

#274

APOLLO 12 69-099C-04C

APOLLO 15 71-063C-03C

LUNAR SURFACE MAGNETOMETER

DECIMATED TAPE

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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 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 This inventory information is now no longer maintained in the DSCs, but is now managed in the inventory part of the NSSDC information system.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

APOLLO 15 LM/ASLEP

SAMPLE DECIMATED TAPE

71-063C-03C

PSFP-00207

This data set has been restored. There was originally one 7-track, 556 BPI tape written in BCD. There is one restored tape written in ASCII. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tape was created on an IBM 7094 computer and the restored tape was created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D number are as follows:

DR#	DS#	D#	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR005905	DS005905	D016170	1	07/31/71 - 08/15/71

o D016170: Read errors occurred in records 1788, 1941, 3786, 3787, 3794, & 3795.

REQ. AGENT
DLB

RAND NO.
RC0823
RC1636

ACQ. AGENT
JHK

APOLLO 12 69-099C-04C

APOLLO 15 71-063C-03C

LUNAR SURFACE MAGNETOMETER

DECIMATED TAPE

This data set catalog consists of 1 Apollo 12 and 1 Apollo 15
Decimated tapes. The 7094 tapes are 556 BPI, 7 track, ~~BOD~~, 1 file
containing variable length records.

↓
ASCII

The time spans for the tapes are:

APOLLO 12

<u>D#</u>	<u>C#</u>	<u>TIME SPAN</u>
D-15122	C-11706	11/28/69 - 12/03/69

APOLLO 15

D-16170	C-12303	7/31/71 - 8/15/71
---------	---------	-------------------

UNITED STATES GOVERNMENT

Memorandum

TO : 69-099C-04C
71-063-03C

DATE: July 26, 1974

FROM : Joseph King

SUBJECT: Filtering and Decimation

An arbitrary $I(t)$ profile has contributions from all frequencies. With a sampling period of Δt , only those frequencies in $I(t)$ less than $1/2\Delta t$ can be studied. In other words, only those parts of the processes contributing to $I(t)$ may be examined. Even to do this, the high frequency components must first be removed from $I(t)$ or they will appear as low frequency components (i.e., aliasing will occur).

A filter which removes frequencies above B without affecting frequencies below B is $aB \sin(2\pi B\tau)/2\pi B\tau \equiv h(\tau)$. That is, if $I'(t) = \int_{-\infty}^{\infty} h(\tau) I(t-\tau) d\tau$, then $I(t)$ will have all frequencies, and $I'(t)$ will have only frequencies $< B$. This is best seen by realizing that $FI'(f) = Fh(f) FI(f)$ (fourier transforms of I' , h , and I , respectively and that $Fh(f)$ is 1 for $-B < \text{frequency} < B$ and $F(h)$ is 0 otherwise.

Palmer Dyal called today to clarify the filtering and decimation procedure. First they applied a 31-weight filter to every tenth point (and the 30 points on each side) of the original data set which has one vector every 0.3 sec. This produced a tape with one vector every 3 sec. They then applied a 16-weight filter to every other point (and the 15 points on either side) of the intermediate stage. This produced one vector every 6 seconds, and it is this tape of which we have a sample. The filtering parameters on our tape relate to the second filtering/decimation stage only.

All periods that were filtered and decimated had the same procedure applied to them (i.e., two steps, same weights, etc.).

All tapes resulting from the second stage of filtering/decimating typically have 5 days of data, as have our sample tapes.



5010-108

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AMES RESEARCH CENTER
MOFFETT FIELD, CALIFORNIA 94035

REPLY TO
ATTN OF:

SSA:245-6

May 6, 1974

National Space Science Data Center
Attention: Dr. Joseph King
Code 601-6
Goddard Space Flight Center
Greenbelt, MD 20771

Dear Dr. King:

Enclosed is a sample "Apollo Decimated" tape for the time period
Year 1969, Day 332, 1900 hrs to Day 337, 1556 hrs. A tape format
description is also enclosed.

