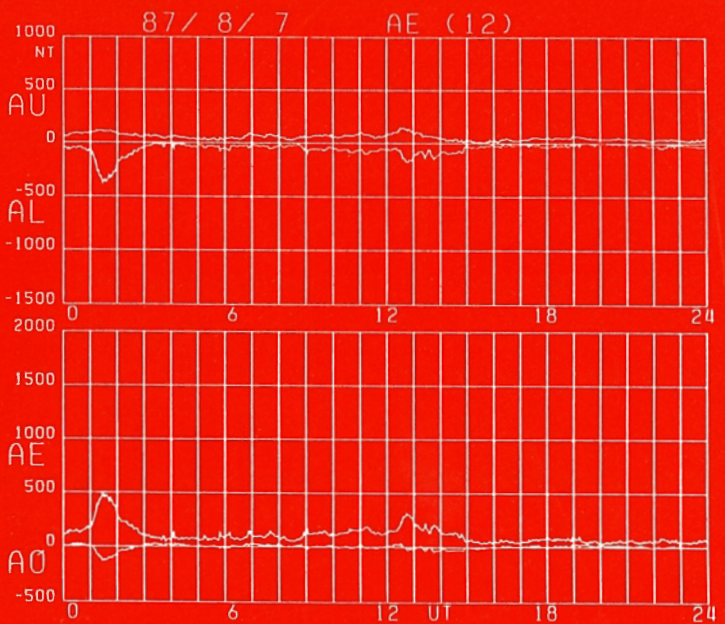
World Data Center C2 for Geomagnetism

DATA BOOK

No. 22

Auroral electrojet (AE) indices
for July-December 1987



FEBRUARY 1993

Data Analysis Center for
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FACULTY OF SCIENCE
KYOTO UNIVERSITY
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Division of
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NATIONAL INSTITUTE OF
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TOKYO

SPECIAL NOTICE

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

Data Book No. 23	AE indices for January - June 1988.
Data Book No. 24	AE indices for July - December 1988.
Data Book	AE indices for January - June 1977.
Data Book	AE indices for July - December 1977.

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February 1993

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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.

TABLE OF CONTENTS

AURORAL ELECTROJET (AE) INDICES

FOR JULY - DECEMBER 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

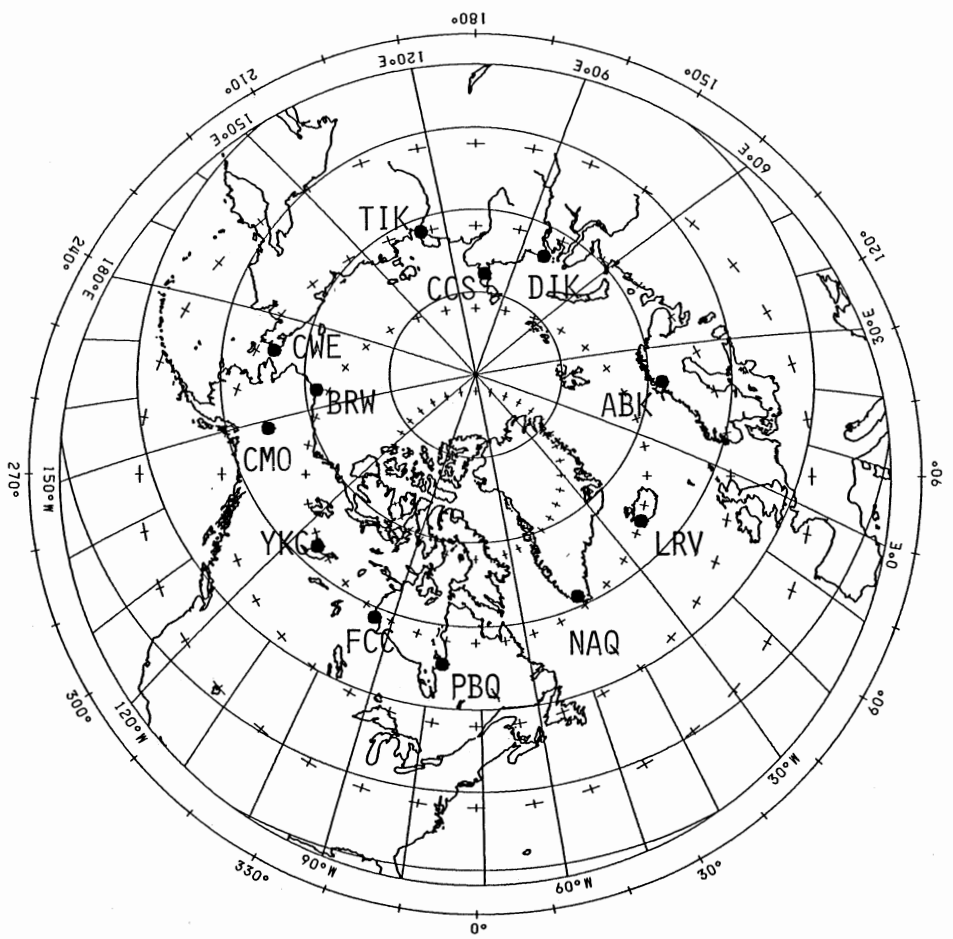

Figure 1. Distribution of AE(12) stations.

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.

