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ACE – FTS

Atmospheric Chemistry Experiment

Microwindow List for ACE-FTS retrievals – version 2.2 + updates

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1. Introduction

Microwindow sets used for the ACE-FTS version 2.2 volume mixing ratio (VMR) retrievals are presented. Also reported are the molecules explicitly included as interferers in the retrieval of the target molecule. The VMR profiles for these interferences are fitted simultaneously with the target VMR profile. For some molecules, additional interferences exist that are not explicitly retrieved, in which case the VMR profile for the interferers are fixed to the results of previous retrievals.

Some molecules (such as C_2H_6) have an upper altitude limit that varies with latitude. The lower value listed in the table corresponds to the upper altitude limit at the poles, while the higher value corresponds to the upper altitude limit at the equator.

The O_3 microwindows listed here are for the "version 2.2 O_3 update" set of results. The microwindows used in the normal version 2.2 processing are not included. Note that there was no change in microwindows for the HDO update. Changes for this isotopologue were in the processing software, not the microwindow set.

Some microwindow sets include windows that do not contain information on the target molecule, but instead are meant to improve the results for the interferences, particularly for cases where the spectral features from the interferences in the main microwindow set are relatively weak.

The weighting factor used for the least squares process varied with wavenumber because the signal-to-noise ratio (SNR) in the spectrum varies with wavenumber. The table below details the assumed SNR used to calculate the fitting weights (the weighting goes as the square of the SNR). Note that the actual SNR performance of the instrument is typically underestimated by these effective values. The purpose of these values is to apply a relative fitting weight for microwindows from different wavenumber ranges for a given molecule.

Table 1: Signal-to-Noise Weighting of Wavenumber Ranges

Range (cm^{-1})	Effective SNR
< 800	50
800 – 900	75
900 – 1000	100
1000 – 1850	175
1850 – 2500	200
2500 – 2750	125
2750 – 3900	100
3900 – 4100	70
4100 – 4200	50
> 4200	35

2. Pressure and Temperature Microwindows

Table 2: Microwindow list for Pressure/Temperature

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
932.96	0.30	12	20
934.90	0.30	12	20
936.80	0.35	12	20
1890.34	0.24	17	47
1899.17	0.30	25	58
1902.05	0.30	30	60
1905.09	0.30	27	63
1906.48	0.30	30	65
1911.02	0.35	35	68
1912.52	0.35	45	68
1914.11	0.30	40	70
1915.48	0.35	39	70
1917.06	0.35	30	70
1918.49	0.30	38	70
1920.11	0.35	30	70
1924.71	0.35	35	65
1927.70	0.30	27	61
1929.35	0.35	21	56
1933.90	0.40	24	60
1934.62	0.30	20	54
1935.23	0.30	15	50
1936.44	0.30	23	50
1941.12	0.35	15	42
1950.68	0.30	12	43
1955.49	0.30	20	50
1963.59	0.30	20	50
1968.63	0.30	12	50
1970.10	0.30	15	48
1975.15	0.20	12	40
2042.93	0.30	48	68
2044.50	0.30	50	70
2045.97	0.30	53	73
2047.53	0.40	55	73
2049.05	0.40	53	75
2050.55	0.40	55	78
2052.10	0.30	50	79
2053.66	0.30	55	80
2055.11	0.35	60	80
2056.72	0.30	55	85
2058.24	0.40	55	85
2061.33	0.35	60	85
2062.87	0.35	60	85
2066.03	0.35	60	85
2067.52	0.35	60	83

Table 2: Microwindow list for Pressure/Temperature (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2070.65	0.40	62	80
2072.23	0.30	57	80
2277.43	0.30	42	68
2293.77	0.55	78	94
2296.05	0.26	80	100
2300.40	0.30	82	115
2306.85	0.30	90	125
2313.10	0.35	100	130
2319.14	0.26	105	130
2323.15	0.30	105	130
2332.37	0.30	105	130
2354.37	0.26	105	130
2361.45	0.30	105	130
2364.10	0.30	105	130
2366.63	0.30	105	130
2367.88	0.30	105	130
2369.10	0.30	105	130
2370.27	0.35	105	130
2371.43	0.30	105	130
2372.56	0.30	105	130
2373.67	0.35	105	130
2374.75	0.40	100	130
2375.80	0.35	100	130
2376.84	0.35	95	130
2377.85	0.35	95	125
2378.83	0.35	93	123
2379.78	0.35	90	120
2380.72	0.35	85	115
2381.62	0.35	85	115
2382.48	0.40	82	115
2383.36	0.35	82	115
2384.19	0.35	79	115
2385.02	0.40	75	95
2385.79	0.35	73	90
2386.51	0.35	70	86
2387.26	0.35	65	83
2387.96	0.35	60	80
2388.64	0.35	55	77
2389.29	0.35	50	71
2389.92	0.30	35	68
2390.52	0.35	33	65
2391.13	0.30	25	62
2391.70	0.30	22	60
2392.10	0.30	20	55
2392.62	0.30	20	50
2393.06	0.30	25	50

