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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<sub>2</sub>H<sub>6</sub>) 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<sub>3</sub> microwindows listed here are for the “version 2.2 O<sub>3</sub> 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 <sup>-1</sup> )	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<sub>2</sub>O**

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<sub>2</sub>O (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<sub>2</sub>O**

Molecule	Upper Altitude Limit(km)
O3	40

**Table 5: Microwindow list for O<sub>3</sub>**

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
922.00 <sup>[1]</sup>	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

<sup>[1]</sup> Included to improve results for interferer CFC-12 (CCl<sub>2</sub>F<sub>2</sub>)

**Table 6: Interfering molecule(s) for O<sub>3</sub>**

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

**Table 7: Microwindow list for N<sub>2</sub>O**

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<sub>2</sub>O (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<sub>2</sub>O**

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 <sup>[1]</sup>	0.38	35	47
1121.85 <sup>[1]</sup>	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 <sup>[2]</sup>	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

<sup>[1]</sup> Included to improve results for interferer O<sub>3</sub><sup>[2]</sup> Included to improve results for interferer CH<sub>4</sub>**Table 10: Interfering molecule(s) for CO**

Molecule	Upper Altitude Limit(km)
O3	55
CH4	30

**Table 11: Microwindow list for CH<sub>4</sub>**

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<sub>4</sub> (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<sub>4</sub> (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 <sup>[1]</sup>	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

<sup>[1]</sup> Included to improve results for interferer O<sub>3</sub>

**Table 13: Interfering molecule(s) for NO**

Molecule	Upper Altitude Limit(km)
O3	35

**Table 14: Microwindow list for NO<sub>2</sub>**

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<sub>3</sub>**

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<sub>3</sub>**

Molecule	Upper Altitude Limit(km)
H <sub>2</sub> O	35
O <sub>3</sub>	35
N <sub>2</sub> O	20
CH <sub>4</sub>	20

**Table 17: Microwindow list for HF**

Center Wavenumber (cm-1)	Microwindow Width (cm-1)	Lower Altitude (km)	Upper Altitude (km)
1815.78 <sup>[2]</sup>	0.30	25	35
1987.34 <sup>[1]</sup>	0.30	10	30
2010.70 <sup>[2]</sup>	0.30	10	25
2667.47 <sup>[4]</sup>	0.35	10	23
2814.40 <sup>[3]</sup>	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

<sup>[1]</sup> Included to improve results for interferer H<sub>2</sub>O

<sup>[2]</sup> Included to improve results for interferer O<sub>3</sub>

<sup>[3]</sup> Included to improve results for interferer N<sub>2</sub>O

<sup>[4]</sup> Included to improve results for interferer CH<sub>4</sub>

**Table 18: Interfering molecule(s) for HF**

Molecule	Upper Altitude Limit(km)
H <sub>2</sub> O	30
O <sub>3</sub>	35
N <sub>2</sub> O	25
CH <sub>4</sub>	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<sub>2</sub>O<sub>5</sub>**

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<sub>2</sub>O<sub>5</sub>**

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

**Table 25: Microwindow list for ClONO<sub>2</sub>**

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

<sup>[1]</sup> Included to improve results for interferer O<sub>3</sub>

<sup>[2]</sup> Included to improve results for interferers N<sub>2</sub>O and CH<sub>4</sub>

<sup>[3]</sup> Included to improve results for interferer HNO<sub>3</sub>

**Table 26: Interfering molecule(s) for ClONO<sub>2</sub>**

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<sub>3</sub>Cl**

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<sub>3</sub>Cl**

Molecule	Upper Altitude Limit(km)
O3	25
CH4	25

**Table 30: Microwindow list for CF<sub>4</sub>**

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<sub>4</sub>**

Molecule	Upper Altitude Limit(km)
CH4	45
N2O	45

**Table 32: Microwindow list for CCl<sub>2</sub>F<sub>2</sub> (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<sub>2</sub>F<sub>2</sub> (CFC-12)**

Molecule	Upper Altitude Limit(km)
O3	25
N2O	25

**Table 34: Microwindow list for CCl<sub>3</sub>F (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<sub>3</sub>F (CFC-11)**

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

**Table 36: Microwindow list for COF<sub>2</sub>**

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<sub>2</sub>**

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

**Table 38: Microwindow list for C<sub>2</sub>H<sub>6</sub>**

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<sub>2</sub>H<sub>6</sub>**

Molecule	Upper Altitude Limit(km)
O3	14 to 21

**Table 40: Microwindow list for C<sub>2</sub>H<sub>2</sub>**

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<sub>2</sub>H<sub>2</sub>**

Molecule	Upper Altitude Limit(km)
H2O	8.5 to 14.5

**Table 42: Microwindow list for CHF<sub>2</sub>Cl**

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<sub>2</sub>Cl**

Molecule	Upper Altitude Limit(km)
O3	25
CO2	25

**Table 44: Microwindow list for SF<sub>6</sub>**

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<sub>6</sub>**

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<sub>2</sub>NO<sub>2</sub>**

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<sub>2</sub>O<sub>2</sub>**

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<sub>2</sub>**

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<sub>2</sub>**

Molecule	Upper Altitude Limit(km)
CO2	30
N2O	30

#### 4. Microwindows for Subsidiary Isotopologues

**Table 53: Microwindow list for H<sub>2</sub>O 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<sub>2</sub>O 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<sub>2</sub>O Isotopologue 181**

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

**Table 55: Microwindow list for H<sub>2</sub>O 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<sub>2</sub>O Isotopologue 171**

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

**Table 57: Microwindow list for H<sub>2</sub>O 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<sub>2</sub>O Isotopologue 162 (HDO)**

Molecule	Upper Altitude Limit(km)
H <sub>2</sub> O	25

**Table 59: Microwindow list for CH<sub>4</sub> 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<sub>4</sub> 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<sub>4</sub> 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<sub>4</sub>**

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<sub>4</sub>**

Molecule	Upper Altitude Limit(km)
CO <sub>2</sub>	23
O <sub>3</sub>	23
H <sub>2</sub> O	23
CHF <sub>2</sub> Cl	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)
O <sub>3</sub>	10
CCl <sub>2</sub> F <sub>2</sub>	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
H <sub>2</sub> O	15
O <sub>3</sub>	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