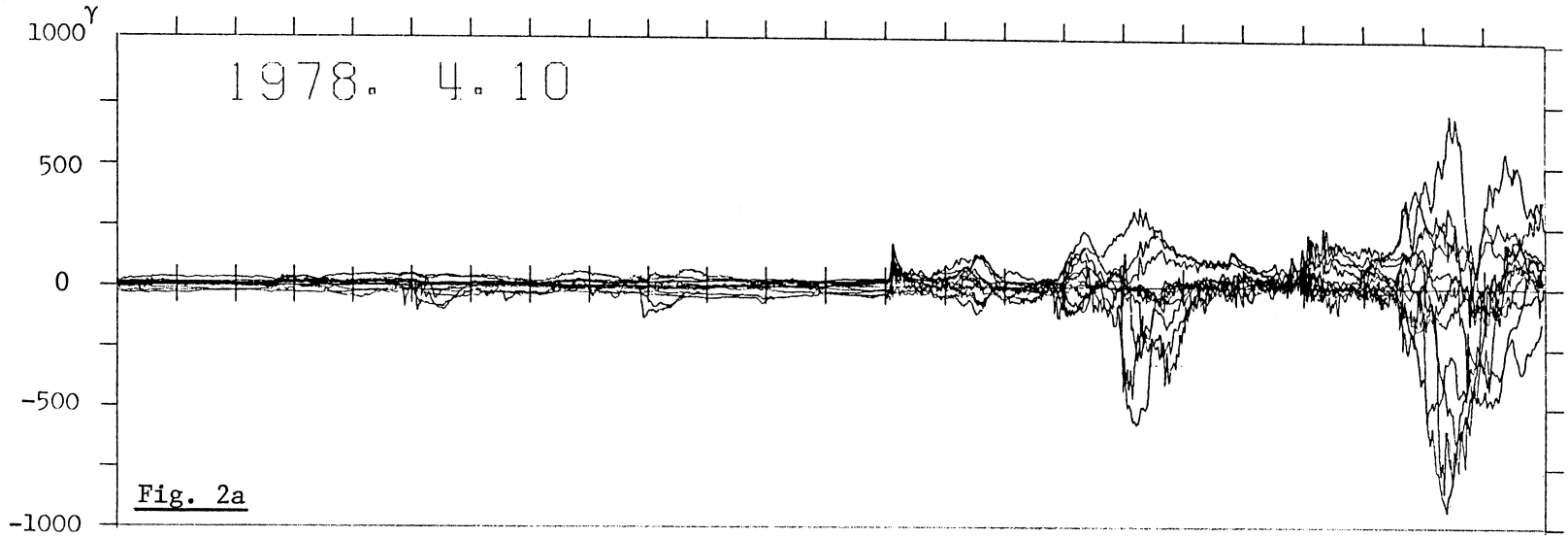

Fig. 2a

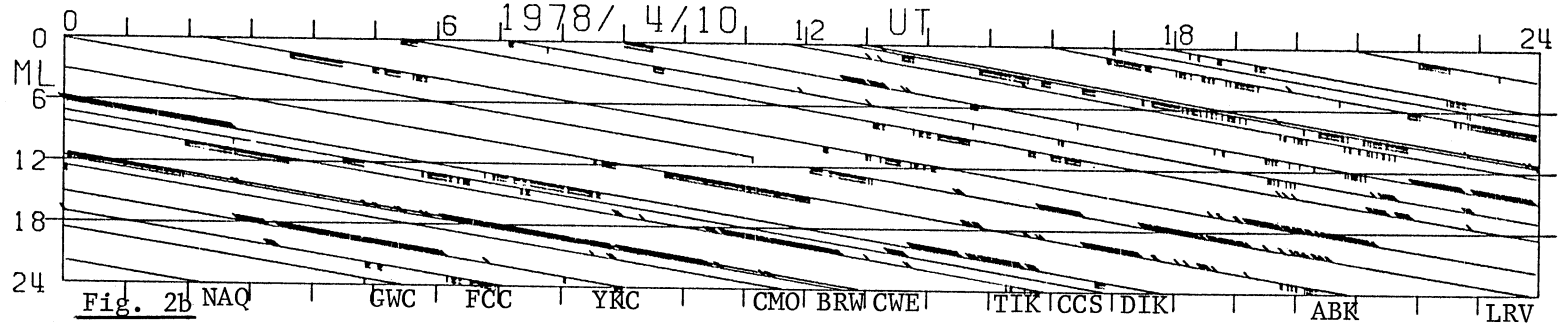

Fig. 2b

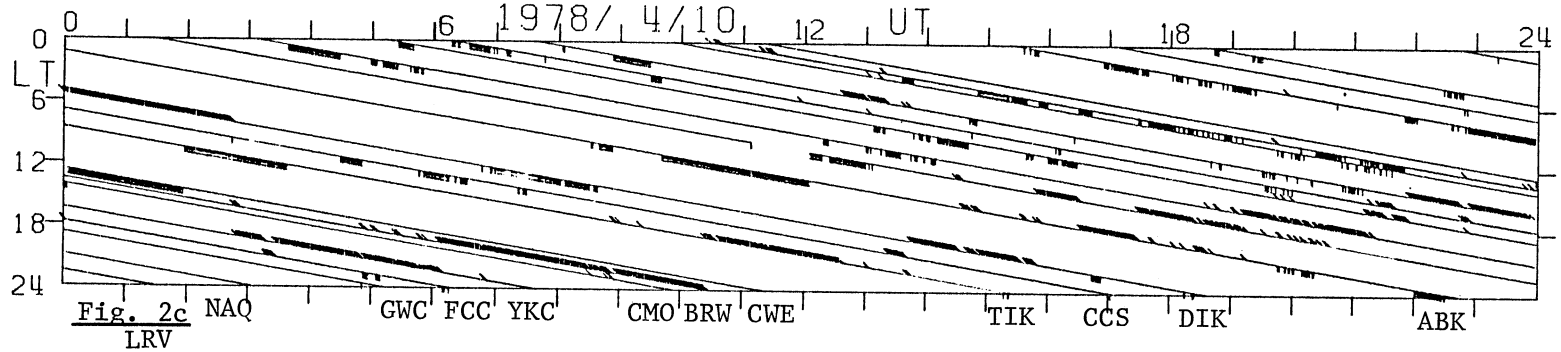

Fig. 2c

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.

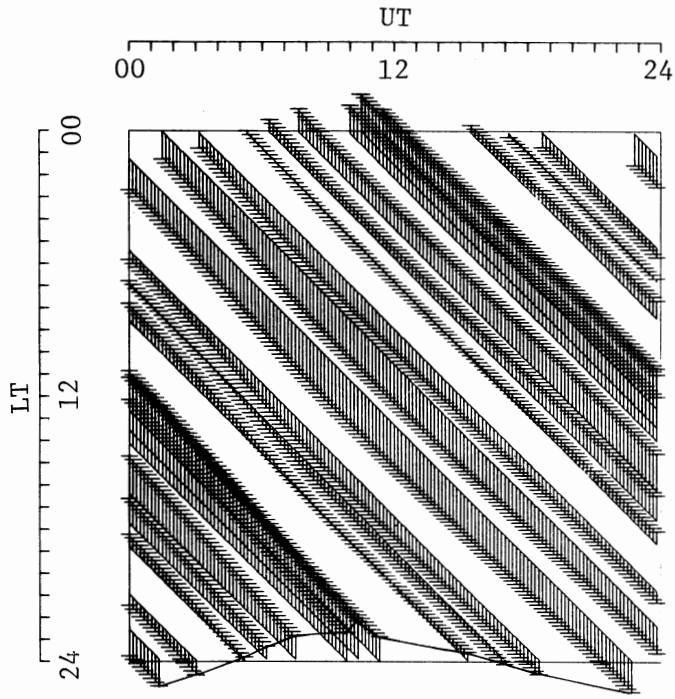

Fig. 3a Difference between GLT and MLT in winter.

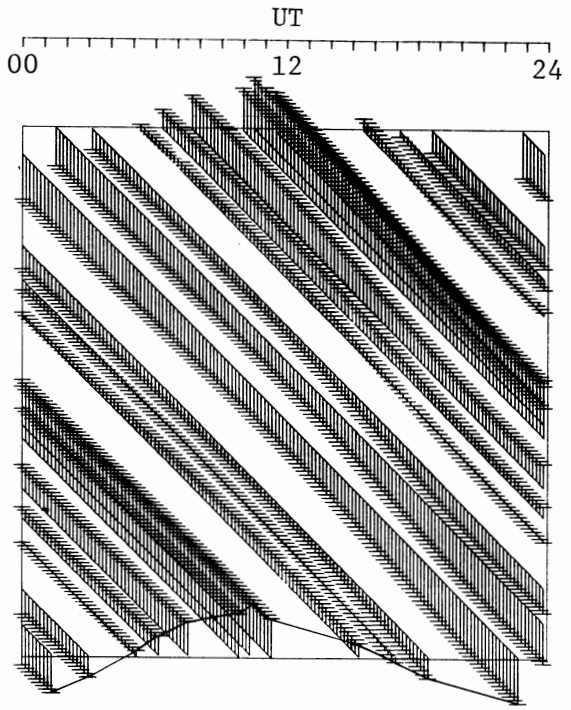

Fig. 3b Difference between GLT and MLT in summer.

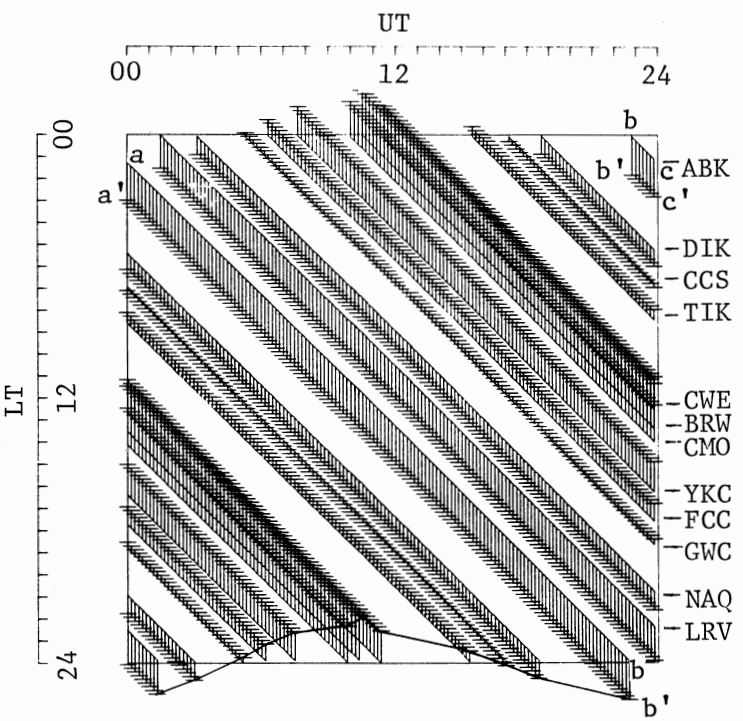

Fig. 3c Difference between GLT and MLT in equinox.

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 July-December 1987 are listed in Table 2. Table 3 gives hourly average values of the AE indices for each day from July to December 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 July to December 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 indices 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, Ms. S. Manabe and Ms. M. Makita of WDC-C2 for Geomagnetism for their assistance in the computation and production of plots, and also to Dr. T. Ono 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	July	Aug.	Sep.	Oct.	Nov.	Dec.	
Abisko	11640	11632	11623	11617	11626	11627	
Dixon Island	-666	-672	-676	-690	-677	-687	(H0+)
Cape Chelyuskin	241	249	240	229	228	233	(H0+)
Tixie Bay	10	8	-5	-5	-8	-7	(H0+)
Cape Wellen	153	146	136	132	134	133	(H0+)
Barrow	9610	9611	9597	9601	9609	9605	
College	12855	12851	12836	12837	12845	12843	
Yellowknife	8747	8735	8729	8734	8749	8741	
Fort Churchill	7808	7795	7787	7797	7805	7808	
Poste-de-la-Baleine	10839	10821	10826	10835	10846	10845	
Narssarssuaq	12247	12223	12227	12237	12238	12241	
Leirvogur	12436	12430	12430	12432	12442	12443	

(H0+) : Deviation from the H base line on the ordinary magnetograms.

TABLE 3

Hourly average AE indices (AU, AL, AE and AO)
for July-December 1987.

