



*Supplement of*

## **Global distributions of CO<sub>2</sub> volume mixing ratio in the middle and upper atmosphere from daytime MIPAS high-resolution spectra**

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Table S.1: Microwindows used in the joint retrieval of CO<sub>2</sub> and line of sight (LOS).

Tangent Height (km)	Microwindows (cm <sup>-1</sup> )
60	2311.188-2311.250, 2314.812-2314.938, 2317.062-2317.375, 2319.000-2319.188, 2319.812-2320.000, 2320.562-2320.688, 2321.438-2321.625, 2323.000-2323.250, 2324.750-2324.938, 2326.188-2326.250, 2326.625-2326.812, 2326.938-2327.062, 2328.562-2328.625, 2329.250-2329.312, 2330.000-2330.062, 2332.500-2332.562, 2334.000-2334.062, 2339.438-2339.500, 2340.938-2341.000, 2346.062-2346.125, 2353.000-2353.062, 2354.375-2354.500, 2355.938-2356.125, 2360.188-2360.312
63	2309.625-2309.688, 2310.375-2310.500, 2311.125-2311.438, 2313.625-2313.812, 2314.688-2314.938, 2315.250-2315.312, 2316.188-2316.250, 2317.062-2317.312, 2317.438-2317.500, 2318.875-2319.188, 2319.688-2320.000, 2320.312-2320.688, 2321.188-2321.688, 2322.812-2323.250, 2324.688-2324.938, 2325.375-2325.625, 2326.000-2326.250, 2326.625-2327.062, 2328.562-2328.625, 2329.000-2329.062, 2329.250-2329.312, 2330.562-2330.750, 2332.125-2332.250, 2332.500-2332.562, 2334.000-2334.062, 2337.688-2337.750, 2339.312-2339.562, 2340.875-2341.000, 2342.625-2342.688, 2344.312-2344.500, 2345.875-2346.125, 2354.375-2354.562, 2355.750-2356.062, 2358.562-2358.875, 2361.312-2361.625, 2363.938-2364.250, 2365.250-2365.500
66	2310.438-2310.562, 2311.125-2311.250, 2314.812-2314.938, 2315.250-2315.312, 2318.938-2319.188, 2319.750-2320.000, 2320.312-2320.375, 2320.562-2320.688, 2321.438-2321.688, 2323.000-2323.312, 2324.750-2324.938, 2325.562-2325.625, 2326.188-2326.250, 2326.625-2327.062, 2328.562-2328.625, 2328.750-2328.812, 2330.562-2330.625, 2332.438-2332.562, 2334.000-2334.062, 2335.938-2336.000, 2339.312-2339.500, 2340.938-2341.000, 2342.625-2342.688, 2344.312-2344.375, 2345.938-2346.125, 2354.312-2354.500, 2355.812-2356.062, 2357.188-2357.438, 2358.562-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.750-2362.938, 2364.000-2364.250, 2365.250-2365.500
69	2310.438-2310.562, 2314.812-2314.938, 2318.938-2319.188, 2319.750-2319.938, 2320.562-2320.688, 2321.125-2321.188, 2324.750-2324.938, 2326.188-2326.250, 2326.688-2327.062, 2328.562-2328.812, 2332.438-2332.500, 2334.000-2334.062, 2335.938-2336.000, 2339.312-2339.500, 2340.938-2341.000, 2342.625-2342.688, 2344.312-2344.375, 2354.312-2354.500, 2355.875-2356.000, 2357.188-2357.438, 2358.625-2358.750, 2362.750-2362.938
72	2323.250-2323.312, 2323.875-2324.188, 2324.875-2324.938, 2328.625-2328.812, 2334.000-2334.062, 2335.938-2336.062, 2340.938-2341.000, 2342.625-2342.688, 2346.625-2346.688, 2347.562-2347.625, 2349.938-2350.000, 2350.938-2351.125, 2352.125-2352.250
75	2307.188-2307.250, 2308.125-2308.188, 2308.312-2308.375, 2309.000-2309.062, 2309.625-2309.688, 2316.125-2316.188, 2317.500-2317.562, 2320.312-2320.375, 2321.125-2321.188, 2321.625-2321.688, 2321.938-2322.000, 2323.562-2323.625, 2323.875-2324.188, 2328.750-2328.812, 2329.000-2329.062, 2335.875-2336.062, 2336.312-2336.438, 2336.625-2336.688, 2337.688-2337.750, 2340.938-2341.000, 2342.250-2342.312, 2342.625-2342.688, 2344.188-2344.250, 2346.562-2346.688, 2347.562-2347.812, 2349.750-2350.062, 2350.875-2351.125
78	2306.000-2306.312, 2306.938-2307.188, 2307.812-2307.875, 2308.000-2308.125, 2308.750-2309.062, 2309.625-2309.688, 2310.562-2310.625, 2311.438-2311.500, 2311.688-2311.750, 2312.312-2312.375, 2312.562-2312.625, 2313.188-2313.250, 2313.438-2313.625, 2314.312-2314.438, 2316.062-2316.188, 2316.938-2317.000, 2317.500-2317.562, 2317.750-2317.875, 2318.625-2318.688, 2319.188-2319.312, 2320.000-2320.062, 2320.312-2320.375, 2320.875-2320.938, 2321.125-2321.188, 2321.688-2321.750, 2321.938-2322.000, 2322.500-2322.812, 2323.312-2323.562, 2323.938-2324.188, 2329.625-2329.875, 2330.250-2330.312, 2330.500-2330.562, 2331.125-2331.375, 2332.000-2332.062, 2332.812-2332.875, 2334.062-2334.125, 2335.750-2336.062, 2336.875-2336.938, 2337.125-2337.188, 2338.500-2338.625, 2339.625-2339.688, 2339.875-2339.938, 2340.938-2341.250, 2342.312-2342.438, 2342.688-2342.938, 2343.938-2344.188, 2344.875-2345.438, 2346.125-2346.625

