.02	65.70	13.99	67.18
72	0.02	63.98	15.16	65.75
77	0.04	61.01	16.77	63.27
80	0.07	60.09	17.57	62.60
82	0.12	58.46	18.20	61.23
85	0.22	55.74	18.54	58.74
87	0.40	52.11	18.56	55.31
92	1.13	45.92	17.38	49.10
95	1.98	43.06	17.35	46.42
97	3.74	39.61	17.90	43.47
100	5.79	37.48	17.56	41.39
102	9.36	35.48	17.05	39.36
107	22.00	31.15	15.14	34.64
110	30.40	29.95	14.11	33.10
112	38.68	30.16	13.41	33.01
115	43.43	31.06	13.35	33.81
120	53.42	30.90	15.16	34.41
120	53.42	30.90	15.16	34.41

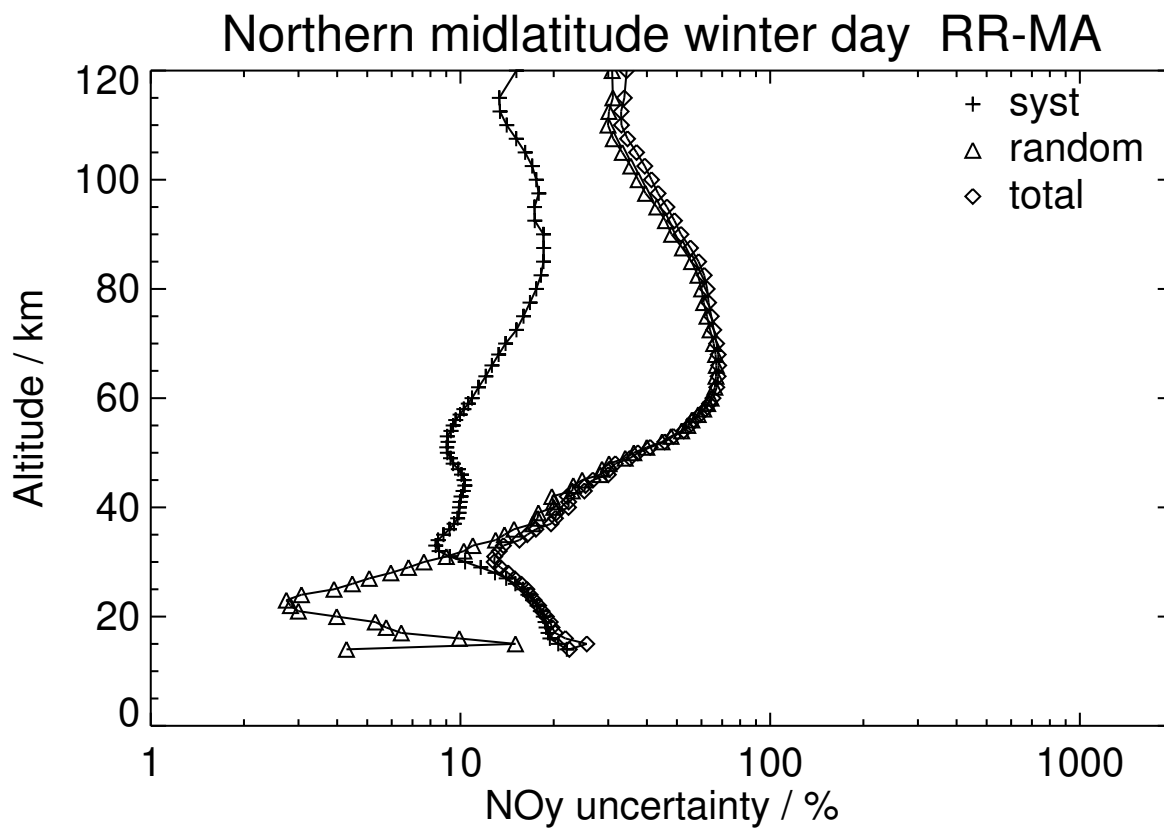


Figure S77: V8R_NO_y_56X Northern midlatitude winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	6.62	7.14	18.40	19.74
20	9.63	3.47	18.24	18.56
23	12.78	2.79	18.08	18.29
26	14.52	3.11	16.74	17.03
29	15.61	3.52	12.40	12.88
32	14.25	4.37	7.68	8.83
35	11.75	5.21	6.13	8.04
38	9.90	5.49	5.75	7.95
41	9.86	5.44	5.28	7.58
44	8.97	5.87	6.26	8.59
47	6.24	8.20	6.64	10.55
50	4.67	12.10	6.29	13.63
53	5.44	31.01	5.27	31.46
56	5.68	51.08	5.18	51.34
59	4.64	53.64	4.83	53.86
62	5.61	61.79	4.97	61.99

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	64.02	5.33	64.24
68	0.02	64.48	5.78	64.74
70	0.02	63.53	5.92	63.80
72	0.03	70.12	10.58	70.91
77	0.09	68.28	13.78	69.65
80	0.16	66.48	14.82	68.11
82	0.28	63.00	14.75	64.70
85	0.38	59.97	14.11	61.61
87	0.65	56.69	14.42	58.49
92	2.03	52.62	15.91	54.97
95	4.34	49.00	16.72	51.77
97	7.40	46.60	16.81	49.54
100	9.76	45.47	16.44	48.36
102	10.61	47.17	15.75	49.72
107	16.60	50.53	14.34	52.53
110	20.05	50.78	13.16	52.46
112	24.35	48.80	11.88	50.23
115	27.04	48.79	11.04	50.03
120	32.36	50.54	12.07	51.96
120	32.36	50.54	12.07	51.96

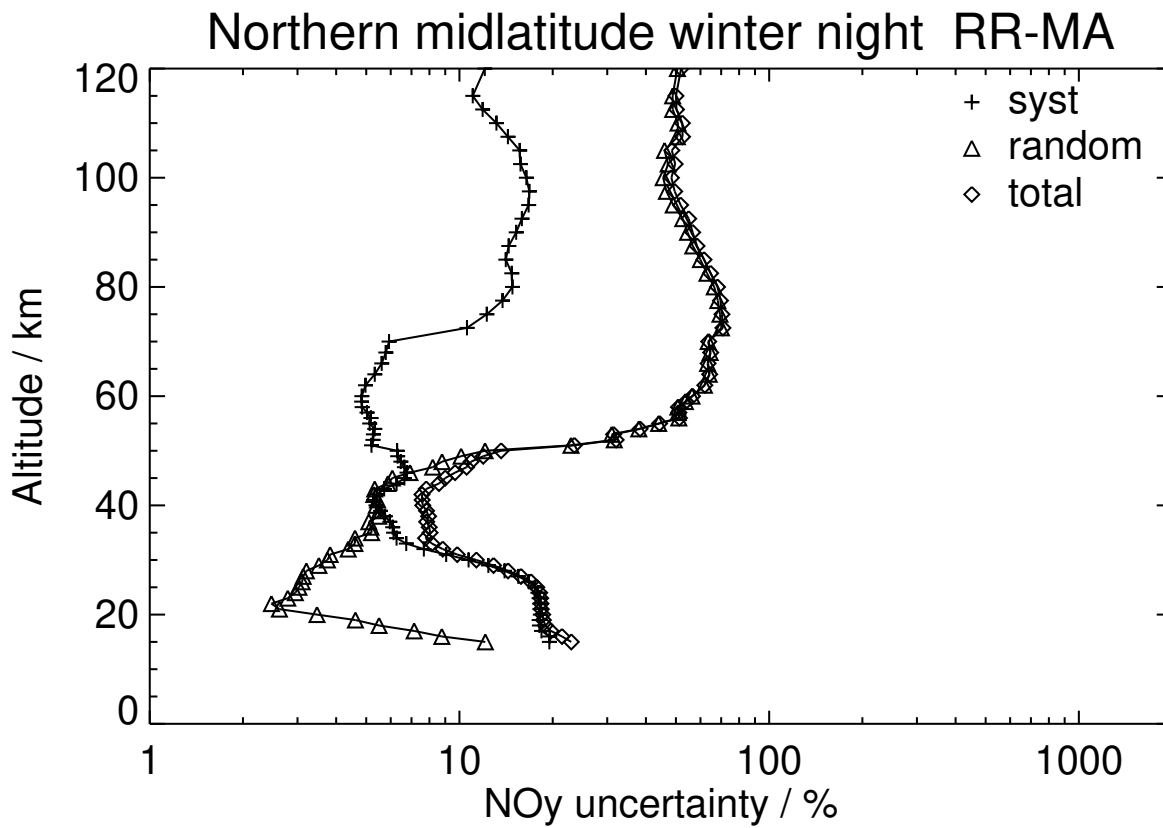


Figure S78: V8R_NOy_56X Northern midlatitude winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	5.14	8.54	20.81	22.49
20	8.34	3.68	16.74	17.14
23	12.55	3.35	15.10	15.47
26	13.96	5.00	12.46	13.42
29	14.88	7.03	9.41	11.74
32	15.15	9.08	8.43	12.39
35	12.57	10.90	8.62	13.90
38	10.83	12.50	8.39	15.05
41	10.29	13.43	8.43	15.86
44	8.65	15.46	8.55	17.66
47	8.40	17.97	8.31	19.80
50	7.30	23.08	8.45	24.58
53	5.93	32.74	8.54	33.84
56	4.49	44.45	8.85	45.33
59	5.15	56.61	10.00	57.49
62	6.67	59.57	10.97	60.57

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	57.47	11.87	58.69
68	0.02	58.72	15.02	60.61
70	0.02	58.94	16.98	61.34
72	0.02	59.58	18.00	62.24
77	0.03	58.17	17.51	60.75
80	0.04	62.19	16.99	64.47
82	0.06	63.57	18.64	66.24
85	0.11	62.30	20.78	65.68
87	0.21	60.23	22.09	64.15
92	0.64	54.62	23.58	59.50
95	1.08	52.17	23.97	57.42
97	1.83	49.95	24.51	55.64
100	3.34	47.70	24.90	53.81
102	5.90	45.73	23.88	51.59
107	14.52	40.10	21.50	45.50
110	20.90	37.45	20.03	42.47
112	27.29	35.62	18.63	40.20
115	33.93	33.98	17.66	38.30
120	46.51	32.17	17.44	36.59
120	46.51	32.17	17.44	36.59

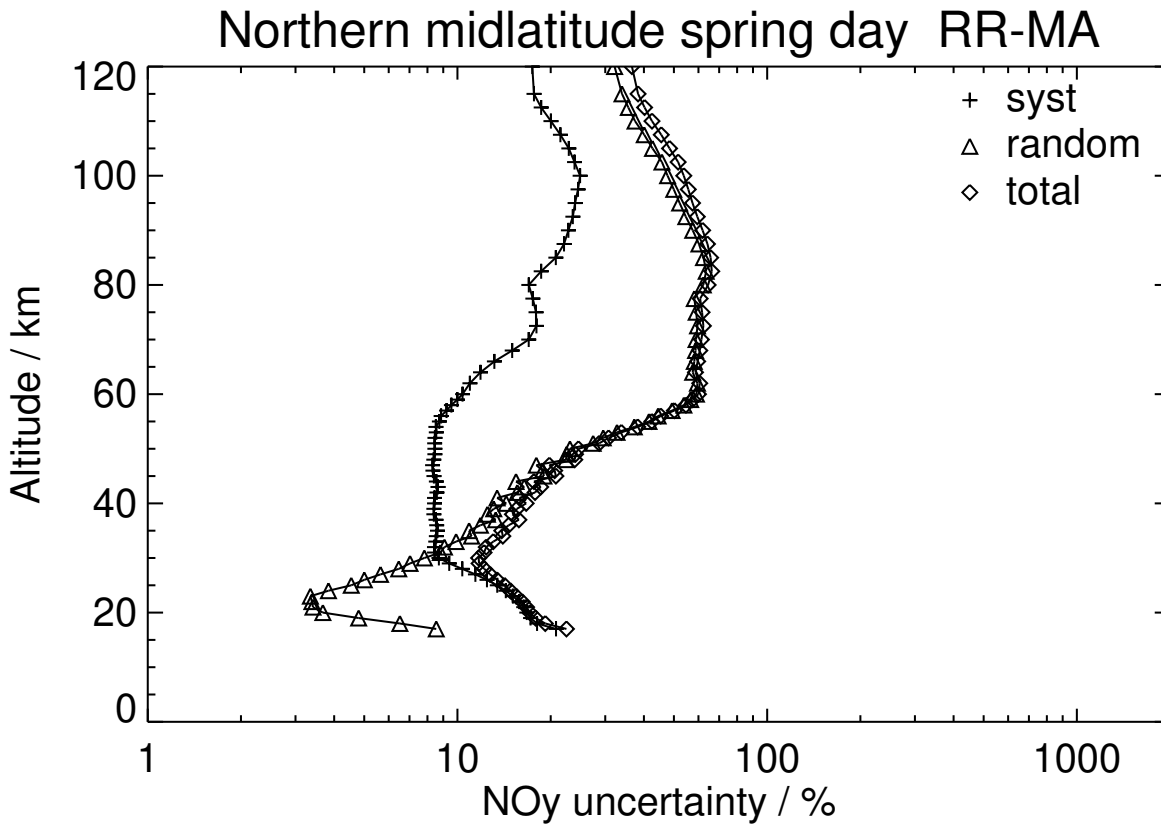


Figure S79: V8R_NO_y_56X Northern midlatitude spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	5.53	8.04	19.21	20.83
20	8.17	3.56	17.13	17.49
23	12.27	2.30	15.73	15.90
26	14.03	2.66	12.63	12.91
29	15.50	3.42	8.83	9.47
32	15.13	4.05	6.64	7.77
35	11.93	4.46	5.76	7.29
38	9.72	4.72	5.22	7.04
41	8.84	5.01	5.56	7.48
44	6.61	6.34	6.01	8.73
47	5.36	8.17	5.46	9.83
50	5.05	9.49	5.33	10.89
53	5.83	20.24	5.22	20.90
56	5.87	36.38	5.60	36.81
59	6.60	47.82	6.00	48.19
62	7.36	59.78	6.75	60.16

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	64.42	7.13	64.81
68	0.02	54.85	6.72	55.26
70	0.02	60.25	7.77	60.75
72	0.02	60.52	8.55	61.12
77	0.02	65.54	10.47	66.37
80	0.04	69.69	12.61	70.82
82	0.06	69.14	12.38	70.24
85	0.13	67.52	12.72	68.71
87	0.24	62.92	14.65	64.60
92	0.74	54.86	15.96	57.13
95	1.28	51.22	17.18	54.03
97	2.12	49.01	19.50	52.75
100	3.46	47.41	19.81	51.39
102	6.74	47.22	22.33	52.23
107	18.46	43.73	21.09	48.55
110	24.06	43.43	19.84	47.75
112	31.09	43.56	19.01	47.53
115	39.56	42.90	18.23	46.62
120	66.22	40.50	17.87	44.27
120	66.22	40.50	17.87	44.27

