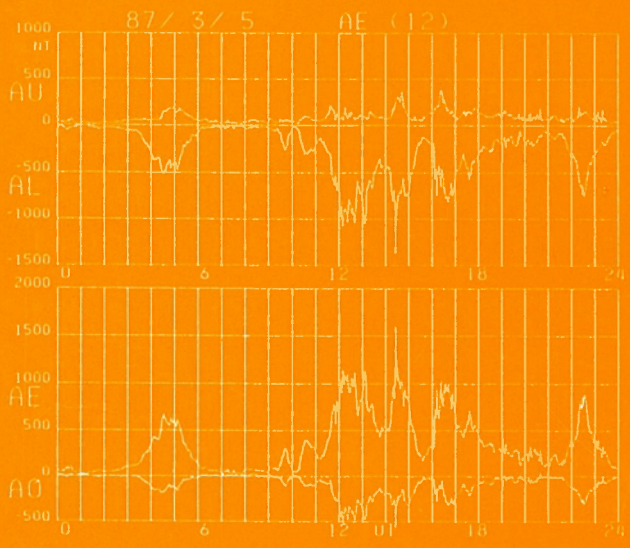
World Data Center C2 for Geomagnetism

DATA BOOK No. 21

Auroral electrojet (AE) indices
for January-June 1987



MAY 1992

Data Analysis Center for
Geomagnetism and Space Magnetism
FACULTY OF SCIENCE
KYOTO UNIVERSITY
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Data Collection and Processing
NATIONAL INSTITUTE OF
POLAR RESEARCH
TOKYO

SPECIAL NOTICE

The tentatively planned order of publication of the Data Books is as follows.

Data Book No. 22	AE indices for July - December 1987.
Data Book No. 23	AE indices for January - June 1988.
Data Book	AE indices for January - June 1977.
Data Book	AE indices for July - December 1977.

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DATA BOOK

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Data Analysis Center for Geomagnetism and Space Magnetism
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PPREFACE

The Auroral Electrojet (AE) index was originally introduced by Davis and Sugiura in 1966 as a measure of global electrojet activity in the auroral zone. The AE index is now widely used for researches in geomagnetism, aeronomy, and solar-terrestrial physics. After the initial development at the NASA/Goddard Space Flight Center the calculation of the index was first performed at the Geophysical Institute of the University of Alaska, which published hourly values of the index for the years 1957 to 1964. The production of 2.5 min values was then made at the Goddard Space Flight Center for the period from September 1964 to June 1968.

After these early publications the index was regularly issued by the World Data Center A for Solar-Terrestrial Physics (WDC-A for STP) in Boulder, Colorado, which published 2.5 min values for the years 1966 to 1974 and 1.0 min values for 1975 and the first 4 months of 1976.

When it became difficult for the WDC-A for STP to continue the production of the AE index, a question was raised if the index could be produced at the WDC-C2 for Geomagnetism, which is operated by the Data Analysis Center for Geomagnetism and Space Magnetism, Faculty of Science, Kyoto University. Responding to this request we decided to produce the index for the two years, 1978-1979, of the International Magnetospheric Study (IMS), and published 1.0 min values of the AE index for these years in the "WDC-C2 for Geomagnetism Data Book" series.

Although the International Association of Geomagnetism and Aeronomy (IAGA) recommended the continuation of the production of the AE index at the WDC-C2, the AE production could not be extended beyond IMS because of the constraints in manpower and computing capability. Increasing demands for the AE index, however, motivated us to resume its production, and we then published the Data Book No.7 for the first half of 1980. After this publication, various possibilities of financial support for the production of the index were explored by the Subcommittee on Solar Terrestrial Physics of the Special Committee for International Cooperation, Science Council of Japan. As a result, the National Institute of Polar Research (NIPR), Tokyo, offered assistance. Beginning with the Data Book No.8, the production of the AE index has been continued at the Kyoto University, but the printing and distribution of the Data Book have been done by NIPR.

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AURORAL ELECTROJET (AE) INDICES

FOR JANUARY - JUNE 1987

1. Derivation and Representation

The AE index is derived from geomagnetic variations in the horizontal component observed at selected (10-13) observatories along the auroral zone in the northern hemisphere. To normalize the data a base value for each station is first calculated for each month by averaging all the data from the station on the five international quietest days. This base value is subtracted from each value of one minute data obtained at the station during that month. Then among the data from all the stations at each given time (UT), the largest and smallest values are selected. The AU and AL indices are respectively defined by the largest and the smallest values so selected. The symbols, AU and AL, derive from the fact that these values form the upper and lower envelopes of the superposed plots of all the data from these stations as functions of UT. The difference, AU minus AL, defines the AE index, and the mean value of the AU and AL, i.e. (AU+AL)/2, defines the AO index. The term "AE indices" is usually used to represent these four indices (AU, AL, AE and AO). The AU and AL indices are intended to express the strongest current intensity of the eastward and westward auroral electrojets, respectively. The AE index represents the overall activity of the electrojets, and the AO index provides a measure of the equivalent zonal current.

In this report we present daily plots and hourly values of the AE indices and "contributing station" plots giving additional information on the indices. The stations that actually give the AU and AL values are named the "contributing stations" of the AU and AL indices. The pair of the AU and AL contributing stations is referred to as "the contributing stations of the AE indices". The plot identifies these AE contributing stations, and also gives information on the data availability for each station.

2. Data Used

To obtain reliable AE indices it is desirable to use as many observatories as possible. However, there are two major difficulties: one is that the distribution of the observatories in operation is not uniform along the auroral zone, and the other is that the digitization of magnetograms is a laborious task.

Table 1. List of AE(12) stations.

Observatory	Abbreviations IAGA	WDC-A	Geographic Lat.(°N)	Long.(°E)	Geomagnetic Lat.(°N)	Long.(°E)
Abisko	ABK	AI	68.36	18.82	66.04	115.08
Dixon Island	DIK	DI	73.55	80.57	63.02	161.57
Cape Chelyuskin	CCS	CC	77.72	104.28	66.26	176.46
Tixie Bay	TIK	TI	71.58	129.00	60.44	191.41
Cape Wellen	CWE	UE	66.17	190.17	61.79	237.10
Barrow	BRW	BW	71.30	203.25	68.54	241.15
College	CMO	CO	64.87	212.17	64.63	256.52
Yellowknife	YKC	YEK	62.40	245.60	69.00	292.80
Fort Churchill	FCC	FC	58.80	265.90	68.70	322.77
Poste-de-la-Baleine	PBQ	PBQ	55.27	282.22	66.58	347.36
(Great Whale River)	GWC	GWR	55.27	282.22	66.58	347.36
Narssarssuaq	NAQ	NAS	61.20	314.16	71.21	36.79
Leirvogur	LRV	LR	64.18	338.30	70.22	71.04

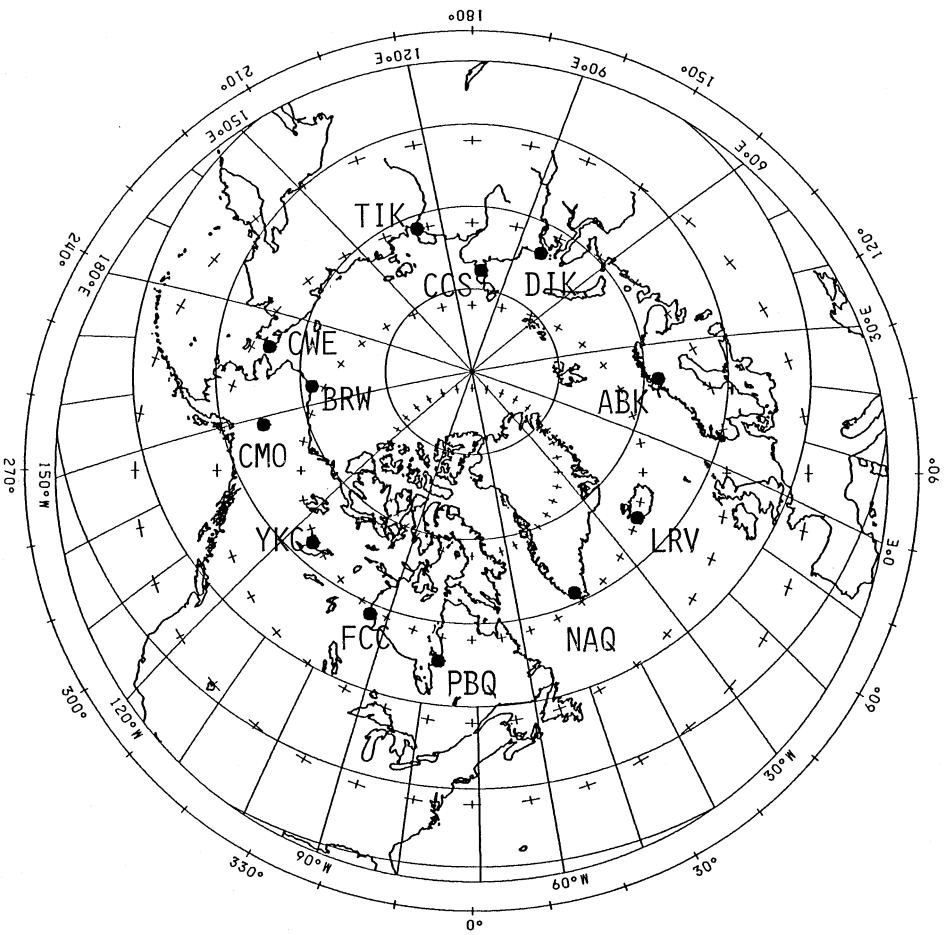

Figure 1. Distribution of AE(12) stations.

This figure is drawn by Lambert projection with the geomagnetic north pole at its center. Geographic coordinates are indicated by solid lines. Geomagnetic coordinates are shown by thin plus signs. Latitude circles are drawn at 10° intervals. Geomagnetic longitude is shown by the numbers along the outer circle and geographic longitude is given by the numbers along the inner circle with suffix E or W.

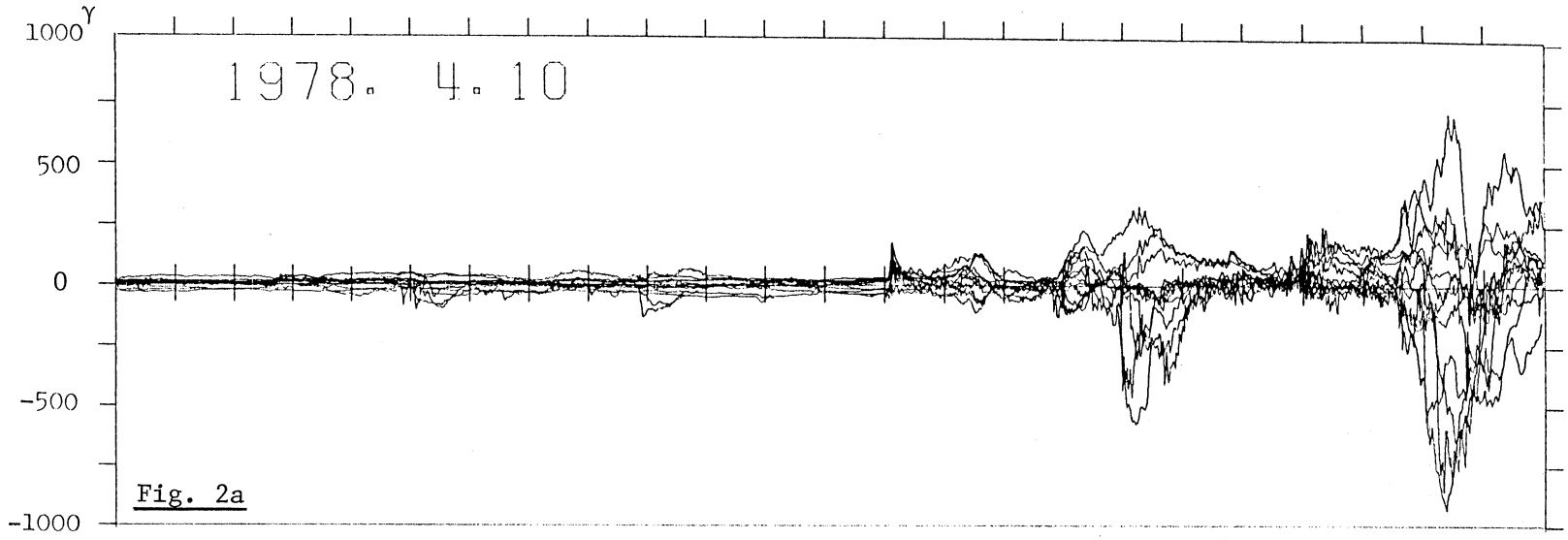

Fig. 2a

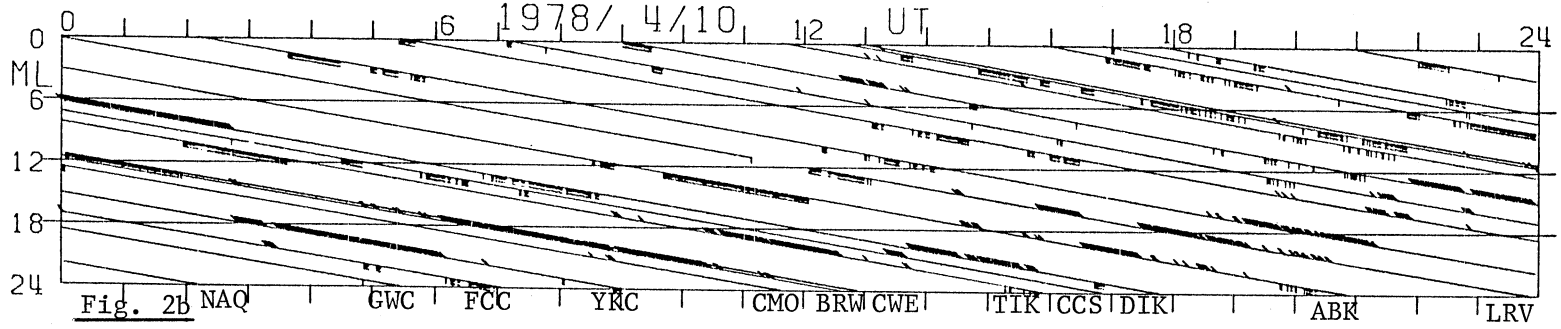

Fig. 2b

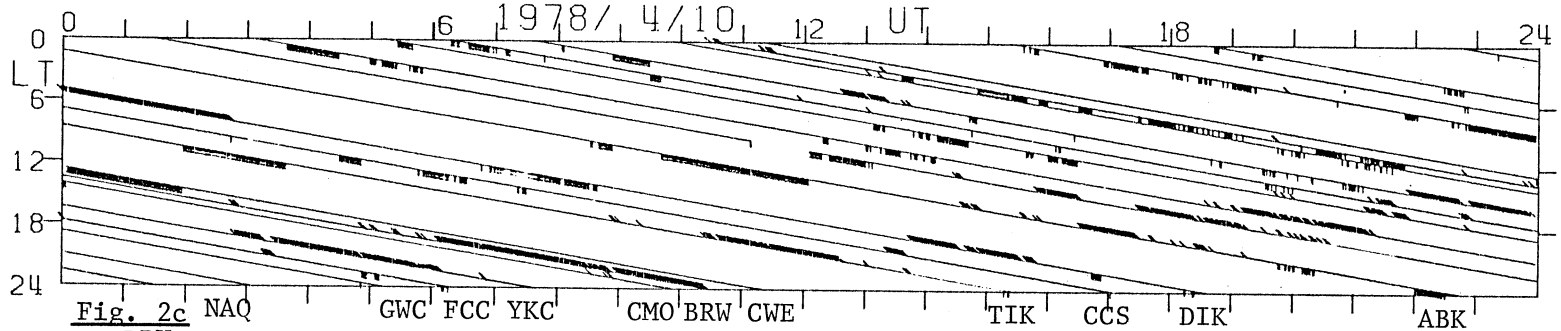

Fig. 2c

We used twelve observatories listed in Table 1. The distribution of the stations is shown in Fig. 1.

Of the twelve observatories six are taking digital data; these stations are referred to as digital stations below. Three of the digital stations, Fort Churchill, Poste-de-la-Baleine, and Yellowknife, give data in the X, Y, Z coordinate system. To make these data compatible with the other stations, we convert the X and Y components to the H component by $H=\sqrt{X^2+Y^2}$. If either X or Y is missing, H is also treated as being missing. For the other three digital stations, Barrow, College, and Narssarssuaq, the original digital H component data are used.

If there is any interval during which the digital recording appears faulty, the analog magnetogram is digitized whenever available. We used Abisko data digitized from analog records by the station. For the other non-digital stations the digitization was performed at this Data Center.

3. The Superposed Plot and the Plot of the Contributing Stations of the AE Indices

Figure 2a shows an example of the superposed plot of H traces from the AE stations for April 10, 1978. The upper envelope gives the AU index and the lower envelope, the AL index; Figs. 2b and 2c show sample plots of the contributing stations in geomagnetic (2b) and geographic (2c) local time, for the same day as in Fig. 2a. In these figures, the upper and lower plumes on a diagonal line for each station show the contribution of this station to the AU and AL indices, respectively. In Fig. 2b, for example, the data from Dixon Island (DIK) give the AU index from 0000 to 0240 UT and again from 1330 to 1530 UT, and the AL index from 0640 to 0830 UT. It is seen that from 1100 to 1200 UT Leirvogur (LRV) offers no data. Since Leirvogur is a key station for the AL index for this time interval, the exact AL values may be lower than was calculated for this interval.

We use geomagnetic local time (MLT) for the ordinate of the plot of the contributing stations. MLT is defined by the difference between the geomagnetic longitude of the station and the geomagnetic longitude of the meridian opposite to the subsolar point; and MLT is a function of the geomagnetic longitude of the station, the Sun's declination, and universal time. Figures 3a, 3b, and 3c show the differences between geographic local time GLT and MLT of the stations used to derive the AE indices for winter, summer and equinox, respectively. In these figures GLT is represented for each station by a straight line which runs diagonally, and MLT is shown by the top of T shaped mark (or the bottom of inverted T). The length of the vertical line of T from the diagonal line is the difference between GLT and MLT. Note that for some stations the difference between GLT and MLT is as much as 2 hours.

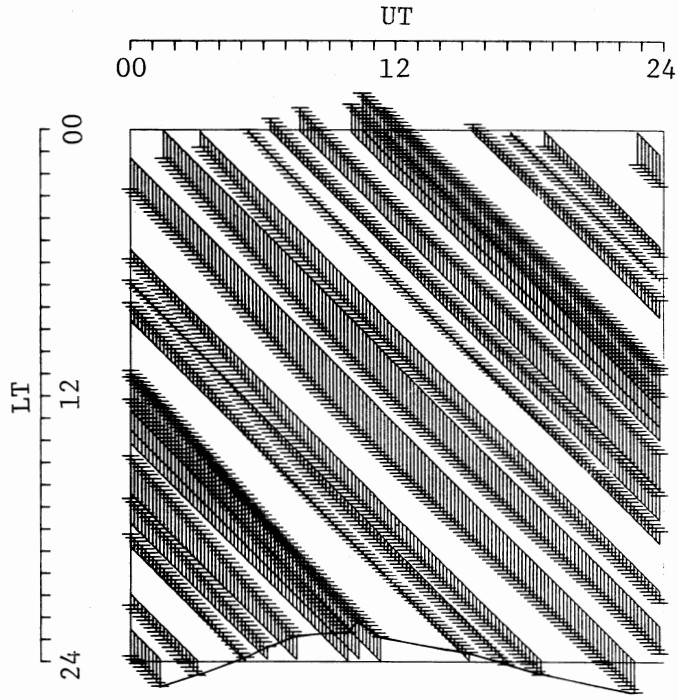

Fig. 3a Difference between GLT and MLT in winter.

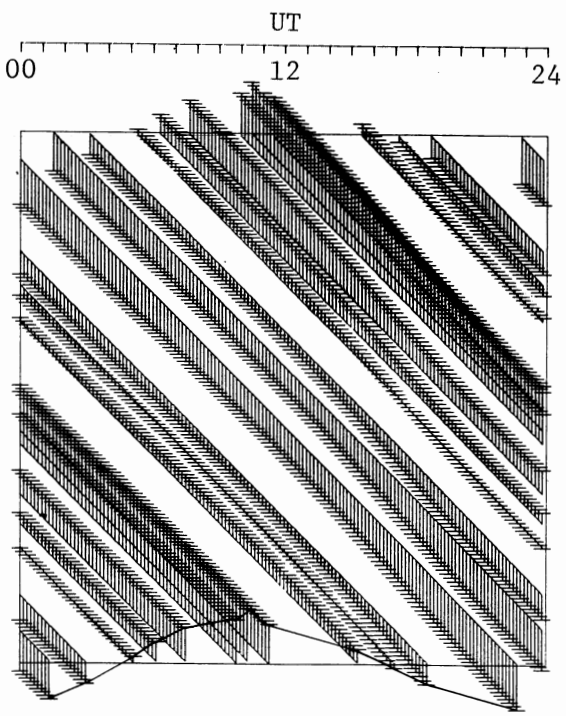

Fig. 3b Difference between GLT and MLT in summer.

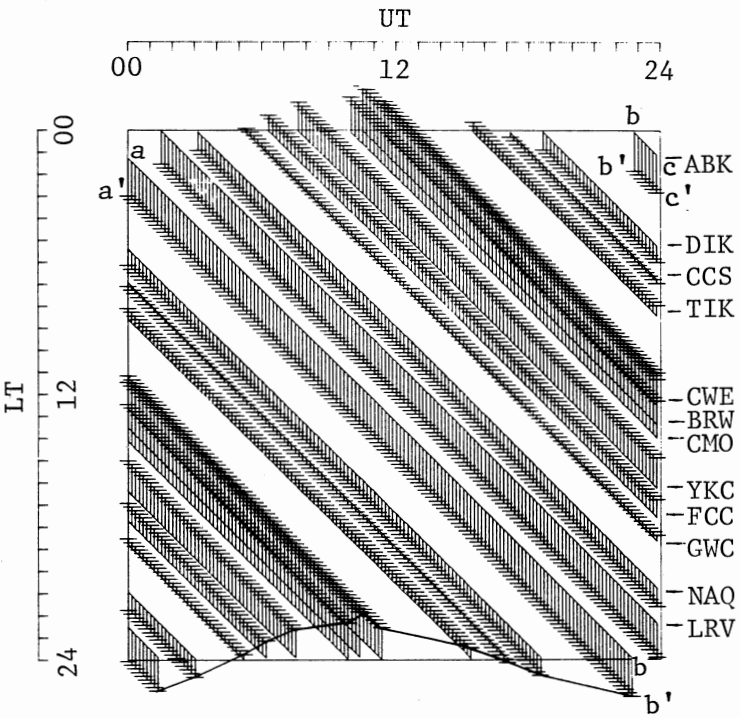

Fig. 3c Difference between GLT and MLT in equinox.

Fig. 3a, 3b and 3c show the difference between the geographic local time (GLT) and the geomagnetic local time (MLT) for winter, summer and equinox, where a-b-c (full line on the top or bottom of the vertical lines) shows the relation between UT and GLT, and a'-b'-c' (crossing of the vertical and horizontal lines) shows the relation between UT and MLT for each of the AE(12) stations.

4. Results

Monthly quiet-time H reference values for January-June 1987 are listed in Table 2. Table 3 gives hourly average values of the AE indices for each day from January to June 1987.

Daily graphs of 1.0-min AE indices (AU, AL, AE and AO) are shown in Fig. 4, and corresponding plots of the contributing stations are given in Fig. 5. Supplemental plots for disturbed days are given at the end of Fig. 4. Figure 6 shows the H-traces of magnetograms from AE(12) stations for each month from January to June 1987. Figure 7 shows hourly mean values of each index for one half year on each page. Finally, a summary plot of hourly values of AU and AL indices is given in Fig. 8.

5. Acknowledgements

The calculation of the AE incices in this volume was made possible by the data provided by the AE stations through the World Data Centers. We thank Ms. Y. Yamamoto for heavy works in digitization, computation and preparation of this data book. We also thank Drs. T. Iyemori, T. Takeda and Ms. S. Ishibashi of WDC-C2 for Geomagnetism for their assistance in the computation and production of plots, and also to Drs. T. Ono and H. Miyaoka of National Institute of Polar Research for their contributions in printing and distribution.

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Table 2. Monthly quiet-time H reference values (unit in nT)

(Year 1987)

STATION	Jan.	Feb.	Mar.	Apr.	May	June	
Abisko	11651	11649	11645	11641	11644	11638	
Dixon Island	-652	-656	-647	-650	-648	-661	(HO+)
Cape Chelyuskin	248	249	246	256	254	250	(HO+)
Tixie Bay	29	22	20	18	23	13	(HO+)
Cape Wellen	163	163	154	154	157	151	(HO+)
Barrow	9626	9623	9626	9641	9635	9623	
College	12866	12866	12855	12859	12862	12855	
Yellowknife	8736	8730	8726	8738	8738	8736	
Fort Churchill	7775	7771	7771	7782	7798	7796	
Poste-de-la-Baleine	10809	10813	10813	10819	10832	10830	
Narssarssuaq	12226	12225	12223	12226	12237	12237	
Leirvogur	12427	12424	12428	12426	12431	12426	

(HO+) : Deviation from the H base line on the ordinary magnetograms.

TABLE 3

Hourly average AE indices (AU, AL, AE and AO)
for January-June 1987.

AU Index (Hourly mean values, unit nT) January 1987

	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
D	1	24	25	65	85	33	71	65	83	111	105	132	163	83	89	102	78	124	93	183	109	50	61	66	32	85
	2	28	33	36	61	26	29	31	42	39	33	44	26	49	30	54	52	55	35	23	20	31	19	31	27	36
	3	24	32	29	16	22	66	38	28	38	39	40	47	45	43	46	54	30	23	20	13	14	15	14	36	32
Q	4	21	15	22	18	17	12	11	13	19	19	15	14	16	18	14	12	12	15	6	18	14	11	10	12	15
Q	5	17	14	16	24	27	30	23	21	27	30	28	16	13	13	15	20	21	9	14	28	29	17	22	24	21
Q	6	17	16	23	37	80	60	41	33	31	30	38	45	31	26	15	11	23	23	16	16	14	14	20	32	29
	7	29	38	47	36	59	81	60	46	49	33	36	36	24	20	12	25	38	22	15	25	32	29	85	115	41
	8	91	59	55	54	53	67	62	90	100	118	129	72	54	83	108	67	54	29	29	63	89	67	32	29	69
	9	41	42	40	29	34	75	122	66	108	124	73	38	81	61	73	50	56	60	34	59	30	23	17	11	56
	10	15	14	15	13	30	41	58	50	106	70	57	37	20	26	49	33	26	10	16	19	20	20	21	16	33
	11	13	15	20	24	34	24	18	18	18	30	19	16	15	20	33	31	10	27	40	34	35	20	39	68	26
	12	62	35	52	56	87	145	106	48	50	40	54	65	27	14	29	42	35	24	43	11	15	15	20	21	46
	13	22	28	33	42	34	39	43	45	36	30	19	25	26	25	28	30	19	28	39	38	28	20	14	13	29
Q	14	15	19	23	23	29	38	38	62	99	84	45	35	44	53	51	33	29	18	11	9	35	23	19	13	35
	15	15	14	16	22	24	26	17	16	30	23	13	14	12	15	24	48	45	26	14	39	50	72	112	123	34
D	16	80	112	123	96	48	20	37	64	55	76	64	99	72	91	71	31	22	69	25	34	45	30	20	20	59
	17	37	32	60	57	33	37	27	29	32	17	16	26	31	22	39	22	33	42	43	80	51	47	61	121	41
	18	81	46	36	30	34	46	57	44	41	68	52	22	8	11	16	27	13	18	16	13	16	60	55	41	35
	19	26	25	22	18	28	34	41	39	64	50	41	73	69	102	39	20	37	29	19	24	47	74	31	25	41
D	20	20	25	43	22	33	83	79	68	43	61	60	41	63	32	124	224	261	201	143	86	98	46	53	45	81
	21	34	41	39	39	35	49	59	47	49	61	37	57	67	92	51	49	30	17	23	34	43	75	55	32	46
	22	32	45	34	29	24	44	41	62	51	32	18	25	36	49	27	85	41	58	78	59	47	52	29	49	44
D	23	26	29	29	48	21	25	17	26	19	61	90	62	77	66	57	21	35	20	21	17	23	55	34	71	40
	24	53	55	41	69	64	68	65	68	85	60	46	41	27	18	8	8	4	34	14	31	22	12	15	9	38
	25	9	8	25	26	31	36	44	44	17	44	37	37	43	26	24	19	14	52	39	23	30	33	33	15	29
	26	13	25	54	62	36	50	50	46	54	23	38	27	13	25	53	12	7	15	19	13	13	9	9	9	28
	27	10	8	9	23	41	44	35	62	40	81	73	108	104	112	86	17	19	13	16	15	15	13	15	9	40
D	28	15	32	87	109	78	62	55	62	64	56	79	33	51	45	52	40	22	89	42	41	36	52	63	91	57
	29	120	125	103	97	97	87	54	59	47	22	30	43	29	15	8	10	4	11	8	14	11	11	16	8	43
Q	30	21	29	27	10	7	3	6	7	10	15	17	14	18	15	9	18	23	11	9	15	20	24	20	25	16
	31	26	53	79	63	108	84	72	82	79	72	62	37	26	13	25	16	12	11	13	9	18	17	13	24	42
	Mean	33	35	42	43	42	50	47	47	51	51	48	44	41	40	43	38	37	36	33	32	32	33	33	37	40
5Q	Mean	18	18	22	22	32	28	23	27	37	35	28	24	24	25	20	18	21	15	11	17	22	17	18	21	23
5D	Mean	33	44	69	72	42	52	50	60	58	71	85	79	69	64	81	78	92	94	82	57	50	48	47	51	64

AU Index (Hourly mean values, unit nT) February 1987

	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	31	33	44	55	53	97	72	48	37	27	37	19	14	32	46	19	17	19	23	19	36	29	24	30	36
Q	2	23	24	25	27	22	28	33	29	25	26	23	27	13	10	18	33	36	29	18	16	14	16	19	24	23
Q	3	25	30	31	31	35	43	34	58	32	51	29	18	11	9	6	8	8	6	10	10	11	13	17	14	22
Q	4	14	13	14	19	21	24	22	16	21	19	30	33	32	32	66	34	33	34	42	41	28	22	21	24	27
Q	5	23	19	20	21	21	23	26	20	24	32	41	21	16	17	17	28	30	19	18	16	16	20	21	22	22
	6	65	87	70	55	53	49	29	40	35	26	16	20	14	66	49	19	23	16	14	16	19	18	44	44	37
	7	46	29	24	22	27	20	21	31	39	46	62	41	34	53	58	34	61	28	55	37	49	94	75	52	43
D	8	46	48	55	70	68	55	67	99	89	56	40	21	18	20	42	123	130	227	125	172	105	37	32	42	74
	9	35	33	66	48	72	39	38	57	36	52	56	88	109	84	40	39	37	48	21	24	35	42	80	71	52
	10	41	37	57	52	71	64	55	38	53	73	88	72	36	22	30	31	17	9	8	19	30	29	25	24	41
	11	33	22	19	26	24	23	21	28	32	33	19	19	22	20	22	34	19	24	72	86	59	27	39	53	32
D	12	147	210	162	89	80	131	109	137	170	118	169	280	243	237	310	289	226	154	192	134	80	69	61	52	160
	13	42	71	55	64	48	39	39	18	13	15	13	15	25	7	13	13	15	12	12	14	18	16	20	23	26
Q	14	20	19	21	26	36	48	63	63	53	40	38	21	16	21	42	43	12	12	13	13	17	23	21	22	29
	15	20	19	20	23	38	37	34	39	39	34	49	40	46	86	122	57	23	18	36	27	31	53	59	35	41
	16	42	45	46	43	33	25	38	50	59	90	194	354	295	78	49	124	198	83	59	88	57	42	32	25	90
	17	34	25	28	28	42	37	48	44	46	26	32	33	32	30	25	36	54	30	61	51	30	37	43	39	37
	18	66	56	43	50	47	65	62	44	56	85	56	64	49	39	27	22	15	18	15	14	28	46	74	84	47
	19	44	39	29	45	43	37	30	19	31	24	19	15	17	17	25	34	34	28	16	16	19	23	26	26	27
D	20	23	35	27	49	86	121	140	156	172	125	263	158	114	86	71	216	108	39	87	90	110	82	77	96	105
D	21	86	97	65	77	63	56	106	125	146	140	69	14	15	15	19	67	37	25	17	29	45	67	54	79	63
D	22	74	57	45	48	123	157	103	115	109	86	147	90	80	51	23	34	26	28	27	28	29	60	122	101	73
	23	125	132	96	95	79	57	101	83	59	33	50	59	37	58	107	75	66	46	69	58	42	30	24	35	67
	24	36	34	34	34	48	41	60	40	45	79	67	53	50	30	21	19	30	24	82	106	119	86	84	62	53
	25	83	60	53	42	40	43	53	61	38	31	44	38	42	25	22	31	27	16	20	41	26	25	30	31	38
	26	32	32	25	26	30	31	40	41	38	25	51	41	37	21	30	25	21	18	20	22	19	22	23	28	29
	27	26	28	26	26	34	46	49	65	90	99	67	52	36	58	65	40	167	230	235	127	86	65	47	48	76
	28	34	37	33	26	46	110	59	57	74	216	88	116	84	52	53	38	26	26	29	63	40	40	55	66	61
	Mean	47	48	44	43	49	55	55	57	59	60	66	65	54	45	50	55	53	45	49	49	42	40	44	44	51
5Q	Mean	21	21	22	24	27	33	35	37	31	33	32	24	17	17	29	29	23	20	20	19	17	18	19	21	24
5D	Mean	75	89	70	66	84	104	105	126	137	105	137	112	94	81	93	145	105	94	89	90	73	63	69	74	95

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	41	46	39	47	36	22	48	47	36	29	19	46	17	15	18	23	18	53	79	88	120	48	28	16	41
Q	2	6	9	12	22	23	28	26	35	17	28	19	26	17	12	24	18	18	18	21	21	24	22	21	27	21
	3	21	17	30	51	53	60	87	84	95	53	50	43	24	22	32	36	28	39	36	77	42	43	74	70	49
	4	134	136	98	124	142	164	130	91	95	106	150	80	32	44	41	79	35	30	32	20	23	53	38	53	80
D	5	36	22	33	56	117	117	45	30	46	50	65	103	103	98	187	85	205	133	113	105	85	76	113	68	87
	6	48	56	44	49	41	32	59	63	53	32	69	43	42	27	22	30	19	16	23	46	57	66	131	140	50
D	7	121	143	111	133	118	102	178	199	161	161	136	100	102	137	94	44	28	31	30	32	33	43	29	36	96
	8	33	52	61	42	38	62	90	85	96	108	172	101	31	27	47	101	75	56	43	34	29	38	33	36	62
	9	39	79	108	124	108	151	128	109	69	55	36	24	21	24	36	37	31	40	24	20	23	17	18	34	57
	10	21	24	39	38	57	59	73	114	159	135	69	48	87	91	134	62	69	41	32	31	24	19	17	16	61
	11	14	24	27	28	24	25	40	40	27	32	32	55	75	44	36	23	20	30	65	43	41	31	31	27	35
	12	23	49	86	65	70	72	71	78	75	87	140	56	28	27	32	27	20	21	31	31	70	70	114	150	62
	13	71	49	37	36	39	61	65	66	61	55	55	64	57	44	35	34	26	20	16	16	18	29	42	69	44
	14	54	30	42	49	66	140	48	60	46	40	67	72	75	68	27	28	24	26	33	31	47	44	38	45	50
	15	56	41	55	52	100	108	89	69	67	106	89	42	66	59	44	28	32	26	43	33	25	33	40	45	56
	16	60	59	63	31	24	30	58	68	50	61	97	111	104	120	42	40	33	26	22	39	80	79	73	50	59
	17	68	94	84	117	178	123	128	74	47	40	47	43	46	66	32	29	23	21	27	18	16	16	15	20	57
	18	30	37	27	27	24	26	35	56	36	35	27	22	34	22	40	36	50	92	55	95	63	90	175	193	55
	19	150	114	81	66	60	43	64	42	68	74	61	108	30	41	45	35	21	13	14	22	54	81	66	46	58
Q	20	29	23	18	18	21	21	27	24	34	21	24	22	14	17	14	19	28	20	18	17	23	31	25	33	23
D	21	29	21	26	39	31	26	55	59	104	77	103	164	144	203	169	293	294	180	127	199	166	118	63	119	117
D	22	106	60	37	61	26	17	36	41	75	42	54	37	60	19	28	15	49	39	72	105	140	182	93	55	60
	23	31	24	24	30	26	26	32	46	54	56	51	76	75	28	33	12	14	21	15	15	11	15	11	11	31
Q	24	12	12	16	16	17	18	20	24	35	19	16	16	17	20	18	17	20	20	14	21	26	21	22	14	19
	25	13	13	14	14	15	16	17	18	18	19	19	19	22	24	15	35	98	103	35	30	26	29	92	75	32
	26	128	136	140	89	93	116	116	129	219	152	101	86	32	56	21	62	96	90	61	43	37	32	30	35	87
D	27	38	49	83	116	165	144	70	95	57	57	105	236	253	149	193	265	176	119	138	89	71	93	61	55	120
	28	65	112	111	77	73	51	88	57	135	96	54	54	53	63	33	33	28	24	21	38	30	24	23	17	57
	29	15	17	15	21	24	32	73	35	48	60	58	32	26	19	19	15	13	20	23	24	27	24	21	18	28
Q	30	17	18	25	23	25	31	26	41	41	35	34	48	41	84	84	37	63	58	57	50	36	21	16	21	39
Q	31	21	24	30	39	53	43	46	63	49	38	54	52	37	36	25	33	23	18	21	20	20	22	28	27	34
	Mean	49	51	52	54	60	63	66	65	70	63	66	65	56	55	52	52	54	46	43	46	47	48	51	52	55
5Q	Mean	17	17	20	23	27	28	29	37	35	28	29	32	25	33	33	24	30	26	26	25	25	23	22	24	27
5D	Mean	66	59	58	81	91	81	76	84	88	77	92	128	132	121	134	140	150	100	96	106	99	102	71	66	96

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	26	44	80	124	107	213	227	164	143	116	164	61	80	74	24	32	40	56	24	36	49	23	22	13	81
	2	11	13	35	38	55	47	31	57	62	79	91	67	64	45	58	32	15	39	21	13	21	18	15	13	39
Q	3	11	10	6	5	5	9	10	11	14	23	16	19	17	12	11	7	8	12	12	9	12	12	13	16	12
D	4	17	9	6	30	25	45	60	61	74	141	184	213	178	172	259	180	67	42	30	22	24	18	21	20	79
D	5	18	23	50	45	46	72	14	32	14	26	30	21	31	81	94	44	46	97	50	40	92	85	39	23	46
	6	25	19	32	45	44	38	20	9	10	12	27	60	83	60	33	27	38	24	21	20	16	20	44	44	32
D	7	61	46	54	65	51	140	133	140	157	71	46	49	37	42	51	54	112	132	76	34	31	24	19	18	68
D	8	20	25	27	25	35	64	75	75	89	95	52	33	20	30	29	28	31	37	66	170	174	122	56	51	60
	9	30	28	30	22	17	12	15	22	29	25	29	50	70	109	100	58	44	80	130	135	42	38	37	36	49
	10	44	75	85	39	42	113	82	68	57	71	26	22	15	16	18	14	15	13	19	20	20	17	20	20	39
	11	18	18	14	23	41	42	40	39	71	78	78	97	137	128	79	43	51	41	29	25	20	23	39	38	50
	12	25	18	11	29	50	37	30	16	14	28	25	55	37	31	16	16	14	16	25	20	17	29	26	20	25
D	13	27	31	56	56	30	24	29	49	62	95	74	63	25	21	16	68	156	244	146	133	136	51	35	35	69
	14	19	10	7	9	10	14	10	16	29	31	29	42	86	124	77	67	17	35	24	30	36	29	26	25	33
	15	36	69	46	25	26	19	11	8	7	13	36	57	41	62	44	22	16	33	37	42	32	17	27	15	31
	16	14	13	16	14	17	25	22	18	15	26	33	36	32	24	16	13	12	15	14	18	13	17	25	63	21
	17	84	85	58	21	9	7	10	12	14	19	16	19	26	28	42	34	24	35	15	22	24	28	30	31	29
Q	18	19	11	14	19	35	28	34	57	54	44	26	15	21	17	18	17	17	23	24	33	30	27	24	23	26
	19	20	27	31	59	93	210	202	194	266	207	68	44	15	12	12	12	20	22	44	54	53	48	32	31	74
	20	19	23	59	71	108	157	196	137	154	117	208	123	50	14	40	19	24	26	26	27	20	14	14	16	69
Q	21	10	14	13	31	50	79	96	74	49	67	40	17	12	6	11	13	19	24	16	14	14	16	18	20	30
	22	18	15	14	23	33	36	70	77	84	35	26	49	35	24	28	24	38	34	49	43	54	69	68	41	41
Q	23	24	38	60	40	27	19	18	25	33	30	30	40	24	35	19	20	15	17	17	21	23	21	27	31	27
	24	48	65	78	78	89	122	146	70	55	89	81	183	215	193	70	40	23	22	57	96	127	93	41	31	88
	25	22	22	22	33	31	37	38	39	38	30	16	18	15	13	14	38	12	21	30	45	68	57	47	42	31
	26	36	19	27	28	23	15	13	24	27	23	18	33	25	47	35	27	27	30	30	29	24	27	30	30	27
	27	27	26	17	21	46	87	48	80	100	123	263	159	128	116	50	52	114	40	39	90	90	71	105	68	82
Q	28	33	22	12	11	11	2	4	5	13	8	13	11	11	12	11	9	10	10	15	13	19	22	35	38	15
	29	41	22	14	13	24	30	23	12	24	32	54	46	25	19	19	23	25	26	56	94	107	44	40	44	36
	30	25	18	17	18	21	33	24	30	35	29	30	36	32	32	26	29	32	25	36	28	29	28	35	42	29
	Mean	27	28	33	35	40	59	57	54	59	59	60	57	52	53	44	35	36	42	39	45	47	36	33	31	44
5Q	Mean	19	19	21	21	25	27	32	34	32	34	25	20	17	16	14	13	13	17	16	18	19	19	23	25	21
5D	Mean	28	26	38	44	37	69	62	71	79	85	77	75	58	69	89	74	82	110	73	79	91	60	34	29	64

AU Index (Hourly mean values, unit nT) May 1987

	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	25	20	22	21	23	24	22	23	36	69	62	38	31	25	20	18	24	27	24	37	51	66	43	56	34
	2	49	35	22	17	25	49	98	104	88	131	179	168	67	19	23	14	28	40	32	29	24	26	39	28	56
	3	17	15	16	17	14	13	39	77	107	103	126	93	98	69	25	17	36	45	28	48	23	19	20	15	45
	4	13	15	20	33	44	77	141	135	86	95	72	45	43	50	55	43	49	39	28	41	30	29	20	25	51
	5	18	14	16	11	15	14	14	25	23	35	57	53	49	39	37	15	23	39	50	64	38	20	17	12	29
	6	13	11	14	7	10	18	15	14	20	25	25	29	48	42	36	29	36	69	72	85	130	113	133	152	48
	7	146	176	179	183	209	137	109	97	146	146	126	42	27	62	36	29	26	19	20	24	48	89	77	67	92
	8	51	54	42	51	51	45	40	72	60	42	52	65	53	47	37	26	46	35	29	20	15	25	34	35	43
	9	17	33	35	21	63	49	26	33	64	32	30	56	34	24	21	26	32	32	24	31	28	33	24	26	33
	10	36	28	35	17	22	40	66	104	65	78	156	194	92	138	113	47	64	50	60	71	37	33	23	18	66
	11	21	35	22	13	15	23	39	46	43	52	53	62	59	51	28	18	30	37	36	53	112	116	50	49	44
Q	12	24	32	33	7	6	5	7	19	30	37	19	25	25	25	18	16	26	24	21	20	26	38	31	28	23
	13	17	10	13	12	26	32	44	66	70	71	32	28	21	20	30	47	75	67	88	77	78	115	124	143	54
	14	127	123	59	28	36	111	145	179	132	74	93	118	163	205	100	89	53	52	39	47	49	44	55	32	90
	15	25	22	13	13	8	8	11	28	82	98	71	63	46	41	32	22	22	24	24	22	38	29	14	17	32
	16	20	23	66	58	82	34	12	18	37	47	92	75	71	22	43	26	47	36	29	29	21	19	18	18	39
Q	17	11	25	17	19	7	6	3	3	15	24	38	26	27	26	23	22	24	33	42	31	32	31	36	28	23
Q	18	20	24	21	15	9	20	14	18	21	21	19	19	27	27	21	20	15	18	24	30	21	16	18	18	20
Q	19	9	9	9	14	20	29	29	24	21	29	27	18	27	30	35	30	36	30	38	29	24	27	28	62	26
	20	67	74	50	39	12	10	10	16	19	27	57	73	67	46	44	39	28	27	31	38	61	73	55	56	43
Q	21	47	39	50	42	23	10	10	5	11	16	17	13	14	21	17	25	27	36	28	23	18	23	24	23	23
	22	25	24	33	38	53	60	61	62	60	71	67	82	72	43	38	67	66	77	77	57	77	103	135	97	64
	23	81	48	50	64	68	95	86	68	79	65	111	64	48	38	44	52	50	69	137	121	176	221	163	107	88
D	24	88	67	72	163	124	130	193	141	183	276	300	152	108	67	89	203	182	305	248	278	281	214	185	253	179
D	25	186	221	186	294	337	309	352	393	366	261	196	86	51	38	32	22	31	30	38	35	29	23	15	14	148
	26	13	12	10	10	10	42	106	34	39	54	105	165	168	125	157	152	174	203	244	240	259	230	283	284	130
D	27	301	271	237	256	270	300	342	333	337	283	302	258	186	142	83	33	25	53	25	53	93	107	98	91	187
	28	58	36	22	16	27	61	112	84	120	153	69	52	47	36	40	19	18	19	48	113	109	100	219	289	78
D	29	270	229	190	295	266	221	164	284	393	422	446	311	199	251	202	99	69	55	42	22	23	20	23	24	188
	30	16	13	9	2	-1	7	10	38	119	204	86	53	125	162	112	53	50	40	128	176	202	177	82	59	80
D	31	53	58	61	39	67	114	112	70	142	184	192	230	208	178	104	153	204	286	293	216	214	265	237	256	164
	Mean	60	57	52	58	62	67	78	84	97	104	105	88	74	68	54	47	52	61	66	69	76	78	74	76	71
5Q	Mean	22	25	26	19	13	14	12	13	19	25	24	20	24	25	22	22	25	28	30	26	24	27	27	31	23
5D	Mean	179	169	149	209	212	214	232	244	284	285	287	207	150	135	102	102	102	145	129	120	128	125	111	127	173

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	178	181	100	102	35	30	27	18	16	45	138	145	142	69	63	58	53	78	99	108	73	54	67	159	85
	2	144	140	60	100	110	165	112	114	91	109	70	37	29	24	20	24	26	25	29	31	37	39	35	20	66
	3	20	11	9	18	14	16	19	37	40	42	47	61	76	55	27	21	29	48	59	64	61	36	35	34	37
	4	21	19	17	21	32	65	85	93	84	97	116	133	187	127	71	32	49	78	68	80	56	35	55	75	71
	5	89	83	74	73	83	66	47	52	75	60	80	90	111	79	78	95	118	88	58	101	61	66	85	64	78
D	6	35	36	45	69	83	127	155	230	450	483	372	232	321	295	180	144	133	177	220	289	230	179	143	162	200
D	7	101	180	72	34	15	15	19	23	55	123	146	76	101	112	69	73	95	142	227	217	155	133	124	105	101
Q	8	51	17	11	9	14	30	59	60	73	67	85	89	63	47	26	31	36	27	23	12	23	30	23	47	40
Q	9	32	47	30	37	58	52	45	61	74	60	43	33	23	22	19	24	38	33	28	27	30	33	47	125	43
	10	208	144	97	47	42	23	20	28	15	22	45	33	34	35	53	36	52	43	38	33	33	25	25	27	48
	11	37	25	15	14	27	61	108	133	72	55	104	146	71	51	59	55	60	64	74	109	121	70	53	42	68
D	12	77	63	93	107	146	199	92	113	123	136	135	157	83	121	69	31	67	74	99	118	132	114	91	64	104
	13	130	81	94	103	162	180	110	99	84	160	139	102	104	84	55	56	55	57	59	56	48	65	55	44	91
	14	63	89	61	61	54	78	141	116	66	69	117	95	65	51	30	25	21	22	24	25	23	57	93	75	63
	15	53	33	30	32	24	16	20	12	16	25	29	58	57	60	43	27	54	63	48	48	34	31	41	62	38
	16	99	99	69	68	62	65	117	183	100	45	34	48	54	47	58	36	35	74	103	227	208	151	87	107	91
	17	107	138	79	42	24	29	23	25	44	69	113	138	99	73	65	27	25	34	39	34	34	56	64	93	62
	18	135	92	38	25	60	125	148	97	109	53	31	66	86	71	25	36	51	63	57	58	31	30	34	96	67
D	19	194	195	181	139	243	219	151	204	439	203	107	238	145	133	83	64	40	31	44	65	135	176	282	197	163
	20	125	79	45	31	25	28	17	31	73	91	147	143	186	129	166	151	159	191	240	282	222	134	166	205	128
	21	192	46	55	62	56	74	35	39	60	60	57	36	22	35	41	40	31	41	60	36	39	40	60	54	53
Q	22	55	23	9	5	16	28	58	86	72	64	39	105	100	73	45	20	15	15	49	67	84	64	70	84	52
Q	23	113	97	70	53	95	51	44	27	18	15	33	27	36	39	25	15	29	38	43	76	98	58	44	36	49
	24	27	23	17	18	22	26	58	120	79	38	21	25	27	26	42	43	64	76	90	149	192	134	126	141	66
	25	91	58	38	38	29	26	30	49	54	60	120	105	74	58	51	43	40	64	126	143	137	216	246	307	92
D	26	232	212	211	175	227	115	32	24	41	92	71	67	61	67	35	46	60	77	95	46	42	50	43	102	93
	27	74	41	42	40	49	52	80	55	104	195	226	207	80	42	35	20	21	21	30	30	33	29	24	24	65
	28	21	30	37	79	130	107	104	93	68	45	39	28	38	47	45	40	35	31	33	32	34	41	59	58	53
	29	74	57	75	103	74	55	50	64	66	54	67	44	58	55	45	37	58	58	68	60	55	67	134	185	69
Q	30	118	41	17	21	37	39	44	34	32	82	76	46	36	44	54	33	22	19	23	35	40	36	30	36	41
	Mean	96	79	59	57	68	72	68	77	89	90	94	93	85	72	55	46	52	61	75	88	83	74	81	94	75
5Q	Mean	73	45	27	25	44	40	50	53	53	57	55	60	51	45	33	24	28	26	33	43	55	44	42	65	44
5D	Mean	127	137	120	104	142	135	89	118	221	207	166	154	142	145	87	71	79	100	137	147	138	130	136	126	131

AL Index (Hourly mean values, unit nT) January 1987

	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
D	1	-21	-27	-100	-133	-19	-57	-180	-310	-310	-106	-74	-119	-350	-411	-299	-219	-446	-308	-393	-436	-56	-226	-154	-23	-199
	2	-11	-13	-40	-187	-6	-8	-14	-105	-207	-127	-145	-64	-60	-64	-530	-291	-260	-89	-19	-29	-36	-20	-8	-7	-97
	3	-5	-11	-17	-11	-79	-95	-28	-20	-86	-227	-108	-77	-66	-61	-86	-40	-31	-21	-51	-51	-43	-51	-40	-39	-56
Q	4	-19	-16	-8	-9	-5	-3	-3	-3	-10	-11	-4	-4	-12	-7	-5	-7	-13	-22	-151	-51	-21	-15	-11	-14	-18
Q	5	-11	-5	-8	-6	-6	-4	-10	-32	-10	-5	0	-1	-8	-7	-8	-15	-19	-124	-82	-44	-15	-10	-8	-7	-19
Q	6	-4	-8	-15	-78	-10	0	-2	-6	-3	-1	-90	-68	-7	-3	-6	-14	-22	-17	-12	-5	-3	-23	-46	-34	-20
	7	-22	-8	-5	-7	-20	-20	0	0	0	-2	-18	-7	-6	-13	-9	-19	-78	-44	-60	-76	-24	-16	-100	-66	-26
	8	-48	-8	-6	-23	-11	0	0	-4	-174	-76	-25	-7	-22	-44	-202	-125	-86	-79	-54	-122	-143	-163	-96	-60	-66
	9	-55	-18	-10	-9	-18	-86	-241	-113	-256	-419	-67	-69	-331	-288	-144	-56	-83	-105	-125	-38	-7	-15	-15	-31	-108
	10	-8	-13	-8	-6	-10	-48	-108	-117	-162	-93	-70	-21	-27	-29	-122	-128	-71	-23	-13	-10	-10	-22	-13	-9	-48
	11	-7	-6	-9	-25	-28	-4	-4	-5	0	-5	-15	-3	-13	-8	-9	-22	-39	-151	-223	-64	2	-12	-44	-86	-32
	12	-86	-17	-4	-21	-142	-159	-38	0	-31	-45	-82	-218	-71	-32	-120	-186	-108	-27	-11	-17	-13	-16	-49	-79	-65
	13	-38	-21	-24	-18	-9	-52	-35	-30	-23	-58	-68	-19	-16	-60	-55	-26	-35	-360	-109	-24	0	-19	-53	-29	-49
Q	14	-13	-33	-41	-33	-16	-20	-24	-142	-175	-56	-27	-49	-218	-353	-120	-37	-11	-27	-19	-56	-148	-13	-10	-7	-69
	15	-7	-2	-2	-6	-10	-3	-7	-5	-14	-4	-1	-15	-3	-3	-11	-87	-39	-8	-10	-173	-279	-47	-94	-204	-43
D	16	-101	-112	-99	-32	0	-1	-8	-24	-42	-239	-241	-207	-386	-277	-142	-63	-163	-692	-432	-232	-69	-23	-29	-23	-152
	17	-29	-42	-189	-105	-10	-11	-5	-9	-20	-19	-15	-31	-26	-24	-84	-106	-239	-147	-105	-35	-13	-35	-214	-324	-76
	18	-191	-59	-53	-67	-31	-36	-60	-92	-184	-252	-174	-28	-12	-14	-25	-98	-67	-32	-9	-9	-18	-172	-125	-49	-77
	19	-19	-9	-25	-14	-6	-19	-37	-96	-281	-113	-63	-301	-214	-147	-116	-183	-112	-28	-9	-40	-30	-85	-24	-22	-83
D	20	-16	-41	-49	-14	-29	-193	-355	-124	-24	-60	-157	-164	-118	-49	-351	-479	-740	-573	-395	-217	-117	-195	-132	-52	-193
	21	-62	-69	-75	-45	-27	-57	-158	-97	-44	-89	-149	-305	-504	-288	-192	-138	-48	-90	-183	-137	-261	-179	-175	-146	-146
	22	-53	-123	-64	-13	-14	-31	-30	-23	-8	-11	-26	-51	-87	-122	-272	-240	-205	-345	-457	-133	-85	-77	-33	-114	-109
D	23	-74	-24	-26	-107	-133	-32	-19	-119	-153	-140	-317	-206	-162	-148	-46	-37	-136	-126	-42	-27	-74	-304	-252	-216	-122
	24	-85	-108	-73	-108	-132	-116	-126	-134	-65	-68	-60	-54	-34	-93	-57	-87	-178	-246	-203	-45	-45	-39	-20	-20	-92
	25	-17	-11	-15	-32	-127	-48	-28	-138	-112	-62	-75	-141	-159	-73	-68	-57	-113	-199	-65	-69	-64	-127	-15	-7	-76
	26	-12	-112	-194	-81	-19	-28	-116	-116	-42	-32	-39	-101	-182	-190	-78	-37	-96	-169	-38	-18	-10	-17	-8	-7	-73
	27	-9	-7	-23	-53	-97	-19	-5	-19	-29	-313	-371	-288	-91	-254	-188	-8	-47	-13	-10	-17	-16	-21	-8	-8	-80
D	28	-14	-36	-58	-74	-13	-20	-40	-155	-93	-76	-80	-49	-124	-120	-118	-138	-167	-321	-357	-115	-69	-299	-290	-227	-127
	29	-161	-509	-239	-136	-82	-52	-89	-102	-101	-36	-32	-28	-33	-48	-43	-49	-55	-53	-46	-31	-24	-24	-20	-16	-84
Q	30	-14	-51	-13	-5	-9	-9	-7	-6	-6	-5	-26	-7	-19	-39	-109	-114	-56	-138	-158	-96	-4	-5	-13	-10	-38
	31	-14	-133	-190	-161	-112	-105	-73	-87	-26	-24	-41	-126	-52	-8	-26	-51	-52	-13	-5	-22	-20	-40	-46	-65	-62
	Mean	-39	-53	-54	-52	-39	-43	-59	-72	-86	-89	-85	-91	-110	-105	-117	-101	-123	-148	-124	-78	-55	-74	-69	-64	-80
5Q	Mean	-12	-22	-17	-26	-9	-7	-9	-37	-40	-15	-29	-25	-52	-81	-49	-37	-24	-65	-84	-50	-38	-13	-17	-14	-32
5D	Mean	-45	-48	-66	-72	-38	-60	-120	-146	-124	-124	-173	-149	-228	-201	-191	-187	-330	-404	-323	-205	-77	-209	-171	-108	-158

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	-169	-81	-30	-34	-106	-62	2	4	-2	-5	-25	-7	-5	-21	-156	-53	-166	-207	-133	-51	-26	-22	-30	-63	-60
Q	2	-29	-18	-6	-4	-12	-49	-17	0	-5	-10	-21	-66	-62	-89	-132	-116	-221	-55	-91	-96	-34	-11	-4	-8	-48
Q	3	-35	-16	-13	-3	-9	-4	-15	-104	-193	-173	-118	-59	-15	-13	-9	-21	-22	-13	-17	-52	-23	-7	-9	-5	-39
Q	4	-4	-7	-7	-11	-2	-2	0	-4	-2	-4	-15	-63	-31	-152	-168	-182	-100	-216	-160	-83	-3	-4	-6	-4	-51
Q	5	-4	-1	0	0	0	0	0	-1	0	-6	-48	-21	-13	-5	-3	-7	-22	-2	1	0	-20	-4	-6	-27	-8
	6	-166	-202	-118	-34	-4	-5	-5	-13	-10	-7	-20	-39	-56	-126	-111	-9	-20	-21	-13	-2	-6	-17	-161	-162	-55
	7	-94	-36	-26	-24	-23	-2	-3	-34	-126	-131	-160	-47	-32	-104	-160	-297	-196	-205	-163	-19	-51	-116	-135	-133	-96
D	8	-28	-7	-32	-239	-183	-188	-134	-295	-165	-91	-10	-29	-20	-16	-163	-704	-521	-296	-154	-247	-89	-14	-14	-56	-154
	9	-124	-58	-66	-92	-78	-6	-23	-58	-106	-60	-103	-308	-419	-121	-53	-220	-262	-41	-9	-8	-18	-287	-314	-195	-126
	10	-28	-40	-143	-99	-14	-10	-23	-45	-37	-96	-274	-156	-24	-35	-50	-184	-314	-154	-46	-12	-4	-7	-9	-17	-76
	11	-32	-25	-22	-24	-3	0	-1	-4	-2	-16	-10	-7	-54	-53	-14	-17	-9	-103	-411	-571	-180	-41	-41	-55	-71
D	12	-211	-145	-67	-24	-18	-83	-145	-171	-133	-171	-195	-194	-344	-495	-545	-466	-598	-325	-308	-215	-156	-110	-108	-121	-223
	13	-63	-104	-158	-156	-51	-9	-24	-29	-12	-10	-13	-14	-66	-25	-8	-12	-11	-10	-9	-13	-83	-19	-5	-3	-38
Q	14	-9	-8	-4	-6	-15	-91	-76	-58	-54	-15	-31	-40	-12	-51	-64	-117	-64	-54	-105	-11	-5	-8	0	-1	-37
	15	-3	-5	-4	-22	-16	-22	-11	-7	-45	-92	-103	-51	-68	-326	-286	-126	-119	-140	-124	-98	-45	-166	-135	-27	-85
	16	-27	-54	-44	-29	-1	0	-11	-147	-254	-195	-347	-368	-203	-48	-208	-296	-357	-163	-136	-241	-114	-38	-27	-30	-139
	17	-14	-8	-1	-5	-70	-79	-53	-20	-22	-43	-44	-120	-74	-69	-143	-285	-221	-91	-281	-347	-70	-91	-229	-89	-103
	18	-117	-47	-43	-48	-91	-86	-57	-28	-69	-223	-128	-73	-105	-115	-47	-12	-37	-22	-26	-16	-116	-366	-163	-116	-90
	19	-48	-18	-20	-46	-7	-6	-3	-15	-13	-7	-15	-20	-22	-15	-10	-115	-46	-94	-12	-4	-2	-4	-1	2	-23
D	20	3	-5	-21	-61	-249	-304	-141	-184	-303	-539	-546	-262	-530	-380	-320	-423	-395	-181	-224	-348	-296	-167	-259	-321	-269
D	21	-255	-174	-184	-261	-85	-30	-246	-528	-442	-386	-100	-74	-64	-76	-135	-405	-370	-113	-30	-23	-173	-485	-176	-201	-209
D	22	-99	-66	-87	-63	-274	-469	-180	-129	-368	-126	-204	-371	-193	-49	-33	-53	-42	-98	-63	-137	-110	-248	-572	-423	-186
	23	-337	-167	-162	-78	-99	-26	-101	-101	-57	-58	-107	-259	-178	-339	-533	-138	-253	-183	-243	-124	-34	-29	-27	-73	-154
	24	-59	-29	-5	-29	-32	-79	-110	-65	-52	-217	-149	-98	-212	-109	-90	-171	-129	-216	-486	-713	-380	-269	-111	-81	-162
	25	-217	-177	-48	-18	-24	-16	-26	-39	-68	-108	-107	-219	-80	-13	-20	-59	-5	-10	-126	-240	-141	-66	-62	-20	-80
	26	-27	-29	-13	-5	-7	-13	-94	-34	-18	-45	-90	-227	-209	-41	-60	-83	-12	-30	-38	-21	-38	-8	-10	-12	-49
	27	-16	-7	-5	0	3	-6	-8	-96	-335	-206	-63	-27	-15	-29	-72	-170	-285	-249	-264	-301	-152	-76	-64	-245	-112
	28	-55	-57	-18	-18	-46	-150	-115	-70	-101	-556	-174	-141	-107	-84	-47	-48	-42	-58	-131	-225	-197	-144	-140	-271	-125
	Mean	-80	-56	-48	-51	-54	-64	-57	-81	-106	-128	-115	-120	-114	-107	-130	-171	-172	-119	-135	-150	-91	-100	-100	-98	-102
5Q	Mean	-16	-10	-6	-4	-7	-29	-21	-33	-50	-41	-46	-49	-26	-62	-75	-88	-85	-68	-74	-48	-17	-6	-5	-9	-36
5D	Mean	-118	-79	-78	-129	-161	-214	-169	-261	-282	-262	-211	-186	-230	-203	-239	-410	-385	-202	-155	-194	-164	-204	-225	-224	-208

