

Supplement of
**“Atomic oxygen retrievals in the MLT region from SCIAMACHY
nightglow limb measurements” by O. Lednyts’kyy et al.**

O. Lednyts’kyy et al.

Correspondence to: O. Lednyts’kyy (olexandr.lednytskyy@uni-greifswald.de)

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Table 3. Estimated uncertainty in limb emission rates (Rayleigh) on a daily timescale (9 September 2010). See Sects. 3, 6.1, 7.1 and Fig. 4 for further details.

Altitude (km)	σ_h^+	σ_h^-	σ_a^+	σ_a^-	σ_l^+	σ_l^-	σ_{LER}^+	σ_{LER}^-
105	0.00	0.00	0.00	0.00	1060.34	0.00	1060.34	0.00
104	0.00	0.00	0.00	0.00	1485.85	0.00	1485.85	0.00
103	0.00	0.00	159.77	0.00	1555.41	0.00	1715.18	0.00
102	323.85	54.37	173.13	173.13	1473.62	67.17	1970.60	294.68
101	47.99	50.79	177.78	177.78	1429.25	509.91	1655.02	738.48
100	50.18	46.76	179.78	179.78	1425.92	990.15	1655.88	1216.69
99	221.91	58.92	176.52	176.52	1341.15	1341.16	1739.58	1576.60
98	67.81	159.02	152.84	152.84	1266.08	1266.08	1486.73	1577.94
97	85.26	76.54	156.20	156.20	1318.65	1318.65	1560.11	1551.39
96	102.71	93.98	160.73	160.73	1312.23	1312.24	1575.67	1566.95
95	90.83	389.62	188.30	188.30	1345.36	1345.36	1624.49	1923.28
94	70.21	79.94	189.66	189.66	1435.94	1435.94	1695.81	1705.54
93	62.14	65.09	181.03	181.03	1455.47	1455.47	1698.64	1701.59
92	175.83	238.77	166.94	166.94	1403.30	1403.31	1746.07	1809.02
91	59.64	68.14	140.64	140.66	1438.86	1438.78	1639.14	1647.58
90	52.70	56.20	131.90	131.80	1449.10	1449.17	1633.70	1637.17
89	323.40	50.60	123.30	123.40	1403.90	1403.82	1850.60	1577.82
88	47.60	84.72	127.60	127.60	1468.20	1468.18	1643.40	1680.50
87	61.24	52.96	127.72	127.71	1515.80	1515.80	1704.76	1696.47
86	112.81	73.95	126.63	126.64	1491.98	1491.95	1731.42	1692.54
85	67.94	369.25	180.31	180.30	1514.09	1514.11	1762.34	2063.66

Table 4. Estimated uncertainty in limb emission rates (Rayleigh) on a monthly timescale (September 2010). See Sects. 3, 6.1, 7.1 and Fig. 4 for further details.

Altitude (km)	σ_h^+	σ_h^-	σ_a^+	σ_a^-	σ_l^+	σ_l^-	σ_{LER}^+	σ_{LER}^-
105	258.58	103.78	154.92	0.00	225.34	0.00	638.83	103.78
104	57.86	62.95	164.36	164.36	237.28	70.07	459.50	297.38
103	61.04	56.90	165.95	165.95	239.42	239.42	466.41	462.27
102	439.81	70.59	160.45	160.45	230.72	230.72	830.98	461.76
101	66.13	76.91	158.19	158.20	232.75	232.74	457.07	467.85
100	67.83	63.82	161.49	161.49	237.55	237.55	466.87	462.86
99	220.76	76.97	157.91	157.91	232.44	232.43	611.11	467.31
98	83.39	320.97	156.36	156.36	239.64	239.65	479.39	716.98
97	81.57	80.63	160.92	160.92	246.64	246.64	489.13	488.19
96	94.14	86.46	160.78	160.78	242.34	242.34	497.26	489.58
95	125.93	461.42	162.30	162.31	238.95	238.95	527.18	862.68
94	68.43	78.25	169.31	169.31	250.75	250.75	488.49	498.31
93	68.41	64.88	170.14	170.14	250.93	250.94	489.48	485.96
92	365.40	164.91	166.33	166.34	240.01	239.99	771.74	571.24
91	61.08	69.10	171.90	171.90	245.67	245.67	478.65	486.67
90	62.99	58.88	173.63	173.63	247.44	247.44	484.06	479.95
89	414.28	72.77	168.85	168.84	238.38	238.37	821.51	479.98
88	72.65	161.45	164.70	164.71	231.66	231.66	469.01	557.82
87	62.86	65.29	167.63	167.62	237.64	237.66	468.13	470.57
86	107.44	65.95	163.14	163.13	233.91	233.93	504.49	463.01
85	69.58	428.10	153.82	153.82	229.02	229.03	452.42	810.95

Table 5. Estimated uncertainty in volume emission rates (photon $\text{cm}^{-3} \text{s}^{-1}$) on a daily timescale (9 September 2010).

