NASA

Technical Memorandum 78069

User's Guide To The Nimbus-4 Backscatter Ultraviolet Experiment Data Sets

Ozone Processing Team

JANUARY 1978

National Aeronautics and Space Administration

Goddard Space Flight Center
Greenbelt, Maryland 20771

USER'S GUIDE TO THE NIMBUS-4 BACKSCATTER ULTRAVIOLET EXPERIMENT DATA SETS

Ozone Processing Team

January 1978

GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland

USER'S GUIDE TO THE NIMBUS-4 BACKSCATTER ULTRAVIOLET EXPERIMENT DATA SETS

Ozone Processing Team

ABSTRACT

The first year's data from the Nimbus-4 Backscatter Ultraviolet (BUV) experiment have been archived in the National Space Science Data Center (NSSDC). Backscattered radiances in the ultraviolet measured by the satellite were used to compute the global total ozone for the period April 1970 - April 1971. The data sets now in the NSSDC are the results obtained by the Ozone Processing Team, which has processed the data with the purpose of determining the best quality of the data. There are 4 basic sets of data available in the NSSDC representing various stages in processing. The Primary Data Base contains organized and cleaned data in telemetry units. The Radiance Data has had most of the engineering calibrations performed. The Detailed Total Ozone data is the result of computations to obtain the total ozone; the Compressed Total Ozone data is a convenient condensation of the Detailed Total Ozone. Product data sets are also included. The purpose of this document is to explain the meaning and formats of the data sets sufficiently so that a user may access them from the NSSDC.

ACKNOWLEDGMENTS

This document was prepared by B. E. Lowrey, Goddard Space Flight Center, and R. Khatri, R. McPeters and T. Kleespies, Systems and Applied Sciences Corporation.

The Ozone Processing Team includes: A. Fleig, Team Manager; D. Heath, Team Scientist; R. Fraser, J. Gatlin, R. Goldberg, B. Guenther, E. Hilsenrath, B. Lowrey, L. Novak, C. Prabhakara, all at Goddard Space Flight Center; A. Miller, National Oceanographic and Atmospheric Administration; A. Krueger, Colorado State University; and A. Kaveeshwar, R. Khatri, and R. McPeters, all at Systems and Applied Sciences Corporation.

CONTENTS

ILLUSTRATIONS

TABLES

USER'S GUIDE TO THE NIMBUS-4 BACKSCATTER ULTRAVIOLET EXPERIMENT DATA SETS

1. INTRODUCTION

Nimbus-4 was launched on April 8, 1970 carrying an experiment measuring the ultraviolet spectrum backscattered from the earth. The first year's data has been processed by the Ozone Processing Team to yield the total amount of ozone in a vertical column directly under the spacecraft. This document describes the data sets and products from the processing of the first year's data that are available from the National Space Sciences Data Center (NSSDC).

The Nimbus-4 spacecraft was developed to provide the opportunity to make daily atmospheric measurements on a global scale. It was launched into an orbit at 1100 km with an 81° retrograde inclination. The period of the orbit is 107 minutes and successive crossings of the equator are 27° apart in longitude. The orbit is sun-synchronized so that the northward equator crossing always occurs at local noon. Thus measurements at a given latitude are independent of diurnal effects. The Backscatter UltraViolet (BUV) experiment is designed to measure the solar irradiance at the top of the atmosphere and the atmospheric radiance in the satellite nadir direction, thus providing data for determination of high-level ozone profiles and the total ozone profiles on a global basis. A detailed description of the experiment is available in the Nimbus IV User's Guide, GSFC, March 1970. Copies of this document are available from the NSSDC.

The Backscatter UltraViolet (BUV) experiment contains a double monochromator which sequentially measures 12 narrow wavelength bands in the region between 250.0 and 340.0 nm (1 nm = 10^{-1} A°) in the nadir direction and a co-linear photometer which measures simultaneously at the 380.0 nm. The photometer data is used to obtain an 'effective reflectivity'; then the monochromator is used to compute total ozone and to construct a profile. Total ozone is a column of air directly below the spacecraft was computed from the measurements of backscattered ultraviolet radiance at 312.5 nm, and 331.2 nm, forming the A-pair result; and from 317.5 nm and 339.8 nm, forming the B-pair result. A weighting algorithm was used to combine the two values to yield the recommended total ozone. Wavelength data taken at 255.5, 273.5, 283.0, 287.6, 292.2, 297.5, 301.9, 305.8 nm are to be used for profile recovery, and a similar report will cover the profile data description.

The Backscatter Ultraviolet experiment was proposed by Heath and Dave for the Nimbus-4 spacecraft. The mathematical developments necessary for such an experiment had been developed by Dave, J. V. and Mateer, C. L. ("A Preliminary Study on the Possibility of Estimating Total Atmospheric Ozone from Satellite Measurements", Journal of the Atmospheric Sciences, 24,

pp 414-427, 1967). The original concept was proposed by Singer and Wentworth (Singer, S. F. and R. C. Wentworth, "A Method for the Determination of the Vertical Ozone Distribution from a Satellite," J. Geophys. Res., 62, 1957, pp 299-308). Because of the increasing importance of ozone data and the value of the Nimbus-4 data as the only global measurements available in the early 1970's, the Ozone Processing Team (OPT) was formed in 1976 under the direction of A. Fleig. The purpose of the formation of the OPT is to provide a uniform and validated data base suitable for distribution to the scientific community and which in future years can be used as a basis for assessing global changes. To further this aim, the BUV data has been reprocessed by the OPT for the first year of data with attention to the algorithms employed, the instrument calibrations and the comparison of the data with ground truth. The quality of the ozone data has been improved substantially after reprocessing.

The second section describes briefly each of the data sets associated with the Nimbus-4 experiment and outlines the relationships between the data sets. It also describes the structure of the tapes containing the data sets. The third through sixth sections describe the Primary Data Base, the Radiance Data, the Detailed Total Ozone Data and the Compressed Total Ozone. The difference between the Detailed and Compressed data sets is that the detailed contains radiance information at all wavelengths as well as experiment and computational information whereas the compressed data set contains only the total ozone data, associated position and time information and the radiances of the A- and B-pair wavelengths used in constructing the total ozone. The seventh section describes the daily zonal means of the total ozone, which have been obtained by averaging over latitude belts. The eighth section discusses the comparison of the data with ground observations.

Processing by the OPT is continuing and it is expected that further results will be archived within the next year. These results will include the total ozone from the second year and subsequent years, the total ozone with a correction for terrain height, the ozone as a function of height and products as generated by the team. Questions should be addressed to D. Heath or A. Fleig, GSFC.

2. DESCRIPTION OF THE DATA SETS

The purpose of this document is to enable the use of the Nimbus-4 Back-scattered Ultraviolet (BUV) data products archived in the NSSDC. Any of these products may be obtained by writing the National Space Sciences Data Center, Goddard Space Flight Center, Greenbelt, Md. 20771. This document describes the following five data sets which have resulted from the Ozone Processing Team's analysis of the first year's data:

1. Primary Data Base (PDB)
2. Radiance data (U-tape)
3. Detailed Total Ozone (DTOZ)
4. Compressed Total Ozone (CTOZ)
5. Daily Zonal Means (DZM)

These first four data sets represent stages in the data processing where the Primary Data Base is the least processed and retains the most engineering and spacecraft condition information. The Radiance data set has had most of the necessary engineering calibrations performed. The Detailed Total Ozone data set has been processed to compute the total ozone from the radiance data and retains sufficient information for profiling. The Compressed Total Ozone retains only enough information to describe the spatial and temporal variations of the ozone. The Daily Zonal Means data is an average of the ozone and is available on tape and in graphic form.

A schematic diagram of the BUV data processing system is given in Figure 1. The computer programs used in producing the Nimbus-4 BUV results were developed under the direction of L. V. Novak and are available at the Computer Program Library, Goddard Space Flight Center, Greenbelt, Maryland 20771.

The Primary Data Base is constructed by sorting, selecting and compiling the raw data. The raw data is obtained from sensory data tapes, which are of two different forms. One is the "old" stacked sensory data tape (SSDT) and is read and processed by the STRIPOLD computer program. The second is the "new" BUV stacked tape (BUVST) and is read and processed by the STRIPNEW computer program. These programs consolidate, check and flag the data and add ephemeris information. The output tapes from these two programs are then time-sorted and merged into one tape by the PDBGEN program. This tape, which is the Primary Data Base tape, contains the BUV measurements, the time of measurements, the

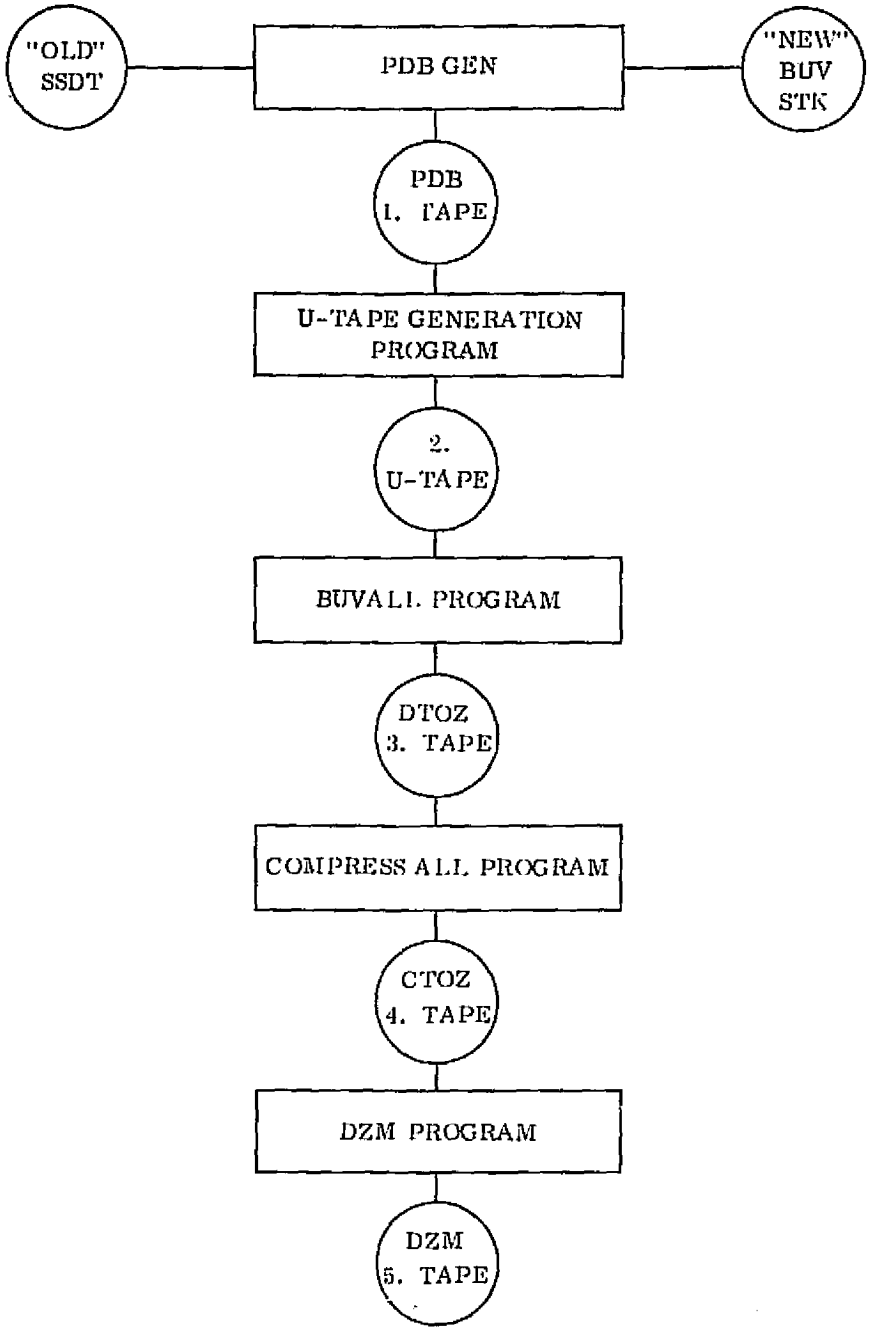


Figure 1. The Total Ozone Processing System

subsatellite position and the engineering information concerning the state of the spacecraft. Although the validity of the data has been checked, the measurements are still in telemetry units. Normally there is one week of data on each PDB tape and each file of the tape contains one or more orbits of data.

The Radiance data is derived by processing the PDB through the U-tape generation program. The radiances for the photometer and the monochromator for each of the 12 wavelengths measured are in engineering units. The 12 wavelengths for which the instrument takes the measurements are 339.8, 331.2, 317.5, 312.5, 305.8, 301.9, 297.5, 292.2, 287.6, 283.0, 273.5, and 255.5 nm. The U-tape normally contains 4 weeks of data and each file of the tape contains data for one or more orbits.

The Detailed Total Ozone data set contains the total ozone derived from the A and B pairs and radiance data from the remaining 8 wavelengths. Sufficient information is available in the DTOZ data set for a user to generate ozone profiles. A DTOZ tape normally contains 4 weeks of data and each file of the tape contains one or more orbits of data. Each logical record of the DTOZ tape uses 80 words to provide the information associated with each scan of data (32 seconds). The DTOZ tapes contain radiance values which are normalized to the solar zenith angle and associated information sufficient to derive an ozone profile. The OPT plans to archive ozone profiles in the near future.

The Compressed Total Ozone data consists of the total ozone, spacecraft time and position information and radiance information at the A and B pair wavelengths. The CTOZ tape is compressed from the DTOZ tapes and one tape contains the entire year's data. Each scan has a 20 word array associated with it. Users interested in the total ozone only will find this data set the most convenient.

The Daily Zonal Means (DZM) are computed means and standard deviations of the total ozone within prescribed latitude zones averaged over one day. This product is available on tape and on contour graphs.

All the tapes, except the CTOZ and the DZM tapes, contain a header file, a number of data files (one for each orbit), and a trailer file. These files shown schematically in Figure 2 are described below:

1. A Header File. This is the first file on the tape and it is used to identify the tape. It has satellite identification and also information regarding the program that made this tape, the version number and date of version of the program.

2. Data Files. Every data file is made up of:

a. A Header Record. The very first record of a data file. In addition to some of the information also contained in the header file, a header record contains the unique number of the input tape used to produce the orbital data, the orbit number of the data and day and the job ID of the actual production run.

b. Data Records. One record for each scan. Each scan is 32 seconds in duration.

c. A Trailer Record. The last record of each data file. Contains the tape number of the input tape, summary of number of records and number of records written and an error summary.

3. A Trailer File. The last file of the tape is the trailer file. It gives the number of files on the output tape. It also contains a list of unique numbers of all the input tapes that went into making the tape.

Chapter 3 gives a description of the PDB tape. Chapter 4 describes the U tape, Chapter 5 the DTOZ tape, Chapter 6 the CTOZ tape, and Chapter 7 the DZM tape.

<table>
<tr><th>FILE</th><th colspan="3">DESCRIPTION</th></tr>
<tr><td>1</td><td>Header File</td><td colspan="2">Very first file on the tape. Contains tape identification information.</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">First Data File

One orbit/file</td><td colspan="2">Header Record, first record of file.</td></tr>
<tr><td>N Data Records</td><td>One for each scan</td></tr>
<tr><td colspan="2">Trailer record, last record of file. Identified by -(N+2) in the first word.</td></tr>
<tr><td>3</td><td>Second Data File</td><td colspan="2">Same as File 2</td></tr>
<tr><td>.
.
.</td><td></td><td colspan="2"></td></tr>
<tr><td>M</td><td>(M-1)th Data File</td><td colspan="2">Same as File 2</td></tr>
<tr><td>M+1</td><td>Trailer File</td><td colspan="2">The last file on tape. Identified by -1 in the first word. Contains list of input tapes processed to create the PDB.</td></tr>
</table>

Figure 2. Structure of BUV Data Tapes

3. PRIMARY DATA BASE

I. DISCUSSION

The Primary Data Base (PDB) tape of the Nimbus-4 ozone data contains the Backscatter Ultraviolet (BUV) data for each scan (32 seconds) of an orbit. Each data record contains the following at the start and end of each scan:

1. Ephemeris data
2. BUV data
3. Satellite calibration data
4. Analog data
5. Attitude data
6. MUSE data

The MUSE (Monitor of Ultraviolet Solar Energy) data concerns another experiment, and will not be discussed in this document.

The Primary Data Base (PDB) tapes contain the Nimbus IV BUV data in the first reduced form archived in the National Space Science Data Center. The processing that has been performed up to this stage is the conversion from analog signals to digital form, deletion of data which did not meet certain quality standards, ordering and arranging of the data into a logical sequence, and adding satellite location information. The data on the PDB tapes are essentially uncalibrated.

The structure of the PDB tapes is as follows:

1. one header file
2. a number of data files
3. one trailer file.

Each data file is made up of:

A. one header record
B. a number of data records
C. one trailer record.

The header and trailer files as well as the header and trailer records are primarily for the purpose of data management, and would not ordinarily be of utility to the user.

The record length for the entire tape is fixed at 1700 bytes and is blocked to 10 records, or 17000 bytes. However, the format for each file and record differs and is detailed in the following sections.

II. Header File

The purpose of the header file is to provide descriptive information about the contents of the tape as a whole. There are a variable number of records in the header file, depending upon how much data resides on the tape. The first record is always formatted in R*8 EBCDIC words, the contents being alphanumeric information. The subsequent records, R*4 words, contain numeric information concerning the beginning and end of each data file. Each one of the subsequent records contains information about 50 data files, so there are as many of these records as necessary. The last of these subsequent records is padded to the end with -77.0's if it describes less than 50 data files. The format of the header file is detailed in Table 3.1.

III. Data File

As stated above, the data file is made up of a header record, a number of data records, and a trailer record. Nominally each data file contains one orbit worth of data. However, this is not a well defined orbit, but rather a period of data collected by the ground station in Alaska which is usually restricted to be within one actual orbit.

III.1 Header Record. The header record contains information regarding the beginning of the orbit and the programs that performed the pre-processing of that orbit. Examination of the format of the header record in Table 3.2 will reveal a variety of word sizes, but judicious use of EQUIVALENCE statements makes unpacking simple.

III.2 Data Record. The Data Record contains all of the information which pertains to one scan. A scan is a thirty-two second period of observation during which the instrument makes a variety of measurements. The scan is made up of two major frames such that the start of the first major frame coincides with the start of the scan, the end of the first major frame with the start of the second, and the end of the second major frame coincides with the end of the scan. Not infrequently one of the major frames will be missing or will have been deleted. If this occurs the flag in word 3 is set, and the data associated with that major frame is set to -77, with the exception of the times and satellite position information which is always present. If both major frames are missing, the scan is deleted. The scans are in chronological order.

Table 3.1
Header File Of PDB Tape

(A) RECORD 1

WORD	DESCRIPTION	TYPE
1	SATELLITE ID (NIMBUS 4)	R*8 EBCDIC
2	EXPERIMENT ID (BUV)	R*8 EBCDIC
3	PROGRAM NAME (E. G. STRIP MRG)	R*8 EBCDIC
4	DATE OF PROGRAM VERSION (12/15/76)	R*8 EBCDIC
5	VERSION NO. OF PROGRAM (VERSN 01)	R*8 EBCDIC
6	UNIQUE # OF OUTPUT TAPE	R*8 EBCDIC
7-10	DCB OF THE OUTPUT TAPE FOUR R*8 WORDS (RECFM=FB, LRECL=1700, BLK=7000, DEN = 1600)	R*8 EBCDIC
11-12	DAY OF WEEK AND DATE OF JOB RUN (THU 15 OCT 77) TWO R*8 WORDS	R*8 EBCDIC
13	STARTING WEEK NUMBER OF DATA	R*8 EBCDIC
14	ENDING WEEK NUMBER OF DATA	R*8 EBCDIC
15	CALENDAR YEAR OF DATA (E.G. 70.)	R*8 EBCDIC
REST	ANNOTATION (= 77777777)	R*8 EBCDIC

(B) SUBSEQUENT RECORDS *

1	NUMBER OF FILES ON OUTPUT TAPE	R*4
2	LOGICAL SEQ. No.* *	R*4
3	START DAY OF FIRST FILE	R*4
4	START TIME OF FIRST FILE	R*4
5	LAT. (-90. TO +90.) OF FIRST FILE	R*4
6	LONG. (0 to 360 W) OF FIRST FILE	R*4
7	DAY AT END OF FIRST FILE	R*4
8	TIME AT END OF FIRST FILE	R*4
9	LATITUDE AT END OF FIRST FILE	R*4
10	LONGITUDE AT END OF FIRST FILE	R*4
11-18	SAME AS 3-10, BUT FOR SECOND FILE	R*4
19-LAST	EIGHT WORDS FOR EACH FILE	R*4

*Records of type "B" give the starting and ending information of each data file. A maximum of 50 data files can be described in each "B" record, which are repeated as necessary, with the last record padded with -77.'s. Each file contains one or more orbits.

** = 2 for first 50 file
= 3 for files 50-100
= 4 for files 101-150, etc.

Table 3.2

Header Record of PDB Tape

2-BYTE WORD

WORD	DESCRIPTION	TYPE
1	LOGICAL SEQ, NO. (ALWAYS = 1)	I*2
2	DUMMY WORD TO MAKE 4 BYTES(= 0)	I*2
3-6	UNIQUE # OF INPUT TAPE	R*8
7-14	DATE OF JOB RUN (TWO R*8 WORDS)	R*8 EBCDIC
15-18	JOBID OF THE JOB	R*8 EBCDIC
19-20	DAY AT START OF THE FILE	R*4
21-22	TIME AT START OF THE FILE	R*4
23-24	LATITUDE (-90 TO +90) AT THE BEGINNING OF THE FILE	R*4
25-26	LONGITUDE (0 TO 360 WESTWARDS) AT BEGINNING OF THE FILE	R*4
27-28	WEEK NUMBER OF START OF FILE	R*4
29-32	PROGRAM NAME (E. G. STRIPOLD)	R*8 EBCDIC
33-36	VERSION DATE (E. G. 12/15/76)	R*8 EBCDIC
37-40	VERSION NUMBER (E. G. VERSN 01)	R*8 EBCDIC
41-42	ORBIT NUMBER	R*4
43-46	DATE OF JOB RUN (77. 035 CORRES. TO FRI. 4 FEB. 1977 IN WORDS 4-5)	R*8 EBCDIC
47-LAST	SPARES(-77.)	R*4

Table 3.3 describes the format of the data record. The logical sequence number is the number of the logical record within the file. The header has a logical sequence number of one and the first data record has a logical sequence number of 2. The day at the start and the end of the scan is stored in the form of sequential day within the year January 1 being day 1 and February 1 being day 32 and so on. The three times associated with the scan are stored as time of day in integer seconds (0 to 86400 secs) and should read using EQUIVALENCE statements. The latitude is negative for the southern hemisphere and positive for northern hemisphere. Longitude is 0°-360° WESTWARDS from Greenwich. The solar zenith angle is 0° when the sun is overhead and goes to 90° when the sun is on the horizon. Words 31 and 32 contain the DAY/NIGHT code for the first and second major frames, with a value of 0, 1, or 2 for day, twilight or night. The U-tape generation program processes all the data but the DTOZ program processes only the day time data for the computation of total ozone. The acronym LSB first seen in word 193 means Least Significant Bit. When two words are separated by a slash, as in NO/YES in word 193, or LCH/NDR in word 194, this refers to the value of the binary digit of that sample with the first being 1 and the second being 0 as in 1/0.

Words 33-112 contain the BUV data (Function 16200) from the first major frame and words 113-192 contain BUV data from second major frame. These 160 words together contain all the BUV data for the twelve wavelengths. There are seven types of data monitored by the instrument. Table 3.4 has a description of the seven types of words. There is alternately one set of 12 and 13 words for each of the 12 wavelength channels. Table 3.5 gives the relative BUV word position in the PDB. As can be seen, there are four samples of words 1 and 3 for each wavelength channel. Reading for word 7 is available for every other wavelength channel.

Words 193-226 contain information regarding experiment subsystem status. Table 3.6 gives a detailed description of these functions. Words 227-250 contain spacecraft housekeeping information. There are 12 analog functions which are averaged in the U-tape generation program for each file and the averages stored in the trailer record of the U-tape. Words 251-536 contain data from the Monitor of Ultraviolet Solar Experiment (MUSE) which is not used in computation of the total ozone and will not be further discussed in this report. Words 537-840 contain information related to spacecraft attitude. This information is not used in the processing of first year data, when the spacecraft attitude system functioned to ±1° accuracy but is used the later years when the attitude control system has deteriorated.

III. 3 Trailer Record. The format of the Trailer record is described in Table 3. 7. The trailer record is a summary of processing of the orbit. Words 19–34 contain the counters which itemize the number of scans deleted from the output tape, and the reasons for deletion.

IV. Trailer File

The trailer file detailed in Table 3. 8 contains a summary of processing of the entire tape. From word 13, eight bytes are allocated to the name of each input tape. After the last input tape, there are four bytes containing the alphabetic word 'LAST'. The rest of the file is filled with -77.'s.

Table 3.3

Data Record of the PDB Tape (850 I*2 Words)

2 BYTE WORD

WORD	DESCRIPTION
1	LOGICAL SEQUENCE NUMBER
2	SPARE (= 0)
3	FLAG FOR MISSING MAJOR FRAME = 0 both major frames present = 1 first major frame absent = 2 second major frame absent
4	DAY OF BEGINNING OF SCAN
5-6*	START TIME IN INTEGER SECONDS OF FIRST MAJOR FRAME
7-8*	START TIME IN INTEGER SECONDS OF SECOND MAJOR FRAME
9	SPARE (= 0)
10	DAY OF END OF SCAN
11-12*	TIME IN INTEGER SECONDS AT END OF SCAN
13-14* *	ALTITUDE AT BEGINNING OF SCAN (IN KM)
15-16* *	LATITUDE AT BEGINNING OF SCAN (-90 TO +90°)
17-18* *	LONGITUDE AT BEGINNING OF SCAN (0-360° WESTWARD)
19-20* *	SOLAR ZENITH ANGLE AT BEGINNING OF SCAN
21-22* *	AZIMUTH ANGLE AT BEGINNING OF SCAN
23-24* *	LATITUDE AT END OF SCAN
25-26* *	LONGITUDE AT END OF SCAN (0-360° WESTWARD)
27-28* *	SOLAR ZENITH ANGLE AT END OF SCAN
29-30* *	AZIMUTH ANGLE AT END OF SCAN
31	DAY-NIGHT CODE FOR START OF FIRST MAJOR FRAME = 0, 1, 2 FOR DAY, TWILIGHT AND NIGHT RESPECTIVELY
32	SAME AS 31 BUT FOR SECOND MAJOR FRAME

*These two words should be read as one I*4 word through an EQUIVALENCE statement.