Continued on next page

Table S.1 continued

Tangent Height (km)	Microwindows ( $\text{cm}^{-1}$ )
81	2306.000-2306.312, 2306.938-2307.188, 2307.875-2308.125, 2308.750-2309.000, 2309.625-2309.938, 2310.562-2310.812, 2311.438-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.062-2314.438, 2314.938-2315.250, 2315.875-2316.125, 2316.688-2317.000, 2317.500-2317.875, 2318.375-2318.688, 2319.188-2319.500, 2320.000-2320.375, 2320.875-2321.188, 2321.688-2322.000, 2322.500-2322.812, 2323.312-2323.562, 2330.250-2330.562, 2331.125-2331.375, 2331.750-2332.062, 2332.562-2332.875, 2333.188-2333.500, 2334.062-2334.375, 2334.625-2334.938, 2335.500-2335.812, 2336.000-2336.312, 2336.875-2337.188, 2337.438-2337.688, 2338.312-2338.625, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.000-2341.250, 2341.438-2341.688, 2342.312-2342.562, 2342.688-2342.938, 2343.938-2344.188, 2344.875-2345.125
84	2306.062-2306.312, 2306.938-2307.188, 2307.875-2308.062, 2308.750-2309.000, 2309.625-2309.938, 2310.562-2310.812, 2311.500-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.062-2314.438, 2314.938-2315.250, 2315.875-2316.125, 2316.688-2317.000, 2317.562-2317.812, 2318.438-2318.688, 2319.188-2319.500, 2320.000-2320.312, 2320.875-2321.188, 2321.688-2321.938, 2322.500-2322.750, 2323.312-2323.562, 2330.250-2330.562, 2331.125-2331.312, 2331.750-2332.000, 2332.562-2332.812, 2333.188-2333.500, 2334.062-2334.250, 2334.688-2334.875, 2335.500-2335.688, 2336.000-2336.312, 2336.938-2337.188, 2337.438-2337.688, 2338.312-2338.625, 2338.812-2339.000, 2339.625-2339.938, 2340.062-2340.375, 2341.000-2341.250, 2341.438-2341.688, 2342.312-2342.562, 2342.688-2342.938, 2343.938-2344.188
87	2306.000-2306.312, 2306.938-2307.188, 2307.875-2308.125, 2308.750-2309.000, 2309.688-2309.938, 2310.562-2310.812, 2311.438-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.062-2314.375, 2314.938-2315.250, 2315.875-2316.125, 2316.688-2317.000, 2317.500-2317.812, 2318.375-2318.688, 2319.188-2319.500, 2320.000-2320.312, 2320.875-2321.188, 2321.688-2322.000, 2322.500-2322.812, 2323.312-2323.562, 2330.250-2330.562, 2331.125-2331.375, 2331.750-2332.062, 2332.562-2332.875, 2333.188-2333.500, 2334.062-2334.375, 2334.625-2334.938, 2335.500-2335.812, 2336.000-2336.312, 2336.875-2337.188, 2337.438-2337.688, 2338.312-2338.625, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.000-2341.250, 2341.438-2341.688, 2342.312-2342.562, 2342.688-2342.938, 2343.938-2344.188