AU Index (Hourly mean values, unit nT) July 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
Q	1	36	27	19	13	13	8	15	22	28	27	31	32	32	35	35	34	19	20	21	23	27	30	42	45	26
Q	2	42	36	59	64	100	82	40	27	28	38	33	20	18	25	20	28	24	16	29	51	106	115	105	111	51
	3	64	52	33	15	29	27	53	76	68	70	59	37	45	40	31	30	37	34	34	57	95	137	116	127	57
	4	110	81	85	87	54	122	149	51	29	26	23	21	28	30	24	32	40	34	34	38	58	62	62	72	56
	5	76	100	101	84	77	103	120	92	45	91	108	117	105	72	51	54	44	32	31	32	46	64	90	106	77
Q	6	94	61	66	58	42	32	22	41	55	107	85	114	78	89	69	43	28	32	41	57	94	77	42	25	60
Q	7	21	24	28	28	16	4	6	15	37	46	28	33	56	67	56	60	56	36	34	52	78	61	46	51	39
	8	61	72	88	93	107	176	231	100	60	99	131	146	117	111	90	69	50	49	63	83	99	117	114	92	101
	9	57	44	97	108	155	165	200	131	182	237	119	40	37	54	82	50	47	45	55	71	104	179	111	66	101
	10	69	145	140	194	237	256	238	224	95	57	185	164	157	146	88	52	40	32	52	65	90	67	70	57	122
	11	42	41	74	70	103	120	147	191	130	92	116	160	132	85	63	57	48	48	64	44	30	45	73	83	86
	12	60	51	71	83	136	172	143	100	121	203	153	114	150	107	44	42	39	30	29	31	33	83	93	97	91
	13	90	80	46	33	26	30	27	21	20	23	18	30	35	32	22	19	21	26	30	31	43	31	50	60	35
	14	57	74	41	23	50	175	122	42	24	23	22	27	47	45	30	19	27	41	32	27	28	53	89	82	50
D	15	74	64	34	13	46	102	92	154	92	53	169	351	109	207	224	214	191	152	204	100	167	241	226	203	145
D	16	129	156	158	199	100	147	125	117	198	196	64	27	38	59	82	38	121	260	200	121	53	92	121	135	122
	17	101	82	96	150	175	206	79	68	110	102	128	174	136	132	97	52	42	44	61	135	111	129	98	133	110
	18	150	77	113	127	117	95	95	34	26	39	86	161	137	69	44	39	37	46	55	76	131	104	66	52	82
	19	45	73	49	63	74	80	57	30	21	112	128	88	74	97	90	63	38	42	74	95	115	104	142	117	78
	20	101	85	82	83	120	59	46	15	66	61	37	34	54	62	46	40	65	72	62	34	71	131	203	67	71
	21	125	38	27	13	67	28	108	127	115	99	45	78	62	55	43	57	59	34	35	28	36	25	41	70	59
	22	90	79	85	120	84	131	177	187	157	69	29	29	45	23	17	23	38	30	55	65	143	90	89	133	83
	23	64	28	19	25	39	57	73	36	25	24	35	58	64	67	81	55	56	90	120	109	151	129	70	55	64
	24	44	21	34	36	63	52	35	21	19	18	30	28	64	41	30	23	74	113	186	125	106	99	65	107	60
D	25	100	91	79	85	99	50	88	141	78	258	287	348	172	56	48	117	128	135	137	135	172	155	97	88	131
Q	26	90	81	51	18	10	14	49	41	48	70	54	31	25	29	18	17	24	28	32	30	24	21	20	20	35
	27	41	105	154	149	126	200	152	139	111	138	124	77	63	68	50	41	41	65	76	53	46	35	24	41	88
D	28	38	68	88	74	30	23	26	27	47	115	280	334	232	263	347	315	214	255	305	335	194	164	216	218	175
D	29	168	176	398	304	353	429	573	427	249	120	221	156	130	184	152	62	57	51	29	13	18	20	44	109	185
	30	135	166	106	63	60	98	114	68	119	179	163	179	145	109	141	50	42	33	18	25	30	59	85	169	98
	31	177	173	192	260	195	125	138	145	112	56	94	77	70	58	59	48	44	45	62	110	130	101	69	38	107
	Mean	82	79	87	88	93	108	114	93	81	91	99	105	85	81	73	59	57	63	72	72	84	90	89	91	85
5Q	Mean	56	45	44	36	36	28	26	29	39	57	46	46	41	49	39	36	30	26	31	42	65	60	51	50	42
5D	Mean	101	111	151	135	125	150	180	173	132	148	204	243	136	153	170	149	142	170	175	140	120	134	140	150	151

AU Index (Hourly mean values, unit nT) August 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	57	168	131	210	312	131	99	45	60	91	61	29	59	40	46	46	42	55	88	88	83	80	106	106	93
Q	2	126	108	100	64	56	103	57	54	22	49	21	73	69	42	40	21	27	58	75	70	62	56	63	57	61
	3	62	84	91	84	75	75	58	38	35	64	160	239	258	183	316	356	307	286	175	107	90	52	49	37	137
	4	57	68	61	36	85	50	60	68	64	97	120	108	53	57	60	37	50	57	94	108	122	143	118	165	81
	5	186	127	124	178	158	148	153	221	181	298	265	158	101	69	96	81	54	61	62	102	110	76	45	38	129
	6	34	36	42	62	67	64	109	85	81	101	99	98	109	112	111	95	55	82	63	85	123	145	114	71	85
Q	7	80	103	70	58	49	36	53	70	46	68	68	73	112	74	33	19	32	46	51	52	43	37	38	31	56
	8	33	56	74	76	87	173	164	134	76	109	161	100	105	152	127	95	69	79	106	110	110	105	163	169	110
	9	170	114	65	103	161	131	85	60	62	88	145	116	135	169	157	121	93	60	66	71	65	45	34	48	98
Q	10	65	43	40	38	28	26	31	38	38	35	28	43	31	33	34	31	36	70	83	75	54	64	61	47	45
	11	49	61	54	28	23	21	19	20	28	30	31	27	31	32	43	44	53	75	121	82	103	108	64	83	51
	12	122	111	114	110	97	101	99	72	89	134	81	56	119	130	235	241	168	113	153	221	166	235	270	233	145
D	13	187	178	201	99	102	193	120	184	386	176	99	60	54	44	49	33	44	86	87	96	133	183	181	104	128
	14	46	158	103	78	227	103	79	59	85	73	40	59	84	102	87	111	94	76	131	152	155	212	151	92	107
	15	116	74	59	75	169	88	83	161	183	211	150	134	65	78	85	82	58	61	116	179	178	237	201	144	124
	16	124	116	94	108	163	162	77	103	76	158	71	79	96	93	95	52	48	60	89	85	91	116	86	96	97
	17	67	80	76	55	106	40	69	83	114	86	79	31	60	79	153	224	151	80	77	72	93	85	74	52	87
Q	18	45	42	70	71	74	100	61	95	59	58	35	16	25	16	29	52	62	62	43	74	71	47	50	36	54
	19	35	65	101	117	160	120	69	124	67	38	47	60	81	154	129	47	70	76	57	54	75	80	82	96	84
	20	119	117	88	107	98	117	99	119	57	56	77	65	87	139	78	43	50	70	83	69	66	52	43	54	81
Q	21	86	82	81	62	67	77	95	54	95	86	79	74	52	42	21	33	57	56	75	64	40	23	21	21	60
	22	18	21	38	36	48	42	21	24	24	44	51	57	55	54	68	47	53	89	128	196	76	47	39	38	55
	23	42	90	67	74	76	70	67	47	109	121	97	178	208	122	140	131	237	216	183	219	187	162	85	52	124
	24	51	48	136	113	64	36	35	24	24	54	88	146	238	200	82	49	55	117	170	120	72	48	50	81	88
D	25	44	31	15	20	20	30	36	108	261	408	276	202	201	414	433	202	339	297	258	294	214	158	284	252	200
D	26	179	217	227	251	330	267	249	131	193	183	152	216	188	162	233	134	157	125	140	186	189	168	164	126	190
D	27	161	221	119	65	80	151	148	151	151	139	123	237	178	138	125	226	294	203	196	254	98	57	48	25	149
	28	20	31	40	73	48	50	24	20	35	60	117	129	102	58	60	118	156	165	226	225	292	284	207	202	114
	29	181	95	78	71	47	61	92	38	33	35	37	58	21	26	26	66	103	146	235	292	128	137	159	179	98
	30	142	67	47	47	63	62	112	164	208	155	83	35	33	26	53	81	140	119	85	91	95	153	107	89	94
D	31	140	92	67	110	161	118	118	327	241	79	189	160	155	265	284	317	465	308	203	146	140	108	105	132	185
	Mean	91	93	86	86	106	95	85	94	102	109	100	100	102	106	113	104	116	111	119	130	113	113	105	95	103
5Q	Mean	80	75	72	58	54	68	59	62	52	59	46	55	57	41	31	31	42	58	65	67	54	45	46	38	55
5D	Mean	142	147	125	109	138	151	134	180	246	197	167	175	155	204	224	182	259	203	176	195	154	134	156	127	170