Sincerely,

Palmer Dyal (cwp)

Palmer Dyal
Research Scientist
Astrophysics Branch

APOLLO DECIMATED TAPE DESCRIPTION

69-0990-04C
71-0630-03C

The decimated tape is a deblocked 7 track BCD tape written at 556 bpi and containing variable length records. Each tape contains a header record followed by a group of three physical records for each logical data record containing the time in milliseconds plus 100 decimated vectors.

The header record contains 1602 characters arranged as follows:

- 1 - 3 (I3) -- Degree of decimation of the data
- 4 - 6 (I3) -- Number of filter weights in this record minus one
- 7 - 17 (F11.8) -- First Filter Weight
- 18 - 28 (F11.8) -- Second Filter Weight

•
•
•

(There are a total of 101 (F11.8) fields
allowing for the maximum size filter.)

•
•
•

- 1118 - 1129 (E12.5) -- Vector delta (milliseconds)
- 1130 - 1602⁰⁷ -- Blanks

The first physical data record contains 810 characters arranged as follows:

- 1 - 12 (I12) -- Time in milliseconds of the first vector in the subsequent physical record. (60-1000)
- 13 - 810 -- Blanks

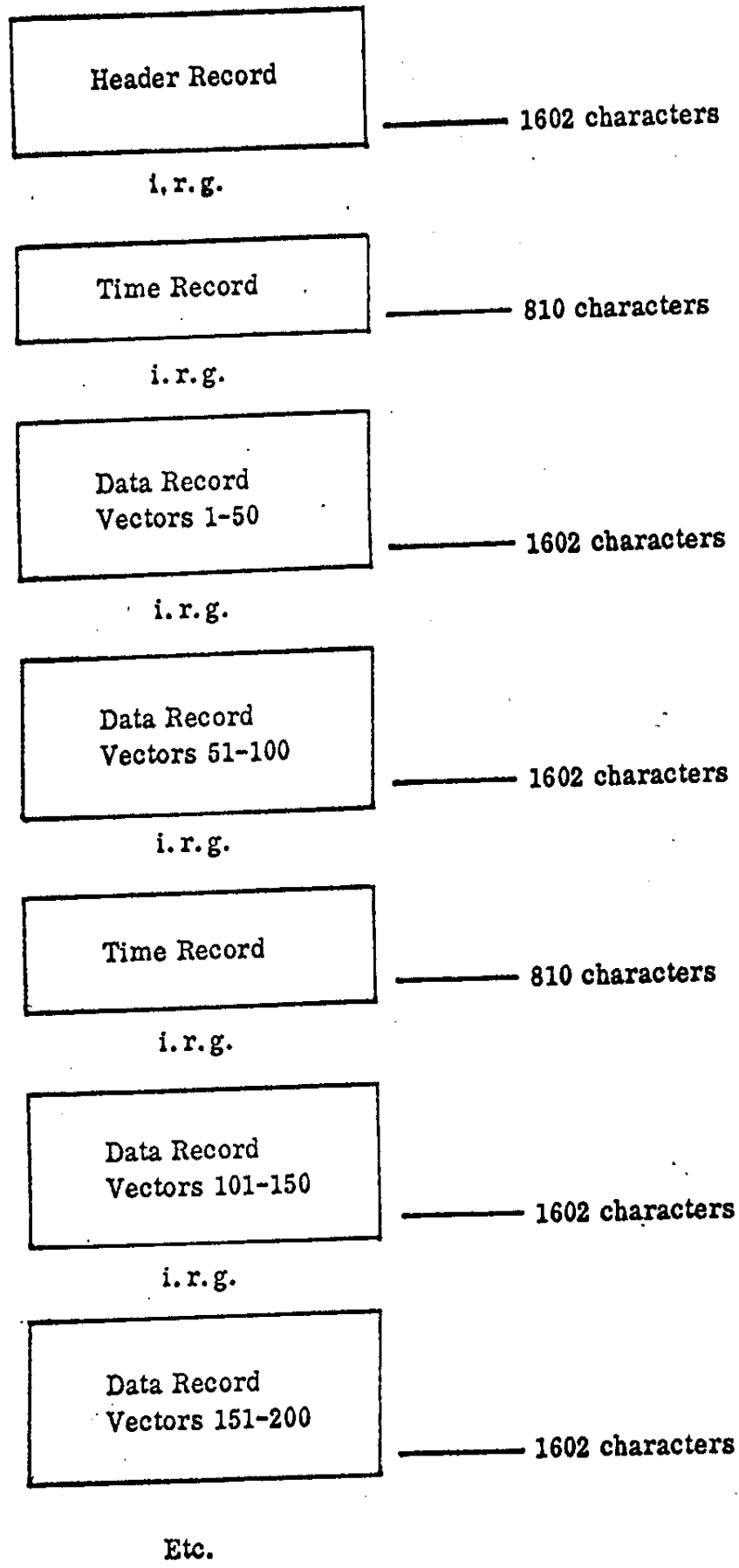
The second physical data record contains 1602 characters arranged as follows:

1 - 8 (F8.3)	--	X_1 Component
9 - 16 (F8.3)	--	Y_1 Component
17 - 24 (F8.3)	--	Z_1 Component
25 - 32 (F8.3)	--	$/B/_1$ (Magnitude)
33 - 40 (F8.3)	--	X_2 Component
		•
		•
		•
		•
1571-1578 (F8.3)	--	X_{50} Component
1579-1586 (F8.3)	--	Y_{50} Component
1587-1594 (F8.3)	--	Z_{50} Component
1595-1602 (F8.3)	--	$/B/_{50}$ (Magnitude)

The third physical data record contains 1602 characters having vectors 50 - 100 arranged the same way as the second record.

NOTE: Negative magnitudes indicate that the vector was linearly interpolated due to a data gap.

DECIMATED TAPE LAYOUT



Filter and Decimation Processing

The low-pass filtering operation is performed using a symmetrical, non-recursive, time-domain filter. If there are $n+1$ distinct weights (W_i), numbered from 0 to n , then the value of a time series X at point X_j after filtering is:

$$X_j = X_j W_0 + \sum_{i=1}^n W_i (X_{j+i} + X_{j-i}) \quad (2)$$

Thus, the filtered value of a point is a function of that point and the n unfiltered points on either side of it.

To filter and decimate, one might filter a complete series, then decimate by selecting every K th point (where K is the degree of decimation) of the filtered series. Alternatively, a cheaper method computationally is to calculate a filtered value only for every K th point. This is the approach used in LPFIL.

Based on equation (1), there are $NRATIO$ output points within the span of whatever filter is used. This means that as a time series is processed a point at a time, each point contributes to $NRATIO$ running sums of the sort shown in equation (2). And at every K th point, an old sum is completed and a new sum is started (Figure 1).

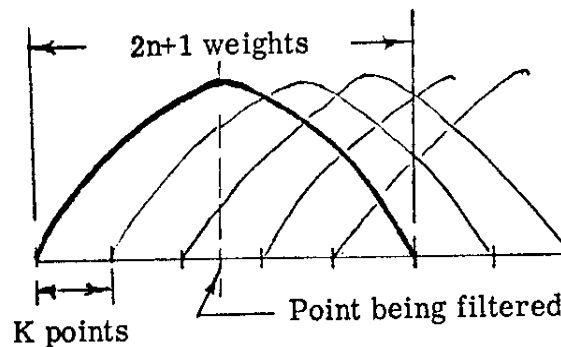


Figure 1 - Example of Filtering and Decimating, $NRATIO = 5$

Processing is further complicated by having to process up to four input series concurrently ($X, Y, Z, /B/$). This means four sets of running sums to be maintained. The major portion of the processing is shown in the diagram of program loops

APOLLO 12 LM/ALSEP

SAMPLE DECIMATED TAPE

69-099C-04C

PSFP-00018

This data set has been restored. There was originally one 7-track, 556 BPI tape written in BCD. There is one restored tape written in ASCII. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The original tape was created on an IBM 7094 computer and the restored tape was created on an IBM 9021 computer. The DR and DS numbers along with the corresponding D number are as follows:

DR#	DS#	D#	FILES	TIME SPAN
-----	-----	-----	-----	-----
DR005496	DS005496	D015122	1	11/28/69 - 12/03/69

See 71-063C-03C

1. LENGTH 1602
April 15 Locusts of type
Day 212-224
D-16170

Day 2/2 - 227

REC 2, LENGTH 810

REC 4. LENGTH 1602

REC 4. LENGTH 1602

18387637850

REC 5. LENGTH 810

-0.244	-0.422	-3.698	3.734	-0.250	-0.413	-3.761	3.815	-0.286	-0.390	-3.601	3.633	-0
506	-0.267	-3.828	3.871	-0.227	-0.377	-3.956	3.998	0.067	-0.467	-3.603	3.628	-0.077
-0.469	-3.541	3.575	-0.126	-0.489	-3.775	3.815	-0.216	-0.524	-3.906	3.943	-0.251	-0
433	-3.891	3.942	-0.198	-0.444	-4.043	4.054	-0.181	-0.062	-4.139	4.165	0.051	0.751
-4.674	4.746	0.307	-0.145	-3.969	3.972	-0.254	-0.388	-3.084	3.174	-0.264	0.381	-3
698	3.785	0.128	-0.052	-3.267	3.253	-0.098	-0.995	-2.900	3.131	-0.081	-1.168	-3.166
3.395	-0.240	-0.461	-3.398	3.423	-0.410	-0.480	-0.375	3.789	-0.366	-0.754	-3.833	3
927	-0.272	-0.616	-3.777	3.845	-0.296	-0.534	3.748	3.800	-0.146	-0.620	-3.811	3.867
-0.305	-0.821	-3.722	3.821	-0.340	-0.454	-3.701	3.774	0.144	-0.287	-3.631	3.644	0
173	-0.698	-3.485	3.562	0.245	-0.620	-3.590	3.665	0.022	-0.570	-3.737	3.786	-0.125
-0.638	-3.724	3.776	-0.094	-0.551	-3.692	3.741	-0.220	-0.757	-3.495	3.583	-0.301	-0
886	-3.415	3.540	-0.217	-0.951	-3.522	3.657	-0.335	-0.987	-3.567	3.716	-0.548	-0.831
-3.678	3.822	-0.182	-0.602	-3.627	3.689	0.047	-0.445	-3.611	3.629	0.134	-0.342	-3
575	3.610	-0.218	-0.237	-3.723	3.750	-0.394	-0.245	-3.781	3.811	-0.327	-0.086	-3.971
3.979	-0.332	-0.496	-3.743	3.787	-0.580	-0.694	-2.821	3.046	-0.658	0.298	-3.729	3
853	-0.335	-0.127	-4.216	4.218	-0.622	-0.975	-3.599	3.766	-0.381	-0.483	-3.883	3.958

-0.086	-0.230	-3.955	3.962	0.086	-0.210	-4.052	4.055	0.218	-0.420	-3.783	3.829	-0
483	-1.051	-2.777	3.109	-0.845	-0.206	-3.503	3.658	-0.716	0.384	-4.271	4.301	-0.728
-0.453	-3.920	4.044	-0.842	-0.365	-3.265	3.391	-1.057	0.670	-3.557	3.754	-1.211	-0
063	-4.082	4.306	-1.066	-1.456	-3.702	4.089	-0.953	-1.687	-3.131	3.737	-1.043	-1.470
-3.183	3.682	-0.978	-1.201	-3.630	3.954	-1.202	-0.971	-3.464	3.812	-1.213	-0.175	-3
957	4.153	-0.927	-0.388	-4.353	4.470	-0.958	-0.849	-3.752	3.970	-0.855	0.094	-4.169
4.253	-0.523	-0.323	-4.645	4.717	-0.425	-0.948	-3.901	4.031	-0.228	-0.678	-4.026	4
124	-0.037	-0.862	-4.467	4.546	-0.046	-1.363	-4.168	4.380	-0.401	-1.459	-2.818	3.346
-0.408	-0.159	-3.502	3.639	-0.076	-0.472	-4.692	4.676	-0.127	-0.882	-4.576	4.717	-0
024	-0.507	-4.820	4.850	-0.006	-0.455	-4.818	4.847	-0.000	-0.348	-5.414	5.429	-0.205
-0.924	-4.618	4.718	-0.146	-0.702	-3.729	3.812	-0.139	-0.806	-3.636	3.746	-0.302	-0
718	-3.524	3.606	-0.394	-0.505	-4.203	4.260	-0.634	-1.106	-4.157	4.360	-0.472	-1.114
-3.568	3.764	-0.448	-0.803	-3.683	3.803	-0.435	-0.697	-3.992	4.075	-0.439	-0.573	-3
840	3.914	-0.506	-0.445	-3.960	4.030	-0.392	-0.521	-4.447	4.504	-0.213	-0.597	-4.580
4.625	-0.393	-0.911	-4.297	4.414	-0.354	-0.902	-4.131	4.254	-0.096	-0.852	-4.246	4
331	-0.013	-1.035	-4.094	4.228	0.046	-0.896	-4.136	4.251	-0.323	-0.996	-4.213	4.345