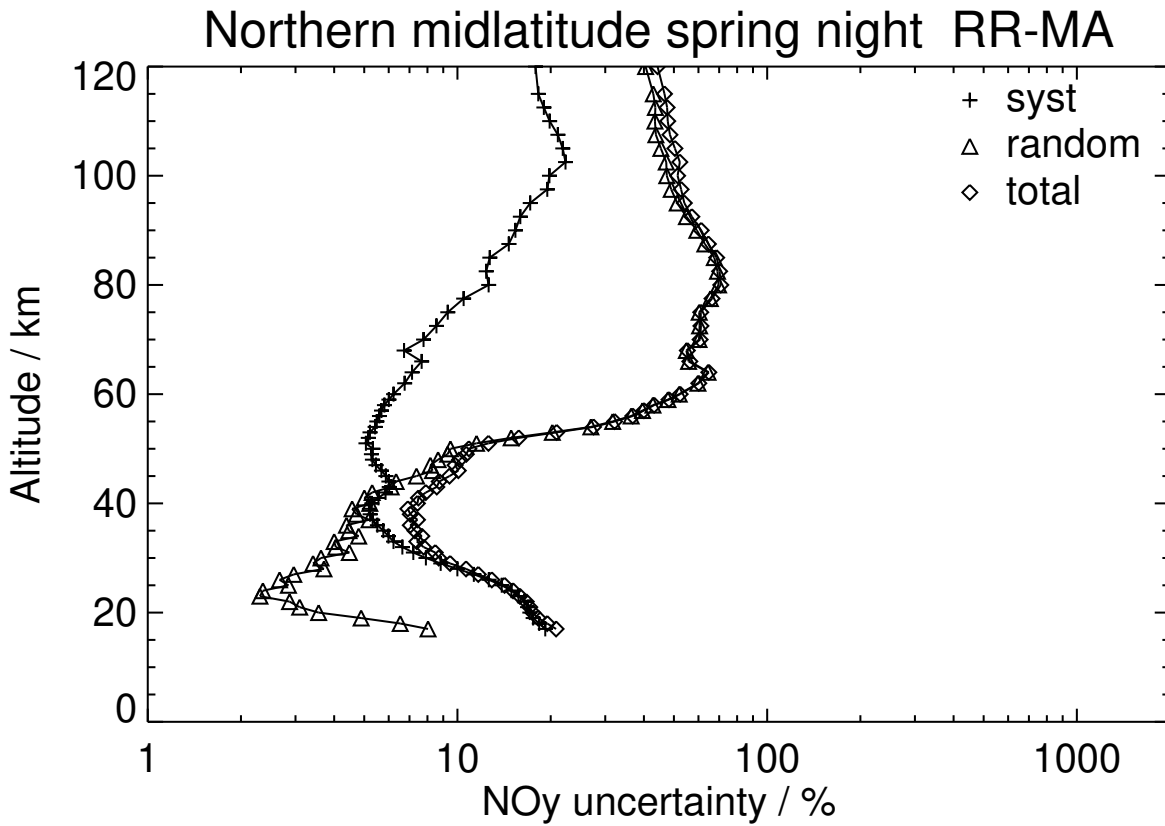


Figure S80: V8R_NOy_56X Northern midlatitude spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	4.20	7.39	19.09	20.47
20	7.43	3.19	17.10	17.40
23	12.55	3.30	15.30	15.66
26	14.55	4.46	12.31	13.10
29	16.09	5.91	9.21	10.94
32	17.31	7.92	7.60	10.98
35	14.92	9.23	7.45	11.86
38	11.66	10.33	7.63	12.84
41	9.93	12.11	7.79	14.40
44	8.73	13.54	8.18	15.82
47	7.26	17.31	8.25	19.17
50	7.10	20.40	8.09	21.94
53	6.81	24.53	8.03	25.81
56	5.99	33.86	8.12	34.81
59	6.11	49.98	9.24	50.82
62	5.38	59.06	11.14	60.10

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	60.36	12.41	61.62
68	0.01	57.62	15.21	59.59
70	0.01	55.69	15.59	57.83
72	0.01	55.25	17.03	57.81
77	0.01	54.89	19.82	58.35
80	0.02	56.06	17.74	58.80
82	0.04	57.62	18.12	60.40
85	0.12	55.43	17.60	58.16
87	0.34	53.18	17.88	56.10
92	1.88	44.83	17.87	48.26
95	3.58	40.66	18.00	44.47
97	6.16	37.35	17.02	41.05
100	9.62	34.39	16.35	38.08
102	14.76	32.34	15.63	35.91
107	27.89	31.78	14.82	35.06
110	34.69	32.63	14.94	35.89
112	41.27	32.62	15.55	36.14
115	47.74	31.62	16.64	35.73
120	61.03	28.66	19.67	34.77
120	61.03	28.66	19.67	34.77

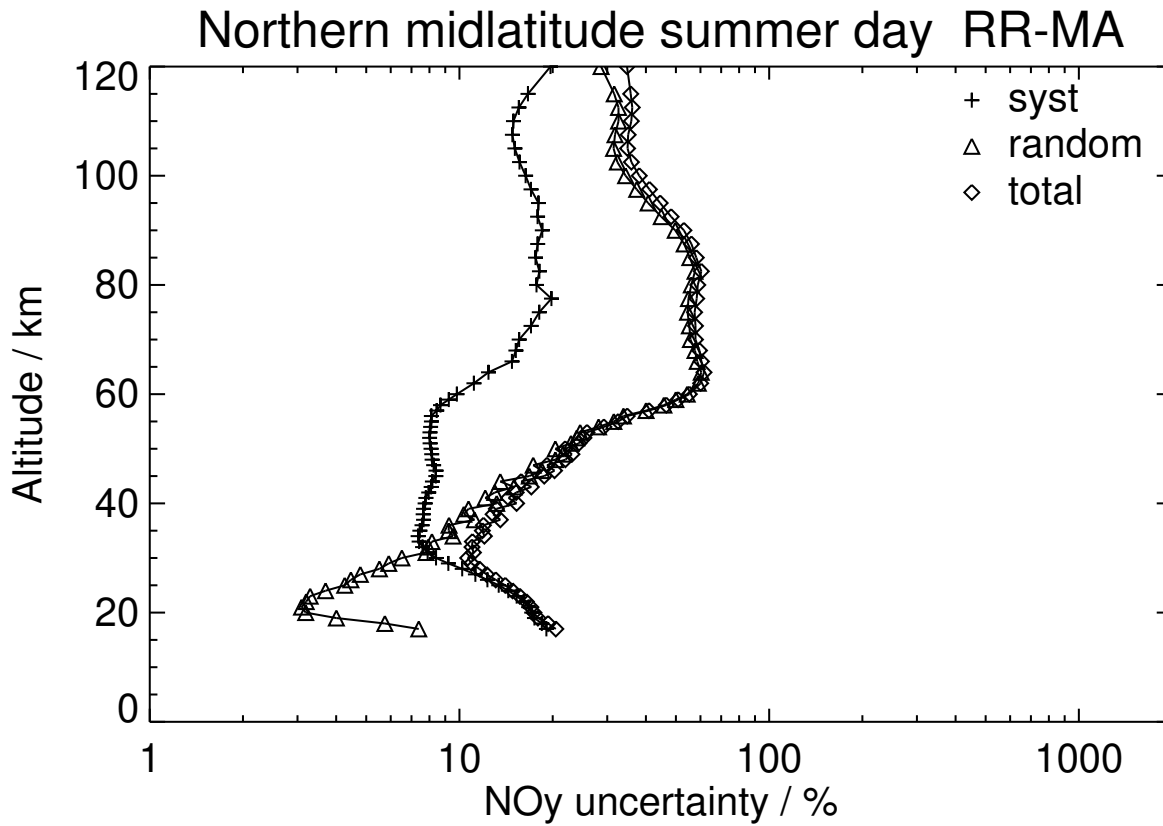


Figure S81: V8R_NOy_56X Northern midlatitude summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	4.41	6.71	18.66	19.83
20	7.47	2.39	16.32	16.50
23	12.46	1.96	14.87	15.00
26	14.44	2.20	12.09	12.29
29	16.32	2.64	8.74	9.13
32	17.25	2.99	6.53	7.18
35	14.94	3.24	5.50	6.38
38	11.68	3.69	5.38	6.53
41	9.42	4.22	5.25	6.74
44	8.30	4.57	5.29	6.99
47	6.88	5.59	5.67	7.96
50	6.24	6.85	5.24	8.62
53	6.34	11.81	4.89	12.78
56	6.75	24.13	4.98	24.64
59	5.88	38.60	5.08	38.93
62	5.59	53.57	5.69	53.87

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	58.51	6.24	58.84
68	0.01	59.75	8.27	60.32
70	0.01	58.80	8.27	59.38
72	0.01	59.67	8.98	60.34
77	0.02	63.96	12.43	65.15
80	0.04	62.58	13.00	63.91
82	0.08	61.91	12.91	63.24
85	0.17	59.09	12.58	60.41
87	0.58	55.44	12.50	56.83
92	3.16	43.35	11.64	44.89
95	5.52	38.74	11.31	40.36
97	7.47	35.40	11.20	37.13
100	10.53	32.84	12.13	35.01
102	14.90	31.56	12.74	34.04
107	25.02	32.07	14.69	35.27
110	29.00	32.44	15.88	36.12
112	32.02	32.98	17.08	37.15
115	37.13	33.77	18.32	38.42
120	44.95	37.42	20.77	42.80
120	44.95	37.42	20.77	42.80

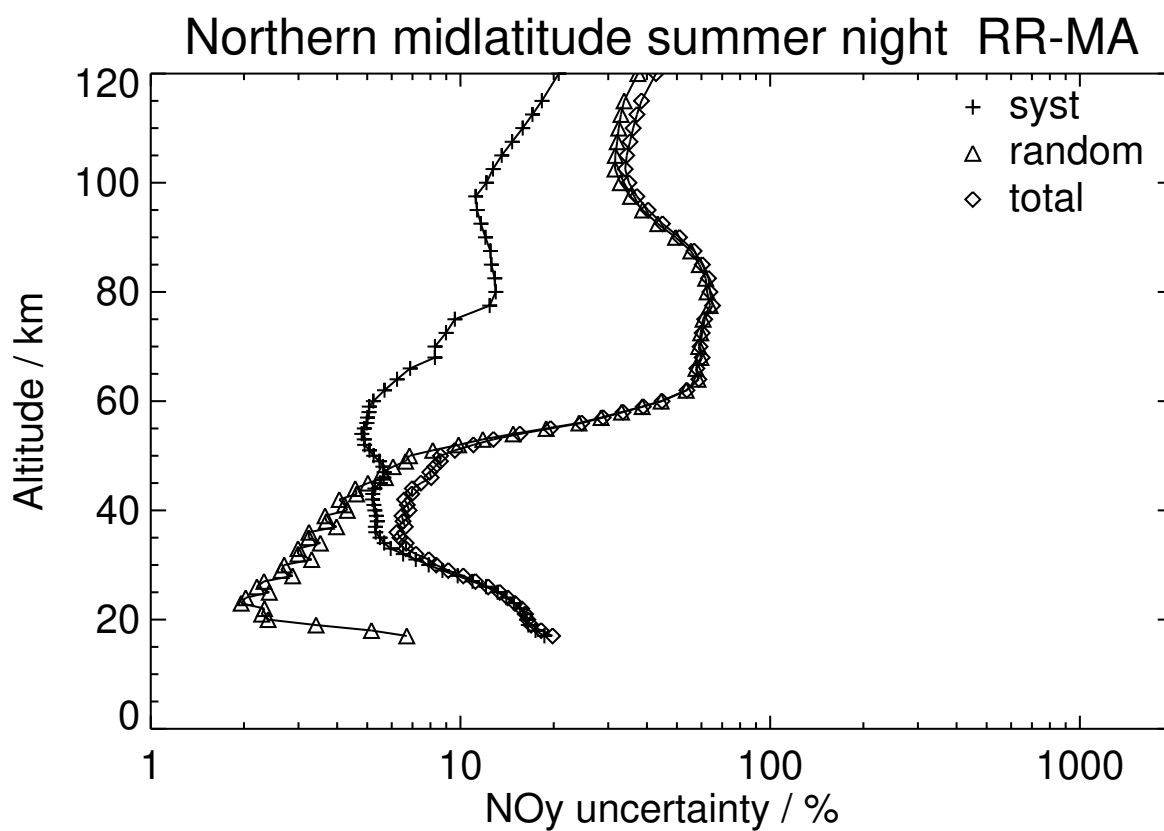


Figure S82: V8R_NOy_56X Northern midlatitude summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	4.44	8.49	21.99	23.58
20	7.61	5.46	18.09	18.89
23	11.71	3.67	16.91	17.30
26	14.88	4.51	13.97	14.68
29	17.04	7.19	10.07	12.38
32	17.86	9.99	8.30	12.98
35	16.64	12.38	8.57	15.06
38	15.13	13.40	8.78	16.03
41	13.43	15.03	9.01	17.52
44	11.33	16.73	8.82	18.91
47	9.82	19.94	8.74	21.77
50	8.07	25.49	8.73	26.94
53	6.88	34.92	8.58	35.96
56	5.42	45.16	8.63	45.98
59	5.12	56.90	9.45	57.68
62	6.06	62.29	10.67	63.20

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	62.80	11.24	63.79
68	0.01	62.56	11.57	63.62
70	0.01	63.24	11.61	64.30
72	0.01	65.24	10.04	66.01
77	0.02	68.95	12.17	70.01
80	0.04	69.07	13.21	70.32
82	0.08	67.21	13.86	68.62
85	0.15	64.40	14.20	65.94
87	0.30	61.01	14.56	62.72
92	0.78	54.02	15.78	56.28
95	1.16	51.36	16.64	53.99
97	1.99	46.67	17.72	49.92
100	4.10	40.05	16.03	43.14
102	6.01	40.14	17.64	43.85
107	15.16	35.89	17.21	39.80
110	22.35	33.63	16.98	37.68
112	27.90	32.33	16.33	36.22
115	23.61	32.62	15.59	36.15
120	28.46	31.10	15.94	34.95
120	28.46	31.10	15.94	34.95