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	-34	-17	-9	-75	-47	-18	-23	-95	-92	-68	-20	-48	-82	-52	-18	-23	-115	-339	-355	-200	-250	-78	-14	-13	-87
Q	2	-12	-9	-15	-6	-8	-12	-30	-88	-50	-28	-18	-40	-10	-39	-71	-63	-116	-44	-22	-7	-49	-30	-60	-19	-35
	3	-3	-3	-12	-106	-162	-55	-155	-141	-81	-37	-102	-94	-11	-7	-9	-73	-186	-168	-31	-122	-118	-74	-80	-116	-81
	4	-207	-123	-58	-94	-131	-36	-34	-42	-60	-98	-309	-133	-41	-25	-225	-142	-89	-49	-128	-72	-23	-146	-54	-65	-99
D	5	-20	-16	-30	-117	-401	-236	-26	-9	-19	-98	-171	-326	-841	-592	-678	-277	-577	-412	-221	-156	-136	-136	-478	-156	-255
	6	-42	-174	-129	-100	-51	-54	-128	-131	-41	-34	-155	-173	-105	-26	-6	-8	-25	-16	-95	-279	-196	-473	-407	-322	-132
D	7	-371	-308	-385	-173	-196	-217	-330	-429	-437	-276	-273	-200	-410	-631	-295	-18	-16	-16	-58	-168	-176	-76	-30	-51	-231
	8	-12	-120	-227	-105	-71	-177	-261	-66	-109	-203	-174	-36	-26	-38	-199	-509	-289	-66	-19	-23	-30	-37	-45	-9	-119
	9	-12	-159	-392	-190	-229	-214	-70	-52	-26	-14	-20	-12	-18	-19	-18	-34	-89	-45	-39	-54	-18	-10	-14	-19	-74
	10	-13	-25	-42	-23	-84	-63	-53	-70	-236	-201	-87	-97	-370	-713	-633	-193	-144	-109	-30	-12	-6	-6	-7	-8	-134
	11	-7	-16	-26	-44	-7	-16	-54	-30	-75	-28	-22	-92	-242	-110	-154	-162	-125	-230	-368	-189	-51	-7	-6	-12	-86
	12	-30	-140	-196	-131	-27	-132	-121	-250	-281	-124	-179	-214	-18	-33	-10	-44	-71	-13	-43	-41	-354	-210	-355	-418	-143
	13	-96	-29	-19	-43	-88	-113	-89	-64	-107	-82	-189	-171	-139	-57	-70	-117	-18	-25	-18	-7	-9	-45	-134	-114	-77
	14	-63	-16	-13	-38	-113	-323	-121	-9	-17	-18	-115	-374	-214	-135	-32	-18	-38	-154	-82	-68	-204	-102	-15	-19	-96
	15	-64	-29	-13	-96	-274	-202	-76	-15	-60	-196	-162	-84	-55	-70	-7	-12	-22	-59	-140	-109	-89	-17	-27	-107	-83
	16	-230	-280	-94	-10	-5	-9	-40	-264	-177	-201	-217	-449	-553	-249	-53	-8	-6	-13	-18	-170	-368	-322	-214	-98	-169
	17	-191	-229	-290	-323	-345	-184	-201	-135	-33	-50	-19	-15	-24	-84	-68	-39	-61	-181	-52	-49	-10	-26	-15	-17	-110
	18	-22	-156	-72	-11	-17	-35	-87	-115	-115	-47	-19	-15	-22	-16	-10	-26	-203	-247	-101	-48	-23	-162	-611	-462	-110
	19	-208	-150	-86	-203	-135	-108	-177	-68	-130	-116	-68	-181	-111	-102	-126	-55	-55	-73	-87	-71	-166	-226	-114	-26	-118
Q	20	-57	-32	-15	-24	-37	-38	-51	-38	-30	-42	-40	-32	-25	-99	-71	-32	-27	-14	-11	-20	-22	-52	-40	-34	-37
D	21	-18	-27	-27	-44	-30	-42	-118	-146	-110	-93	-152	-230	-419	-429	-473	-863	-510	-178	-104	-208	-362	-286	-90	-306	-219
D	22	-497	-159	-62	-81	-30	-12	-45	-141	-273	-195	-167	-66	-90	-37	-58	-26	-62	-141	-225	-216	-376	-442	-229	-92	-155
	23	-35	-45	-33	-39	-25	-11	-17	-58	-104	-84	-35	-86	-120	-34	-21	-21	-12	-17	-21	-13	-9	-11	-16	-17	-37
Q	24	-12	-12	-9	-9	-9	-4	-2	-6	-10	-18	-21	-25	-22	-21	-13	-8	-7	-5	-2	-6	-16	-8	-11	-13	-11
	25	-14	-16	-15	-22	-18	-10	-10	-14	-12	-18	-22	-24	-21	-17	-14	-19	-147	-319	-47	-18	-16	-14	-91	-89	-42
	26	-165	-153	-89	-33	-31	-102	-83	-133	-237	-101	-44	-40	-13	-58	-153	-175	-115	-178	-115	-11	-34	-44	-31	-20	-90
D	27	-26	-115	-248	-388	-361	-261	-114	-135	-69	-7	-112	-702	-459	-250	-375	-534	-436	-187	-184	-116	-64	-180	-151	-50	-230
	28	-48	-172	-541	-176	-86	-65	-109	-190	-214	-227	-140	-86	-123	-139	-114	-92	-90	-78	-110	-35	-14	-8	-15	-18	-120
	29	-18	-14	-15	-15	-18	-17	-275	-67	-152	-116	-179	-48	-15	-20	-27	-41	-32	-13	-16	-29	-44	-63	-22	-29	-54
Q	30	-32	-29	-47	-24	-18	-13	-12	-15	-36	-24	-19	-62	-127	-232	-220	-126	-168	-141	-50	-5	-25	-12	-18	-20	-61
Q	31	-21	-21	-57	-113	-115	-10	-15	-54	-141	-66	-31	-46	-139	-105	-28	-10	-18	-10	-3	-22	-9	-13	-16	-17	-45
	Mean	-83	-90	-105	-92	-102	-89	-94	-99	-114	-93	-105	-135	-156	-143	-137	-121	-124	-114	-90	-82	-105	-106	-110	-88	-107
5Q	Mean	-26	-20	-28	-35	-37	-15	-22	-40	-53	-35	-25	-41	-64	-99	-80	-47	-67	-42	-17	-12	-24	-23	-29	-20	-37
5D	Mean	-186	-125	-150	-160	-203	-153	-126	-172	-181	-133	-175	-304	-443	-387	-375	-343	-320	-186	-158	-172	-222	-224	-195	-131	-218

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	-18	-54	-178	-243	-257	-222	-181	-115	-229	-217	-127	-82	-44	-66	-58	-49	-107	-201	-65	-19	-79	-14	-14	-24	-111
	2	-31	-30	-70	-182	-137	-22	-22	-35	-131	-131	-115	-198	-133	-42	-40	-35	-44	-110	-90	-42	-4	-9	-16	-18	-70
Q	3	-21	-21	-17	-16	-17	-20	-18	-14	-12	-15	-20	-21	-16	-16	-12	-9	-12	-12	-13	-15	-10	-13	-15	-23	-16
D	4	-25	-23	-17	-13	-10	-17	-25	-20	-37	-123	-385	-275	-593	-558	-369	-139	-92	-25	-2	-1	-5	-11	-16	-19	-117
D	5	-14	-98	-83	-95	-202	-90	-31	-28	-20	-29	-27	-22	-33	-158	-417	-158	-78	-296	-74	-64	-142	-245	-31	-38	-103
	6	-21	-19	-76	-225	-120	-17	-13	-11	-11	-14	-19	-50	-187	-145	-67	-162	-79	-18	-8	-19	-24	-12	-36	-79	-60
D	7	-82	-116	-206	-248	-157	-285	-433	-334	-151	-108	-55	-53	-36	-42	-103	-279	-218	-276	-96	-11	-4	-5	-10	-12	-138
D	8	-15	-20	-17	-27	-56	-92	-215	-120	-167	-58	-194	-154	-34	-15	-29	-66	-147	-82	-68	-245	-394	-278	-92	-24	-109
	9	-25	-51	-34	-67	-44	-40	-32	-30	-97	-30	-47	-233	-148	-259	-212	-177	-146	-108	-189	-378	-22	-5	-13	-14	-100
	10	-18	-69	-422	-146	-28	-224	-215	-117	-117	-132	-53	-25	-23	-28	-53	-25	-23	-16	-17	-18	-33	-12	-12	-15	-77
	11	-21	-21	-19	-26	-72	-181	-126	-102	-107	-226	-168	-167	-381	-307	-264	-139	-111	-120	-15	-5	-7	-12	-21	-44	-111
	12	-19	-15	-18	-52	-132	-185	-31	-19	-27	-28	-22	-43	-150	-86	-20	-18	-17	-12	-36	-43	-15	-10	-11	-17	-43
D	13	-16	-30	-104	-111	-27	-15	-15	-15	-28	-55	-75	-70	-18	-14	-12	-48	-320	-629	-262	-237	-174	-111	-217	-21	-109
	14	-21	-19	-17	-15	-18	-16	-15	-14	-34	-81	-28	-27	-93	-317	-163	-144	-70	-44	-80	-69	-27	-31	-20	-22	-58
	15	-35	-183	-132	-26	-16	-21	-24	-32	-27	-27	-26	-31	-69	-103	-67	-42	-113	-18	-18	-27	-117	-35	-15	-19	-51
	16	-19	-17	-18	-24	-30	-29	-34	-27	-22	-20	-22	-27	-43	-22	-24	-35	-29	-17	-15	-17	-17	-18	-19	-32	-24
	17	-56	-76	-29	-52	-32	-27	-27	-29	-26	-25	-26	-27	-30	-46	-76	-164	-81	-92	-76	-11	-11	-18	-20	-21	-45
Q	18	-21	-22	-22	-22	-20	-49	-29	-85	-58	-19	-21	-25	-17	-15	-11	-18	-15	-11	-4	-7	-19	-16	-19	-18	-24
	19	-20	-17	-69	-116	-170	-225	-301	-334	-349	-209	-28	-29	-21	-20	-17	-22	-13	-10	-26	-53	-190	-82	-11	-8	-97
	20	-12	-10	-38	-33	-150	-296	-266	-238	-348	-119	-259	-46	-40	-30	-73	-105	-67	-34	-31	-23	-18	-22	-27	-29	-96
Q	21	-27	-25	-25	-26	-105	-150	-163	-83	-37	-37	-55	-23	-26	-20	-11	-10	-3	-10	-10	-14	-21	-23	-23	-25	-40
	22	-24	-23	-21	-16	-70	-62	-138	-144	-60	-27	-22	-32	-48	-12	-18	-16	-35	-65	-105	-30	-63	-89	-69	-23	-51
Q	23	-14	-25	-40	-117	-20	-16	-23	-14	-81	-66	-32	-16	-27	-17	-10	-14	-6	-11	-9	-20	-22	-23	-18	-13	-27
	24	-19	-105	-190	-92	-113	-131	-87	-48	-16	-24	-23	-496	-563	-403	-105	-14	-14	-49	-51	-76	-277	-145	-3	-3	-127
	25	-9	-19	-26	-44	-29	-60	-68	-34	-41	-21	-16	-17	-15	-11	-17	-46	-72	-47	-54	-58	-38	-48	-27	-16	-35
	26	-20	-22	-25	-54	-28	-14	-16	-18	-24	-26	-26	-31	-29	-93	-71	-37	-21	-20	-31	-20	-21	-21	-22	-21	-30
	27	-17	-17	-17	-18	-39	-194	-71	-93	-279	-205	-238	-308	-96	-88	-76	-73	-185	-56	-29	-66	-113	-76	-74	-66	-104
Q	28	-38	-65	-23	-24	-23	-25	-24	-23	-21	-24	-19	-16	-19	-18	-12	-20	-10	-10	-22	-26	-30	-32	-47	-52	-26
	29	-38	-24	-22	-20	-23	-19	-32	-30	-23	-16	-72	-32	-21	-14	-12	-26	-51	-47	-64	-288	-230	-40	-18	-23	-49
	30	-29	-27	-28	-27	-25	-29	-31	-31	-22	-27	-21	-16	-15	-14	-19	-50	-112	-40	-22	-16	-18	-28	-27	-20	-29
	Mean	-24	-42	-66	-72	-72	-92	-90	-74	-86	-71	-74	-86	-98	-99	-81	-71	-76	-82	-52	-63	-71	-49	-32	-25	-69
5Q	Mean	-24	-31	-25	-41	-37	-52	-51	-43	-41	-32	-29	-20	-21	-17	-11	-14	-9	-10	-11	-16	-20	-21	-24	-26	-26
5D	Mean	-30	-57	-85	-98	-90	-99	-143	-103	-80	-74	-147	-114	-142	-157	-186	-138	-171	-261	-100	-111	-143	-130	-73	-22	-115

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	-22	-18	-19	-19	-18	-25	-27	-25	-25	-31	-47	-34	-26	-23	-29	-30	-30	-29	-16	-25	-36	-103	-32	-114	-33
	2	-65	-82	-37	-21	-21	-35	-195	-278	-202	-89	-275	-210	-63	-31	-21	-28	-26	-28	-34	-28	-17	-30	-36	-29	-78
	3	-27	-33	-20	-12	-25	-25	-20	-35	-190	-217	-257	-129	-186	-183	-36	-26	-32	-50	-35	-22	-20	-21	-19	-24	-69
	4	-20	-19	-21	-17	-54	-93	-338	-247	-82	-33	-35	-46	-39	-55	-175	-147	-108	-34	-32	-41	-37	-30	-31	-32	-74
	5	-21	-21	-21	-19	-20	-24	-21	-50	-27	-44	-88	-118	-109	-170	-139	-28	-24	-40	-143	-166	-91	-19	-24	-27	-61
	6	-22	-24	-24	-31	-45	-30	-35	-33	-31	-31	-33	-32	-46	-35	-66	-42	-86	-177	-145	-40	-45	-89	-145	-128	-59
	7	-170	-186	-209	-284	-312	-181	-70	-97	-120	-257	-168	-60	-41	-150	-87	-84	-45	-12	-14	-19	-42	-163	-128	-42	-123
	8	-36	-73	-57	-164	-129	-34	-36	-73	-48	-40	-29	-52	-86	-98	-55	-50	-182	-105	-21	-20	-23	-33	-31	-29	-63
	9	-27	-25	-54	-48	-54	-23	-18	-10	-21	-19	-19	-30	-26	-26	-22	-23	-17	-15	-13	-22	-28	-33	-28	-21	-26
	10	-27	-39	-51	-16	-13	-12	-24	-57	-64	-21	-167	-363	-169	-272	-298	-57	-52	-26	-87	-175	-11	-17	-18	-21	-86
	11	-32	-29	-18	-17	-20	-20	-25	-24	-46	-83	-81	-50	-39	-20	-13	-14	-23	-33	-98	-105	-85	-241	-67	-32	-51
Q	12	-28	-33	-43	-24	-19	-25	-23	-27	-30	-35	-32	-22	-19	-21	-21	-26	-27	-41	-37	-32	-27	-33	-29	-28	-28
	13	-29	-27	-25	-16	-16	-29	-19	-40	-185	-103	-34	-30	-28	-22	-18	-29	-69	-57	-42	-230	-62	-48	-190	-212	-65
	14	-308	-360	-84	-14	-21	-138	-167	-122	-49	-37	-54	-76	-248	-355	-213	-179	-151	-11	-10	-16	-33	-29	-86	-33	-116
	15	-21	-24	-23	-25	-22	-19	-22	-24	-112	-203	-92	-42	-46	-96	-97	-55	-36	-21	-23	-19	-40	-39	-44	-37	-49
	16	-24	-22	-64	-124	-66	-41	-35	-28	-59	-87	-114	-60	-66	-40	-66	-83	-72	-29	-17	-17	-25	-36	-34	-35	-52
Q	17	-38	-35	-30	-22	-34	-30	-31	-30	-28	-34	-30	-31	-28	-18	-21	-29	-22	-16	-15	-17	-28	-40	-53	-35	-29
Q	18	-22	-27	-24	-17	-17	-25	-23	-19	-36	-41	-36	-31	-32	-20	-29	-35	-28	-23	-23	-22	-16	-19	-26	-31	-26
Q	19	-26	-31	-30	-26	-19	-18	-57	-24	-18	-21	-20	-24	-21	-19	-20	-37	-75	-21	-5	-10	-11	-22	-28	-56	-27
	20	-63	-57	-97	-35	-28	-20	-26	-18	-25	-29	-41	-29	-21	-21	-12	-25	-99	-21	-11	-12	-47	-192	-73	-28	-43
Q	21	-25	-79	-66	-49	-26	-18	-14	-13	-25	-26	-32	-33	-27	-23	-24	-30	-26	-20	-15	-18	-21	-23	-20	-19	-28
	22	-23	-31	-23	-51	-55	-33	-42	-26	-33	-27	-24	-29	-24	-27	-37	-43	-84	-90	-112	-41	-32	-74	-163	-98	-51
	23	-109	-36	-25	-62	-96	-182	-123	-66	-63	-76	-114	-43	-29	-30	-58	-189	-171	-89	-92	-128	-121	-331	-128	-99	-102
D	24	-161	-143	-62	-194	-361	-144	-92	-154	-263	-364	-375	-246	-178	-136	-176	-370	-418	-503	-607	-491	-367	-222	-285	-277	-275
D	25	-211	-371	-466	-601	-629	-651	-553	-393	-476	-118	-145	-22	-33	-25	-41	-31	-24	-15	-19	-12	-16	-20	-24	-30	-205
	26	-26	-29	-37	-33	-29	-35	-87	-83	-29	-48	-47	-252	-278	-244	-192	-133	-244	-278	-202	-190	-387	-299	-285	-301	-157
D	27	-370	-319	-254	-268	-298	-484	-554	-523	-420	-542	-536	-467	-295	-245	-173	-98	-49	-30	-19	-41	-110	-222	-127	-28	-270
	28	-32	-31	-25	-30	-33	-128	-174	-158	-94	-96	-87	-38	-34	-21	-26	-34	-15	-16	-36	-87	-98	-98	-353	-357	-87
D	29	-223	-242	-341	-452	-256	-153	-128	-255	-646	-831	-574	-531	-392	-681	-349	-96	-101	-54	-28	-32	-21	-16	-21	-21	-269
	30	-17	-30	-27	-26	-28	-36	-33	-32	-129	-368	-172	-43	-108	-443	-267	-39	-23	-39	-220	-331	-151	-115	-82	-44	-117
D	31	-49	-70	-54	-62	-139	-83	-191	-61	-88	-231	-274	-251	-254	-204	-164	-261	-263	-276	-261	-541	-438	-310	-190	-234	-206
	Mean	-73	-82	-75	-89	-93	-90	-103	-97	-118	-134	-130	-110	-96	-121	-95	-75	-84	-70	-78	-95	-80	-95	-90	-80	-94
5Q	Mean	-27	-41	-38	-27	-23	-23	-29	-22	-27	-31	-30	-28	-25	-20	-23	-31	-35	-24	-19	-19	-20	-27	-31	-33	-27
5D	Mean	-202	-229	-235	-315	-336	-303	-303	-277	-378	-417	-380	-303	-230	-258	-180	-171	-171	-175	-186	-223	-190	-158	-129	-118	-244

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	-146	-145	-153	-78	-21	-19	-18	-21	-22	-21	-49	-216	-244	-109	-99	-43	-53	-85	-162	-76	-23	-12	-40	-112	-82
	2	-326	-233	-77	-60	-182	-287	-191	-136	-99	-180	-44	-25	-24	-13	-12	-10	-16	-10	-13	-17	-34	-43	-71	-35	-89
	3	-27	-22	-21	-20	-15	-17	-22	-16	-24	-28	-47	-46	-72	-97	-41	-30	-26	-24	-63	-77	-98	-44	-39	-20	-39
	4	-16	-17	-20	-16	-19	-31	-96	-151	-128	-150	-77	-202	-449	-233	-87	-64	-50	-121	-83	-16	-39	-22	-28	-32	-89
	5	-79	-65	-88	-129	-149	-45	-30	-37	-31	-37	-43	-48	-233	-138	-94	-64	-212	-181	-32	-46	-25	-25	-39	-75	-81
D	6	-23	-21	-56	-129	-48	-149	-281	-443	-638	-654	-527	-309	-513	-666	-292	-175	-85	-139	-605	-527	-383	-363	-260	-134	-309
D	7	-49	-266	-127	-21	-21	-26	-25	-24	-14	-49	-210	-80	-88	-214	-207	-138	-182	-272	-313	-273	-141	-48	-39	-127	-123
Q	8	-66	-29	-27	-24	-39	-53	-122	-112	-73	-137	-105	-86	-52	-106	-121	-26	-18	-24	-21	-18	-28	-34	-29	-34	-58
Q	9	-26	-28	-26	-31	-79	-60	-46	-77	-100	-63	-44	-21	-16	-16	-17	-26	-24	-25	-37	-21	-28	-40	-49	-97	-42
	10	-153	-104	-47	-23	-20	-13	-8	-12	-11	-20	-40	-48	-37	-26	-18	-10	-24	-21	-14	-18	-19	-28	-36	-24	-32
	11	-7	-10	-9	-14	-22	-13	-70	-84	-34	-34	-50	-243	-56	-1	-9	-22	-34	-9	-81	-165	-95	-49	-9	-16	-47
D	12	-50	-60	-116	-63	-132	-216	-99	-48	-77	-102	-72	-126	-69	-143	-168	-67	-90	-119	-60	-64	-267	-150	-47	-36	-102
	13	-105	-95	-57	-65	-111	-184	-149	-41	-30	-106	-212	-114	-180	-130	-63	-92	-105	-9	-5	-20	-24	-53	-65	-32	-85
	14	-31	-45	-76	-71	-20	-44	-108	-311	-119	-73	-117	-64	-103	-25	-12	-13	-12	-14	-16	-26	-25	-57	-112	-115	-67
	15	-35	-18	-16	-16	-20	-25	-21	-19	-21	-30	-34	-29	-29	-37	-18	-22	-74	-217	-107	-18	-14	-22	-26	-31	-38
	16	-54	-85	-39	-27	-39	-42	-68	-219	-166	-37	-28	-26	-24	-28	-81	-50	-102	-154	-95	-118	-221	-121	-90	-85	-83
	17	-111	-229	-165	-30	-18	-26	-27	-18	-19	-21	-65	-145	-147	-138	-123	-54	-16	-10	-5	-5	-6	-49	-68	-107	-67
	18	-150	-50	-24	-17	-19	-93	-170	-55	-75	-61	-34	-43	-40	-30	-20	-74	-137	-38	-23	-89	-66	-22	-32	-81	-60
D	19	-389	-231	-68	-105	-233	-165	-199	-311	-528	-403	-38	-164	-467	-266	-38	-17	-19	-15	-18	-37	-160	-252	-483	-290	-204
	20	-119	-27	-28	-33	-30	-22	-22	-23	-24	-46	-129	-180	-237	-298	-309	-252	-230	-245	-416	-383	-264	-159	-183	-306	-165
	21	-159	-29	-38	-39	-111	-76	-25	-21	-31	-63	-58	-32	-21	-30	-93	-149	-94	-113	-117	-28	-33	-42	-57	-59	-63
Q	22	-47	-27	-30	-24	-18	-17	-34	-141	-59	-53	-64	-93	-173	-48	-66	-99	-35	-17	-37	-100	-110	-78	-61	-46	-61
Q	23	-50	-41	-38	-36	-137	-58	-15	-35	-31	-29	-24	-21	-17	-22	-24	-29	-68	-98	-64	-117	-150	-53	-31	-26	-51
	24	-32	-36	-25	-17	-13	-11	-13	-191	-185	-48	-26	-23	-23	-16	-22	-89	-179	-286	-198	-86	-52	-38	-168	-102	-78
	25	-31	-19	-25	-18	-14	-17	-42	-29	-35	-57	-67	-103	-52	-60	-82	-114	-81	-150	-222	-130	-64	-247	-286	-315	-94
D	26	-294	-345	-272	-209	-131	-72	-38	-18	-31	-30	-19	-25	-7	-25	-48	-48	-67	-147	-98	-7	3	-1	-9	-63	-83
	27	-41	-30	-27	-29	-35	-68	-29	-32	-61	-158	-245	-189	-173	-73	-40	-33	-55	-33	-23	-32	-24	-15	-13	-14	-61
	28	-22	-21	-22	-71	-277	-206	-78	-39	-44	-27	-16	-18	-21	-17	-7	-7	-22	0	0	-10	-25	-33	-46	-58	-45
	29	-39	-30	-32	-152	-118	-13	-5	-32	-62	-40	-158	-30	-27	-43	-52	-50	-88	-165	-101	-48	-52	-61	-140	-188	-72
Q	30	-76	-20	-32	-21	-13	-25	-73	-32	-25	-32	-54	-39	-23	-18	-35	-46	-5	0	-3	-17	-31	-48	-33	-23	-30
	Mean	-91	-79	-59	-52	-70	-69	-70	-90	-93	-92	-89	-92	-120	-102	-76	-63	-73	-91	-101	-86	-83	-73	-86	-89	-83
5Q	Mean	-53	-29	-30	-27	-57	-42	-58	-79	-57	-62	-58	-52	-56	-42	-52	-45	-30	-32	-32	-54	-69	-50	-40	-45	-48
5D	Mean	-161	-184	-127	-105	-113	-125	-128	-168	-257	-247	-173	-140	-228	-262	-150	-89	-88	-138	-218	-181	-189	-162	-167	-130	-164

AE Index (Hourly mean values, unit nT) January 1987

	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
D	1	45	53	167	220	53	129	246	393	422	211	206	282	434	501	402	298	571	403	577	545	108	289	221	56	285
	2	40	48	78	250	33	38	46	148	247	161	190	91	109	95	585	344	316	125	43	51	69	40	40	35	134
	3	30	45	47	28	103	162	67	49	126	268	149	125	112	105	133	95	62	45	73	65	58	67	55	77	89
Q	4	42	33	31	28	24	17	15	17	30	31	20	18	29	26	20	20	25	38	158	70	36	27	22	27	34
Q	5	29	20	26	31	34	36	33	54	37	36	29	18	23	21	24	35	40	134	97	74	44	29	31	32	40
Q	6	23	25	39	117	92	60	44	40	35	32	128	114	40	31	23	26	46	41	29	22	17	38	67	67	50
	7	52	47	54	45	80	102	60	45	49	35	56	45	32	34	22	45	117	67	75	102	56	45	186	181	68
	8	141	68	63	78	65	66	61	95	276	195	155	80	77	128	310	193	140	108	84	187	233	231	129	90	136
	9	97	62	51	39	53	162	364	180	364	543	140	108	412	349	218	106	141	166	160	98	39	39	33	43	165
	10	25	28	24	20	42	90	167	168	269	164	128	60	47	56	172	162	98	34	30	30	31	43	35	27	81
	11	22	23	31	50	64	29	22	25	19	36	36	20	29	29	42	54	50	179	264	98	33	34	84	154	59
	12	148	53	57	78	231	306	145	48	81	86	137	283	99	47	149	228	143	52	55	29	29	32	70	101	112
	13	60	50	59	61	45	93	79	76	59	89	88	46	43	86	84	57	54	389	149	63	29	40	69	43	80
Q	14	30	53	66	57	46	59	63	205	275	141	73	86	263	406	172	71	41	46	30	67	184	38	30	22	105
	15	24	17	20	30	36	30	24	22	45	28	15	30	16	19	35	135	84	35	24	213	329	119	206	328	78
D	16	182	226	223	130	48	21	46	90	98	315	306	306	458	369	213	95	187	762	458	267	115	54	51	44	211
	17	67	75	250	163	45	49	33	39	53	37	32	58	58	47	123	128	273	189	149	116	65	83	275	446	119
	18	274	106	91	99	66	83	118	138	226	321	227	51	21	25	42	125	80	50	26	23	34	233	180	92	114
	19	46	36	49	33	35	53	79	136	346	164	104	374	284	250	156	204	150	58	28	65	78	159	56	48	125
D	20	38	67	93	37	64	277	435	193	69	122	218	206	182	82	476	704	1002	774	538	304	216	242	186	98	276
	21	98	112	116	86	63	107	218	146	95	150	186	362	571	380	244	188	78	108	207	171	305	255	230	179	194
	22	86	169	99	43	40	77	72	86	60	44	45	77	123	171	300	326	247	404	537	194	132	130	62	164	154
D	23	100	54	55	156	155	58	37	146	173	202	407	269	240	214	104	59	171	148	64	45	98	360	287	288	162
	24	139	165	116	179	198	185	192	203	152	129	107	96	62	111	66	95	183	281	217	78	68	53	36	30	131
	25	27	20	41	60	159	85	73	183	130	107	113	179	202	100	92	77	128	252	105	94	95	162	49	24	106
	26	26	139	250	145	57	80	168	162	96	55	78	129	195	216	131	51	104	185	58	32	25	27	18	17	102
	27	19	15	33	78	139	65	42	82	70	395	444	397	196	366	275	26	67	27	28	33	32	36	24	18	121
D	28	31	69	145	184	93	83	96	218	158	133	160	84	176	165	171	178	190	411	401	157	106	352	353	319	185
	29	283	636	344	234	180	140	144	161	149	59	62	72	64	63	52	59	60	65	55	47	36	36	37	25	128
Q	30	35	82	41	17	17	14	15	14	17	22	44	23	38	55	118	133	80	150	168	112	24	30	34	36	55
	31	40	187	270	226	222	189	146	169	106	97	104	164	79	22	52	68	65	25	20	32	39	58	60	89	105
	Mean	74	89	97	96	83	95	108	120	139	142	135	137	152	147	161	141	161	185	158	112	89	109	103	103	122
5Q	Mean	31	42	40	50	42	37	34	66	78	52	58	51	78	107	71	57	46	81	96	69	61	32	36	36	56
5D	Mean	79	93	136	145	82	113	172	208	184	196	259	229	298	266	273	266	424	499	407	263	128	259	219	161	223

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	202	114	75	89	160	161	69	43	39	33	62	27	19	54	202	72	185	228	158	72	64	52	55	94	97
Q	2	54	43	31	31	35	78	52	28	32	37	44	94	76	100	151	149	258	86	110	114	49	28	24	33	72
Q	3	61	47	46	34	45	48	50	163	226	225	148	79	27	23	16	30	31	20	29	63	35	20	27	20	63
Q	4	19	21	21	31	25	26	23	21	24	23	46	97	65	184	235	217	134	251	204	125	33	26	28	28	79
Q	5	28	21	20	21	21	24	26	22	25	39	91	43	30	23	20	36	53	21	16	16	37	25	28	50	31
	6	232	291	189	90	57	55	35	54	45	34	37	59	71	193	160	29	44	38	28	19	25	35	207	208	93
	7	141	66	50	46	51	22	25	65	166	177	222	90	67	157	219	332	259	234	220	57	101	211	212	186	141
D	8	75	56	89	310	251	243	202	395	255	148	51	51	39	36	205	828	652	524	280	421	195	52	46	99	229
	9	160	93	133	141	150	46	62	115	142	112	160	396	528	206	93	259	300	90	32	33	54	330	396	267	179
	10	70	77	201	151	87	74	79	84	91	170	363	229	62	57	81	216	332	163	55	33	35	37	35	41	118
	11	66	49	42	51	27	24	23	33	35	49	29	26	77	73	36	52	29	128	484	659	240	69	81	109	104
D	12	359	357	230	114	98	215	256	310	304	289	365	474	588	732	855	756	825	480	501	350	237	180	171	174	384
	13	107	176	214	220	100	49	64	47	25	26	27	30	92	33	23	26	27	24	22	29	102	36	26	26	65
Q	14	30	27	26	33	52	139	139	121	109	56	69	61	28	72	106	160	77	67	120	25	23	31	22	24	67
	15	24	24	24	47	54	59	45	46	85	127	154	92	115	413	409	184	143	159	162	126	77	221	195	62	127
	16	71	101	92	73	34	23	50	198	315	287	541	722	499	126	257	420	557	247	196	330	171	81	60	55	229
	17	49	34	30	34	113	116	102	65	69	70	77	154	107	99	168	322	276	122	344	399	101	129	273	129	141
	18	185	104	87	98	140	152	120	72	126	309	185	137	154	155	75	35	53	42	43	32	145	414	238	202	138
	19	93	57	49	91	52	45	34	35	45	33	34	36	40	33	36	149	81	124	30	21	21	28	27	23	51
D	20	19	41	49	110	336	425	282	342	476	664	810	421	644	467	392	640	504	221	312	440	407	250	337	418	375
D	21	341	272	250	339	149	87	353	653	590	528	169	89	81	92	155	473	408	139	48	53	219	553	231	280	273
D	22	175	125	133	112	399	627	284	245	478	213	352	463	273	101	56	88	69	127	91	167	140	310	695	525	260
	23	462	301	259	174	178	84	203	184	117	92	158	319	215	397	641	214	320	231	313	183	78	61	52	110	223
	24	96	65	39	64	80	121	171	105	98	298	217	151	263	140	111	191	160	241	569	820	501	356	196	143	217
	25	301	238	103	61	64	59	80	101	107	140	151	258	124	39	42	90	32	27	147	282	169	93	93	52	119
	26	60	62	39	32	38	45	135	76	57	70	142	269	247	63	92	108	34	49	60	44	59	30	34	41	79
	27	44	36	31	27	30	53	57	163	426	306	131	80	52	88	137	211	453	481	500	430	240	142	112	294	188
	28	90	96	53	44	93	261	175	127	176	773	263	257	191	136	100	87	69	85	161	289	238	186	196	339	187
	Mean	129	106	93	95	104	120	114	139	167	190	182	185	170	153	181	227	227	166	186	201	135	142	146	144	154
5Q	Mean	38	31	28	30	35	63	58	71	83	76	79	74	45	80	105	118	110	89	95	68	35	26	25	31	62
5D	Mean	193	170	150	197	246	319	275	389	420	368	349	299	325	285	332	557	491	298	246	286	239	269	296	299	304

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	75	64	48	122	83	41	72	143	129	98	41	96	100	68	37	47	134	393	436	289	370	127	42	30	129
Q	2	19	19	27	29	32	42	57	125	69	57	37	67	27	53	96	82	135	63	44	28	74	53	82	46	57
	3	25	20	42	157	216	115	243	227	178	91	154	139	36	30	42	109	215	209	68	200	161	117	156	187	131
	4	342	260	156	219	273	201	164	134	156	206	460	215	75	70	268	222	125	80	161	93	48	201	93	120	181
D	5	58	39	63	174	519	353	72	41	66	150	237	431	945	691	866	363	783	546	334	262	221	212	591	225	344
	6	90	231	174	150	93	86	188	195	94	68	226	218	149	55	30	39	45	33	119	326	253	540	539	463	183
D	7	492	451	496	307	314	320	509	630	600	439	411	302	513	769	390	62	45	47	89	201	211	120	60	88	328
	8	45	172	289	147	110	240	352	153	207	313	347	139	58	67	246	611	366	123	63	57	59	77	78	46	182
	9	52	238	501	315	338	366	199	162	96	70	57	38	41	44	55	71	121	85	64	74	42	27	33	54	131
	10	35	50	82	62	142	123	127	185	397	338	158	147	458	806	769	256	213	150	62	44	30	26	25	24	196
	11	21	41	53	73	32	42	95	71	103	62	55	148	319	155	190	185	146	262	435	233	93	39	38	39	122
	12	53	190	283	196	97	205	192	329	357	212	320	272	47	60	43	72	91	34	76	73	425	282	470	569	206
	13	167	79	57	80	128	174	154	131	169	139	245	237	197	102	106	152	44	45	34	24	28	74	178	184	122
	14	118	46	55	88	180	463	170	70	64	59	184	448	290	204	61	48	63	181	117	100	252	147	54	65	147
	15	121	71	69	148	374	311	166	85	128	304	252	127	122	131	52	41	55	86	184	143	115	50	68	152	140
	16	290	340	158	41	29	40	98	333	227	264	316	562	658	371	95	49	39	40	41	211	449	402	288	149	229
	17	260	324	374	441	524	307	329	211	81	92	68	59	71	152	102	70	85	204	80	69	27	43	31	37	168
	18	53	193	100	38	41	61	123	172	153	83	47	37	57	38	51	64	254	340	157	145	87	253	786	655	166
	19	358	264	167	269	195	152	242	112	199	191	130	291	142	144	172	91	77	88	101	94	221	308	181	72	178
Q	20	87	55	33	42	59	60	79	63	65	64	65	55	39	118	87	52	57	35	29	39	46	84	66	68	60
D	21	48	49	54	83	61	69	173	206	216	171	256	396	564	633	643	1157	806	359	232	408	530	404	154	425	337
D	22	604	219	99	144	57	31	81	183	349	238	222	104	152	56	87	42	112	181	298	322	518	624	323	149	216
	23	67	70	58	69	52	38	50	106	158	141	88	163	196	64	56	35	28	39	38	30	21	26	27	28	69
Q	24	25	25	26	26	26	23	23	31	46	38	38	42	40	41	31	27	28	26	16	28	42	30	34	28	31
	25	27	30	29	37	33	27	27	32	31	37	42	43	43	42	30	55	246	424	83	49	43	45	183	164	75
	26	293	290	229	122	124	218	199	263	457	254	146	128	46	115	176	238	212	270	178	55	72	77	62	55	178
D	27	65	164	331	505	526	406	185	230	127	66	219	939	714	401	569	800	614	307	323	206	137	275	213	106	351
	28	113	284	653	253	160	116	197	248	351	324	195	142	177	204	148	126	120	103	133	74	45	32	38	35	178
	29	34	31	30	37	42	49	349	104	201	177	239	81	42	39	47	57	47	33	39	54	73	89	44	47	83
Q	30	49	47	73	47	43	45	38	56	78	60	55	112	170	318	305	165	232	200	108	56	62	35	35	41	101
Q	31	43	45	88	152	168	53	62	118	191	105	87	100	178	142	55	45	42	28	25	43	30	36	44	45	80
	Mean	133	141	157	147	163	154	161	166	185	158	174	202	215	199	190	175	180	161	134	130	154	156	161	141	164
5Q	Mean	44	38	49	59	65	44	51	78	89	64	56	75	90	134	114	74	98	70	44	38	50	47	52	45	65
5D	Mean	253	184	208	242	295	235	204	258	271	212	269	434	577	510	511	484	472	288	255	279	323	327	268	198	315

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	45	99	259	368	364	435	409	279	373	334	291	143	125	140	83	82	149	258	90	57	130	39	37	37	193
	2	42	44	107	221	193	71	54	93	194	210	206	265	198	88	99	68	60	150	113	57	25	28	32	33	111
Q	3	33	32	24	22	23	30	29	26	27	39	37	41	34	28	24	16	20	24	26	25	23	25	28	40	28
D	4	43	32	25	44	35	63	85	82	112	265	570	488	771	730	629	320	160	68	33	24	30	29	38	41	196
D	5	33	121	133	141	249	164	45	61	35	56	58	44	65	240	512	203	126	394	126	104	236	332	71	62	150
	6	47	40	109	270	166	57	34	21	22	28	47	111	271	205	100	190	117	43	30	40	40	32	81	125	93
D	7	144	163	261	314	208	425	568	474	308	180	102	103	74	86	154	334	332	409	172	45	35	30	30	31	208
D	8	36	46	45	54	92	157	292	196	256	155	247	189	55	46	59	96	179	120	136	417	570	402	149	76	170
	9	56	80	65	90	62	53	47	53	127	56	76	283	219	368	312	235	190	189	321	515	65	44	52	51	150
	10	64	146	508	187	71	338	299	186	175	203	80	49	39	46	71	40	39	30	37	40	54	31	33	36	117
	11	40	40	35	50	114	224	168	141	179	305	248	266	518	436	343	183	163	163	46	32	28	36	61	84	163
	12	46	34	31	83	184	224	62	36	42	57	49	99	189	118	37	35	32	29	63	64	33	41	38	38	69
D	13	44	63	161	169	59	41	46	66	92	151	150	134	44	36	29	117	478	875	410	372	312	164	253	57	180
	14	41	30	26	24	29	31	26	31	64	114	59	70	181	442	241	212	88	81	105	100	64	61	47	47	92
	15	72	254	179	52	43	41	37	42	35	41	63	90	110	166	112	66	130	52	57	70	151	53	43	36	83
	16	35	31	35	39	48	55	56	46	37	47	56	64	76	48	41	49	42	32	29	36	32	37	45	97	46
	17	142	162	89	74	43	35	38	42	42	45	44	48	58	74	118	198	106	128	92	34	37	47	51	53	75
Q	18	41	34	38	43	57	78	64	142	113	65	49	41	39	33	30	36	33	35	30	41	50	44	44	41	51
	19	40	45	101	177	263	436	504	529	616	417	98	74	37	33	30	35	35	33	71	108	245	132	43	39	172
	20	32	35	97	105	259	453	462	376	503	237	468	169	91	45	114	125	92	62	59	51	40	37	42	47	167
Q	21	38	40	40	58	156	230	260	158	87	106	96	42	40	28	23	24	23	35	28	28	36	41	42	45	71
	22	43	40	37	41	104	98	209	221	145	64	50	82	84	38	47	41	75	100	155	74	118	159	138	65	93
Q	23	40	65	102	159	48	36	42	40	115	97	62	57	52	53	30	34	22	29	28	42	47	45	47	45	56
	24	68	171	269	170	203	254	234	118	72	114	106	680	779	597	176	55	38	73	110	174	406	239	45	34	216
	25	32	43	49	78	61	98	107	75	80	53	32	36	32	25	32	85	86	69	85	104	107	107	75	59	67
	26	57	43	53	84	52	29	30	43	52	50	44	66	55	140	106	65	49	52	63	50	47	49	53	52	58
	27	46	44	36	41	86	282	120	174	380	329	501	468	224	205	127	125	300	97	70	158	205	149	180	135	187
Q	28	72	88	36	36	36	28	30	29	36	34	34	29	31	31	24	30	21	21	38	39	50	55	82	91	42
	29	80	48	38	35	48	50	56	43	49	49	126	80	48	34	32	50	76	74	121	384	339	85	59	69	86
	30	56	47	46	47	47	64	56	62	58	57	52	52	48	47	46	80	144	66	59	44	49	57	63	64	59
	Mean	53	72	101	109	113	152	148	129	147	131	136	145	152	153	126	107	113	126	93	110	120	87	66	57	114
5Q	Mean	44	51	48	63	64	80	85	79	75	68	55	42	39	34	26	28	23	28	30	35	41	42	48	52	49
5D	Mean	60	85	125	144	128	170	207	175	160	161	225	191	201	227	276	214	255	373	175	192	236	191	108	53	180

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	48	39	43	42	43	50	51	50	62	101	111	74	58	50	49	48	55	56	40	63	88	169	76	171	68
	2	115	119	60	39	47	85	295	383	291	220	454	379	131	50	46	42	54	68	67	57	42	57	76	58	135
	3	45	49	36	30	40	40	61	114	298	321	384	222	284	252	61	44	68	96	64	71	43	40	39	40	114
	4	35	36	42	51	99	172	480	383	169	130	107	91	83	105	231	191	157	74	61	82	68	60	52	59	126
	5	40	37	38	31	37	39	37	76	52	80	146	172	158	209	177	43	48	80	194	230	129	40	42	41	91
	6	36	36	39	39	56	50	52	49	53	57	59	62	94	77	102	71	122	247	218	126	175	203	279	281	108
	7	318	364	390	469	522	320	180	195	267	404	295	102	68	213	123	113	72	32	36	43	91	252	205	110	216
	8	88	129	100	216	181	80	77	147	110	83	82	118	140	145	93	77	228	140	51	41	39	60	65	65	107
	9	45	60	91	70	118	73	46	45	86	52	51	87	61	52	44	50	50	47	38	54	57	67	53	49	60
	10	64	69	87	35	37	53	92	162	130	100	324	557	262	411	412	104	116	76	147	246	48	51	42	40	153
	11	54	65	42	31	36	45	66	71	90	135	135	113	98	72	41	32	54	70	135	159	197	358	118	82	96
Q	12	53	66	77	31	26	31	32	47	62	73	52	48	45	48	40	43	54	66	58	52	53	71	61	56	52
	13	47	38	39	29	43	62	65	107	256	174	68	60	51	43	48	76	145	124	130	307	141	164	316	357	120
	14	436	484	144	43	58	250	313	303	182	113	148	195	411	561	314	269	204	64	50	64	83	74	143	66	207
	15	47	48	37	40	31	29	35	53	195	301	163	106	93	137	129	78	59	45	47	41	78	68	59	55	82
	16	45	46	131	184	150	76	48	48	98	134	206	136	137	63	110	110	120	65	46	47	47	56	52	54	92
Q	17	50	62	48	43	42	37	35	34	44	60	69	58	55	45	45	51	47	50	58	49	61	71	90	65	53
Q	18	42	52	46	34	27	47	38	39	58	63	56	51	59	48	50	55	43	41	47	52	38	36	44	49	47
Q	19	36	42	40	41	40	48	87	49	41	51	48	44	49	50	55	67	112	51	45	40	36	50	57	120	54
	20	132	132	148	75	42	31	37	36	45	58	98	103	88	68	57	64	127	49	43	50	108	266	129	86	86
Q	21	74	119	118	93	50	29	26	20	37	44	51	47	42	45	42	55	54	57	44	42	39	46	45	43	53
	22	50	56	57	90	109	94	104	90	94	99	92	112	97	70	76	111	150	167	190	98	110	178	300	196	116
	23	191	85	76	127	165	279	210	135	143	142	225	107	77	68	103	241	222	158	230	249	297	552	292	208	191
D	24	251	211	135	358	487	276	287	295	447	641	676	399	286	204	265	573	600	809	855	770	649	437	471	532	455
D	25	399	593	653	896	966	962	906	787	843	380	341	109	85	64	74	54	55	46	57	48	46	44	40	45	354
	26	40	42	47	44	40	78	195	118	69	102	152	417	446	370	350	285	419	482	447	430	648	530	570	586	288
D	27	672	592	493	526	570	786	898	858	759	827	839	725	481	387	256	131	75	85	45	94	204	330	227	120	458
	28	90	68	47	47	61	190	288	243	215	249	157	91	81	58	67	54	33	36	85	200	207	198	574	647	166
D	29	494	473	533	748	523	375	293	540	1040	1254	1021	843	592	932	552	195	171	109	71	55	45	37	46	46	458
	30	35	44	37	29	27	44	45	71	249	572	258	97	233	606	380	92	74	81	348	507	354	292	166	104	198
D	31	103	130	116	102	208	198	304	132	232	415	466	481	463	382	268	415	468	562	554	758	653	577	428	491	371
	Mean	134	141	128	149	157	159	183	183	216	239	236	200	171	189	150	123	137	133	145	165	157	175	166	158	166
5Q	Mean	51	68	65	48	37	38	43	37	48	58	55	49	50	47	46	54	62	53	50	47	45	54	59	66	51
5D	Mean	383	399	386	526	550	519	537	522	664	703	668	511	381	393	283	273	273	322	316	345	319	285	242	246	419

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	325	327	253	182	58	51	46	40	39	67	188	361	386	179	163	102	107	165	262	184	97	67	108	273	168
	2	471	373	139	161	293	453	304	252	191	290	114	62	54	38	34	35	43	36	43	49	72	82	107	55	156
	3	47	34	32	40	31	34	42	54	65	71	94	108	148	153	68	52	56	73	123	143	159	80	75	55	77
	4	38	37	39	38	53	97	182	245	213	247	193	336	636	360	159	97	100	201	152	96	96	58	83	108	161
	5	168	149	163	204	234	113	78	91	107	99	123	138	345	217	173	160	332	270	91	147	86	92	125	140	160
D	6	59	58	103	200	132	277	438	674	1089	1138	900	543	835	961	473	320	220	317	826	817	613	543	403	296	510
D	7	150	447	200	56	37	43	45	48	69	173	357	156	189	326	277	212	278	415	542	490	297	182	164	233	224
Q	8	118	46	40	34	54	84	183	173	148	205	190	176	116	154	148	58	55	53	45	31	52	64	53	82	98
Q	9	59	75	57	69	139	113	92	140	175	125	89	54	40	39	37	50	63	59	66	49	58	73	98	224	85
	10	362	250	146	72	63	37	29	41	27	44	86	82	72	62	72	47	76	64	53	52	53	55	62	51	82
	11	44	36	26	29	51	76	179	219	106	90	155	390	128	53	68	78	95	73	157	274	216	120	62	58	116
D	12	128	124	211	172	280	416	193	162	201	238	207	283	153	265	239	100	158	194	161	183	399	264	139	101	207
	13	236	177	152	169	273	366	261	141	115	267	351	216	285	214	118	149	162	67	65	77	73	119	121	77	177
	14	95	135	138	133	75	123	250	427	186	142	234	160	169	77	44	39	35	38	41	52	49	115	206	192	131
	15	89	52	47	48	45	42	42	33	38	56	64	88	87	97	62	50	130	281	157	67	49	54	68	93	77
	16	154	185	109	95	103	109	186	403	267	83	63	75	79	75	139	87	139	230	199	345	430	273	178	193	175
	17	219	368	246	74	43	56	52	45	64	91	178	283	247	212	189	81	42	46	45	40	40	107	133	201	129
	18	285	143	64	43	81	219	320	153	184	115	67	109	126	101	46	110	189	102	81	148	99	52	66	177	128
D	19	584	426	250	245	477	386	352	517	968	608	146	402	613	400	122	83	60	47	62	102	295	429	766	487	368
	20	245	106	74	65	55	51	41	55	98	137	276	324	424	427	476	405	391	437	657	666	487	295	349	511	294
	21	352	77	95	102	168	152	61	61	92	124	115	68	44	65	135	190	125	155	179	65	73	82	118	114	117
Q	22	102	50	39	30	35	46	93	228	132	119	103	198	274	122	111	120	52	32	87	167	195	143	132	132	114
Q	23	164	139	108	91	233	111	61	63	50	45	58	48	54	62	50	45	99	138	107	194	249	112	77	62	101
	24	60	59	43	35	36	38	72	313	265	88	48	49	50	42	64	132	244	362	289	235	244	172	294	244	145
	25	123	78	64	56	44	44	74	78	90	117	187	209	126	119	134	158	122	216	349	274	202	464	534	624	187
D	26	527	558	484	384	358	189	71	43	73	122	91	93	69	93	84	94	129	225	194	54	37	52	53	166	177
	27	115	71	70	69	85	121	111	89	165	353	471	396	255	116	76	55	77	56	54	63	58	45	38	38	127
	28	44	51	60	152	408	315	184	133	113	73	56	48	61	65	53	48	57	31	32	42	60	74	106	116	99
	29	113	87	107	257	193	69	56	97	129	94	226	75	86	99	97	89	147	225	170	110	107	129	275	374	142
Q	30	194	61	49	43	52	66	118	67	58	115	131	86	60	63	89	79	28	20	27	52	71	85	64	60	72
	Mean	189	159	120	111	139	143	140	169	183	184	185	187	207	175	133	110	127	154	177	175	167	149	168	184	160
5Q	Mean	127	74	58	53	102	84	109	134	112	121	114	112	108	88	87	70	59	60	66	98	125	95	84	112	94
5D	Mean	289	322	249	211	256	262	219	288	480	455	340	295	371	409	239	161	169	239	357	329	328	294	305	256	297

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
D	1	1	0	-17	-23	6	6	-57	-112	-98	0	28	21	-133	-160	-97	-69	-160	-107	-104	-163	-3	-81	-43	4	-56
	2	7	8	-2	-62	9	9	8	-31	-83	-46	-49	-18	-5	-16	-237	-118	-101	-27	1	-4	-2	0	10	9	-30
	3	8	9	6	2	-28	-14	4	3	-23	-93	-33	-14	-10	-8	-19	6	0	0	-15	-19	-14	-17	-12	-1	-11
Q	4	0	0	6	3	5	3	3	4	4	4	5	4	1	5	3	1	0	-3	-71	-16	-3	-1	0	0	-1
Q	5	2	3	3	8	9	11	6	-4	8	11	13	6	1	2	2	1	0	-57	-33	-7	6	2	6	7	0
Q	6	5	3	3	-20	34	30	18	13	14	14	-25	-11	11	11	3	-1	0	2	2	4	4	-4	-13	-1	4
	7	3	14	20	13	18	29	29	23	25	15	8	14	8	3	1	2	-19	-10	-22	-25	3	5	-8	23	7
	8	21	25	24	15	20	33	31	42	-37	20	51	32	16	18	-46	-29	-15	-24	-12	-29	-27	-47	-32	-15	1
	9	-6	11	14	9	7	-5	-58	-22	-73	-147	3	-15	-125	-112	-35	-2	-13	-22	-45	9	11	3	1	-9	-25
	10	2	0	2	2	9	-3	-24	-33	-28	-11	-6	7	-3	-2	-36	-47	-22	-5	1	4	4	0	3	3	-7
	11	2	3	4	0	2	9	6	6	8	12	1	5	0	5	11	3	-14	-61	-91	-14	18	4	-2	-9	-3
	12	-11	8	23	16	-27	-7	33	24	9	-2	-13	-76	-21	-8	-45	-71	-36	-1	15	-2	0	0	-13	-28	-9
	13	-7	3	4	11	12	-5	3	7	6	-13	-24	2	4	-17	-13	1	-8	-165	-35	6	14	0	-19	-7	-9
Q	14	0	-6	-8	-4	6	8	6	-39	-37	13	8	-6	-86	-149	-34	-2	8	-4	-3	-23	-56	4	4	2	-16
	15	3	5	6	7	6	11	4	5	7	9	5	0	3	5	6	-19	2	8	1	-66	-114	12	8	-40	-5
D	16	-10	0	11	31	23	9	14	19	6	-81	-88	-53	-156	-92	-35	-15	-69	-311	-202	-98	-11	2	-4	-1	-46
	17	4	-4	-64	-23	10	12	10	9	5	0	0	-2	2	-1	-22	-41	-102	-51	-29	21	18	5	-76	-100	-17
	18	-54	-6	-8	-18	1	4	0	-23	-71	-91	-60	-2	-1	-1	-4	-35	-26	-7	3	1	-1	-56	-34	-3	-20
	19	2	6	-1	1	10	7	1	-28	-107	-30	-10	-113	-72	-22	-38	-81	-36	0	4	-7	8	-5	3	1	-21
D	20	1	-7	-2	3	1	-54	-137	-27	9	0	-47	-60	-27	-8	-113	-127	-239	-185	-125	-65	-9	-74	-39	-3	-55
	21	-14	-13	-17	-3	3	-3	-48	-24	2	-14	-55	-123	-217	-97	-69	-44	-8	-36	-79	-51	-108	-51	-59	-56	-49
	22	-10	-38	-14	7	4	5	5	19	20	10	-3	-12	-24	-36	-121	-77	-81	-143	-189	-36	-18	-12	-2	-32	-32
D	23	-23	1	1	-29	-55	-3	0	-45	-66	-38	-113	-71	-42	-40	4	-8	-50	-52	-10	-4	-25	-124	-108	-72	-40
	24	-15	-26	-15	-19	-33	-23	-30	-32	9	-3	-6	-6	-3	-36	-23	-38	-86	-106	-94	-6	-11	-13	-2	-5	-26
	25	-3	-1	4	-2	-47	-5	7	-46	-46	-8	-18	-51	-57	-22	-21	-18	-49	-73	-12	-22	-16	-46	8	3	-22
	26	0	-43	-69	-9	8	10	-32	-34	6	-4	0	-36	-84	-82	-11	-12	-44	-76	-9	-2	1	-3	0	0	-21
	27	0	0	-6	-14	-27	12	14	20	5	-115	-148	-89	6	-70	-50	4	-14	0	2	0	0	-3	2	0	-19
D	28	0	-1	14	17	32	20	7	-45	-13	-9	0	-7	-35	-37	-32	-48	-71	-116	-157	-36	-16	-123	-113	-67	-35
	29	-20	-191	-67	-19	7	16	-17	-21	-26	-6	0	6	-1	-16	-16	-19	-24	-20	-18	-8	-6	-5	-1	-3	-20
Q	30	2	-10	6	2	0	-2	0	0	1	4	-4	2	0	-11	-49	-47	-16	-63	-74	-40	7	8	3	6	-11
	31	5	-39	-55	-48	-1	-10	0	-2	26	23	10	-43	-13	2	0	-17	-19	-1	3	-6	0	-11	-16	-20	-9
	Mean	-3	-9	-6	-4	0	3	-6	-12	-17	-18	-18	-22	-34	-32	-36	-31	-42	-55	-45	-22	-11	-20	-17	-13	-19
5Q	Mean	1	-2	2	-2	10	10	6	-5	-2	9	0	-1	-14	-28	-15	-9	-1	-25	-35	-16	-8	1	0	2	-5
5D	Mean	-6	-1	1	0	1	-4	-34	-42	-32	-25	-44	-34	-78	-67	-54	-53	-117	-154	-119	-73	-12	-80	-61	-27	-46

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	-69	-23	6	9	-26	17	37	26	17	10	5	5	3	4	-54	-16	-74	-93	-54	-16	4	3	-3	-16	-12
Q	2	-3	2	8	10	4	-10	7	14	9	7	0	-19	-23	-38	-56	-41	-92	-12	-36	-39	-9	2	7	7	-12
Q	3	-4	6	8	13	12	19	9	-23	-80	-60	-44	-20	-2	-1	-1	-6	-7	-3	-3	-20	-6	2	3	4	-8
Q	4	4	2	2	3	9	10	10	5	8	6	7	-14	0	-59	-51	-73	-33	-90	-59	-20	11	8	6	9	-12
Q	5	8	8	9	9	9	10	12	9	11	12	-3	0	1	5	6	10	3	8	9	7	-2	7	7	-2	6
	6	-50	-56	-23	10	23	21	11	12	12	8	-2	-9	-20	-30	-31	4	1	-2	0	6	5	0	-58	-58	-9
	7	-23	-3	-1	-1	1	8	8	-2	-42	-42	-48	-3	0	-25	-50	-131	-67	-88	-53	9	-1	-10	-29	-39	-26
D	8	8	19	11	-84	-57	-65	-33	-97	-38	-16	14	-4	-1	1	-60	-290	-195	-34	-14	-37	7	10	8	-7	-39
	9	-43	-12	0	-21	-3	15	6	-1	-34	-3	-23	-109	-155	-18	-6	-90	-112	2	5	7	8	-122	-116	-61	-37
	10	6	-1	-42	-23	28	26	15	-3	7	-11	-92	-41	5	-6	-10	-76	-148	-72	-18	3	11	10	7	2	-17
	11	0	-1	-1	1	10	11	9	11	14	8	4	5	-16	-16	3	7	4	-39	-169	-242	-59	-6	-1	0	-19
D	12	-31	32	46	32	30	23	-17	-16	18	-26	-12	42	-50	-128	-116	-88	-185	-84	-57	-40	-37	-20	-22	-33	-31
	13	-10	-16	-51	-45	-1	14	7	-5	0	2	0	0	-20	-8	1	0	1	0	1	0	-32	-2	6	9	-6
Q	14	4	4	7	9	9	-21	-6	2	0	11	3	-8	1	-14	-10	-36	-25	-20	-46	0	5	6	9	9	-4
	15	7	6	7	0	10	6	10	14	-3	-29	-26	-4	-11	-119	-81	-34	-47	-60	-43	-35	-6	-56	-38	3	-22
	16	7	-4	0	6	15	12	13	-48	-97	-52	-76	-7	45	14	-79	-85	-79	-40	-37	-76	-28	1	2	-2	-24
	17	9	8	12	10	-14	-20	-2	11	11	-8	-6	-43	-21	-19	-58	-123	-83	-30	-109	-147	-19	-26	-92	-25	-32
	18	-25	4	0	1	-21	-10	2	7	-6	-68	-35	-4	-28	-37	-10	4	-10	-1	-5	0	-44	-159	-43	-15	-21
	19	-2	9	3	0	17	14	13	1	8	7	1	-2	-2	0	7	-40	-6	-32	1	5	8	8	11	14	1
D	20	13	14	2	-6	-81	-91	0	-13	-64	-206	-141	-52	-207	-146	-124	-102	-143	-70	-68	-128	-92	-42	-90	-111	-81
D	21	-84	-37	-59	-91	-11	12	-69	-201	-147	-122	-15	-29	-24	-30	-58	-168	-166	-44	-6	2	-63	-208	-60	-60	-72
D	22	-12	-4	-20	-7	-75	-155	-38	-7	-129	-19	-28	-140	-56	0	-4	-9	-8	-35	-17	-54	-40	-93	-224	-160	-56
	23	-105	-17	-32	8	-10	14	0	-9	0	-11	-28	-99	-70	-140	-212	-31	-93	-68	-86	-33	3	0	-1	-18	-43
	24	-11	2	14	2	7	-18	-24	-11	-3	-68	-41	-21	-80	-39	-34	-75	-49	-95	-201	-303	-130	-90	-13	-9	-54
	25	-67	-58	2	11	7	12	12	10	-15	-37	-30	-90	-18	5	0	-13	10	2	-52	-99	-57	-20	-15	4	-20
	26	2	1	5	10	10	8	-27	3	9	-9	-18	-92	-85	-9	-14	-29	3	-6	-8	0	-9	6	5	7	-9
	27	4	10	9	12	19	19	19	-15	-122	-52	1	12	10	14	-3	-64	-58	-9	-14	-86	-32	-5	-7	-98	-18
	28	-9	-9	7	3	0	-19	-27	-6	-13	-169	-42	-12	-11	-15	2	-5	-7	-15	-51	-80	-77	-51	-41	-102	-31
	Mean	-17	-4	-2	-4	-2	-4	-1	-11	-23	-33	-24	-27	-29	-30	-39	-57	-59	-36	-42	-50	-24	-30	-27	-26	-25
5Q	Mean	1	4	6	8	8	1	6	1	-10	-4	-7	-12	-4	-21	-22	-29	-30	-23	-27	-14	0	5	6	5	-6
5D	Mean	-21	4	-4	-31	-38	-55	-31	-66	-72	-77	-36	-36	-67	-60	-72	-131	-139	-53	-32	-51	-45	-70	-77	-74	-55

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	Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
	1	3	13	15	-13	-5	1	11	-23	-27	-19	0	-1	-32	-18	0	0	-48	-142	-137	-55	-64	-15	6	1	-22
Q	2	-2	0	-1	7	7	7	-2	-26	-16	0	0	-6	3	-13	-23	-21	-48	-12	0	6	-12	-3	-18	3	-7
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AO Index (Hourly mean values, unit nT) May 1987

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	17	-1	-44	-42	5	2	1	-1	3	11	23	23	-3	-24	-32	-29	-13	3	11	16	14	13	3	-2	-6	-2
	18	-7	20	6	3	19	15	-11	20	16	-4	-1	11	22	20	2	-18	-42	12	16	-15	-16	3	0	7	3
D	19	-96	-17	55	17	5	26	-24	-52	-43	-99	34	36	-160	-66	21	23	10	7	12	13	-12	-37	-99	-46	-20
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	21	16	8	8	10	-27	-1	4	8	13	-1	0	1	0	1	-25	-54	-31	-35	-27	4	2	0	1	-2	-5
Q	22	3	-1	-9	-8	0	4	12	-26	6	5	-12	5	-36	12	-11	-39	-9	-1	4	-16	-12	-6	4	18	-4
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	24	-1	-5	-2	0	4	7	21	-35	-52	-4	-1	0	1	4	9	-22	-57	-104	-52	31	69	47	-20	19	-6
	25	29	18	6	9	6	3	-6	9	9	1	26	0	9	-1	-15	-34	-20	-42	-47	6	36	-16	-20	-4	-1
D	26	-30	-65	-29	-16	47	21	-2	2	4	30	25	20	26	20	-6	-1	-3	-34	-1	18	22	24	16	18	4
	27	16	5	7	4	6	-7	25	10	21	17	-9	8	-46	-15	-2	-6	-16	-5	2	-1	4	6	5	4	1
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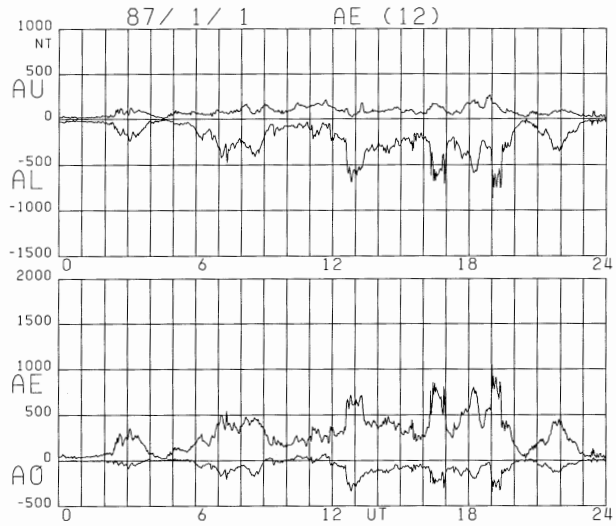
Q	30	20	10	-6	0	11	6	-14	1	3	24	10	3	6	12	8	-6	8	9	9	8	3	-5	-1	6	5
	Mean	2	0	0	1	-1	0	-1	-6	-1	-1	2	0	-17	-15	-10	-8	-10	-14	-12	0	0	0	-2	2	-3
5Q	Mean	10	7	-1	-1	-6	-1	-3	-12	-1	-2	-1	3	-2	0	-9	-9	-1	-3	0	-5	-7	-2	1	9	-1
5D	Mean	-16	-23	-3	0	14	4	-18	-24	-18	-20	-3	6	-43	-58	-31	-8	-4	-19	-40	-17	-25	-16	-15	-2	-16

FIGURE 4 (on even pages)

Daily graphs of 1.0 min AE indices (AU, AL, AE and AO) for January-June 1987.