18388241591

REC 8. LENGTH 810

-0.330	-0.989	-4.238	4.364	-0.277	-0.561	-4.348	4.464	-0.328	-0.879	-4.267	4.369	-0
215	-0.807	-4.492	4.568	-0.177	-1.084	-4.650	4.784	-0.069	-1.285	-4.693	4.864	0.081
-1.351	-4.517	4.724	0.221	-1.115	-4.592	4.735	0.192	-0.726	-4.817	4.864	-0.016	0
034	-5.124	5.146	-0.178	0.243	-5.576	5.577	-0.070	-0.224	-5.543	5.546	0.133	-0.577
-5.127	5.168	0.129	-0.584	-5.039	5.076	0.272	-0.649	-5.266	5.316	0.395	-0.902	-5
020	5.114	0.388	-0.858	-5.118	5.206	0.554	-0.896	-5.167	5.271	0.264	-0.861	-5.451

EOF-PARITY-ERROR TAPE CHECK RUN BEGINS.

AN END-OF-FILE HAS BEEN ENCOUNTERED ON PHYSICAL RECORD NO. 2096 OF FILE NO. 1

INPUT TAPE HAS 551.36 FEET OF DATA

EOF-PARITY-ERROR TAPE CHECK RUN HAS ENDED.

D-15122

2 15 0.43329704 0.30930120 0.06303245-0.08096655-0.05326017 0.02692589 0.03959081-0.00344334-0.025
47478-0.00621887 0.01339223 0.00788474-0.00523364-0.00588473 0.00088468 0.00282165*****
*****-0.00000000*****
*****0.00000000 0.00000000 0.00000000 0.00000000 0.06427777*****10.00014687*****
*****0.00000000 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
0 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000

9.000000510.00000001-0.00002866***** 0.00000000*****
0.00000000-0.00000000***** 0.00000000*****
11046600***** 0.00000000-0.1877668*****
***** 0.60377E 04 ***** 0.00000000*****

REC 1. LENGTH 1602
332-337
Page 12
D-15122
C-11706

28753254164 REC 2. LENGTH 810

-23.051 10.785 -31.856 -40.763 -23.267 17.318 -33.398 -44.257 -22.942 15.447 -32.823 42.894 -23
023 17.001 -29.194 40.934 -23.664 18.373 -28.472 41.386 -22.779 12.025 -27.463 37.663 -22.975
14.577 -26.050 37.699 -23.356 18.550 -28.639 41.326 -23.154 19.915 -33.700 45.484 -23.435 17
-243 -35.515 46.005 -23.272 14.382 -32.530 42.453 -23.592 19.356 -30.383 43.066 -24.057 19.708
-32.864 45.358 -23.676 17.569 -37.676 47.809 -23.486 15.985 -33.687 44.154 -23.897 14.841 -28
043 39.723 -24.315 15.787 -26.667 39.411 -23.756 13.957 -30.519 41.095 -23.425 16.819 -30.443
-42.125 -24.546 17.426 -20.493 -36.253 -24.653 15.118 -25.479 -38.751 -24.367 17.207 -35.453 -46
266 -24.367 12.488 -29.761 -40.486 -23.925 15.005 -28.159 -40.116 -23.981 20.437 -30.779 -44.090
-24.303 17.999 -29.051 -41.835 -25.319 13.271 -26.208 -39.003 -25.190 11.860 -27.188 -39.261 -24
507 19.830 -32.030 -44.892 -25.082 19.060 -33.071 -45.711 -24.618 15.933 -33.752 -44.722 -24.746
16.597 -30.348 -42.561 -25.214 15.872 -32.755 -44.373 -24.112 14.557 -36.026 -45.660 -24.175 16
923 -28.829 -41.284 -24.596 16.661 -30.770 -42.872 -24.175 13.196 -34.566 -44.178 -24.073 15.104
-33.860 44.187 -23.788 17.423 -32.292 43.773 -24.613 18.260 -26.574 40.586 -25.112 14.405 -27
896 40.283 -24.298 10.763 -31.144 40.893 -23.731 15.998 -36.786 46.718 -23.551 13.869 -34.093
43.823 -23.728 13.050 -27.854 38.881 -23.980 17.311 -30.950 42.787 -24.100 16.496 -31.553 43
010 -24.630 15.452 -32.767 43.856 -24.745 12.995 -34.793 44.673 -24.134 13.950 -35.052 44.772

