

#269

PIONEER 8

COSMIC RAY DATA

67-123A-05A

6 tapes

Table of Contents

1. Introduction
2. Errata/Change Log
3. LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM
4. Catalog Materials
 - a. Associated Documents
 - b. Core Catalog Materials

1. INTRODUCTION:

The documentation for this data set was originally on paper, kept in NSSDC's Data Set Catalogs (DSCs). The paper documentation in the Data Set Catalogs have been made into digital images, and then collected into a single PDF file for each Data Set Catalog. The inventory information in these DSCs is current as of July 1, 2004. This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system. The information existing in the DSCs is now not needed for locating the data files, but we did not remove that inventory information.

The offline tape datasets have now been migrated from the original magnetic tape to Archival Information Packages (AIP's).

A prior restoration may have been done on data sets, if a requestor of this data set has questions; they should send an inquiry to the request office to see if additional information exists.

2. ERRATA/CHANGE LOG:

NOTE: Changes are made in a text box, and will show up that way when displayed on screen with a PDF reader.

When printing, special settings may be required to make the text box appear on the printed output.

Version	Date	Person	Page	Description of Change
01				
02				

3 LINKS TO RELEVANT INFORMATION IN THE ONLINE NSSDC
INFORMATION SYSTEM:

<http://nssdc.gsfc.nasa.gov/nmc/>

[NOTE: This link will take you to the main page of the NSSDC Master Catalog. There you will be able to perform searches to find additional information]

4. CATALOG MATERIALS:

- a. Associated Documents To find associated documents you will need to know the document ID number and then click here.
<http://nssdcftp.gsfc.nasa.gov/miscellaneous/documents/>

- b. Core Catalog Materials

PIONEER E

7 MIN. & 1 HOUR COUNT RATES TAPE

67-123A-05A

SPHE-00608

THIS DATA SET HAS BEEN RESTORED. THERE WERE ORIGINALLY 6
9-TRACK, 1600 BPI TAPES, WRITTEN IN BINARY. THERE IS ONE
RESTORED TAPE. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS
TAPE IS A 9-TRACK, 6250 BPI. THE TAPES WERE ORIGINALLY
CREATED ON AN IBM 360 COMPUTER. THE DR AND DS NUMBERS ALONG
WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	DD#	FILES	TIME SPAN
DR03091	DS03091	D14232	1	12/13/67 - 03/08/68
		D14233	2	03/08/68 - 05/16/68
		D14234	3	05/19/68 - 08/07/68
		D14235	4	08/07/68 - 10/26/68
		D14236	5	10/26/68 - 01/10/69
		D14237	6	01/11/69 - 03/31/69

REQ. AGENT
CLB
CMM

RAND NO.
R00329

ACQ. AGENT
JHK

PIONEER 8
COSMIC RAY DATA
67-123A-05A

This data set consists of 6 800 BPI, 9-track, EBCDIC data tapes. The 'D' tapes were created on an IBM 370/155 computer and the 'C' tapes were created on the IBM 360/75 computer. Each tape contains 1 file of data.

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-14232	C-11315	12/13/67 - 03/08/68
D-14233	C-11316	03/08/68 - 05/16/68
D-14234	C-11317	05/19/68 - 08/07/68
D-14235	C-11318	08/07/68 - 10/26/68
D-14236	C-11319	10/26/68 - 01/10/69
D-14237	C-11423	01/11/69 - 03/31/69

b) Isotropic data

Cj (j = 1 to 6) = detector C in anticoincidence with D, energy level = j (see Table 1B).

Aj (j = 1 to 6) = detector A, energy level j

C4I = C detector, energy level > 7.4 MeV

C4I = C detector, energy level > 19.5 MeV

D = D detector, energy > (1 MeV electrons, 15 MeV protons)

III. Data Tape Format

The data is written on magnetic tape in hourly blocks (records). Each tape contains approximately 80 days of data with 24 records provided for each day.

Records for which no data is available are flagged in the first entry (see below).

The tapes were written on an IBM 370/155 computer using the following parameters:

- 1 Tracks = 9
- 2 Density = 800 BPI
- 3 Code = EBCDIC
- 4 Record Format = FIXED
- 5 Logical Record length = 8099 Bytes

The J.C.L. used in writing the tapes is given in Table 3.

Table 3. IBM 370 J.C.L. used to write data tapes.

