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1. INTRODUCTION:

The documentation for this data set was originally on paper kept in NSSDC's Data Set Catalogs (DSCs). The offline tape datasets have now been migrated from the original magnetic tape to magnetic disk (starting in mid-2005). Accordingly, statements in the format descriptions that address such tape relevant factors as blocking and bit density are no longer applicable. The paper documentation in the Data Set Catalogs have been scanned and made into digital images of the pages, the collected into a single PDF file for each Data Set Catalog.

The inventory information in these DSCs is current as of July 1, 2005. But this inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system, and the user should go to that interface (JIN) if further information existing in the DSCs is now not needed for locating data files, but we did not go to the trouble of removing that inventory information.

2. CHANGE LOG

Version	Date	Person	Page	Description of Change
01	10/29/2004	J. Manuel	23	Retyped
	09/28/2005	G.Schneider	17	Added TRF document ID

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

[NOTE: EACH OF THESE LINKS RETRIEVES THREE FIELDS FOR THE OBJECT IN QUESTION: "BRIEF DESCRIPTION", "REMARKS", AND "MATERIALS FOR DISTRIBUTION". ANY OF THE RETRIEVED INFORMATION FIELDS MIGHT BE BLANK.]

DATA SET CATALOG # 3

Explorer 7 Heavy Primary Cosmic Rays

59-009A-03A 1 Tape

EXPLORER 7
ION COUNTS, TAPE
59-009A-03A

THIS DATA SET HAS BEEN RESTORED. ORIGINALLY IT CONTAINED ONE 7-TRACK 556 BPI TAPE WRITTEN IN BCD. THERE IS ONE RESTORED TAPE WRITTEN IN EBCDIC. THE DR TAPE IS A 3480 CARTRIDGE AND THE DS TAPE IS 9-TRACK, 6250 BPI. THE ORIGINAL TAPE WAS CREATED ON AN IBM 1401 COMPUTER. THE DR AND DS NUMBER ALONG WITH THE CORRESPONDING D NUMBER AND THE TIME SPAN IS AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR002859	DS002859	D000001	1	10/13/59 - 05/31/60

59-009A-03A

Explorer 7 (1959 IOTA 1)
Heavy Primary Cosmic Rays

This data set consists of a single magnetic tape (D-00001) which is the BCD image of a set of punch cards.

The Data Set Catalog consists of:

1. A partial listing of the first part of the tape.
2. A Data Users' Note which
 - a. Supplies the distribution of data (longitude vs. latitude), p. 6
 - b. Describes the format p. 10-11
 - c. Gives the dates of availability p. 12.

D-0001

10/13/59 - 5/31/60

HDR NSSDC 000001 65306 004080301 00001 EXPLORES 7 HEAVY COSMIC RADIATION

0	20.59	10	190	6	0	15	0.	14.0	15.8	1589	128	652	10	78	155	1
0	20.61	15	190	5	16	120	480.	13.8	14.9	1589	128	652	10	78	155	2
0	20.63	20	200	5	0	60	0.	13.0	13.0	1589	128	652	10	78	155	3
0	20.65	25	200	5	4	30	480.	12.0	11.3	1589	128	652	10	78	155	4
0	20.95	45	280	6	36	45	2880.	1.1	1.6	1589	128	652	10	78	155	5
0	20.97	45	290	6	52	105	1783.	1.0	1.5	1589	128	652	10	78	155	6
0	21.66	-45	40	10	56	90	2240.	2.3	3.4	1589	128	652	10	78	155	7
0	21.69	-45	50	10	80	135	2133.	2.0	2.9	1589	128	652	10	78	155	8
0	21.71	-45	60	10	12	15	2980.	1.7	2.5	1589	128	652	10	78	155	9
0	21.63	-40	30	11	52	105	1783.	3.2	5.4	1589	128	652	10	78	155	10
0	22.81	25	300	7	0	15	0.	5.7	6.9	1589	128	652	10	78	155	11
0	22.79	30	290	7	20	45	1600.	3.8	5.2	1589	128	652	10	78	155	12
0	22.75	35	280	7	20	60	1200.	2.8	3.8	1589	128	652	10	78	155	13
0	22.77	35	290	7	20	60	1200.	2.7	3.7	1589	128	652	10	78	155	14
0	22.70	40	270	6	29	60	1680.	2.0	2.7	1589	128	652	10	78	155	15
0	22.72	40	280	7	52	105	1783.	1.8	2.5	1589	128	652	10	78	155	16
0	22.69	45	270	6	28	45	2240.	1.2	1.7	1589	128	652	10	78	155	17
1	2.18	30	240	7	20	75	960.	6.5	6.8	611	120	652	26	102	153	18
1	3.96	15	230	8	0	30	0.	12.2	12.7	611	120	652	26	102	153	19
1	4.69	-40	10	9	15	45	1280.	4.5	6.7	611	120	652	26	102	153	20
1	4.70	-35	10	9	24	60	1440.	5.8	8.4	611	120	652	26	102	153	21
1	4.72	-35	20	8	49	60	2980.	5.4	7.7	611	120	652	26	102	153	22
1	4.74	-30	20	8	80	90	3200.	6.9	9.5	611	120	652	26	102	153	23
1	4.78	-25	30	8	56	75	2688.	8.1	10.6	611	120	652	26	102	153	24
1	4.81	-20	30	7	52	120	1560.	9.3	12.3	611	120	652	26	102	153	25
1	4.83	-15	40	7	4	30	480.	10.8	13.3	611	120	652	26	102	153	26
1	5.57	25	190	7	4	60	240.	11.7	12.0	611	120	652	26	102	153	27
1	5.58	25	200	8	4	30	480.	11.0	11.3	611	120	652	26	102	153	28
1	5.55	30	190	7	4	30	480.	10.3	10.2	611	120	652	26	102	153	29
1	12.66	-25	140	10	8	30	960.	6.4	7.4	611	120	652	26	102	153	30
1	12.65	-20	130	10	16	75	768.	8.7	9.0	611	120	652	26	102	153	31
1	12.62	-15	130	10	4	45	320.	11.2	10.8	611	120	652	26	102	153	32
1	21.29	-45	40	10	52	120	1560.	2.3	3.4	611	120	652	26	102	153	33
1	21.33	-45	50	10	76	105	2606.	2.0	2.9	611	120	652	26	102	153	34
1	21.26	-40	30	11	4	15	960.	3.2	5.4	611	120	652	26	102	153	35
1	21.27	-40	40	11	32	60	1920.	3.0	4.8	611	120	652	26	102	153	36
1	22.39	35	290	7	28	90	1120.	2.7	3.7	611	120	652	26	102	153	37
1	22.33	40	270	6	20	60	1200.	2.0	2.7	611	120	652	26	102	153	38
1	22.36	40	280	6	60	120	1800.	1.8	2.5	611	120	652	26	102	153	39
1	22.32	45	270	6	24	30	2880.	1.2	1.7	611	120	652	26	102	153	40
1	23.04	-50	30	10	44	60	2640.	1.8	2.7	611	120	652	26	102	153	41
1	23.06	-50	40	10	64	120	1920.	1.5	2.3	611	120	652	26	102	153	42
1	22.96	-45	10	11	24	60	1440.	3.2	5.1	611	120	652	26	102	153	43
1	22.99	-45	20	10	60	120	1800.	3.0	4.5	611	120	652	26	102	153	44
1	23.02	-45	30	10	32	60	1920.	2.6	3.9	611	120	652	26	102	153	45
1	22.92	-40	0	11	0	15	0.	5.0	7.3	611	120	652	26	102	153	46
1	22.95	-40	10	11	24	60	1440.	4.2	6.7	611	120	652	26	102	153	47
2	0.74	-50	10	10	43	105	1646.	2.6	3.7	1646	134	651	30	96	160	48
2	0.78	-50	20	10	60	105	2057.	2.1	3.2	1646	134	651	30	96	160	49
2	0.81	-50	30	10	60	120	1800.	1.8	2.7	1646	134	651	30	96	160	50
2	0.71	-45	0	10	64	105	2194.	3.9	5.6	1646	134	651	30	96	160	51
2	0.84	-45	40	10	68	135	1813.	2.3	3.4	1646	134	651	30	96	160	52
2	0.87	-45	50	9	48	90	1920.	2.0	2.9	1646	134	651	30	96	160	53
2	0.68	-45	350	10	40	105	1371.	4.8	6.2	1646	134	651	30	96	160	54
2	2.48	-50	0	10	16	45	1280.	3.1	4.1	1646	134	651	30	96	160	55
2	2.50	-50	10	10	24	45	1920.	2.6	3.7	1646	134	651	30	96	160	56
2	2.52	-45	10	10	20	60	1200.	3.3	5.1	1646	134	651	30	96	160	57
2	2.56	-45	20	9	43	105	1646.	3.0	4.5	1646	134	651	30	96	160	58
2	2.59	-40	30	9	56	120	1680.	3.4	5.4	1646	134	651	30	96	160	59
2	2.62	-40	40	9	12	30	1440.	3.2	4.8	1646	134	651	30	96	160	60
2	2.64	-35	40	9	36	120	1080.	4.3	6.7	1646	134	651	30	96	160	61

MIC RADIATION

10	78	155	1
10	78	155	2
10	78	155	3
10	78	155	4
10	78	155	- 5
10	78	155	6
10	78	155	- 7
10	78	155	8
10	78	155	9
10	78	155	10
10	78	155	11
10	78	155	12
10	78	155	13
10	78	155	14
10	78	155	15
10	78	155	16
10	78	155	17
26	102	153	18
26	102	153	19
26	102	153	20
26	102	153	21
26	102	153	- 22
26	102	153	- 23
26	102	153	- 24
26	102	153	- 25
26	102	153	26
26	102	153	27
26	102	153	28
26	102	153	29
26	102	153	30
26	102	153	31
26	102	153	32
26	102	153	33
26	102	153	- 34
26	102	153	35
26	102	153	36
26	102	153	37
26	102	153	38
26	102	153	39
26	102	153	40
26	102	153	41
26	102	153	42
26	102	153	43
26	102	153	44
26	102	153	45
26	102	153	46
26	102	153	47
30	96	160	48
30	96	160	49
30	96	160	50
30	96	160	- 51
30	96	160	52
30	96	160	53
30	96	160	54
30	96	160	55
30	96	160	56
30	96	160	57
30	96	160	58
30	96	160	59
30	96	160	60
30	96	160	61

BCD list of tape D-00001

Card image formats are described in
Data Users' Note.