-24.332 17.395 -33.155 44.725 -24.960 16.389 -33.255 44.796 -24.963 14.141 -34.843 45.108 -25
024 14.773 -33.087 44.096 -24.779 13.829 -33.731 44.107 -24.667 15.314 -32.413 43.489 -25.430
13.258 -30.521 41.970 -24.669 9.194 -32.003 41.237 -24.360 16.966 -27.519 40.698 -25.104 17
758 -23.356 38.590 -24.572 13.826 -27.784 39.602 -24.402 16.062 -32.343 43.563 -24.203 14.962
-30.769 41.931 -24.054 16.167 -33.633 44.425 -23.785 19.120 -39.320 49.768 -24.057 18.703 -36
480 47.580 -24.646 14.715 -33.524 44.247 -24.335 14.477 -32.616 43.236 -23.714 15.105 -34.734
44.686 -23.638 15.971 -31.905 42.959 -24.142 17.408 -30.763 42.833 -23.704 16.771 -34.207 44
847 -23.702 17.152 -31.183 42.759 -24.225 15.172 -32.206 43.143 -24.320 15.087 -33.682 44.207
-24.305 15.317 -32.920 43.732 -24.094 17.296 -34.969 45.907 -23.651 15.723 -35.277 45.421 -22
994 11.880 -32.971 41.967 -23.026 16.366 -34.651 44.721 -23.296 17.746 -34.198 45.032 -23.542
16.545 -32.256 43.242 -23.708 16.478 -33.658 44.356 -23.906 17.400 -33.422 44.633 -23.931 18
707 -33.243 -45.035 -24.275 19.136 -47.376 -45.512 -24.283 16.507 -32.814 -44.067 -24.021 16.779
-29.167 -41.475 -24.059 17.120 -29.396 -41.746 -24.229 18.289 -30.435 -42.948 -24.570 15.468 -30
750 -42.444 -24.221 11.764 -30.349 -40.587 -24.308 13.279 -30.281 -41.045 -23.986 13.928 -29.062
-40.264 -23.581 17.530 -32.336 -43.749 -22.914 14.578 -34.255 -43.691 -23.149 19.268 -28.119 -41
488 -23.911 19.492 -28.689 -42.241 -23.342 12.880 -31.895 -41.426 -23.042 18.234 -34.316 -45.220

REC 4. LENGTH 1602

28753858771

REC 5. LENGTH 810

	REC	6. LENGTH	1602
-23.269 19.636 -34.470 -46.020 -23.245 16.634 -33.159 -43.816 -23.358 18.156 -32.921 -44.253 -23			
539 16.632 -31.857 -42.970 -23.763 13.688 -26.507 -38.169 -24.475 14.359 -27.588 -39.622 -24.206			
15.087 -35.026 -45.121 -24.020 17.337 -33.280 -44.689 -24.275 13.310 -28.671 -39.858 -24.763 14			
413 -24.948 -38.113 -25.226 18.759 -23.026 -38.966 -24.313 16.920 -26.993 -40.056 -23.415 16.389			