* *These two words should be read as one R*4 word through an EQUIVALENCE statement.

Table 3.3 (Continued)

WORD	DESCRIPTION
33-112	FCN 16200, BUV DATA FOR FIRST MAJOR FRAME
113-192	FCN 16200, BUV DATA FOR SECOND MAJOR FRAME
193	FCN 16012 BUV 10 KHZ - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
194	FCN 16013 BUV MODE LCH/NDR - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
195	FCN 16021 BUV CALIB. - INH/ENA - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
196	FCN 16022 BUV DPLY DIFF - YES/NO - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
197	FCN 16023 BUV STR DIFF - YES/NO - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
198	FCN 16024 BUV DIF DPLYD - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
199	FCN 16025 BUV DIF STRD - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
200	FCN 16030 BUV PWAY CAL. - ON/OFF - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
201	FCN 16031 ELECTRICAL CAL. - ON/OFF - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
202	FCN 16032 PHOTO CAL. - ON/OFF - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
203	FCN 16033 - WC LAMP - ON/OFF - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
204	FCN 16034 MSH DATA - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
205	FCN 16035 MSH PCAL. - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
206	FCN 16036 MSH DCUR - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
207	FCN 16037 PSH DATA - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
208	FCN 16038 PSH PCAL. - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
209	FCN 16039 PSH DCUR - NO/YES - 3 SAMPLES IN 3 LSB'S FOR FIRST MAJOR FRAME
	SAME AS FOR 193-209, BUT FOR SECOND MAJOR FRAME

Table 3.3 (Continued)

WORD		DESCRIPTION
227		FCN 16101: +4 VDC
228	1 sample	FCN 16102: Thermistor Bias (-6.375V)
229	for each	FCN 16103: Photometer High Voltage
230	function,	FCN 16104: Monochromator High Voltage
231	right-	FCN 16105: Housing Absolute Temperature
232	adjusted,	FCN 16106: Photomultiplier Absolute Temperature
233	for first	FCN 16107: Sensor Mod Elect Temperature
234	major	FCN 16108: Mtr Cur Limiter Temperature
235	frame	FCN 16109: Static Inverter 1 Temperature
236		FCN 16110: Static Inverter 2 Temperature
237		FCN 16111: Arm Gradient
238		FCN 16112: Housing Gradient
239-250		SAME AS 227-238 BUT FOR SECOND MAJOR FRAME
251-266		FCN 14001 (16 words) MUSE Data
267-282		FCN 14002 (16 words) MUSE Data
283	for	FCN 14003 MUSE - 3 volts
284	first	FCN 14004 MUSE - 6 volts
285	major	FCN 14005 MUSE Aspect Sensor ATA
286	frame	FCN 14006 MUSE Aspect Sensor EATA
287		FCN 14007 MUSE Cathode Temps
288	for	FCN 14008 MUSE Feedback Res. T.
289	first	FCN 14009 MUSE Elec. Temp.
290	major	FCN 14011 MUSE PITCH EYE 1 1/0 in 2^{o} Bit/1 Sample
291	frame	FCN 14012 MUSE PITCH EYE 2 1/0 in 2^{o} Bit/1 Sample
292		FCN 14013 MUSE PITCH EYE 3 1/0 in 2^{o} Bit
293-295		FCN 14014 MUSE PITCH EYE 4 1/0 in 2^{o} Bit/3 Samples
296-298		FCN 14015 MUSE PITCH EYE 5 1/0 in 2^{o} Bit/3 Samples
299-301		FCN 14016 MUSE PITCH EYE 6 1/0 in 2^{o} Bit/3 Samples
302		FCN 14017 MUSE PITCH EYE 7 1/0 in 2^{o} Bit
303-305		FCN 14021 MUSE YAW EYE 1 1/0 in 2^{o} Bit

Table 3.3 (Continued)

WORD		DESCRIPTION
306-308	for	FCN 14022 2 3 Samples of each Information
309-311	first	FCN 14023 3
312-314	major	FCN 14024 4 (3 words each)
315-317	frame	FCN 14025 5
318-320		FCN 14026 6
321-323		FCN 14027 7
324-339		FCN 14030 (16 wds) Reference Ind. in Bit 3
340-355		FCN 14031 (16 wds) Range Bit 1 in Bit 1
356-371		FCN 14032 (16 wds) Range Bit 2 in Bit 5
372-387		FCN 14033 (16 wds) Range Bit 3 in Bit 10
388-390		FCN 14034 (3 wds) MUSE Power On/Off in Bit 1
391-393		FCN 14035 (3 wds) MUSE Man/Auto in Bit 10
394-536		SAME AS 251-393 BUT FOR SECOND MAJOR FRAME
537		FCN 1101 Coarse Pitch Error
538-553		FCN 1102 (16 wds) Fine Pitch
554-569		FCN 1103 (16 wds) Pitch Tach Amp
570		FCN 1201 Coarse Roll
571-586	for	FCN 1202 (16 wds) Fine Roll
587-602	first	FCN 1205 (16 wds) Roll FWD Flywheel Speed
603-618	major	FCN 1206 (16 wds) Roll Rear Flywheel Speed
619-634	frame	FCN 1303 (16 wds) Yaw Tach. Amp.
635		FCN 1322 Yaw Sun Sensor Amp.
636-651		FCN 1351 (16 wds) RUP IND. Rate (Hi. Res.)
652		FCN 1411 Left SAD SSDA
653-655		FCN 1413 (3 words) left SAD Phase-Switch in Bit 7
656-671		FCN 1417 (16 words) Left SAD Tach.
672-687		FCN 1431 (16 words) Left Cosine Pot
688		FCN 2005 Solar Array I
689-840		SAME AS FOR 537-688, BUT FOR SECOND MAJOR FRAME
841		ORBIT NUMBER
842-850		SPARES (-77.)

Table 3.4

BUV Word Definition for the Seven Types of Data

a.	Photometer Analog Data	BUV	Word	1
b.	Photometer Housekeeping Data	BUV	Word	2
c.	Monochromator Analog Data	BUV	Word	3
d.	Monochromator Housekeeping Data	BUV	Word	4
e.	Photometer Pulse Count Data	BUV	Word	5
f.	Monochromator Pulse Count Data	BUV	Word	6
g.	Monochromator Energetic Particle Data	BUV	Word	7

The data and calibration sequences and timing are described in the Nimbus IV User's Guide.

Table 3.5

Relative BUV word position in PDB data record (add 32 to get absolute position for the first frame; 112 to get absolute position for the second frame)

BUV Word													Wavelength Channel
W4	W1	W3	W1	W3	W1	W3	W1	W3	W5	W6	W7	W2	
	1	2	3	4	5	6	7	8	9	10	11	12	339.8 nm
13	14	15	16	17	18	19	20	21	22	23		24	331.2
25	26	27	28	29	30	31	32	33	34	35	36	37	317.5
38	39	40	41	42	43	44	45	46	47	48		49	312.5
50	51	52	53	54	55	56	57	58	49	60	61	62	305.8
63	64	65	66	67	68	69	70	71	72	73		74	301.9
75	76	77	78	79	80	81	82	83	84	85	86	87	297.5
88	89	90	91	92	93	94	95	96	97	98		99	292.2
100	101	102	103	104	105	106	107	108	109	110	111	112	287.6
113	114	115	116	117	118	119	120	121	122	123		124	283.0
125	126	127	128	129	130	131	132	133	134	135	136	137	273.5
138	139	140	141	142	143	144	145	146	147	148		149	255.5

Table 3.6

Description of Subsystem Status Functions

Function No.	Description
16012	10 KHZ Clock. A logical ∅ indicates the presence of the 10 KHZ signal and a 1 indicates the loss of the signal.
16013	Mode Launch/Normal. 1 indicates a launch mode and ∅ a normal mode.
16021	Calibration. A 1 indicates the calibration to be inhibited and a ∅ indicates a normal calibration sequence to occur.
16022	Command Verification Deploy Diffuser. A 1 indicates that a diffuser deploy command has been received and a ∅ indicates that such a command has not been received in the last 32 to 64 seconds.
16023	Command Verification Store Diffuser. A 1 indicates that a store diffuser command has been received and a ∅ indicates that either the command has not been received in the last 32 to 64 seconds or that it has been succeeded by a Deploy Diffuser command.
16024	Diffuser Deployed. A 1 indicates that the diffuser is not in the fully deployed position, while a ∅ indicates the diffuser is deployed.
10625	Diffuser Stored. A 1 indicates that the diffuser is not in the fully stored position, while a ∅ indicates diffuser is in the stored position.

Table 3.6 (Continued)

Function No.	Description
16030	Pre-Wavelength Calibrate. Each BUV experimental cycle comprises of 192 BUV frames. The last eight frames (185-192) are the pre-wavelength calibration frames. A 1 indicates that the calibration occurred and a ∅ indicates that only frames 1-184 are processed.
16031	Electronics Calibrate. A 1 indicates that a MCS-A calibration is being performed and a ∅ indicates that MCS-A calibration is not being performed.
16032	Photometric Calibrate. A 1 indicates a MCS-B, C calibration is being performed and ∅ indicates that MCS-B, C calibration is not being performed.
16033	Wavelength Calibrate Lamp. A 1 indicates this lamp is ON and a ∅ indicates the lamp is OFF.
16034	Monochromator Shutters in Data Position. A 1 indicates that shutters are not in data position and a ∅ indicates that they are.
16035	Monochromator Shutters Photometric Position. A 1 indicates that shutters are not in photometric position and a ∅ indicates they are.
16036	Monochromator Shutters in Wavelength Dark Current Position. A 1 indicates that the shutters are not in dark current position and a ∅ indicates they are.
16037	Same as 16034, but for Photometer Shutters.
16038	Same as 16035, but for Photometer Shutters.
16039	Same as 16036, but for Photometer Shutters.

Table 3.7

Trailer Record of PDB Tape

2 BYTE WORD

WORD	DESCRIPTION	TYPE
1	NEGATIVE OF LOG. SEQ. NO. = -N, WHERE NO. OF SCANS = N-2	I*2
2	DUMMY WORD TO FILL BY 4 BYTES (= 0)	I*2
3-4	DAY OF LAST SCAN	R*4
5-6	TIME IN SECS. AT END OF ORBIT	R*4
7-8	LAT. (-90 TO +90) AT THE END OF ORBIT	R*4
9-10	LONG. (0 TO 360W) AT THE END OF ORBIT	R*4
11-12	NO. OF SSDT RECORDS (FRAMES) READ	R*4
13-14	NO. OF STP RECORDS (SCANS) WRITTEN	R*4
15-18	UNIQUE #OF INPUT TAPE	R*8 EBCDIC
19-20*	DATA RECORD READ ERROR	R*4
21-22*	WRONG RECORD LENGTH ENCOUNTERED	R*4
23-24*	TIME NOT AVAILABLE	R*4
25-26*	FRAM SYNCH. ERROR	R*4
27-28*	BUV POWER OFF	R*4
29-30*	BAD TIME ON RECORD	R*4
31-32*	DATA CYCLE NEITHER FIRST NOR SECOND	R*4
33-34*	BACKWARD TIME STEP	R*4
35-850	SPARES = (-77.)	R*4

* COUNTERS FOR VARIOUS TYPES OF ERRORS FOR WHICH RECORD (SCAN) WAS REJECTED.

Table 3.8

Trailer File of PDB Tape

WORD	DESCRIPTION	TYPE
1	TRAILER FILE IDENTIFIER (ALWAYS -1)	I*2
2	DUMMY WORD TO FILL UP 4 BYTES (= 0)	I*2
3-4	NUMBER OF FILES ON OUTPUT TAPE	R*4
5-6	DAY AT THE END OF LAST ORBIT	R*4
7-8	TIME AT END OF LAST ORBIT ON TAPE	R*4
9-10	LAT. (-90 TO +90) AT END OF LAST ORBIT	R*4
11-12	LONG. (0 to 360 W) AT END OF LAST ORBIT	R*4
13-16	UNIQUE # OF FIRST INPUT TAPE	R*8 EBCDIC
17-20	UNIQUE # OF SECOND INPUT TAPE	R*8 EBCDIC
21-MM	UNIQUE # OF THIRD, FOURTH ... TO (MM-6)TH INPUT TAPE	R*8 EBCDIC
(MM+1)-(MM+2)	= 'LAST', INDICATING THAT THERE ARE NO MORE INPUT TAPES	R*4
	REMAINING WORDS ARE SET TO -77.	

4. RADIANCE DATA

The U-Tape is an intermediate step in the total ozone processing system. It contains the calibrated backscattered ultra violet radiances derived from the data on the Primary Data Base (PDB) tape. The data on the U-Tape is in engineering units. The U-Tape (like the PDB) is made up of a header file, a number of data files (one for each orbit) and a trailer file. The data file contains a header record, a number of data records (one for each scan) and a trailer record. The header file, which is the first file on the U-Tape, is described in Table 4.1 and contains tape identifying information. The header record, which is the first record of a data file, contains orbit identifying information, and its format is described in Table 4.2.

The data record, described in detail below, contains one scan of data. The format of a data record can be found in Table 4.3. The trailer record is the last record of a data file. It contains a summary of the data on the file and an error summary for the data rejected by the U-Tape generation program. Table 4.4 contains the format of the U-Tape trailer record. Table 4.5 contains the format of a trailer file of a U-Tape. The trailer file contains a list of all the input PDB tapes that were processed to generate the U-Tape.

The header file, the header record of the data file, the trailer record of the data file, and the trailer file are primarily used for internal data management purposes by the production team and are not ordinarily needed by an outside user of the U-Tape. Hence only the data record will be explained in detail. A data record contains one complete wavelength scan of the BUV monochromator spanning thirty-two seconds. The data record on the U-Tape has 100 words (type REAL *4). The logical sequence number for the record, beginning at 2 for the first data record (the header record being 1). The count number is an administrative number. The day in the year at the start of the scan is numbered from January 1 = 1. Word 5 refers to the Primary Data Base tape. Words 6-9 give the positions of the subsatellite point where longitude is given as 0-360 in the WESTWARD direction and lattitude is between ±90°.

Words 16-51 contain twelve sets of photometer U-values, monochromator U-values and screening flags, one set for each of the following twelve wavelengths, in the following order

1. 255.5 nm
2. 273.5
3. 283.0
4. 287.6

5. 292.2
6. 297.5
7. 301.9
8. 305.8
9. 312.5
10. 317.5
11. 331.2
12. 339.8

A U-value is the radiance in resolution units of the digitizer. In this instrument the quantization error in the digitizer exceeds the error due to the photomultiplier noise in most cases. The instrument uses a logarithmic amplifier such that the U-value is defined as

$$U = 100 \log E$$

where E is the event rate, which is the photomultiplier cathode current divided by the electronic charge. A wavelength-dependent calibration factor relates the cathode current to the radiance.

Word 55 has the altitude, in kilometers, of the satellite at the beginning of the scan. Words 56 and 57 contain the performance check flags for the first major frame and the second major frame respectively. These performance checks are as follows

UTAPE (56) = $P_{41}P_{31}P_{21}P_{11}$ performance checks for Frame 1
UTAPE (57) = $P_{42}P_{32}P_{22}P_{12}$ performance checks for Frame 2

where the second subscript represents the major frame. P_{1j} represents the check for diffuser

= 1 if diffuser is either deployed or stored
= 2 if diffuser is both deployed and stored
= 3 if diffuser is neither deployed nor stored

P_{2j} represents the check for Functions 16030-16033 (see data record format for PDB)

= 0 if all the functions have value 0 meaning all the calibrations were OFF
= 1 when at least one of the functions was ON

P_{3j} represents check on MSH functions 16034-36

= 0 when we do not have MSH data (function 16034 = 0)
= 1 when we do not have MSH DCUR but are in MSH PCAL mode (16035 = 1 and 16036 = 0)

= 2 when we are in MSH DCUR mode (16035 = 0 and 16036 = 1)
= 3 when we are in both DCUR and PCAL mode

P_{4j} is same as P_{3j} but for PSH functions 16037-39.

Words 58 and 59 contain the resistor indicators for channels 1-6 and 7-12 respectively. See note at bottom of Table 4.3 for further details. Words 61 - 100 are for Dark Current analysis of the data. Word 61 contains the DAY/NIGHT code for the data record. This code is 0 for day, 1 for twilight, and 2 for night. Word 62 contains the data type indicator, and this is 0 for BUV data and 1 indicating a Master Calibration Sequence was being performed. Words 63 - 74 contain the Monochromator pulse count data in counts/sec at cathode, one for each of the twelve wavelengths in ascending order from 2555 nm. Words 75-86 contain similar data for the photometer. Words 87-92 contain the energetic particle counts.

Table 4.1

Header File of U-Tape

(A) RECORD 1

WORD	DESCRIPTION	TYPE
1	SATELLITE ID (NIMBUS-4)	R*8 EBCDIC
2	EXPERIMENT ID (ØØBUVØØØ)	R*8 EBCDIC
3	PROGRAM NAME (U-TAPE ØØ)	R*8 EBCDIC
4	DATE OF PROGRAM VERSION (E.G. 1/20/77)	R*8 EBCDIC
5	VERSION NO. (VERSN 01)	R*8 EBCDIC
6	UNIQUE NO. OF THE OUTPUT TAPE (E.G. 7OUT1515)	R*8 EBCDIC
7-10	DCB OF THE U-TAPE - 4 WORDS (RECFM=FB, LRECL=400, BLKSIZE=10000, DEN=1600)	R*8 EBCDIC
11-12	DATE OF THE JOB RUN (E.G. TUE 18 JAN 77)	R*8 EBCDIC
13	STARTING WEEK NUMBER OF DATA	R*8 EBCDIC
14	ENDING WEEK NUMBER OF DATA	R*8 EBCDIC
15	CALENDAR YEAR OF DATA (E.G. 70)	R*8 EBCDIC
16-50	ANNOTATION (= 77777777)	R*8 EBCDIC

(B) RECORD 2

1	NO. OF FILES ON THE OUTPUT TAPE (ALWAYS -77.)	R*4
2	TOTAL NO. OF LOGICAL RECORDS IN THE HEADER FILE (ALWAYS 2)	R*4
3	DAY OF THE BEGINNING OF THE FIRST SCAN OF THE FIRST ORBIT ON TAPE	R*4
4	TIME IN SECS. OF DAY FOR 3 ABOVE	R*4
5	LATITUDE AT (4) ABOVE (±90.00)	R*4
6	LONGITUDE AT (4) ABOVE (0.00 - 360.00; WEST POSITIVE)	R*4
7-LAST	SPARES (= -77.)	R*4

Table 4.2

Header Record of U-Tape

4-BYTE WORD

WORD	DESCRIPTION	TYPE
1	LOGICAL SEQUENCE NO. (ALWAYS 1.0)	R*4
2	SPARE (0.0)	R*4
3-4	UNIQUE NO. OF INPUT TAPE	R*8 EBCDIC
5-8	DAY AND DATE OF THE JOB RUN TWO R*8 WORDS (E.G. TUE 18 JAN 77)	R*8 EBCDIC
9-10	JOB I.D. (E.G. ZMVGKUTP)	R*8 EBCDIC
11	DAY OF THE BEGINNING OF THE FIRST GOOD SCAN OF THE FIRST ORBIT ON THE OUTPUT TAPE	R*4
12	TIME IN SECS. OF DAY FOR (11) ABOVE	R*4
13	LAT. (-90.0 TO +90.0) AT (11) ABOVE	R*4
14	LONG (0 to 360, W) AT (11) ABOVE	R*4
15	WEEK # OF THE START OF THE ORBIT	R*4
16	ORBIT #	R*4
17-18	PROGRAM NAME (E.G. U-TAPE)	R*8 EBCDIC
19-20	VERSION DATE (E.G. 1/20/77)	R*8 EBCDIC
21-22	VERSION # (E.G. VERSN06)	R*8
23	β_0, PHOTOMETER	R*4
24	β_0, MONOCHROMATOR	R*4
25-26	DATE OF JOB RUN (E.G. 77.018)	R*8 EBCDIC
27-100	ANNOTATION (= -77.)	R*4

Table 4.3

Data Record of U-Tape
(This record contains 100 REAL* 4 words.)

WORD	DESCRIPTION
1	LOGICAL SEQUENCE NO. ON U-TAPE DATA FILE
2	ORBIT NUMBER
3	DAY IN YEAR AT START OF SCAN
4	TIME OF DAY IN SECONDS AT START OF SCAN
5	LOGICAL RECORD NO. ON PDB DATA FILE
6	VIEW LATITUDE AT START OF SCAN
7	VIEW LONGITUDE AT START OF SCAN
8	VIEW LATITUDE AT END OF SCAN
9	VIEW LONGITUDE AT END OF SCAN
10	SOLAR ZENITH ANGLE AT START OF SCAN
11	AZIMUTH ANGLE AT START OF SCAN
12	SPARE
13	SOLAR ZENITH ANGLE AT END OF SCAN
14	AZIMUTH ANGLE AT END OF SCAN
15	SPARE
16	PHOTOMETER AVERAGE U-VALUE *
17	MONOCHROMATOR AVERAGE U-VALUE FOR λ = 155.5 nm*
18	SCREENING FLAG**
19-51	SAME AS 16-18, BUT FOR λ = 273.5, 283.0 . . . 339.8 nm
52	12 FLAG BITS WHERE i^{th} BIT = 0, IF λ_i IS PROPER, AND i^{th} BIT = 1 IF NOT
53	VIEW LATITUDE AT START OF SCAN
54	VIEW LONGITUDE AT START OF SCAN
55	ALTITUDE IN KMS, AT BEGINNING OF SCAN
56	PERFORMANCE CHECK FOR 1ST MAJOR FRAME
57	SAME AS 56, BUT FOR SECOND MAJOR FRAME
58	RESISTOR INDICATORS FOR CHANNELS 1-6#
59	RESISTOR INDICATORS FOR CHANNELS 7-12# #
60	SPARE (= -77.)
61	DAY/NIGHT/TWILIGHT CODE (0/2/1)
62	DATA TYPE (= 0 FOR DATA, = 1 FOR MCSA)
63-74	MONOCHROMATOR PULSE COUNT DATA, ONE FOR EACH WAVELENGTH 255.5, 273.5 . . . , 339.8 (COUNTS/SEC AT CATHODE)
75-86	SAME AS 63-74, BUT FOR PHOTOMETER
87-92	ENERGETIC PARTICLE COUNTS
93-100	SPARES (= -77.)

(See Notes on following page.)