10/13/59 - 5/31/60

2	2.66	-35	50	8	8	30	950.	4.0	5.7	1646	134	651	30	96	160	62
2	2.69	-30	59	8	49	150	1152.	5.6	7.4	1646	134	651	30	96	160	63
2	2.72	-25	50	8	8	60	480.	7.2	9.2	1646	134	651	30	96	160	64
2	2.73	-25	60	8	24	60	1440.	6.8	8.5	1646	134	651	30	96	160	65
2	4.30	-40	10	9	4	15	960.	4.5	6.7	1646	134	651	30	96	160	66
2	4.32	-35	10	9	20	60	1200.	5.8	8.4	1646	134	651	30	96	160	67
2	4.34	-35	20	9	56	120	1680.	5.2	7.7	1646	134	651	30	96	160	68
2	4.38	-30	20	8	76	75	3648.	6.9	9.5	1646	134	651	30	96	160	69
2	4.41	-25	30	8	44	75	2112.	8.1	10.6	1646	134	651	30	96	160	70
2	4.44	-20	30	8	76	120	2280.	9.0	12.3	1646	134	651	30	96	160	71
2	4.46	-15	40	7	12	45	960.	10.8	13.3	1646	134	651	30	96	160	72
2	5.09	40	170	6	16	105	540.	7.5	7.9	1646	134	651	30	96	160	73
2	5.02	45	150	6	0	15	0.	5.9	7.1	1646	134	651	30	96	160	74
2	5.04	45	160	6	0	15	0.	5.7	6.7	1646	134	651	30	96	160	75
2	5.06	45	170	6	0	15	0.	5.3	6.2	1646	134	651	30	96	160	76
2	19.17	-40	50	11	36	60	2160.	2.8	4.2	1646	134	651	30	96	160	77
2	19.19	-40	60	11	72	105	2469.	2.6	3.7	1646	134	651	30	96	160	78
2	19.15	-35	50	10	28	60	1680.	3.8	5.7	1646	134	651	30	96	160	79
2	19.09	-30	40	10	52	135	1387.	5.6	8.1	1646	134	651	30	96	160	80
2	19.70	-10	170	7	0	45	0.	13.8	14.1	1646	134	651	30	96	160	81
2	19.72	-5	170	7	0	60	0.	14.1	15.3	1646	134	651	30	96	160	82
2	19.73	-5	180	7	4	60	240.	14.0	15.6	1646	134	651	30	96	160	83
2	19.76	0	180	6	8	90	320.	14.6	16.2	1646	134	651	30	96	160	84
2	20.91	-45	40	11	72	105	2469.	2.2	3.4	1646	134	651	30	96	160	85
2	20.94	-45	50	10	84	135	2240.	2.0	2.9	1646	134	651	30	96	160	86
2	20.86	-40	30	11	52	105	1783.	3.2	5.4	1646	134	651	30	96	160	87
2	20.82	-35	20	10	48	120	1440.	5.1	7.7	1646	134	651	30	96	160	88
2	20.78	-30	20	10	44	75	2112.	6.5	9.5	1646	134	651	30	96	160	89
2	20.77	-25	10	10	32	60	1920.	7.7	12.0	1646	134	651	30	96	160	90
2	22.00	35	280	6	32	45	2560.	2.8	3.8	1646	134	651	30	96	160	91
2	22.02	35	290	7	40	105	1371.	2.7	3.7	1646	134	651	30	96	160	92
2	21.97	40	280	6	64	120	1920.	1.9	2.5	1646	134	651	30	96	160	93
2	21.95	45	270	6	32	60	1920.	1.2	1.7	1646	134	651	30	96	160	94
2	22.66	-50	30	10	20	30	2400.	1.8	2.7	1646	134	651	30	96	160	95
2	22.69	-50	40	10	68	150	1632.	1.5	2.3	1646	134	651	30	96	160	96
2	22.72	-50	50	10	48	90	1920.	1.2	1.9	1646	134	651	30	96	160	97
2	22.60	-45	10	11	8	15	1920.	3.2	5.1	1646	134	651	30	96	160	98
2	22.63	-45	20	10	56	105	1920.	3.0	4.5	1646	134	651	30	96	160	99
2	22.65	-45	30	10	0	15	0.	2.6	3.9	1646	134	651	30	96	160	100
2	22.55	-40	0	11	28	60	1680.	5.0	7.3	1646	134	651	30	96	160	101
2	22.57	-40	10	11	32	90	1280.	4.2	6.7	1646	134	651	30	96	160	102
2	22.52	-35	0	10	36	105	1234.	6.2	9.1	1646	134	651	30	96	160	103
2	22.50	-35	350	10	40	60	2400.	6.7	9.7	1646	134	651	30	96	160	104
2	22.48	-30	350	10	36	45	2880.	7.8	11.5	1646	134	651	30	96	160	105
3	0.43	-50	30	10	64	105	2194.	1.8	2.7	1666	125	652	10	116	167	106
3	0.47	-45	40	10	40	90	1600.	2.3	3.4	1666	125	652	10	116	167	107
3	0.51	-45	50	9	48	105	1646.	2.0	2.9	1666	125	652	10	116	167	108
3	1.42	30	240	7	16	75	768.	6.5	6.8	1666	125	652	10	116	167	109
3	1.38	35	230	7	12	60	720.	5.3	5.7	1666	125	652	10	116	167	110
3	1.37	40	230	6	4	15	960.	4.0	4.2	1666	125	652	10	116	167	111
3	2.11	-50	0	10	20	60	1200.	3.1	4.1	1666	125	652	10	116	167	112
3	2.13	-45	10	10	24	60	1440.	3.3	5.1	1666	125	652	10	116	167	113
3	2.17	-45	20	10	48	105	1646.	3.0	4.5	1666	125	652	10	116	167	114
3	2.20	-45	30	9	16	60	960.	2.7	3.9	1666	125	652	10	116	167	115
3	2.21	-40	30	9	20	60	1200.	3.4	5.4	1666	125	652	10	116	167	116
3	2.25	-40	40	9	24	60	1440.	3.2	4.8	1666	125	652	10	116	167	117
3	2.28	-35	40	9	24	75	1152.	4.3	6.3	1666	125	652	10	116	167	118
3	2.31	-30	50	8	64	120	1920.	5.6	7.4	1666	125	652	10	116	167	119
3	2.33	-25	50	8	24	60	1440.	7.2	9.2	1666	125	652	10	116	167	120
3	2.35	-25	60	8	16	60	960.	6.8	8.5	1666	125	652	10	116	167	121
3	2.36	-20	60	8	4	15	960.	9.1	10.4	1666	125	652	10	116	167	122
3	3.08	35	210	7	4	15	960.	6.8	7.0	1666	125	652	10	116	167	123
3	3.88	-45	0	10	20	60	1200.	3.9	5.6	1666	125	652	10	116	167	124
3	3.90	-40	0	9	32	60	1920.	5.3	7.3	1666	125	652	10	116	167	125