90	2306.000-2306.312, 2306.938-2307.188, 2307.875-2308.125, 2308.750-2309.000, 2309.688-2309.938, 2310.562-2310.812, 2311.438-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.062-2314.375, 2314.938-2315.250, 2315.875-2316.125, 2316.688-2317.000, 2317.500-2317.812, 2318.375-2318.688, 2319.188-2319.500, 2320.000-2320.312, 2320.875-2321.188, 2321.688-2322.000, 2322.500-2322.812, 2323.312-2323.562, 2330.250-2330.562, 2331.125-2331.375, 2331.750-2332.062, 2332.562-2332.875, 2333.188-2333.500, 2334.062-2334.375, 2334.625-2334.938, 2335.500-2335.812, 2336.000-2336.312, 2336.875-2337.188, 2337.438-2337.688, 2338.312-2338.625, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.000-2341.250, 2341.438-2341.688, 2342.312-2342.562, 2342.688-2342.938, 2343.938-2344.188
93	2306.000-2306.312, 2306.938-2307.188, 2307.875-2308.125, 2308.750-2309.000, 2309.688-2309.938, 2310.562-2310.812, 2311.438-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.125-2314.375, 2314.938-2315.250, 2315.875-2316.125, 2316.688-2317.000, 2317.500-2317.812, 2318.375-2318.688, 2319.250-2319.500, 2320.000-2320.312, 2320.875-2321.125, 2321.688-2322.000, 2322.500-2322.812, 2323.312-2323.562, 2330.250-2330.500, 2331.125-2331.375, 2331.750-2332.062, 2332.562-2332.875, 2333.188-2333.500, 2334.125-2334.375, 2334.625-2334.938, 2335.500-2335.812, 2336.062-2336.312, 2336.875-2337.188, 2337.438-2337.625, 2338.312-2338.562, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.062-2341.312, 2341.438-2341.688, 2342.312-2342.562, 2342.688-2342.938, 2343.938-2344.188
96	2306.000-2306.312, 2306.938-2307.188, 2307.875-2308.125, 2308.750-2309.000, 2309.688-2309.938, 2310.562-2310.812, 2311.438-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.125-2314.375, 2314.938-2315.312, 2315.875-2316.125, 2316.688-2317.000, 2317.500-2317.812, 2318.375-2318.688, 2319.250-2319.500, 2320.000-2320.312, 2320.875-2321.062, 2321.688-2322.000, 2322.562-2322.812, 2323.312-2323.562, 2330.250-2330.500, 2331.750-2332.062, 2332.562-2332.875, 2333.188-2333.500, 2334.125-2334.375, 2334.625-2334.938, 2335.500-2335.812, 2336.062-2336.312, 2336.875-2337.188, 2337.438-2337.625, 2338.312-2338.562, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.062-2341.312, 2341.438-2341.688, 2342.312-2342.562, 2342.688-2342.938, 2343.938-2344.188, 2346.125-2346.375