Table 4.3 (Continued)

* U-VALUE = -77 FOR MISSING DATA
= -99 FOR BAD DATA

** SCREENING FLAG - 7 DIGITS TO THE LEFT OF THE DECIMAL POINT ARE SIGNIFICANT, E.G. $d_7\ d_6\ d_5\ d_4\ d_3\ d_2\ d_1\ .\ 0$

d_2 represents Lamda blocks does not agree with composition

d_3 represents cam is moving

d_4 represents photometer H. V. indicator = 2 or 3

d_5 represents monochromator H. V. indicator = 2 or 3

d_6 represents photometer high (= 1)/low (= 0) gain code

d_7 represents monochromator high (= 1)/low (-0) gain code

\# SIX DIGITS TO THE LEFT OF THE DECIMAL POINT ARE SIGNIFICANT, E.G. $R_1\ R_2\ R_3\ R_4\ R_5\ R_6\ .\ 0.$

WHERE R_1 - Resistors used for 255.5 nm channel

R_2	"	273.5 nm	"
R_3	"	283.0 nm	"
R_4	"	287.6 nm	"
R_5	"	292.2 nm	"
R_6	"	297.5 nm	"

\#\# SIX DIGITS TO THE LEFT OF THE DECIMAL POINT ARE SIGNIFICANT, $R_7\ R_8\ R_9\ R_{10}\ R_{11}\ R_{12}\ .\ 0.$

WHERE R_7 - Resistors used for 301.9 nm channel

R_8	"	305.8 nm	"
R_9	"	312.5 nm	"
R_{10}	"	317.3 nm	"
R_{11}	"	331.2 nm	"
R_{12}	"	339.8 nm	"

Table 4.4

Trailer Record of U-Tape

(A) RECORD 1

4-BYTE WORD	DESCRIPTION	TYPE
1	NEGATIVE OF LOG. SEQ. NO. (=N, WHERE N-2= NO. OF SCANS FOR THIS ORBIT)	R*4
2	ORBIT NO.	R*4
3	DAY AT THE END OF THE LAST SCAN OF THE ORBIT	R*4
4	TIME IN SECS. OF DAY FOR 2	R*4
5	LAT. (-90.0 TO +90.0) AT (3) ABOVE	R*4
6	LONG. (0 TO 360.0) AT (3) ABOVE	R*4
7	NO. OF PDB RECORDS (SCANS) READ	R*4
8	NO. OF U-TAPE RECORDS (SCANS) WRITTEN	R*4
9-10	UNIQUE NO. OF THE INPUT TAPE	R*8 EBCDIC
11	TOTAL SCANS READ	R*4
12	GOOD DATA SCANS	R*4
13	GOOD DIFFUSER SCANS	R*4
14	GOOD MCSA SCANS	R*4
15	GOOD DATA Z-A. < 88.0	R*4
16	TOTAL SCANS REJECTED	R*4
17	BACKWARD TIME STEPS	R*4
18	DIFFUSER MISSING	R*4
19	MCSA FRAME MISSING	R*4
20	NON-DATA, NON-MCSA, NON-DIFFUSER	R*4
21	SCANS FOLLOWING MCSB, C OR E	R*4
22	T. READ ERRORS	R*4
23	UNABLE TO CORRECT ZENITH ANGLE (ATTITUDE)	R*4

Table 4.4 (Continued)

4-BYTE WORD	DESCRIPTION	TYPE
24-30	— NOT USED (0.0)	R*4
31	MOVING DIFFUSER PLATE	R*4
32	WAVELENGTH CAM ERROR	R*4
33	MOVING CAM ERROR	R*4
34	PHOTO H.V. NON HIGH/LOW	R*4
35	MONO H.V. NON HIGH/LOW	R*4
36-40	NOT USED (0.0)	R*4
41-100	SPARES (= -77.)	R*4

(B) RECORD 2

4-BYTE WORD		
1-10	AVERAGE VALUES OF THE 10 HOUSEKEEPING FUNCTIONS 16101 - 16112	R*4
11-20	STANDARD DEVIATION OF THE 10 HOUSEKEEPING FUNCTIONS	R*4
21-30	MINIMUM VALUES FOR THE 10 HOUSEKEEPING FUNCTIONS	R*4
31-40	MAXIMUM VALUES FOR THE 10 HOUSEKEEPING FUNCTIONS	R*4
41-50	NUMBER OF DATA POINTS FOR THE 10 HOUSEKEEPING FUNCTIONS	R*4
51-100	ANNOTATION (= - 77.)	R*4

Table 4.5

Trailer File of U-Tape

4-BYTE WORD	DESCRIPTION	TYPE
1	TRAILER FILE IDENTIFIER (ALWAYS -1.0)	R*4
2	NO. OF FILES ON THE OUTPUT TAPE (INCLUDING HEADER FILE AND THE TRAILER FILE)	R*4
3	DAY AT THE END OF THE LAST SCAN OF THE LAST ORBIT ON TAPE	R*4
4	TIME IN SECS OF DAY FOR (3) ABOVE	R*4
5	LAT. (-90.0 to +90.0) AT (4) ABOVE	R*4
6	LONG. (0.0 to 360.0 WESTWARD) AT (4) ABOVE	R*4
7	NO. OF PDB FILES TO READ	R*4
8	SPARE (= 0.0)	R*4
9-10	UNIQUE NO. OF THE FIRST INPUT TAPE	R*8 EBCDIC
11-12	UNIQUE NO. OF THE SECOND INPUT TAPE	R*8 EBCDIC
13-(MM-2)	UNIQUE NO. OF THE THIRD - LAST INPUT TAPE	R*8 EBCDIC
(MM-1)-MM=	LAST, INDICATING THAT THERE ARE NO MORE INPUT TAPES	R*8 EBCDIC
(MM+1)=100	SPARES (= -77.)	R*4

5. DETAILED TOTAL OZONE

The Detailed Total Ozone (DTOZ) tape contains the total ozone data calculated from the calibrated backscattered ultra violet radiances on the U-tape. Data for the first year of satellite operation, covering the period April 10, 1970 to May 6, 1971 is stored on fourteen tapes, one tape for each four week period. For subsequent years a DTOZ tape may contain data for more than a four week period depending upon data density. A file of the DTOZ tape contains data from one or more orbits.

A DTOZ tape, like the U-tape and PDB tape, is made up of a header file, a number of data files and a trailer file. The data file contains a header record, a number of data records (one for each scan of data) and a trailer record. The header file is the first file of a tape and contains tape identification information. The format of the header file records is presented in Table 5.1. The header record, which is the first record of a data file, contains information required to identify the orbit data on that file. The format of the header record is described in Table 5.2.

A data record, described below, contains the measurements and position during one scan. Table 5.3 describes the format of a data record. The last record on a data file is the trailer record which contains a summary of the data processed in the data file. The trailer record, described in Table 5.4, also contains an error summary for data rejected during the processing. The last file on a DTOZ tape is the trailer file, which contains a list of all the input tapes which were processed to generate the DTOZ tape. The format of the trailer file is described in Table 5.5.

The header file, the header record, the trailer record, and the trailer file are primarily used for data management by the production team and may not be of much use to an outside user of DTOZ tape. Hence these records will not be described in any detail.

The data record contains one complete 12-wavelength scan of the BUV monochromator spanning 32 seconds. The first word is the logical sequence number within the file of the scan in question. Logical sequence number of a data record always starts with two, since one is the logical sequence number of the header record. The logical sequence number of a particular record on the DTOZ tape may be different from the logical sequence number of the same record on the U-tape. This is because scans are rejected in the total ozone computation if the data is during twilight or night time, if the solar zenith angle is larger than 82.7° (sun near the horizon), if "bad" data is found or if a calibration procedure occurred during the scan. Words 2 through 6 of the DTOZ data record are self explanatory and are copied unaltered from the U-tape data record. Words 7, 8, and 9 contain the latitude, longitude (longitude convention: 0° to 360°

WESTWARD) and the solar zenith angle given as average values for the satellite during the time of the four monochromator readings used to compute the total ozone. Words 10, 11, and 12 contain the same averages during the time the eight monochromator readings used to calculate the ozone profile were taken.

Words 13 and 14 contain resistor flags for each of the 12 wavelength positions. The meaning of these flags is given in Table 4.3. Because the backscattered radiance decreases rapidly with decreasing wavelengths, the instrument increases gain by switching from feedback resistor 1, to 2, to 3, and the resistor number used at each wavelength is given in the flag. We have found that the nominal gain for R2 and R3 were in error and have corrected these values as accurately as possible. Data at the resistor switching point are still being studied.

Words 15 through 26 contain the twelve monochromator U-values input from the U-tape. A U-value is a radiance in resolution units of the digitizer. In this instrument quantization error in the digitizer exceeds error due to photomultiplier noise in most cases. The instrument uses a logarithmic amplifier such that the U-value is defined as $U = 100 \log E$ where E the event rate is the photomultiplier cathode current divided by the electronic charge Q. A wavelength dependent calibration factor relates the cathode current to the radiance. The U-values recorded are exactly as they appear on the U-tape. Before being used to calculate total ozone, they are normalized to 1 A. U. sun-earth distance; the dark current is subtracted; and a scene stabilization correction factor designed to insure long term instrument calibration is applied. This corrected U-value is used to compute Q and N values.

Words 27 - 34 contain Q values for the 8 wavelengths used to calculate ozone profiles. The definition is

$$Q = I/(I_0 \ \beta_\lambda \ P(\theta))$$

where I is the backscattered radiance, I_0 is the extraterrestrial solar radiance, β_λ is the Rayleigh scattering coefficient, and P is the Rayleigh scattering phase function at solar zenith angle θ. So Q is a normalized radiance convenient for profile computation. Words 35 - 38 contain N-values for the four wavelengths used to calculate total ozone. The definition is

$$N = -100 \log {}^{I}/_{I_0}$$

where I and I_0 are as before. Because of the definition of the U-Value, if an extraterrestrial value U_0 is defined (values are given in Table 5.6), the N-value may be calculated directly as $N = U_0 - U$ where U is the corrected U-value.

Words 39 - 50 contain twelve photometer (λ = 380.0 nm) N-values measured λ simultaneously with the monochromator measurements to monitor scene change. These are used in the total ozone algorithm to calculate effective reflectivity.

The remaining elements of the array contain results of the total ozone computation. Total ozone Ω is computed using a pair of wavelengths, and since radiances at four wavelengths are available, two independent estimates of the total ozone can be made. The A wavelength pair is 312.5 nm and 331.2 nm; the B wavelength pair is 317.5 nm and 339.8 nm. These correspond to the C and D Dobson wavelength pairs. The independent A and B total ozone estimates are weighted and averaged to obtain the final recommended total ozone value. Because the field of view may be either ground or cloud or a combination, the A and B calculations are carried out assuming that the reflecting surface is the ground (1.0 atm.) and cloud tops (0.4 atm.). Low reflectivity is assumed to be ground and high reflectivity is assumed to be cloud in the combination algorithm.

Word 51 contains the flag for the A pair, one atmosphere total ozone computation. A flag digit of zero indicates a normal total ozone computation. A flag code of 1 indicates that the N-value used was below the range of our tables (corresponding to total ozone less than 0.200 atm-cm.). Since total ozone values lower than this do occur, this represents an artificial limit on our present algorithm. Similarly, a flag code of 9 indicates that the N-value was above the range of our tables (corresponding to upper limits on total ozone of 0.300, 0.550, and 0.650 for low, mid, and high latitude ozones respectively). This flag code applies to the unit digit normally, but in intermediate latitude zones the calculation is done for both latitude tables and the results are combined. In this case, the tens digit is as above and applies to the higher latitude computation. The hundreds digit is set to unity if the reflectivity calculated for the 339.8 monochromator channel causes too large a difference in total ozone from that calculated using the photometer reflectivity. This can occur for physical reasons such as aerosol induced errors and is a good indication of a bad ozone value. Flagged ozone values are not used in the computation of recommended total ozone.

The reflectivity stored in word 52 is <u>not</u> a true ground reflectivity, but an effective reflectivity parameter that may be greater than one or less than zero. Aerosols are not included in the standard table calculation, and their presence in the troposphere produces an increase in the effective reflectivity. If the ground is not at sea level, but at a pressure height of 800 mb for instance, a negative reflectivity will be computed. The total ozone atmosphere-centimeters for the A pair, computed at 1.0 in atmosphere is in word 53. Word 54 contains $DN/D\Omega$, the slope of the N-value versus total ozone curve, This parameter is a direct measure of the sensitivity of the ozone measurement.

Words 55 – 66 contain the same information as the block 51–54 but for the three other cases: B pair, 1.0 atm., A pair, 0.4 atm., and B pair, 0.4 atm.

The combined reflectivity and total ozone for the A and B pair separately and as a final recommended weighted average are contained in words 67 – 72. We emphasize again that this reflectivity is not a true ground reflectivity.

Word 73 is a flag indicating in the tens digit how the two A pair ozone values were combined and in the units digit how the two B pair ozone values were combined. A flag of one indicates that the reflectivity was low and the one atmosphere value was used; a flag of four indicates that the reflectivity was high (presumably due to cloud cover) and the 0.4 atmosphere value was used. A flag of two indicates an intermediate case for which a weighted average of the two answers is used. A flag of three indicates a high latitude, high reflectivity case, which may occur because of either snow or cloud cover. In this case a simple average of the two answers is used.

Words 74 – 80 are spares, filled with -77's.

Table 5.1

Header File of DTOZ Tape

(A) RECORD 1

WORD	DESCRIPTION	TYPE
1	SATELLITE ID (NIMBUS 4)	R*8 EBCDIC
2	EXPERIMENT ID (BUV)	R*8 EBCDIC
3	PROGRAM NAME (BUVALL)	R*8 EBCDIC
4	DATE OF PROGRAM VERSION (SEP 1977)	R*8 EBCDIC
5	VERSION NO. OF PROGRAM (VERSN 07)	R*8 EBCDIC
6	UNIQUE NO. OF OUTPUT TAPE	R*8 EBCDIC
7-10	DCB OF THE OUTPUT TAPE 4 WORDS (RECM=FB, LRECL=320, BLK=16000, DEN=1600)	R*8 EBCDIC
11-12	DAY OF WEEK AND DATE OF JOB RUN (THRU 20 OCT 77) TWO R*8 WORDS	R*8 EBCDIC
13	STARTING WEEK NUMBER OF DATA	R*8 EBCDIC
14	ENDING WEEK NUMBER OF DATA	R*8 EBCDIC
15	CALENDAR YEAR OF DATA (E.G. 70)	R*8 EBCDIC
REST	ANNOTATION (= 77777777)	R*8 EBCDIC

(B) RECORD 2

1	NUMBER OF FILES ON OUTPUT TAPE (-77.)	R*4
2	LOGICAL SEQ. NO. (ALWAYS 2.)	R*4
3	START DAY OF FIRST ORBIT	R*4
4	START TIME OF FIRST ORBIT	R*4
5	LAT. (-90. TO +90.) OF FIRST ORBIT	R*4
6	LONG. (0 to 360 W) OF FIRST ORBIT	R*4
7-LAST	SPARES (= -77.)	R*4

Table 5.2

Header Record of DTOZ Tape

4-BYTE WORD	DESCRIPTION	TYPE
1	LOGICAL SEQUENCE NUMBER (ALWAYS 1.0)	R*4
2	SPARE (0.0)	R*4
3-4	UNIQUE NO. OF INPUT TAPE	R*8 EBCDIC
5-8	DAY AND DATE OF THE JOB RUN TWO R*8 WORDS (E.G. TUE 18 JAN 77)	R*8 EBCDIC
9-10	JOB ID (E.G. ZMRKKALL)	R*8 EBCDIC
11	DAY OF THE BEGINNING OF THE FIRST GOOD SCAN OF THE FIRST ORBIT ON THE OUTPUT TAPE	R*4
12	TIME IN SECS. OF DAY FOR (11) ABOVE	R*4
13	LAT. (-90 TO +90° 0) AT (11) ABOVE	R*4
14	LONG. (0 TO 360°W) AT (11) ABOVE	R*4
15	WEEK NO. OF THE START OF THE ORBIT	R*4
16	ORBIT NO.	R*4
17-18	PROGRAM NAME (BUVALL)	R*8 EBCDIC
19-20	VERSION DATE (SEP 77)	R*8 EBCDIC
21-22	VERSION NO. (E.G. VERSN 07)	R*8 EBCDIC
23	β_0, PHOTOMETER	R*4
24	β_0, MONOCHROMATOR	R*4
25-26	DATE OF JOB RUN (E.G. 77.018)	R*8 EBCDIC
27-LAST	ANNOTATION = (-77.)	R*4

Table 5.3

Data Record of DTOZ Tape
(80 R*4 Words)

WORD	DESCRIPTION
1	LOGICAL SEQUENCE NUMBER
2	ORBIT NUMBER OF THE DATA
3	DAY AT START OF SCAN
4	SECONDS OF DAY (UT)
5	SOLAR ZENITH ANGLE AT START OF SCAN
6	SOLAR ZENITH ANGLE AT END OF SCAN
7	LATITUDE (AVERAGE FOR TOTAL OZONE)
8	LONGITUDE (AVERAGE FOR TOTAL OZONE) (0 - 360 W)
9	SOLAR ZENITH ANGLE (AVERAGE FOR TOTAL OZONE)
10	LATITUDE (AVERAGE FOR PROFILE COMPUTATION)
11	LONGITUDE (AVERAGE FOR PROFILE COMPUTATION)
12	SOLAR ZENITH ANGLE (AVERAGE FOR PROFILE COMPUTATION)
13	RESISTOR FLAG 255.5-297.5 nm
14	RESISTOR FLAG 301.9-339.8 nm
15-26	12 MONOCHROMATOR U-VALUES 255.5-339.8 nm
27-34	8 MONOCHROMATOR Q-VALUES 255.5-305.8 nm
35-38	4 MONOCHROMATOR N-VALUES 312.5-339.8 nm
39-50	12 PHOTOMETER N-VALUES 255.5-339.8 nm
51	FLAG FOR A-PAIR, 1.0 ATM.
52	REFLECTIVITY FOR A-PAIR, 1.0 ATM.
53	TOTAL OZONE FOR A-PAIR, 1.0 ATM.
54	DN/DΩ FOR A-PAIR, 1.0 ATM.
55-58	SAME AS 51-54 FOR B-PAIR, 1.0 ATM.
59-62	SAME AS 51-54 FOR A-PAIR, 0.4 ATM.
63-66	SAME AS 51-54 FOR B-PAIR, 0.4 ATM.
67	COMBINED REFLECTIVITY FOR A-PAIR
68	COMBINED TOTAL OZONE FOR A-PAIR
69	COMBINED REFLECTIVITY FOR B-PAIR
70	COMBINED TOTAL OZONE FOR B-PAIR
71	RECOMMENDED REFLECTIVITY
72	RECOMMENDED TOTAL OZONE
73	COMBINATION FLAG
74-80	-77. SPARES

Table 5.4

Trailer Record of DTOZ Tape

4-BYTE WORD	DESCRIPTION	TYPE
1	NEGATIVE OF LOG. SEQ. NO. (= N, WHERE N-2 = NO. OF SCANS FOR THIS ORBIT)	R*4
2	ORBIT NO.	R*4
3	DAY AT THE END OF THE LAST SCAN OF THE ORBIT	R*4
4	TIME IN SECS. OF DAY FOR 2	R*4
5	LAT. (-90.0 TO +90.0) AT (3) ABOVE	R*4
6	LONG. (0 TO 360.0) AT (3) ABOVE	R*4
7	NO. OF RECORDS (SCANS) READ	R*4
8	NO. OF BUVALL RECORDS (SCANS) WRITTEN	R*4
9-10	UNIQUE NO. OF THE INPUT TAPE	R*8
11	NO. OF TIMES PROCESS CALLED	R*4
12	NO. OF GOOD VALUES RETURNED	R*4
13	NO. OF BAD VALUES RETURNED	R*4
14	NO. OF SCANS REJECTED	R*4
15	NO. SCANS REJECTED FOR LARGE SOLAR ZENITH ANGLE	R*4
16	NO. SCANS REJECTED FOR BAD U-VALUES	R*4
17	NO. LARGE (G.T. 82.7) SOLAR ZENITH ANGLES	R*4
18	NO. OF TIMES B PAIR FORCED	R*4
19	NO. OF SCANS HAVING BAD OMEGA VALUES FOR LOW SENSITIVITY	R*4
20	NO. OF SCANS WITH LARGE DIFFERENCE IN PHOTOMETER AND MONOCHROMATOR OMEGA VALUES	R*4
21	NO. SCANS BOTH PAIRS COMPLETE	R*4
22	NO. SCANS A ONLY	R*4
23	NO. SCANS B ONLY	R*4
24	NO. SCANS NEITHER COMPLETE	R*4
25	NO. SCANS WITH TABLE SWITCHING	R*4
26	NO. SCANS WITH OUT OF RANGE N-VALUES	R*4
27	SPARES (=-77.)	R*4

Table 5.5

Trailer File of DTOZ Tape

4-BYTE WORD	DESCRIPTION	TYPE
1	TRAILER FILE IDENTIFIER (ALWAYS -1.0)	R*4
2	NO. OF FILES ON THE OUTPUT TAPE (INCLUDING HEADER FILE AND THE TRAILER FILE)	R*4
3	DAY AT THE END OF THE LAST SCAN OF THE LAST ORBIT ON TAPE	R*4
4	TIME IN SECS OF DAY FOR (3) ABOVE	R*4
5	LAT. (-90.0 TO +90.0) AT (4) ABOVE	R*4
6	LONG. (0.0 TO 360.0 W) AT (4) ABOVE	R*4
7	NO. OF U-TAPE FILES READ	R*4
8	SPARE (= 0.0)	R*4
9-10	UNIQUE NO. OF THE FIRST INPUT TAPE	R*8 EBCDIC
11-12	UNIQUE NO. OF THE SECOND INPUT TAPE	R*8 EBCDIC
13-(MM-2)	UNIQUE NO. OF THIRD - LAST INPUT TAPE	R*8 EBCDIC
(MM-1)-MM	= LAST, INDICATING THAT THERE ARE NO MORE INPUT TAPES	R*8 EBCDIC
(MM+1)-80	SPARES (= -77.)	R*4

Table 5.6

Extraterrestrial Solar Flux in Resolutions Units

λ in nm	U_o
255.5	914.86
273.5	960.50
283.0	982.51
287.6	979.11
292.2	996.55
297.5	989.96
301.9	974.06
305.8	980.42
312.5	974.62
317.5	971.48
331.2	948.73
339.8	924.97
380.0	1097.89

6. COMPRESSED TOTAL OZONE

The Compressed Total Ozone (CTOZ) tape contains one year of total ozone values calculated from backscattered ultraviolet radiances measured by the BUV monochromator on the Nimbus-4 satellite. The instrument made one complete scan over 12 wavelengths every 32 seconds; 300,000 scans have been processed from the first year of operation. The data on the tape is in 14 files, one for each four week period with each file containing about 20,000 scans. The tape was made from the Detailed Total Ozone tapes, selecting only information which would be required by a user needing only total ozone information.

Each scan is recorded as a 20 word array in the format given in Table 6.1. (There are no header or trailer files or records on this tape.) The first eight words of the array uniquely identify the scan. Orbit number refers to the number of orbital revolutions since launch at the start of the orbit. The logical sequence number defines scan order within a data file on the DTOZ tape.

The time the scan was made is given as year, day, and seconds. Day is the sequential day number within the year (day 1 being Jan 1); seconds of the day for the scan are given in universal time. Individual scans may be missing either because there was an on-board calibration sequence, or because of poor quality of transmitted data. The latitude and longitude given are for the subsatellite point at the midpoint of the sequence of four radiance measurements needed to infer total ozone (the subsatellite point moves about $.7^{o}$ during the measurement). Latitude is positive in the northern hemisphere, negative in the southern. An unusual convention was used for the longitude, which is 0° to 360° increasing WESTWARD from Greenwich.

The solar zenith angle is also defined at the midpoint of the measurement sequence. Total ozone was calculated for solar zenith angles from 0 (sun overhead) to 82.7^{o} (sun 7.3^{o} above the horizon).

The monochromator N-values for radiance measurements at 312.5nm, 317.5nm, 331.2nm, and 339.8nm (1nm being 10^{-9} m) are defined according to the Dobson convention:

$$N = -100 \log (I/I_0)$$

where I is the backscattered radiance from the atmosphere, and I_0 is the extraterrestrial solar radiance. The photometer N-values were measured by a filter photometer centered at 380.0nm simultaneously with the monochromator measurements to account for scene change beneath the moving satellite.

Total ozone is calculated by differencing monochromator N-values at pairs of wavelengths. $N_{312.5} - N_{331.2}$ is the A wavelength pair; $N_{317.5} - N_{339.8}$ is the B wavelength pair. Total ozone is calculated independently for the A and B pair and the results are available in the data set. Also, the A and B pair results are combined using a weighting function depending on relative sensitivity and expected penetration through the atmosphere to produce the recommended total ozone value. Total ozone is given in units of atmosphere-centimeters. If for some reason a total ozone value could not be calculated, a value of -999. was entered. If either the A or B pair ozone values individually could not be returned, the recommended total ozone was entered as the negative of itself. (-0.353). The range of total ozone values determined from the experiment is between 0.200 atm-cm and 0.650 atm-cm. USERS SHOULD BE CAREFUL TO TEST THE RECOMMENDED TOTAL OZONE TO SEE IF IT IS POSITIVE.

We have included the reflectivity in this array, but the user should be cautioned that this is NOT a true ground reflectivity; rather, it is an effective albedo parameter which includes and compensates for several effects, including aerosols and incorrect surface pressure. About 6000 scans of negative reflectivity have been removed from this data set. Negative reflectivity is returned when the reflecting surface is at significantly less than 1000mb pressure, leading to errors in the total ozone. It is planned to reprocess these scans and add them to the data set.

Table 6.1 describes the format of the CTOZ tape record while Table 6.2 gives a brief outline of the contents of each file of the tape.

Appendix A gives a sample program in Fortran, to read the CTOZ tape on the IBM 360 computer using a Fortran Input/Output (FTIO) package. If the user does not have access to the FTIO package, the data can be read with a Fortran read format for an array of length of 20 words and file positioning can be handled by the JCL.

Table 6.1

Data Record of CTOZ Tape

20(R*4)

1	LOGICAL SEQUENCE NUMBER
2	ORBIT NUMBER
3	YEAR
4	DAY
5	SECONDS OF DAY (UT)
6.	*LATITUDE (AVERAGE FOR TOTAL OZONE)
7	**LONGITUDE (AVERAGE FOR TOTAL OZONE)
8	SOLAR ZENITH ANGLE (AVERAGE FOR TOTAL OZONE)
9-12	MONOCHROMATOR N-VALUES 312.5-339.8
13-16	PHOTOMETER N-VALUES 312.5-339.8
17	A PAIR TOTAL OZONE
18	B PAIR TOTAL OZONE
19	RECOMMENDED REFLECTIVITY
20	RECOMMENDED TOTAL OZONE

The tape specifications of a Compressed Total Ozone tape are:

RECFM = FB, LRECL = 80 bytes, BLKSIZE = 8000 bytes
9 TRACK IBM 360 NL TAPE WRITTEN WITH 1600 BPI.

*Latitude is +90 to -90°
**Longitude is 0 to 360° WESTWARD

Table 6.2

Summary of Data on CTOZ

File No.	No. of Orbits	No. of Scans	Day Range
1	310	21872	101-126, 1970
2	328	21841	127-154
3	332	22349	155-182
4	302	22774	183-210
5	296	23026	211-238
6	320	22692	239-266
7	328	22339	267-294
8	334	24568	295-322
9	335	25769	323-350
10	175	13168	351-365
11	309	21624	1-28, 1971
12	289	17898	29-56
13	256	17045	57-84
14	298	22257	85-126

7. DAILY ZONAL MEANS

The Daily Zonal Means (DZM) tape contains the average and the standard deviation for the total ozone in specified latitude zones for an entire year. Averages and standard deviation for ozone at various pressure levels may also be available on the DZM when the profile information becomes available on the tape input to the DZM program.

The tape data are generated from the compressed total ozone (CTOZ) tape. Daily spatial statistical analyses are performed in geodetic coordinates. (Geodetic coordinates are indicated by -1 in the first word of the data array; geomagnetic values, not archived currently, would be indicated by +1.)

The standard deviation of the mean is computed using the following expression

$$\sigma = \sqrt{\frac{\sum_{i=1}^{N} \chi i^2 - N\left(\sum_{i=1}^{N} \chi i\right)^2}{N-1}}$$

where χ_i is the value of the total ozone at the i^{th} data point within a latitude zone containing N data points. Any data more than 3σ away from the average value is thrown out and the average and standard deviation recomputed. This filtering process is repeated three times before the data are stored on the DZM tape.