3	3.01	-40	10	9	8	15	1920.	4.5	6.7	1666	125	652	10	116	167	126
3	3.95	-35	10	9	16	45	1280.	5.8	8.4	1666	125	652	10	116	167	127
3	3.97	-35	20	9	32	60	1920.	5.2	7.7	1666	125	652	10	116	167	- 128
3	3.99	-30	20	9	64	120	1920.	6.7	9.5	1666	125	652	10	116	167	- 129
3	4.01	-30	30	8	28	30	3360.	6.5	8.8	1666	125	652	10	116	167	- 130
3	4.03	-25	30	8	24	45	1920.	8.1	10.6	1666	125	652	10	116	167	- 131
3	4.07	20	200	7	4	45	320.	12.2	13.0	1666	125	652	10	116	167	132
3	4.84	25	200	7	12	120	360.	11.3	11.3	1666	125	652	10	116	167	133
3	4.82	30	190	7	8	75	384.	10.3	10.2	1666	125	652	10	116	167	134
3	11.96	-30	140	10	4	15	960.	4.3	5.7	1666	125	652	10	116	167	135
3	11.94	-25	140	10	20	105	686.	6.4	7.4	1666	125	652	10	116	167	136
3	11.90	-20	130	10	8	60	480.	8.7	9.0	1666	125	652	10	116	167	137
3	11.92	-20	140	10	12	45	960.	9.1	9.3	1666	125	652	10	116	167	138
3	11.87	-15	130	10	8	45	640.	11.2	10.8	1666	125	652	10	116	167	139
3	17.89	30	230	5	3	60	480.	7.8	7.4	1666	125	652	10	116	167	140
3	19.47	10	190	6	4	60	240.	14.0	15.8	1666	125	652	10	116	167	141
3	19.49	15	190	6	8	60	480.	13.4	14.9	1666	125	652	10	116	167	142
3	21.66	30	290	7	12	30	1440.	3.8	5.2	1666	125	652	10	116	167	143
3	21.63	35	280	6	32	60	1920.	2.8	3.8	1666	125	652	10	116	167	144
3	21.65	35	290	7	24	60	1440.	2.7	3.7	1666	125	652	10	116	167	145
3	21.60	40	280	6	48	105	1546.	1.8	2.5	1666	125	652	10	116	167	146
3	21.57	45	270	6	64	105	2194.	1.2	1.7	1666	125	652	10	116	167	147
3	22.30	-50	30	10	48	75	2304.	1.8	2.7	1666	125	652	10	116	167	148
3	22.33	-50	40	10	56	90	2240.	1.8	2.3	1666	125	652	10	116	167	149
3	22.35	-50	50	10	36	60	2160.	1.2	1.9	1666	125	652	10	116	167	150
3	22.25	-45	20	11	16	45	1280.	2.9	4.5	1666	125	652	10	116	167	151
3	22.28	-45	30	10	32	75	1536.	2.6	3.9	1666	125	652	10	116	167	152
3	22.20	-40	10	11	4	15	960.	4.2	6.7	1666	125	652	10	116	167	153
3	22.14	-35	0	10	48	75	2304.	6.2	9.1	1666	125	652	10	116	167	- 154
3	22.12	-30	350	10	16	60	960.	7.8	11.5	1666	125	652	10	116	167	155
3	23.98	-50	10	10	12	30	1440.	2.6	3.7	1666	125	652	10	116	167	156
3	23.96	-45	0	10	40	90	1600.	3.9	5.6	1666	125	652	10	116	167	157
3	23.94	-45	350	11	24	60	1440.	4.6	6.2	1666	125	652	10	116	167	158
4	0.01	-50	10	10	3	15	1920.	2.6	3.7	2633	128	655	30	107	169	159
4	0.02	-50	20	10	24	30	2880.	2.1	3.2	2633	128	655	30	107	169	- 160
4	0.05	-50	30	10	48	60	2880.	1.8	2.7	2633	128	655	30	107	169	- 161
4	0.09	-45	40	10	48	90	1920.	2.3	3.4	2633	128	655	30	107	169	162
4	0.12	-45	50	10	52	120	1560.	2.0	2.9	2633	128	655	30	107	169	163
4	0.15	-40	50	10	12	30	1440.	2.9	4.2	2633	128	655	30	107	169	164
4	0.16	-40	60	9	4	15	960.	2.7	3.7	2633	128	655	30	107	169	165
4	1.05	30	240	7	8	45	640.	6.5	6.8	2633	128	655	30	107	169	166
4	1.01	35	230	6	4	15	960.	5.4	5.7	2633	128	655	30	107	169	167
4	1.04	35	240	7	9	15	0.	4.6	5.1	2633	128	655	30	107	169	168
4	1.00	40	230	6	4	30	480.	4.0	4.2	2633	128	655	30	107	169	169
4	1.73	-50	0	10	24	45	1920.	3.1	4.1	2633	128	655	30	107	169	170
4	1.75	-50	10	10	28	60	1680.	2.6	3.7	2633	128	655	30	107	169	171
4	1.76	-45	10	10	24	45	1920.	3.3	5.1	2633	128	655	30	107	169	172
4	1.81	-45	20	10	32	90	1280.	3.0	4.5	2633	128	655	30	107	169	173
4	1.87	-40	40	9	24	45	1920.	3.2	4.8	2633	128	655	30	107	169	174
4	1.90	-35	40	9	20	45	1600.	4.3	6.3	2633	128	655	30	107	169	175
4	1.92	-35	50	9	3	45	640.	3.9	5.7	2633	128	655	30	107	169	176
4	1.94	-30	50	9	40	120	1200.	5.4	7.4	2633	128	655	30	107	169	177
4	1.97	-25	50	8	24	90	960.	7.2	9.2	2633	128	655	30	107	169	178
4	1.98	-25	60	8	4	60	240.	6.8	8.5	2633	128	655	30	107	169	179
4	3.51	-45	0	10	0	15	0.	3.9	5.6	2633	128	655	30	107	169	180
4	3.54	-40	10	9	8	15	1920.	4.5	6.7	2633	128	655	30	107	169	181
4	3.59	-35	20	9	60	105	2057.	5.2	7.7	2633	128	655	30	107	169	- 182
4	3.63	-30	20	9	64	90	2560.	6.7	9.5	2633	128	655	30	107	169	- 183
4	3.70	-20	30	8	52	60	3120.	9.0	12.3	2633	128	655	30	107	169	- 184
4	3.71	-15	40	8	4	30	480.	10.5	13.3	2633	128	655	30	107	169	185
4	10.87	40	0	5	4	30	480.	6.3	4.6	2633	128	655	30	107	169	186
4	10.86	40	350	5	4	15	960.	5.5	4.1	2633	128	655	30	107	169	187
4	10.88	45	0	5	20	60	1200.	4.4	3.3	2633	128	655	30	107	169	188
4	10.91	45	10	5	32	105	1097.	4.7	3.8	2633	128	655	30	107	169	189

4	10.93	45	20	5	8	30	960.	4.9	4.4	2633	128	655	30	107	169	190
4	17.17	-25	180	8	8	45	640.	8.9	9.7	2633	128	655	30	107	169	191
4	17.19	-20	190	8	24	120	720.	11.3	12.2	2633	128	655	30	107	169	192
4	17.21	-15	190	8	4	15	960.	12.5	13.7	2633	128	655	30	107	169	193
4	19.10	10	190	6	4	15	960.	14.0	15.8	2633	128	655	30	107	169	194
4	19.11	15	190	6	4	60	240.	13.4	14.9	2633	128	655	30	107	169	195
4	19.13	15	200	6	0	60	0.	13.2	14.4	2633	128	655	30	107	169	196
4	19.15	20	200	6	12	60	720.	12.6	13.0	2633	128	655	30	107	169	197
4	19.16	25	200	6	0	30	0.	11.7	11.3	2633	128	655	30	107	169	198
4	20.17	-45	40	11	28	60	1680.	2.2	3.4	2633	128	655	30	107	169	199
4	20.18	-45	50	11	28	45	2240.	1.9	2.9	2633	128	655	30	107	169	200
4	20.12	-40	30	10	48	90	1920.	3.3	5.4	2633	128	655	30	107	169	201
4	20.15	-40	40	11	28	60	1680.	3.0	4.8	2633	128	655	30	107	169	202
4	20.07	-35	20	10	40	120	1200.	5.1	7.7	2633	128	655	30	107	169	203
4	20.10	-35	30	10	16	30	1920.	4.6	7.0	2633	128	655	30	107	169	204
4	20.05	-30	20	10	36	75	1728.	6.5	9.5	2633	128	655	30	107	169	205
4	21.91	-50	30	10	32	60	1920.	1.8	2.7	2633	128	655	30	107	169	206
4	21.94	-50	40	10	68	120	2040.	1.5	2.3	2633	128	655	30	107	169	207
4	21.98	-50	50	10	64	120	1920.	1.2	1.9	2633	128	655	30	107	169	208
4	22.00	-50	60	10	20	30	2400.	1.1	1.6	2633	128	655	30	107	169	209
4	21.88	-45	20	11	20	45	1600.	2.9	4.5	2633	128	655	30	107	169	210
4	21.90	-45	30	11	16	30	1920.	2.6	3.9	2633	128	655	30	107	169	211
4	23.61	-50	10	10	16	30	1920.	2.6	3.7	2633	128	655	30	107	169	212
4	23.64	-50	20	10	52	105	1783.	2.1	3.2	2633	128	655	30	107	169	213
4	23.67	-50	30	10	68	120	2040.	1.8	2.7	2633	128	655	30	107	169	214
4	23.58	-45	0	11	44	90	1760.	3.8	5.6	2633	128	655	30	107	169	215
4	23.60	-45	10	10	16	30	1920.	3.3	5.1	2633	128	655	30	107	169	216
4	23.70	-45	30	10	40	60	2400.	2.6	3.9	2633	128	655	30	107	169	217
4	23.72	-45	40	10	68	120	2040.	2.3	3.4	2633	128	655	30	107	169	218
4	23.76	-45	50	10	60	135	1600.	2.0	2.9	2633	128	655	30	107	169	219
4	23.80	-40	60	9	60	120	1800.	2.7	3.7	2633	128	655	30	107	169	220
5	1.36	-50	0	10	28	90	1120.	3.1	4.1	1648	123	657	45	116	171	221
5	1.39	-50	10	10	20	45	1600.	2.6	3.7	1648	123	657	45	116	171	222
5	1.33	-50	350	10	28	60	1680.	3.6	4.6	1648	123	657	45	116	171	223
5	1.40	-45	10	10	32	60	1920.	3.3	5.1	1648	123	657	45	116	171	224
5	1.42	-45	20	10	44	75	2112.	3.0	4.5	1648	123	657	45	116	171	225
5	1.48	-40	30	10	8	15	1920.	3.3	5.4	1648	123	657	45	116	171	226
5	1.50	-40	40	9	8	30	960.	3.2	4.8	1648	123	657	45	116	171	227
5	1.52	-35	40	9	36	120	1080.	4.3	6.3	1648	123	657	45	116	171	228
5	1.55	-35	50	9	8	60	480.	3.9	5.7	1648	123	657	45	116	171	229
5	1.57	-30	50	9	52	135	1387.	5.4	7.4	1648	123	657	45	116	171	230
5	1.61	-25	60	8	28	120	840.	6.8	8.5	1648	123	657	45	116	171	231
5	3.14	-45	0	10	8	30	960.	3.9	5.6	1648	123	657	45	116	171	232
5	3.12	-45	350	10	16	45	1280.	4.8	6.2	1648	123	657	45	116	171	233
5	3.15	-40	0	10	28	60	1680.	5.2	7.3	1648	123	657	45	116	171	234
5	3.16	-40	10	10	16	30	1920.	4.4	6.7	1648	123	657	45	116	171	235
5	3.21	-35	10	9	4	15	960.	5.8	8.4	1648	123	657	45	116	171	236
5	3.22	-35	20	9	36	90	1440.	5.2	7.7	1648	123	657	45	116	171	237
5	3.25	-30	20	9	64	60	3840.	6.7	9.5	1648	123	657	45	116	171	238
5	3.27	-30	30	9	28	60	1680.	6.3	8.8	1648	123	657	45	116	171	239
5	3.29	-25	30	8	28	45	2240.	8.1	10.6	1648	123	657	45	116	171	240
5	3.32	-20	30	8	20	45	1600.	9.0	12.3	1648	123	657	45	116	171	241
5	3.33	-20	40	8	32	60	1920.	9.3	11.7	1648	123	657	45	116	171	242
5	3.36	-15	40	8	16	105	549.	10.5	13.3	1648	123	657	45	116	171	243
5	3.38	-10	40	7	4	30	480.	12.0	14.6	1648	123	657	45	116	171	244
5	4.12	20	200	7	8	120	240.	12.2	13.0	1648	123	657	45	116	171	245
5	4.09	25	200	7	8	120	240.	11.3	11.3	1648	123	657	45	116	171	246
5	10.49	40	0	5	4	15	960.	6.3	4.6	1648	123	657	45	116	171	247
5	10.51	45	0	5	40	120	1200.	4.4	3.3	1648	123	657	45	116	171	248
5	10.54	45	10	5	32	75	1536.	4.7	3.8	1648	123	657	45	116	171	249
5	12.28	50	0	5	28	60	1680.	2.9	2.2	1648	123	657	45	116	171	250
5	12.30	50	10	5	16	60	960.	3.2	2.6	1648	123	657	45	116	171	251
5	17.12	25	230	6	8	75	384.	9.6	9.2	1648	123	657	45	116	171	252
5	17.15	30	230	5	20	60	1200.	7.8	7.4	1648	123	657	45	116	171	253