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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	162	177	244	279	268	361	224	206	161	141	184	157	303	211	253	246	166	132	124	105	118	148	133	145	194
	2	166	131	157	118	101	153	124	138	158	87	107	85	144	132	56	54	52	76	110	95	70	56	46	27	102
Q	3	18	21	15	33	43	55	67	47	40	27	39	24	30	31	20	18	15	17	16	18	19	15	14	13	27
Q	4	26	30	68	89	71	55	29	27	36	35	56	67	91	78	58	95	156	89	60	67	114	102	82	83	69
Q	5	80	77	98	97	113	163	116	81	92	108	142	120	101	44	39	31	28	28	32	46	76	105	114	115	85
	6	115	106	114	78	63	58	70	61	67	79	183	174	54	40	27	38	68	114	122	99	108	84	71	51	85
	7	30	18	25	21	25	47	87	83	94	96	80	53	112	99	147	55	38	26	34	43	32	61	107	158	65
	8	117	103	89	97	57	48	39	52	57	97	70	60	59	41	35	72	57	37	34	41	53	75	71	51	63
	9	43	59	72	38	52	54	70	121	103	113	49	63	51	36	27	17	19	28	37	34	40	40	54	43	53
D	10	27	33	33	31	35	37	45	37	37	42	31	57	113	159	317	301	127	131	90	171	224	398	301	144	122
D	11	121	95	136	172	148	66	39	61	167	179	85	96	95	59	62	49	185	258	195	259	291	296	117	70	138
	12	76	46	41	136	176	104	94	71	71	76	58	49	42	73	109	108	99	122	165	161	120	125	200	130	102
	13	177	156	141	91	68	100	40	32	74	66	53	60	112	81	252	270	133	57	32	33	55	128	162	118	104
	14	171	234	173	212	86	126	75	87	87	113	58	152	65	81	59	82	45	68	112	131	219	110	53	45	110
	15	106	89	77	61	109	104	98	90	137	146	100	143	179	144	95	79	184	118	150	206	169	221	169	140	130
	16	164	150	107	47	70	103	112	86	74	127	125	94	70	82	82	59	77	99	54	99	99	105	128	81	96
	17	87	112	75	54	138	119	75	58	90	82	50	30	72	79	71	110	116	140	233	165	125	136	141	114	103
Q	18	102	68	56	50	70	79	88	76	113	109	67	57	38	40	34	41	32	30	34	30	31	38	40	46	57
Q	19	36	43	39	31	26	25	20	21	26	23	45	26	23	19	33	35	11	13	19	27	29	27	24	24	27
	20	27	27	26	31	31	24	20	26	35	34	50	62	89	58	35	56	86	147	232	164	118	136	79	57	69
	21	48	57	82	95	57	38	45	44	57	49	46	49	110	102	117	56	29	31	36	59	66	27	26	41	57
	22	73	86	93	134	190	181	151	197	83	128	118	100	56	29	21	56	153	305	366	331	239	241	131	121	149
	23	164	131	122	119	107	113	118	191	145	132	105	84	127	69	17	29	49	48	43	30	25	23	18	25	85
	24	21	25	105	127	177	99	68	39	44	38	36	34	26	32	29	29	28	28	30	29	36	40	31	22	49
D	25	22	17	26	42	102	163	151	269	348	325	125	169	225	198	269	365	340	296	248	207	227	185	158	166	193
	26	99	52	72	107	139	182	200	312	346	343	140	149	117	105	59	39	25	95	91	68	34	38	35	34	120
	27	35	42	21	25	34	49	30	42	37	46	57	41	35	50	64	19	65	138	132	177	132	150	74	64	65
	28	144	187	83	50	37	23	26	92	101	106	115	85	99	74	46	46	53	76	106	116	89	146	164	132	91
	29	141	188	120	133	189	103	69	59	67	71	109	171	163	151	316	231	191	232	325	245	174	158	140	89	160
D	30	87	142	239	259	174	158	205	208	237	158	112	129	107	104	129	166	180	258	111	91	93	54	59	58	147
	Mean	89	90	91	95	98	99	86	97	106	105	86	88	96	83	95	95	93	107	112	111	107	115	98	80	97
5Q	Mean	52	47	55	60	64	75	64	50	61	60	69	58	56	42	36	44	48	35	32	37	53	57	54	56	53
5D	Mean	83	92	135	156	145	157	132	156	190	169	107	121	168	146	206	225	199	215	153	166	190	216	153	116	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	79	68	43	37	46	46	72	92	111	92	110	65	46	41	66	41	56	68	55	70	64	60	45	41	63
	2	30	34	56	39	45	105	99	92	68	85	127	114	61	37	42	57	22	26	39	31	29	21	24	20	54
D	3	17	16	20	30	35	56	87	151	185	184	241	116	230	393	312	275	338	231	256	241	235	207	109	65	168
	4	65	60	66	69	117	141	68	125	155	141	119	108	151	64	113	71	70	31	35	37	27	40	41	39	81
Q	5	28	22	26	32	27	41	36	61	36	73	82	101	91	83	62	48	45	57	40	29	36	54	64	46	51
Q	6	27	21	29	35	39	38	61	36	62	42	37	29	23	16	15	18	17	12	16	24	33	32	27	22	30
	7	24	26	22	20	30	48	85	85	69	88	104	129	80	141	89	64	40	21	25	15	23	27	14	35	54
	8	48	80	75	81	41	40	61	40	89	78	62	68	41	29	39	48	40	37	64	30	43	28	24	23	51
Q	9	18	14	12	15	27	33	22	17	18	17	14	14	13	16	18	18	19	18	19	48	137	141	144	235	44
	10	207	101	109	60	98	109	133	58	35	39	21	19	22	22	20	19	24	44	85	55	29	35	30	46	59
D	11	50	71	114	93	147	133	149	88	55	94	95	65	46	25	121	256	280	242	217	303	215	243	77	63	135
	12	36	39	43	34	36	23	22	23	33	24	16	15	15	23	44	21	32	27	44	34	27	22	59	46	31
	13	69	123	102	102	76	86	79	80	67	82	85	72	110	112	155	158	115	179	189	152	172	80	140	174	115
D	14	145	134	194	161	134	95	121	204	124	107	90	118	88	97	69	198	138	126	103	143	82	80	78	73	121
	15	55	89	82	168	272	153	84	161	115	110	183	127	91	100	117	139	124	96	122	69	64	59	51	62	112
	16	37	60	82	76	88	92	155	100	84	50	49	63	55	70	40	71	103	56	57	36	35	32	38	38	65
	17	47	37	34	42	56	57	54	64	84	126	110	75	116	129	114	119	132	130	100	58	72	68	66	48	81
Q	18	48	41	41	31	32	23	26	42	23	34	35	36	28	23	33	26	35	25	13	15	11	11	12	10	27
	19	15	11	28	23	20	16	17	26	22	25	61	78	103	110	47	36	47	34	35	56	53	55	66	82	44
	20	50	25	23	36	42	45	41	68	54	47	54	62	58	77	73	91	137	183	201	261	203	238	244	231	106
	21	229	194	151	121	205	176	218	145	98	94	88	65	73	53	71	106	172	184	200	190	146	64	51	32	130
Q	22	31	30	46	39	28	16	25	38	22	26	28	18	20	31	30	14	17	13	15	20	28	31	33	37	27
	23	82	78	62	79	78	157	134	158	122	136	138	55	49	54	30	60	116	30	22	16	19	34	30	24	73
	24	18	21	26	31	18	54	72	69	101	91	105	131	60	38	31	52	43	165	162	224	239	198	109	110	90
	25	61	83	89	162	262	271	119	102	115	156	215	138	120	72	31	28	16	20	33	60	75	65	57	57	100
	26	36	43	33	30	67	86	93	82	118	100	103	121	118	65	75	75	64	47	30	15	27	35	37	48	64
D	27	38	111	85	115	121	182	128	146	177	200	200	112	207	87	68	233	198	241	213	122	75	162	191	158	149
D	28	130	122	138	98	239	221	176	192	149	122	125	209	125	104	149	140	238	208	180	104	101	110	49	98	147
	29	79	112	67	63	89	88	74	76	69	73	86	74	93	84	67	60	54	70	62	72	80	100	89	104	79
	30	81	108	99	63	111	86	85	126	113	151	104	91	39	42	35	18	15	14	9	20	33	41	39	37	65
	31	29	37	23	32	41	106	89	119	86	92	79	65	45	32	28	29	31	48	92	114	116	72	57	46	63
	Mean	61	64	65	65	86	91	86	92	85	89	95	82	77	73	71	83	89	86	88	85	81	78	67	69	79
5Q	Mean	30	25	30	30	30	30	34	38	32	38	39	39	35	33	31	24	26	25	20	27	49	53	56	70	35
5D	Mean	76	90	110	99	135	137	132	156	138	141	150	124	139	141	143	220	238	209	193	182	141	160	100	91	143