See Sects. 4, 4.3, 6.1, 7.1 and Fig. 6 for further details.

Altitude (km)	$\sigma_{\text{S}_s}^+$	$\sigma_{\text{S}_s}^-$	$\sigma_{\text{S}_m}^+$	$\sigma_{\text{S}_m}^-$	$\sigma_{\text{S}_b}^+$	$\sigma_{\text{S}_b}^-$	$\sigma_{\text{S}_f}^+$	$\sigma_{\text{S}_f}^-$	σ_{VER}^+	σ_{VER}^-
105	4.53	0.00	25.85	0.00	2.88	0.00	1.40	0.00	34.66	0.00
104	3.12	0.00	26.03	0.00	3.92	0.00	1.83	0.00	34.91	0.00
103	0.20	0.00	25.77	0.00	4.89	0.00	2.30	0.00	33.17	0.00
102	1.79	1.79	25.29	1.11	6.06	0.00	2.83	0.00	35.98	2.90
101	1.09	1.09	24.92	20.38	7.29	0.00	3.49	0.00	36.79	21.47
100	1.13	1.13	24.43	24.43	9.02	9.02	4.34	4.34	38.92	38.92
99	3.88	3.88	23.78	23.78	11.68	11.68	5.33	5.33	44.68	44.68
98	5.76	5.76	23.50	23.50	14.44	14.44	6.25	6.25	49.96	49.96
97	3.83	3.83	23.69	23.69	16.49	16.49	6.83	6.83	50.84	50.84
96	1.48	1.48	23.94	23.94	16.81	16.81	6.86	6.86	49.09	49.09
95	7.31	7.31	24.36	24.36	14.62	14.62	6.26	6.26	52.55	52.55
94	8.24	8.24	24.72	24.72	11.74	11.74	5.19	5.19	49.89	49.89
93	6.24	6.24	24.69	24.69	7.11	7.11	4.00	4.00	42.04	42.04
92	4.48	4.48	24.65	24.65	1.25	1.25	3.65	3.65	34.03	34.03
91	3.45	3.45	24.87	24.87	8.74	8.74	4.77	4.77	41.83	41.83
90	3.80	3.80	25.04	25.04	14.51	14.51	6.41	6.41	49.77	49.77
89	3.90	3.90	25.30	25.30	18.36	18.36	7.76	7.76	55.33	55.33
88	2.08	2.08	25.86	25.86	20.74	20.74	8.48	8.48	57.16	57.16
87	0.20	0.20	26.16	26.16	20.79	20.79	8.37	8.37	55.52	55.52
86	1.49	1.49	25.99	25.99	17.05	11.13	7.44	0.00	51.98	38.61
85	2.27	1.27	25.55	0.00	12.91	0.00	6.06	0.00	46.79	1.27

Table 6. Estimated uncertainty in volume emission rates (photon $\text{cm}^{-3} \text{s}^{-1}$) on a monthly timescale (September 2010).

See Sects. 4, 4.3, 6.1, 7.1 and Fig. 6 for further details.

