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TOTAL OZONE DERIVED FROM UV SPECTROPHOTOMETER MEASUREMENTS ON THE NASA CV-990 AIRCRAFT FOR THE FALL 1976 LATITUDE SURVEY FLIGHTS

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16 Abstract
An ultraviolet interference filter spectrophotometer (UVS) fabricated for aircraft use on the DOT CIAP was modified to use a photodiode and was flown on the NASA Latitude Survey flights in the fall of 1976 Precise calibration of the UVS results in an estimated ±3 percent absolute accuracy in the calculated columnar ozone values derived from the UV flux measurements. Comparison with Dobson station total ozone values shows agreement between UVS and Dobson total ozone of ±2 percent. The procedure used to convert UVS measured ozone above the aircraft altitude to total ozone above ground level may introduce an additional 2 percent deviation for very high altitude UVS ozone data Under stable aircraft operating conditions, the UVS derived ozone values have a variability, or reproducibility, of better than ±1 percent. The UVS data from the Latitude Survey flights yield a detailed latitude profile of total ozone over the Pacific Ocean during November 1976. Significant latitudinal structure in total ozone is found at the middle latitudes (30^{0} to 40^{0} N and S). Use of the UVS on future flights is discussed, as well as its use to cross calibrate Dobson and filter ozonometer stations and to provide ground truth for satellite ozone data

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FOREWORD

The ultraviolet spectrophotometer (UVS) was originally fabricated for the DOT Climatic Impact Assessment Program, for which the Project Manager was Mr. A. J. Grobecker. The Deputy Project Manager was Mr. Samuel C. Coroniti, whose guidance contributed significantly to the overall success of our work on that program, as summarized in the FINAL CIAP REPORT, PANA-UVS-7 (December 1975).

The UVS was first flown in the NASA CV-990 in the fall of 1975, the project was supported by the NASA Lewis Research Center through the Office of Naval Research. Technical guidance was provided by Mr. Porter J. Perkins of the Lewis Research Center, Mr. Louis C. Haughney was the Mission Manager for these Global Atmospheric Sampling Program (GASP) flights, and the in-flight experimenter was Mr. Daniel C. Briehl.

The fall 1976 use of the UVS for the NASA Latitude Survey flights was supported by the Lewis Research Center and carried out under the direction of Mr. Daniel C. Briehl.

All the UVS data (ozone values and fluxes) presented here have been archived on a magnetic tape at the Lewis Research Center. The tape contains all data to 75° solar zenith angles and for altitudes above 5000 feet. These data are more extensive than those tabulated in this report, which cut off at the 65° solar zenith angle and below 10 000 feet. Copies of this tape may be obtained from Mr. Daniel C. Briehl at the Lewis Research Center.

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I. INTRODUCTION

The UVS was developed by Panametrics, Inc. for the CIAP program (Ref. 1.1), during which an extensive upper atmosphere monitoring system was installed (Ref. 1.2) on the high altitude WB57F. The UVS was flown successfully on more than 80 missions during the course of about three years of measurements. The structure of UV flux vs latitude and longitude was measured in much greater detail than had ever been possible before, and by use of the data (in the Hartley-Huggins bands) computer-based mathematical techniques were developed for deduction of the total ozone above the aircraft. As a result of this experience we became convinced (Ref. 1.3) that such a UV spectrophotometer (UVS) would make a useful addition to both the 747 and CV-990 instrument packages as part of the NASA Global Air Sampling Program (GASP).

As a consequence of the foregoing, a preliminary operational test of the UVS on the CV-990 was carried out (Ref. 1.4) with very satisfactory results. Several desirable changes in the instrument design became obvious as a result of this test, including replacement of the photomultiplier by a UV photodiode. Thus, a follow-on effort took place in which (1) the modifications were made, (2) a much more extensive series of CV-990 tests occurred (Oct-Nov 1976), and (3) computer-based data reduction procedures were developed. The operational tests have been completely successful, and we believe that a similar UVS package could, in fact, be designed for long-term operation on the CV-990, 747 or other high altitude aircraft.

The desirability of replacing the photomultiplier with the photodiode, when long-term application is the objective, was discussed in Ref. 1.4. Basically, the photodiode is inherently more stable and less temperature sensitive. The photosensitivity, however, is much less. This has made it necessary to install a lens and larger area collimators than were used with the photomultiplier. All modification, installation and flight work was completed successfully, and is discussed in Section 2.

In Section 3 the calibration effort is discussed. Use of the larger area collimators and the lenses causes the light rays to pass through the filters at much larger angular deviation from the normal than was the case with the photomultiplier. The addition of the quartz lens increased the angular deviation sufficiently to cause about a 1% downward shift in the effective filter wavelengths. As discussed in Section 3, it was found during the program development that the ozone overburden calculation was strongly affected. This is because it is necessary to calculate the ozone absorption coefficient at a specific wavelength, and an uncertainty even as small as 1% in that wavelength can lead to large errors in the ozone overburden calculation. A procedure was developed which allows the effective wavelength shift to be measured to better than 0.1%, which results in an error in the calculated total ozone of less than a few percent.

Information about the UVS flights is given in Section 4. Most of the data were obtained on the 15 Latitude Survey Flights in the fall of 1976. Magnetic tape data from the GASP flights in the fall of 1975 were also analyzed.

Flight results are presented in Section 5. The analysis procedure is briefly outlined there, with only changes from the more detailed discussion in Refs. 1.5 and 1.6 being described fully. Tabular listing of the 1976 and 1975 results are presented, and a comparison with Dobson station measurements is made. It is found that for the Dobson data presently available, the average agreement is better than a few percent. Some plots of the ozone data are presented for flights where interesting structure shows up. Conclusions and Recommendations are given in Section 6.

2. PHOTODIODE VERSION OF THE UV SPECTROPHOTOMETER USED FOR THE FALL 1976 FLIGHTS

The basic structure of the UVS has been described earlier in Refs. 1.1, 1.5 and 1.6, with the modifications necessary for flight in the CV-990 being described in Ref. 1.4. For the fall 1976 flights, the major modification involved replacement of the photomultiplier with a photodiode to reduce the instrument's internal power dissipation and to obtain a less temperature-sensitive signal. The UVS incorporating the photodiode was successfully flown aboard Galileo II on June 28 and June 30, 1976. Results from those test flights were summarized in a letter report (Ref. 2.1) and proved the suitability of that design concept for application on the CV-990. It further showed the desirability of improving the response characteristic of the system including that of the electronics. These modifications are detailed below.

The optics of the UVS has been modified by introducing a biconvex lens between the diffuser and the filter wheel. Additionally, the collimators over the bandpass filters have been replaced with larger area ones. Both measures serve to increase the light intensity incident on the photodiode. A diagram of the so modified optical system of the UVS is shown in Fig. 2.1. To improve the acceptance angle of the instrument when installed in the aircraft, a new mounting arrangement was designed and constructed permitting flush mounting. The UVS is mounted on a 1/2 in. aluminum plate (A16061-T6) such that the collimator projects through and 1/4 in. above that plate. A gasket is provided between the instrument and the plate. The latter is substituted for the quartz window in the second zenith port. The acceptance half angle in this configuration is 75° from the vertical.

The self-calibrating feature of the system is accomplished with a LED light source which is activated during a time period equivalent to one filter position interval. To match the lower sensitivity of the photodiode the light

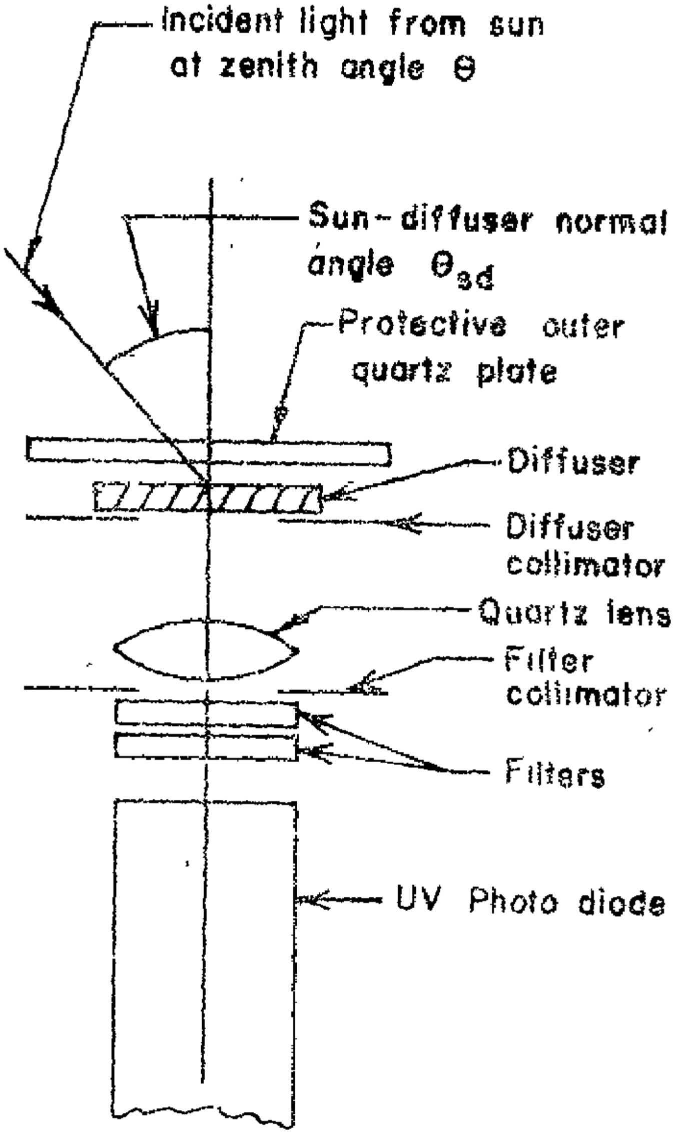


Fig. 2.1 Optical System Outline for the UVS Photodiode Version.

source had to be replaced with an LED of higher intensity in the red spectrum. The originally fixed calibration period of 1 sec. has been modified to assure automatically the same value as the sampling interval of the filters. This interval is selectable as 1 sec. or 10 sec.

In order for the existing logarithmic electrometer to process the low photodiode currents (dark current $\approx 3 \times 10^{-12}$A) it was necessary to introduce further amplification. This has been accomplished with a linear current-to-voltage preamplifier with a conversion gain of 1 mV per 1×10^{-12}A. Since the log electrometer is a current input device, it had to be converted for voltage input signals by addition of a resistor. Results of temperature tests with the preamplifier/electrometer combination are discussed below. During these tests it was necessary to measure the interval temperature from -15°C to +70°C. Therefore, the temperature monitoring circuit has been redesigned to encompass that range.

The preamplifier/electrometer configuration as flown during the latitude survey mission was tested over a temperature range of 0°C to +30°C to verify proper operation of the amplifier during flight. Actual internal system temperature varied between 15°C and 17°C on all 14 missions. The tests showed that below about 10°C and above 25°C considerable errors are introduced - mainly due to the electrometer input offset voltage - which is temperature dependent. If it is remembered that the electrometer has been converted to measure voltage, it becomes clear that an offset of only 100μV (typical TC of offset is 25μV/°C, max. 60μV/°C) results in a 10% error at an equivalent input current of 1×10^{-12}A. This error reduces to 1% at 1×10^{-11}A and becomes inconsequential at higher currents. Since the instrument calibration is made at light levels equivalent to photodiode currents above 10^{-11}A, errors at the above stated flight temperatures are negligible. Nevertheless, it was obvious that an increased temperature range of -15°C to +70°C, as tentatively specified for the Boeing 747 operation, would pose a problem. Therefore a new electrometer which does not require a preamplifier has been designed and a breadboard constructed. It employs low leakage MOS-FET transistors for the logarithmic feedback element and the reference source. This design measures the photodiode current directly without conversion to a voltage, and therefore the amplifier offset voltage has a negligible temperature effect. The main deviation (from exact logarithmic response) at low currents is contributed by the temperature dependent input bias current and the leakage current of the logarithmic element. Both currents double for every +10°C. At higher currents, gain effects are the main contributor. A temperature test was conducted over the range -15°C to 70°C. From the 25°C reference temperature the input reference deviation increases exponentially with temperature. It is 7% at +60°C and 2% at 0°C for the input currents to be measured. Since the deviation is symmetrical about the reference point and increases monotonically, it may be extrapolated to yield a maximum deviation of 9%

at the temperature extremes of -15°C and 65°C. The latter represents the recommended upper limit for the photodiode. It should be noted that under actual flight conditions the internal temperature of the UVS will not change more than 5°C due to its temperature control. It is only during ground check-out that the 65°C limit could be reached. Therefore, we can expect amplifier induced deviation to be <1% under flight conditions; since the internal temperature of the housing is measured, even this small deviation can be taken into account.

The relatively low operating altitude of the CV-990 ($\lesssim$40 kft) made it unlikely that useful UV fluxes would be measured by the 214 and 287 nm filter sets, so they were replaced by 374.1 and 312.8 nm wide-band filters to test the possibility of obtaining total ozone measurements with just two wide-band filters. In addition, the 297.8 nm filter set, which had deteriorated significantly, was replaced with a new set at 294.5 nm. More details about the filter sets used are given in Section 3 (Calibration).

The modified system including test console and a 2 channel strip chart recorder was installed in the CV-990 at Ames Research Center, California, on October 18 and October 19, 1976. At this time the system was integrated with the on-board data recording system and tested on the ground. Two outputs, UV signal and multiplexer, were connected to the digital recorder, as well as to the strip chart recorder. No difficulties were encountered and the system performed within specifications. On October 26, 1976 a Panametrics engineer verified system operation on a NASA conducted check-out flight. All systems parameters tested out as expected. NASA personnel were instructed about the operation of the instrument for the subsequent latitude survey mission starting October 28 and ending November 18, 1976. During this time a total of 14 flights were conducted with the UVS operating properly for each flight.

3. CALIBRATION

3.1 Response Calculation

The response of the UVS was calculated as described in Ref. 1.1, 1.5 and 1.6, with the photodiode detection efficiency used in place of that for the photomultiplier. A number of additional changes and improvements have also been made in the calculations. The solar response calculations were originally set up to use the 5 nm averaged spectrum recommended by Thekaekara (Ref. 3.1). Recently, a more resolved solar spectrum has been given by DeLuisi (Ref. 3.2), and this spectrum, averaged over 1 nm intervals, has been used for the present calculations.

The original calculations used the room temperature ozone absorption coefficient measurements of Inn and Tanaka (Ref. 3.3). Since most of the atmospheric ozone is in the stratosphere at temperatures near -50°C, these measurements have been converted to a temperature of -51.5°C using the data of Vigroux (Ref. 3.4). Measurements by Griggs (Ref. 3.5) indicate that the absorption coefficient measurements of Inn and Tanaka (Ref. 3.3) are the most accurate at room temperature.

The transmission curves of all filter sets was also remeasured, and the new values used in the calculations. Most filters showed negligible changes from the original values measured four years earlier, but a few showed moderate changes in the peak transmission and blocking transmission, while one set (297.8 nm) showed significant deterioration and was replaced.

A final correction is made by shifting the wavelengths of all filter transmission curves to correct for the effect of the quartz lens. This effect, and the precise measurement of the shift factor, is discussed more fully in Section 3.3.

The response for each filter set is calculated for both the solar spectrum and the calibration (Standard of Spectral Irradiance - SSI) spectrum. The ratio is then used to correct the measured calibration response to an equivalent solar response. The solar response is also calculated with attenuation by several values of total ozone thickness, to enable an effective ozone absorption coefficient to be calculated for each filter set. These effective absorption coefficients are used to calculate total ozone as described more fully in Section 5.

3.2 Calibration

The UV Spectrophotometer (UVS) is calibrated with a Standard of Spectral Irradiance (SSI) before and after each series of flights. The SSI is a 200 W tungsten halogen lamp with a quartz envelope, and its calibration is traceable to the National Bureau of Standards. Since the unattenuated solar spectrum differs slightly in shape from the SSI spectrum, a small correction is made to the SSI calibration to provide a calibration for the solar spectrum. More details about the calibration procedure are given in Refs. 1.1, 1.5 and 1.6. In general, it has been found that the calibration shifts only a few percent over several months, so the SSI accuracy of several percent is not compromised.

The calibration data for the fall 1976 flights are given in Table 3.1. Listed are the average wavelength for detected light for unattenuated sunlight, with all corrections described in Section 3.1 included, the bandpass for each filter (full width at half of peak transmission), and the measured calibration sensitivity converted to the unattenuated solar spectrum.

Table 3.1

UVS Calibration for Latitude Survey Flights in the Fall, 1976

Filter position no.	Average wavelength $\overline{\lambda}$ (nm)	Bandpass (nm)	Solar spectral sensitivity at $\overline{\lambda}$ (A/(W/(cm^2-nm)))
1	374.1	10	2.700×10^{-3}
2	312.8	14	1.203×10^{-2}
3	289.2	2.5	1.845×10^{-2}
4	294.5	2.1	2.248×10^{-2}
5	303.9	3.0	6.301×10^{-2}
6	308.4	2.9	1.691×10^{-2}
7	318.8	3.4	1.716×10^{-2}
8	326.1	2.5	1.644×10^{-2}
9	365.5	28	4.699×10^{-3}
10	395.6	26	6.067×10^{-3}

3.3 Measurement of Effective Wavelengths

A brief survey of the UVS strip chart data from the fall 1976 flights showed that all monitor voltages were within the proper operating range, and the solar flux outputs appeared reasonable. Preliminary calculation of the ozone thickness using the effective absorption coefficients calculated from the original filter transmission measurements gave inconsistent results, however. The ozone thicknesses were far greater than any measured before with the UVS, and each filter set gave a different value. After remeasuring the temperature stability of the UVS calibration, the diffuser angular response, and the filter set transmissions, it was finally concluded that the quartz lens used before the filters, in combination with the large collimator apertures, was increasing the average angle of incidence of the light on the filters sufficiently to shift the effective bandpass by about 1% toward shorter wavelengths. The above conclusion was confirmed by measuring the attenuation of the Standard of Spectral Irradiance (SSI) calibration by a piece of 0-53 Corning Glass. The transmission curve of this glass was measured, and this allowed the measured calibration attenuation for each filter set to be converted into an effective wavelength shift. The average for all narrow bandpass filters was measured to be $\lambda_{eff} \approx \lambda_o \times 0.990$, where λ_{eff} is the effective bandpass wavelength and λ_o is the measured bandpass wavelength for normally incident light.

The effective bandpass wavelength at an average angle of incidence of $\overline{\theta}$ to the filter normal can be written as

$$\lambda_{eff} = \lambda_o (1 - \sin^2 \overline{\theta}/2.1)^{1/2} \qquad (3.1)$$

For the UVS with the photomultiplier $\overline{\theta} \lesssim 2^\circ$, and λ_{eff} differs from λ_o by about 0.03%, which is negligible. Only for $\overline{\theta} = 12^\circ$ does $\lambda_{eff} = 0.990 \ \lambda_o$. Rough calculations for the UVS with the photodiode indicated that λ_{eff} should not deviate importantly from λ_o, and approximate ozone calculations from the June 28-30, 1976 UVS test flights gave reasonable values (Ref. 2.1). However, addition of the quartz lens for the Oct.-Nov. 1976 UVS flights, while increasing the narrow bandpass filter signals a factor of two, also made $\overline{\theta}$ large enough so that the shift in λ_{eff} became important. Measurement of the λ_{eff} shift, as described above, allows recalculation of the effective ozone absorption coefficients, and thus calculation of better values for the ozone thicknesses.

The above procedure for measuring λ_{eff} has an additional advantage, in terms of long term system applications, which should be noted here.

By including this measurement of the SSI calibration attenuation by 0-53 Corning Glass it becomes feasible to check for shifts in the bandpass wavelengths during routine maintenance and recalibration of the UVS. This is a much simpler procedure than remeasuring filter transmissions, and would be an important check on stability for an operational set of UVS instruments.

The wavelength shift factor has been measured to be 0.990 ± 0.001. This corresponds to ±3% in the measured total ozone. For the arrangement without the quartz lens the shift factor was measured to be 0.999 ± 0.001, in agreement with findings from the June 1976 UVS test flights that no significant shift is present without the quartz lens.

4. FLIGHT INFORMATION

4.1 Latitude Survey Flights - Fall 1976

A complete list of all Latitude Survey flights for the fall of 1976 is given in Table 4.1. All were made by the Galileo II CV-990 aircraft. The date(s), GMT range, and approximate latitude-longitude range covered are all listed. Flight 1 was for checkout and the UVS was attended by Panametrics personnel. For all others the UVS was operated by NASA personnel. The UVS operated properly on all flights, although the amount of data for some is small because of large solar zenith angles during most of the flight.

4.2 GASP/JPL Flights - Fall 1975

Table 4.2 gives a complete listing of all GASP flights of Galileo II, including those conducted for the Jet Propulsion Laboratory (JPL) for the period November 25 to December 16, 1975. Columns 1-3 give the flight number, description and date of this flight series, respectively, while Column 4 indicates the range of latitude and longitude for each mission. The UV Spectrophotometer was on-board and operational for the entire flight series. The instrument was attended by Panametrics personnel during flight Nos. 2, 3 and 4. During all other missions, including the test flight on November 25, 1975, personnel from NASA-Lewis Research Center operated the instrument successfully.

The local test flight (No. 1) was intended as an operational check of all instrumentation aboard the aircraft and the UVS was only turned on for 2 short periods of time. Its operation proved to be satisfactory, and the instrument was deemed flightworthy. The flight west to east (No. 2) was a chase flight in the wake of a United Airlines 747 from Moffet Field, California to Patrick Air Force Base (PAFB), Florida. Number 3 was a step profile flight over Wallops Island, and was coordinated with the launch of a balloon borne ozone sonde from that island. Although flights 4 through

Table 4.1

Summary of Latitude Survey Flights for the Fall of 1976

Flt. No.	Date (1976) (Mo-day)	Approx. GMT range (hrs-min)	Approximate location range (lat., long.) (deg N, deg E)
1	Oct. 26-27	1940-0140	(37, -122) - (40, -105)
2	Oct. 28-29	2130-0205	(38, -122) - (65, -148)
3	Oct. 29-30	1905-0055	(65, -148) - (75, -142) - (65, -148)
4	Oct. 30	1640-2240	(65, -148) - (21, -157)
5	Nov. 1	1530-2010	(21, -158) - (14, -157) - (21, -158)
6	Nov. 3	1950-2310	(21, -158) - (10, -161) - (21, -158)
7	Nov. 7-8	2040-0115	(21, -158) - (-11, -169)
8	Nov. 8-9	2110-0555	(-14, -171) - (-38, 145)
9	Nov. 10-11	1815-0010	(-36, 141) - (-43, 147)
10	Nov. 11	1935-2245	(-38, 145) - (-34, 142) - (-38, 145)
11	Nov. 12-13	2310-0405	(-38, 145) - (-55, 159) - (-43, 173)
12	Nov. 14	0245-0810	(-43, 173) - (-62, 171) - (-43, 173)
13	Nov. 16	0045-0600	(-43, 173) - (-14, -170)
14	Nov. 17-18	2215-0410	(-14, -170) - (21, -158)
15	Nov. 18	1845-2315	(21, -158) - (37, -122)

Table 4.2

Summary of GASP/JPL Flights for the Fall of 1975

No.	Flight Description	Date (1975) Month-Day	Approximate location range (Lat., Long.) (deg. N, deg. W)
1	Local test	Nov. 25	(37, 122)
2	W to E Chase	Nov. 28	(37, 122) - (43, 83)
3	Wallops/Balloon	Dec. 2	(28, 80) - (39, 74)
4	JPL	Dec. 4	(28, 80) - (31, 77)
5	"	Dec. 6	(28, 80) - (30, 79)
6	"	Dec. 8	(28, 80) - (40, 78)
7	"	Dec. 10	(28, 80) - (30, 80)
8	"	Dec. 12	(28, 80) - (38, 77)
9	"	Dec. 14	(28, 80) - (31, 81)
10	"	Dec. 15	(28, 80) - (31, 82)
11	E to W Return	Dec. 16	(30, 82) - (37, 122)

10 were mainly conducted for JPL to test various radar equipment, the UVS was operational during those missions as well. The return trip from the east to the west coast concluded this series.

The major conclusions from the 1975 flights were presented in Ref. 1.4, with some of the results also presented in Ref. 4.1.

5. FLIGHT RESULTS

5.1 Data Reduction Procedure

5.1.1 Analysis Equations

The basic analysis equations are the same as given in Section 2 of Ref. 1.6, except that the method of calculating the leakage flux $B_\ell(\lambda)$ for the filter set of average wavelength λ has been modified. The modified method uses

$$B_\ell(\lambda) = B_k(\lambda) F_{tot\,m}(\theta, \lambda_b) \tag{5.1}$$

with

$$B_k(\lambda) = \frac{F_o(\lambda)}{F_o(\lambda_b)} \frac{B_o(\lambda)}{B_o(\lambda) + S_o(\lambda)} \tag{5.2}$$

The symbols have the same meaning as in Ref. 1.6, with $F_{tot\,m}(\theta, \lambda_b)$ being the measured downward flux for the filter λ_b used to find the leakage flux, $\lambda_b = 365.5$ nm for the filter set used with the photodiode UVS in the fall of 1976. $F_o(\lambda)$ and $F_o(\lambda_b)$ are the unattenuated solar fluxes at λ and λ_b. $B_o(\lambda)$ and $S_o(\lambda)$ are obtained from the theoretically calculated solar responses, $S_c(\lambda, t_{o3})$, for $t_{o3} = 0$, 0.3 and 0.6 atm-cm of ozone attenuation. The three calculated responses are fit by

$$S_c(\lambda, t_{o3}) = S_o(\lambda) e^{-\mu_{o3}(\lambda) t_{o3}} + B_o(\lambda) \tag{5.3}$$

with $\mu_{o3}(\lambda)$ also being determined from this fit. Essentially, $B_o(\lambda)$ is the leakage response, and $S_o(\lambda)$ the bandpass response, both for unattenuated sunlight (no Rayleigh scattering or ozone attenuation). The value for $\mu_{o3}(\lambda)$ derived in this way is used to calculate the total ozone thickness as described in Ref. 1.6.

The total ozone thickness is calculated in two ways. One value is obtained by referencing each narrow-band filter output to that of the 365.5 and 395.6 broad-band filters to obtain a $t_{o3}(\lambda)$, as described in Ref. 1.6.

A weight $w(\lambda)$ is also calculated and used to obtain an average $\overline{t}_{o3}$. A second value for the total ozone is calculated by using adjacent (in wavelength) narrow-band filters to obtain

$$t_{o3a}(\lambda_1) = \frac{-\cos\theta}{(\mu_{o3}(\lambda_1) - \mu_{o3}(\lambda_2))} \times \ell n \left\{ \frac{F_{tot\,m}(\theta, \lambda_1)}{F_{tot\,o}(\theta, \lambda_1)} \frac{F_{tot\,o}(\theta, \lambda_2)}{F_{tot\,m}(\theta, \lambda_2)} \right\} \tag{5.4}$$

A modified weighting function

$$w_a(\lambda_1) = w(\lambda_1) \frac{F_{tot\,m}(\lambda_2)}{F_{tot\,o}(\lambda_2)} \tag{5.5}$$

is used to calculate a second average $\overline{t}_{o3a}$. The final value for total ozone is taken as the average of $\overline{t}_{o3}$ and $\overline{t}_{o3a}$. These two values generally are equal to within a few percent, and the lack of this near equality can be used as a test for data inconsistency.

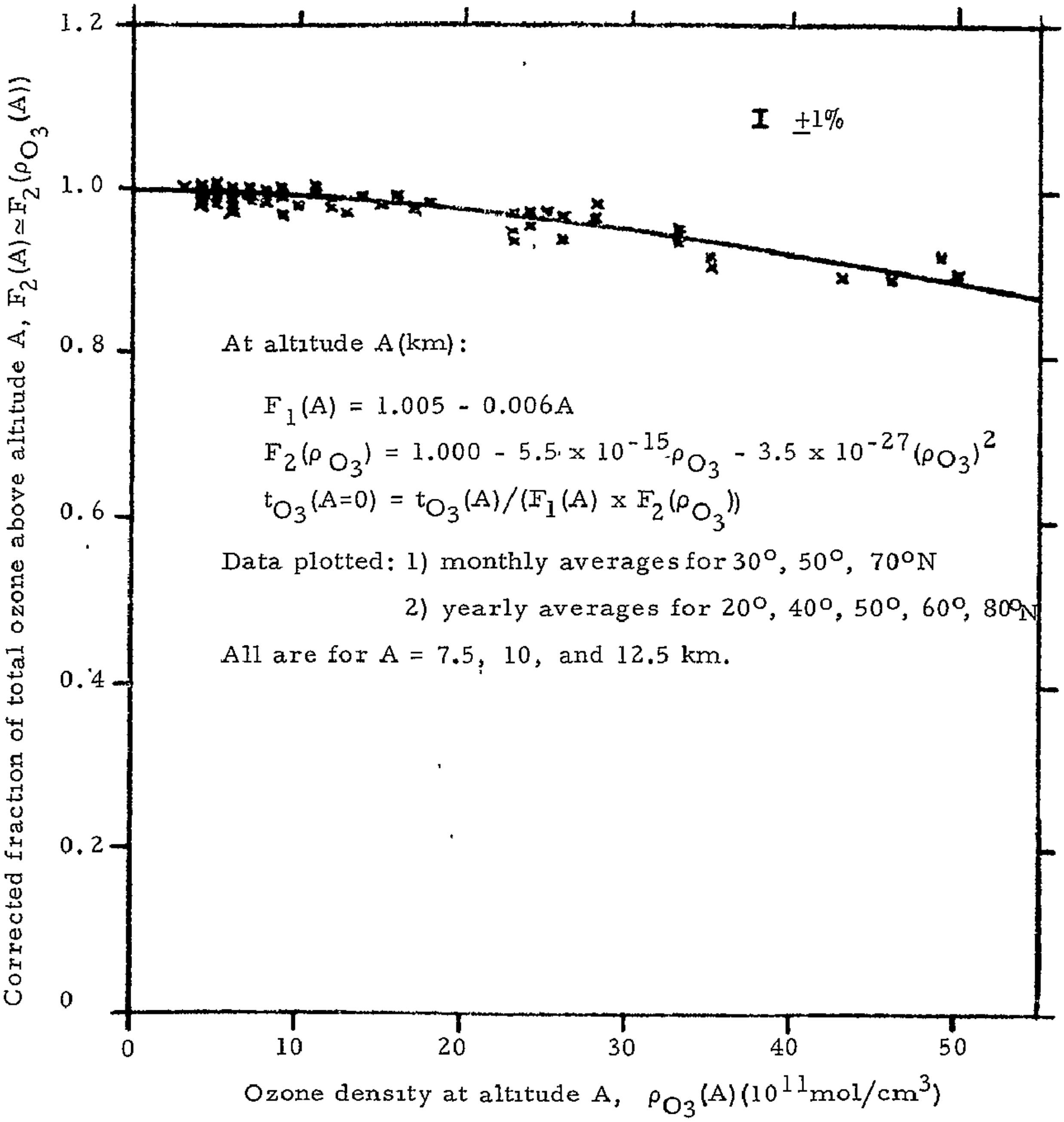
An additional calculation is made to correct the measured total ozone above the flight altitude to the total ozone above ground level. The method has been discussed in Ref. 5.1, and is based on the results of Ref. 5.2. If the aircraft is flying at altitude A(km), an approximate correction to obtain ground level (A=0) total ozone thickness can be made using the ozone density measurement at the aircraft altitude, $\rho_{O_3}(A)(\text{mol/cm}^3)$. This can be readily shown using the monthly and annual average vertical ozone profiles given in Ref. 5.2. A survey of the data suggests that total ozone above ground level can be derived as

$$t_{O_3}(A = 0) \simeq \frac{t_{O_3}(A)}{F_1(A) \times F_2(\rho_{O_3}(A))} \tag{5.6}$$

where

$$F_1(A) = 1.005 - 0.006\,A(\text{km}) \tag{5.7}$$

and $F_2(\rho_{O_3})$ is given by the solid curve in Fig. 5.1. The points in Fig. 5.1 are values of $F_2(\rho_{O_3}(A))$ calculated from the monthly and annual averages of Ref, 5.1. The residual ozone above 35 km was calculated using the 7 km pressure scale height from Ref. 5.3 and the 32.5 km ozone densities of Ref. 5.2, and it generally amounted to between 5 and 20%. The calculations were made for altitudes of 7.5, 10 and 12.5 km (24600, 32800, and 41000 ft), the approximate range of expected flight altitudes.



At altitude A(km):

$F_1(A) = 1.005 - 0.006A$

$F_2(\rho_{O_3}) = 1.000 - 5.5 \times 10^{-15} \rho_{O_3} - 3.5 \times 10^{-27} (\rho_{O_3})^2$

$t_{O_3}(A=0) = t_{O_3}(A)/(F_1(A) \times F_2(\rho_{O_3}))$

Data plotted: 1) monthly averages for 30°, 50°, 70°N

2) yearly averages for 20°, 40°, 50°, 60°, 80°N

All are for A = 7.5, 10, and 12.5 km.

Fig. 5.1 Graph Showing Accuracy of Approximate Method of Correcting Total Ozone Measurement for Partial Penetration of the Ozone Layer.

The curve in Fig. 5.1 can be fitted by

$$F_2(\rho_{O_3}) = 1.000 - 5.5 \times 10^{-15}\rho_{O_3} - 3.5 \times 10^{-27}(\rho_{O_3})^2 \qquad (5.8)$$

where ρ_{O_3} is in mol/cm^3. The results in Fig. 5.1 show that, on the average, it should be possible to calculate the total ozone above ground level to a few percent using only $t_{O_3}(A)$ and $\rho_{O_3}(A)$, although it is possible that inclusion of geographical effects could improve the calculation. The values of ρ_{O_3} used to calculate $F_2(\rho_{O_3})$ are obtained from the measured ozone concentrations and the static air temperature, which are available from the magnetic tape recorded data for the Latitude Survey flights. The conversion is

$$\rho_{O_3} = \frac{P \times (PPB) \times 2.652 \times 10^7}{1 + T/273.16} \text{mol/cm}^3 \qquad (5.9)$$

where P is the ambient pressure in mb, (PPB) the measured ozone concentration in parts per billion, and T the static air temperature in deg C. P is readily obtained from the pressure altitude.

All other analysis equations are as given in Ref. 1.6, and will not be repeated here. The above changes and additions are the only modifications in the data analysis procedure.

5.1.2 Computer Reduction Methods

The digital magnetic tape data of the UVS are computer processed in four major steps, using four main programs written in Fortran, and three subroutines (in MACRO for the DEC PDP-10 Computer used for the processing), which do the necessary tape data handling and bit processing. Each main program reads an input tape and writes an output tape for the next main program (except for the last), and writes line-printer output which duplicates the magnetic tape output for visual use. The general flow of the computer processing is shown in Fig. 5.2.

The raw data for the Latitude Survey Flights for the Fall of 1976 consist of about two dozen digital magnetic tapes. The data necessary to process the UVS output forms only a portion of the total data on these tapes. Thus the first stage of processing is by a main program NASARD. F4, which reads the NASA-supplied tapes, strips and decodes the needed data, and writes it onto an output tape. This reduces the amount of tape needed by nearly an order of magnitude.

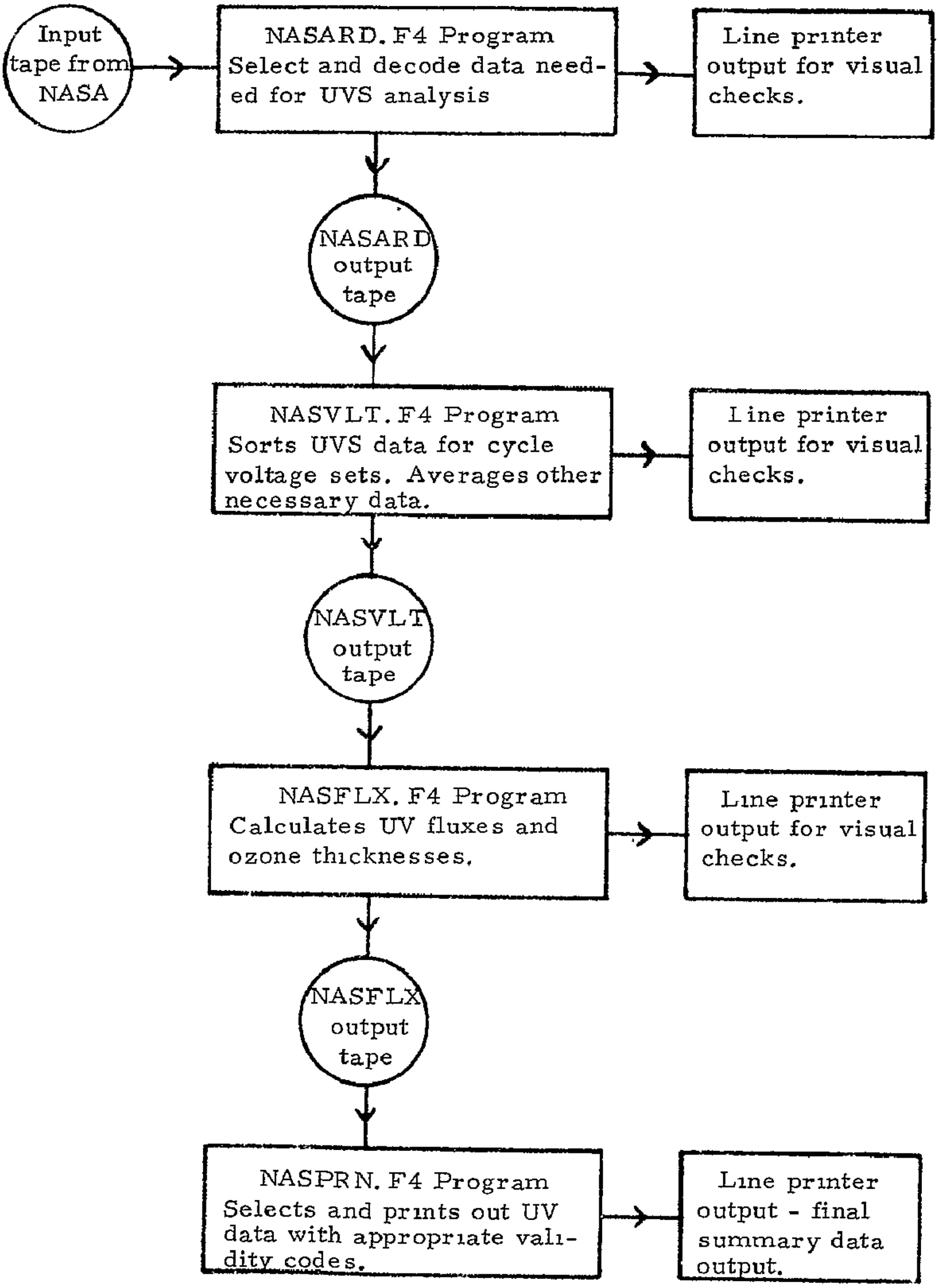


Fig. 5. 2. Outline of Work Flow in Computer Processing of UVS Magnetic Tape Data.

The line printer output from the NASARD. F4 program is used to select processing times for the next step, NASVLT.F4, and to obtain the necessary starting parameters. The second main program, NASVLT. F4, averages the digitized UVS voltages to obtain a set of 13 average voltages (dark, 10 filters, 2 cal levels) and their standard deviations for each complete UVS filter wheel cycle. The necessary auxiliary data (latitude, etc.) are also averaged for each complete UVS cycle, with standard deviations, maxima, and minima also calculated. All auxiliary data are tested for deviations from a running average to avoid including noise. The amount of output magnetic tape from NASVLT. F4 is about an order of magnitude reduction from the input tape amount.

The UV fluxes and ozone values are calculated by NASFLX. F4, which reads the NASVLT. F4 output tape. The fluxes, total ozone, and other data are output onto another magnetic tape. The output tape amount from NASFLX. F4 is about equal to the input tape amount.

The final summary print-outs are made by the fourth main program, NASPRN. F4. This program selects the desired time range of data, generates appropriate validity codes (see Sections 5.2 and 5.3), and prints out the results in summary form. These final summaries have been reduced for tabular inclusion in this report.

5.1.3 Modifications for the 1975 Flights

Processing of the magnetic tape data for the Fall 1975 GASP flights was identical to that just described for the 1976 Latitude Survey flights, except that the programs were modified for the differences in data format and analysis procedure. The NASARD. F4 program required only minor modifications because of slight format changes. NASVLT. F4 required some modification because the two calibration level steps were only 0.5 sec long each, rather than the 5 sec of the Fall 1976 data.

The major modification for NASFLX. F4 was for the UVS-photomultiplier combinations, and inclusion of the 59 degree cut-off for the solar zenith angle. This was accomplished by using a modified diffuser efficiency for direct sunlight for sun-detector normal angles greater than 58°. The modified diffuser efficiency is

$$R_1(\theta) = R(\theta) \left[0.001 + 0.999e^{-(\theta - 58)^2/4}\right] \qquad (5.10)$$

$$\theta \geq 58 \text{ deg}$$

where R(θ) is the non-cut-off calculated relative diffuser efficiency, and θ is in degrees. This function provides a suitable roll-off from direct and Rayleigh scattered light response to pure Rayleigh scattered light response.

The quartz window in the CV-990 is expected to reflect about 8% of the incident light, and this effect has not been included in the analysis of the UVS data. Thus the UVS measured fluxes should be systematically low by about 8% for the 1975 GASP/JPL flights. The ozone thicknesses should not be significantly affected because they are calculated from flux ratios.

The ozone thicknesses calculated for solar zenith angles greater than 60 deg have a greater uncertainty than for smaller angles. This is because the Rayleigh scattered light is not calculated as accurately as the direct sunlight component, and the ozone thicknesses are calculated from the ratios of measured and calculated fluxes (see Eq. (5.4)). For $\theta_{sun} > 60^{\circ}$ most of the detected light is Rayleigh scattered, with the exception of a small amount of direct sunlight scattered by dirt, scratches and imperfections of the quartz window (which is roughly included by the 0.001 term in the brackets in (5.10)), and so results in decreased accuracy.

The ozone thicknesses calculated from adjacent (in wavelength) filters are expected to be more accurate than those calculated from reference to the 371.3 and 401.9 nm filters. This is quite evident in the data, where for $\theta_{sun} < 59^{\circ}$ the two methods give nearly identical ozone thicknesses, but for $\theta_{sun} > 60^{\circ}$ the latter method gives thicknesses which appear to be about 20% too large. Thus the NASPRN.F4 program was modified for the 1975 GASP data to print out only the adjacent filter ozone results, calculated as described in Section 5.1.1. More discussion of these topics is given in Section 5.3 where the 1975 UVS ozone results are tabulated.

It must be emphasized that for this 1975 series of flights the instrument was being operated in a non-standard mode, viewing essentially only Rayleigh scattered light. The data processing modifications described in this section apply only for that mode of operation.

5.2 Latitude Survey Flights - Fall 1976

A total of 15 Latitude Survey flights was made with the UVS on the NASA CV-990 in the Fall of 1976. Flight 1 on Oct. 26-27, 1976 was a test flight with only minimal amounts of UVS data being acquired. Flight 3 on Oct. 29-30, 1976 was for twilight conditions with the sun within about 5° of the horizon, hence no useful UVS data were acquired. Flight 4 on Oct. 30, 1976 was a sunrise flight and so also gave no useful UVS data. Thus no magnetic tape data for the UVS were collected for this flight. All other flights gave at least some valid UVS data, and these are presented in the following pages.

Each ozone measurement takes one complete cycle of the UVS filter wheel, or about 2 minutes. For each complete UVS cycle the necessary location and orientation data (latitude, pitch, etc.) averages, standard deviations, maxima, and minima are also calculated. For the ozone density, used to correct the UVS measured ozone to total (above ground level) ozone, the average uses only data points with a signal voltage of less than 1.5 volts, to avoid calibration cycles. No additional filtering of the ozone density data has been carried out for the UVS data analysis, so some noise may still be present in some of the ozone densities listed. For such cases the listed total ozone will also be slightly in error, although a corrected value of the total ozone can be obtained by using the listed UVS measured ozone and the corrected ozone density to calculate a new total ozone by the method of Section 5.1.1. The ozone density voltages were converted to PPB by

$$PPB_{O_3} = (500V_{O_3} + 14) \times 1.12 \qquad (5.11)$$

where V_{O3} is the measured voltage. The value of PPB_{O3} was converted to density by Eq. (5.9).

The measured UVS ozone values have been corrected for detailed solar spectrum structure and for the ozone absorption cross sections at about -50°C. The listed values are estimated to have a maximum systematic error of ±5%, which applies only to unflagged values. Flagged values should be considered unreliable because of aircraft maneuvering or noisy data. The total ozone values are estimated to be almost as accurate as the measured ozone values. Under stable flight conditions both of these ozone values should have relative accuracies of ±2 to 3%. Accuracy of the measurements is discussed in more detail in Section 5.4.

The data have the date (year-month-day), day of the year (from Jan. 1), and flight number heading each page. The tabulated data are explained in more detail below.

Column	Heading	Explanation
1	TBAR(GMT) HH MM:SS	Average time of the UVS measurement, in GMT hours-minutes-seconds.
2	LAT(DEG N)	Latitude - degrees North.
3	LONG(DEG E)	Longitude - degrees East.
4	PRESS ALT (KFT)	Pressure altitude, in kft (1000 ft).
5	SUN ANG (DEG)	Solar zenith angle, in degrees.
6	O_3 PPB	The measured ozone density, in parts per billion (PPB) (negative = no data).
7	MEAS OZONE (ATM-CM)	The UVS measured ozone above the aircraft, in atm-cm (=Dobson units).

Column	Heading	Explanation
8	TOTAL OZONE (ATM-CM)	The total ozone above ground level, calculated as described in Section 5.1.1, in atm-cm.
9	QQQQQ	Five quality codes. All blank indicates valid UVS data. For meaning of non-blank codes, see below.
10-19	UV Fluxes	The measured UV fluxes at the wavelengths listed at the top of each column. The wavelengths are in nm, the fluxes in W/(cm^2-nm). BB means broad-band filter (≃10-30 nm), and NB means narrow-band filter (2-3 nm).

The conditions which set the five quality codes (column 9) are as follows:

Quality Code No.	Symbol	Set conditions (one or more will set the code)
1	P	Standard deviation of aircraft pitch angle >2°. /Max-Min/ for pitch >5°. /Average pitch angle/ >5°.
2	R	Same as pitch conditions, but for the roll angle.
3	T	Standard deviation of the true heading >10°. /Max-Min/ for true heading >30°.
4	A	Standard deviation of the altitude >1000 ft. /Max-Min/ for altitude >3000 ft.
5	M	The average of the deviation of the 365.5 and 395.6 nm (371.3 and 401.9 for the 1975 flights) measured fluxes from the calculated fluxes is more than 10% of the running average. This generally indicates noisy data.
5	N	The standard deviation of at least one (four for the 1975 flights) of the average voltages for the dark current, 365.5, 395.6 (371.3 and 401.9 for 1975), and all filters contributing to the average ozone measurement, was >0.1 volt. This indicates noise in the data, and overrides the M flag.

In the following pages UVS data are tabulated for altitudes greater than about 10 kft, and solar zenith angles of less than 65°. In Ref. 1.6 these cut-offs were about 30 kft and 75°, but for the lower altitudes of the present flight set it is felt that a 65° solar zenith angle cut-off is more appropriate. For some of the flights the UVS was turned off for $\theta_{sun} > 60°$, so the 65° cut-off is more consistent with actual instrument operation. A few flights had data to $\theta_{sun} > 75°$ for altitudes above 30 kft, and the data appear valid to at least $\theta_{sun} = 75°$, but the cut-off has still been set at 65° for consistency. The tabulated data are presented in flight order below.

The following pages give the measured ozone, total ozone, and UV fluxes obtained from the UVS for the Fall 1976 Latitude Survey Flights of the NASA CV-990. Data are given for the flights listed below, in the order of the listing.