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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	37	33	53	76	56	74	72	108	74	69	134	171	117	84	35	18	12	17	17	12	21	19	18	11	56
D	2	16	45	43	65	102	167	129	109	123	113	75	164	175	119	142	161	235	312	192	171	329	182	83	91	139
D	3	104	94	73	69	67	116	103	53	33	36	63	64	67	87	80	74	86	162	92	200	106	182	164	148	97
	4	106	59	44	27	25	22	30	24	0	2	9	20	17	9	7	1	11	17	15	22	44	33	28	25	25
	5	60	40	16	7	15	24	34	28	26	19	41	44	26	32	40	29	114	108	136	151	202	132	132	118	65
	6	115	196	117	84	118	175	175	101	97	96	63	17	14	47	88	86	25	10	37	43	11	17	48	56	77
	7	18	2	4	28	23	10	10	10	10	6	11	5	7	7	9	7	4	3	3	7	10	11	13	11	10
Q	8	11	13	19	19	27	33	66	26	17	13	21	23	18	20	42	30	19	19	21	10	11	9	12	15	21
	9	16	16	11	20	21	24	29	57	71	68	38	46	99	144	113	74	31	32	50	112	81	135	159	175	68
	10	165	146	111	81	96	120	148	59	26	57	129	130	62	44	39	30	17	7	10	22	23	45	63	94	72
	11	79	73	43	94	126	104	142	169	133	122	80	54	27	14	14	16	34	32	51	49	72	79	92	67	74
	12	90	111	108	93	43	42	76	116	105	89	51	41	50	40	19	16	28	30	25	88	121	169	143	141	77
D	13	124	140	147	125	142	136	141	88	80	132	172	112	71	84	163	64	131	50	26	40	46	80	94	114	104
	14	72	68	65	73	84	78	104	104	76	90	89	205	122	96	15	21	92	130	91	44	64	51	76	59	82
	15	54	83	60	58	102	57	76	82	66	58	57	54	30	19	27	31	34	36	28	47	22	36	26	22	49
	16	26	32	28	32	56	69	37	36	43	59	50	45	13	15	39	20	33	13	13	7	15	13	6	4	29
Q	17	17	14	11	16	16	23	31	28	36	34	19	16	11	10	4	3	4	5	9	13	14	14	14	15	16
Q	18	13	14	20	21	49	61	53	60	39	40	19	13	25	23	11	33	11	13	16	33	36	22	34	23	28
	19	22	17	17	31	79	115	218	153	128	102	146	132	47	30	35	66	100	57	44	51	30	21	18	16	70
	20	21	36	52	54	68	94	88	61	35	53	27	17	13	14	23	43	36	45	50	136	102	68	53	68	52
	21	69	76	77	58	59	50	46	26	54	60	47	24	24	14	11	6	5	3	6	4	4	3	7	12	31
	22	26	26	35	63	84	99	94	64	79	73	55	35	28	25	32	17	13	14	26	35	57	64	58	51	48
D	23	28	27	70	138	107	102	102	213	348	361	344	133	173	136	73	72	36	101	166	153	182	142	128	113	144
D	24	120	98	76	80	85	82	151	138	146	193	164	95	106	158	184	111	55	50	59	44	54	88	68	76	103
	25	30	17	27	23	55	89	131	95	28	36	18	13	31	15	132	66	37	32	17	4	22	32	41	43	43
	26	45	67	73	60	61	99	100	55	54	123	124	50	67	108	66	38	47	104	40	31	22	18	25	50	64
	27	44	60	53	84	119	160	186	133	157	137	102	86	116	63	122	103	132	126	55	31	32	10	10	40	90
	28	8	15	44	34	61	78	56	34	28	40	107	99	118	82	50	47	30	43	56	35	38	36	24	31	50
Q	29	24	26	24	19	13	16	10	4	3	2	3	5	1	0	1	1	5	4	3	2	2	2	3	4	7
Q	30	3	4	6	4	4	5	5	7	4	6	5	10	6	5	5	8	10	16	18	28	20	18	12	22	10
	Mean	52	54	50	54	65	77	88	74	70	76	75	64	56	51	54	43	47	53	45	54	59	57	55	57	59
5Q	Mean	13	14	16	15	21	27	33	25	19	19	13	13	12	11	12	15	9	11	13	17	16	13	15	15	16
5D	Mean	78	80	81	95	100	120	125	120	146	167	163	113	118	116	128	96	108	135	107	121	143	134	107	108	117

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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	28	35	28	28	20	21	25	35	38	29	41	60	77	103	58	58	28	22	22	54	25	19	18	19	37
	2	16	14	17	22	36	62	66	38	32	15	18	13	12	11	11	7	5	6	10	16	12	11	16	28	21
	3	54	122	134	96	95	80	115	88	60	37	19	29	20	15	24	173	136	34	18	34	29	51	92	74	68
	4	48	36	20	18	18	32	35	73	96	54	38	34	17	13	35	27	16	83	30	80	64	90	122	186	53
D	5	208	118	57	49	56	95	104	76	186	89	38	31	41	92	81	54	44	87	113	133	60	34	29	17	79
	6	12	15	13	36	50	107	70	43	46	62	46	31	30	22	31	72	67	48	35	47	35	59	70	54	46
	7	24	29	37	39	27	27	35	22	16	16	11	10	9	17	26	43	41	38	16	8	17	12	9	14	23
Q	8	13	12	15	10	16	10	6	11	11	13	16	10	13	9	6	7	7	6	5	6	6	7	9	10	10
	9	12	13	15	16	18	18	18	19	17	18	20	20	9	9	9	17	16	13	10	15	26	93	117	136	28
D	10	93	60	66	68	64	54	64	87	88	78	75	74	45	69	169	274	118	178	146	180	177	162	142	140	111
	11	121	121	162	104	19	38	30	17	18	15	17	17	17	40	17	38	92	62	79	72	78	61	50	87	57
	12	96	91	85	101	88	113	106	87	73	61	91	79	123	104	57	51	37	32	22	24	25	15	13	13	66
Q	13	10	13	14	17	14	14	16	24	18	15	27	24	23	21	39	15	26	20	8	4	6	5	7	15	17
	14	19	15	11	16	36	28	13	26	20	23	30	27	22	46	22	24	15	11	14	24	20	19	20	26	22
	15	23	24	24	25	35	27	27	37	60	50	52	42	38	33	39	267	273	87	73	165	65	49	74	94	70
D	16	112	143	162	224	257	169	328	150	130	113	132	231	155	113	152	132	143	156	98	79	63	72	99	125	147
D	17	104	122	82	85	105	56	25	21	19	30	56	108	78	99	132	111	85	22	14	45	50	41	44	31	65
	18	33	54	52	61	48	45	32	29	62	75	60	24	25	39	14	9	17	4	5	8	11	12	4	13	31
	19	22	20	20	22	30	32	27	19	21	21	22	82	78	58	28	20	50	31	34	51	20	21	26	17	32
	20	15	24	25	19	18	25	21	23	21	22	27	16	13	10	59	25	3	17	22	12	19	11	12	18	20
	21	18	23	17	23	42	41	41	30	56	68	58	76	114	145	106	194	244	191	198	237	136	158	127	39	99
D	22	69	180	162	142	93	86	99	83	92	104	77	50	104	109	83	26	29	83	123	98	120	88	85	67	94
	23	102	68	52	108	92	58	52	84	74	67	77	96	101	89	48	45	44	77	30	14	19	21	26	25	61
	24	20	32	27	18	20	28	25	58	51	53	63	78	95	60	31	21	7	9	13	18	11	13	31	25	34
	25	27	25	36	30	19	36	41	50	48	36	40	33	48	47	80	21	11	1	4	17	20	30	41	39	32
	26	43	26	47	53	41	24	11	13	12	42	47	28	16	9	14	12	7	6	8	7	11	15	17	17	22
Q	27	20	21	20	22	21	16	24	31	31	30	30	22	22	18	12	7	11	10	7	9	11	12	14	15	18
Q	28	14	14	15	16	19	23	29	26	33	19	32	35	21	26	20	11	12	8	15	45	60	51	69	75	29
	29	85	81	81	68	52	35	44	38	42	53	24	19	25	18	18	14	13	11	11	13	16	17	19	17	34
Q	30	16	15	16	19	20	13	12	13	10	32	20	23	22	15	17	19	13	8	6	8	9	9	10	13	15
	31	15	15	16	23	38	35	43	49	45	40	43	75	114	70	79	44	28	44	34	28	54	87	53	29	46
	Mean	48	51	49	50	48	46	51	45	49	44	43	48	49	49	48	59	52	45	39	50	41	43	47	47	47
5Q	Mean	14	15	16	16	18	15	17	21	20	21	25	22	20	17	18	11	13	10	8	14	18	16	21	25	17
5D	Mean	117	124	105	113	115	92	124	83	103	82	75	98	84	96	123	119	83	105	98	107	94	79	79	76	99