5	17.16	30	240	5	15	45	1280.	6.9	6.8	1648	123	657	45	116	171	254
5	17.17	35	240	5	4	15	960.	4.9	5.1	1648	123	657	45	116	171	255
5	18.73	10	190	6	4	60	240.	14.0	15.8	1648	123	657	45	116	171	256
5	18.75	15	190	6	4	60	240.	13.4	14.9	1648	123	657	45	116	171	257
5	18.77	20	200	6	8	90	320.	12.6	13.0	1648	123	657	45	116	171	258
5	18.80	25	200	6	4	90	160.	11.7	11.3	1648	123	657	45	116	171	259
6	0.31	30	240	6	15	105	549.	6.7	6.8	1674	124	656	28	111	173	260
6	0.27	35	230	6	8	30	960.	5.4	5.7	1674	124	656	28	111	173	261
6	0.28	35	240	6	0	15	0.	4.8	5.1	1674	124	656	28	111	173	262
6	0.98	-50	0	10	20	45	1600.	3.1	4.1	1674	124	656	28	111	173	263
6	1.00	-50	10	10	16	45	1280.	2.5	3.7	1674	124	656	28	111	173	264
6	1.02	-45	10	10	36	75	1728.	3.3	5.1	1674	124	656	28	111	173	265
6	1.06	-45	20	10	32	75	1536.	3.0	4.5	1674	124	656	28	111	173	266
6	1.09	-45	30	10	8	30	960.	2.6	3.9	1674	124	656	28	111	173	267
6	1.10	-40	30	10	12	30	1440.	3.3	5.4	1674	124	656	28	111	173	268
6	1.13	-40	40	10	4	30	480.	3.1	4.8	1674	124	656	28	111	173	269
6	1.15	-35	40	9	20	45	1600.	4.3	6.3	1674	124	656	28	111	173	270
6	1.17	-35	50	9	16	60	960.	3.9	5.7	1674	124	656	28	111	173	271
6	1.19	-30	50	9	52	120	1560.	5.4	7.4	1674	124	656	28	111	173	272
6	1.22	-25	50	9	16	60	960.	7.0	9.2	1674	124	656	28	111	173	273
6	1.23	-25	60	9	12	60	720.	6.6	8.5	1674	124	656	28	111	173	274
6	2.76	-45	0	10	56	90	2240.	3.9	5.6	1674	124	656	28	111	173	275
6	2.74	-45	350	10	4	15	960.	4.8	6.2	1674	124	656	28	111	173	276
6	2.80	-40	10	10	48	165	1047.	4.4	6.7	1674	124	656	28	111	173	277
6	2.84	-35	20	9	40	120	1200.	5.2	7.7	1674	124	656	28	111	173	278
6	2.87	-30	20	9	120	135	3200.	6.7	9.5	1674	124	656	28	111	173	279
6	2.90	-30	30	9	44	60	2640.	6.3	8.8	1674	124	656	28	111	173	280
6	2.92	-25	30	9	56	90	2240.	7.9	10.6	1674	124	656	28	111	173	281
6	2.96	-20	40	8	52	120	1560.	9.3	11.7	1674	124	656	28	111	173	282
6	2.99	-15	40	8	20	120	600.	10.5	13.3	1674	124	656	28	111	173	283
6	3.02	-10	40	8	0	60	0.	11.6	14.6	1674	124	656	28	111	173	284
6	3.03	-5	50	7	4	60	240.	13.6	15.3	1674	124	656	28	111	173	285
6	3.73	25	200	7	12	120	360.	11.3	11.3	1674	124	656	28	111	173	286
6	3.70	30	190	7	4	30	480.	10.3	10.2	1674	124	656	28	111	173	287
6	4.36	-50	310	10	84	90	3360.	5.8	5.9	1674	124	656	28	111	173	288
6	10.12	40	0	5	8	45	540.	6.3	4.6	1674	124	656	28	111	173	289
6	10.13	45	0	5	8	45	640.	4.4	3.3	1674	124	656	28	111	173	290
6	10.16	45	10	5	16	90	640.	4.7	3.8	1674	124	656	28	111	173	291
6	10.18	45	20	5	24	60	1440.	4.9	4.4	1674	124	656	28	111	173	292
6	10.88	-35	150	10	24	45	1920.	3.3	4.5	1674	124	656	28	111	173	293
6	10.87	-30	150	10	12	45	960.	4.7	6.1	1674	124	656	28	111	173	294
6	10.82	-25	140	10	40	120	1200.	6.4	7.4	1674	124	656	28	111	173	295
6	10.79	-20	140	10	20	105	686.	9.1	9.3	1674	124	656	28	111	173	296
6	10.75	-15	130	9	8	75	384.	11.5	10.8	1674	124	656	28	111	173	297
6	10.74	-10	130	9	4	30	480.	12.8	12.5	1674	124	656	28	111	173	298
6	11.87	45	350	5	16	30	1920.	3.9	2.8	1674	124	656	28	111	173	299
6	11.89	50	0	5	8	30	960.	2.9	2.2	1674	124	656	28	111	173	300
6	11.92	50	10	5	44	120	1320.	3.2	2.6	1674	124	656	28	111	173	301
6	11.95	50	20	5	8	30	960.	3.4	3.1	1674	124	656	28	111	173	302
6	11.88	50	350	5	20	60	1200.	2.6	1.8	1674	124	656	28	111	173	303
6	12.62	-40	130	10	24	45	1920.	1.6	2.6	1674	124	656	28	111	173	304
6	12.64	-40	140	10	32	75	1536.	1.9	2.9	1674	124	656	28	111	173	305
6	12.60	-35	130	10	8	15	1920.	2.8	3.9	1674	124	656	28	111	173	306
6	12.54	-30	120	10	44	105	1509.	3.9	5.2	1674	124	656	28	111	173	307
6	12.52	-25	120	10	8	30	960.	5.8	6.9	1674	124	656	28	111	173	308
6	13.38	25	280	6	12	45	960.	5.8	7.0	1674	124	656	28	111	173	309
6	13.41	30	290	5	48	120	1440.	4.1	5.2	1674	124	656	28	111	173	310
6	13.66	45	0	5	16	30	1920.	4.4	3.3	1674	124	656	28	111	173	311
6	13.68	45	10	6	32	120	960.	4.6	3.8	1674	124	656	28	111	173	312
6	13.65	50	0	5	16	30	960.	2.9	2.2	1674	124	656	28	111	173	313
6	13.64	50	350	5	12	30	1440.	2.6	1.8	1674	124	656	28	111	173	314
6	15.13	35	270	5	32	105	1097.	3.3	4.0	1674	124	656	28	111	173	315
6	15.15	40	270	5	36	60	2160.	2.1	2.7	1674	124	656	28	111	173	316
6	15.18	40	280	5	44	105	1509.	1.9	2.5	1674	124	656	28	111	173	317