Table 5.1

List of UVS Flight Data for Fall 1976

Flight No.	Date (1976)	Minutes of Valid UVS data*	Page No. (s)
2	Oct. 28	40	22
5	Nov. 1	30	22
6	Nov. 3	175	22-24
7	Nov. 7-8	260	24-27
8	Nov. 8-9	300	28-30
9	Nov. 10	160	31-32
10	Nov. 11	70	33
11	Nov. 12-13	240	34-35
12	Nov. 14	120	36
13	Nov. 16	160	37-38
14	Nov. 17-18	215	39-40
15	Nov. 18	200	41-42

*Data for $\theta_{sun} < 65^o$, and altitude >10 kft.

```
DATE=  761028   (YR-MO-DAY)      DAY=  302      FLT NO=   2              NASA LATITUDE SURVEY - FALL 1976
     TBAR     LAT      LONG   PRESS      SUN    O3    MEAS   TOTAL  QC000   374.1   312.8   289.2   294.5   303.9   308.4   318.8   326.1   365.5   395.6
 HHMM:SS     (DEG      (DEG     ALT      ANG   PPB   OZONE   OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)   WAVELENGTH IN NM)
   (GMT)       N)        E)   (KFT)    (DEG)          (ATM-CM)                BB      BB      NB      NB      NB      NB      NB      NB      BB      BB
------------------------------------------------------------------------------------------------------------------------------------------------------
 2136.31    38.39 -122.95   17.62    56.95    37   0.230   0.237           58.4    5.60   0.000   0.009    1.25    5.11   21.06   42.04    49.6    64.0
 2138:43    38.61 -123.06   20.17    57.31    47   0.228   0.237           57.3    5.51   0.000   0.010    1.28    5.14   21.24   42.18    49.7    63.5
 2140 55    38.84 -123.17   22.77    57.68    43   0.226   0.236           57.8    5.58   0.000   0.010    1.27    5.21   21.59   42.44    49.1    62.9
 2143: 7    39.08 -123.26   25.20    58.07    53   0.238   0.250  RT       62.4    5.94   0.000   0.006    1.13    5.18   22.09   45.04    53.7    70.4
 2145:19    39.34 -123.24   27.20    58.52    53   0.227   0.240           58.5    5.64   0.000   0.009    1.25    5.16   21.98   42.63    51.6    62.4
 2147:31    39.62 -123.21   29.10    58.99    56   0.217   0.230       M   55.8    5.74   0.000   0.010    1.20    5.14   21.36   42.45    47.6    55.3
 2149.43    39.92 -123.18   30.60    59.48    64   0.223   0.237           58.9    5.87   0.000   0.008    1.21    4.87   20.95   41.83    45.6    60.8
 2151:55    40.21 -123.15   31.05    59.96    61   0.222   0.236           57.7    5.69   0.000   0.008    1.12    4.76   20.11   38.86    47.2    61.3
 2154: 7    40.49 -123.13   31.05    60.44    55   0.218   0.231       M   55.0    5.83   0.000   0.006    1.02    4.55   20.29   39.41    44.3    52.7
 2156:19    40.79 -123.10   31.06    60.93    49   0.233   0.248           49.9    4.77   0.000   0.005    0.89    4.00   19.49   37.80    44.9    56.8
 2158.31    41.08 -123.07   31.06    61.42    47   0.213   0.226       M   47.9    5.29   0.053   0.004    0.61    3.72   16.49   33.04    37.5    44.7
 2200:43    41.37 -123.04   31.05    61.91    47   0.224   0.238           45.7    4.45   0.000   0.004    0.80    3.76   17.68   35.67    41.9    54.2
 2202:54    41.66 -123.01   31.05    62.39    53   0.223   0.237           51.1    4.87   0.000   0.005    0.77    3.66   18.10   36.63    41.2    50.9
 2205: 6    41.96 -122.98   31.06    62.89    53   0.225   0.239           54.5    4.90   0.000   0.004    0.68    3.53   17.63   35.24    41.9    53.5
 2207:19    42.25 -122.94   31.06    63.38    45   0.227   0.241           49.7    4.33   0.000   0.002    0.59    3.22   16.27   34.58    40.3    52.5
 2209:29    42.54 -122.94   31.05    63.85    41   0.222   0.236  R    M   49.9    7.02   0.079   0.002    0.53    2.95   14.98   31.35    36.1    47.6
 2211:41    42.83 -123.01   31.06    64.29    37   0.232   0.247           51.0    4.03   0.000   0.000    0.47    2.90   15.78   34.37    40.5    52.4
 2213:53    43.11 -123.09   31.05    64.73    39   0.235   0.249           47.1    3.66   0.000   0.000    0.39    2.74   15.63   33.74    40.8    51.4
 2216: 4    43.40 -123.16   31.05    65.16    33   0.243   0.258           48.0    3.40   0.000   0.000    0.35    2.44   15.00   33.03    40.0    51.1
```

```
DATE=  751101   (YR-MO-DAY)      DAY=  306      FLT NO=   5              NASA LATITUDE SURVEY - FALL 1976
     TBAR     LAT      LONG   PRESS      SUN    O3    MEAS   TOTAL  00000   374.1   312.8   289.2   294.5   303.9   308.4   318.8   326.1   365.5   395.6
 HHMM:SS     (DEG      (DEG     ALT      ANG   PPB   OZONE   OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)   WAVELENGTH IN NM)
   (GMT)       N)        E)   (KFT)    (DEG)          (ATM-CM)                BB      BB      NB      NB      NB      NB      NB      NB      BB      BB
------------------------------------------------------------------------------------------------------------------------------------------------------
 1840:52    19.24 -155.56   14.89    60.63    56   0.241   0.249           52.7    3.81   0.000   0.000    0.63    3.49   16.92   35.69    45.7    58.3
 1843: 4    19.42 -155.55   14.89    60.26    54   0.232   0.240  R        53.2    3.60   0.000   0.000    0.63    3.74   17.18   35.32    45.5    57.3
 1845.16    19.61 -155.53   14.89    59.89    54   0.244   0.252           53.6    3.64   0.000   0.000    0.67    3.59   17.09   36.14    46.2    59.0
 1847:27    19.80 -155.49   14.85    59.52    55   0.245   0.253           53.4    3.77   0.000   0.000    0.69    3.68   17.35   36.56    46.2    60.3
 1849.39    19.98 -155.46   14.36    59.15    54   0.243   0.251           54.1    3.91   0.000   0.000    0.77    3.93   18.37   38.20    47.7    61.5
 1851:51    20.15 -155.43   14.87    58.78    55   0.242   0.250           56.1    4.14   0.000   0.002    0.84    4.14   19.01   39.51    49.2    62.7
 1854: 3    20.27 -155.46   13.66    58.42    51   0.228   0.234  PRTAM    20.3    0.00   0.000   0.000    0.77    4.39   20.96   43.04    48.8    44.0
 1856:14    20.12 -155.52   11.04    57.96    47   0.243   0.249           54.5    4.17   0.000   0.002    0.80    3.91   17.68   36.43    45.2    59.9
 1858.26    19.94 -155.55   11.04    57.45    47   0.245   0.251           54.5    4.05   0.000   0.003    0.84    4.05   17.99   37.00    47.2    61.3
 1900:38    19.76 -155.58   11.04    56.94    53   0.245   0.251           56.2    4.16   0.000   0.003    0.91    4.28   18.60   38.37    49.1    63.1
 1902:59    19.58 -155.61   11.04    56.44    49   0.246   0.252           56.3    4.30   0.000   0.004    0.96    4.36   18.73   38.31    49.0    63.7
 1905: 1    19.40 -155.65   11.04    55.94    52   0.247   0.254           56.9    4.29   0.000   0.005    1.02    4.50   19.26   39.43    49.3    64.9
 1907:13    19.22 -155.68   11.04    55.43    52   0.246   0.252           58.3    4.64   0.000   0.006    1.08    4.79   20.05   41.09    51.4    65.9
 1909:25    19.05 -155.71   11.04    54.93    67   0.243   0.250           59.7    5.07   0.000   0.007    1.19    5.09   20.87   42.22    52.2    66.9
```

```
DATE=  751103   (YR-MO-DAY)      DAY=  308      FLT NO=   6              NASA LATITUDE SURVEY - FALL 1976
     TBAR     LAT      LONG   PRESS      SUN    O3    MEAS   TOTAL  QC000   374.1   312.8   289.2   294.5   303.9   308.4   318.8   326.1   365.5   395.6
 HHMM:SS     (DEG      (DEG     ALT      ANG   PPB   OZONE   OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)   WAVELENGTH IN NM)
   (GMT)       N)        E)   (KFT)    (DEG)          (ATM-CM)                BB      BB      NB      NB      NB      NB      NB      NB      BB      BB
------------------------------------------------------------------------------------------------------------------------------------------------------
 2006:45    21.09 -157.90    6.14    47.94   -20   0.244   0.246  P   A    65.5    5.94   0.000   0.022    2.02    7.06   25.11   49.75    60.4    77.3
 2008:58    20.90 -157.93    9.68    47.46   -20   0.237   0.241   R  A    84.2    8.58   0.000   0.028    2.33    7.81   27.55   51.18    60.1    76.3
 2011:10    20.67 -157.91   13.75    46.93   -20   0.233   0.239      A    70.8    7.75   0.000   0.038    2.80    8.87   30.01   55.46    65.8    82.6
 2013:22    20.42 -157.89   17.03    46.39    22   0.230   0.237      A    74.8    8.88   0.000   0.045    3.11    9.75   32.04   58.17    67.3    84.1
 2015:34    20.16 -157.87   19.87    45.84    38   0.229   0.238           78.5    9.66   0.000   0.051    3.40   10.38   33.66   60.79    69.9    86.9
 2017:46    19.90 -157.85   22.54    45.28    31   0.229   0.239  R        82.6   10.39   0.000   0.059    3.75   11.15   28.85   64.39    75.7    92.0
```

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```
DATE=  751103  (YR-MO-DAY)      DAY=  308      FLT NO=   6              NASA LATITUDE SURVEY - FALL 1976
    TBAR     LAT     LONG   PRESS     SUN    O3    MEAS   TOTAL  QQQQQ  374.1  312.8  289.2  294.5   303.9  308.4  318.8  326.1   365.5  395.6
 HHMM:SS    (DEG     (DEG     ALT     ANG   PPB   OZONE   OZONE       (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)   WAVELENGTH IN NM)
   (GMT)      N)       E)    (KFT)   (DEG)           (ATM-CM)              BB     BB     NB     NB       NB     NB     NB     NB      BB     BB
-----------------------------------------------------------------------------------------------------------------------------------------------

 2022:11   19.39 -158.02  26.75   44.32    35   0.224   0.236          83.0  11.49  0.095  0.073    4.17  12.04  37.38  66.05    74.2   91.4
 2024:23   19.12 -158.14  28.42   43.85    39   0.224   0.237          85.0  12.09  0.107  0.082    4.39  12.45  38.61  67.43    76.0   93.2
 2026.35   18.84 -158.26  30.16   43.37    41   0.222   0.236          87.9  12.82  0.113  0.090    4.70  13.30  39.95  70.19    78.0   95.7
 2028.47   18.56 -158.38  31.07   42.89    40   0.224   0.238          88.2  13.33  0.115  0.096    4.83  13.60  40.58  71.41    79.7   97.4
 2030:59   18.28 -158.50  31.06   42.42    54   0.222   0.236          92.2  13.91  0.130  0.103    5.07  13.95  41.87  73.54    80.9   98.7
 2033 11   18.00 -158.62  31.06   41.94    59   0.224   0.238          93.5  14.37  0.140  0.110    5.11  14.21  42.41  73.39    81.2   98.8
 2035:23   17.73 -158.74  31.07   41.47    42   0.225   0.239          94.1  14.07  0.129  0.113    5.19  14.45  42.54  73.93    83.2  101.1
 2037:35   17.45 -158.85  31.07   40.99    50   0.226   0.240          94.9  14.41  0.133  0.113    5.22  14.29  42.26  73.49    82.3  101.1
 2039·47   17.18 -158.97  31.06   40.52    59   0.226   0.241          93.8  14.36  0.136  0.118    5.30  14.36  42.48  73.46    82.7  100.9
 2041·59   16.90 -159.09  31.06   40.05    63   0.226   0.241          95.7  14.78  0.141  0.124    5.43  14.66  43.12  75.19    84.0  101.9
 2044 11   16.64 -159.20  31.07   39.58    63   0.228   0.243          97.2  15.13  0.145  0.126    5.52  15.00  43.76  76.22    85.4  104.3
 2046.23   16.37 -159.31  31.06   39.11    67   0.227   0.241          98.1  15.19  0.148  0.131    5.63  15.32  43.66  76.32    86.1  102.1
 2048.35   16.11 -159.42  31.06   38.65    66   0.258   0.275          90.8  13.21  0.142  0.102    4.37  14.02  44.07  76.50    79.4  103.6
 2050 46   15.85 -159.53  31.07   38.18    56   0.226   0.240         100.5  15.82  0.152  0.144    5.96  15.57  44.57  76.59    86.7  106.8
 2052.58   15.59 -159.64  31.07   37.72    49   0.211   0.224     M   102.5  17.62  0.239  0.126    5.50  13.89  40.16  57.10    58.0   90.4
 2055 10   15.33 -159.75  31.07   37.26    39   0.227   0.241          92.1  16.00  0.157  0.153    6.10  15.91  45.22  78.24    87.7  107.6
 2057.22   15.07 -159.86  31.07   36.80    33   0.293   0.311     M   100.3  17.40  0.206  0.158    3.42   9.66  34.75  60.02    75.8   95.1
 2059:34   14.81 -159.96  31.06   36.33    30   0.232   0.246         103.6  16.50  0.153  0.162    6.20  15.89  48.00  80.51    88.7  108.0
 2101 45   14.55 -160.06  31.07   35.87    26   0.227   0.241         104.1  17.10  0.166  0.171    6.52  16.82  47.59  80.82    90.0  109.3
 2103 57   14.28 -160 16  31.06   35.40    25   0.230   0.244         104.2  16.97  0.164  0.177    6.50  16.81  47.37  81.07    91.1  110.8
 2106: 9   14.03 -160.26  31.07   34.95    24   0.229   0.243         104.1  16.72  0.158  0.182    6.62  17.10  47.80  82.33    92.0  111.4
 2108.21   13.76 -160.36  31.07   34.48    27   0.227   0.241         105.3  17.54  0.173  0.191    6.86  17.59  48.51  82.20    91.2  111.7
 2110·32   13.50 -160.46  31.07   34.02    30   0.228   0.242         105.8  18.00  0.179  0.198    6.89  17.63  48.37  82.38    91.7  112.2
 2112.44   13.23 -160.57  31.07   33.56    32   0.229   0.243         105.9  17.61  0.172  0.205    6.92  17.53  48.23  82.42    92.4  113.2
 2114:56   12.96 -160.67  31.07   33.10    34   0.228   0.242         105.3  17.47  0.172  0.213    7.11  18.17  49.26  83.70    93.5  112.9
 2117: 7   12.69 -160.77  31.07   32.63    36   0.225   0.239         106.8  18.15  0.185  0.226    7.36  18.37  49.30  83.44    93.0  114.7
 2119:19   12.42 -160.87  31.07   32.17    38   0.228   0.242         108.2  18.49  0.184  0.230    7.35  18.34  49.71  83.93    94.2  115.8
 2121 31   12.16 -160.98  31.06   31.72    34   0.226   0.239         109.2  18.29  0.174  0.241    7.60  18.77  50.36  85.06    95.7  115.8
 2123:42   11.89 -161.08  31.07   31.26    34   0.219   0.233         109.1  19.89  0.199  0.253    7.95  19.38  51.51  81.74    90.3  115.1
 2125 54   11.62 -161.18  31.06   30.81    31   0.212   0.225     M   111.5  21.53  0.277  0.255    7.99  19.34  51.96  82.81    78.8  106.4
 2128: 6   11.36 -161.28  31.07   30.36    28   0.214   0.227     M    90.6  22.68  0.159  0.195    6.28  15.35  39.13  62.31    66.4   82.5
 2130:17   11.09 -161.37  31.07   29.91    32   0.237   0.252     M    78.0  12.88  0.115  0.172    5.80  14.95  40.64  68.52    74.5   92.9
 2132:29   10.83 -161.47  31.06   29.47    32   0.234   0.249     M    94.4  17.60  0.183  0.193    6.36  15.89  43.99  74.13    78.3  100.3
 2134 41   10.62 -161.61  31.04   29.09    31   0.232   0.246  RT N   143.5  23.33  0.158  0.303    9.99  20.65  61.27 114.81   126.0  144.8
 2136:52   10.78 -161.71  30.14   29.02    37   0.193   0.204  RT N    85.0  17.68  0.226  0.161    5.05  11.08  26.06  36.79    49.2   55.6
 2139: 4   11.05 -161.59  29.15   28.97    28   0.237   0.250  R  M    65.8  12.05  0.097  0.134    4.75  12.10  32.80  57.64    60.6   76.3
 2141·16   11.32 -161.49  29.05   28.94    22   0.240   0.254     M    82.3  15.71  0.130  0.211    6.21  16.21  43.29  77.03    81.3  103.2
 2143·27   11.58 -161 38  29.06   28.91    23   0.229   0.242          81.1  16.46  0.132  0.268    8.20  20.62  54.67  91.88    98.7  121.8
 2145.39   11.83 -161.27  29.06   28.90    28   0.225   0.238         107.2  19.00  0.193  0.264    7.81  18.96  49.74  83.96    92.6  114.7
 2147:50   12.08 -161.16  29.07   28.90    30   0.226   0.239         112.8  19.82  0.215  0.274    7.88  19.32  50.94  85.41    93.4  115.5
 2150: 2   12.39 -161.04  29.07   28.92    31   0.224   0.236         114.3  20.46  0.210  0.289    8.42  20.44  53.37  89.24    98.2  121.8
 2152 14   12.60 -160.93  29.06   28.97    31   0.226   0.239         115.6  20.29  0.200  0.278    8.29  20.39  53.53  90.67    99.1  121.8
 2154 25   12.87 -160 82  29.06   29.03    27   0.227   0.240         113.7  20.16  0.198  0.275    8.22  20.27  53.55  90.18    99.0  121.5
 2156:37   13.13 -160.70  29.06   29.12    26   0.227   0.239         116.0  20.31  0.207  0.276    8.33  20.42  53.89  90.51    99.7  123.9
 2158 49   13.41 -160.58  29.06   29.22    26   0.229   0.242         115.8  20.08  0.197  0.264    8.18  20.28  54.24  91.55    99.8  122.3
 2201: 0   13.68 -160.46  29.06   29.34    28   0.228   0.241         115.9  20.59  0.209  0.265    8.21  20.25  54.02  90.89    99.7  123.5
 2203:12   13.96 -160.34  29.07   29.48    27   0.228   0.241         114.6  19.81  0.198  0.258    8.06  19.96  53.34  89.46    98.0  121.0
 2205:23   14.23 -160.22  29.06   29.64    24   0.229   0.242         112.9  19.74  0.197  0.250    7.89  19.44  52.09  88.07    97.1  121.1
 2207 35   14.50 -160.10  29.06   29.81    62   0.230   0.244         113.4  19.47  0.189  0.246    7.84  19.59  52.80  88.84    97.6  119.8
 2209:47   14.78 -159.98  29.06   30.00    44   0.215   0.228     M   112.2  19.59  0.197  0.244    7.82  19.39  50.18  86.51    96.2   87.5
 2211.58   15.05 -159.86  29.06   30.21    50   0.274   0.290         105.7  14.24  0.000  0.219    5.83  19.21  40.80  78.80    96.6  125.4
 2214:10   15.33 -159.74  29.06   30.44    54   0.253   0.268  R       88.5  10.72  0.000  0.201    6.90  12.25  37.88  50.89    98.6  109.0
 2216:21   15.61 -159.64  29.06   30.68    54   0.229   0.243          72.2  10.21  0.000  0.229    7.76  19.29  52.48  89.19    98.0  121.0
 2218:33   15.89 -159.54  29.06   30.93    58   0.226   0.240         116.9  15.10  0.000  0.232    7.80  19.37  52.07  88.42    95.6  120.2
 2220:45   16.17 -159.43  29.05   31.20    58   0.213   0.226     M   114.0  21.97  0.233  0.218    7.04  15.77  45.16  73.55    77.7   97.2
 2222:56   16.44 -159.32  29.06   31.48    57   0.232   0.246         105.4  18.21  0.183  0.226    7.39  19.11  51.84  87.20    95.5  119.4
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DATE= 761103 (YR-MO-DAY) DAY= 308 FLT NO= 6 NASA LATITUDE SURVEY - FALL 1976

(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)

TBAR HHMM:SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE	QQQQQ	374.1 BB	312.8 BB	289.2 NB	294.5 NB	303.9 NB	308.4 NB	318.8 NB	326.1 NB	365.5 BB	395.6 BB
2225: 8	16.71	-159.21	29.06	31.77	56	0.234	0.248		113.7	19.07	0.179	0.218	7.30	18.99	51.65	87.79	98.0	120.8
2227.20	16.98	-159.11	29.05	32.06	54	0.228	0.242		111.5	19.05	0.187	0.214	7.48	18.85	51.56	87.04	95.8	119.3
2227 31	17.24	-159.01	29.06	32.36	51	0.231	0.245		112.4	18.89	0.182	0.212	7.29	18.56	51.19	87.06	96.8	119.1
2231·43	17.49	-158.91	29.06	32.67	44	0.229	0.242		111.6	18.84	0.185	0.210	7.39	18.93	51.69	87.26	95.8	118.9
2233.54	17.74	-158.80	29.06	32.99	43	0.230	0.244		113.5	19.08	0.185	0.207	7.24	18.57	51.34	87.20	96.7	119.4
2236: 6	17.99	-158.70	29.06	33.32	41	0.226	0.239		111.6	19.11	0.195	0.208	7.34	18.73	51.00	86.44	95.6	117.5
2238:18	18.25	-158.60	29.05	33.65	39	0.227	0.240		110.9	18.36	0.177	0.199	7.19	18.26	50.75	85.81	94.6	116.6
2240:29	18.49	-158.50	29.06	34.00	35	0.228	0.241		109.0	18.13	0.180	0.192	6.95	17.68	49.07	83.94	92.8	116.2
2242:41	18.73	-158.41	29.06	34.34	41	0.228	0.241		108.9	18.00	0.171	0.186	6.90	17.74	49.63	83.84	93.0	114.5
2244 52	18.97	-158.31	29.06	34.70	40	0.230	0.244		107.6	17.84	0.170	0.177	6.65	17.16	48.58	83.33	92.2	114.2
2247· 4	19.22	-158.21	28.14	35.07	39	0.227	0.239	R	108.3	18.25	0.186	0.168	6.53	17.08	47.07	76.85	87.3	110.7
2249:16	19.48	-158.11	26.05	35.47	37	0.231	0.243	R	106.7	16.83	0.163	0.153	6.12	16.09	45.77	78.88	88.5	109.8
2251.27	19.73	-157.99	24.65	35.87	35	0.234	0.245	RT	102.1	16.14	0.159	0.145	6.00	14.13	45.08	80.79	87.1	110.1
2253:39	19.99	-157.98	22.82	36.26	41	0.232	0.243		104.4	16.36	0.161	0.137	5.70	15.28	44.30	75.92	85.9	108.3
2255:50	20.26	-157.97	19.11	36.66	47	0.236	0.245	A	101.7	15.05	0.128	0.117	5.23	14.27	42.71	74.31	84.6	106.0
2258: 2	20.52	-157.97	14.39	37.06	50	0.236	0.243	P A	98.8	14.65	0.154	0.107	4.87	13.51	39.36	67.85	80.2	107.6

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DATE=  761107  (YR-MO-DAY)      DAY=  312     PLT NO=   7            NASA LATITUDE SURVEY - FALL 1976
   PBAR      LAT     LONG  PRESS     SUN    O3    MEAS   TOTAL  QQQQQ  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
HHMM:SS    (DEG     (DEG     ALT     ANG   PPB   OZONE   OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)       N)       E)  (KFT)   (DEG)         (ATM-CM)                  BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
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2051:26  20.61  -158.02  15.94   42.54    67   0.245   0.253  PR A    81.9  11.18  0.079  0.054   3.12   9.73  30.85  59.01   66.7   85.5
2053:38  20.38  -158.02  19.31   42.08    43   0.191   0.199   R  M   70.1   9.76  0.000  0.078   4.55  11.67  33.99  51.58   54.4   67.5
2055:50  20.14  -158.02  21.40   41.61    51   0.225   0.235      M   81.7   8.55  0.091  0.068   3.91  11.05  34.88  60.59   62.4   79.7
2058: 3  19.88  -158.01  24.21   41.12    53   0.245   0.257   R  M   80.7  12.35  0.109  0.075   3.53  10.51  35.72  68.97   68.8   75.2
2100:15  19.61  -158.04  26.28   40.66    49   0.269   0.283   R      70.5   5.89  0.000  0.061   3.44  14.37  42.49  78.63   85.3  101.6
2102.27  19.36  -158.15  28.13   40.24    39   0.226   0.239          89.6  13.42  0.122  0.109   5.10  13.96  41.38  71.69   79.9   97.4
2104 39  19.12  -158.25  30.43   39.83    19   0.227   0.240          91.2  13.72  0.130  0.119   5.35  14.63  42.60  73.84   82.9  100.5
2106:51  18.88  -158.35  31.05   39.41    23   0.225   0.239          93.8  14.61  0.144  0.130   5.64  15.13  44.06  75.72   84.7  102.5
2109. 4  18.63  -158.45  31.04   39.00    21   0.227   0.241          93.3  14.18  0.142  0.133   5.67  15.32  44.60  76.19   84.4  103.0
2111 16  18.38  -158.54  31.04   38.59    22   0.224   0.238          96.2  15.16  0.147  0.139   5.88  15.64  44.87  77.51   85.1  103.0
2113:28  18 14  -158.64  31.04   38.18    24   0.223   0.236          96.4  15.35  0.165  0.145   5.98  15.69  44.77  77.14   84.2  102.6
2115.40  17.89  -158.74  31.04   37.77    26   0.226   0.240          98.3  15.94  0.167  0.153   5.97  15.82  44.72  76.26   85.8  106.5
2117:52  17.64  -158.85  31.04   37.37    25   0.225   0.239          98.1  15.60  0.155  0.153   5.99  15.60  44.19  76.92   85.2  103.3
2120: 4  17.39  -158.95  31.03   36.96    23   0 224   0.238          97.1  15.87  0.161  0.158   6.06  15.89  44.08  76.68   84.9  101.9
2122:16  17.14  -159.05  31.05   36.56    31   0.224   0.238          98.6  16.29  0.163  0.165   6.21  16.04  44.57  77.03   85.3  104.7
2124 27  16.89  -159.15  31.04   36.16    27   0.635   0.674      M   88.6   0.00  0.000  0.000  12.03  29.11  56.36  24.67  110.7   12.9
2126:34  16.64  -159.24  31.04   35.77    26   0.223   0.236         101.7  16.67  0.179  0.185   6.67  16.92  47.44  80.60   88.9  107.6
2128 46  16.39  -159.34  31.04   35.38    28   0.225   0.239         100.9  16.96  0.178  0.185   6.67  17.10  47.26  80.50   90.7  109.3
2130:58  16.14  -159.44  31.05   34.98    21   0.229   0.243          86.1  16.28  0.000  0.143   6.67  17.52  48.30  82.76   93.4  109.5
2133:10  15.88  -159.54  31.03   34.59    23   0.242   0.257         102.8  17.68  0.193  0.162   5.98  15.99  41.48  95.79   92.2  106.7
2135 21  15.63  -159.64  31.04   34.20    24   0.227   0.241      M   84.3  15.20  0.319  0.213   6.14  18.49  42.50  76.25   71.3   68.5
2137:33  15 38  -159.74  31.05   33.81    26   0.222   0.236         102.7  19.19  0.205  0.205   7.32  15.35  45.54  81.21   92.8  110.8
2139 45  15.13  -159.84  31.04   33.43    25   0.223   0.236         105.7  17.38  0.195  0.222   7.36  18.29  49.82  84.06   93.7  112.2
2141:57  14.88  -159.94  31.04   33.05    27   0.225   0.239         108.5  18.40  0.188  0.224   7.40  18.58  50.99  85.50   94.4  113.9
2144: 9  14.62  -160.03  31.04   32.68    29   0.223   0.236         105.6  18.74  0.210  0.225   7.25  18.02  49.60  79.70   87.3  108.9
2146.20  14.36  -160.13  31.05   32.30    30   0.219   0.233         104.2  14.41  0.153  0.212   7.72  18.30  49.77  85.85   94.3  113.7
2148.32  14.10  -160.23  31.04   31.92    31   0.226   0.240         110.1  18.39  0.189  0.235   7.44  18.81  49.08  84.14   96.1  113.0
2150 44  13.85  -160.33  31.04   31.55    29   0.228   0.242         110.8  19.33  0.204  0.246   7.57  17.63  51.38  85.88   95.4  116.1
2152:56  13.59  -160.43  31.04   31.19    26   0.999   1.060      M  110.4  18.10  0.199  0.245   7.86  19.62  51.36  20.63   96.2  106.9
2155: 8  13.33  -160.53  31.04   30.83    62   0.223   0.237         109.2  19.15  0.175  0.264   8.05  19.71  52.34  87.41   96.5  116.4
2157:19  13.07  -160.63  31.04   30.47    21   0.225   0.239         111.7  19.80  0.216  0.263   8.04  19.79  52.71  87.65   96.6  119.5
2159:31  12.82  -160.73  31.04   30.12    19   0.223   0.236         109.8  19.04  0.205  0.272   8.24  19.96  53.08  88.47   96.9  118.8
2201.43  12.56  -160.82  31.04   29.77    21   0.226   0.240         112.7  19.88  0.211  0.276   8.23  20.20  53.21  89.52  100.0  121.0
2203:55  12.31  -160.92  31.05   29.43    23   0.226   0.240         112.4  19.75  0.205  0.272   8.19  20.11  53.07  89.93   98.2  113.6
2206. 6  12.05  -161.02  31.04   29.10    27   0.224   0.238         112.0  19.82  0.217  0.286   8.39  20.19  53.47  89.81   98.2  119.7
2208:18  11.79  -161.11  31.04   28.76    30   0.227   0.241         111.3  20.02  0.209  0.283   8.27  20.29  53.24  88.90   98.1  120.1
2210:30  11.53  -161.21  31.04   28.43    30   0.224   0.237         112.8  19.89  0.214  0.292   8.53  20.42  53.65  90.01   99.2  120.4
2212.41  11.27  -161.31  31.04   28.11    30   0.223   0.236         115.7  19.58  0.239  0.297   8.39  20.53  54.32  88.23   95.6  109.4
2214:53  11.01  -161.41  31.05   27.79    26   0.240   0.255          99.0  16.60  0.230  0.272   7.60  19.30  53.49  91.43   97.4  116.2
2217. 5  10.75  -161.51  31.04   27.47    28   0.225   0.239         115.3  20.64  0.228  0.301   8.45  20.47  53.39  88.03   96.6  117.4
2219:17  10.48  -161.61  31.04   27.16    33   0.232   0.246         108.4  19.65  0.208  0.279   8.00  18.98  53.97  86.19   95.2  113.3
2221:28  10.22  -161.71  31.05   26.86    40   0.227   0.241      M  108.8  20.24  0.258  0.278   7.59  19.03  49.99  79.64   84.5  100.4
2223 40   9.95  -161.81  31.04   26.55    26   0.236   0.250          78.4  14.42  0.258  0.252   7.41  17.82  50.49  88.16   89.8  108.6
2225 52   9.68  -161.91  31.05   26.26    43   0.223   0.237         109.2  15.93  0.222  0.303   8.95  21.46  52.49  94.08  102.0  121.4
2228: 3   9.42  -162.00  31.04   25.98    35   0.251   0.267         105.8  15.66  0.182  0.233   6.80  18.73  47.92  86.40   91.4  109.1
2230:15   9.16  -162.10  31.04   25.71    37   0.205   0.217      M  110.1  24.65  0.320  0.304   8.74  21.58  47.11  57.77   73.1   88.0
2232.27   8.89  -162.20  31.05   25.44    30   0.226   0.240         110.7  14.75  0.199  0.293   8.38  20.45  53.17  87.66   93.6  108.2
2234.38   8.62  -162.30  31.04   25.17    25   0.216   0.229          97.5  19.81  0.257  0.280   8.47  19.56  48.33  84.77   90.2  105.9
2236.50   8.35  -162.40  31.05   24.91    29   0.220   0.234         105.6  19.11  0.206  0.291   8.64  20.92  55.04  94.04   94.5   95.5
2239: 2   8.07  -162.50  31.05   24.65    29   0.220   0.233      M  119.3  21.55  0.266  0.269   7.59  15.69  44.68  58.70   80.7   97.1
2241:13   7.80  -162.60  31.04   24.40    26   0.242   0.257      M   86.9  12.41  0.106  0.194   5.79  14.38  40.51  59.66   77.1   76.0
2243:25   7.53  -162.70  31.04   24.17    31   0.228   0.242          71.2  11.48  0.101  0.277   7.95  19.44  47.68  82.50   89.1  106.9
2245:37   7.26  -162.80  31.05   23.95    21   0.226   0.240         109.3  18.72  0.210  0.312   8.32  19.86  51.39  82.84   88.4  111.4
2247:48   6.99  -162.90  31.05   23.73    34   0.211   0.224      M   79.3  22.36  0.227  0.216   7.05  19.28  53.39  88.62   47.3   53.1
2250: 0   6.72  -163.00  31.04   23.53   122   0.000   0.000      M    0.0   0.08  0.474  5.525  30.27  40.74  20.45  20.50    0.0    0.0
2254. 7   6.21  -163.18  31.04   23.17   -20   0.290   0.307      M   59.4   8.42  0.000  0.185   4.80  12.20  38.87  77.83   82.0   93.9
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DATE=  751107  (YR-MO-DAY)      DAY=  312       FLT NO=   7              NASA LATITUDE SURVEY - FALL 1976
    TBAR      LAT     LONG  PRESS      SUN   O3    MEAS   TOTAL  QQQQQ  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
  HHMM:SS    (DEG     (DEG    ALT      ANG  PPB   OZONE   OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
   (GMT)      N)       E)   (KFT)    (DEG)           (ATM-CM)              BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
---------------------------------------------------------------------------------------------------------------------------------------------
  2256:18    5.94 -163.28  31.05  22.99  -20   0.229  0.243          101.9  19.88  0.233  0.320   7.89  19.16  48.82  79.84   84.9  103.1
  2258:30    5.66 -163.38  31.05  22.82  181   0.219  0.237           93.0  16.85  0.202  0.343   8.94  20.71  51.66  87.76   91.4  111.2
  2300:42    5.39 -163.48  31.05  22.66  -20   0.247  0.262          104.7  19.27  0.191  0.349   8.08  20.69  55.69  90.96   99.7  120.1
  2302:53    5.11 -163.58  31.04  22.51   19   0.225  0.238          117.7  21.78  0.234  0.383   9.57  22.26  56.59  93.92  102.6  124.0
  2305: 5    4.84 -163.68  31.05  22.37   19   0.221  0.234          118.9  22.04  0.240  0.403   9.96  22.99  58.00  95.51  104.1  123.3
  2307:17    4.56 -163.78  31.29  22.24   19   0.219  0.232          120.4  22.60  0.256  0.406   9.97  22.62  56.34  93.17  102.5  124.2
  2309:28    4.28 -163.88  33.00  22.12   19   0.225  0.239          119.0  22.33  0.236  0.413   9.94  23.16  58.04  96.73  104.9  126.9
  2311:40    4.01 -163.98  34.53  22.02  -20   0.221  0.236          121.7  22.79  0.254  0.432  10.41  23.91  57.75  98.42  107.2  129.3
  2313:52    3.73 -164.08  35.01  21.92  -20   0.221  0.236          124.4  24.00  0.273  0.442  10.53  24.10  59.97  97.74  106.9  128.9
  2316: 3    3.46 -164.18  35.02  21.85  136   0.223  0.241          124.7  23.59  0.257  0.442  10.50  24.11  60.15 100.04  108.9  131.2
  2318 15    3.18 -164.27  35.03  21.78  420   0.223  0.252          124.2  23.28  0.260  0.443  10.56  24.40  60.85 100.31  109.2  130.9
  2320.26    2.90 -164.38  35.02  21.72   18   0.221  0.237          125.0  23.85  0.269  0.447  10.67  24.33  60.56  99.68  109.0  131.4
  2322:38    2.62 -164.48  35.03  21.67   25   0.224  0.239          125.4  23.80  0.261  0.443  10.51  24.02  60.18  99.79  109.7  131.8
  2324.50    2.34 -164.58  35.00  21.64   20   0.225  0.241          124.8  23.50  0.255  0.442  10.51  24.41  61.04 100.99  109.8  131.3
  2327: 1    2.07 -164.67  35.01  21.62   20   0.222  0.238          124.3  23.83  0.265  0.444  10.65  24.48  60.63 100.35  108.8  131.6
  2329.13    1.80 -164.77  35.02  21.62   36   0.226  0.242          124.2  23.57  0.256  0.434  10.27  23.82  59.53  98.60  108.0  130.8
  2331:24    1.53 -164.87  35.02  21.63  159   0.225  0.243          121.9  22.99  0.248  0.428  10.27  23.88  59.48  98.62  106.9  128.9
  2333:36    1.26 -164.97  35.02  21.65   19   0.223  0.238          121.3  23.24  0.259  0.428  10.29  23.57  58.69  96.86  105.7  127.7
  2335:47    0.99 -165.07  35.00  21.68   20   0.225  0.241          122.4  23.09  0.250  0.421  10.11  23.35  58.56  97.55  106.3  128.3
  2337:59    0.72 -165.16  35.02  21.73   19   0.225  0.240          123.9  23.46  0.254  0.435  10.46  24.31  60.87 100.03  108.7  130.4
  2340:10    0.44 -165.26  35.02  21.79   21   0.226  0.242          127.7  24.38  0.264  0.442  10.53  24.43  61.06 102.16  111.5  135.0
  2342:22    0.16 -165.36  35.02  21.85   22   0.223  0.239          125.2  23.78  0.257  0.437  10.53  24.31  60.97  99.89  108.1  130.2
  2344:33   -0.11 -165.46  34.96  21.93   24   0.227  0.243 P        119.9  25.12  0.247  0.431  10.07  23.29  59.18  98.26  107.6  129.4
  2346:45   -0.38 -165.56  35.02  22.03   23   0.223  0.239          122.8  22.98  0.258  0.432  10.35  23.89  60.07  98.21  106.8  127.8
  2348.57   -0.66 -165.66  35.03  22.12   20   0.221  0.236          126.0  23.94  0.273  0.444  10.65  24.20  60.34  99.44  109.3  131.2
  2351. 8   -0.94 -165.76  35.02  22.24   21   0.224  0.239          125.9  23.58  0.263  0.442  10.47  24.14  60.45 100.74  109.4  132.1
  2353:20   -1.21 -165.86  35.03  22.36   21   0.221  0.237          124.6  23.64  0.266  0.442  10.63  24.54  60.78 100.41  108.5  131 2
  2355 31   -1.49 -165.96  35.02  22.50   21   0.223  0.238          124.0  23.55  0.266  0.435  10.36  23.74  59.69  98.06  107.4  130.3
  2357:43   -1.77 -166.06  35.03  22.64   20   0.223  0.239          120.9  22.63  0.250  0.415  10.12  23.46  58.82  97.22  105.4  127.2
  2359:55   -2.04 -166.16  35.02  22.79   20   0.221  0.236          120.6  23.02  0.257  0.424  10.19  23.29  58.02  95.89  105.0  126.9
  0002  6   -2.32 -166.26  35.01  22.96   20   0.223  0.238          121.3  22.88  0.256  0.414   9.97  22.97  57.99  95.54  103.8  125.3
  0004:18   -2.58 -166.35  35.02  23.14   20   0.220  0.236          120.8  22.98  0.263  0.422  10.25  23.57  58.96  96.70  105.0  126.8
  0006:29   -2.85 -166.45  35.02  23.34   20   0.222  0.238          125.3  23.55  0.260  0.423  10.29  23.57  59.59  98.59  108.3  131.0
  0008:41   -3.11 -166.54  35.02  23.55   24   0.223  0.239          122.5  22.87  0.254  0.414  10.15  23.65  59.47  98.52  106.7  128.5
  0010:52   -3.38 -156.64  35.02  23.76   26   0.223  0.238          121.6  22.93  0.258  0.404  10.00  23.06  58.21  96.67  105.7  128.5
  0013: 4   -3.64 -166.74  35.02  23.98   29   0.225  0.241          121.6  22.70  0.242  0.393   9.83  23.09  58.39  97.24  105.9  127.0
  0015.15   -3.91 -166.84  35.03  24.21   30   0.222  0.237          123.4  23.43  0.264  0.402  10.15  23.58  59.31  97.98  106.6  128.9
  0017:27   -4.18 -166.93  35.02  24.44   32   0.224  0.240          122.4  22.60  0.240  0.385   9.79  22.76  58.58  96.63  105.7  125.8
  0019:38   -4.45 -167.03  35.02  24.69   34   0.223  0.238          117.2  22.03  0.246  0.376   9.57  22.31  56.75  93.62  101.6  123.1
  0021:50   -4.72 -167.13  35.03  24.94   31   0.226  0.241          119.4  22.04  0.240  0.367   9.44  22.12  56.67  94.49  103.5  125.4
  0024: 2   -4.98 -167.23  35.02  25.20   40   0.222  0.238          118.3  21.77  0.241  0.362   9.54  22.38  57.02  94.99  102.4  121.7
  0026:13   -5.25 -167.33  35.02  25.46   40   0.225  0.241          117.0  21.75  0.239  0.349   9.23  21.65  55.47  93.16  102.3  123.4
  0028:25   -5.52 -167.42  35.02  25.73   42   0.225  0.241          114.6  20.98  0.234  0.339   9.09  21.47  55.47  91.91  100.0  120.4
  0030:36   -5.79 -167.52  35.02  26.01   50   0.227  0.243          117.3  21.44  0.236  0.336   9.08  21.41  55.84  92.91  102.3  123.4
  0032:48   -6.06 -167.62  35.03  26.29   29   0.227  0.243          118.4  21.25  0.234  0.330   9.08  21.75  56.39  93.94  101.9  123.2
  0034:59   -6.33 -167.72  35.02  26.58   26   0.226  0.242          116.0  21.29  0.238  0.324   8.92  21.12  54.77  91.68  100.2  122.4
  0037:11   -6.60 -167.82  35.02  26.87   31   0.228  0.244          114.4  20.85  0.222  0.312   8.71  20.87  54.71  91.14   99.5  119.7
  0039:22   -6.88 -167.92  35.02  27.17   39   0.228  0.244          117.2  21.12  0.232  0.310   8.81  21.11  55.19  92.74  100.9  123.1
  0041:34   -7.15 -168.02  35.02  27.48   60   0.231  0.248          119.3  21.12  0.224  0.300   8.72  21.37  55.91  94.82  103.5  125.1
  0043:45   -7.42 -168.12  35.02  27.79   59   0.229  0.245          116.5  20.93  0.225  0.288   8.65  21.00  55.60  92.66  100.9  121.2
  0045.57   -7.69 -168.22  35.02  28.11   39   0.227  0.243       M  115.9  21.16  0.236  0.274   7.91  20.03  49.80  89.53   97.3   98.6
  0048. 9   -7.96 -168.32  35.02  28.43   52   0.218  0.233       M  101.7  17.98  0.218  0.238   7.90  18.02  47.74  80.65   86.8  103.4
  0050:20   -8.23 -168.42  35.02  28.75   51   0.234  0.250          100.5  18.31  0.194  0.263   8.31  20.76  56.03  93.56  101.1  122.7
  0052.32   -8.51 -168.52  35.02  29.08   42   0.229  0.245          114.5  20.48  0.231  0.275   8.33  20.42  53.96  90.31   98.8  120.5
  0054:43   -8 77 -168.62  35.03  29.42   36   0.232  0.248          113.7  19.64  0.218  0.264   8.04  19.84  53.24  90.17   99.8  120.0
  0056:55   -9.05 -168.72  35.03  29.75   24   0.229  0.245          115.1  20.36  0.225  0.266   8.26  20.40  54.41  91.46   99.3  120.5
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DATE=  761108  (YR-MO-DAY)      DAY=  313      FLT NO=   7          NASA LATITUDE SURVEY - FALL 1976
   FDAR     LAT     LONG  PRESS     SUN    O3     MEAS   TOTAL 00000  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
HHMM:SS    (DEG     (DEG    ALT     ANG   PPB    OZONE  OZONE       (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)  (KFT)   (DEG)           (ATM-CM)               BB     BB     NB     NB      NB     NB     NB     NB     BB     BB
-------------------------------------------------------------------------------------------------------------------------------------------
0059. 6  -9.33 -168.82  35.03  30.09    23   0.231  0.247           117.2  20.72  0.222  0.256   8.18  20.22  54.19  93.00  101.1  123.0
0101:18  -9.60 -168.92  35.03  30.43    37   0.231  0.248           115.2  20.02  0.217  0.248   8.05  20.06  54.42  91.93   99.3  121.6
0103:30  -9.87 -169.02  35.01  30.78    47   0.232  0.248           114.4  20.10  0.226  0.236   7.78  19.40  53.00  89.39   97.3  119.1
0105.41 -10.14 -169.12  35.02  31.14    79   0.235  0.252           112.3  19.28  0.197  0.223   7.48  18.96  51.89  88.73   98.0  118.4
0107 53 -10.41 -169.22  35.03  31.49    64   0.234  0.251           112.0  19.14  0.208  0.215   7.47  18.98  52.30  89.01   96.0  117.0
0110: 4 -10.68 -169.32  35.03  31.85    84   0.233  0.251           111.0  18.88  0.206  0.209   7.24  18.32  50.08  86.14   94.3  116.0
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REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