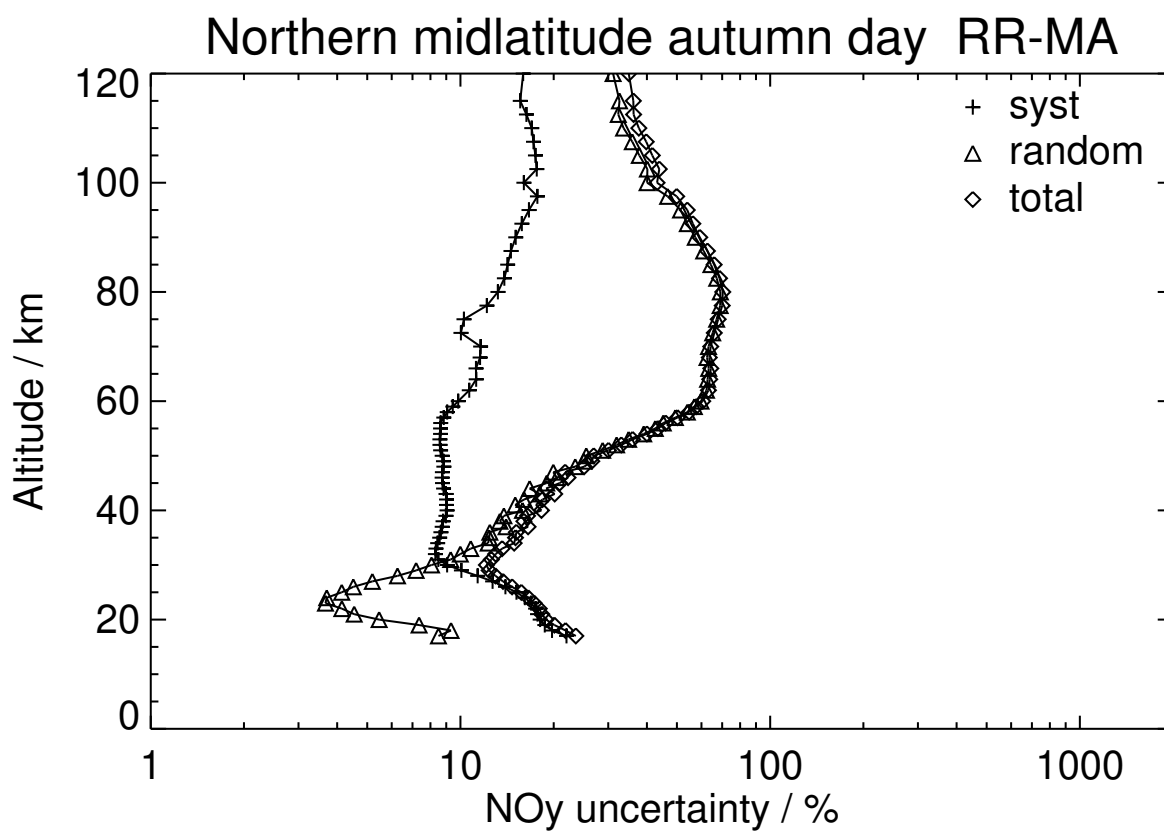


Figure S83: V8R_NOy_56X Northern midlatitude autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	6.02	11.80	20.81	23.93
20	8.31	5.00	17.88	18.57
23	12.16	3.27	16.91	17.22
26	14.61	2.60	14.16	14.39
29	16.68	2.97	10.09	10.52
32	17.89	3.74	6.61	7.59
35	17.31	4.27	5.44	6.92
38	14.44	4.69	5.49	7.22
41	12.40	5.07	5.30	7.33
44	10.86	5.19	5.54	7.59
47	9.17	5.93	5.58	8.14
50	8.44	8.63	5.35	10.15
53	7.36	20.07	5.83	20.89
56	6.10	41.72	6.16	42.17
59	6.15	53.94	7.03	54.40
62	9.02	51.80	8.72	52.53

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	41.41	9.13	42.40
68	0.06	31.13	7.86	32.10
70	0.07	34.26	7.41	35.05
72	0.05	39.52	7.27	40.18
77	0.05	50.18	7.75	50.78
80	0.08	53.82	8.27	54.46
82	0.09	56.01	8.79	56.70
85	0.16	54.93	9.11	55.68
87	0.22	52.23	9.88	53.16
92	0.57	44.32	10.73	45.60
95	0.78	41.15	11.04	42.60
97	1.36	36.87	11.50	38.62
100	2.31	36.19	12.11	38.16
102	4.16	32.34	11.81	34.43
107	8.39	29.09	11.85	31.41
110	10.23	29.76	12.40	32.24
112	12.38	31.32	12.94	33.89
115	9.42	34.34	13.25	36.80
120	13.93	34.81	13.51	37.34
120	13.93	34.81	13.51	37.34

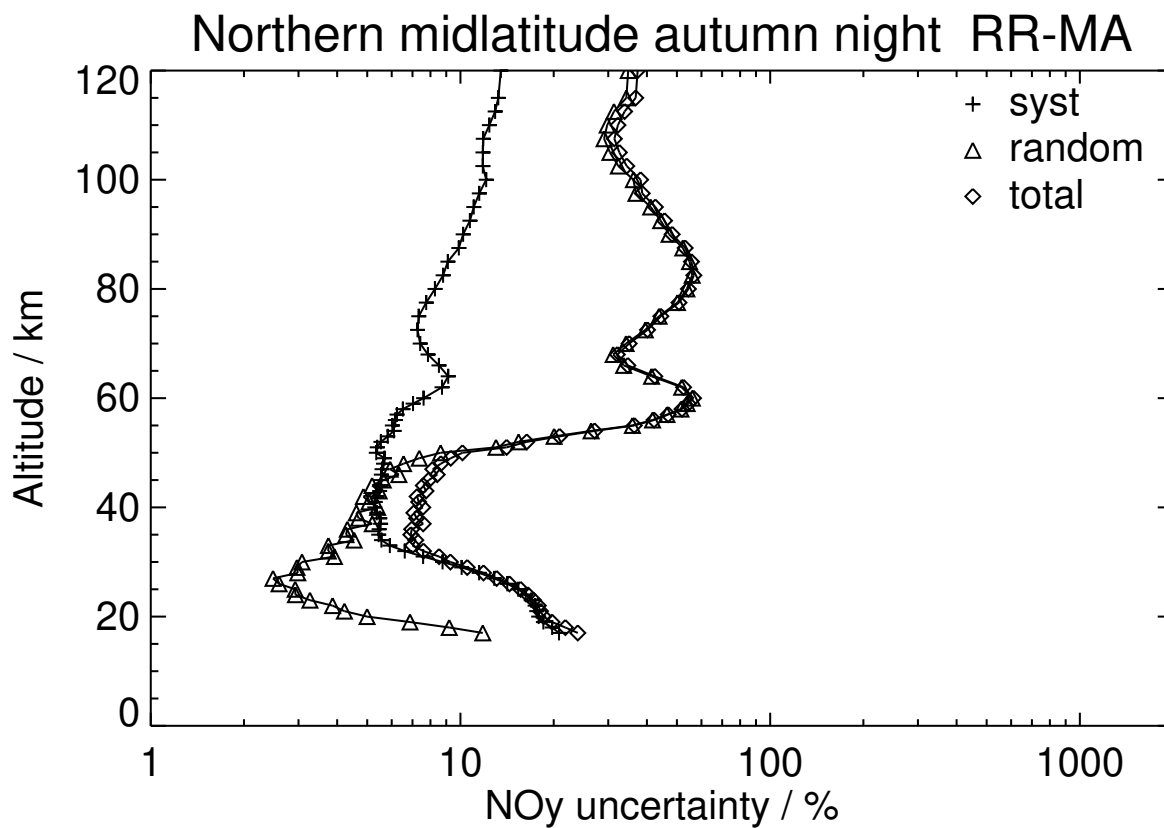


Figure S84: V8R_NOy_56X Northern midlatitude autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
17	0.22	> 100	60.32	> 100	64	0.01	68.20	12.71	69.38
20	2.46	9.66	15.75	18.48	68	0.01	63.66	12.84	64.94
23	6.57	7.98	14.10	16.20	70	0.01	69.60	14.70	71.13
26	8.51	6.36	12.46	13.99	72	0.01	68.95	15.34	70.64
29	9.99	6.67	9.31	11.45	77	0.01	67.73	16.32	69.67
32	13.11	7.98	7.48	10.94	80	0.02	66.74	16.71	68.80
35	17.10	9.51	8.25	12.59	82	0.04	65.31	17.31	67.56
38	18.24	10.17	8.33	13.15	85	0.08	62.98	18.71	65.71
41	15.62	10.36	8.23	13.23	87	0.18	60.11	18.80	62.98
44	13.00	11.34	8.59	14.23	92	0.73	53.74	18.20	56.74
47	10.28	15.03	8.66	17.35	95	1.36	51.10	18.39	54.31
50	7.89	20.01	8.72	21.83	97	2.27	48.66	18.83	52.17
53	5.73	30.94	9.02	32.23	100	3.85	46.58	18.71	50.20
56	3.73	44.08	9.20	45.03	102	6.42	44.16	18.25	47.78
59	3.85	59.26	10.49	60.18	107	12.44	37.02	16.76	40.63
62	4.37	67.14	11.95	68.20	110	15.96	33.70	16.06	37.33
					112	19.65	31.45	15.65	35.13
					115	20.11	28.92	15.48	32.80
					120	25.16	23.81	16.45	28.94
					120	25.16	23.81	16.45	28.94

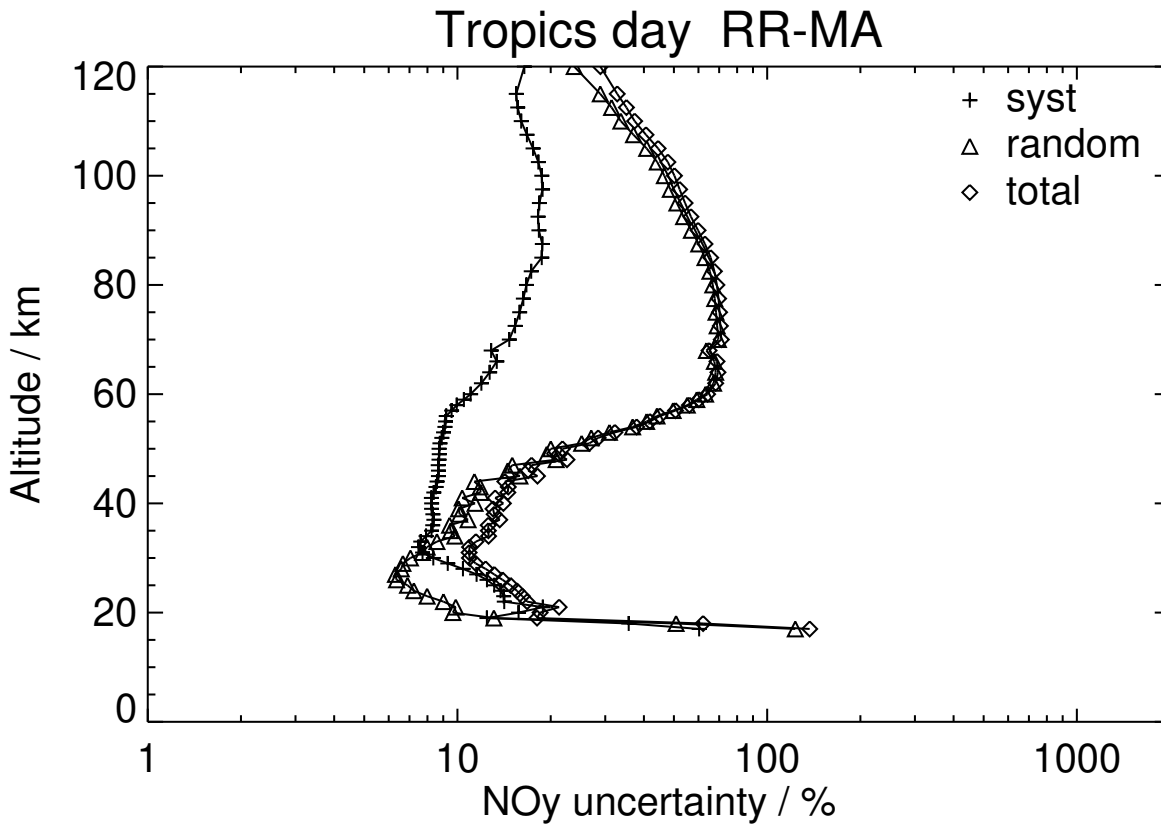


Figure S85: V8R_NOy_56X Tropics day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)	altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
17	0.79	40.59	18.71	44.70	64	< 0.01	66.52	10.59	67.36
20	3.11	12.12	14.89	19.20	68	< 0.01	60.38	14.17	62.02
23	6.74	6.52	14.39	15.80	87	0.11	53.86	11.63	55.10
26	8.75	4.63	12.28	13.13	92	0.39	45.25	14.20	47.43
29	10.36	3.66	8.58	9.33	95	0.64	42.26	14.32	44.62
32	14.61	3.54	6.00	6.96	97	1.03	39.74	14.74	42.39
35	18.21	3.50	4.56	5.75	100	1.68	37.12	14.99	40.04
38	18.87	3.52	4.99	6.10	102	2.76	34.68	15.43	37.96
41	15.42	3.95	5.17	6.51	107	6.39	29.78	15.75	33.69
44	12.87	4.00	5.45	6.76	110	7.48	29.50	15.78	33.46
47	9.39	4.78	5.90	7.59	112	8.81	30.16	15.74	34.02
50	7.05	6.64	5.99	8.94	115	9.96	31.36	15.59	35.02
53	5.53	14.85	6.24	16.10	120	13.10	30.86	15.34	34.46
56	4.74	42.15	6.48	42.65	120	13.10	30.86	15.34	34.46
59	4.67	58.10	8.01	58.65					
62	4.76	66.29	9.67	66.99					

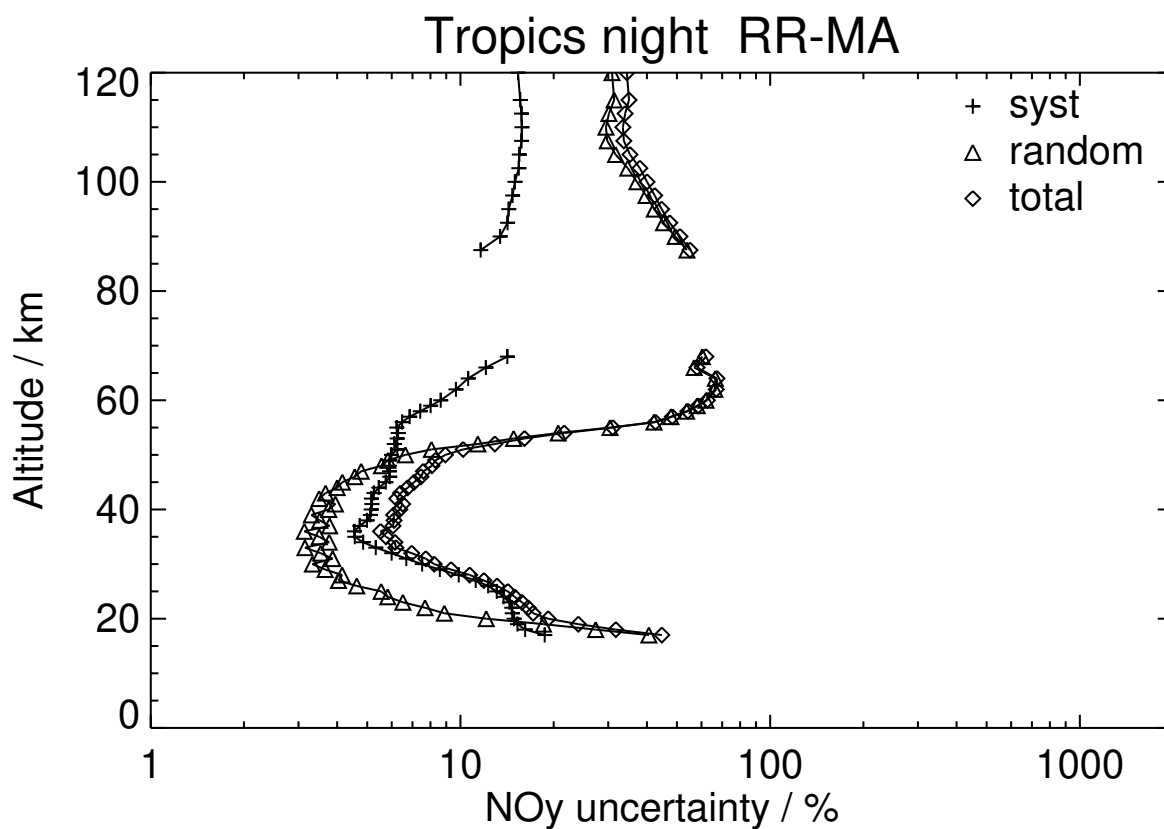


Figure S86: V8R_NOy_56X Tropics night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	6.84	3.21	22.48	22.71
20	8.37	3.19	19.04	19.31
23	12.74	2.61	17.89	18.08
26	14.59	4.59	15.11	15.79
29	16.11	8.01	10.52	13.22
32	17.36	10.58	8.37	13.49
35	15.80	12.62	8.61	15.28
38	9.81	16.06	8.87	18.35
41	7.15	20.62	8.47	22.29
44	7.31	22.61	7.89	23.94
47	7.44	23.75	8.01	25.06
50	6.35	30.49	8.04	31.53
53	5.95	39.12	7.92	39.92
56	5.63	46.83	8.04	47.51
59	7.11	56.50	8.86	57.19
62	8.97	61.66	9.85	62.44