Table 2: Microwindow list for Pressure/Temperature (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2408.77	0.20	15	46
2412.47	0.30	15	46
2421.19	0.30	15	46
2422.88	0.30	15	46
2437.60	0.22	15	46
2439.00	0.30	15	46
2440.28	0.20	17	46
2444.27	0.24	15	46
2447.89	0.26	15	43
3301.52	0.30	12	25
3304.67	0.30	12	30
3306.29	0.30	12	31
3330.00	0.30	12	22
3377.06	0.26	12	30
3378.64	0.26	12	25
3380.03	0.30	12	20

3. Microwindows for All Official Version 2.2 Species

Table 3: Microwindow list for H_2O

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
953.43	0.45	5	9
955.25	0.50	5	8
971.34	0.35	5	12
973.99	0.40	5	12
1362.60	0.30	50	70
1375.06	0.35	40	75
1379.56	0.30	30	55
1388.52	0.28	15	45
1428.21	0.30	20	55
1429.95	0.35	44	70
1456.84	0.30	50	84
1496.25	0.35	50	84
1505.57	0.35	54	90
1507.06	0.35	53	90
1539.06	0.35	70	90
1540.30	0.35	60	86
1553.00	0.35	15	40
1558.53	0.35	55	90
1560.26	0.35	54	86
1562.64	0.30	15	35
1568.94	0.35	44	75

Table 3: Microwindow list for H_2O (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1576.19	0.35	55	90
1616.71	0.35	75	90
1623.56	0.35	50	82
1635.65	0.35	54	86
1652.40	0.40	75	90
1653.23	0.30	60	90
1662.81	0.35	50	84
1668.28	0.35	40	75
1669.30	0.50	65	83
1672.42	0.30	30	65
1684.84	0.35	55	90
1695.93	0.35	65	90
1699.94	0.35	55	90
1734.53	0.45	55	85
1739.84	0.35	60	80
1752.75	0.30	30	60
1767.04	0.40	15	45
1770.91	0.35	40	60
1788.36	0.30	15	50
1788.66	0.30	15	35
1805.13	0.30	40	60
1837.43	0.30	25	45
1856.20	0.40	15	40
1904.36	0.35	35	55
1940.24	0.30	8	15
1945.34	0.35	35	60
1946.31	0.30	35	60
1950.10	0.35	7	15
1951.11	0.18	12	30
1954.98	0.25	23	55
1956.33	0.30	17	40
1959.58	0.40	7	30
1961.15	0.30	20	55
1966.26	0.35	33	60
1969.82	0.26	7	9
1976.20	0.25	15	45
1987.34	0.30	12	20
1989.96	0.26	8	15
1999.92	0.30	7	12

Table 4: Interfering molecule(s) for H_2O

Molecule	Upper Altitude Limit(km)
O3	40

Table 5: Microwindow list for O_3

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
922.00 [1]	4.00	5	20
984.98	0.35	5	40
986.90	0.35	20	40
988.13	0.70	5	45
990.97	0.60	20	40
1022.74	0.70	45	80
1023.55	0.60	45	95
1024.45	0.30	45	95
1025.00	0.30	45	95
1026.00	1.20	40	85
1027.10	1.00	60	95
1028.00	0.55	45	95
1029.00	0.60	55	95
1030.05	0.60	45	90
1045.91	0.30	40	95
1046.85	1.00	70	85
1048.10	0.80	45	90
1049.11	0.30	45	95
1054.24	0.33	55	95
1056.04	0.52	45	95
1057.63	0.30	55	95
1058.28	0.60	45	95
1084.22	0.34	30	55
1104.00	0.80	5	45
1108.03	0.40	5	45
1114.84	0.18	5	40
1115.58	0.20	5	45
1117.35	0.26	7	45
1119.20	0.38	35	55
1119.84	0.22	5	45
1121.85	0.35	8	45
1122.44	0.45	40	55
1122.95	0.22	5	45
1123.93	0.45	35	55
1126.00	0.40	30	55
1127.05	0.30	30	50
1128.49	0.28	25	45