DATE= 761108 (YR-MO-DAY) DAY= 313 PLT NO= 8 NASA LATITUDE SURVEY - FALL 1976

TBAR	LAT	LONG	PRESS	SUN	O3	MEAS	TOTAL	00000	374.1	312.8	289.2	294.5	303.9	308.4	318.8	326.1	365.5	395.6
HHMM:SS	(DEG	(DEG	ALT	ANG	PPB	OZONE	OZONE		(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)									
(GMT)	N)	E)	(KFT)	(DEG)		(ATM-CM)			BB	BB	NB	NB	NB	NB	NB	NB	BB	BB
2204:24	-17.88	-175.20	31.03	19.17	23	0.232	0.247		132.2	25.57	0.275	0.355	9.93	21.32	57.95	102.73	108.2	136.8
2206:35	-18.06	-175.42	31.04	18.86	24	0.248	0.263		132.9	21.04	0.242	0.345	9.35	23.56	60.25	102.94	113.0	133.5
2208:47	-18.23	-175.65	31.05	18.56	24	0.241	0.255		126.9	23.38	0.228	0.341	9.59	22.18	61.22	101.40	109.3	132.0
2210.59	-18.40	-175.87	31.05	18.26	28	0.241	0.256		114.9	19.68	0.227	0.320	9.46	22.92	57.92	100.52	108.5	132.3
2213·11	-18.57	-176.09	31.05	17.95	29	0.244	0.259		129.3	23.32	0.234	0.351	9.19	21.07	51.87	94.39	111.9	134.9
2215:22	-18.74	-176.32	31.06	17.66	27	0.222	0.236	M	129.6	27.06	0.370	0.347	10.25	24.21	63.98	82.77	86.1	121.6
2217 34	-18.91	-176.55	31.05	17.36	16	0.249	0.264		131.6	22.72	0.238	0.343	9.53	23.77	61.34	102.34	114.7	136.8
2219:46	-19.08	-176.78	31.05	17.07	16	0.244	0.259		128.0	23.78	0.243	0.338	9.77	22.77	61.80	102.79	111.2	140.4
2221:57	-19.25	-177.00	31.05	16.79	18	0.246	0.260		131.1	23.08	0.267	0.333	9.75	23.40	61.14	103.96	111.1	142.2
2224: 9	-19.42	-177.23	31.05	16.50	22	0.246	0.261		134.9	23.46	0.267	0.343	9.97	24.42	62.18	105.72	114.7	141.9
2226:21	-19.58	-177.45	31.04	16.21	18	0.249	0.264		134.5	23.35	0.258	0.347	9.84	24.51	62.33	103.38	115.2	141.3
2228 32	-19.74	-177.66	31.04	15.92	20	0.249	0.264		133.3	23.66	0.250	0.352	9.79	24.33	62.45	100.66	115.5	137.7
2230:44	-19.90	-177.88	31.06	15.64	19	0.247	0.262		132.9	24.34	0.241	0.362	10.01	23.95	63.36	99.84	116.7	140.5
2232 56	-20.06	-178.10	31.05	15.36	19	0.245	0.260		131.8	24.90	0.251	0.361	10.13	23.82	63.99	100.05	115.1	140.6
2235· 7	-20.22	-178.32	31.06	15.08	56	0.244	0.259		129.2	24.03	0.255	0.351	10.03	23.17	62.31	99.89	112.6	139.7
2237.19	-20.39	-178.54	31.05	14.81	18	0.244	0.259		127.0	23.50	0.252	0.341	9.90	22.83	61.84	98.63	110.9	138.8
2239.31	-20.55	-178.77	31.05	14.54	21	0.245	0.260		130.0	23.94	0.254	0.351	10.24	23.73	64.21	100.57	115.3	142.4
2241.42	-20.71	-178.99	31.05	14.29	21	0.243	0.258		134.8	24.71	0.264	0.364	10.72	25.01	66.64	101.21	119.3	145.2
2243:54	-20.87	-179.21	31.05	14.03	20	0.244	0.259		132.9	25.42	0.264	0.362	10.41	24.25	65.40	98.99	116.5	141.6
2246. 6	-21.03	-179.44	31.05	13.78	22	0.246	0.261		129.2	24.68	0.248	0.350	10.07	23.67	63.69	96.90	113.8	138.3
2248:17	-21.19	-179.66	31.05	13.53	23	0.249	0.264		130.0	24.25	0.245	0.344	9.98	23.64	63.94	97.26	114.8	140.0
2250 29	-21.35	-179.88	31 06	13.28	23	0.248	0.263		131.5	24.58	0.255	0.349	10.12	23.68	64.21	98.70	115.4	142.1
2252 41	-21.50	-180.10	31.05	13.04	26	0.250	0.266		129.6	24.11	0.234	0.346	9.89	23.57	63.35	97.33	115.2	138.5
2254:52	-21.66	179.68	31.06	12.80	24	0.253	0.268		129.6	23.54	0.238	0.334	9.66	23.04	63.00	98.12	113.3	137.0
2257 4	-21.81	179.46	31.05	12.57	25	0.247	0.262		129.3	23.75	0.263	0.328	10.00	22.86	62.06	101.36	111.1	141.0
2259:16	-21.97	179.24	31.04	12.35	28	0.261	0.277		133.5	21.94	0.222	0.321	9.53	24.29	62.31	101.97	118.9	143.6
2301·27	-22.12	179.02	31.05	12.13	29	0.256	0.272		134.4	24.32	0.243	0.338	9.81	24.51	63.99	99.49	117.6	140.7
2303.39	-22.27	178.80	31.05	11.91	24	0.258	0.274		133.6	23.90	0.248	0.331	9.53	24.01	62.10	100.42	112.7	142.9
2305:50	-22.42	178.58	31.06	11.71	27	0.255	0.271		134.9	24.01	0.248	0.323	9.94	23.61	64.67	98.90	117.7	143.9
2308: 2	-22.58	178.35	31.05	11.51	51	0.257	0.273		134.5	24.80	0.252	0.326	9.89	23.54	65.07	99.40	119.4	145.0
2310.14	-22.73	178.13	31.05	11.32	29	0.258	0.273		128.9	22.32	0.230	0.320	9.69	23.45	64.00	97.85	117.5	140.6
2312.25	-22.88	177.91	31.05	11.13	71	0.255	0.271		134.9	23.71	0.256	0.311	9.52	23.22	59.29	99.58	113.8	140.8
2314:37	-23.02	177.69	31.05	10.95	29	0.273	0.290		134.3	23.15	0.269	0.293	8.60	22.79	61.35	100.42	111.5	139.6
2316:48	-23.17	177.48	31.05	10.78	31	0.258	0.274		138.7	23.47	0.274	0.308	9.78	23.88	63.31	103.12	116.0	146.5
2319: 0	-23.32	177.25	31.06	10.62	34	0.258	0.274		129.5	22.74	0.259	0.300	9.64	23.28	62.48	100.96	114.8	145.2
2321:12	-23.47	177.03	31.87	10.47	34	0.259	0.275		133.5	22.90	0.241	0.299	9.83	23.55	64.34	99.45	117.3	146.5
2323:23	-23.61	176.82	34.16	10.32	43	0.255	0.273		135.5	24.54	0.263	0.324	10.15	23.91	65.43	99.95	117.7	143.5
2325:35	-23.76	176.60	31.96	10.19	52	0.258	0.275		129.4	23.24	0.239	0.302	9.42	22.51	62.59	97.84	114.8	133.1
2327:46	-23.91	176.36	31.00	10.08	74	0.265	0.282		130.3	23.13	0.219	0.299	9.13	22.92	61.69	97.23	116.1	137.7
2329:58	-24.07	176.13	31.05	9.98	90	0.266	0.284		131.1	22.68	0.233	0.289	8.90	22.90	59.64	97.26	112.7	137.2
2332:10	-24.21	175.91	31.05	9.88	93	0.265	0.282		133.5	22.28	0.248	0.279	8.99	22.59	59.93	98.59	111.0	140.1
2334:21	-24.36	175.68	31.05	9.79	96	0.264	0.281		135.4	22.60	0.259	0.278	9.29	22.83	62.00	100.10	114.3	143.7
2336:33	-24.50	175.46	31.05	9.71	91	0.264	0.281		131.2	22.47	0.237	0.274	9.21	22.12	61.95	97.45	114.9	140.0
2338 44	-24.65	175.23	31.05	9.64	91	0.268	0.286		127.9	22.60	0.213	0.274	8.87	22.12	60.79	95.38	115.0	136.2
2340.56	-24.79	175.01	31.05	9.59	92	0.269	0.287		129.8	22.51	0.215	0.278	8.74	22.44	59.88	96.75	113.8	136.3
2343· 7	-24.94	174.78	31.06	9.55	111	0.268	0.286		135.9	22.60	0.250	0.276	8.96	22.95	60.39	100.81	112.9	141.7
2345:19	-25.08	174.56	31.05	9.51	122	0.265	0.283		132.7	21.90	0.254	0.272	9.09	22.39	60.79	98.91	112.3	141.2
2347:30	-25.23	174.33	31.05	9.49	84	0.263	0.280		129.2	22.19	0.238	0.270	9.07	21.63	60.81	96.01	111.9	136.8
2349:42	-25.37	174.10	31.05	9.49	88	0.265	0.283		130.6	23.28	0.233	0.280	9.19	22.36	62.42	97.37	115.1	139.6
2351:54	-25.52	173.86	31.05	9.50	93	0.266	0.284		130.3	23.10	0.226	0.283	9.07	22.46	61.69	97.11	115.7	137.0
2354: 5	-25.67	173.63	31.05	9.52	88	0.268	0.286		129.8	22.54	0.217	0.283	8,83	22.39	60.64	95.91	114.2	136.5
2356:17	-25.81	173.40	31.05	9.55	84	0.264	0.281		126.2	22.77	0.231	0.276	8.99	21.72	60.66	94.84	111.1	136.0
2358·29	-25.95	173.17	31.05	9.59	84	0.264	0.281		127.3	22.63	0.231	0.278	9.02	21.80	61.01	95.29	112.3	136.3
0000:40	-26.10	172.93	31.05	9.64	83	0.266	0.284		128.3	22.72	0.221	0.276	8.95	22.03	61.22	95.94	114.1	136.7
0002.52	-26.24	172.70	31.05	9.70	82	0.268	0.285		127.7	22.37	0.215	0.274	8.75	21.95	59.96	95.59	113.4	134.2
0005: 3	-26.38	172.47	31.05	9.77	83	0.269	0.287		127.1	21.90	0.214	0.273	8.56	21.90	59.07	94.76	112.1	132.2

DATE= 761109 (YR-MO-DAY) DAY= 314 FLT NO= 8 NASA LATITUDE SURVEY - FALL 1976

TBAR HHMM-SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE (ATM-CM)	00000	374.1 BB	312.8 BB	289.2 NB	294.5 NB	303.9 NB	308.4 NB	318.8 NB	326.1 NB	365.5 BB	395.6 BB
									(MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM) WAVELENGTH IN NM)									
0007:15	-26.52	172.23	31.05	9.85	84	0.269	0.287		127.6	21.90	0.216	0.272	8.54	21.97	58.92	95.50	111.7	132.2
0009:27	-26.67	171.99	31.27	9.95	85	0.269	0.287		129.3	22.10	0.220	0.274	8.67	22.28	59.47	96.91	113.2	134.2
0011:38	-26.81	171.76	32.04	10.05	82	0.269	0.287		128.7	21.97	0.225	0.274	8.65	22.30	59.21	96.23	111.7	132.8
0013:50	-26.95	171.52	31.29	10.16	83	0.271	0.289		128.1	21.63	0.222	0.261	8.40	21.80	58.19	96.17	110.5	132.4
0016: 2	-27.10	171.27	31.05	10.29	68	0.271	0.289		128.2	21.62	0.225	0.256	8.38	21.89	58.07	96.76	110.0	132.9
0018:13	-27.24	171.03	31.05	10.41	81	0.272	0.290		130.3	21.61	0.225	0.254	8.38	22.02	58.44	97.43	111.3	133.4
0020:25	-27 38	170.79	31.06	10.55	86	0.272	0.291		128.5	21.37	0.218	0.252	8.29	21.68	58.14	96.49	110.5	132.1
0022.36	-27.52	170.55	31.06	10.69	85	0.274	0.292		126.6	20.99	0.217	0.242	8.14	21.35	57.51	95.66	109.9	131.0
0024:48	-27.66	170.31	31.18	10.83	85	0.275	0.294		128.3	21.30	0.211	0.241	8.19	21.41	58.61	96.23	112.5	132.8
0026.59	-27.79	170.08	31.75	10.99	81	0.274	0.292		128.7	21.82	0.207	0.244	8.39	21.40	59.89	96.28	113.6	134.9
0029 11	-27.93	169.84	32.19	11.15	83	0.272	0.291		126.4	22.05	0.216	0.241	8.47	21.21	60.09	95.48	111.9	135.4
0031-22	-28.06	169.60	33.01	11.31	80	0.272	0.291		125.2	21.89	0.220	0.240	8.46	20.94	59.71	95.10	111.1	134.5
0033.34	-28.20	169.36	33.87	11.49	84	0.272	0.291		127.0	22.34	0.228	0.243	8.63	21.34	60.96	96.97	112.3	137.5
0035 45	-28 33	169.13	34.98	11.66	86	0.268	0.287		131.0	22.95	0.252	0.252	9.02	22.05	61.67	100.10	112.8	141.8
0037-57	-28.46	168.90	35.03	11.84	82	0.268	0.288		131.7	22.23	0.261	0.246	8.83	22.16	60.22	100.52	111.3	140.3
0040: 8	-28.59	168.67	35.03	12.03	79	0.272	0.292		131.2	21.54	0.250	0.242	8.46	21.87	58.66	99.08	110.9	135.4
0042.20	-28.72	168.43	35.03	12.21	77	0.274	0.294		131.6	21.70	0.236	0.243	8.30	21.96	58.66	97.72	111.8	132.6
0044.32	-28.85	168.19	35.04	12.41	79	0.276	0.296		129.3	21.86	0.216	0.241	8.28	21.26	59.45	96.29	113.4	133.9
0046 43	-28.98	167.96	35.03	12.61	79	0.271	0.291	R	123.6	21.86	0.225	0.224	8.42	21.51	59.69	95.13	107.7	133.3
0048:55	-29.08	167.72	35.03	12.78	126	0.272	0.293		125.5	21.01	0.250	0.217	8.16	20.71	57.10	97.89	106.9	132.6
0051. 6	-29.18	167.47	35 03	12.96	77	0.278	0.298		128.3	20.48	0.225	0.223	7.91	21.13	57.27	96.51	110.1	130.1
0053 18	-29.28	167.22	35.04	13.14	82	0.279	0.300		127.8	21.55	0.216	0.224	8.03	20.71	59.54	96.53	112.0	133.5
0055.29	-29.38	166.97	35.03	13.32	83	0.477	0.512	N	143.5	0.00	0.000	1.438	37.22	44.94	80.96	38.35	153.3	0.7
0057-35	-29.48	166.74	35.03	13.51	82	0.275	0.295		122.9	21.04	0.224	0.211	8.05	20.05	57.81	96.44	109.1	131.9
0059-47	-29.58	166.49	35.03	13.70	83	0.273	0.293		125.5	21.56	0.241	0.213	8.19	20.64	58.29	100.06	108.2	135.4
0101:59	-29.68	166.25	35.03	13.89	82	0.279	0.300		131.7	20.99	0.231	0.221	7.95	21.58	58.27	100.51	112.3	133.3
0104-10	-29.78	166.00	35.03	14.09	80	0.279	0.300		127.2	21.79	0.213	0.218	7.98	20.52	59.52	98.20	110.6	134.9
0106.21	-29.88	165.75	35.03	14.30	85	0.273	0.294		125.6	21.24	0.239	0.203	8.03	20.40	57.51	100.11	107.4	133.2
0108-33	-29.98	165.51	35.03	14.50	89	0.280	0.301		130.6	20.76	0.227	0.210	7.75	21.05	57.46	99.95	110.4	131.5
0110:44	-30.08	165.26	35.03	14.71	87	0.280	0.300		130.4	22.17	0.219	0.214	7.97	20.89	59.85	99.55	112.4	135.2
0112-56	-30.19	165.02	35.03	14.93	72	0.276	0.296		123.9	21.58	0.224	0.204	7.95	20.06	58.29	99.62	107.5	134.2
0115: 7	-30.29	164.79	35.03	15.15	70	0.275	0.295		121.3	19.96	0.235	0.200	7.62	20.26	55.35	98.02	105.7	126.8
0117:19	-30.39	164.55	35.04	15.37	68	0.280	0.300		128.0	20.94	0.214	0.212	7.78	20.57	58.38	97.94	111.4	133.4
0119 31	-30.50	164.31	35.04	15.59	70	0.273	0.293		128.8	21.93	0.254	0.209	8.25	21.02	59.50	105.32	110.8	137.8
0121.42	-30.61	164.07	35.03	15.82	58	0.279	0.299		131.4	21.17	0.221	0.217	7.88	21.16	59.32	100.60	113.8	133.3
0123.54	-30.72	163.82	35.03	16.05	66	0.273	0.293		126.2	22.13	0.240	0.205	8.15	20.26	59.09	102.24	108.8	137.8
0126: 5	-30.83	163.58	35.03	16.28	67	0.285	0.306	R	128.1	20.03	0.221	0.201	7.59	20.56	56.90	99.10	110.3	143.1
0128:17	-30.92	163.33	35.03	16.50	65	0.276	0.296	R	125.4	22.38	0.227	0.204	8.02	20.24	59.43	102.42	110.8	137.1
0130:28	-30.99	163.07	35.03	16.70	68	0.276	0.296	R	127.0	20.60	0.259	0.204	7.71	21.30	56.58	99.63	108.2	129.9
0132:40	-31.06	162.81	35.04	16.89	65	0.279	0.299		121.0	20.37	0.208	0.201	7.71	20.25	58.59	98.16	109.5	133.9
0134:51	-31.11	162.54	35.03	17.08	68	0.271	0.291		126.9	21.33	0.259	0.194	7.85	20.33	56.53	100.30	108.0	131.2
0137: 2	-31.17	162.28	35.03	17.27	67	0.281	0.302		125.0	19.42	0.182	0.200	7.73	20.65	59.57	100.07	113.6	136.2
0139:14	-31.23	162.02	35.03	17.46	74	0.279	0.299		126.9	20.77	0.218	0.181	7.52	20.04	56.99	102.84	109.4	131.0
0141:26	-31.31	161.77	35.03	17.68	67	0.282	0.303		123.3	20.61	0.207	0.182	7.34	19.40	57.64	97.76	107.4	130.9
0143:37	-31.40	161.52	35.05	17.90	56	0.277	0.297		125.6	20.57	0.248	0.176	7.30	19.82	55.45	96.39	105.2	123.9

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DATE=  751109  (YR-MO-DAY)      DAY=  314      FLT NO=   8              NASA LATITUDE SURVEY - FALL 1976
   TBAR     LAT     LONG   PRESS     SUN    O3    MEAS   TOTAL  QQQQQ  374.1   312.8   289.2   294.5   303.9   308.4   318.8   326.1   365.5   395.6
HHMM:SS    (DEG     (DEG     ALT     ANG   PPB   OZONE   OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)   (KFT)   (DEG)        (ATM-CM)                 BB      BB      NB      NB      NB      NB      NB      NB      BB      BB
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0148: 0 -31.57  161.00   35.04   18.35    54   0.285   0.305           127.2   19.71   0.206   0.176    7.20   20.07   57.32   98.76   110.8   131.1
0150:12 -31.66  160.74   35.04   18.57    53   0.282   0.302           121.1   20.02   0.223   0.160    7.04   19.08   54.28  100.68   106.0   130.1
0152.23 -31.75  160.48   35.04   18.79    58   0.286   0.307           122.4   19.80   0.193   0.162    6.95   19.00   55.88   95.62   109.2   127.9
0154:35 -31.83  160.22   35.06   19.02    59   0.289   0.310           123.7   18.63   0.224   0.154    7.04   19.82   57.24  102.28   112.5   134.1
0156:46 -31.92  159.95   35.96   19.24    58   0.284   0.305           127.5   21.87   0.233   0.164    7.40   19.43   58.95  102.22   109.9   136.6
0158:58 -32.00  159.69   38.46   19.47    80   0.287   0.311           130.8   20.08   0.220   0.174    7.26   20.27   59.06  100.52   113.4   133.6
0201: 9 -32.08  159.44   38.99   19.69    82   0.277   0.300           127.7   21.83   0.248   0.175    7.70   20.20   58.73  103.49   109.3   136.1
0203.21 -32.16  159.19   38.99   19.92    69   0.283   0.306           132.9   20.96   0.248   0.177    7.50   21.03   59.30  104.93   113.9   134.8
0205:32 -32.24  158.94   38.98   20.15    93   0.285   0.308           128.8   21.25   0.213   0.176    7.45   20.05   60.16  101.90   113.7   134.8
0207:44 -32.32  158.69   38.99   20.39    65   0.280   0.302           126.3   21.64   0.244   0.165    7.50   19.71   58.54  103.42   109.2   135.6
0209:55 -32.39  158.45   38.98   20.62    65   0.279   0.301           127.6   20.38   0.246   0.162    7.34   19.89   57.14  101.97   108.1   130.9
0212. 7 -32.47  158.20   38.98   20.85    61   0.284   0.307           128.0   20.45   0.218   0.168    7.04   19.80   57.06   99.61   109.8   126.4
0214:18 -32 55  157.95   38.98   21.09    60   0.281   0.304   R       115.5   19.99   0.214   0.161    7.20   18.85   57.13   98.46   107.1   130.9
0216.29 -32.63  157.70   38.98   21.32    74   0.283   0.306           122.2   18.93   0.222   0.156    6.73   18.63   53.41   96.46   105.9   125.6
0218:41 -32.70  157.44   38.99   21.55   139   0.286   0.310           125.5   20.49   0.201   0.160    7.05   19.01   57.85   97.37   109.1   133.0
0220:52 -32.78  157.18   38.99   21.77   159   0.281   0.306           129.9   20.49   0.234   0.157    7.25   19.85   57.41  103.13   111.0   134.3
0223. 4 -32.85  156.91   38.98   22.00   140   0.288   0.313           128.3   20.10   0.206   0.155    6.81   19.15   57.32   97.77   109.2   130.7
0225 15 -32 93  156.65   38.98   22.23   174   0.279   0.304           120.8   19.86   0.227   0.145    6.87   18.57   54.11   98.16   104.1   127.6
0227 27 -33.00  156.38   39.99   22.45   140   0.289   0.314           124.9   19.17   0.205   0.151    6.57   18.56   55.66   94.72   108.0   127.9
0229.38 -33.08  156.11   38.98   22.67   142   0.282   0.307           123.9   20.21   0.233   0.143    6.94   18.92   56.22  100.59   106.9   132.0
0231.50 -33.15  155.84   38.98   22.90   138   0.286   0.311           125.9   19.33   0.199   0.146    6.73   18.68   56.24   96.39   110.1   128.2
0234: 1 -33.22  155.58   38.98   23.13   133   0.283   0.307           121.0   19.73   0.215   0.138    6.74   18.41   54.98   97.67   105.8   129.7
0236:13 -33.29  155.32   38.98   23.35   133   0.289   0.314           125.7   19.05   0.201   0.141    6.48   18.66   55.88   95.58   108.4   128.0
0238.24 -33.37  155.05   38.99   23.58   138   0.283   0.307           122.8   19.84   0.224   0.132    6.78   18.63   55.50   99.28   107.5   130.5
0240 36 -33.44  154.79   38.99   23.80   143   0.290   0.315           125.1   19.19   0.198   0.137    6.49   18.33   56.05   95.43   109.0   129.2
0242.47 -33.51  154.52   39.98   24.03   145   0.282   0.306           119.9   19.86   0.224   0.128    6.56   18.06   53.72   97.22   102.4   127.4
0244.58 -33.58  154.25   38.98   24.25   139   0.296   0.322   R       124.7   18.71   0.200   0.134    6.32   17.83   59.23   98.79   107.0   127.3
0247:10 -33.62  153.97   38.99   24.46   127   0.284   0.308           123.6   19.31   0.228   0.131    6.61   18.58   54.23   99.19   107.0   129.1
0249:21 -33.66  153.68   38.99   24.65   118   0.287   0.311           122.4   19.84   0.206   0.133    6.57   17.78   55.89   96.03   105.6   131.0
0251:33 -33.70  153.41   38.09   24.85   113   0.288   0.311 P         121.3   17.57   0.195   0.129    6.29   17.99   54.38   94.68   107.9   126.5
0253:44 -33.73  153.11   34.15   25.04    85   0.283   0.304   R A     129.6   18.74   0.203   0.110    6.03   16.70   50.83   92.44   100.7   121.9
0255 56 -33.77  152.81   29.65   25.22    78   0.297   0.316     A     120.0   18.01   0.177   0.102    5.57   16.02   52.43   91.95   102.0   126.2
0258: 7 -33.80  152.51   24.88   25.41    67   0.300   0.315     A     121.4   16.35   0.176   0.088    5.06   15.23   48.67   84.87    99.7   121.0
0300.19 -33.82  152.22   19.37   25.59    83   0.302   0.316     A     114.9   15.60   0.165   0.071    4.58   14.28   45.73   82.70    96.6   115.3
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DATE=  761110  (YR-MO-DAY)      DAY=  315     FLT NO=   9            NASA LATITUDE SURVEY - FALL 1976
   TBAR     LAT      LONG  PRESS     SUN   O3    MEAS   TOTAL 00000  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
HHMM:SS    (DEG      (DEG    ALT     ANG  PPB   OZONE  OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)        E)  (KFT)   (DEG)        (ATM-CM)                BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
---------------------------------------------------------------------------------------------------------------------------------------
2116:33 -38.58  145.19  37.03  65.11  158  0.289  0.314  R  M    8.6   0.00  0.000  0.000   0.00   1.66  12.90  30.66   36.6   48.0
2118:44 -38.84  145.13  37.04  64.72  172  0.277  0.301          58.5   2.98  0.000  0.000   0.18   2.47  17.64  40.62   50.2   62.0
2120:56 -39.11  145.C7  37.04  64.33  174  0.277  0.301          59.3   3.27  0.000  0.000   0.20   2.66  18.81  43.03   51.3   65.4
2123: 7 -39.37  145.01  37.04  63.95  183  0.278  C.303          62.8   3.57  0.000  0.000   0.22   2.81  19.67  44.38   52.9   68.5
2125-19 -39.63  144.94  37.04  63.57  196  0.282  0.307          61.7   3.57  0.000  0.000   0.24   2.83  20.19  44.75   53.6   68.3
2127:30 -39.89  144.88  37.04  63.19  202  0.265  0.311          63.3   3.88  0.000  0.000   0.25   2.87  19.91  45.02   54.3   68.7
2129:42 -40.16  144.81  37.04  62.82  196  0.286  0.312          64.3   3.84  0.000  0.000   0.27   2.99  20.56  46.56   55.1   70.5
2131:53 -40.42  144.75  37.04  62.45  200  0.289  0.315          68.4   4.37  0.000  0.000   0.31   3.08  20.98  48.02   56.5   71.0
2134: 5 -40.69  144.68  36.70  62.09  194  0.279  C.303  P       65.0   4.45  0.000  0.000   0.33   3.17  20.74  44.82   53.6   64.2
2136 16 -40.95  144.61  32.07  61.73   82  0.291  0.311     A    59.6   3.95  0.000  0.000   0.24   2.77  18.91  42.08   50.3   63.1
2138:28 -41.22  144.55  26.20  61.37   87  0.295  0.312     A    57.6   3.49  0.000  0.000   0.22   2.54  17.23  39.33   47.3   60.2
2140.39 -41.48  144.48  21.54  61.02   73  0.226  0.237  PRT M   43.3   5.36  0.096  0.000   0.36   2.31  15.25  34.74   18.2   19.0
2142:51 -41.51  144.36  21.01  60.70   92  0.441  0.463   RT M  224.7  12.43  0.247  0.000   0.52   4.17  33.50  80.06  127.9  188.0
2145: 2 -41.29  144.43  21.02  60.22   73  0.309  0.324          57.3   2.77  0.000  0.000   0.20   2.53  17.32  39.91   50.0   62.9
2147:14 -41.07  144.52  21.03  59.73   66  0.316  0.330          59.7   2.75  0.000  0.000   0.23   2.67  18.38  42.64   53.8   66.5
2149:25 -40.85  144.61  21.03  59.24   79  0.310  0.324          64.8   3.29  0.000  0.000   0.31   3.08  20.39  46.69   57.6   71.7
2151-37 -40.63  144.70  21.03  58.74   81  0.307  0.321          66.7   3.85  0.000  0.000   0.33   3.15  20.03  45.82   55.6   69.8
2153 48 -40.40  144.79  21.03  58.25   82  0.303  0.318          66.5   4.07  0.000  0.000   0.40   3.43  21.25  47.29   57.7   72.1
2156- 0 -40.18  144.88  21.03  57.75   81  0.303  0.318          69.5   4.20  0.000  0.000   0.47   3.75  22.68  50.54   61.6   75.7
2159 12 -39.95  144.97  21.04  57.24   78  0.246  0.257   RT M   62.2   5.70  0.068  0.000   0.59   3.67  21.19  46.15   42.4   21.2
2200:23 -39.82  144.91  18.17  56.86   89  0.319  0.334  PRTAM   40.3   0.00  0.000  0.000   0.52   5.93  40.83  90.96  115.7  103.2
2202 35 -40.03  144.84  10.68  56.51   39  0.322  0.329  P  A    61.8   3.01  0.000  0.000   0.34   3.09  19.82  45.10   56.8   72.4
2204 46 -40.23  144.80  10.15  56.14   43  0.314  0.321          72.2   4.12  0.000  0.000   0.45   3.49  21.61  48.63   59.8   76.0
2206.58 -40.40  144.75  10.15  55.78   37  0.318  0.324          68.8   3.80  0.000  0.000   0.45   3.59  22.52  50.15   61.3   78.0
2209.10 -40.58  144.71  10.15  55.42   45  0.351  0.359   R  M   76.7   3.40  0.000  0.000   0.41   3.69  25.11  56.56   70.9  107.5
2211:22 -40.75  144.76  10.15  54.98   49  0.311  0.318   R      91.7   5.86  0.000  0.000   0.57   3.99  23.67  52.32   63.3   78.7
2213-33 -40.90  144.93  10.15  54.46   66  0.310  0.318          67.2   4.14  0.000  0.000   0.58   3.96  23.04  50.69   60.2   75.4
2215-45 -41.04  145.10  10.15  53.95   76  0.384  0.395      M   68.7   2.68  0.000  0.000   0.47   3.30  19.69  56.23   71.2   81.4
2217-57 -41.19  145.27  10.18  53.43   70  0.313  0.322  P       70.0   4.84  0.000  0.000   0.60   4.12  23.76  51.21   60.9   74.6
2220: 9 -41.36  145.48  13.71  52.90   53  0.300  0.309  P  A    62.9   4.63  0.000  0.000   0.78   4.49  23.41  50.72   58.2   70.8
2222:20 -41.55  145.69  19.18  52.37   61  0.301  0.313    TA    65.9   5.34  0.000  0.003   0.87   4.73  23.84  50.46   58.5   72.2
2224 32 -41.74  145.32  23.17  51.83   64  0.297  0.312     A    71.3   5.93  0.000  0.004   1.11   5.54  26.93  55.71   63.5   78.6
2226.44 -41.95  146.17  26.86  51.29   47  0.298  0.314     A    73.6   6.45  0.000  0.006   1.22   5.89  27.78  57.89   65.8   80.6
2228:56 -42.16  146.43  29.59  50.75   46  0.298  0.316          75.9   6.73  0.000  0.007   1.34   6.23  28.82  59.28   67.5   82.5
2231: 8 -42.38  146.70  32.47  50.21   59  0.299  0.319     A    76.3   6.96  0.000  0.008   1.39   6.35  28.90  59.22   66.9   81.5
2233:19 -42.60  146.97  35.83  49.67   87  0.298  0.320          76.0   7.30  0.000  0.008   1.53   6.72  29.64  60.08   68.1   83.5
2235:31 -42.76  147.26  37.91  49.12  170  0.200  0.217  PRT M   72.1  19.44  0.347  0.018   1.92   6.06  21.01  33.80   29.7   23.7
2237:43 -42.57  147.37  38.32  48.60  198  0.300  0.327   R      17.7  11.33  0.119  0.011   1.75   7.41  31.55  65.11   73.0   88.6
2239:55 -42.31  147.29  39.00  48.20  228  0.289  0.317   R     104.7  12.13  0.141  0.016   2.29   9.27  38.19  74.41   85.1  101.5
2242: 6 -42.02  147.26  39.02  47.75  228  0.303  0.331          94.9   9.21  0.088  0.012   2.01   8.36  35.51  71.42   80.5   99.1
2244.18 -41.74  147.23  39.02  47.30  233  0.298  0.327          91.6   9.58  0.099  0.014   2.15   8.69  36.21  71.80   80.7   97.7
2246:29 -41.48  147.16  39.03  46.88  196  0.298  0.325   R      51.0   4.58  0.000  0.013   2.11   8.73  36.14  70.95   78.8   97.1
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DATE=  761110  (YR-MO-DAY)      DAY=  315      FLT NO=   9              NASA LATITUDE SURVEY - FALL 1976
    TBAR     LAT      LONG  PRESS     SUN    O3     MEAS   TOTAL  QQQQQ   374.1   312.8   289.2   294.5   303.9   308.4   318.8   326.1   365.5   395.6
  HHMM:SS   (DEG     (DEG    ALT      ANG   PPB    OZONE   OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-MM)  WAVELENGTH IN MM)
   (GMT)      N)       E)   (KFT)   (DEG)          (ATM-CM)                 BB      BB      NB      NB      NB      NB      NB      NB      BB      BB
-------------------------------------------------------------------------------------------------------------------------------------------------
  2250:52 -41.00  146.89  39.02  46.16  218    0.279   0.305 PR  M  100.8   13.32   0.480   0.034   2.77    8.39   31.16   62.42   71.3    93.3
  2253: 4 -40.76  146.79  39.02  45.76  213    0.298   0.325         95.4   10.85   0.099   0.017   2.59    9.75   38.89   78.06   87.2   105.1
  2255:16 -40.51  146.66  39.02  45.39  220    0.296   0.324         99.5   11.39   0.102   0.019   2.66    9.92   39.35   77.26   86.3   105.2
  2257:27 -40.28  146.53  39.02  45.01  211    0.295   0.322        100.1   11.40   0.107   0.020   2.74   10.29   40.37   78.29   87.5   106.7
  2259:39 -40.04  146.41  39.02  44.63  201    0.288   0.315        103.5   11.97   0.120   0.022   2.92   11.09   41.97   80.73   88.9   109.9
  2301:50 -39.79  146.28  39.02  44.25  190    0.289   0.316        102.2   12.21   0.118   0.022   3.00   11.01   41.47   81.41   89.2   108.9
  2304: 1 -39.55  146.16  39.03  43.86  189    0.290   0.316        103.6   12.31   0.124   0.023   2.96   11.09   41.65   80.23   88.9   107.9
  2306.13 -39.31  146.03  39.02  43.48  194    0.287   0.314        106.0   12.56   0.120   0.028   3.18   11.43   42.09   81.18   90.6   109.7
  2308:24 -39.06  145.91  39.02  43.09  197    0.287   0.313        104.7   13.16   0.129   0.033   3.35   11.71   43.13   82.67   91.2   112.0
  2310:36 -38.81  145.79  39.02  42.70  204    0.286   0.312        104.3   12.95   0.134   0.035   3.41   11.87   42.95   82.46   92.0   111.1
  2312.47 -38.57  145.66  39.02  42.31  199    0.256   0.279 R   M  100.4   15.96   0.239   0.039   3.59   11.80   42.03   73.10   62.2    85.2
  2314.59 -38.36  145.48  39.02  41.97  207    0.285   0.311 R      102.4   12.84   0.137   0.038   3.63   12.17   43.63   83.88   92.3   113.0
  2317:10 -38.17  145.26  39.02  41.67  173    0.282   0.307        107.6   13.91   0.131   0.041   3.75   12.67   44.34   84.18   93.7   114.9
  2319·22 -37.98  145.04  38.99  41.37  188    0.278   0.303        105.3   13.80   0.138   0.043   3.89   12.84   44.42   81.93   92.1   113.3
  2321.33 -37.79  144.83  35.93  41.06  124    0.266   0.287 PR AM   94.1   13.02   0.156   0.041   3.77   11.28   37.59   71.64   80.1    99.1
  2323.45 -37.59  144.62  28.36  40.74   68    0.225   0.239  RTAM   85.5   15.52   0.246   0.035   3.22   10.21   26.49   35.61   39.7    56.9
  2325.56 -37 61  144.47  24.96  40.45   91    0.253   0.267  RT M  156.8   24.75   0.394   0.075   6.85   21.76   73.43  127.99  132.2   160.8
  2328- 8 -37.70  144.73  24.98  39.87   79    0.253   0.267  RT M   89.0   14.43   0.137   0.030   3.17    9.58   28.57   44.96   59.7    90.7
  2330·19 -37.86  144.96  24.96  39.35   72    0.290   0.306  R     101.4   13.40   0.000   0.019   3.34   10.22   35.96   73.71   84.6   103.6
  2332:31 -38 06  145.13  24.96  38.89   71    0.291   0.306        100.3   11.96   0.106   0.036   3.30   11.28   39.98   74.40   86.2   107.1
  2334:42 -38.26  145.30  24.97  38.44   69    0.337   0.355         87.1    8.08   0.000   0.022   2.93    9.12   38.40   70.57   88.9   114.5
  2336 54 -38.45  145.46  24.98  38.00   69    0.296   0.312        105.4   12.85   0.118   0.039   3.49   11.73   42.58   80.90   90.5   111.2
  2339: 5 -38.64  145.63  24.98  37.57   70    0.297   0.313        103.2   12.79   0.126   0.040   3.54   11.88   42.91   82.16   90.3   112.9
  2341·17 -38.84  145.79  24.93  37.15   70    0.354   0.373 PRT M  114.1    7.96   0.000   0.039   3.58   13.05   50.13  116.56  135.9   159.3
  2343 29 -38.84  145.98  20.14  36.63   82    0.285   0.299 PRTA   130.4   14.87   0.229   0.042   3.72   12.32   42.90   78.85   87.2   109.0
  2345 40 -38.65  145.85  12.29  36.25   80    0.309   0.320 P  A   102.4   10.81   0.098   0.025   2.81   10.14   38.49   74.21   83.6   104.8
  2347:52 -38 51  145.67  10.21  35.94   55    0.309   0.317        105.4   11.55   0.103   0.027   2.99   10.83   41.08   78.59   90.1   113.2
  2350. 3 -38.40  145.51  10.22  35.61   62    0.305   0.313        108.3   11.66   0.103   0.029   3.04   10.67   39.24   75.03   88.0   112.1
  2352·15 -38 28  145.36  10.24  35.28   67    0.308   0.316 R      116.9   12.12   0.106   0.029   2.94    9.48   35.45   70.89   81.6   103.3
  2354:27 -38.15  145.22  10.23  34.93   63    0.314   0.323 R       99.3   10.14   0.000   0.029   2.83    9.93   36.79   76.68   85.8   106.9
  2356:38 -38.00  145.09  10.22  34.58   65    0.315   0.323         90.7    9.40   0.000   0.028   2.83    9.91   36.32   70.30   85.8   109.1
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DATE=  761111  (YR-MO-DAY)      DAY=  316      FLT NO=  10             NASA LATITUDE SURVEY - FALL 1976
   TBAR     LAT      LONG  PRESS     SUN   O3    MEAS   TOTAL  OOOOO  374.1  312.8  289.2  294.5  303.9  308.4  318.0  326.1  365.5  395.6
 HHMM:SS   (DEG     (DEG    ALT      ANG  PPB   OZONE  OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
   (GMT)     N)       E)   (KFT)   (DEG)          (ATM-CM)              BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
------------------------------------------------------------------------------------------------------------------------------------------
 2129:42 -35.47  142.38  31.06  64.93   84   0.293  0.313           53.7   2.26  0.000  0.000   0.12   2.08  15.26  37.90   47.9   58.7
 2131:53 -35.19  142.43  31.06  64.46  107   0.289  0.309           55.2   2.40  0.000  0.000   0.16   2.29  15.95  39.31   48.3   62.7
 2134: 5 -34.91  142.48  31.05  63.99  115   0.289  0.309           56.9   2.48  0.000  0.000   0.15   2.37  16.77  40.20   50.7   61.1
 2136:16 -34.63  142.54  31.05  63.51  108   0.281  0.300           57.0   3.04  0.000  0.000   0.25   2.60  17.65  41.04   50.1   63.3
 2138 28 -34.36  142.60  31.06  63.02   93   0.185  0.197  RT M     56.7   7.84  0.160  0.000   0.60   3.16  18.88  16.52   11.9   12.7
 2140:40 -34.16  142.50  29.70  62.67   90   0.260  0.277  PRTAM    22.6   0.00  0.000  0.000   0.29   2.28  14.06  31.27   34.7   44.3
 2142:51 -34.16  142.24  25.29  62.43  100   0.297  0.314  PRT M    68.6   0.00  0.000  0.000   0.00   4.69  33.68  81.23  116.3   95.2
 2145: 3 -34.38  142.15  24.96  62.04   89   0.284  0.299           58.1   3.30  0.000  0.000   0.29   2.74  17.13  41.08   48.9   63.9
 2147.14 -34.61  142.10  24.97  61.62   87   0.282  0.298           61.3   3.66  0.000  0.000   0.33   3.01  18.92  42.61   52.7   68.1
 2149:26 -34.83  142.07  25.00  61.18   87   0.284  0.300   RT M   151.2   0.00  0.000  0.000   0.78   9.68  64.29 130.23  181.2  198.0
 2151:37 -34.83  142.22  24.96  60.61   88   0.268  0.283   RT M    11.1   0.00  0.000  0.000   0.27   2.48  14.42  31.57   37.2   45.0
 2153:49 -34.63  142.26  24.97  60.14   88   0.282  0.298           61.9   3.58  0.000  0.000   0.44   3.43  20.41  45.54   55.1   69.1
 2156: 0 -34.41  142.28  24.98  59.67   91   0.281  0.297           64.3   3.98  0.000  0.000   0.50   3.62  20.92  46.37   56.2   69.7
 2158.12 -34.20  142.31  24.70  59.20   89   0 218  0.230  PR  M    57.5   5.70  0.076  0.000   0.67   3.71  19.57  39.34   35.9   17.0
 2200:24 -34.07  142.19  18.74  58.84   88   0.327  0.342  PRTA     22.2   0.00  0.000  0.000   0.31   2.83  16.09  39.58   51.5   75.7
 2202.35 -34.21  142.03  15.38  58.52  109   0.298  0.312  PRT     111.7   7.63  0.000  0.000   0.44   3.49  21.00  45.62   59.6   79.1
 2204:47 -34.42  142.01  15.01  58.08   76   0.292  0.303           59.6   3.27  0.000  0.000   0.45   3.27  19.06  41.86   52.5   67.4
 2206:58 -34.61  142.01  15.02  57.63   65   0.307  0.317   RT M    72.1   0.00  0.000  0.000   0.54   4.45  28.18  61.58   81.6   90.2
 2209.10 -34.79  142.12  15.03  57.09   58   0.292  0.302      M    54.9   3.50  0.000  0.000   0.48   3.28  18.66  40.54   50.1   62.2
 2211:22 -34.98  142.28  15.03  56.52   38   0.293  0.302      M    58.7   3.79  0.000  0.000   0.53   3.48  19.51  42.78   51.8   64.5
 2213.33 -35.17  142.44  15.03  55.94   42   0.289  0.297           61.9   4.33  0.000  0.000   0.65   3.88  21.21  44.79   53.5   67.5
 2215 45 -35.36  142.62  15.03  55.36   52   0.300  0.310           61.9   3.77  0.000  0.000   0.62   3.88  20.89  47.86   56.4   72.2
 2217:57 -35.54  142.82  15.02  54.76   51   0.291  0.300           65.3   4.77  0.000  0.000   0.74   4.08  21.09  45.49   54.2   69.0
 2220: 8 -35.72  143.04  15.04  54.14   48   0.296  0.305           66.3   4.33  0.000  0.000   0.79   4.40  22.52  48.05   59.7   74.5
 2222:20 -35.91  143.27  16.74  53.53   54   0.328  0.340  PR AM    60.5   4.47  0.000  0.000   0.67   3.27  17.47  42.13   52.2   63.6
 2224.32 -36.08  143.47  20.43  52.94   52   0.296  0.308  PR       69.1   5.25  0.000  0.000   0.91   4.90  24.61  50.51   60.2   72.6
 2226.43 -36.28  143.70  21.00  52.33   52   0.288  0.300   R       64.1   5.15  0.000  0.003   1.13   5.41  25.37  52.61   61.4   75.8
 2228:55 -36.50  143.91  20.99  51.74   57   0.289  0.301           72.2   6.13  0.000  0.004   1.24   5.77  26.57  54.89   64.5   80.1
 2231: 7 -36.73  144.13  20.99  51.16   59   0.287  0.300           72.7   6.27  0.000  0.004   1.30   5.97  26.71  54.70   64.5   80.9
 2233:19 -36.96  144.35  20.32  50.58   67   0.286  0.299           77.4   6.73  0.000  0.006   1.44   6.41  28.50  57.62   67.1   83.8
 2235.30 -37.18  144.57  15.65  50.00   50   0.291  0.301  P  AM    82.3   6.79  0.000  0.005   1.44   6.67  29.80  60.57   72.8   92.2
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REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

DATE= 761112 (YR-MO-DAY) DAY= 317 FLT NO= 11 NASA LATITUDE SURVEY - FALL 1976

(MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM) WAVELENGTH IN NM)

FDAR HHMM:SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE (ATM-CM)	00000	374.1 BB	312.8 BB	289.2 NB	294.5 NB	303.9 NB	308.4 NB	318.8 NB	326.1 NB	365.5 BB	395.6 BB
2342: 2	-40.29	145.57	34.15	37.48	49	0.323	0.346		83.3	9.17	0.000	0.037	2.71	9.37	-31.65	-68.58	85.9	96.9
2344:13	-40.57	145.69	35.00	37.15	68	0.281	0.301		91.4	12.52	0.122	0.059	3.95	12.30	40.90	76.19	84.1	103.6
2346:25	-40.86	145.81	35.01	36.83	74	0.276	0.296		98.4	13.74	0.143	0.064	4.27	12.98	42.86	79.00	86.3	105.2
2348.37	-41.13	145.99	35.00	36.49	68	0.284	0.305	R	131.3	17.10	0.161	0.062	3.98	12.21	40.36	76.35	85.5	105.9
2350.49	-41.39	146.22	34.99	36.11	68	0.278	0.298		98.8	13.81	0.145	0.065	4.26	13.06	42.57	79.51	85.1	106.7
2353: 1	-41.65	146.44	35.00	35.75	72	0.282	0.303		102.4	14.03	0.147	0.067	4.32	13.22	43.34	80.83	89.4	110.1
2355:12	-41.90	146.66	35.01	35.40	70	0.283	0.304		103.2	13.82	0.147	0.065	4.28	13.35	43.68	80.19	89.2	108.6
2357:24	-42.15	146.88	35.01	35.07	74	0.281	0.302		103.3	14.09	0.142	0.066	4.40	13.60	43.89	80.51	89.7	109.2
2359:36	-42.39	147.10	34.99	34.74	67	0.283	0.304		103.9	14.50	0.149	0.070	4.45	13.76	44.89	82.91	90.6	110.8
0001.47	-42.64	147.33	35.02	34.43	70	0.282	0.302		107.5	14.78	0.148	0.073	4.67	14.16	45.82	83.96	93.7	112.7
0003:59	-42.89	147.55	35.01	34.14	74	0.290	0.311		109.0	14.30	0.115	0.067	4.47	13.68	45.51	82.49	93.7	115.3
0006.10	-43.14	147.74	35.01	33.88	69	0.285	0.306		109.2	15.09	0.148	0.073	4.72	14.24	46.41	84.19	94.3	117.1
0008:22	-43.40	147.93	35.01	33.63	74	0.284	0.305		107.4	15.02	0.153	0.075	4.75	14.24	45.99	85.33	93.6	116.7
0010:33	-43.66	148.13	35.01	33.40	131	0.286	0.308		108.0	14.98	0.165	0.075	4.76	14.28	46.69	85.51	94.6	115.6
0012 45	-43.92	148.33	35.00	33.18	73	0.288	0.309		107.8	15.55	0.157	0.076	4.75	14.20	46.88	87.12	93.4	116.9
0014:57	-44.17	148.52	35.02	32.98	83	0.291	0.312		110.1	15.52	0.164	0.072	4.64	14.25	47.08	87.04	94.0	116.1
0017. 8	-44.42	148.72	34.99	32.79	75	0.289	0.310		113.2	16.02	0.157	0.073	4.75	14.84	47.50	87.71	96.0	119.7
0019:17	-44.68	148.92	35.00	32.61	82	0.290	0.311		115.4	16.25	0.157	0.075	4.94	15.02	49.23	89.35	99.6	120.8
0021:31	-44.93	149.12	35.00	32.45	151	0.290	0.313		114.5	15.98	0.153	0.075	5.00	14.81	48.09	89.56	99.4	123.5
0023:42	-45.17	149.32	35.00	32.30	66	0.294	0.315		114.7	16.11	0.166	0.072	4.77	14.64	48.50	89.55	98.4	119.2
0025 54	-45.42	149.52	35.00	32.16	69	0.295	0.316		118.7	16.51	0.166	0.074	4.91	14.93	49.91	91.72	100.9	122.6
0028 5	-45.67	149.72	35.00	32.04	68	0.297	0.318		119.9	16.64	0.171	0.075	4.91	15.10	50.35	92.89	102.1	124.9
0030:17	-45.92	149.93	35.01	31.94	75	0.297	0.319		118.1	16.37	0.168	0.073	4.88	14.93	49.31	91.98	101.4	125.2
0032 23	-46.16	150.14	35.01	31.85	76	0.295	0.316		116.5	16.12	0.168	0.074	4.92	15.14	49.68	91.76	100.5	124.0
0034.40	-46.41	150.35	35.01	31.77	75	0.297	0.318		121.1	16.40	0.167	0.073	4.90	15.43	50.56	93.58	101.5	126.3
0036:51	-46.66	150.56	35.02	31.71	79	0.300	0.322		121.3	16.59	0.168	0.072	4.91	15.32	51.66	93.07	103.0	126.6
0039: 3	-46.90	150.77	35.00	31.66	60	0.301	0.322		119.6	16.27	0.160	0.071	4.82	14.90	49.89	92.51	102.8	125.0
0041 14	-47.15	150.99	35.01	31.63	57	0.302	0.324		117.3	16.09	0.165	0.068	4.74	14.63	48.99	91.73	102.2	124.4
0043:26	-47.39	151.21	35.01	31.62	57	0.302	0.324		115.8	15.71	0.165	0.067	4.70	14.67	48.86	91.23	100.6	125.7
0045:37	-47.64	151.43	35.02	31.62	105	0.300	0.323		119.5	16.32	0.168	0.069	4.93	15.20	50.64	94.45	103.2	129.1
0047:49	-47.89	151.65	35.01	31.63	50	0.300	0.321		120.1	16.48	0.158	0.069	4.92	15.21	50.62	94.29	103.8	128.1
0050: 0	-48.13	151.88	35.01	31.66	52	0.301	0.323		119.8	16.35	0.163	0.069	4.82	14.99	50.72	93.34	101.9	124.9
0052 12	-48.37	152.10	35.00	31.71	70	0.298	0.320		120.8	16.94	0.178	0.072	4.90	15.28	50.41	93.88	102.5	127.4
0054:24	-48.62	152.34	35.01	31.77	95	0.302	0.324		122.3	16.93	0.167	0.071	4.88	15.19	51.18	95.64	104.4	127.6
0056:35	-48.87	152.57	35.00	31.84	112	0.301	0.324		119.3	16.11	0.168	0.068	4.81	14.98	50.39	93.38	103.1	125.9
0058.47	-49.11	152.81	35.00	31.93	118	0.305	0.329		119.8	16.11	0.163	0.066	4.66	14.63	49.79	93.56	103.2	125.3
0100.59	-49.35	153.05	35.01	32.04	114	0.302	0.325		118.4	16.07	0.167	0.065	4.71	14.82	50.02	92.74	101.8	125.0
0103:10	-49.60	153.29	35.01	32.16	112	0.303	0.327		121.2	16.58	0.172	0.066	4.71	14.99	50.34	94.28	103.2	129.2
0105:21	-49.85	153.54	35.01	32.30	111	0.305	0.329		120.6	16.35	0.164	0.063	4.66	14.86	50.83	94.71	103.9	127.9
0107 33	-50.10	153.79	35.00	32.45	110	0.304	0.327		120.0	16.02	0.159	0.061	4.65	14.77	50.37	93.11	103.3	126.7
0109.44	-50.34	154.04	35.00	32.61	103	0.306	0.329		118.4	15.66	0.154	0.058	4.54	14.41	49.49	92.09	102.4	125.8
0111:56	-50.58	154.29	35.01	32.78	92	0.305	0.328		117.7	15.78	0.160	0.058	4.49	14.38	49.28	92.29	100.7	125.7
0114: 7	-50.82	154.54	35.01	32.97	72	0.306	0.328		116.7	15.48	0.156	0.056	4.45	14.13	49.01	90.93	100.3	123.7
0116:17	-51.06	154.79	35.01	33.17	59	0.309	0.331		116.5	15.38	0.153	0.053	4.33	13.93	48.94	91.47	100.9	123.1
0118:30	-51.29	155.05	35.01	33.37	57	0.307	0.329		117.7	15.34	0.154	0.053	4.35	14.23	49.56	92.29	101.0	125.0
0120:42	-51.53	155.31	35.01	33.59	125	0.306	0.330		119.6	16.10	0.164	0.053	4.36	14.33	49.66	93.79	101.3	126.3
0122:53	-51.77	155.59	35.01	33.83	55	0.311	0.334		118.1	15.75	0.158	0.050	4.15	13.70	48.27	91.77	100.3	124.6
0125: 5	-52.01	155.86	35.00	34.08	57	0.311	0.333		115.0	14.73	0.153	0.047	4.06	13.38	48.09	89.02	98.0	119.7
0127.16	-52.24	156.13	35.01	34.33	57	0.314	0.336		115.4	14.88	0.156	0.046	3.99	13.11	47.49	89.21	98.7	121.4
0129:28	-52.47	156.41	35.01	34.60	53	0.309	0.331		115.7	14.77	0.157	0.046	4.06	13.47	48.19	89.13	98.7	121.1
0131:39	-52.70	156.69	35.00	34.87	49	0.312	0.334		116.5	14.85	0.154	0.045	3.95	13.21	47.73	89.00	99.4	121.3
0133 51	-52.93	156.97	35.01	35.16	49	0.311	0.333		114.3	14.46	0.153	0.043	3.90	12.92	46.43	86.97	97.5	120.0
0136: 2	-53.16	157.25	35.01	35.45	57	0.313	0.336		115.5	14.44	0.147	0.040	3.83	13.06	47.67	88.87	98.9	120.7
0138:14	-53.39	157.54	35.01	35.76	58	0.316	0.338		116.1	14.53	0.148	0.038	3.72	12.68	46.89	88.89	98.1	120.4
0140:25	-53.62	157.84	35.02	36.08	58	0.319	0.342		113.5	14.22	0.145	0.035	3.57	12.32	45.98	88.21	97.6	119.5
0142:37	-53.85	158.14	35.00	36.41	58	0.319	0.342		112.2	13.86	0.140	0.033	3.48	12.23	45.31	87.30	97.4	120.1