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	63.15	10.45	64.01
68	0.01	64.13	11.68	65.18
70	0.01	64.11	12.52	65.32
72	0.02	62.14	13.19	63.52
77	0.03	59.66	14.53	61.40
80	0.06	57.96	15.02	59.87
82	0.11	55.72	15.67	57.88
85	0.23	52.48	16.04	54.88
87	0.46	49.04	16.39	51.70
92	1.58	42.94	16.85	46.13
95	2.89	40.31	16.89	43.71
97	5.24	37.59	16.78	41.17
100	9.58	34.25	16.42	37.99
102	17.03	30.78	15.82	34.61
107	40.06	30.03	14.20	33.22
110	51.92	32.72	13.64	35.45
112	63.20	36.33	13.67	38.81
115	69.42	39.39	14.24	41.89
120	83.95	38.02	16.52	41.46
120	83.95	38.02	16.52	41.46

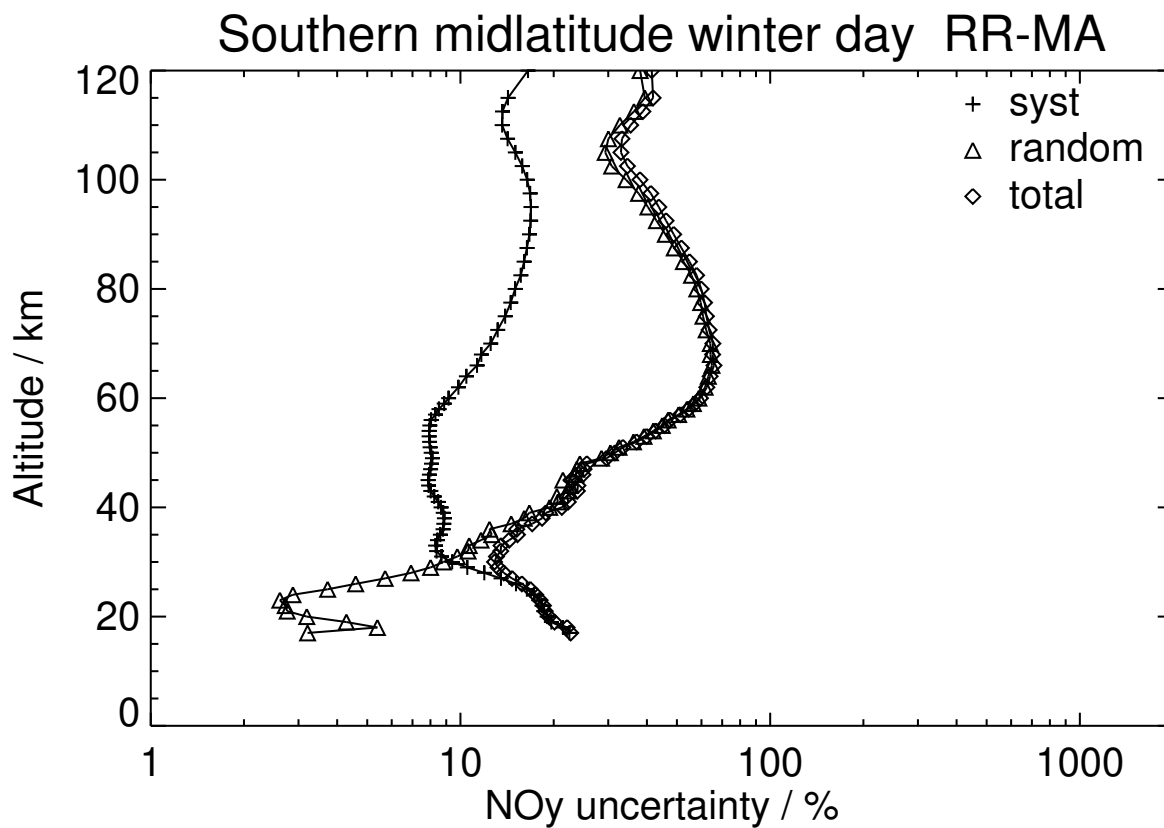


Figure S87: V8R_NOy_56X Southern midlatitude winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	6.93	4.69	19.51	20.06
20	8.83	3.36	16.98	17.31
23	13.23	2.58	16.45	16.65
26	15.96	3.53	13.41	13.86
29	16.59	4.65	9.62	10.68
32	16.06	5.55	6.65	8.66
35	14.06	5.97	5.89	8.39
38	9.16	6.76	6.65	9.48
41	6.53	7.75	5.70	9.62
44	6.27	7.97	5.37	9.61
47	5.82	8.61	5.48	10.21
50	7.25	13.77	4.73	14.56
53	7.95	20.96	5.00	21.55
56	9.07	34.22	5.74	34.70
59	11.71	41.69	6.76	42.23
62	16.53	47.45	8.10	48.14

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	50.89	8.92	51.67
68	0.03	52.55	10.16	53.52
70	0.04	52.38	10.48	53.42
72	0.05	51.02	10.96	52.19
77	0.12	52.71	12.34	54.14
80	0.19	52.42	12.56	53.91
82	0.32	51.95	12.72	53.48
85	0.56	50.32	12.82	51.93
87	0.94	47.93	12.93	49.65
92	2.30	43.51	13.15	45.45
95	3.78	41.21	13.48	43.36
97	6.03	39.38	13.95	41.78
100	10.06	37.53	14.24	40.14
102	16.11	36.24	14.06	38.88
107	30.31	36.90	13.77	39.38
110	37.75	37.88	13.73	40.29
112	42.86	38.36	14.01	40.84
115	49.69	38.36	14.60	41.05
120	69.09	36.06	16.47	39.64
120	69.09	36.06	16.47	39.64

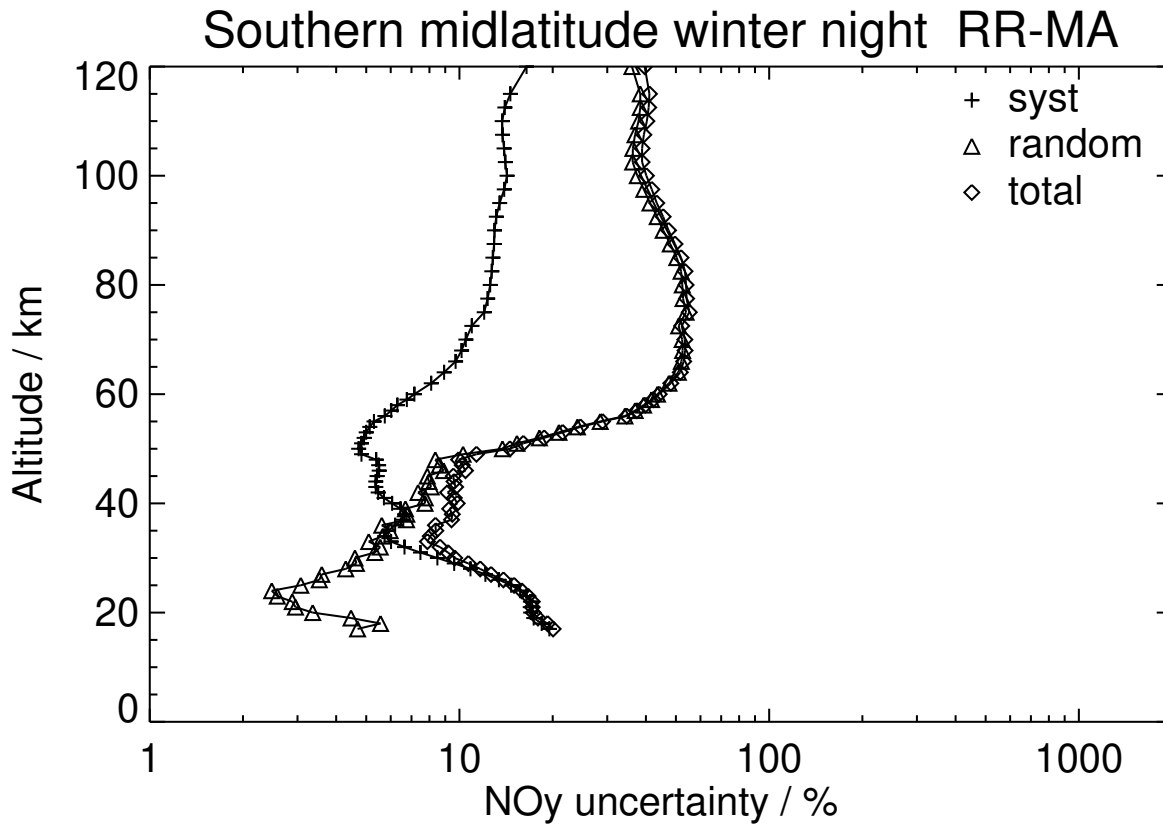


Figure S88: V8R_NOy_56X Southern midlatitude winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	10.01	3.73	16.09	16.51
23	13.29	2.54	15.75	15.96
26	13.38	3.87	13.57	14.11
29	14.00	5.85	9.72	11.34
32	16.57	9.09	7.56	11.82
35	16.22	11.90	8.03	14.36
38	12.02	14.44	8.87	16.95
41	9.35	17.42	8.64	19.45
44	8.74	19.46	8.45	21.22
47	7.17	23.21	8.64	24.76
50	5.86	27.72	8.10	28.88
53	5.57	34.58	7.93	35.47
56	5.04	43.50	8.30	44.29
59	5.73	54.70	9.82	55.58
62	5.83	63.33	12.31	64.52

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	65.34	14.09	66.84
68	0.01	64.62	17.84	67.04
70	0.01	64.20	19.12	66.99
72	0.02	64.16	24.15	68.56
77	0.02	69.30	28.49	74.93
80	0.03	65.97	27.31	71.39
82	0.05	66.31	24.59	70.72
85	0.10	65.32	24.40	69.73
87	0.21	63.27	24.49	67.85
92	0.73	56.41	23.47	61.09
95	1.22	53.01	23.46	57.97
97	1.98	49.58	24.21	55.18
100	3.48	45.91	24.01	51.81
102	6.22	42.90	23.28	48.81
107	15.27	38.70	21.37	44.20
110	21.30	37.36	20.36	42.55
112	27.64	36.26	19.47	41.16
115	34.39	34.67	18.83	39.45
120	48.06	30.90	18.94	36.25
120	48.06	30.90	18.94	36.25

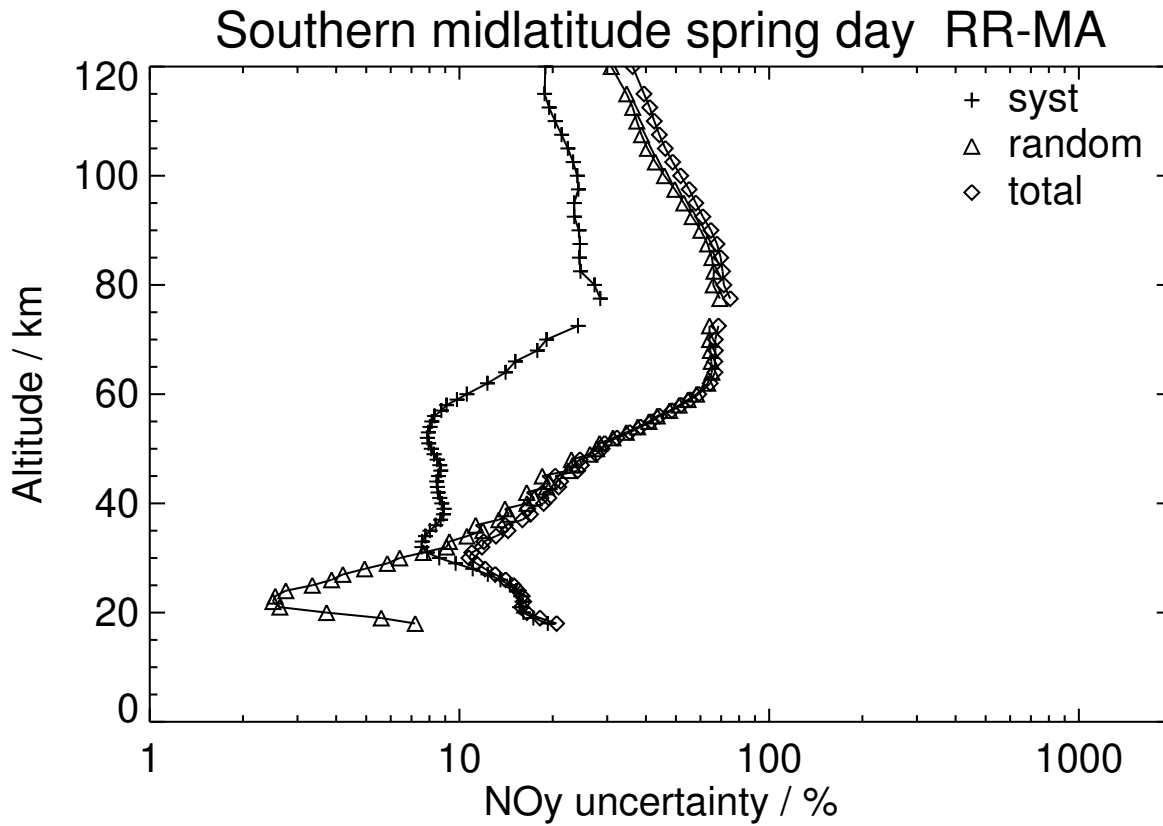


Figure S89: V8R_NOy_56X Southern midlatitude spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	6.37	4.69	20.71	21.24
20	8.93	2.68	17.55	17.75
23	13.04	2.16	16.56	16.70
26	13.61	2.64	13.75	14.00
29	14.26	3.06	9.27	9.76
32	15.67	3.74	6.23	7.27
35	16.86	3.95	5.18	6.51
38	12.77	4.43	5.89	7.37
41	9.21	5.15	5.36	7.43
44	7.56	5.81	5.23	7.82
47	6.72	6.74	5.17	8.50
50	6.29	8.10	5.34	9.70
53	5.69	14.14	5.57	15.19
56	5.19	43.70	5.81	44.09
59	5.65	58.01	6.58	58.38
62	6.99	61.51	7.89	62.01