FIGURE 5 (on odd pages)

Plots of the contributing station to the AU (upper plumes) and AL (lower plumes) indices, showing which station contributes to these indices at each UT minute.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AE
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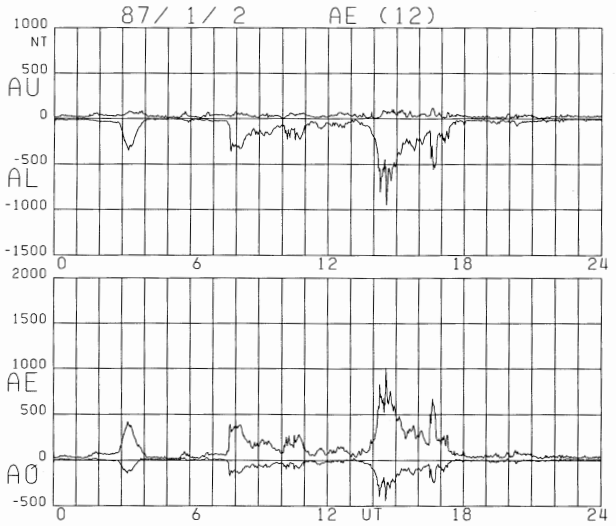
AO
-500
0 6 12 UT 18 24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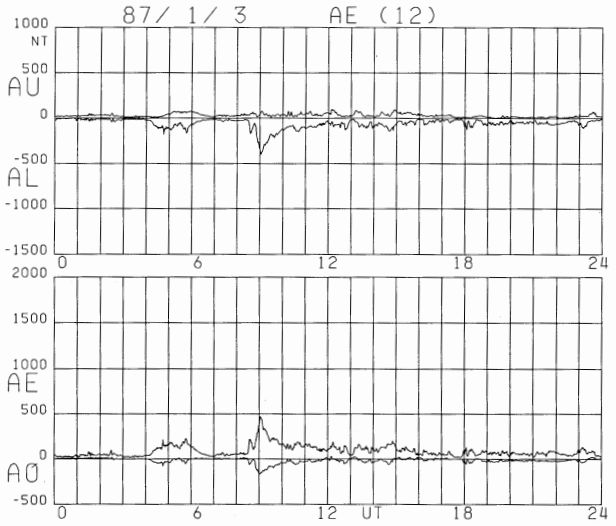
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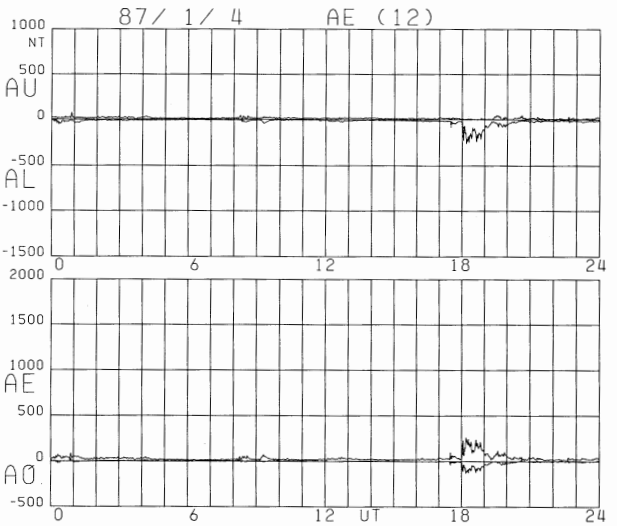
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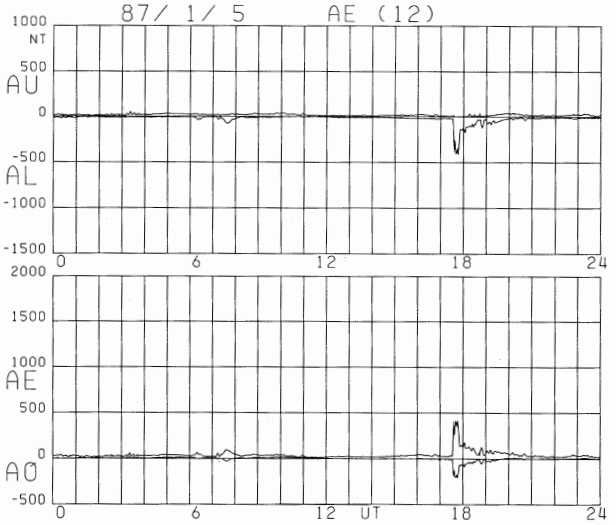
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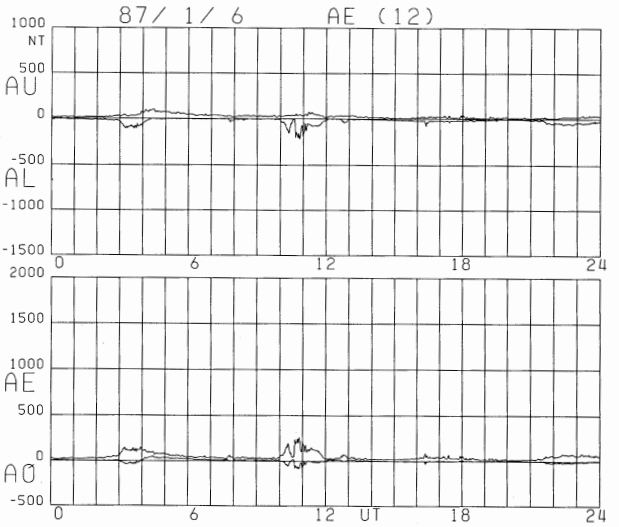
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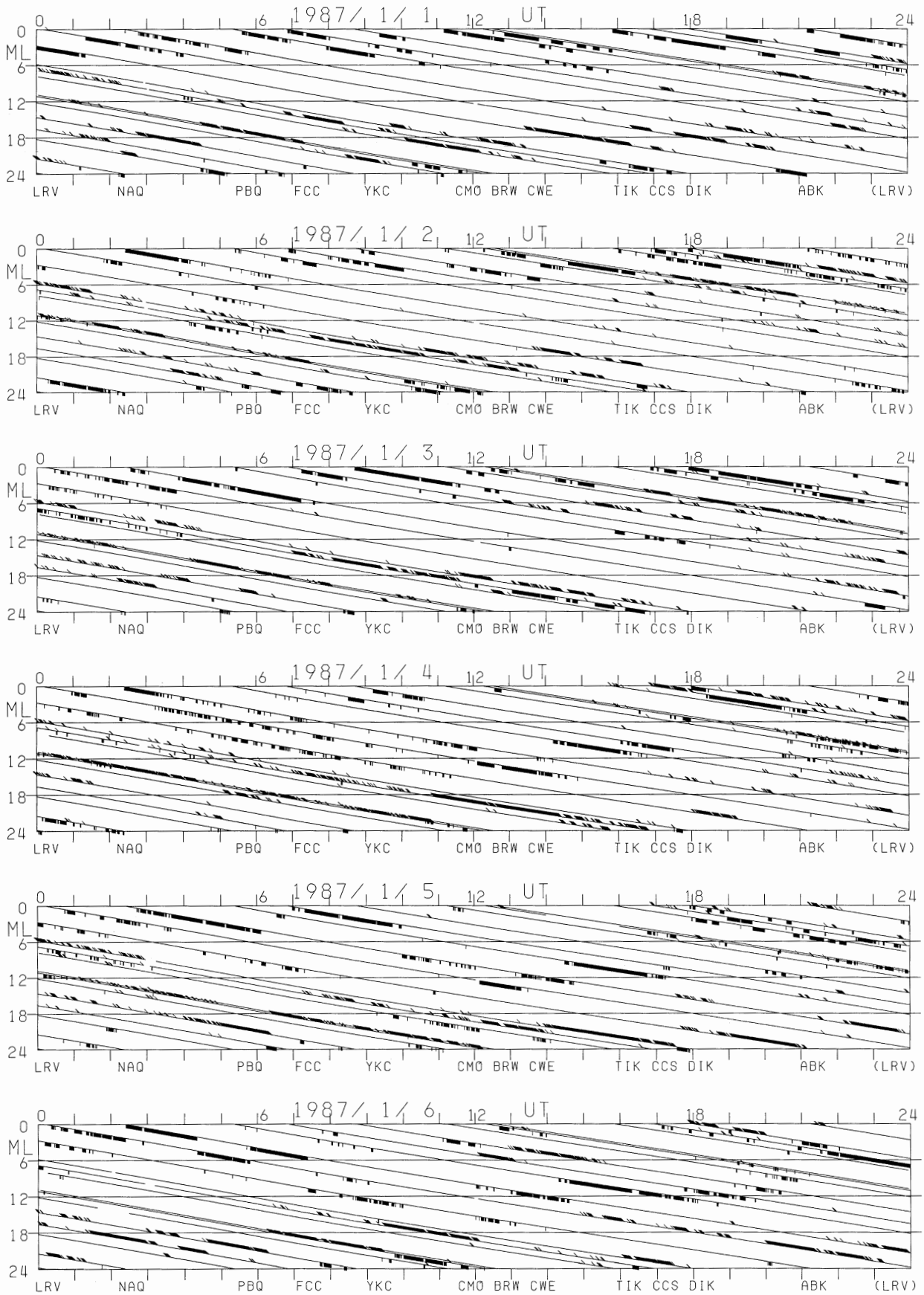
0 6 12 UT 18 24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1987/ 1/ 2 UT
1987/ 1/ 3 UT
1987/ 1/ 4 UT
1987/ 1/ 5 UT
1987/ 1/ 6 UT
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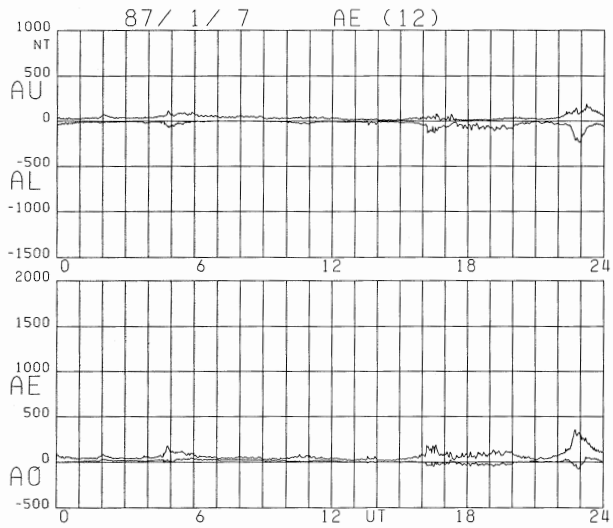
18
24
ML
LRV NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)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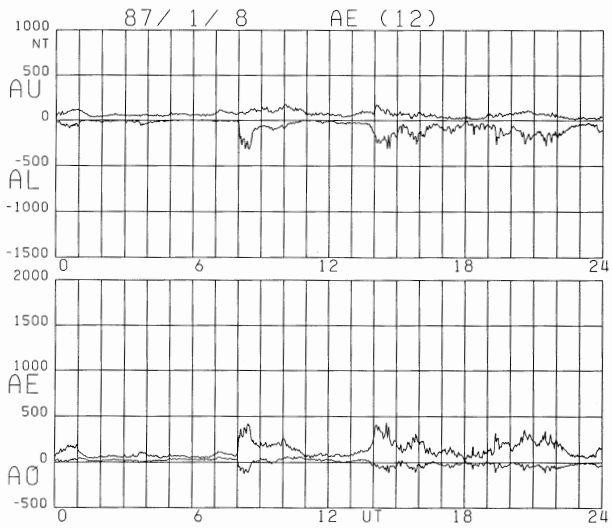
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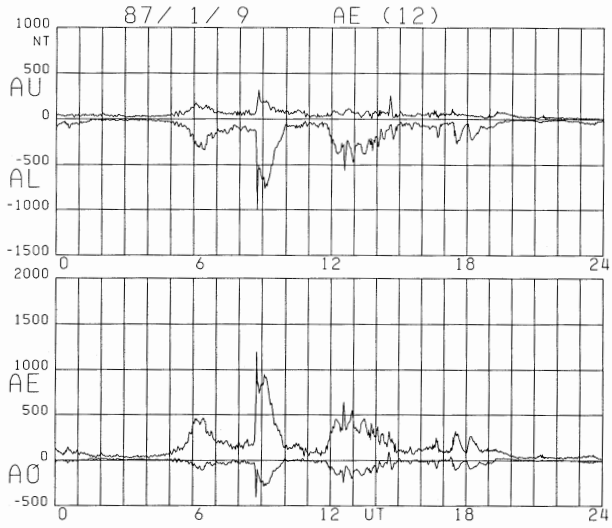
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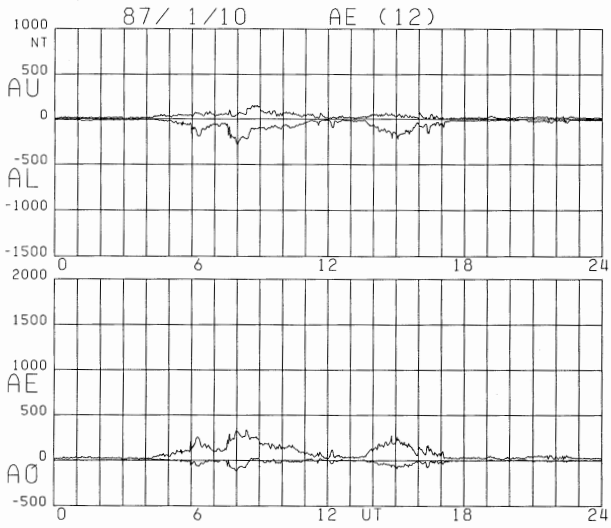
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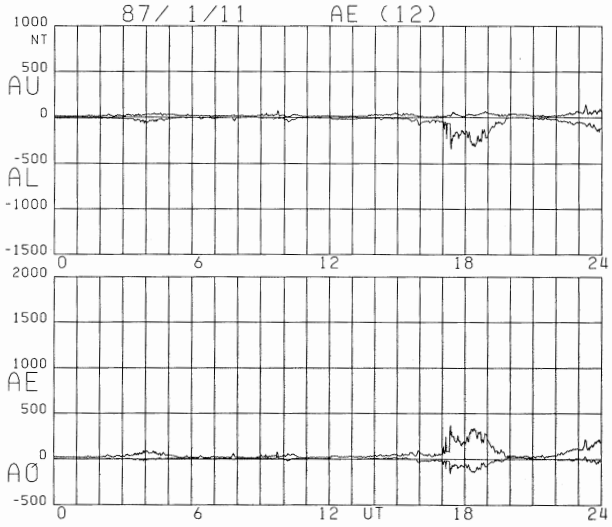
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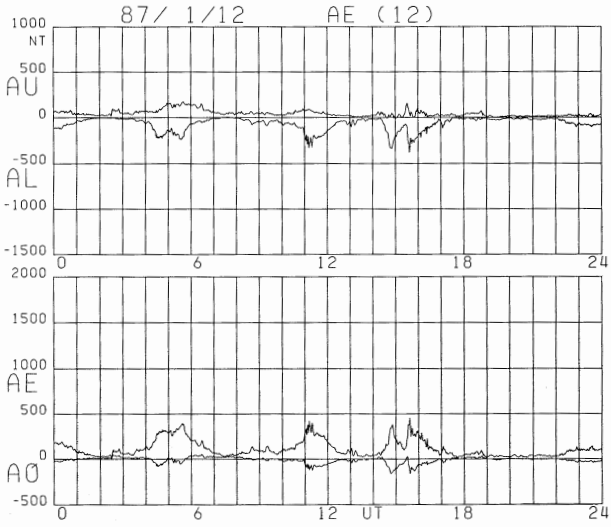
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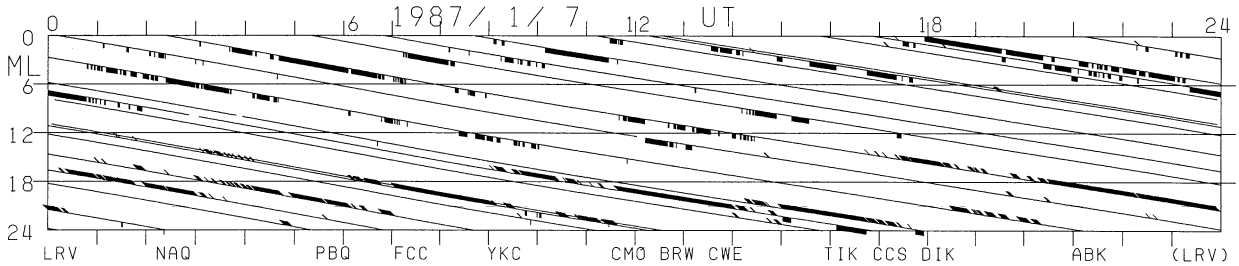
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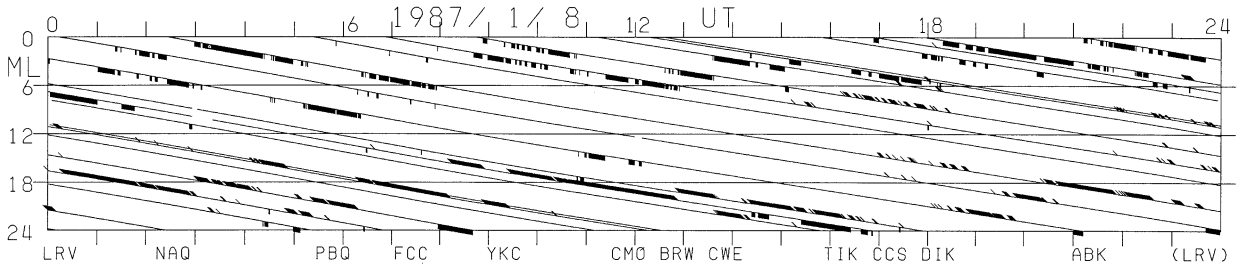
(LRV)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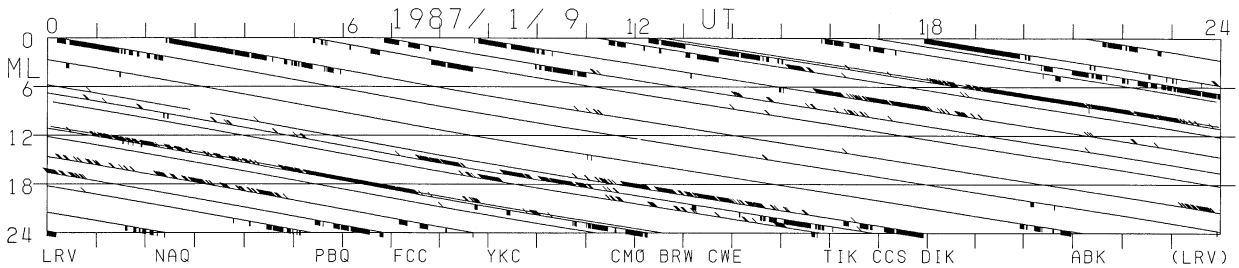
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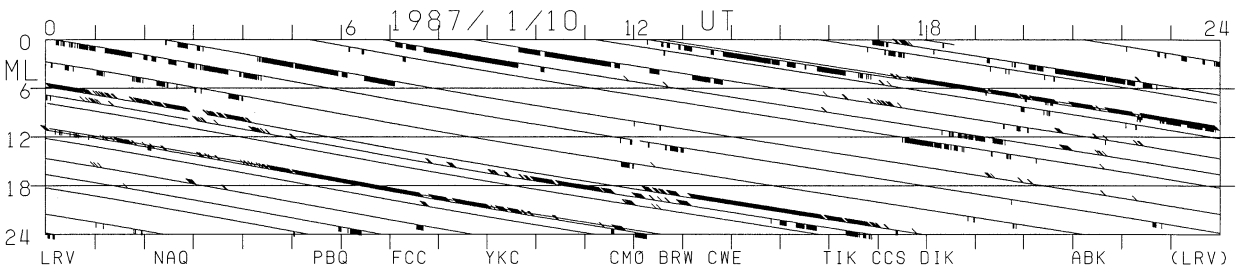
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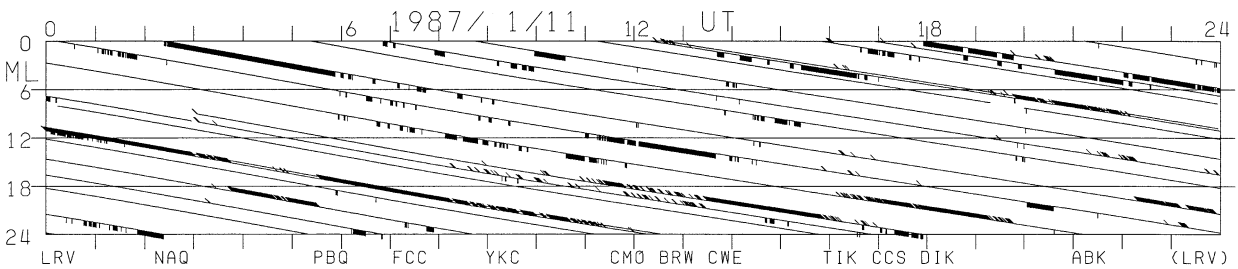
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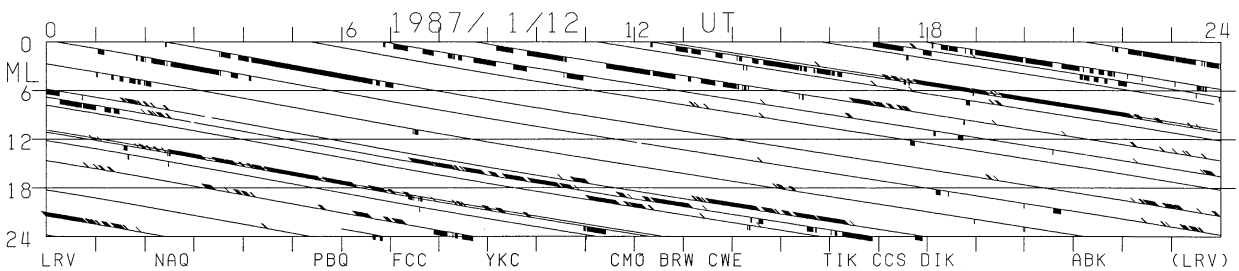
(LRV)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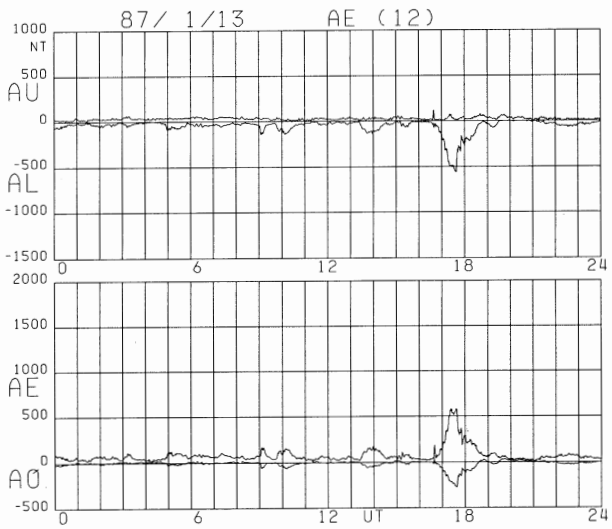
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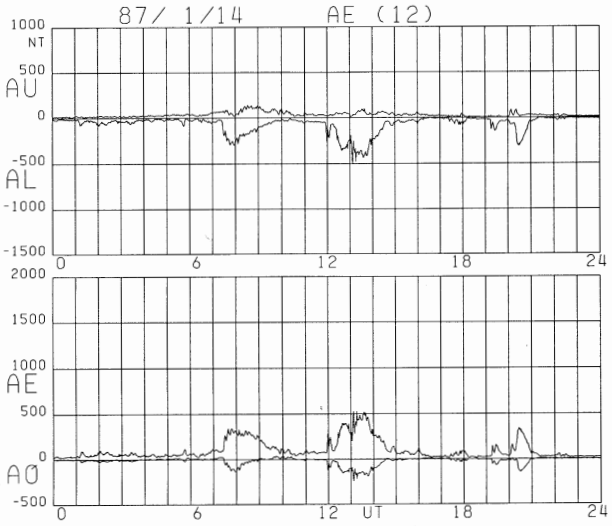
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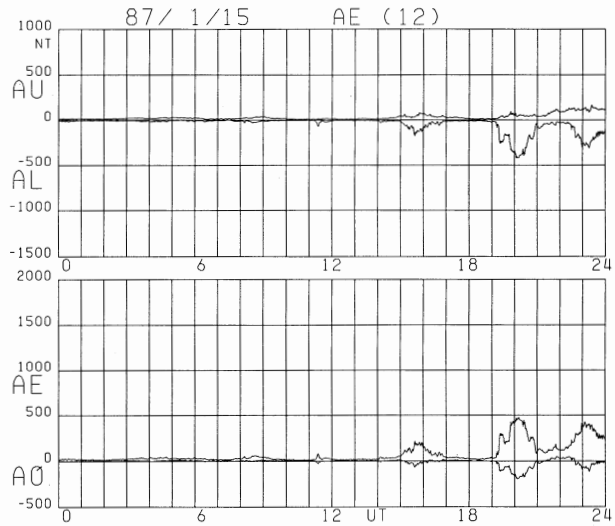
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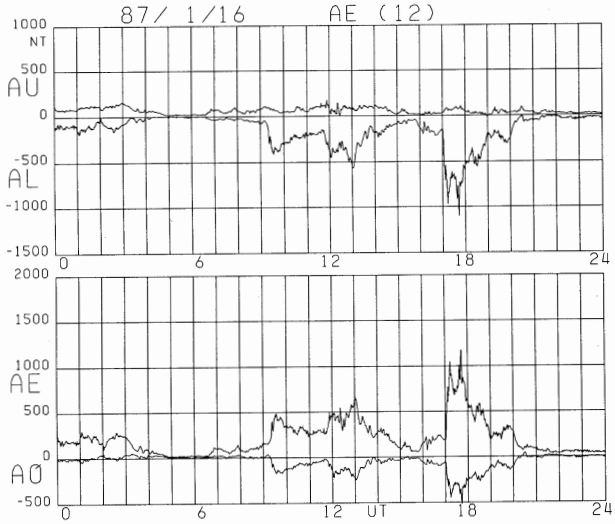
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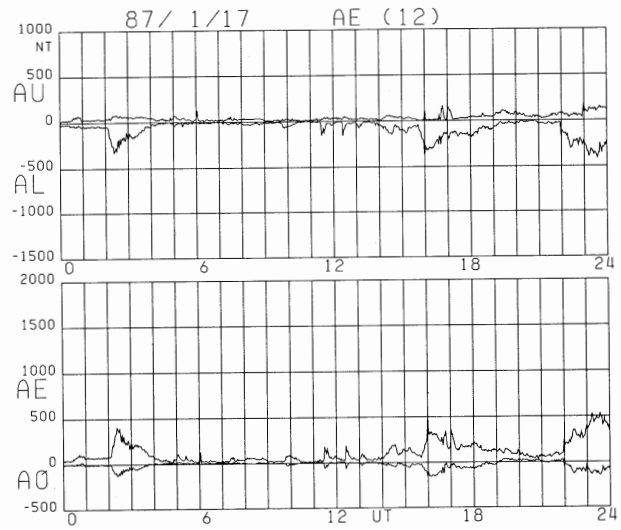
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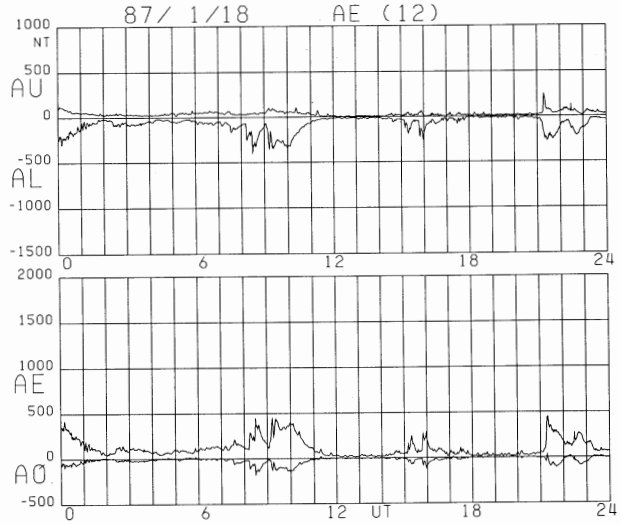
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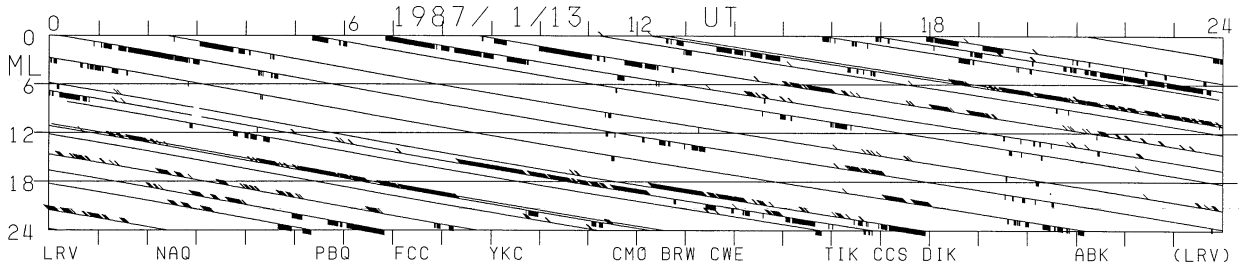
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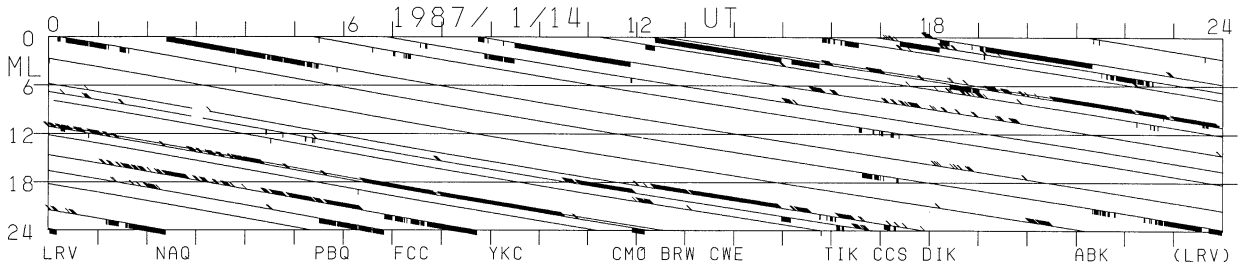
(LRV)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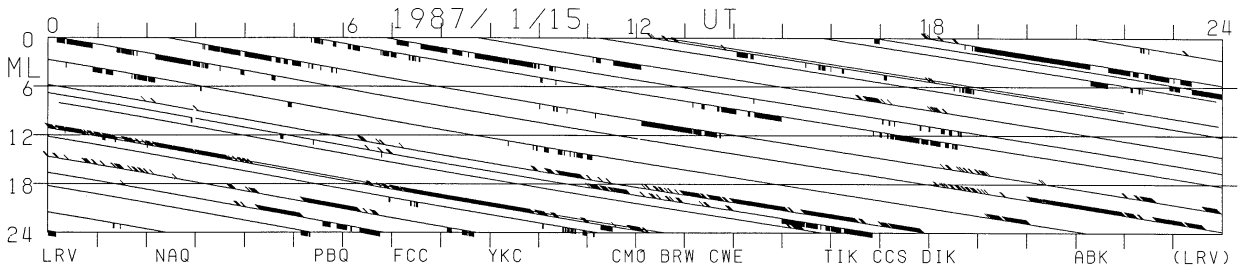
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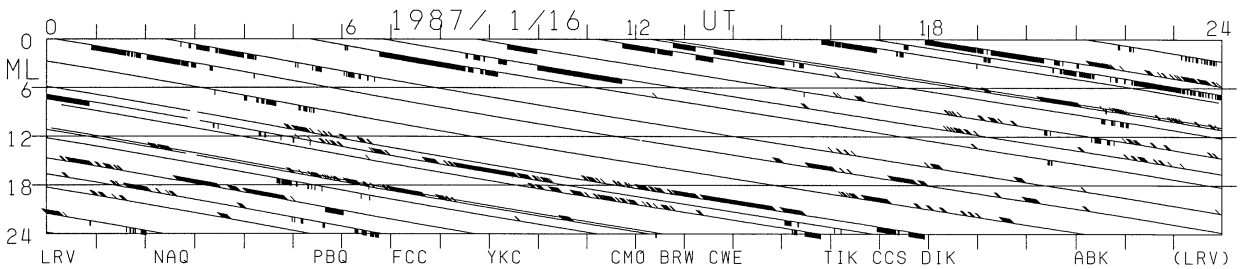
(LRV)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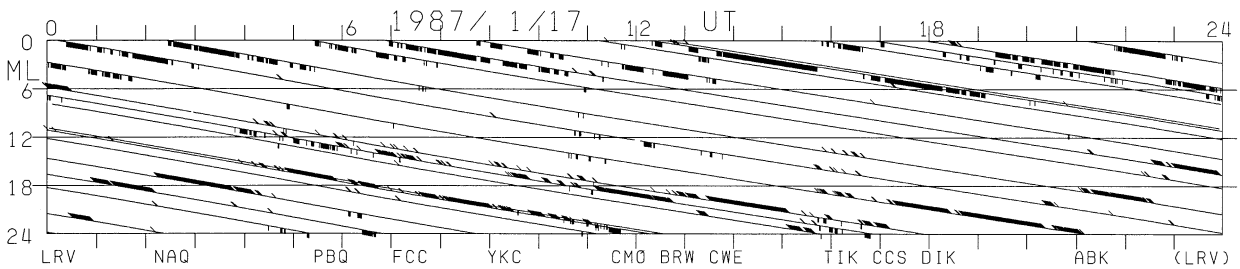
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CCS
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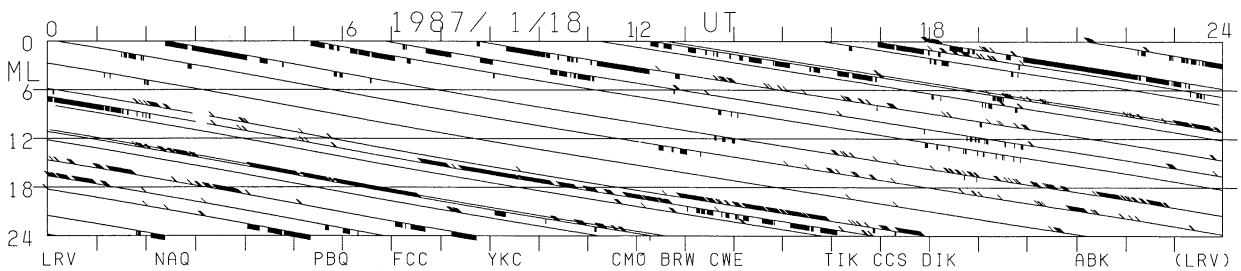
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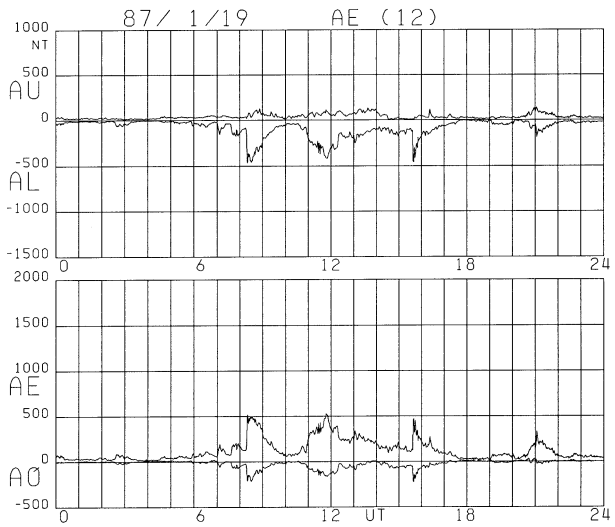
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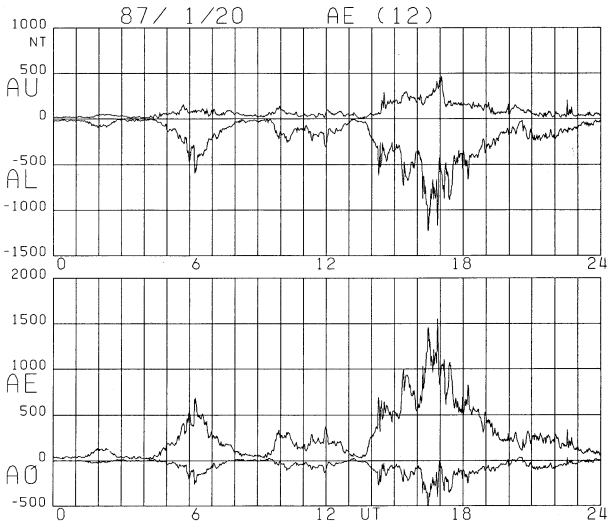
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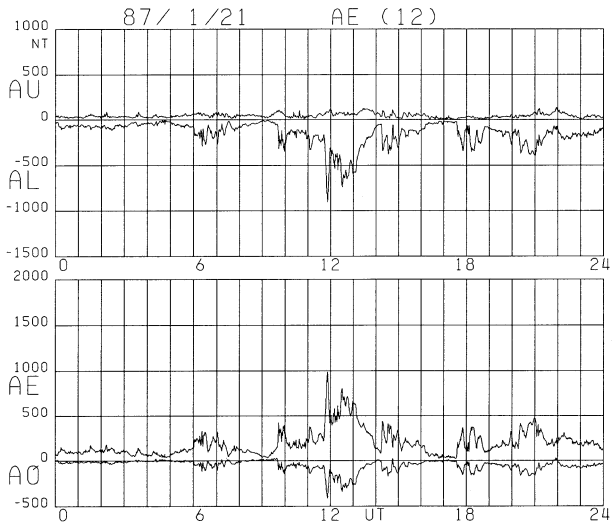
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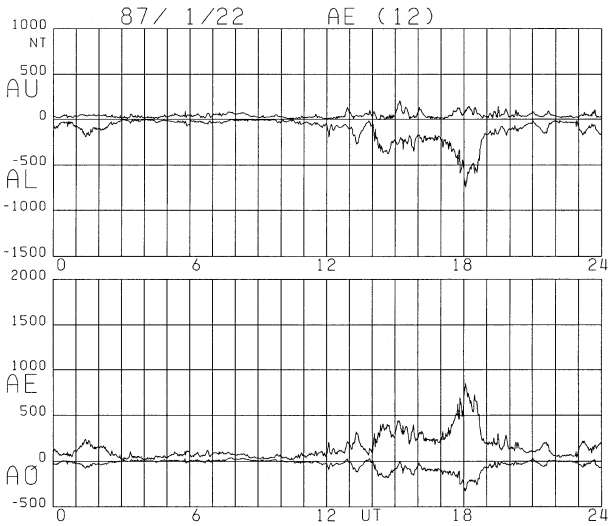
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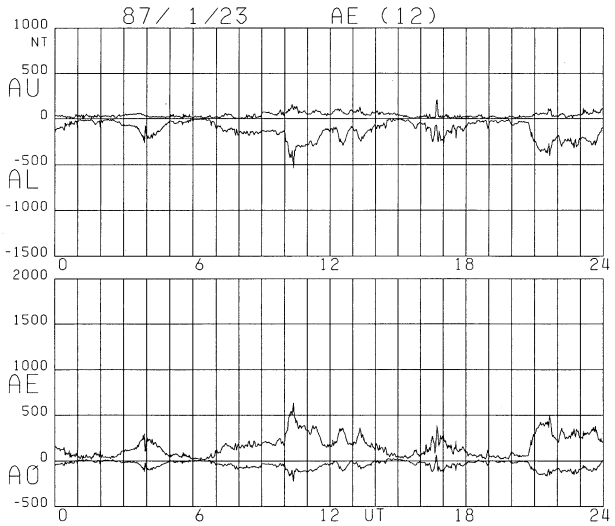
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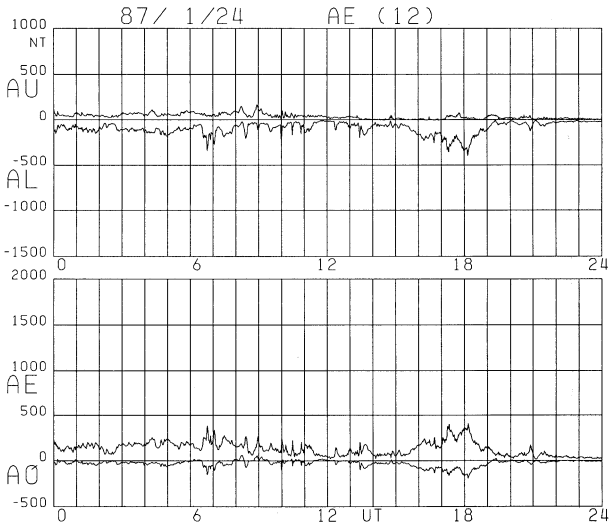
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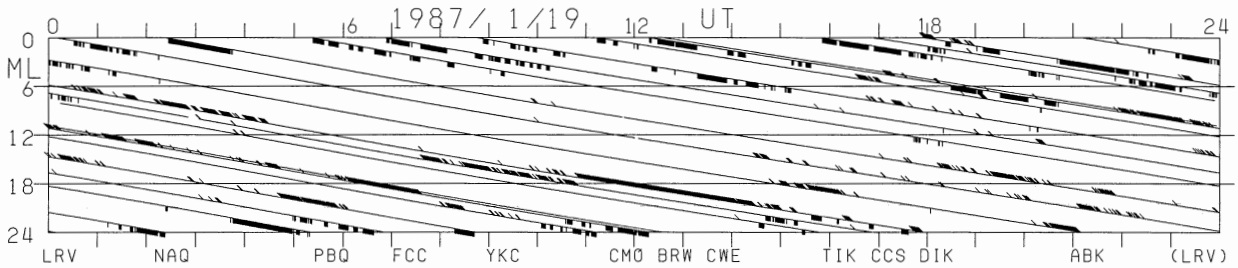
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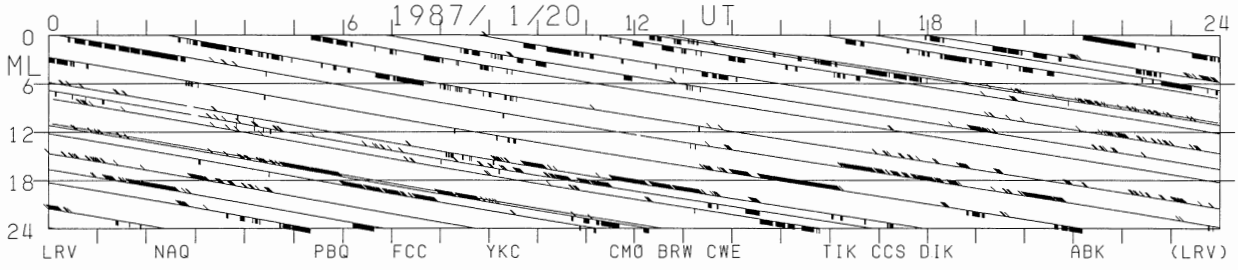
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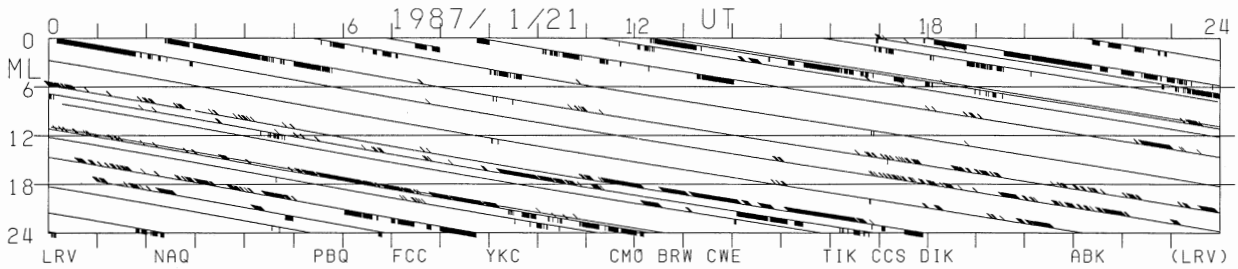
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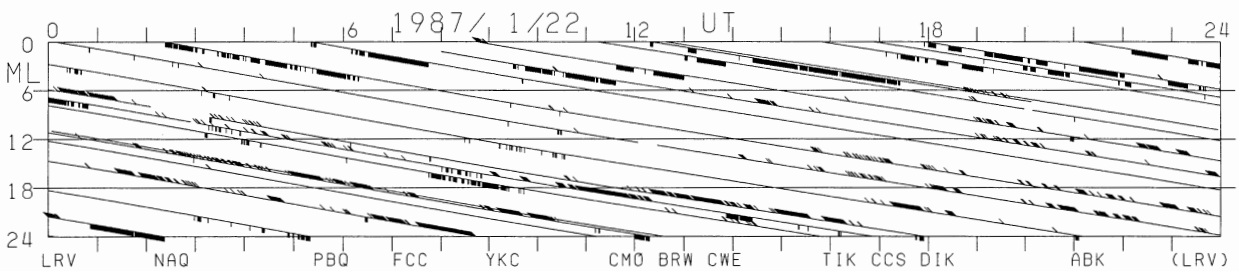
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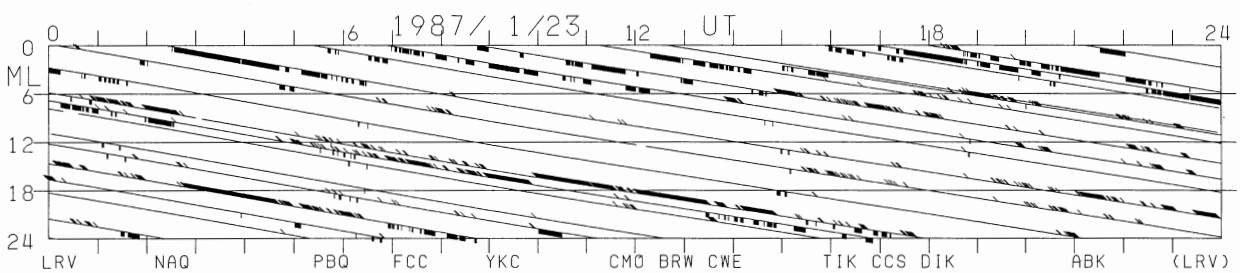
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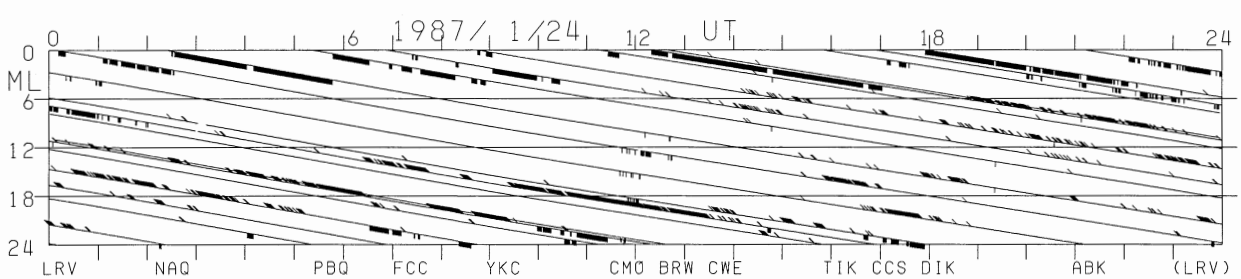
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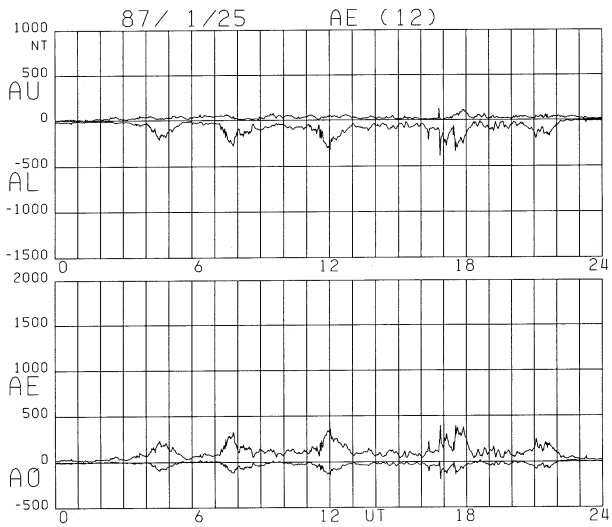
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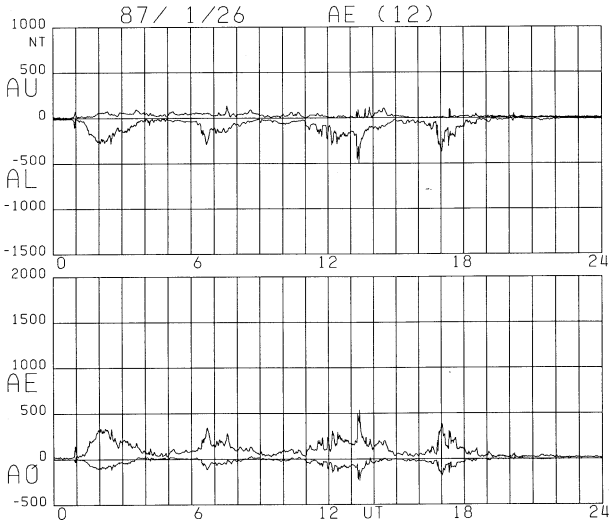
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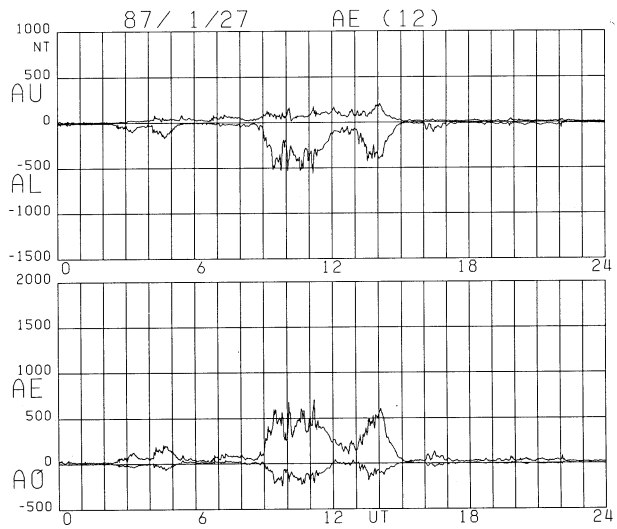
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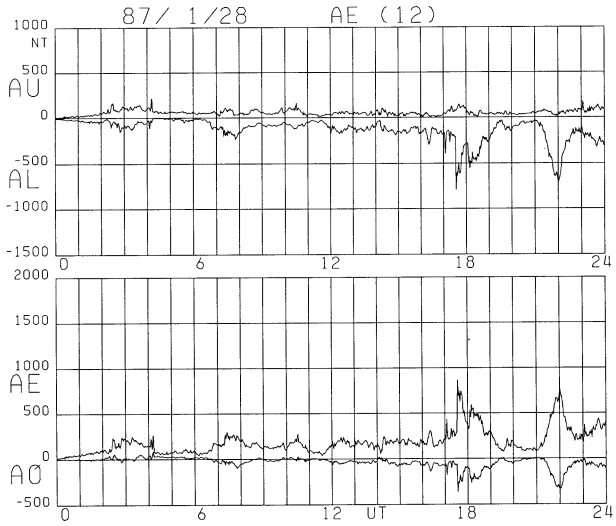
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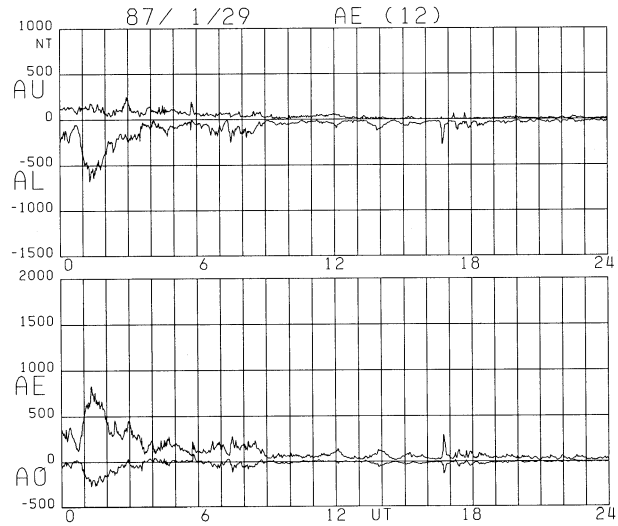
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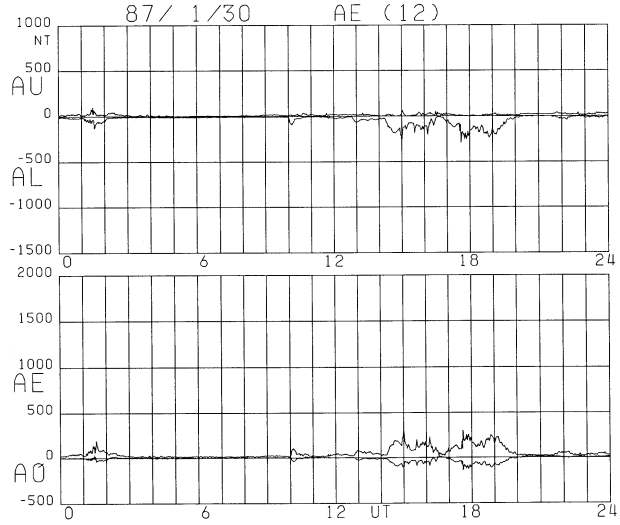
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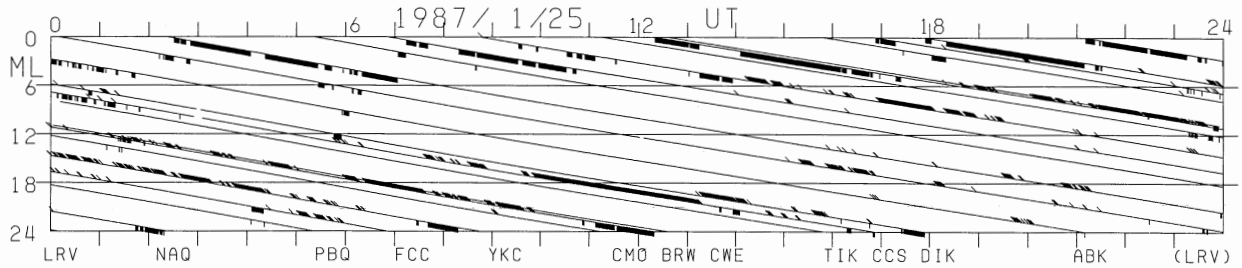
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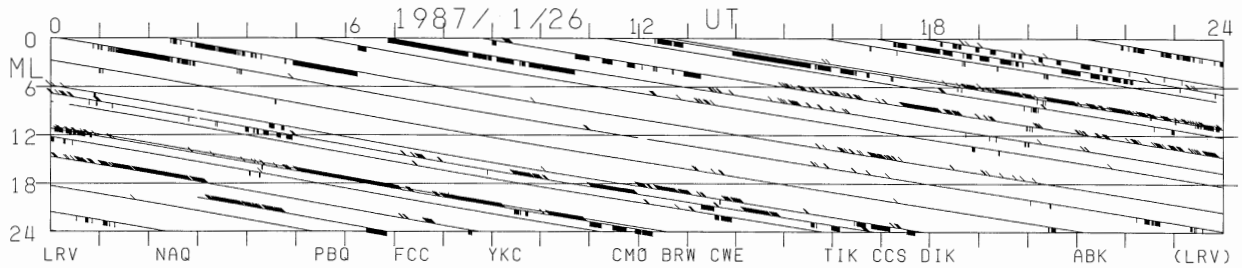
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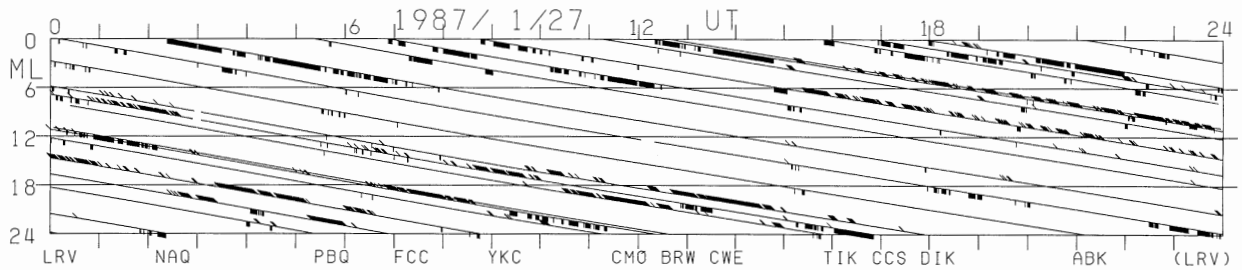
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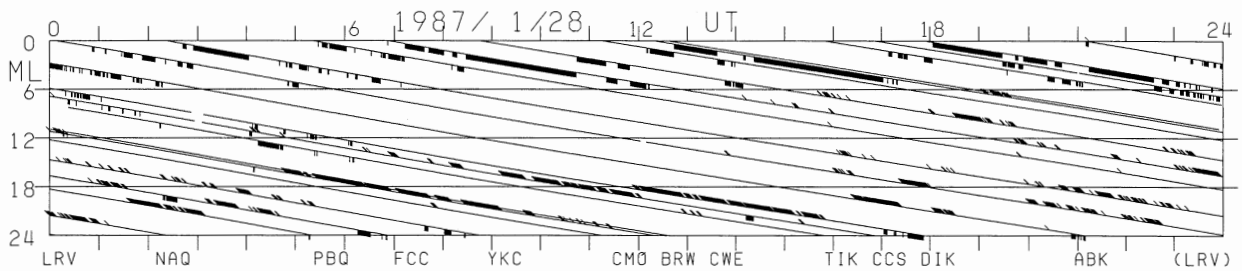
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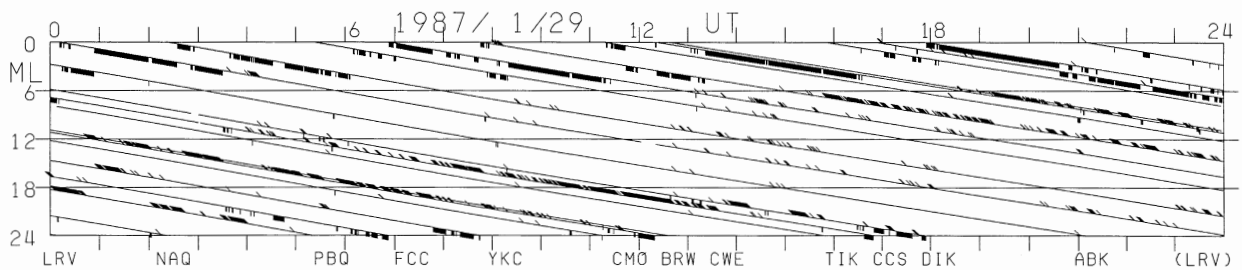
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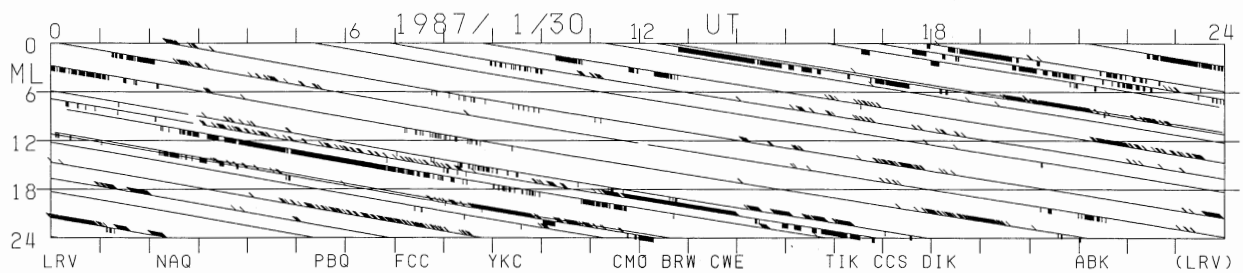
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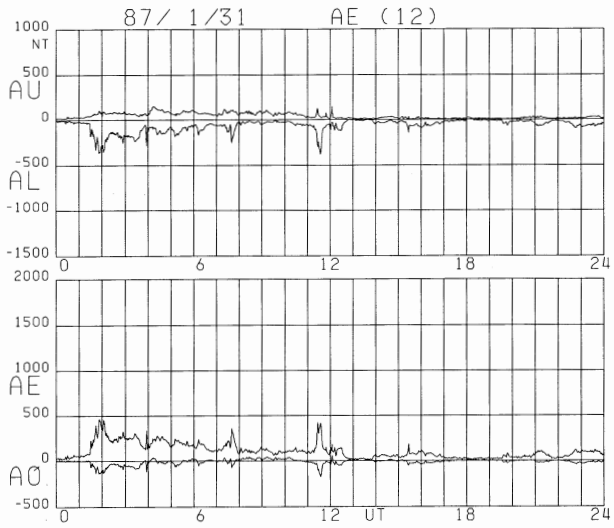
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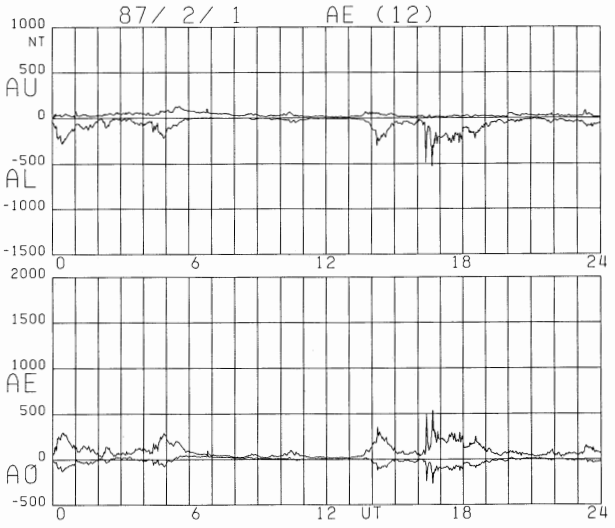
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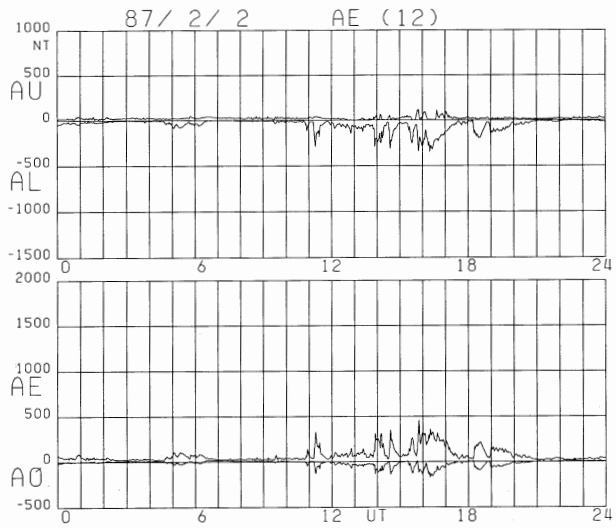
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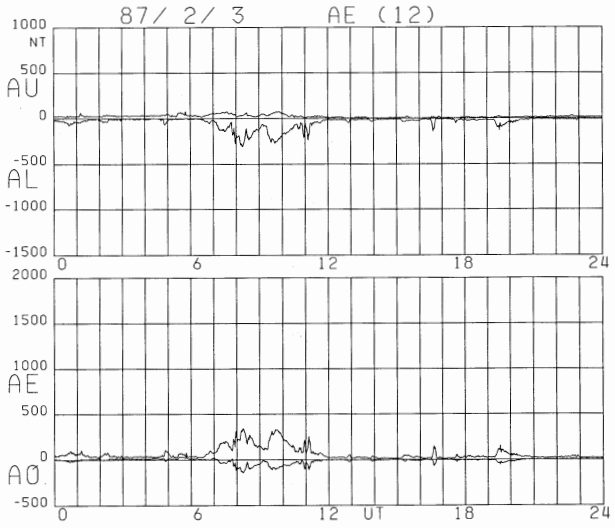
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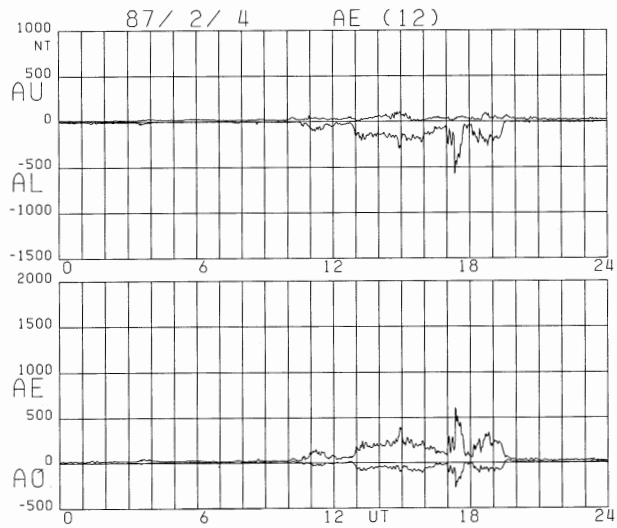
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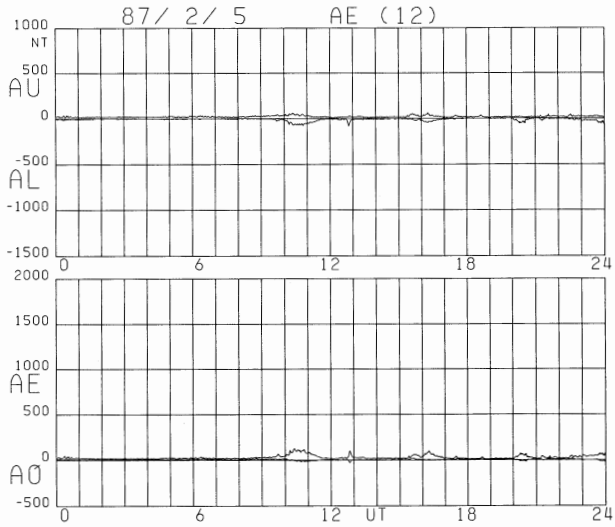
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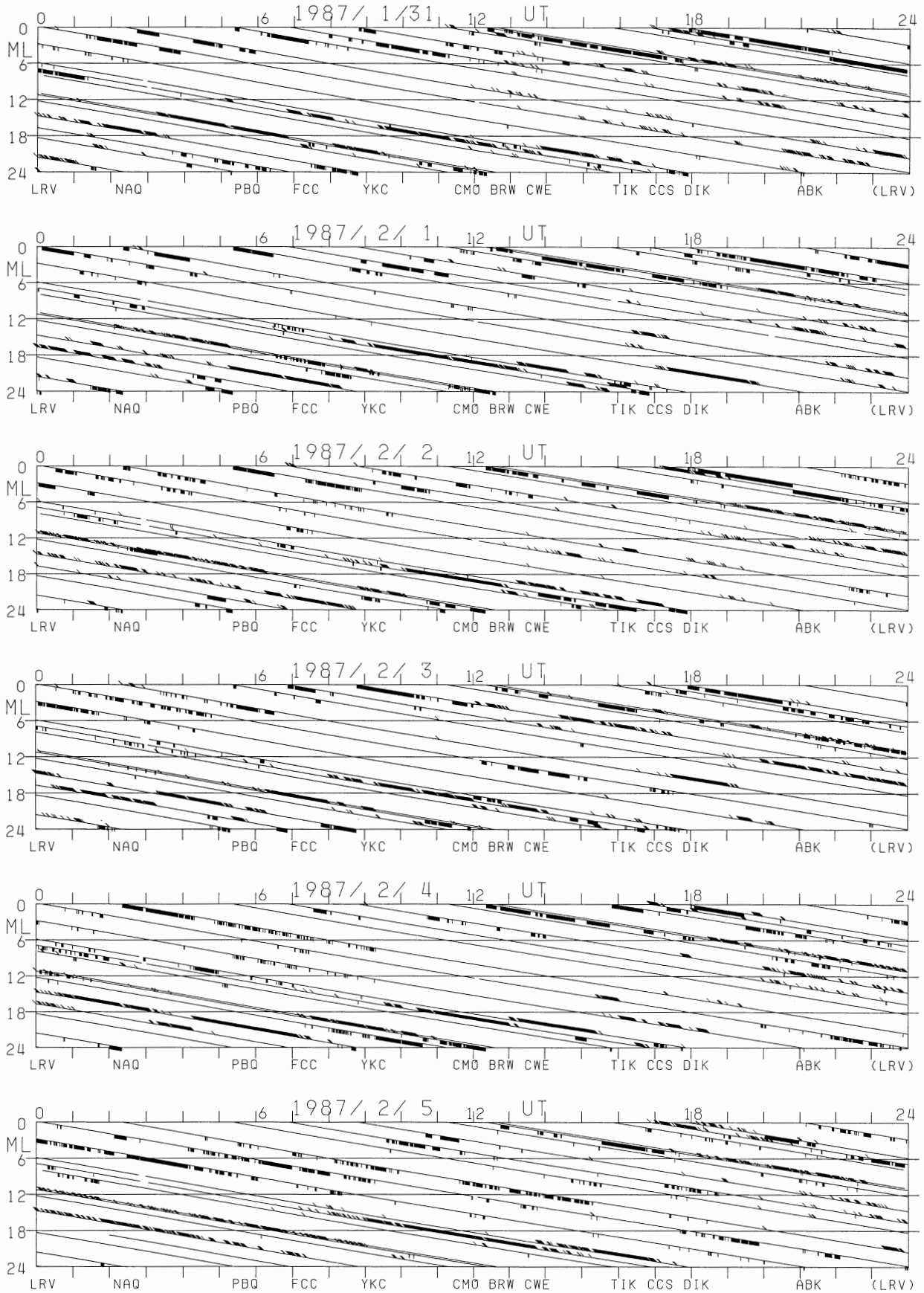
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1987/ 2/ 1 UT
1987/ 2/ 2 UT
1987/ 2/ 3 UT
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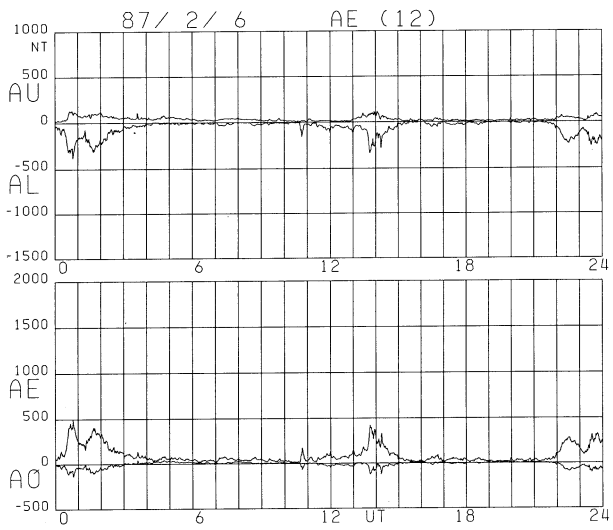
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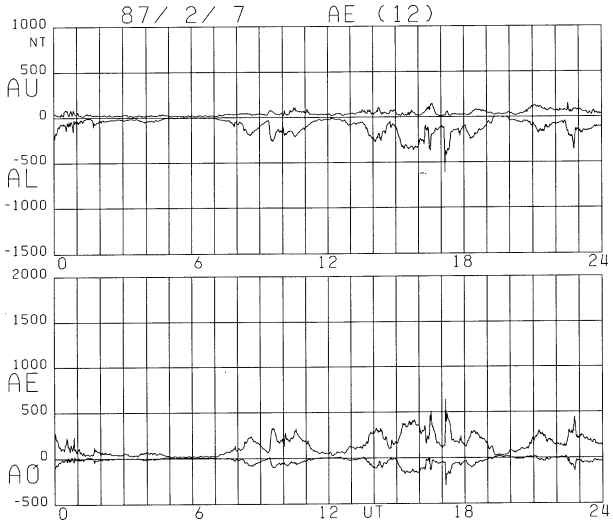
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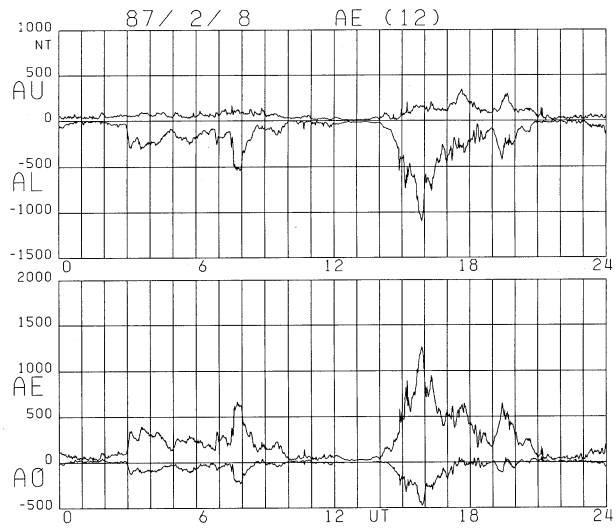
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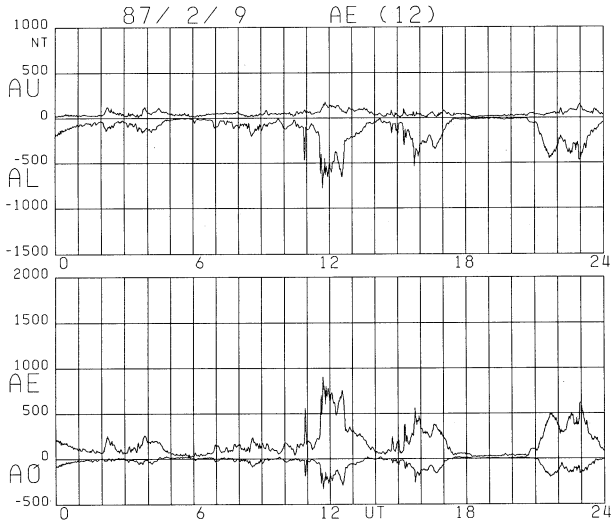
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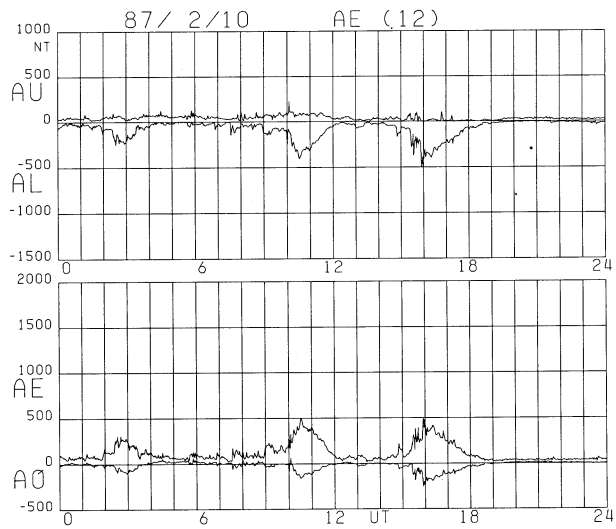
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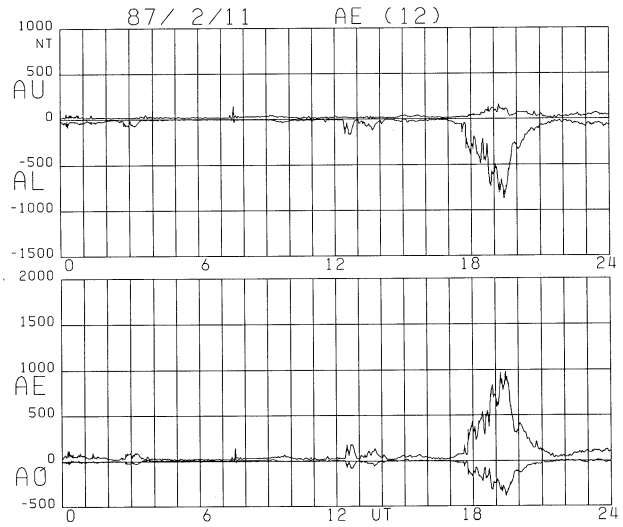
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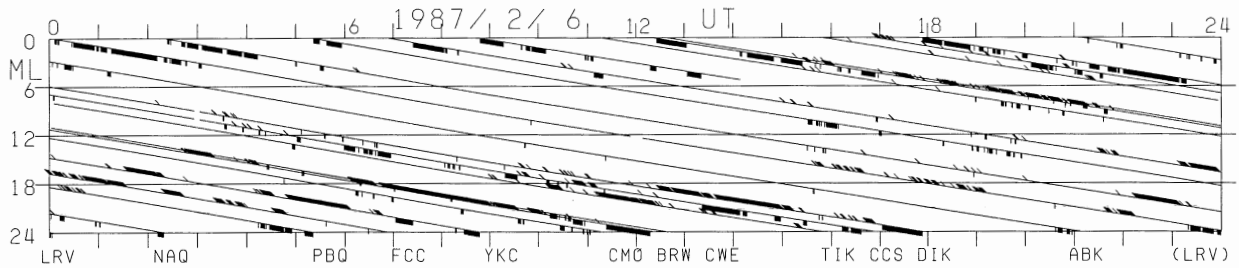
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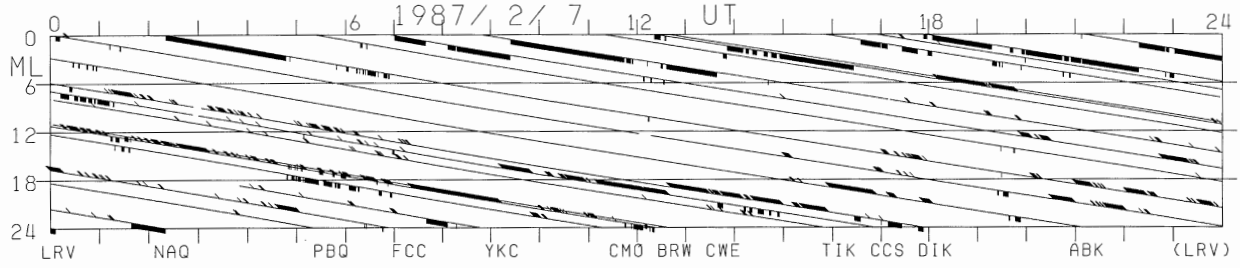
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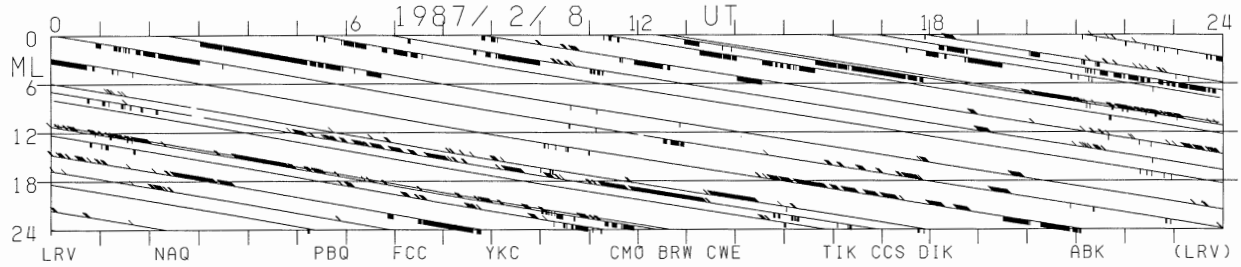
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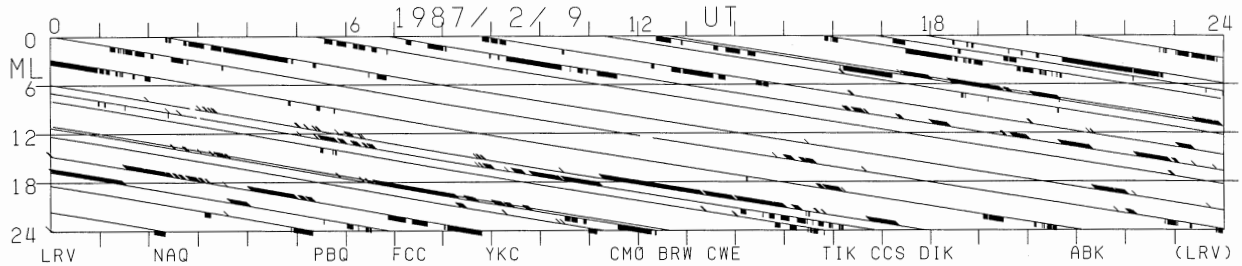
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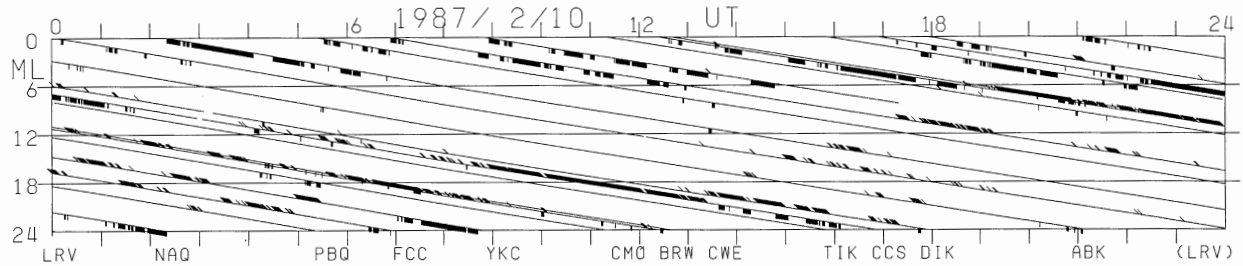
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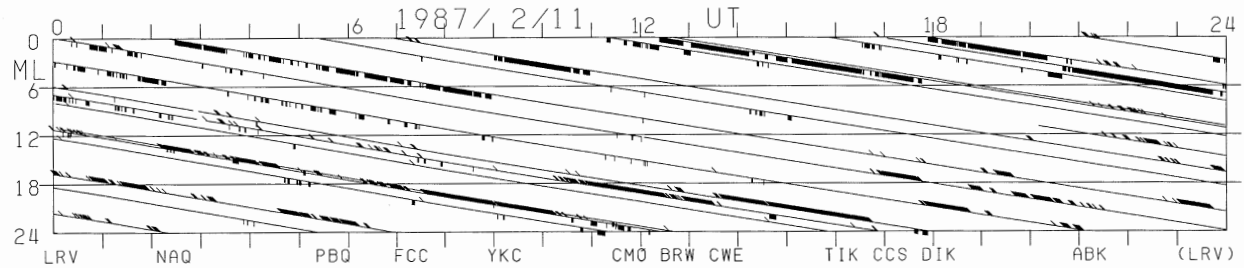
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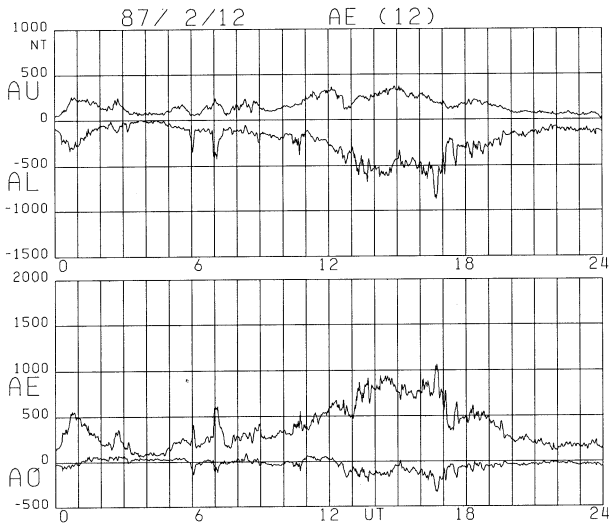
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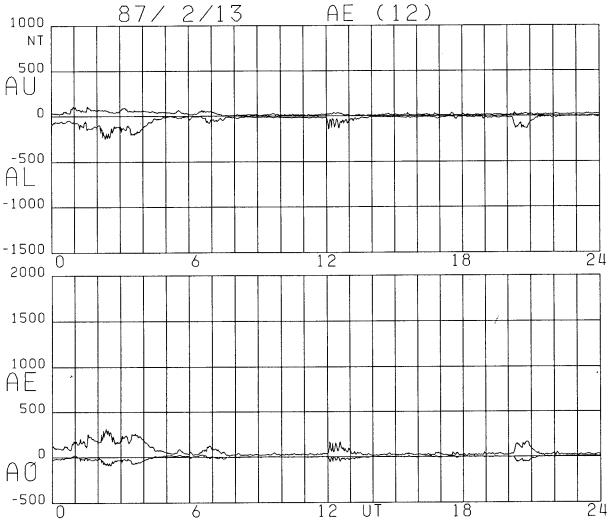
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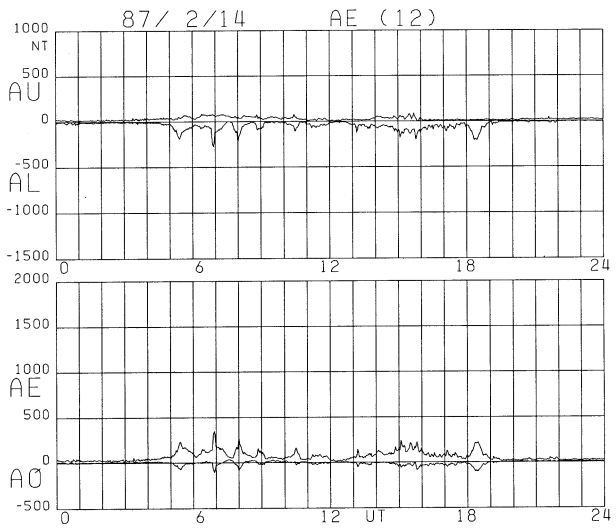
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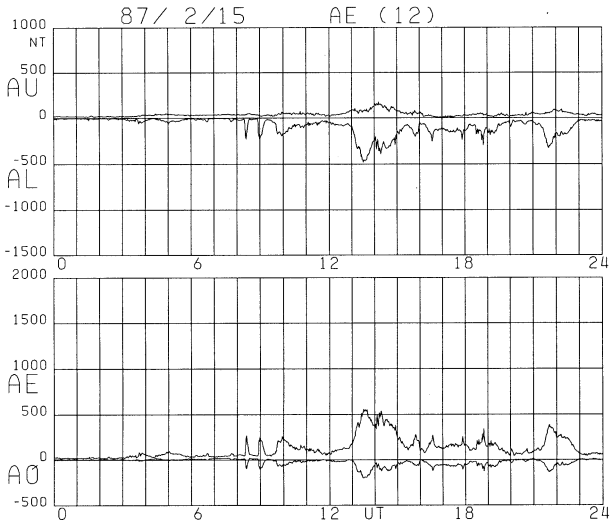
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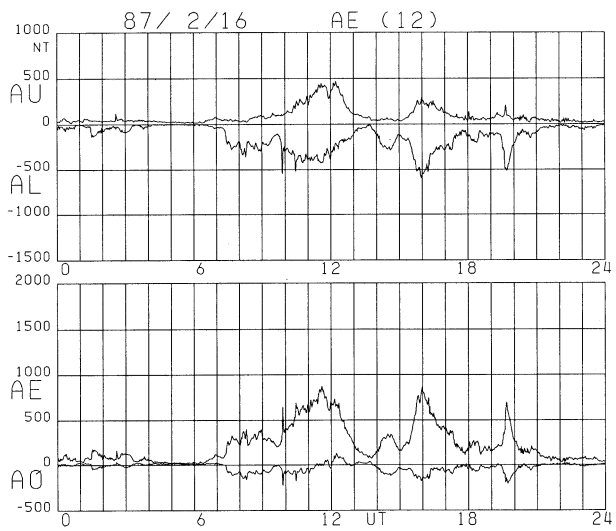
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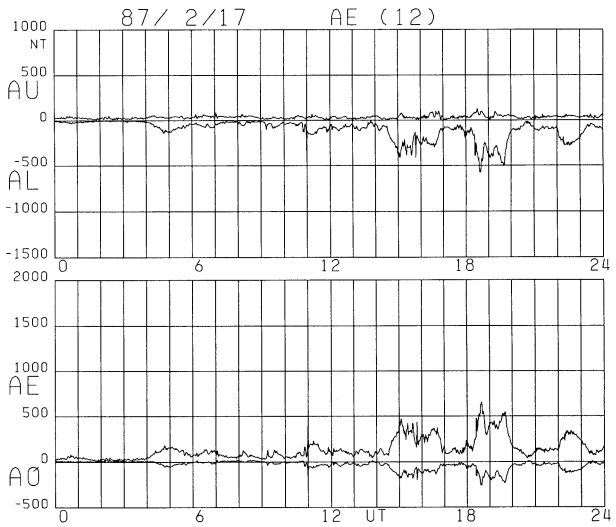
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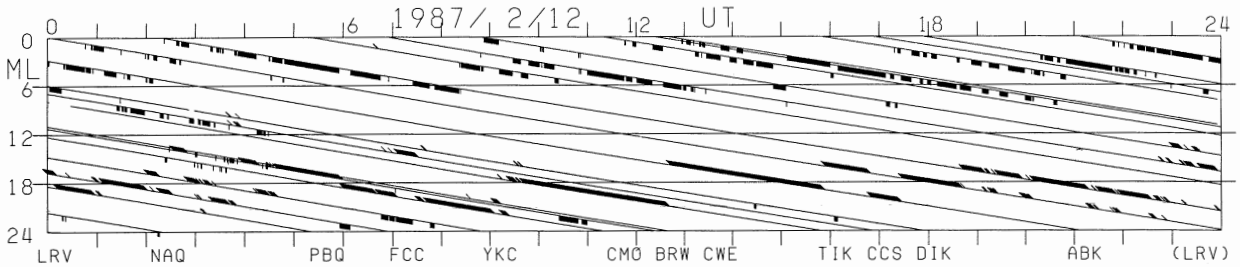
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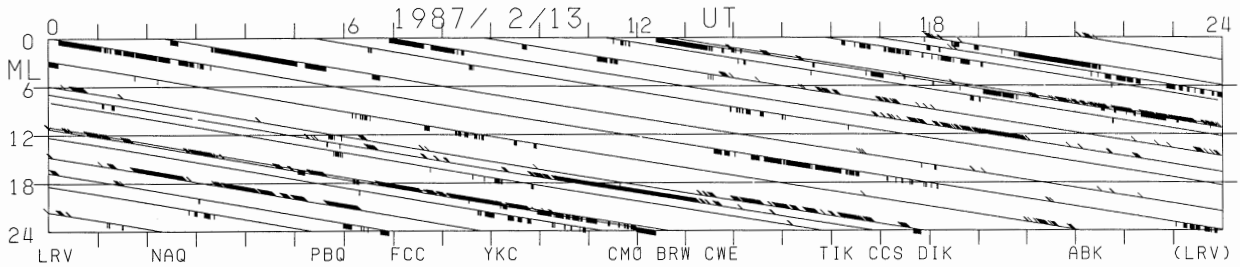
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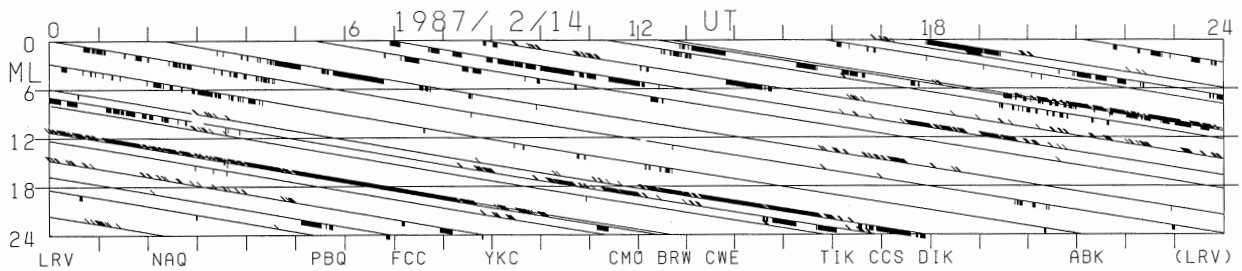
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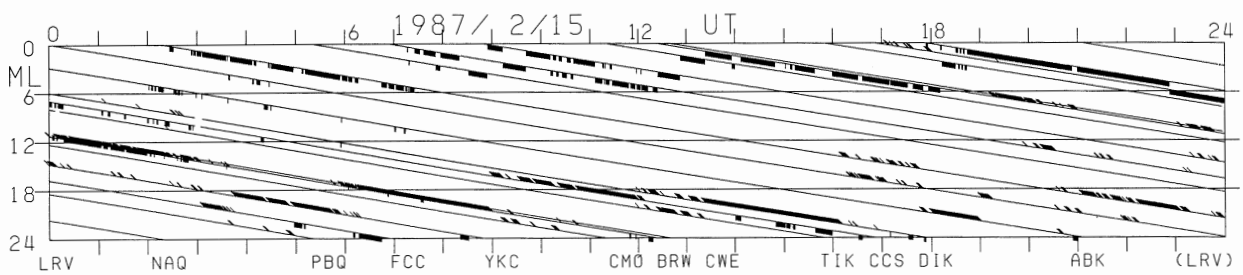
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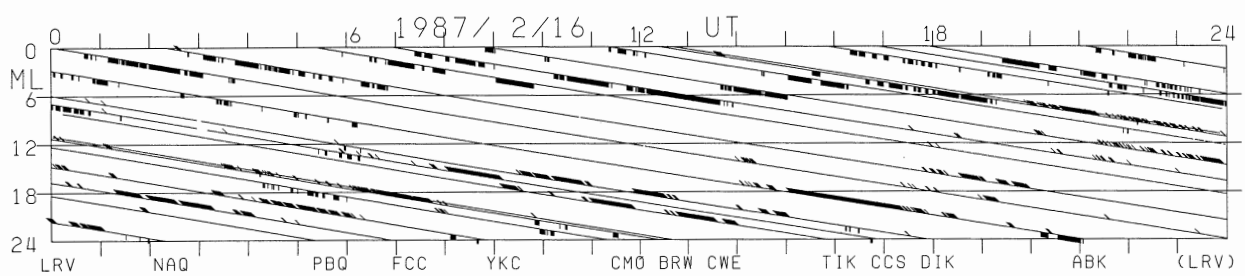
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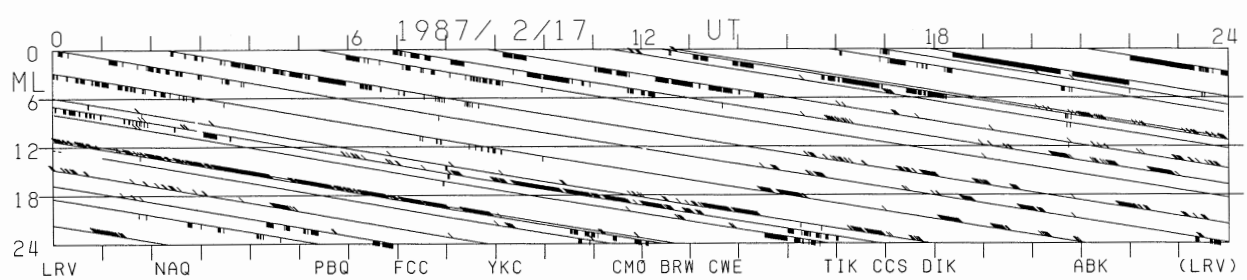
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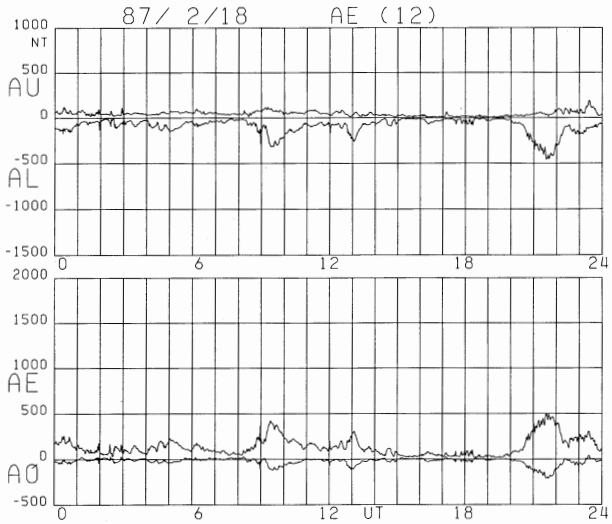
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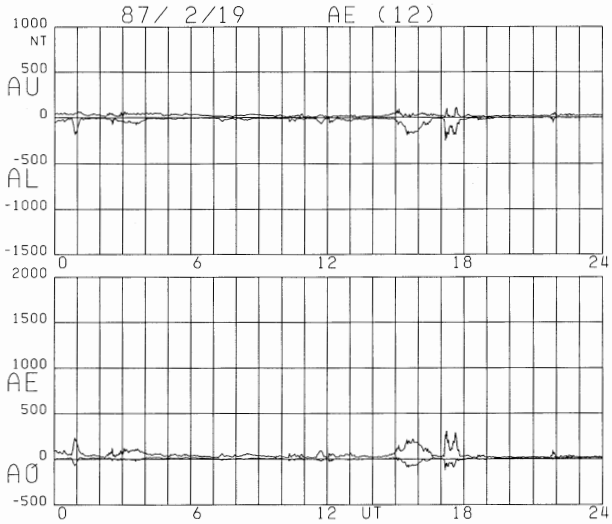
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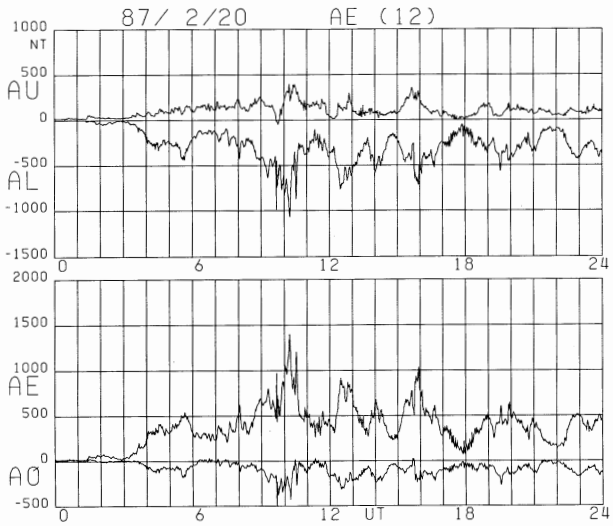
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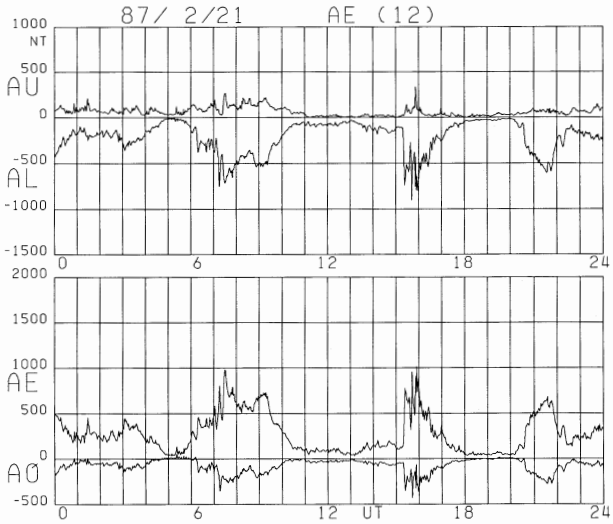
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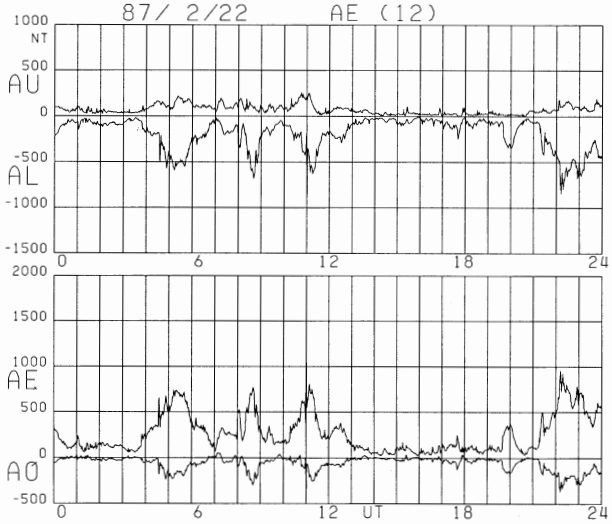
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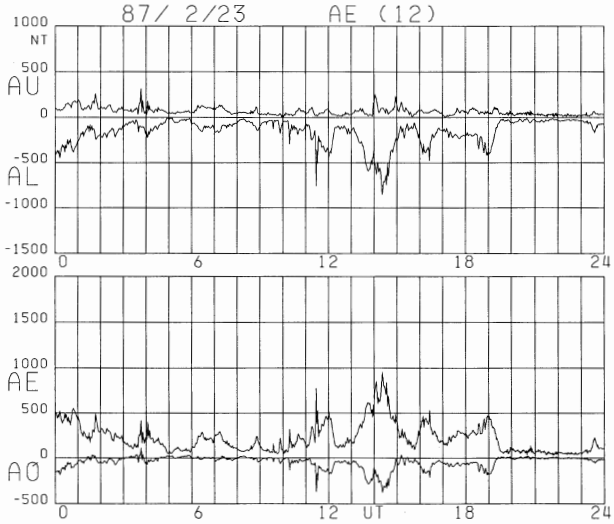
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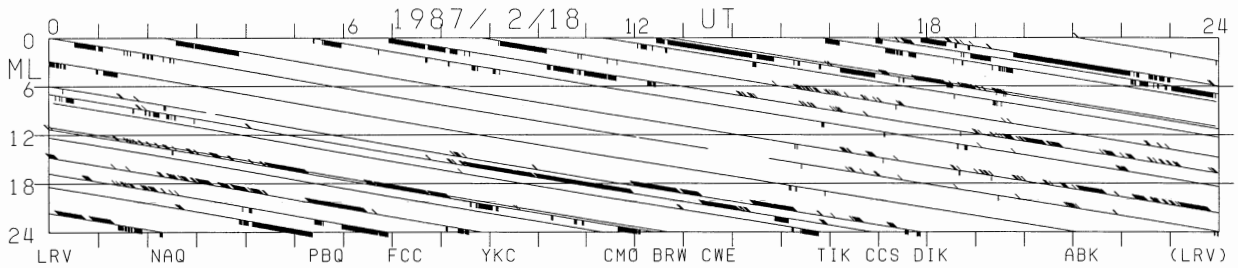
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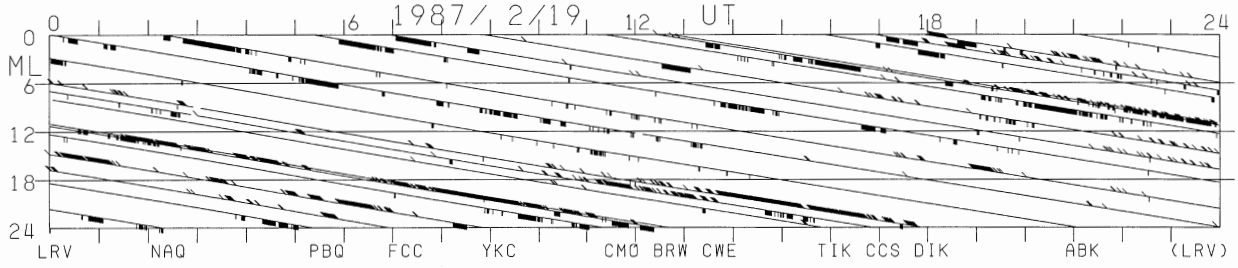
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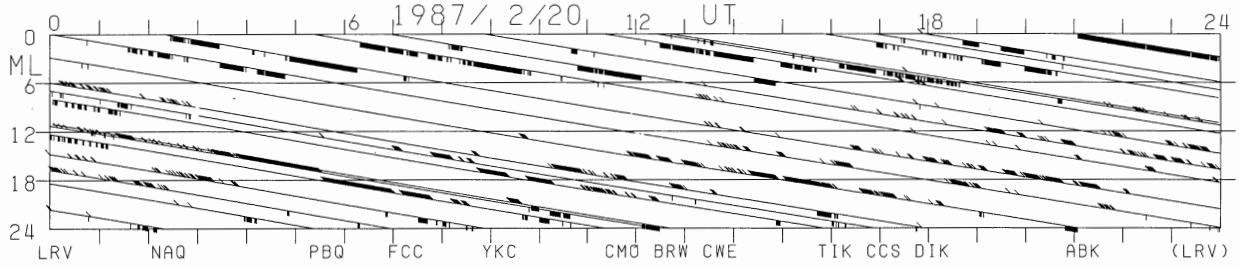
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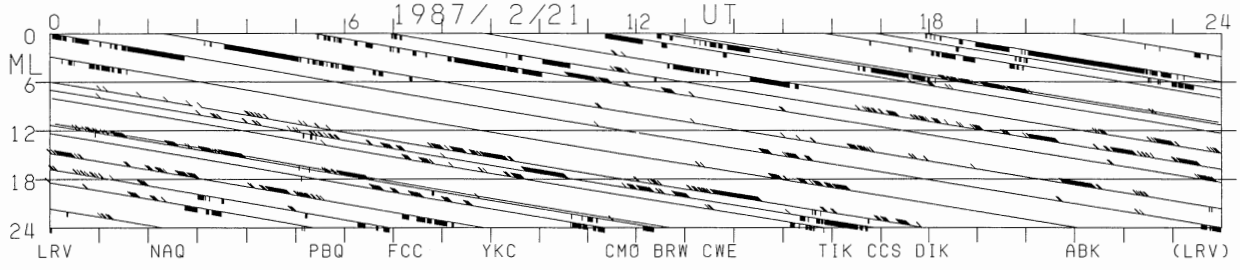