6	15.19	45	290	5	8	15	1920.	1.0	1.5	1674	12	656	28	111	173	318
6	16.79	30	240	5	28	120	840.	6.9	6.8	1674	124	656	28	111	173	319
6	18.00	-40	140	10	16	45	1280.	1.9	2.9	1674	124	656	28	111	173	320
6	18.02	-35	140	9	12	45	960.	3.0	4.2	1674	124	656	28	111	173	321
6	18.02	-35	150	9	4	15	960.	3.4	4.5	1674	124	656	28	111	173	322
6	18.37	15	190	6	4	60	240.	13.4	14.9	1674	124	656	28	111	173	323
6	18.38	15	200	6	4	60	240.	13.2	14.4	1674	124	656	28	111	173	324
6	18.40	20	200	6	4	90	160.	12.6	13.0	1674	124	656	28	111	173	325
6	19.82	-20	140	8	20	105	686.	9.6	9.3	1674	124	656	28	111	173	326
6	19.87	-15	140	8	4	45	320.	12.0	11.1	1674	124	656	28	111	173	327
6	19.89	-10	150	8	4	90	160.	13.2	13.2	1674	124	656	28	111	173	328
6	20.53	35	290	6	40	120	1200.	2.8	3.7	1674	124	656	28	111	173	329
6	20.49	40	280	6	56	120	1680.	1.8	2.5	1674	124	656	28	111	173	330
6	20.46	45	270	6	48	90	1920.	1.2	1.7	1674	124	656	28	111	173	331
7	2.39	-45	0	10	48	75	2304.	3.9	5.6	1696	129	660	16	108	175	332
7	2.37	-45	350	10	16	30	1920.	4.8	6.2	1696	129	660	16	108	175	333
7	2.43	-40	10	10	48	150	1152.	4.4	6.7	1696	129	660	16	108	175	334
7	2.47	-35	20	9	44	120	1320.	5.2	7.7	1696	129	660	16	108	175	335
7	2.50	-30	20	9	68	75	3264.	6.7	9.5	1696	129	660	16	108	175	336
7	2.52	-30	30	9	32	60	1920.	6.3	8.8	1696	129	660	16	108	175	337
7	2.54	-25	30	9	52	60	3120.	7.9	10.6	1696	129	660	16	108	175	338
7	2.57	-20	30	9	56	60	3360.	8.8	12.3	1696	129	660	16	108	175	339
7	2.58	-20	40	8	20	60	1200.	9.3	11.7	1696	129	660	16	108	175	340
7	2.61	-15	40	8	40	135	1067.	10.5	13.3	1696	129	660	16	108	175	341
7	2.63	-10	40	8	8	60	480.	11.6	14.6	1696	129	660	16	108	175	342
7	2.85	-10	50	8	4	60	240.	12.2	14.2	1696	129	660	16	108	175	343
7	3.36	25	200	7	8	105	274.	11.3	11.3	1696	129	660	16	108	175	344
7	3.34	30	200	6	0	30	0.	9.6	9.5	1696	129	660	16	108	175	345
7	9.75	40	0	5	4	30	480.	6.3	4.6	1696	129	660	16	108	175	346
7	9.77	45	0	5	12	60	720.	4.4	3.3	1696	129	660	16	108	175	347
7	9.79	45	10	5	32	105	1097.	4.7	3.8	1696	129	660	16	108	175	348
7	9.81	45	20	5	0	30	0.	4.9	4.4	1696	129	660	16	108	175	349
7	10.37	-15	130	9	24	75	1152.	11.5	10.8	1696	129	660	16	108	175	350
7	10.34	-10	130	9	24	120	720.	12.8	12.5	1696	129	660	16	108	175	351
7	10.32	-5	120	9	4	15	960.	13.8	13.9	1696	129	660	16	108	175	352
7	11.51	45	350	5	4	15	960.	3.9	2.8	1696	129	660	16	108	175	353
7	11.53	50	0	5	44	120	1320.	2.9	2.2	1696	129	660	16	108	175	354
7	11.55	50	10	5	20	75	960.	3.2	2.6	1696	129	660	16	108	175	355
7	12.28	-45	140	10	32	45	2560.	1.0	1.8	1696	129	660	16	108	175	356
7	12.24	-40	130	10	20	30	2400.	1.6	2.6	1696	129	660	16	108	175	357
7	12.26	-40	140	10	76	120	2280.	1.9	2.9	1696	129	660	16	108	175	358
7	13.01	25	280	6	28	90	1120.	5.8	7.0	1696	129	660	16	108	175	359
7	13.04	30	290	5	44	105	1509.	4.1	5.2	1696	129	660	16	108	175	360
7	13.30	45	0	5	12	60	720.	4.4	3.3	1696	129	660	16	108	175	361
7	13.32	45	10	5	12	45	960.	4.7	3.8	1696	129	660	16	108	175	362
7	13.29	50	0	5	16	60	960.	2.9	2.2	1696	129	660	16	108	175	363
7	13.27	50	350	5	4	30	480.	2.6	1.8	1696	129	660	16	108	175	364
7	14.76	35	270	5	36	90	1440.	3.3	4.0	1696	129	660	16	108	175	365
7	14.78	40	270	5	28	60	1680.	2.1	2.7	1696	129	660	16	108	175	366
7	14.80	40	280	5	36	45	2880.	1.9	2.5	1696	129	660	16	108	175	367
7	14.83	45	290	5	24	45	1920.	1.0	1.5	1696	129	660	16	108	175	368
7	16.38	25	230	6	12	60	720.	9.6	9.2	1696	129	660	16	108	175	369
7	16.40	30	230	6	12	60	720.	7.5	7.4	1696	129	660	16	108	175	370
7	16.42	30	240	5	16	60	960.	6.9	6.8	1696	129	660	16	108	175	371
7	16.44	35	240	5	8	60	480.	4.9	5.1	1696	129	660	16	108	175	372
7	17.54	-45	120	10	52	120	1560.	1.0	1.6	1696	129	660	16	108	175	373
7	17.57	-45	130	10	48	105	1646.	1.0	1.7	1696	129	660	16	108	175	374
7	17.60	-40	130	10	4	30	480.	1.6	2.6	1696	129	660	16	108	175	375
7	17.61	-40	140	10	4	15	960.	1.9	2.9	1696	129	660	16	108	175	376
7	18.00	15	190	6	4	60	240.	13.4	14.9	1696	129	660	16	108	175	377
7	18.01	15	200	6	4	60	240.	13.2	14.4	1696	129	660	16	108	175	378
7	18.04	20	200	6	12	120	360.	12.6	13.0	1696	129	660	16	108	175	379
7	18.07	25	200	6	8	45	640.	11.7	11.3	1696	129	660	16	108	175	380
7	19.42	-25	130	9	8	45	640.	6.3	7.1	1696	129	660	16	108	175	381

7	19.44	-25	140	9	4	30	480.	6.6	7.4	1696	129	660	16	108	175	382
7	19.45	-20	140	8	12	75	576.	9.6	9.3	1696	129	660	16	108	175	383
7	20.15	35	290	6	32	90	1280.	2.8	3.7	1696	129	660	16	108	175	384
7	20.12	40	280	6	48	105	1646.	1.8	2.5	1696	129	660	16	108	175	385
7	20.09	45	270	6	52	105	1783.	1.2	1.7	1696	129	660	16	108	175	386
7	20.80	-50	30	11	36	60	2160.	1.8	2.7	1696	129	660	16	108	175	387
7	20.82	-50	40	11	32	50	1920.	1.4	2.3	1696	129	660	16	108	175	388
7	20.85	-50	50	10	32	75	1536.	1.2	1.9	1696	129	660	16	108	175	389
7	20.75	-45	20	11	36	60	2160.	2.9	4.5	1696	129	660	16	108	175	390
7	20.78	-45	30	11	44	90	1760.	2.6	3.9	1696	129	660	16	108	175	391
7	20.71	-40	10	10	24	60	1440.	4.4	6.7	1696	129	660	16	108	175	392
7	22.50	-50	10	11	20	45	1600.	2.6	3.7	1696	129	660	16	108	175	393
7	22.53	-50	20	11	60	120	1800.	2.1	3.2	1696	129	660	16	108	175	394
7	22.56	-50	30	10	76	120	2280.	1.8	2.7	1696	129	660	16	108	175	395
7	22.46	-45	0	11	12	15	2880.	3.8	5.6	1696	129	660	16	108	175	396
7	22.59	-45	40	10	44	90	1760.	2.3	3.4	1696	129	660	16	108	175	397
7	22.63	-45	50	10	88	165	1920.	2.0	2.9	1696	129	660	16	108	175	398
7	22.67	-40	60	10	12	30	1440.	2.6	3.7	1696	129	660	16	108	175	399
8	0.23	-50	0	10	32	90	1280.	3.1	4.1	2701	136	662	13	111	175	400
8	0.26	-50	10	10	48	120	1440.	2.6	3.7	2701	136	662	13	111	175	401
8	0.28	-45	10	10	24	45	1920.	3.3	5.1	2701	136	662	13	111	175	402
8	0.30	-45	20	10	40	90	1600.	3.0	4.5	2701	136	662	13	111	175	403
8	0.33	-45	30	10	28	60	1680.	2.6	3.9	2701	136	662	13	111	175	404
8	0.35	-40	30	10	24	60	1440.	3.3	5.4	2701	136	662	13	111	175	405
8	0.37	-40	40	10	48	120	1440.	3.1	4.8	2701	136	662	13	111	175	406
8	0.40	-35	40	10	28	75	1344.	4.2	6.3	2701	136	662	13	111	175	407
8	0.43	-35	50	9	44	120	1320.	3.9	5.7	2701	136	662	13	111	175	408
8	0.46	-30	50	9	44	120	1320.	5.4	7.4	2701	136	662	13	111	175	409
8	0.49	-25	60	9	12	120	360.	6.6	8.5	2701	136	662	13	111	175	410
8	0.51	-20	60	9	0	30	0.	8.9	10.4	2701	136	662	13	111	175	411
8	1.88	-50	320	11	16	105	549.	5.4	5.7	2701	136	662	13	111	175	412
8	1.90	-50	330	11	8	90	320.	4.7	5.4	2701	136	662	13	111	175	413
8	1.79	-45	300	10	60	90	3200.	7.7	7.8	2701	136	662	13	111	175	- 414
8	1.84	-45	310	11	56	105	1920.	7.4	7.7	2701	136	662	13	111	175	- 415
8	1.75	-40	290	10	148	180	2960.	9.0	9.7	2701	136	662	13	111	175	- 416
8	1.71	-35	280	10	40	105	1371.	9.9	11.5	2701	136	662	13	111	175	- 417
8	1.66	-30	270	10	12	30	1440.	10.8	13.0	2701	136	662	13	111	175	418
8	1.69	-30	280	10	4	15	960.	10.4	13.2	2701	136	662	13	111	175	419
8	1.65	-25	270	10	20	75	960.	11.2	14.4	2701	136	662	13	111	175	420
8	2.07	-40	10	10	4	15	960.	4.4	6.7	2701	136	662	13	111	175	421
8	2.10	-35	20	9	68	180	1360.	5.2	7.7	2701	136	662	13	111	175	422
8	2.14	-30	30	9	84	105	2880.	6.3	8.8	2701	136	662	13	111	175	- 423
8	2.17	-25	30	9	60	105	2057.	7.9	10.6	2701	136	662	13	111	175	- 424
8	2.21	-20	40	8	96	120	2880.	9.3	11.7	2701	136	662	13	111	175	- 425
8	2.24	-15	40	8	24	105	823.	10.5	13.3	2701	136	662	13	111	175	426
8	2.27	-10	40	8	8	60	480.	11.6	14.6	2701	136	662	13	111	175	427
8	2.28	-10	50	8	4	60	240.	12.2	14.2	2701	136	662	13	111	175	428
8	2.29	-5	50	8	0	15	0.	13.2	15.3	2701	136	662	13	111	175	429
8	3.00	20	200	7	4	75	192.	12.2	13.0	2701	136	662	13	111	175	430
8	2.97	25	200	6	4	75	192.	11.7	11.3	2701	136	662	13	111	175	431
8	2.95	30	190	6	0	30	0.	10.6	10.2	2701	136	662	13	111	175	432
8	9.37	40	0	5	20	90	800.	6.3	4.6	2701	136	662	13	111	175	433
8	9.42	45	10	5	20	75	960.	4.7	3.8	2701	136	662	13	111	175	434
8	11.14	45	350	5	12	30	1440.	3.9	2.8	2701	136	662	13	111	175	435
8	11.16	50	0	5	20	60	1200.	2.9	2.2	2701	136	662	13	111	175	436
8	11.18	50	10	5	12	15	2880.	3.2	2.6	2701	136	662	13	111	175	437
8	12.62	20	280	6	20	45	1600.	7.6	8.8	2701	136	662	13	111	175	438
8	12.63	25	280	6	16	60	960.	5.8	7.0	2701	136	662	13	111	175	439
8	12.65	30	290	6	8	30	960.	4.0	5.2	2701	136	662	13	111	175	440
8	12.68	35	290	5	56	120	1680.	2.8	3.7	2701	136	662	13	111	175	441
8	12.89	50	350	5	20	45	1600.	2.6	1.8	2701	136	662	13	111	175	442
8	14.40	35	270	5	28	60	1680.	3.3	4.0	2701	136	662	13	111	175	443
8	14.42	40	280	5	72	120	2160.	1.9	2.5	2701	136	662	13	111	175	444
8	14.45	45	280	5	8	45	640.	1.1	1.6	2701	136	662	13	111	175	445