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	60.89	8.64	61.50
68	0.01	58.78	9.67	59.57
70	0.02	56.81	9.92	57.67
72	0.02	57.75	10.45	58.69
77	0.02	59.74	11.28	60.79
80	0.04	60.00	11.14	61.03
82	0.06	59.13	11.62	60.26
85	0.11	58.36	12.13	59.61
87	0.19	55.48	12.43	56.86
92	0.52	48.55	12.99	50.26
95	0.83	46.33	12.54	48.00
97	1.44	44.11	12.09	45.73
100	2.20	40.94	11.48	42.52
102	3.66	35.92	12.45	38.02
107	7.32	33.37	12.60	35.67
110	10.13	33.79	13.14	36.26
112	11.61	32.61	14.01	35.49
115	12.76	31.04	14.48	34.25
120	17.97	28.42	14.57	31.94
120	17.97	28.42	14.57	31.94

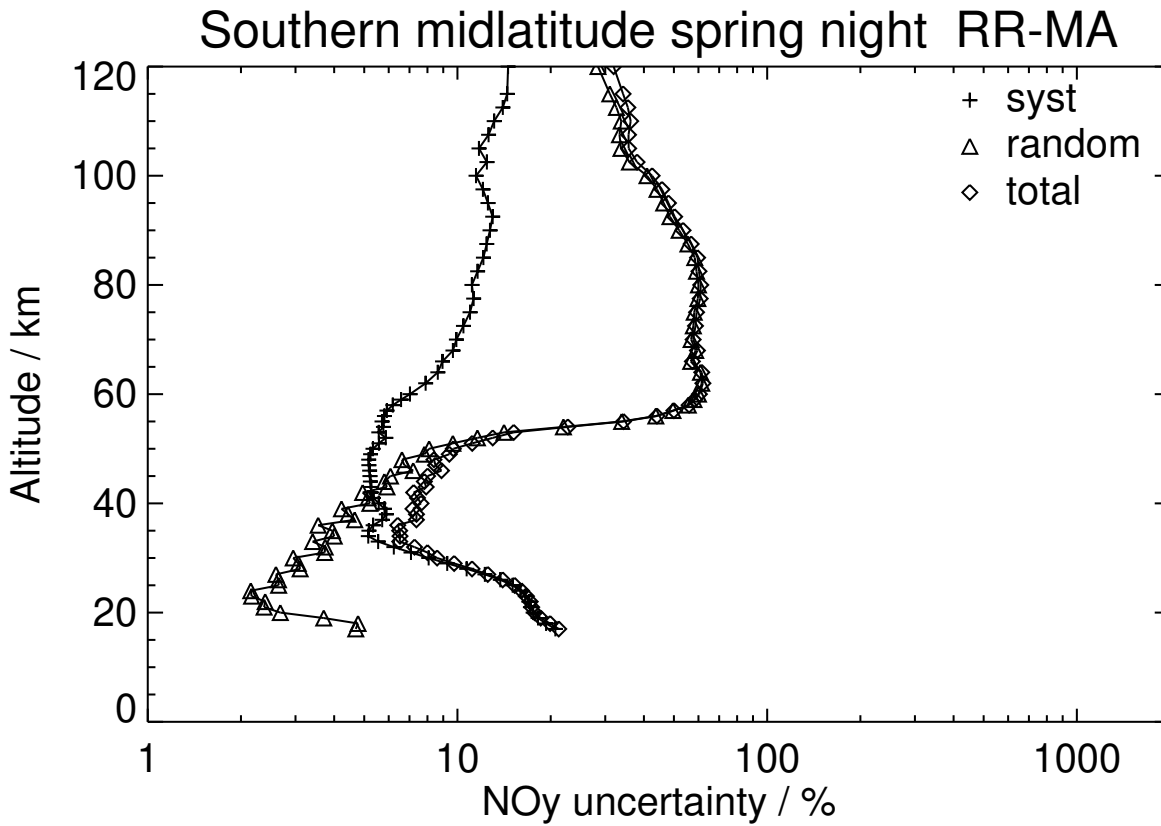


Figure S90: V8R_NOy_56X Southern midlatitude spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	3.04	11.10	16.53	19.91
20	6.40	4.14	16.29	16.81
23	11.28	3.52	14.76	15.18
26	15.01	4.45	11.71	12.53
29	18.23	6.00	8.45	10.36
32	18.96	7.79	7.05	10.50
35	17.46	8.41	6.94	10.91
38	15.61	9.06	7.29	11.63
41	13.74	9.75	7.66	12.40
44	11.64	11.69	8.13	14.24
47	9.64	15.17	8.07	17.19
50	8.55	19.01	7.89	20.58
53	7.38	24.91	7.72	26.08
56	6.72	33.93	7.71	34.79
59	7.05	48.56	9.33	49.45
62	7.72	54.14	11.46	55.34

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	55.01	12.66	56.45
68	0.01	56.89	16.62	59.27
70	0.01	56.75	18.11	59.57
72	0.01	57.09	22.56	61.39
77	0.02	53.65	29.70	61.32
80	0.03	55.70	30.00	63.27
82	0.06	57.79	28.83	64.58
85	0.14	58.31	29.42	65.31
87	0.33	56.87	29.42	64.03
92	1.73	49.31	27.45	56.43
95	2.98	47.57	27.67	55.03
97	5.29	45.13	27.75	52.98
100	8.08	42.83	27.61	50.96
102	12.47	40.02	27.05	48.31
107	28.72	39.92	24.28	46.72
110	39.03	40.96	22.23	46.60
112	49.25	40.46	20.40	45.32
115	58.70	39.16	20.01	43.97
120	74.84	36.12	23.92	43.32
120	74.84	36.12	23.92	43.32

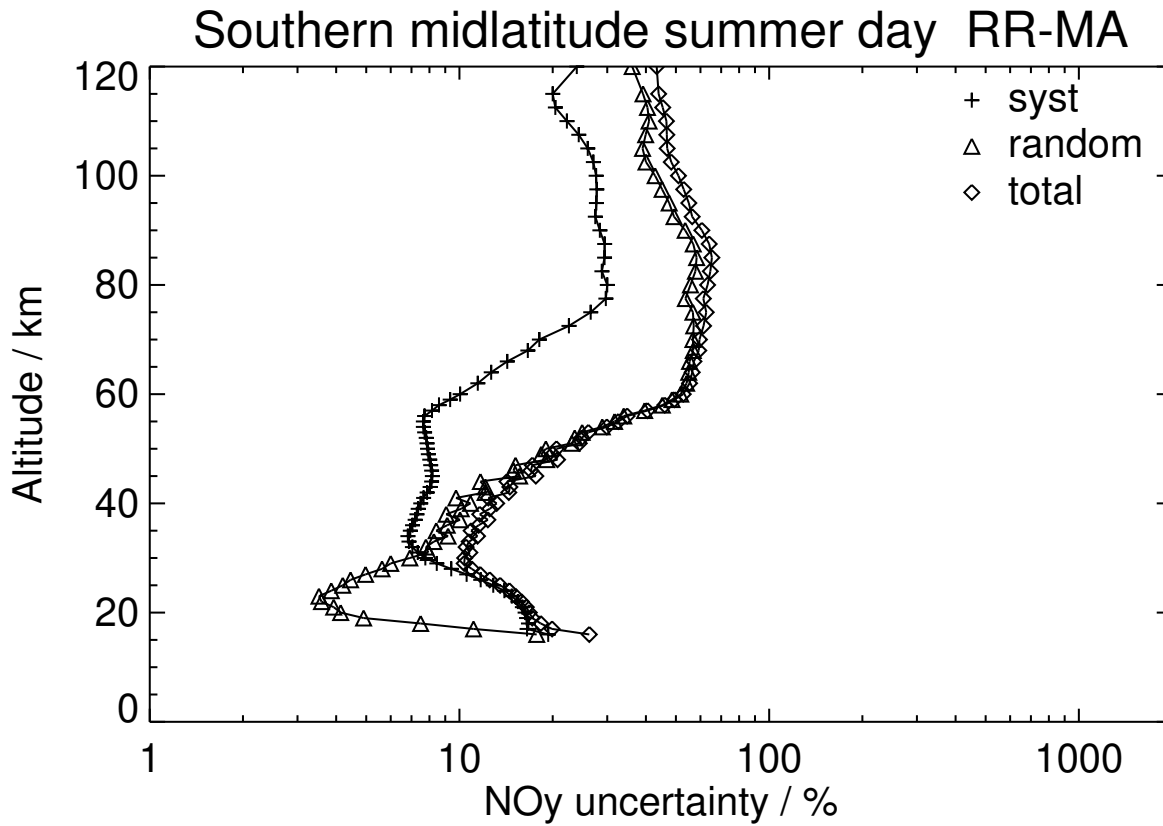


Figure S91: V8R_NOy_56X Southern midlatitude summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	2.74	9.24	18.18	20.39
20	6.37	3.60	16.72	17.11
23	11.42	2.46	14.76	14.96
26	15.08	2.33	11.46	11.69
29	18.70	2.68	8.22	8.64
32	19.70	2.98	6.40	7.06
35	18.74	3.09	5.21	6.06
38	15.85	3.30	5.33	6.27
41	12.58	3.75	5.43	6.60
44	10.19	4.11	5.25	6.67
47	8.31	4.86	5.47	7.32
50	7.39	6.04	5.12	7.92
53	6.88	10.58	5.13	11.75
56	6.57	25.35	6.08	26.07
59	6.42	41.09	8.68	42.00
62	7.04	51.85	11.85	53.18

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	48.88	12.58	50.47
68	0.04	41.32	13.31	43.41
70	0.05	41.94	13.28	44.00
72	0.06	42.54	12.58	44.36
77	0.06	47.72	15.60	50.21
80	0.07	50.32	20.19	54.22
82	0.12	51.01	22.33	55.68
85	0.28	51.43	22.92	56.30
87	0.50	54.23	24.96	59.70
92	3.09	44.80	22.22	50.01
95	4.57	41.40	22.79	47.26
97	6.14	42.95	22.33	48.40
100	9.67	40.21	20.74	45.24
102	14.38	38.93	19.12	43.37
107	33.25	43.40	17.22	46.70
110	46.35	46.01	16.57	48.91
112	63.85	47.38	15.94	49.99
115	86.23	46.90	15.28	49.33
120	116.13	42.63	18.55	46.49
120	116.13	42.63	18.55	46.49

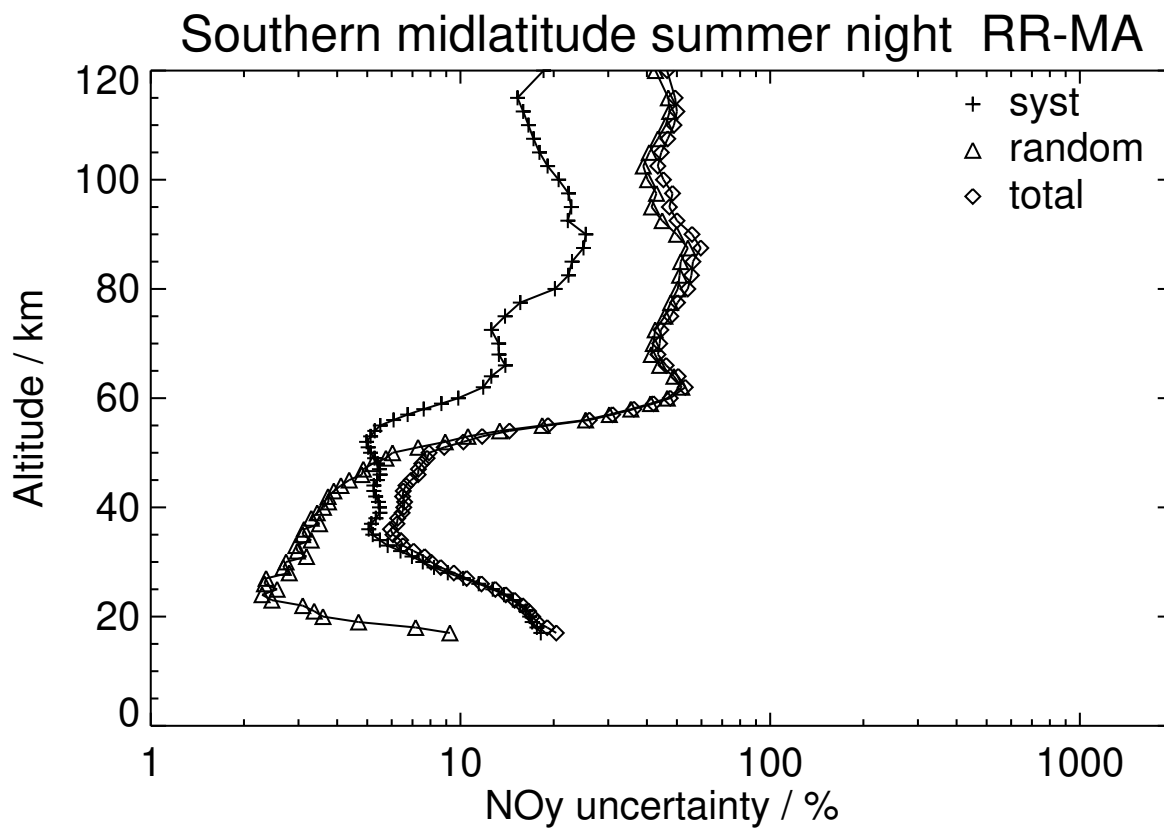


Figure S92: V8R_NOy_56X Southern midlatitude summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	6.06	5.60	18.27	19.11
23	11.73	3.73	16.85	17.25
26	15.64	4.41	13.73	14.42
29	18.07	6.62	9.81	11.84
32	19.28	9.68	8.27	12.74
35	18.18	12.30	8.57	14.99
38	16.96	13.60	8.77	16.19
41	14.96	15.67	9.09	18.12
44	13.41	17.43	8.95	19.60
47	11.78	20.44	8.79	22.24
50	9.67	26.03	8.71	27.45
53	8.29	34.70	8.24	35.66
56	6.87	42.74	7.89	43.46
59	6.68	52.31	7.77	52.88
62	7.42	55.05	7.71	55.59

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	54.12	8.17	54.74
68	0.02	54.87	9.36	55.67
70	0.02	55.00	9.99	55.90
72	0.02	55.40	11.44	56.57
77	0.04	53.85	12.73	55.34
80	0.07	54.31	13.19	55.89
82	0.12	54.18	14.01	55.96
85	0.25	52.21	14.38	54.16
87	0.48	49.69	14.79	51.84
92	1.32	46.06	16.45	48.91
95	2.10	43.51	17.46	46.89
97	3.03	41.81	18.02	45.53
100	4.64	39.83	18.30	43.83
102	7.51	37.84	18.40	42.08
107	17.98	34.41	17.31	38.52
110	24.46	34.13	16.78	38.03
112	31.66	34.32	16.47	38.07
115	31.23	35.30	16.48	38.96
120	42.39	34.48	17.66	38.74
120	42.39	34.48	17.66	38.74