[1] Included to improve results for interferer CFC-12 (CCl_2F_2)

Table 6: Interfering molecule(s) for O_3

Molecule	Upper Altitude Limit(km)
O3 (isotope 2)	45
O3 (isotope 3)	45
CCl2F2	20

Table 7: Microwindow list for N_2O

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1121.85	0.35	5	35
1123.93	0.45	35	42
1134.43	0.45	5	15
1139.80	0.60	5	20
1168.82	0.60	5	22
1169.71	0.50	5	22
1203.82	0.65	5	25
1204.72	0.45	5	15
1208.25	0.28	5	22
1262.85	0.35	30	40
1264.82	0.30	30	43
1274.55	0.30	32	41
1278.10	0.35	32	41
1278.94	0.30	32	41
1861.22	0.30	10	20
1862.02	0.30	10	22
1864.68	0.40	10	22
1865.52	0.30	12	22
1874.44	0.35	8	20
1886.78	0.35	9	20
1906.48	0.30	30	50
1950.68	0.30	5	30
2188.17	0.35	31	43
2190.42	0.35	33	45
2197.65	0.70	33	50
2201.75	0.35	35	55
2203.73	0.35	35	58
2205.75	0.50	37	56
2207.56	0.35	35	60
2208.60	0.30	37	60
2210.46	0.45	37	60
2211.34	0.30	37	60
2214.11	0.30	35	60
2215.10	0.30	45	60
2216.00	0.30	45	60
2217.65	0.40	40	60
2227.82	0.30	35	50
2237.60	0.30	55	60
2442.25	0.35	22	32
2454.36	0.30	22	32
2455.24	0.35	22	32
2456.05	0.35	22	32
2456.94	0.35	22	31
2460.32	0.35	18	28
2461.16	0.35	12	25
2463.63	0.30	17	28

Table 7: Microwindow list for N_2O (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2466.19	0.35	20	31
2466.93	0.30	20	31
2467.79	0.35	22	32
2519.02	0.35	6	27
2521.22	0.40	5	27
2523.50	0.40	5	27
2548.17	0.35	27	37
2549.12	0.35	27	37
2553.80	0.35	27	37
2556.41	0.30	26	36
2558.21	0.35	28	36
2569.75	0.30	26	36
2570.58	0.30	27	37
2572.16	0.30	26	37
2574.29	0.30	27	37
2595.13	0.35	5	20
2596.10	0.26	5	22
2667.85	0.35	5	25

Table 8: Interfering molecule(s) for N_2O

Molecule	Upper Altitude Limit(km)
CO2	51
O3	42
CH4	27

Table 9: Microwindow list for CO

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1119.20 [1]	0.38	35	47
1121.85 [1]	0.35	5	35
2046.29	0.24	8	25
2086.37	0.40	70	105
2092.71	0.40	47	55
2094.76	0.40	70	105
2099.08	0.40	47	105
2115.63	0.35	65	105
2127.67	0.40	70	105
2135.54	0.40	25	105
2139.40	0.40	15	105
2147.18	0.35	15	105
2150.93	0.30	25	105
2154.55	0.26	27	105

Table 9: Microwindow list for CO (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2158.35	0.50	28	105
2162.02	0.35	35	105
2165.64	0.30	28	105
2169.23	0.35	30	105
2172.76	0.40	55	105
2176.35	0.30	35	105
2179.77	0.40	60	105
2183.20	0.40	40	105
2189.93	0.35	40	105
2193.30	0.35	55	105
2200.00	0.35	55	105
2203.19	0.35	35	105
2206.43	0.28	45	100
2667.85 [2]	0.40	5	25
4209.39	0.30	5	15
4222.88	0.40	5	15
4227.35	0.60	5	15
4231.63	0.45	5	15
4236.05	0.45	5	15
4248.35	0.35	5	15
4274.77	0.30	5	15
4285.12	0.50	5	15
4288.27	0.35	7	15

[1] Included to improve results for interferer O_3
[2] Included to improve results for interferer CH_4