The latitude zones are defined to be 10° wide such that there are 17 latitude zones centered at -80°, -70°, -60°, . . . , 60°, 70°, and 80°. Hence there are 17 logical records for each day, one for each latitude zone. Whenever data are unavailable for a latitude zone, the average and standard deviation values corresponding to this zone are filled with -777.s.

The format of the DZM tape is shown in Table 7.1. The first word of each data record has the coordinate system indicator. The second word contains the sequential day number within a year, January 1 being day 1. The number of points in the latitude zone is the number remaining after bad data points have been filtered out. The fourth word contains the pressure level in millibars, which is 1000. for total ozone.

The fifth word has the mid-point of the latitude zone (e.g. -80°, -70°, etc). The sixth and seventh words contain the average value of the total ozone and the corresponding standard deviation. Words 8 and 9 contain the same quantities as words 6 and 7 for ozone partial pressure. Word 10 contains the mixing ratio for the ozone. These last three words are computed from the high level ozone distribution if available on the input tape.

The daily zonal means in atm-cm have been plotted for the first year's data for all the latitude zones. Figure 3 gives one such plot for the latitude zone centered at 50°N from first year's data. These plots are archived in the NSSDC.

A sample program which reads and prints out the contents of a DZM tape is given in Appendix B.

Table 7.1

Data Record of a DZM Tape

4-BYTE WORD	DESCRIPTION	TYPE
1	COORDINATE INDICATORS = 1 GEOMAGNETIC COORD. = -1 GEODETIC COORD.	I*4
2	JULIAN DAY FOR WHICH MEANS ARE COMPUTED	I*4
3	NUMBER OF POINTS IN THE LATITUDE ZONE	I*4
4	PRESSURE LEVEL IN mb	R*4
5	MID-PT OF LATITUDE ZONE	R*4
6	AVERAGE TOTAL OZONE FOR THE LATITUDE ZONE	R*4
7	STANDARD DEVIATION OF WORD (6)	R*4
8	AVERAGE OZONE — PARTIAL PRESSURE FOR THE LATITUDE ZONE	R*4
9	STANDARD DEVIATION OF WORD (8)	R*4
10	MIXING RATIO FOR THE OZONE	R*4

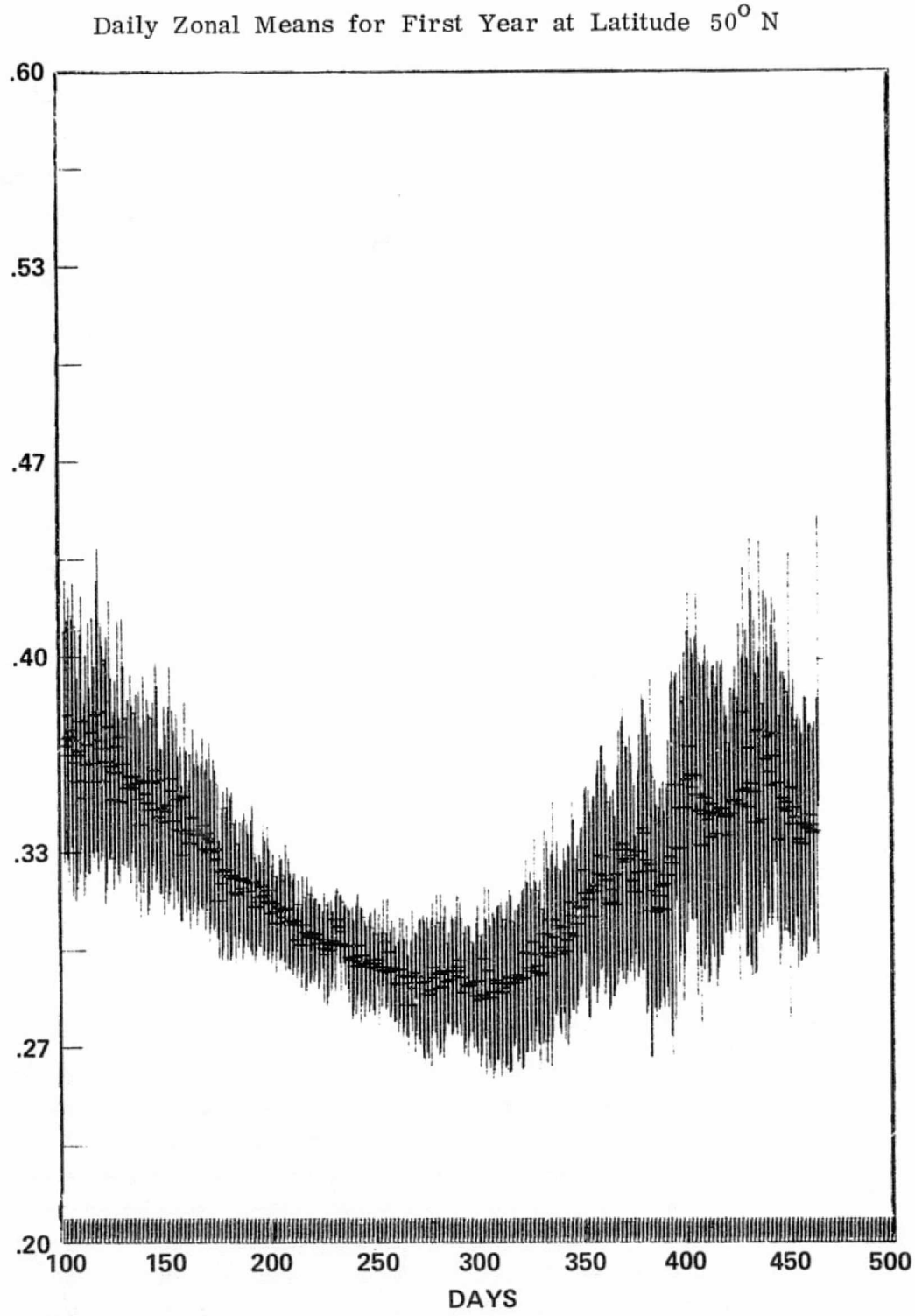


Figure 3. 50 N (GEODET) (1970) OZONE ABOVE 1000. MB. IN ATM-CM

8. COMPARISON OF DATA WITH GROUND STATIONS

The quality of the Nimbus 4 total ozone data is best verified by comparing the satellite data with ground data. Values of total ozone computed from the satellite data are compared with total ozone values computed from measurements of transmitted sunlight during satellite overpasses of ground stations. The World Meteorological Organization (WMO) in cooperation with the Canadian Meteorological society collects data from approximately 66 Dobson stations and 16 Russian M83 stations (the exact number of stations changes from year to year).

Total ozone varies seasonally with the changing solar flux and latitudinally because of production and transport mechanisms and also varies spatially and temporally with the dynamics of the atmosphere. Consequently, satellite and ground station data must be coincident for meaningful comparison. The BUV instrument field of view is two degrees of arc on the Earth's surface, so a coincidence is defined as a ground station - sub-satellite point separation of 2° or less. This corresponds to approximately 200 km on the ground. Nimbus-4 is in a noon orbit, which means that the time at the subsatellite point is approximately at local noon. Since Dobson station readings are also normally made within a couple of hours of local noon, we require only that ground measurement be made on the same day as the satellite overpass. Test runs with more restrictive coincidence limits did not significantly improve the correlation.

The ground station measurements of total ozone are not all of the same accuracy. The observation code is a two digit number in which the first digit indicates the instrument wavelengths used and the second digit indicates the atmospheric conditions (clear, cloudy, etc.) at the time of observation. The highest quality Dobson ozone measurements are indicated by a 00 code, the first 0 indicating that the Dobson A and D wavelength pairs were used, the second 0 indicating that a clear sky direct sun observation was made. The Dobson A pair, at 305.5 and 325.4 nm, is defined differently from the Nimbus-4 A pair; the Dobson D pair is at 317.6 nm and 339.8 nm.

Table 8.1 gives average ozone values and correlation for Nimbus-Dobson station overpasses within 2° for 00 Dobson observation codes for the first year of operation (April 1970 to April 1971) averaged by month and for the entire year. The correlation coefficient for the entire year is 0.938, but varies month by month with the average total ozone. When there are few observations of of high total ozone, the correlation coefficient appears worse because the data "clusters" in a narrow ozone range even though the uncertainty in individual measurements is no worse. The "bias," the difference between the average ozone

Table 8.1

Dobson Stations, 00 Code, 2° Separation

Month	N	Ω_{N4}	Ω_{DOB}	$\Omega_{DOB} - \Omega_{N4}$	Corr. Coeff.
April, 1970	103	362.5	364.8	2.3	.963
May	193	358.9	361.9	3.0	.941
June	196	342.0	350.2	8.2	.803
July	172	325.7	330.2	4.5	.824
August	184	309.7	320.1	10.4	.798
September	156	293.4	299.7	6.3	.792
October	148	287.6	294.6	7.0	.883
November	151	288.4	293.5	5.1	.942
December	137	262.2	300.7	4.5	.902
January, 1971	84	315.8	314.3	-1.5	.911
February	80	335.0	336.5	1.5	.957
March	104	358.8	364.5	5.7	.973
April	92	340.2	348.4	8.2	.953
4/70 - 4/71	1800	322.9	328.4	5.4	.938

as determined by Nimbus and as determined by the Dobson network is also provided. For the first year, the Nimbus average total ozone was 5.4 Dobson units (1.6 percent) less than the Dobson average total ozone.

Table 8.2 presents the same statistical results as Table 8.1 but for the Russian M83 network instead of the Dobson network. The M83 instrument is a filter photometer instrument instead of a double monochromator. The broad bandpass of a filter introduces solar zenith angle dependent bandpass errors which are difficult to correct.

Figures 4 and 5 are scatter diagrams for the first year of coincident data for the Dobson network and for the M83 network respectively. The measured Nimbus total ozone is plotted against the measured ground station total ozone for each coincidence. If the ground and satellite instruments were perfectly correlated the data would fall along a straight line passing through the origin with a slope of unity; the actual slope obtained from a linear fit is .932 due to residual bias between the instruments and random error.

The biggest advantage enjoyed by a satellite sensor over a ground based instrument network is that a single instrument can give continuous world-wide coverage. A network of ground based instruments will provide very non-uniform coverage and is prone to biases introduced by improper calibration or operation of individual instruments. Efforts have been made recently to carefully intercalibrate instruments in the Dobson network, but Table 8.3 indicates that during the first year of satellite operation not all stations were equally well calibrated. Table 8.3 presents statistical data for one year of 00 code 2° coincidences. There is a very wide range in the average bias between Nimbus and individual station average total ozone, too large to be explained as random error. The correlation coefficient must be interpreted carefully since high latitude stations, which observe a wide range of ozone values, will appear to be better correlated than low latitude stations. But Mauna Loa (station 31) shows that a well calibrated low latitude Dobson station will correlate with Nimbus to better than 0.9. The Nimbus data might be calibrated against several acknowledged standard Dobson stations such as Arosa, Toronto, or Boulder, and used as a transfer standard for intercalibrating the remaining stations of the network.

We would conclude that a correlation coefficient of 0.94 shows the validity of the Nimbus-BUV total ozone data. The accuracy of an individual measurement appears to be almost as good as an ozone measurement by a Dobson instrument. The bias of 5-10 Dobson units between Nimbus and Dobson remains to be evaluated.

Table 8.2

Non-Dobson Stations, All Codes, 2° Separation

Month	N	Ω_{N4}	Ω_{DOB}	$\Omega_{DOB} - \Omega_{N4}$	Corr. Coeff.
April, 1970	89	427.2	435.9	8.7	.590
May	147	378.7	375.9	-2.8	.586
June	134	358.6	358.4	-0.2	.266
July	154	333.1	327.1	-6.0	.378
August	135	310.7	306.8	-3.9	.283
September	122	303.2	321.1	17.9	.618
October	107	290.8	329.3	38.5	.451
November	85	320.7	341.6	20.9	.547
December	37	334.8	329.2	-5.6	.561
January, 1971	36	341.4	371.1	29.7	.591
February	64	393.8	434.8	41.0	.237
March	95	430.0	433.4	3.4	.525
April	90	415.8	424.6	8.8	.737
4/70 - 4/71	1295	354.0	362.9	8.9	.685

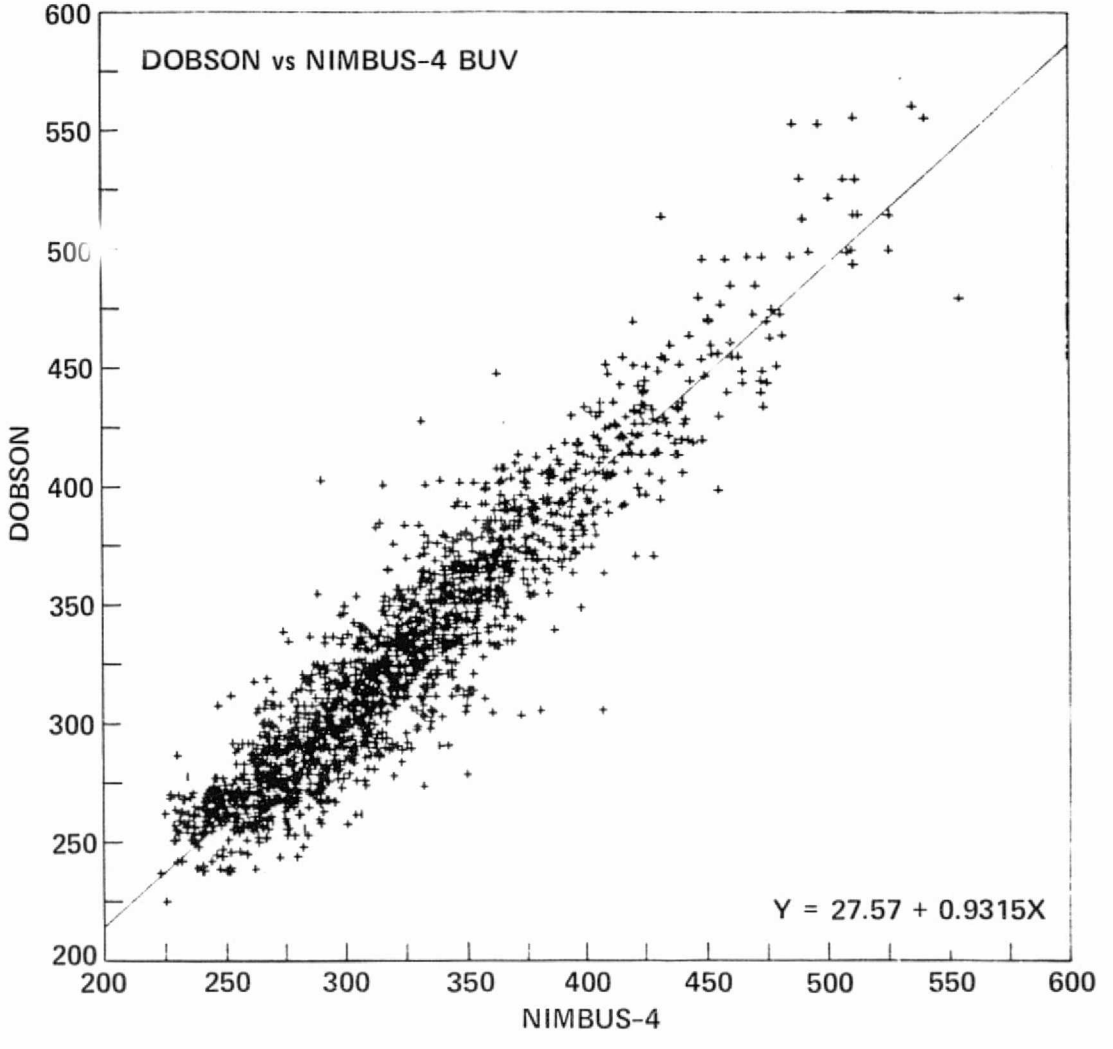


Figure 4. Dobson Stations, 00 Code

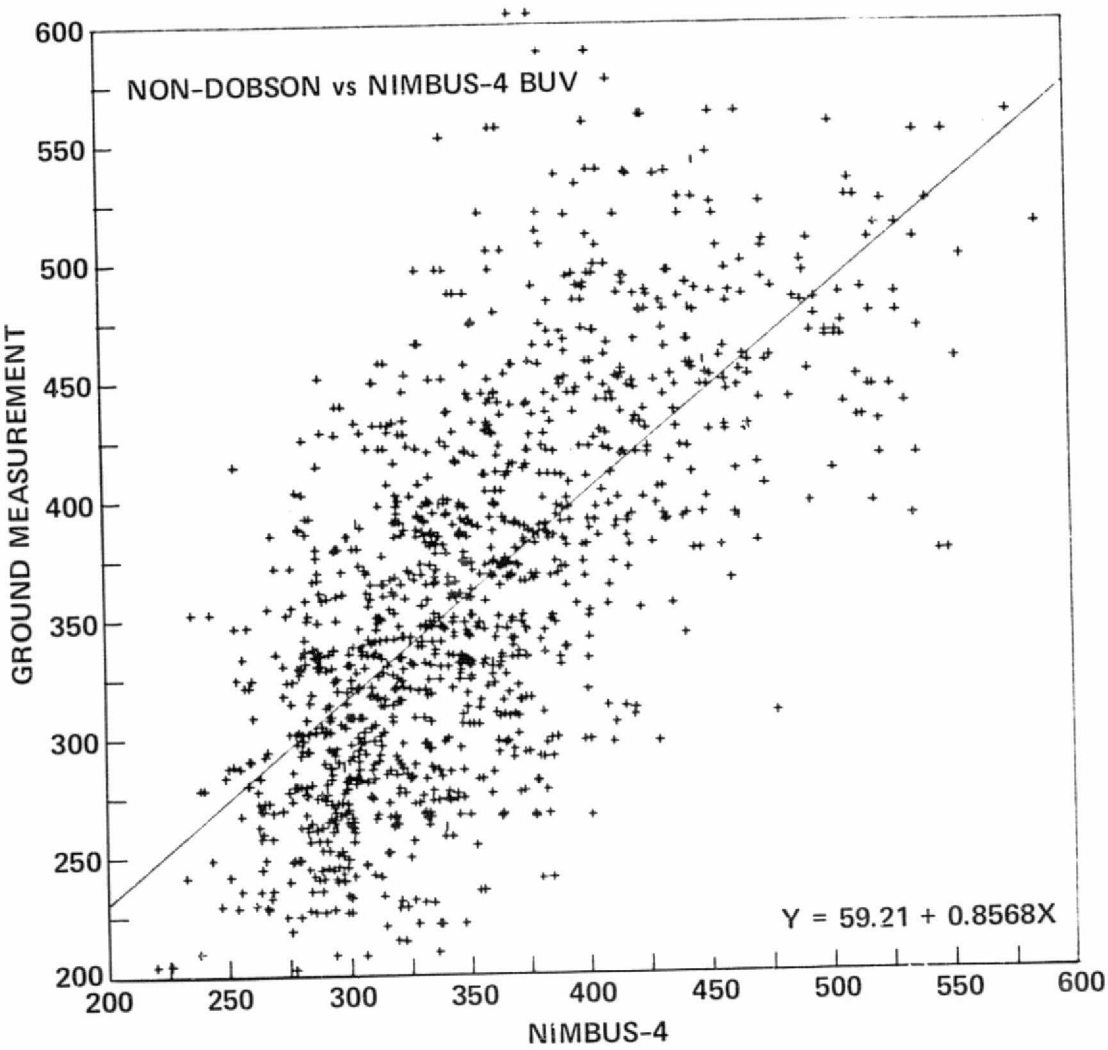


Figure 5. Non-Dobson Stations

Table 8.3

BUV Dobson Comparison - by Station, 00 Code, 2° Separation

April 1970 - April 1971

North American Stations									
Station		Latitude	Longitude	No. of Obs.	Ω_N	Ω_D	$\Omega_N - \Omega_D$	Correlation Coefficient	σ Dif.
ID	Name								
124	Cerrillo	19 29N	99 43W	4					
31	Mauna Loa Obs.	19 32N	155 35W	45	266.46	278.75	-12.30	.920	8.14
79	Tallahassee	30 26N	84 20W	0					
155	White Sands	32 14N	106 27W	0					
106	Nashville	36 15N	86 34W	39	300.83	330.95	-30.11	.688	27.38
107	Wallops Island	37 51N	75 29W	35	312.39	332.63	-20.24	.868	18.89
67	Boulder	40 01N	105 15W	36	314.92	325.91	-10.99	.921	16.10
104	Bedford	42 27N	71 16W	27	336.04	354.59	-18.55	.962	13.49
65	Toronto	43 43N	79 14W	19	349.32	357.84	-8.52	.958	10.09
22	Green Bay	44 29N	88 08W	49	348.91	377.34	-28.41	.967	12.50
19	Bismarck	46 46N	100 45W	39	357.60	367.28	-11.68	.913	21.58
20	Cariboo	46 52N	68 01W	24	339.95	353.50	-13.55	.886	18.09
76	Goose	53 19N	60 23W	7	334.46	349.14	-14.68	.982	7.90
21	Ed. Stony Plain	53 33N	114 06W	22	371.55	364.18	7.37	.961	17.43
77	Churchill	58 45N	94 04W	21	373.68	375.38	-1.70	.962	14.45
105	Fairbanks	64 49N	147 52W	32	378.32	391.25	-12.93	.922	23.91
199	Barrow, Alaska	71 12N	156 22W	0					
24	Resolute	74 43N	94 59W	39	433.09	447.82	-14.73	.948	27.08

Table 8.3 (Continued)

European Stations									
Station		Latitude	Longitude	No. of Obs.	Ω_N	Ω_D	$\Omega_N - \Omega_D$	Correlation Coefficient	σDif.
ID	Name								
158	Casablanca	33 34N	7 40W	5	317.14	319.20	-2.06	.977	10.47
45	Messina	38 12N	15 33E	51	332.63	348.74	-16.11	.910	12.81
82	Lisbon	38 46N	9 08W	41	327.90	308.80	19.10	.933	15.12
38	Cagliari-Elmas	39 15N	9 03E	12	329.72	339.08	-9.36	.982	9.35
47	Naples	40 51N	14 15E	18	310.87	289.39	21.48	.657	26.21
55	Vigna DiValle	42 05N	12 13E	74	337.93	343.42	-5.49	.972	10.83
70	Mont-Louis	42 30N	2 07E	81	336.49	345.05	-8.56	.959	13.78
35	Arosa	46 46N	9 40E	74	339.00	338.97	0.03	.964	11.71
100	Budapest-Lorine	47 26N	19 11E	61	331.70	319.69	12.02	.924	17.36
99	Hohenpeissenberg	47 48N	11 01E	57	340.59	343.87	-3.29	.976	12.42
96	Hrudec Kralove	50 11N	15 50E	70	361.05	354.74	6.31	.982	11.32
53	Uccle	50 48N	4 21E	0					
68	Belsk	50 50N	20 47E	28	331.02	333.68	-2.66	.904	17.32
102	Bracknell	51 25N	00 45E	9	339.66	346.67	-7.00	.940	16.63
48	Oxford	51 45N	1 11W	43	345.05	373.72	-28.67	.954	15.28
50	Potsdam	52 23N	13 03E	43	336.81	337.18	-0.37	.958	12.85
34	Aarhus	56 10N	10 13E	11	345.60	365.18	-19.58	.957	7.17
43	Lerwick	60 08N	1 11W	29	364.06	374.76	-10.70	.963	12.58
51	Regkjavik	64 08N	21 54W	6	350.97	357.00	-6.03	.235	43.99
165	Oslo	59 55N	10 43E	0					

Table 8.3 (Continued)

Asian Stations									
Station		Latitude	Longitude	No. of Obs.	Ω_N	Ω_D	$\Omega_N - \Omega_D$	Correlation Coefficient	σDif.
ID	Name								
8	Kodaikanal	10 14N	77 28E	8	253.25	270.87	-17.63	.778	10.56
187	Poona	18 30N	73 30E	0					
75	Dum Dum	22 39N	88 27E	34	259.77	269.20	-9.44	.723	15.65
9	Mount Abu	24 36N	72 43E	40	272.00	264.72	7.27	.916	8.50
74	Varanasi	25 27N	82 52E	25	261.03	280.88	-19.85	.908	8.37
10	New Delhi	28 38N	77 13E	41	277.80	270.66	7.14	.619	18.82
11	Quetta	30 11N	66 57E	30	291.95	285.93	6.02	.823	10.43
7	Kagoshima	31 38N	130 36E	21	275.49	287.47	-13.99	.951	10.33
13	Srinagar	34 05N	74 50E	50	290.50	287.42	3.09	.779	14.35
14	Tateno	36 03N	140 08E	20	305.94	315.10	-9.16	.925	15.07
12	Sapporo	43 03N	141 20E	19	378.34	377.31	1.02	.946	14.13
Northern Hemisphere - Low Latitudes									
8	Kodaikanal	10 14N	77 28E	8	253.25	270.87	-17.63	.778	10.56
187	Poona	18 30N	73 30E	0					
124	Cerrillo	19 29N	99 43W	4					
31	Mauna Loa Obs.	19 32N	155 35W	45	266.46	278.75	-12.30	.920	8.14
75	Dum Dum	22 39N	88 27E	34	259.77	269.20	-9.44	.723	15.65
9	Mount Abu	24 36N	72 43E	40	272.00	264.72	7.27	.916	8.50
74	Varanasi	25 27N	82 52E	25	261.03	280.88	-19.85	.908	8.37

Table 8.3 (Continued)

Southern Hemisphere									
Station		Latitude	Longitude	No. of Obs.	Ω_N	Ω_D	$\Omega_N - \Omega_D$	Correlation Coefficient	σDif.
ID	Name								
80	Gan * Maldives	00 41S	73 09E	39	246.20	268.38	-22.18	.637	9.92
110	Huancoyo	12 03S	75 19W	64	248.95	268.65	-19.70	.427	10.80
84	Darwin	12 28S	130 50E	16	255.92	274.31	-18.39	.837	8.00
71	Pretoria	25 45S	28 14E	13	277.27	253.54	23.73	.711	10.89
27	Brisbane	27 28S	153 02E	26	286.73	301.42	-14.69	.687	13.67
159	Perth	31 57S	115 51E	31	307.56	306.45	1.11	.929	10.53
91	Buenos Aires	34 35S	58 29W	22	297.57	290.91	6.67	.945	8.67
26	Aspendale	38 02S	145 06E	38	316.76	312.34	4.41	.784	23.94
32	Wellington	41 17S	174 46E	0					
92	Hobart	42 53S	147 20E	26	353.39	346.77	6.63	.959	13.56
180	Invercargill	46 25S	168 19E	26	340.45	336.00	4.46	.941	17.82
29	Macquarie Is.	54 29S	158 58E	23	363.76	356.08	7.63	.980	14.47
101	Syowa	69 00S	39 35E	39	343.81	325.25	18.64	.908	16.56
111	Amundsen-Scott	89 59S	24 48W	0					

APPENDIX A

PROGRAM TO READ COMPRESSED TOTAL OZONE TAPE

A sample program demonstrating the reading of the compressed total ozone tape on the GSFC IBM 360-91 is given here.