Continued on next page

Table S.1 continued

Tangent Height (km)	Microwindows ( $\text{cm}^{-1}$ )
99	2306.000-2306.312, 2306.938-2307.188, 2307.875-2308.125, 2308.750-2309.000, 2309.688-2309.938, 2310.562-2310.812, 2311.438-2311.750, 2312.312-2312.625, 2313.188-2313.562, 2314.125-2314.375, 2314.938-2315.312, 2315.875-2316.125, 2316.688-2317.000, 2317.500-2317.812, 2318.375-2318.688, 2319.250-2319.500, 2320.000-2320.312, 2320.875-2321.062, 2321.688-2322.000, 2323.250-2323.562, 2324.125-2324.375, 2330.250-2330.438, 2331.750-2332.062, 2332.562-2332.875, 2333.250-2333.500, 2334.125-2334.375, 2334.625-2334.938, 2335.500-2335.812, 2336.062-2336.312, 2336.875-2337.188, 2337.438-2337.625, 2338.312-2338.562, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.062-2341.312, 2341.438-2341.688, 2342.312-2342.938, 2343.938-2344.250, 2346.125-2346.375, 2347.500-2347.750
102	2306.000-2306.312, 2307.000-2307.188, 2307.875-2308.125, 2308.875-2309.188, 2309.688-2309.938, 2310.562-2310.812, 2310.938-2311.188, 2311.500-2311.750, 2312.375-2312.625, 2313.062-2313.562, 2314.125-2314.375, 2315.000-2315.375, 2315.875-2316.125, 2316.688-2317.312, 2317.562-2317.812, 2318.375-2318.688, 2319.250-2319.500, 2320.062-2320.312, 2320.875-2321.250, 2321.688-2321.938, 2323.250-2323.562, 2324.125-2324.438, 2325.000-2325.188, 2326.688-2327.000, 2330.312-2330.500, 2331.750-2332.062, 2332.562-2332.875, 2333.250-2333.500, 2334.125-2334.375, 2334.625-2334.938, 2335.500-2335.750, 2336.062-2336.312, 2336.938-2337.188, 2337.438-2337.625, 2338.312-2338.562, 2338.812-2339.062, 2339.625-2339.938, 2340.062-2340.375, 2341.062-2341.312, 2341.438-2341.688, 2342.312-2342.938, 2343.625-2344.250, 2346.125-2346.375, 2347.438-2347.750, 2349.750-2350.062, 2352.812-2353.062
107	2306.812-2307.062, 2308.875-2309.188, 2310.938-2311.250, 2313.062-2313.312, 2315.000-2315.375, 2317.000-2317.312, 2319.000-2319.312, 2321.000-2321.312, 2322.938-2323.188, 2324.812-2325.125, 2326.688-2327.000, 2328.562-2328.875, 2330.438-2330.688, 2332.250-2332.500, 2334.000-2334.312, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.250, 2342.562-2342.875, 2344.250-2344.500, 2345.875-2346.125, 2347.438-2347.750, 2349.750-2350.062, 2351.312-2351.625, 2352.812-2353.125, 2354.312-2354.562, 2355.750-2356.000, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2362.688-2362.875, 2365.250-2365.500, 2367.750-2368.000, 2370.188-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.750, 2374.625-2374.875, 2375.688-2375.938, 2376.750-2376.938
112	2306.812-2307.062, 2308.875-2309.188, 2310.938-2311.250, 2313.062-2313.312, 2315.000-2315.375, 2317.000-2317.312, 2319.000-2319.312, 2321.000-2321.312, 2322.938-2323.188, 2324.812-2325.125, 2326.750-2327.000, 2328.562-2328.875, 2330.375-2330.688, 2332.250-2332.500, 2334.062-2334.312, 2335.750-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.250, 2342.562-2342.875, 2344.188-2344.500, 2345.875-2346.125, 2347.438-2347.750, 2349.750-2350.062, 2351.312-2351.625, 2352.812-2353.125, 2354.250-2354.625, 2355.750-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2359.938-2360.250, 2361.312-2361.625, 2362.688-2362.938, 2364.000-2364.250, 2365.250-2365.500, 2366.562-2366.750, 2367.750-2368.000, 2368.938-2369.188, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938
117	2311.000-2311.250, 2313.062-2313.312, 2315.062-2315.312, 2317.062-2317.312, 2319.000-2319.312, 2321.000-2321.312, 2322.938-2323.188, 2324.875-2325.125, 2326.750-2327.000, 2328.562-2328.875, 2330.375-2330.688, 2332.250-2332.562, 2334.062-2334.312, 2335.750-2336.062, 2337.500-2337.812, 2339.188-2339.500, 2340.938-2341.250, 2342.562-2342.875, 2344.188-2344.500, 2345.875-2346.125, 2347.438-2347.750, 2351.312-2351.625, 2352.812-2353.125, 2354.250-2354.625, 2355.750-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.750-2368.062, 2368.938-2369.188, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938