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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
Q	1	-20	-26	-26	-21	-15	-12	-16	-15	-21	-26	-30	-25	-25	-20	-22	-32	-37	-31	-30	-38	-86	-55	-57	-38	-30
Q	2	-24	-27	-29	-37	-119	-72	-33	-37	-17	-15	-25	-24	-30	-21	-29	-38	-42	-52	-47	-53	-196	-104	-111	-71	-52
	3	-24	-36	-36	-22	-71	-10	-15	-20	-52	-50	-54	-32	-34	-35	-47	-32	-28	-32	-27	-29	-40	-29	-105	-196	-44
	4	-153	-72	-96	-68	-55	-63	-117	-64	-20	-22	-26	-27	-35	-34	-37	-70	-96	-102	-20	-18	-67	-62	-76	-43	-60
	5	-59	-134	-168	-164	-120	-88	-62	-28	-24	-51	-135	-136	-76	-57	-67	-86	-173	-66	-17	-28	-103	-82	-63	-103	-87
Q	6	-48	-27	-59	-142	-22	-21	-32	-18	-21	-39	-74	-102	-105	-148	-120	-107	-104	-52	-34	-77	-133	-94	-44	-19	-68
Q	7	-21	-32	-23	-28	-15	-13	-12	-13	-15	-25	-32	-33	-33	-97	-98	-141	-173	-158	-52	-47	-83	-31	-26	-14	-51
	8	-26	-49	-44	-128	-88	-83	-98	-111	-42	-30	-41	-81	-127	-182	-175	-103	-95	-32	-17	-166	-166	-154	-143	-125	-96
	9	-22	-21	-63	-270	-119	-202	-207	-121	-229	-267	-113	-13	-11	-13	-42	-12	-22	-38	-38	-53	-30	-141	-156	-32	-93
	10	-44	-242	-415	-316	-258	-248	-198	-260	-152	-41	-133	-329	-198	-238	-220	-54	-55	-29	-45	-193	-112	-22	-30	-26	-161
	11	-93	-85	-56	-140	-172	-114	-311	-318	-131	-60	-80	-162	-182	-137	-65	-87	-61	-68	-6	-24	-19	-13	-78	-129	-108
	12	-43	-22	-36	-137	-181	-155	-135	-149	-157	-333	-171	-213	-279	-162	-44	-28	-37	-23	-37	-24	-26	-75	-132	-160	-115
	13	-94	-75	-69	-33	-19	-42	-26	-19	-25	-34	-41	-43	-41	-40	-28	-20	-27	-33	-38	-34	-41	-30	-57	-71	-41
	14	-49	-44	-24	-12	-22	-100	-146	-41	-16	-25	-35	-40	-37	-34	-31	-66	-44	-71	-60	-54	-37	-54	-50	-118	-50
D	15	-45	-46	-28	-22	-33	-98	-137	-119	-58	-40	-220	-355	-138	-314	-537	-433	-104	-97	-214	-95	-105	-361	-547	-417	-190
D	16	-581	-240	-373	-417	-164	-109	-124	-153	-288	-422	-76	-18	-19	-65	-146	-144	-261	-504	-413	-151	-53	-78	-184	-299	-220
	17	-192	-145	-209	-263	-461	-379	-112	-64	-77	-129	-124	-263	-228	-227	-205	-151	-35	-18	-41	-257	-157	-91	-137	-319	-179
	18	-371	-119	-96	-235	-319	-164	-158	-125	-42	-27	-89	-185	-350	-127	-114	-78	-208	-112	-56	-112	-336	-143	-107	-40	-155
	19	-67	-206	-168	-63	-129	-135	-25	-27	-27	-38	-240	-212	-52	-82	-282	-278	-94	-50	-85	-103	-78	-238	-201	-176	-127
	20	-122	-82	-63	-249	-227	-48	-36	-27	-45	-73	-57	-47	-31	-100	-35	-97	-161	-181	-102	-40	-79	-223	-297	-77	-104
	21	-90	-37	-31	-39	-34	-40	-108	-248	-182	-75	-43	-53	-72	-33	-31	-42	-30	-126	-16	-19	-33	-36	-52	-53	-64
	22	-129	-102	-49	-98	-129	-177	-427	-292	-239	-103	-26	-27	-37	-23	-24	-27	-39	-41	-76	-56	-164	-168	-92	-107	-111
	23	-46	-60	-39	-22	-40	-91	-105	-35	-28	-25	-28	-33	-48	-55	-174	-111	-139	-119	-192	-124	-59	-175	-69	-56	-78
	24	-37	-38	-50	-50	-41	-82	-47	-22	-25	-31	-27	-26	-40	-32	-43	-36	-37	-142	-260	-109	-30	-35	-46	-167	-61
D	25	-248	-56	-52	-49	-134	-39	-112	-196	-69	-206	-560	-367	-156	-44	-21	-55	-256	-203	-188	-204	-107	-246	-81	-64	-155
Q	26	-40	-41	-38	-36	-35	-31	-44	-51	-31	-31	-20	-14	-15	-36	-31	-24	-24	-25	-15	-11	-19	-27	-35	-37	-30
	27	-44	-90	-221	-178	-100	-147	-121	-86	-37	-72	-65	-40	-53	-20	-23	-47	-52	-66	-113	-29	-18	-18	-17	-24	-70
D	28	-29	-48	-104	-149	-11	-10	-22	-29	-27	-31	-301	-345	-283	-527	-501	-253	-132	-126	-231	-236	-219	-79	-93	-92	-162
D	29	-168	-433	-654	-424	-747	-471	-626	-640	-619	-501	-416	-406	-429	-439	-337	-88	-66	-35	-20	-22	-16	-26	-33	-89	-321
	30	-129	-242	-218	-70	-63	-93	-158	-101	-101	-82	-103	-139	-192	-310	-310	-41	-38	-34	-19	-25	-29	-36	-67	-278	-120
	31	-467	-402	-332	-410	-480	-251	-173	-270	-158	-38	-74	-128	-110	-52	-74	-43	-63	-23	-37	-97	-165	-71	-30	-28	-166
	Mean	-113	-105	-124	-138	-142	-115	-127	-119	-95	-94	-111	-126	-111	-119	-126	-91	-88	-86	-82	-81	-90	-96	-103	-111	-108
5Q	Mean	-30	-30	-35	-52	-41	-29	-27	-26	-21	-27	-36	-39	-41	-64	-60	-68	-76	-63	-35	-45	-103	-62	-54	-35	-46
5D	Mean	-214	-164	-242	-212	-217	-145	-204	-227	-212	-240	-314	-298	-205	-277	-308	-194	-163	-193	-213	-141	-100	-158	-187	-192	-209

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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	-47	-175	-276	-333	-365	-210	-75	-43	-47	-120	-108	-27	-49	-35	-29	-93	-19	-119	-89	-75	-82	-69	-119	-124	-114
Q	2	-109	-96	-141	-37	-27	-48	-166	-90	-25	-30	-31	-27	-95	-70	-12	-12	-24	-84	-130	-101	-70	-63	-89	-51	-68
	3	-55	-57	-80	-52	-153	-24	-8	-16	-18	-12	-194	-395	-434	-421	-446	-381	-343	-147	-133	-76	-48	-23	-29	-38	-149
	4	-78	-85	-85	-17	-61	-165	-86	-59	-86	-80	-128	-95	-45	-39	-53	-105	-111	-156	-100	-88	-45	-194	-190	-155	-96
	5	-216	-412	-221	-99	-318	-165	-158	-427	-363	-377	-339	-185	-88	-103	-273	-141	-87	-85	-62	-141	-178	-67	-20	-19	-189
	6	-26	-32	-38	-68	-141	-78	-189	-223	-172	-76	-81	-296	-317	-133	-162	-238	-119	-102	-21	-141	-215	-163	-88	-38	-132
Q	7	-55	-272	-114	-20	-26	-36	-35	-31	-29	-57	-66	-71	-99	-103	-79	-30	-20	-20	-24	-7	-6	-16	-26	-23	-53
	8	-41	-49	-127	-94	-118	-193	-172	-84	-59	-51	-257	-205	-59	-278	-256	-164	-99	-54	-91	-51	-35	-71	-77	-319	-125
	9	-279	-126	-40	-93	-222	-267	-125	-47	-107	-65	-62	-84	-185	-537	-402	-215	-137	-74	-89	-42	-29	-16	-18	-43	-138
Q	10	-88	-61	-39	-39	-30	-20	-58	-44	-48	-61	-69	-18	-23	-11	-25	-15	-16	-128	-103	-31	-30	-42	-28	-27	-44
	11	-25	-39	-59	-62	-16	-21	-21	-21	-17	-22	-27	-24	-19	-19	-34	-27	-80	-169	-221	-112	-110	-84	-53	-56	-56
	12	-234	-240	-101	-135	-71	-13	-115	-67	-161	-83	-58	-33	-111	-548	-725	-525	-220	-123	-139	-342	-247	-211	-340	-425	-219
D	13	-259	-151	-193	-198	-71	-229	-226	-301	-793	-439	-117	-34	-79	-89	-50	-50	-93	-118	-110	-30	-129	-407	-219	-155	-189
	14	-44	-233	-276	-79	-401	-296	-31	-17	-82	-196	-56	-38	-117	-203	-236	-282	-119	-52	-150	-486	-361	-209	-247	-134	-181
	15	-139	-133	-55	-34	-201	-311	-112	-160	-532	-390	-212	-202	-292	-160	-206	-206	-33	-20	-123	-327	-199	-523	-340	-275	-216
	16	-177	-214	-140	-214	-294	-265	-211	-137	-49	-244	-124	-98	-180	-193	-183	-186	-66	-31	-102	-181	-75	-274	-86	-60	-158
	17	-48	-62	-114	-94	-111	-47	-69	-98	-78	-48	-151	-39	-7	-51	-478	-474	-343	-165	-100	-53	-135	-33	-104	-97	-125
Q	18	-26	-27	-118	-235	-183	-123	-151	-94	-80	-98	-20	-13	-13	-9	-24	-59	-204	-232	-85	-65	-67	-99	-38	-36	-88
	19	-33	-60	-160	-245	-285	-240	-117	-83	-37	-32	-16	-41	-66	-315	-287	-148	-21	-114	-93	-94	-63	-37	-68	-88	-114
	20	-157	-58	-58	-60	-175	-171	-209	-114	-14	-15	-206	-141	-201	-362	-210	-49	-19	-50	-88	-183	-94	-51	-29	-37	-115
Q	21	-157	-210	-236	-99	-59	-70	-129	-25	-13	-121	-76	-61	-56	-47	-46	-21	-72	-101	-191	-91	-28	-33	-34	-23	-83
	22	-21	-25	-87	-54	-70	-88	-29	-25	-22	-23	-18	-7	-7	-4	-10	-37	-121	-208	-161	-159	-81	-32	-39	-30	-57
	23	-34	-61	-53	-199	-184	-101	-108	-40	-122	-87	-149	-355	-320	-204	-251	-249	-345	-420	-187	-194	-189	-207	-76	-60	-175
	24	-57	-50	-117	-125	-26	-17	-18	-19	-21	-25	-29	-124	-391	-316	-132	-26	-63	-187	-264	-156	-39	-34	-44	-47	-97
D	25	-25	-17	-20	-23	-31	-28	-10	-206	-398	-556	-622	-1126	-596	-686	-872	-357	-648	-797	-674	-468	-267	-396	-425	-215	-394
D	26	-241	-345	-440	-490	-582	-513	-326	-178	-157	-293	-190	-272	-441	-170	-269	-267	-415	-318	-252	-192	-295	-225	-162	-170	-300
D	27	-143	-200	-75	-29	-29	-304	-367	-166	-108	-247	-219	-267	-249	-205	-141	-411	-734	-374	-391	-329	-75	-25	-24	-23	-214
	28	-42	-35	-76	-148	-57	-88	-63	-42	-13	-48	-248	-405	-270	-62	-87	-308	-416	-339	-317	-418	-410	-344	-453	-491	-216
	29	-280	-169	-166	-37	-7	-18	-90	-86	-8	-17	-20	-28	-18	-11	-20	-44	-245	-347	-324	-362	-196	-117	-176	-107	-121
	30	-224	-45	-21	-30	-14	-15	-118	-371	-376	-143	-45	-66	-118	-10	-47	-164	-293	-312	-126	-44	-67	-182	-225	-76	-131
D	31	-99	-116	-124	-247	-361	-218	-275	-755	-635	-125	-96	-178	-323	-531	-423	-305	-870	-467	-359	-151	-82	-191	-234	-292	-311
	Mean	-111	-124	-124	-119	-151	-141	-124	-131	-150	-134	-130	-159	-169	-191	-208	-180	-206	-190	-170	-167	-127	-143	-132	-120	-150
5Q	Mean	-87	-133	-129	-86	-65	-59	-107	-56	-39	-73	-52	-38	-57	-48	-37	-27	-67	-113	-106	-59	-40	-50	-43	-32	-67
5D	Mean	-153	-165	-170	-197	-214	-258	-240	-321	-418	-332	-248	-375	-337	-336	-351	-278	-552	-414	-357	-234	-169	-248	-212	-171	-281