C1

SYSOUT DD

C16

UNIT = TAPE 7, LABEL = (1,NL), DISP =

(OLD,PASS),

DCB = (RECFM=F, BLKSIZE=8099, LRECL=8099, TRTCH=C,

DEN=2),

DSN = C8XTYY *

* X = last digit of year YYY = day of year of first record of tape.

IV. Data Record Format

Each record consists of a data array (P8SM) made up of the following information:

1. Time period in which data were collected.
2. Information on the location of the data on NASA data tapes, tracking station, bit rate, spin rate, etc.
3. Number of counts and accumulation time for each data classification in each 7 1/2 min interval.
4. Number of counts and accumulation time for each data classification for the hour.
5. Hourly and 7 1/2 min. average rates for each data classification.

The data array was generated using an IBM 360/50 PL/I program. The declaration of this array is shown in table 4. A detailed description of the actual structure of the array can be obtained by reference to the "IBM System/360 Operating System PL/I (F) Language Reference Guide", GC28-8201-2.

The definitions of the various elements of P8SM are as follows:

TAPE# - NASA tape number containing raw data. If no data is available

TAPE# = -1, otherwise TAPE# 0.

CURDAY - Day of year in which data were collected Jan. 1 = 1.

CURHOUR - G.M.T. hour in which data were collected

CURHOUR = 1 for data collected between 0000 hr and 0100 hr G.M.T.

FILE# - Logical file on NASA tape

REC# - Record number on NASA tape of first data used in array

OUTCYC - Not used

BIT(2) - Indicates telemetry bit rates (bits/sec) used during the hour.

BIT(1) defines the bit rate of the first data used in the hour.

BIT(2) is set only if a change in the bit rate occurs in the subsequent data.

PREDET-E&F DETECTORS ON INDICATOR

PREDET = E & F ON

= E & F OFF

REC-CODE- Not used

ANIS:

The anisotropy data are contained in P8SM sub-arrays ANIS(2). The subscript i ($i = 1$ to 8) refers to the 7 1/2 minute interval during which the data were accumulated.

($i = 1$) = time interval 00 min 00 sec to 07 min 30 sec,

($i = 2$) = " " 07 min 30 sec to 15 min 00 sec,

etc.

ANIS (9) contains the sums of the data contained in ANIS(1) through ANIS(8), ie it contains hourly sums of the anisotropy data.

Each sub-array ANIS is made up of subarrays SS and CRY containing data from the solid state and crystal detectors respectively. Each of these subarrays is further divided into subarrays NS and S which contain data accumulated in the non slipped and slipped mode respectively.

The data contained in each of the subarrays consists of:

- (a) the number of counts of a given logic (ALO, ELO, FLO, CLO) and mode which were accumulated during a given 7 1/2 min time period, and
- (b) the number of spins (AL, EL, FL, CL) during which that particular data was being accumulated. / Since the data for a given logic, mode and energy level are simultaneously collected for the octant pairs (1,5), (2,6), (3,7), and (4,8) only four spin counts are provided, since the number of spins during which

ALO(,3) and ALO (,7), for example are accumulated are identical and equal to AL(,3).

The complete PL-1 variable name required to specify, for example, the number of counts accumulated in the crystal logic CLO26, in the slipped mode during the time period 45-52.5 min. would be:

P8SM.ANIS(7).CRY.S.CLO(2,6)

The variable name required to specify the number of spins over which this data was accumulated is

P8SM.ANIS(7).CRY.S.CL(2,3)

The hourly data contained in ANIS(9) were obtained by summing the corresponding data over the eight 7 1/2 min intervals, for example,

$$P8SM.ANIS(9).CRY.S.CLO(2,6) = \sum_{i=1}^8 P8SM.ANIS(2).CRY.S.CLO(2,6)$$

and similarly for the number of spins

$$P8SM.ANIS(9).CRY.S.CL(2,3) = \sum_{i=1}^8 P8SM.ANIS(2).CRY.S.CL(2,3)$$

ISOT:

The anisotropy data for each hour is contained in nine subarrays: ANIS(1) (, 1 = 1 to 8) which contain data for the eight 7 1/2 min, intervals in the hour and ANIS(9) containing the hourly sums of the data. A(i), C(i) (i = 1 to 6), CLI, etc. (logics defined in section IIb) contain the number of counts accumulated during a given time interval and ANF(i), CNF(i), CINF, etc. contain the number of 0.4375 sec. telemetry frames over which the corresponding data was accumulated.