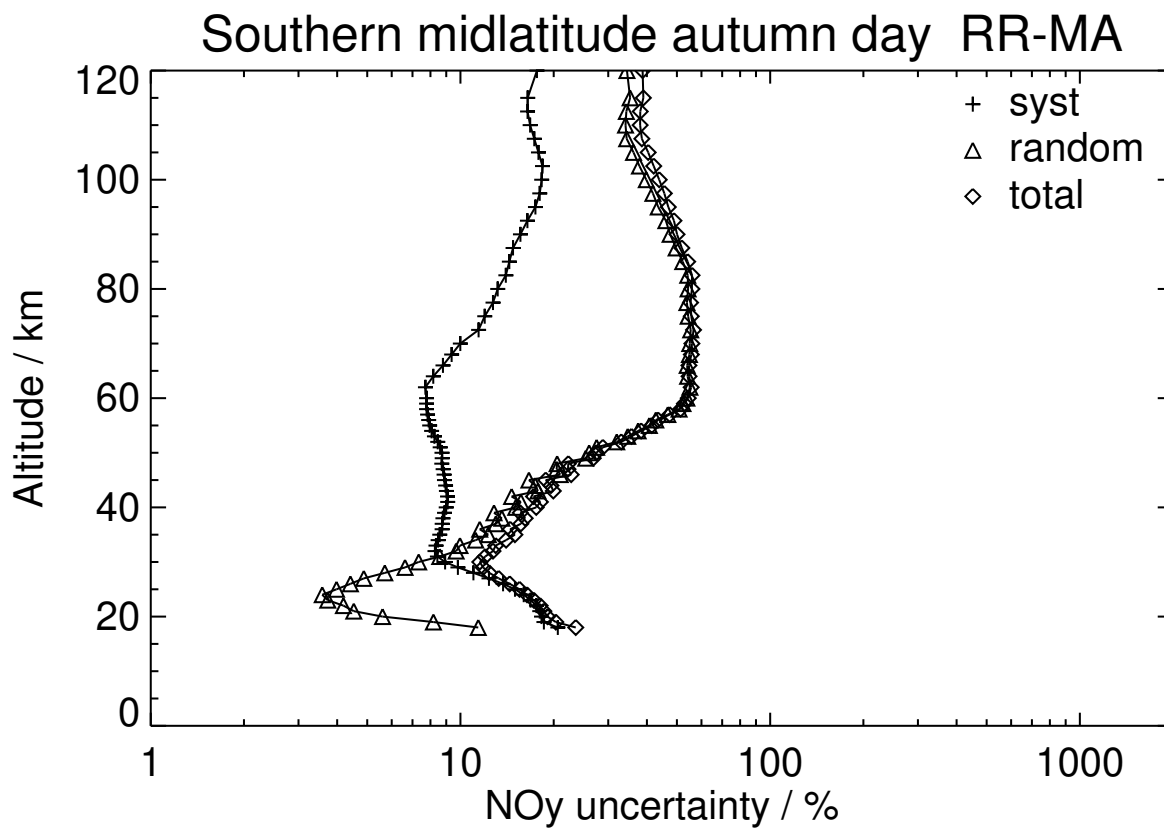


Figure S93: V8R_NOy_56X Southern midlatitude autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	6.08	5.75	17.94	18.84
23	11.82	3.44	16.29	16.65
26	16.29	2.63	13.02	13.29
29	19.41	3.26	8.86	9.44
32	20.23	3.99	6.46	7.59
35	18.12	4.45	5.49	7.06
38	14.84	4.66	5.09	6.90
41	13.27	4.72	4.96	6.85
44	11.84	4.85	5.12	7.05
47	10.45	5.31	5.46	7.61
50	10.48	10.32	5.16	11.54
53	8.65	22.06	6.00	22.86
56	8.31	47.02	7.84	47.66
59	6.76	60.46	10.29	61.33
62	6.15	67.21	10.67	68.05

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	65.67	12.30	66.81
68	0.01	82.98	27.32	87.36
70	0.02	97.78	38.81	> 100
72	0.02	96.86	34.07	> 100
77	0.06	95.52	36.27	> 100
80	0.08	91.03	31.16	96.22
82	0.15	84.56	29.46	89.54
85	0.27	78.37	27.64	83.10
87	0.45	72.97	25.81	77.40
92	1.72	56.44	24.88	61.68
95	2.76	46.77	18.45	50.28
97	5.24	40.76	18.25	44.66
100	10.54	39.27	21.89	44.96
102	15.85	38.40	20.19	43.39
107	40.43	38.58	19.22	43.10
110	50.56	42.53	18.81	46.51
112	51.04	47.67	18.34	51.08
115	30.82	56.73	18.06	59.54
120	42.60	56.77	19.65	60.08
120	42.60	56.77	19.65	60.08

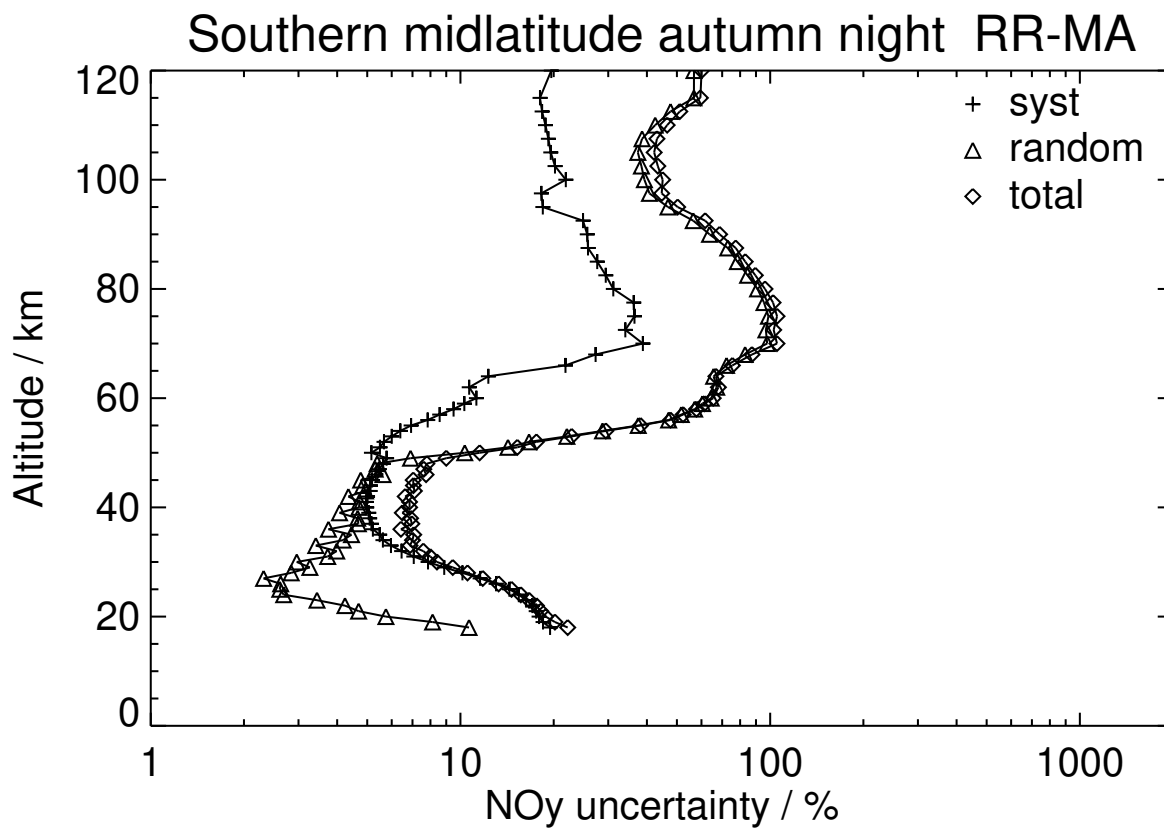


Figure S94: V8R_NOy_56X Southern midlatitude autumn night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	10.92	4.23	21.59	22.00
20	8.22	11.65	19.55	22.76
23	11.20	7.23	17.92	19.32
26	13.32	10.23	12.31	16.00
29	12.44	17.16	8.38	19.10
32	9.61	17.98	7.54	19.50
35	7.32	17.85	7.19	19.24
38	6.05	18.90	6.92	20.13
41	6.11	20.37	7.26	21.63
44	5.98	22.49	7.62	23.75
47	5.57	26.77	8.10	27.97
50	4.69	32.73	8.43	33.80
53	4.23	41.21	8.66	42.11
56	4.69	47.27	9.14	48.15
59	6.22	54.23	10.15	55.17
62	10.08	56.56	10.60	57.54

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	56.86	10.96	57.91
68	0.02	54.61	11.70	55.85
70	0.03	55.88	12.58	57.28
72	0.03	55.73	13.45	57.32
77	0.09	53.22	14.45	55.15
80	0.17	51.26	14.99	53.40
82	0.32	48.77	15.56	51.19
85	0.59	45.81	16.10	48.55
87	1.07	43.07	16.62	46.16
92	3.56	38.43	17.18	42.09
95	6.29	36.60	17.10	40.40
97	10.96	34.80	16.71	38.60
100	19.33	32.16	16.06	35.94
102	31.86	28.99	15.20	32.73
107	65.24	29.89	13.56	32.82
110	82.66	33.29	13.00	35.74
112	97.91	37.26	13.07	39.49
115	110.88	39.98	13.94	42.34
120	134.03	38.35	17.13	42.00
120	134.03	38.35	17.13	42.00

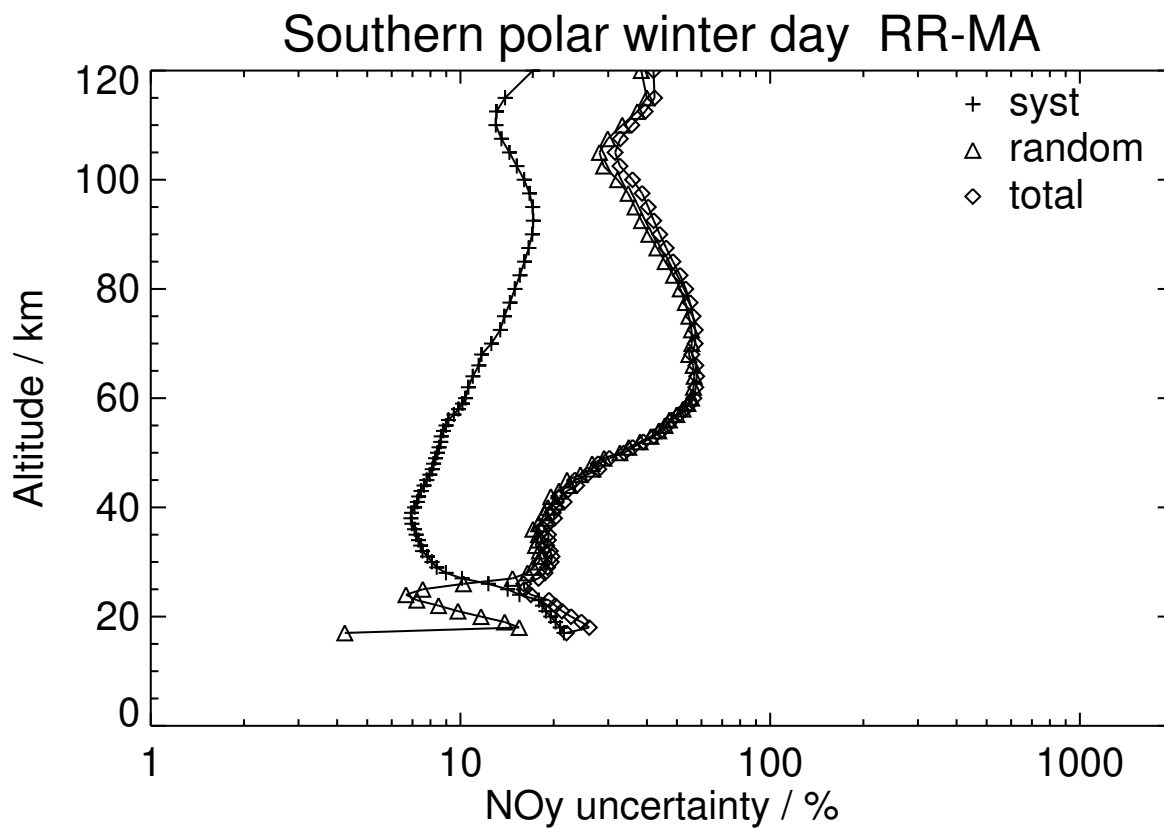


Figure S95: V8R_NOy_56X Southern polar winter day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	8.10	11.17	15.09	18.77
23	12.33	8.05	14.08	16.22
26	13.95	6.39	11.89	13.50
29	11.16	6.41	9.33	11.32
32	8.08	6.93	6.97	9.83
35	6.22	7.85	5.18	9.41
38	6.17	8.05	4.75	9.35
41	6.01	8.68	4.95	9.99
44	6.14	9.54	5.00	10.78
47	5.71	10.64	5.14	11.82
50	5.98	15.63	5.02	16.42
53	6.32	22.44	5.70	23.15
56	7.30	33.65	7.60	34.50
59	8.92	41.65	10.39	42.92
62	15.40	49.09	12.82	50.74

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	51.38	13.98	53.25
68	0.06	53.48	12.55	54.93
70	0.10	52.48	11.35	53.70
72	0.16	56.35	10.81	57.38
77	0.58	58.56	9.59	59.34
80	0.94	57.53	10.24	58.43
82	1.72	53.63	10.78	54.70
85	2.87	49.54	11.66	50.89
87	4.57	46.96	12.67	48.64
92	7.71	46.07	15.74	48.68
95	11.65	45.29	17.42	48.53
97	16.39	44.55	19.68	48.70
100	26.79	41.76	21.02	46.75
102	38.60	38.85	21.04	44.18
107	73.49	36.09	19.89	41.21
110	87.66	38.62	18.94	43.02
112	100.59	41.31	18.19	45.14
115	113.06	41.41	17.81	45.08
120	139.13	35.93	18.25	40.30
120	139.13	35.93	18.25	40.30