The program reads a data card specifying the first and last files to be read and processed. Using the subroutines MOUNT, POSN, and FREAD, which are part of the FTIO package ("FTIO - Fortran I/O Package", Computer Sciences Corporation, contract No. NAS-5-11999, 1976) available on the system, the tape is mounted on unit 11, positioned to the specified files and each scan is read. The 20 words associated with each scan are contained in the array COMIN (see Table 6.1). A criteria is imposed to determine if the scan should be printed; in this example, the 100th scan of each file is printed. The WRITE statement prints out words 4-8, that is, the day, seconds of the day, latitude and longitude (0 to 360^{o} positive in the westward direction) and words 17 through 21, that is, the total ozone Ω_A derived from the A pair, the total ozone Ω_B derived from the B pair, the effective reflectivity and the recommended total ozone Ω derived by combining Ω_A and Ω_B.

Sample Program to read a CTOZ tape and print out
one line for every file of the tape.

```
              COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=62,SIZE=0000K,
                                 SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
                     C
                     C****    PROGRAM TO READ THE COMPRESSED TOTAL OZONE (CTOZ) TAPE
                     C****    AND PRINT OUT ONE LINE OUTPUT FOR EVERY FILE OF TAPE
                     C
      ISN 0002                DIMENSION COMIN(20)
      ISN 0003                REAL*8 TAPEIN
      ISN 0004                DATA TAPEIN/'AD32    '/
                     C
                     C****     READ THE DESIRED RANGE OF FILES TO BE PROCESSED
                     C
      ISN 0005                READ(5,1000) NBEGIN,NEND
      ISN 0006                CALL MOUNT(1,12,TAPEIN,NBEGIN)
                     C
                     C****    PROCESS ONE FILE AT A TIME
      ISN 0007                DO 300 IFILE=NBEGIN,NEND
      ISN 0008                IF(IFILE.NE.NBEGIN) CALL POSN(1,12,IFILE)
      ISN 0010                WRITE(6,2000) TAPEIN,IFILE
      ISN 0011                WRITE(6,2100)
      ISN 0012                I=0
      ISN 0013          100   CONTINUE
      ISN 0014                CALL FREAD(COMIN,12,LENH,&200,&195)
      ISN 0015                I=I+1
      ISN 0016                IF(I.EQ.1) WRITE(6,2200) (COMIN(J),J=4,8),(COMIN(J),J=17,20)
      ISN 0018                GO TO 100
      ISN 0019          195   CONTINUE
      ISN 0020                WRITE(6,2999)
      ISN 0021                GO TO 100
      ISN 0022          200   CONTINUE
      ISN 0023                WRITE(6,2300) I
      ISN 0024          300   CONTINUE
      ISN 0025                WRITE(6,2400)
      ISN 0026                STOP
                     C
                     C********************************
                     C
                     C             FORMATS
                     C
                     C********************************
                     C
      ISN 0027          1000 FORMAT(2I0)
      ISN 0028          2000 FORMAT(//,5X,25('*'),/,3X,'INPUT TAPE ',A8,4X,'POSITIONED TO ',
                            .'FILE',I4,/,3X,33('*'),/)
      ISN 0029          2100 FORMAT(//,T2,'DAY',T9,'SEC',T16,'LAT.',T22,'LONG.',T30,'ZA',
                            .T40,'OMEG-A        OMEG-B      REFL      OMEGA')
      ISN 0030          2200 FORMAT(F6.0,F8.0,2F7.1,F7.2,T40,4F10.3)
      ISN 0031          2300 FORMAT(6X,'PRINTED 1 SCAN OUT OF ',I6,' TOTAL SCANS READ',/)
      ISN 0032          2400 FORMAT(5X,'------- JOB COMPLETED SUCCESSFULLY ------')
      ISN 0033          2999 FORMAT(' ***** TAPE READ ERROR, READ NEXT SCAN *****')
      ISN 0034                END
```

PRECEDING PAGE BLANK NOT FILMED

PRECEDING PAGE BLANK NOT FILMED

```
SYMBOL   INTERNAL STATEMENT NUMBERS
I        0012  0012  0013  0016  0022
J        0012  0016  0016  0016  0016  0016
LENH     0014
NEND     0005  0007
PCSN     0005
CCMIN    0002  0014  0016  0016
FREAD    0014
IFILE    0007  0008  0008  0010
MCUNT    0004
NEGIN    [illegible]
TAPEIN   0002  0004  0004  0010
```

LABEL	DEFINED	REFERENCES
100	3013	3013 3321
199	3019	3314
200	3022	3314
300	3024	3267
1000	3027	3285
2000	3028	3313
2100	3029	3311
2200	3030	3312
2300	3031	3323
2400	3032	3325
2500	3033	3322

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
[illegible]	SF	I*4	000234	[illegible]	SF	I*4	000208	[illegible]	SFA	I*4	00020C	NEND	SF	I*4	000210
PUSH	SF XF	R*4	000000	CCMIN	SFA	R*4	000228	FREAD	SF XF	R*4	000000	IFILE	SFA	I*4	000214
MOUNT	SF XF	I*4	000000	IgCOM#	F XF	R*4	000000	NBEGIN	SFA	I*4	000218	TAPEIN	SFA	R*8	000220

LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	LABEL	ADDR	PAGE 005
100	0003B4	199	0003BC	200	0003D4	300	0003F0	

```
*OPTIONS IN EFFECT*      NAME= MAIN,OPT=02,LINECNT=60,SIZE=0000K,
*OPTIONS IN EFFECT*      SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,XREF
*STATISTICS*     SOURCE STATEMENTS =      33 ,PROGRAM SIZE =    1092
*STATISTICS*  NO  DIAGNOSTICS GENERATED
******  END OF COMPILATION  ******                    376K BYTES OF CORE NOT USED
```

```
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS1.FCRTH                                KEPT         DDNAME=STEPLIB          273 EXCPS
IEF285I   VOL SER NOS= M2SYS5.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.OBJMOD    PASSED       DDNAME=SYSLIN             1 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.SV000.ZMRKKACD.R0000001  SYSOUT       DDNAME=SYSPRINT           2 EXCPS
IEF285I   VOL SER NOS= M2SCR3.
IEF285I   SYS78003.T104903.SV000.ZMRKKACD.R0000002  DELETED      DDNAME=SYSPUNCH           0 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.R0000003  DELETED      DDNAME=SYSUT1             0 EXCPS
IEF285I   VOL SER NOS= M2SCR6.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.R0000004  DELETED      DDNAME=SYSUT2             3 EXCPS
IEF285I   VOL SER NOS= M2SCR1.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.S0000005  SYSIN        DDNAME=SYSIN              4 EXCPS
IEF285I   VOL SER NOS= M2SCR1.
IEF285I   SYS78003.T104903.RVJOC.ZMRKKACD.S0000006  DELETED      DDNAME=SYSIN              4 EXCPS
IEF285I   VOL SER NOS= M2SCR1.
IEF373I STEP /SOURCE  / START 78003.1052 CPU    0MIN 00.45SEC MAIN 248K LCS    OK
IEF374I STEP /SOURCE  / STOP  78003.1052 CPU    0MIN 00.45SEC MAIN 248K LCS    OK
- STEP 01 -      RETURN CODE = 0000                    STEP TIME =      .10 MINS=(CPU=      .00,IO=      .10)
                                    IO IN SECS. DISK=      6.08,DRUM=      .00,TAPE=      .00,CELL=      .00,OTHR=      .14
- SURCHARGES=(DRIVES ALOC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.   TOTAL STP TIME=      .10 MINS.  -
      // EXEC LINKGC,REGION.GO=100K,CLT=8                                                00000005
      XXLINKGC PROC NBLK=40,LIB='SYS2.LOADLIB',OUT=A,BLKSIZE=7265,  10/27/78  00000010
      XX    TERMOUT=A                                                         00000015
      XXLINK EXEC PGM=LINKEDIT,COND=(4,LT),REGION=140K,          * LINKGC *   00000020
      XX PARM='MAP,LIST,SIZE=(126K,12K),TERM'                                 00000030
      XXLOADLIB DD DSN=&LIB,DISP=SHR                                          00000040
IEF653I SUBSTITUTION JCL - DSN=SYS2.LOADLIB,DISP=SHR
      XXNULLIN DD DUMMY                                                       00000050
      XXSYSLIB DD DSN=SYS1.DUMMY,DISP=SHR                                     00000060
      XX DD DSN=SYS1.DUMMY,DISP=SHR                                           00000070
      XX DD DSN=SYS1.FCRTLIB,DISP=SHR                                         00000080
      XX DD DSN=SYS2.FCRTLIB,DISP=SHR                                         00000090
      XX DD DSN=SYS1.PLILIB,DISP=SHR                                          00000100
      XX DD DSN=SYS1.FCRTSSP,DISP=SHR                                         00000110
      ***                                                                     00000120
      XXSYSLMOD DD DSN=&&LOADMOD(GSFC),DISP=(NEW,PASS),UNIT=2314,             00000130
      XX SPACE=(6144,(&NBLK,20,1),,,ROUND)                                    00000140
IEF653I SUBSTITUTION JCL - SPACE=(6144,(40,20,1),,,ROUND)
      XXSYSPRINT DD SYSOUT=&OUT,UNIT=(2314,SEP=SYSLMOD),                      00000150
IEF653I SUBSTITUTION JCL - SYSOUT=A,UNIT=(2314,SEP=SYSLMOD),
      XX DCB=(RECFM=FBA,LRECL=121,BLKSIZE=3509)                               00000160
      XXSYSTERM  DD  SYSOUT=&TERMOUT                                          00000170
IEF653I SUBSTITUTION JCL - SYSOUT=A
      XXSYSUT1 DD UNIT=(2314,SEP=(SYSLMOD,SYSPRINT)),                         00000180
      XX SPACE=(6144,(&NBLK,20,1),,,ROUND)                                    00000190
IEF653I SUBSTITUTION JCL - SPACE=(6144,(40,20,1),,,ROUND)
      XXTAPELIB DD DUMMY,DISP=(OLD,KEEP),UNIT=(180,,DEFER),LABEL=(1,BLP),     00000200
      XX DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)                                 00000210
      XXSYSLIN DD DSN=&OBJMOD,DISP=(OLD,DELETE),DCB=RECFM=FB                  00000220
      XX DD DDNAME=OBJECT                                                     00000230
IEF236I ALLOC. FOR ZMRKKACD LINK
IEF237I 240   ALLOCATED TO LOADLIB
IEF237I 332   ALLOCATED TO SYSLIB
IEF237I 332   ALLOCATED TO
IEF237I 240   ALLOCATED TO
IEF237I 330   ALLOCATED TO
IEF237I 330   ALLOCATED TO
IEF237I 233   ALLOCATED TO SYSLMOD
IEF237I 212   ALLOCATED TO SYSPRINT
IEF237I 233   ALLOCATED TO SYSTERM
IEF237I 234   ALLOCATED TO SYSUT1
IEF237I 233   ALLOCATED TO SYSLIN
```

F128-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED MAP,LIST,SIZE=(128K,12K),TERM
VARIABLE OPTIONS USED - SIZE=(131072,12288)

MODULE MAP

CONTROL SECTION

NAME	ORIGIN	LENGTH
MAIN	00	444
FREAD *	448	1CF8
FUNITABL*	2148	C8
ERL1 *	2210	8
FDDNLIST*	2218	4
IHCECOMH*	2220	F61
IHCCOMH2*	3188	66D
IHCFCVTH*	37F8	1190
IHCEFNTH*	4998	542
IHCEFIOS*	4EE0	F20
IHCFIOS2*	5EC8	52E
IHCUOPT *	6338	328
IHCERRM *	6660	5D4
IHCUATBL*	6C38	638
IHCETRCH*	7270	28E
FERMSG *	7500	68

ENTRY

NAME	LOCATION	NAME	LOCATION	NAME	LOCATION	NAME	LOCATION
FREADB	6A0	FWRITE	764	REWIND	99A	LEAVE	A4E
UNLOAD	B02	POSN	C18	MOUNT	E38	MEMBER	101A
FTRAP	110A	FALLOW	1168				
IBCOM#	2220	FDIOCS#	23DC	INTSWTCH	3166		
SEQDASD	3510						
ADCON#	37F8	FCVAOUTP	38A2	FCVLOUTP	3932	FCVZOUTP	3A82
FCVIOUTP	3E30	FCVEOUTP	4332	FCVCOUTP	454C	INT6SWCH	4833
ARITH#	4998	ADJSWTCH	4D34				
FIOCS#	4EE0	FIOCSEEP	4EE6				
ERRMON	6660	IHCERRE	6678				
IHCTRCH	7270	ERRTRA	7278				

ENTRY ADDRESS 00
TOTAL LENGTH 7568

****GSFC DOES NOT EXIST BUT HAS BEEN ADDED TO DATA SET

```
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS2.LOADLIB                                   KEPT          DDNAME=.JADLIB              0 EXCPS
IEF285I   VOL SER NOS= K3ITL0.
IEF285I   SYS1.DUMMY                                     KEPT          DDNAME=SYSLIB  -1            0 EXCPS
IEF285I   VOL SER NOS= M2SYS5.
IEF285I   SYS1.DUMMY                                     KEPT          DDNAME=SYSLIB  -2            0 EXCPS
IEF285I   VOL SER NOS= M2SYS5.
IEF285I   SYS1.FORTLIB                                   KEPT          DDNAME=SYSLIB  -3           56 EXCPS
IEF285I   VOL SER NOS= K3ITL0.
IEF285I   SYS2.FORTLIB                                   KEPT          DDNAME=SYSLIB  -4           12 EXCPS
IEF285I   VOL SER NOS= M2SYS2.
IEF285I   SYS1.PL1LIB                                    KEPT          DDNAME=SYSLIB  -5            0 EXCPS
IEF285I   VOL SER NOS= M2SYS2.
IEF285I   SYS1.FORTSSP                                   KEPT          DDNAME=SYSLIB  -6            0 EXCPS
IEF285I   VOL SER NOS= M2SYS2.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.LODMOD         PASSED        DDNAME=SYSLMOD              27 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.SV000.ZMRKKACD.R0000006       SYSOUT        DDNAME=SYSPRINT              2 EXCPS
IEF285I   VOL SER NOS= M2SCR6.
IEF285I   SYS78003.T104903.SV000.ZMRKKACD.R0000007       SYSOUT        DDNAME=SYSTERM               1 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.R0000008       DELETED       DDNAME=SYSUT1               16 EXCPS
IEF285I   VOL SER NOS= M2SCR3.
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.OBJMOD         DELETED       DDNAME=SYSLIN  -1            2 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF373I STEP /LINK    / START 78003.1052
IEF374I STEP /LINK    / STOP  78003.1052 CPU    0MIN 00.24SEC MAIN 130K LCS    OK
- STEP 02 -     RETURN CODE = 0000                                  STEP TIME =      .14 MINS=(CPU=      .00,IO=      .14)
                                        IO IN SECS, DISK=    8.49,DRUM=     .00,TAPE=     .00,CELL=     .00,OTHR=     .16
- SURCHARGES=(DRIVES ALCC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.    TOTAL STP TIME=      .14 MINS.  -
      XXGO EXEC PGM=*.LINK,SYSLMOD,REGION=70K,COND=(4,LT)                                00000240
      XXFT05F001 DD DDNAME=DATA5                                                         00000250
      XXFT06F001 DD SYSOUT=&OUT,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=&BLKSIZE)               00000260
      IEF653I SUBSTITUTION JCL - SYSOUT=&,DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265)
      XXFT07F001 DD SYSOUT=E,DCB=(RECFM=FB,LRECL=80,BLKSIZE=7280)                        00000270
      XXSYSPRINT DD SYSOUT=&OUT,UNIT=(2314,3),SPACE=(CYL,(1,1)),                         00000280
      IEF653I SUBSTITUTION JCL - SYSOUT=&,UNIT=(2314,3),SPACE=(CYL,(1,1)),
      XX DCB=(RECFM=VBA,LRECL=137,BLKSIZE=&BLKSIZE)                                      00000290
      IEF653I SUBSTITUTION JCL - DCB=(RECFM=VBA,LRECL=137,BLKSIZE=7265)
      XXSYSDUMP DD SYSOUT=A,SPACE=(CYL,(0,5))                                            00000300
      //GO.FT12F001 DD UNIT=(6250,,DEFER),DISP=(OLD,KEEP),
      //  LABEL=(,NL,,IN),DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000),
      //  VOL=SER=TAPEIN
      //GO.DATA5 DD *
IEF236I ALLOC. FOR ZMRKKACD GO
IEF237I 233   ALLOCATED TO PGM=*.DD
IEF237I 233   ALLOCATED TO FT05F001
IEF237I 333   ALLOCATED TO FT06F001
IEF237I 334   ALLOCATED TO FT07F001
IEF237I 233   ALLOCATED TO SYSPRINT
IEF237I 212   ALLOCATED TO SYSPRINT
IEF237I 233   ALLOCATED TO SYSPRINT
IEF237I 336   ALLOCATED TO SYSUDUMP
IEF237I 480   ALLOCATED TO FT12F001

   ************************************************
   INPUT TAPE AWD02        POSITIONED TO FILE    1
   ************************************************

DAY     SEC     LAT.  LONG.    ZA          OMEG-A      OMEG-B     REFL      OMEGA
 100.  80601.    62.5  178.0   56.65          0.495       0.489      0.798      0.492
       PRINTED 1 SCAN OUT OF  21872 TOTAL SCANS READ

   ************************************************
   INPUT TAPE AWD02        POSITIONED TO FILE    2
   ************************************************

DAY     SEC     LAT.  LONG.    ZA          OMEG-A      OMEG-B     REFL      OMEGA
 127.   4129.   -61.3  186.7   79.16          0.390       0.370      0.218      0.379
       PRINTED 1 SCAN OUT OF  21841 TOTAL SCANS READ

   ************************************************
   INPUT TAPE AWD02        POSITIONED TO FILE    3
   ************************************************
```

```
DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 155.     545.   79.3  297.2  72.44          0.400       0.418     0.820     0.411
        PRINTED 1 SCAN OUT OF  22349 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE   4
**********************************************

DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 183.    6415.  77.8  311.6  79.10          0.332       0.329     0.614     0.329
        PRINTED 1 SCAN OUT OF  22774 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE   5
**********************************************

DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 211.    4225.  -62.7  160.4  82.27          0.411       0.385     0.232     0.385
        PRINTED 1 SCAN OUT OF  23026 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE   6
**********************************************

DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 239.   17026.  -67.8  228.3  79.68          0.395       0.371     0.663     0.371
        PRINTED 1 SCAN OUT OF  22815 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE   7
**********************************************

DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 267.   16834.  -77.6  200.9  81.99          0.346       0.327     0.808     0.327
        PRINTED 1 SCAN OUT OF  22339 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE   8
**********************************************

DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 295.    5475.   0.3  205.8  11.36          0.243       0.252     0.194     0.246
        PRINTED 1 SCAN OUT OF  24508 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE   9
**********************************************

DAY     SEC     LAT.  LONG.   ZA          OMEG-A      OMEG-B     REFL     OMEGA
 323.    5475.   -0.8  205.7  18.50          0.247       0.256     0.080     0.251
        PRINTED 1 SCAN OUT OF  25769 TOTAL SCANS READ

**********************************************
INPUT TAPE AWD02        POSITIONED TO FILE  10
**********************************************
```

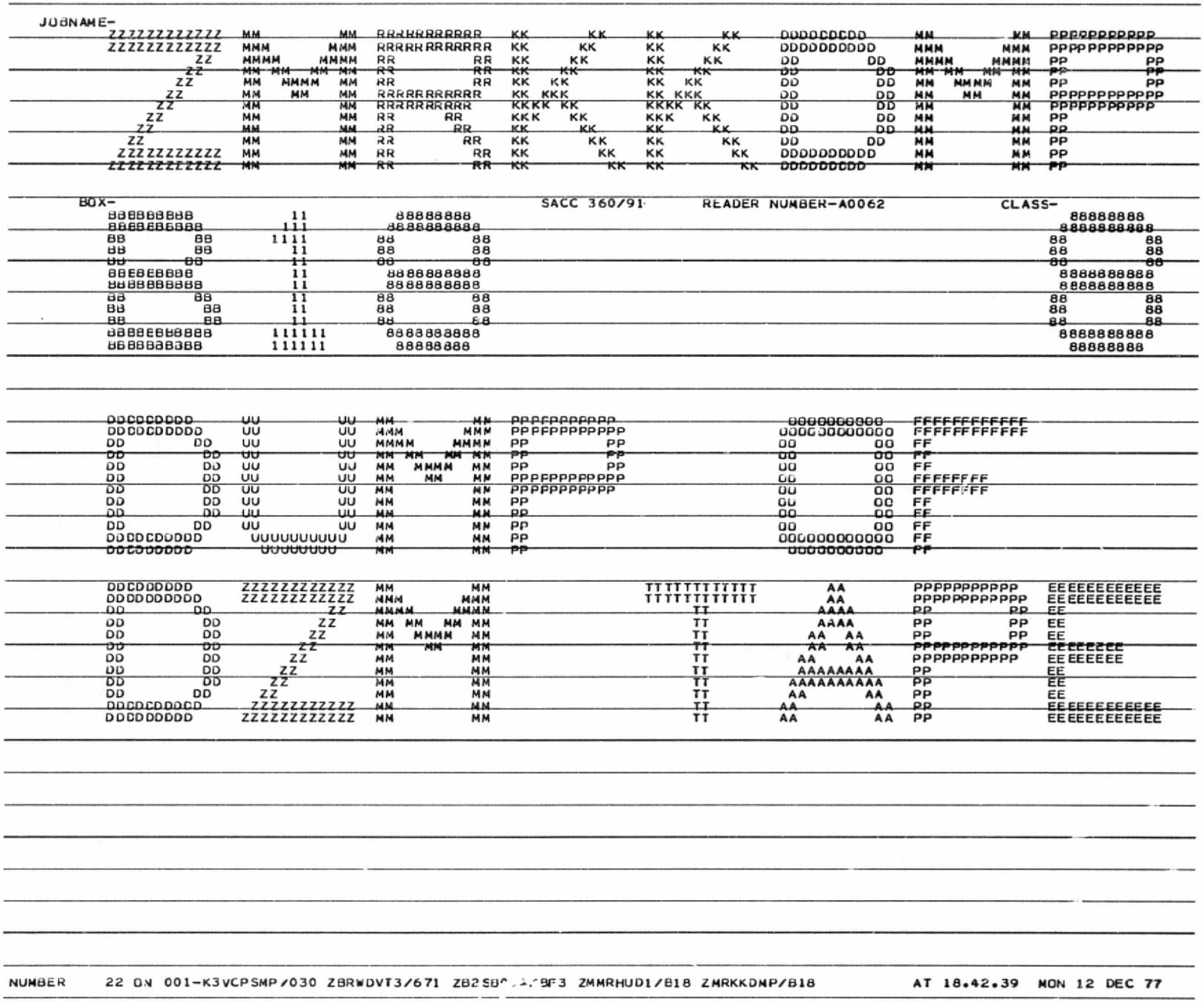
```
**************************************************
INPUT TAPE AWD02        POSITIONED TO FILE  11
**************************************************

DAY     SEC     LAT.  LONG.    ZA          OMEG-A      OMEG-B     REFL      OMEGA
  1.   20166.  -71.7   118.9   82.14          0.394       0.359      0.705     0.359
       PRINTED 1 SCAN OUT OF  21624 TOTAL SCANS READ

**************************************************
INPUT TAPE AWD02        POSITIONED TO FILE  12
**************************************************

DAY     SEC     LAT.  LONG.    ZA          OMEG-A      OMEG-B     REFL      OMEGA
 29.    1061.  -79.9    76.8   76.03          0.323       0.301      0.848     0.326
       PRINTED 1 SCAN OUT OF  17898 TOTAL SCANS READ

**************************************************
INPUT TAPE AWD02        POSITIONED TO FILE  13
**************************************************

DAY     SEC     LAT.  LONG.    ZA          OMEG-A      OMEG-B     REFL      OMEGA
 27.    1126.  -80.0    89.3   81.51          0.301       0.300      0.855     0.300
       PRINTED 1 SCAN OUT OF  17045 TOTAL SCANS READ

**************************************************
INPUT TAPE AWD02        POSITIONED TO FILE  14
**************************************************

DAY     SEC     LAT.  LONG.    ZA          OMEG-A      OMEG-B     REFL      OMEGA
 25.    7756.   76.7   168.9   81.97          0.373       0.366      0.644     0.382
       PRINTED 1 SCAN OUT OF  22257 TOTAL SCANS READ

------- JOB COMPLETED SUCCESSFULLY ------
```

```
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.LODMOD        PASSED          DDNAME=PGM=*.DD                0 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.RV00C.ZMRKKACD.S0000014      SYSIN           DDNAME=FT05F001                2 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.RV00C.ZMRKKACD.S0000014      DELETED         DDNAME=FT05F001                2 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.SVCCC.ZMRKKACD.R0000009      SYSOUT          DDNAME=FT06F001                1 EXCPS
IEF285I   VOL SER NOS= M2SCR8.
IEF285I   SYS78003.T104903.SVCCC.ZMRKKACD.R0000010      DELETED         DDNAME=FT07F001                0 EXCPS
IEF285I   VOL SER NOS= M2SCR2.
IEF285I   SYS78003.T104903.SVCCC.ZMRKKACD.R0000011      DELETED         DDNAME=SYSPRINT                0 EXCPS
IEF285I   VOL SER NOS= M2SCR5.
IEF285I   SYS78003.T104903.SV000.ZMRKKACD.R0000012      DELETED         DDNAME=SYSUDUMP                0 EXCPS
IEF285I   VOL SER NOS= M2SCR4.
IEF285I   SYS78003.T104903.RVCCC.ZMRKKACD.R0000013      KEPT            DDNAME=FT12F001            3,028 EXCPS
IEF285I   VOL SER NOS= AWD02 .
IEF373I STEP /GO        / START 78003.1057
IEF374I STEP /GO        / STOP  78003.1057 CPU    0MIN 15.84SEC MAIN   74K LCS    0K
- STEP 03 -      RETURN CODE = 0000                                    STEP TIME =      .84 MINS=(CPU=      .26,IO=      .58)
                                        IO IN SECS. DISK=     3.36,DRUM=      .84,TAPE=    30.63,CELL=      .00,OTHR=      .14
- SURCHARGES=(DRIVES ALCC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.   TOTAL STP TIME=      .84 MINS.  -
      // EXEC NOTIFY
      XXDEFALLT PROC MODE=ALL,USRID=,MSG=                * NOTIFY * 16 MAY 75   00000010
      XXNOTIFY EXEC PGM=NOTIFY,REGION=20K,COND=EVEN,PARM='&MODE,&USRID,&MSG'  00000020
      ILE05JI SUBSTITUTION JCL - PGM=NOTIFY,REGION=20K,COND=EVEN,PARM='ALL,,'
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /NOTIFY    / START 78003.1057
IEF374I STEP /NOTIFY    / STOP  78003.1057 CPU    0MIN 00.02SEC MAIN    8K LCS    0K
- STEP 04 -      RETURN CODE = 0000                                    STEP TIME =      .00 MINS=(CPU=      .00,IO=      .00)
                                        IO IN SECS. DISK=      .32,DRUM=      .00,TAPE=      .00,CELL=      .00,OTHR=      .05
- SURCHARGES=(DRIVES ALCC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.   TOTAL STP TIME=00000.00 MINS.  -
IEF285I   SYS78003.T104903.RV000.ZMRKKACD.LODMOD        DELETED
IEF285I   VOL SER NOS= M2SCR5.
IEF375I  JOB /ZMRKKACD/ START 78003.1051
IEF376I  JOB /ZMRKKACD/ STOP  78003.1057 CPU    0MIN 16.55SEC
- SYSTEM=REL21.0E (11-01-77) ME                                                  TIME=10.57.10.58 DATE=01-03-78
- JOB 0235-                                                          TOTAL TIME =     1.09 MINS=(CPU=      .27,IO=      .82)
                                        IO IN SECS. DISK=    18.25,DRUM=      .84,TAPE=    30.63,CELL=      .00,OTHR=      .50
- SURCHARGES=(DRIVES ALCC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.   TOTAL JOB TIME=     1.09 MINS.  -
  THERE WERE 01 TAPES MOUNTED FOR THIS JOB. TAPE MOUNT CHARGE WAS 00.0 MINUTES.
```