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DATE=  761113  (YR-MO-DAY)       DAY=  318      FLT NO=  11             NASA LATITUDE SURVEY - FALL 1976
    TBAR     LAT     LONG  PRESS      SUN    O3     MEAS   TOTAL QCQQQ  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
HHMM:SS    (DEG     (DEG     ALT      ANG   PPB   OZONE  OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)   (KFT)    (DEG)         (ATM-CM)                  BB     BB     NB     NB      NB     NB     NB     NB     BB     BB
------------------------------------------------------------------------------------------------------------------------------------------------
0144:48 -54.08  158.44  35.00  36.74   54   0.319  0.342          111.8  13.66  0.138  0.031   3.44  12.07  45.35  86.25   96.4  118.9
0147: 0 -54.31  158.74  35.01  37.09   53   0.317  0.340          114.3  14.13  0.139  0.032   3.50  12.26  45.87  88.03   97.2  121.4
0149:11 -54.52  159.07  35.03  37.43   50   0.342  0.367  RT M     95.2   7.01  0.000  0.024   2.97  12.38  50.99 100.68  121.4  119.9
0151:23 -54.49  159.54  34.99  37.57   99   0.318  0.342          107.8  13.15  0.129  0.029   3.24  11.45  42.92  84.85   94.2  113.7
0153:34 -54.38  160.00  35.02  37.66  105   0.318  0.342          108.1  13.27  0.133  0.029   3.17  11.60  43.12  84.51   94.4  115.6
0155:46 -54.28  160.47  35.97  37.76   58   0.332  0.357          110.1  12.49  0.000  0.024   2.96  11.08  43.36  85.75   96.8  117.4
0157:57 -54.19  160.96  37.01  37.91   66   0.321  0.346          109.7  13.29  0.137  0.026   3.04  11.40  43.11  83.93   93.1  114.3
0200: 9 -54.11  161.45  37.03  38.08   63   0.328  0.354          109.0  12.58  0.131  0.023   3.00  11.04  43.83  83.07   93.7  114.4
0202:20 -54.03  161.94  37.03  38.26   70   0.326  0.351          109.9  12.86  0.125  0.023   3.02  11.11  43.42  84.31   93.6  114.2
0204:32 -53.94  162.41  37.03  38.45   85   0.324  0.349          112.6  12.99  0.131  0.023   3.08  11.41  44.48  85.45   94.5  118.7
0206:43 -53.85  162.90  37.03  38.66   95   0.324  0.350          109.8  12.93  0.132  0.022   3.04  11.27  45.14  84.05   92.2  115.2
0208:55 -53.76  163.36  37.03  38.87  111   0.322  0.348          106.1  12.51  0.120  0.022   2.93  11.05  42.41  81.80   92.3  115.5
0211: 6 -53.67  163.84  37.03  39.11  123   0.322  0.348          108.7  12.24  0.118  0.023   2.90  10.85  41.79  80.94   92.5  112.7
0213:18 -53.58  164.31  37.02  39.36  104   0.323  0.349          109.0  12.08  0.118  0.022   2.95  10.87  42.31  82.35   94.3  115.4
0215:29 -53.49  164.77  37.03  39.62  121   0.324  0.350          106.4  12.32  0.119  0.022   2.90  10.69  41.81  82.62   93.7  113.4
0217:41 -53.39  165.23  37.03  39.89  139   0.328  0.355          106.3  12.31  0.126  0.021   2.73  10.37  41.68  80.66   91.8  112.5
0219:52 -53.30  165.70  37.03  40.18  147   0.327  0.354          106.9  12.06  0.117  0.019   2.68  10.39  41.89  81.79   93.5  111.4
0222: 4 -53.20  166.17  37.03  40.48  143   0.327  0.354          106.6  12.42  0.129  0.018   2.75  10.39  42.53  83.03   92.3  112.4
0224:15 -53.10  166.62  37.03  40.79  162   0.325  0.352          108.1  12.31  0.117  0.016   2.66  10.28  41.77  81.54   90.8  111.6
0226:26 -53.00  167.06  37.03  41.11  174   0.327  0.355          107.1  11.52  0.115  0.014   2.55   9.98  40.93  79.50   89.6  111.3
0228:38 -52.90  167.51  37.03  41.45  144   0.326  0.353          103.5  11.51  0.115  0.015   2.49   9.81  40.25  78.10   88.6  110.5
0230:49 -52.80  167.95  37.02  41.79  169   0.327  0.355          104.7  11.21  0.106  0.014   2.38   9.66  39.38  79.46   89.9  109.4
0233: 1 -52.69  168.39  37.03  42.14  193   0.332  0.361          101.1  11.19  0.109  0.013   2.22   9.14  38.63  76.95   87.0  107.0
0235:12 -52.59  168.82  37.03  42.50  220   0.331  0.361          100.0  10.73  0.101  0.011   2.18   8.90  37.71  75.88   84.5  105.0
0237:24 -52.45  169.20  37.05  42.83  256   0.279  0.306  RT       98.1   9.78  0.322  0.026   3.49  12.77  49.17  87.31   89.8   98.0
0239:35 -52.19  169.16  37.01  42.89  255   0.338  0.371  R        91.8   7.94  0.000  0.008   2.07   9.07  39.49  79.01   91.9  112.1
0241:47 -51.89  169.11  37.03  42.93  247   0.332  0.364          100.2  10.15  0.093  0.008   2.08   8.81  37.54  75.16   86.5  106.6
0243:58 -51.60  169.06  37.03  42.99  248   0.337  0.369           98.5   9.80  0.000  0.008   2.02   8.62  37.27  75.97   87.1  106.3
0246:10 -51.29  169.01  37.01  43.05  256   0.313  0.365          100.8  10.34  0.095  0.008   2.07   8.88  38.42  77.45   87.5  106.2
0248:21 -50.99  168.97  37.03  43.11  261   0.334  0.366          105.1  10.70  0.000  0.009   2.16   9.00  39.57  77.75   88.8  107.6
0250:33 -50.69  168.92  37.03  43.19  259   0.327  0.359          101.0  10.49  0.097  0.011   2.17   9.07  38.72  75.47   85.6  106.9
0252:44 -50.40  168.88  37.03  43.27  267   0.323  0.355           97.8  10.32  0.000  0.012   2.18   8.94  36.94  75.37   84.6  104.8
0254:56 -50.10  168.83  37.02  43.37  274   0.326  0.359           98.3  10.08  0.095  0.011   2.16   8.90  37.46  75.41   86.9  104.2
0257: 7 -49.80  168.79  37.03  43.47  311   0.328  0.363          100.0  10.59  0.096  0.011   2.14   8.84  38.02  76.48   85.5  104.5
0259:19 -49.51  168.74  37.03  43.58  251   0.324  0.355           99.1  10.12  0.100  0.010   2.15   8.92  37.55  74.82   85.3  105.3
0301:30 -49.21  168.70  37.03  43.70  253   0.325  0.356           98.7   9.95  0.093  0.010   2.13   8.81  37.17  75.04   86.0  103.3
0303:41 -48.91  168.66  37.03  43.82  246   0.328  0.359           99.3  10.37  0.096  0.009   2.13   8.82  38.03  76.12   86.7  106.2
0305:53 -48.60  168.61  37.02  43.95  243   0.325  0.356          102.1  10.27  0.000  0.008   2.08   9.00  38.38  77.05   87.3  107.0
0308: 4 -48.30  168.57  37.02  44.09  252   0.327  0.359          100.7   9.94  0.097  0.008   2.06   8.71  37.46  75.88   86.3  105.6
0310:16 -48.00  168.53  37.02  44.24  254   0.331  0.363           98.7  10.18  0.098  0.008   1.97   8.37  36.97  74.77   84.7  103.0
0312:27 -47.70  168.49  37.02  44.40  260   0.330  0.363           98.2  10.24  0.099  0.008   1.94   8.44  37.61  75.30   84.4  103.0
0314:39 -47.40  168.45  37.03  44.56  258   0.327  0.359          100.0  10.05  0.098  0.009   1.99   8.64  37.83  75.77   86.0  104.6
0316:50 -47.11  168.41  37.03  44.74  254   0.327  0.358           99.5  10.05  0.093  0.009   2.01   8.55  37.32  75.02   85.5  105.1
0319: 2 -46.81  168.37  37.03  44.92  264   0.324  0.356           97.2   9.71  0.099  0.008   1.96   8.50  36.83  74.01   85.1  103.0
0321:13 -46.53  168.40  37.05  45.16  271   0.776  0.853  RT       91.6   0.00  0.000  0.000   0.35   3.59  18.40  56.65   89.6  120.1
0323:25 -46.36  168.74  37.00  45.65  266   0.322  0.354           99.5  10.48  0.092  0.007   1.90   8.37  36.97  74.13   83.5  102.7
0325:36 -46.22  169.09  37.00  46.17  263   0.317  0.349           95.8  10.22  0.097  0.006   1.90   8.37  36.05  73.28   82.7  104.7
0327:48 -46.07  169.45  37.03  46.69  306   0.318  0.352           97.1   9.38  0.100  0.006   1.81   8.02  35.73  71.23   81.5   99.8
0329:59 -45.93  169.81  37.03  47.23  261   0.323  0.355           95.9   9.20  0.096  0.006   1.69   7.57  34.75  70.91   80.0   98.8
0332:11 -45.75  170.13  37.03  47.73  262   0.318  0.349  PRT M    83.0  17.29  0.335  0.011   1.55   6.53  29.80  61.64   68.6   84.0
0334:22 -45.50  170.34  37.03  48.15  261   0.317  0.348  R        95.5   9.50  0.000  0.000   1.61   7.66  35.25  71.75   81.0   98.9
0336:34 -45.26  170.58  37.03  48.60  255   0.317  0.347           90.6   8.71  0.000  0.005   1.56   7.11  32.81  66.80   75.8   94.9
0338:45 -45.01  170.83  37.03  49.06  257   0.312  0.343           89.3   8.50  0.000  0.004   1.50   6.97  31.68  65.61   73.7   93.5
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DATE=  761114  (YR-MO-DAY)     DAY=  319       FLT NO=  12             NASA LATITUDE SURVEY - FALL 1976
   TBAR     LAT      LONG   PRESS     SUN    O3     MEAS   TOTAL QQQQQ  374.1  312.8  289.2  294.5  303.9   308.4  318.8  326.1  365.5  395.6
HHMM:SS    (DEG      (DEG    ALT      ANG   PPB    OZONE  OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)        E)   (KFT)   (DEG)           (ATM-CM)              BB     BB     NB     NB      NB      NB     NB     NB     BB     BB
------------------------------------------------------------------------------------------------------------------------------------------------

0310.30 -45.09   170.19  32.30   43.78    54    0.315   0.336            97.4  10.17  0.093  0.012    2.15   8.89  37.11  73.73   82.6  101.0
0312:42 -45.30   169.91  33.02   44.04    55    0.312   0.333            95.3   9.69  0.097  0.014    2.12   8.73  35.57  71.27   81.4   99.3
0314:53 -45.50   169.63  33.01   44.29    57    0.310   0.331            93.9   9.40  0.000  0.014    2.06   8.61  34.69  70.10   80.2   97.4
0317: 5 -45.70   169.35  33.02   44.54    59    0.318   0.340            92.2   9.26  0.086  0.013    1.97   8.08  34.48  69.46   78.2   95.5
0319:17 -45.90   169.06  33.02   44.79    62    0.318   0.340            90.1   8.87  0.086  0.012    1.89   7.99  34.37  68.79   77.1   95.3
0321:28 -46.10   168.77  33.01   45.04    62    0.318   0.340            89.7   8.91  0.084  0.011    1.85   7.93  33.89  67.75   77.7   96.2
0323:40 -46.30   168.48  33.02   45.28    60    0.276   0.295   R  M     97.0  10.95  0.130  0.013    2.03   8.44  36.13  72.91   72.6   35.8
0325:52 -46.54   168.33  33.01   45.63    63    0.323   0.345   R        67.6   5.88  0.000  0.009    1.81   8.11  35.86  72.06   82.6  102.4
0328: 3 -46.82   168.35  33.02   46.09    62    0.320   0.341            90.6   9.07  0.000  0.009    1.75   7.53  33.17  67.61   76.7   95.1
0330:15 -47.09   168.37  33.02   46.56    64    0.319   0.341            89.5   8.59  0.000  0.007    1.64   7.48  33.32  67.22   77.3   95.3
0332:26 -47.36   168.39  33.01   47.02    65    0.321   0.343            89.5   8.68  0.000  0.006    1.63   7.17  32.61  67.06   75.8   92.9
0334:38 -47 64   168.41  33.01   47.48    77    0.319   0.341            87.0   8.53  0.000  0.005    1.52   7.10  32.41  65.88   75.6   92.3
0336:49 -47.91   168.43  33.01   47.93    72    0.320   0.342            87.7   8.23  0.000  0.004    1.47   6.89  32.25  65.45   73.7   92.5
0339. 1 -48.18   168.45  33.01   48.39    71    0.317   0.339            88.5   8.23  0.000  0.003    1.46   6.90  31.88  66.13   75.6   91.3
0341:12 -48.45   168.47  33.02   48.84    76    0.321   0.343            87.4   7.69  0.000  0.003    1.36   6.60  31.53  65.33   74.0   91.1
0343:24 -48.73   168.49  33.02   49.29    79    0.318   0.340            85.2   7.76  0.000  0.000    1.32   6.45  30.98  63.20   72.1   90.0
0345 35 -49.00   168.51  33.01   49.73    84    0.316   0.338            85.7   7.93  0.000  0.003    1.31   6.45  31.06  63.50   72.8   90.5
0347:47 -49.28   168.53  33.02   50.18    74    0.318   0.340            86.6   7.69  0.000  0.003    1.28   6.35  31.03  65.23   73.9   90.9
0349.58 -49.55   168.55  33.02   50.62    85    0.317   0.339            84.5   7.43  0.000  0.000    1.20   6.15  30.12  62.76   73.6   89.3
0352 10 -49.83   168.57  33.02   51.06   103    0.318   0.341            83.9   7.04  0.000  0.000    1.13   5.90  29.59  61.73   71.2   88.4
0354:21 -50.11   168.59  33.02   51.50    96    0.322   0.344            83.3   6.85  0.000  0.000    1.05   5.67  28.95  62.14   72.0   87.9
0356.33 -50.39   168.61  33.02   51.93    75    0.323   0.345            83.8   6.99  0.000  0.000    1.00   5.46  28.53  59.61   69.8   89.5
0358 45 -50.67   168.63  33.02   52.36    89    0.319   0.341            81.1   6.77  0.000  0.000    0.97   5.36  27.79  60.16   68.8   85.7
0400 56 -50 95   168.65  33.02   52.79    49    0.319   0.340            79.4   6.57  0.000  0.000    0.88   5.23  27.27  58.55   70.0   84.5
0403  7 -51 24   168.67  33.02   53.22    51    0.319   0.341            79.4   6.13  0.000  0.000    0.83   5.14  27.34  58.61   69.2   86.2
0405 19 -51 52   168.70  33.01   53.65    53    0.321   0.343            81.1   6.29  0.000  0.000    0.81   4.98  27.50  58.59   68.1   85.7
0407:30 -51.81   168.72  33.02   54.07    41    0.322   0.344            79.2   6.06  0.000  0.000    0.75   4.66  26.23  57.24   65.7   82.3
0409 42 -52.10   168.74  33.02   54.49    50    0.321   0.342            76.2   5.80  0.000  0.000    0.72   4.48  25.27  55.33   64.6   79.3
0411:53 -52.38   168.77  33.02   54.91    54    0.319   0.340            75.6   5.77  0.000  0.000    0.69   4.42  24.84  55.52   64.3   79.1
0414  5 -52.67   168.79  33.02   55.32    58    0.320   0.342            76.5   5.55  0.000  0.000    0.64   4.33  24.94  56.06   65.7   78.8
0416:16 -52.95   168.82  33.02   55.74    54    0.317   0.339            74.7   5.42  0.000  0.000    0.59   4.25  24.73  53.83   63.6   79.5
0418 28 -53.24   168.84  33.01   56.15    44    0.318   0.339            73.9   5.03  0.000  0.000    0.55   4.10  24.18  52.82   63.9   78.5
0420:39 -53.53   168.87  33.02   56.55    43    0.320   0.341            74.1   4.96  0.000  0.000    0.50   3.92  23.95  52.71   62.3   78.0
0422 51 -53 81   168 89  33.02   56.95    46    0.322   0.343            73.9   4.73  0.000  0.000    0.47   3.77  23.40  52.35   62.5   77.1
0425: 2 -54.10   168.92  33.02   57.35    47    0.323   0.344            72.6   4.80  0.000  0.000    0.44   3.60  22.97  51.59   60.7   76.4
0427:14 -54.40   168.94  33.02   57.75    45    0.320   0.342            69.1   4.59  0.000  0.000    0.40   3.46  22.24  50.37   59.2   73.1
0429:25 -54.69   168.97  33.02   58.15    49    0.320   0.341            69.2   4.45  0.000  0.000    0.38   3.40  21.93  49.21   59.4   74.3
0431.37 -54.98   169.00  33.02   58.54    53    0.322   0.344            69.1   4.04  0.000  0.000    0.32   3.24  21.54  48.87   58.9   73.2
0433.48 -55.27   169.02  33.02   58.93    59    0.324   0.345            68.1   4.04  0.000  0.000    0.31   3.09  21.03  48.29   57.6   72.5
0436  0 -55.56   169.05  33.01   59.31    66    0.324   0.346            67.7   3.89  0.000  0.000    0.27   2.97  20.41  47.67   57.6   70.5
0438:11 -55.85   169.08  33.01   59.69   106    0.327   0.351            66.8   3.63  0.000  0.000    0.24   2.84  20.19  47.00   57.3   70.9
0440:23 -56.12   169.10  33.02   60.06    49    0.324   0.346            66.0   3.51  0.000  0.000    0.21   2.79  19.92  46.37   56.6   70.4
0442:34 -56.40   169.13  33.02   60.43    52    0.326   0.348            66.0   3.41  0.000  0.000    0.19   2.63  39.72  45.75   55.2   68.9
0444:46 -56.69   169.16  33.02   60.80    56    0.322   0.344            64.1   3.57  0.000  0.000    0.18   2.56  19.01  44.83   53.9   66.1
0446.57 -56.97   169.18  33.02   61.16    60    0.324   0.346            62.9   3.28  0.000  0.000    0.15   2.44  18.57  43.40   53.3   65.7
0449: 9 -57.25   169.21  33.01   61.52    53    0.326   0.348            64.0   3.15  0.000  0.000    0.13   2.35  18.65  43.58   53.4   66.2
0451:20 -57.54   169.24  33.02   61.88    59    0.328   0.350            62.8   3.02  0.000  0.000    0.12   2.29  18.27  43.85   53.4   66.0
0453:32 -57.82   169.27  33.02   62.23    47    0.323   0.345            61.6   2.90  0.000  0.000    0.00   2.28  17.94  42.43   53.2   65.7
0455:43 -58.10   169.29  33.02   62.58    47    0.325   0.346            60.8   2.78  0.000  0.000    0.00   2.14  17.71  42.42   51.5   63.9
0457:55 -58.37   169.32  33.02   62.92    57    0.322   0.344            59.8   2.87  0.000  0.000    0.00   2.09  17.40  41.16   51.0   63.1
0500: 6 -58.65   169.35  33.02   63.27    72    0.320   0.342            59.5   2.68  0.000  0.000    0.00   2.02  17.28  40.28   49.8   63.0
0502.18 -58.92   169.38  33.03   63.60    70    0.331   0.353            58.6   2.65  0.000  0.000    0.00   1.90  16.40  40.43   50.0   61.6
0504:29 -59.21   169.41  33.02   63.94    60    0.329   0.352            57.9   2.46  0.000  0.000    0.00   1.79  16.34  39.76   48.2   61.1
0506:41 -59.50   169.44  33.02   64.27    66    0.352   0.376            59.5   2.40  0.000  0.000    0.00   1.63  15.74  39.39   50.2   61.7
0508:52 -59.79   169.48  33.25   64.60    71    0.347   0.371            55.3   2.08  0.000  0.000    0.00   1.54  15.41  38.15   48.4   59.5
0511: 4 -60.08   169.54  34.53   64.94    71    0.370   0.397   R        37.4   0.00  0.000  0.000    0.00   1.55  16.26  41.68   53.5   66.4
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DATE= 761116  (YR-MO-DAY)     DAY=  321      FLT NO=  13            NASA LATITUDE SURVEY - FALL 1976
    TBAR     LAT      LONG   PRESS     SUN   O3     MEAS   TOTAL OCOOO  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
 HHMM:SS    (DEG      (DEG    ALT      ANG   PPB   OZONE   OZONE       (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)       N)        E)   (KFT)    (DEG)            (ATM-CM)              BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
-------------------------------------------------------------------------------------------------------------------------------------------
 0111:31 -41.80   174.21  30.30   26.75    67   0.349   0.371           121.2  14.53  0.145  0.038   3.77  13.13  48.46  93.34  103.2  126.7
 0113:43 -41.59   174.47  31.84   26.94   126   0.345   0.370           116.5  13.96  0.145  0.043   3.84  13.16  47.49  90.62  101.6  125.9
 0115:54 -41.39   174.74  32.90   27.15   196   0.340   0.369           114.8  14.01  0.140  0.044   3.92  13.37  48.16  90.54  100.5  123.6
 0118: 6 -41.17   175.02  33.02   27.38   197   0.339   0.367           116.8  14.59  0.143  0.047   3.91  13.39  48.30  90.84  100.0  122.0
 0120:18 -40.95   175.29  33.01   27.63   209   0.338   0.367           118.1  14.53  0.143  0.049   4.07  13.66  48.86  93.27  104.5  126.8
 0122:30 -40.73   175.56  33.00   27.88   236   0.332   0.362           119.0  15.13  0.158  0.052   4.21  13.94  49.20  93.06  103.3  126.9
 0124:41 -40.50   175.83  33.01   28.16   257   0.331   0.363           116.8  15.15  0.158  0.052   4.21  13.70  48.96  91.84  101.6  125.8
 0126:53 -40.28   176.10  33.01   28.46   261   0.329   0.361           118.4  14.87  0.157  0.050   4.13  13.73  48.76  92.01  101.1  122.9
 0129: 5 -40.06   176.37  33.01   28.77   272   0.332   0.364           119.0  15.15  0.149  0.049   4.09  13.79  49.19  93.34  102.4  125.9
 0131:16 -39.83   176.63  33.01   29.10   286   0.332   0.366           120.8  14.99  0.147  0.048   4.12  13.80  49.41  92.98  105.0  127.1
 0133:28 -39.61   176.88  33.01   29.44   232   0.330   0.359           119.9  14.85  0.161  0.048   4.14  13.61  48.52  93.48  103.0  126.0
 0135:39 -39.39   177.14  33.01   29.80   250   0.330   0.361           118.6  14.58  0.148  0.046   4.01  13.52  48.31  91.82  102.0  124.6
 0137:51 -39.17   177.40  33.01   30.17   248   0.335   0.366           118.8  14.49  0.143  0.044   3.86  13.24  47.97  91.84  104.0  124.8
 0140: 3 -38.94   177.66  33.01   30.55   288   0.335   0.369           120.8  14.73  0.156  0.042   3.92  13.34  48.63  93.65  104.2  128.3
 0142:14 -38.71   177.91  33.01   30.95   310   0.344   0.380   R       114.5  12.53  0.000  0.039   3.70  13.93  56.13 101.34  106.5  122.7
 0144:26 -38.45   178.10  33.01   31.31   314   0.335   0.371           117.6  14.41  0.143  0.039   3.72  12.86  47.74  91.34  101.4  123.1
 0146:37 -38.18   178.27  33.01   31.65   334   0.331   0.368           117.5  14.20  0.143  0.038   3.75  13.08  47.62  90.44  101.8  125.0
 0148:49 -37.90   178.43  33.01   32.00   341   0.334   0.371           117.9  14.10  0.142  0.035   3.68  12.67  47.04  90.80  100.9  122.7
 0151: 0 -37.62   178.60  33.01   32.37   335   0.342   0.380           115.6  13.64  0.135  0.031   3.41  12.07  46.10  88.67  100.5  121.6
 0153:12 -37.34   178.76  33.01   32.75   331   0.346   0.384           113.8  13.33  0.127  0.027   3.22  11.59  44.68  87.58   98.5  120.5
 0155:23 -37.06   178.92  33.01   33.14   316   0.347   0.384           113.7  12.77  0.125  0.025   3.10  11.53  44.42  86.57   99.0  120.8
 0157:35 -36.77   179.09  33.01   33.54   309   0.345   0.382           115.5  12.92  0.124  0.023   3.10  11.71  45.27  88.75   99.7  122.2
 0159:47 -36.49   179.25  33.01   33.95   291   0.348   0.383           115.3  12.82  0.118  0.023   3.05  11.48  45.57  88.60   99.0  121.0
 0201:58 -36.20   179.42  33.01   34.38   252   0.343   0.375           114.1  12.88  0.123  0.023   3.00  11.39  44.43  87.36   97.2  118.4
 0204:10 -35.90   179.58  33.01   34.81   235   0.332   0.362           112.7  12.99  0.128  0.028   3.22  11.74  44.63  85.98   97.4  117.6
 0206:21 -35.61   179.75  33.01   35.26   103   0.319   0.342           111.0  13.69  0.139  0.036   3.52  12.22  44.77  86.15   96.3  118.3
 0208:33 -35.30   179.92  33.01   35.71    74   0.307   0.328   P       115.2  13.96  0.151  0.043   3.92  13.05  46.19  88.35   99.2  121.5
 0210:44 -35.01  -179.93  33.01   36.17    73   0.265   0.283   R       116.8  14.47  0.151  0.056   5.54  16.24  52.88  93.36  101.8  121.9
 0212:56 -34.70  -179.86  33.01   36.56    83   0.293   0.314           104.8  13.25  0.136  0.046   3.94  12.80  44.28  82.95   91.6  113.0
 0215: 8 -34.40  -179.81  33.01   36.96   120   0.289   0.310           107.4  14.02  0.142  0.049   4.06  13.09  44.87  84.37   92.0  114.2
 0217:19 -34.09  -179.75  33.01   37.37   125   0.288   0.310           107.0  13.89  0.140  0.049   4.00  13.03  45.07  84.31   91.8  112.9
 0219:31 -33.79  -179.70  33.01   37.78    87   0.287   0.308           107.6  13.84  0.138  0.048   3.98  12.92  44.75  83.50   91.8  112.9
 0221:42 -33.49  -179.64  33.01   38.20    97   0.284   0.304           108.5  14.30  0.142  0.051   4.05  13.16  45.42  84.34   92.4  113.0
 0223:54 -33.19  -179.59  33.01   38.63   133   0.283   0.304           107.7  14.03  0.139  0.049   4.09  13.00  45.06  84.50   92.9  113.7
 0226: 5 -32.89  -179.54  33.01   39.06   125   0.282   0.302           105.7  13.88  0.141  0.046   3.93  12.70  43.76  81.06   90.9  111.2
 0228:17 -32.59  -179.48  33.01   39.50   118   0.283   0.304           103.4  13.64  0.132  0.044   3.77  12.26  42.63  81.19   89.0  109.1
 0230:28 -32.29  -179.43  33.02   39.95   108   0.282   0.303           105.2  13.82  0.133  0.042   3.77  12.38  43.47  82.02   89.9  110.0
 0232:40 -31.99  -179.38  33.01   40.41   115   0.281   0.302           108.2  13.94  0.129  0.041   3.80  12.50  44.15  82.72   90.8  112.2
 0234:51 -31.69  -179.33  33.01   40.87   107   0.283   0.303           104.2  13.19  0.126  0.040   3.64  12.05  42.75  80.82   89.8  110.9
 0237: 3 -31.38  -179.27  33.01   41.34    92   0.281   0.300           100.7  13.15  0.128  0.039   3.52  11.74  41.72  79.01   87.4  106.3
 0239:15 -31.08  -179.22  33.31   41.81   106   0.275   0.294           102.3  13.13  0.126  0.038   3.57  11.96  41.77  78.31   85.9  105.9
 0241:26 -30.78  -179.17  34.54   42.29   112   0.237   0.255   RT N     92.3  14.19  0.190  0.039   3.39  11.30  38.92  72.43   61.7   43.3
 0243:38 -30.49  -179.02  35.04   42.86   116   0.263   0.283   R        85.1  13.56  0.234  0.048   3.94  12.07  41.42  76.91   85.9  108.3
 0245:49 -30.23  -178.79  35.03   43.51   114   0.275   0.296           103.8  13.26  0.131  0.038   3.57  11.76  42.61  81.01   89.3  109.6
 0248: 1 -29.97  -178.55  35.03   44.17   109   0.273   0.294           104.1  13.23  0.130  0.034   3.41  11.67  42.25  79.10   86.7  108.9
 0250:12 -29.72  -178.33  35.03   44.82   113   0.271   0.292           101.9  12.41  0.121  0.031   3.35  11.28  40.59  77.67   86.5  107.4
 0252:24 -29.47  -178.11  35.04   45.48   119   0.274   0.295            99.8  12.45  0.125  0.028   3.11  10.88  40.21  76.98   84.8  105.6
 0254:35 -29.23  -177.87  35.04   46.16   115   0.335   0.360   RT       93.1  11.23  0.100  0.006   0.97   7.49  34.47  71.90   81.3  103.7
 0256:47 -29.06  -177.56  35.03   46.90   112   0.274   0.295           102.8  12.22  0.117  0.021   2.90  10.34  39.11  75.99   84.2  106.6
 0258:58 -28.89  -177.24  35.03   47.66   116   0.277   0.299            98.3  11.60  0.108  0.018   2.67  10.03  39.24  75.78   84.7  104.3
 0301:10 -28.72  -176.94  35.04   48.40   121   0.273   0.294            96.8  11.31  0.103  0.017   2.53   9.63  37.33  72.15   80.4  102.3
 0303:21 -28.55  -176.63  35.04   49.15   124   0.274   0.295            92.5  10.49  0.096  0.016   2.39   9.05  35.92  70.27   78.7   97.5
 0305:33 -28.38  -176.32  35.04   49.91   120   0.269   0.290            93.9  10.83  0.106  0.016   2.39   9.13  36.33  70.88   78.4   98.2
 0307:44 -28.21  -176.01  35.04   50.67   117   0.265   0.285            95.4  10.74  0.100  0.015   2.36   9.18  36.20  70.67   78.7  100.1
 0309:56 -28.04  -175.71  35.03   51.42   116   0.268   0.289            93.6  10.08  0.097  0.012   2.20   8.65  35.27  70.47   78.8   98.3
 0312: 7 -27.86  -175.41  35.04   52.18   115   0.266   0.286            93.0  10.13  0.096  0.010   2.07   8.45  35.02  69.24   76.2   97.8
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DATE=  761116  (YR-MO-DAY)       DAY=  321      FLT NO=  13             NASA LATITUDE SURVEY - FALL 1976
    TBAR     LAT     LONG  PRESS     SUN   O3     MEAS  TOTAL OCOOO  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
HHMM:SS     (DEG     (DEG    ALT     ANG  PPB    OZONE  OZONE     (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)       N)       E)  (KFT)   (DEG)          (ATM-CM)                 BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
-------------------------------------------------------------------------------------------------------------------------------------------
0314.19 -27.69 -175.11  35.03  52.95   94   0.265  0.285         90.7   9.40  0.086  0.008   1.94   7.99  33.10  66.83   74.8   96.2
0316:31 -27.51 -174.80  35.04  53.71  103   0.265  0.285         86.2   9.08  0.083  0.006   1.81   7.56  32.69  65.05   73.0   90.8
0318:42 -27.34 -174.50  35.04  54.47  111   0.260  0.280         85.5   8.82  0.000  0.005   1.73   7.39  31.51  63.57   71.0   90.9
0320:54 -27.17 -174.20  35.04  55.24  102   0.261  0.281         83.6   8.46  0.000  0.003   1.62   7.03  30.99  62.29   71.3   89.0
0323. 5 -26.99 -173.90  35.04  56.01   91   0.257  0.276         83.8   8.38  0.000  0.000   1.52   6.90  30.80  61.95   69.2   88.1
0325:17 -26.81 -173.60  35.04  56.78   90   0.260  0.279         80.9   7.87  0.000  0.000   1.39   6.31  29.04  59.69   68.0   86.0
0327:28 -26.63 -173.30  35.04  57.55   88   0.258  0.277         79.8   7.54  0.000  0.000   1.22   6.03  28.52  58.46   65.3   84.0
0329.40 -26.45 -173.00  35.04  58.32   87   0.257  0.276         77.7   7.04  0.000  0.000   1.11   5.57  26.98  55.51   62.2   80.1
0331:51 -26.27 -172.70  35.04  59.10   89   0.259  0.279         75.0   6.35  0.000  0.000   0.99   5.10  25.66  53.13   61.5   78.4
0334: 3 -26.09 -172.41  35.03  59.87   88   0.257  0.276         73.7   6.33  0.000  0.000   0.88   4.90  25.31  52.42   60.3   77.1
0336:14 -25.91 -172.12  35.04  60.64   84   0.259  0.278    T    73.6   5.92  0.000  0.000   0.82   4.58  24.54  51.89   60.0   77.6
0338:26 -25.73 -171.82  35.04  61.42   85   0.254  0.273         72.7   5.91  0.000  0.000   0.71   4.45  24.04  51.41   58.7   75.8
0340:37 -25.55 -171.53  35.04  62.19   92   0.257  0.276         69.2   5.26  0.000  0.000   0.61   3.99  22.09  49.10   56.6   74.1
0342:49 -25.37 -171.24  35.04  62.96   89   0.256  0.275         66.6   4.95  0.000  0.000   0.52   3.71  21.95  47.25   55.3   71.6
0345: 0 -25.19 -170.96  35.04  63.74  111   0.256  0.275         65.3   4.55  0.000  0.000   0.46   3.37  20.56  44.73   52.9   69.8
0347:12 -25.01 -170.69  35.03  64.50  118   0.257  0.277         63.7   4.24  0.000  0.000   0.36   3.11  19.80  44.16   52.4   68.8
0349:23 -24.84 -170.41  35.03  65.26  190   0.255  0.277         62.2   4.14  0.000  0.000   0.29   2.92  19.20  43.88   51.2   66.8
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DATE= 761117 (YR-MO-DAY) DAY= 322 FLT NO= 14 NASA LATITUDE SURVEY - FALL 1976

TBAR HHMM:SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE	00000	374.1 (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM) BB	312.8 BB	289.2 NB	294.5 NB	303.9 NB	308.4 NB	318.8 NB	326.1 NB	365.5 BB	395.6 BB
2228:55	-13.53	-170.39	17.18	10.70	28	0.229	0.237	A	112.6	19.03	0.204	0.342	9.47	21.89	56.22	94.89	99.4	122.2
2231: 7	-13.31	-170.30	19.67	10.32	40	0.228	0.237		113.7	20.02	0.215	0.366	9.72	22.01	56.74	95.38	99.7	124.4
2233:20	-13.07	-170.22	21.81	9.97	66	0.225	0.235		113.3	20.25	0.217	0.401	10.27	23.16	58.12	95.46	101.6	125.5
2235:32	-12.82	-170.12	23.74	9.66	57	0.210	0.220	M	114.9	22.03	0.229	0.432	10.50	21.67	59.77	95.00	96.5	104.0
2237:44	-12.57	-170.03	25.72	9.38	21	0.229	0.240		101.6	20.06	0.209	0.444	9.92	22.60	55.30	93.17	99.1	123.2
2239 57	-12.30	-169.93	27.42	9.15	61	0.219	0.232		115.4	21.73	0.246	0.468	11.04	24.29	59.50	92.97	101.8	125.3
2242 9	-12.03	-169.83	29.07	8.97	-20	0.221	0.233		118.2	22.48	0.250	0.484	11.18	24.59	60.34	93.74	103.9	126.5
2244:21	-11.76	-169.72	30.60	8.84	19	0.220	0.233		118.3	22.91	0.260	0.502	11.38	24.80	60.37	92.46	104.6	129.3
2246.34	-11.48	-169.62	32.26	8.76	18	0.220	0.234		121.2	23.36	0.268	0.523	11.73	25.74	62.38	93.81	106.5	130.6
2248:46	-11.21	-169.52	33.02	8.73	18	0.220	0.234		122.2	23.82	0.272	0.527	11.73	25.62	62.40	93.84	106.3	129.7
2250:59	-10.93	-169.41	33.02	8.76	17	0.219	0.233		122.0	23.62	0.272	0.532	11.85	25.67	62.22	93.24	106.4	131.4
2253:10	-10.65	-169.31	33.01	8.84	18	0.220	0.234		123.9	23.87	0.270	0.537	11.93	26.14	63.47	94.10	107.8	132.2
2255:22	-10.38	-169.21	33.02	8.97	20	0.221	0.235		124.6	24.24	0.276	0.531	11.79	25.80	62.81	94.07	107.4	131.3
2257 34	-10.11	-169.11	33.02	9.15	19	0.220	0.234	R	123.8	24.45	0.288	0.530	11.65	25.64	62.63	93.56	104.0	129.6
2259 46	-9.87	-168.95	33.01	9.34	20	0.234	0.249	R	102.5	23.24	0.262	0.463	10.93	25.75	62.64	93.48	106.3	129.7
2301:58	-9.66	-168.75	33.02	9.56	23	0.220	0.234		124.3	24.30	0.278	0.541	11.77	25.80	62.61	93.90	106.8	131.3
2304.10	-9.44	-168.56	33.01	9.83	25	0.220	0.235		124.5	24.08	0.278	0.540	11.71	25.74	62.30	93.67	106.4	131.3
2306 22	-9.23	-168.36	33.02	10.15	26	0.220	0.234		125.3	24.34	0.282	0.547	11.83	25.84	62.63	94.39	107.4	133.1
2308:34	-9.01	-168.16	33.01	10.52	25	0.219	0.233		124.5	24.03	0.281	0.541	11.79	25.50	61.99	93.57	107.5	133.1
2310 46	-8.80	-167.96	33.01	10.92	30	0.218	0.233		123.5	23.90	0.282	0.543	11.73	25.40	61.37	93.37	107.1	132.6
2312:58	-8 58	-167.76	33.01	11.37	144	0.219	0.236		122.6	23.77	0.277	0.534	11.56	25.09	60.81	93.04	106.7	131.6
2315.10	-8.37	-167.57	33.02	11.83	20	0.219	0.234		122.5	23.77	0.273	0.529	11.46	24.97	60.76	93.64	107.1	128.8
2317.22	-8.16	-167.37	33.02	12.34	23	0.220	0.234		122.5	23.93	0.280	0.527	11.43	24.95	61.14	93.87	106.4	130.6
2319.33	-7.94	-167.17	33.01	12.87	26	0.225	0.240		124.3	24.76	0.259	0.502	10.99	24.60	60.53	94.23	104.8	130.4
2321 45	-7.73	-166.98	33.00	13.41	29	0.217	0.231		121.1	23.70	0.281	0.527	11.58	25.15	59.61	94.73	106.5	132.8
2323.57	-7.51	-166.78	33.02	13.98	26	0.222	0.236		125.3	24.59	0.290	0.520	11.20	24.75	61.06	96.84	106.7	130.1
2326: 9	-7.30	-166.58	33.01	14.57	26	0.218	0.232		123.8	23.82	0.274	0.518	11.50	25.19	61.36	95.33	106.9	132.6
2328:21	-7.09	-166.39	33.01	15.17	27	0.220	0.234		122.6	24.00	0.281	0.513	11.26	24.78	61.21	96.58	106.4	130.4
2330 32	-6.87	-166.20	33.02	15.78	21	0.217	0.232		125.4	24.30	0.280	0.514	11.50	25.31	61.70	96.58	106.4	133.2
2332:44	-6.66	-166.00	33.02	16.41	21	0.219	0.233		124.8	24.20	0.284	0.519	11.37	25.03	61.93	98.64	108.0	132.3
2334:56	-6.44	-165.81	33.01	17.04	21	0.218	0.232		124.5	24.36	0.282	0.499	11.28	24.97	61.35	97.19	105.5	131.9
2337: 8	-6.23	-165.62	33.01	17.69	22	0.217	0.232		122.6	23.38	0.276	0.495	11.09	24.31	60.15	97.58	105.7	130.1
2339.19	-6.02	-165.42	33.02	18.34	29	0.218	0.232		125.1	24.25	0.278	0.482	11.11	24.76	61.21	98.73	105.2	131.8
2341:31	-5.80	-165.23	33.01	19.01	31	0.219	0.233		124.0	23.66	0.274	0.478	11.04	24.44	60.96	100.58	107.4	132.3
2343.43	-5.59	-165.03	33.01	19.68	87	0.216	0.231		123.1	24.04	0.270	0.464	10.93	24.21	59.44	99.41	104.6	130.8
2345.55	-5.37	-164.84	33.01	20.36	23	0.217	0.231		120.9	23.03	0.266	0.457	10.76	23.79	59.70	100.20	104.8	129.4
2348: 6	-5.15	-164.64	33.02	21.05	26	0.218	0.232		122.7	23.63	0.268	0.451	10.72	24.16	59.97	99.56	103.8	130.1
2350 18	-4.93	-164.44	33.02	21.74	26	0.217	0.232		123.4	23.41	0.275	0.456	10.74	24.10	60.62	101.91	106.3	130.2
2352:30	-4.72	-164.25	33.01	22.43	26	0.215	0.229		122.4	23.00	0.261	0.441	10.66	23.85	59.21	99.37	104.4	130.7
2354.41	-4.50	-164.05	33.01	23.13	28	0.208	0.221	M	119.8	24.42	0.310	0.427	10.42	23.54	59.48	99.67	92.3	115.1
2356.53	-4.28	-163.85	33.02	23.84	28	0.214	0.228		121.7	22.67	0.258	0.432	10.49	23.58	58.52	97.77	104.8	128.6
2359. 5	-4.06	-163.65	33.02	24.55	30	0.188	0.200	M	124.4	26.27	0.357	0.420	10.62	22.90	52.31	82.20	84.4	104.2
0001 16	-3.84	-163.45	33.02	25.27	35	0.193	0.206	N	121.4	17.19	0.000	0.397	9.57	22.44	55.38	82.79	148.7	0.7
0003:22	-3.63	-163.26	33.01	25.96	33	0.213	0.227		120.7	23.05	0.254	0.400	10.30	23.35	58.89	98.61	103.9	128.6
0005.34	-3.41	-163.07	33.01	26.68	27	0.212	0.226		121.4	23.63	0.284	0.396	10.06	23.16	59.51	99.73	98.7	124.6
0007:45	-3.20	-162.87	33.01	27.40	34	0.212	0.226		120.9	22.48	0.253	0.308	9.76	22.52	57.81	96.98	99.0	120.7
0009 57	-2.98	-162.67	33.02	28.13	28	0.225	0.240		118.7	22.40	0.146	0.337	8.96	22.09	57.01	94.07	99.2	124.4
0012: 9	-2.76	-162.47	33.01	28.86	26	0.215	0.230		115.1	21.29	0.242	0.341	9.23	21.42	55.96	94.86	98.7	122.4
0014 20	-2.54	-162.28	33.01	29.59	64	0.214	0.228		115.4	20.69	0.224	0.328	9.12	21.13	54.54	92.10	98.6	121.7
0016:32	-2.32	-162.08	33.01	30.31	53	0.216	0.231		117.8	21.82	0.237	0.323	9.12	21.69	56.36	94.27	99.9	124.7
0018.44	-2.11	-161.89	33.02	31.04	77	0.216	0.231		114.6	20.93	0.236	0.306	8.80	20.88	55.27	93.62	98.1	120.7
0020:55	-1.89	-161.70	33.02	31.77	18	0.214	0.228		113.5	19.95	0.216	0.291	8.58	20.21	53.24	90.84	96.7	118.9
0023: 7	-1 67	-161.50	33.02	32.51	28	0.215	0.229		114.0	20.47	0.221	0.278	8.48	20.36	53.52	90.63	96.0	120.0
0025.18	-1.46	-161.31	33.02	33.24	19	0.215	0.229		113.3	20.32	0.227	0.275	8.35	20.16	54.28	92.05	96.0	119.8
0027:30	-1.24	-161.11	33.02	33.98	23	0.213	0.227		111.4	19.41	0.213	0.262	8.16	19.43	51.94	89.30	94.9	117.5
0029.41	-1.03	-160.93	33.01	34.71	25	0.215	0.229		109.6	19.32	0.206	0.241	7.81	19.14	51.43	87.35	92.2	116.4