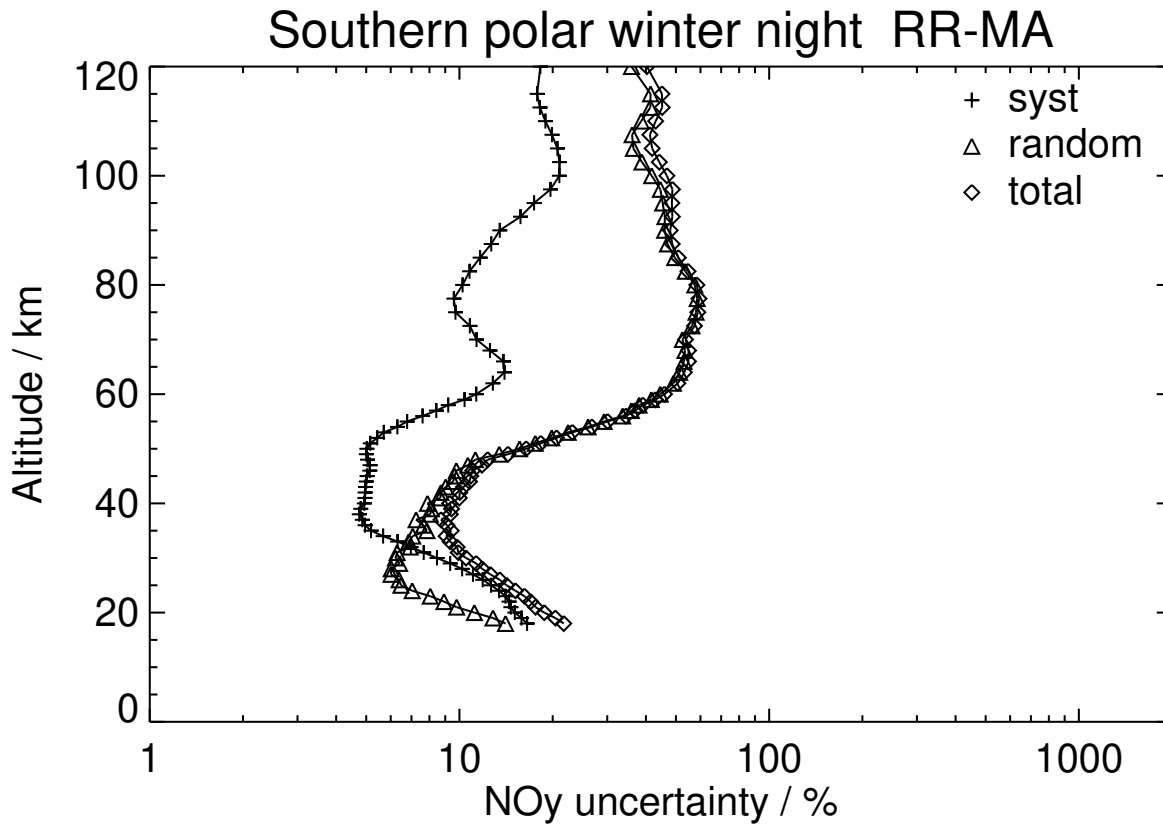


Figure S96: V8R_NOy_56X Southern polar winter night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	5.84	9.55	12.06	15.38
23	10.50	4.97	12.19	13.17
26	9.29	7.02	9.73	12.00
29	9.81	7.53	6.53	9.97
32	12.81	7.38	5.59	9.26
35	13.14	7.25	5.77	9.27
38	10.01	9.70	6.51	11.68
41	8.47	12.65	7.14	14.52
44	8.02	15.75	7.45	17.43
47	8.10	19.26	7.89	20.81
50	6.50	24.56	8.51	26.00
53	5.30	30.80	8.54	31.96
56	4.30	40.54	9.29	41.59
59	4.89	54.29	11.25	55.44
62	6.28	60.26	13.01	61.65

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	59.41	13.15	60.85
68	0.02	50.62	11.57	51.92
70	0.03	46.71	10.76	47.93
72	0.04	46.51	11.21	47.84
77	0.04	51.48	13.51	53.22
80	0.06	52.70	14.79	54.74
82	0.11	54.79	16.45	57.21
85	0.19	55.83	17.93	58.64
87	0.38	54.69	18.93	57.87
92	0.96	51.06	20.74	55.12
95	1.65	48.54	20.46	52.67
97	2.47	46.91	20.49	51.19
100	4.36	43.94	20.25	48.39
102	7.93	41.55	19.89	46.06
107	19.73	38.68	18.88	43.04
110	26.51	38.24	18.47	42.46
112	32.73	37.47	18.36	41.73
115	38.27	35.59	18.68	40.19
120	48.86	29.32	20.87	35.99
120	48.86	29.32	20.87	35.99

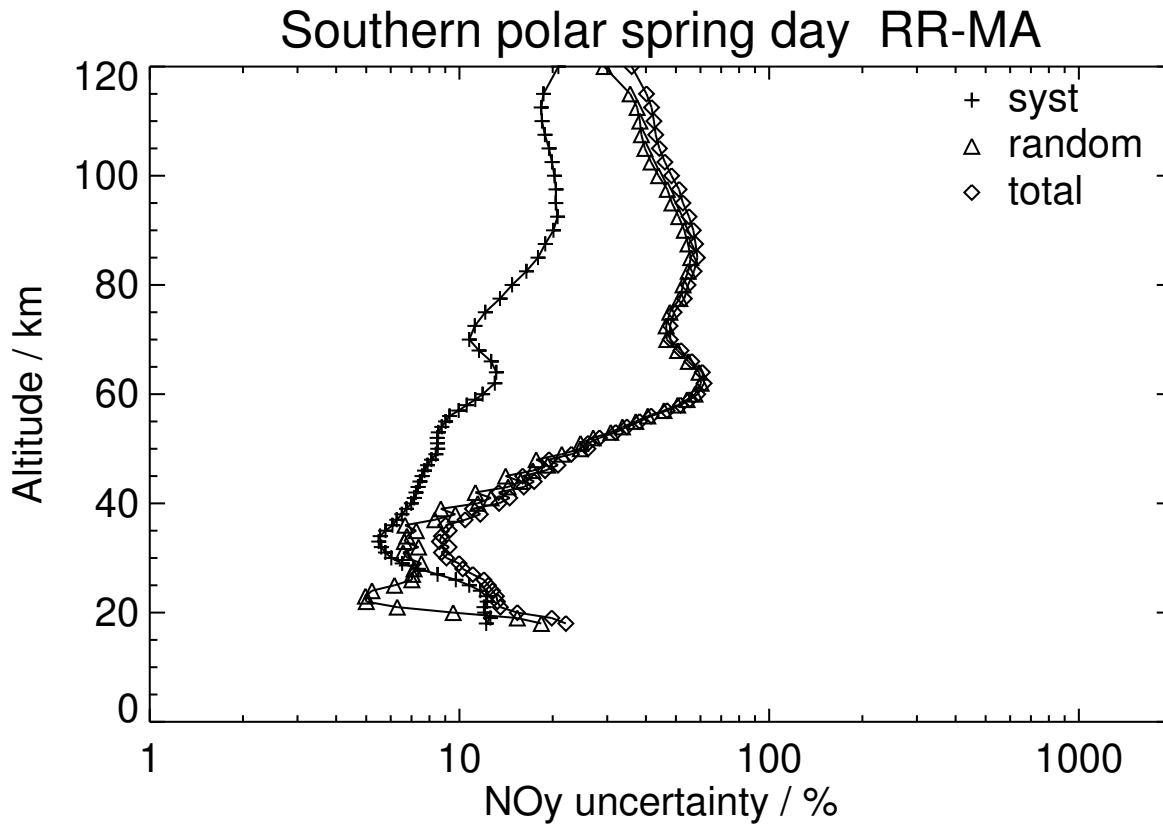


Figure S97: V8R_NOy_56X Southern polar spring day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	9.02	9.29	13.38	16.29
23	12.23	4.70	12.52	13.37
26	11.19	4.63	10.61	11.57
29	12.49	4.66	7.15	8.53
32	14.22	4.26	6.03	7.38
35	12.11	4.12	5.52	6.89
38	9.90	4.07	5.39	6.75
41	8.23	4.63	5.19	6.96
44	7.39	5.53	5.08	7.51
47	7.04	6.45	5.04	8.19
50	6.39	8.29	5.26	9.82
53	5.61	16.42	5.62	17.35
56	6.30	41.27	6.79	41.82
59	7.75	46.98	7.85	47.63
62	10.03	52.12	8.99	52.89

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.02	47.78	8.95	48.61
68	0.09	41.19	9.63	42.30
70	0.20	35.69	9.72	36.99
72	0.32	32.13	9.13	33.40
77	0.23	36.79	9.99	38.12
80	0.23	41.86	11.28	43.36
82	0.25	46.99	13.34	48.85
85	0.36	50.59	15.90	53.03
87	0.57	53.39	18.80	56.60
92	1.60	50.03	19.58	53.72
95	2.26	47.58	20.48	51.80
97	3.51	45.58	18.57	49.22
100	6.75	42.57	18.17	46.28
102	9.62	41.34	19.80	45.84
107	23.01	37.87	19.15	42.44
110	27.46	37.83	18.94	42.31
112	31.14	36.96	19.04	41.57
115	39.44	35.15	19.43	40.16
120	51.67	30.16	21.09	36.80
120	51.67	30.16	21.09	36.80

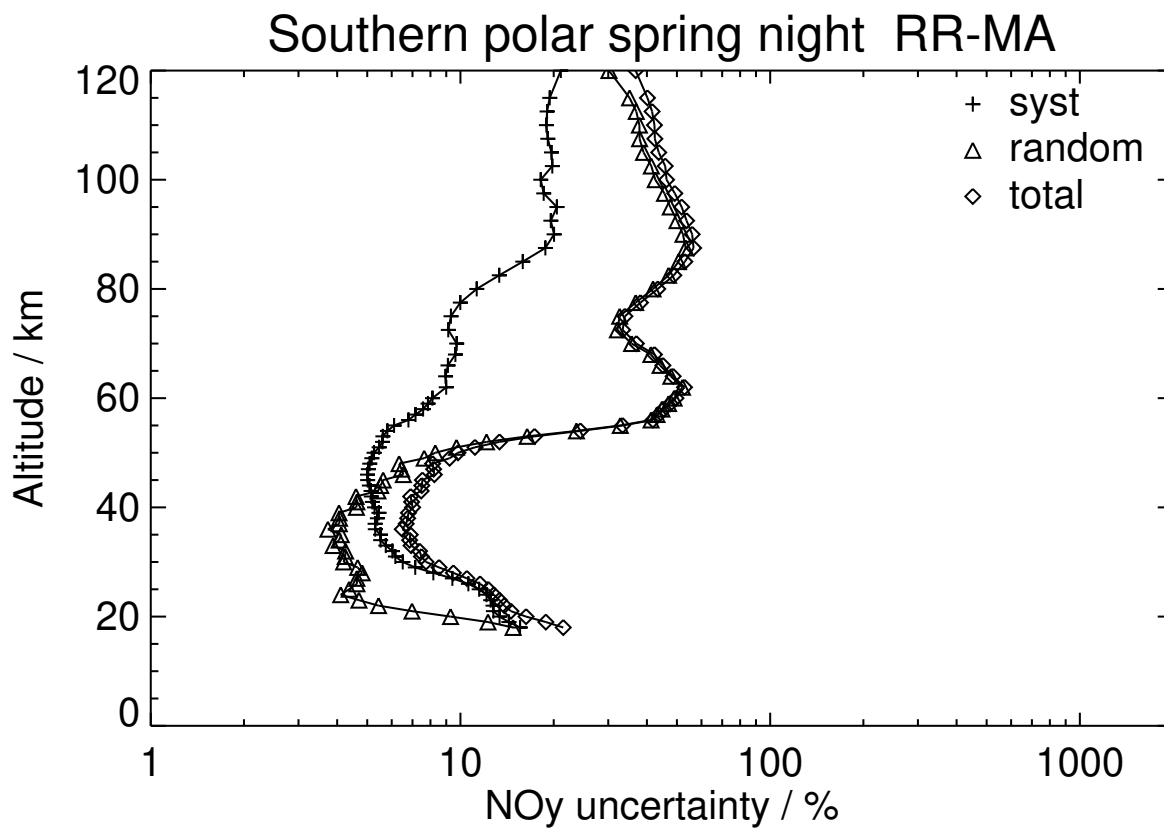


Figure S98: V8R_NOy_56X Southern polar spring night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	5.75	3.66	18.26	18.62
20	8.70	2.67	14.80	15.04
23	12.88	3.05	14.30	14.62
26	16.55	4.76	11.88	12.80
29	18.20	6.87	9.24	11.51
32	18.89	8.75	7.10	11.27
35	17.61	8.78	6.15	10.72
38	16.37	8.88	6.41	10.95
41	13.71	9.33	6.85	11.57
44	11.63	10.74	7.53	13.12
47	8.31	14.46	7.89	16.47
50	7.25	18.38	7.70	19.93
53	6.78	21.90	7.79	23.24
56	5.68	28.60	7.84	29.65
59	6.58	37.18	8.71	38.19
62	8.53	42.02	9.96	43.18

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	45.97	11.54	47.39
68	0.01	52.14	16.06	54.56
70	0.02	52.91	18.31	55.99
72	0.02	50.00	19.45	53.65
77	0.03	46.01	21.38	50.73
80	0.04	44.40	23.39	50.19
82	0.06	45.89	27.13	53.31
85	0.20	48.38	29.43	56.62
87	0.70	49.87	31.00	58.72
92	3.92	45.41	28.30	53.50
95	7.33	46.14	27.09	53.50
97	13.19	43.86	26.45	51.22
100	17.24	40.38	25.77	47.90
102	20.24	37.01	24.41	44.33
107	32.34	33.57	19.81	38.98
110	36.37	32.39	18.25	37.18
112	41.22	31.64	18.05	36.43
115	50.65	32.19	19.59	37.68
120	65.73	38.24	24.86	45.61
120	65.73	38.24	24.86	45.61

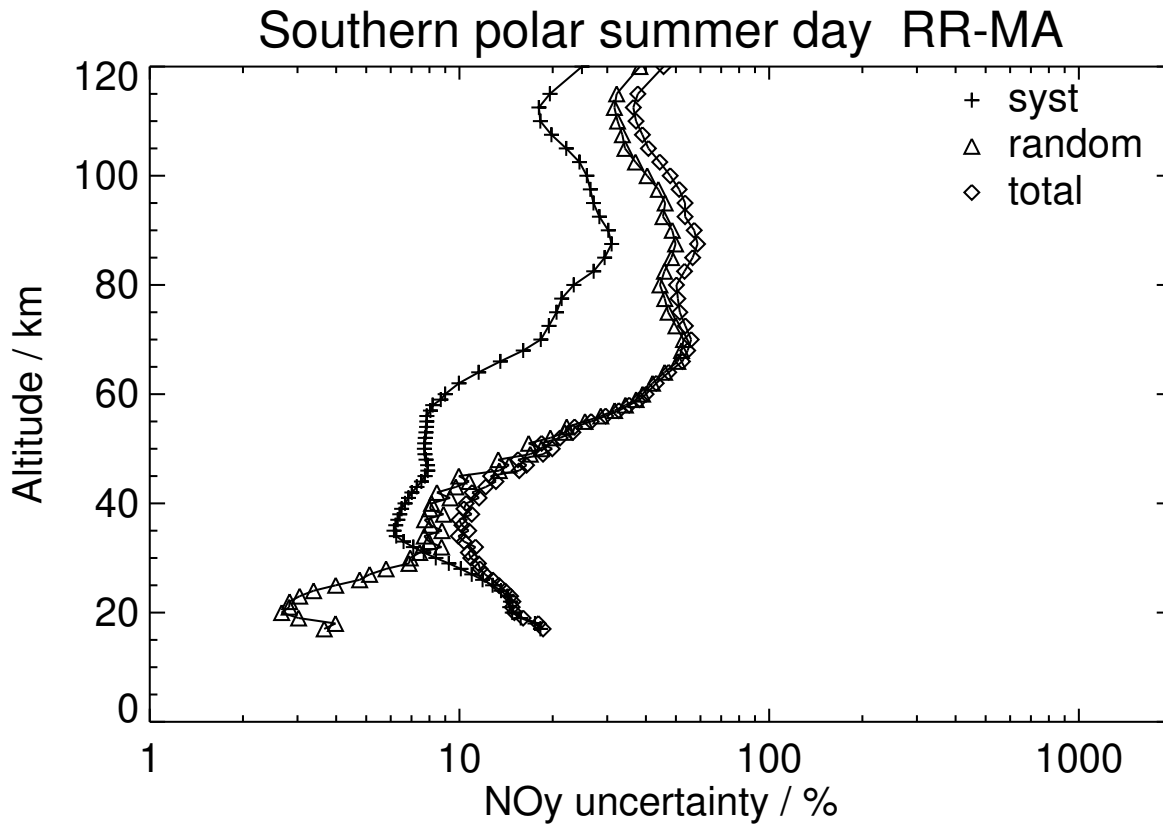


Figure S99: V8R_NOy_56X Southern polar summer day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
17	5.62	4.17	20.12	20.55
20	8.50	2.15	16.91	17.04
23	13.24	1.86	15.34	15.45
26	17.11	2.23	11.99	12.20
29	19.80	2.77	8.69	9.12
32	19.89	3.36	6.78	7.56
35	17.85	3.64	5.38	6.50
38	14.86	3.83	5.65	6.82
41	10.83	4.21	5.57	6.98
44	8.79	4.86	5.64	7.45
47	6.69	6.21	6.00	8.63
50	5.48	8.52	5.73	10.27
53	4.65	15.27	5.30	16.16
56	4.49	35.31	5.63	35.76
59	4.69	45.87	7.44	46.47
62	9.35	44.17	9.59	45.20