APPENDIX B

PROGRAM TO READ DZM TAPE

Following is a Sample Program which reads and prints out the contents of a DZM tape. This program is written in Fortran IV using the Fortran Input Output (FTIO) package of the Science Applications Computing Center (SACC) of Goddard Space Flight Center.



```
IEF298I  ZMRKKDMP SYSOUT=A.
     //ZMRKKDMP JOB (S00042665B,P,CLMDMP,001H00),B18,MSGLEVEL=(2,0),          B18A0062
     //   MSGCLASS=8
     ***DUMP OF CZM TAPE
     // EXEC FORTRANH,OUT=8
     //SYSIN DD * GENERATED STATEMENT
```

```
LEVEL  21.6  (DEC 72)                    OS/360  FORTRAN H                    DATE  77.346/18.26.00

          COMPILER OPTIONS - NAME=  MAIN,OPT=02,LINECNT=82,SIZE=0000K,
                             SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
                C              PROGRAM TO PROVIDE COMPLETE LIST OF DAILY
                C          OZONE AND STANDARD DEVIATIONS.  READS TAPE FOR ENTIRE
                C          YEAR.  DATA IN ARRAY CONTEN.
  ISN 0002            DIMENSION CONTEN(10),INDAT(17),CENLAT(17),SIGMA(17),OZONE(17)
  ISN 0003            EQUIVALENCE (CONTEN( 1),LCOOR), (CONTEN(2),NODAY),(CONTEN(3),
                     1 NOMES)
                C              READ TAPE - DATA FOR ENTIRE DAY AT ONCE
  ISN 0004            WRITE(6,203)
  ISN 0005          203 FORMAT(14X,3(6X,'LAT  PTS  OZONE',7X,'SIGMA',5X))
  ISN 0006           10 DO 15 K=1,17
  ISN 0007              CALL FREAD(CONTEN,10,LEN,&80,&91)
  ISN 0008              INDAT(K) = NOMES
  ISN 0009              CENLAT(K) = CONTEN(5)
  ISN 0010              OZONE(K) = CONTEN(6)
  ISN 0011           15 SIGMA(K) = CONTEN(7)
                C                 WRITE DATA: AT LEAST FOUR ZONES FOR EVERY DAY, ALL
                C          ZONES EVERY 20 DAYS.
  ISN 0012              WRITE(6,201) NODAY
  ISN 0013           50 WRITE(6,202) (CENLAT(I),INDAT(I),OZONE(I),SIGMA(I), I = 1,17)
  ISN 0014              GO TO 10
  ISN 0015          201 FORMAT(1H ,'DAY NUMBER',I4)
  ISN 0016          202 FORMAT(14X,3(4X,F6.1,I4,2E12.4)/ 14X,3(4X,F6.1,I4,2E12.4)/
                     1 14X,3(4X,F6.1,I4,2E12.4)/14X,3(4X,F6.1,I4,2E12.4)/
                     2 14X,3(4X,F6.1,I4,2E12.4)/14X,2(4X,F6.1,I4,2E12.4))
  ISN 0017           80 WRITE(6,204) LCOOR,CONTEN(4)
  ISN 0018          204 FORMAT(2X,'COORDINATE STYLE',I3,5X,'PRESSURE LEVEL',F8.1)
  ISN 0019              GO TO 95
  ISN 0020           91 WRITE(6,131)
  ISN 0021          131 FORMAT(1X,'ERROR TERMINATION - TROUBLE READING TAPE')
  ISN 0022           95 CALL UNLOAD(10)
  ISN 0023              STOP
  ISN 0024              END
```

NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.	NAME	TAG	TYPE	ADD.
I	F	I*4	0001AC	K	SF	I*4	0001B0	LEN	SFA	I*4	0001B4	FREAD	SF XF	R*4	000890
INDAT	SF	I*4	0001B8	LCOOR	F E	I*4	0002D0	NODAY	F E	I*4	0002D4	NOMES	F E	I*4	0002D8
OZONE	SF	R*4	0001FC	SIGMA	SF	R*4	000240	CENLAT	SF	R*4	000284	CONTEN	SFA E	R*4	0002DC
IBCOM#	F XF	I*4	000000	UNLOAD	SF XF	R*4	000000								

```
   LABEL    ADDR                LABEL    ADDR                LABEL    ADDR                LABEL    ADDR          PAGE 003
      10  000334                  15  000370                  50  000398 NR               80  000308
      91  000400                  95  000414
*OPTIONS IN EFFECT*      NAME=  MAIN,OPT=02,LINECNT=82,SIZE=0000K,
*OPTIONS IN EFFECT*      SOURCE,EBCDIC,NOLIST,NODECK,LOAD,MAP,NOEDIT,ID,NOXREF
*STATISTICS*     SOURCE STATEMENTS =      23 ,PROGRAM SIZE =     1102
*STATISTICS*  NO  DIAGNOSTICS GENERATED
****** END OF COMPILATION ******                                  81K BYTES OF CORE NOT USED
```

```
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /SOURCE  / START 77346.1824
IEF374I STEP /SOURCE  / STOP  77346.1826 CPU    0MIN 00.45SEC MAIN 248K LCS    0K
- STEP 01 -      RETURN CODE = 0000                                  STEP TIME =      .11 MINS=(CPU=      .00,IO=      .11)
                                        IO IN SECS. DISK=     6.60,DRUM=      .00,TAPE=      .00,CELL=      .00,OTHR=      .12
- SURCHARGES=(DRIVES ALOC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.    TOTAL STP TIME=      .11 MINS.  -
     // EXEC LINKGO,REGION.GO=100K
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /LINK    / START 77346.1826
IEF374I STEP /LINK    / STOP  77346.1827 CPU    0MIN 00.34SEC MAIN 130K LCS    0K
- STEP 02 -      RETURN CODE = 0000                                  STEP TIME =      .15 MINS=(CPU=      .00,IO=      .15)
                                        IO IN SECS. DISK=     9.52,DRUM=      .00,TAPE=      .00,CELL=      .00,OTHR=      .15
- SURCHARGES=(DRIVES ALOC=000,TAPE MOUNTS=000,CORE=000,PAPER=000,PRIORITY=00000)SECS.    TOTAL STP TIME=      .15 MINS.  -
     //GO.FT10F001 DD UNIT=(2400-9),DISP=(OLD,KEEP),
     //  LABEL=(1,NL,,IN),VOL=SER=L5560,
     //  DCB=(RECFM=FB,LRECL=40,BLKSIZE=16000)
     //GO.SYSUDUMP DD SYSOUT=A
IEF142I - STEP WAS EXECUTED - COND CODE 0000
IEF373I STEP /GO      / START 77346.1827
IEF374I STEP /GO      / STOP  77346.1831 CPU    0MIN 04.20SEC MAIN  82K LCS    0K
- STEP 03 -      RETURN CODE = 0000                                  STEP TIME =      .12 MINS=(CPU=      .07,IO=      .05)
                                        IO IN SECS. DISK=     2.90,DRUM=      .00,TAPE=      .27,CELL=      .00,OTHR=      .15
- SURCHARGES=(DRIVES ALOC=000,TAPE MOUNTS=000,CORE=000,PAPER=001,PRIORITY=00000)SECS.    TOTAL STP TIME=      .13 MINS.  -
IEF375I  JOB /ZMRKKDMP/ START 77346.1824
IEF376I  JOB /ZMRKKDMP/ STOP  77346.1831 CPU    0MIN 04.99SEC
-  SYSTEM=REL21.8E (11-01-77) M2                                                    TIME=18.31.49.08 DATE=12-12-77
- JOB 1137-                                                        TOTAL TIME =      .40 MINS=(CPU=      .08,IO=      .32)
                                        IO IN SECS. DISK=    19.02,DRUM=      .00,TAPE=      .27,CELL=      .00,OTHR=      .43
- SURCHARGES=(DRIVES ALOC=000,TAPE MOUNTS=000,CORE=000,PAPER=001,PRIORITY=00000)SECS.    TOTAL JOB TIME=      .41 MINS.  -
 THERE WERE 01 TAPES MOUNTED FOR THIS JOB. TAPE MOUNT CHARGE WAS 00.0 MINUTES.
```

```
Z02SB.U2S.CNTL          DISK00    1    1 771108  NOT USED IN PAST 30 DAYS
Z02SB.TSCAN.CNTL        DISK00    2    1 771107  NOT USED IN PAST 30 DAYS
Z02SB.LABEL.CNTL        DISK00    1    1 771107  NOT USED IN PAST 30 DAYS
Z02SB.JOB91.CNTL        DISK00    1    1 771107  NOT USED IN PAST 30 DAYS
Z02SB.NOTIFY.CNTL       DISK00    1    1 771107  NOT USED IN PAST 30 DAYS
ZMGEM.BIL.CLIST         DISK00    5    3 771104  NOT USED IN PAST 30 DAYS
ZGJMS.LIB.EYETER        DISK00   20    8 771108  NOT USED IN PAST 30 DAYS

SPACE MAKER IS RUN ON TUESDAY AND FRIDAY MORNINGS DURING GRAVE SHIFT.  TO HAVE
YOUR ALLOCATION LIMIT INCREASED, CONTACT BILL MYERS, X6819.  FOR DATA SET
RECOVERY, CONTACT THE PAC, X6406.


F128-LEVEL LINKAGE EDITOR OPTIONS SPECIFIED MAP,LIST,SIZE=(128K,12K),TERM
          VARIABLE OPTIONS USED -  SIZE=(131072,12288)

                                MODULE MAP

  CONTROL SECTION                          ENTRY

    NAME      ORIGIN   LENGTH      NAME    LOCATION    NAME    LOCATION    NAME    LOCATION    NAME    LOCATION

  MAIN            00      44E
  FREAD     *    450     1CF9
                                   FREADE      6A8    FWRITE      76C    REWIND      9A2    LEAVE       A56
                                   UNLOAD      80A    POSN        C20    MOUNT       E40    MEMBER     1022
                                   FTRAP      1112    FALLOW     1190
  FUNITABL*   2150       C8
  FPL1      *   2218        8
  FOUNLIST*   2220        4
  IHCECOMH*   2228      F61
                                   IECCM#      2228    FDIOCS#    22E4    INTSWTCH    316E
  IHCCOMH2*   3190      66D
                                   SEQBASD     3518
  IHCFCVTH*   3800      119D
                                   ACCCN#      3800    FCVAOUTP    38AA    FCVLOUTP    393A    FCVZOUTP    3A8A
                                   FCVICUTP    3E38    FCVEOUTP    433A    FCVCOUTP    4554    INTGSWCH    4838
  IHCEFNTH*   49A0      542
                                   ARITH#      49A0    ADJSWTCH    4D3C
  IHCEFIOS*   4EE8      F28
                                   FICCS#      4EE8    FIOCSBEP    4EEE
  IHCFIOS2*   5E10      52E
  IHCUOPT   *  6340      328
  IHCERRM   *  6668      5D4
                                   ERRMCN      6668    IHCERRE     6680
  IHCUATBL*   6C40      638
  IHCETRCH*   7278      28E
                                   IHCTRCH     7278    ERRTRA      7280
  FERMSG    *  7508       68

  ENTRY ADDRESS     .    00
  TOTAL LENGTH         7570

****GSFC      DOES NOT EXIST BLT HAS BEEN ADDED TO DATA SET
```

	LAT	PTS	OZONE	SIGMA	LAT	PTS	OZONE	SIGMA	LAT	PTS	OZONE	SIGMA
DAY NUMBER 101												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	41	0.3315E 00	0.3009E-01	-60.0	59	0.3425E 00	0.3847E-01
	-50.0	60	0.3086E 00	0.2351E-01	-40.0	60	0.2819E 00	0.1665E-01	-30.0	54	0.2721E 00	0.1096E-01
	-20.0	55	0.2567E 00	0.8455E-02	-10.0	58	0.2528E 00	0.1040E-01	0.0	52	0.2545E 00	0.1028E-01
	10.0	58	0.2628E 00	0.1378E-01	20.0	53	0.2849E 00	0.1641E-01	30.0	55	0.3173E 00	0.1975E-01
	40.0	60	0.3689E 00	0.3955E-01	50.0	60	0.4287E 00	0.5251E-01	60.0	51	0.4436E 00	0.5034E-01
	70.0	59	0.4734E 00	0.6325E-01	80.0	60	0.5042E 00	0.3551E-01				
DAY NUMBER 102												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	35	0.3411E 00	0.3108E-01	-60.0	55	0.3360E 00	0.2535E-01
	-50.0	52	0.3030E 00	0.2532E-01	-40.0	55	0.2773E 00	0.1538E-01	-30.0	44	0.2710E 00	0.1112E-01
	-20.0	45	0.2569E 00	0.1100E-01	-10.0	47	0.2533E 00	0.7699E-02	0.0	34	0.2537E 00	0.1014E-01
	10.0	44	0.2638E 00	0.1239E-01	20.0	41	0.2851E 00	0.1516E-01	30.0	43	0.3156E 00	0.2051E-01
	40.0	42	0.3815E 00	0.4755E-01	50.0	41	0.4247E 00	0.4623E-01	60.0	35	0.4345E 00	0.2460E-01
	70.0	45	0.4693E 00	0.4061E-01	80.0	36	0.5119E 00	0.2797E-01				
DAY NUMBER 103												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	35	0.3265E 00	0.3315E-01	-60.0	50	0.3340E 00	0.3162E-01

	-50.0	55	0.3129E 00	0.2322E-01	-40.0	50	0.2782E 00	0.1430E-01	-30.0	54	0.2698E 00	0.1328E-01
	-20.0	57	0.2553E 00	0.1052E-01	-10.0	52	0.2493E 00	0.8760E-02	0.0	49	0.2487E 00	0.9600E-02
	10.0	54	0.2615E 00	0.1404E-01	20.0	49	0.2857E 00	0.1720E-01	30.0	52	0.3105E 00	0.2799E-01
	40.0	50	0.3735E 00	0.4093E-01	50.0	47	0.4169E 00	0.4842E-01	60.0	51	0.4561E 00	0.6007E-01
	70.0	58	0.5074E 00	0.5667E-01	80.0	51	0.5235E 00	0.3805E-01				
DAY NUMBER 104												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	32	0.3237E 00	0.3993E-01	-60.0	57	0.3315E 00	0.3313E-01
	-50.0	52	0.3225E 00	0.2588E-01	-40.0	55	0.2816E 00	0.1444E-01	-30.0	54	0.2662E 00	0.9832E-02
	-20.0	56	0.2556E 00	0.7295E-02	-10.0	56	0.2495E 00	0.9404E-02	0.0	44	0.2488E 00	0.9730E-02
	10.0	55	0.2602E 00	0.1549E-01	20.0	46	0.2863E 00	0.1889E-01	30.0	51	0.3110E 00	0.3140E-01
	40.0	57	0.3727E 00	0.4879E-01	50.0	45	0.4138E 00	0.5935E-01	60.0	45	0.4405E 00	0.3911E-01
	70.0	53	0.5163E 00	0.4384E-01	80.0	48	0.5285E 00	0.4038E-01				
DAY NUMBER 105												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	34	0.3177E 00	0.3993E-01	-60.0	56	0.3262E 00	0.3495E-01
	-50.0	57	0.3183E 00	0.3079E-01	-40.0	55	0.2894E 00	0.2616E-01	-30.0	56	0.2687E 00	0.1181E-01
	-20.0	54	0.2577E 00	0.8015E-02	-10.0	54	0.2491E 00	0.7736E-02	0.0	44	0.2504E 00	0.9075E-02
	10.0	52	0.2628E 00	0.1359E-01	20.0	46	0.2825E 00	0.1194E-01	30.0	48	0.3248E 00	0.3642E-01
	40.0	53	0.3716E 00	0.4073E-01	50.0	43	0.4169E 00	0.5121E-01	60.0	46	0.4472E 00	0.5770E-01
	70.0	61	0.5059E 00	0.4341E-01	80.0	51	0.5370E 00	0.3608E-01				
DAY NUMBER 106												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	32	0.3211E 00	0.2766E-01	-60.0	58	0.3241E 00	0.2577E-01
	-50.0	51	0.3110E 00	0.2556E-01	-40.0	54	0.2891E 00	0.2856E-01	-30.0	55	0.2710E 00	0.1557E-01
	-20.0	49	0.2551E 00	0.9949E-02	-10.0	51	0.2461E 00	0.7749E-02	0.0	50	0.2524E 00	0.1349E-01
	10.0	45	0.2656E 00	0.1366E-01	20.0	40	0.2793E 00	0.1375E-01	30.0	50	0.3170E 00	0.2927E-01
	40.0	50	0.3690E 00	0.5490E-01	50.0	48	0.4042E 00	0.4390E-01	60.0	37	0.4492E 00	0.4707E-01
	70.0	42	0.4880E 00	0.4257E-01	80.0	31	0.5181E 00	0.5007E-01				
DAY NUMBER 107												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	35	0.3269E 00	0.2229E-01	-60.0	63	0.3365E 00	0.1996E-01
	-50.0	64	0.3172E 00	0.2623E-01	-40.0	61	0.2905E 00	0.3388E-01	-30.0	60	0.2760E 00	0.1426E-01
	-20.0	60	0.2558E 00	0.7957E-02	-10.0	60	0.2475E 00	0.9976E-02	0.0	51	0.2494E 00	0.1448E-01
	10.0	58	0.2657E 00	0.1589E-01	20.0	56	0.2839E 00	0.1339E-01	30.0	51	0.3131E 00	0.2641E-01
	40.0	51	0.3649E 00	0.4698E-01	50.0	52	0.4044E 00	0.4821E-01	60.0	50	0.4589E 00	0.5025E-01
	70.0	54	0.4916E 00	0.3974E-01	80.0	50	0.4989E 00	0.4486E-01				
DAY NUMBER 108												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	18	0.3237E 00	0.1984E-01	-60.0	48	0.3336E 00	0.2732E-01
	-50.0	46	0.3275E 00	0.2542E-01	-40.0	49	0.2906E 00	0.2576E-01	-30.0	44	0.2700E 00	0.1053E-01
	-20.0	43	0.2557E 00	0.9611E-02	-10.0	47	0.2470E 00	0.1044E-01	0.0	39	0.2482E 00	0.1188E-01
	10.0	42	0.2633E 00	0.1228E-01	20.0	46	0.2860E 00	0.1259E-01	30.0	49	0.3100E 00	0.2282E-01
	40.0	46	0.3570E 00	0.3578E-01	50.0	48	0.4190E 00	0.4868E-01	60.0	45	0.4681E 00	0.4835E-01
	70.0	49	0.5079E 00	0.3991E-01	80.0	57	0.4994E 00	0.4381E-01				
DAY NUMBER 109												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	30	0.3258E 00	0.2266E-01	-60.0	65	0.3389E 00	0.2558E-01
	-50.0	64	0.3325E 00	0.3729E-01	-40.0	61	0.2895E 00	0.2887E-01	-30.0	53	0.2675E 00	0.1117E-01
	-20.0	55	0.2587E 00	0.7924E-02	-10.0	61	0.2481E 00	0.1045E-01	0.0	46	0.2450E 00	0.1150E-01
	10.0	57	0.2651E 00	0.1691E-01	20.0	49	0.2870E 00	0.1199E-01	30.0	54	0.3160E 00	0.2644E-01
	40.0	61	0.3691E 00	0.4275E-01	50.0	49	0.4041E 00	0.4496E-01	60.0	55	0.4653E 00	0.5163E-01
	70.0	64	0.5100E 00	0.4779E-01	80.0	69	0.4736E 00	0.4855E-01				
DAY NUMBER 110												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	25	0.3225E 00	0.2078E-01	-60.0	62	0.3447E 00	0.3013E-01
	-50.0	57	0.3226E 00	0.3195E-01	-40.0	57	0.2933E 00	0.2996E-01	-30.0	60	0.2735E 00	0.2142E-01
	-20.0	58	0.2562E 00	0.9584E-02	-10.0	61	0.2473E 00	0.9614E-02	0.0	56	0.2470E 00	0.9112E-02
	10.0	53	0.2645E 00	0.1191E-01	20.0	56	0.2861E 00	0.1323E-01	30.0	54	0.3254E 00	0.3567E-01
	40.0	52	0.3754E 00	0.4257E-01	50.0	51	0.3957E 00	0.4376E-01	60.0	60	0.4672E 00	0.5070E-01
	70.0	61	0.5094E 00	0.3782E-01	80.0	62	0.4760E 00	0.4747E-01				
DAY NUMBER 111												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	12	0.3273E 00	0.2310E-01	-60.0	51	0.3381E 00	0.2949E-01
	-50.0	50	0.3112E 00	0.2884E-01	-40.0	47	0.2865E 00	0.3022E-01	-30.0	45	0.2705E 00	0.2124E-01
	-20.0	48	0.2567E 00	0.1069E-01	-10.0	49	0.2454E 00	0.9529E-02	0.0	38	0.2433E 00	0.1105E-01
	10.0	45	0.2633E 00	0.1596E-01	20.0	45	0.2835E 00	0.1294E-01	30.0	40	0.3206E 00	0.2383E-01
	40.0	47	0.3549E 00	0.4179E-01	50.0	40	0.3969E 00	0.3430E-01	60.0	45	0.4614E 00	0.4885E-01
	70.0	54	0.5082E 00	0.3107E-01	80.0	52	0.4911E 00	0.4082E-01				
DAY NUMBER 112												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	5	0.3368E 00	0.1779E-01	-60.0	51	0.3350E 00	0.2654E-01
	-50.0	67	0.3231E 00	0.3104E-01	-40.0	58	0.2882E 00	0.2569E-01	-30.0	53	0.2674E 00	0.1624E-01
	-20.0	53	0.2556E 00	0.8011E-02	-10.0	57	0.2469E 00	0.9974E-02	0.0	45	0.2484E 00	0.1315E-01
	10.0	52	0.2660E 00	0.1451E-01	20.0	51	0.2884E 00	0.1778E-01	30.0	54	0.3275E 00	0.2588E-01
	40.0	55	0.3587E 00	0.3957E-01	50.0	49	0.4139E 00	0.3647E-01	60.0	51	0.4645E 00	0.4081E-01
	70.0	59	0.5056E 00	0.3596E-01	80.0	61	0.4816E 00	0.3423E-01				
DAY NUMBER 113												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	16	0.3231E 00	0.1013E-01	-60.0	32	0.3371E 00	0.2875E-01
	-50.0	50	0.3184E 00	0.2977E-01	-40.0	50	0.2790E 00	0.1651E-01	-30.0	47	0.2697E 00	0.1864E-01
	-20.0	62	0.2555E 00	0.9850E-02	-10.0	60	0.2486E 00	0.1028E-01	0.0	40	0.2500E 00	0.1243E-01
	10.0	54	0.2627E 00	0.1673E-01	20.0	42	0.2858E 00	0.2090E-01	30.0	44	0.3261E 00	0.3206E-01
	40.0	50	0.3691E 00	0.4413E-01	50.0	41	0.4071E 00	0.4188E-01	60.0	46	0.4518E 00	0.4098E-01
	70.0	51	0.4962E 00	0.3545E-01	80.0	63	0.4810E 00	0.3351E-01				
DAY NUMBER 114												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	20	0.3314E 00	0.2625E-01	-60.0	54	0.3394E 00	0.2741E-01
	-50.0	56	0.3203E 00	0.3748E-01	-40.0	62	0.2811E 00	0.2161E-01	-30.0	63	0.2730E 00	0.2026E-01
	-20.0	59	0.2571E 00	0.1236E-01	-10.0	57	0.2464E 00	0.1022E-01	0.0	51	0.2473E 00	0.1107E-01
	10.0	51	0.2643E 00	0.1620E-01	20.0	48	0.2884E 00	0.1822E-01	30.0	50	0.3220E 00	0.3047E-01
	40.0	48	0.3565E 00	0.3356E-01	50.0	42	0.4141E 00	0.4233E-01	60.0	51	0.4475E 00	0.3108E-01