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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	-488	-599	-478	-411	-323	-420	-485	-456	-198	-307	-448	-313	-757	-340	-496	-556	-319	-211	-340	-154	-120	-376	-391	-235	-384
	2	-390	-255	-227	-202	-230	-468	-354	-192	-326	-94	-196	-115	-305	-191	-74	-54	-101	-254	-250	-254	-175	-75	-14	-12	-200
Q	3	-9	-33	-17	-40	-39	-56	-101	-189	-54	-9	-22	-30	-23	-36	-23	-21	-18	-15	-12	-11	-14	-19	-21	-19	-35
Q	4	-19	-21	-79	-120	-93	-40	-13	-42	-51	-23	-32	-100	-177	-154	-190	-253	-279	-137	-54	-32	-233	-160	-88	-177	-107
Q	5	-197	-80	-67	-91	-104	-128	-349	-154	-125	-73	-204	-148	-144	-25	-19	-6	-10	0	-5	-7	-24	-123	-89	-141	-96
	6	-160	-175	-191	-121	-63	-18	-21	-39	-37	-22	-81	-239	-29	-1	-15	-54	-131	-319	-211	-53	-163	-68	-82	-37	-97
	7	-13	-9	-20	-16	-12	-9	-63	-122	-122	-151	-23	-51	-191	-347	-265	-159	-83	-39	-11	-42	-13	-24	-84	-372	-93
	8	-245	-61	-83	-157	-43	-10	-11	-18	-46	-58	-210	-60	-182	-94	-125	-226	-94	-32	-33	-67	-134	-119	-109	-43	-94
	9	-13	-56	-134	-130	-60	-26	-19	-121	-368	-52	-16	-44	-43	-16	-27	-18	-32	-16	-29	-51	-70	-66	-38	-52	-62
D	10	-23	-37	-93	-17	-16	-16	-21	-19	-17	-19	-17	-32	-330	-683	-696	-566	-127	-124	-157	-191	-272	-750	-533	-480	-218
D	11	-486	-506	-182	-94	-174	-30	-19	-25	-189	-519	-499	-254	-192	-190	-64	-30	-149	-501	-454	-443	-300	-294	-140	-72	-242
	12	-89	-113	-29	-95	-277	-306	-201	-71	-127	-261	-138	-24	-46	-221	-253	-240	-356	-248	-354	-488	-173	-242	-517	-260	-214
	13	-340	-377	-229	-158	-120	-111	-15	-1	-33	-28	-22	-37	-216	-367	-431	-589	-344	-44	-35	-19	-26	-196	-500	-644	-203
	14	-526	-444	-372	-402	-96	-196	-119	-109	-348	-120	-87	-471	-179	-102	-51	-226	-111	-98	-297	-263	-574	-184	-64	-42	-228
	15	-170	-267	-103	-35	-145	-364	-191	-66	-453	-407	-89	-310	-511	-366	-177	-125	-394	-439	-339	-355	-185	-285	-531	-506	-284
	16	-375	-320	-130	-17	-119	-180	-298	-120	-32	-152	-466	-191	-63	-233	-131	-87	-175	-306	-147	-92	-73	-251	-388	-236	-191
	17	-138	-102	-137	-44	-85	-329	-149	-41	-71	-274	-102	-14	-64	-374	-249	-399	-279	-246	-443	-325	-192	-235	-335	-316	-206
Q	18	-121	-21	-20	-59	-147	-65	-62	-144	-234	-103	-164	-142	-50	-19	-46	-106	-34	-49	-59	-53	-10	-39	-30	-38	-76
Q	19	-18	-31	-83	-20	-1	-6	-12	-13	-15	-15	-18	-95	-60	-24	-26	-113	-23	-60	-18	-6	-7	-4	-3	-4	-28
	20	-1	0	-6	-12	-14	-18	-25	-28	-19	-11	-23	-104	-169	-69	-106	-123	-223	-296	-480	-274	-66	-16	-27	-16	-89
	21	-37	-36	-136	-111	-10	-2	1	0	-14	-7	-13	-14	-103	-155	-88	-20	-40	-36	-64	-78	-53	-13	-11	-12	-44
	22	-58	-360	-237	-248	-311	-237	-147	-152	-217	-108	-88	-65	-32	-3	-17	-23	-125	-623	-730	-529	-284	-205	-326	-797	-247
	23	-364	-402	-293	-129	-53	-99	-170	-288	-229	-88	-94	-119	-112	-72	-66	-110	-105	-125	-141	-25	-22	-73	-16	-11	-134
	24	-11	-19	-122	-335	-310	-63	-53	-17	-18	-13	-11	-23	-10	0	-5	-9	-90	-42	3	-60	-50	-3	-15	-32	-54
D	25	-35	-49	-159	-330	-348	-358	-464	-417	-378	-429	-526	-769	-358	-327	-758	-929	-606	-298	-235	-310	-303	-141	-334	-399	-386
	26	-134	-34	-61	-239	-393	-472	-415	-300	-327	-300	-192	-124	-296	-228	-36	-17	-22	-136	-178	-160	-35	-31	-16	-15	-173
	27	-13	-21	-18	-11	-9	-7	-8	-8	-12	-16	-27	-14	-14	-25	-87	-18	-128	-381	-119	-67	-137	-89	-27	-54	-55
	28	-368	-479	-214	-69	-23	-15	-4	-24	-34	-90	-130	-652	-479	-129	-53	-89	-185	-207	-276	-465	-255	-257	-353	-254	-213
	29	-146	-288	-253	-236	-226	-35	-22	-27	-100	-138	-200	-446	-737	-357	-709	-571	-462	-505	-652	-489	-359	-343	-465	-138	-329
D	30	-156	-674	-721	-549	-310	-116	-313	-664	-612	-339	-347	-496	-344	-247	-477	-669	-699	-699	-226	-114	-254	-167	-90	-157	-393
	Mean	-171	-195	-163	-149	-138	-140	-137	-128	-160	-140	-149	-183	-207	-179	-192	-213	-191	-216	-211	-182	-152	-161	-187	-185	-172
5Q	Mean	-72	-37	-53	-66	-76	-59	-107	-108	-95	-44	-88	-103	-90	-51	-60	-99	-72	-52	-29	-21	-57	-69	-46	-75	-68
5D	Mean	-237	-373	-326	-280	-234	-188	-260	-316	-278	-322	-367	-372	-396	-357	-498	-550	-380	-366	-282	-242	-249	-345	-297	-268	-324