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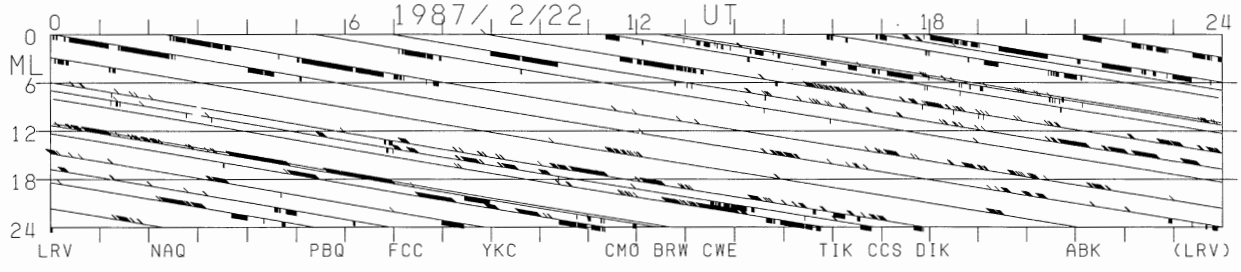
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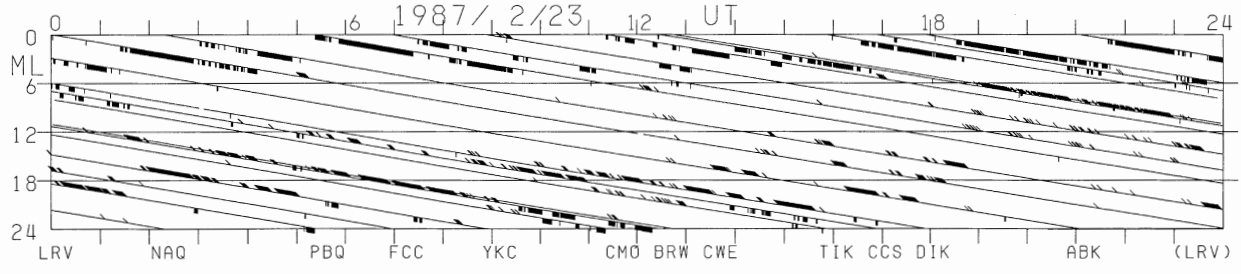
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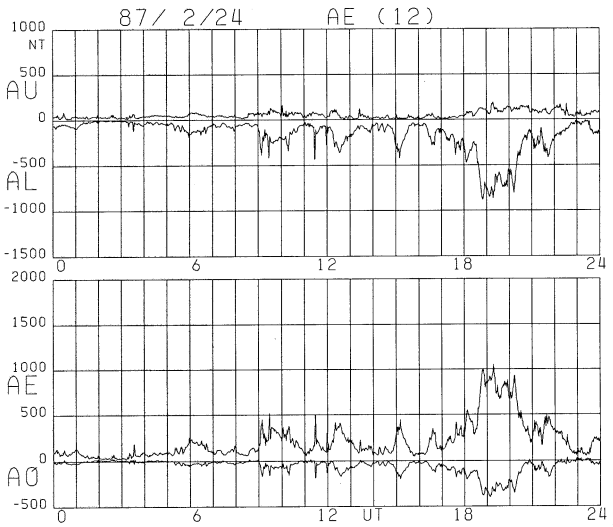
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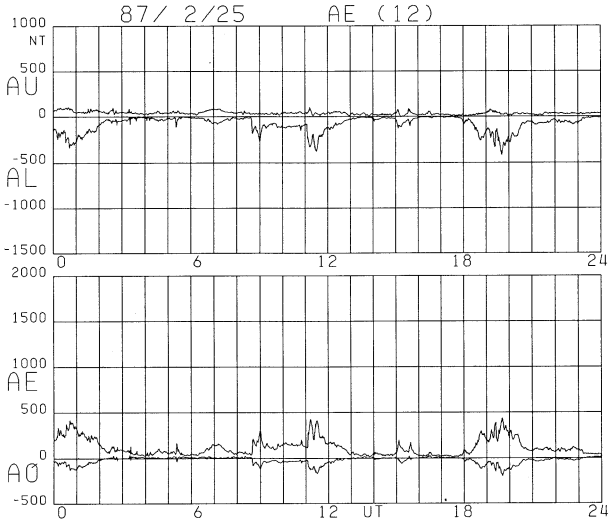
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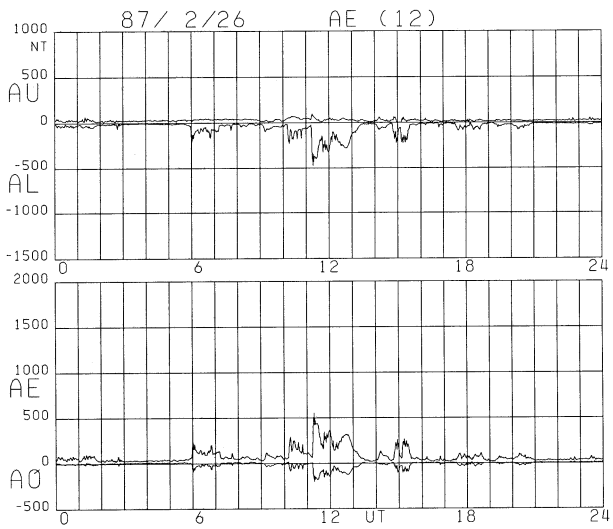
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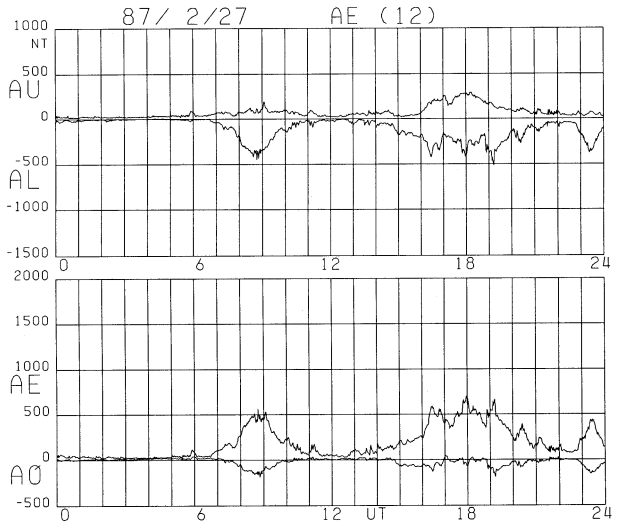
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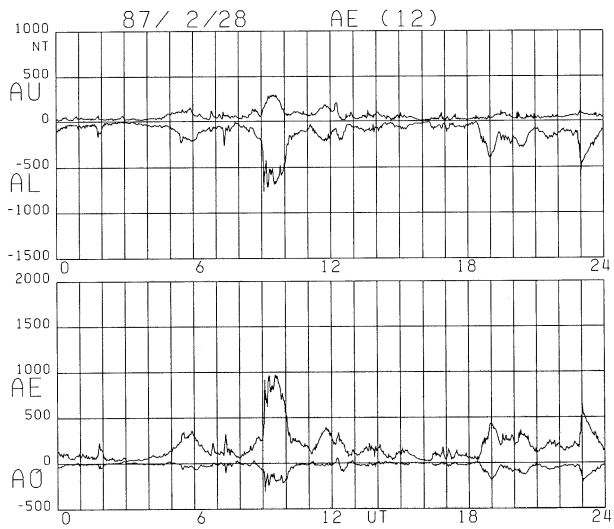
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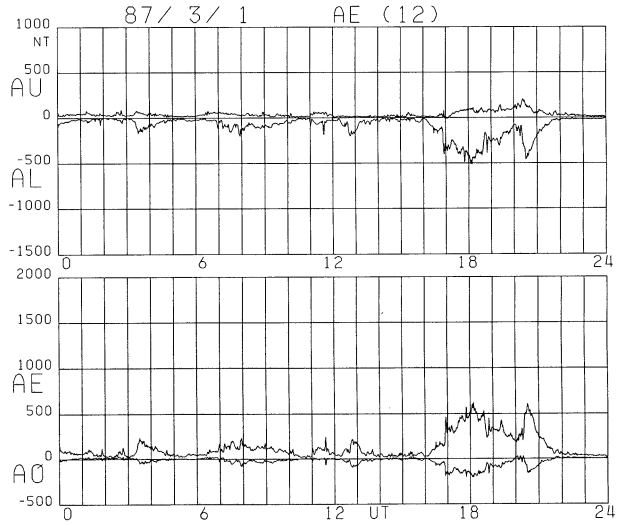
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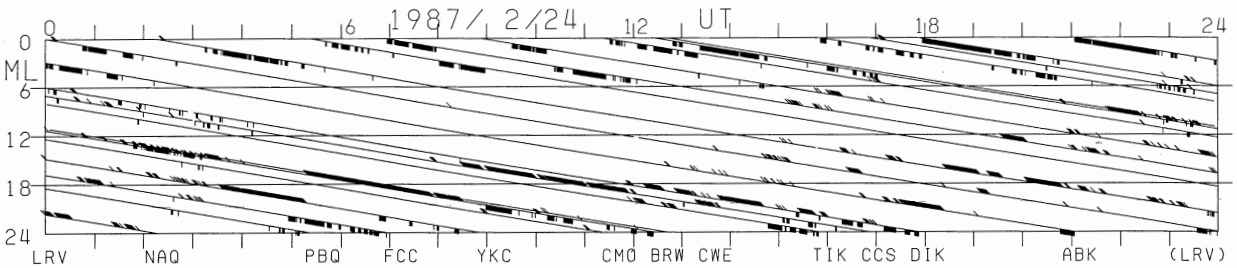
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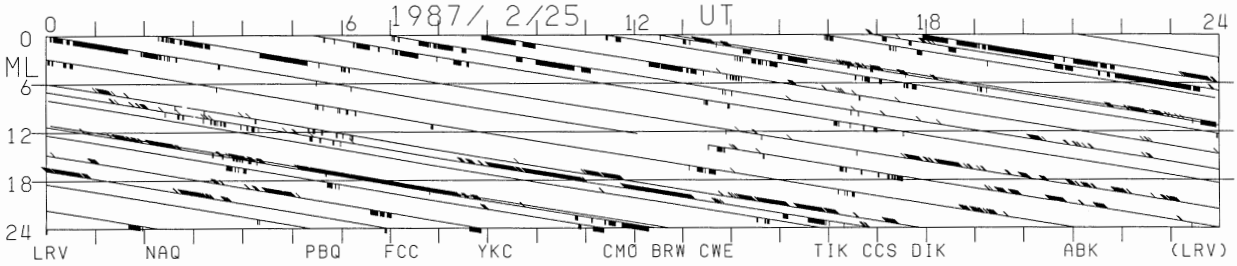
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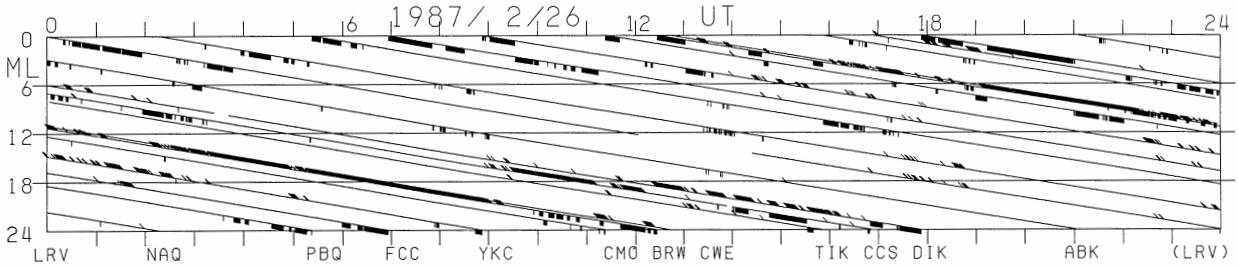
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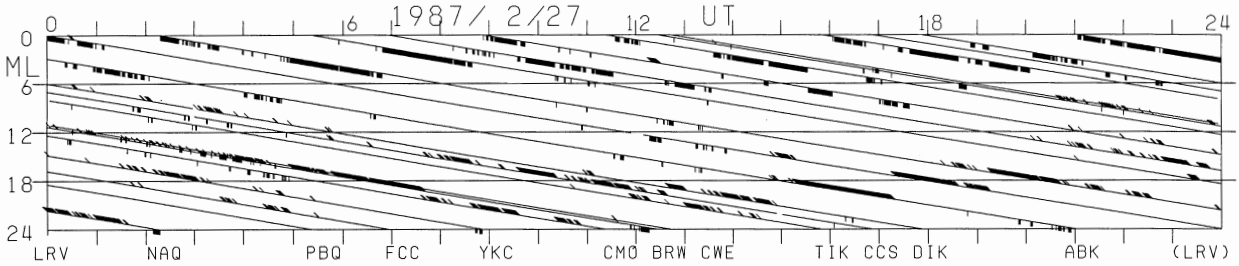
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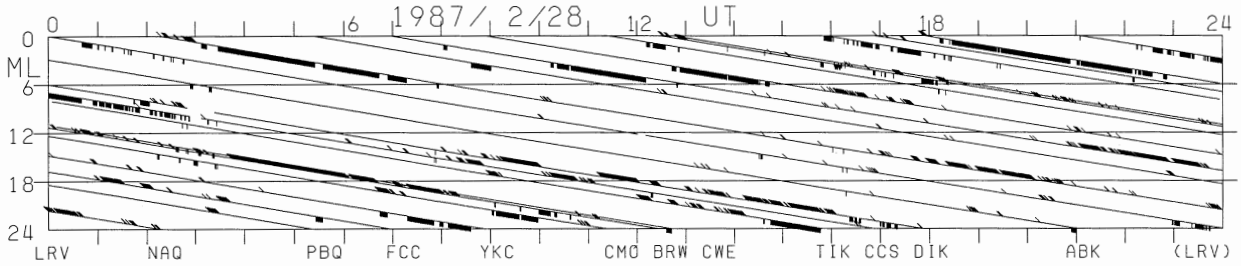
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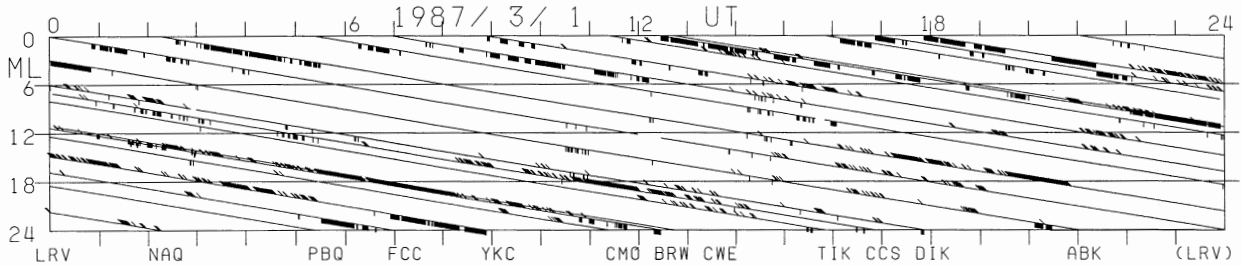
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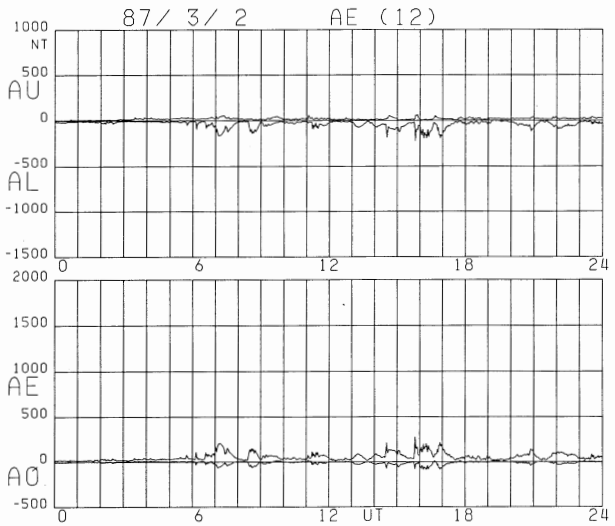
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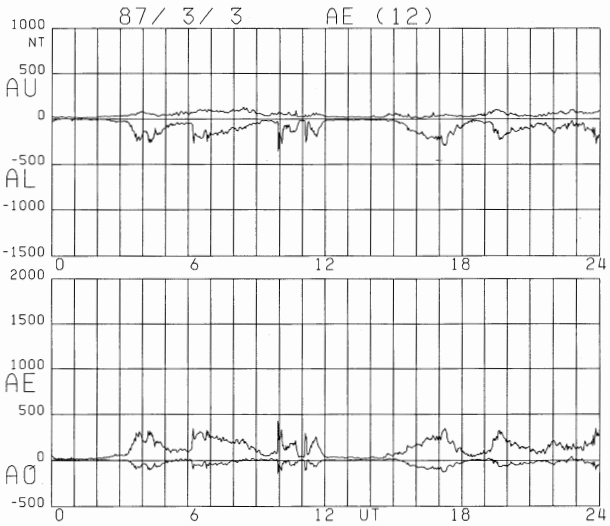
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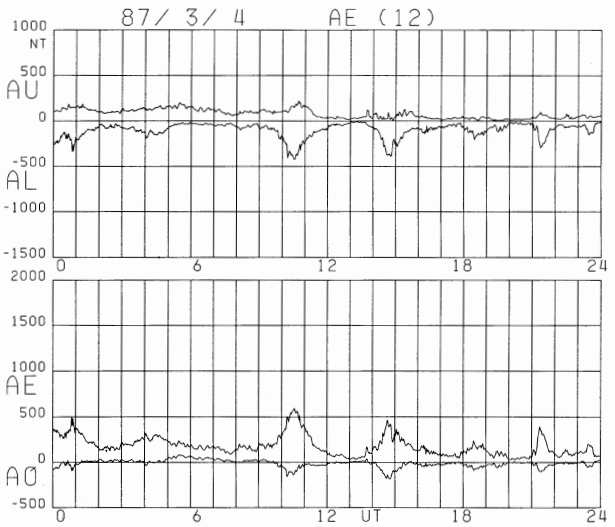
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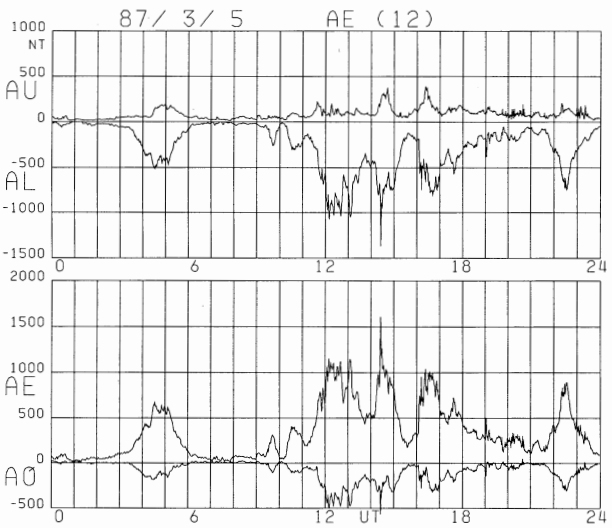
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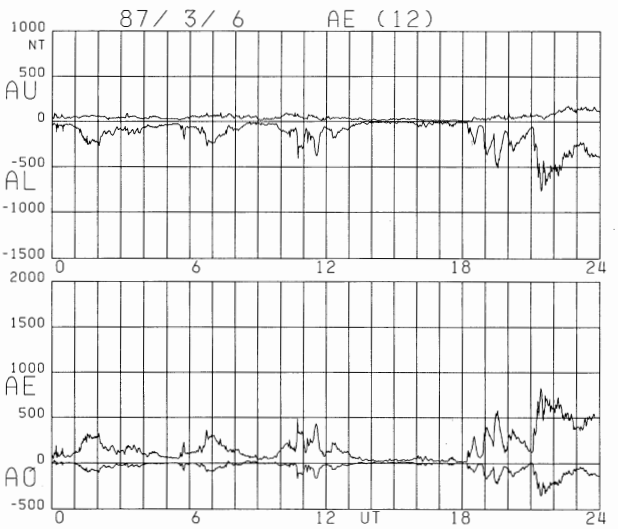
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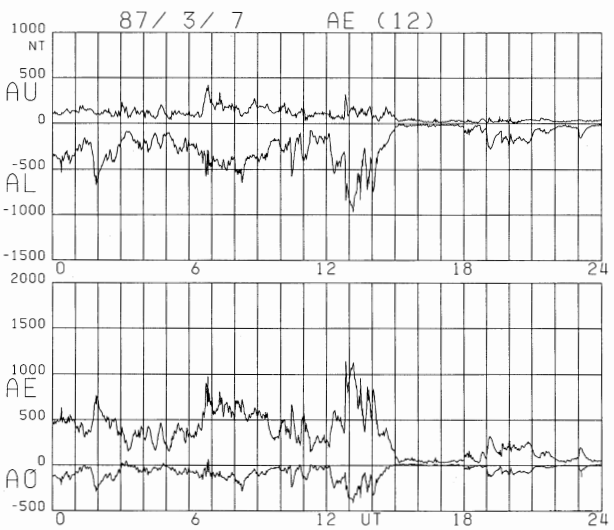
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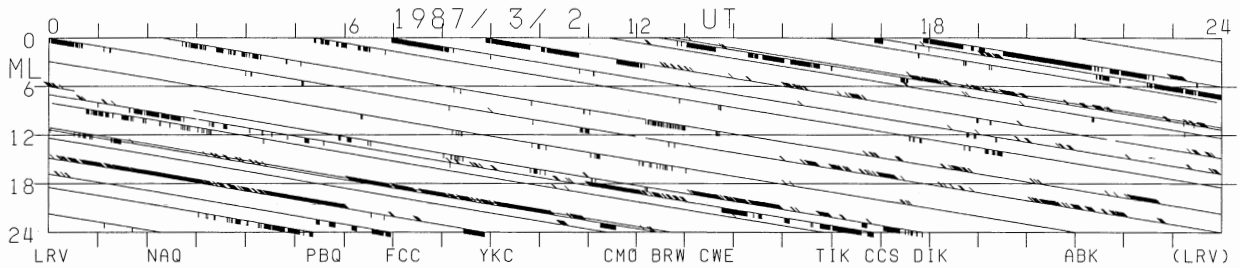
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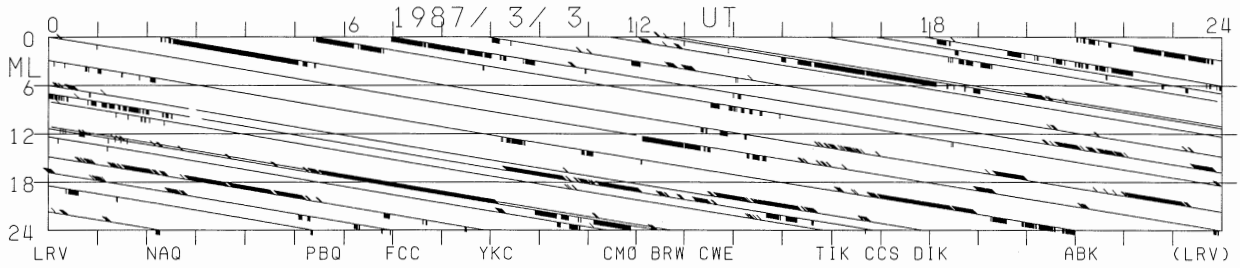
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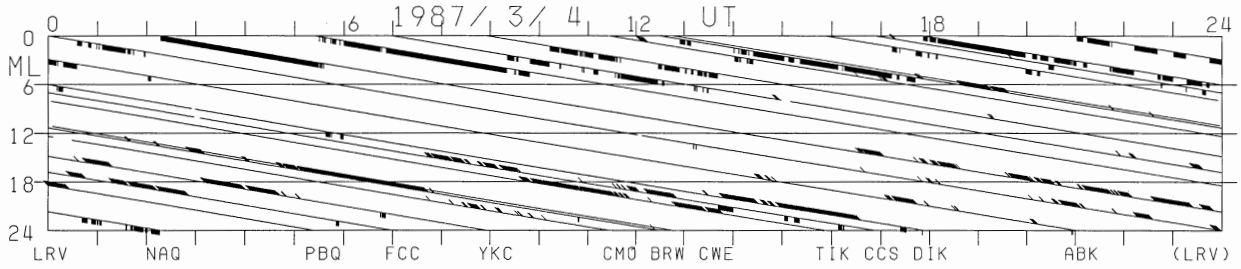
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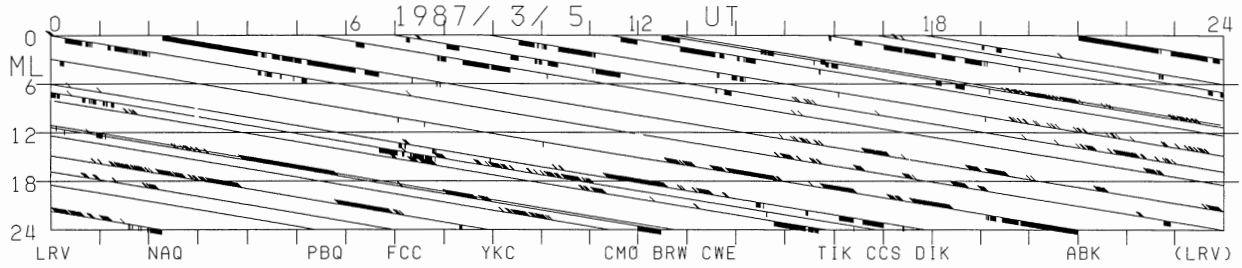
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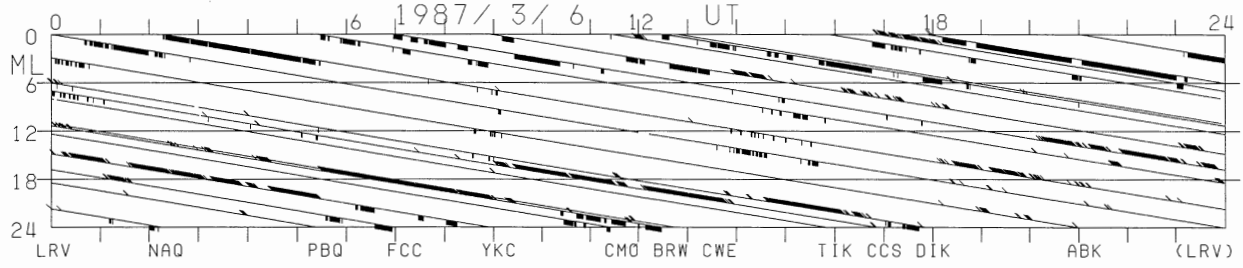
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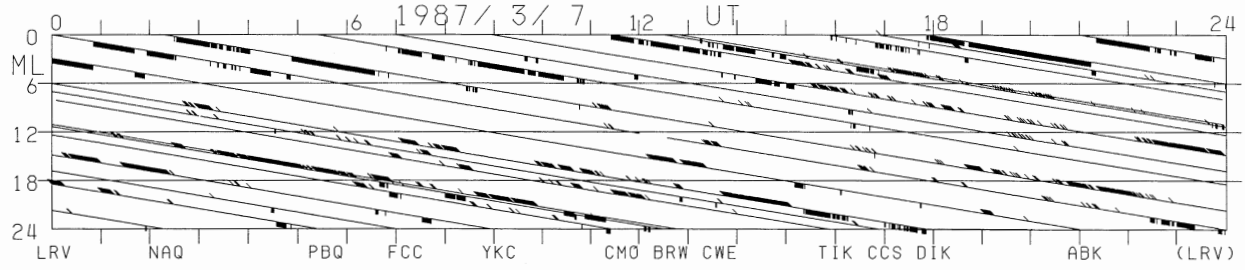
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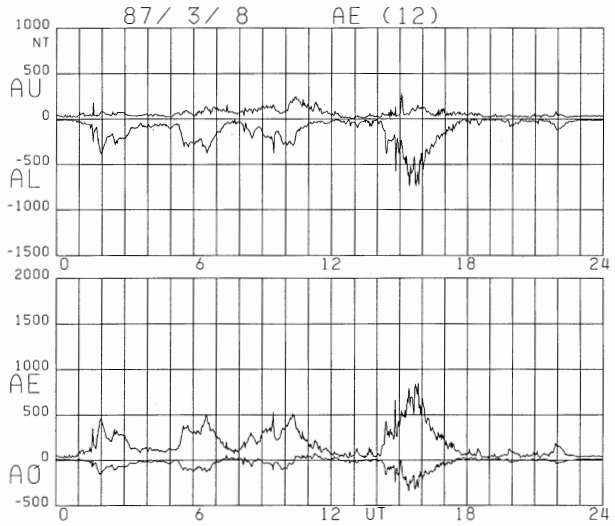
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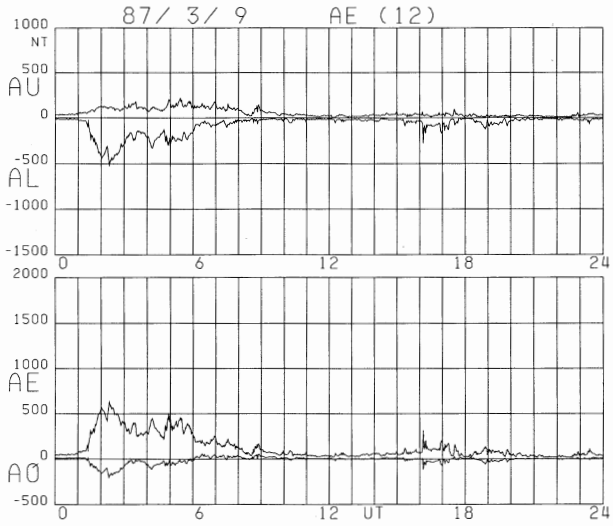
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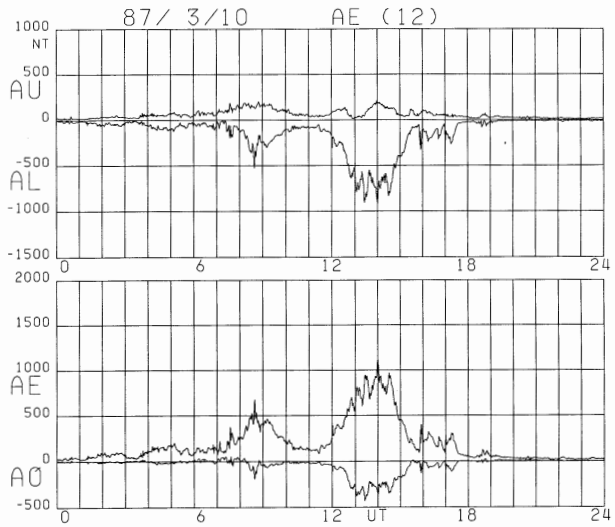
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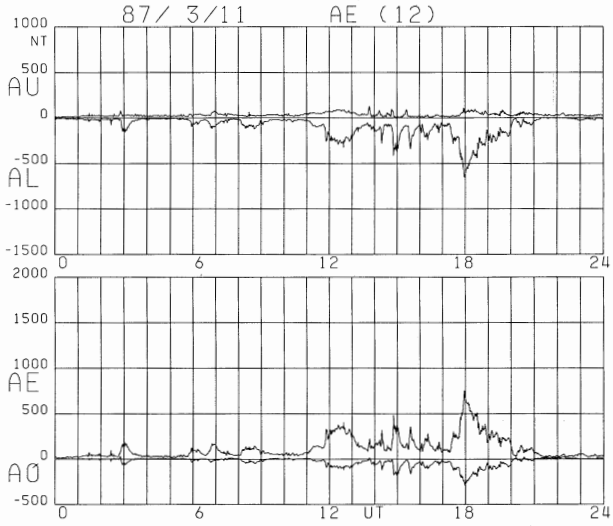
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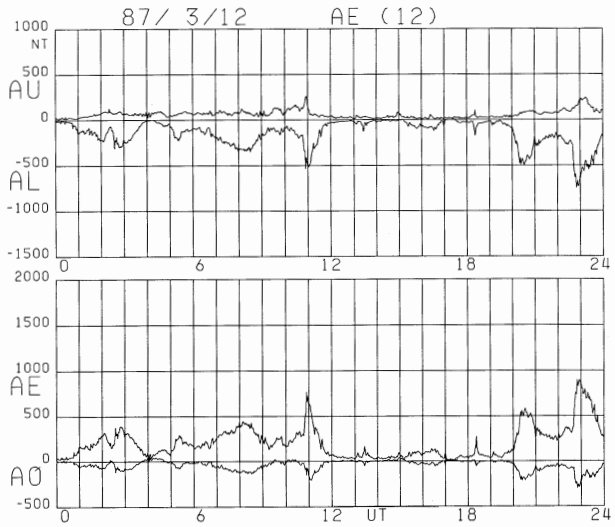
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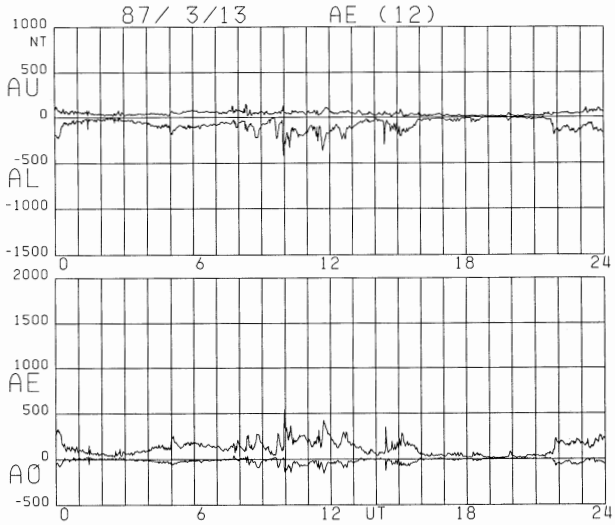
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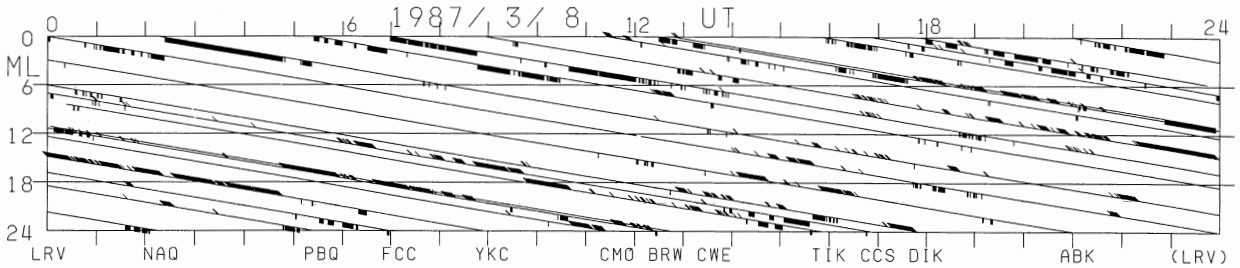
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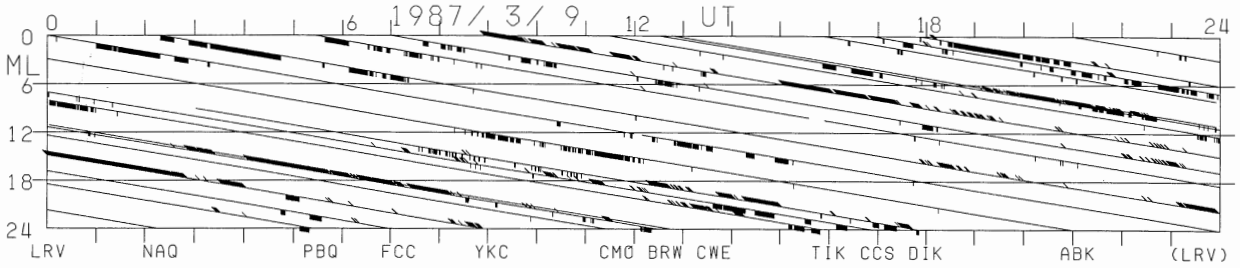
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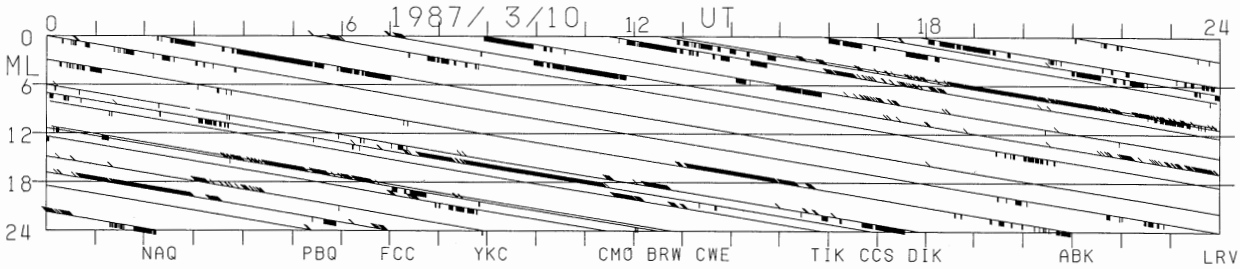
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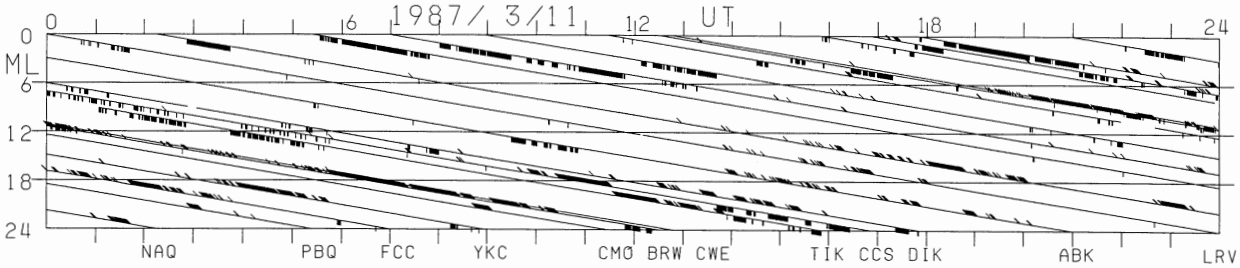
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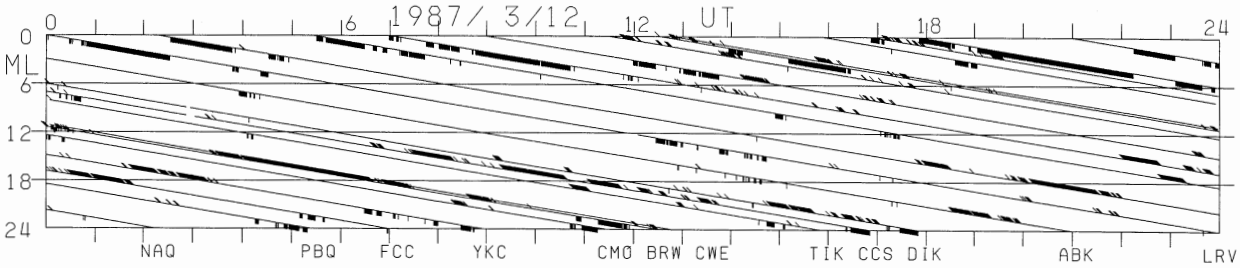
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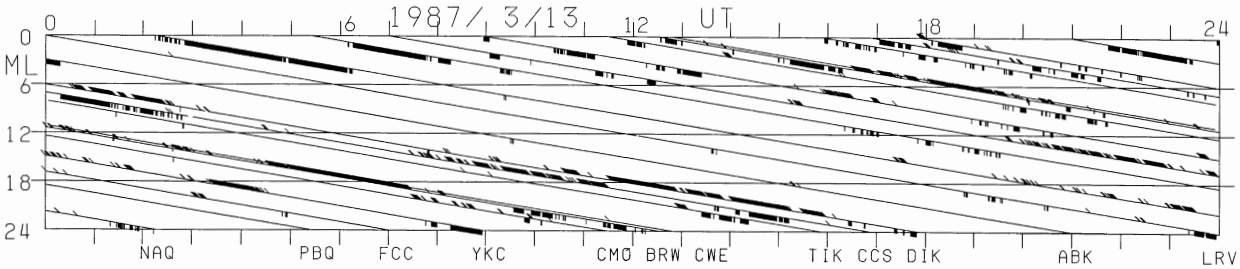
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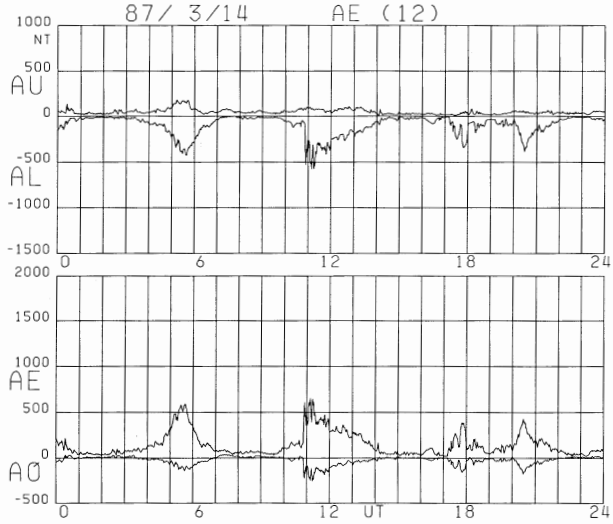
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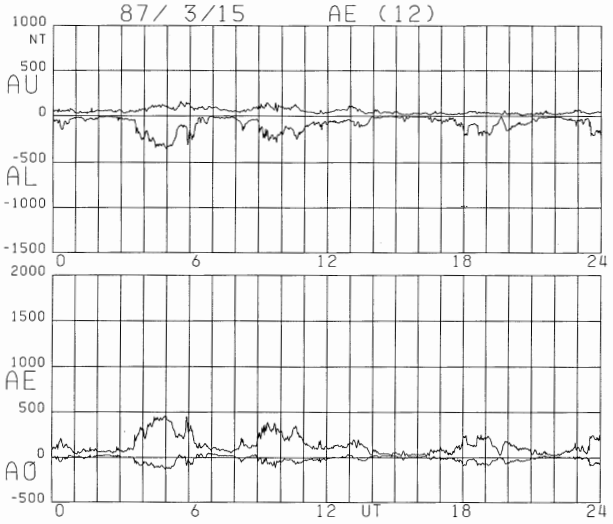
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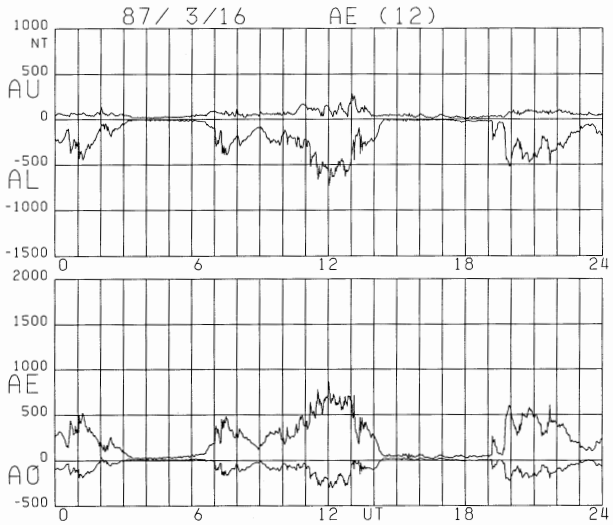
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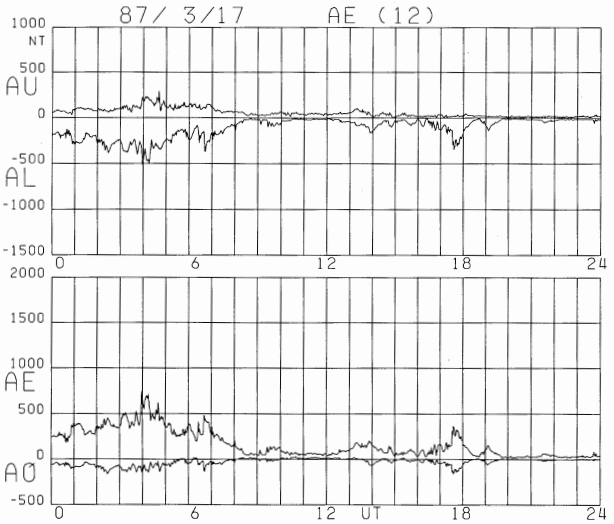
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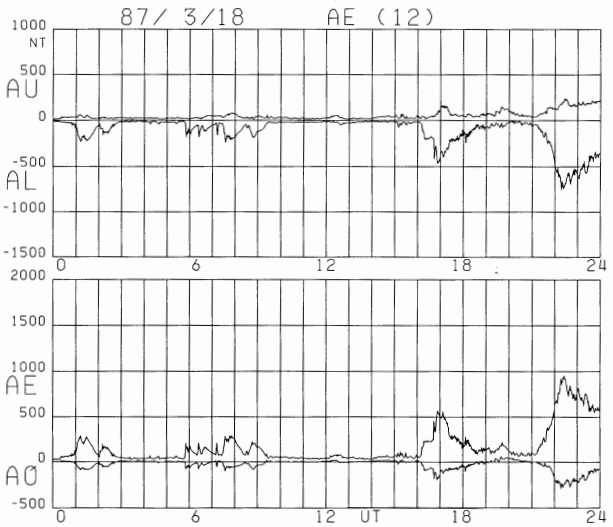
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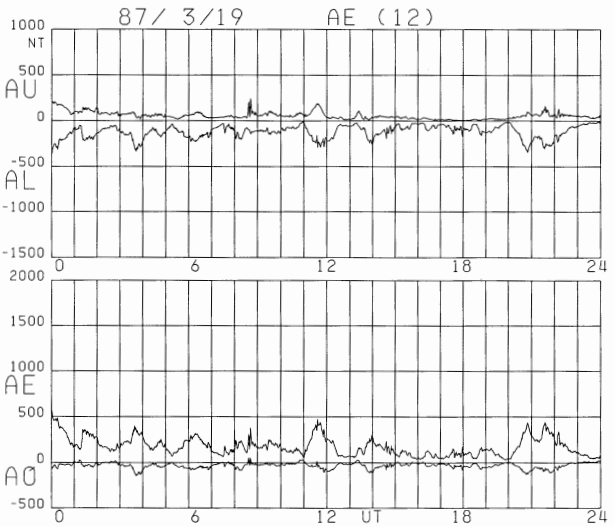
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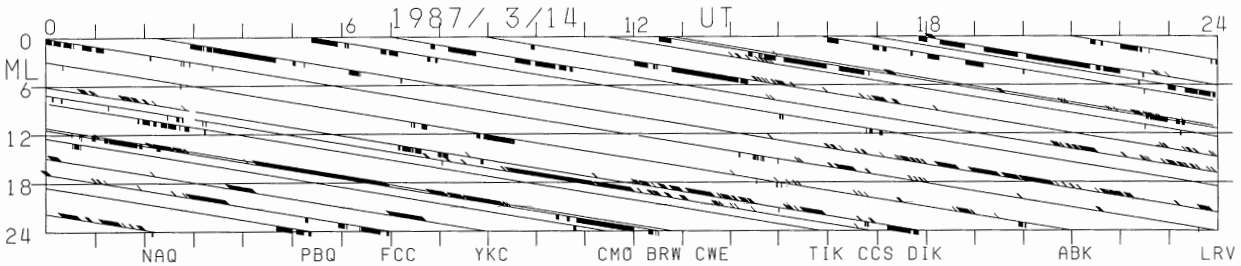
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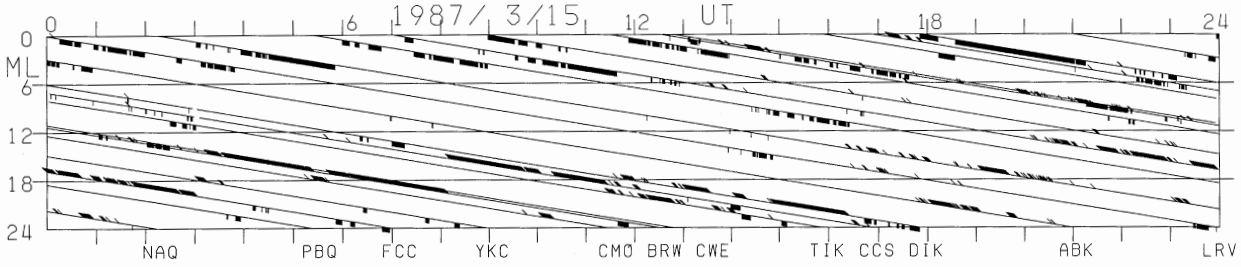
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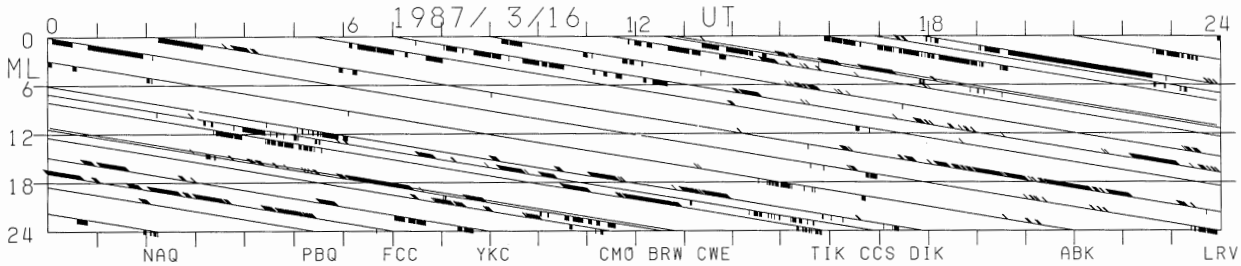
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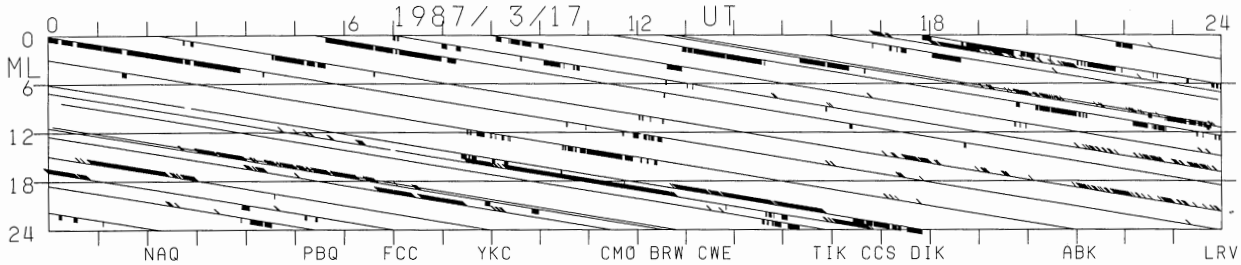
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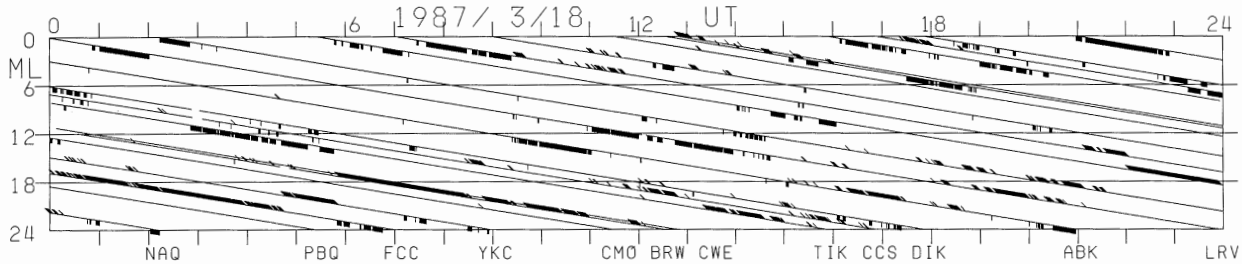
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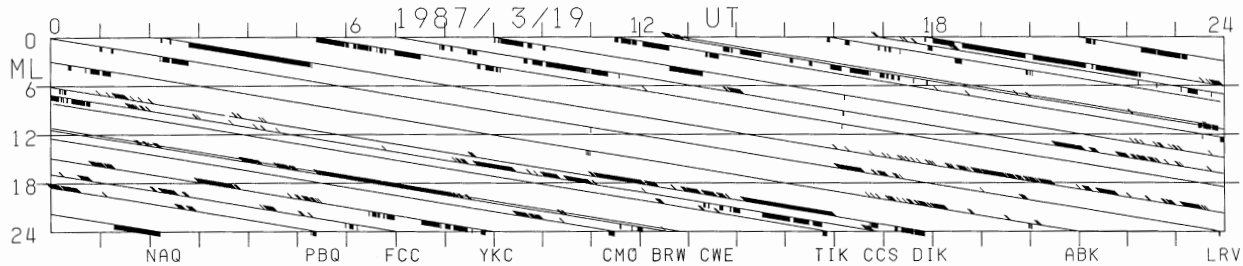
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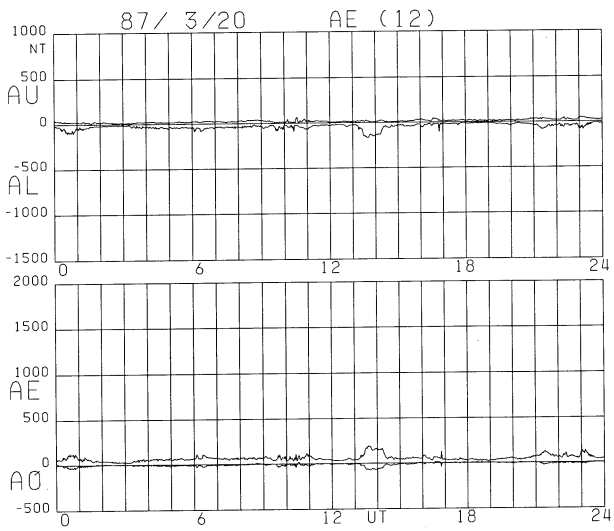
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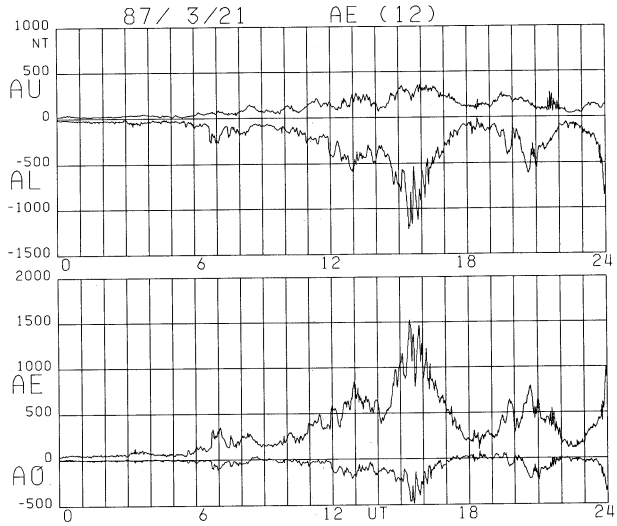
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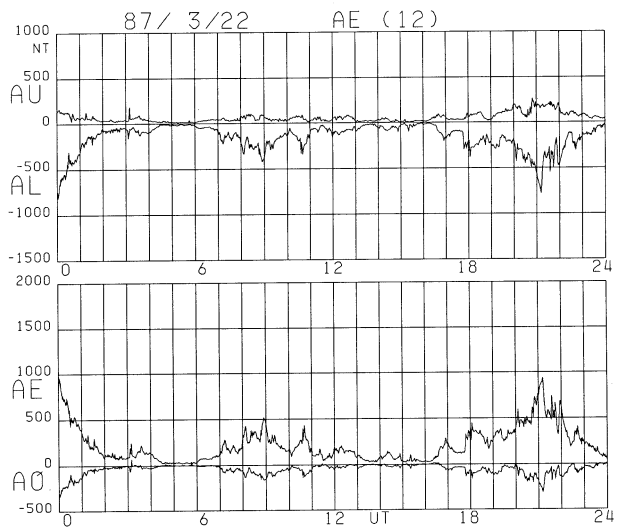
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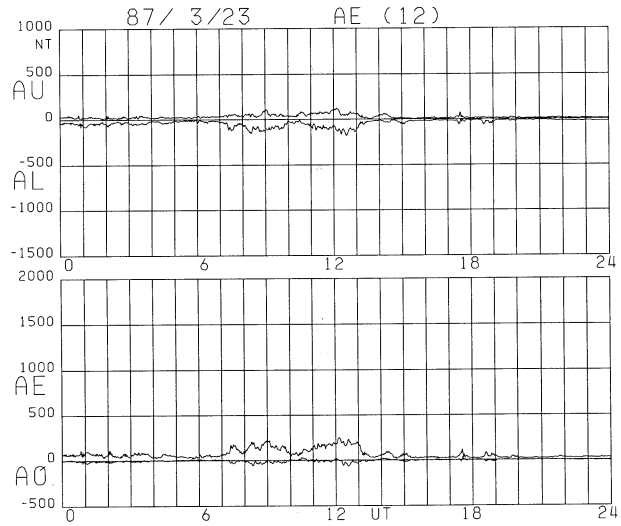
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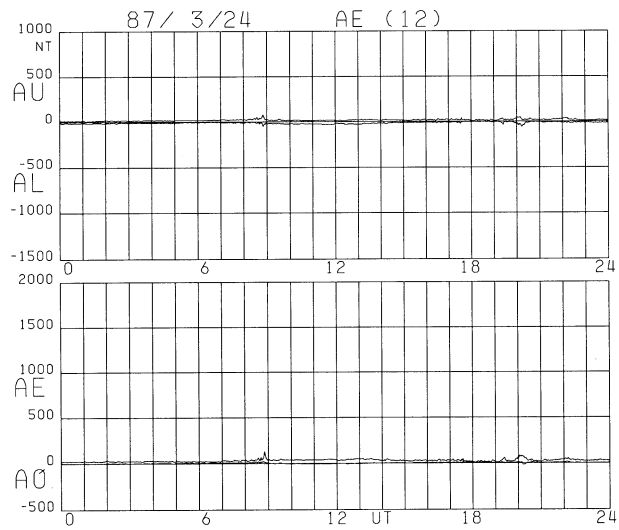
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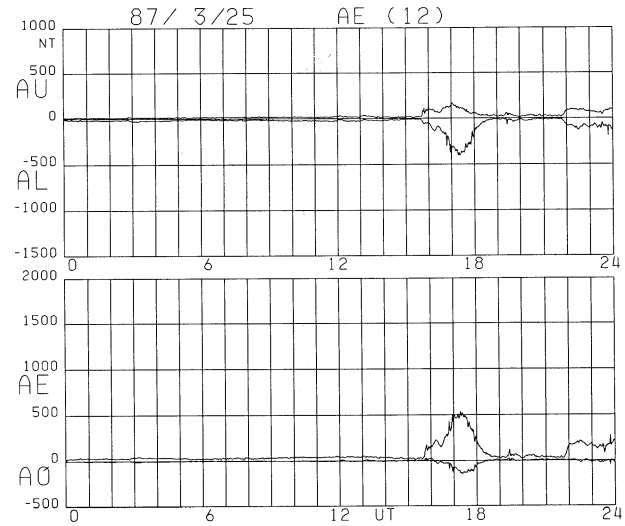
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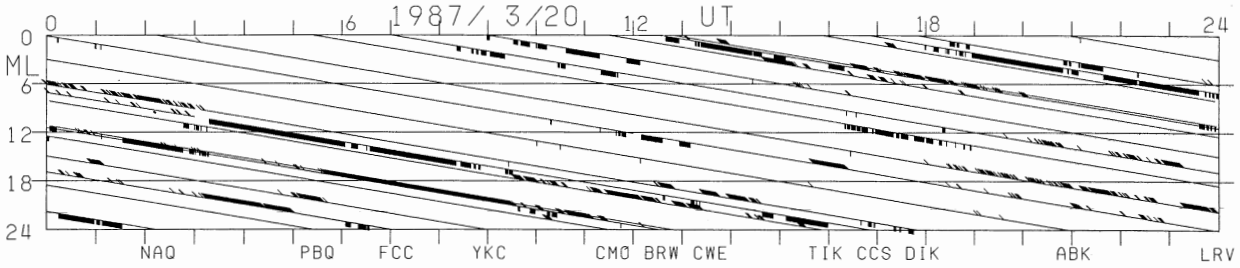
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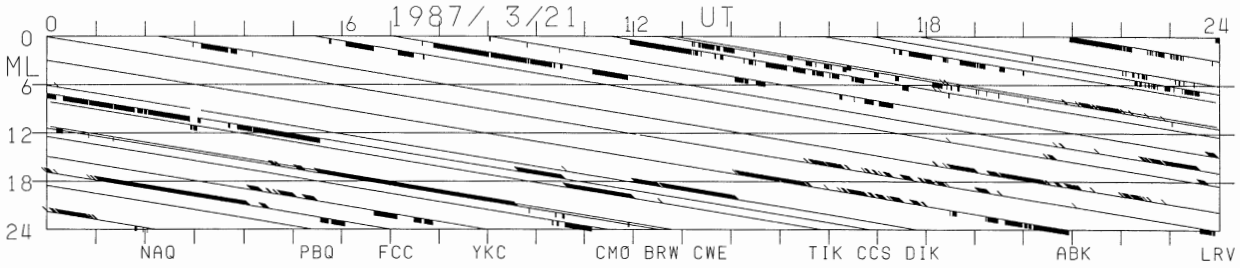
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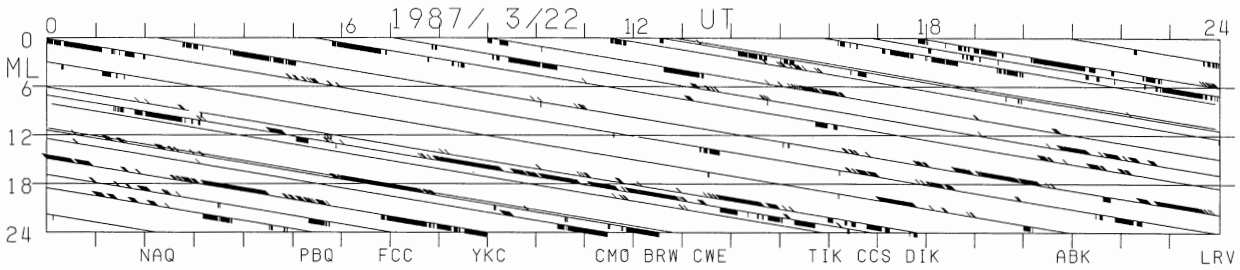
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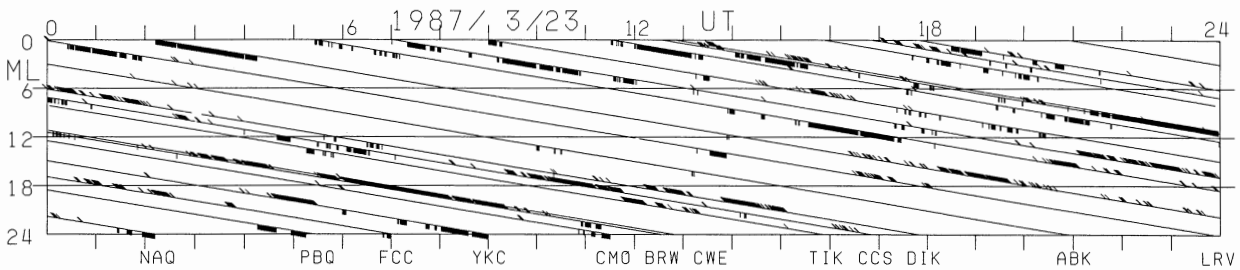
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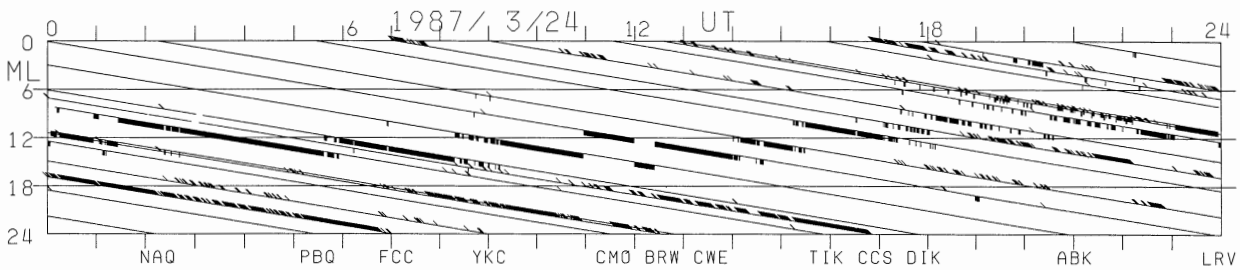
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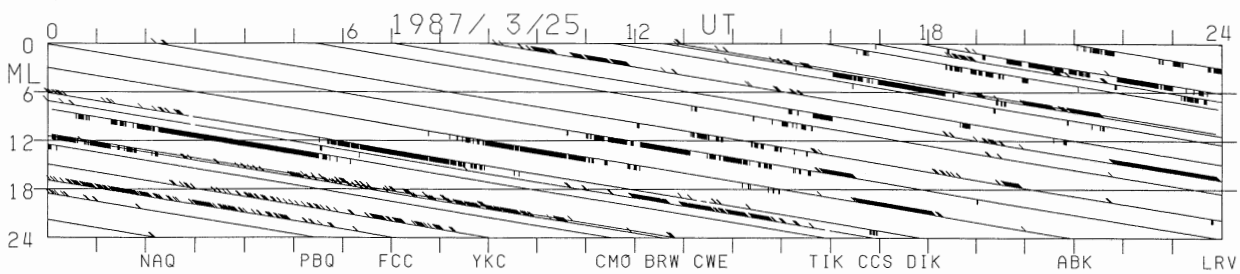
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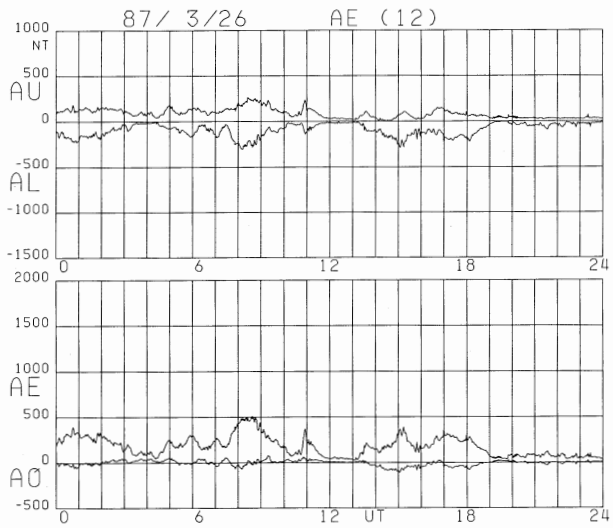
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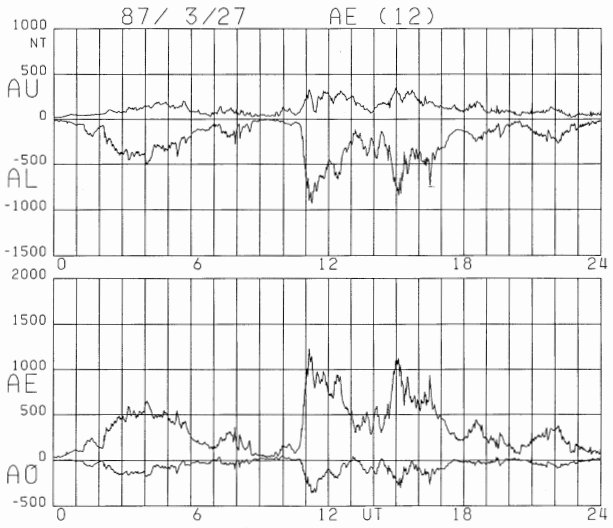
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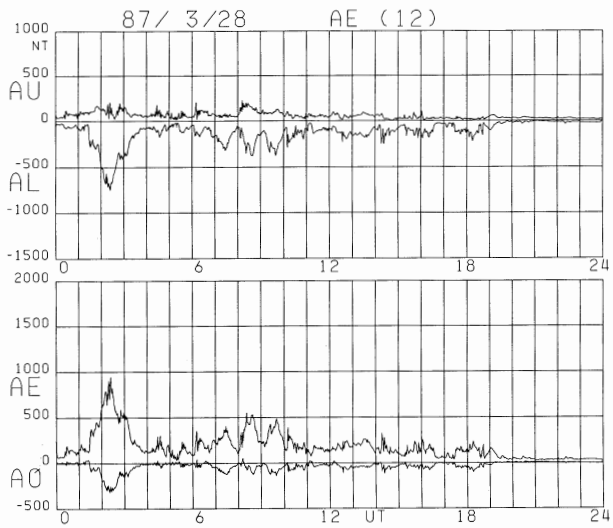
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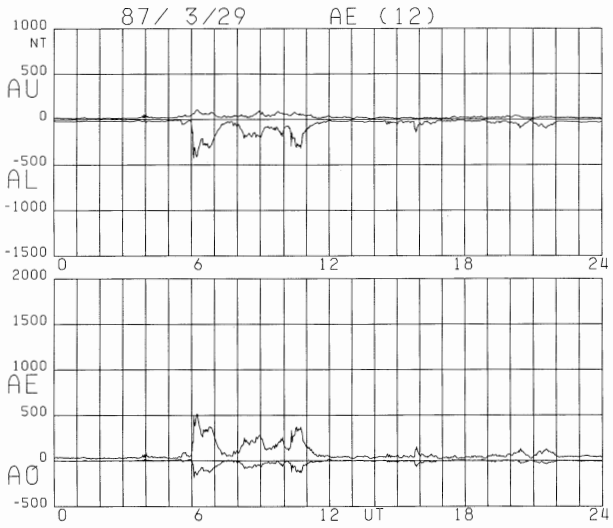
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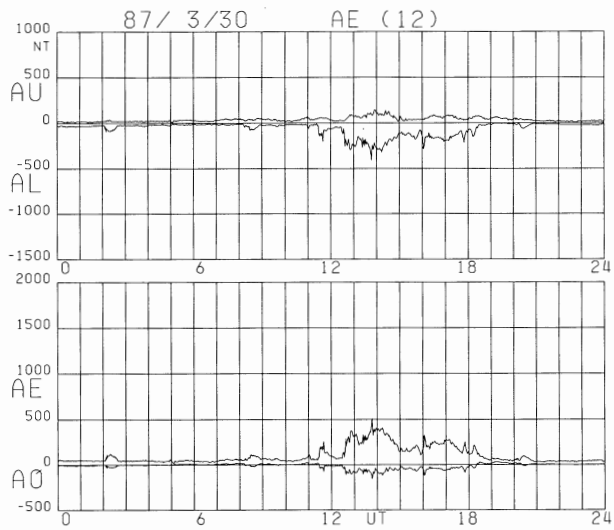
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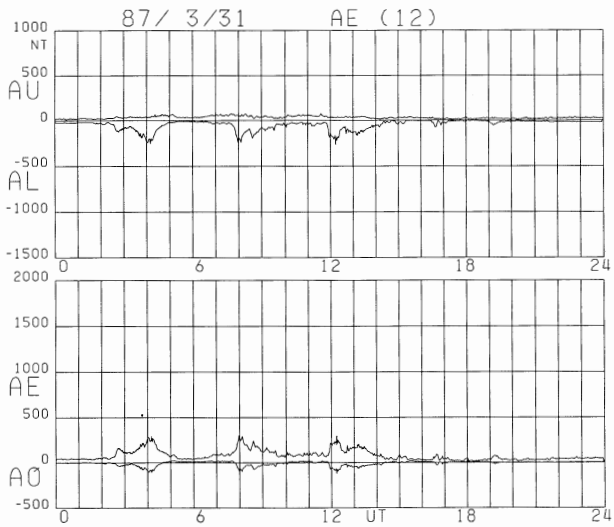
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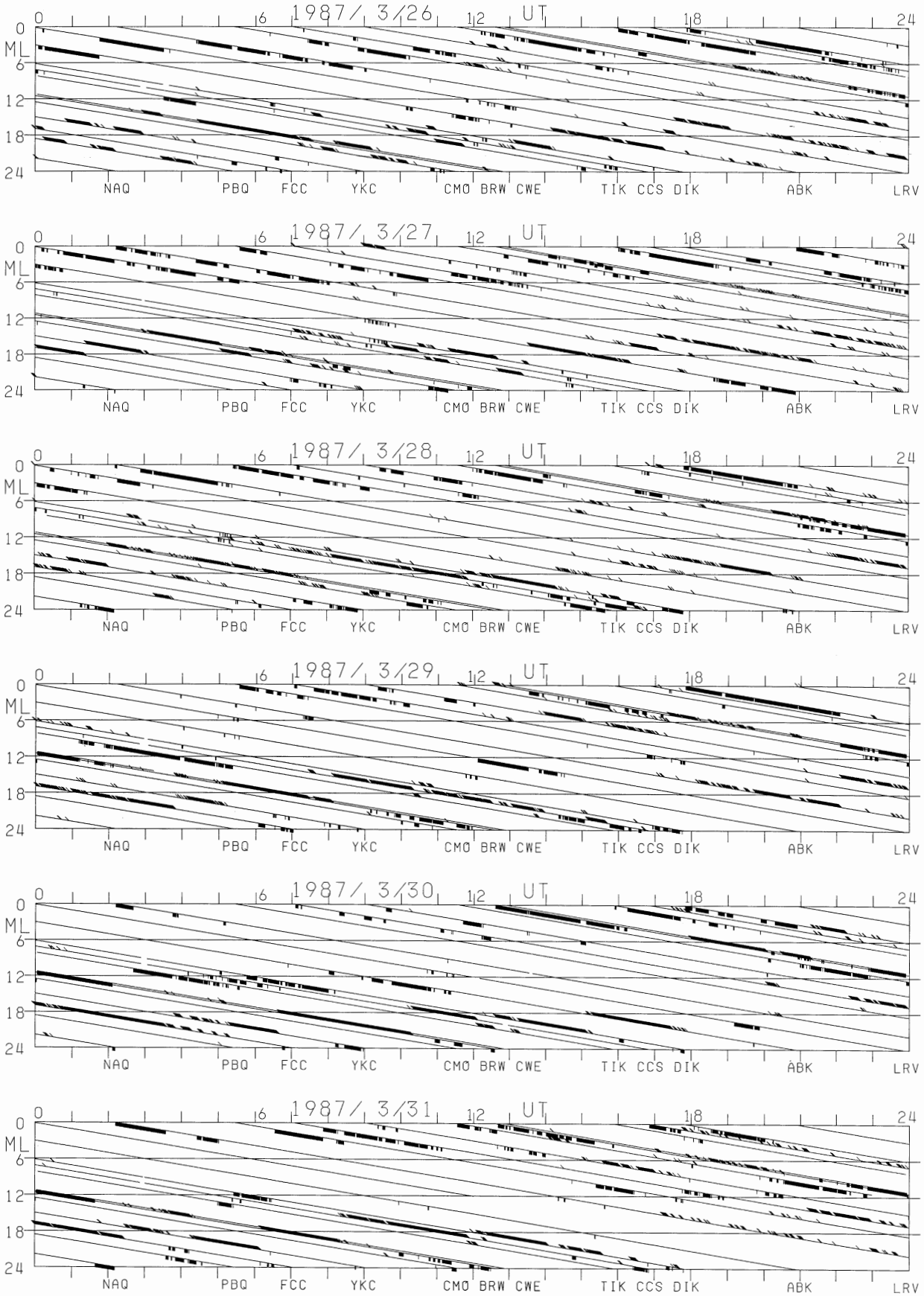
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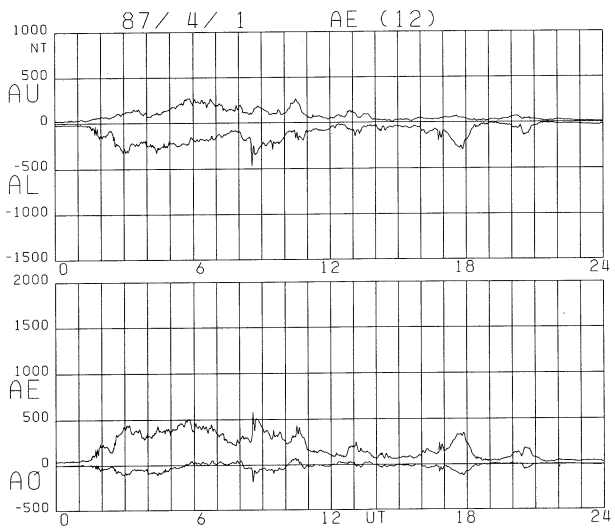
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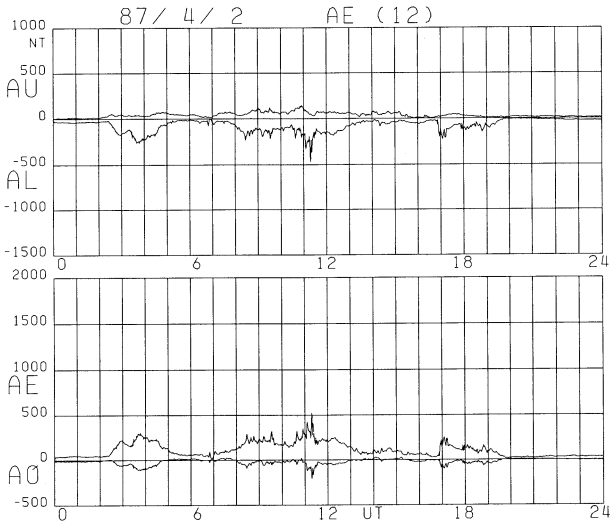
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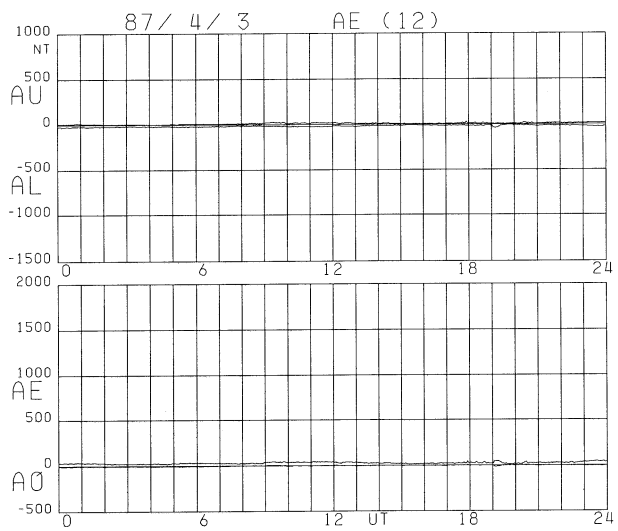
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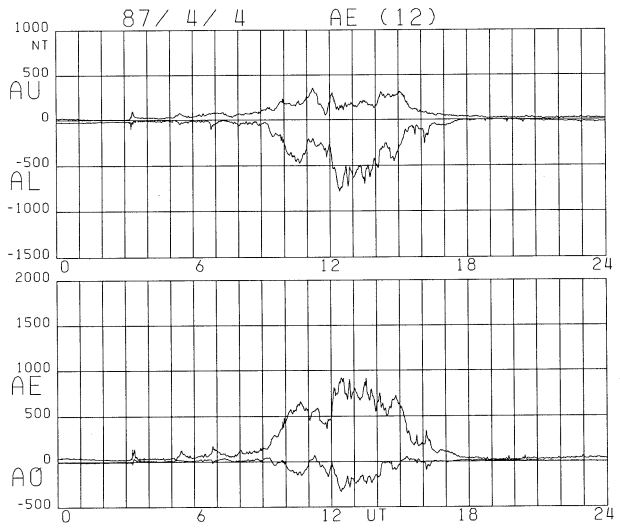
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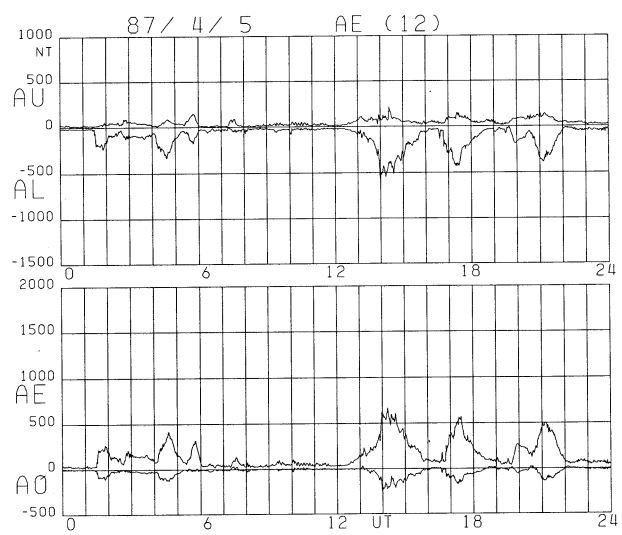
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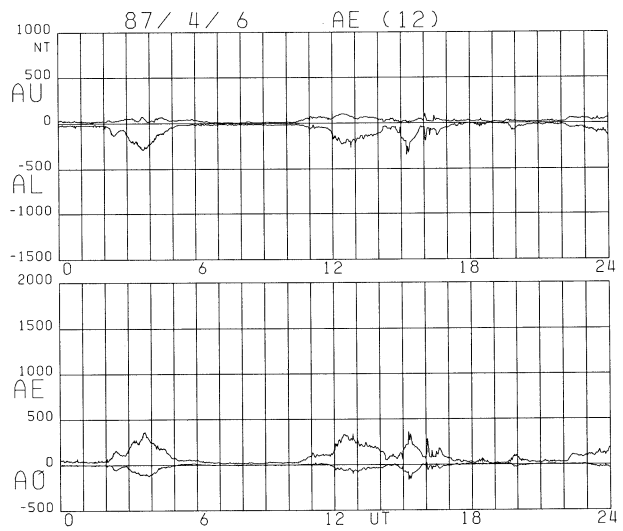
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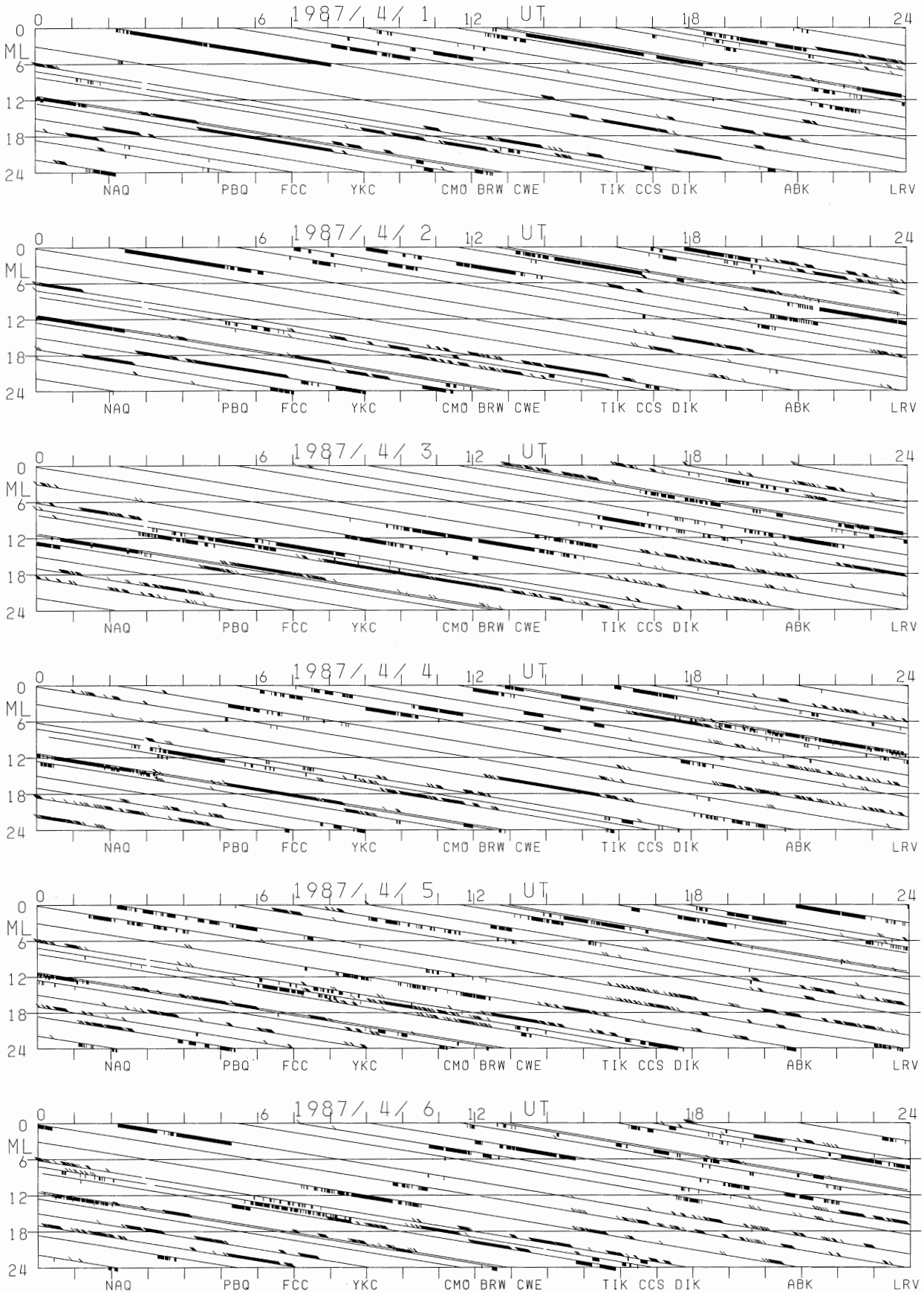
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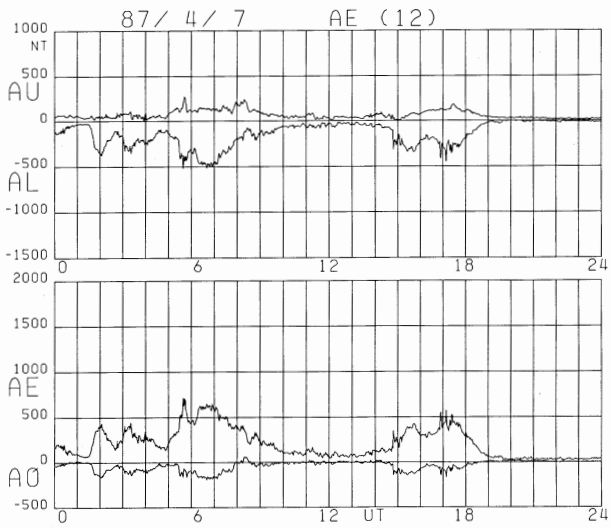
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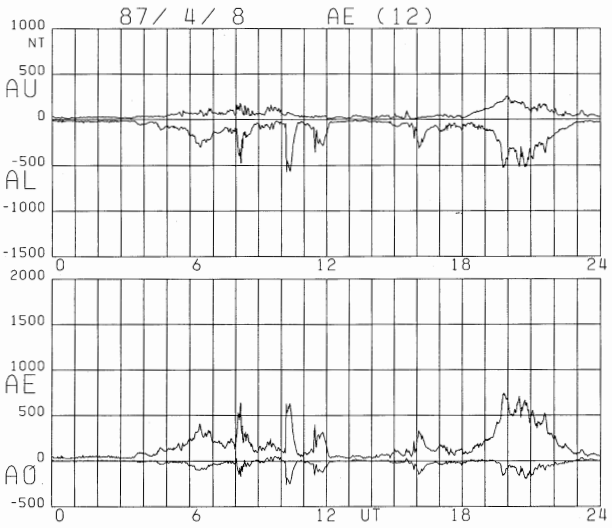
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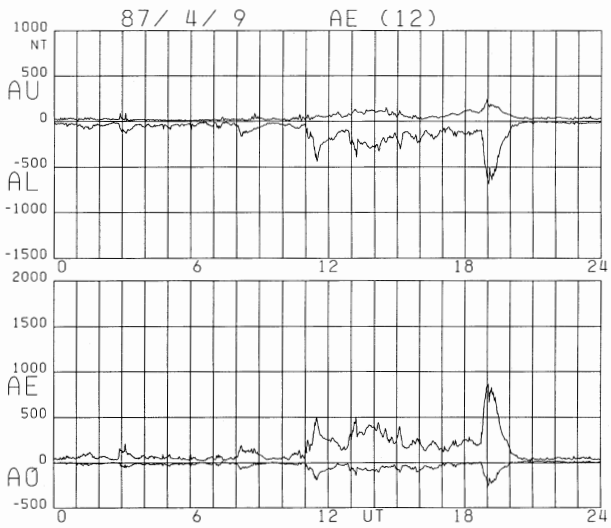
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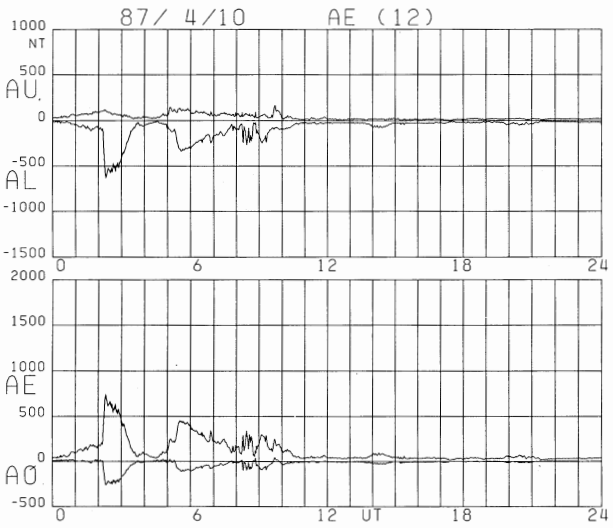
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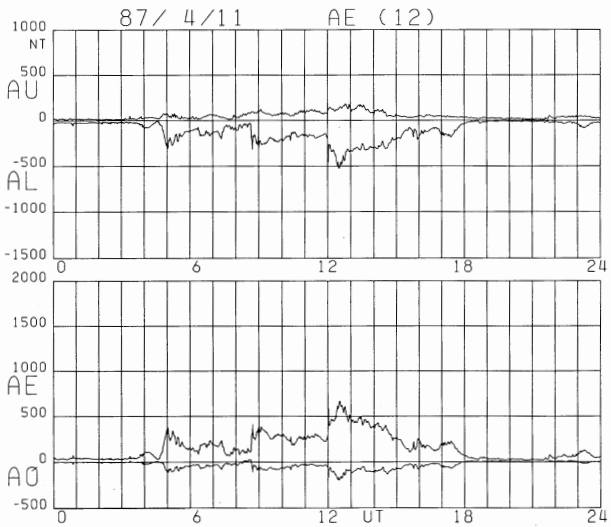
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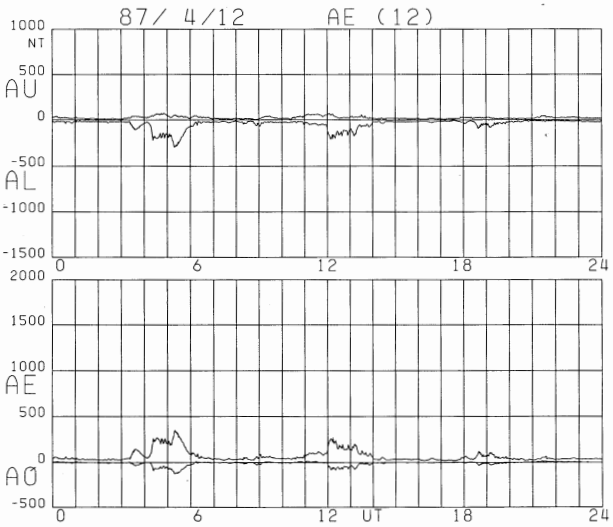
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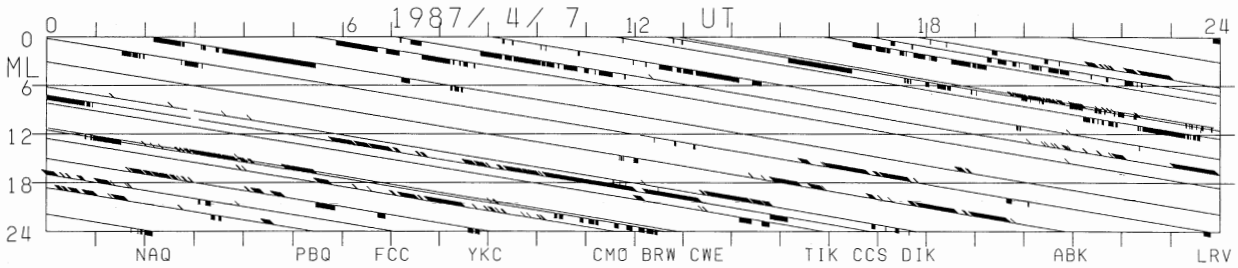
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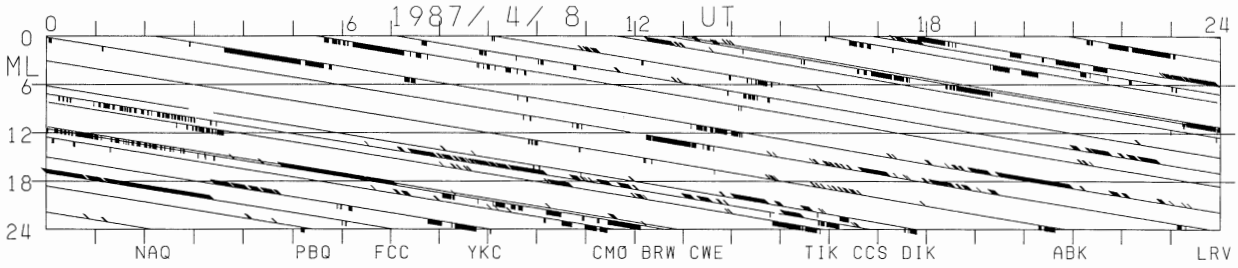
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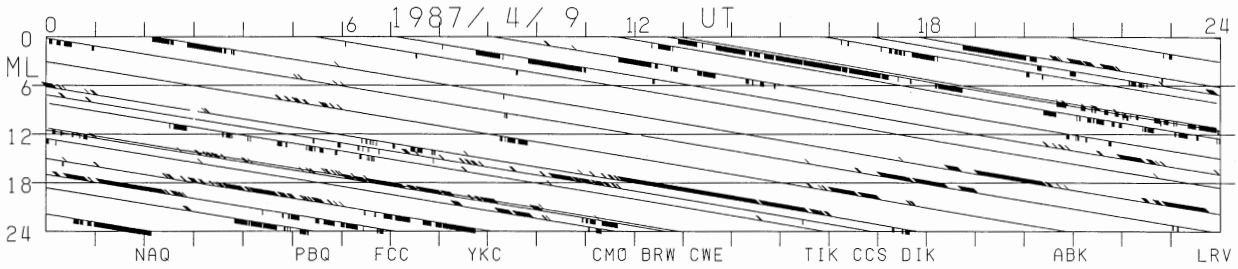
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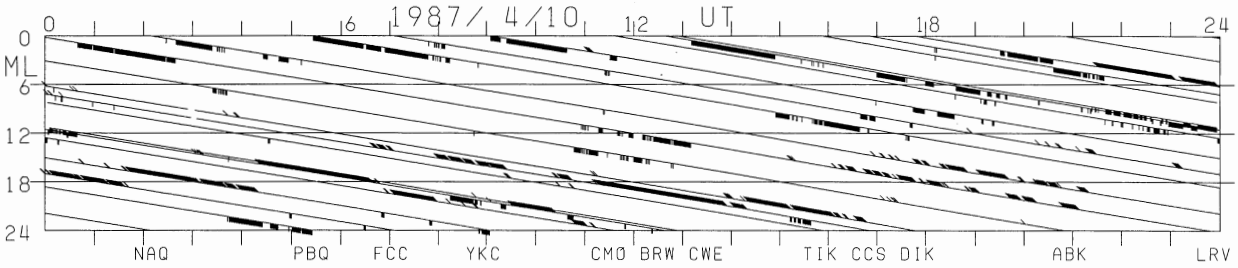
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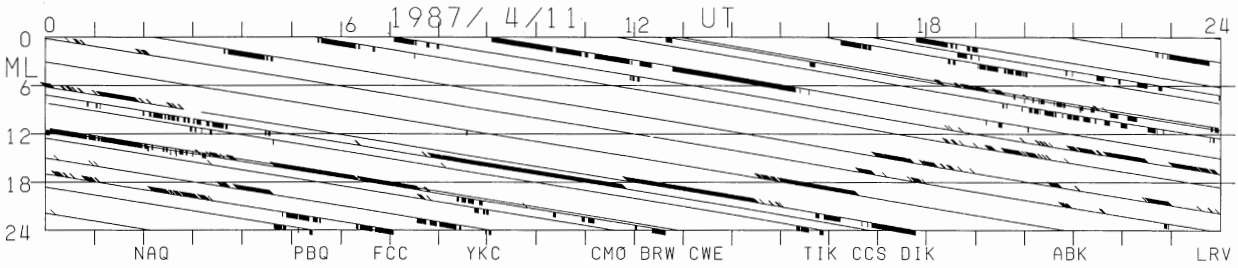
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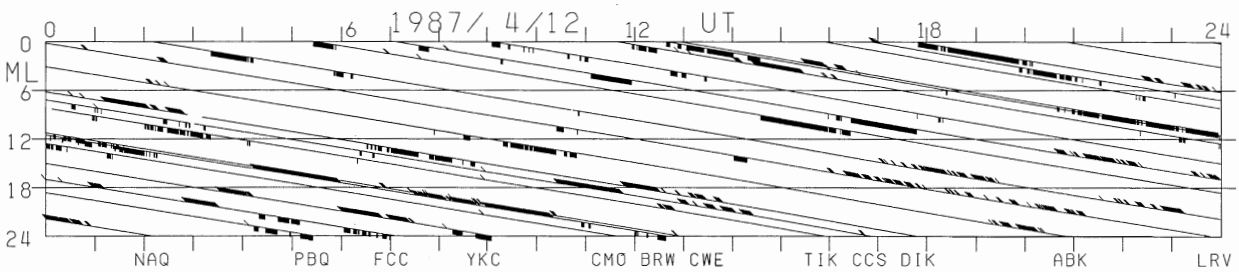
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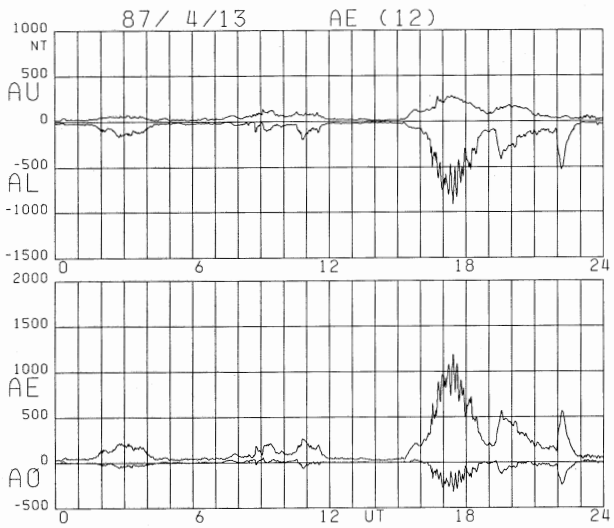
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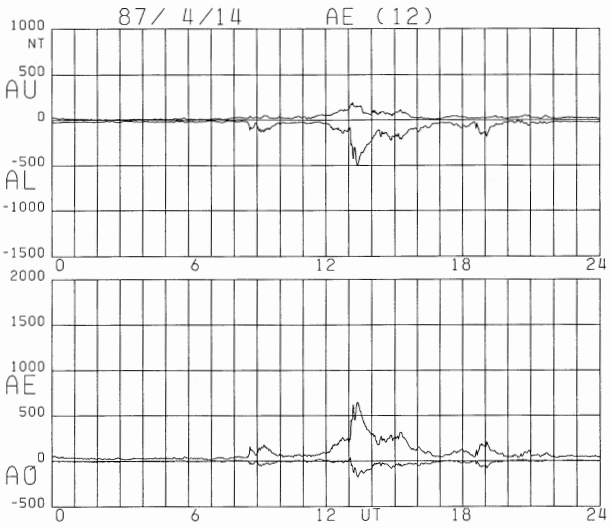
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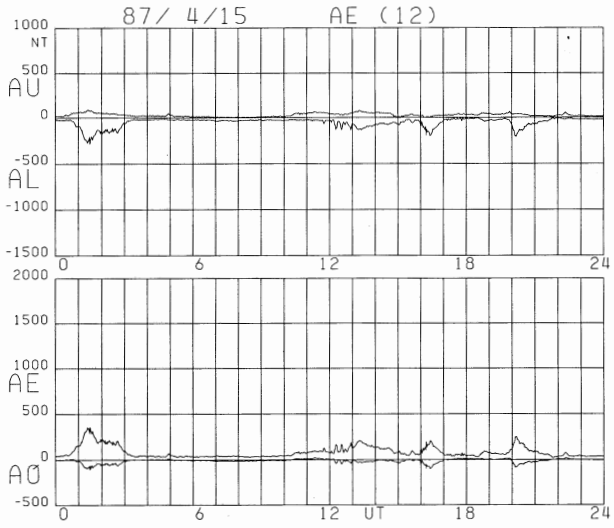
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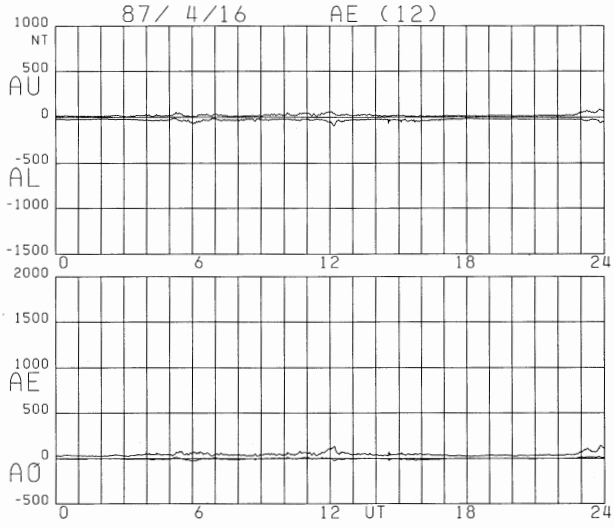
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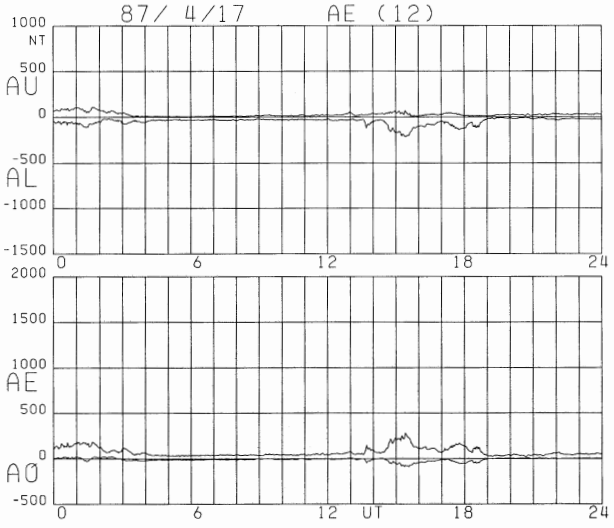
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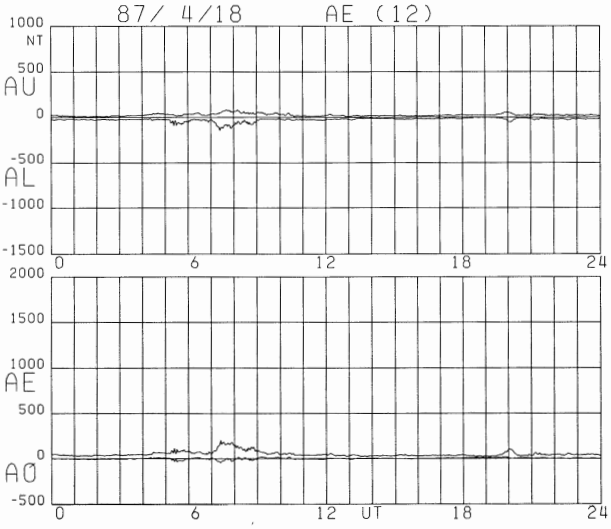
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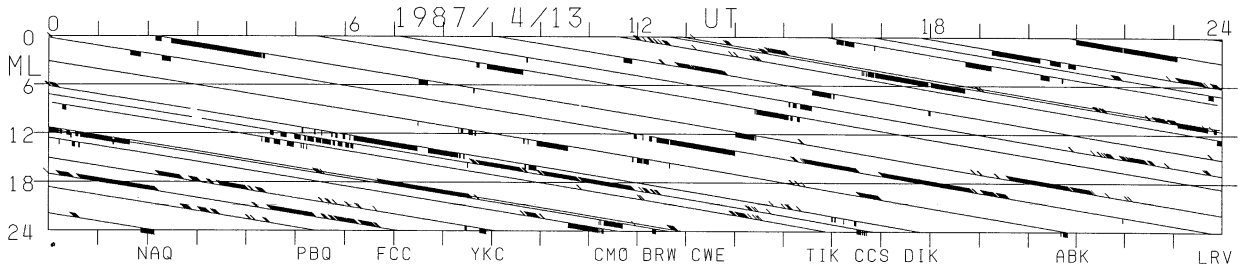
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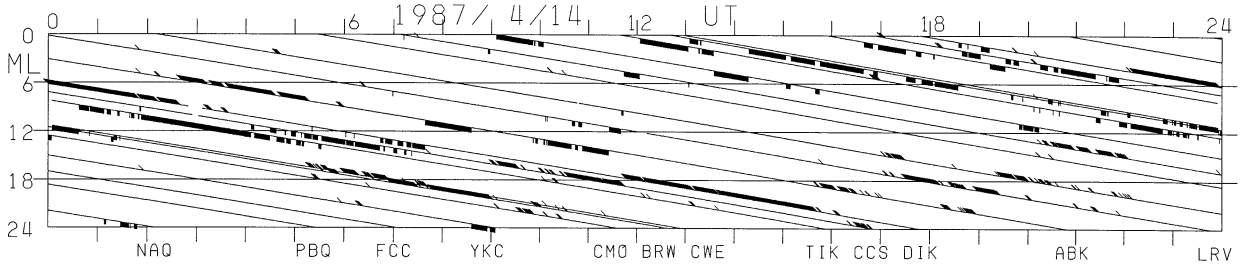
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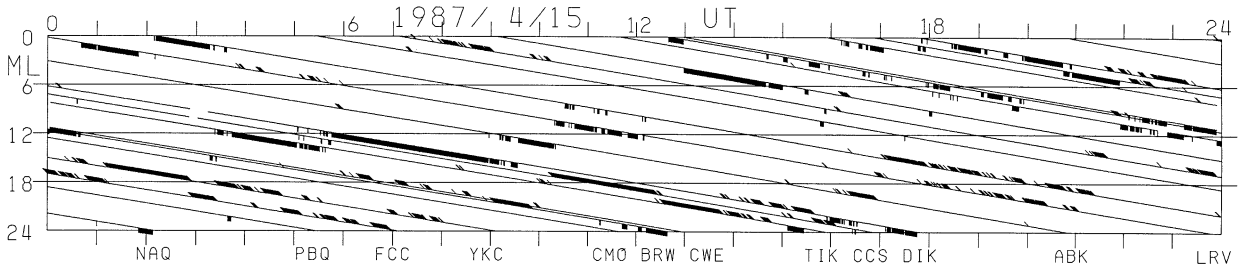
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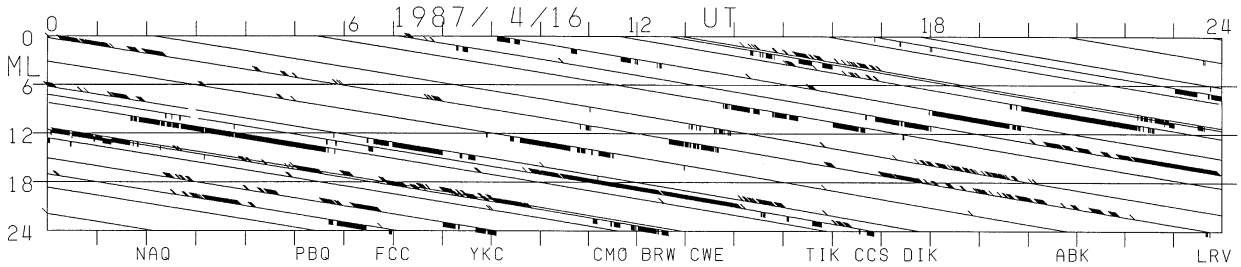
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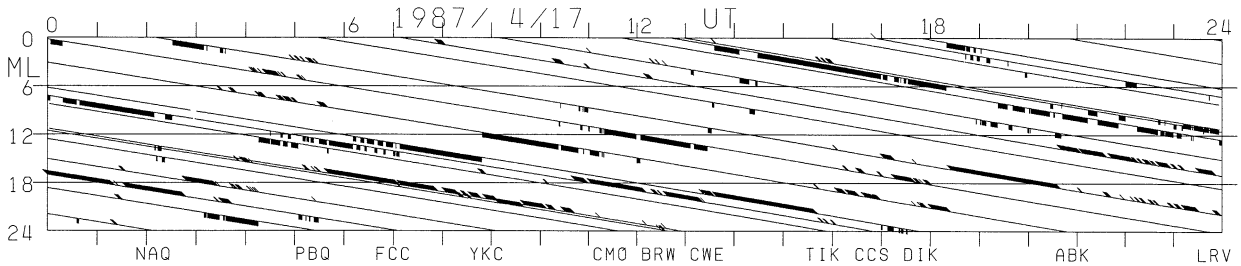
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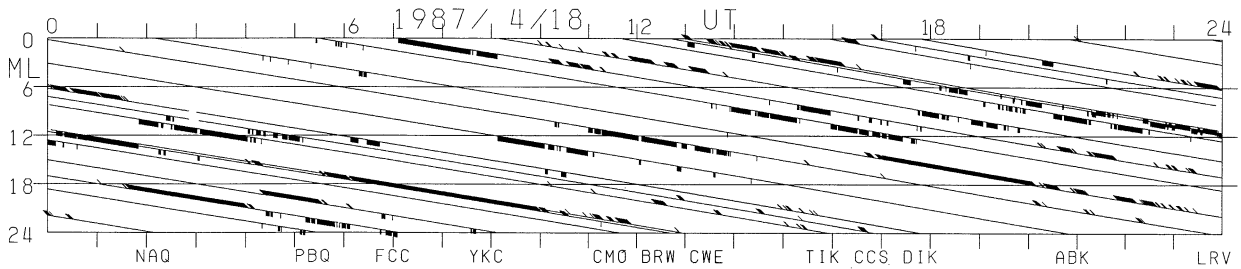
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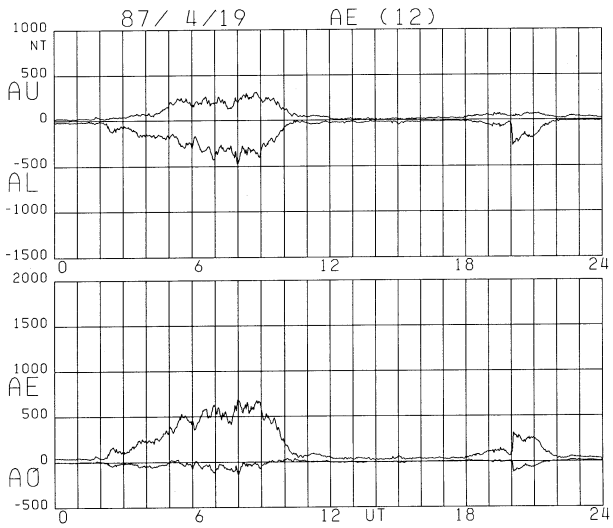
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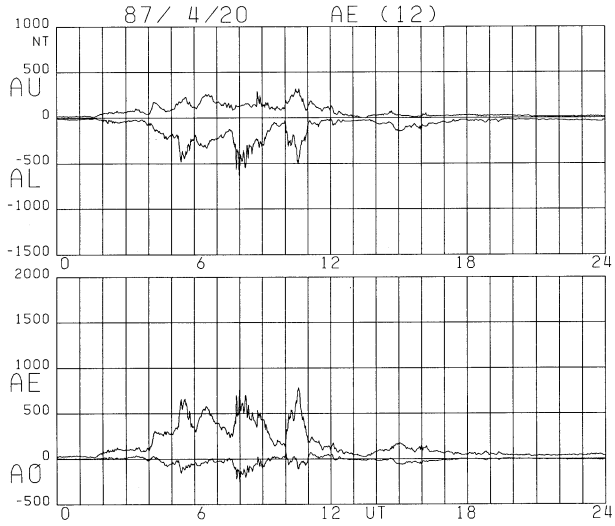