Table 10: Interfering molecule(s) for CO

Molecule	Upper Altitude Limit(km)
O3	55
CH4	30

Table 11: Microwindow list for CH_4

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1245.14	0.30	39	50
1267.78	0.30	45	60
1270.73	0.30	40	60
1283.43	0.30	50	70
1287.80	0.30	55	70
1299.89	0.30	40	55
1302.07	0.30	45	70
1302.74	0.30	55	70

Table 11: Microwindow list for CH_4 (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1303.63	0.35	45	70
1304.25	0.30	40	60
1311.50	0.30	50	60
1322.08	0.30	38	70
1327.23	0.60	35	70
1332.08	0.30	55	70
1332.48	0.30	40	70
1332.75	0.30	55	70
1337.55	0.30	40	60
1341.68	0.35	35	70
1342.65	0.30	55	70
1346.65	0.40	32	57
1348.00	0.35	32	57
1350.95	0.30	30	55
1351.74	0.30	35	55
1353.10	0.40	33	60
1356.00	0.35	35	55
1407.60	0.30	15	30
1427.60	0.35	9	20
1439.43	0.35	10	25
1463.00	0.35	12	25
2610.20	0.35	10	27
2613.98	0.35	20	30
2614.73	0.30	20	33
2618.27	0.35	25	37
2622.58	0.30	20	33
2636.30	0.30	5	20
2644.72	0.35	12	28
2650.70	0.35	5	20
2658.08	0.35	12	28
2658.60	0.35	5	25
2664.50	0.35	17	30
2667.19	0.30	20	30
2667.47	0.35	10	27
2667.85	0.40	5	25
2669.65	0.30	5	20
2671.30	0.30	15	30
2671.66	0.45	5	25
2674.15	0.35	20	32
2675.62	0.30	12	27
2691.25	0.30	25	35
2805.97	0.30	23	33
2809.02	0.30	27	37
2820.82	0.30	25	40
2822.68	0.30	28	43
2825.05	0.30	28	40

Table 11: Microwindow list for CH_4 (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2828.17	0.40	30	45
2835.61	0.35	18	31
2839.48	0.50	8	22
2841.22	0.35	15	30
2847.72	0.35	27	43
2849.25	0.30	25	36
2857.50	0.35	10	25
2867.10	0.30	30	40
2869.53	0.30	5	20
2888.48	0.28	25	39

Table 12: Microwindow list for NO

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1104.93 [1]	0.30	15	35
1842.95	0.30	60	110
1846.62	0.30	15	110
1850.20	0.30	45	110
1853.70	0.30	35	110
1857.17	0.45	15	110
1860.75	0.30	60	110
1864.30	0.30	55	105
1887.53	0.40	15	110
1890.80	0.40	40	110
1894.00	0.45	15	110
1897.00	0.35	40	110
1900.00	0.30	15	110
1903.17	0.35	15	110
1906.15	0.30	60	110
1909.13	0.30	60	110
1911.98	0.35	15	110
1914.96	0.30	15	110
1917.82	0.30	85	110
1920.70	0.30	30	55
1923.46	0.24	25	45

[1] Included to improve results for interferer O_3

Table 13: Interfering molecule(s) for NO

Molecule	Upper Altitude Limit(km)
O3	35

Table 14: Microwindow list for NO_2

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1581.20	0.60	15	35
1584.15	0.50	14	35
1584.70	0.40	14	37
1585.40	0.90	14	38
1586.45	0.30	14	38
1588.70	0.30	13	37
1590.61	0.28	14	39
1592.57	0.30	14	40
1595.33	0.40	15	41
1597.10	0.50	14	58
1598.12	0.35	13	58
1599.93	0.55	30	58
1602.25	0.30	15	58
1607.99	0.58	30	58
1611.70	0.40	15	58
1628.73	0.44	25	58
1629.75	0.70	20	58
1630.97	0.30	15	58
1634.05	0.60	28	58
1636.88	0.40	28	58
1641.65	0.30	18	58

Table 15: Microwindow list for HNO_3

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
868.10	2.20	5	32
872.90	2.20	5	32
878.50	3.00	15	35
1691.64	0.30	12	32
1698.25	0.70	25	37
1701.70	0.30	25	37
1703.05	0.40	22	37
1705.31	0.60	20	37
1716.23	0.30	25	37
1720.15	0.35	25	35
1720.89	0.40	25	35
1728.28	0.70	10	32