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DATE=  761118  (YR-MO-DAY)      DAY=  323      FLT NO=  14                NASA LATITUDE SURVEY - FALL 1976
   TBAR        LAT      LONG  PRESS     SUN    O3     MEAS  TOTAL QQQQQ  374.1  312.8  289.2  294.5   303.9  308.4  318.8  326.1  365.5  395.6
 HHMM:SS      (DEG     (DEG     ALT     ANG   PPB   OZONE  OZONE       (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)         N)       E)    (KFT)   (DEG)         (ATM-CM)                BB     BB     NB     NB      NB     NB     NB     NB     BB     BB
---------------------------------------------------------------------------------------------------------------------------------------------
 0031:53   -0.82 -160.73   33.01   35.44    27   0.216  0.230          110.7  19.63  0.216  0.236   7.76  19.14  52.65  89.64   93.6  116.1
 0034: 5   -0.60 -160.54   33.02   36.18    34   0.214  0.228          109.8  18.83  0.201  0.226   7.62  18.71  50.97  87.91   93.7  115.8
 0036;16   -0.39 -160.35   33.02   36.92    33   0.214  0.228          106.9  18.52  0.197  0.205   7.24  18.03  49.26  84.29   89.4  112.5
 0038:28   -0.18 -160.16   33.01   37.65    29   0.216  0.230          103.1  17.65  0.197  0.190   6.81  17.17  48.33  82.92   86.7  108.6
 0040:39    0.04 -159.98   32.98   38.38    36   0.206  0.219  PRT      98.8  17.88  0.152  0.182   7.16  18.70  49.49  80.68   82.7   99.5
 0042:51    0.30 -159.88   33.01   39.08    29   0.214  0.228          103.1  16.93  0.177  0.177   6.77  17.17  48.22  82.87   89.4  111.1
 0045: 3    0.57 -159.77   33.02   39.77    27   0.215  0.229          102.5  17.24  0.184  0.164   6.45  16.60  47.46  80.74   86.1  107.6
 0047:14    0.83 -159.67   33.01   40.47    28   0.215  0.229           99.0  16.32  0.182  0.156   6.19  16.04  46.36  80.39   84.6  104.8
 0049.26    1.11 -159.56   33.55   41.17    30   0.214  0.229           97.8  15.37  0.161  0.147   6.15  15.74  46.26  81.40   86.3  106.0
 0051:37    1.36 -159.46   35.31   41.86    25   0.214  0.229          101.3  16.15  0.170  0.142   6.09  15.82  45.93  80.86   86.4  106.2
 0053:49    1.62 -159.35   36.55   42.55    26   0.214  0.230           99.2  15.82  0.162  0.132   5.88  15.39  44.02  79.12   85.0  104.6
 0056. 1    1.89 -159.25   37.03   43.25    21   0.213  0.228           97.9  15.57  0.163  0.121   5.71  15.05  44.02  76.83   82.1  103.2
 0058:12    2.15 -159.14   37.02   43.95    24   0.215  0.231           95.2  15.47  0.162  0.111   5.29  14.63  42.47  74.85   79.8  100.0
 0100 24    2.42 -159.04   37.02   44.64    87   0.217  0.233           95.6  15.38  0.160  0.104   5.22  14.42  43.77  75.73   80.6  101.3
 0102:35    2.68 -158.93   37.02   45.34    25   0.217  0.233           92.5  14.75  0.158  0.096   4.98  13.89  42.84  74.49   79.3   98.7
 0104-47    2.95 -158.82   37.02   46.04    27   0.215  0.231           91.4  14.20  0.155  0.089   4.78  13.25  41.37  72.82   76.8   95.2
 0106 58    3.22 -158.72   37.02   46.74    28   0.214  0.230           93.4  14.07  0.150  0.086   4.76  13.22  41.21  74.44   78.5   97.4
 0109.10    3.48 -158.61   37.02   47.44    28   0.215  0.231           93.6  13.85  0.142  0.080   4.60  13.03  40.96  73.87   78.7   97.0
 0111:22    3.75 -158.50   37.02   48.14    29   0.214  0.230           91.5  13.67  0.133  0.071   4.36  12.75  39.79  71.60   76.6   95.9
 0113:33    4.02 -158 40   37.02   48.84    29   0.214  0.230           88.2  13.29  0.136  0.064   4.12  12.16  38.47  69.13   73.5   93.9
 0115:45    4 29 -158.29   37.02   49.54    30   0.216  0.232           85.8  12.66  0.127  0.057   3.86  11.53  37.63  66.98   72.6   90.5
 0117-56    4 55 -158.18   37.03   50.23    28   0.218  0.234           85.7  12.16  0.123  0.051   3.60  11.02  36.15  65.55   71.3   89.0
 0120  8    4.81 -158.08   37.02   50.93    75   0.216  0.233           81.9  11.51  0.113  0.045   3.45  10.49  34.80  63.90   69.7   86.1
 0122:19    5.07 -157.96   37.02   51.63    25   0.216  0.232           77.7  10.51  0.098  0.039   3.28  10.18  34.15  63.53   68.3   85.4
 0124:31    5.33 -157.84   37.02   52.35    19   0.217  0.233           80.9  11.12  0.100  0.035   3.12   9.97  33.94  63.35   68.2   85.0
 0126.42    5.59 -157.71   37.02   53.06    23   0.217  0.233           81.1  10.84  0.102  0.031   3.03   9.77  34.29  64.35   68.2   85.9
 0128-54    5.85 -157.58   37.02   53.77    25   0.216  0.232           79.0  10.42  0.104  0.027   2.84   9.31  33.20  62.37   65.8   82.5
 0131: 5    6.11 -157.45   37.02   54.48    26   0.217  0.233           75.2   9.89  0.097  0.024   2.55   8.70  31.52  58.89   62.6   79.4
 0133 17    6.37 -157.32   37.02   55.20    30   0.217  0.233           73.1   9.45  0.097  0.021   2.43   8.23  30.58  55.87   61.1   77.6
 0135 28    6.63 -157.20   37.02   55.92    28   0.216  0.232           73.5   9.22  0.090  0.018   2.29   8.10  30.16  55.36   61.0   77.1
 0137:40    6.89 -157.07   37.02   56.63    28   0.217  0.233           71.7   8.91  0.081  0.015   2.11   7.56  28.54  54.04   60.2   75.2
 0139.51    7.14 -156.94   37.02   57.34    29   0.216  0.232           69.3   8.33  0.074  0.013   1.98   7.07  27.41  52.29   57.9   72.2
 0142. 3    7.40 -156.81   37.02   58.05    30   0.216  0.232           69.2   8.02  0.072  0.010   1.84   6.84  27.22  52.88   56.6   70.6
 0144:14    7.66 -156.68   37.02   58.77    30   0.214  0.230           67.3   7.82  0.068  0.008   1.73   6.74  26.89  52.66   56.7   71.9
 0146:26    7.92 -156.55   37.02   59.48    29   0.215  0.230           65.9   7.56  0.067  0.005   1.56   6.29  25.73  50.03   54.5   70.0
 0148-37    8.17 -156.43   37.02   60.19    30   0.215  0.231           63.1   7.22  0.060  0.003   1.42   5.87  24.58  47.77   52.9   68.1
 0150:49    8.42 -156.30   37.02   60.90    28   0.213  0.229           63.9   6.83  0.000  0.003   1.33   5.61  23.64  47.59   52.4   66.6
 0153: 0    8.68 -156.17   37.02   61.61    26   0.214  0.230           62.5   6.50  0.000  0.002   1.21   5.25  23.22  46.93   51.0   65.0
 0155:12    8.94 -156.04   37.02   62.33    22   0.215  0.230           59.5   6.07  0.056  0.000   1.07   4.83  22.31  43.79   48.1   62.5
 0157.24    9.20 -155.91   37.03   63.04    21   0.214  0.230           57.4   5.74  0.000  0.000   0.93   4.45  21.00  42.05   46.6   59.8
 0159.35    9.45 -155.78   37.02   63.75    21   0.212  0.228           56.2   5.44  0.000  0.000   0.85   4.22  20.10  41.68   45.7   59.7
 0201:47    9.72 -155.65   37.02   64.47    24   0.212  0.227           55.6   5.12  0.000  0.000   0.76   3.95  19.70  40.82   44.5   57.1
 0203.58    9.98 -155.51   37.02   65.19    22   0.215  0.231  R        53.4   5.05  0.000  0.000   0.55   3.47  18.29  37.00   40.7   57.4
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DATE=  761118  (YR-MO-DAY)      DAY=  323      PLT NO=  15              NASA LATITUDE SURVEY - FALL 1976
    FBAR    LAT      LONG   PRESS     SUN   O3    MEAS   TOTAL 00000  374.1  312.8  289.2  294.5  303.9  308.4  318.8  326.1  365.5  395.6
 HHMM:SS   (DEG     (DEG     ALT      ANG   PPB   OZONE  OZONE       (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
   (GMT)     N)       E)    (KFT)   (DEG)          (ATM-CM)              BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
 ------------------------------------------------------------------------------------------------------------------------------------------

 1916:47   22.98  -154.70   32.95   58.69   68   0.250  0.267         64.5   5.94  0.000  0.004   1.24   4.89  22.71  49.40   56.2   68.3
 1918:59   23.15  -154.43   32.97   58.25   73   0.241  0.258         65.0   6.05  0.000  0.007   1.24   5.48  24.91  49.40   55.6   70.0
 1921:11   23.31  -154.15   32.99   57.82   80   0.243  0.260         64.9   6.09  0.000  0.007   1.25   5.56  25.06  50.50   56.1   69.9
 1923:23   23.48  -153.88   32.99   57.40   84   0.243  0.260         65.5   6.18  0.000  0.007   1.32   5.67  24.97  50.97   56.7   69.8
 1925:34   23.65  -153.60   32.99   56.98   86   0.244  0.261         65.4   6.44  0.000  0.008   1.39   5.89  25.96  51.48   57.1   72.4
 1927:46   23.81  -153.33   33.01   56.58   87   0.244  0.261         68.3   6.67  0.000  0.008   1.44   6.11  26.43  52.50   58.9   73.2
 1929:58   23.98  -153.05   33.00   56.18   73   0.243  0.260         68.5   6.55  0.000  0.008   1.50   6.34  26.50  52.71   60.8   74.3
 1932: 9   24.14  -152.78   33.00   55.79   79   0.244  0.261         69.1   6.80  0.000  0.009   1.58   6.42  26.41  53.15   60.7   75.4
 1934:21   24.30  -152.51   32.99   55.41   55   0.246  0.262         70.7   6.37  0.000  0.008   1.64   6.68  27.48  54.79   63.5   77.5
 1936:33   24.46  -152.24   33.00   55.04   80   0.242  0.259         70.3   7.51  0.000  0.009   1.75   7.01  28.69  55.92   62.3   77.9
 1938:44   24.62  -151.96   33.00   54.68   82   0.238  0.255         72.2   7.58  0.000  0.010   1.83   7.22  28.44  55.69   61.9   77.1
 1940:56   24.78  -151.69   32.98   54.33   84   0.244  0.261         72.9   7.85  0.000  0.010   1.86   7.17  28.52  55.99   63.4   80.3
 1943: 8   24.94  -151.42   32.98   53.99   77   0.245  0.262         74.7   7.70  0.000  0.011   1.88   7.42  29.72  57.66   64.7   79.9
 1945:19   25.10  -151.15   32.96   53.66   46   0.244  0.260         74.6   8.19  0.000  0.012   2.03   7.63  30.39  58.38   66.1   80.1
 1947:31   25.26  -150.87   32.96   53.34   40   0.243  0.259         75.0   8.51  0.000  0.013   2.11   7.78  30.86  58.91   64.4   82.3
 1949:42   25.42  -150.59   32.95   53.03   40   0.242  0.258         75.9   8.31  0.072  0.014   2.15   7.92  30.71  58.70   65.6   82.1
 1951:54   25.57  -150.31   32.97   52.73   43   0.237  0.253         77.3   8.89  0.075  0.015   2.27   8.41  31.69  60.24   65.4   81.8
 1954: 5   25.73  -150.04   32.97   52.44   46   0.242  0.258         78.2   8.84  0.000  0.017   2.33   8.52  32.84  62.71   68.7   84.1
 1956:17   25.88  -149.75   32.95   52.16   48   0.241  0.257         75.8   9.16  0.086  0.018   2.37   8.53  32.22  61.13   67.5   84.0
 1958:28   26.04  -149.47   32.94   51.89   46   0.240  0.256         78.4   9.10  0.081  0.019   2.44   8.53  31.78  61.41   68.2   83.4
 2000:40   26.20  -149.19   32.93   51.63   76   0.238  0.254         80.5   9.54  0.077  0.019   2.51   8.98  32.44  63.13   69.5   85.7
 2002:52   26.35  -148.90   32.94   51.38   42   0.241  0.257         84.0   9.67  0.082  0.022   2.59   9.15  34.17  64.84   71.1   87.4
 2005: 3   26.50  -148.63   32.94   51.15   53   0.240  0.256         80.9   9.53  0.081  0.022   2.56   9.12  32.74  63.36   71.4   85.7
 2007:15   26.65  -148.35   32.97   50.93   60   0.242  0.258         81.0   9.59  0.087  0.023   2.50   9.01  32.92  62.85   68.5   85.5
 2009:26   26.80  -148.08   33.00   50.72   67   0.246  0.262         81.5   9.54  0.093  0.023   2.54   8.94  33.47  63.19   69.9   86.6
 2011:38   26.94  -147.80   33.00   50.52  108   0.246  0.264         82.0   9.72  0.089  0.022   2.57   9.05  33.78  64.61   70.6   87.1
 2013:50   27.08  -147.53   33.02   50.33  158   0.250  0.269         82.8   9.86  0.085  0.021   2.55   8.87  33.44  64.38   70.1   88.2
 2016: 1   27.23  -147.26   33.02   50.15  216   0.253  0.274         82.8   9.26  0.094  0.020   2.44   8.87  33.46  63.28   70.0   88.3
 2018:13   27.37  -146.99   32.98   49.99  215   0.256  0.278         81.8   9.36  0.086  0.017   2.35   8.66  33.02  63.02   69.1   87.4
 2020:24   27.52  -146.69   32.96   49.84  227   0.270  0.294         83.8   8.79  0.000  0.013   2.18   8.22  33.23  64.85   71.8   89.0
 2022:36   27.67  -146.41   32.95   49.70  257   0.272  0.297         82.1   8.28  0.000  0.012   2.08   8.16  32.72  64.16   71.4   89.7
 2024:48   27.82  -146.12   32.94   49.58  230   0.272  0.296         82.0   8.75  0.000  0.012   2.08   8.27  33.21  66.53   71.5   89.6
 2026:59   27.96  -145.84   32.99   49.46  187   0.277  0.300         83.7   8.80  0.086  0.013   2.12   8.23  34.28  66.30   72.4   90.9
 2029:11   28.10  -145.56   33.01   49.36  202   0.273  0.296         87.9   9.24  0.000  0.012   2.20   8.47  34.54  66.41   73.9   90.0
 2031:22   28.24  -145.29   33.02   49.27  156   0.276  0.297         85.8   9.73  0.088  0.013   2.30   8.56  35.36  67.25   74.6   94.5
 2033:34   28.37  -145.02   33.02   49.19  125   0.270  0.290         84.5   9.74  0.096  0.016   2.41   8.67  34.84  68.47   75.6   89.3
 2035:45   28.51  -144.74   33.03   49.13   76   0.268  0.287         84.9   8.06  0.000  0.017   2.54   9.12  33.18  70.03   83.8   97.0
 2037:57   28.65  -144.46   33.02   49.08   52   0.270  0.288         84.1   8.90  0.000  0.017   2.21   8.83  34.39  69.06   75.3   91.4
 2040: 9   28.79  -144.17   33.00   49.04   49   0.274  0.292         82.8   9.12  0.000  0.019   2.37   8.53  34.70  66.53   74.5   92.5
 2042:20   28.94  -143.86   32.94   49.02   56   0.255  0.272         84.9  10.75  0.105  0.023   2.70   9.64  36.98  70.32   75.1   89.0
 2044:32   29.09  -143.55   32.96   49.02   64   0.258  0.276         84.2   9.66  0.097  0.022   2.55   9.49  35.74  71.91   74.7   90.7
 2046:44   29.24  -143.24   32.94   49.03   46   0.256  0.273         87.7  11.21  0.105  0.024   2.74   9.22  35.86  67.15   74.7   86.1
 2048:55   29.39  -142.93   32.93   49.06   44   0.253  0.270         81.6  10.56  0.107  0.024   2.59   9.68  36.60  68.17   72.3   87.4
 2051: 7   29.53  -142.62   32.94   49.09   38   0.254  0.271         84.4  10.21  0.091  0.024   2.65   9.08  34.02  63.49   73.0   86.6
 2053:18   29.68  -142.31   32.96   49.14   35   0.249  0.266         81.8   9.82  0.102  0.026   2.86   9.53  35.21  67.30   72.8   91.6
 2055:30   29.82  -141.99   32.96   49.21   62   0.247  0.264         83.0  10.50  0.101  0.026   2.88   9.82  36.03  66.71   74.5   90.9
 2057:41   29.96  -141.68   32.95   49.29   39   0.249  0.265         86.2  10.97  0.101  0.023   2.85  10.18  39.21  70.70   73.0   89.3
 2059:53   30.11  -141.37   32.95   49.38   39   0.246  0.263         86.5  10.22  0.092  0.026   2.85   9.74  35.65  67.43   73.5   90.2
 2102: 5   30.25  -141.05   32.95   49.48   35   0.269  0.286         86.2  10.27  0.085  0.026   2.73   8.79  37.99  73.50   76.6   90.7
 2104:16   30.39  -140.73   32.96   49.60   33   0.244  0.260         82.8  10.31  0.094  0.026   2.80   9.90  36.01  65.29   71.4   90.2
 2106:28   30.53  -140.41   32.95   49.74   33   0.242  0.258         82.8  10.04  0.101  0.026   2.85   9.63  34.69  65.55   71.9   89.0
 2108:39   30.67  -140.09   32.94   49.88   36   0.244  0.260         85.2  10.42  0.101  0.025   2.82   9.65  36.21  66.30   71.1   88.6
 2110:51   30.82  -139.77   32.94   50.04   36   0.241  0.257         84.1  10.42  0.095  0.025   2.83   9.71  35.30  66.26   71.3   89.0
 2113: 2   30.96  -139.44   32.93   50.22   38   0.240  0.255         85.7  10.27  0.093  0.026   2.87   9.73  35.02  65.95   72.6   90.1
 2115:14   31.10  -139.11   32.93   50.41   69   0.241  0.257         81.7  10.23  0.103  0.027   2.79   9.43  34.50  64.83   70.9   88.4
 2117:25   31.24  -138.79   32.93   50.61   58   0.658  0.702    N    81.3   6.40  0.000  0.425  14.80  24.57  50.77  24.95   98.1   29.5
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REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

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DATE=  751118  (YR-MO-DAY)      DAY=  323      FLT NO=  15                NASA LATITUDE SURVEY - FALL 1976
   TBAR     LAT     LONG   PRESS     SUN    O3      MEAS   TOTAL  OOOOO   374.1   312.8   289.2   294.5   303.9   308.4   318.8   326.1   365.5   395.6
HHMM:SS    (DEG     (DEG    ALT      ANG   PPB     OZONE   OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)   (KFT)   (DEG)           (ATM-CM)                  BB      BB      NB      NB      NB      NB      NB      NB      BB      BB
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2119:32   31.38  -138.46   32.94   50.82    54    0.239   0.255            81.0    9.83   0.089   0.024    2.70    9.40   34.38   65.34    70.2    87.2
2121:43   31.52  -138.13   32.94   51.04    47    0.240   0.256            82.1   10.07   0.096   0.025    2.65    9.27   34.44   64.79    69.8    87.1
2123:55   31.66  -137.79   32.94   51.29    47    0.240   0.256            81.2   10.27   0.090   0.025    2.64    9.08   33.77   64.49    69.8    86.9
2126: 7   31.79  -137.46   32.96   51.54    45    0.234   0.249            79.9    9.81   0.095   0.025    2.71    9.16   33.22   62.90    68.9    85.5
2128:18   31.93  -137.13   32.97   51.80    49    0.233   0.249            79.9   10.00   0.089   0.024    2.65    9.13   33.13   62.96    68.7    84.7
2130:30   32.07  -136.79   32.94   52.08    66    0.232   0.248            81.9    9.91   0.092   0.023    2.67    9.21   33.73   63.33    68.6    85.8
2132:41   32.20  -136.45   32.94   52.36    73    0.234   0.251            81.0   10.00   0.086   0.021    2.59    9.02   33.82   63.45    69.0    85.5
2134:53   32.34  -136.11   32.95   52.66    59    0.236   0.252            82.1   10.04   0.088   0.021    2.53    8.91   33.74   64.25    69.9    87.1
2137: 4   32.47  -135.78   32.98   52.97    43    0.232   0.247            80.1    9.79   0.093   0.021    2.52    8.87   33.24   63.03    68.5    84.5
2139:16   32.60  -135.44   32.98   53.29    38    0.232   0.247            77.9    9.80   0.093   0.020    2.44    8.54   32.34   61.72    67.0    82.3
2141:28   32.73  -135.10   32.98   53.62    41    0.230   0.245            78.3    9.34   0.088   0.019    2.40    8.52   31.92   61.41    66.4    82.9
2143:39   32.86  -134.76   32.97   53.97    46    0.229   0.244            77.3    9.11   0.000   0.016    2.39    8.68   32.47   62.14    68.3    83.6
2145:51   33.00  -134.41   32.97   54.33    51    0.228   0.244            78.4    9.20   0.082   0.016    2.37    8.40   32.03   61.50    66.4    83.1
2148: 2   33.13  -134.06   32.96   54.69    51    0.225   0.240            78.5    9.53   0.080   0.016    2.35    8.45   31.90   60.83    66.2    82.4
2150:14   33.23  -133.72   32.98   55.06    54    0.227   0.243            76.9    8.96   0.076   0.015    2.17    8.04   31.06   60.19    64.5    79.9
2152:25   33.38  -133.37   32.99   55.45    57    0.226   0.242            74.7    8.62   0.075   0.014    2.09    7.75   30.18   58.08    63.2    77.6
2154:37   33.51  -133.02   33.01   55.84    55    0.226   0.241            75.1    8.72   0.076   0.013    2.01    7.66   30.10   58.11    62.9    77.4
2156:49   33.63  -132.67   32.98   56.25    54    0.226   0.242            74.4    8.31   0.073   0.012    1.93    7.35   28.93   56.19    61.8    77.5
2159: 0   33.76  -132.32   32.95   56.66    55    0.228   0.244            71.9    7.72   0.069   0.010    1.82    6.99   28.04   54.66    60.9    76.9
2201:12   33.88  -131.96   32.96   57.09    53    0.231   0.246            70.2    7.46   0.065   0.008    1.68    6.66   27.47   54.22    60.1    74.7
2203:23   34.01  -131.61   32.95   57.52    54    0.234   0.249            69.3    7.19   0.000   0.006    1.53    6.23   26.30   52.34    58.5    73.4
2205:35   34.13  -131.25   32.94   57.96    61    0.232   0.248            67.1    7.22   0.064   0.006    1.60    5.88   25.62   53.28    56.1    68.1
2207:47   34.25  -130.90   33.00   58.41    26    0.231   0.246            63.2    6.76   0.068   0.005    1.39    5.82   25.83   46.68    54.8    67.6
2209:58   34.36  -130.55   33.02   58.86    25    0.234   0.249            55.7    5.59   0.000   0.000    1.28    5.41   24.42   49.22    54.5    65.6
2212:10   34.48  -130.20   32.97   59.32    53    0.225   0.240            57.6    6.15   0.094   0.002    1.17    5.37   22.44   44.86    52.1    66.5
2214:21   34.59  -129.85   32.97   59.79    18    0.232   0.247            61.0    5.89   0.000   0.000    1.15    5.24   24.07   48.25    54.1    67.9
2216:33   34.71  -129.50   32.97   60.26    20    0.228   0.242            61.2    6.22   0.000   0.000    1.11    5.07   23.34   46.61    51.7    64.2
2218:45   34.82  -129.14   32.97   60.75    22    0.230   0.245            62.1    5.53   0.000   0.000    0.97    4.79   22.55   46.40    50.9    64.8
2220:56   34.94  -128.78   32.97   61.24    21    0.241   0.257            61.6    5.84   0.051   0.000    0.94    4.21   21.29   48.55    47.8    65.4
2223: 8   35.05  -128.41   32.93   61.75    21    0.234   0.249            61.0    5.27   0.000   0.000    0.86    4.34   21.63   44.87    51.1    64.7
2225:19   35.16  -128.05   32.94   62.26    21    0.233   0.249            57.8    5.02   0.000   0.000    0.76    4.05   20.55   42.88    48.5    62.4
2227:31   35.27  -127.68   32.98   62.78    20    0.235   0.250            57.3    4.53   0.000   0.000    0.65    3.78   19.88   42.05    47.2    60.1
2229:42   35.38  -127.32   32.97   63.30    20    0.238   0.253            57.0    4.58   0.000   0.000    0.58    3.55   19.52   41.51    47.0    60.5
2231:54   35.49  -126.96   32.97   63.82    22    0.239   0.254            56.7    4.29   0.000   0.000    0.52    3.36   19.11   40.49    47.2    59.4
2234: 5   35.59  -126.60   32.97   64.35    24    0.236   0.251            52.9    3.99   0.000   0.000    0.46    3.12   17.95   38.17    43.6    57.0
2236:17   35.70  -126.24   32.96   64.89    25    0.238   0.253            51.5    3.56   0.000   0.000    0.40    2.88   17.38   37.21    42.5    54.8
```

5.3 GASP/JPL Flights - Fall 1975

A total of 11 flights was made with the UVS on the NASA CV-990 for the GASP/JPL series in the Fall of 1975. This was a feasibility test for the UVS, and it was mounted inside the CV-990, viewing the sun through a quartz window. This resulted in a 59° cut-off in the sun-diffuser normal angle, and required the analysis procedure described in Section 5.1.

Valid UVS data have been obtained for 7 of the 11 flights of 1975. Flights 1 and 8 have no UVS data for $\theta_{sun} < 75^{\circ}$, while no magnetic tape was received for flight 4. The magnetic tape for flight 2 appears to have a different format than the other tapes, and so was not processed. The remaining seven flights have varying amounts of valid UVS data, which are tabulated in the following pages. As noted in Section 5.1.3, the ozone thickness values are taken from the adjacent filter calculations only. The format is identical to that for the 1976 flights.

A change has been made in the set conditions for the N(noise) Q flag. The 0.1 volt standard deviation (see discussion in Section 5.2) is nearly always exceeded by the dark current and filters with low signal levels. This is because the greater gain of the photomultiplier allows use of much lower light levels, which increases statistical fluctuations in the low level outputs. Thus the N flag was set only if more than four standard deviations in signal voltage exceeded 0.1 volt. It will be seen in the tabulated data, that for $\theta_{sun}<59^{\circ}$ the signal levels are generally large enough to avoid setting N, but that for $\theta_{sun}>59^{\circ}$ the N flag is usually set. This is expected because the latter condition involves the lower signal levels from the Rayleigh scattered light alone. The calculated ozone thicknesses also show this increased noise, with the scatter increasing significantly for $\theta_{sun}>59^{\circ}$. For $\theta_{sun}>59^{\circ}$ it is thus better to average three or more consecutive ozone measurements to reduce the statistical errors. The flux values for $\theta_{sun}>59^{\circ}$ are likely to have errors larger than 50%, because the direct solar flux is essentially being calculated from the Rayleigh scattered flux alone. Flux ratios are much more accurate, though, especially for nearby wavelengths.

The UVS data for the Fall 1975 flights, for $\theta_{sun}<65^{\circ}$ and the altitude >10 kft, are presented below.

The analyzed UVS data for the Fall 1975 NASA GASP/JPL flights on the CV-990 are presented in the following tabulations. Data are given for the flights listed below.

Table 5.2

List of UVS Flight Data for Fall 1975

Flight No.	Date (1975)	Minutes of Valid UVS data*	Page No. (s)
3	Dec. 2	120	45
5	Dec. 6	150	46-47
6	Dec. 8	230	48-49
7	Dec. 10	185	50-51
9	Dec. 14	245	52-53
10	Dec. 15	230	54-55
11	Dec. 16	125	56

*Data for $\theta_{sun} < 65^{o}$, and altitude >10 kft.

```
DATE=  751202  (YR-MO-DAY)        DAY=  336      FLT NO=   3              NASA - GASP - FALL 1975 FLIGHTS
  GMT      LAT.    LONG   PRESS    SUN   O3    MEAS  TOTAL  QQQQQ  227.1  302.3  292.0  307.5  307.0  311.1  322.4  329.7  371.3  401.9
HHMM SS   (DEG    (DEG     ALT     ANG   PPB   OZONE  OZONE       (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
 (GMT)      N)      E)    (KFT)   (DEG)        (ATM-CM)               BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
--------------------------------------------------------------------------------------------------------------------------------------------
1652:29  37.11  -76.00  14.72   58.94   60   0.318  0.328           0.0   0.00  0.000  0.000   1.17   5.46  20.94  39.53   50.7   78.5
1654:41  37.31  -75.86  14.72   59.14   58   0.325  0.336      N    0.0   0.00  0.000  0.000   1.09   5.31  21.50  38.10   46.6   68.5
1656:53  37.52  -75.73  14.72   59.36   59   0.308  0.318      N    0.0   0.00  0.000  0.000   1.32   5.54  21.16  39.68   48.9   69.7
1659: 5  37.74  -75.59  14.72   59.59   60   0.333  0.344           0.0   0.00  0.000  0.000   1.09   5.25  22.15  39.06   51.7   78.5
1701:17  37.95  -75.46  14.72   59.83   59   0.335  0.346      N    0.0   0.00  0.000  0.000   0.87   4.42  18.89  33.24   47.7   70.4
1703:29  38.17  -75.31  14.71   60.07   57   0.321  0.331      N    0.0   0.94  0.000  2.162   1.23   4.10  17.99  25.99   34.1   62.7
1705:41  38.38  -75.17  14.71   60.32   52   0.372  0.384      M    0.0   0.00  0.000  0.000   1.06   4.97  16.71  40.64   58.6   93.0
1707:52  38.60  -75.03  14.72   60.59   53   0.417  0.431      M    0.0   0.00  0.000  0.000   0.46   3.41  20.17  36.83   55.8   90.5
1710: 4  38.82  -74.88  14.72   60.85   48   0.361  0.372      N    0.0   0.00  0.000  0.000   0.83   4.35  20.07  38.57   61.3  101.0
1712:16  39.03  -74.74  14.71   61.12   50   0.371  0.382      N    0.0   0.00  0.000  0.000   0.71   4.26  19.74  38.70   66.3  110.6
1714:28  39.24  -74.60  14.72   61.39   50   0.352  0.364  R   M    0.0   0.00  0.000  0.000   0.63   3.25  14.28  26.50   36.2  120.4
1716:40  39.41  -74.47  14.76   61.63   49   0.384  0.396  RT  M    0.0   0.00  0.000  0.000   0.63   6.28  34.33  64.13  105.1   87.7
1718:52  39.33  -74.58  19.23   61.59   55   0.314  0.327  PRTAN    0.0   0.00  0.000  0.000   0.59   3.12  13.23  22.13   31.4   52.5
1721: 4  39.15  -74.66  19.89   61.46   57   0.346  0.360      N    0.0   0.00  0.000  0.000   0.78   3.91  18.16  33.23   46.7   76.1
1723:16  38.99  -74.77  19.96   61.36   57   0.288  0.300      N    0.0   0.00  0.000  0.000   0.70   4.45  16.20  29.44   47.1   69.7
1725:27  38.84  -74.87  19.97   61.27   57   0.410  0.428      N    0.0   0.00  0.000  0.000   0.45   4.60  20.18  41.85   74.3  145.9
1727:39  38.68  -74.98  19.97   61.18  111   0.339  0.357      N    0.0   0.00  0.000  0.000   0.87   4.88  22.06  38.49   58.5  103.0
1729:51  38.52  -75.09  19.97   61.08   51   0.353  0.367      N    0.0   0.00  0.000  0.000   1.08   5.97  26.50  50.00   76.9  150.1
1732: 3  38.35  -75.20  19.96   60.98   53   0.347  0.362      N    0.0   0.00  0.000  0.000   1.25   5.30  21.31  41.77   66.0  134.0
1734:15  38.18  -75.31  19.96   60.88   52   0.334  0.348      N    0.0   0.00  0.000  0.000   1.13   5.94  26.29  44.60   68.2  107.2
1736:27  38.01  -75.42  19.96   60.78   51   0.319  0.332      N    0.0   0.00  0.000  0.000   0.92   5.35  20.94  39.09   57.1  107.7
1738:39  37.84  -75.53  19.97   60.69   54   0.340  0.354      N    0.0   0.00  0.000  0.000   0.75   4.61  19.90  35.88   62.9   58.9
1740:51  37.67  -75.64  19.97   60.60   56   0.337  0.351      N    0.0   0.00  0.000  0.000   0.95   4.86  19.95  38.15   62.5   93.7
1743: 3  37.49  -75.75  19.96   60.51   57   0.357  0.372      N    0.0   0.00  0.000  0.000   0.96   4.67  22.12  37.87   59.3   90.5
1745:15  37.32  -75.86  19.96   60.43   58   0.358  0.374      N    0.0   0.00  0.000  0.000   0.89   4.42  21.23  35.20   61.7   91.6
1747:27  37.14  -75.97  19.96   60.34   58   0.307  0.320      N    0.0   0.00  0.000  0.000   0.98   5.06  18.97  33.55   64.3   91.8
1749:39  36.97  -76.09  19.97   60.26   57   0.328  0.342  R   M    0.0   0.00  0.000  0.000   1.10   4.70  18.53  34.61   57.8   89.5
1752: 2  37.07  -76.04  24.73   60.61   62   0.462  0.486  RT  M    0.0   0.00  0.000  0.000   0.59   5.90  33.28  66.73  117.1  225.8
1754:14  37.30  -75.87  25.02   60.99   62   0.319  0.336      N    0.0   0.00  0.000  0.000   1.23   5.79  23.44  43.95   58.2   89.4
1758:26  37.55  -75.72  25.02   61.39   55   0.311  0.327      N    0.0   0.00  0.000  0.000   1.36   6.69  26.63  49.41   67.6  109.4
1800:38  37.79  -75.56  25.02   61.80  135   0.329  0.349  R   N    0.0   0.00  0.000  0.000   1.19   6.75  28.70  51.74   89.6  144.8
1802:49  38.04  -75.39  25.01   62.21   68   0.371  0.391      N    0.0   0.00  0.000  0.000   1.26   6.24  30.57  57.74  102.4  174.6
1805: 1  38.28  -75.24  25.01   62.62   62   0.341  0.359      N    0.0   0.00  0.000  0.000   0.93   5.77  27.67  48.19   89.0  154.7
1807:13  38.52  -75.08  25.02   63.04   60   0.359  0.376      M    0.0   0.00  0.000  0.000   0.68   5.77  26.72  51.42   87.4  169.5
1809:25  38.76  -74.92  25.02   63.46   62   0.338  0.356      M    0.0   0.00  0.000  0.000   0.82   5.53  24.43  45.38   89.6  160.1
1811:37  38.99  -74.76  25.24   63.87   62   0.661  0.696  RT  M    0.0   0.00  0.000  0.000   0.00   3.52  26.94  67.08  150.2  305.9
1813:49  39.03  -74.53  27.43   64.14   74   0.052  0.055  PT  N    0.0   7.67  0.262  4.387   0.86   1.62   5.02   9.04    7.0    7.7
1815: 1  39.32  -74.70  30.24   64.14   88   0.266  0.283  P   N    0.0   0.00  0.000  0.000   0.53  10.29  39.48  40.32   52.5  117.2
1818:13  38.75  -74.88  31.04   64.10   72   0.333  0.355  P   N    0.0   0.00  0.000  0.000   0.73   4.01  19.16  35.42   55.6   93.2
1820:24  38.54  -75.02  31.05   64.04   71   0.333  0.354      N    0.0   0.00  0.000  0.000   0.68   3.76  16.55  34.24   50.1   76.8
1822:36  38.33  -75.15  31.05   63.98   81   0.294  0.314      N    0.0   0.00  0.000  0.000   0.90   4.04  15.24  30.46   41.9   76.7
1824:48  38.13  -75.28  31.05   63.93   81   0.300  0.320      N    0.0   0.00  0.000  0.000   0.73   3.83  15.69  28.04   52.2   82.5
1827: 0  37.93  -75.41  31.05   63.88   82   0.325  0.346      N    0.0   0.00  0.000  0.000   0.82   3.82  17.06  33.69   46.3   76.5
1829:12  37.73  -75.54  31.05   63.84   81   0.311  0.331      N    0.0   0.00  0.000  0.000   0.85   3.54  15.19  28.33   41.0   71.4
1831:24  37.53  -75.68  31.05   63.81   80   0.310  0.330      N    0.0   0.00  0.000  0.000   0.82   3.81  16.05  30.34   43.0   79.2
1833:35  37.34  -75.81  31.05   63.77   79   0.318  0.339      N    0.0   0.00  0.000  0.000   0.87   3.82  17.18  31.27   45.0   74.2
1835:47  37.13  -75.95  31.06   63.74   85   0.326  0.348      N    0.0   0.00  0.000  0.000   0.79   3.72  16.09  30.47   53.3   85.5
1837:59  36.93  -76.06  31.05   63.71   85   0.278  0.296      N    0.0   0.00  0.000  0.000   0.93   5.34  19.18  36.02   53.2   99.7
1840:11  36.73  -76.22  31.05   63.68   82   0.320  0.341  R   N    0.0   0.00  0.000  0.000   0.83   4.32  20.02  34.02   63.0   69.0
1842:23  36.63  -76.39  32.78   63.73  105   0.236  0.253  PT  N    0.0   1.87  0.102  1.072   0.90   3.83  12.29  22.01   28.1   42.2
1844:34  36.80  -76.20  34.06   64.15  142   0.253  0.273  RT  N    0.0  22.61  0.435  3.513   1.78   7.44  28.79  30.05   36.3   57.0
1846:46  37.01  -75.96  34.97   64.66  134   0.311  0.335  R   N    0.0   0.00  0.000  0.000   0.86   5.50  23.65  42.90   83.0  133.8
1848:53  37.31  -75.78  35.00   65.20  133   0.323  0.348      N    0.0   0.00  0.000  0.000   1.04   4.61  21.08  40.30   64.5  114.9
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DATE=  751206  (YR-MO-DAY)       DAY=  340      FLT NO=   5              NASA - GASP - FALL 1975 FLIGHTS
   PPAR     LAT     LONG   PRESS      SUN    O3    MEAS   TOTAL  CCOOO   227.1   302.3   292.0   307.5   307.0   311.1   322.4   329.7   371.3   401.9
HHMM:SS    (DEG     (DEG     ALT      ANG   PPB   OZONE  OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)    (KFT)    (DEG)          (ATM-CM)                 BB      BP      NB      NP      NB      NP      NB      NP      PB      PB
------------------------------------------------------------------------------------------------------------------------------------------------
1723:44   30.03  -79.03   32.96   52.57   26   0.262  0.279  R  M    0.0    0.00   0.000   0.000    4.61   12.77   33.89   58.41    85.8   140.6
1726: 2   30.17  -78.74   32.95   52.78   27   0.267  0.284  R       0.0    0.00   0.083   2.687    4.41   13.76   37.94   61.56    66.6    88.2
1728:14   30.26  -78.41   33.00   52.96   26   1.256  1.338  RT M    0.0   10.79   0.720   0.000    1.72    8.54   25.42   83.25   255.9   630.6
1730:26   30.43  -78.44   32.94   53.18   27   0.168  0.179  RT M    0.0    3.18   0.246   7.308    6.39   14.50   34.18   45.71    49.0    60.7
1732:38   30.37  -78.73   32.96   53.15   27   0.248  0.264          0.0    0.00   0.000   2.079    4.46   12.66   35.11   59.60    65.1    87.3
1734:51   30.27  -79.03   32.96   53.09   27   0.257  0.273          0.0    0.00   0.000   2.419    4.51   13.68   36.87   56.93    74.1    89.6
1737: 3   30.18  -79.33   32.96   53.03   28   0.251  0.268          0.0    0.00   0.000   2.769    4.69   12.82   37.75   59.11    67.6    94.5
1739:15   30.09  -79.63   32.96   52.97   28   0.257  0.274          0.0    0.00   0.000   2.268    4.61   13.84   37.65   60.29    70.1    90.4
1741:27   30.00  -79.92   32.95   52.91   29   0.232  0.247          0.0    0.00   0.000   3.037    5.23   14.09   36.60   60.31    67.2    96.8
1743:39   29.90  -80.22   32.96   52.85   28   0.240  0.255          0.0    0.00   0.000   2.455    5.16   14.11   38.26   61.16    71.0    92.6
1745:51   29.81  -80.51   32.96   52.80   44   0.248  0.265          0.0    0.00   0.084   2.948    4.69   13.06   37.01   57.31    62.0    93.0
1748: 3   29.71  -80.80   32.96   52.74  193   0.266  0.288  R       0.0    0.00   0.000   1.872    4.00   12.94   32.33   52.47    65.9    82.0
1750:16   29.62  -81.09   32.96   52.69   54   0.250  0.267          0.0    0.00   0.000   2.536    4.34   12.62   32.93   53.30    65.4    87.2
1752:28   29.57  -81.39   32.97   52.67   56   0.645  0.689  RT M    0.0    0.00   0.000   0.000    0.81    9.03   82.16  162.47   253.5   448.5
1754:33   29.68  -81.65   32.96   52.83   61   0.219  0.234  R       0.0    2.09   0.076   3.291    5.30   13.34   35.13   55.88    55.0    96.5
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DATE= 751206 (YR-MO-DAY) DAY= 340 FLT NO= 5 NASA - GASP - FALL 1975 FLIGHTS

(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)

TRAJ HHMM:SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE	QCQQQ	227.1 BB	302.3 BB	292.0 NB	307.5 NB	307.0 NB	311.1 NB	322.4 NB	329.7 NB	371.3 BB	401.9 BB
1759 3	29.88	-81.53	32.95	53.24	54	0.232	0.248	R M	0.0	3.75	0.140	3.575	4.08	10.92	28.60	46.72	59.3	80.3
1891 15	29.75	-81 21	32.97	53.28	53	0.253	0.270		0.0	1.76	0.073	3.202	4.31	12.57	35.70	55.61	58.2	88.9
1803 27	29.60	-80.91	32.97	53.30	56	0.165	0.176	RT M	0.0	0.00	0.251	9.199	6.60	11.21	31.84	46.55	59.4	70.1
1805.39	29.30	-80.75	32.99	53.21	48	0.064	0.068	RT M	0.0	6.65	0.355	7.389	5.41	13.13	22.37	16.96	10.9	10.3
1807.51	29.29	-80.92	32.93	53.20	46	0.249	0.266	R	0.0	0.00	0.000	2.452	4.51	11.91	34.58	56.42	69.2	99.1
1810. 3	29.37	-81.16	32.97	53.39	52	0.309	0.329	RT M	0.0	0.00	0.000	0.000	5.45	19.73	59.99	106.95	164.4	210.4
1812.15	29.-2	-81.27	32.97	53.75	56	0.253	0.270		0.0	0.00	0.000	2.751	4.21	12.21	34.42	56.32	65.5	93.7
1814 27	29.81	-81.34	32.97	54.12	51	0.448	0.478	RT	0.0	2.19	0.000	0.000	1.16	7.45	36.47	62.95	65.7	96.8
1816 39	30.16	-81.22	32.95	54.55	52	0.266	0.284	R M	0.0	0.00	0.000	1.698	3.87	12.10	34.65	57.34	75.0	129.0
1818 51	30.26	-80.98	32.95	54.85	56	0.163	0.174	RT M	0.0	6.74	0.273	7.708	5.47	12.68	20.70	33.58	46.7	86.6
1821. 2	30.01	-80.93	32.95	54.78	52	0.255	0.273	RT	0.0	0.00	0.000	0.000	3.66	10.45	31.47	49.89	61.4	86.3
1823 14	29 76	-81 07	32.93	54.66	52	0.269	0.287	M	0.0	0.00	0.000	2.040	3.06	9.78	29.30	45.33	52.7	73.3
1825.26	29 50	-81.21	32.95	54.57	55	0.065	0.069	RT M	0.0	4.53	0.242	5.776	4.02	10.44	31.36	16.40	12.6	11.9
1827.37	29.36	-81.45	32.34	54.49	53	0.343	0.366	R N	0.0	0.00	0.000	0.000	2.59	8.10	31.47	51.29	63.2	84.1
1829.49	29.33	-81.72	32.99	54.55	55	0.297	0.317	RT N	0.0	3.88	0.185	2.000	3.76	10.17	24.61	41.62	64.3	313 4
1832 1	29.55	-81.70	32.95	54.94	54	0.303	0.323	RT M	0.0	0.00	0.000	0.000	4.70	17.00	56.56	86.19	105.4	128.3
1834.13	29.63	-81.40	32.96	55.33	54	0.270	0.288	T	0.0	0.00	0.000	2.087	3.24	11.32	32.06	53.49	57.6	89.0
1836 24	29.78	-81.06	32.96	55.71	53	0.761	0.812	RT M	0.0	0.00	0.000	0.000	2.59	10.63	35.70	115.87	163.3	239.5
1838.36	29.73	-80.73	32.96	55.97	55	0.276	0.294	RT M	0.0	0.00	0.000	2.097	3.99	11.75	36.56	57.37	68.1	220.2
1840.48	29.55	-80.58	32.96	56.05	55	0.478	0.510	RT M	0.0	20.72	0.428	0.000	2.36	7.92	82.83	145.94	251.6	441.1
1842 59	29.65	-80 87	32.96	56.09	57	0.431	0.460	RT M	0.0	0.00	0.000	0.000	2.46	17.50	79.62	143.14	284.9	575.5
1845 11	29.55	-81.09	32.97	56.27	57	0.248	0.265		0.0	0.00	0.000	1.906	3.75	11.23	33.01	53.61	67.8	84.6
1847.23	29.66	-81.37	32 98	56.47	55	0.130	0.139	RT N	0.0	18.22	0.963	16.740	10.93	29.83	88.85	86.43	49.4	78.0
1849 35	29 86	-81.55	32.95	56.79	57	0.260	0.277	R	0.0	2.27	0.000	2.229	3.05	9.64	29.77	47.82	57.8	79.3
1851 47	30 12	-81 60	33.00	57.21	59	0.690	0.737	RT M	0.0	0.00	0.000	0.000	0.00	19.24	99.16	225.00	461.5	1004.6
1853 58	30.12	-81 34	32.94	57.52	57	0.205	0.219	RT	0.0	0.00	0.000	4.017	5.62	15.06	41.96	57.77	62.8	67.9
1856 10	29.97	-81.19	32.96	57.58	53	0.261	0.279	N	0.0	1.27	0.059	2.260	2.47	8.72	25.73	39.70	39.8	65.7
1858 21	29.59	-81.08	32.97	57.60	53	0.293	0.302	R	0.0	0.00	0.000	0.000	1.88	5.87	19.29	30.58	50.6	97.1
1900.33	29.32	-81.10	32.96	57.59	58	0.259	0.277	R N	0.0	0.00	0.000	1.250	2.05	5.66	19.77	28.96	35.7	46.5
1902 44	29.11	-81.26	32.33	57.57	58	0 205	0.219	RT N	0.0	10.66	0.262	2.148	2.70	6.05	18.68	29.29	35.9	45.9
1904.56	29.26	-81.43	32.96	57.86	59	0.360	0.384	RT N	0.0	12.92	0.723	11.584	2.36	7.04	22.60	40.70	83.3	273.4
1907 8	29.52	-81.36	32.96	58.35	54	0.256	0.275	R M	0.0	0.00	0.000	1.805	2.42	7.75	25.47	39.39	45.2	61.9
1909 19	29.79	-81.22	32.96	58.89	54	0.253	0.270	R M	0.0	0.00	0.000	1.790	2.31	7.90	24.60	39.38	47.6	52.7
1911 31	29.94	-80.99	32.96	59.37	56	0.103	0.110	RT N	0.0	4.46	0.247	7.023	4.14	7.64	15.60	22.03	25.9	35.0
1913.43	29.76	-80.70	32.97	59.62	56	0.274	0.292	RT M	0.0	0.00	0.000	0.000	3.60	14.07	40.58	56.67	50.5	50.5
1915.54	29.51	-80.65	32.96	59.67	56	0.192	0.205	R N	0.0	6.94	0.470	6.914	5.40	14.14	50.18	88.89	56.3	58.6
1918. 5	29.31	-80.51	32.98	59 84	57	0.407	0.434	RT N	0.0	0.00	0.096	0.000	1.85	5.83	17.83	36.01	54.9	217.1
1920 17	29.52	-80.36	32.94	60.35	56	0.235	0.251	RT N	0.0	2.02	0.091	1.527	1.71	5.68	17.28	28.89	32.1	46.4
1922 29	29.80	-80 37	32.95	60.85	53	0.257	0.274	M	0.0	0.00	0.000	0.000	2.58	9.36	30.53	53.33	65.9	95.4
1924.41	30 09	-80.36	32.96	61.36	56	0.221	0.235	RT N	0.0	7.44	0.420	6.480	4.80	15.71	52.62	45.62	58.7	90.7
1926.52	30.34	-80.23	32.95	61.91	58	0.248	0.265	R N	0.0	0.00	0.000	0.000	3.71	12.88	41.76	68.07	113.9	188.6
1929. 4	30.44	-79.97	32.98	62.40	55	0.201	0.214	RT N	0.0	3.42	0.169	4.671	2.94	9.20	29.63	44.57	29.0	13.5
1931.15	30.20	-79.90	32.97	62.53	57	0.147	0.157	RT N	0.0	2.80	0.147	2.742	5.50	12.88	20.82	26.03	27.1	38.8
1933 27	30.02	-80.09	32.96	62.57	54	0.247	0.263	R N	0.0	2.95	0.154	0.000	2.09	7.43	24.94	39.24	60.8	119.3
1935 39	29.83	-80.31	32.97	62.59	55	0.280	0.299	R N	0.0	0.00	0.000	0.000	2.13	6.83	26.14	48.18	74.4	67.3
1937 51	29 74	-80 57	32.96	62.67	54	0.444	0.474	R N	0.0	0.00	0.000	0.000	1.94	6.44	24.03	63.01	89.2	145.1
1940 2	29.79	-80 85	32.99	62.85	53	0.240	0.257	RT N	0.0	2.99	0.109	0.000	1.31	4.72	15.41	26.42	36.1	49.0
1942 13	29.96	-80.76	32.94	63.35	55	0.299	0.319	RT N	0.0	0.00	0.000	0.000	1.94	8.88	37.50	64.12	73.5	86.2
1944.25	30.02	-80.12	32.97	63.80	117	0.292	0.314	N	0.0	0.00	0.000	0.000	1.53	5.91	23.26	41.84	70.9	120.5
1946.36	30 02	-80.07	32.99	64.36	55	0.556	0.594	RT M	0.0	0.00	0.000	0.000	0.00	1.06	28.59	63.88	88.6	67.7
1948 48	29.28	-79.78	32.96	64.72	56	0.324	0.346	R M	0.0	0.00	0.000	0.000	1.23	5.27	20.59	35.76	59.2	723.4
1951: 0	29.67	-79.70	32.96	64.92	57	0.278	0.297	RT N	0.0	14.59	0.140	0.000	1.18	3.85	10.89	23.28	44.0	58.9
1953:11	29.64	-79.97	32.96	65.06	57	0.261	0.279	RT N	0.0	0.00	0.000	0.000	0.90	3.69	13.92	24.22	37.4	64.7