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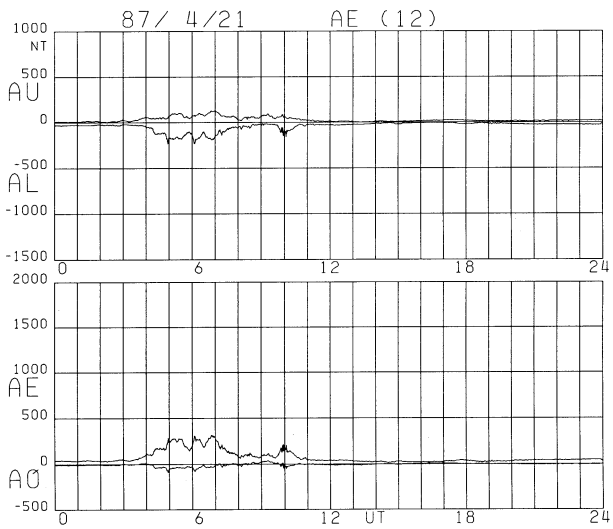
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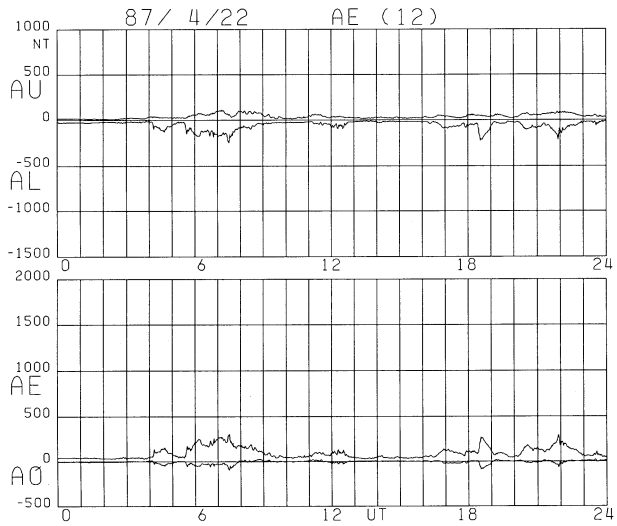
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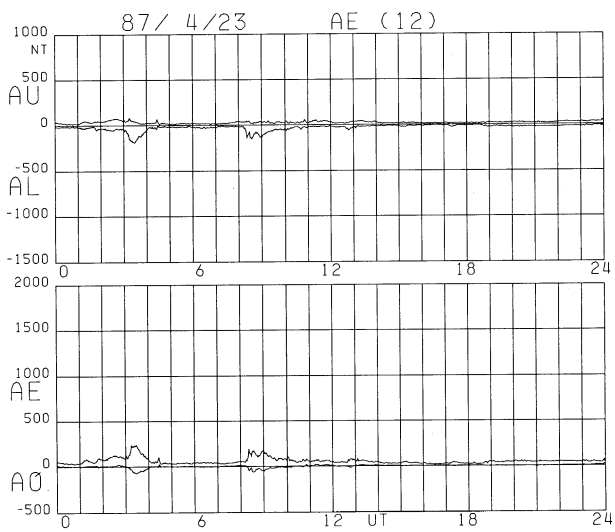
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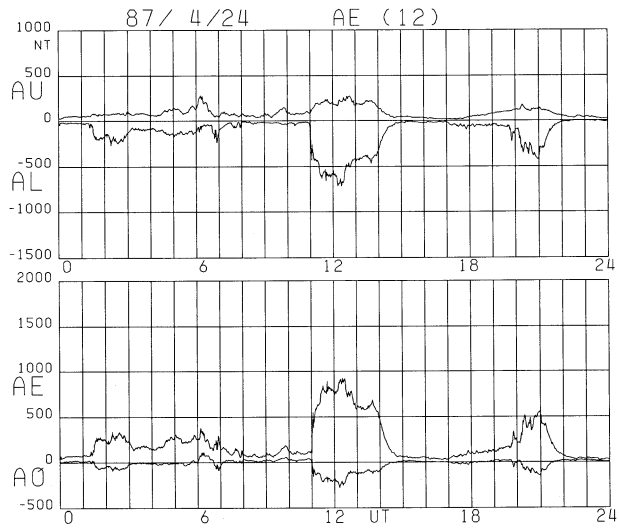
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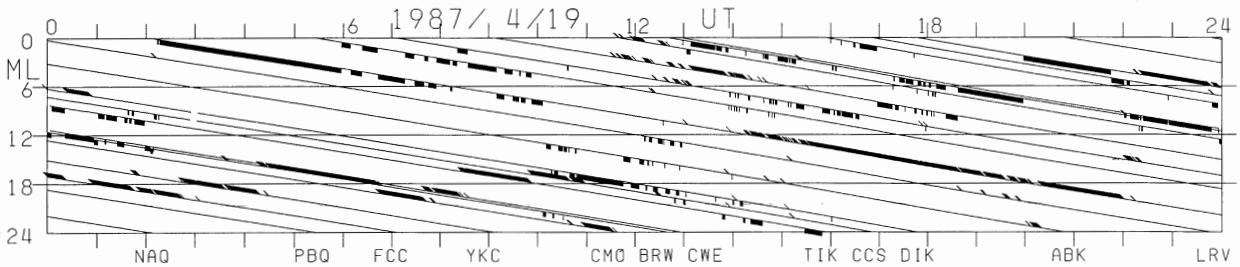
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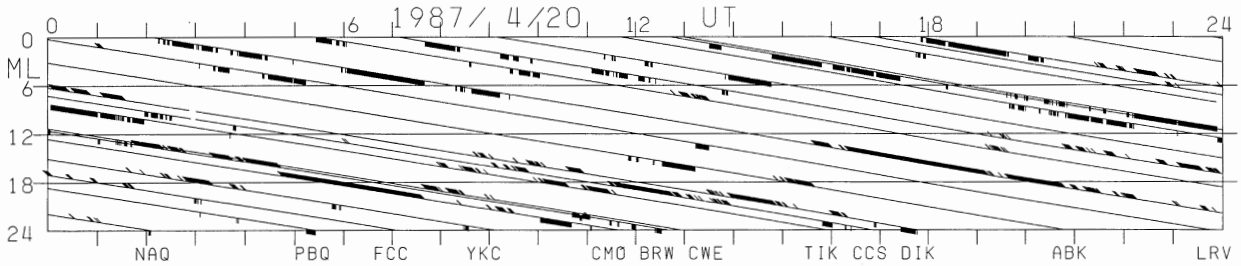
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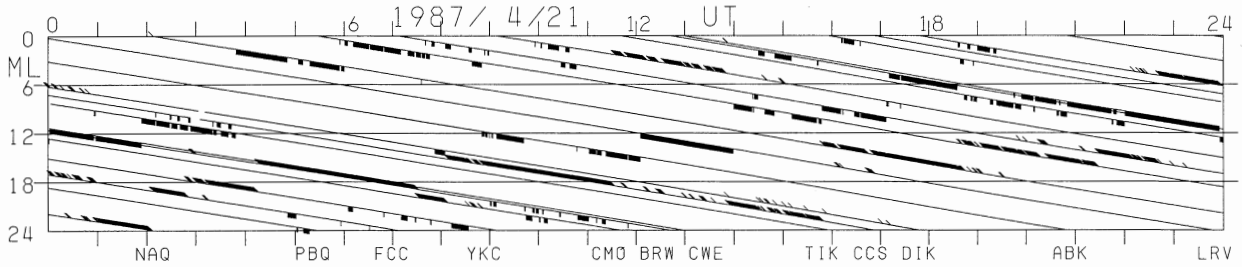
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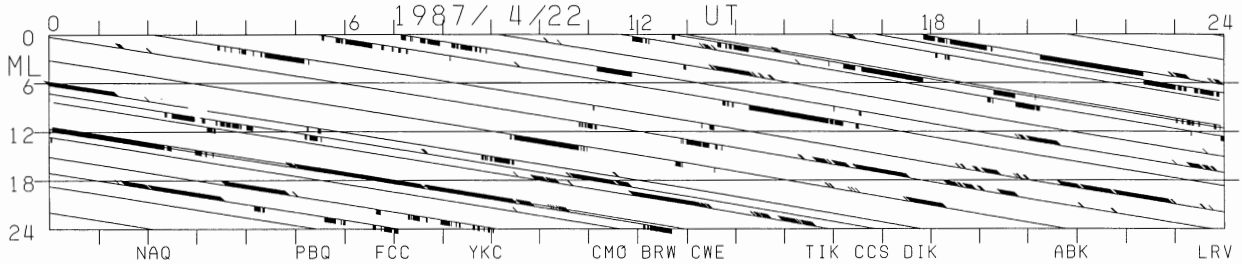
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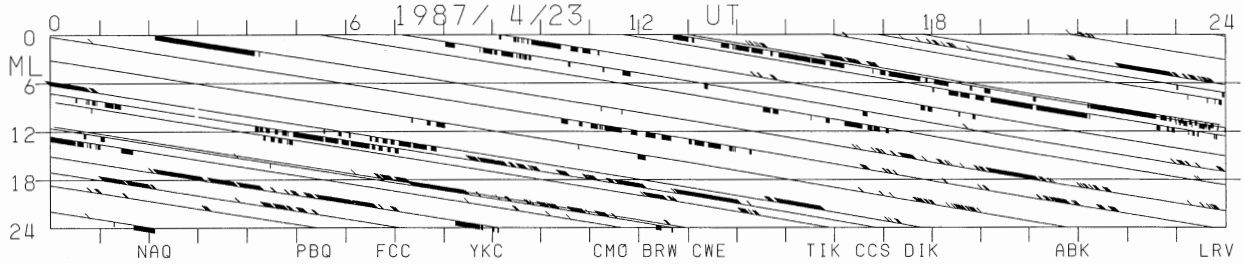
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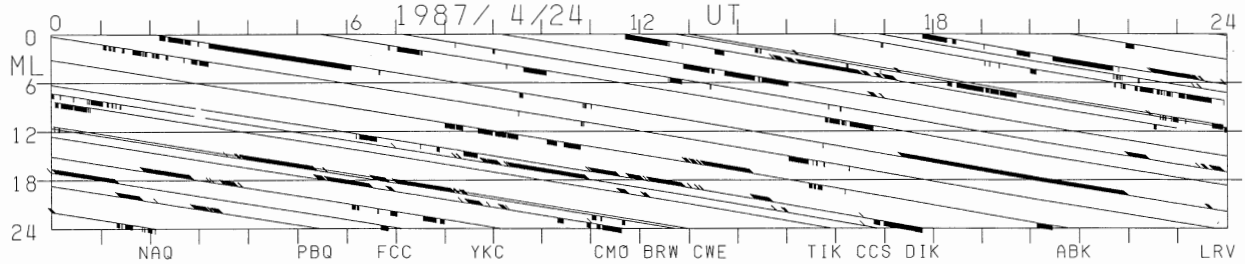
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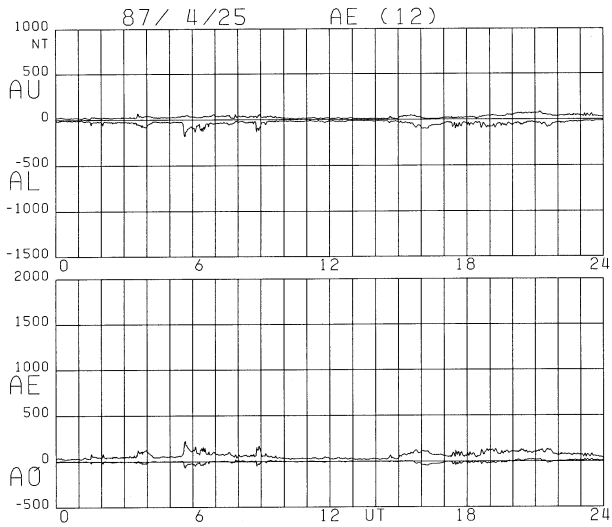
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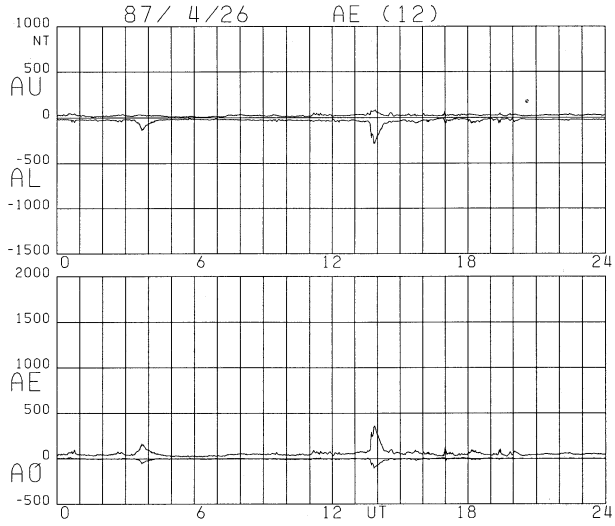
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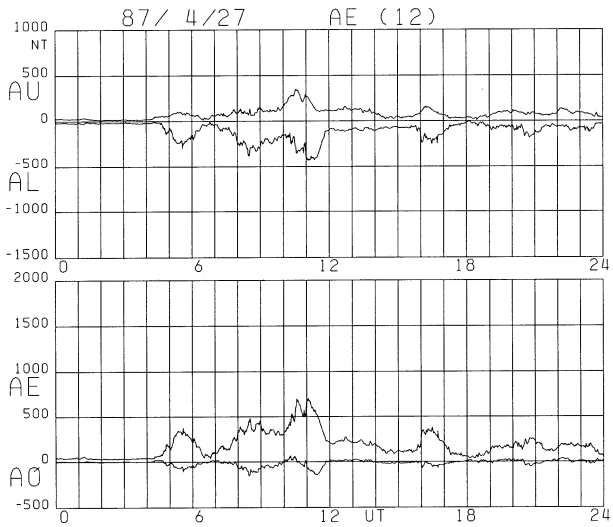
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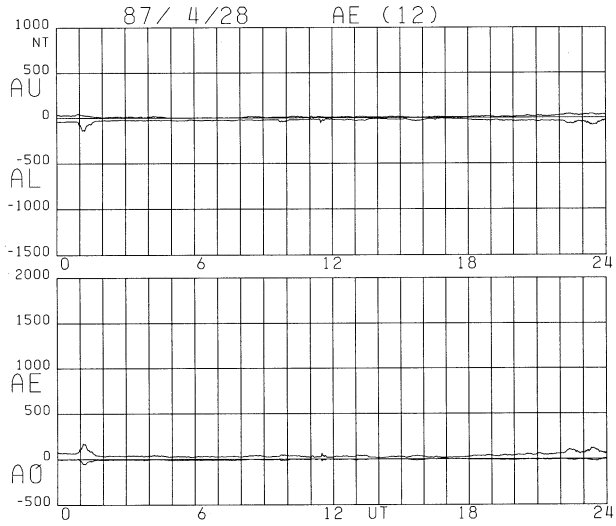
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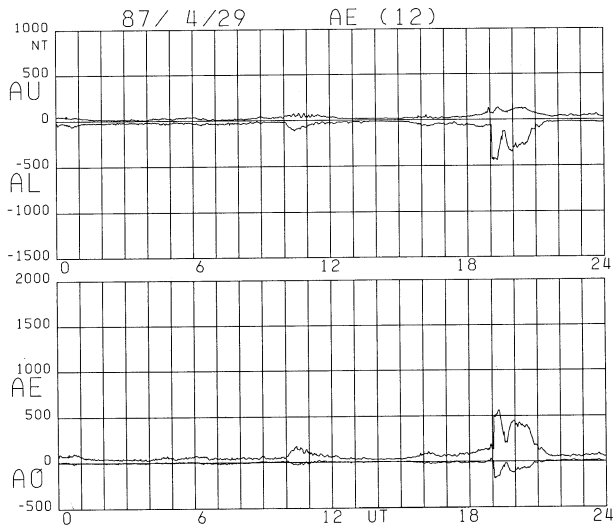
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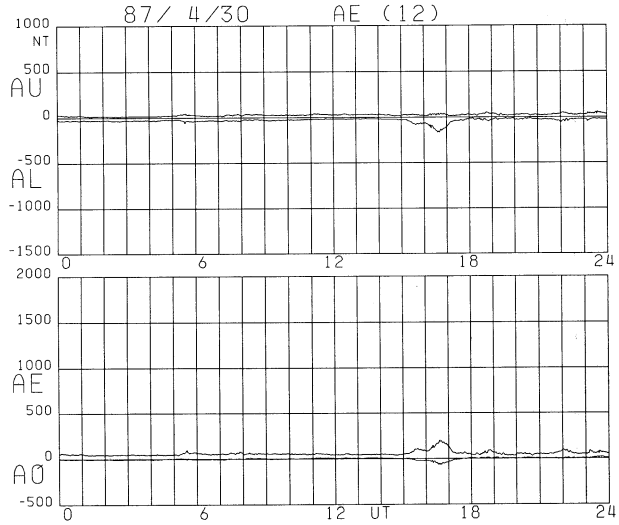
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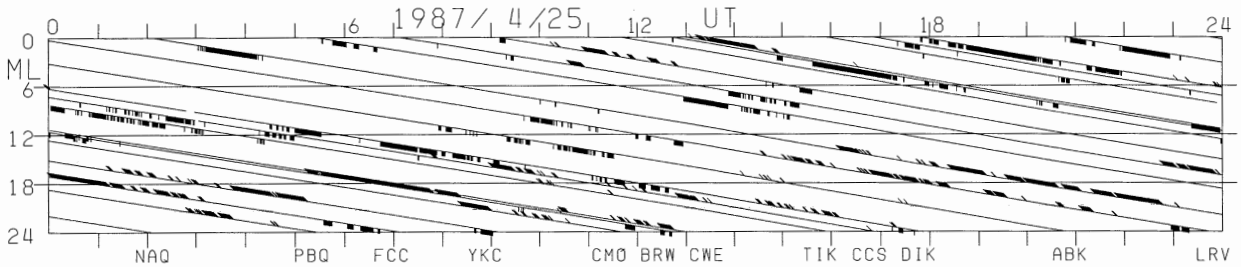
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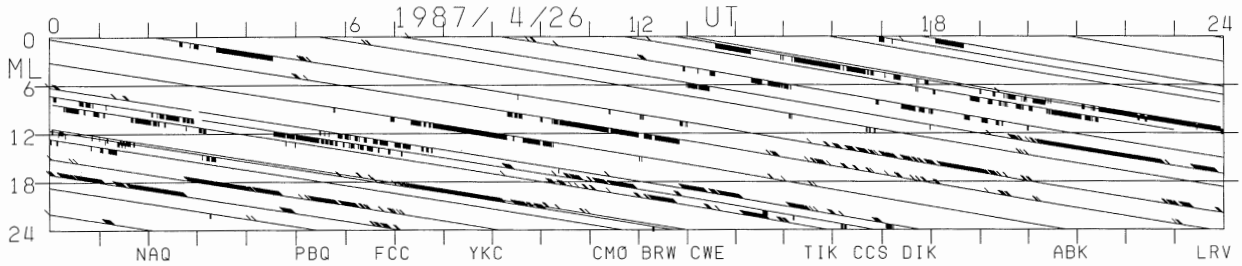
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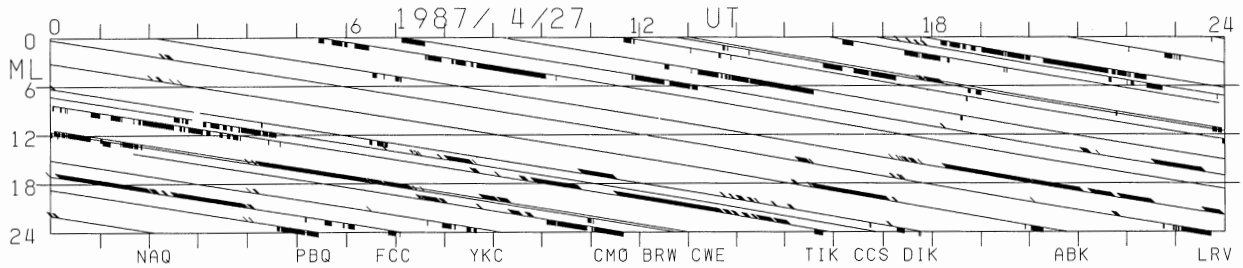
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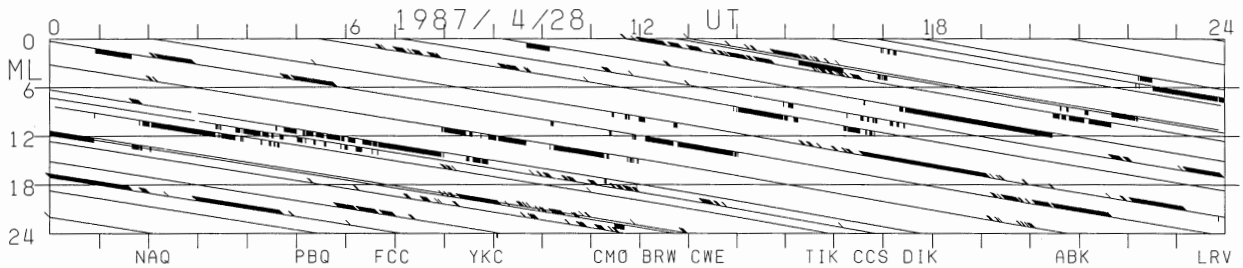
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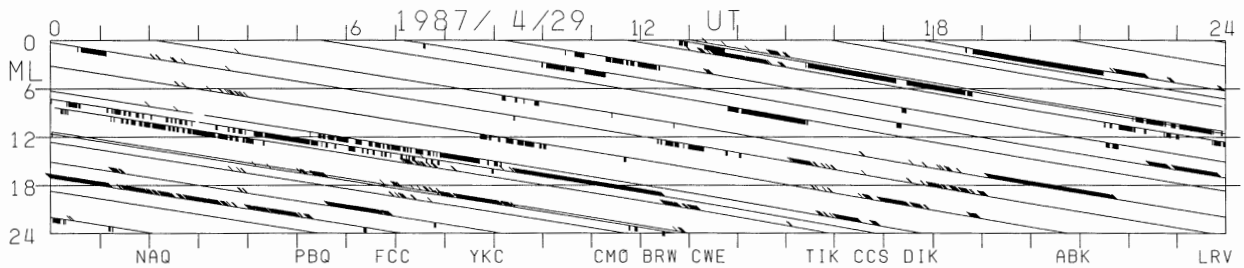
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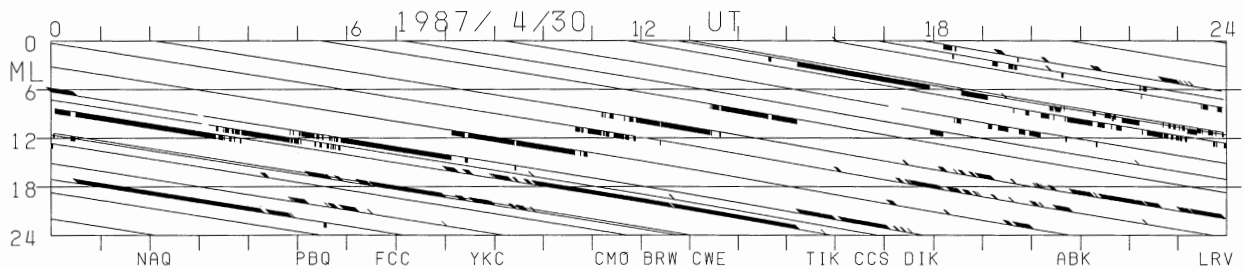
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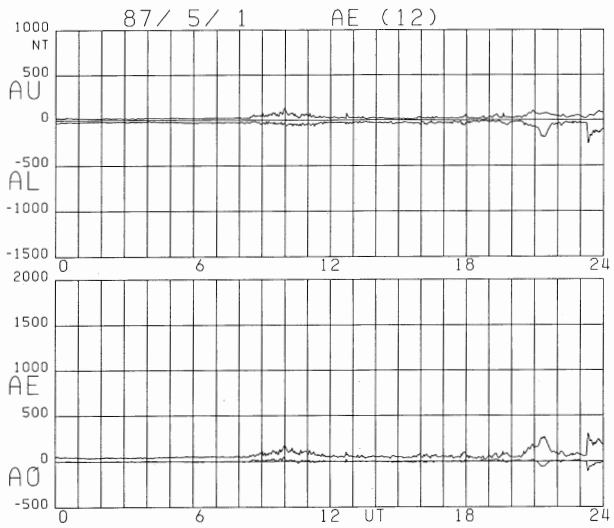
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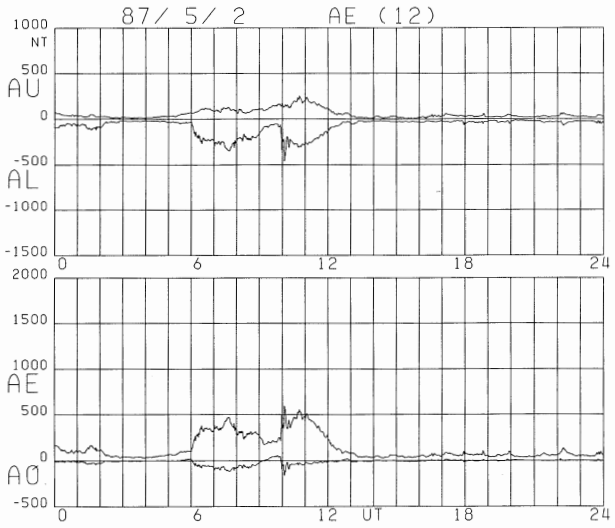
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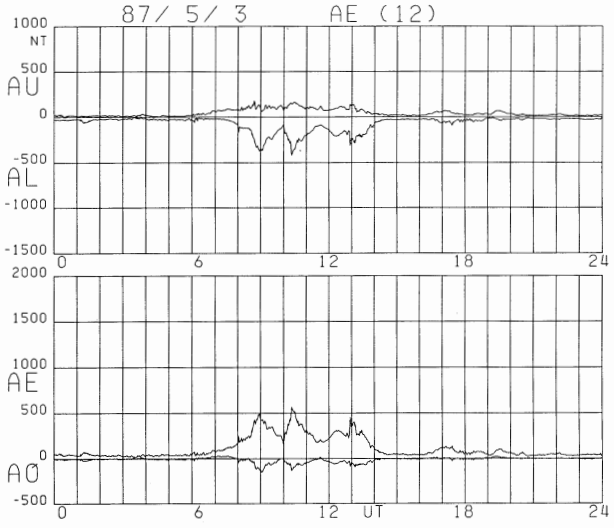
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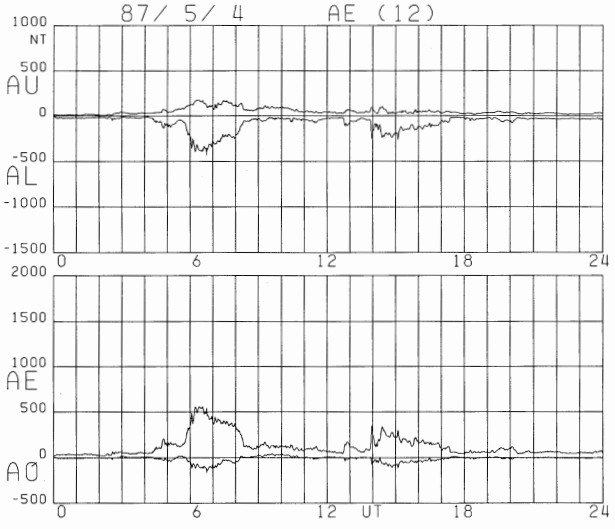
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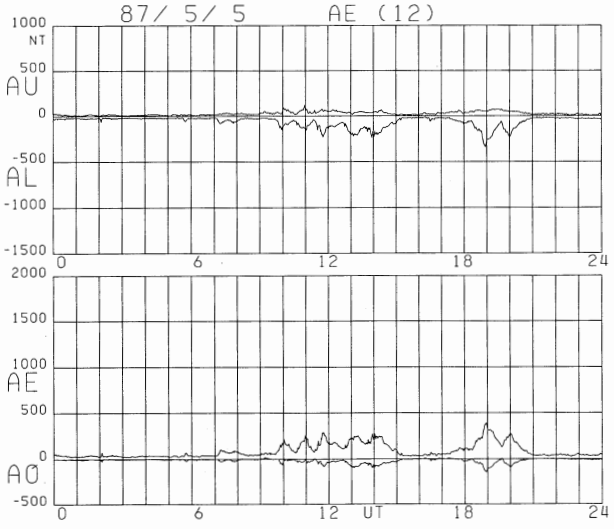
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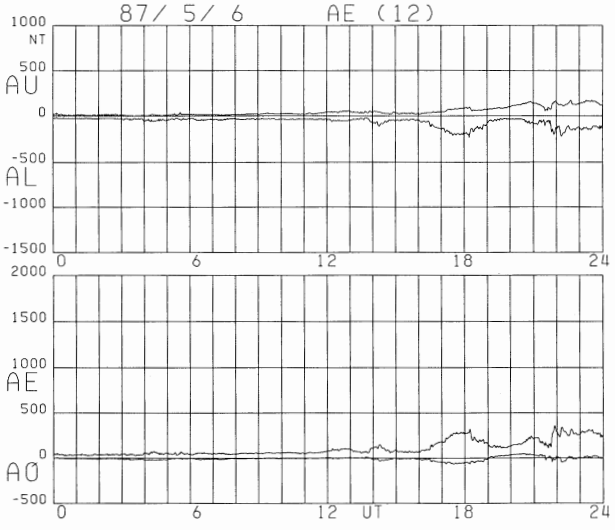
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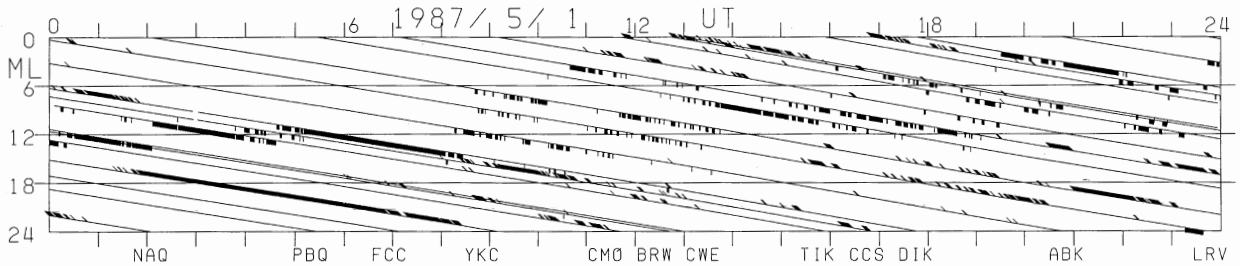
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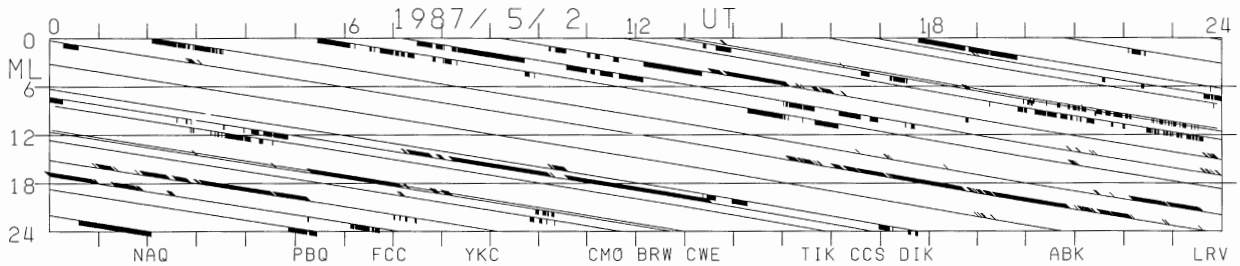
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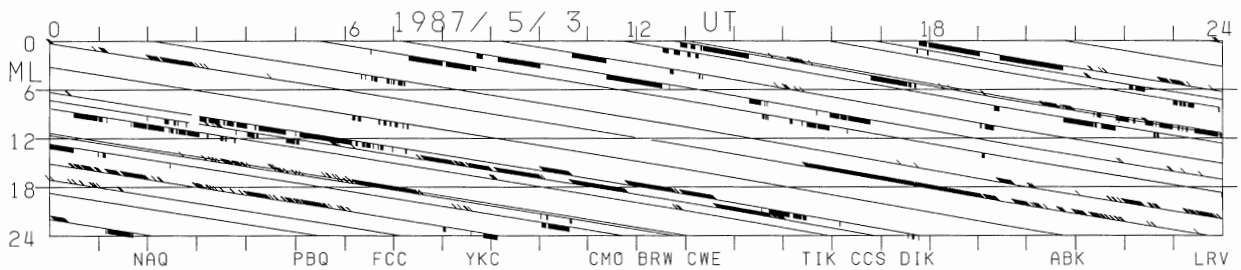
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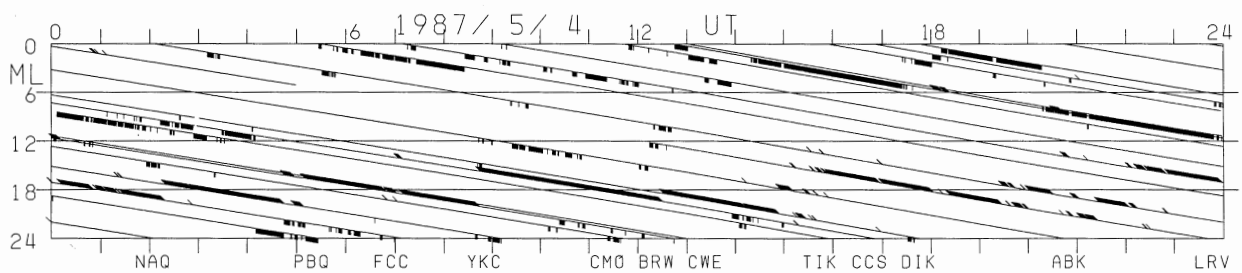
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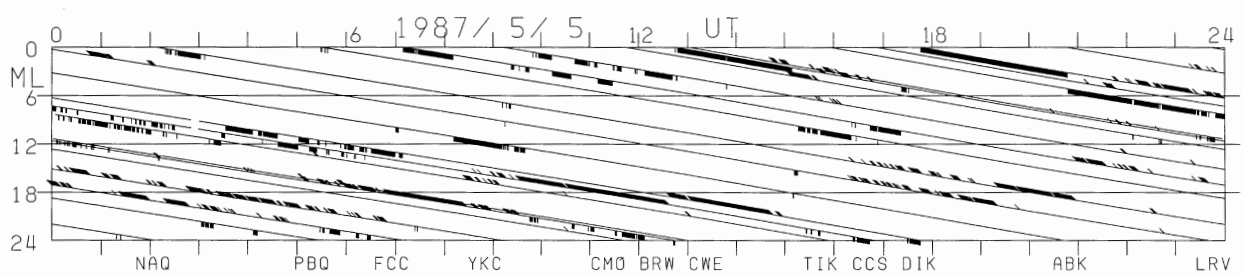
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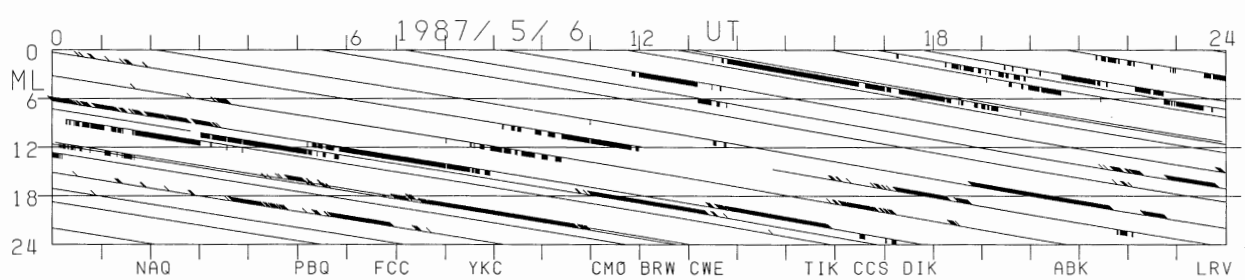
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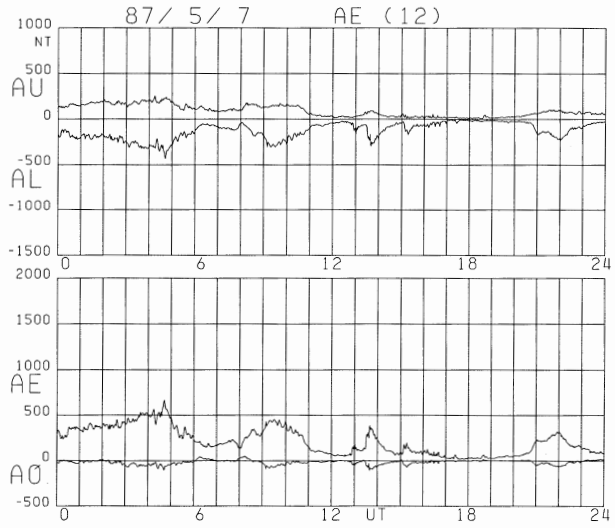
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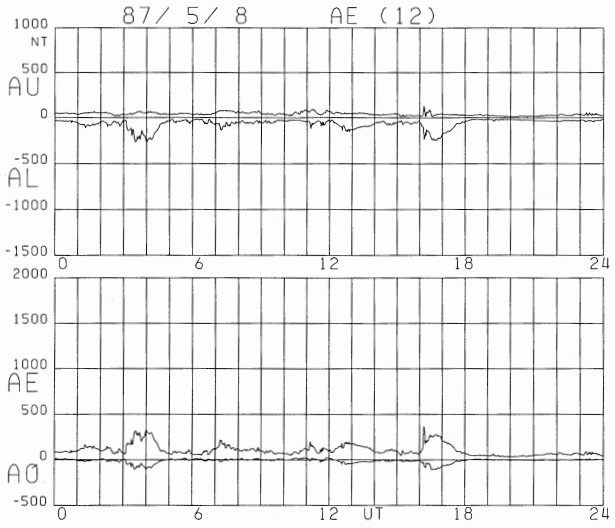
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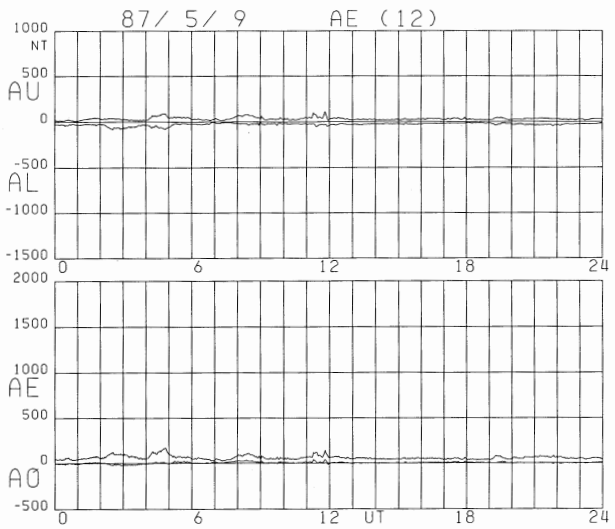
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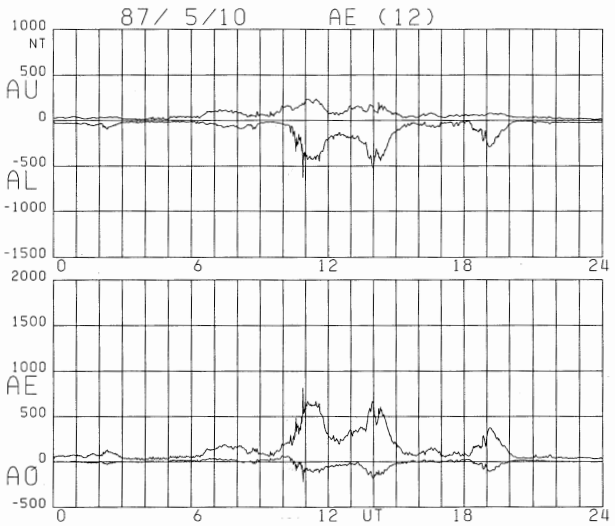
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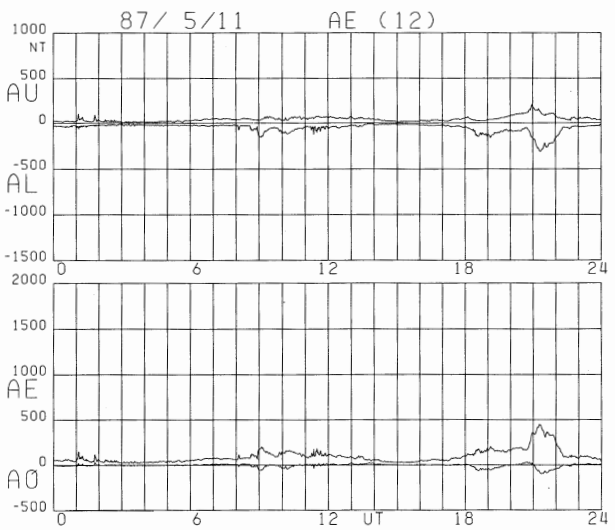
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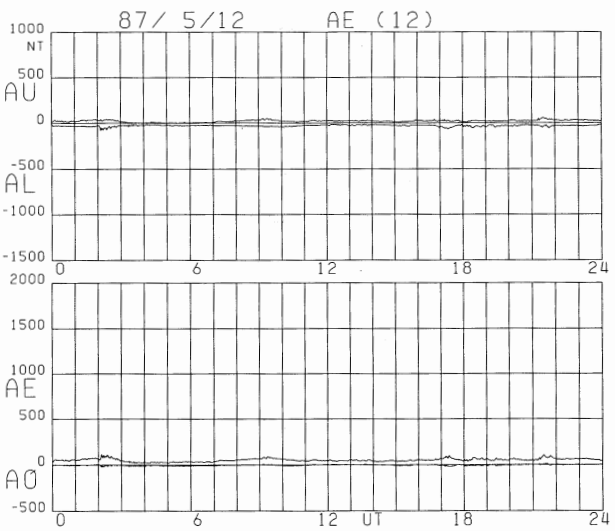
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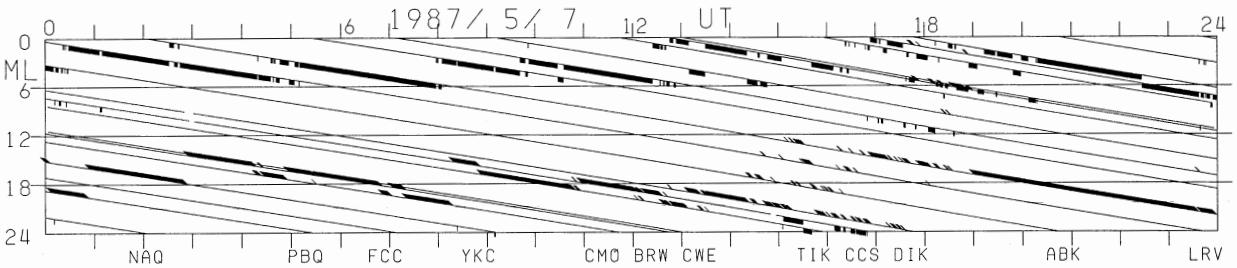
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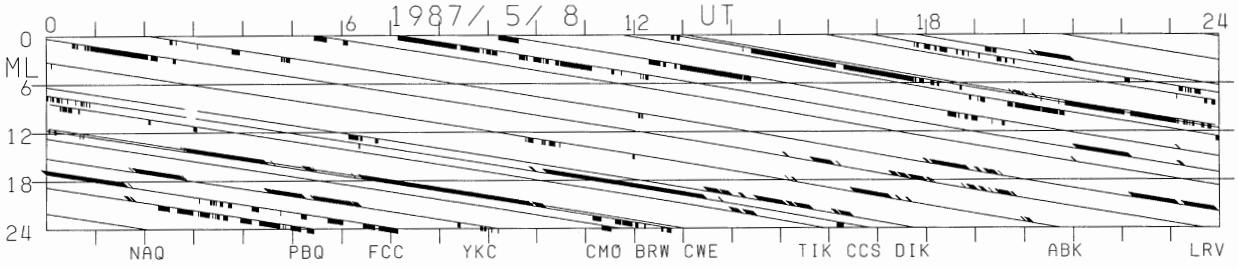
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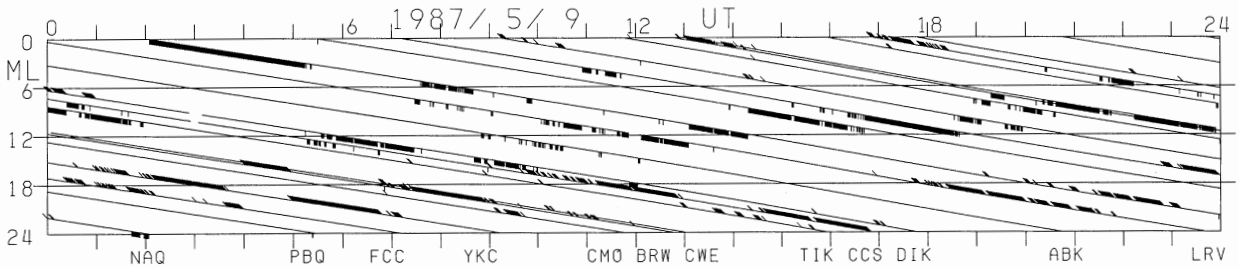
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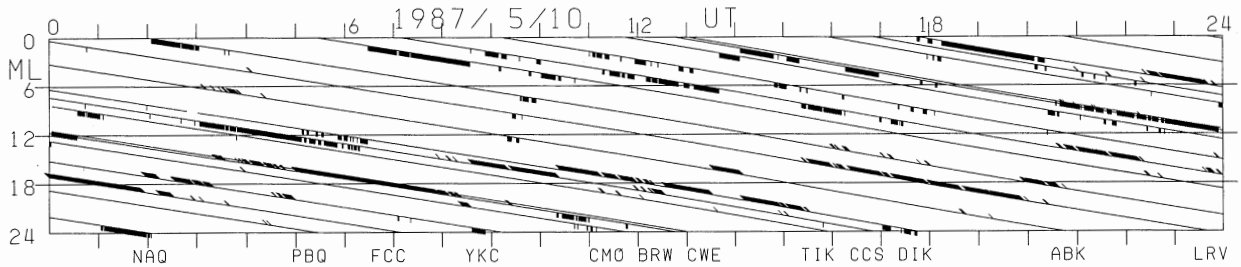
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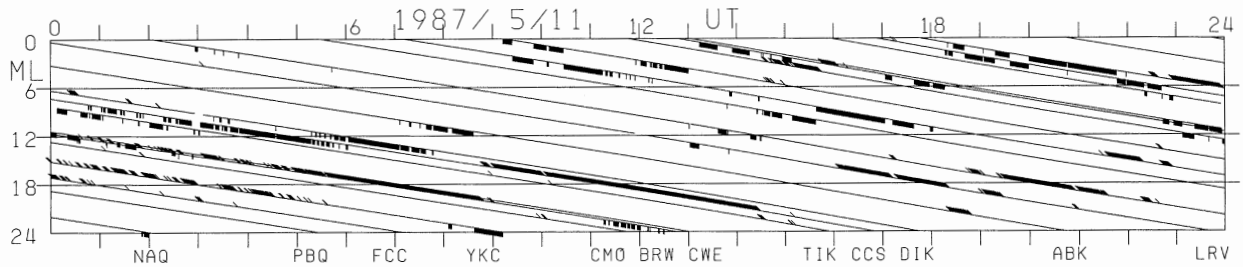
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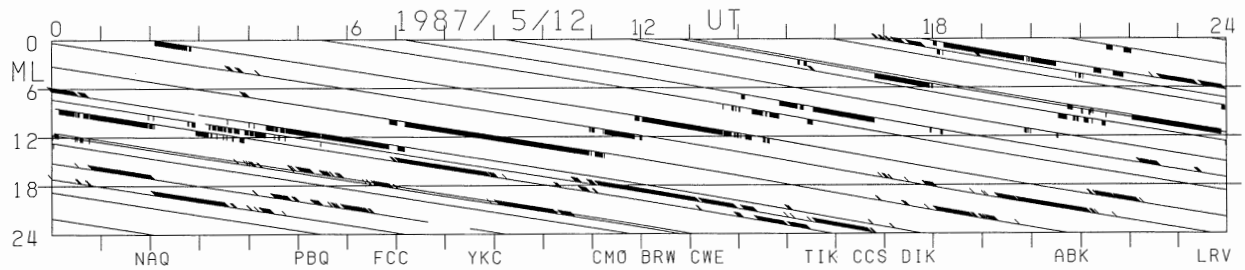
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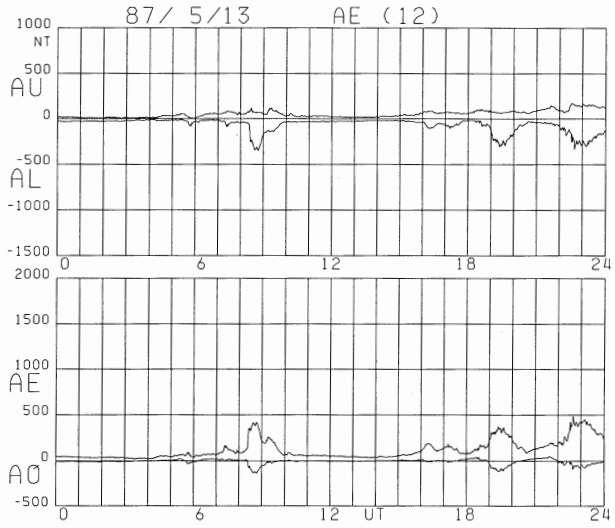
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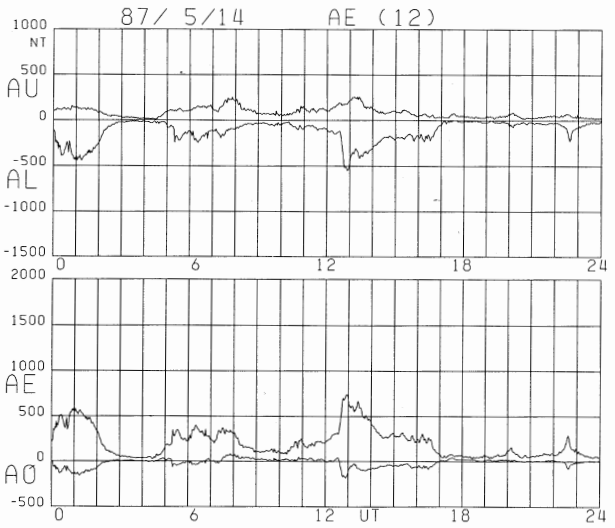
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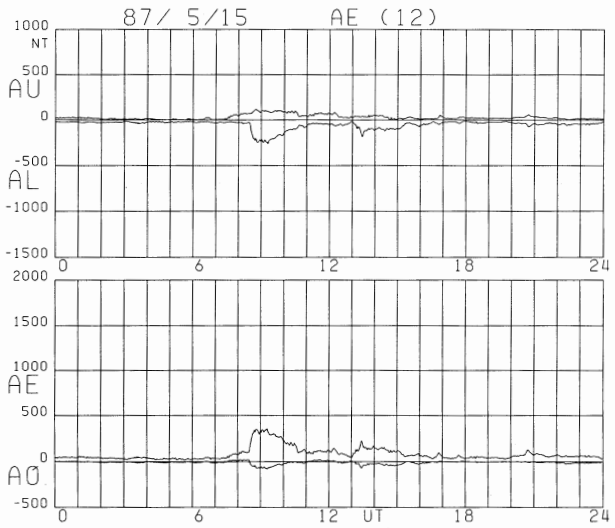
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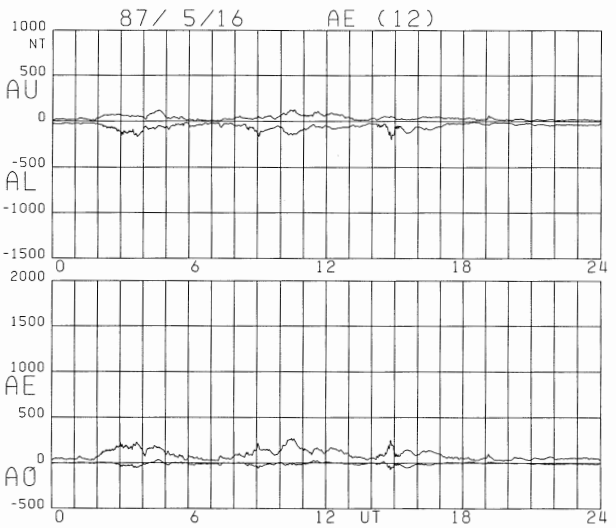
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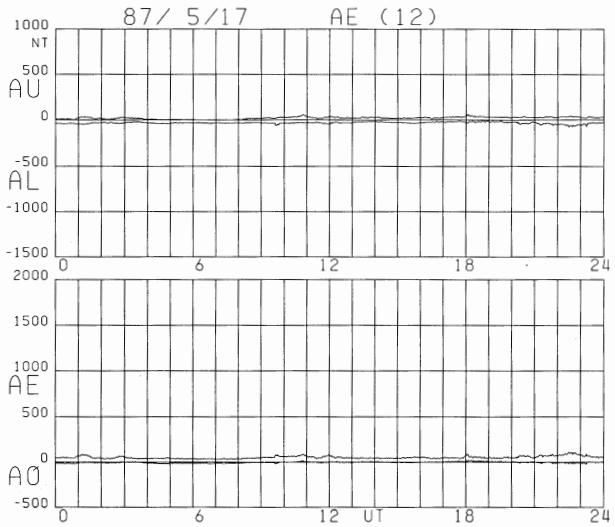
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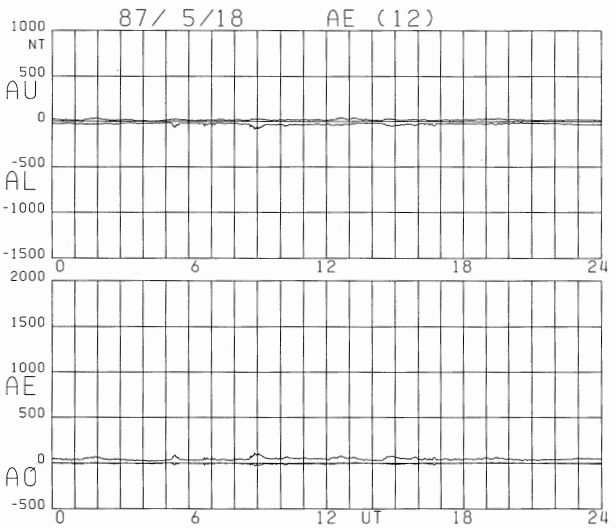
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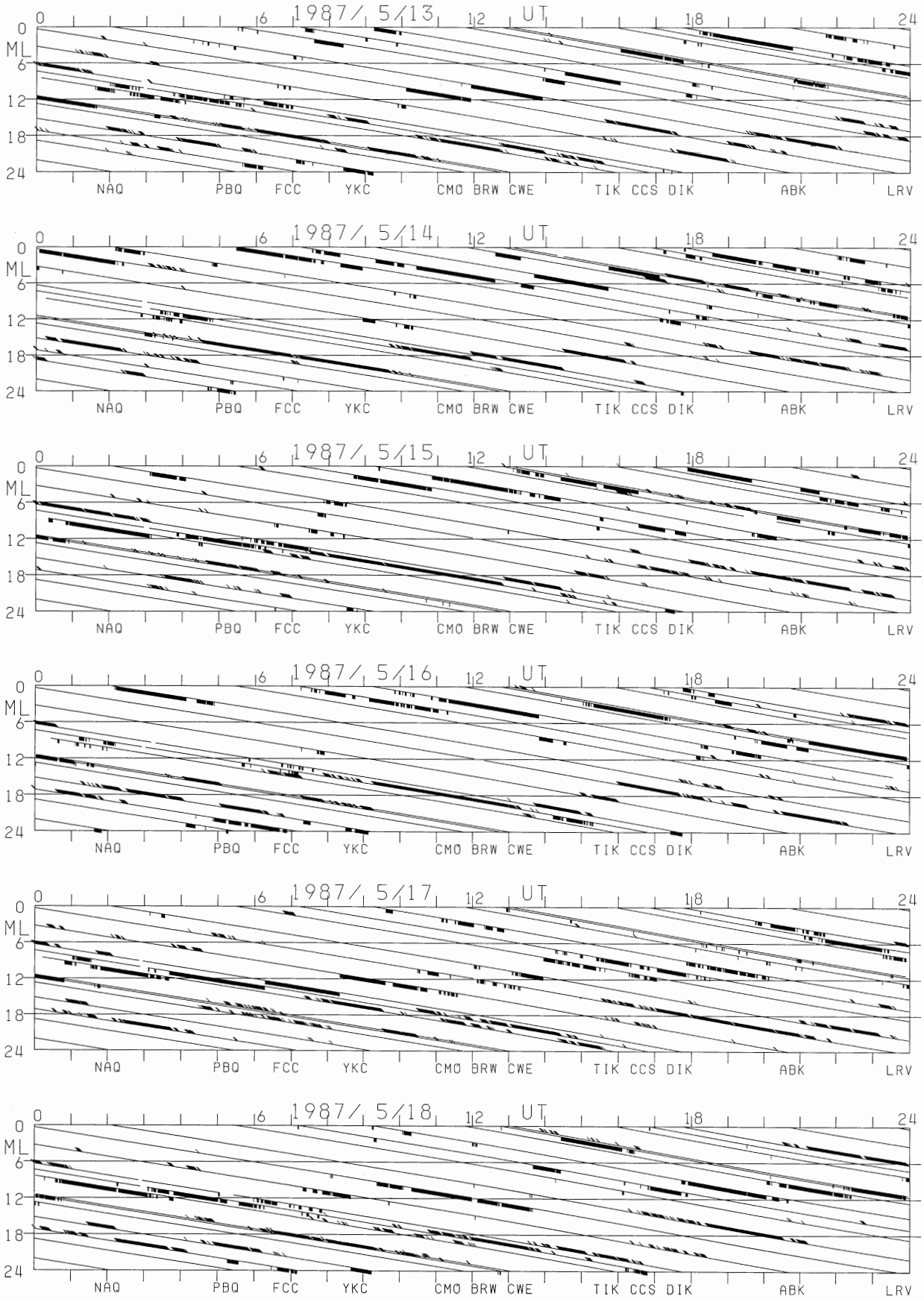
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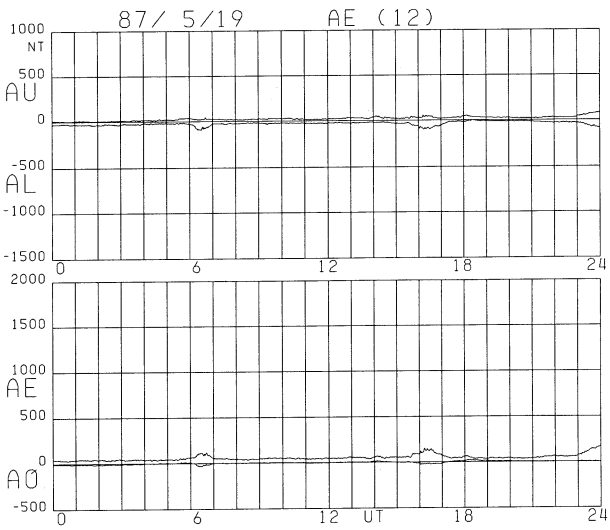
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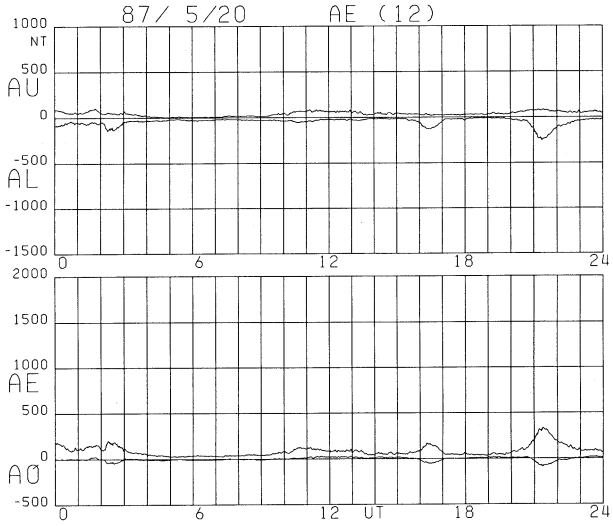
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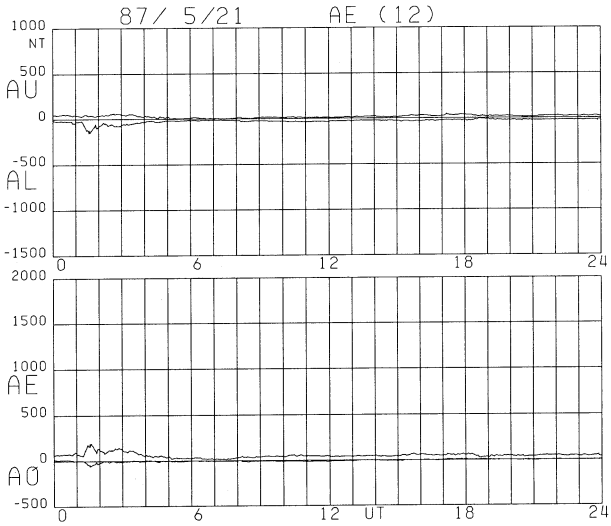
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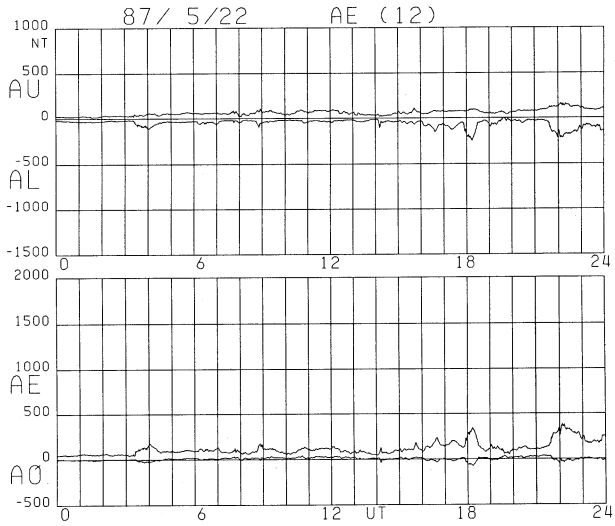
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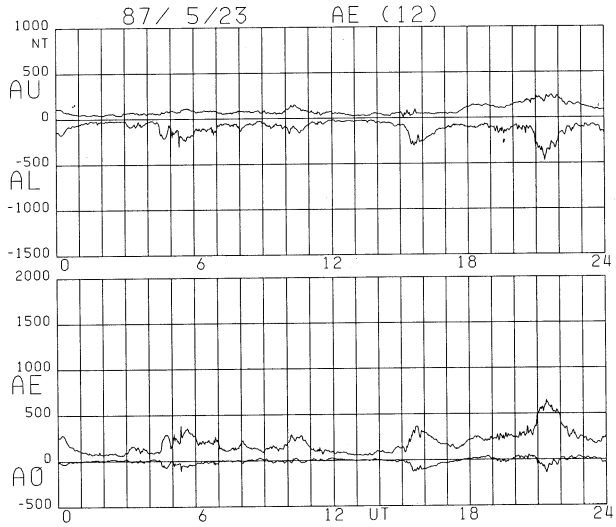
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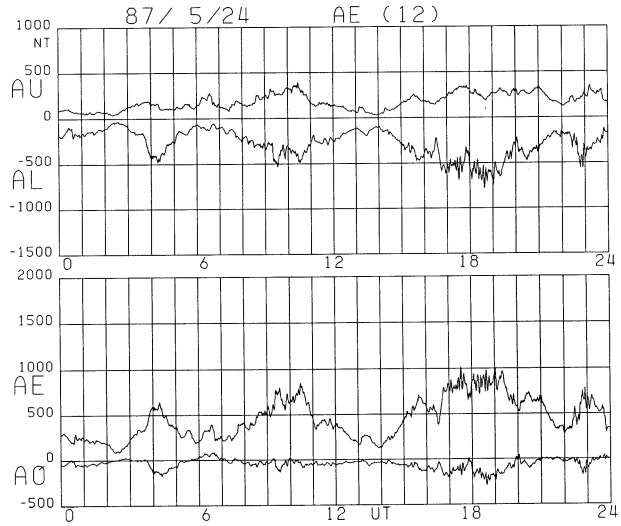
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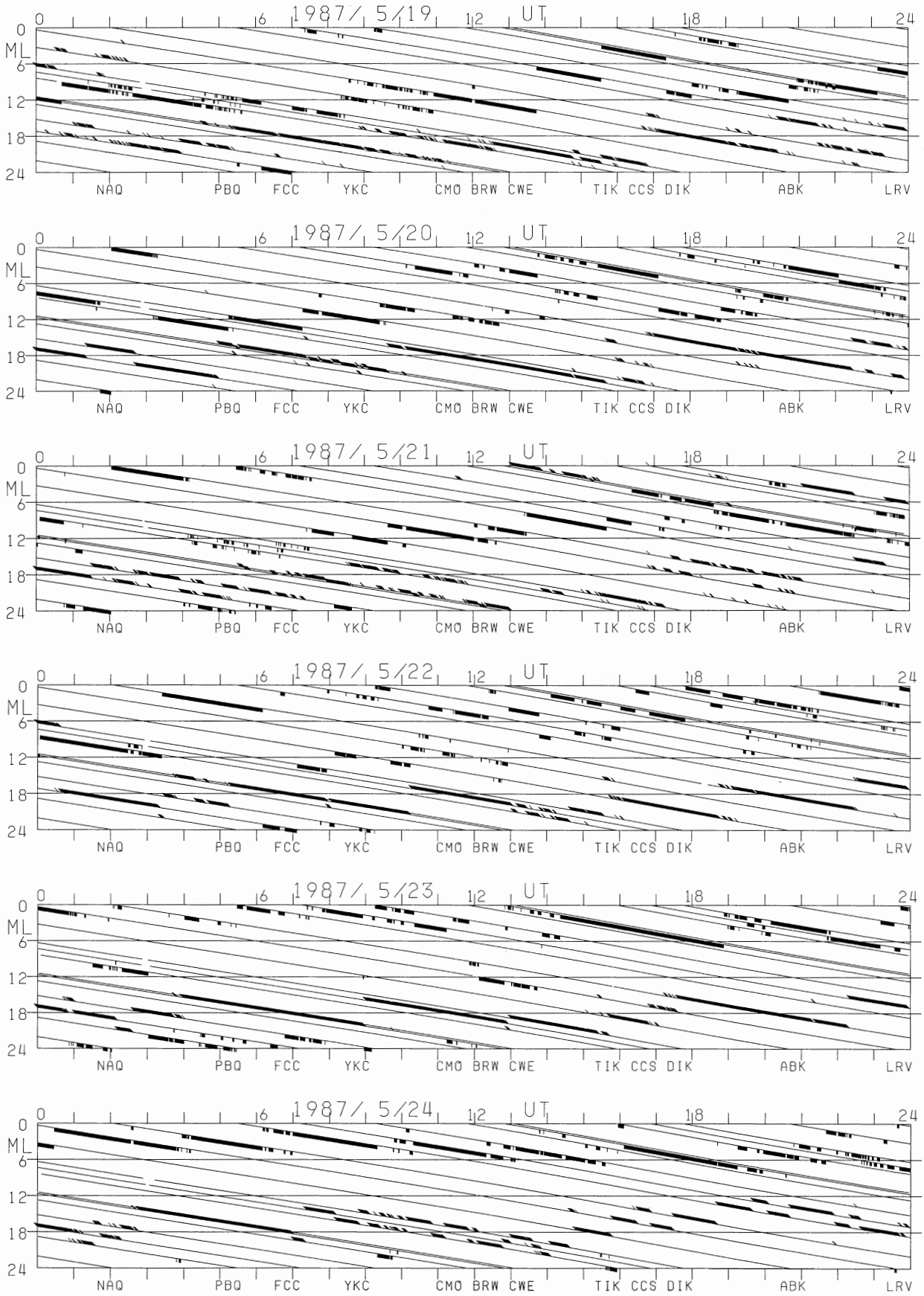
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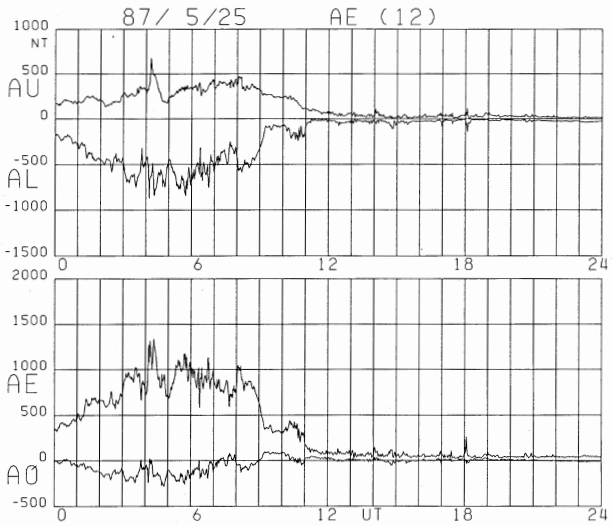
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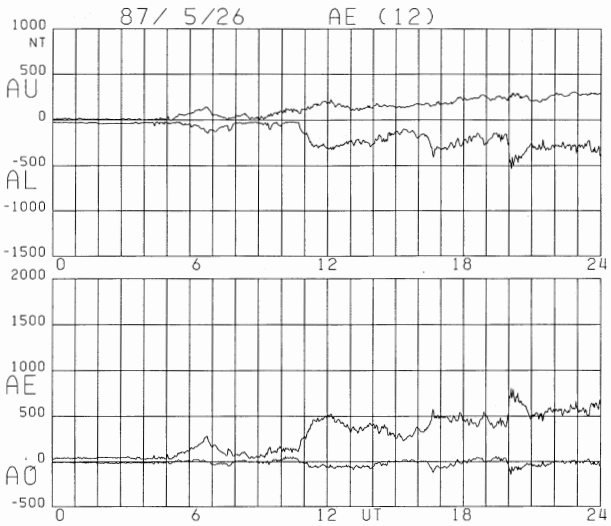
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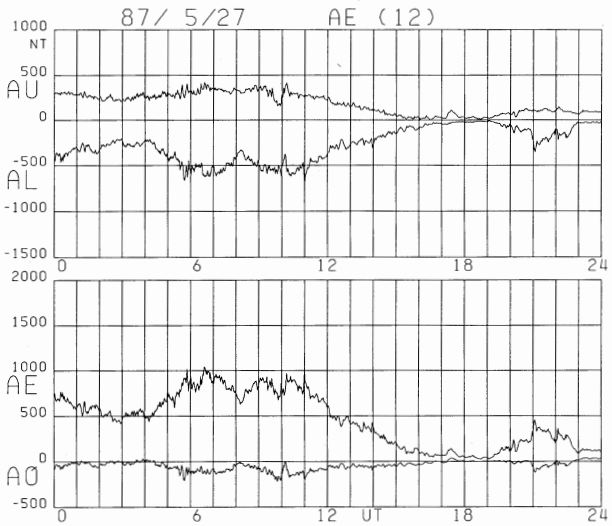
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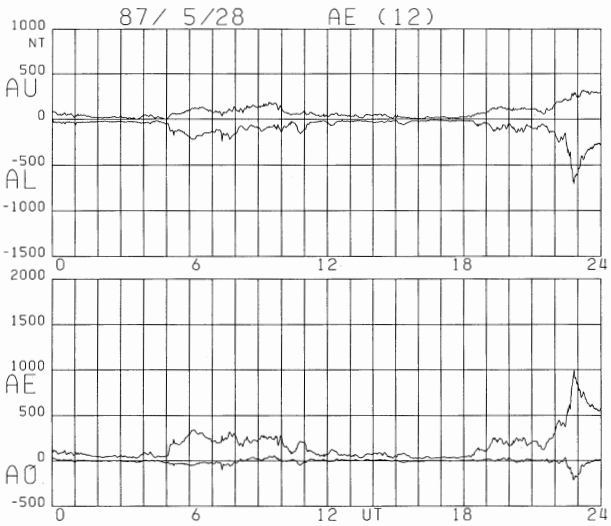
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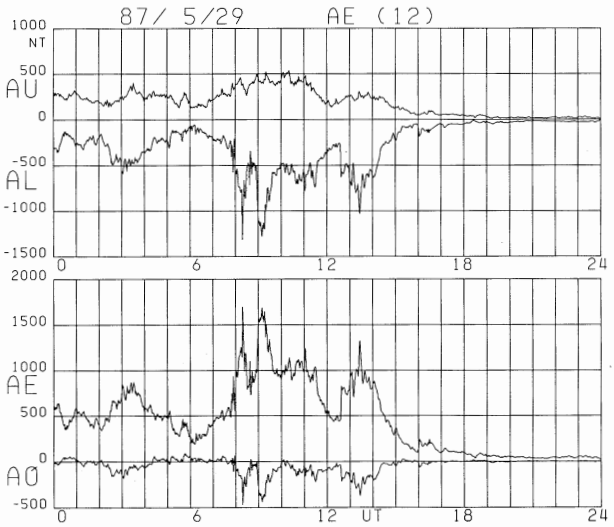
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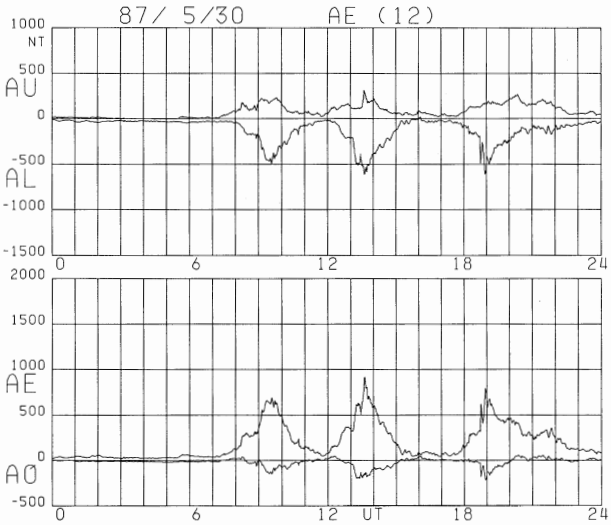
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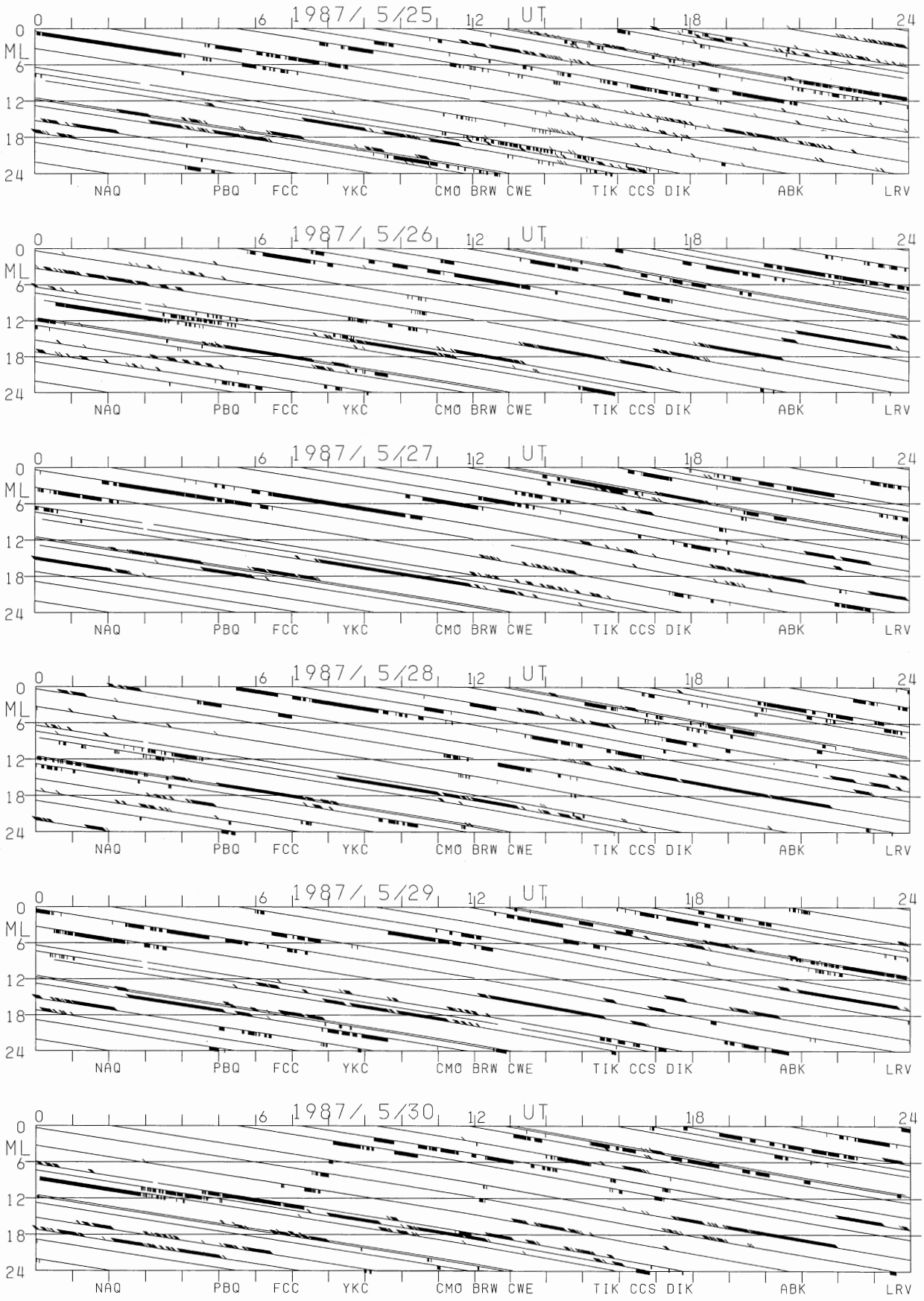
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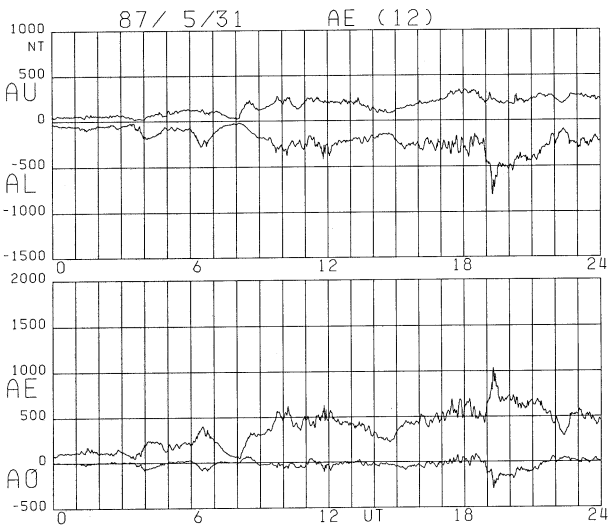
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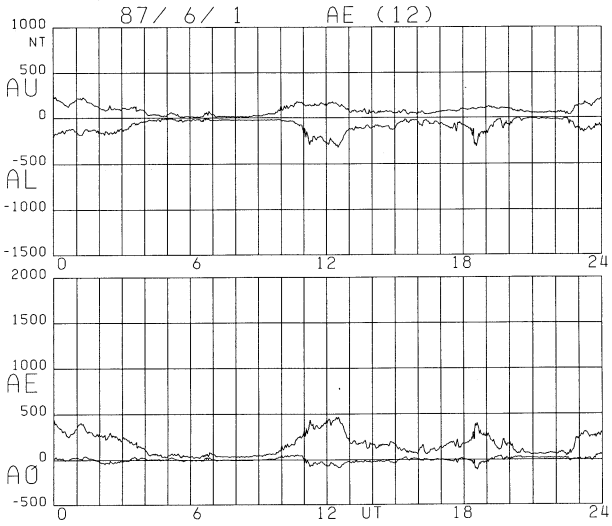
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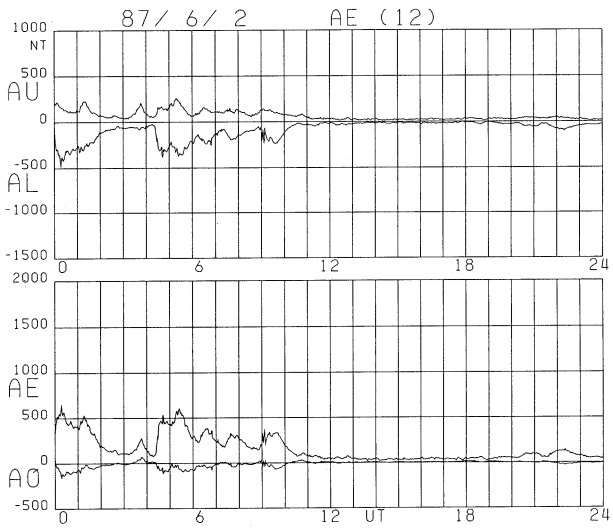
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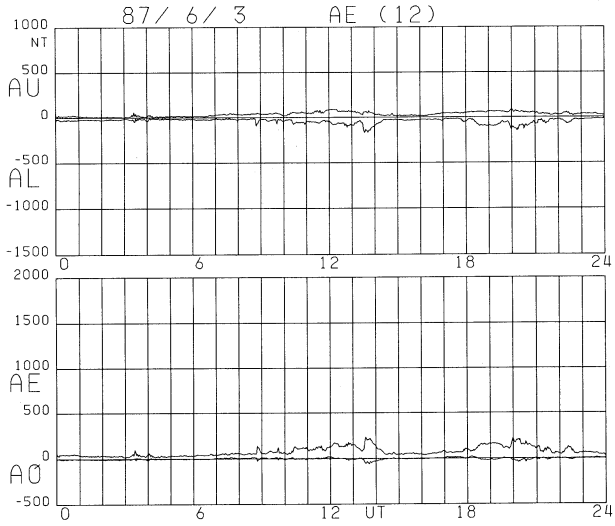
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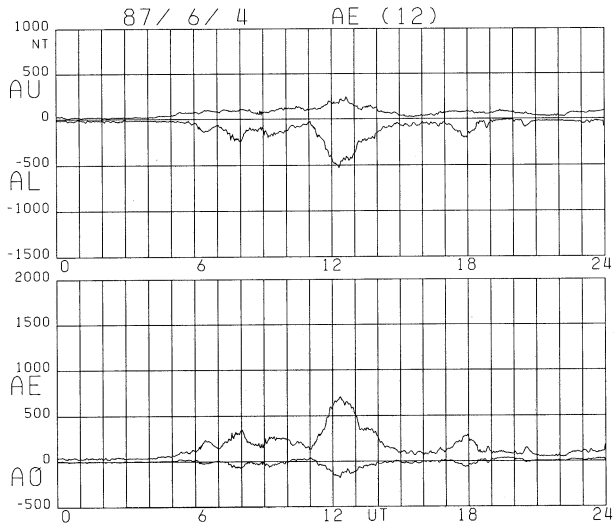
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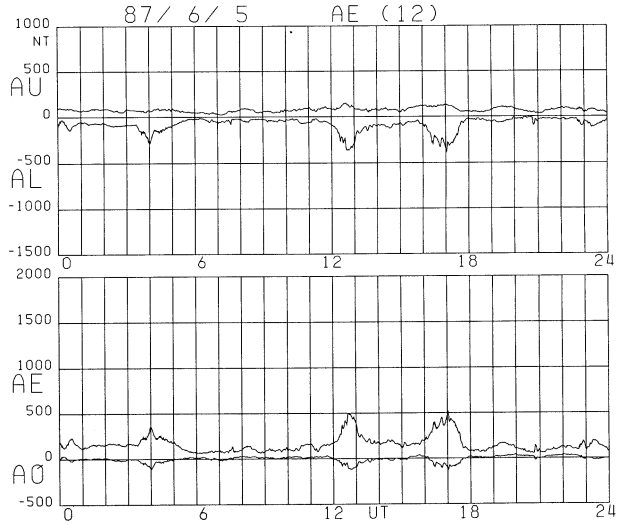
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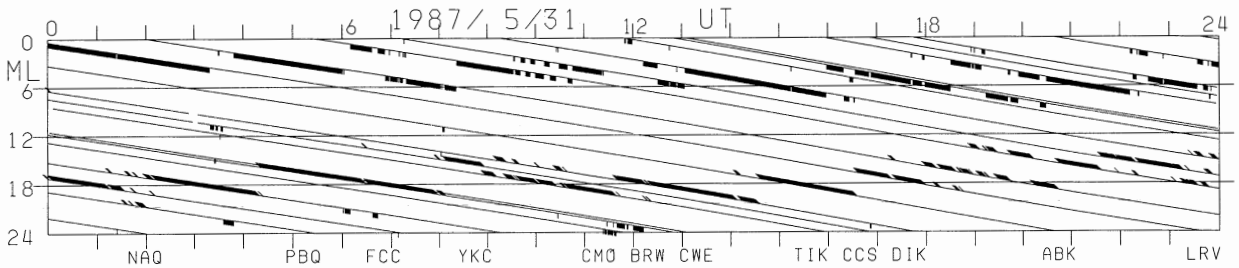
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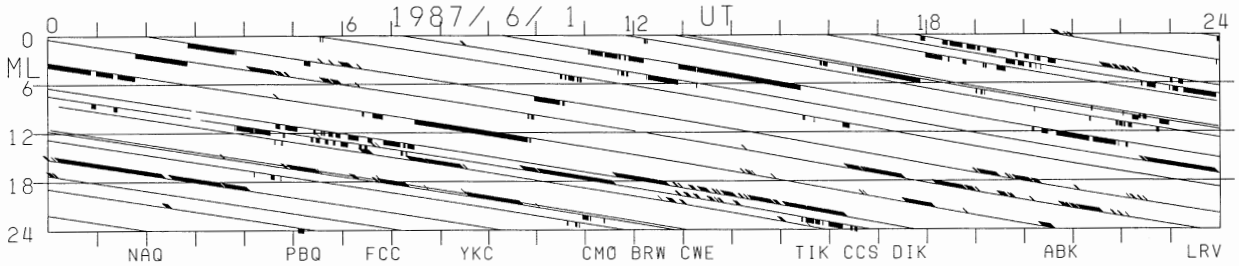
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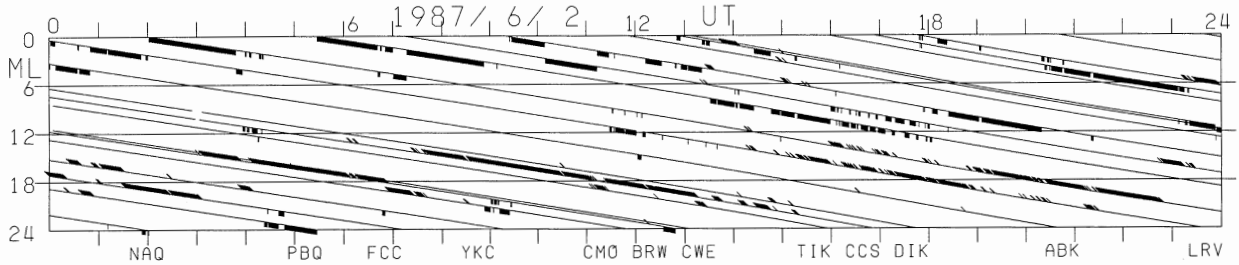
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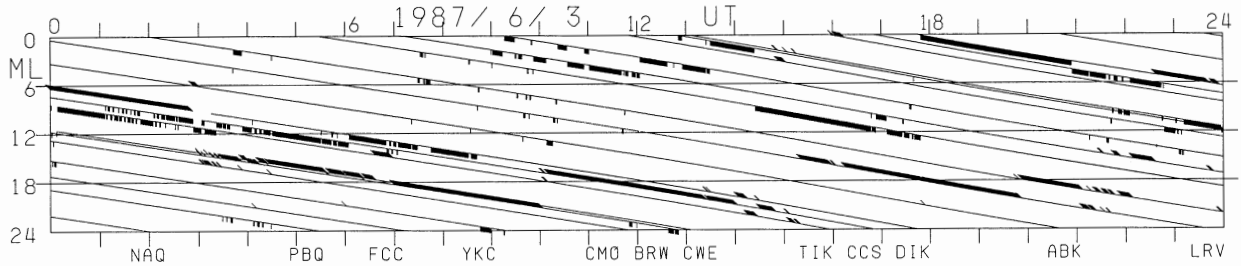
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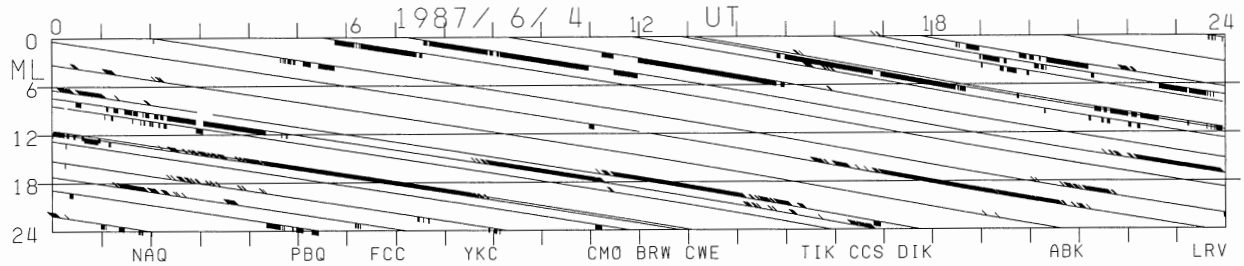
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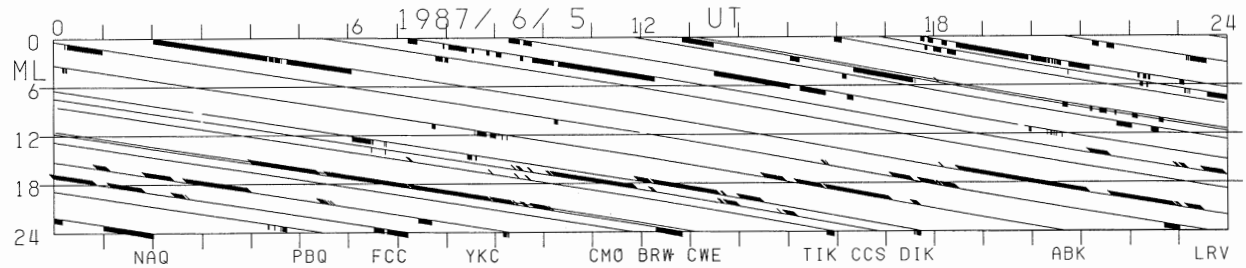
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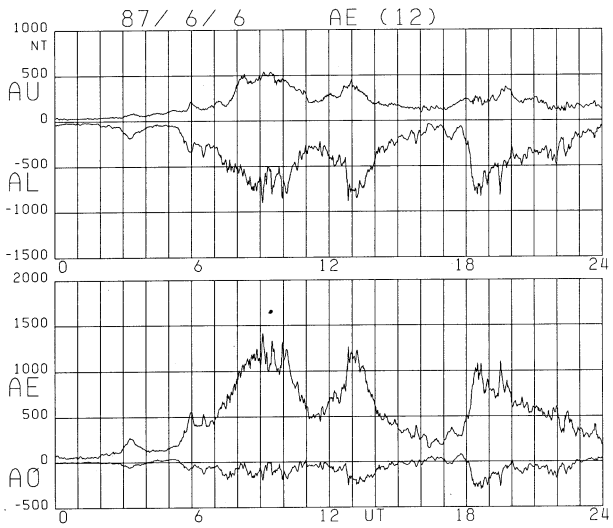
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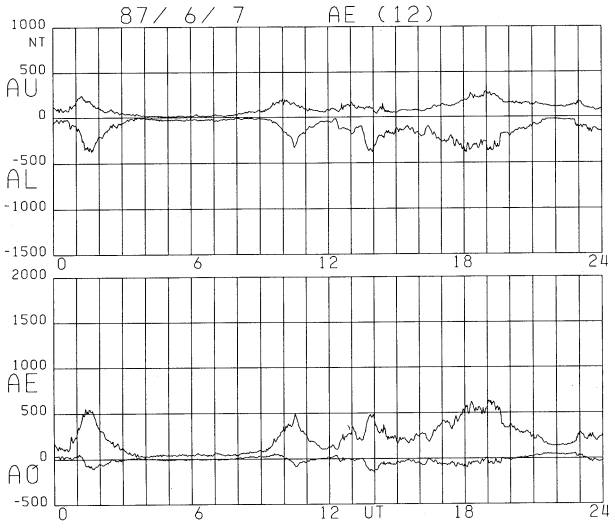
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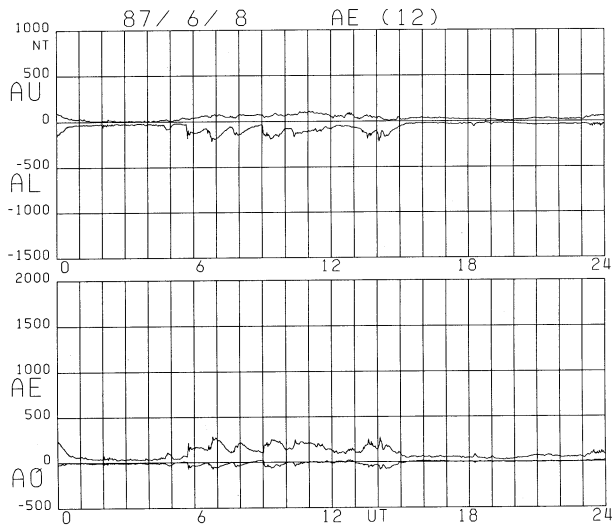
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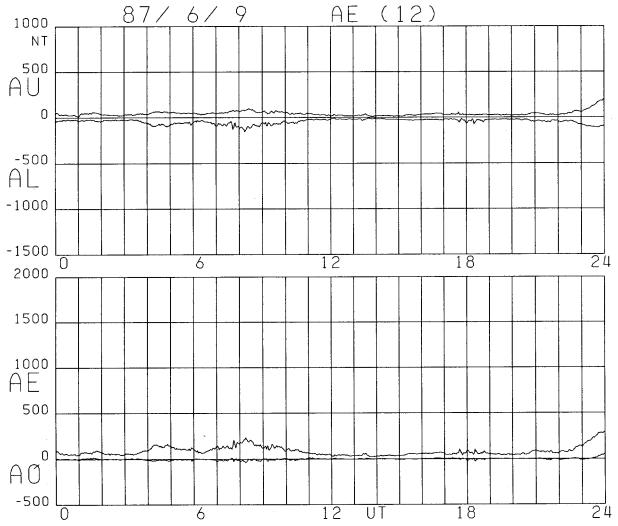
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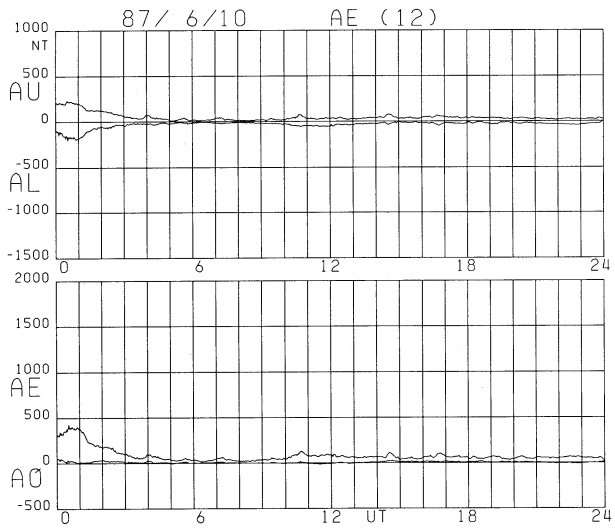
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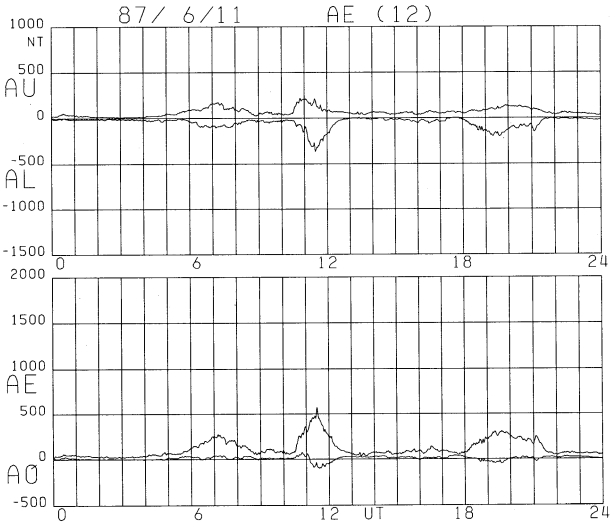
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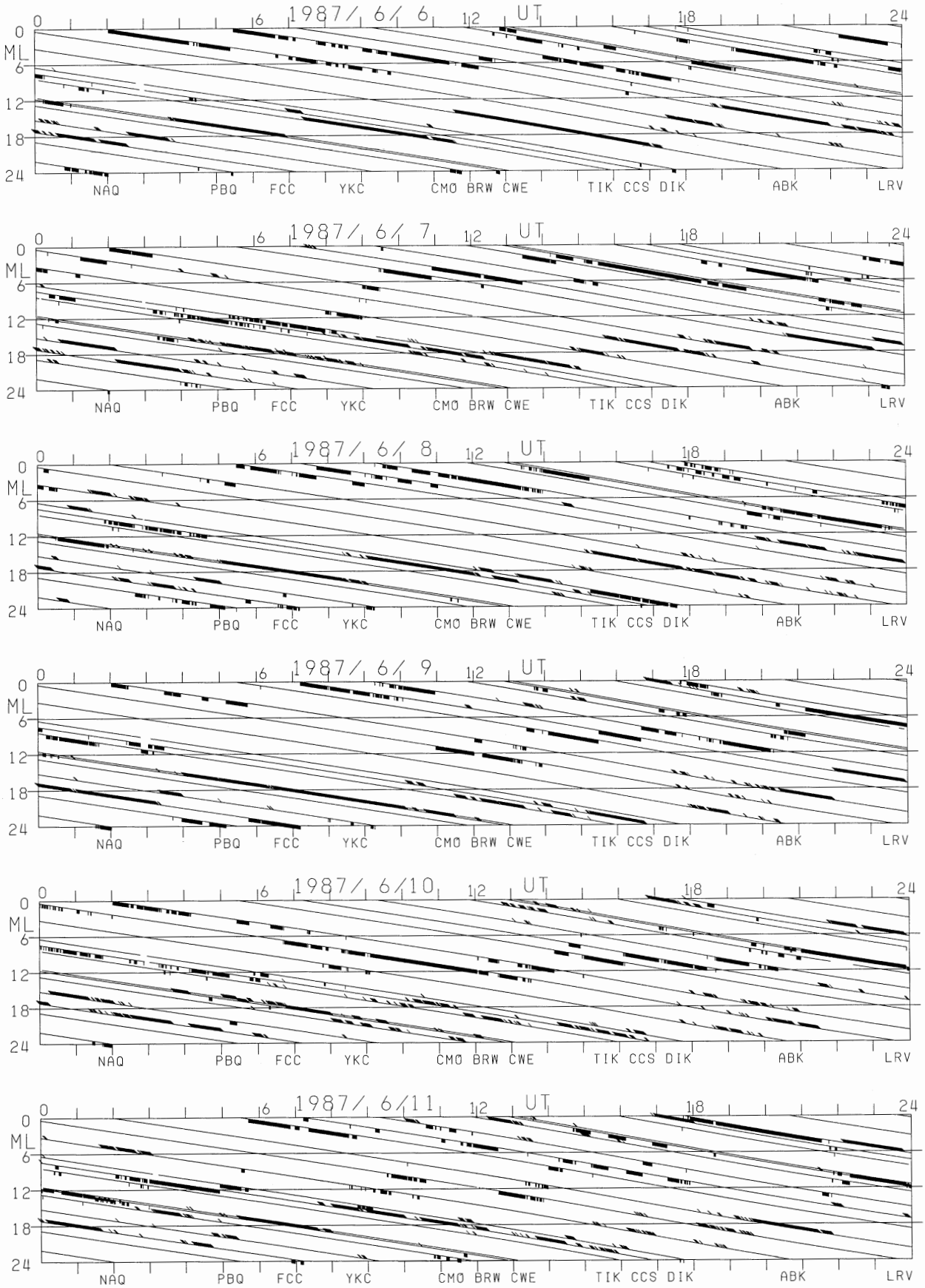
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1987/ 6/ 8
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1987/ 6/10
1987/ 6/11
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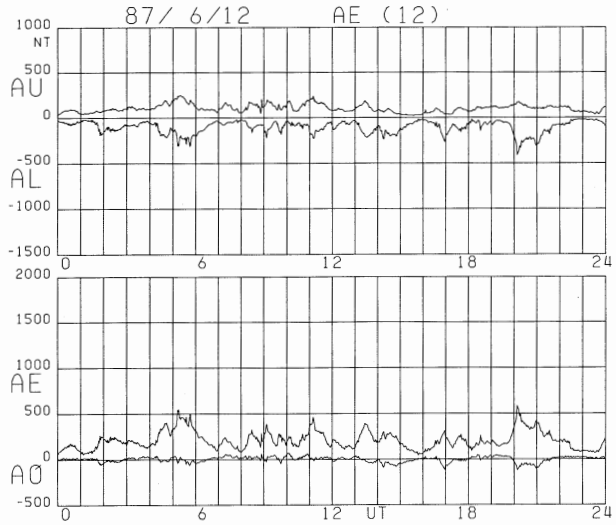
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
LRV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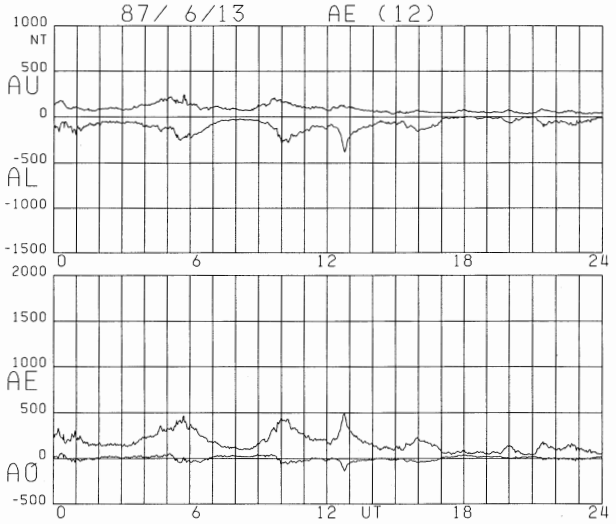
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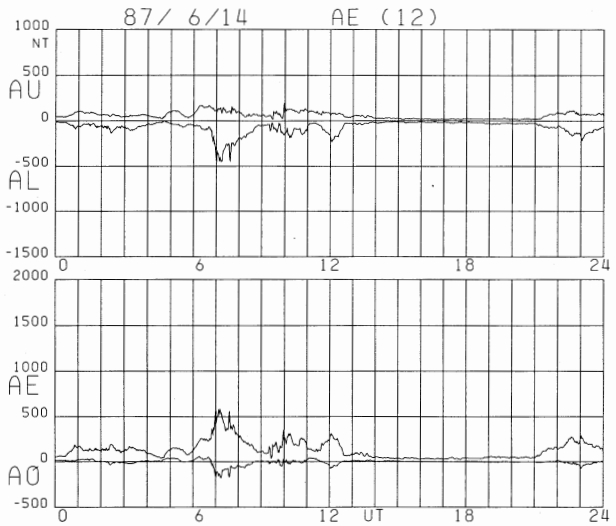
0 6 12 UT 18 24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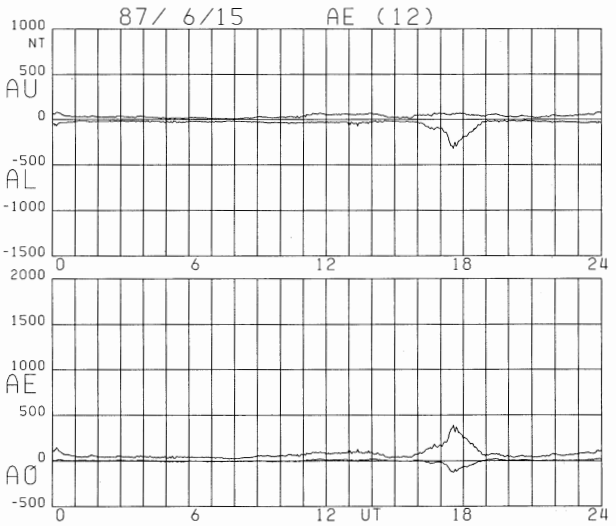
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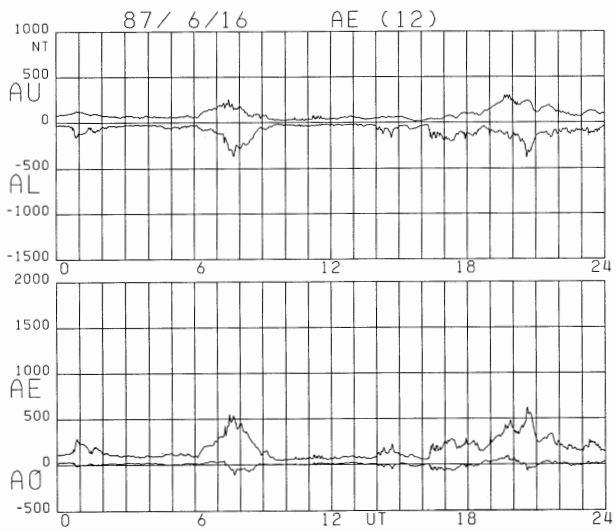
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NT
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AU
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-1500
0 6 12 18 24
2000
1500
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AE
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AO
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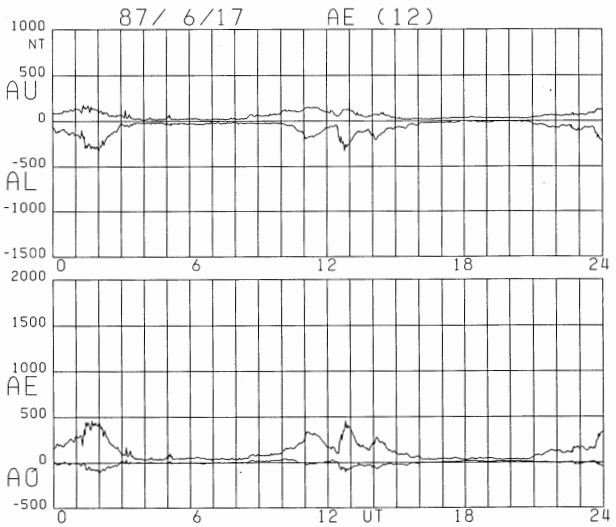
0 6 12 UT 18 24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NT
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AL
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-1500
0 6 12 18 24
2000
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AE
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AO
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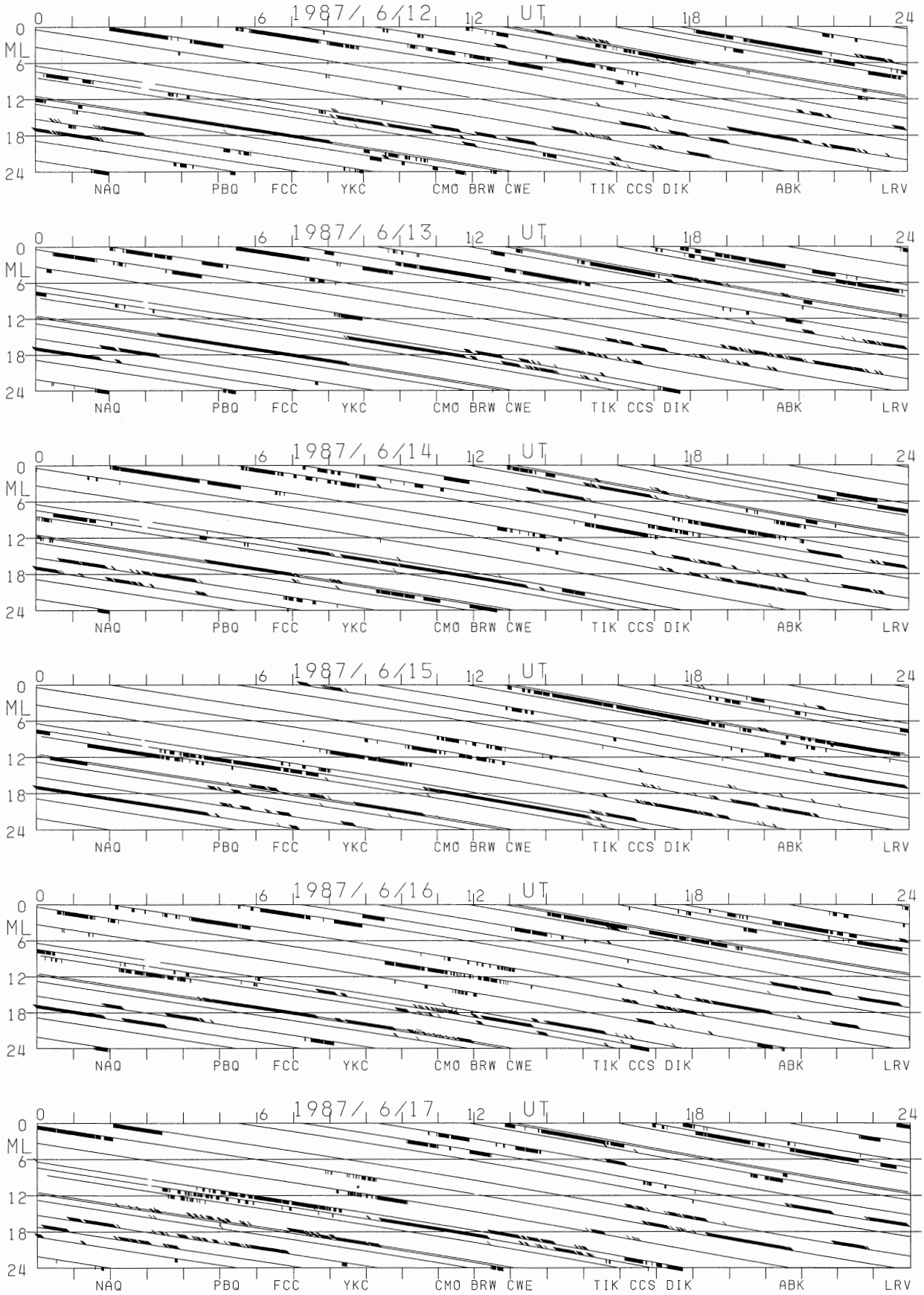
0 6 12 UT 18 24