Table 16: Interfering molecule(s) for HNO_3

Molecule	Upper Altitude Limit(km)
H2O	35
O3	35
N2O	20
CH4	20

Table 17: Microwindow list for HF

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1815.78 [2]	0.30	25	35
1987.34 [1]	0.30	10	30
2010.70 [2]	0.30	10	25
2667.47 [4]	0.35	10	23
2814.40 [3]	0.30	10	25
3788.33	0.40	10	44
3833.71	0.40	18	48
3877.75	0.35	10	50
3920.39	0.30	27	50
4001.03	0.30	10	50
4038.87	0.45	10	50
4109.94	0.35	25	46
4142.97	0.40	15	40

[1] Included to improve results for interferer H_2O
[2] Included to improve results for interferer O_3
[3] Included to improve results for interferer N_2O
[4] Included to improve results for interferer CH_4

Table 18: Interfering molecule(s) for HF

Molecule	Upper Altitude Limit(km)
H2O	30
O3	35
N2O	25
CH4	23

Table 19: Microwindow list for HCl

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2701.26	0.30	8	36
2703.03	0.30	35	47
2727.77	0.40	8	45
2751.97	0.30	47	55
2775.75	0.30	40	55
2798.95	0.35	51	57
2819.48	0.30	20	54
2821.47	0.30	18	57
2841.63	0.40	20	50
2843.67	0.30	15	57
2865.16	0.26	38	57
2906.30	0.30	45	57
2923.57	0.50	20	48
2923.73	0.30	44	50
2925.90	0.30	17	57
2942.67	0.40	15	54
2944.95	0.30	10	57
2961.00	0.40	25	48
2963.11	0.50	8	57
2981.00	0.50	40	57
2995.88	0.30	45	51
2998.14	0.30	52	57

Table 20: Interfering molecule(s) for HCl

Molecule	Upper Altitude Limit(km)
O3	40
CH4	50

Table 21: Microwindow list for OCS

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2038.90	0.20	7	20
2043.50	0.40	10	25
2045.14	0.30	7	25
2048.05	0.35	10	25
2052.72	0.30	10	25

Table 22: Interfering molecule(s) for OCS

Molecule	Upper Altitude Limit(km)
O3	25
CO2	25

Table 23: Microwindow list for N_2O_5

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1225.00	30.00	15	40
1255.00	30.00	15	40

Table 24: Interfering molecule(s) for N_2O_5

Molecule	Upper Altitude Limit(km)
CH4	40
N2O	40
H2O	40
CO2	40

Table 25: Microwindow list for $ClONO_2$

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
780.15	0.60	12	20
1104.93 [1]	0.30	12	35
1202.86 [2]	0.50	12	18
1292.60	1.60	18	35
1728.28 [3]	0.50	12	18

[1] Included to improve results for interferer O_3
[2] Included to improve results for interferers N_2O and CH_4
[3] Included to improve results for interferer HNO_3

Table 26: Interfering molecule(s) for $ClONO_2$

Molecule	Upper Altitude Limit(km)
O3	12
HNO3	33
N2O	35
CH4	35

Table 27: Microwindow list for HCN

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1438.70	0.30	10	28
1444.76	0.30	15	25
3261.75	0.30	7	15
3268.25	0.30	7	22
3277.86	0.30	7	26
3281.02	0.30	8	26
3287.30	0.40	7	28
3296.48	0.26	10	28
3299.56	0.30	8	26
3305.54	0.35	7	22
3328.77	0.30	20	28
3334.30	0.30	13	28

Table 28: Microwindow list for CH_3Cl

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2966.50	0.40	9	25
2966.90	0.40	9	25
2967.30	0.70	9	25

Table 29: Interfering molecule(s) for CH_3Cl

Molecule	Upper Altitude Limit(km)
O3	25
CH4	25

Table 30: Microwindow list for CF_4

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1283.20	2.00	20	45

Table 31: Interfering molecule(s) for CF_4

Molecule	Upper Altitude Limit(km)
CH4	45
N2O	45

Table 32: Microwindow list for CCl_2F_2 (CFC-12)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
922.00	4.00	6	28
1161.00	1.20	12	25

Table 33: Interfering molecule(s) for CCl_2F_2 (CFC-12)

Molecule	Upper Altitude Limit(km)
O3	25
N2O	25

Table 34: Microwindow list for CCl_3F (CFC-11)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
842.50	25.00	5	22