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

DATE= 751208 (YR-MO-DAY) DAY= 342 FLT NO= 6 NASA - GASP - FALL 1975 FLIGHTS

(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)

HOUR HHMM:SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE (ATM-CM)	CCCQQ	227.1 BB	302.3 BB	292.0 NB	307.5 NB	307.0 NB	311.1 NB	322.4 NB	329.7 NB	371.3 BB	401.9 BB
1555:33	30.51	-81.62	32.97	56.72	47	0.253	0.270	R N	0.0	0.00	0.000	1.430	2.69	8.65	25.03	41.61	52.6	63.7
1557:45	30.75	-81.82	32.93	56.83	47	0.262	0.279		0.0	0.00	0.000	1.501	2.67	8.42	26.16	43.86	53.2	69.7
1559:57	30.99	-82.03	32.94	56.93	47	0.276	0.294		0.0	0.00	0.000	1.673	2.23	8.67	25.28	46.01	50.3	71.6
1602:10	31.23	-82.24	33.81	57.04	50	0.255	0.273	N	0.0	0.00	0.000	1.938	3.14	9.41	30.79	48.27	49.8	69.6
1604:22	31.45	-82.43	34.98	57.14	70	0.277	0.297		0.0	0.00	0.000	1.357	2.19	8.63	25.54	44.54	51.0	68.7
1606:34	31.67	-82.63	34.96	57.24	179	0.287	0.311		0.0	0.00	0.000	1.907	2.22	8.45	27.53	43.62	52.0	68.4
1608:46	31.84	-82.84	35.00	57.33	242	0.277	0.303		0.0	0.00	0.000	0.000	2.31	7.51	24.48	43.17	53.4	67.1
1610:58	32.09	-83.05	35.00	57.43	239	0.287	0.314		0.0	0.00	0.000	1.539	2.36	7.56	26.42	44.19	51.1	70.8
1613:11	32.31	-83.26	34.97	57.53	45	0.287	0.308	N	0.0	0.00	0.000	1.303	2.11	7.75	26.05	39.83	50.8	65.3
1615:23	32.52	-83.47	34.87	57.64	58	0.282	0.302		0.0	0.00	0.000	1.215	2.24	7.50	25.64	40.38	50.0	66.3
1617:35	32.74	-83.67	0.00	57.75	54	0.267	0.272	AM	0.0	0.00	0.000	0.000	1.81	6.98	22.72	40.56	52.3	62.5
1619:47	32.95	-83.91	0.00	57.87	55	0.257	0.261	AM	0.0	0.00	0.000	1.384	2.10	7.19	24.35	40.26	44.6	68.7
1621:59	33.16	-84.12	33.39	57.98	52	0.305	0.326	N	0.0	0.00	0.000	0.000	2.08	6.97	25.70	44.02	55.3	70.0
1624:11	33.37	-84.33	33.87	58.09	46	0.296	0.316		0.0	0.00	0.000	0.000	1.94	7.69	26.69	42.54	54.2	73.9
1626:23	33.59	-84.53	34.97	58.20	46	0.304	0.325		0.0	0.00	0.000	0.000	1.89	6.90	24.90	42.26	51.8	71.2
1628:35	33.81	-84.72	35.00	58.34	70	0.315	0.338		0.0	0.00	0.000	0.000	1.88	6.02	23.22	40.53	51.0	64.3
1630:47	34.04	-84.91	34.98	58.47	75	0.273	0.293	N	0.0	0.00	0.000	0.000	1.94	7.32	22.93	41.63	52.1	67.2
1632:59	34.27	-85.10	35.00	58.61	74	0.293	0.314	N	0.0	0.00	0.000	0.000	1.80	6.95	22.35	45.11	55.2	77.6
1635:11	34.49	-85.29	37.00	58.74	89	0.287	0.310		0.0	0.00	0.000	1.457	2.09	7.34	25.74	43.09	50.5	69.6
1637:23	34.70	-85.46	37.71	58.86	99	0.266	0.309		0.0	0.00	0.000	1.501	1.78	7.60	25.25	43.70	49.6	69.7
1639:35	34.91	-85.64	38.01	58.98	101	0.290	0.314		0.0	0.00	0.000	1.192	2.15	6.51	23.95	41.23	48.1	71.2
1641:47	35.12	-85.82	38.30	59.11	97	0.268	0.290	N	0.0	1.06	0.000	1.481	2.16	7.51	24.41	43.14	47.1	69.9
1643:59	35.34	-86.00	38.72	59.24	104	0.293	0.317	N	0.0	0.00	0.000	1.282	1.96	7.50	26.52	45.06	51.4	77.2
1646:11	35.54	-86.18	38.94	59.37	110	0.309	0.335	N	0.0	0.00	0.000	0.000	1.62	6.20	23.36	40.98	45.4	66.2
1648:23	35.75	-86.36	38.98	59.50	121	0.311	0.337		0.0	0.00	0.000	0.000	1.56	6.16	23.11	40.92	50.7	66.1
1650:35	35.96	-86.54	38.97	59.64	119	0.325	0.352	T N	0.0	0.00	0.000	0.000	1.83	5.87	24.42	38.28	49.2	70.1
1652:46	36.18	-86.64	38.97	59.78	113	0.273	0.295	RT N	0.0	0.00	0.000	2.296	1.91	6.70	23.17	37.91	47.2	55.4
1654:58	36.44	-86.51	38.97	59.92	102	0.326	0.357	T	0.0	0.00	0.000	0.000	1.54	6.27	25.39	41.84	52.1	72.4
1657:10	36.62	-86.37	38.93	60.07	100	0.290	0.314	N	0.0	0.00	0.000	0.000	1.78	7.04	24.68	44.80	51.5	81.2
1659:22	36.95	-86.23	38.97	60.22	98	0.298	0.322	N	0.0	0.00	0.000	1.363	1.76	7.02	25.80	44.54	54.0	77.8
1701:34	37.21	-86.08	38.97	60.39	97	0.305	0.330	N	0.0	0.00	0.000	0.000	1.70	7.24	27.23	47.23	60.0	85.2
1703:46	37.47	-85.94	38.97	60.56	94	0.297	0.322	N	0.0	0.00	0.000	0.000	2.08	8.40	30.06	60.75	70.4	97.2
1705:57	37.74	-85.79	38.97	60.75	96	0.316	0.343	N	0.0	0.00	0.000	0.000	1.92	8.59	33.74	59.37	91.4	116.3
1708:09	38.01	-85.63	38.97	60.94	94	0.301	0.412	N	0.0	0.00	0.000	0.000	1.99	7.51	38.02	67.25	84.2	117.3
1710:21	38.23	-85.46	38.97	61.14	94	0.300	0.325	N	0.0	0.00	0.000	0.000	2.02	10.76	40.11	71.11	108.1	145.9
1712:33	38.58	-85.28	38.95	61.35	96	0.318	0.344	N	0.0	0.00	0.000	0.000	2.47	11.28	46.33	78.55	107.6	139.1
1714:44	38.81	-85.10	38.97	61.57	102	0.319	0.345	N	0.0	0.00	0.000	0.000	2.57	11.69	45.40	86.01	133.9	189.7
1716:56	39.07	-84.91	38.98	61.79	103	1.339	1.450	RT N	0.0	0.00	0.000	0.000	0.00	3.37	14.13	67.67	99.9	165.1
1719:08	39.22	-84.57	38.96	61.90	106	0.292	0.317	N T	0.0	0.00	0.050	0.000	2.40	12.19	43.97	78.02	127.8	203.0
1721:20	39.28	-84.17	38.97	61.93	106	0.344	0.373	N	0.0	0.00	0.000	0.000	2.23	10.37	42.68	80.94	136.4	242.6
1723:31	39.39	-83.79	38.96	61.97	104	0.355	0.395	N	0.0	0.00	0.000	0.000	2.33	10.30	42.49	82.67	138.4	251.6
1725:43	39.40	-83.38	38.95	62.03	107	0.377	0.408	N	0.0	0.00	0.000	0.000	1.90	8.72	42.00	79.64	138.4	218.2
1727:55	39.46	-82.98	38.95	62.09	115	0.361	0.391	N	0.0	0.00	0.000	0.000	1.81	9.43	38.20	75.16	146.7	217.3
1730:06	39.51	-82.57	38.95	62.17	125	0.376	0.408	N	0.0	0.00	0.000	0.000	2.20	9.29	37.91	77.35	137.2	231.5
1732:18	39.57	-82.16	38.94	62.26	126	0.335	0.363	N	0.0	0.00	0.142	0.000	2.67	9.80	41.27	75.07	113.7	258.0
1734:30	39.62	-81.75	38.92	62.36	128	0.333	0.361	N	0.0	0.00	0.000	0.000	1.48	10.28	42.05	77.77	139.5	236.7
1736:41	39.67	-81.34	38.93	62.47	125	0.319	0.346	N	0.0	0.00	0.000	0.000	2.08	10.67	42.20	75.83	142.3	246.0
1738:53	39.68	-80.95	38.97	62.54	123	0.164	0.178	RT N	0.0	7.24	0.251	5.178	1.57	4.67	14.83	17.11	16.2	15.3
1741:05	39.52	-80.61	38.97	62.47	123	0.352	0.382	N	0.0	0.00	0.000	0.000	1.33	6.62	28.13	55.44	93.4	147.2
1743:16	39.35	-80.29	38.97	62.39	120	0.336	0.364	N	0.0	0.00	0.000	0.000	1.91	6.91	31.29	53.97	93.1	163.8
1745:28	39.19	-79.96	38.95	62.32	117	0.318	0.344	N	0.0	0.00	0.000	0.000	1.76	7.45	29.77	53.41	87.3	169.9
1747:40	39.01	-79.63	38.94	62.26	127	0.327	0.355	N	0.0	0.00	0.000	0.000	1.57	8.24	32.72	61.15	102.8	181.5
1749:51	38.85	-79.30	38.94	62.22	125	0.341	0.369	N	0.0	0.00	0.000	0.000	1.65	7.63	35.16	60.22	99.9	181.9
1752:03	38.68	-78.98	38.98	62.18	124	0.268	0.291	RT N	0.0	6.77	0.425	4.544	1.99	4.27	16.83	31.92	43.0	59.4
1754:15	38.76	-78.69	39.24	62.40	115	0.311	0.337	RT N	0.0	0.00	0.000	0.000	3.54	16.12	61.67	110.62	189.0	378.3
1756:26	39.03	-78.56	39.67	62.78	111	0.300	0.326	RT N	0.0	2.84	0.000	0.000	2.44	10.15	41.08	69.21	101.7	160.5

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DATE= 751208  (YR-MO-DAY)      DAY= 342     FLT NO=  6               NASA - GASP - FALL 1975 FLIGHTS
  TRAS.   LAT    LONG   PRESS.   SUN   O3    MEAS.  TOTAL QCCCQ  227.1  302.3  292.0  307.5  307.0  311.1  322.4  329.7  371.3  401.9
HHMM.SS   (DEG   (DEG    ALT     ANG   PPB   OZONE  OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
 (GMT)     N)     E)    (KMT)   (DEG)        (ATM-CM)              BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
----------------------------------------------------------------------------------------------------------------------------------------
1758:38  39.32  -78.48  39.67  63.17  117   0.636  0.691  RT N    0.0    0.00  0.000  0.000   2.10  12.21  24.12  68.94  186.6  425.2
1800 49  39.57  -78.29  39.72  63.56  118   0.365  0.396     N    0.0    0.00  0.000  0.000   1.72   8.84  44.03  81.26  152.6  272.8
1803: 1  39.81  -78.03  40.53  63.95  111   0.811  0.881  RT N    0.0    0.00  0.000  0.000   1.44   7.10  15.73  47.25  163.1  473.7
1805:13  40.02  -78.04  40.91  64.26   98   0.292  0.317  RT N    0.0    1.94  0.000  1.409   0.98   4.94  20.69  34.07   39.7   30.7
1807:24  39.95  -78.31  40.62  64.25  100   0.343  0.372  R  N    0.0   12.05  0.012  0.000   0.90   4.20  20.79  39.13   52.0   93.5
1809:36  39.79  -78.54  40.60  64.17  108   0.319  0.346  R  N    0.0   10.73  0.499  0.000   0.92   4.39  19.16  35.24   54.6  102.0
1811:48  39.60  -78.74  40.91  64.05  103   0.330  0.359     N    0.0    0.00  0.000  0.000   1.09   4.64  22.50  38.45   71.2  101.8
1813 59  39.40  -78.93  41.00  63.95  101   0.299  0.325     N    0.0    0.00  0.134  0.000   1.24   5.79  23.91  43.09   61.5   99.0
1816:11  39.21  -79.12  40.99  63.85  104   0.312  0.339     N    0.0    0.00  0.105  0.000   1.57   5.47  22.79  43.87   62.1  101.7
1818:22  39.02  -79.30  41.00  63.75  105   0.315  0.342     N    0.0    0.00  0.000  0.000   1.24   5.80  25.65  44.81   67.0  105.3
1820:34  38.83  -79.49  40.39  63.66  104   0.308  0.335     N    0.0    1.68  0.094  0.000   1.40   5.28  22.99  38.14   60.0   95.2
1822 46  38.63  -79.67  41.00  63.57  104   0.309  0.335     N    0.0    0.00  0.127  0.000   1.44   5.54  22.94  42.58   61.0   99.5
1824:57  38.44  -79.86  41.00  63.48  102   0.316  0.343     N    0.0    0.00  0.000  0.000   1.29   5.22  22.99  39.33   63.8  102.7
1827: 9  38.25  -80.04  41.00  63.39  107   0.320  0.348     N    0.0    0.00  0.121  0.000   1.16   5.52  23.83  43.62   70.3  102.3
1829:21  38.05  -80.22  41.00  63.30  108   0.307  0.333     N    0.0    0.00  0.000  0.000   1.28   6.08  24.93  44.51   66.4  118.1
1831:32  37.86  -80.40  41.00  63.22  108   0.304  0.330     N    0.0    0.00  0.091  0.000   1.46   6.27  25.55  44.38   74.1  123.8
1833:44  37.66  -80.59  41.00  63.13  115   0.310  0.337     N    0.0    0.00  0.000  0.000   1.25   6.39  27.90  44.23   76.4  125.0
1835 55  37.46  -80.77  40.99  63.04  115   0.330  0.359     N    0.0    0.00  0.000  0.000   1.47   5.87  25.49  46.90   73.3  127.7
1838  7  37.26  -80.96  41.00  62.95  114   0.316  0.344  R  N    0.0    0.00  0.000  0.000   1.47   5.92  25.55  46.51   70.0   57.4
1840 18  37.20  -81.20  40.98  63.00  114   0.363  0.395  RT N    0.0    0.00  0.000  0.000   1.33   7.21  33.90  63.09  116.4  206.6
1842 30  37.32  -81.47  41.00  63.18  118   0.235  0.256  R  N    0.0    5.23  0.144  2.761   1.42   4.45  15.43  28.05   32.0   38.8
1844 42  37.37  -81.77  41.00  63.31  125   0.312  0.340     N    0.0    0.00  0.000  0.000   1.51   7.16  29.11  51.50  100.0  168.4
1846 53  37.43  -82.07  40.99  63.45  138   0.327  0.356     N    0.0    0.00  0.000  0.000   1.63   6.95  31.78  55.15   88.6  151.1
1849  5  37.50  -82.39  41.00  63.58  139   0.321  0.350     N    0.0    0.00  0.000  0.000   1.29   7.48  30.25  58.89   92.1  156.5
1851:15  37.56  -82.69  41.00  63.71  146   0.270  0.294     N    0.0    0.00  0.000  0.000   1.12   7.10  27.90  13.38  121.7    3.6
1853 23  37.62  -82.99  40.98  63.83  141   0.339  0.370     N    0.0    0.00  0.000  0.000   1.43   6.67  26.99  54.27   95.9  149.4
1855:34  37.68  -83.32  40.96  63.96  130   0.286  0.311     N    0.0    0.00  0.000  0.000   1.76   8.24  31.61  56.39   94.6  147.6
1857:46  37.75  -83.64  40.97  64.09  134   0.335  0.365     N    0.0    0.00  0.000  0.000   1.26   6.61  28.58  57.21   96.0  132.7
1859:57  37.81  -83.95  40.99  64.22  138   0.305  0.333     N    0.0    0.00  0.000  0.000   1.50   6.68  28.71  49.86   84.1  147.4
1902  9  37.87  -84.28  40.99  64.35  143   0.313  0.342     N    0.0    0.00  0.000  0.000   1.26   6.45  29.02  50.62   87.4  132.7
1904:20  37.93  -84.60  41.00  64.47  144   0.323  0.352     N    0.0    0.00  0.000  0.000   0.98   6.35  26.57  49.99   98.1  151.1
1906:32  37.99  -84.93  40.99  64.60  141   0.322  0.351     N    0.0    0.00  0.000  0.000   1.59   5.86  27.87  48.28   80.1  135.2
1908 44  38.05  -85.25  40.99  64.73  138   0.328  0.357     N    0.0    0.00  0.000  0.000   1.06   5.84  26.90  50.28   80.4  143.3
1910 55  38.04  -85.56  41.01  64.83  139   0.181  0.197  RT M    0.0    0.42  0.020  6.719   2.05   6.11  18.10  15.28    8.2    8.2
1913  7  37.87  -85.72  40.99  64.73  144   0.298  0.324  R  N    0.0    0.00  0.000  0.000   1.00   4.79  20.65  35.75   58.5   92.7
1915:18  37.62  -85.86  40.49  64.69  145   0.284  0.309  R  N    0.0    0.00  0.000  0.000   1.17   6.14  24.36  43.09   72.7  110.1
1917:30  37.38  -85.99  40.98  64.61  147   0.301  0.329     N    0.0    0.00  0.000  0.000   1.07   6.11  27.26  44.78   78.7  120.2
1919:41  37.13  -86.13  40.95  64.54  148   0.313  0.341     N    0.0    0.00  0.090  0.000   1.21   6.25  26.40  50.66   75.8  130.7
1921:53  36.88  -86.27  40.95  64.46  148   0.304  0.332     N    0.0    0.00  0.000  0.000   1.23   5.72  24.50  43.55   71.7  119.0
1924  5  36.64  -86.40  40.96  64.40  147   0.311  0.339     N    0.0    0.00  0.000  0.000   0.97   5.07  19.56  39.02   65.6  100.4
1926:16  36.39  -86.54  40.98  64.33  147   0.310  0.338     N    0.0    0.00  0.000  0.000   1.12   4.98  21.43  39.14   62.9   97.5
1928:28  36.14  -86.67  41.01  64.27  146   0.317  0.345  RT N    0.0    1.81  0.130  1.065   1.07   4.49  20.94  32.46   48.1   56.9
1930:39  35.91  -86.53  40.98  64.31  146   0.331  0.361  R  N    0.0    0.00  0.000  0.000   0.74   5.24  21.20  43.00   75.7  109.2
1932:51  35.71  -86.33  40.99  64.45  142   0.306  0.334  R  N    0.0   10.67  0.404  2.443   1.44   5.33  23.43  40.86   61.7  107.1
1935  2  35.47  -86.12  40.96  64.55  143   0.284  0.309     N    0.0    0.00  0.078  0.000   0.99   5.43  21.71  37.35   64.0  104.4
1937:14  35.23  -85.92  40.95  64.66  140   0.307  0.335     N    0.0    0.00  0.000  0.000   1.05   5.33  20.59  40.33   66.0  115.4
1939:25  34.99  -85.72  40.95  64.78  137   0.300  0.327     N    0.0    0.00  0.089  0.000   1.00   5.26  22.98  39.56   63.7  110.3
1941:37  34.75  -85.51  40.95  64.90  131   0.295  0.321     N    0.0    0.00  0.000  0.000   1.31   5.56  24.59  40.11   66.5  116.6
1943:48  34.50  -85.31  40.94  65.04  129   0.289  0.315     N    0.0    0.00  0.000  0.000   1.20   5.73  24.83  40.45   67.6  117.6
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REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

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DATE=  751210   (YR-MO-DAY)      DAY=  344      FLT NO=    7             NASA - GASP - FALL 1975 FLIGHTS
[illegible]  LAT    LONG   PRESS     SUN    O3    MEAS   TOTAL  QC000  227.1  302.3  292.0  307.5  307.0  311.1  322.4  329.7  371.3  401.9
HHMM-SS   (DEG     (DEG     ALT      ANG   PPB   OZONE   OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
 (GMT)      N)       E)    (KFT)   (DEG)           (ATM-CM)              BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
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1645:22  30.39   -78.51   32.96   53.47   218   0.270   0.294            0.0   0.00  0.000  1.662   3.68  11.34  33.58  55.71   65.6   85.3
1647:34  30.31   -78.79   32.97   53.37   226   0.279   0.303            0.0   1.41  0.000  2.653   3.57  10.78  33.82  56.78   59.2   95.8
1649:46  30.23   -79.06   32.96   53.26   208   0.294   0.319            0.0   0.00  0.000  2.172   3.48  10.74  35.40  56.64   66.2   88.1
1651 58  30.15   -79.34   32.96   53.16   205   0.288   0.313            0.0   0.00  0.000  1.657   3.57  10.91  34.99  58.12   67.8   91.8
1654:11  30.07   -79.61   32.97   53.06   209   0.288   0.313            0.0   0.00  0.000  1.945   3.63  10.59  33.96  57.76   68.0   96.9
1656:22  29.99   -79.89   32.97   52.96   223   0.297   0.324            0.0   0.00  0.000  0.000   3.30  11.15  34.91  57.88   69.3   89.3
1658:34  29.91   -80.17   32.97   52.86   221   0.267   0.290   R        0.0   0.00  0.000  3.509   3.88  11.41  33.93  53.61   63.6   88.2
1700 46  29.83   -80.44   32.97   52.76   222   0.299   0.316       M    0.0   0.00  0.000  2.125   3.47   9.77  31.03  53.09   68.5   96.6
1702:57  29.75   -80.72   32.95   52.67   213   0.287   0.312            0.0   0.00  0.000  1.593   3.54  12.12  35.01  52.90   69.5   89.2
1705: 9  29.66   -81.00   32.96   52.57   210   0.283   0.307   R        0.0   2.55  0.000  2.596   4.18  13.10  40.13  62.55   68.1   99.1
1707:21  29.56   -81.28   32.94   52.46   200   0.297   0.322   R  M     0.0   0.00  0.000  2.156   3.69  13.90  38.96  63.06   79.6  110.5
1709 33  29.40   -81.49   32.95   52.28   185   0.330   0.357   RT M     0.0   7.45  0.238  3.736   3.17  11.64  44.88  57.83   46.3   71.3
1711.42  29.15   -81.36   32.94   52.00   184   0.386   0.418   RT M     0.0   0.00  0.000  3.478   4.06  12.27  51.61 110.78  105.1  118.2
1713 57  28.90   -81.14   32.97   51.74   167   0.062   0.067   RT N     0.0  22.36  1.208 17.576  12.48   7.86  18.89  29.98   29.2   35.5
1716. 9  28.90   -80.87   32.98   51.73   162   0.582   0.627   RT M     0.0   0.00  0.000  0.000   2.94  24.07  88.48 191.23  351.6  784.3
1718:21  29.10   -80.98   32.94   51.93   176   0.342   0.369   RT       0.0   0.00  0.000  0.000   1.92   8.92  29.45  52.64   65.9   94.1
1720.33  29.38   -81.10   32.95   52.18   189   0.276   0.299            0.0   0.00  0.000  1.958   3.63  10.64  31.63  53.38   63.4   86.1
1722.44  29.59   -81.20   32.92   52.44   194   0.292   0.317            0.0   0.00  0.000  1.935   3.27  10.06  31.74  52.07   61.4   84.7
1724:55  29.85   -81.31   32.93   52.71   194   0.293   0.318      M     0.0   1.43  0.000  2.019   2.90   9.34  28.78  49.39   54.7   83.0
1727: 3  30.10   -81.40   32.95   52.98   203   0.294   0.319      M     0.0   0.00  0.000  1.928   2.93   9.44  30.03  52.07   57.0   77.6
1729:20  30.35   -81.50   32.97   53.25   207   0.295   0.320      M     0.0   0.00  0.000  1.681   2.83   9.50  29.47  48.10   57.6   82.0
1731:32  30.60   -81.59   32.98   53.52   213   0.301   0.327   R        0.0   0.00  0.000  0.000   2.73   9.40  29.45  50.76   64.5   84.8
1733.43  30.85   -81.57   33.00   53.80   214   0.396   0.430   RT M     0.0   0.00  0.000  0.000   2.49  10.75  43.44  81.67  111.9  150.9
1735 55  30.85   -81.26   32.97   53.86   229   0.558   0.607   RT M     0.0   0.00  0.000  0.000   1.71   7.19  47.95  81.10   84.1  100.3
1738. 7  30.61   -81.09   32.95   53.69   231   0.294   0.320   R        0.0   0.00  0.000  1.452   2.66   9.10  28.11  45.51   59.7   82.5
1740 19  30.31   -81.03   32.98   53.44   219   0.306   0.332   R        0.0   0.00  0.000  1.812   2.83  10.21  32.58  55.15   60.8   88.5
1742.31  30.00   -80.97   32.97   53.21   205   0.288   0.313            0.0   0.00  0.000  2.147   3.20  10.47  31.86  52.71   59.9   91.5
1744.42  29.70   -80.90   32.97   52.98   194   0.292   0.316            0.0   0.00  0.000  1.519   3.19  10.82  31.62  58.24   68.8   89.3
1746.54  29.39   -80.83   32.95   52.76   190   0.284   0.308            0.0   0.00  0.000  2.271   3.60  10.65  33.83  53.67   65.9   87.8
1749: 6  29.10   -80.79   32.99   52.55   185   0.185   0.200   RT N     0.0   3.65  0.189  3.544   3.40   9.29  28.24  43.68   19.4    9.0
1751 18  28.84   -80.64   33.03   52.38   162   0.068   0.074   RT N     0.0  28.30  1.717 18.597   7.35   7.67  21.06  35.60   37.7   48.2
1753.30  28.84   -80.58   32.93   52.51   163   0.317   0.342   RT M     0.0   0.00  0.000  0.000   2.57  17.29  55.79  86.29  127.1  206.2
1755.41  29.11   -80.50   32.96   52.88   179   0.286   0.309   R        0.0   0.00  0.000  1.529   3.40  10.79  32.63  53.37   69.6   88.2
1757 53  29.39   -80.50   32.97   53.25   191   0.280   0.303            0.0   1.49  0.088  2.537   3.64  11.39  34.91  59.17   63.7   92.1
1800: 5  29.67   -80.50   32.97   53.63   195   0.499   0.541      N     0.0   0.00  0.000  0.000   3.14  25.17  23.85  15.31  113.1    0.6
1802 11  29.93   -80.50   32.97   53.99   206   0.311   0.337            0.0   0.00  0.000  1.675   3.17   9.99  35.09  56.32   67.0   92.7
1804.23  30.21   -80.50   32.98   54.37   220   0.311   0.338            0.0   0.00  0.000  1.634   2.90   9.56  32.58  56.21   70.1   89.9
1806 35  30.48   -80.50   32.97   54.75   239   0.297   0.324            0.0   0.00  0.000  2.140   2.85  10.85  33.68  56.58   68.0   91.6
1808.46  30.75   -80.50   32.97   55.14   248   0.298   0.326            0.0   0.00  0.000  1.460   3.03   8.43  30.46  52.17   59.8   80.4
1810:58  31.02   -80.50   32.97   55.52   250   0.309   0.338    T       0.0   0.00  0.000  1.943   2.61   8.25  30.05  47.67   54.4   81.8
1813.10  31.27   -80.47   32.99   55.91   248   0.495   0.540   RT M     0.0   0.00  0.000  0.000   2.22  21.18  94.45 196.43  363.1  591.1
1815:22  31.29   -80.18   32.95   56.12   235   0.306   0.333   RT N     0.0   6.61  0.398  2.334   1.90   6.62  23.01  40.64   44.9   66.2
1817:33  31.07   -79.99   32.97   56.11   234   0.311   0.339   RT M     0.0   3.94  0.089  1.779   1.80   6.14  22.09  36.64   44.3   57.8
1819.45  30.80   -80.03   32.98   55.99   246   0.310   0.338      M     0.0   0.00  0.000  1.211   1.89   6.94  23.99  40.84   48.5   70.2
1821.57  30.51   -80.05   32.93   55.86   247   0.313   0.342      N     0.0   0.00  0.000  1.372   1.88   6.89  23.87  42.00   48.8   71.5
1824: 9  30.22   -80.10   32.97   55.74   233   0.297   0.323      M     0.0   0.00  0.000  1.340   2.27   8.34  27.22  46.14   54.4   70.4
1826:20  29.93   -80.13   32.97   55.62   214   0.374   0.407      N     0.0   0.00  0.732  0.000   3.55  18.26  20.78  12.09   83.8    0.4
1828:27  29.66   -80.17   32.97   55.52   199   0.289   0.313      N     0.0   0.00  0.000  1.259   2.50   8.44  27.34  45.16   53.6   77.9
1830.33  29.37   -80.21   32.96   55.41   185   0.272   0.294            0.0   0.00  0.000  0.000   2.92   8.43  27.21  44.48   57.9   74.9
1832:53  29.09   -80.24   32.97   55.32   179   0.287   0.310      M     0.0   0.00  0.000  1.386   2.38   7.77  25.34  41.35   52.2   64.6
1835. 2  28.82   -80.24   32.97   55.25   165   0.244   0.263   RT N     0.0   8.25  0.386  6.947   6.22  19.82  41.30  61.92   46.2   29.7
1837 14  28.65   -80.01   32.96   55.37   160   0.366   0.395   RT N     0.0   0.00  0.000  0.000   8.18  24.73  82.57 155.49  304.2  481.3
1839.25  28.70   -79.64   32.99   55.75   158   0.323   0.355   RT M     0.0  12.68  0.211  0.000   1.61  23.85  88.53 110.81  116.7  389.8
1841.37  28.94   -79.50   32.95   56.22   173   0.280   0.303   R  N     0.0   1.82  0.000  1.769   2.44   8.35  26.58  42.93   54.9   71.4
1843:43  29.23   -79.50   32.92   56.69   188   0.260   0.281            0.0   0.00  0.000  1.333   2.87   8.33  25.65  46.76   56.8   78.5
1846: 0  29.52   -79.50   32.97   57.16   206   0.290   0.315            0.0   0.00  0.000  1.412   2.42   8.24  28.57  45.53   56.0   72.9
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DATE= 751210 (YR-MO-DAY) DAY= 344 FLT NO= 7 NASA - GASP - FALL 1975 FLIGHTS

(MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM) WAVELENGTH IN NM)

TIME HHMM:SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE	QCODE	227.1 BB	302.3 BB	292.0 NB	307.5 NB	307.0 NB	311.1 NB	322.4 NB	329.7 NB	371.3 BB	401.9 BB
1848:12	29.80	-79.50	32.98	57.62	219	0.290	0.315	N	0.0	1.42	0.000	2.064	2.49	7.81	28.24	45.70	50.3	81.5
1850:24	30.08	-79.51	33.09	58.08	233	0.341	0.372	RT M	0.0	0.00	0.000	0.000	1.21	9.34	36.95	65.06	88.0	128.6
1852:36	30.19	-79.69	34.66	58.33	240	0.115	0.125	RT N	0.0	6.20	0.254	5.634	2.74	7.57	20.51	26.85	17.9	11.8
1854:47	29.97	-79.78	37.38	58.33	215	0.295	0.321	R N	0.0	0.00	0.000	0.000	3.74	12.38	40.25	76.30	104.1	161.2
1856:59	29.70	-79.78	38.62	58.32	136	0.315	0.341	R N	0.0	0.00	0.000	0.000	3.90	11.65	42.68	72.76	104.6	194.5
1859 11	29.46	-79.82	39.01	58.31	135	0.131	0.143	RT N	0.0	18.30	1.199	8.168	2.82	7.71	20.21	33.61	40.9	50.5
1901,23	29.43	-80.05	38.83	58.43	131	0.134	0.145	R N	0.0	15.76	1.057	14.352	9.50	25.05	20.96	32.22	39.7	469.6
1903:34	29.55	-80.27	39.00	58.67	124	0.067	0.073	RT N	0.0	23.16	1.397	16.453	9.63	27.36	22.10	33.09	42.8	62.7
1905 46	29.30	-80.37	38.99	59.09	124	0.301	0.326	R M	0.0	0.00	0.000	0.000	2.66	7.76	30.08	53.33	62.2	81.0
1907 53	30.10	-80.37	39.00	59.58	141	0.232	0.251	R N	0.0	6.09	0.251	5.292	3.37	11.13	38.63	43.38	32.5	29.0
1910: 1	30.38	-80.24	39.00	60.11	239	0.275	0.301	RT M	0.0	0.00	0.000	0.000	2.74	9.49	32.48	57.16	72.4	92.8
1912:21	30.61	-80.03	39.01	60.66	133	0.419	0.454	RT M	0.0	0.00	0.000	0.000	0.64	6.22	33.35	66.95	92.4	144.8
1914.33	30.54	-79.76	38.99	60.98	162	0.265	0.289	RT N	0.0	7.35	0.253	4.925	1.82	2.05	8.21	15.55	17.9	58.7
1916:44	30.29	-79.80	38.99	61.00	134	0.318	0.345	R N	0.0	0.00	0.000	0.000	2.29	9.79	39.65	65.37	108.5	209.2
1918:56	30.10	-80.01	39.00	61.01	122	0.317	0.343	N	0.0	0.00	0.000	0.000	2.66	10.12	38.20	69.21	122.8	177.7
1921: 8	29.92	-80.21	39.00	61.03	120	0.296	0.320	N	0.0	0.00	0.000	0.000	2.96	9.87	35.47	62.08	107.6	161.8
1923,20	29.76	-80.41	39.01	61.06	158	0.368	0.400	RT N	0.0	6.07	0.434	3.352	2.15	5.14	27.64	34.17	39.3	115.6
1925:31	29.74	-80.67	39.00	61.19	193	0.457	0.499	R N	0.0	0.00	0.000	0.000	0.58	3.55	23.77	92.79	60.3	25.5
1927 43	29.81	-80.90	39.03	61.41	173	0.261	0.284	RT N	0.0	0.00	0.000	0.000	1.20	3.91	15.22	23.63	56.0	272.1
1929 55	30.01	-80.71	38.99	61.93	186	0.202	0.220	RT N	0.0	2.34	0.169	4.615	2.36	7.22	21.82	28.66	25.2	22.8
1932 6	30.02	-80.32	39.00	62.42	126	0.315	0.341	N	0.0	0.00	0.000	0.000	2.75	12.13	47.38	86.19	148.5	256.8
1934 18	29.99	-79.95	39.00	62.46	118	0.051	0.056	RT N	0.0	3.34	0.413	9.524	3.14	4.64	8.64	14.49	15.4	20.4
1936.30	29.89	-79.67	39.02	63.15	122	0.197	0.213	RT M	0.0	0.00	0.000	0.000	3.19	9.71	31.88	42.07	26.4	9.4
1938.42	29.66	-79.77	38.18	63.28	129	0.283	0.307	RT N	0.0	0.00	0.000	0.000	1.80	7.45	26.95	50.14	78.0	119.0
1940,53	29.69	-80.04	39.00	63.46	125	0.338	0.366	RT N	0.0	0.00	0.000	0.000	0.99	4.16	18.92	34.26	63.7	105.7
1943 5	29.85	-80.26	38.99	63.76	170	0.285	0.310	N	0.0	0.00	0.000	0.000	1.62	8.52	29.70	56.60	96.8	153.2
1945.17	30.03	-80.47	39.01	64.08	175	0.208	0.227	RT N	0.0	3.87	0.211	3.030	2.08	7.18	14.60	31.62	42.2	42.4
1947.28	30.28	-80.59	38.98	64.51	190	0.261	0.285	R N	0.0	16.42	0.231	0.000	1.39	5.79	21.96	37.37	55.2	31.9
1949:40	30.51	-80.56	39.02	65.01	194	0.329	0.359	RT M	0.0	0.00	0.000	0.000	5.24	30.74	154.97	126.81	100.7	642.2

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

DATE= 751214 (YR-MO-DAY) DAY= 348 FLT NO= 9

NASA - GASP - FALL 1975 FLIGHTS

(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)

GMT HHMM:SS	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE (ATM-CM)	QCODE	227.1 BB	302.3 BB	292.0 NB	307.5 NB	307.0 NB	311.1 NB	322.4 NB	329.7 NB	371.3 BB	401.9 BB
1559.32	28.63	-80.28	12.50	54.93	30	0.242	0.248	A	0.0	0.00	0.000	1.336	3.17	8.97	27.44	47.41	55.4	74.5
1601 44	28.80	-80.12	16.12	54.86	37	0.232	0.239	A	0.0	0.00	0.000	1.681	3.55	10.14	27.27	47.56	54.9	82.7
1603.57	28.98	-79.95	19.79	54.82	45	0.228	0.237	A	0.0	0.00	0.000	1.497	3.78	10.65	28.78	47.19	56.1	77.2
1606. 9	29.17	-79.78	22.97	54.78	35	0.222	0.232		0.0	0.00	0.000	1.690	4.22	11.11	30.49	49.98	60.2	83.5
1608:21	29.36	-79.59	25.74	54.76	32	0.218	0.229		0.0	0.00	0.000	2.140	4.55	11.65	32.37	52.56	60.5	87.7
1610:34	29.56	-79.40	27 77	54.75	37	0.238	0.251		0.0	0.00	0.000	2.685	4.57	13.34	36.06	57.49	63.9	88.9
1612:46	29.77	-79.20	29.50	54.76	41	0.231	0.244		0.0	0.00	0.000	2.051	4.61	12.65	34.33	55.93	64.3	97.3
1614:58	29.98	-78.98	31.14	54.78	99	0.278	0.297	RT M	0.0	0.00	0.000	2.256	5.88	19.86	60.43	94.32	53.5	76.5
1617 11	30 09	-78.66	32.51	54.68	171	0.223	0.241		0.0	0.00	0.000	2.619	4.85	12.66	35.14	54.66	63.2	87.1
1619:23	30.20	-78.37	33.03	54.61	35	1.416	1.509	RT M	0.0	0.00	0.000	0.000	0.00	5.95	35.52	137.72	333.4	779.3
1621.35	30.34	-78.52	32.97	54.67	36	0.270	0.288	RT M	0.0	0.00	0.000	0.000	3.71	9.94	26.51	49.19	75.6	125.2
1623:48	30 34	-78.80	33.00	54.62	34	0.224	0.239	R M	0.0	2.06	0.066	2.235	3.87	10.03	27.92	42.28	53.1	66.9
1626 0	30.25	-79 11	33.01	54.48	34	0.228	0.243	M	0.0	0.00	0.000	1.789	4.10	11.02	29.23	48.22	58.0	78.9
1628 12	30.16	-79.41	33 00	54.35	35	0.227	0.242		0.0	0.00	0.000	2.256	4.42	11.95	31.83	51.28	59.1	82.1
1630 25	30.06	-79.71	33.00	54.21	34	0.236	0.252	M	0.0	0.00	0 000	2.145	4.12	11.79	30.88	51.36	57.4	76.8
1632 37	29.97	-80.01	33.00	54 07	36	0.219	0.233		0.0	0.00	0.000	2.183	4.69	12.01	32.00	49.29	57.5	84.5
1634.49	29.87	-80.21	33.01	53.93	37	0.233	0.248		0.0	0.00	0.000	2.153	4.41	12.56	31.49	48.58	62.6	77.2
1637 1	29 78	-80 60	33.00	53.80	36	0.239	0.254	N	0.0	1.38	0.000	2.513	4.01	11.15	30.59	49.42	55.9	77.7
1639.14	29.69	-80.90	33.00	53.66	39	0.230	0.246	R	0.0	2.43	0.000	2.629	4.58	11.76	32.39	52.12	64.0	88.6
1641.26	29 59	-81.19	33.01	53.53	36	0.221	0.235		0.0	0.00	0.000	3.077	5.12	13.26	33.70	54.26	62.3	96.0
1643 38	29.53	-81.48	33.01	53.44	38	0.256	0.273	RT M	0.0	0.00	0.000	0.000	9.64	29.22	75.92	127.70	187.4	271.5
1645.50	29.67	-81.74	33 00	53 52	37	0.191	0.204	R N	0.0	0.00	0.000	2.902	5.72	13.27	34.69	58.96	72.2	9.2
1648: 2	29.64	-81.83	33.00	53.62	36	0.202	0.215	RT	0.0	0.00	0.164	6.875	9.01	23.72	58.79	35.53	57.3	82.3
1650 14	29.87	-81.52	33.00	53.53	38	0.202	0.215	RT M	0.0	5.33	0.213	4.632	4.89	12.18	30.20	45.82	54.2	72.0
1652 26	29.74	-81.19	33.00	53.29	38	0 219	0.233		0.0	0.00	0.000	2.733	5.38	13.49	35.77	59.20	68.2	89.7
1654 39	29.57	-80.89	33.01	53.03	39	0.210	0.224	RT	0.0	6.16	0.231	4.651	5.15	12.63	33.21	50.97	60.4	79.8
1656 51	29.28	-80.75	33.03	52.68	36	0.058	0.062	RT M	0.0	16.97	0.950	15.001	7.84	9.08	18.88	27.12	25.5	28.1
1659 3	29.20	-80.95	32.97	52.56	37	0 219	0.233	RT M	0.0	0.00	0.000	3.246	6.41	16.28	44.38	71.14	78.0	22.4
1701.15	29.36	-81.17	33.00	52.69	36	0.240	0.256	R M	0.0	0.00	0.000	2.160	5.53	14.82	40.82	64.95	81.7	101.5
1703 27	29.61	-81.26	33.01	52 91	37	0 226	0.241		0.0	0.00	0.089	2.843	5.24	13.71	35.60	54.76	65.4	91.4
1705.39	29.86	-81.34	33.02	53.13	36	0.357	0.380	RT	0.0	0.00	0.000	2.611	2.45	11.82	41.30	53.61	62.2	89.7
1707:51	30.11	-81.22	33.00	53.34	35	0.227	0.242		0.0	0.00	0.000	2.783	4.87	12.57	34.05	54.05	63.1	86.3
1710. 3	30.28	-81.00	33 03	53.47	35	0.171	0.183	RT M	0.0	3.74	0.244	6.653	6.06	14.35	32.35	44.71	39.5	45.3
1712:15	30.05	-80.91	32.98	53.22	35	0.268	0.286	RT M	0.0	0.00	0.000	0.000	4.21	12.32	37.35	58.41	70.7	96.3
1714:27	29.72	-81.06	33.01	52.94	35	0.238	0.253		0.0	0.00	0.000	2.439	4.60	12.38	33.96	54.47	64.0	79.9
1716 39	29.50	-81 21	33.02	52.67	35	0.070	0.075	RT M	0.0	6.22	0.324	8.321	6.47	14.60	38.43	41.24	11.8	9.5
1718 51	29.33	-81.45	32.98	52.49	36	0.230	0.245		0.0	0.00	0.000	2.667	5.00	12.85	33.73	55.41	64.4	92.0
1721 3	29.30	-81.72	33.03	52.46	36	1.467	1.563	RT M	0.0	0.00	0.000	0.000	1.48	7.95	34.34	130.67	351.2	608.5
1723 15	29.54	-81.66	33.00	52.70	37	0.294	0.314	RT M	0.0	0.00	0.000	0.000	4.56	14.84	44.77	80.62	96.9	127.4
1725 27	29.69	-81 38	32.99	52.87	37	0.223	0.238	R	0.0	1.73	0.084	2.546	5.29	13.58	35.32	56.69	68.5	91.9
1727 39	29.79	-81 04	32.98	53.00	35	0.201	0.215	R M	0.0	2.90	0.141	8.451	5.79	14.69	38.05	57.31	49.2	73.5
1729 51	29.81	-80.70	32.99	53 06	36	0.273	0.291	RT	0.0	6.00	0.100	0.000	3.66	9.77	27.16	54.88	69.5	92.6
1732 2	29.61	-80 47	33.02	52.91	35	0.812	0.865	RT N	0.0	5.76	0.197	2.076	2.14	3.38	7.49	21.66	63.3	90.5
1734.14	29.42	-80.67	33.01	52.74	37	1.287	1.372	RT N	0.0	8.22	0.000	0.000	1.72	6.37	18.50	61.55	240.5	548.2
1736 27	29.49	-80.95	33.00	52.83	37	0.218	0.232		0.0	0.00	0.000	2.802	5.15	12.49	33.78	53.31	62.7	84.2
1738 38	29.60	-81.22	33.00	52.96	37	0.223	0.238	M	0.0	0.00	0.000	2.009	4.40	11.09	29.80	45.22	55.9	74.8
1740:51	29.73	-81.46	33.01	53.12	35	0.735	0.783	RT M	0.0	0.00	0.000	0.000	0.81	3.28	37.59	64.88	79.4	117.9
1743. 2	29.97	-81.57	33.00	53.39	36	0.211	0.225		0.0	0.00	0.000	2.903	5.06	12.31	32.30	52.38	59.0	86.1
1745 14	30.19	-81.54	33.03	53.67	34	0.257	0.274	RT M	0.0	0.00	0.000	2.555	5.34	16.18	45.11	70.22	68.9	46.2
1747 26	30.07	-81.28	32.99	53.65	37	0.210	0.224	PT M	0.0	5.14	0.166	4.590	4.77	12.35	31.24	43.60	52.8	73.3
1749:38	29.77	-81.16	33.01	53.44	38	0.247	0.263		0.0	0.00	0.070	2.375	4.21	11.92	33.23	50.95	59.2	86.6
1751 50	29.47	-81.05	33.01	53.23	38	0.841	0.896	RT	0.0	1.53	0.000	3.127	4.97	9.31	11.93	49.54	62.0	80.6
1754. 2	29.19	-81.14	33.01	53.01	36	0.063	0.067	PT M	0.0	6.03	0.330	6.482	5.04	15.48	39.44	54.22	10.6	10.9
1756 14	29.11	-81.36	32.99	53.00	35	0.289	0.308	RT M	0.0	0.00	0.000	0.000	13.40	42.61	110.72	192.57	352.9	629.3
1758 26	29.34	-81.45	33.01	53.30	37	0.231	0.246	RT M	0.0	0.00	0.000	1.981	5.33	13.87	37.36	58.96	73.4	101.9
1800.37	29.60	-81.32	32.99	53.67	38	0.233	0.248	T	0.0	0.00	0.000	2.844	4.98	13.20	36.84	57.74	65.1	92.8