The PL-1 variable name required to specify, for example, the number of counts accumulated in the solid state logic A5 during the time period 9 to 7 1/2 min. would be P8SM.ISOT(1).A(6) . The corresponding number of frames over which these counts were accumulated would be P8SM.ISOT(1).ANL (6).

The hourly data contained in ISOT(9) were obtained by summing the corresponding data over the eight 7 1/2 min, intervals, for example,

$$P8SM.ISOT(9).A (6) = \sum_{i=1}^8 P8SM.ISOT(i).A(6) ,$$

and similarly the corresponding number of frames for the hour is

$$P8SM.ISOT(9). ANL(6) = \sum_{i=1}^8 P8SM.ISOT(i).ANL(6) .$$

The variables SYNC and SYNCF were used in decommunicating the telemetry data stream and contain no data of general use.

Table 4 DECLARATION FOR ARRAY P8SM

NAME	DATE TYPE
1 P8SM,	
2 TAPE#	DEC FIXED (5),
2 CURDAY	DEC FIXED (5),
2 CURHOUR	DEC FIXED (5),
2 REC#	DEC FIXED (5),
2 FILE#	DEC FIXED (5),
2 OUTCYC	DEC FIXED (15),
2 BIT (2)	DEC FIXED (5),
2 PREDET	DEC FIXED (5),
2 REC-C	DEC FIXED (5),
2 ANIS (9),	
3 SS	
4 NS,	
5 ALO (2,8)	DEC FIXED (7,2),
5 ELO (2,8)	DEC FIXED (7,2),
5 FLO (2,8)	DEC FIXED (7,2),
5 AL (2,4)	DEC FIXED (7,2),
5 EL (2,4)	DEC FIXED (7,2),
5 FL (2,4)	DEC FIXED (7,2),
4 S,	
5 ALO (2,8)	DEC FIXED (7,2),
5 ELO (2,8)	DEC FIXED (7,2),
5 FLO (2,8)	DEC FIXED (7,2),
5 AL (2,4)	DEC FIXED (7,2),
5 EL (2,4)	DEC FIXED (7,2),
5 FL (2,4)	DEC FIXED (7,2),
3 CRY,	
4 NS,	
5 CLO (2,8)	DEC FIXED (7,2),
5 CL (2,4)	DEC FIXED (7,2),
4 S,	
5 CLO (2,8)	DEC FIXED (7,2),
5 CL (2,4)	DEC FIXED (7,2),

Table 4 (continued)

2 ISOT (9),

4 A (6)	DEC FIXED (7,2),
4 ANF (6)	DEC FIXED (7,2),
4 C (6)	DEC FIXED (7,2),
4 CNF (6)	DEC FIXED (7,2),
4 CII	DEC FIXED (7,2),
4 CINF	DEC FIXED (7,2),
4 C4I	DEC FIXED (7,2),
4 C4NF	DEC FIXED (7,2),
4 D	DEC FIXED (7,2),
4 DLNF	DEC FIXED (7,2),
4 SYNC	DEC FIXED (7,2),
4 SYNCF	DEC FIXED (7,2);

V. Data Reliability

Although considerable efforts have been made to insure that the Pioneer cosmic ray data are free from errors, there are several conditions in which problems are known to occur and the data should be examined carefully to insure data reliability.

The type of errors are as follows:

1) Detector noise. The isotropic logics A1 and A2 contain counts which are due to electrical noise generated on the spacecraft. These logics should not be used. All other logics are free of electrical noise.

2) Accumulator overflow. Each of the accumulators used in the instrument has a capacity of 2752 counts. Since no overflow correction has been incorporated in the data reduction programs, the tapes may contain errors due to accumulator overflow. The process of identifying overflows in the data is somewhat subjective and any data which exhibit erratic behavior during periods of high count rate should be regarded with suspicion. The general problem of overflow is most likely to occur at the low bit rates (64, 16 and 8 bits/sec) and for the low energy and integral logics, i.e. in decreasing sensitivity to overflow are the logics A3, A4, etc. D, C1I, C1, C2, etc.

3) Transmission bit errors. Data recorded during periods of high telemetry stress are not used in the normal data processing. Bit errors are known to occur occasionally even during periods of low telemetry stress. These usually can be recognized by the fact that they result in an individual readout which is drastically different from the preceeding and subsequent data.

19

[illegible]

REC 5. LENGTH 8099

[illegible]