Table 35: Interfering molecule(s) for CCl_3F (CFC-11)

Molecule	Upper Altitude Limit(km)
CO2	22
HNO3	22
H2O	22
O3	22

Table 36: Microwindow list for COF_2

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1950.27	1.36	10	32
1952.05	1.20	10	32

Table 37: Interfering molecule(s) for COF_2

Molecule	Upper Altitude Limit(km)
H2O	32
CO2	32
O3	32

Table 38: Microwindow list for C_2H_6

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2976.95	0.60	6	14 to 21

Table 39: Interfering molecule(s) for C_2H_6

Molecule	Upper Altitude Limit(km)
O3	14 to 21

Table 40: Microwindow list for C_2H_2

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
3268.50	0.30	5.0 to 8.0	8.5 to 14.5
3295.78	0.30	5.0 to 8.0	9.5 to 14.5
3305.10	0.50	4.0 to 6.5	9.5 to 14.5

Table 41: Interfering molecule(s) for C_2H_2

Molecule	Upper Altitude Limit(km)
H2O	8.5 to 14.5

Table 42: Microwindow list for CHF_2Cl

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
809.30	1.10	5	15
820.85	0.70	5	12
829.03	0.50	5	25

Table 43: Interfering molecule(s) for CHF_2Cl

Molecule	Upper Altitude Limit(km)
O3	25
CO2	25

Table 44: Microwindow list for SF_6

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
947.65	0.90	7	22

Table 45: Interfering molecule(s) for SF_6

Molecule	Upper Altitude Limit(km)
CO2	22

Table 46: Microwindow list for ClO

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
823.475	5.00	11	30
828.475	5.00	11	30
833.475	5.00	11	30
838.475	5.00	11	30
843.475	5.00	11	30

Table 47: Interfering molecule(s) for ClO

Molecule	Upper Altitude Limit(km)
CHF2Cl	30
CCl3F	30

Table 48: Microwindow list for HO_2NO_2

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
802.89	2.08	12	25

Table 49: Microwindow list for H_2O_2

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1233.10	4.60	5	12

Table 50: Microwindow list for HOCl

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1221.21	0.46	10	30
1227.50	2.25	10	30
1232.03	2.54	10	30
1234.66	2.16	10	30

Table 51: Microwindow list for N_2

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
2388.35	0.24	20	35
2395.96	0.28	15	35
2403.55	0.35	15	40
2411.13	0.35	15	35
2418.63	0.35	20	40
2426.14	0.40	15	30
2433.64	0.24	15	37
2440.97	0.35	15	30

Table 52: Interfering molecule(s) for N_2

Molecule	Upper Altitude Limit(km)
CO2	30
N2O	30

4. Microwindows for Subsidiary Isotopologues

Table 53: Microwindow list for H_2O Isotopologue 181

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1414.72	0.24	15	50
1415.02	0.30	40	62
1424.90	0.35	12	50
1430.77	0.30	15	50
1442.80	0.35	14	55
1449.63	0.40	13	50
1466.80	0.35	22	60
1483.22	0.35	12	35
1484.92	0.30	16	55
1500.20	0.35	25	64
1530.80	0.35	14	45
1536.60	0.30	50	65
1552.05	0.50	25	65
1563.53	0.30	23	60
1609.85	0.30	50	65
1629.00	0.30	50	65
1662.30	0.30	25	62
1677.75	0.30	40	65
1689.19	0.30	40	65
1692.20	0.30	55	65
1726.77	0.30	45	60
1764.20	0.30	35	65
1885.76	0.30	9	20

Table 53: Microwindow list for H_2O Isotopologue 181 (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1897.87	0.30	9	20
1911.88	0.30	9	20
1957.11	0.45	9	18
1977.60	0.50	5	20
1980.75	0.35	11	30
1982.06	0.45	5	12
2002.55	0.50	5	9
2029.88	0.50	5	9

Table 54: Interfering molecule(s) for H_2O Isotopologue 181

Molecule	Upper Altitude Limit(km)
CO2	25
CH4	25
O3	25

Table 55: Microwindow list for H_2O Isotopologue 171

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1470.48	0.30	14	50
1484.53	0.35	13	45
1492.94	0.30	14	50
1503.51	0.30	15	35
1503.99	0.30	15	50
1514.14	0.40	14	40
1518.21	0.30	15	50
1551.16	0.40	15	45
1658.82	0.30	14	45
1862.27	0.40	9	18
1862.80	0.55	9	20
1906.10	0.35	8	15
1986.10	0.35	7	20