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	37.78	9.39	38.93
68	0.05	43.32	11.72	44.88
70	0.04	46.10	13.28	47.97
72	0.04	46.28	13.34	48.16
77	0.03	48.80	16.10	51.39
80	0.05	50.03	17.19	52.90
82	0.09	50.84	18.06	53.96
85	0.17	53.79	25.77	59.65
87	0.35	52.39	26.37	58.65
92	1.16	49.15	24.87	55.08
95	2.42	46.07	23.94	51.92
97	3.54	43.63	22.74	49.20
100	6.83	40.51	20.23	45.28
102	9.89	40.70	19.05	44.94
107	17.90	41.22	16.61	44.44
110	23.45	40.04	16.09	43.15
112	29.05	38.40	16.04	41.61
115	35.95	37.61	16.69	41.15
120	43.85	35.61	19.43	40.57
120	43.85	35.61	19.43	40.57

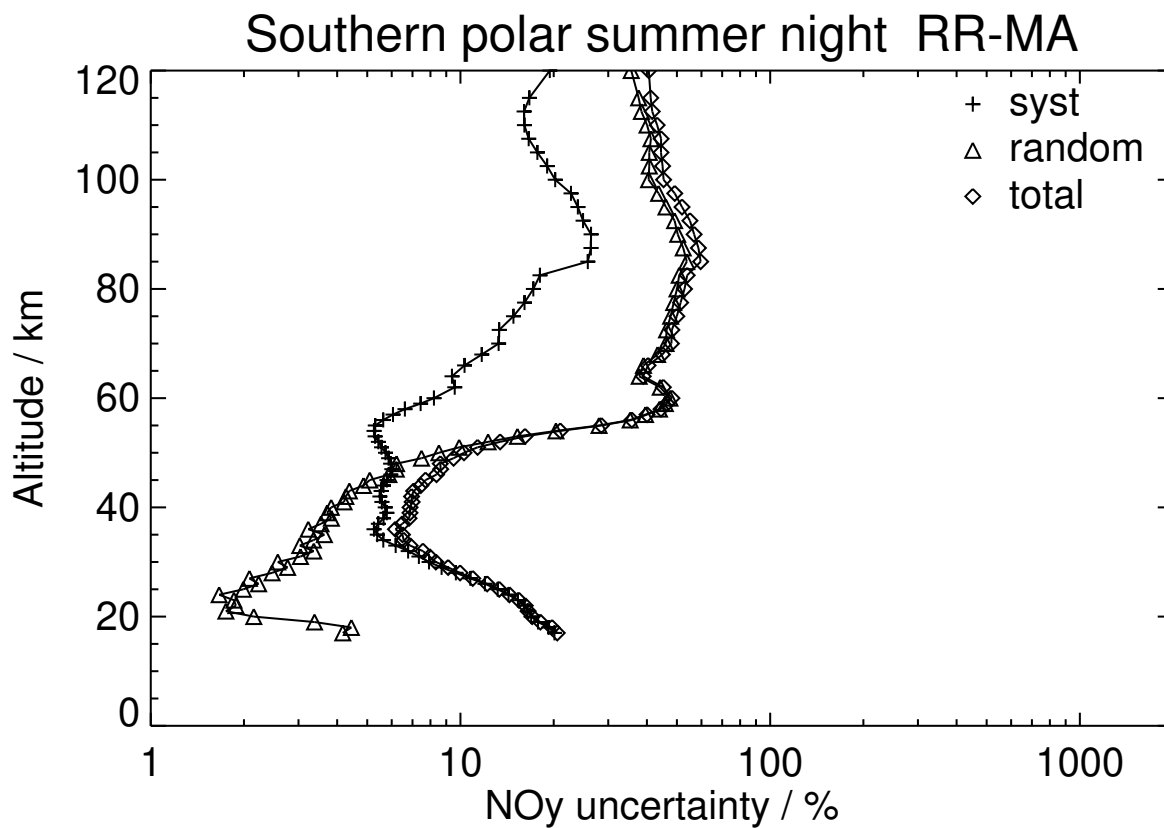


Figure S100: V8R_NOy_56X Southern polar summer night

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	10.88	3.27	19.21	19.49
23	15.32	2.74	18.03	18.24
26	18.50	5.67	14.39	15.47
29	19.60	11.00	10.54	15.24
32	18.74	16.19	9.13	18.58
35	14.05	20.31	9.63	22.47
38	9.29	23.52	9.95	25.54
41	6.60	28.35	9.99	30.06
44	4.90	33.48	9.40	34.78
47	4.17	38.20	8.99	39.25
50	4.11	44.14	9.30	45.11
53	3.74	51.94	10.17	52.93
56	3.57	58.07	10.51	59.01
59	5.03	60.90	11.05	61.90
62	9.36	60.39	10.63	61.32

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.01	60.37	11.53	61.46
68	0.02	60.42	13.66	61.94
70	0.03	58.66	14.37	60.40
72	0.04	55.44	14.89	57.41
77	0.08	52.96	16.78	55.56
80	0.13	52.51	17.64	55.39
82	0.24	50.93	18.35	54.14
85	0.45	50.05	19.63	53.76
87	0.75	49.25	21.27	53.65
92	2.17	43.94	23.05	49.62
95	3.48	42.74	23.80	48.92
97	6.03	40.19	24.60	47.12
100	10.32	38.47	24.15	45.42
102	18.58	35.67	23.23	42.56
107	48.48	32.78	19.63	38.21
110	69.81	34.30	17.63	38.56
112	85.52	37.33	15.87	40.57
115	100.33	38.80	15.22	41.68
120	126.82	35.90	17.99	40.16
120	126.82	35.90	17.99	40.16

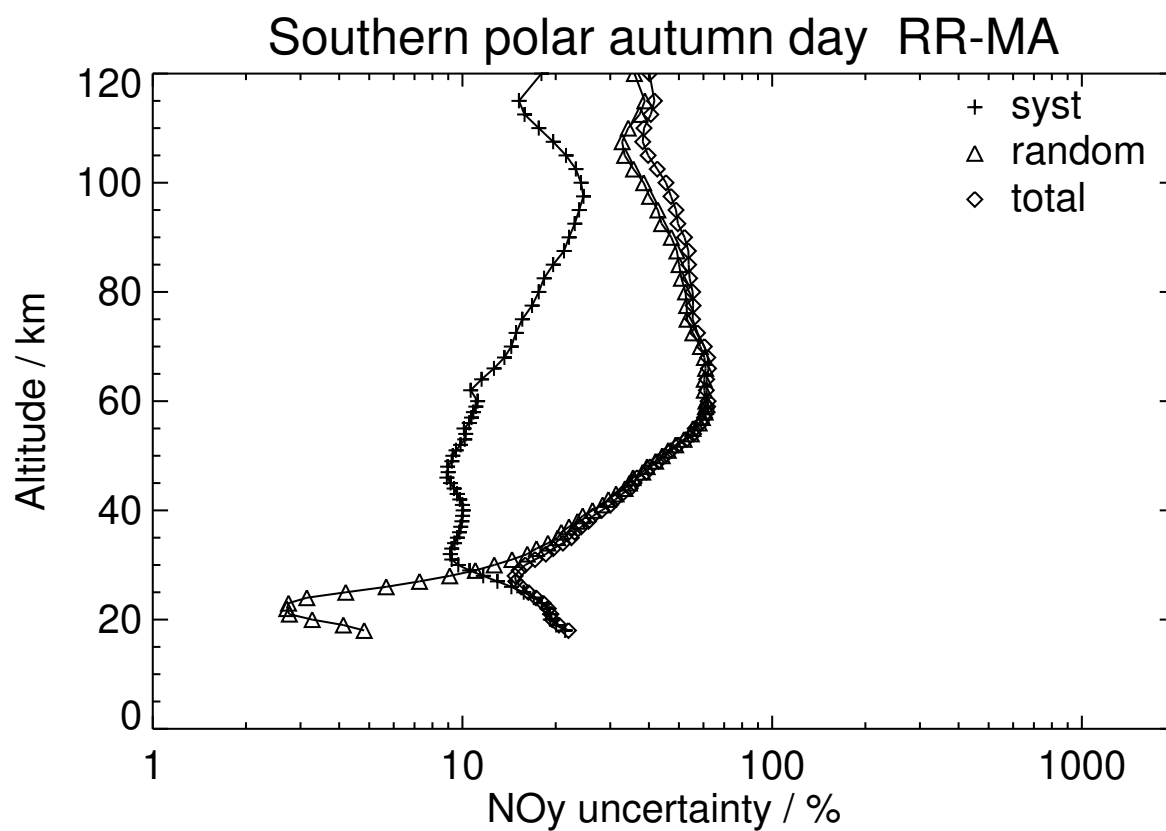


Figure S101: V8R_NOy_56X Southern polar autumn day

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

altitude (km)	mean target (ppbv)	random (%)	syst (%)	total (%)
20	11.32	4.10	18.77	19.21
23	16.12	3.22	17.56	17.85
26	19.09	3.05	14.01	14.33
29	19.20	3.93	9.84	10.59
32	16.81	5.29	7.24	8.96
35	11.60	6.44	6.61	9.23
38	7.28	8.06	6.24	10.20
41	5.36	9.78	6.02	11.48
44	3.91	12.93	5.65	14.11
47	3.87	15.47	4.94	16.23
50	5.62	26.47	5.70	27.08
53	7.77	36.03	7.31	36.77
56	11.51	39.83	8.36	40.70
59	17.52	41.94	9.27	42.95
62	27.14	48.72	11.09	49.96

altitude (km)	mean target (ppmv)	random (%)	syst (%)	total (%)
64	0.03	52.31	12.05	53.68
68	0.06	56.57	13.30	58.11
70	0.09	56.09	13.37	57.66
72	0.12	54.62	13.98	56.38
77	0.26	54.03	15.80	56.29
80	0.41	54.64	17.53	57.38
82	0.74	53.66	18.13	56.64
85	1.30	52.36	18.66	55.59
87	2.15	50.80	19.17	54.30
92	5.98	45.97	18.19	49.44
95	10.22	43.58	17.79	47.07
97	14.99	41.68	18.05	45.42
100	24.09	39.60	17.90	43.46
102	35.92	38.18	19.82	43.02
107	85.90	40.15	18.37	44.15
110	120.16	49.87	17.19	52.75
112	122.88	49.14	19.12	52.73
115	122.59	45.20	19.82	49.35
120	147.83	35.32	19.81	40.50
120	147.83	35.32	19.81	40.50

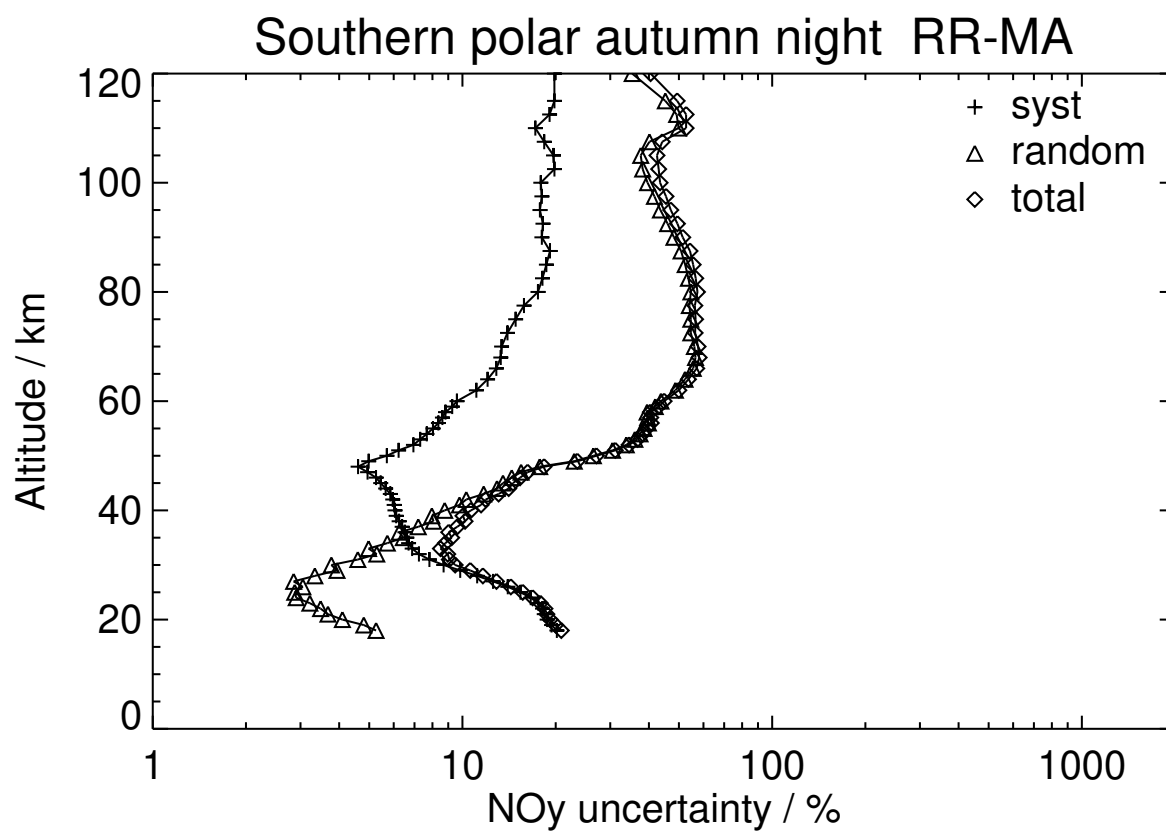


Figure S102: V8R_NOy_56X Southern polar autumn night