8 15.54	-40	160	10	16	45	1280.	2.5	3.6	2701	136	662	13	111	175	446
8 15.58	-35	170	10	4	15	960.	4.0	5.6	2701	136	662	13	111	175	447
8 15.61	-35	180	9	4	15	960.	4.6	6.2	2701	136	662	13	111	175	448
8 15.79	-10	200	8	0	30	0.	13.2	15.4	2701	136	662	13	111	175	449
8 15.81	-5	200	8	12	120	360.	13.5	16.1	2701	136	662	13	111	175	450
8 15.85	0	210	7	16	180	320.	13.8	16.4	2701	136	662	13	111	175	451
8 15.88	5	210	7	4	60	240.	13.7	15.9	2701	136	662	13	111	175	452
8 15.90	5	220	7	0	45	0.	13.6	15.7	2701	136	662	13	111	175	453
8 15.91	10	220	7	8	60	480.	13.1	14.6	2701	136	662	13	111	175	454
8 15.94	15	220	6	8	105	274.	13.0	13.3	2701	136	662	13	111	175	455
8 17.22	-45	130	10	20	30	2400.	1.0	1.7	2701	136	662	13	111	175	456
8 17.26	-40	140	10	40	105	1371.	1.9	2.9	2701	136	662	13	111	175	457
8 17.29	-35	150	10	36	105	1234.	3.3	4.5	2701	136	662	13	111	175	458
8 17.32	-30	150	9	12	60	720.	4.8	6.1	2701	136	662	13	111	175	459
8 17.34	-30	160	9	0	15	0.	5.2	6.7	2701	136	662	13	111	175	460
8 17.36	-25	160	9	12	90	480.	7.3	8.4	2701	136	662	13	111	175	461
8 17.38	-20	160	9	28	60	1680.	10.2	10.3	2701	136	662	13	111	175	- 462
8 17.59	5	190	7	4	30	480.	13.9	16.3	2701	136	662	13	111	175	463
8 17.61	10	190	6	8	120	240.	14.0	15.8	2701	136	662	13	111	175	464
8 17.64	15	200	6	12	120	360.	13.2	14.4	2701	136	662	13	111	175	465
8 17.66	20	200	6	0	30	0.	12.6	13.0	2701	136	662	13	111	175	466
8 17.68	25	200	6	8	90	320.	11.7	11.3	2701	136	662	13	111	175	467
8 17.70	25	210	6	12	60	720.	11.1	10.6	2701	136	662	13	111	175	468
8 18.62	-40	30	10	12	30	1440.	3.3	5.4	2701	136	662	13	111	175	469
8 18.58	-35	20	10	12	30	1440.	5.1	7.7	2701	136	662	13	111	175	470
8 18.60	-35	30	10	20	60	1200.	4.6	7.0	2701	136	662	13	111	175	471
8 18.56	-30	20	10	48	90	1920.	6.5	9.5	2701	136	662	13	111	175	- 472
8 18.50	-25	10	10	40	60	2400.	7.7	12.0	2701	136	662	13	111	175	- 473
8 18.92	-40	110	10	16	30	1920.	1.6	2.5	2701	136	662	13	111	175	474
8 18.95	-40	120	10	16	45	1280.	1.6	2.5	2701	136	662	13	111	175	475
8 18.97	-35	120	10	24	60	1440.	2.6	3.8	2701	136	662	13	111	175	476
8 19.01	-30	130	9	16	90	640.	4.1	5.4	2701	136	662	13	111	175	477
8 19.79	35	290	6	28	75	1344.	2.8	3.7	2701	136	662	13	111	175	478
8 19.75	40	280	6	76	180	1520.	1.8	2.5	2701	136	662	13	111	175	479
8 22.12	-50	10	11	8	15	1920.	2.6	3.7	2701	136	662	13	111	175	480
8 22.15	-50	20	11	92	150	2208.	2.1	3.2	2701	136	662	13	111	175	- 481
8 22.19	-50	30	10	44	90	1760.	1.8	2.7	2701	136	662	13	111	175	482
8 22.08	-45	0	11	24	60	1440.	3.8	5.6	2701	136	662	13	111	175	483
8 22.09	-45	10	11	16	30	1920.	3.2	5.1	2701	136	662	13	111	175	484
8 22.23	-45	40	10	20	45	1600.	2.3	3.4	2701	136	662	13	111	175	485

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Data Users' Note

EXPLORER VII Heavy Primary Cosmic Ray Experiment

December 1965

NASA Space Science Data Center

National Aeronautics and Space Administration / Goddard Space Flight Center
Greenbelt, Maryland 20771 USA



NASA SPACE SCIENCE DATA CENTER

EXPLORER VII
(1959 Iota)

HEAVY PRIMARY COSMIC RAY EXPERIMENT
DATA USERS' NOTE

DECEMBER 1965

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

FOREWORD

This Data Users' Note, prepared by the NASA Space Science Data Center (NSSDC), describes the final reduced data available through NSSDC for use by the scientific community. The material presented herein was prepared from available literature and from information obtained from the principal investigator.

This Note is intended to provide the potential data user with experiment information and the nature of the reduced data available at NSSDC.

Inquiries concerning the availability of data should be directed to:

NASA Space Science Data Center
Goddard Space Flight Center
Greenbelt, Maryland 20771

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HEAVY PRIMARY COSMIC RAY EXPERIMENT DATA USERS' NOTE

INTRODUCTION

The data described in these notes were the results of the Explorer VII Heavy Primary Cosmic Ray Experiment. Brief descriptions of the Explorer VII spacecraft, telemetry, instrumentation, calibration, data reduction, and data continuity are presented. Additional data concerning the experiment may be obtained by contacting Dr. Martin A. Pomerantz, the principal investigator, or by reviewing the referenced literature. The sections on data format and bibliography, however, are intended to be as complete as possible and fully descriptive of the data available at the Space Science Data Center.

PURPOSE OF EXPERIMENT

The late Dr. Gerhart K. Groetzinger of the Research Institute for Advanced Studies (RIAS), Martin Company, and Dr. Martin A. Pomerantz of Bartol Research Foundation, designed this experiment to study temporal variations in the flux and magnetic rigidity spectrum of primary heavy nuclei (atomic number, $Z \geq 6$) during a period when solar modulation effects were most pronounced. The experiment was also designed to provide a basis for comparing the long term (solar cycle) with the short term (cosmic ray storm) modulation effects.

SPACECRAFT DESCRIPTION

Explorer VII (1959 Iota) was launched 13 October 1959 to carry instrumentation for a variety of scientific research. Its active lifetime extended to 24 August 1961, during which time the orbital elements changed only slightly. Initial apogee, perigee, and inclination angle were about 1100 km, 530 km, and 50.3 degrees, respectively. The satellite was spin stabilized about its longitudinal axis. At the time of antenna deployment the spin rate decreased to 360 rpm from the injection rate of 420 rpm. By the 300th day of orbit the rate had decreased to about 312 rpm.

Research was conducted using data obtained from five experiments carried aboard Explorer VII. These experiments are listed in Table 1.

TABLE 1
EXPLORER VII EXPERIMENTS

Experiment Name	Principle Components	Experimenter	Affiliation
Thermal Radiation Balance	Five Bolometers	V. Suomi	University of Wisconsin
Solar X-ray and Lyman-Alpha	Four Ionization Chambers	H. Friedman T. A. Chubb	Naval Research Laboratory
Heavy Primary Cosmic Ray	Pulse Ionization Chamber	G. Groetzinger M. Pomerantz	Martin Company Bartol Research Foundation
Radiation and Solar Proton	Two Geiger-Mueller Counters	J. Van Allen	State University of Iowa
Micrometeorite Penetration	Three Cd-S Cells	H. La Gow L. Secretan	Goddard Space Flight Center

TELEMETRY DESCRIPTION

The 20 Mc telemetry system, which transmitted all Explorer VII scientific experimental data except the micrometeorite information, consisted of a time division multiplexer, four sub-carrier oscillators, and an amplitude-modulated transmitter.

The time division multiplexer was a ten-channel commutation device containing a timing oscillator, pulse amplifier, and a ten-stage counter in the conventional ring counter configuration. The ten commutator segments were divided in the following manner: two used for calibration at 0 and 5.5 volt levels, three used for NRL experiment, one used for battery voltage, one used for solar cell data, and three used for heavy primary cosmic ray data.

EXPERIMENT DESCRIPTION

A complete description of the instrumentation, circuitry, etc.. may be found in Schwed et al 1,2. Pomerantz et al.3 and Pomerantz et al.4 Individual features of the experiment are presented below

Instrument

The detector, a pulse ionization chamber, consisted of an extruded cylinder 11 cm in diameter and 11 cm long fabricated from magnesium alloy (principle componets 95% Mg, 3% Al, 1 % Zn by weight) of a 2.5 mm thickness to which were welded end disks, of the same material, of a 3 mm thickness. The center wire was a length of 0.25 mm Kovar wire held in place by a Kovar scal in each end piece.