Table 56: Interfering molecule(s) for H_2O Isotopologue 171

Molecule	Upper Altitude Limit(km)
N2O	20
CO2	20
CH4	30
O3	20
NO	15

Table 57: Microwindow list for H_2O Isotopologue 162 (HDO)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1402.86	0.30	10	32
1408.45	0.40	9	32
1413.68	0.24	7	28
1421.63	0.30	10	38
1422.06	0.24	9	27
1422.61	0.30	12	38
1431.66	0.24	12	33
1435.29	0.24	15	33
1439.93	0.30	8	38
1447.38	0.30	20	33
1451.35	0.30	12	30
1475.60	0.24	20	32
1477.04	0.24	12	30
1480.25	0.50	10	38
1484.20	0.30	15	38
1488.20	0.24	15	38
1494.93	0.30	12	30
1497.85	0.24	15	38
2612.49	0.30	5	10
2621.77	0.24	5	20
2657.28	0.40	5	20
2659.47	0.26	5	10
2666.19	0.30	12	30
2672.60	0.40	5	28

Table 58: Interfering molecule(s) for H_2O Isotopologue 162 (HDO)

Molecule	Upper Altitude Limit(km)
H2O	25

Table 59: Microwindow list for CH_4 Isotopologue 311

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1214.07	0.40	5	25
1219.18	0.30	8	25
1231.39	0.45	5	32
1234.28	0.45	5	35
1256.05	0.35	12	40
1258.30	0.30	25	40
1275.86	0.35	21	40
1280.08	0.30	25	40
1291.89	0.30	30	40
1318.59	0.30	35	45

Table 59: Microwindow list for CH_4 Isotopologue 311 (continued)

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1323.60	0.30	40	45
1324.10	0.30	35	45
1328.40	0.30	35	45
1329.08	0.30	34	45
1333.30	0.28	40	45
1334.10	0.40	25	45
2617.63	0.30	5	25
2703.33	0.30	5	25
2748.53	0.35	5	15
2861.00	0.45	8	27
2933.71	0.28	15	25

Table 60: Microwindow list for CH_4 Isotopologue 212

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1156.20	1.70	6	15
1158.55	0.28	6	15
1162.75	0.45	6	15
1167.94	0.40	6	15
1176.99	0.30	6	15
1194.47	0.30	6	15
1204.38	0.28	6	15
1206.91	0.30	6	15
2929.53	0.30	6	20
2950.86	0.26	6	30
2952.65	0.70	6	20
2972.45	0.40	8	30
2974.23	0.35	8	25
2980.31	0.40	20	30
2987.94	0.40	12	30
3023.80	1.20	8	20
3032.69	0.30	10	25
3040.37	0.45	6	20
3061.36	0.50	10	30
3063.36	0.40	12	30
3065.12	0.26	12	20
3068.91	0.30	15	30
3070.85	0.30	8	25
3072.84	0.30	15	30
3078.40	0.30	12	25
3082.11	0.55	15	30
3091.32	0.55	8	25
3096.98	0.40	20	30
3098.75	0.40	12	23

5. Microwindows for Research Products

NOTE: These molecules were not official version 2.2 data products but were processed "offline" with slightly modified versions of the processing software.

Table 61: Microwindow list for CCl_4

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
799.85	11.00	9	23

Table 62: Interfering molecule(s) for CCl_4

Molecule	Upper Altitude Limit(km)
CO2	23
O3	23
H2O	23
CHF2Cl	23

Table 63: Microwindow list for HCOOH

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1105.15	1.40	5	10

Table 64: Interfering molecule(s) for HCOOH

Molecule	Upper Altitude Limit(km)
O3	10
CCl2F2	10

Table 65: Microwindow list for HCFC-142b

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1134.50	4.00	8	19
1193.60	3.60	8	19

Table 66: Interfering molecule(s) for HCFC-142b

Molecule	Upper Altitude Limit(km)
HDO	14
H2O	15
O3	19

Table 67: Microwindow list for CFC-113

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
817.50	25.00	7	17

Table 68: Interfering molecule(s) for CFC-113

Molecule	Upper Altitude Limit(km)
H2O	15
CO2	15
O3	15