Altitude (km)	$\sigma_{\text{S}_s}^+$	$\sigma_{\text{S}_s}^-$	$\sigma_{\text{S}_m}^+$	$\sigma_{\text{S}_m}^-$	$\sigma_{\text{S}_b}^+$	$\sigma_{\text{S}_b}^-$	$\sigma_{\text{S}_f}^+$	$\sigma_{\text{S}_f}^-$	σ_{VER}^+	σ_{VER}^-
105	0.10	0.02	4.25	0.00	2.88	0.00	1.47	0.00	8.70	0.02
104	0.18	0.18	4.34	4.34	3.92	3.07	1.92	0.00	10.37	7.60
103	0.76	0.76	4.36	4.36	4.89	4.89	2.40	2.40	12.41	12.41
102	0.90	0.90	4.35	4.35	6.06	6.06	2.95	2.95	14.26	14.26
101	0.75	0.75	4.38	4.38	7.29	7.29	3.63	3.63	16.06	16.06
100	1.48	1.48	4.42	4.42	9.02	9.02	4.52	4.52	19.44	19.44
99	1.31	1.31	4.45	4.45	11.68	11.68	5.56	5.56	23.00	23.00
98	1.38	1.38	4.51	4.51	14.44	14.44	6.54	6.54	26.88	26.88
97	1.53	1.53	4.54	4.54	16.49	16.49	7.18	7.18	29.73	29.73
96	0.62	0.62	4.53	4.53	16.81	16.81	7.21	7.21	29.18	29.18
95	1.38	1.38	4.57	4.57	14.62	14.62	6.57	6.57	27.15	27.15
94	2.06	2.06	4.63	4.63	11.74	11.74	5.42	5.42	23.86	23.86
93	2.27	2.27	4.60	4.60	7.11	7.11	4.12	4.12	18.10	18.10
92	2.85	2.85	4.57	4.57	1.25	1.25	3.70	3.70	12.37	12.37
91	2.66	2.66	4.59	4.59	8.74	8.74	4.93	4.93	20.91	20.91
90	2.12	2.12	4.55	4.55	14.51	14.51	6.71	6.71	27.89	27.89
89	0.03	0.03	4.48	4.48	18.36	18.36	8.17	8.17	31.04	31.04
88	4.17	4.17	4.46	4.46	20.74	20.74	8.95	8.95	38.32	38.32
87	4.80	4.80	4.48	4.48	20.79	16.69	8.84	0.00	38.90	25.96
86	3.16	3.16	4.41	4.41	17.05	2.62	7.84	0.00	32.47	10.20
85	1.18	1.18	4.30	0.59	12.91	0.00	6.35	0.00	24.73	1.77

Table 7. Estimated uncertainty in atomic oxygen concentrations ($\times 10^{10}$ cm $^{-3}$) on a daily timescale (9 September 2010).

See Sects. 5, 6.2, 7.1 and Fig. 8 for further details.

Altitude (km)	$\sigma_{S_s}^+$	$\sigma_{S_s}^-$	$\sigma_{S_m}^+$	$\sigma_{S_m}^-$	$\sigma_{S_b}^+$	$\sigma_{S_b}^-$	$\sigma_{S_f}^+$	$\sigma_{S_f}^-$	σ_T^+	σ_T^-	σ_D^+	σ_D^-	σ_O^+	σ_O^-
105	4.16	0.00	26.84	0.00	3.32	0.00	1.51	0.00	0.00	0.00	0.00	0.00	35.82	0.00
104	0.21	2.09	22.60	6.34	3.61	0.00	1.64	0.00	0.70	0.00	0.53	0.00	29.29	8.42
103	1.44	2.09	17.68	9.57	3.70	6.30	1.68	3.39	1.33	2.32	0.94	0.98	26.76	24.64
102	0.72	2.09	14.84	9.57	3.87	6.30	1.79	3.39	1.72	2.32	1.09	0.98	24.03	24.64
101	0.64	2.09	12.70	9.57	4.25	6.30	1.98	3.39	2.04	2.32	1.16	0.98	22.76	24.64
100	1.86	2.09	10.58	9.57	4.79	6.30	2.11	3.39	2.35	2.32	1.19	0.98	22.88	24.64
99	2.30	1.73	8.86	7.75	5.08	5.54	2.12	2.67	2.69	2.65	1.18	0.97	22.23	21.31
98	1.29	0.94	7.65	6.18	5.02	4.78	2.01	2.13	3.07	3.02	1.17	0.96	20.23	18.01
97	0.43	0.31	6.73	5.17	4.49	3.93	1.78	1.69	3.46	3.41	1.14	0.93	18.04	15.43
96	1.88	1.35	6.06	4.72	3.49	3.01	1.47	1.34	3.80	3.73	1.07	0.87	17.76	15.02
95	1.95	1.39	5.67	4.35	2.60	2.17	1.13	0.99	3.96	3.90	0.93	0.75	16.25	13.55
94	1.42	1.00	5.47	4.10	1.53	1.23	0.85	0.70	4.03	3.96	0.78	0.62	14.09	11.62
93	1.04	0.72	5.56	4.10	0.28	0.22	0.80	0.63	4.06	3.99	0.64	0.50	12.37	10.15
92	0.83	0.57	5.80	4.24	1.97	1.56	1.06	0.87	4.00	3.93	0.50	0.38	14.15	11.54
91	0.96	0.66	6.12	4.53	3.41	2.79	1.48	1.27	3.86	3.79	0.35	0.25	16.17	13.29
90	1.05	0.73	6.58	4.99	4.54	3.93	1.86	1.76	3.60	3.53	0.20	0.13	17.83	15.08
89	0.61	0.73	7.21	4.99	5.41	3.93	2.13	1.76	3.18	3.53	0.07	0.13	18.60	15.08
88	0.07	0.73	8.10	4.99	5.88	3.93	2.25	1.76	2.66	3.53	0.05	0.13	19.00	15.08
87	0.61	0.73	9.75	4.99	5.67	3.93	2.34	1.76	2.05	3.53	0.14	0.13	20.55	15.08
86	1.38	0.73	12.99	4.99	5.44	3.78	2.38	0.00	1.22	0.00	0.19	0.00	23.61	9.51
85	0.80	0.00	22.80	0.00	5.63	0.00	2.43	0.00	0.00	0.00	0.00	0.00	31.66	0.00