Three features of the chamber deserve mention. First, the choice of magnesium as the structural material was advantageous in reducing the background of pulses due to the disruption of nuclei in the chamber wall. Such pulses, which would be spurious from the point of view of the experiment, could have been produced if the interaction between an energetic primary or secondary particle of the cosmic ray flux and a nucleus within the chamber had lef to a star production. The prongs of such a star include low energy (10-50 Mev) protons and a-particles and also some heavier nuclear fragments. Since particles of this type are highly ionizing, the voltage pulse resulting when they slowed down within the ionization chamber could have been as large as that due to a relativistic heavy nucleus. The probability of this occurrence was diminished by constructing the ionization chamber of a relatively low Z material which necessarily could not fragment into a large number of multiply charged secondaries when disrupted by an energetic particle.

Second, the chamber was supplied with an a-particle source in the form of a short wire plated with Po210. The a-particles leaving this source could be "turned on or off" by varying the source potential relative to the center wire as can be seen from the following argument. The path length of the 5.3 Mev a-particle within the argon filling the chamber was quite short so that all the electron liberated when it stopped therein were generated in the immediate vicinity of the source wire. If the source wire and center wire were at the same potential (positive, relative to the chamber wall), those electrons were all attracted to the source wire; whereas if the source was at the potential of the chamber wall, the electrons were free to move to the center wire producing the normal pulse. The source wire, via its capacitive coupling to the center wire, also served as a convenient means of introducing electrical pulses into the amplifier.

Third, the ionization chamber also carried a simple, lightweight, pressure gauge in the form of a metal bellows which was extended by the gas pressure within the chamber. At the normal filling pressure the extension of the bellows closed a contact which would have opened if the pressure dropped by more than about ten psi. This provided a simple go, no-go, test of the chamber pressure.

The chamber was filled with argon at nine atmospheres absolute. It was determined, using the internal α -particle source, that its plateau began at 300 volts; and, consequently, 400 volts was selected as the operating voltage with the circuitry used. The electron-collection pulse had a duration of seven seconds to 50% decay.

Prior to filling, the chamber was outgassed 24 hours at a pressure of 10^{-5} mm and a temperature of 120°C . It was then flushed several times with the spectroscopically pure-argon used as the filling gas. The evacuation following each flush was accomplished by means of an ordinary rotary pump in conjunction with a liquid air trap. Immediately subsequent to the last flush, the final filling was accomplished. After the chamber was completed, it was tested for leaks by immersing it in a mineral oil bath at 70°C for five hours and examining the surface of the chamber for gas bubbles.

Lifetime

Data suitable for routine electronic data processing were obtained from the time of launch, 13 October 1959 until 31 May 1960. Some additional data, acquired thereafter, are discussed by Pomerantz and Witten⁵.

Details of Measurement

Heavy nuclei with atomic number Z greater than five were detected. The amplified output of the detector was introduced into a three-channel integral pulse height discriminator which was set to pass pulses corresponding to incident nuclei with $Z \geq 6$, $Z \geq 9$, $Z \geq 16$, respectively. Each of these channels operated independently so that any event triggering the last discriminator also triggered the other two. The output of each discriminator in turn was introduced into an associated scaler (the scale factor was four for each of the two lower levels and two for the highest level), stored in its own storage unit, and subsequently sampled by the electronic commutator.

Calibration

Pre-flight calibration was accomplished with the 5.3 Mev α -particles emanating from a Po^{210} coated wire within the chamber. This also served as an in-flight calibration.

Schedule of Measurement

The satellite did not carry a tape recorder; measurements were recorded at ground stations as the satellite passed within radio range. The three storage units of the instrumentation were each sampled for 1-1/2 seconds every 15 seconds. Tables 2 and 3 display the geographic distribution of the data obtained from the carbon and above channel ($Z \geq 6$) only.

Operational Experience

As far as can be ascertained from the results obtained, the entire unit behaved properly during the first eleven days subsequent to launch. Beginning on the twelfth day after launch the analog storage unit associated with the carbon-and-above discriminator underwent a change in mode of operation. This change manifested itself in a failure of the output signal to recycle to zero volts and it proved possible to determine the behavior of the unit by analyzing the telemetry records obtained while the satellite was in the trapped radiation belt. During such intervals the counting rate was considerably above its normal value so that the analog storage unit changed state a number of times during a single 1.5 second sampling period. Observations made during several such periods indicated that the storage unit behaved in quite a consistent fashion in its altered mode. Schematically, if one represents the normal cycle in which the system goes from zero to five volts in one-volt steps, by the progression 0123450, the altered cycle can be represented as 345453. The validity of this representation was also verified by following the behavior of the storage unit during an epoch in which, on the average, it changed state perhaps once a minute. Under these conditions, it was again possible to follow the cycle through which the unit progresses since at this rate the probability of "skipping a step" during the 15 seconds between readings is sufficiently small to be neglected.

A further running check on the validity of assuming the 345453 pattern was performed as follows: For a given period of time (ordinarily 15 or 30 days) the total number of times that each level occurred was determined. If the above pattern held, the numbers of three, four and five volt readings should have been in the ratios 1:2:2, respectively. Over the period from 1 November 1959 through

Table 2

EXPLORER 7 HEAVY PRIMARY COSMIC RAY DATA DISTRIBUTION
LONGITUDE EAST (DEGREES)

	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180
SON	198	185	161	106	85	36	1	0	0	0	10	28	33	47	43	30	10	2	1
L 45N	279	286	239	117	70	29	1	1	1	1	11	44	72	76	62	65	29	12	20
A 40N	142	154	116	53	35	18	0	0	0	1	13	37	54	104	70	47	37	16	29
T 35N	68	66	53	31	26	8	0	0	0	3	5	21	59	60	96	59	25	26	31
I 30N	41	24	22	27	24	1	1	1	0	1	2	10	43	55	84	61	27	34	49
T 25N	17	30	10	28	3	0	0	1	0	1	0	3	14	57	49	35	24	14	33
U 20N	5	3	4	9	1	1	0	1	1	0	0	2	4	28	25	21	18	3	17
D 15N	2	0	6	2	0	1	0	0	1	0	0	0	5	11	10	14	5	2	9
E 10N	0	0	4	1	0	1	0	0	1	0	1	0	4	3	5	8	0	3	5
5N	0	1	0	0	0	0	1	1	0	0	0	1	4	1	6	3	0	1	1
I 0	0	1	1	0	3	2	1	1	2	0	0	2	0	3	4	0	0	0	4
N 5S	2	1	5	6	2	9	1	0	2	0	1	1	3	6	6	0	0	1	3
10S	2	0	6	9	8	14	1	0	1	1	2	1	12	15	12	6	2	2	1
D 15E	4	3	17	7	15	7	2	0	0	0	1	4	23	42	50	7	1	0	0
E 20E	4	11	31	28	25	7	5	0	0	1	7	12	41	74	79	27	1	0	0
G 25E	3	16	40	48	26	16	14	0	0	0	6	27	44	95	83	32	4	0	1
R 30E	7	22	49	53	37	31	5	0	0	0	7	35	53	96	66	41	11	0	0
E 35E	17	32	58	49	48	23	3	1	0	1	12	33	64	93	59	52	10	4	1
E 40E	27	40	41	50	32	13	5	2	1	0	5	28	86	90	84	42	9	3	1
S 45E	24	44	60	47	30	17	1	1	0	1	12	30	65	107	74	23	4	2	1
50E	13	30	24	30	14	7	1	0	0	0	4	18	27	24	18	10	2	0	0

Table 3

EXPLORER 7 HEAVY PRIMARY COSMIC RAY DATA DISTRIBUTION
LONGITUDE WEST (DEGREES)

	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0
SON	1	7	13	13	26	24	36	64	60	76	87	40	32	29	19	60	118	178	198
L 45N	20	40	48	66	36	42	61	91	101	165	162	110	71	37	41	62	118	213	279
A 40N	29	57	60	54	35	50	68	67	79	118	132	82	49	27	17	25	46	96	182
T 35N	31	51	64	64	37	74	82	75	88	150	100	85	31	33	8	8	38	62	68
I 30N	49	44	72	62	48	88	90	75	80	127	115	74	52	8	5	12	16	73	41
T 25N	33	58	93	64	55	68	92	59	66	118	148	72	49	15	1	1	5	20	17
U 20N	17	64	90	69	49	39	65	50	41	90	105	64	44	17	3	2	3	7	5
D 15N	9	52	69	46	29	31	53	39	30	60	67	52	44	12	1	1	1	1	2
E 10N	5	28	47	29	27	14	19	24	22	23	35	24	30	6	1	1	1	0	0
5N	1	17	15	10	25	6	3	3	4	6	40	8	13	2	0	0	3	2	0
I 0	4	13	9	20	14	1	3	1	0	8	42	14	6	1	0	0	0	1	0
N 5S	3	3	7	7	2	1	0	0	1	5	10	3	1	0	0	0	0	1	2
10S	1	1	3	1	2	1	0	0	0	3	1	4	2	0	0	0	0	0	2
D 15E	0	1	0	3	2	1	0	0	1	2	1	3	1	0	0	0	0	0	4
E 20E	0	1	0	2	1	1	1	0	0	1	7	4	1	0	0	0	0	2	4
G 25E	1	0	0	1	0	0	2	0	0	2	1	6	1	0	0	8	8	0	3
R 30E	0	0	0	0	0	2	1	0	1	1	8	10	1	0	0	0	0	2	7
E 35E	1	0	0	0	1	2	0	1	0	2	11	8	0	0	0	0	0	3	17
E 40E	1	0	0	1	1	0	1	1	0	3	7	2	1	0	0	0	0	4	27
S 45E	1	0	0	0	1	1	0	1	3	3	1	3	1	1	0	0	1	7	24
50E	0	1	1	1	0	0	0	0	1	0	0	1	0	1	1	1	0	2	13

15 March 1960, and from 18 April 1960 through 31 May 1960, this relationship was maintained satisfactorily (generally to within 5%) giving further credence to the above conclusion about the behavior of the storage unit. It appears that for a very high counting rate (more than seven changes in 1.5 seconds) the storage unit pattern changed to 345453 with a tendency towards a delay in transfer from five to three. During the period from 13 to 19 April 1960, inclusive, the storage unit resumed its normal 0123450 cycle. From approximately 16 March 1960, through 12 April 1960, it operated in some variation of a 3453 cycle in a somewhat irregular pattern. At the present writing it appears impractical to attempt to interpret the data from this period.