1987/ 6/12 UT
1987/ 6/13 UT
1987/ 6/14 UT
1987/ 6/15 UT
1987/ 6/16 UT
1987/ 6/17 UT
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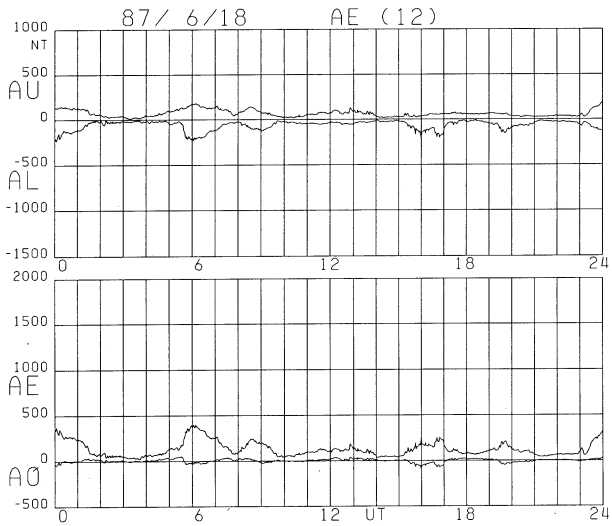
18
24
ML
NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK LRV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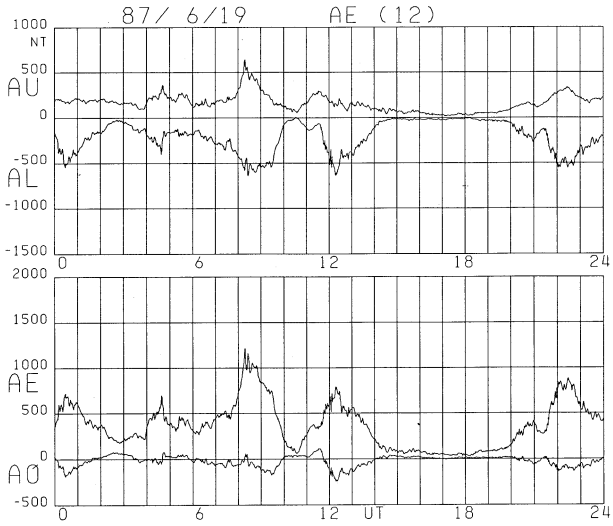
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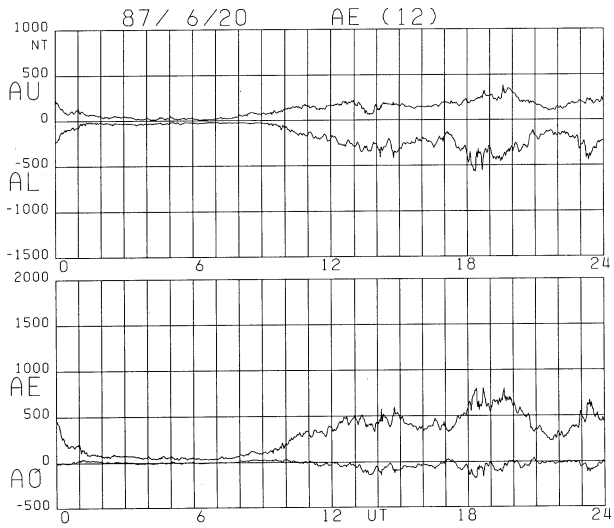
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AO
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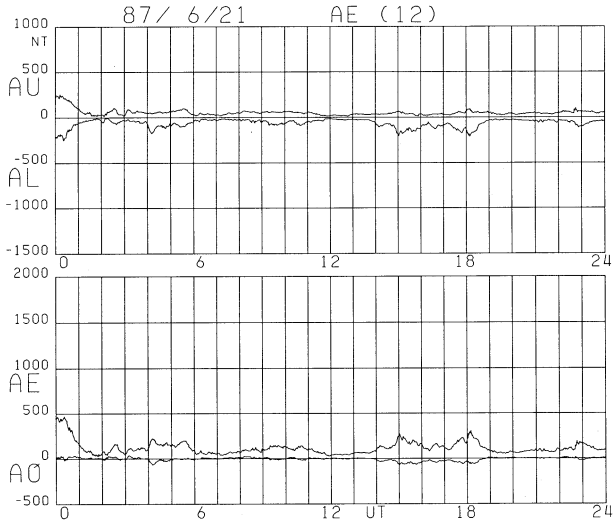
0 6 12 UT 18 24