Table 8. Estimated uncertainty in atomic oxygen concentrations ($\times 10^{10}$ cm $^{-3}$) on a monthly timescale (September 2010). See Sects. 5, 6.2, 7.1 and Fig. 8 for further details.

Altitude (km)	$\sigma_{S_s}^+$	$\sigma_{S_s}^-$	$\sigma_{S_m}^+$	$\sigma_{S_m}^-$	$\sigma_{S_b}^+$	$\sigma_{S_b}^-$	$\sigma_{S_f}^+$	$\sigma_{S_f}^-$	σ_T^+	σ_T^-	σ_D^+	σ_D^-	σ_O^+	σ_O^-
105	0.31	-26.93	5.13	5.97	4.26	7.80	1.98	7.67	1.12	1.10	1.01	0.84	13.81	-3.55
104	0.71	-4.50	4.05	3.94	4.24	5.25	1.99	3.12	1.40	1.38	1.14	0.95	13.52	10.15
103	0.64	-4.06	3.30	2.83	4.34	4.39	2.02	2.40	1.66	1.64	1.22	1.02	13.19	8.21
102	0.51	-2.92	2.85	2.25	4.50	4.04	2.15	2.20	1.94	1.92	1.29	1.07	13.24	8.56
101	0.80	-1.09	2.47	1.88	4.80	4.08	2.31	2.21	2.24	2.21	1.34	1.11	13.94	10.38
100	0.56	0.40	2.16	1.59	5.41	4.41	2.47	2.25	2.54	2.50	1.35	1.12	14.48	12.27
99	0.49	0.34	1.90	1.37	5.83	4.62	2.54	2.24	2.81	2.77	1.32	1.09	14.90	12.44
98	0.52	0.36	1.68	1.19	5.86	4.52	2.45	2.09	3.04	2.99	1.24	1.01	14.77	12.17
97	0.23	0.16	1.50	1.05	5.37	4.03	2.22	1.82	3.23	3.18	1.12	0.92	13.68	11.15
96	0.35	0.24	1.40	0.96	4.33	3.17	1.89	1.48	3.39	3.34	1.00	0.82	12.36	10.01
95	0.55	0.37	1.34	0.92	3.31	2.38	1.50	1.13	3.46	3.40	0.86	0.70	11.02	8.90
94	0.63	0.42	1.30	0.89	1.97	1.39	1.12	0.82	3.44	3.38	0.71	0.57	9.17	7.47
93	0.81	0.54	1.30	0.89	0.35	0.25	1.03	0.73	3.34	3.28	0.55	0.43	7.37	6.11
92	0.76	0.51	1.35	0.92	2.51	1.80	1.38	1.04	3.14	3.09	0.40	0.30	9.54	7.66
91	0.62	0.42	1.43	0.98	4.40	3.29	1.96	1.61	2.85	2.79	0.25	0.18	11.50	9.27
90	0.04	0.03	1.56	1.08	6.07	4.82	2.54	2.38	2.44	2.39	0.12	0.07	12.78	10.77
89	1.65	0.03	1.77	1.08	7.60	4.82	2.99	2.38	1.97	2.39	0.01	0.07	16.00	10.77
88	2.35	0.03	2.17	1.08	8.93	4.82	3.34	2.38	1.56	2.39	0.07	0.07	18.42	10.77
87	2.02	0.03	2.82	1.08	9.18	4.82	3.59	2.38	1.23	2.39	0.12	0.07	18.96	10.77
86	0.92	0.03	3.65	1.08	8.77	4.82	3.57	2.38	0.99	2.39	0.15	0.07	18.06	10.77
85	1.72	-10.09	3.84	1.08	7.14	4.82	3.00	2.38	0.94	1.81	0.19	0.00	16.83	0.00