DATE= 751214 (YR-MO-DAY) DAY= 348 FLT NO= 9 NASA - GASP - FALL 1975 FLIGHTS

TIME HHMM·SS (GMT)	LAT (DEG N)	LONG (DEG E)	PRESS ALT (KFT)	SUN ANG (DEG)	O3 PPB	MEAS OZONE (ATM-CM)	TOTAL OZONE	QCCOQ	227.1 BB	302.3 BB	292.0 NB	307.5 NB	307.0 NB	311.1 NB	322.4 NB	329.7 NB	371.3 BB	401.9 BB
									(MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM) WAVELENGTH IN NM)									
1802 49	29.86	-81.18	33.00	54.05	36	0.273	0.291	RT M	0.0	0.00	0.000	0.000	4.69	12.22	32.89	61.12	94.6	151.6
1805 1	29.94	-80.90	32.97	54.29	39	0.299	0.318	RT M	0.0	0.00	0.000	0.000	3.50	10.60	36.64	60.35	67.4	100.1
1807 13	29.76	-80.65	33.00	54.28	35	0.234	0.249	RT M	0.0	5.69	0.219	3.286	3.72	9.17	28.12	42.78	51.8	67.4
1809 25	29.45	-80.66	33.02	54.09	36	0.062	0.067	RT M	0.0	10.88	0.590	12.288	8.58	9.11	15.35	23.61	20.0	20.6
1811 37	29.34	-80.46	32.99	54.16	37	0.581	0.619	RT M	0.0	0.00	0.000	0.000	6.56	23.74	44.57	110.63	272.9	522.1
1813.49	29.58	-80.37	32.99	54.54	36	0.241	0.257	R	0.0	0.00	0.000	2.106	4.08	11.66	32.26	53.45	61.7	81.2
1816: 1	29.84	-80.37	33.01	54.93	35	0.256	0.273	T	0.0	0.00	0.000	2.036	3.65	10.73	32.48	47.33	59.3	82.8
1818 12	30.10	-80.37	33.02	55.32	34	0.211	0.225	RT N	0.0	3.75	0.197	5.183	6.15	15.31	44.11	22.15	56.4	134.9
1820:24	30.33	-80.21	32.99	55.73	37	0.234	0.249		0.0	0.00	0.000	1.687	3.80	10.68	29.58	49.42	59.4	80.2
1822 36	30.59	-79.95	33.04	56.11	34	0.285	0.304	RT M	0.0	0.00	0.000	0.000	4.19	15.24	47.59	83.49	100.2	120.6
1824:48	30.32	-79.81	32.98	56.14	37	0.382	0.407	RT N	0.0	2.54	0.165	2.299	1.77	3.70	11.89	26.07	42.1	71.8
1827. 0	30.10	-80.01	33.01	56.03	37	0.233	0.248	M	0.0	0.00	0.000	1.626	3.21	8.22	25.42	39.67	47.9	61.2
1829.12	29.83	-80.25	33.01	55.93	36	0.242	0.258	M	0.0	0.00	0.000	1.883	3.08	9.23	26.04	38.56	43.5	66.4
1831·23	29.74	-80.50	33.01	55.88	38	0.291	0.310	RT M	0.0	0.00	0.000	0.000	8.80	24.33	71.86	123.23	254.8	394.1
1833 35	29.75	-80.80	33.02	55.96	36	0.062	0.066	RT M	0.0	5.76	0.278	6.590	4.93	13.05	37.83	60.15	20.2	13.4
1835 47	29.87	-80.95	32.99	56.21	38	0.264	0.281	RT M	0.0	0.00	0.000	0.000	11.69	31.06	84.62	144.88	255.1	509.9
1837:59	30.02	-80.69	33.00	56.61	36	0.193	0.206	RT M	0.0	7.43	0.321	6.616	5.89	15.21	38.74	59.78	68.2	99.5
1840 11	30.02	-80.33	33.01	56.91	37	0.235	0.250	T M	0.0	0.00	0.066	2.021	3.32	9.73	28.13	41.65	50.6	70.8
1842.23	29.90	-79.97	33.01	57.20	38	0.181	0.193	RT M	0.0	0.00	0.662	24.940	19.71	46.18	51.28	87.19	146.1	216.0
1844.35	29.79	-79.69	33.03	57.33	37	0.317	0.338	RT M	0.0	0.00	0.000	0.000	12.80	58.87	151.13	211.85	260.0	259.2
1846.46	29.61	-79.78	32.98	57.33	39	0.210	0.224	RT M	0.0	0.00	0.000	0.000	8.88	22.77	65.95	116.22	176.1	55.4
1848 58	29.67	-80.05	33.00	57.49	37	0.292	0.311	R M	0.0	0.00	0.000	0.000	6.49	20.77	64.92	116.91	166.3	332.1
1851.10	29.85	-80.26	33.03	57.78	37	0.221	0.236	M	0.0	0.00	0.000	1.634	3.31	8.72	25.53	42.64	51.3	70.5
1853 22	30.03	-80.47	33.03	58.07	35	0.108	0.116	PT N	0.0	14.73	0.899	14.196	10.33	30.86	23.37	36.10	48.0	58.7
1855 34	30.28	-80.52	32.97	58.48	37	0.226	0.240		0.0	0.00	0.000	1.736	3.24	9.43	27.19	42.84	54.8	70.7
1857.46	30.50	-80.42	33.04	58.94	36	0.273	0.291	RT M	0.0	0.00	0.000	0.000	2.87	10.90	34.44	58.47	64.7	25.4
1859.57	30.33	-80.21	32.99	59.10	36	0.170	0.181	RT N	0.0	6.74	0.234	3.444	2.63	5.86	17.70	25.19	25.5	38.5
1902 9	30.02	-80.20	33.01	59.05	37	0.238	0.254	N	0.0	0.00	0.000	2.058	2.94	9.37	27.70	44.80	56.2	79.6
1904.21	29.70	-80.19	33.02	59.01	37	0.168	0.179	RT N	0.0	11.79	0.557	8.781	3.06	6.97	18.11	31.56	37.9	50.3
1906·33	29.58	-79.96	33.57	59.24	37	0.283	0.302	RT M	0.0	0.00	0.000	0.000	6.85	23.41	78.40	125.91	255.4	512.9
1908.45	29.72	-79.67	36.43	59.73	35	0.279	0.299	RT	0.0	0.00	0.000	1.809	2.80	11.10	37.49	42.20	51.6	63.7
1910 57	29.82	-79.37	38.60	60.20	34	0.237	0.255	M	0.0	0.00	0.000	1.717	3.05	10.14	29.92	50.26	58.6	77.5
1913 9	29.92	-79.07	39.01	60.68	33	0.227	0.245	R N	0.0	2.04	0.000	0.000	4.59	12.95	37.60	64.26	90.3	153.3
1915.20	30.01	-78.76	38.96	61.16	34	0.265	0.286	N	0.0	0.00	0.000	0.000	5.38	14.98	53.63	80.43	135.8	206.1
1917.32	30.11	-78.44	38.94	61.66	35	0.257	0.277	N	0.0	0.00	0.000	0.000	5.05	17.30	54.29	96.29	149.8	244.0
1919·44	30.20	-78.12	38.95	62.16	36	0.266	0.287	T N	0.0	0.00	0.000	0.000	4.55	15.47	53.07	87.77	158.3	259.9
1921:55	30.31	-77.81	39.01	62.67	40	1.524	1.645	RT M	0.0	0.00	0.000	0.000	1.23	2.91	15.24	89.96	334.9	886.5
1924· 7	30.48	-77.82	38.38	63.08	44	1.194	1.288	RT M	0.0	0.00	0.000	0.000	0.00	1.62	10.89	46.33	71.7	107.3
1926.19	30.51	-78.09	39.00	63.25	40	0.229	0.248	R N	0.0	7.47	0.188	1.681	1.90	5.87	19.37	31.70	43.5	58.4
1928·31	30.42	-78.39	39.01	63.31	36	0.253	0.273	N	0.0	0.00	0.000	0.000	2.35	7.13	22.87	42.78	67.2	102.9
1930.42	30.34	-78.69	38.99	63.36	36	0.271	0.292	N	0.0	0.00	0.000	0.000	2.47	6.41	24.10	41.97	63.1	112.0
1932:54	30.25	-78.99	38.99	63.42	35	0.252	0.272	N	0.0	0.00	0.000	0.000	1.94	6.50	22.72	36.17	64.2	92.5
1935: 6	30.17	-79.29	39.00	63.48	36	0.268	0.289	N	0.0	0.00	0.000	0.000	2.08	6.88	25.54	41.68	66.8	112.5
1937·18	30.08	-79.59	39.00	63.54	35	0.236	0.254	N	0.0	0.00	0.082	0.000	2.56	7.10	23.79	37.77	67.2	108.1
1939:29	29.99	-79.89	39.01	63.60	39	0.238	0.257	N	0.0	0.00	0.118	0.000	2.18	7.70	22.07	42.27	60.5	105.8
1941 41	29.90	-80.19	39.00	63.66	39	0.247	0.266	N	0.0	0.00	0.102	0.000	1.99	7.59	26.22	40.97	64.2	108.3
1943.53	29.81	-80.49	38.93	63.72	38	0.254	0.274	N	0.0	0.00	0.000	0.000	2.34	7.27	25.99	42.60	64.0	115.7
1946. 4	29.72	-80.78	38.97	63.79	34	0.263	0.283	N	0.0	0.00	0.103	0.000	2.29	6.70	24.52	41.88	63.8	111.6
1948 16	29.63	-81.08	38.98	63.85	35	0.258	0.279	N	0.0	0.00	0.000	0.000	2.09	7.01	25.02	42.28	61.1	116.9
1950 28	29.54	-81.37	39.02	63.92	35	0.576	0.621	RT N	0.0	0.00	0.000	0.000	1.13	4.63	15.33	93.41	59.8	33.9
1952.39	29.32	-81.46	38.98	64.01	37	0.239	0.258	RT N	0.0	0.00	0.096	0.000	2.01	7.05	21.98	41.50	57.7	92.1
1954.51	29.04	-81.34	39.01	64.16	34	0.235	0.254	N	0.0	0.00	0.082	0.000	2.03	7.60	23.39	42.29	66.5	101.2
1957. 3	28.76	-81.21	39.02	64.33	34	0.211	0.227	R N	0.0	2.50	0.142	1.536	2.35	6.40	22.72	39.25	41.9	49.6
1959 14	28.62	-80.99	39.01	64.65	35	0.437	0.471	RT N	0.0	0.00	0.000	0.000	1.13	8.66	65.70	44.13	77.5	117.9
2001:26	28.83	-80.88	39.00	65.20	34	0.176	0.189	RT M	0.0	0.00	0.127	4.415	3.30	9.73	32.01	39.94	40.8	35.6

REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

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DATE=  751215  (YR-MO-DAY)     DAY=  349     FLT NO=  10            NASA - GASP - FALL 1975 FLIGHTS
   FBAR     LAT     LONG   PRESS    SUN   O3    MEAS   TOTAL  QQQQQ  227.1  302.3  292.0  307.5  307.0  311.1  322.4  329.7  371.3  401.9
HHMM:SS    (DEG    (DEG     ALT     ANG   PPB   OZONE  OZONE         (MEASURED DOWNWARD SOLAR FLUX IN (E-06) W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)      E)    (KFT)   (DEG)        (ATM-CM)                BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
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1601:53   28.77  -80.25   14.85   54.98   15   0.243  0.259  AN   0.0   0.00  0.000  0.000   3.61  10.72  30.58  49.91   70.2   91.2
1603:55   28.95  -80.08   18.64   54.92   32   0.243  0.252  AN   0.0   0.00  0.000  1.765   3.98  11.40  33.24  56.77   68.5   90.9
1606: 4   29.13  -79.89   21.66   54.87   36   0.242  0.252   M   0.0   0.00  0.000  2.010   4.12  12.06  34.71  55.03   63.7   93.0
1608:20   29.32  -79.69   24.57   54.85   38   0.237  0.248        0.0   1.73  0.000  2.883   4.31  12.58  34.45  54.13   60.8   93.7
1610:32   29.53  -79.49   26.93   54.63   37   0.225  0.237   M   0.0   0.00  0.000  1.879   5.01  12.67  37.19  59.80   69.9   93.5
1612:43   29.73  -79.28   28.60   54.84   39   0.231  0.245   M   0.0   0.00  0.000  2.416   4.06  13.58  37.29  55.02   70.5   92.4
1614:57   29.95  -79.05   30.12   54.66   42   0.224  0.237        0.0   0.00  0.000  2.349   4.58  12.58  33.10  47.96   60.0   80.9
1617: 9   30.16  -78.81   32.50   54.88   45   0.193  0.205 RT M   0.0   0.00  0.055  2.926   7.11  17.50  29.64  40.61   45.5   63.7
1619:22   30.28  -78.50   33.05   54.81   41   0.257  0.274 RT M   0.0  21.84  1.185 17.684   4.96   8.99  24.25  39.66   53.0  328.2
1621:34   30.40  -78.57   32.92   54.83   39   0.156  0.166 RT M   0.0   5.29  0.260  4.928   4.55   9.85  23.72  35.40   36.6   52.1
1623:46   30.32  -78.88   32.98   54.70   46   0.231  0.246        0.0   0.00  0.000  1.625   4.04  10.90  29.69  48.92   61.6   74.9
1625:58   30.23  -79.18   32.99   54.56   42   0.230  0.245        0.0   0.00  0.000  2.552   4.15  10.79  30.79  52.22   58.0   81.9
1628:11   30.13  -79.48   32.98   54.42   42   0.228  0.243        0.0   0.00  0.000  2.191   4.55  11.53  33.60  52.68   58.2   86.0
1630:23   30.04  -79.78   32.98   54.28   45   0.217  0.231        0.0   0.00  0.000  2.465   5.07  13.23  33.94  55.08   66.0   86.7
1632:35   29.95  -80.08   32.98   54.14   45   0.247  0.264        0.0   0.00  0.000  2.648   4.29  13.12  33.76  56.21   65.0   86.9
1634:47   29.85  -80.37   32.98   54.01   45   0.233  0.249        0.0   0.00  0.000  2.582   4.40  11.95  32.72  54.26   57.9   84.6
1636:59   29.76  -80.67   32.99   53.87   45   0.246  0.263        0.0   0.00  0.000  2.166   4.38  12.45  35.13  55.05   67.7   86.1
1639:11   29.66  -80.97   32.98   53.73   48   0.239  0.255        0.0   0.00  0.000  1.964   4.73  13.24  35.91  56.71   66.6   92.9
1641:24   29.57  -81.26   32.98   53.60   46   0.230  0.246 R  M   0.0   0.00  0.000  2.462   4.49  11.62  32.85  52.61   59.5   74.3
1643:36   29.37  -81.55   32.98   53.56   48   0.214  0.228 R      0.0   0.00  0.000  3.611   5.71  14.31  37.22  55.40   66.4   96.4
1645:48   29.71  -81.81   33.02   53.65   47   1.046  1.115 RT M   0.0   0.00  0.000  0.000   0.00   7.14  64.97 179.13  436.2  924.8
1648: 0   29.68  -81.65   32.96   53.71   49   0.211  0.225 RT M   0.0   0.00  0.000  5.193   7.59  19.91  47.40  64.59   63.9   70.5
1650:12   29.80  -81.32   32.98   53.50   47   0.235  0.251        0.0   0.00  0.000  1.836   4.88  12.11  35.78  55.52   67.2   92.9
1652:24   29.66  -81.00   33.00   53.27   46   0.344  0.367 RT     0.0   0.00  0.000  0.000   3.96  11.13  48.98  75.61   77.7   72.0
1654:36   29.42  -80.82   32.97   52.95   46   0.234  0.250 R      0.0   0.00  0.000  1.891   4.79  12.40  34.43  52.17   68.3   87.5
1656:48   29.19  -80.86   33.00   52.67   45   2.500  2.666 RT M   0.0   0.00  0.000  0.000   1.31   7.96  20.78 180.31  326.1  577.6
1659: 0   29.27  -81.11   32.98   52.72  133   0.319  0.338 RT M   0.0   0.00  0.000  0.000   3.06  13.71  41.04  74.74   91.0  129.2
1701:12   29.53  -81.23   32.99   52.94  212   0.229  0.248    M   0.0   1.76  0.000  3.036   5.71  15.03  35.56  62.49   72.2  102.6
1703:24   29.89  -81.33   33.00   53.18   47   0.192  0.205 RT M   0.0   0.00  0.000  3.215   6.30  16.41  36.12  44.11   87.3  148.7
1705:36   30.08  -81.26   32.97   53.41   47   0.220  0.235    M   0.0   0.00  0.000  3.108   6.08  15.09  40.95  65.30   77.9  105.6
1707:48   30.25  -81.04   33.00   53.54   48   0.154  0.164 RT M   0.0   5.69  0.311  7.770   6.80  15.14  37.05  48.52   40.1   44.4
1710: 0   30.03  -80.93   32.97   53.29   48   0.273  0.291 RT     0.0   0.00  0.000  0.000   3.80  11.18  33.54  57.12   67.9   96.5
1712:12   29.78  -81.06   32.98   53.02   47   0.245  0.261        0.0   0.00  0.000  2.648   4.46  12.45  34.14  55.71   66.1   86.4
1714:24   29.52  -81.20   32.99   52.76   48   0.166  0.178 R  M   0.0   4.65  0.225  6.701   5.89  13.16  37.69  58.28   27.1   13.3
1716:36   29.36  -81.42   32.97   52.59   50   0.271  0.289 R  M   0.0   0.00  0.000  0.000   2.33  14.40  36.01  58.89   83.6  107.8
1718:47   29.38  -81.70   33.02   52.57   49   0.779  0.831 PT M   0.0   0.00  0.000  0.000   2.40   7.29  18.83  42.22  182.2  506.9
1720:59   29.57  -81.67   32.97   52.79   49   0.233  0.249 PT     0.0   0.00  0.000  3.835   6.56  18.16  43.52  61.21   67.2   82.7
1723:11   29.70  -81.36   32.98   52.92   51   0.240  0.256        0.0   0.00  0.000  2.319   4.76  12.30  35.68  54.27   65.1   89.6
1725:23   29.79  -81.01   33.00   53.04   47   0.431  0.460 RT M   0.0   0.00  0.000  0.000   4.21  23.69  64.29 100.48   70.9   66.4
1727:35   29.71  -80.67   32.99   52.99   46   0.281  0.300 R  M   0.0   0.00  0.000  0.000   3.47  10.56  29.60  47.18  113.2  140.9
1729:47   29.52  -80.56   32.94   52.82   47   0.360  0.385 RT M   0.0   0.00  0.000  0.000   1.63   7.23 101.80 162.24  323.9  523.1
1731:59   29.46  -80.84   32.98   52.78   50   0.324  0.345 RT M   0.0   0.00  0.000  0.000   5.75  17.60  56.43 102.59  145.6  225.8
1734:11   29.56  -81.13   32.98   52.90   49   0.245  0.261        0.0   0.00  0.000  2.520   4.37  12.21  33.46  54.89   60.8   89.0
1736:22   29.68  -81.41   33.00   53.04   50   0.239  0.254 RT M   0.0  12.85  0.760 14.446  10.71  25.91  15.53  25.11   25.8  176.2
1738:34   29.91  -81.57   32.97   53.29   50   0.222  0.236        0.0   0.00  0.000  3.345   5.37  12.98  36.60  57.37   69.2   88.1
1740:46   30.17  -81.61   33.02   53.59   47   0.357  0.381 RT M   0.0   0.00  0.000  0.000  16.83  53.31 170.65 302.89  581.2 1168.6
1742:58   30.15  -81.34   32.96   53.65   49   0.175  0.187 RT M   0.0   0.00  0.206  7.446   7.04  16.73  36.80  47.86   57.7   68.2
1745:10   29.89  -81.20   32.98   53.46   49   0.250  0.267        0.0   0.00  0.000  2.374   4.31  12.65  34.51  52.66   61.6   79.7
1747:22   29.61  -81.09   32.99   53.26   49   0.244  0.260 R      0.0   0.00  0.000  2.434   4.44  11.98  34.27  53.56   62.1   91.6
1749:33   29.34  -81.09   32.97   53.06   52   0.220  0.235 R      0.0   0.00  0.083  3.303   5.14  13.12  34.28  54.90   59.4   86.7
1751:45   29.11  -81.26   33.02   52.89   51   0.181  0.193 RT M   0.0  33.65  1.688  3.810   5.48  13.11  32.66  55.12   61.1   95.1
1753:57   29.23  -81.44   32.96   53.06   52   0.534  0.570 RT M   0.0   2.21  0.130  3.664   5.34   5.96  16.80  47.75   72.9  123.9
1756: 9   29.51  -81.37   32.98   53.43   51   0.231  0.247 R  M   0.0   0.00  0.000  2.583   5.59  14.85  40.07  64.65   79.4  100.4
1758:21   29.78  -81.22   32.99   53.81   49   0.239  0.255 R  M   0.0   0.00  0.000  3.491   5.28  14.87  40.20  66.92   72.7  105.9
1800:32   29.98  -80.98   32.98   54.10   49   0.219  0.228 RT     0.0   6.21  0.000  3.028   4.57  11.64  30.16  48.48   55.8   81.3
1802:44   30.07  -80.63   32.98   54.39   50   0.233  0.249 R      0.0   0.00  0.000  2.775   4.46  11.77  33.97  50.68   63.2   78.4
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DATE= 751215  (YR-MO-DAY)      DAY= 349    FLT NO=  10            NASA - GASP - FALL 1975 FLIGHTS
   TIME     LAT     LONG   PRESS    SUN   O3    MEAS   TOTAL  QQQQQ  227.1  302.3  292.0  307.5  307.0  311.1  322.4  329.7  371.3  401.9
HHMM SS    (DEG     (DEG    ALT     ANG   PPB   OZONE  OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)   (KFT)   (DEG)        (ATM-CM)                 BB     BB     NB     NB     NB     NB     NB     NB     BB     BB
-------------------------------------------------------------------------------------------------------------------------------------------
1304:56   30.18   -40.29   33.82   54.68   47   0.235  0.252          0.0   1.40  0.000  2.043   4.01  11.00  30.90  50.64   59.4   77.8
1307: 8   30.29   -79.95   35.60   54.97   44   0.215  0.231          0.0   0.00  0.071  2.676   4.75  12.45  32.17  51.55   57.6   82.8
1309:20   30.38   -79.61   37.62   55.26   42   0.245  0.264          0.0   0.00  0.000  2.026   3.97  11.86  32.31  51.94   62.5   84.4
1311:31   30.47   -79.28   36.84   55.56   40   0.233  0.252          0.0   1.59  0.000  2.451   4.66  11.89  35.08  55.79   62.6   93.1
1313:43   30.56   -78.95   39.00   55.87   38   0.240  0.258          0.0   0.00  0.096  2.808   4.33  11.96  35.50  55.18   61.7   90.9
1315:55   30.65   -78.61   38.99   56.14   36   0.214  0.231         -0.0   1.50  0.000  2.939   4.91  12.21  34.50  54.56   63.4   89.5
1318: 7   30.74   -78.27   39.99   56.52   37   0.248  0.269          0.0   0.00  0.073  2.315   3.30   9.73  28.44  45.56   57.9   86.0
1320:19   30.78   -77.95   39.02   56.81   40   0.170  0.183  RT M   0.0   3.57  0.159  5.783   5.27  12.88  33.36  43.33   40.2   34.2
1322.30   30.57   -77.96   38.97   56.77   38   0.755  0.814  RT N   0.0   0.00  0.000  0.000   2.65   9.37  36.03  87.57  196.4  447.1
1324:42   30.47   -78.23   38.99   56.77   36   0.235  0.254     M   0.0   0.00  0.063  1.718   2.99   9.08  24.36  38.91   46.3   60.2
1326:54   30.39   -78.52   39.99   56.72   38   0.222  0.239     M   0.0   0.00  0.000  2.038   3.24   8.95  24.42  41.00   46.3   63.1
1329: 6   30.30   -78.81   38.98   55.78   39   0.243  0.262     M   0.0   0.00  0.000  1.492   3.13   8.91  26.89  41.51   52.3   68.5
1331:17   30.22   -79.10   38.99   56.78   40   0.231  0.249     M   0.0   0.00  0.000  1.267   3.39   9.15  27.02  43.88   54.2   65.0
1333:29   30.13   -79.39   38.99   56.79   41   0.240  0.260     N   0.0   0.00  0.000  1.657   3.37   8.67  27.77  43.32   52.5   67.6
1335:41   30.05   -79.67   38.99   56.80   43   0.249  0.269     M   0.0   0.00  0.000  1.531   3.01   9.67  26.85  43.26   49.6   74.4
1337:53   29.97   -79.96   38.99   56.81   43   0.249  0.269     N   0.0   0.00  0.000  1.518   2.61   8.36  23.66  40.32   46.9   57.9
1340: 5   29.89   -80.23   38.93   56.83   41   0.236  0.255     N   0.0   0.00  0.000  1.625   2.80   8.19  22.47  39.39   46.7   60.0
1342:16   29.80   -80.51   38.99   56.85   41   0.229  0.248     M   0.0   1.14  0.060  2.370   3.07   8.09  25.05  39.56   39.8   59.7
1344:28   29.72   -80.79   38.99   56.86   42   0.245  0.264     M   0.0   0.00  0.056  2.294   3.00   8.89  26.74  43.13   46.4   65.7
1346:39   29.63   -81.06   38.99   56.88   41   0.231  0.249     M   0.0   0.00  0.000  1.551   3.46  10.16  27.18  44.08   56.7   71.2
1348:51   29.54   -81.34   39.00   56.90   42   0.332  0.358  RT M   0.0   0.00  0.000  0.000   2.85   8.47  31.43  65.91   76.9   96.5
1351: 3   29.35   -81.45   38.97   56.88   45   0.322  0.348  RT N   0.0   0.00  0.000  0.000  14.23  35.65  61.20 126.39  298.5  508.3
1353:14   29.02   -81.38   38.99   56.93   39   0.230  0.249          0.0   0.00  0.000  1.822   3.74  10.71  28.99  48.51   60.2   78.4
1355:26   28.93   -81.22   38.99   56.97   38   0.224  0.241  R  N   0.0   1.21  0.080  4.624   4.78  14.33  29.53  40.63   44.5   16.8
1357:38   28.64   -81.05   39.00   57.03   39   0.763  0.823  RT N   0.0   0.00  0.000  0.000   1.35   6.53  20.78  48.73  291.3  495.9
1359:49   28.84   -80.87   38.98   57.50   38   0.190  0.205  RT M   0.0   0.00  1.163 17.899  24.63  62.16 151.78 214.43  333.1  565.7
1402: 1   29.10   -80.96   38.98   57.72   39   0.247  0.267     M   0.0   0.00  0.069  1.786   2.90   8.98  27.27  45.45   51.4   70.1
1404:12   29.37   -81.08   38.99   58.33   42   0.232  0.250     N   0.0   0.00  0.000  1.910   2.98   8.62  25.64  39.36   48.0   68.1
1406:24   29.63   -81.20   38.99   58.74   43   0.241  0.260     M   0.0   1.24  0.000  2.017   2.85   8.79  27.08  45.70   45.8   65.7
1408:35   29.89   -81.32   38.99   59.15   41   0.197  0.212  R  N   0.0   5.65  0.287  6.562   4.47  12.69  36.02  23.41   25.6   37.3
1410:47   30.17   -81.39   38.93   59.59   43   0.231  0.250     M   0.0   0.00  0.055  2.063   2.58   7.82  23.73  39.12   42.4   62.8
1412:59   30.45   -81.43   38.98   60.06   43   0.239  0.258     N   0.0   1.69  0.000  2.035   2.62   7.99  26.07  38.50   43.4   63.3
1415:11   30.73   -81.47   38.93   60.52   41   0.248  0.267     N   0.0   0.00  0.000  1.740   2.26   8.59  25.44  40.61   48.1   66.2
1417.22   31.01   -81.50   38.93   60.98   40   0.296  0.319  R  N   0.0   0.00  0.000  0.000   2.62   8.46  19.01  43.61   63.4  100.3
1419:34   31.28   -81.53   39.02   61.45   39   0.287  0.257  RT N   0.0   0.00  0.000  0.000   0.00   3.97  14.15  41.34  225.7  639.3
1421:45   31.35   -81.31   38.97   61.85   40   0.295  0.318  RT M   0.0   5.20  0.185  0.000   1.09   8.41  29.92  43.92   42.7   47.5
1423:57   31.09   -81.19   38.98   61.94   40   0.270  0.291  R  N   0.0   0.00  0.000  0.000   3.38   9.93  32.92  58.14   96.8  172.6
1426: 9   30.81   -81.13   38.97   61.98   40   0.313  0.338     N   0.0   0.00  0.000  0.000   3.49  10.93  40.15  76.23  127.4  210.7
1428:20   30.53   -81.06   38.99   62.04   42   0.249  0.269     N   0.0   0.00  0.129  0.000   3.79  11.43  37.78  59.45  110.3  189.3
1430:32   30.24   -81.00   38.99   62.10   44   0.272  0.293     N   0.0   0.00  0.000  0.000   3.97  12.72  46.61  71.66  124.3  198.9
1432:43   29.96   -80.94   38.98   62.17   42   0.264  0.285     N   0.0   0.00  0.000  0.000   3.32  11.46  36.50  65.46  104.2  190.0
1434:55   29.68   -80.88   38.99   62.24   43   0.257  0.278     N   0.0   0.00  0.142  0.000   3.81  10.97  37.65  59.80  113.2  190.0
1437: 7   29.40   -80.82   38.99   62.33   42   0.238  0.256     N   0.0   3.32  0.178  0.000   4.00  12.07  39.20  61.99   93.9  163.0
1439:18   29.13   -80.78   38.99   62.41   38   0.253  0.273  R  N   0.0  13.04  0.670  0.000   3.48   9.84  32.93  56.36   83.0  159.0
1443:41   29.01   -80.52   38.95   63.04   39   0.174  0.188  RT N   0.0   0.96  0.134  3.919   2.37   6.44  19.84  24.43   25.0   31.5
1445:53   29.30   -80.50   38.98   63.57   38   0.281  0.304     N   0.0   0.00  0.000  0.000   2.96  12.70  40.95  79.38  138.8  225.8
1448: 4   29.59   -80.50   38.99   64.10   43   0.286  0.309     N   0.0   0.00  0.000  0.000   2.71   9.27  37.16  63.32  113.2  167.3
1450:16   29.88   -80.50   38.98   64.62   42   0.261  0.282   T N   0.0   0.00  0.000  0.000   2.24   8.91  29.81  54.47   95.4  165.8
1452:28   30.16   -80.50   38.99   65.14   42   0.288  0.311   T N   0.0   0.00  0.000  0.000   2.20   7.75  29.42  56.24   88.0  164.4
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REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