Continued on next page

Table S.1 continued

Tangent Height (km)	Microwindows ( $\text{cm}^{-1}$ )
122	2313.062-2313.312, 2315.062-2315.312, 2317.062-2317.312, 2319.000-2319.312, 2321.000-2321.250, 2322.938-2323.188, 2324.875-2325.125, 2326.750-2327.000, 2328.562-2328.875, 2330.375-2330.688, 2332.250-2332.500, 2334.062-2334.312, 2335.812-2336.062, 2337.500-2337.750, 2339.250-2339.500, 2340.938-2341.250, 2342.562-2342.875, 2344.250-2344.500, 2345.875-2346.125, 2352.812-2353.125, 2354.312-2354.562, 2355.750-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.750-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938
127	2311.000-2311.188, 2313.062-2313.312, 2315.062-2315.312, 2317.062-2317.312, 2319.000-2319.312, 2321.062-2321.250, 2322.938-2323.188, 2324.875-2325.125, 2326.750-2327.000, 2328.562-2328.812, 2330.375-2330.688, 2332.250-2332.500, 2334.062-2334.312, 2335.812-2336.062, 2337.500-2337.750, 2339.250-2339.500, 2340.938-2341.250, 2342.562-2342.875, 2344.250-2344.500, 2352.812-2353.062, 2354.312-2354.562, 2355.750-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.750-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938
132	2311.000-2311.188, 2313.062-2313.312, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.312, 2322.938-2323.125, 2324.875-2325.062, 2326.688-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.750, 2339.188-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2352.812-2353.062, 2354.312-2354.562, 2355.750-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.750-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938
137	2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.750-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938
142	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938
147	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938

Continued on next page

Table S.1 continued

Tangent Height (km)	Microwindows ( $\text{cm}^{-1}$ )
152	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938
157	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938
162	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938
167	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938
172	2306.938-2307.000, 2308.938-2309.125, 2311.000-2311.125, 2313.000-2313.250, 2315.062-2315.250, 2317.062-2317.250, 2319.000-2319.250, 2321.062-2321.250, 2323.000-2323.125, 2324.875-2325.062, 2326.750-2327.000, 2328.562-2328.812, 2330.438-2330.625, 2332.250-2332.438, 2334.000-2334.250, 2335.812-2336.062, 2337.500-2337.812, 2339.250-2339.500, 2340.938-2341.188, 2342.562-2342.875, 2344.250-2344.500, 2354.312-2354.562, 2355.812-2356.062, 2357.188-2357.438, 2358.625-2358.875, 2360.000-2360.250, 2361.312-2361.562, 2362.688-2362.938, 2363.938-2364.250, 2365.250-2365.500, 2366.500-2366.750, 2367.688-2368.062, 2368.938-2369.250, 2370.125-2370.375, 2371.312-2371.562, 2372.438-2372.688, 2373.562-2373.812, 2374.625-2374.875, 2375.688-2375.938, 2376.688-2376.938, 2377.750-2377.938