87/ 6/21 AE (12)
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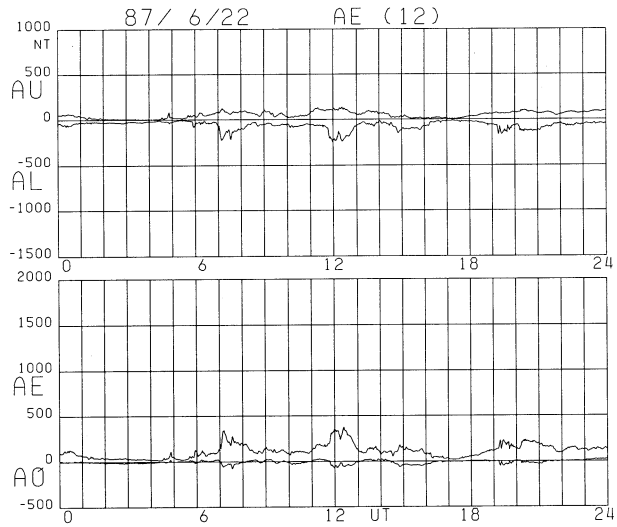
-500
0 6 12 UT 18 24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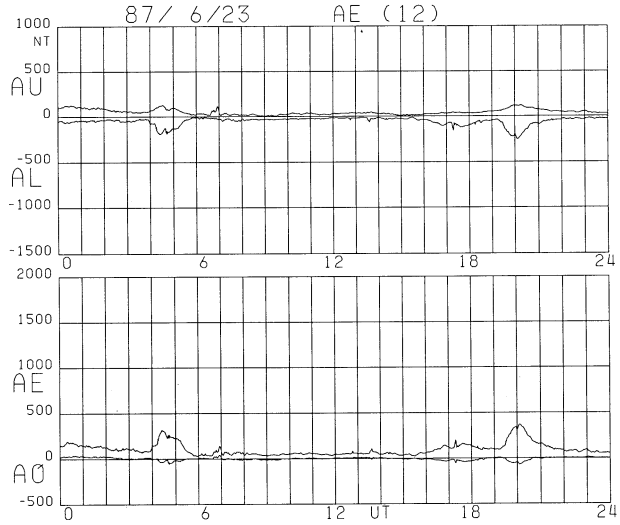
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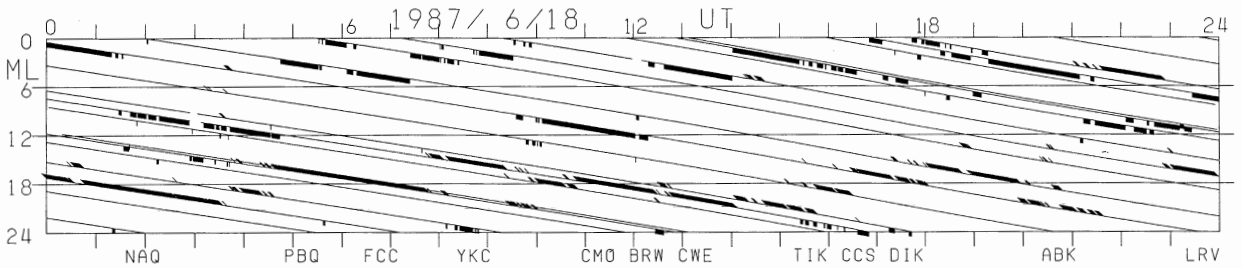
1987/ 6/18 UT
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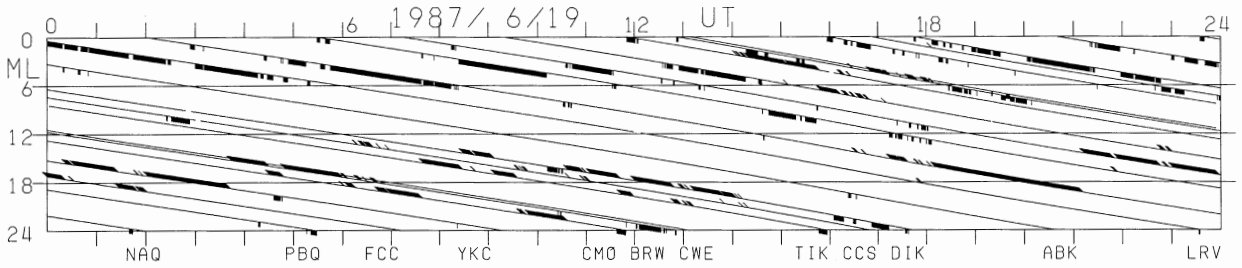
24
NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK LRV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ML
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12
18
24
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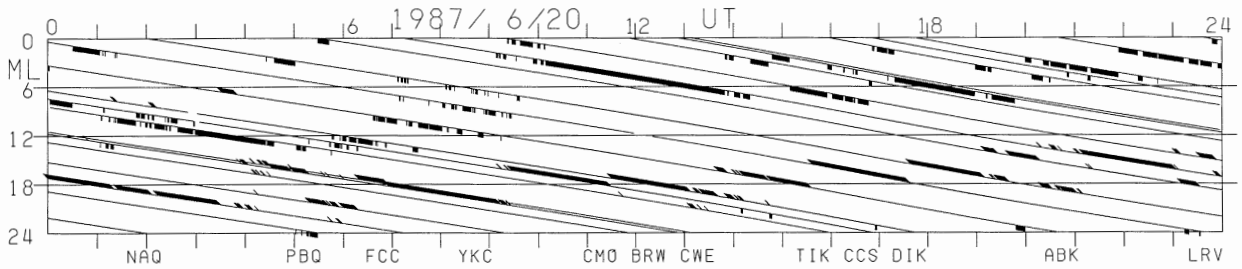
1987/ 6/20 UT
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ML
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24
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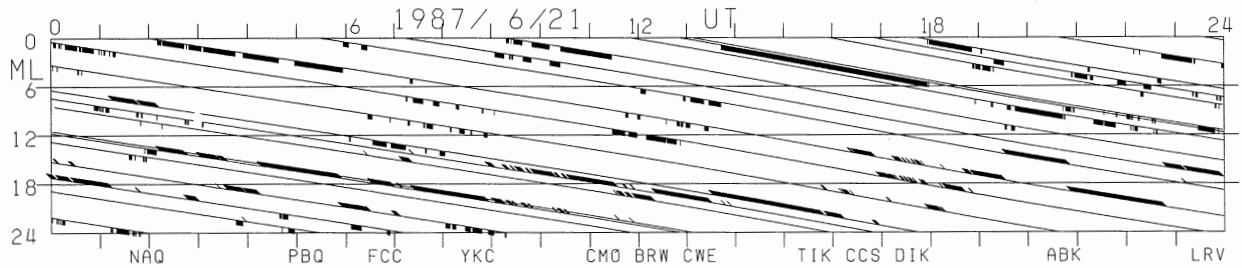
1987/ 6/21 UT
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ML
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24
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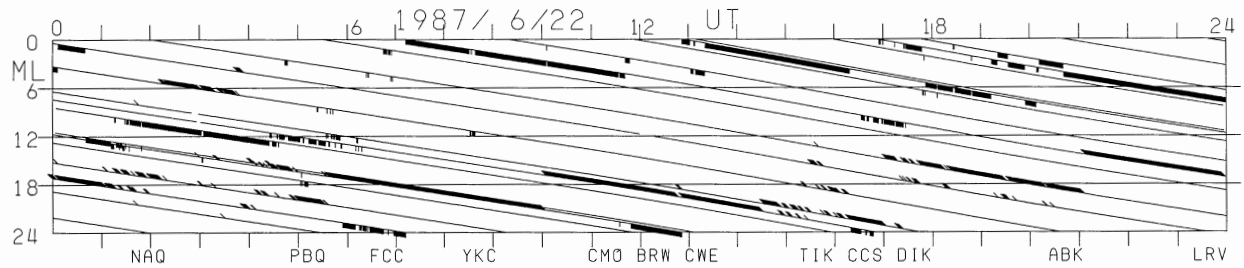
1987/ 6/22 UT
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24
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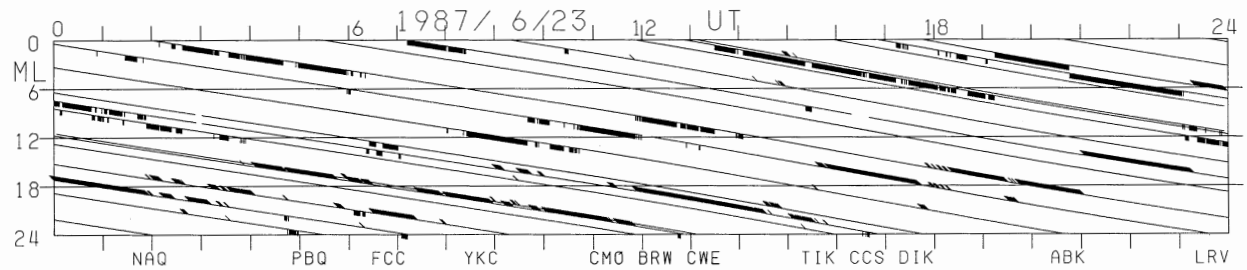
1987/ 6/23 UT
0 6 12 18 24
ML
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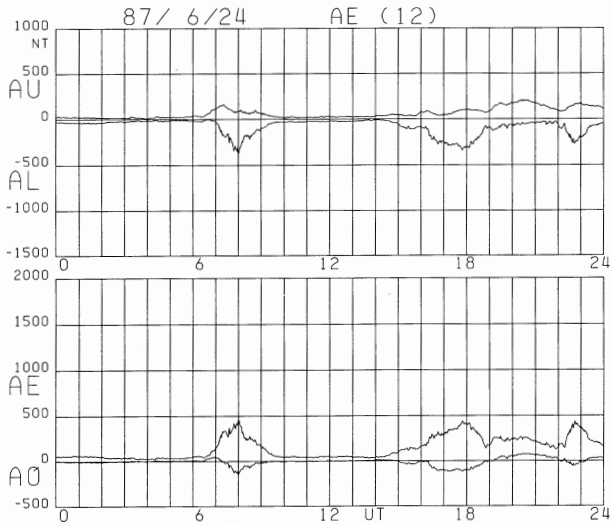
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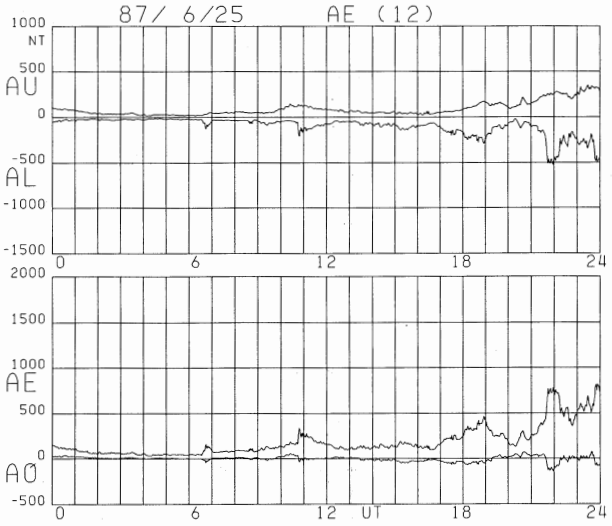
0 6 12 UT 18 24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2000
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AO
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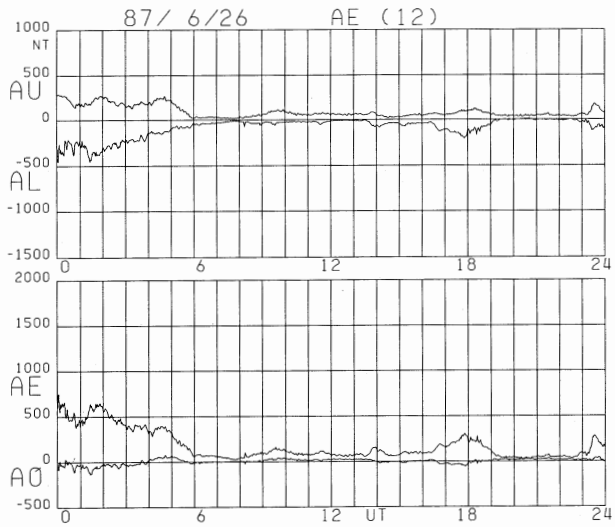
0 6 12 UT 18 24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2000
1500
1000
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500
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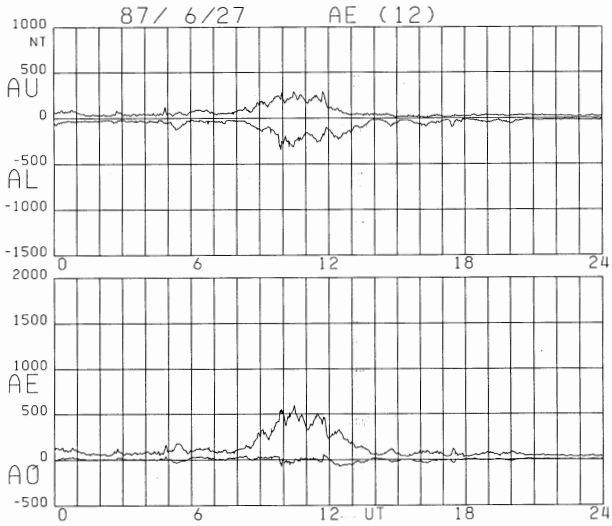
AO
-500
0 6 12 UT 18 24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-1000
-1500
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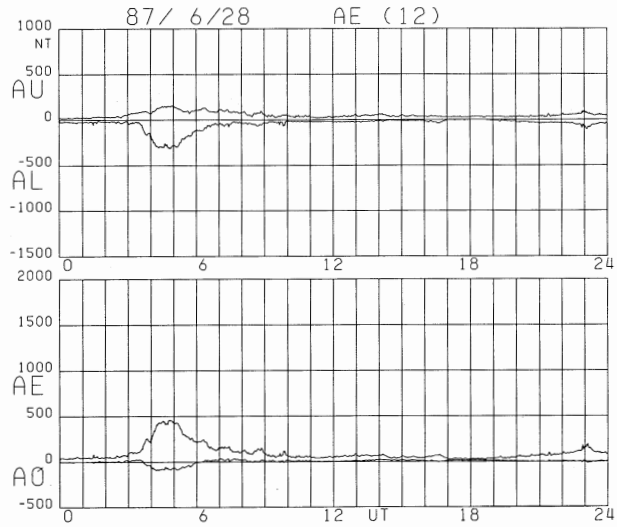
AO
-500
0 6 12 UT 18 24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AE
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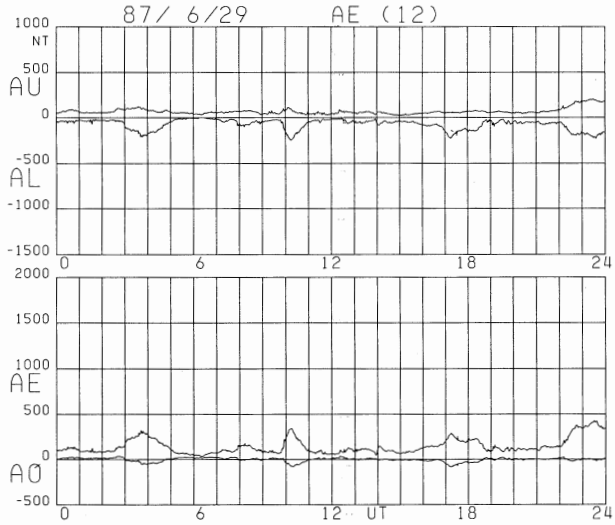
0 6 12 UT 18 24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2000
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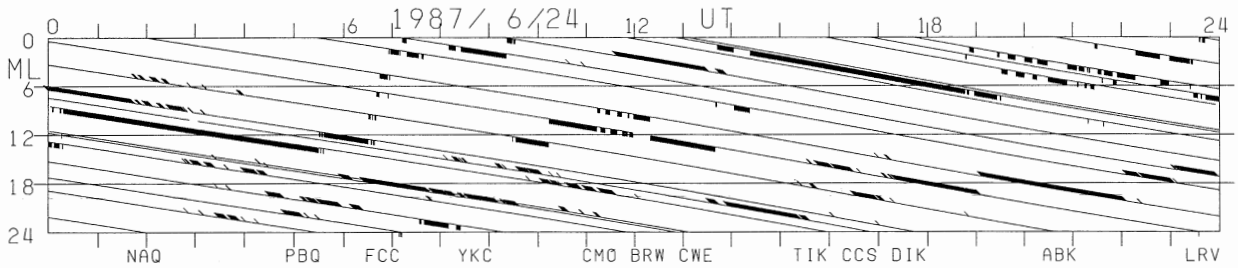
-500
0 6 12 UT 18 24