DAY NUMBER 115	70.0	53	0.4893E 00	0.3525E-01	80.0	60	0.4747E 00	0.2978E-01					
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	15	0.3312E 00	0.1964E-01	-60.0	50	0.3418E 00	0.2912E-01	
	-50.0	38	0.3254E 00	0.3219E-01	-40.0	48	0.2781E 00	0.1929E-01	-30.0	45	0.2720E 00	0.2251E-01	
	-20.0	41	0.2558E 00	0.8483E-02	-10.0	46	0.2460E 00	0.1018E-01	0.0	41	0.2482E 00	0.8348E-02	
	10.0	44	0.2645E 00	0.1573E-01	20.0	47	0.2873E 00	0.2038E-01	30.0	49	0.3151E 00	0.2535E-01	
	40.0	48	0.3747E 00	0.4131E-01	50.0	46	0.4105E 00	0.5099E-01	60.0	47	0.4455E 00	0.3448E-01	
	70.0	55	0.4821E 00	0.2832E-01	80.0	55	0.4774E 00	0.2872E-01					
DAY NUMBER 116													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	15	0.3341E 00	0.1818E-01	-60.0	65	0.3422E 00	0.2377E-01	
	-50.0	64	0.3166E 00	0.3270E-01	-40.0	46	0.2878E 00	0.2588E-01	-30.0	44	0.2711E 00	0.1250E-01	
	-20.0	55	0.2579E 00	0.1040E-01	-10.0	55	0.2477E 00	0.1092E-01	0.0	49	0.2455E 00	0.1041E-01	
	10.0	56	0.2640E 00	0.1443E-01	20.0	50	0.2816E 00	0.1028E-01	30.0	55	0.3194E 00	0.2883E-01	
	40.0	52	0.3680E 00	0.4135E-01	50.0	49	0.4061E 00	0.4164E-01	60.0	60	0.4403E 00	0.3601E-01	
	70.0	62	0.4781E 00	0.2841E-01	80.0	67	0.4859E 00	0.2953E-01					
DAY NUMBER 117													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	12	0.3359E 00	0.1938E-01	-60.0	60	0.3362E 00	0.2246E-01	
	-50.0	58	0.3196E 00	0.2505E-01	-40.0	57	0.2893E 00	0.2427E-01	-30.0	56	0.2686E 00	0.1397E-01	
	-20.0	49	0.2591E 00	0.1114E-01	-10.0	49	0.2491E 00	0.8010E-02	0.0	55	0.2471E 00	0.1103E-01	
	10.0	53	0.2618E 00	0.1496E-01	20.0	54	0.2855E 00	0.1214E-01	30.0	60	0.3189E 00	0.2564E-01	
	40.0	55	0.3795E 00	0.4846E-01	50.0	60	0.4109E 00	0.3905E-01	60.0	56	0.4393E 00	0.3956E-01	
	70.0	61	0.4761E 00	0.3601E-01	80.0	60	0.4748E 00	0.2953E-01					
DAY NUMBER 118													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	10	0.3304E 00	0.1208E-01	-60.0	54	0.3424E 00	0.2283E-01	
	-50.0	53	0.3242E 00	0.2840E-01	-40.0	47	0.2969E 00	0.2182E-01	-30.0	54	0.2763E 00	0.1479E-01	
	-20.0	45	0.2599E 00	0.8407E-02	-10.0	44	0.2497E 00	0.7838E-02	0.0	50	0.2512E 00	0.1100E-01	
	10.0	50	0.2673E 00	0.1155E-01	20.0	46	0.2835E 00	0.1342E-01	30.0	47	0.3230E 00	0.2482E-01	
	40.0	46	0.3808E 00	0.5645E-01	50.0	46	0.4156E 00	0.3815E-01	60.0	49	0.4314E 00	0.4469E-01	
	70.0	61	0.4727E 00	0.3858E-01	80.0	61	0.4667E 00	0.2369E-01					
DAY NUMBER 119													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	8	0.3349E 00	0.2935E-01	-60.0	68	0.3378E 00	0.2328E-01	
	-50.0	62	0.3228E 00	0.3030E-01	-40.0	60	0.3084E 00	0.2579E-01	-30.0	59	0.2747E 00	0.1783E-01	
	-20.0	56	0.2574E 00	0.9582E-02	-10.0	59	0.2440E 00	0.9081E-02	0.0	54	0.2497E 00	0.1041E-01	
	10.0	48	0.2642E 00	0.1467E-01	20.0	53	0.2855E 00	0.1666E-01	30.0	54	0.3164E 00	0.2439E-01	
	40.0	53	0.3696E 00	0.4025E-01	50.0	55	0.4100E 00	0.3088E-01	60.0	57	0.4375E 00	0.3029E-01	
	70.0	60	0.4667E 00	0.3723E-01	80.0	62	0.4635E 00	0.2423E-01					
DAY NUMBER 120													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	7	0.3395E 00	0.3105E-01	-60.0	53	0.3293E 00	0.1626E-01	
	-50.0	54	0.3194E 00	0.2582E-01	-40.0	49	0.2990E 00	0.2648E-01	-30.0	52	0.2793E 00	0.1873E-01	
	-20.0	50	0.2567E 00	0.9175E-02	-10.0	49	0.2483E 00	0.6655E-02	0.0	50	0.2495E 00	0.9194E-02	
	10.0	47	0.2660E 00	0.1259E-01	20.0	53	0.2838E 00	0.1182E-01	30.0	51	0.3281E 00	0.2795E-01	
	40.0	50	0.3693E 00	0.3588E-01	50.0	54	0.4087E 00	0.4987E-01	60.0	51	0.4390E 00	0.3183E-01	
	70.0	64	0.4679E 00	0.4435E-01	80.0	63	0.4717E 00	0.2658E-01					
DAY NUMBER 121													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	5	0.3652E 00	0.2424E-01	-60.0	64	0.3329E 00	0.2163E-01	
	-50.0	60	0.3175E 00	0.2961E-01	-40.0	61	0.3013E 00	0.2499E-01	-30.0	52	0.2754E 00	0.1561E-01	
	-20.0	57	0.2588E 00	0.1104E-01	-10.0	61	0.2479E 00	0.9876E-02	0.0	55	0.2488E 00	0.1191E-01	
	10.0	58	0.2668E 00	0.1407E-01	20.0	48	0.2859E 00	0.1225E-01	30.0	43	0.3209E 00	0.2240E-01	
	40.0	54	0.3560E 00	0.4209E-01	50.0	53	0.3975E 00	0.4914E-01	60.0	53	0.4438E 00	0.3764E-01	
	70.0	50	0.4625E 00	0.4637E-01	80.0	64	0.4683E 00	0.3467E-01					
DAY NUMBER 122													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	3	0.3628E 00	0.1384E-01	-60.0	50	0.3272E 00	0.2339E-01	
	-50.0	51	0.3176E 00	0.3347E-01	-40.0	49	0.3029E 00	0.2650E-01	-30.0	39	0.2762E 00	0.1454E-01	
	-20.0	45	0.2584E 00	0.1107E-01	-10.0	47	0.2474E 00	0.9900E-02	0.0	41	0.2488E 00	0.9073E-02	
	10.0	47	0.2650E 00	0.1195E-01	20.0	49	0.2925E 00	0.2225E-01	30.0	47	0.3336E 00	0.2480E-01	
	40.0	47	0.3581E 00	0.3738E-01	50.0	39	0.3981E 00	0.4339E-01	60.0	42	0.4448E 00	0.4164E-01	
	70.0	58	0.4767E 00	0.4545E-01	80.0	58	0.4713E 00	0.3371E-01					
DAY NUMBER 123													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	3	0.3460E 00	0.3124E-01	-60.0	64	0.3297E 00	0.2818E-01	
	-50.0	63	0.3161E 00	0.2762E-01	-40.0	63	0.3068E 00	0.2396E-01	-30.0	55	0.2766E 00	0.1654E-01	
	-20.0	55	0.2582E 00	0.1049E-01	-10.0	58	0.2496E 00	0.9925E-02	0.0	47	0.2478E 00	0.1039E-01	
	10.0	58	0.2657E 00	0.1309E-01	20.0	47	0.2828E 00	0.9782E-02	30.0	58	0.3281E 00	0.2757E-01	
	40.0	57	0.3764E 00	0.4536E-01	50.0	54	0.3820E 00	0.4703E-01	60.0	47	0.4401E 00	0.5324E-01	
	70.0	53	0.4723E 00	0.6123E-01	80.0	55	0.4542E 00	0.4365E-01					
DAY NUMBER 124													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	1	-0.7770E 03	-0.7770E 03	-60.0	55	0.3343E 00	0.2633E-01	
	-50.0	54	0.3232E 00	0.3024E-01	-40.0	55	0.2982E 00	0.2343E-01	-30.0	57	0.2764E 00	0.1413E-01	
	-20.0	53	0.2592E 00	0.1086E-01	-10.0	56	0.2487E 00	0.7159E-02	0.0	53	0.2492E 00	0.7422E-02	
	10.0	54	0.2648E 00	0.1256E-01	20.0	51	0.2880E 00	0.1945E-01	30.0	53	0.3208E 00	0.2074E-01	
	40.0	58	0.3625E 00	0.3157E-01	50.0	53	0.3917E 00	0.5259E-01	60.0	53	0.4373E 00	0.4947E-01	
	70.0	61	0.4578E 00	0.5396E-01	80.0	69	0.4507E 00	0.4051E-01					
DAY NUMBER 125													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	61	0.3262E 00	0.3031E-01	
	-50.0	60	0.3106E 00	0.3094E-01	-40.0	58	0.3031E 00	0.2887E-01	-30.0	56	0.2731E 00	0.1523E-01	
	-20.0	58	0.2601E 00	0.1261E-01	-10.0	51	0.2470E 00	0.8201E-02	0.0	48	0.2478E 00	0.1110E-01	
	10.0	54	0.2639E 00	0.1295E-01	20.0	45	0.2862E 00	0.8806E-02	30.0	61	0.3278E 00	0.2624E-01	
	40.0	55	0.3505E 00	0.3071E-01	50.0	53	0.3947E 00	0.4725E-01	60.0	53	0.4298E 00	0.6702E-01	
	70.0	60	0.4625E 00	0.5226E-01	80.0	68	0.4523E 00	0.3725E-01					
DAY NUMBER 126													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	61	0.3212E 00	0.3549E-01	
	-50.0	62	0.3150E 00	0.3147E-01	-40.0	56	0.2937E 00	0.2844E-01	-30.0	56	0.2761E 00	0.2180E-01	

-20.0	55	0.2584E 00	0.1149E-01	-10.0	57	0.2480E 00	0.7369E-02	0.0	53	0.2496E 00	0.1086E-01
10.0	60	0.2625E 00	0.1396E-01	20.0	50	0.2870E 00	0.1461E-01	30.0	60	0.3285E 00	0.2598E-01
40.0	60	0.3601E 00	0.3203E-01	50.0	61	0.3962E 00	0.4172E-01	60.0	65	0.4240E 00	0.5782E-01
70.0	65	0.4566E 00	0.5658E-01	80.0	63	0.4539E 00	0.3164E-01				
DAY NUMBER 127											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	50	0.3366E 00	0.3156E-01
-50.0	47	0.3147E 00	0.2827E-01	-40.0	47	0.2943E 00	0.2750E-01	-30.0	45	0.2804E 00	0.1850E-01
-20.0	43	0.2545E 00	0.1177E-01	-10.0	37	0.2464E 00	0.1221E-01	0.0	44	0.2494E 00	0.1023E-01
10.0	44	0.2651E 00	0.1234E-01	20.0	38	0.2833E 00	0.9863E-02	30.0	46	0.3289E 00	0.2195E-01
40.0	44	0.3689E 00	0.4361E-01	50.0	44	0.3938E 00	0.4145E-01	60.0	44	0.4182E 00	0.5758E-01
70.0	54	0.4587E 00	0.5846E-01	80.0	59	0.4513E 00	0.4597E-01				
DAY NUMBER 128											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	54	0.3277E 00	0.3896E-01
-50.0	61	0.3133E 00	0.2643E-01	-40.0	62	0.2930E 00	0.2689E-01	-30.0	56	0.2751E 00	0.2062E-01
-20.0	55	0.2621E 00	0.9843E-02	-10.0	60	0.2488E 00	0.1150E-01	0.0	57	0.2506E 00	0.1008E-01
10.0	60	0.2628E 00	0.1464E-01	20.0	46	0.2856E 00	0.1250E-01	30.0	50	0.3237E 00	0.2330E-01
40.0	56	0.3499E 00	0.2914E-01	50.0	54	0.3895E 00	0.4329E-01	60.0	55	0.4251E 00	0.5160E-01
70.0	64	0.4515E 00	0.6225E-01	80.0	64	0.4539E 00	0.4231E-01				
DAY NUMBER 129											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	52	0.3286E 00	0.3854E-01
-50.0	57	0.3146E 00	0.3266E-01	-40.0	57	0.3042E 00	0.3015E-01	-30.0	56	0.2756E 00	0.1797E-01
-20.0	52	0.2604E 00	0.1054E-01	-10.0	56	0.2502E 00	0.1109E-01	0.0	50	0.2504E 00	0.9773E-02
10.0	53	0.2632E 00	0.1771E-01	20.0	57	0.2883E 00	0.1453E-01	30.0	59	0.3233E 00	0.2697E-01
40.0	56	0.3723E 00	0.4407E-01	50.0	50	0.3945E 00	0.3837E-01	60.0	45	0.4365E 00	0.6118E-01
70.0	55	0.4502E 00	0.5212E-01	80.0	61	0.4616E 00	0.3308E-01				
DAY NUMBER 130											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	54	0.3344E 00	0.3734E-01
-50.0	64	0.3146E 00	0.3535E-01	-40.0	60	0.3014E 00	0.3186E-01	-30.0	57	0.2807E 00	0.1843E-01
-20.0	55	0.2634E 00	0.9261E-02	-10.0	55	0.2490E 00	0.1231E-01	0.0	49	0.2507E 00	0.1195E-01
10.0	50	0.2632E 00	0.1378E-01	20.0	52	0.2843E 00	0.1618E-01	30.0	53	0.3211E 00	0.2941E-01
40.0	56	0.3629E 00	0.3387E-01	50.0	53	0.3896E 00	0.3121E-01	60.0	48	0.4253E 00	0.5441E-01
70.0	63	0.4403E 00	0.5385E-01	80.0	66	0.4611E 00	0.3833E-01				
DAY NUMBER 131											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	48	0.3331E 00	0.3562E-01
-50.0	62	0.3214E 00	0.3527E-01	-40.0	59	0.2979E 00	0.2616E-01	-30.0	58	0.2727E 00	0.2107E-01
-20.0	54	0.2611E 00	0.1074E-01	-10.0	61	0.2470E 00	0.1248E-01	0.0	57	0.2476E 00	0.1111E-01
10.0	57	0.2639E 00	0.1478E-01	20.0	59	0.2884E 00	0.1480E-01	30.0	56	0.3255E 00	0.2947E-01
40.0	58	0.3546E 00	0.2517E-01	50.0	62	0.3876E 00	0.4390E-01	60.0	59	0.4349E 00	0.5368E-01
70.0	66	0.4485E 00	0.5587E-01	80.0	75	0.4502E 00	0.4155E-01				
DAY NUMBER 132											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	47	0.3336E 00	0.2462E-01
-50.0	58	0.3176E 00	0.2511E-01	-40.0	59	0.2986E 00	0.1986E-01	-30.0	54	0.2781E 00	0.1718E-01
-20.0	54	0.2637E 00	0.1166E-01	-10.0	56	0.2508E 00	0.1069E-01	0.0	45	0.2460E 00	0.8908E-02
10.0	55	0.2628E 00	0.1485E-01	20.0	54	0.2888E 00	0.1633E-01	30.0	50	0.3179E 00	0.2145E-01
40.0	51	0.3559E 00	0.2994E-01	50.0	47	0.3878E 00	0.3881E-01	60.0	52	0.4171E 00	0.3658E-01
70.0	56	0.4392E 00	0.4244E-01	80.0	63	0.4416E 00	0.3903E-01				
DAY NUMBER 133											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	46	0.3484E 00	0.2730E-01
-50.0	60	0.3179E 00	0.2626E-01	-40.0	58	0.3011E 00	0.2196E-01	-30.0	50	0.2773E 00	0.2057E-01
-20.0	55	0.2599E 00	0.9831E-02	-10.0	56	0.2495E 00	0.8977E-02	0.0	49	0.2475E 00	0.1013E-01
10.0	57	0.2620E 00	0.1575E-01	20.0	48	0.2895E 00	0.2111E-01	30.0	45	0.3173E 00	0.1954E-01
40.0	55	0.3589E 00	0.3724E-01	50.0	52	0.3749E 00	0.3939E-01	60.0	57	0.4182E 00	0.4003E-01
70.0	52	0.4532E 00	0.4730E-01	80.0	59	0.4463E 00	0.3832E-01				
DAY NUMBER 134											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	32	0.3319E 00	0.2130E-01
-50.0	43	0.3094E 00	0.2752E-01	-40.0	42	0.2930E 00	0.1953E-01	-30.0	41	0.2875E 00	0.1739E-01
-20.0	43	0.2629E 00	0.9847E-02	-10.0	40	0.2523E 00	0.8437E-02	0.0	30	0.2539E 00	0.9407E-02
10.0	43	0.2657E 00	0.1369E-01	20.0	36	0.2841E 00	0.1487E-01	30.0	37	0.3127E 00	0.2367E-01
40.0	43	0.3576E 00	0.2458E-01	50.0	44	0.3856E 00	0.2317E-01	60.0	46	0.4109E 00	0.2111E-01
70.0	59	0.4444E 00	0.4052E-01	80.0	69	0.4391E 00	0.3743E-01				
DAY NUMBER 135											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	42	0.3370E 00	0.2808E-01
-50.0	50	0.3257E 00	0.3329E-01	-40.0	46	0.3045E 00	0.2444E-01	-30.0	49	0.2814E 00	0.2042E-01
-20.0	53	0.2617E 00	0.1183E-01	-10.0	48	0.2495E 00	0.7074E-02	0.0	41	0.2516E 00	0.9946E-02
10.0	44	0.2661E 00	0.1536E-01	20.0	34	0.2885E 00	0.1841E-01	30.0	46	0.3107E 00	0.1891E-01
40.0	42	0.3533E 00	0.2705E-01	50.0	42	0.3883E 00	0.3251E-01	60.0	52	0.4271E 00	0.3111E-01
70.0	50	0.4301E 00	0.4093E-01	80.0	59	0.4450E 00	0.3036E-01				
DAY NUMBER 136											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	37	0.3259E 00	0.2835E-01
-50.0	55	0.3157E 00	0.2337E-01	-40.0	52	0.3046E 00	0.2240E-01	-30.0	50	0.2754E 00	0.1912E-01
-20.0	54	0.2631E 00	0.1110E-01	-10.0	52	0.2486E 00	0.1003E-01	0.0	44	0.2518E 00	0.1102E-01
10.0	51	0.2620E 00	0.1522E-01	20.0	42	0.2835E 00	0.1320E-01	30.0	51	0.3204E 00	0.2613E-01
40.0	51	0.3505E 00	0.3701E-01	50.0	54	0.3907E 00	0.3379E-01	60.0	54	0.4253E 00	0.2576E-01
70.0	59	0.4375E 00	0.4432E-01	80.0	68	0.4456E 00	0.3327E-01				
DAY NUMBER 137											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	45	0.3384E 00	0.3409E-01
-50.0	64	0.3237E 00	0.3298E-01	-40.0	59	0.3133E 00	0.2445E-01	-30.0	57	0.2770E 00	0.1788E-01
-20.0	57	0.2616E 00	0.8300E-02	-10.0	47	0.2506E 00	0.8510E-02	0.0	42	0.2451E 00	0.1168E-01
10.0	49	0.2625E 00	0.1354E-01	20.0	42	0.2892E 00	0.1743E-01	30.0	51	0.3176E 00	0.2030E-01
40.0	44	0.3581E 00	0.3442E-01	50.0	46	0.3836E 00	0.3714E-01	60.0	52	0.4184E 00	0.2609E-01