One other difficulty was encountered in the operation of the telemetry system. The signal associated with the NRL solar emission experiment appeared in the form of a sinusoidal signal, of approximately 5 cps, superimposed on the normal signal. This sometimes made it difficult or impossible to determine the levels of the storage unit which represented the output of the cosmic ray experiment. In addition, a similar difficulty was encountered in fixing the 0 to 5.5 volt reference levels incorporated into the sequence of time commutated signals on the 960 cps channel. This introduced a further ambiguity into the measurement. It may be remarked that the interference seemed to be most serious at lower voltages and it was frequently possible to identify four-volt levels in a sequence of the records in which signals of less than three volts were completely undecipherable.

As a consequence of increased noise level, intermittent commutator malfunction, erratic storage unit behavior, and the intermixing of the NRL signal on other commutator channels, it became increasingly difficult to acquire data after May 1960.

Conclusions

A discussion related to the solar disturbed and quiet periods during the experiment's lifetime is presented by Pomerantz et al.⁶ Other results are given by Pomerantz and Witten⁷, Duggal et al.⁸, and Nogashima et al.⁹

DATA DESCRIPTION

Preparation of Reduced Data

The information was initially recorded in the form of magnetic tapes containing the audio signal modulation of the 20 Mc transmitter within the satellite. These tapes were recorded at 1-7/8 ips at the NASA stations monitoring the

Explorer VII satellite. For the first step in the data reduction the tapes were played back at 15 inches per second ($8 \times 1-7/8$) into a 7680 cps (8×960) discriminator. The output of this discriminator was recorded on a Sanborn chart run at the rate of 25 mm/sec. On the same record were the timing signal which was included on the magnetic tape and the output of this discriminator as modified by an 80 cps low pass filter. The extra filtration on the record of the 960 cps channel served to damp out high frequency noise and was designed to take advantage of (1) the relatively long (1.5 second) time during which each storage unit was sampled and (2) the relatively slow rate (much smaller than once a second) at which the level of any of these units changed when the satellite was outside the trapped radiation belt. (It should be remarked that the procedure described was employed only when the counting rate was "normal".) For data corresponding to times when the satellite was well within the belt of trapped radiation, the tape was played back at its original speed which had the effect of producing the Sanborn record at a chart speed of eight times that usually employed.

The manually read Sanborn records were punched onto IBM cards. A three-digit decimal number served to specify the information contained in a basic 15-second commutator interval or frame. Each one of the three digits represented the level of some one of the storage units during the frame. If this level could be read and was "normal" the number was an integer from zero through five inclusive. If any level changed once during the 1.5-second sampling period, the value at the beginning of the period was recorded. If the level changed twice during this time the rate was considered "abnormally" high and the reading was represented by a seven. If the record at some point was too noisy to permit a given segment to be read in a given frame, the number assigned to the segment was eight. As a practical matter most of the reading was done with the aid of Benson-Lehner Oscar J readers. This permitted the charts to be advanced electrically and increased the efficiency of the process. These machines were also equipped with card punches which permitted direct and rapid entry of the results on punched cards without the extra step of making a handwritten record. The identification of the individual levels was facilitated by the use of a transparent overlay carrying six equi-spaced horizontal lines ranging from zero to five. A series of these overlays had been prepared and the particular one employed was selected in terms of the positions of the 0 and 5.5 volt standards present in each frame. In practice it was usually found that a single overlay would serve for the entire record of a single pass at a single station. As indicated earlier, perhaps the greatest source of difficulty in making the readings resulted from the commutator malfunction which allowed the signals from the NRL experiment to be mixed with those of the heavy primary cosmic ray experiment and with the voltage reference.

The task of the IBM 709 computer in handling the data as obtained above was to convert from the readings into counts for the carbon and above channel ($Z \geq 6$) only. With the storage units operating as designed, this function was quite straightforward. Providing the time interval between readings was not excessive, the number of counts which had occurred between a pair of readings was simply equal to the appropriate scale factor times the change in reading Δ , if the latter was non-negative. Otherwise, for Δ negative, the number of counts equaled the scale factor times the quantity $(\text{six} + \Delta)$. (There is an inherent ambiguity since six impulses entering a storage unit will apparently leave its state unchanged; this occurrence was sufficiently improbable for the counting rates associated with the fluxes of heavy primary cosmic rays as to be neglected.)

The procedure followed when the storage unit operated in the 345453 mode was more difficult to select—at least in the case in which the counting rate was high enough to admit a possibility of eight counts between a pair of successive samplings. There were essentially two procedures available. Using the first procedure, any of the following was considered to correspond to no counts: 33, 44, or 55. Any of the following was considered to correspond to four counts (taking into account the scale factor): 34, 45, 54, or 53. Finally, either of the following was considered to correspond to 18 counts: 35 or 43. It should be noted that, considered by itself, either of the last two sequences could have corresponded to eight counts. However, it was possible for the level to go from four to four when the unit received eight counts, therefore, concluding that no change had occurred. On the average the sequences 35 and 43, representative of 18 counts, compensated for this error. The possible occurrence of 12 counts between readings demanded a further refinement which is described below. The above procedure was used in the machine treatment of data. The second procedure (which is also easily adaptable to machine computation) consisted essentially of comparing a span of actual record with the 345453 sequence and of associating with this span the smallest counting rate consistent with the 345453 sequence. Thus, 343 was taken as representing 20 counts since it was a skeleton representation of the complete cycle. This procedure was investigated in a "hand computation" treatment of the data.

Counting rates were all corrected for the possibility of missed counts because the storage unit could no longer indicate the occurrence of 12 counts in a single frame. For this purpose a Poisson distribution for the number of counts in a 15-second interval was assumed. (This correction was in addition to that employed in setting the equivalence between the change in level of the storage unit and the associated number of counts.)

The next stage in the data reduction process was the merging of two magnetic tapes, one of which contained the count rate and the corresponding Universal

Time as obtained from the first program, and the other contained the satellite ephemeris. The program produced a tape on which were recorded the total number of counts registered within the box-like volume defined by latitude, longitude, and altitude; the time in seconds that the satellite was within the volume; the hourly count rate computed from the first two values; the mid-point latitude and longitude, and the altitude at the top of the box; and the time at which the last useful data within the box were recorded. The dimensions of these boxes were: five degrees of latitude, 10 degrees of longitude, and 100 km altitude. These summary data were then punched onto cards to which were added the following information: geomagnetic threshold rigidity computed on the basis of the centered-dipole approximation; geomagnetic threshold rigidity computed in accordance with the Quenby-Wenk¹⁰ formulation; neutron monitor data from Climax, Mt. Norikura, and Thule; solar flare importance; Zurich Sunspot number, R_z ; solar radio emission at 2800 Mc recorded at Ottawa; and K_p .

The dependence of the cutoff rigidity, R_h , upon altitude, h , was taken into account by means of the relationship:

$$R_h = R_o \frac{r_e^2}{(r_e + h)^2}$$

where R_o is the threshold rigidity at the earth's surface and r_e is the radius of the earth.

Format

The 17238 data cards have been transcribed to magnetic tape, one card per record preceded by a NASA Space Science Data Center (NSSDC) header card and followed by a card containing all nines. The tape was prepared on an IBM 1401 System, BCD Mode, 556 bits per inch density. The card formats are indicated below.

NSSDC Header Card Format

<u>Columns</u>	<u>Content</u>
1 - 4	= 1 HDR
6 - 10	= NSSDC
13 - 18	Accession number - D00001
20 - 21	Year tape made (tens and units) = 65

NSSDC Header Card Format (Continued)

<u>Columns</u>	<u>Content</u>
22 - 24	Day of year = 306
26 - 34	File Identification, SSSSSEEDD where SSSSS = NSSDC Satellite no. = 00408 EE = NSSDC Experiment no. = 03 DD = Data Set no. = 01
36 - 40	Sequential Reel number of Data Set = 00001
42 - 80	Descriptive Information

Explorer VII Data Card Format

<u>Columns</u>	<u>Content</u>
2, 3, 4	Day after launching (October 13, 1959 = 0 day)
6, 7, 8, 9, 10	Universal time in Hours, e.g., 20.78 (column 8 is always punched as decimal)
12, 13, 14	Geographic mean Latitude of the box (e.g., 10°N = 10, 60°S = -60)
17, 18, 19	Geographic mean Longitude of the box (0 to 360° measured Eastward)
21, 22	Altitude in 100 Km units
24, 25, 26	Counts for $Z \geq 6$ particles (recorded in the box)
28, 29, 30	Time in seconds in which these particles were recorded
32, 33, 34, 35, 36	Hourly counting rate (36 column, always decimal point)
39, 40, 41, 42	Cut-off rigidity (corrected for altitude) on Quenby-Wenk model (Decimal 41)
45, 46, 47, 48	Cut-off rigidity from Dipole model (Decimal 47) (not corrected for altitude)
50	Solar Flare Importance
51, 52, 53	Climax Neutron Monitor Data
55, 56, 57	Mt. Norikura Neutron Monitor Data
59, 60, 61	Thule Neutron Monitor Data
63, 64	K_p (Planetary Magnetic index)
66, 67, 68	R_z (Zurich Sunspot number)
70, 71, 72	Solar flux at 2800 MC recorded at Ottawa
76, 77, 78, 79, 80	Serial Number of the card

Availability

The table below gives the days for which data are available:

<u>Explorer VII Day</u>	<u>Dates</u>
9 - 11	13 October 1959 - 24 October 1959
19 - 154	01 November 1959 - 15 March 1960
182 - 231	12 April 1960 - 31 May 1960

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