1987/ 6/24
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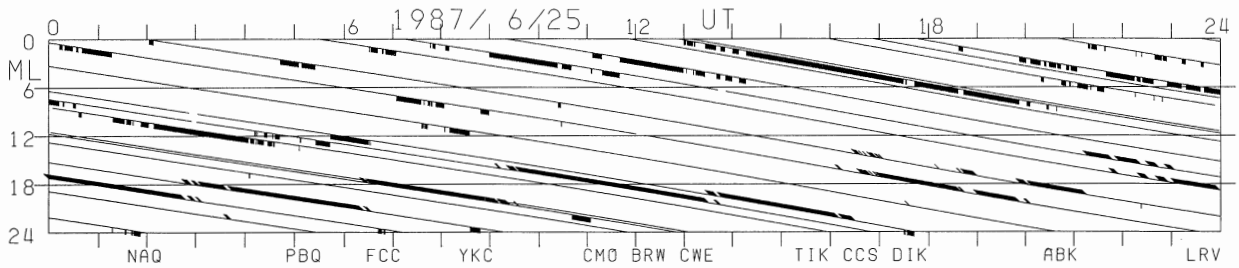
CMO BRW CWE
TIK CCS DIK
ABK
LRV


1987/ 6/25
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PBQ
FCC
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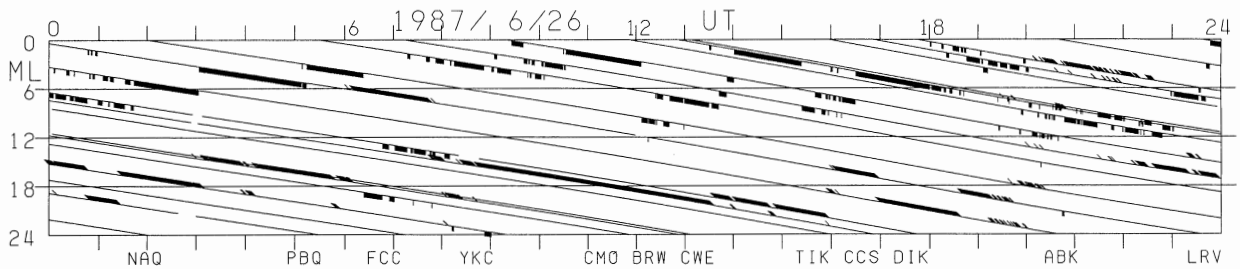
CMO BRW CWE
TIK CCS DIK
ABK
LRV


1987/ 6/26
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CMO BRW CWE
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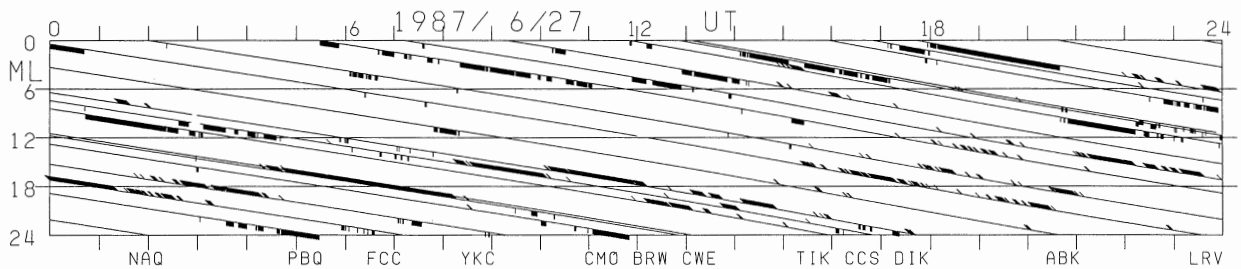
ABK
LRV


1987/ 6/27
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ML
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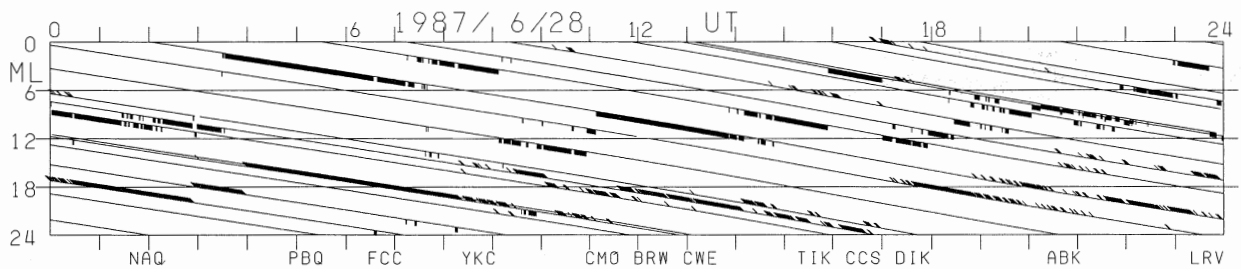
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
LRV


1987/ 6/28
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ML
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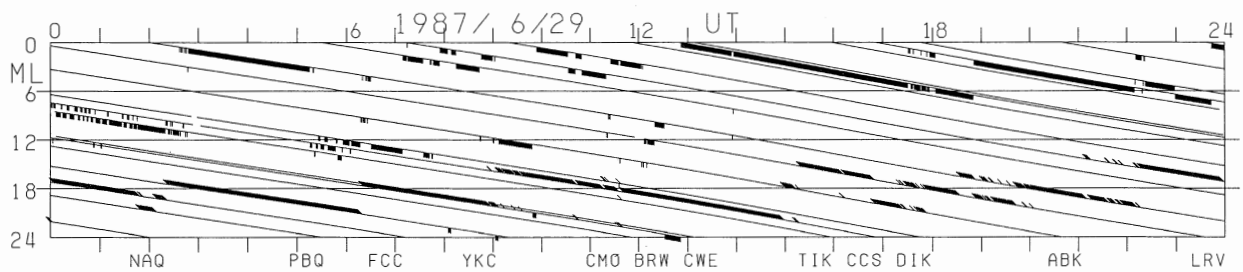
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
LRV


1987/ 6/29
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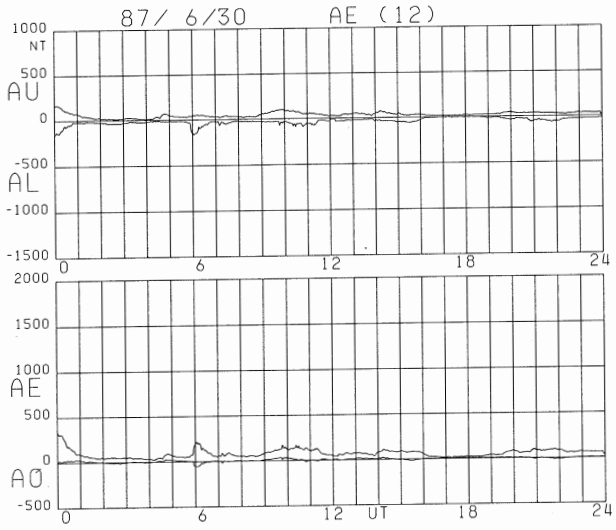
CMO BRW CWE
TIK CCS DIK
ABK
LRV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AO
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12 UT
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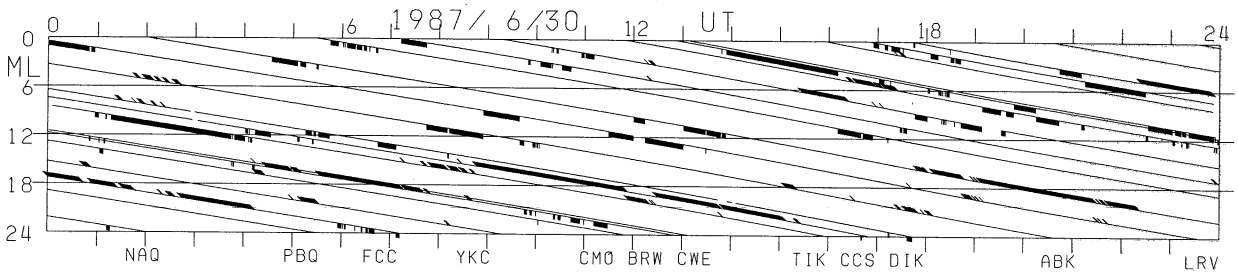
24


0
6
1987/ 6/30
12
UT
18
24
ML
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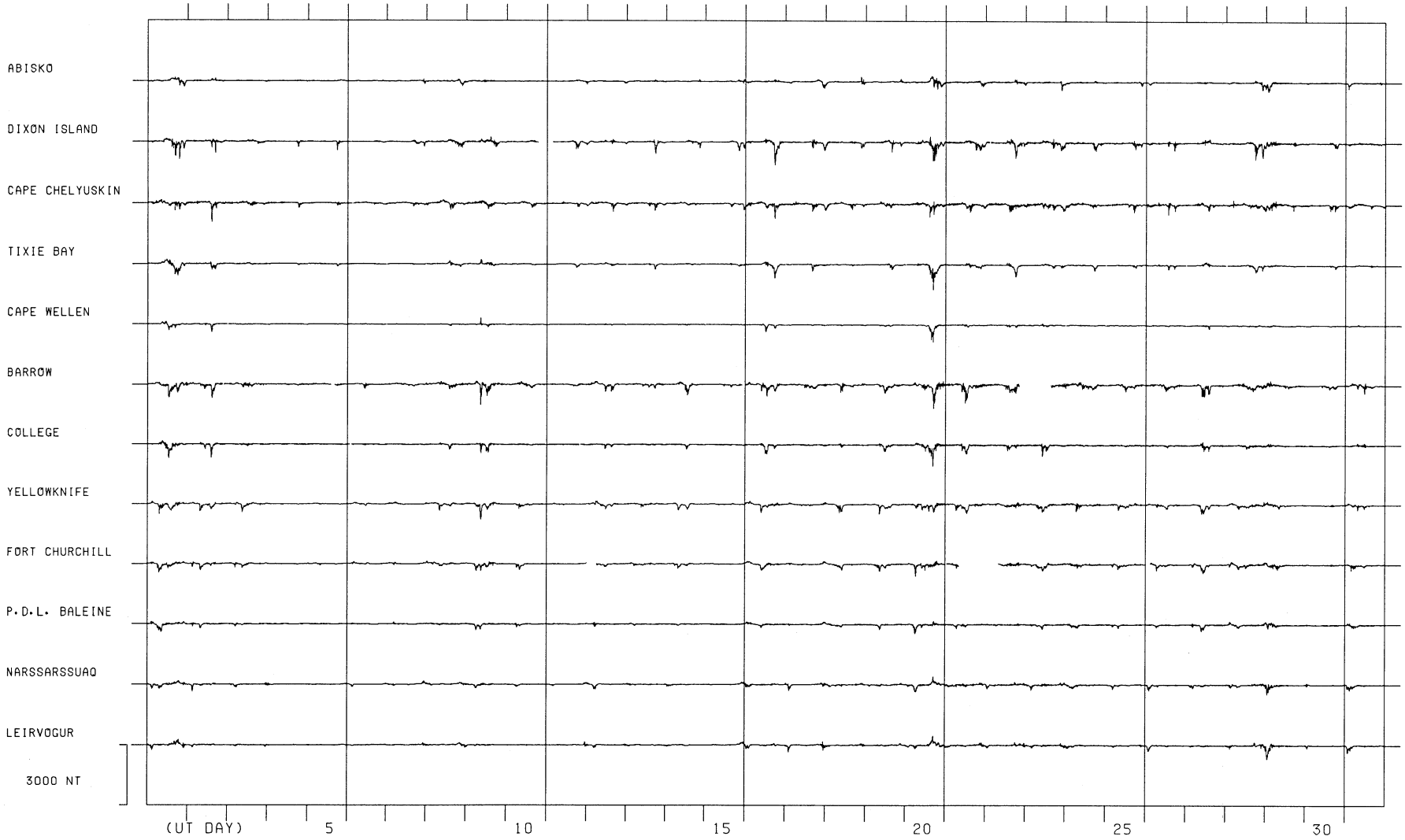
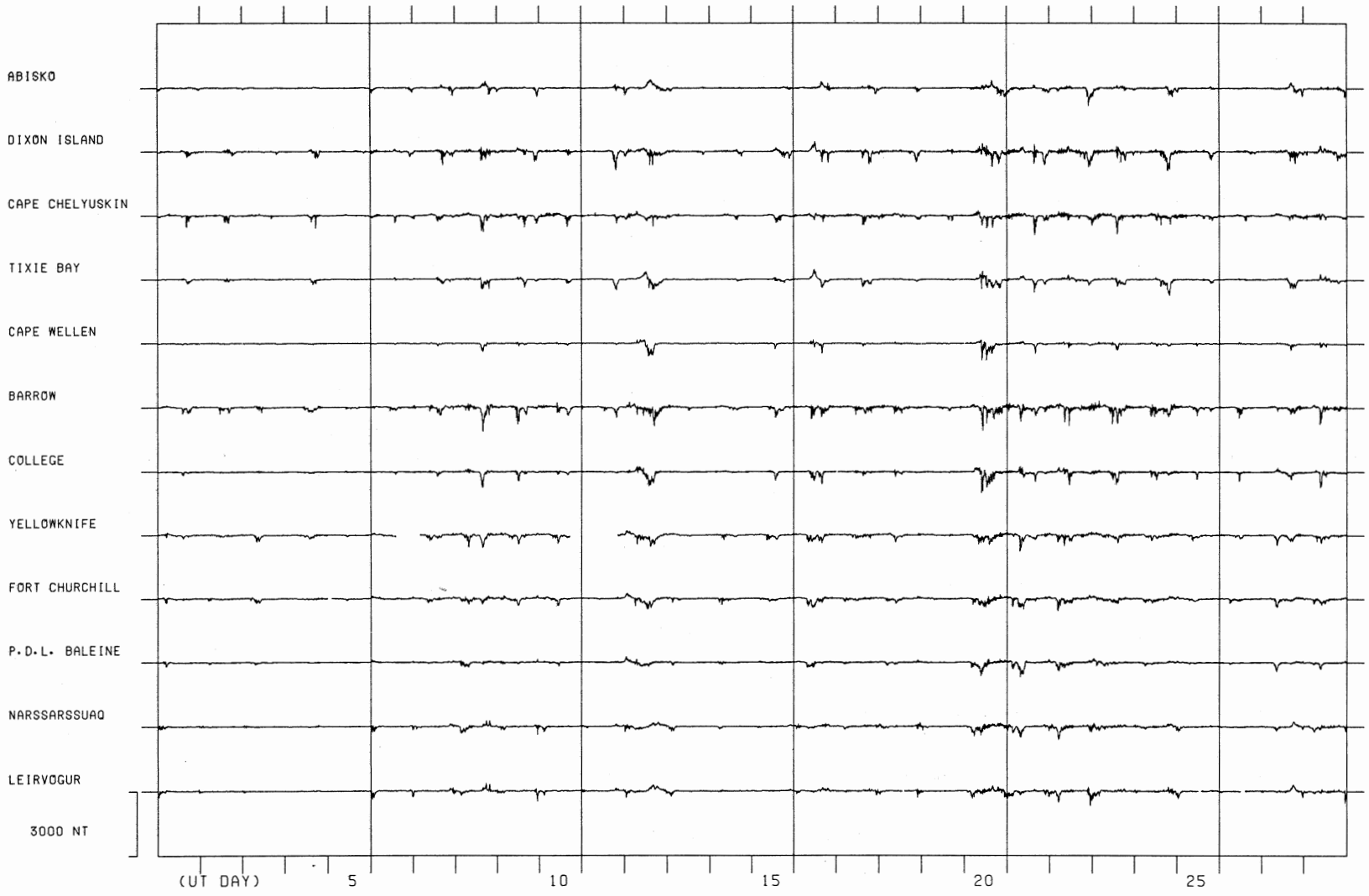
6
12
18
24
NAQ
PBQ
FCC
YKC
CMO
BRW
CWE
TIK
CCS
DIK
ABK
LRV

FIGURE 6

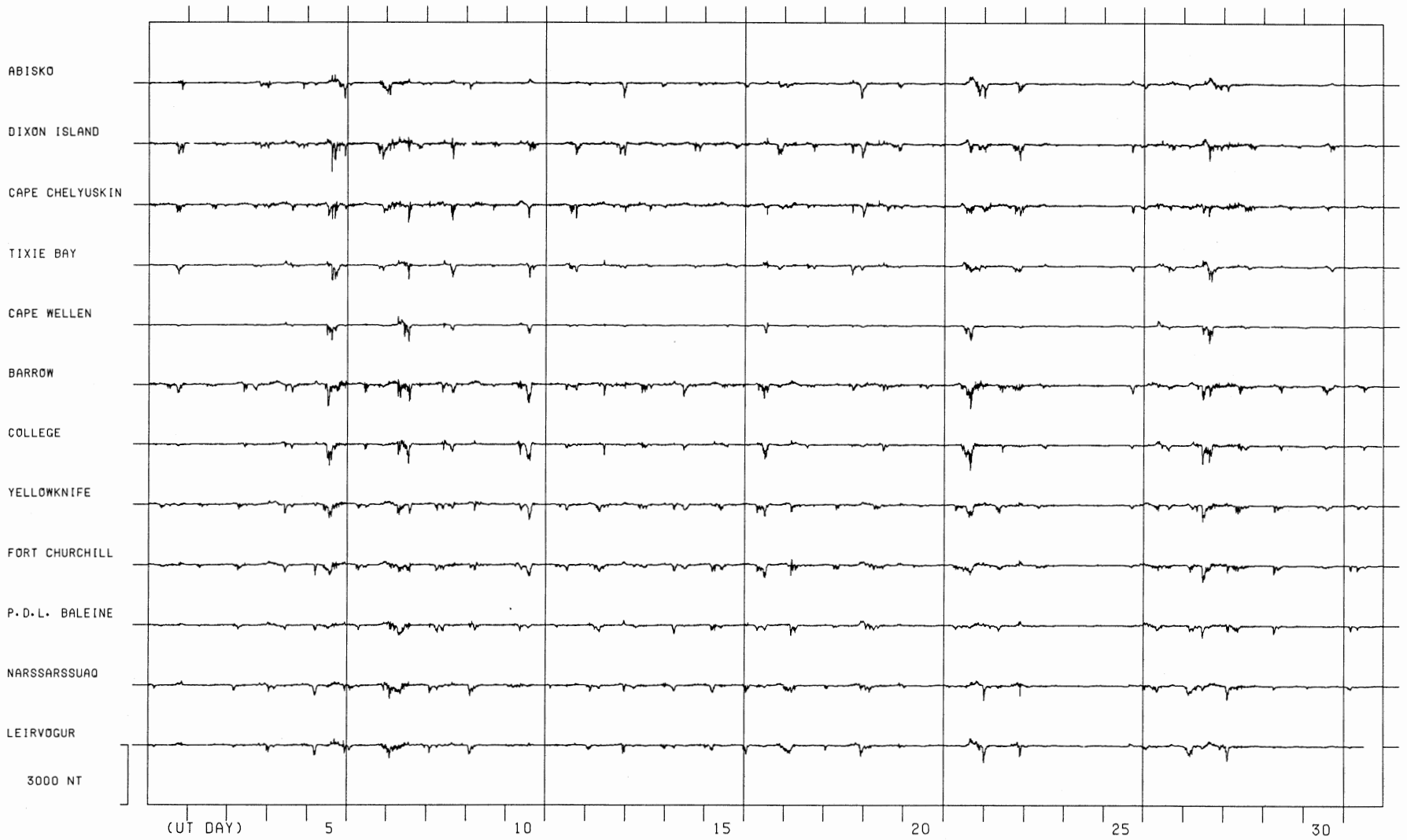
The H traces of magnetograms
from AE(12) stations
in each month
for January-June 1987.



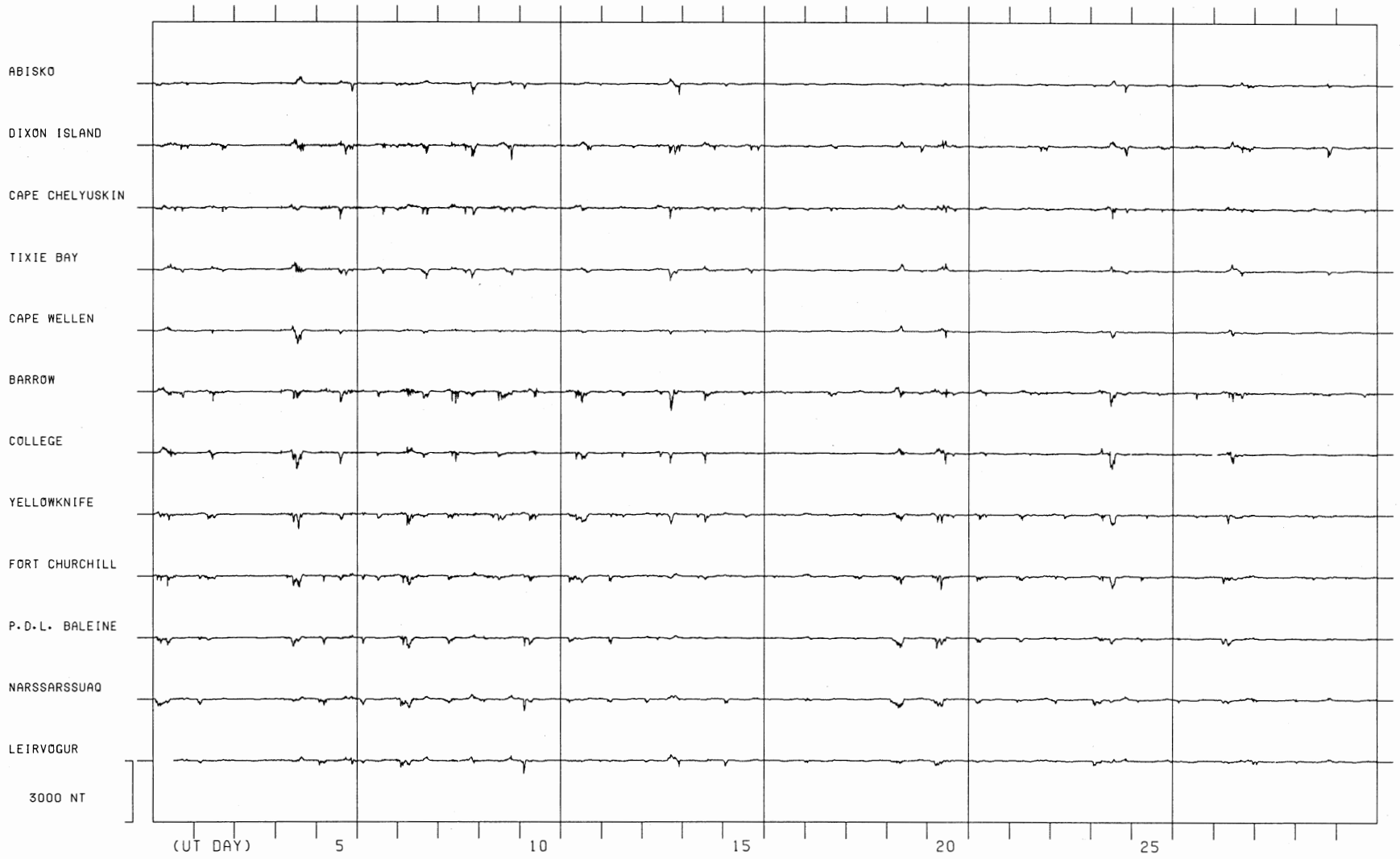
STACKED COMMON SCALE MAGNETOGRAMS FOR JANUARY 1987



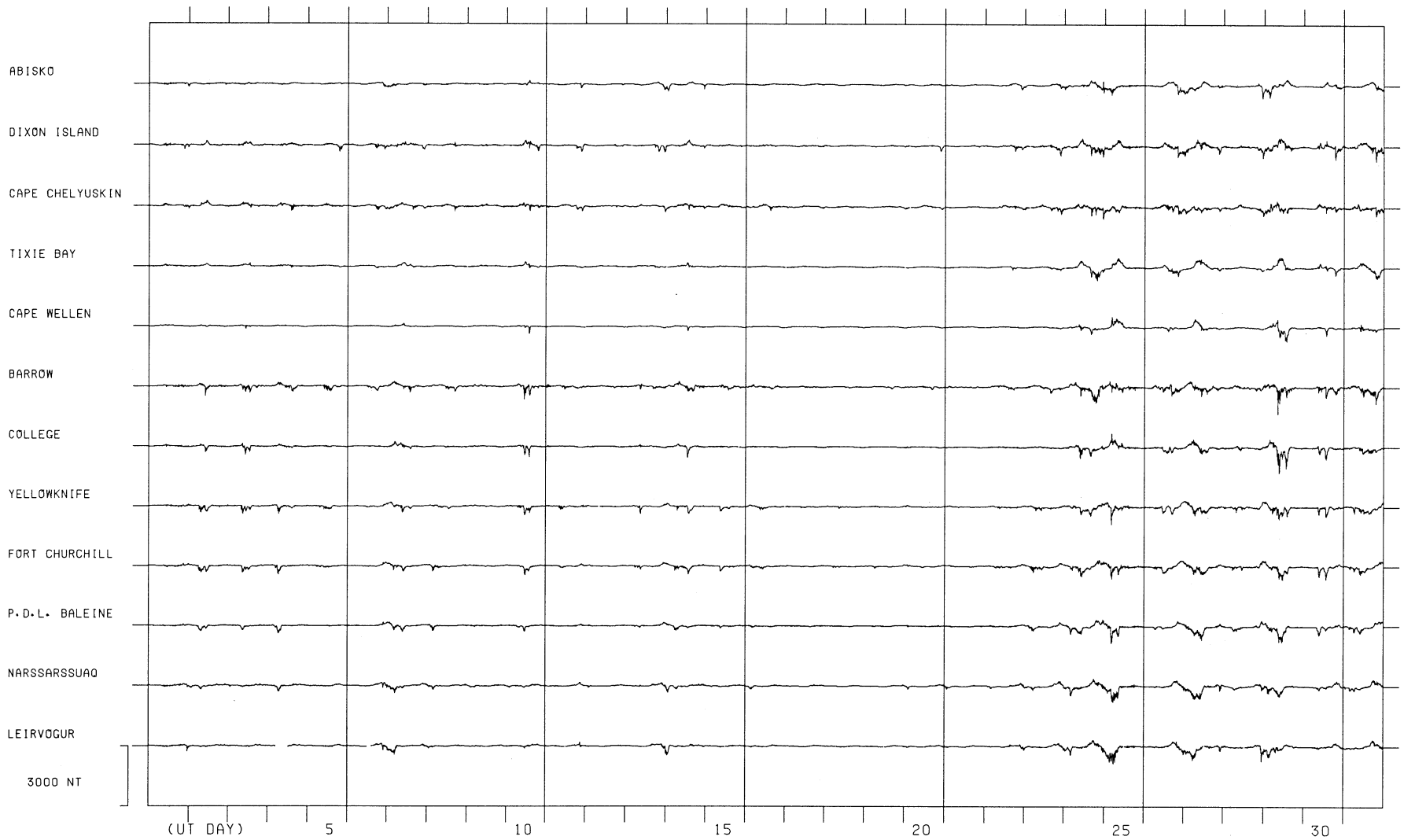
STACKED COMMON SCALE MAGNETOGRAMS FOR FEBURUARY 1987



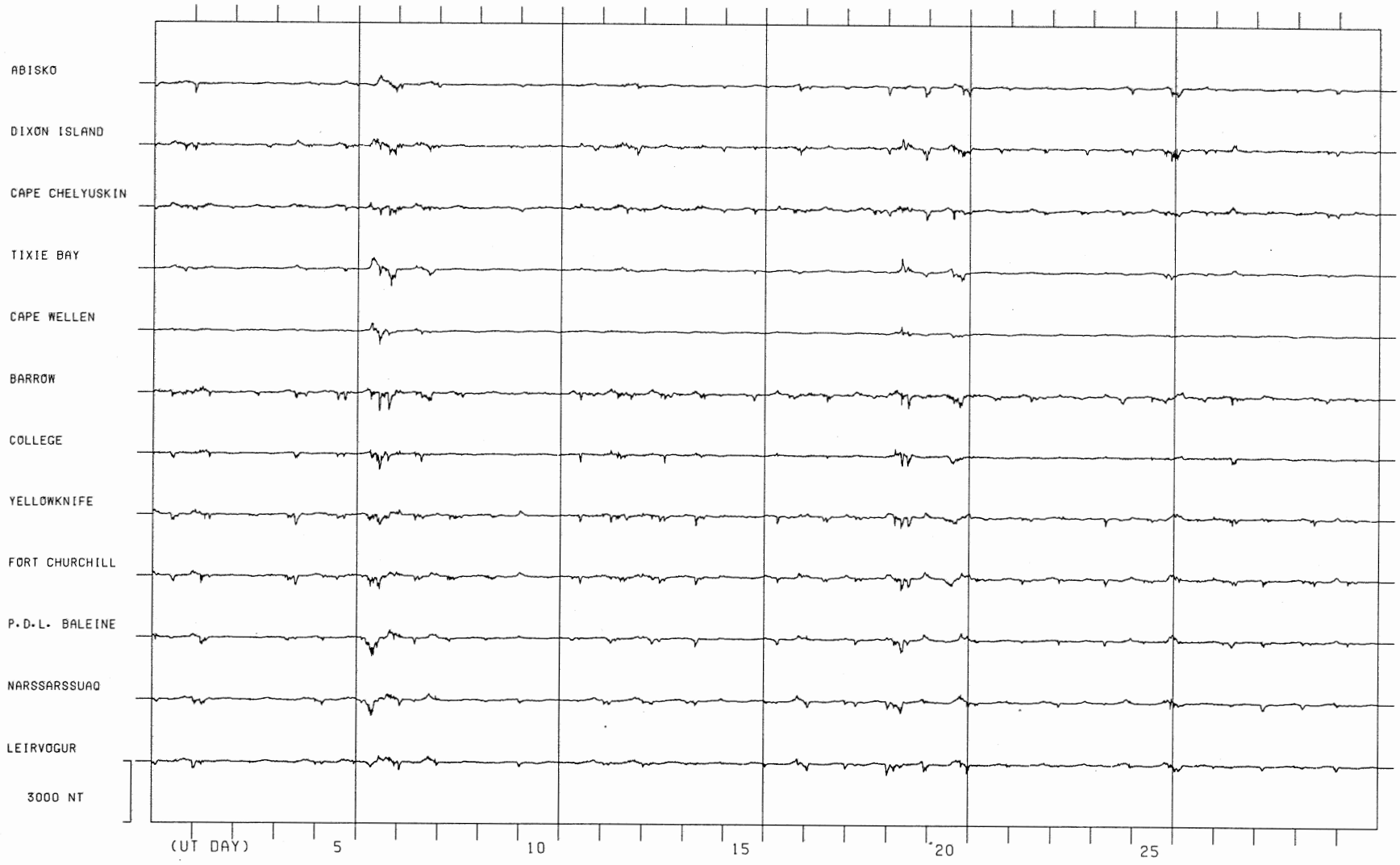
STACKED COMMON SCALE MAGNETOGRAMS FOR MARCH 1987



STACKED COMMON SCALE MAGNETOGRAMS FOR APRIL 1987



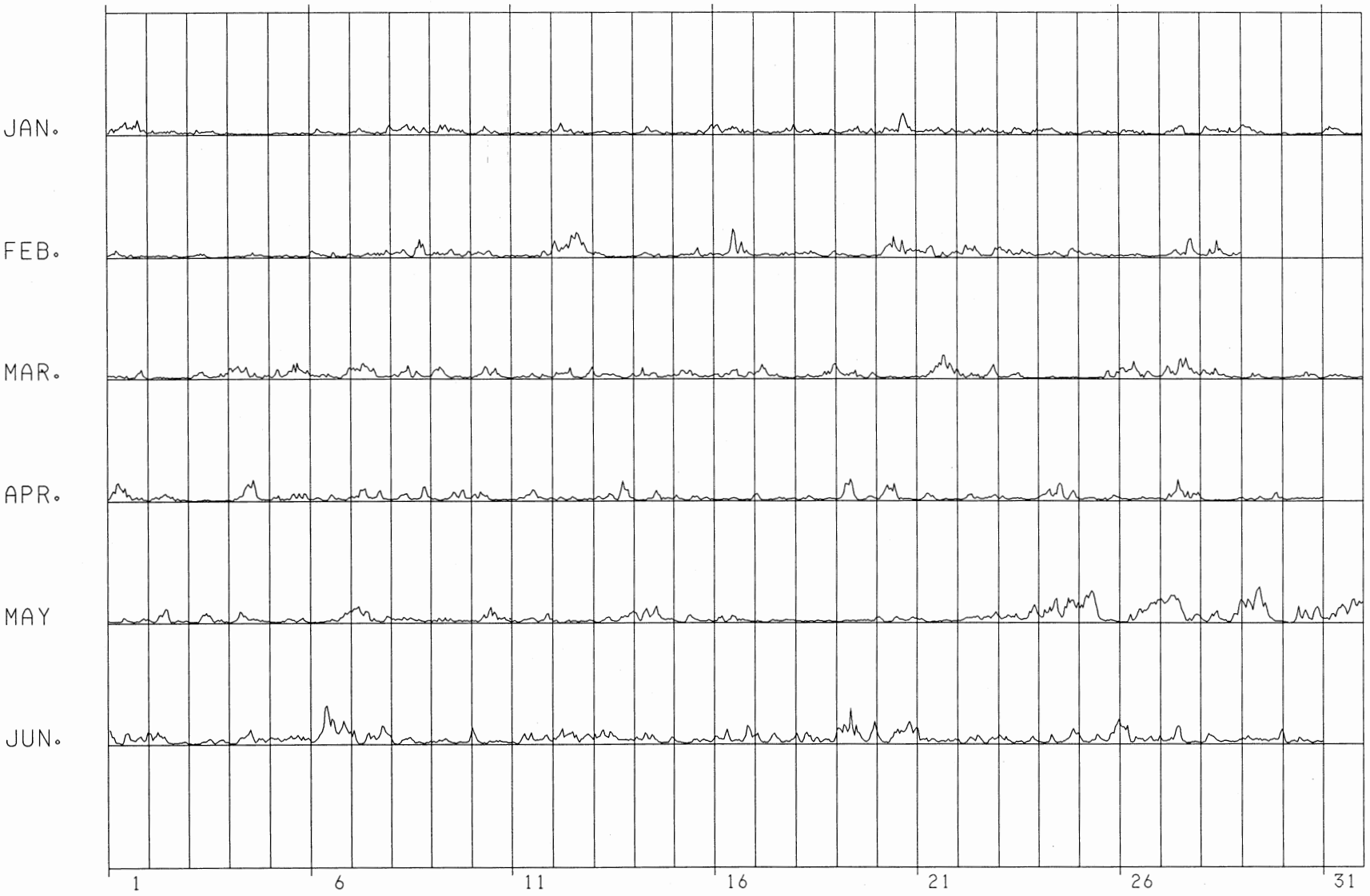
STACKED COMMON SCALE MAGNETOGRAMS FOR MAY 1987



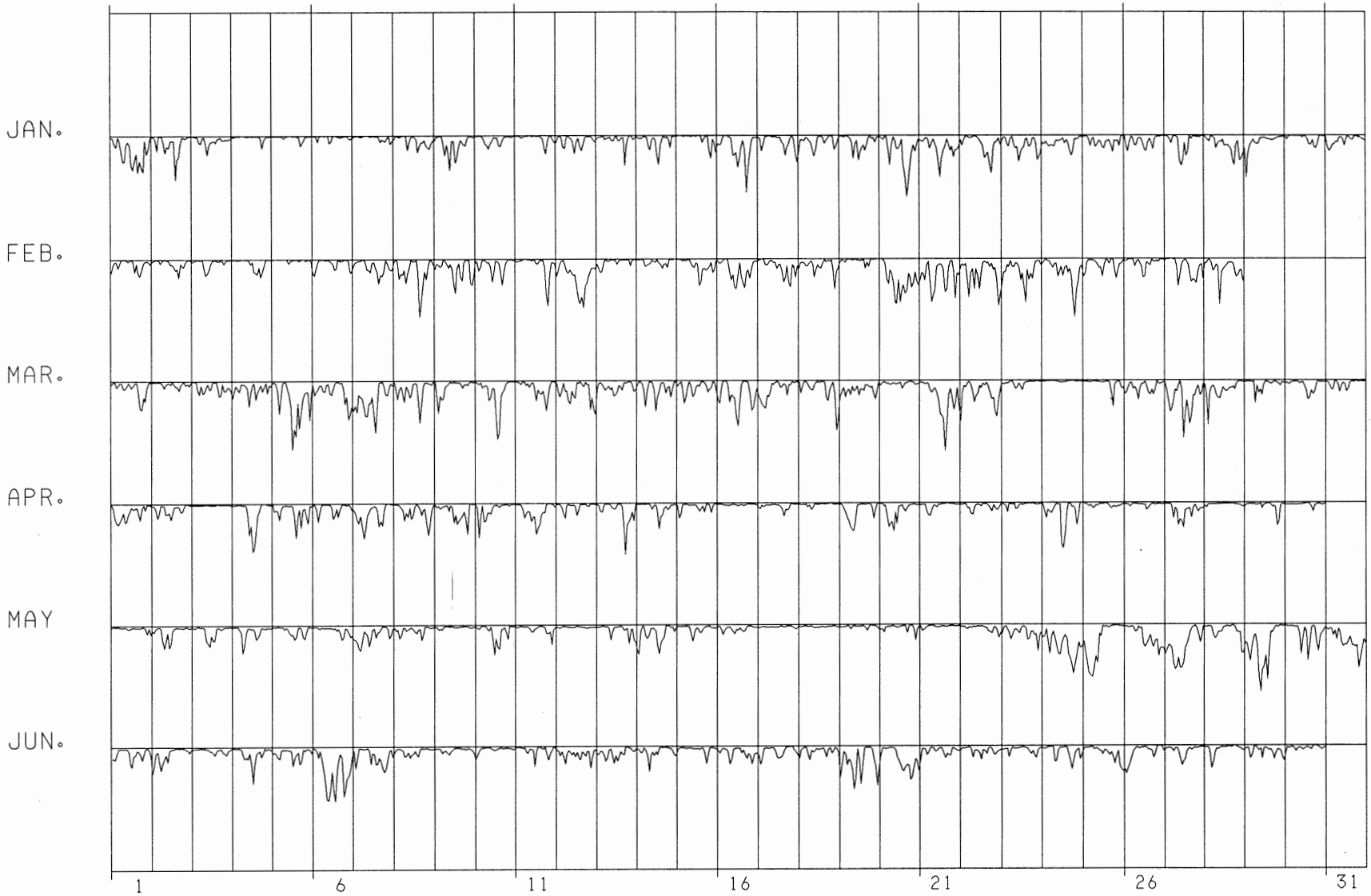
STACKED COMMON SCALE MAGNETOGRAMS FOR JUNE 1987

FIGURE 7

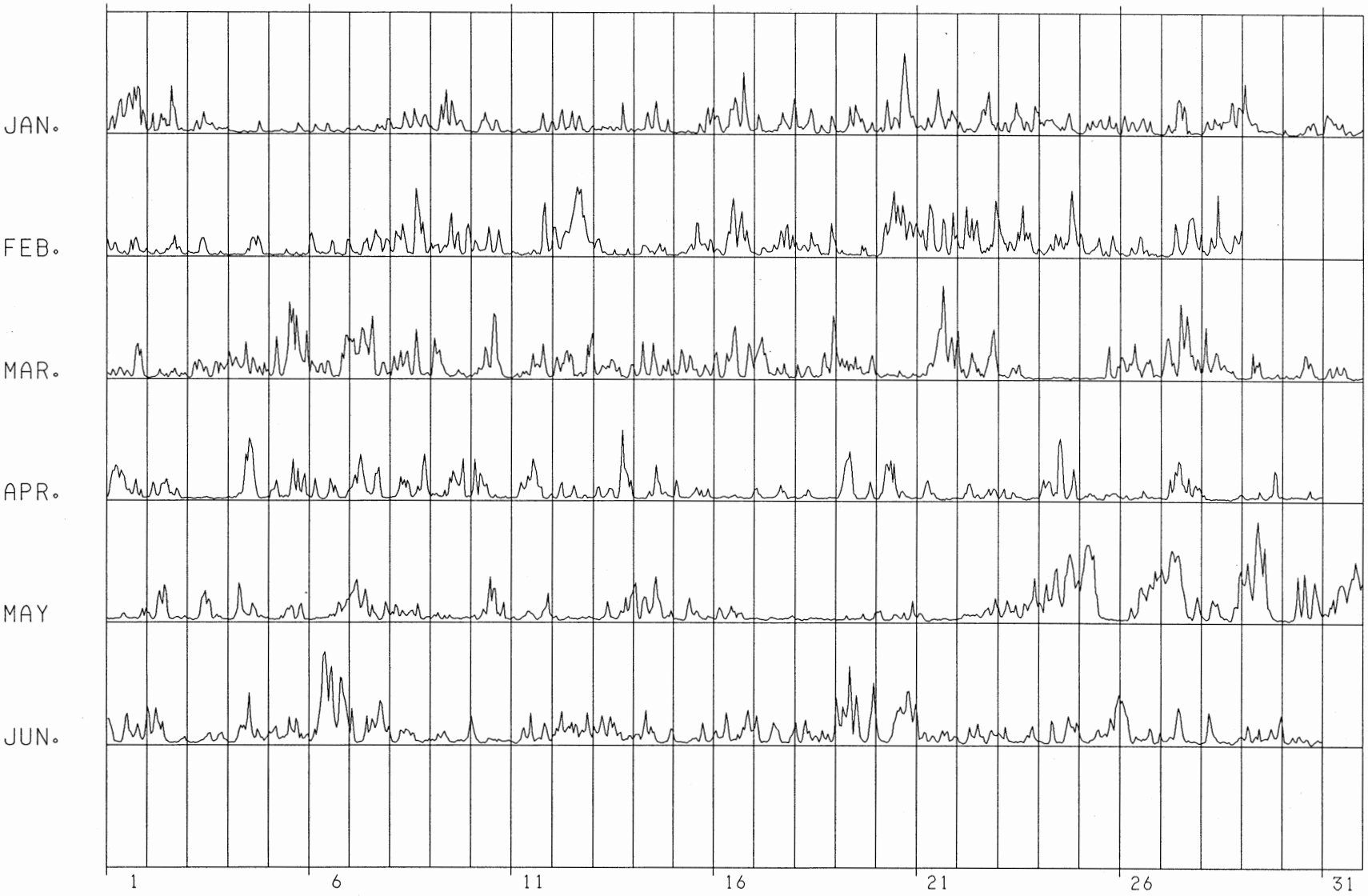
Plots of hourly values of each index
(AU, AL, AE and AO)
for January-June 1987.



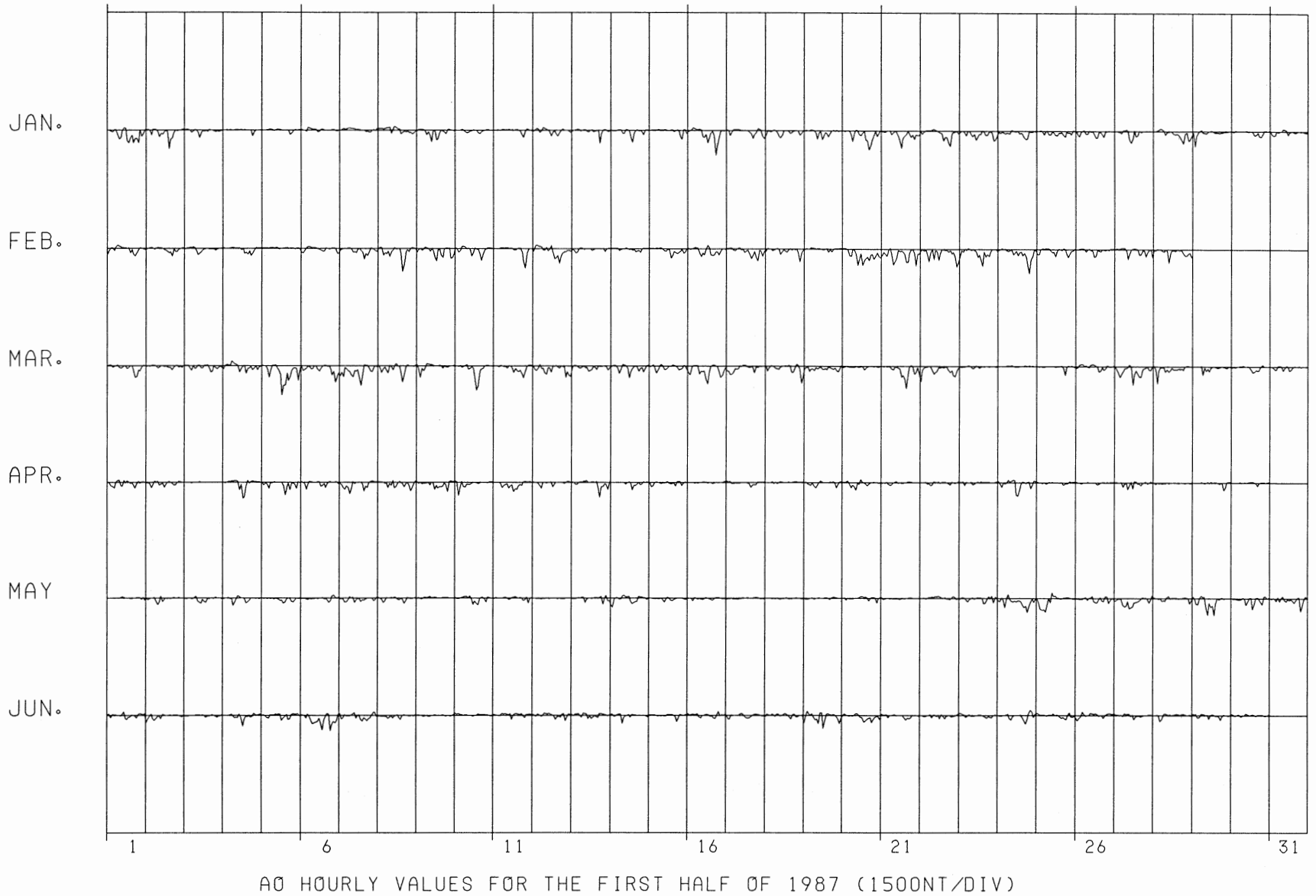
AU HOURLY VALUES FOR THE FIRST HALF OF 1987 (1500NT/DIV)



AL HOURLY VALUES FOR THE FIRST HALF OF 1987 (1500NT/DIV)



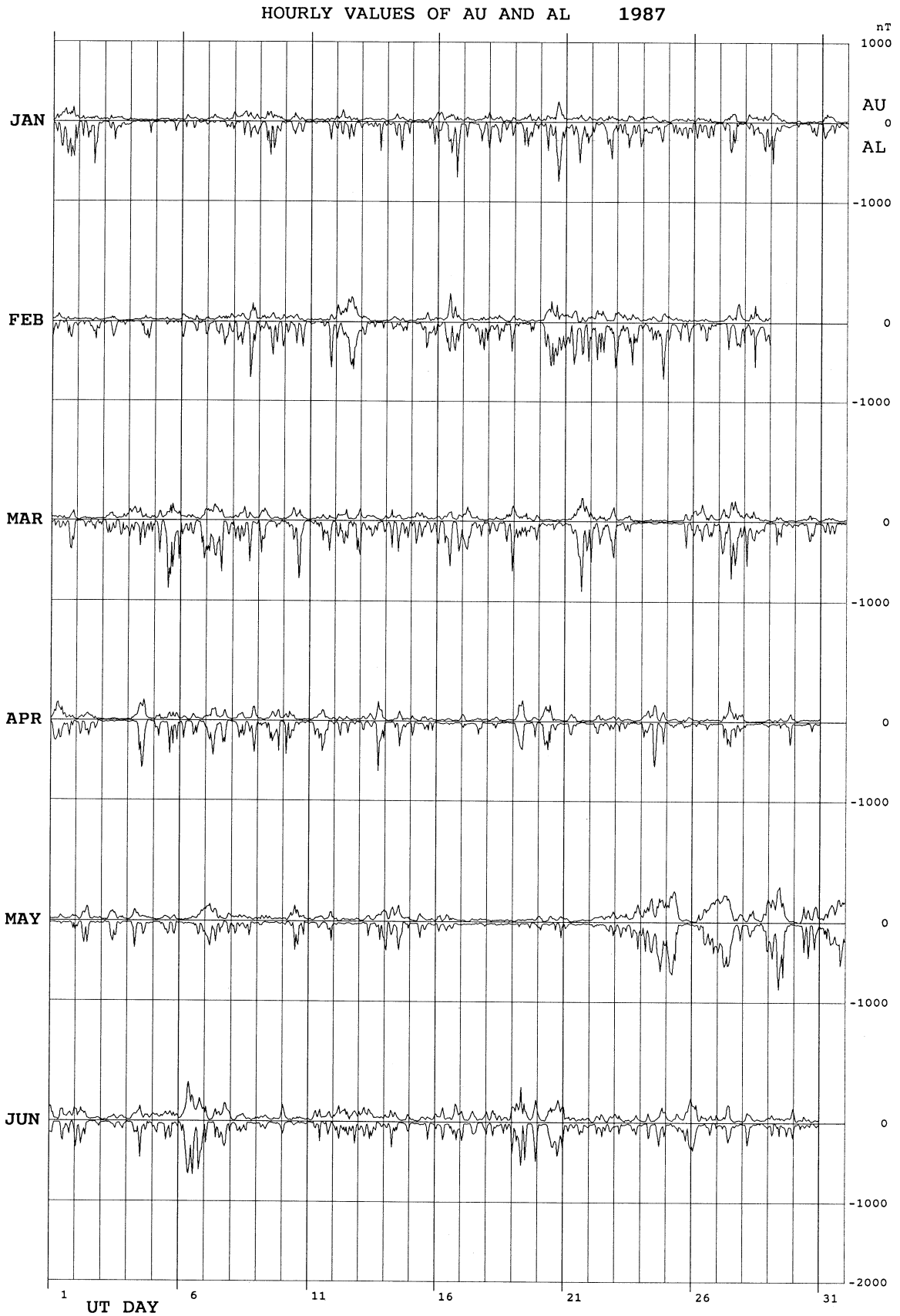
AE HOURLY VALUES FOR THE FIRST HALF OF 1987 (1500NT/DIV)



AO HOURLY VALUES FOR THE FIRST HALF OF 1987 (1500NT/DIV)

FIGURE 8

A summary plot of hourly values of
AU and AL indices
for January-June 1987.


HOURLY VALUES OF AU AND AL 1987
nT
1000
AU
0
AL
-1000
JAN
FEB
MAR
APR
MAY
JUN
0
-1000
-2000
1
6
11
16
21
26
31
UT DAY

Publications by the World Data Center C2 for Geomagnetism.

1. Data Catalogue

	Published in
Data Catalogue of World Data Center C2 for Geomagnetism No.22	1990

2. Data Books

No. 1	Equivalent current systems of the daily geomagnetic variations in December 1964	1978
No. 2	Electric fields and neutral winds in the ionospheric dynamo region as deduced from the daily geomagnetic variations in December 1964	1979
No. 3	Auroral electrojet (AE) indices for January-June 1978	1981
No. 4	Auroral electrojet (AE) indices for July-December 1978	1981
No. 5	Auroral electrojet (AE) indices for January-June 1979	1982
No. 6	Auroral electrojet (AE) indices for July-December 1979	1982
No. 7	Auroral electrojet (AE) indices for January-June 1980	1983
No. 8	Auroral electrojet (AE) indices for July-December 1980	1983
No. 9	Auroral electrojet (AE) indices for January-June 1981	1984
No.10	Auroral electrojet (AE) indices for July-December 1981	1984
No.11	Auroral electrojet (AE) indices for January-June 1983	1985
No.12	Auroral electrojet (AE) indices for July-December 1982	1985
No.13	Auroral electrojet (AE) indices for July-December 1983	1986
No.14	Auroral electrojet (AE) indices for January-June 1982	1986
No.15	Auroral electrojet (AE) indices for January-June 1984	1987
No.16	Auroral electrojet (AE) indices for July-December 1984	1988
No.17	Auroral electrojet (AE) indices for July-December 1985	1989
No.18	Auroral electrojet (AE) indices for January-June 1985	1989
No.19	Auroral electrojet (AE) indices for January-June 1986	1990
No.20	Auroral electrojet (AE) indices for July-December 1986	1991
No.21	Auroral electrojet (AE) indices for July-December 1987	1992

3. Prompt Reports

Provisional Equatorial Dst Index (since Oct. 1985)	monthly
Provisional Auroral Electrojet Indices (AE11) for March 1989	1989
Provisional Geomagnetic Data Plots No1 (Jan-Dec 1989)	1990
Provisional Geomagnetic Data Plots No2 (Jan-Jun 1990)	1990
Provisional Geomagnetic Data Plots No3 (Jul-Dec 1990)	1991
Provisional Geomagnetic Data Plots No4 (Jan-Jun 1991)	1992
Provisional Geomagnetic Data Plots No5 (Jul-Dec 1991)	1992

4. Other publications

Report of Aeromagnetic Survey in Japan	1966
Japanese WMS Magnetic Charts for 1965	1966
WMA Inventory; First Issue	1970
WMA Inventory; Second Issue	1971

(WMA: World Magnetic Archives; WMS: World Magnetic Survey)

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The publications above are available on request. Requests should be made by mail to:

WDC-C2 for Geomagnetism
Faculty of Science, Kyoto University
Kyoto 606, Japan

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