DAY NUMBER 138	70.0	66	0.4443E 00	0.4159E-01	80.0	68	0.4464E 00	0.3844E-01					
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	37	0.3484E 00	0.3166E-01	
	-50.0	48	0.3143E 00	0.1960E-01	-40.0	51	0.3112E 00	0.2643E-01	-30.0	56	0.2772E 00	0.1988E-01	
	-20.0	53	0.2622E 00	0.9751E-02	-10.0	53	0.2503E 00	0.9565E-02	0.0	48	0.2490E 00	0.8039E-02	
	10.0	54	0.2620E 00	0.1511E-01	20.0	44	0.2883E 00	0.1903E-01	30.0	52	0.3156E 00	0.2511E-01	
	40.0	52	0.3424E 00	0.3408E-01	50.0	49	0.3715E 00	0.3243E-01	60.0	53	0.4106E 00	0.2624E-01	
	70.0	55	0.4407E 00	0.3632E-01	80.0	72	0.4343E 00	0.3082E-01					
DAY NUMBER 139													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	30	0.3297E 00	0.3262E-01	
	-50.0	44	0.3126E 00	0.2341E-01	-40.0	49	0.3105E 00	0.3188E-01	-30.0	52	0.2864E 00	0.2909E-01	
	-20.0	46	0.2630E 00	0.1109E-01	-10.0	48	0.2468E 00	0.1112E-01	0.0	44	0.2513E 00	0.9596E-02	
	10.0	46	0.2666E 00	0.1439E-01	20.0	43	0.2845E 00	0.1686E-01	30.0	48	0.3224E 00	0.2670E-01	
	40.0	48	0.3573E 00	0.3818E-01	50.0	45	0.3833E 00	0.4713E-01	60.0	45	0.4171E 00	0.2710E-01	
	70.0	60	0.4465E 00	0.2866E-01	80.0	58	0.4427E 00	0.3430E-01					
DAY NUMBER 140													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	37	0.3285E 00	0.4220E-01	
	-50.0	48	0.3131E 00	0.2406E-01	-40.0	55	0.3063E 00	0.2254E-01	-30.0	47	0.2769E 00	0.1783E-01	
	-20.0	51	0.2615E 00	0.8172E-02	-10.0	58	0.2490E 00	0.9445E-02	0.0	44	0.2507E 00	0.9468E-02	
	10.0	50	0.2647E 00	0.1294E-01	20.0	44	0.2834E 00	0.1647E-01	30.0	49	0.3145E 00	0.2214E-01	
	40.0	54	0.3525E 00	0.2567E-01	50.0	51	0.3769E 00	0.3572E-01	60.0	56	0.4134E 00	0.3314E-01	
	70.0	64	0.4377E 00	0.2418E-01	80.0	64	0.4434E 00	0.3386E-01					
DAY NUMBER 141													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	27	0.3372E 00	0.4630E-01	
	-50.0	48	0.3363E 00	0.4158E-01	-40.0	48	0.3179E 00	0.3468E-01	-30.0	46	0.2877E 00	0.1656E-01	
	-20.0	44	0.2618E 00	0.8225E-02	-10.0	41	0.2489E 00	0.8640E-02	0.0	40	0.2517E 00	0.1037E-01	
	10.0	42	0.2651E 00	0.1351E-01	20.0	35	0.2865E 00	0.1316E-01	30.0	39	0.3192E 00	0.2177E-01	
	40.0	46	0.3500E 00	0.3857E-01	50.0	38	0.3822E 00	0.3698E-01	60.0	48	0.4100E 00	0.2855E-01	
	70.0	56	0.4253E 00	0.1712E-01	80.0	58	0.4333E 00	0.3787E-01					
DAY NUMBER 142													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	33	0.3374E 00	0.4600E-01	
	-50.0	60	0.3288E 00	0.3684E-01	-40.0	54	0.3113E 00	0.2629E-01	-30.0	49	0.2826E 00	0.1637E-01	
	-20.0	52	0.2625E 00	0.1041E-01	-10.0	57	0.2504E 00	0.9474E-02	0.0	50	0.2504E 00	0.9053E-02	
	10.0	55	0.2639E 00	0.1158E-01	20.0	48	0.2834E 00	0.1820E-01	30.0	50	0.3191E 00	0.2561E-01	
	40.0	45	0.3469E 00	0.3386E-01	50.0	54	0.3812E 00	0.3658E-01	60.0	51	0.4184E 00	0.3162E-01	
	70.0	65	0.4326E 00	0.2490E-01	80.0	68	0.4327E 00	0.3424E-01					
DAY NUMBER 143													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	24	0.3609E 00	0.2600E-01	
	-50.0	46	0.3438E 00	0.4239E-01	-40.0	43	0.3171E 00	0.3032E-01	-30.0	39	0.2889E 00	0.2021E-01	
	-20.0	38	0.2580E 00	0.1370E-01	-10.0	41	0.2485E 00	0.1148E-01	0.0	38	0.2482E 00	0.9353E-02	
	10.0	39	0.2675E 00	0.1477E-01	20.0	44	0.2827E 00	0.1658E-01	30.0	45	0.3066E 00	0.2020E-01	
	40.0	48	0.3505E 00	0.2987E-01	50.0	41	0.3745E 00	0.3643E-01	60.0	42	0.4125E 00	0.3043E-01	
	70.0	58	0.4291E 00	0.2290E-01	80.0	59	0.4389E 00	0.3028E-01					
DAY NUMBER 144													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	30	0.3522E 00	0.3674E-01	
	-50.0	60	0.3394E 00	0.4284E-01	-40.0	58	0.3157E 00	0.2832E-01	-30.0	48	0.2892E 00	0.1872E-01	
	-20.0	49	0.2628E 00	0.1056E-01	-10.0	49	0.2498E 00	0.1085E-01	0.0	41	0.2469E 00	0.1017E-01	
	10.0	49	0.2631E 00	0.1442E-01	20.0	50	0.2841E 00	0.1535E-01	30.0	46	0.3122E 00	0.1972E-01	
	40.0	47	0.3579E 00	0.2858E-01	50.0	52	0.3819E 00	0.3736E-01	60.0	49	0.4079E 00	0.3068E-01	
	70.0	52	0.4236E 00	0.1515E-01	80.0	55	0.4330E 00	0.2234E-01					
DAY NUMBER 145													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	24	0.3454E 00	0.2961E-01	
	-50.0	45	0.3356E 00	0.2772E-01	-40.0	45	0.3168E 00	0.2712E-01	-30.0	47	0.2914E 00	0.2370E-01	
	-20.0	45	0.2621E 00	0.1021E-01	-10.0	47	0.2462E 00	0.1160E-01	0.0	37	0.2509E 00	0.1031E-01	
	10.0	42	0.2660E 00	0.1336E-01	20.0	38	0.2866E 00	0.1221E-01	30.0	50	0.3110E 00	0.1642E-01	
	40.0	52	0.3617E 00	0.3829E-01	50.0	43	0.3843E 00	0.3983E-01	60.0	49	0.4035E 00	0.3539E-01	
	70.0	55	0.4207E 00	0.1948E-01	80.0	59	0.4352E 00	0.1871E-01					
DAY NUMBER 146													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	27	0.3470E 00	0.3831E-01	
	-50.0	47	0.3360E 00	0.3680E-01	-40.0	47	0.3190E 00	0.3380E-01	-30.0	50	0.2885E 00	0.2212E-01	
	-20.0	38	0.2590E 00	0.8614E-02	-10.0	43	0.2511E 00	0.7076E-02	0.0	43	0.2484E 00	0.8990E-02	
	10.0	43	0.2641E 00	0.1528E-01	20.0	40	0.2884E 00	0.1324E-01	30.0	39	0.3215E 00	0.2491E-01	
	40.0	42	0.3572E 00	0.3347E-01	50.0	31	0.3880E 00	0.3342E-01	60.0	48	0.4117E 00	0.2938E-01	
	70.0	49	0.4200E 00	0.2372E-01	80.0	55	0.4362E 00	0.1843E-01					
DAY NUMBER 147													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	30	0.3365E 00	0.3686E-01	
	-50.0	52	0.3243E 00	0.3826E-01	-40.0	57	0.3153E 00	0.3164E-01	-30.0	47	0.2925E 00	0.2040E-01	
	-20.0	45	0.2601E 00	0.1032E-01	-10.0	51	0.2482E 00	0.1094E-01	0.0	44	0.2490E 00	0.1230E-01	
	10.0	48	0.2635E 00	0.1322E-01	20.0	44	0.2898E 00	0.1068E-01	30.0	54	0.3185E 00	0.1852E-01	
	40.0	52	0.3442E 00	0.2583E-01	50.0	47	0.3728E 00	0.2657E-01	60.0	50	0.4063E 00	0.3732E-01	
	70.0	56	0.4189E 00	0.2792E-01	80.0	49	0.4289E 00	0.1410E-01					
DAY NUMBER 148													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	23	0.3387E 00	0.3247E-01	
	-50.0	49	0.3206E 00	0.2901E-01	-40.0	50	0.3088E 00	0.3221E-01	-30.0	45	0.2861E 00	0.2078E-01	
	-20.0	41	0.2600E 00	0.1000E-01	-10.0	45	0.2490E 00	0.8072E-02	0.0	36	0.2506E 00	0.8592E-02	
	10.0	43	0.2630E 00	0.1250E-01	20.0	38	0.2877E 00	0.1633E-01	30.0	46	0.3150E 00	0.1976E-01	
	40.0	42	0.3435E 00	0.2395E-01	50.0	39	0.3640E 00	0.3301E-01	60.0	40	0.4077E 00	0.3458E-01	
	70.0	56	0.4215E 00	0.3325E-01	80.0	53	0.4240E 00	0.1172E-01					
DAY NUMBER 149													
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	28	0.3337E 00	0.2917E-01	

-50.0	55	0.3253E 00	0.2353E-01	-40.0	58	0.3201E 00	0.3580E-01	-30.0	54	0.2810E 00	0.2241E-01
-20.0	45	0.2603E 00	0.1281E-01	-10.0	41	0.2488E 00	0.1190E-01	0.0	45	0.2498E 00	0.1063E-01
10.0	41	0.2624E 00	0.1184E-01	20.0	45	0.2872E 00	0.1254E-01	30.0	42	0.3134E 00	0.1750E-01
40.0	48	0.3477E 00	0.3682E-01	50.0	39	0.3707E 00	0.3422E-01	60.0	41	0.3872E 00	0.2684E-01
70.0	51	0.4060E 00	0.4095E-01	80.0	52	0.4261E 00	0.1477E-01				
DAY NUMBER 150											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	23	0.3379E 00	0.3066E-01
-50.0	55	0.3322E 00	0.3510E-01	-40.0	50	0.3216E 00	0.4124E-01	-30.0	61	0.2837E 00	0.2149E-01
-20.0	47	0.2604E 00	0.1429E-01	-10.0	50	0.2479E 00	0.9496E-02	0.0	50	0.2508E 00	0.9075E-02
10.0	51	0.2630E 00	0.1405E-01	20.0	53	0.2836E 00	0.1391E-01	30.0	56	0.3199E 00	0.2181E-01
40.0	50	0.3455E 00	0.2585E-01	50.0	50	0.3645E 00	0.2433E-01	60.0	44	0.3934E 00	0.3509E-01
70.0	59	0.4162E 00	0.3074E-01	80.0	62	0.4241E 00	0.2345E-01				
DAY NUMBER 151											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	25	0.3372E 00	0.2809E-01
-50.0	53	0.3299E 00	0.2851E-01	-40.0	55	0.3207E 00	0.3167E-01	-30.0	54	0.2835E 00	0.1866E-01
-20.0	46	0.2592E 00	0.1163E-01	-10.0	46	0.2460E 00	0.1090E-01	0.0	42	0.2488E 00	0.1063E-01
10.0	50	0.2649E 00	0.1467E-01	20.0	44	0.2843E 00	0.1356E-01	30.0	50	0.3210E 00	0.2490E-01
40.0	46	0.3493E 00	0.3480E-01	50.0	47	0.3729E 00	0.3246E-01	60.0	50	0.3973E 00	0.3769E-01
70.0	62	0.4102E 00	0.2157E-01	80.0	53	0.4215E 00	0.2641E-01				
DAY NUMBER 152											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	18	0.3509E 00	0.3260E-01
-50.0	35	0.3398E 00	0.4257E-01	-40.0	41	0.3260E 00	0.3224E-01	-30.0	36	0.2813E 00	0.1523E-01
-20.0	34	0.2613E 00	0.1160E-01	-10.0	46	0.2486E 00	0.1365E-01	0.0	35	0.2477E 00	0.9326E-02
10.0	43	0.2660E 00	0.1575E-01	20.0	35	0.2848E 00	0.1540E-01	30.0	48	0.3159E 00	0.2420E-01
40.0	47	0.3580E 00	0.3870E-01	50.0	43	0.3694E 00	0.3269E-01	60.0	38	0.3995E 00	0.3623E-01
70.0	40	0.4076E 00	0.3510E-01	80.0	55	0.4144E 00	0.2404E-01				
DAY NUMBER 153											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	17	0.3700E 00	0.2155E-01
-50.0	42	0.3506E 00	0.3400E-01	-40.0	46	0.3213E 00	0.2537E-01	-30.0	52	0.2838E 00	0.2044E-01
-20.0	42	0.2600E 00	0.9550E-02	-10.0	46	0.2477E 00	0.1001E-01	0.0	44	0.2499E 00	0.7464E-02
10.0	39	0.2612E 00	0.1466E-01	20.0	45	0.2846E 00	0.1414E-01	30.0	42	0.3122E 00	0.1830E-01
40.0	43	0.3550E 00	0.3978E-01	50.0	39	0.3743E 00	0.3725E-01	60.0	39	0.3863E 00	0.4080E-01
70.0	48	0.4081E 00	0.3048E-01	80.0	53	0.4240E 00	0.1884E-01				
DAY NUMBER 154											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	18	0.3408E 00	0.3647E-01
-50.0	34	0.3253E 00	0.4650E-01	-40.0	36	0.3210E 00	0.3159E-01	-30.0	29	0.2850E 00	0.1935E-01
-20.0	36	0.2606E 00	0.7401E-02	-10.0	30	0.2508E 00	0.1257E-01	0.0	29	0.2514E 00	0.1038E-01
10.0	31	0.2687E 00	0.1459E-01	20.0	26	0.2845E 00	0.1777E-01	30.0	36	0.3105E 00	0.1625E-01
40.0	36	0.3431E 00	0.3180E-01	50.0	32	0.3622E 00	0.2624E-01	60.0	35	0.3856E 00	0.4804E-01
70.0	36	0.3967E 00	0.3601E-01	80.0	44	0.4203E 00	0.3013E-01				
DAY NUMBER 155											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	22	0.3498E 00	0.3966E-01
-50.0	50	0.3297E 00	0.4196E-01	-40.0	50	0.3171E 00	0.2462E-01	-30.0	46	0.2804E 00	0.1896E-01
-20.0	46	0.2572E 00	0.9448E-02	-10.0	47	0.2462E 00	0.1209E-01	0.0	36	0.2489E 00	0.1167E-01
10.0	40	0.2593E 00	0.1366E-01	20.0	45	0.2826E 00	0.1665E-01	30.0	46	0.3231E 00	0.2301E-01
40.0	48	0.3527E 00	0.3056E-01	50.0	47	0.3765E 00	0.3360E-01	60.0	53	0.3756E 00	0.4073E-01
70.0	53	0.3959E 00	0.4331E-01	80.0	62	0.4255E 00	0.2082E-01				
DAY NUMBER 156											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3500E 00	0.4482E-01
-50.0	58	0.3242E 00	0.4942E-01	-40.0	49	0.3074E 00	0.3596E-01	-30.0	51	0.2835E 00	0.2151E-01
-20.0	50	0.2590E 00	0.9321E-02	-10.0	53	0.2499E 00	0.1133E-01	0.0	41	0.2475E 00	0.1218E-01
10.0	54	0.2585E 00	0.1567E-01	20.0	44	0.2860E 00	0.1029E-01	30.0	42	0.3128E 00	0.1942E-01
40.0	49	0.3412E 00	0.2518E-01	50.0	47	0.3758E 00	0.2888E-01	60.0	49	0.3706E 00	0.3708E-01
70.0	50	0.3948E 00	0.4069E-01	80.0	55	0.4192E 00	0.1711E-01				
DAY NUMBER 157											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	17	0.3555E 00	0.6286E-01
-50.0	36	0.3419E 00	0.4954E-01	-40.0	37	0.3101E 00	0.3630E-01	-30.0	38	0.2826E 00	0.1995E-01
-20.0	42	0.2584E 00	0.9855E-02	-10.0	39	0.2478E 00	0.9063E-02	0.0	28	0.2491E 00	0.7129E-02
10.0	37	0.2604E 00	0.1477E-01	20.0	40	0.2863E 00	0.1773E-01	30.0	41	0.3099E 00	0.1943E-01
40.0	45	0.3393E 00	0.3101E-01	50.0	34	0.3869E 00	0.3309E-01	60.0	39	0.3812E 00	0.3458E-01
70.0	31	0.3929E 00	0.4064E-01	80.0	38	0.4159E 00	0.1759E-01				
DAY NUMBER 158											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	18	0.3322E 00	0.4679E-01
-50.0	49	0.3359E 00	0.4516E-01	-40.0	44	0.3213E 00	0.4199E-01	-30.0	45	0.2825E 00	0.2022E-01
-20.0	39	0.2600E 00	0.8727E-02	-10.0	36	0.2492E 00	0.7835E-02	0.0	42	0.2477E 00	0.1049E-01
10.0	41	0.2649E 00	0.1519E-01	20.0	39	0.2819E 00	0.1363E-01	30.0	46	0.3220E 00	0.2055E-01
40.0	45	0.3328E 00	0.2369E-01	50.0	35	0.3680E 00	0.3039E-01	60.0	38	0.3702E 00	0.3744E-01
70.0	45	0.3806E 00	0.4243E-01	80.0	48	0.4035E 00	0.2154E-01				
DAY NUMBER 159											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	15	0.3402E 00	0.4305E-01
-50.0	39	0.3382E 00	0.5218E-01	-40.0	42	0.3224E 00	0.4246E-01	-30.0	35	0.2821E 00	0.3015E-01
-20.0	36	0.2571E 00	0.1386E-01	-10.0	38	0.2499E 00	0.7639E-02	0.0	36	0.2471E 00	0.1071E-01
10.0	38	0.2612E 00	0.1602E-01	20.0	38	0.2802E 00	0.1365E-01	30.0	43	0.3008E 00	0.1574E-01
40.0	37	0.3506E 00	0.3364E-01	50.0	36	0.3655E 00	0.2540E-01	60.0	34	0.3680E 00	0.3276E-01
70.0	40	0.3734E 00	0.3111E-01	80.0	45	0.4039E 00	0.1165E-01				
DAY NUMBER 160											
-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3674E 00	0.5349E-01
-50.0	46	0.3481E 00	0.5534E-01	-40.0	48	0.3373E 00	0.3764E-01	-30.0	52	0.2850E 00	0.2316E-01
-20.0	45	0.2568E 00	0.1384E-01	-10.0	39	0.2414E 00	0.1205E-01	0.0	44	0.2471E 00	0.1173E-01
10.0	49	0.2601E 00	0.1635E-01	20.0	42	0.2849E 00	0.1436E-01	30.0	61	0.3068E 00	0.1377E-01

	40.0	44	0.3388E 00	0.2920E-01	50.0	41	0.3696E 00	0.3187E-01	60.0	44	0.3792E 00	0.3867E-01
	70.0	54	0.3877E 00	0.3569E-01	80.0	60	0.4006E 00	0.1726E-01				
DAY NUMBER 161												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3308E 00	0.5599E-01
	-50.0	47	0.3636E 00	0.5385E-01	-40.0	43	0.3328E 00	0.2904E-01	-30.0	48	0.2868E 00	0.2617E-01
	-20.0	43	0.2594E 00	0.1380E-01	-10.0	46	0.2483E 00	0.9344E-02	0.0	43	0.2470E 00	0.1007E-01
	10.0	45	0.2612E 00	0.1479E-01	20.0	41	0.2862E 00	0.1139E-01	30.0	48	0.3135E 00	0.1678E-01
	40.0	45	0.3356E 00	0.2188E-01	50.0	42	0.3566E 00	0.2751E-01	60.0	41	0.3771E 00	0.3803E-01
	70.0	52	0.3839E 00	0.2983E-01	80.0	45	0.3915E 00	0.1787E-01				
DAY NUMBER 162												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	16	0.3520E 00	0.6604E-01
	-50.0	44	0.3386E 00	0.3764E-01	-40.0	43	0.3387E 00	0.3298E-01	-30.0	42	0.2917E 00	0.2772E-01
	-20.0	38	0.2540E 00	0.1147E-01	-10.0	37	0.2421E 00	0.8983E-02	0.0	34	0.2448E 00	0.7740E-02
	10.0	39	0.2630E 00	0.1457E-01	20.0	37	0.2813E 00	0.1442E-01	30.0	39	0.3103E 00	0.2140E-01
	40.0	34	0.3316E 00	0.3157E-01	50.0	39	0.3685E 00	0.3050E-01	60.0	41	0.3827E 00	0.3212E-01
	70.0	50	0.3807E 00	0.3207E-01	80.0	53	0.3865E 00	0.1990E-01				
DAY NUMBER 163												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3468E 00	0.4395E-01
	-50.0	56	0.3424E 00	0.4959E-01	-40.0	58	0.3415E 00	0.3348E-01	-30.0	52	0.2879E 00	0.2228E-01
	-20.0	48	0.2580E 00	0.1133E-01	-10.0	54	0.2449E 00	0.1082E-01	0.0	40	0.2490E 00	0.1002E-01
	10.0	47	0.2638E 00	0.1493E-01	20.0	51	0.2838E 00	0.1104E-01	30.0	44	0.3059E 00	0.1872E-01
	40.0	51	0.3446E 00	0.3306E-01	50.0	53	0.3666E 00	0.3240E-01	60.0	50	0.3777E 00	0.3455E-01
	70.0	51	0.3831E 00	0.3141E-01	80.0	60	0.3938E 00	0.1643E-01				
DAY NUMBER 164												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	15	0.3220E 00	0.2796E-01
	-50.0	56	0.3519E 00	0.5557E-01	-40.0	54	0.3346E 00	0.3132E-01	-30.0	54	0.2880E 00	0.2357E-01
	-20.0	52	0.2569E 00	0.1023E-01	-10.0	53	0.2470E 00	0.1035E-01	0.0	50	0.2471E 00	0.1088E-01
	10.0	51	0.2612E 00	0.1268E-01	20.0	51	0.2815E 00	0.1631E-01	30.0	58	0.3041E 00	0.1960E-01
	40.0	55	0.3403E 00	0.2353E-01	50.0	47	0.3712E 00	0.2772E-01	60.0	55	0.3720E 00	0.3164E-01
	70.0	63	0.3817E 00	0.3075E-01	80.0	68	0.3866E 00	0.1849E-01				
DAY NUMBER 165												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	16	0.3513E 00	0.5477E-01
	-50.0	48	0.3598E 00	0.5406E-01	-40.0	53	0.3386E 00	0.3769E-01	-30.0	47	0.2810E 00	0.1888E-01
	-20.0	50	0.2579E 00	0.8478E-02	-10.0	47	0.2472E 00	0.1150E-01	0.0	40	0.2447E 00	0.8670E-02
	10.0	50	0.2588E 00	0.1221E-01	20.0	45	0.2792E 00	0.1429E-01	30.0	46	0.2995E 00	0.2054E-01
	40.0	48	0.3398E 00	0.3140E-01	50.0	48	0.3621E 00	0.2323E-01	60.0	49	0.3690E 00	0.2744E-01
	70.0	54	0.3829E 00	0.2614E-01	80.0	62	0.3828E 00	0.2155E-01				
DAY NUMBER 166												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3672E 00	0.4911E-01
	-50.0	61	0.3585E 00	0.4908E-01	-40.0	53	0.3416E 00	0.3806E-01	-30.0	45	0.2851E 00	0.2328E-01
	-20.0	50	0.2562E 00	0.8207E-02	-10.0	50	0.2430E 00	0.1072E-01	0.0	44	0.2461E 00	0.1213E-01
	10.0	54	0.2586E 00	0.1590E-01	20.0	38	0.2816E 00	0.1754E-01	30.0	49	0.3048E 00	0.2060E-01
	40.0	50	0.3381E 00	0.2381E-01	50.0	47	0.3641E 00	0.2954E-01	60.0	47	0.3630E 00	0.3138E-01
	70.0	56	0.3839E 00	0.2670E-01	80.0	62	0.3815E 00	0.1636E-01				
DAY NUMBER 167												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	18	0.3677E 00	0.3134E-01
	-50.0	48	0.3538E 00	0.4318E-01	-40.0	50	0.3496E 00	0.4050E-01	-30.0	48	0.2822E 00	0.1672E-01
	-20.0	44	0.2619E 00	0.1051E-01	-10.0	47	0.2434E 00	0.9696E-02	0.0	39	0.2472E 00	0.9048E-02
	10.0	42	0.2555E 00	0.1322E-01	20.0	47	0.2817E 00	0.1584E-01	30.0	50	0.3083E 00	0.1790E-01
	40.0	53	0.3388E 00	0.2494E-01	50.0	47	0.3640E 00	0.2955E-01	60.0	53	0.3662E 00	0.2727E-01
	70.0	55	0.3815E 00	0.2216E-01	80.0	65	0.3893E 00	0.1819E-01				
DAY NUMBER 168												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3624E 00	0.3452E-01
	-50.0	55	0.3499E 00	0.4038E-01	-40.0	55	0.3398E 00	0.3644E-01	-30.0	48	0.2812E 00	0.2013E-01
	-20.0	50	0.2597E 00	0.1090E-01	-10.0	48	0.2458E 00	0.1270E-01	0.0	41	0.2481E 00	0.1296E-01
	10.0	56	0.2600E 00	0.1381E-01	20.0	43	0.2848E 00	0.1302E-01	30.0	51	0.3068E 00	0.1618E-01
	40.0	56	0.3422E 00	0.3082E-01	50.0	44	0.3650E 00	0.3200E-01	60.0	48	0.3670E 00	0.2935E-01
	70.0	53	0.3758E 00	0.2636E-01	80.0	60	0.3850E 00	0.1384E-01				
DAY NUMBER 169												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	19	0.3557E 00	0.3741E-01
	-50.0	53	0.3630E 00	0.4408E-01	-40.0	54	0.3377E 00	0.3521E-01	-30.0	48	0.2842E 00	0.2022E-01
	-20.0	45	0.2585E 00	0.6841E-02	-10.0	48	0.2430E 00	0.8837E-02	0.0	38	0.2472E 00	0.1415E-01
	10.0	48	0.2589E 00	0.1198E-01	20.0	43	0.2840E 00	0.1447E-01	30.0	47	0.3041E 00	0.1611E-01
	40.0	49	0.3315E 00	0.2877E-01	50.0	46	0.3563E 00	0.2984E-01	60.0	42	0.3714E 00	0.2077E-01
	70.0	53	0.3729E 00	0.2927E-01	80.0	61	0.3796E 00	0.1502E-01				
DAY NUMBER 170												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	20	0.3481E 00	0.2929E-01
	-50.0	64	0.3481E 00	0.3364E-01	-40.0	60	0.3300E 00	0.3186E-01	-30.0	56	0.2865E 00	0.1958E-01
	-20.0	54	0.2563E 00	0.8577E-02	-10.0	55	0.2427E 00	0.1091E-01	0.0	50	0.2462E 00	0.1355E-01
	10.0	56	0.2611E 00	0.1369E-01	20.0	48	0.2849E 00	0.1082E-01	30.0	56	0.3072E 00	0.1961E-01
	40.0	52	0.3387E 00	0.2626E-01	50.0	45	0.3585E 00	0.2277E-01	60.0	58	0.3634E 00	0.2525E-01
	70.0	58	0.3651E 00	0.1885E-01	80.0	72	0.3831E 00	0.1668E-01				
DAY NUMBER 171												
	-80.0	0	-0.7770E 03	-0.7770E 03	-70.0	0	-0.7770E 03	-0.7770E 03	-60.0	20	0.3568E 00	0.3099E-01
	-50.0	55	0.3490E 00	0.3754E-01	-40.0	51	0.3360E 00	0.3211E-01	-30.0	51	0.2828E 00	0.1564E-01
	-20.0	49	0.2554E 00	0.8316E-02	-10.0	43	0.2490E 00	0.9450E-02	0.0	52	0.2478E 00	0.1418E-01
	10.0	47	0.2610E 00	0.1378E-01	20.0	51	0.2840E 00	0.1212E-01	30.0	55	0.2995E 00	0.1440E-01
	40.0	55	0.3378E 00	0.3559E-01	50.0	53	0.3638E 00	0.2591E-01	60.0	61	0.3660E 00	0.2703E-01
	70.0	62	0.3694E 00	0.2068E-01	80.0	62	0.3785E 00	0.1788E-01				
DAY NUMBER 172												

BIBLIOGRAPHIC DATA SHEET

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
T M 78069		

4. Title and Subtitle	5. Report Date
User's Guide to the Nimbus-4 Backscatter Ultraviolet Experiment Data Set	January 1978
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Ozone Processing Team	
9. Performing Organization Name and Address	10. Work Unit No.
Measurement Evaluation Branch Information Processing Division Goddard Space Flight Center Greenbelt, Maryland 20771	11. Contract or Grant No. NAS5-23854
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address GSFC - NASA Greenbelt, Maryland 20771 Barbara Lowrey, Technical Monitor	Technical Memo
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

The first year's data from the Nimbus-4 Backscatter Ultraviolet (BUV) experiment have been archived in the National Space Sciences Data Center. Radiances in the ultraviolet measured by the satellite were used to compute the global total ozone for the period April 1970 - April 1971. The data sets now in the NSSDC are the results obtained by the Ozone Processing Team, which has processed the data with the purpose of determining the best quality of the data attainable. There are four basic sets of data available in the NSSDC representing various stages in processing. The Primary Data Base contains organized and cleaned data in telemetry units. The Radiance data has had most of the engineering calibrations performed. The Detailed Total Ozone data is the result of computations to obtain the total ozone; the Compressed Total Ozone data is a convenient condensation of the Detailed Total Ozone. Product data sets are also included. The purpose of this document is to explain the meaning and formats of the data sets sufficiently so that a user may access them from the NSSDC.

17. Key Words (Selected by Author(s))	18. Distribution Statement
Nimbus-4 BUV data, global total ozone, backscatter Ultraviolet experiment.	

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
None	None	60	

*For sale by the National Technical Information Service, Springfield, Virginia 22151.