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DATE=  751216  (YR-MO-DAY)      DAY=  350     FLT NO=  11            NASA - GASP - FALL 1975 FLIGHTS
    TBAR    LAT     LONG   PRESS    SUN   O3    MEAS   TOTAL  QQQQQ   227.1  302.3  292.0  307.5  307.0  311.1  322.4  329.7  371.3  401.9
HHMM:SS    (DEG     (DEG     ALT     ANG   PPB   OZONE  OZONE        (MEASURED DOWNWARD SOLAR FLUX IN (E-06)W/(CM**2-NM)  WAVELENGTH IN NM)
  (GMT)      N)       E)    (KFT)   (DEG)         (ATM-CM)               RB     FE     NB     NP     NB     NB     NB     NB     PB     PP
-----------------------------------------------------------------------------------------------------------------------------------------
1816:44   30.33  -82.55   13.71  54.99    23   0.215  0.221   A      0.0   0.00  0.000  1.417   3.96  10.08  28.14  48.53   58.8   81.7
1818:56   30.36  -82.81   17.29  55.08    33   0.246  0.255   A      0.0   0.00  0.000  1.333   3.73  10.97  33.23  52.10   62.2   83.1
1821: 9   30.39  -83.07   20.53  55.18    28   0.236  0.246   N      0.0   0.00  0.000  1.651   4.21  12.83  32.95  52.23   60.1   89.7
1823:21   30.43  -83.34   23.44  55.28    27   0.231  0.241          0.0   0.00  0.000  2.156   4.52  12.59  35.67  56.78   65.6   98.7
1825:34   30.46  -83.63   25.89  55.37    28   0.206  0.216          0.0   0.00  0.000  2.955   5.43  14.07  36.10  59.31   68.7   93.2
1827:47   30.50  -83.92   27.64  55.47    27   0.210  0.221          0.0   0.00  0.000  2.259   4.91  12.35  33.87  55.63   66.7   85.8
1829:59   30.53  -84.22   29.32  55.56    36   0.197  0.208          0.0   2.12  0.094  3.441   5.49  13.40  35.46  54.55   56.3   89.7
1832:12   30.59  -84.52   30.81  55.69    42   0.433  0.459  R N     0.0   6.34  0.290  1.987   9.75  25.55  53.52  28.16   18.0   52.0
1834:24   30.68  -84.81   31.01  55.82    42   0.247  0.263  R M     0.0   3.62  0.000  4.817   5.03  16.80  33.44  46.99   46.9   94.1
1836:37   30.75  -85.11   31.01  55.96    41   0.432  0.459  R       0.0   1.75  0.000  4.380   2.45   5.38  29.40  47.48   70.9   83.3
1838:49   30.84  -85.39   31.01  56.11    43   0.214  0.228  R M     0.0   0.00  0.000  0.000   5.10  11.81  27.86  56.18   77.8   99.4
1841: 2   30.89  -85.68   31.01  56.23    37   0.197  0.209  R M     0.0   9.65  0.272  3.654   4.49  11.17  29.62  46.19   52.8   70.6
1843:14   30.88  -85.97   31.01  56.28    38   0.233  0.248          0.0   0.00  0.000  1.787   4.25  11.50  34.40  53.39   67.8   87.5
1845:26   30.86  -86.26   31.01  56.34    38   0.222  0.236          0.0   0.00  0.000  1.998   4.51  12.03  34.38  53.74   67.0   86.4
1847:39   30.85  -86.55   31.01  56.39    40   0.191  0.203  R N     0.0   3.83  0.218  5.196   4.48  12.17  33.06  52.81   22.2   27.4
1849:51   30.96  -86.84   31.01  56.47    39   0.222  0.235    M     0.0   0.00  0.000  1.685   3.70  10.01  28.28  49.07   54.4   71.7
1852: 4   30.90  -87.14   31.01  56.58    41   0.227  0.242    M     0.0   0.00  0.000  1.871   3.78  11.09  29.68  50.44   58.6   77.5
1854:16   30.94  -87.43   31.01  56.69    45   0.223  0.237          0.0   0.00  0.000  1.935   4.11  11.83  30.67  51.49   63.4   78.6
1856:28   30.98  -87.73   31.01  56.80    45   0.222  0.236          0.0   0.00  0.000  2.092   4.12  11.68  31.77  50.56   60.4   82.7
1858:41   31.02  -88.03   31.02  56.91   142   0.224  0.240    N     0.0   0.00  0.000  2.228   4.17  11.64  33.15  52.94   59.1   84.0
1900:53   31.06  -88.34   31.01  57.02   257   0.219  0.240    N     0.0   1.55  0.078  2.661   4.31  11.03  33.37  53.89   59.4   81.6
1903: 5   31.10  -88.64   31.01  57.13   257   0.238  0.260    N     0.0   1.67  0.000  1.465   3.65  10.21  30.19  54.59   65.5   80.8
1905:17   31.14  -88.94   31.01  57.24   257   0.231  0.253    N     0.0   0.00  0.000  2.414   3.51   9.98  29.81  46.93   59.3   70.3
1907:30   31.18  -89.23   31.02  57.35   257   0.219  0.239    N     0.0   0.00  0.000  1.981   3.69  10.58  28.34  45.67   53.0   68.3
1909:42   31.21  -89.53   31.01  57.46   257   0.219  0.240    M     0.0   0.00  0.000  2.393   3.87  11.17  30.01  47.33   50.5   71.4
1911:54   31.25  -89.81   31.01  57.58   257   0.212  0.232    M     0.0   0.00  0.000  1.785   3.70   9.90  26.64  47.82   56.2   68.3
1914: 6   31.28  -90.11   31.02  57.69   257   0.121  0.132  R N     0.0   5.96  0.318  6.752   5.38  14.18  40.18  62.25   24.1   23.3
1916:18   31.36  -90.39   31.01  57.84   257   0.204  0.223  R       0.0   0.00  0.000  1.362   4.02  10.38  28.94  45.71   58.3   69.7
1918:30   31.43  -90.66   31.02  58.04    43   0.220  0.234    M     0.0   1.01  0.000  2.435   3.20   9.19  26.12  42.05   45.3   64.6
1920:43   31.59  -90.93   31.01  58.24    44   0.212  0.225    M     0.0   1.31  0.051  2.063   3.09   8.52  24.10  39.26   40.4   61.1
1922:55   31.71  -91.20   31.01  58.43    49   0.215  0.229    M     0.0   1.27  0.062  1.552   3.13   8.74  25.34  39.39   42.3   56.9
1925: 7   31.82  -91.47   31.01  58.63    43   0.223  0.237    M     0.0   0.00  0.000  1.804   2.93   8.88  24.60  35.25   43.3   61.3
1927:19   31.93  -91.75   31.02  58.82    48   0.219  0.232    M     0.0   0.00  0.058  1.996   3.01   8.60  25.48  39.48   42.1   60.2
1929:31   32.05  -92.03   31.01  59.02    43   0.214  0.227    M     0.0   0.00  0.000  1.723   2.90   7.67  23.25  36.51   44.0   61.3
1931:43   32.16  -92.30   31.01  59.22    46   0.214  0.227    M     0.0   0.00  0.000  1.696   2.78   8.25  21.93  36.22   46.7   57.4
1933:55   32.27  -92.57   31.01  59.41    44   0.209  0.222    M     0.0   0.00  0.000  1.088   2.92   8.11  23.18  38.42   47.4   57.2
1936: 7   32.38  -92.85   31.02  59.61    47   0.224  0.238    M     0.0   0.00  0.000  1.069   2.13   6.63  19.04  27.72   36.3   48.5
1938:19   32.49  -93.11   31.01  59.80    52   0.230  0.245    M     0.0   0.00  0.000  0.974   2.11   6.93  19.50  33.26   44.6   52.3
1940:31   32.57  -93.38   31.01  60.00    47   0.236  0.251    N     0.0   0.00  0.000  1.320   2.04   6.27  19.74  32.21   40.2   53.8
1942:43   32.70  -93.65   31.02  60.19    57   0.224  0.239    N     0.0   0.00  0.000  1.096   2.32   7.50  21.18  34.56   43.0   59.2
1944:55   32.82  -93.91   31.01  60.40    46   0.241  0.256  R N     0.0   0.00  0.000  0.000   3.29  10.83  32.80  53.50   89.7  128.8
1947: 7   32.95  -94.16   31.01  60.63    44   0.225  0.239    N     0.0   0.00  0.000  1.261   2.79   8.97  25.25  45.59   60.1   76.0
1949:19   33.09  -94.41   31.01  60.86    46   0.230  0.244    N     0.0   0.00  0.000  0.000   2.66   9.14  25.80  46.23   60.1   83.3
1951:31   33.22  -94.66   31.01  61.09    55   0.247  0.263    N     0.0   0.00  0.000  0.000   2.61   8.78  27.83  47.67   69.6   98.6
1953:43   33.36  -94.91   31.01  61.32    62   0.244  0.259    N     0.0   0.00  0.000  0.000   2.80   8.97  28.71  47.63   69.4  112.9
1955:55   33.49  -95.16   31.02  61.55    63   0.254  0.270    N     0.0   0.00  0.000  0.000   2.62   8.07  26.04  48.56   68.7  102.9
1958: 7   33.63  -95.42   31.01  61.78    65   0.227  0.242    N     0.0   0.00  0.000  0.000   2.56   9.55  27.62  46.30   70.9  110.7
2000:19   33.77  -95.68   31.01  62.01    70   0.227  0.242    N     0.0   0.00  0.000  0.000   2.43   8.86  26.48  42.51   67.6  115.1
2002:31   33.90  -95.94   32.30  62.24    71   0.244  0.261   AN     0.0   0.00  0.000  0.000   2.74   9.00  30.31  45.93   78.7  120.3
2004:43   34.03  -96.18   35.01  62.47    54   0.337  0.361  R N     0.0   0.00  0.000  0.000   1.22   5.87  21.82  38.89  138.5  149.8
2006:55   34.12  -96.43   35.00  62.67    50   0.238  0.255  R N     0.0  11.37  0.326  2.588   2.45   7.39  25.14  38.70   57.3   87.1
2009: 7   34.22  -96.69   35.02  62.86    63   0.327  0.351  R N     0.0   0.00  0.000  0.000   1.42   6.95  22.36  47.03   83.9  138.0
2011:19   34.39  -96.92   35.01  63.14    94   0.256  0.276    N     0.0   0.00  0.000  0.000   2.15   9.91  34.28  55.94   98.7  180.1
2013:31   34.57  -97.15   34.99  63.42    92   0.239  0.257    N     0.0   0.00  0.000  0.000   2.37   9.02  28.73  48.16   83.3  140.7
2015:43   34.74  -97.38   35.01  63.69    95   0.270  0.290    N     0.0   0.00  0.000  0.000   2.15   7.61  28.37  47.55   82.1  136.8
2017:54   34.91  -97.60   35.01  63.97    93   0.260  0.280    N     0.0   0.00  0.000  0.000   2.21   7.21  25.93  44.24   72.7  125.4
```

Some of the data from the 1975 flights were reduced earlier and presented in Ref. 1.4. Results from flight 3 over Wallops Island have been compared with balloon sonde and Dobson instrument measurements (Ref. 4.1). All these data are compared with the recomputed UVS results in Table 5. 3. For altitudes less than 40 kft the present and earlier (Ref. 1.4) UVS ozone results are in excellent agreement. The averaged UVS total ozone is nearly identical to the integrated sonde ozone, and about 5% greater than the Dobson ozone. In view of the fact that all UVS measurements in Table 5. 3 were with $\theta_{sun} > 59^o$, the agreement is excellent. The extreme non-standard operating conditions for the UVS in the Rayleigh scattered light only mode make the UVS derived ozone (for $\theta_{sun} > 59^o$) uncertain by more than $\pm 5\%$, probably as high as $\pm 10\%$, for altitudes less than 35 kft. Above 35 kft the UVS ozone values become even more inaccurate because much of the Rayleigh scattering takes place in the ozone layer, and the measured solar UV attenuation becomes a complicated function of the ozone thickness and vertical distribution (this was discussed briefly in Ref. 1.4). The last three values for UVS ozone in Table 5. 3, being for $\theta_{sun} > 65^o$, are not listed in the data tabulations, which are cut off at $\theta_{sun} = 65^o$, but were taken from the full data listings.

The data tabulations do not include all the times presented in Ref. 1. 4, because the magnetic tape data did not include all the time covered by the strip chart recordings used for the data presented in Ref. 1.4.

Table 5.3

Comparison of Ozone Measurements for the Wallops Island Flight of Dec. 2, 1975

Time GMT (hr-min)	Altitude (kft)	θ_{sun} (deg)	Measured* ozone	Total* ozone	Integrated sonde ozone (Refs. 1.4 & 4.1)	Measured ozone (Ref. 1.4)	Ratio $\left(\frac{\text{Meas. here}}{\text{Meas. Ref. 1.4}}\right)$
1657	14.7	59.4	0.322	0.333		-	-
1734	20.0	60.9	0.333	0.347		-	-
1745	20.0	60.4	0.341	0.355		-	-
1807	25.0	63.0	0.346	0.364		-	-
1822	31.1	64.0	0.309	0.329	0.312	0.312	0.990
1836	31.1	63.7	0.307	0.328	0.312	0.310	0.990
1853	35.0	66.3	0.307	0.332	0.307	0.319	0.962
1917	40.0	69.3	0.279	0.304	0.301	0.250	1.116
1926	40.0	69.3	0.267	0.291	0.301	0.233	1.146
t_{O_3} averages for Alt. ≤ 35 kft			0.324	0.341		0.314	

From Ref. 4.1: Dobson t_{O_3} = 0.324, Integrated sonde t_{O_3} = 0.340

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*Listed values are averages of three consecutive measurements. All measurements are approximately at 38°N lat., 75°W long., ±1°.

Note: all ozone values are in atm-cm.

5.4 Comparison of UVS Derived Columnar Ozone with Dobson Station Measurements - Fall 1976

The Latitude Survey flights of 1976 overflew several Dobson Stations, allowing the comparison of UVS derived total ozone thicknesses with those obtained from the Dobson instruments. A total of nine stations, not all of them listed in Ozone Data of the World (Ref. 5.4), were overflown, and are listed in Table 5.4 (note that American Samoa was not strictly overflown, as there was still a 1° latitude difference).

As of June 1977 Dobson data for five overflights have been received (D. Briehl, personal communication), and these are compared with the UVS derived total ozone, as discussed in Section 5,1, in Tables 5.5 to 5.10. The comparison results are summarized in Table 5.11.

The Mauna Loa comparison on flight 5 is given in Table 5.5. Since flight 5 was a dawn flight, there is not much UVS data for solar zenith angles less than 60°. Thus the Mauna Loa comparisons are for near the end of the flight, and are at comparatively low altitudes. The comparison is, however, quite good, with the Dobson and UVS data averages being for nearly the same time. The Dobson data show about 7% changes in an hour, so the less than 2% disagreement of the Dobson and UVS total ozone is better than the variability in the Dobson-measured total ozone.

The Hobart comparison on flight 9, given in Table 5.6, also shows excellent agreement between Dobson and UVS total ozone values. For this comparison the high altitudes and small solar zenith angles are conditions for the most reliable UVS results. There is some diurnal variation evident in the Dobson ozone data, but near the time of the comparison the variations are small, only about 2% in an hour. The UVS and Dobson total ozone values agree to about 2%. Note that the UVS total ozone includes a 7% addition to the measured ozone value, whereas for the lower altitude Mauna Loa data the addition is less than 3%.

The Aspendale comparison on flight 9, given in Table 5.7, has comparisons with UVS data from three different altitudes. The higher altitude derived UVS total ozone values are about 4% low, while the low altitude (10.2 kft) value is 1.6% high. The average for all UVS total ozone values is 2.5% low, when compared to the Dobson data. This type of disagreement, while not large, could be due to a vertical ozone profile different from that corresponding to the averaged distribution used in the procedure to convert the measured UVS ozone to total ozone. Since the Dobson data show only small variations (less than ±3% from the average), the 1 hour difference between the times of the comparison measurements should not be a significant factor. The comparison suggests that UVS and Dobson total ozone agree to ±2%, with the conversion to total ozone possibly adding another 2% disagreement for high altitude UVS measurements.

UVS data from flight 11 are compared with Hobart Dobson data in Table 5.8. The Dobson data, taken from about local noon on through the afternoon, show ±7% variation about the average of the four measurements. The 0057 GMT Dobson measurement is about 7% higher than the UVS average for about 1 hour earlier. The UVS and Dobson average agree almost exactly. Extrapolation of the Dobson data back 1 hour from the 0057 and 0205 GMT measurements would give a large disagreement, but for a questionable Dobson ozone value. In view of the large variations in the Dobson data, it seems best to use the average for comparison with the UVS total ozone, but to consider the resulting ratio (0.997) as uncertain by at least a few percent.

The comparison with the Macquarie Island Dobson data for flight 11 is given in Table 5.9. The 0053 GMT Dobson measurement used for comparison is almost identical to the average. The variation is ±3% about the average, less than half that for Hobart on this flight. The UVS total ozone is 5% lower than the Dobson measurement made an hour earlier.

The tabulated UVS data for flight 11 (pp. 34-35) show that the UVS total ozone only varies by ±2% maximum during the overflight periods for each of the two Dobson stations. Thus there was no significant latitude structure in total ozone near the Dobson stations during the overflight period. However, the data from flight 11 show that at 45°S latitude the total ozone at 0023 GMT and 149°E longitude was 0.314 atm-cm, and at 0338 GMT and 171°E longitude it was 0.345 atm-cm (both are averages of 2 consecutive readings). Thus for a difference of 3 hours and 22° in longitude, the total ozone increased by 10%. (The ozone density data show a significant concentration of ozone at 0338 GMT and 37 kft, indicating possible partial penetration of the aircraft into the stratosphere at this time.) The UVS data thus show that there was some structure in the longitudinal total ozone distribution, and are in agreement with the variability observed in the Dobson data if it is assumed that this structure was convected past the Dobson stations during the several hours covered by the various data in Tables 5.8 and 5.9. The comparisons for this flight may thus be subject to errors introduced by the total ozone variability over the Dobson stations, and the 1 hour difference between Dobson and UVS measurement times. The Dobson-UVS total ozone differences in Tables 5.8 and 5.9 are thus likely to be maximum deviations, with the actual agreement being significantly better.

The comparison of UVS total ozone with the Wellington Dobson data for flight 13 are given in Table 5.10. Here only one Dobson measurement for about 2-1/2 hours after the overflight is available. The agreement is to 2%, but the tabulation of UVS data for flight 13 (pp. 37-38) shows latitudinal variations, so the comparison may be influenced by the substantial time difference.

Table 5.4

List of Dobson Stations for Comparison with UVS Ozone Column Measurements for the Fall 1976 Flights

Station Name	Latitude (deg N)	Longitude (deg E)	Flight numbers for comparisons*
Mauna Loa	19.53	-155.58	5/6,7/-
American Samoa	-14.25	-170.57	-/-/14
Mildura	-34.00	141.92	-/10/-
Aspendale	-38.03	145.10	9/-/-
Cape Grim	-40.68	144.68	-/9,11/-
Wellington	-41.33	174.82	13/-/-
Hobart	-42.83	147.50	9,11/-/-
Invercargill	-46.42	168.32	-/11,12/-
Macquarie Island	-54.48	158.97	11/-/12

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*Flight number order is: Comparisons made/Possible additional comparisons/Flights at same latitude but different longitude. Possible additional comparisons indicates that UVS ozone data exist, but Dobson station data have not been obtained. The possible comparisons for Mauna Loa are actually about 3° longitude to the west.

Table 5.5

Comparison of UVS Columnar Ozone with Dobson Data from Mauna Loa - Flight 5, Nov. 1, 1976

Dobson Ozone Data (Use average of underlined values for comparison):

Time (GMT-hrs-min): 1753, 1757, 1946, 1951, 2033, 2036

Total ozone (atm-cm): 0.265, 0.265, 0.246, 0.246, 0.265, 0.266

Averages for comparison: 1852 GMT, 0.256 atm-cm

UVS Ozone Data (Use average values for comparison):

Time (GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
1845	19.61, -155.53	14.9	59.9	0.244	0.252
1903	19.58, -155.61	11.0	56.4	0.246	0.252

Averages for comparison: 1854 GMT, 0.245, 0.252 atm-cm

So: $$\frac{\text{Measured UVS}}{\text{Dobson}} = 0.957$$

$$\frac{\text{Total UVS}}{\text{Dobson}} = 0.984$$

Table 5.6

Comparison of UVS Columnar Ozone with Dobson Data from Hobart - Flight 9, Nov. 10-11, 1976

Dobson Ozone Data (Use average of underlined values for comparison):

Time (GMT-hrs-min): 2058, 2206, 2304, 0006, 0057, 0202, 0410, 0508, 0609, 0716

Total ozone (atm-cm): 0.336, 0.332, 0.326, 0.317, 0.311, 0.317, 0.325, 0.326, 0.330, 0.339

Averages for comparison: 2235 GMT, 0.329 atm-cm

UVS Ozone Data (Use average values for comparison):

Time (GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
2229	-42.16, 146.43	29.6	50.8	0.298	0.316
2233	-42.60, 146.97	35.8	49.7	0.298	0.320
2242	-42.02, 147.26	39.0	47.8	0.303	0.331

Averages for comparison: 2235 GMT, 0.300, 0.322 atm-cm

So: $$\frac{\text{Measured UVS}}{\text{Dobson}} = 0.912$$

$$\frac{\text{Total UVS}}{\text{Dobson}} = 0.979$$

Table 5.7

Comparison of UVS Columnar Ozone with Dobson Data from Aspendale - Flight 9, Nov. 10-11, 1976

Dobson Ozone Data (Use underlined value for comparison):

Time (GMT-hrs-min): 2058, 2112, 2129, 2126, 2226, 0545, 0622, 0635
Total ozone (atm-cm): 0.322, 0.324, 0.315, 0.314, 0.318, 0.323, 0.326, 0.330
Value for comparison: 2226 GMT, 0.318 atm-cm

UVS Ozone Data (Use average for total ozone only):

Time (GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
2317	-38.17, 145.26	39.0	41.7	0.282	0.307
2319	-37.98, 145.04	39.0	41.4	0.278	0.303
2333	-38.06, 145.13	25.0	38.9	0.291	0.306
2357	-38.00, 145.09	10.2	34.6	0.315	0.323

Averages for comparison: 2332 GMT, 0.310 (total) atm-cm

So:

Alt(kft)	Measured UVS/Dobson	Total UVS/Dobson
39.0	0.881	0.959
25.0	0.915	0.962
10.2	0.991	1.016

$$\left(\frac{\text{Total UVS}}{\text{Dobson}}\right) = 0.975$$

Table 5.8

Comparison of UVS Columnar Ozone with Dobson Data from Hobart - Flight 11, Nov. 12-13, 1976

Dobson Ozone Data (Use underlined value for comparison):

Time (GMT-hrs-min): <u>0057</u>, 0205, 0301, 0510

Total ozone (atm-cm): <u>0.328</u>, 0.294, 0.286, 0.319

Value for comparison: 0057 GMT, 0.328 atm-cm
(Averages: 0246 GMT, 0.307 atm-cm)

UVS Ozone Data (Use average values for comparison):

Time (GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
0002	-42.64, 147.33	35.0	34.4	0.282	0.302
0004	-42.89, 147.55	35.0	34.1	0.290	0.311
0006	-43.14, 147.74	35.0	33.9	0.285	0.306

Averages for comparison: 0004 GMT, 0.286, 0.306 atm-cm

So: $\frac{\text{Measured UVS}}{\text{Dobson}} = 0.872 \qquad \left(\frac{\text{Meas. UVS}}{\text{Dobson Av}}\right) = 0.932$

$\frac{\text{Total UVS}}{\text{Dobson}} = 0.933 \qquad \left(\frac{\text{Total UVS}}{\text{Dobson Av}}\right) = 0.997$

Table 5.9

Comparison of UVS Columnar Ozone with Dobson Data from Macquarie Island - Flight 11, Nov. 12- 13, 1976

Dobson Ozone Data (Use underlined value for comparison):

Time (GMT-hrs-min): 1942, 2140, 0004, 0053

Total ozone (atm-cm): 0.365, 0.358, 0.347, 0.358

Value for comparison: 0053 GMT, 0.358 atm-cm.

UVS Ozone Data (Use average values for comparison):

Time (GMT (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
0147	-54.31,158.74	35.0	37.1	0.317	0.340
0151	-54.49,159.54	35.0	37.6	0.318	0.342
0154	-54.38,160.00	35.0	37.7	0.318	0.342

Averages for comparison: 0151 GMT, 0.318, 0.341 atm-cm

So: $$\frac{\text{Measured UVS}}{\text{Dobson}} = 0.888$$

$$\frac{\text{Total UVS}}{\text{Dobson}} = 0.953$$

Table 5.10

Comparison of Columnar UVS Ozone with Dobson Data from Wellington - Flight 13, Nov. 16, 1976

Dobson Ozone Data:

Time (GMT-hrs-min): 0339

Total ozone (atm-cm): 0.362

UVS Ozone Data (Use average values for comparison):

TIME(GMT) (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	θ_{sun} (deg)	Meas. ozone	Total ozone
0114	-41.59, 174.47	31.8	26.9	0.345	0.370
0116	-41.39, 174.74	32.9	27.2	0.340	0.369
0118	-41.17, 175.02	33.0	27.4	0.339	0.367

Averages for comparison: 0116 GMT, 0.341, 0.369 atm-cm

So: $\frac{\text{Measured UVS}}{\text{Dobson}} = 0.942$

$\frac{\text{Total UVS}}{\text{Dobson}} = 1.019$

A summary of UVS-Dobson total ozone ratios is given in Table 5.11. The average of what are considered to be the six best values is 0.985, showing that the UVS and Dobson total ozone values agree to 1.5%. This is about the same result derived from the two $\Delta T = 0$ hr measurements, with the first 2 entries in Table 5.11 giving an average ratio of 0.982. The UVS total ozone values thus agree with the Dobson data presented here to about 2%. As discussed earlier, the data for flight 9 over Aspendale indicate a possible ±2% additional variation in the conversion of measured ozone to total ozone, caused by extreme deviations in the vertical ozone profiles from the average used in the conversion procedure. Overall, the UVS total ozone values are generally in the range of 0% to 5% below the Dobson values.

Calculations summarized in Ref. 5.5 show that Dobson measurements can vary by up to a few percent from the true total ozone because of variations in the vertical temperature profile and the dependence of the ozone absorption cross section on temperature (Ref. 3.4). As already discussed, the conversion of UVS measured ozone to total ozone can also have errors of ±2% or so for non-standard vertical ozone profiles, which are not uncommon as illustrated by the data in Ref. 5.6. Thus the agreement of the UVS and Dobson total ozone values are excellent, and within the accuracy possible without more detailed conversions.

All of the ozone values from the UVS are derived from the narrow band (NB) (2 nm) filter measurements, and are thus directly comparable to the Dobson measurements, which are about 1 nm bandwidths. For the 1976 flights an additional set of two broad band (BB) filters ($\simeq 12$ nm) was used. Comparison of the BB calculated ozone thicknesses to the NB results show systematic deviations of 30% high for small θ_{sun} to nearly equal at $\theta_{sun} = 70^{\circ}$. The results are summarized in Table 5.12, which compares measurements made in the 30-40 kft altitude range. The analysis procedure is identical to that for the NB filters, using calculated responses to derive the leakage flux and effective ozone absorption cross section, as described in Section 5.11.

The BB filter ozone data give an inherently less accurate ozone measurement, since a given change in ozone thickness produces a significantly smaller attenuation change than the corresponding optimum NB filter. The normal UVS operating mode uses the one or two best (in the sense of showing "optimum" attenuation for that particular time) of six NB filters for a given ozone measurement, and thus achieves better accuracy over a wide range of ozone thicknesses. This is particularly necessary for large θ_{sun} angles, where the attenuation path of solar UV through the ozone layer may be as large as 0.6 to 1 atm-cm.

Our findings are similar to the results reported in Ref. 5.7, where Dobson and Filter Ozonometer measurements were directly compared. Most of the total ozone measurements from the USSR and Eastern Europe are made with Filter Ozonometers, with BB filters with full-width-at-half-maximum transmission bands of about 25 nm (Ref. 5.7). The data in Ref. 5.7 show that these BB Filter Ozonometers give values of total ozone about 10% low for small θ_{sun} and up to 30% high for large θ_{sun}, when compared directly with Dobson spectrophotometer results. The UVS results, using a modified method of data analysis with leakage flux subtraction, show a similar magnitude deviation, although with an opposite dependence on θ_{sun}. It should be possible to devise a corrected analysis procedure, possibly involving more than a three parameter fit to the calculated response as shown in Section 5.1.1, which will give more accurate ozone thicknesses from the BB filter measurements. However, the BB filter derived ozone values are unlikely to equal the accuracy obtainable with an optimally attenuated NB filter. The UVS data analysis procedure weights the different NB calculated ozone values to emphasize the optimally attenuated measurements, and so should always give an ozone thickness more accurate than that obtainable from BB filter measurements. The UVS accuracy should be similar to that of the Dobson instruments, since the wavelength band widths are comparable (1-2 nm). This indeed was found from the direct comparisons presented earlier.

Since there are some deviations between Dobson and Filter ground based Ozonometers, the UVS could be used to provide direct comparison of such ground ozone stations by a suitable overflight program. Should it become possible in the future to make flights with the UVS and other instruments over some of the Filter Ozonometer stations in the USSR and Eastern Europe, this would provide data of considerable use in eliminating possible systematic differences between different ground based ozone stations.

The UVS columnar ozone measurements for additional possible comparisons with Dobson data are summarized in Table 5.13. These are from overflights of Dobson stations for which no Dobson data have been received. The UVS measurements are generally averages of two or more entries from the Tables in Section 5.2. Note that American Samoa was not actually overflown, the UVS data being for a location 1°North of the coordinates in Table 5.4. Only unflagged data have been used to obtain the averages in Table 5.13. Not all the stations are listed in "Ozone Data for the World" (Ref. 5.4), but are from a list supplied by NASA.

Table 5.11

Summary of Comparison of UVS Columnar Ozone with Dobson Data for Fall 1976 Flights

Flight	Date (1976)	Dobson Station	Av. Alt. (kft)	$\left(\frac{\text{Meas. UVS}}{\text{Dobson}}\right)$	$\left(\frac{\text{Total UVS}}{\text{Dobson}}\right)$	Comments a)
5	Nov. 1	Mauna Loa	13.0	0.957	0.984	ΔT=0 hr
9	Nov. 10-11	Hobart	34.8	0.912	0.979	ΔT=0 hr
		Aspendale	39.0	0.881	(0.959)	ΔT=1 hr
		"	25.0	0.915	(0.962)	"
		"	10.2	0.991	(1.016)	"
		"	(28.3)	-	0.975	"
11	Nov.12-13	Hobart	35.0	0.872	(0.933)	ΔT=1 hr[b]
		"	35.0	0.932	0.997	c)
		Macquarie	35.0	0.888	0.953	ΔT=1 hr[d]
13	Nov. 16	Wellington	32.6	0.942	1.019	ΔT=2½ hr

Average of 6 values not in parentheses = 0.985

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a) ΔT is the approximate time lapse between the UVS and Dobson measurements being compared.

b) The Hobart Dobson data show significant variations (see Table 5.8), so the ΔT=1 hr may be a factor in the disagreement.

c) These values are for the average of the four Hobart Dobson measurements (see Table 5.8).

d) The Macquarie Island Dobson data show significant variations (see Table 5.9), so the ΔT=1hr may be a factor in the disagreement.

Table 5.12

Comparison of Broad Band and Narrow Band UVS Measured Ozone Column Values

Solar zenith angle (deg)	$\left(\frac{\text{Measured BB ozone}}{\text{Measured NB ozone}}\right)$
10	1.32
15	1.31
20	1.30
25	1.29
30	1.31
35	1.25
40	1.23
45	1.16
50	1.14
55	1.12
60	1.09
65	1.04
70	1.00

Note: All data are for 30-40 kft altitudes, and are from the 1976 Latitude Survey Flights.

Table 5.13

UVS Columnar Ozone Data for Possible Future Comparison with Dobson Measurements

Dobson Station	Flight No.	Date (1976)	GMT[b] (hrs-min)	Lat, Long (deg N, deg E)	Alt. (kft)	Meas. ozone[a]	Total ozone[a]
Mauna Loa	6	Nov. 3	2022	19.4, -158.0	26.8	0.224	0.236
			2254	20.0, -158.0	22.8	0.232	0.243
	7	Nov. 7	2102	19.4, -158.2	28.1	0.226	0.239
American Samoa[c]	14	Nov. 17	2232	-13.2, -170.3	20.7	0.227	0.236
Cape Grim	9	Nov. 10	2132	-40.4, 144.8	37.0	0.289	0.315
			2152	-40.6, 144.7	21.0	0.307	0.321
			2210	-40.7, 144.8	10.2	0.314	0.321
			2254	-40.6, 146.7	39.0	0.297	0.325
	11	Nov. 12	2345	-40.7, 145.8	35.0	0.279	0.299
Mildura	10	Nov. 11	2135	-34.8, 142.5	31.1	0.285	0.305
			2151	-34.5, 142.2	25.0	0.282	0.298
			2205	-34.4, 142.0	15.0	0.292	0.303
Macquarie Island	12	Nov. 14	0427	-54.4, 168.9	33.0	0.320	0.342
Invercargill	11	Nov. 12	0323	-46.4, 168.7	37.0	0.322	0.354
	12	Nov. 14	0325	-46.5, 168.6	33.0	0.320	0.341

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a) Units are atm-cm.

b) Some listed values are averages over two or more measurements.

c) American Samoa is actually 1° further South in latitude.

5.5 Latitude Ozone Profiles for the Fall 1976 Flights

Several of the Latitude Survey flights in the Fall of 1976 have good UVS ozone measurements over a large latitude range. These data can be combined to give the north-south variation of total ozone for November 1976. The data are for longitudes near 170°E for the southern most latitudes, and for longitudes near 130°W for the northern most latitudes.

Total ozone data derived from the UVS measurements on five Latitude Survey flights are plotted in Fig. 5.3. These data show the ozone minimum near the equator, the rise between about 15°S and 45°S, and strong latitudinal structure at about 28°N and 37°S. More detailed plots of the UVS measured ozone above flight altitude are given in Figs. 5.4, 5.5 and 5.6. These figures show the two latitude structures and the flat profile near the equator. Note that Fig. 5.3 shows total ozone corrected to ground level, while Figs. 5.4, 5.5 and 5.6 show UVS measured ozone above the flight altitude.

The structure in total ozone at 37°S appears to be rather wide if the data from flight 13 is compared to a smooth joining of the data from flight 12 (further south) and the northern most part of the flight 13 data. Actually, the region from 35°S to 50°S also shows variability with time and longitude. This is illustrated by data from flight 11 which are plotted in Fig. 5.7. Here the measured UVS ozone for the southbound and northbound legs of the flight are plotted and show a significant change in ozone for about a 20° shift in longitude.

A more detailed "graph" of the UVS total ozone results is given in Table 5.14, where total ozone values for every two degress of latitude are given for 29°S to 55°S. The values are located approximately at the correct longitudes, and the date in November 1976 is given in parentheses. A substantial increase in total ozone is seen to occur from about 145°E to 180°E longitude. The data from Nov. 12-13 show an east-west gradient in total ozone for the range 47°S to 50°S, with the increase being in excess of 0.5% per degree of longitude at the maximum gradient. The data near 50°S and 170°E show some time dependence, with about a 5% decrease in total ozone from Nov. 12-13 to Nov. 14.

The UVS total ozone data, while showing some latitudinal and time variations, nevertheless give a reasonable picture of the North-South variation of total ozone, as shown in Fig. 5.3. For clarity, not all the data tabulated in Section 5.2 are shown in Fig. 5.3. The additional data fill in some of the gaps in Fig. 5.3, and give some information on the time variability of total ozone. Overall, the total ozone profile shown in Fig. 5.3 gives an excellent picture of the latitudinal distribution of ozone, as well as showing the latitude regions where ozone variability is found to be greatest.

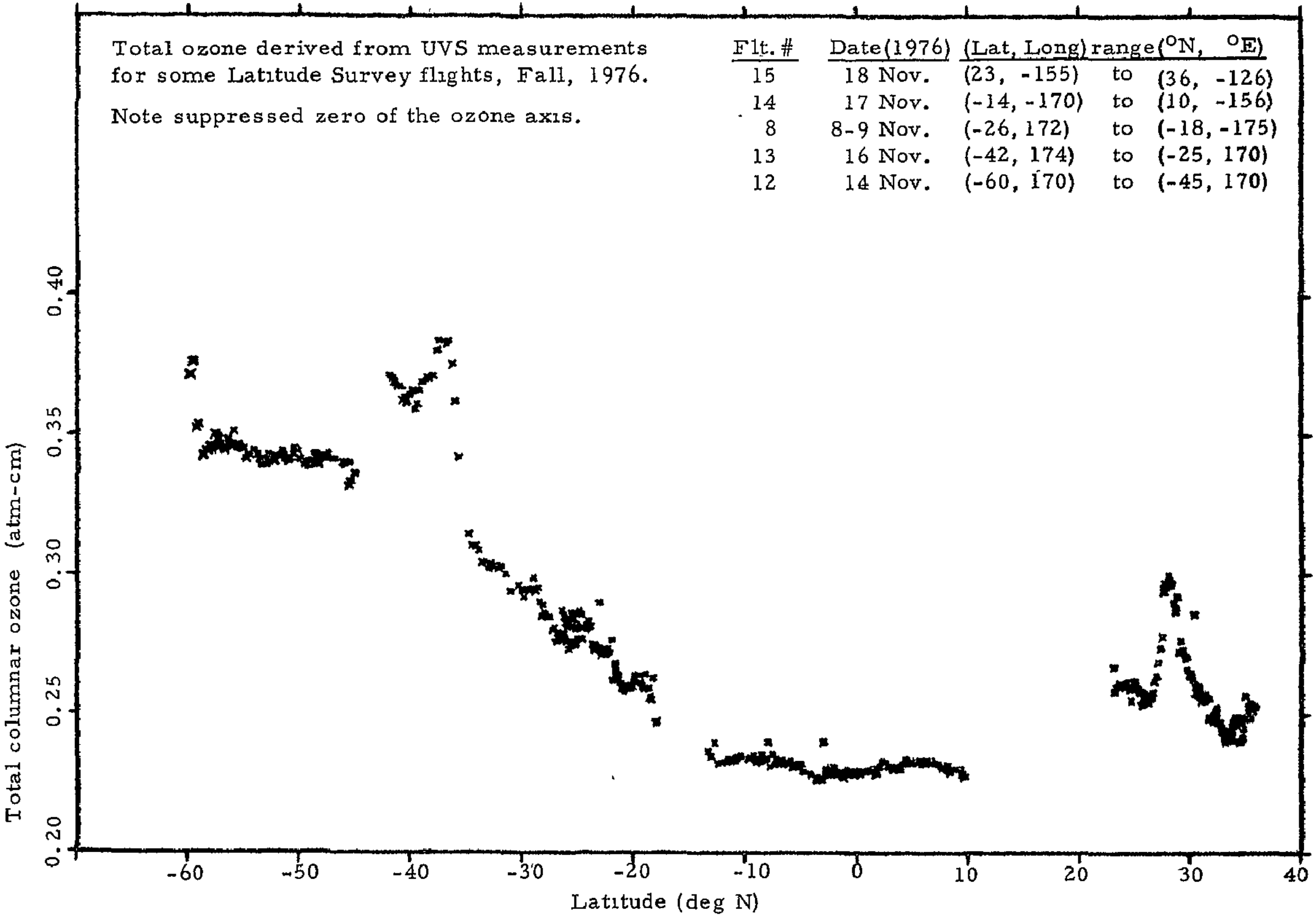

Fig 5. 3. Latitude Profile of Total Ozone Derived from UVS Measurements for November 1976.

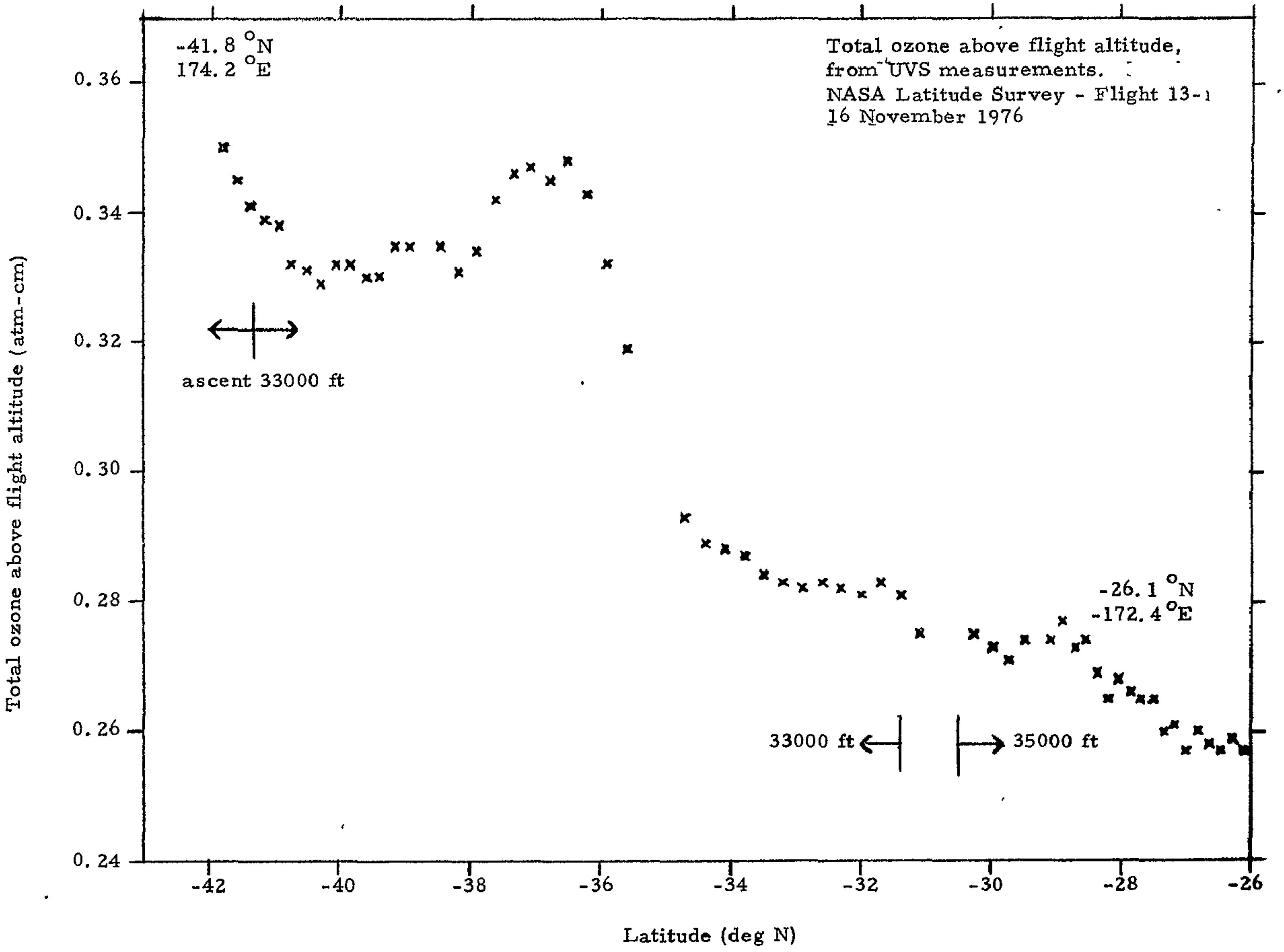

Fig. 5.4 UVS Measured Ozone above Flight Altitude for Flight 13, 16 Nov. 1976.

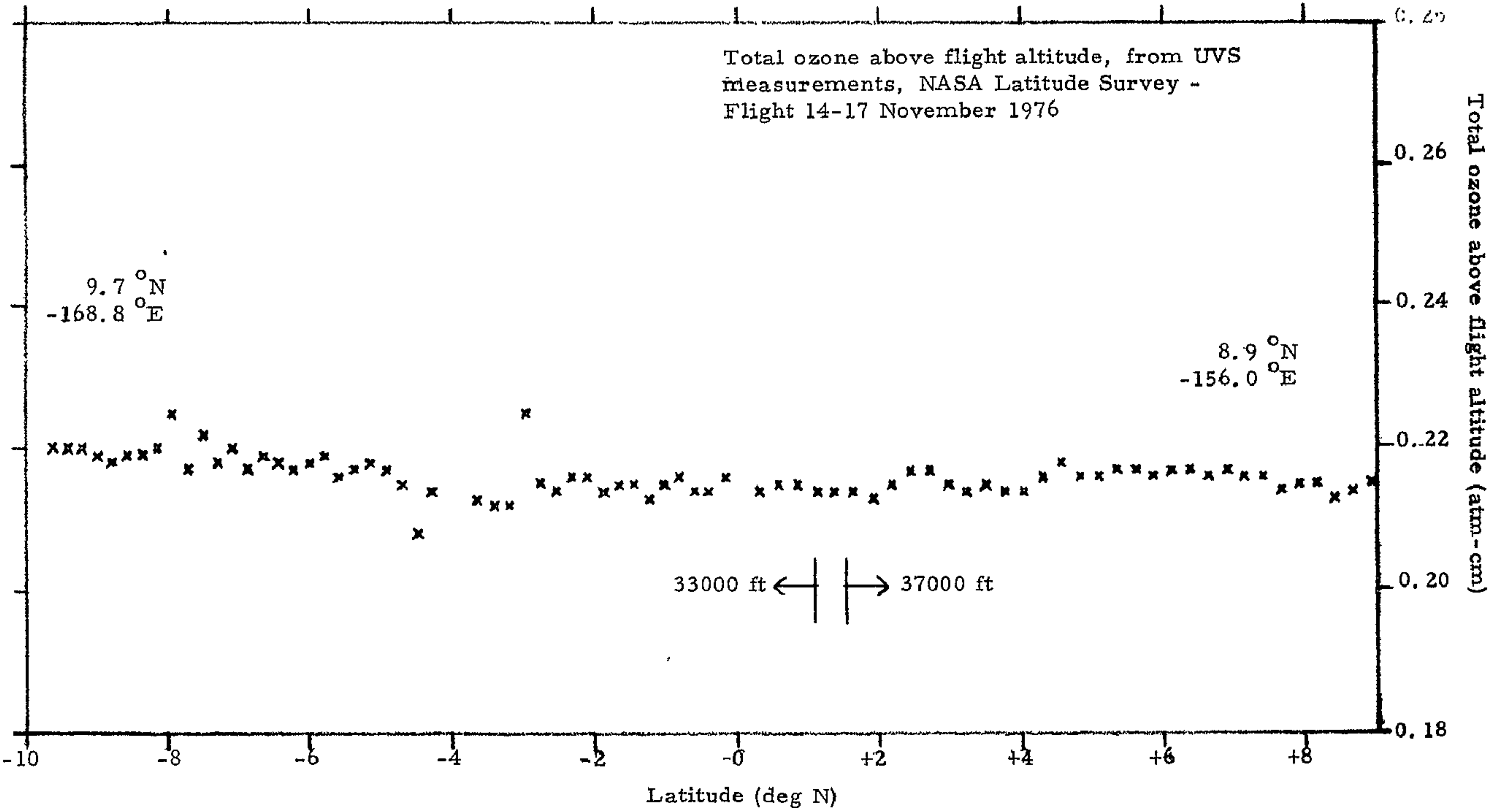

Fig. 5.5 UVS Measured Ozone above Flight Altitude for Flight 14, 17 Nov. 1976.

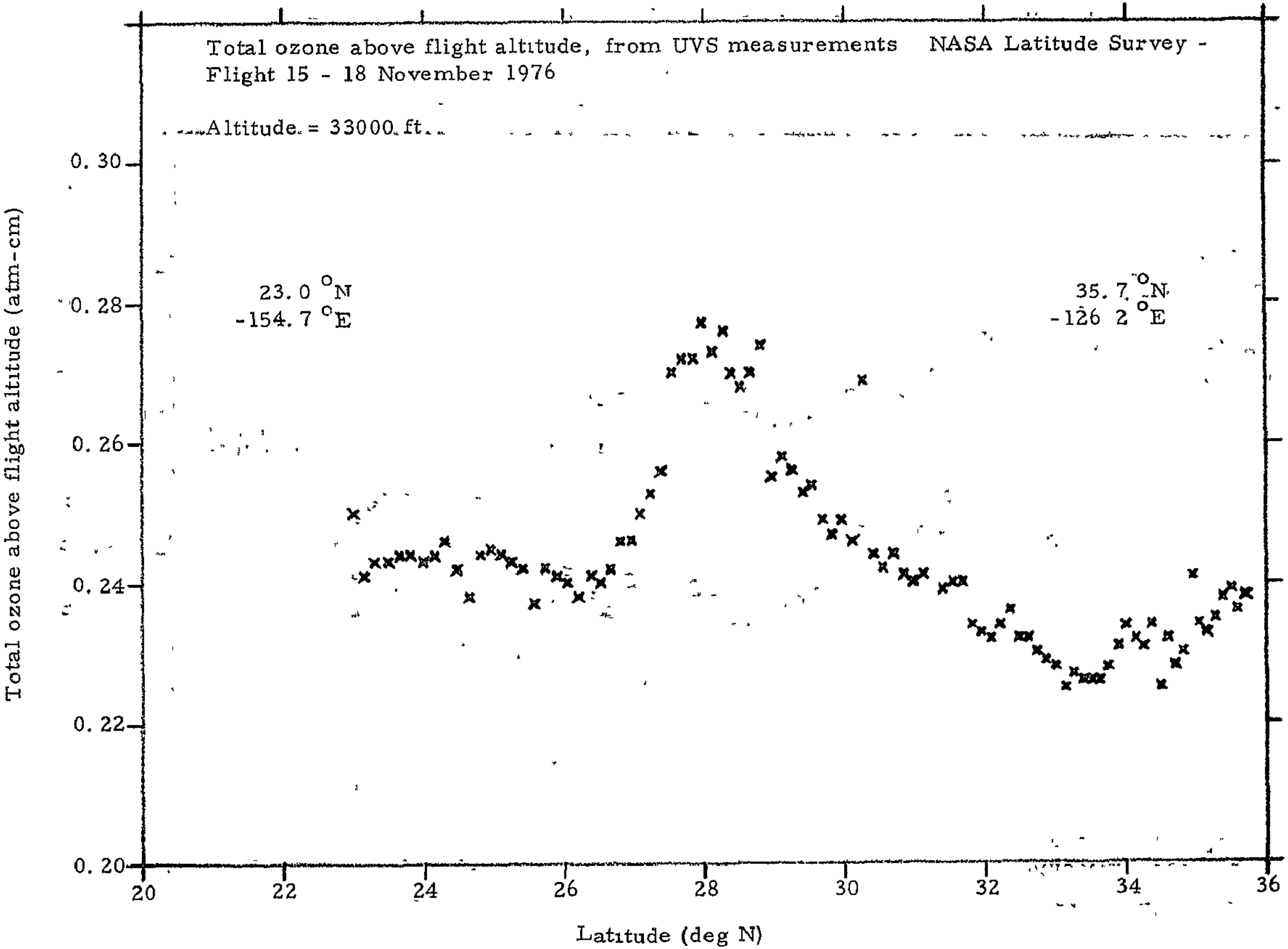

Fig. 5.6 UVS Measured Ozone above Flight Altitude for Flight 15, 18 Nov. 1976.

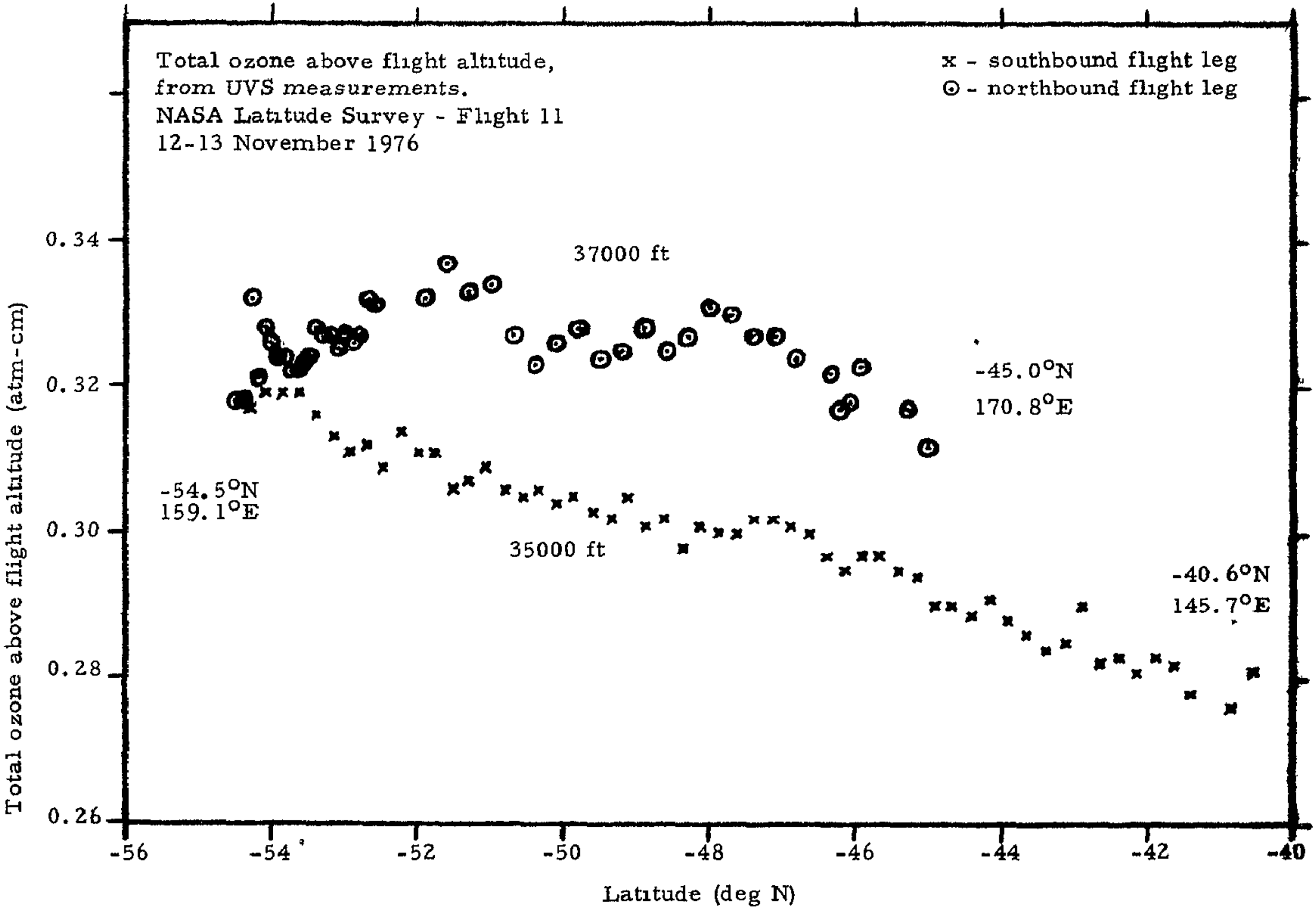

Fig. 5.7. UVS Measured Ozone above Flight Altitude for Two Legs of Flight 11, 12-13 November 1976.

Table 5.14

Time and Longitude Dependence of Total Ozone at Latitude 30 to 55 Degrees South in November 1976 Listed are total ozone (atm-cm) and (date(Nov. 1976))

Lat. (deg S) \ Long (deg E)	140	150	160	170	±180	-170
29				0.296(9)	0.297(16)	
31			0.295(9)		0.294(16)	
33			0.308(9)		0.304(16)	
35	0.308(11)				0.326(16)	
37		0.300(11)			0.383(16)	
39		0.308(11)			0.365(16)	
41		0.300(12-13) 0.325(11)		0.366(16)		
43		0.306(12-13)				
45		0.314(12-13)		0.335(14)		
47		0.323(12-13)		0.342(14) 0.345(12-13)		
49		0.326(12-13)		0.339(14) 0.358(12-13)		
51			0.329(12-13)	0.363(12-13) 0.341(14)		
53			0.335(12-13)	0.354(12-13) 0.340(14)		
55			0.342(12-13)	0.343(14)		

6. CONCLUSIONS AND RECOMMENDATIONS

The Panametrics' UV Spectrophotometer was successfully flown on fifteen Latitude Survey flights in the NASA CV-990 in the Fall of 1976. Several overflights of Dobson spectrophotometer stations allowed the UVS derived total ozone measurements to be compared with the Dobson results. The UVS data from the complete flight series give a good picture of the North-South (latitudinal) distribution of total ozone in November 1976.

The absolute accuracy of the UVS derived values for ozone above the flight altitude is estimated to be ±3%, as discussed in Section 3. This accuracy is determined by laboratory calibration measurements, and responses calculated from measured ozone absorption coefficients and the solar spectrum in the 300 nm region. No adjustments have been made to the UVS data to force agreement with other measurements.

The comparison of UVS derived total ozone with the Dobson measurements presented here shows agreement to ±2%. As discussed in detail in Section 5.4, this agreement is for those cases considered to be most valid for comparison, and it is also obtained from the two cases where the comparison should be the best. The UVS derived total-ozone values average about 2% less than the Dobson results. Comparisons made with UVS data from different altitudes suggest that for very high altitudes with substantial penetration of the aircraft into the ozone layer, the procedure to correct UVS measured ozone to total ozone can result in an additional 2% decrease in UVS total ozone compared to Dobson total ozone. This effect might be reduced by improvements in the procedure used to correct for the columnar ozone below the aircraft.

The UVS operated properly and reliably on the CV-990 flights. Latitude profiles of UVS measured ozone near the equator show that for flat (longitudinal) ozone profiles the variation, or reproducibility, of the UVS ozone is better than ±1% These results indicate that the photodiode version of the UVS should operate reliably and easily on the commercial aircraft of the NASA Global Air Sampling Program (GASP).

The UVS data from the Fall 1976 Latitude Survey flights provide a detailed view of the north-south variation in total ozone, including the structure which exists near the mid-latitudes (30° to 40° N or S). The UVS data are for only one latitude-longitude path over the Pacific Ocean, but still provide important data on the ozone distribution in that region as it existed in November 1976.

The operation of, and results from, the UVS on the Fall 1976 flights demonstrate its accuracy and potential for further contribution to improving world ozone data. The UVS would be a useful addition to the NASA package on board commercial aircraft used in the GASP. The data acquired from such instruments would provide information on the detailed latitudinal-longitudinal structure of total ozone, and aid in interpreting the large variability in total ozone measured by Dobson stations.

An important use for the UVS would be in a program to intercalibrate the various ground-based total ozone stations, in particular the Dobson and M-83 Filter ozonometers. Measurements have shown that the Dobson and M-83 Filter ozonometers can give differences of more than 20% in total ozone (Ref. 5.7). Since the Filter ozonometer is used primarily in the USSR and Eastern Europe, this can lead to systematic errors in world ozone profiles. Such a systematic error has been inferred in Ref. 6.1, where comparison of the total ozone and temperature profiles over Europe were found to be in disagreement, contrary to expectations. The author concluded that as of 1973 total ozone results were unreliable, and felt that further comparison of ozone instruments was needed. The need for intercomparison of ozone stations, both Dobson and Filter type, was strongly expressed in Ref. 6.2. The effect of instrumental differences on analyses of total ozone profiles and seasonal changes, and the necessity to reduce these effects by intercomparison of stations, was also noted in Ref. 6.3. The UVS would be an excellent instrument to provide these intercomparisons.

Satellite mounted instruments have been developed to measure total ozone and its vertical distribution from infrared (IRIS, Ref. 6.4, 6.5) and backscattered solar ultraviolet (BUV, Ref. 6. 6) radiation The IRIS total ozone results agree with mid-latitude Dobson data to about 6%, with poorer agreement in the tropics (Ref. 6.4, 6.5). The BUV and Dobson total ozone results differed by ±0.02 atm-cm (standard error, Ref. 6.5). Satellite ozone data, while providing wide coverage, also have some limitations. Latitudinal coverage is generally 1-2 degrees per point, while longitudinal coverage is about every 20 degrees, and measurements are all at nearly the same local time, which changes slowly throughout the year. Newer satellites should provide more complete longitudinal coverage (Ref. 6.7), and reduce the aliasing problem in using satellite data for ozone variability studies (Ref. 6.8, p. 5). However, the local time problem still remains, and seasonal maps of total ozone prepared from satellite data may have some component of daily variation in total ozone included. Additionally, the satellite instruments must operate for many years without the opportunity for laboratory calibration.

The UVS can help provide ground-truth for many satellite ozone measurements. The inclusion of a UVS in the commercial aircraft GASP package would provide much comparison data with satellite ozone measurements under a wide variety of solar zenith angle conditions. Time and position coincidence of UVS and satellite measurements are likely to be much more common than for Dobson station satellite coincidences. This is particularly important because of the observed longitudinal variability in total ozone (Ref. 5.2, p 16, also indicated by some of the UVS data discussed in Section 5.5).

The latitudinal structure in total ozone measured by the UVS and discussed in Section 5.5 makes it desirable to fly the UVS on future CV-990 Latitude Survey type flights. This would allow measurement of the variability in the structure observed in the latitude profiles, as well as the observation of seasonal.changes in the overall profile. A particularly interesting set of measurements would come from flights with the UVS into polar regions during and after large Solar Proton Events (SPE's) producing Polar Cap Absorption (PCA's). Calculations (Ref. 6.9) indicate that such events produce large quantities of nitrogen oxides in the upper stratosphere, and so can reduce the amount of ozone in the polar regions. It has been reported (Ref. 6.10) that for the August 1972 SPE the predicted total ozone reduction over the poles is 20%, while satellite measurements indicate an approximately 16% decrease. UVS measurements of this effect can help determine the precise relation between SPE particle fluxes and the amount of polar cap ozone depletion.

Inclusion of a UVS in the GASP package would increase the usefulness of the ozone density data currently being obtained. The GASP ozone density data have been used to study the flow of tropospheric ozone (Ref. 6.8), and an extensive set of ozone density data from commercial aircraft over Europe and Africa has been used to study the tropospheric ozone distribution and its seasonal variations (Ref. 6.11). Use of the UVS in commercial aircraft covering a polar route might be very useful in obtaining before, during and after total ozone data for the SPE - PCA events discussed above.

The main conclusions of this report can be summarized as follows.

Conclusions

1) The calculated absolute accuracy in UVS measured ozone is ±3%.

2) The UVS derived total ozone agrees with the Dobson data presented here to ±2%. There may be an additional 2% deviation in UVS total ozone values derived from very high altitudes, caused by the conversion from measured to total ozone by use of measured O_3 density to estimate the columnar ozone below the aircraft.

3) For normal aircraft operating conditions the UVS derived ozone values are very stable, with the variability, or reproducibility, being better than ±1%.

4) The UVS ozone results for the Fall 1976 Latitude Survey flights give a good latitude profile for ozone over the Pacific in November 1976.

5) The UVS should operate reliably and easily on the commercial aircraft of the GASP.

The main recommendations of this report can be summarized as follows.

Recommendations

1) The UVS would be a useful addition to the NASA package on board the commercial aircraft used in the GASP.

2) The procedure used to convert measured columnar ozone above the aircraft to total ozone should be refined for high altitude measurements to reduce as much as possible the deviation introduced by this conversion.

3) The UVS would be very useful in a program to cross-calibrate ground based total ozone stations. A program of overflights of many such stations would greatly reduce uncertainties which currently exist, particularly between the Dobson and M-83 Filter ozonometers

4) UVS derived total ozone measurements should be compared with satellite measurements to provide additional cross-calibration of instruments and data analysis methods. Flights with the UVS could be planned to provide precise time and location coincidence with the satellite measurements.

5) The UVS should be used on as many CV-990 Latitude Survey type flights as possible, in order to obtain more data on the latitudinal structure and seasonal variation of total ozone. Flights into the polar regions during and after PCA's would provide data on ozone destruction by such natural phenomena.

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