AL Index (Hourly mean values, unit nT) October 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	-440	-198	-109	-95	-141	-26	-193	-457	-335	-178	-251	-100	-77	-201	-124	-215	-313	-300	-160	-100	-231	-168	-66	-119	-192
	2	-215	-117	-268	-257	-165	-109	-113	-84	-96	-48	-293	-467	-266	-115	-67	-54	-56	-117	-184	-86	-4	-7	-7	-7	-133
D	3	-5	-21	-25	-27	-105	-162	-146	-397	-511	-341	-421	-591	-743	-1071	-787	-877	-755	-894	-406	-553	-295	-232	-71	-177	-400
	4	-185	-214	-242	-234	-174	-129	-81	-283	-226	-239	-163	-484	-391	-274	-433	-293	-217	-47	-21	-3	-4	-13	-33	-23	-184
Q	5	-8	-9	-10	-35	-124	-76	-26	-62	-81	-77	-256	-304	-201	-167	-131	-46	-44	-59	-45	-23	-18	-67	-45	-14	-80
Q	6	-15	-4	-24	-49	-40	-55	-69	-93	-87	-119	-48	-26	-28	-23	-21	-22	-24	-47	-48	-65	-154	-88	-85	-49	-54
	7	-16	-20	-45	-26	-12	-17	-161	-133	-49	-41	-102	-266	-272	-676	-225	-20	-18	-20	-7	-2	-11	-23	-19	-52	-93
	8	-38	-55	-150	-52	-6	-20	-77	-26	-70	-88	-27	-102	-69	-25	-32	-61	-114	-61	-113	-25	-58	-54	-11	-3	-56
Q	9	-5	-5	-4	-5	-7	-6	-5	-6	-12	-15	-19	-24	-28	-30	-29	-32	-30	-20	-34	-140	-170	-197	-203	-193	-51
	10	-163	-152	-100	-8	-55	-95	-46	-21	0	-4	-9	-15	-20	-24	-24	-29	-28	-47	-132	-61	-30	-16	-18	-34	-47
D	11	-28	-73	-225	-218	-158	-176	-373	-51	-1	-71	-55	-4	-13	-21	-174	-665	-771	-510	-494	-409	-392	-153	-42	-58	-214
	12	-55	-22	-14	-7	-16	-9	-9	-12	-13	-10	-14	-22	-28	-36	-78	-246	-53	-48	-72	-57	-18	-16	-52	-76	-41
	13	-189	-230	-147	-58	-35	-96	-200	-219	-129	-97	-92	-81	-314	-383	-295	-527	-399	-410	-612	-801	-598	-191	-126	-402	-276
D	14	-542	-256	-325	-385	-227	-120	-409	-467	-435	-143	-57	-365	-97	-250	-246	-632	-457	-508	-222	-246	-282	-150	-198	-169	-299
	15	-195	-183	-267	-242	-513	-344	-206	-261	-203	-104	-536	-464	-356	-214	-344	-366	-479	-203	-238	-130	-180	-128	-16	-45	-259
	16	-11	-47	-93	-161	-106	-128	-467	-189	-18	-25	-28	-58	-113	-100	-218	-198	-307	-104	-68	-61	-155	-107	-85	-46	-121
	17	-56	-99	-87	-66	-33	-21	-10	-6	-22	-185	-234	-122	-124	-656	-610	-293	-307	-311	-333	-34	-158	-232	-158	-81	-177
Q	18	-48	-10	-13	-16	-12	-5	-5	-13	-54	-139	-46	-124	-97	-21	-17	-43	-63	-28	-8	-7	-15	-8	-7	-9	-34
	19	-11	-29	-32	-30	-43	-28	-6	-9	-7	-11	-37	-153	-286	-162	-48	-52	-184	-132	-62	-37	-64	-34	-23	-76	-65
	20	-26	-10	-6	-15	-14	-8	-21	-2	-3	-33	-60	-24	-23	-22	-113	-274	-366	-396	-361	-358	-253	-477	-278	-208	-140
	21	-181	-236	-222	-200	-150	-169	-100	-85	-33	-100	-61	-17	-63	-300	-423	-275	-169	-304	-394	-410	-237	-33	-10	-8	-174
Q	22	-22	-21	-47	-37	-25	-5	-4	-16	-7	-5	-8	-13	-33	-22	-22	-23	-19	-14	-4	-3	-3	0	-1	-61	-17
	23	-259	-240	-203	-187	-107	-294	-220	-136	-150	-196	-142	-31	-33	-121	-134	-174	-399	-51	-36	-59	-103	-70	-19	-8	-140
	24	-7	-38	-187	-126	-30	-31	-147	-189	-120	-228	-363	-196	-50	-50	-135	-172	-173	-331	-570	-548	-343	-233	-158	-134	-190
	25	-598	-590	-489	-367	-411	-429	-146	-113	-307	-624	-540	-565	-414	-462	-213	-42	-82	-111	-276	-302	-278	-385	-195	-90	-335
	26	-40	-93	-48	-83	-171	-210	-291	-203	-266	-143	-251	-403	-345	-186	-234	-190	-279	-299	-137	-60	-11	-46	-85	-134	-175
D	27	-67	-165	-396	-495	-357	-368	-396	-387	-525	-632	-511	-485	-470	-95	-239	-923	-547	-433	-603	-637	-258	-387	-344	-356	-420
D	28	-691	-419	-168	-141	-346	-683	-454	-402	-343	-221	-835	-555	-596	-431	-544	-407	-425	-577	-589	-358	-358	-285	-54	-187	-419
	29	-420	-319	-170	-194	-250	-82	-97	-207	-144	-222	-569	-480	-208	-384	-504	-393	-243	-258	-240	-186	-137	-196	-79	-246	-259
	30	-247	-195	-145	-155	-263	-329	-219	-248	-266	-347	-420	-209	-65	-158	-166	-30	-27	-71	-76	-38	-48	-187	-99	-62	-170
	31	-50	-68	-32	-20	-39	-157	-233	-217	-264	-222	-156	-184	-59	-44	-167	-283	-150	-143	-233	-399	-226	-83	-87	-87	-150
	Mean	-155	-133	-138	-128	-133	-141	-159	-161	-154	-158	-213	-223	-189	-216	-219	-253	-241	-221	-218	-199	-164	-137	-86	-103	-173
5Q	Mean	-19	-9	-19	-28	-41	-29	-21	-38	-48	-71	-75	-98	-77	-52	-44	-33	-36	-33	-27	-47	-72	-72	-68	-65	-47
5D	Mean	-266	-186	-227	-253	-238	-301	-355	-340	-363	-281	-375	-400	-383	-373	-398	-700	-591	-584	-462	-440	-317	-241	-141	-189	-350

AL Index (Hourly mean values, unit nT) November 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	-108	-135	-230	-305	-131	-140	-220	-211	-171	-248	-217	-196	-152	-167	-226	-189	-119	-250	-168	-112	-17	-7	-7	-8	-156
D	2	-19	-107	-191	-176	-179	-119	-74	-258	-229	-133	-144	-259	-360	-463	-319	-495	-856	-644	-495	-649	-456	-479	-218	-158	-312
D	3	-135	-303	-237	-86	-39	-79	-155	-176	-78	-42	-22	-67	-141	-319	-176	-139	-238	-373	-539	-442	-262	-528	-363	-223	-215
	4	-144	-54	-23	-22	-24	-30	-45	-57	-31	-23	-28	-33	-27	-26	-28	-37	-77	-105	-53	-52	-26	-35	-84	-73	-47
	5	-64	-34	-9	-11	-11	-23	-29	-17	-13	-15	-18	-23	-18	-24	-22	-52	-211	-255	-192	-200	-142	-152	-258	-90	-78
	6	-90	-87	-86	-142	-201	-112	-62	-72	-61	-91	-165	-23	-24	-60	-146	-73	-25	-29	-66	-57	-20	-21	-41	-38	-75
	7	-12	-6	-8	-13	-3	-5	-3	-6	-9	-5	-8	-11	-13	-13	-20	-26	-24	-21	-13	-13	-14	-14	-10	-9	-12
Q	8	-7	-7	-24	-8	0	-5	-32	-37	-19	-18	-22	-11	-18	-19	-26	-28	-38	-17	-15	-11	-11	-9	-9	-6	-16
	9	-4	-4	-1	-3	-1	-4	-8	-22	-52	-104	-5	-19	-133	-205	-102	-87	-88	-73	-97	-241	-138	-65	-375	-511	-98
	10	-373	-160	-73	-23	-55	-125	-245	-41	-13	-38	-220	-321	-85	-41	-28	-78	-25	-18	-21	-49	-42	-39	-46	-44	-92
	11	-20	-20	-158	-260	-139	-179	-214	-85	-59	-23	-68	-207	-47	-20	-30	-80	-155	-48	-109	-34	-86	-170	-383	-467	-128
	12	-484	-366	-241	-63	-5	-12	-51	-220	-224	-173	-37	-87	-43	-26	-43	-51	-159	-120	-55	-310	-369	-198	-286	-255	-162
D	13	-163	-150	-305	-295	-107	-65	-170	-244	-229	-318	-450	-400	-631	-275	-626	-324	-624	-265	-111	-70	-100	-189	-128	-229	-269
	14	-120	-97	-32	-54	-202	-226	-46	-72	-176	-320	-321	-328	-360	-158	-36	-108	-431	-611	-190	-68	-73	-164	-174	-152	-188
	15	-100	-295	-116	-23	-64	-57	-114	-145	-96	-36	-79	-208	-42	-64	-130	-257	-138	-323	-348	-364	-253	-105	-74	-18	-144
	16	-19	-118	-151	-131	-156	-148	-8	-6	-14	-47	-39	-42	-14	-20	-57	-190	-146	-127	-52	-39	-25	-31	-16	-23	-67
Q	17	-16	-13	-15	-5	-17	-8	-9	-9	-24	-37	-19	-10	-13	-13	-16	-15	-13	-20	-17	-27	-13	-12	-8	-5	-15
Q	18	-8	-9	-10	-10	-52	-22	-12	-66	-57	-11	-10	-15	-17	-22	-14	-15	-10	-15	-10	-78	-164	-57	-55	-37	-32
	19	-53	-6	-5	-58	-258	-287	-151	-210	-157	-287	-224	-258	-51	-141	-239	-249	-331	-171	-131	-76	-53	-66	-62	-24	-148
	20	-92	-113	-125	-160	-217	-272	-367	-158	-44	-114	-115	-18	-15	-30	-153	-349	-243	-374	-322	-291	-101	-80	-60	-151	-165
	21	-228	-100	-74	-86	-98	-257	-239	-145	-54	-296	-148	-41	-54	-37	-18	-36	-23	-29	-80	-84	-13	-12	-8	-15	-91
	22	-39	-35	-36	-56	-198	-68	-62	-103	-121	-81	-184	-141	-28	-34	-67	-199	-162	-99	-110	-117	-122	-289	-134	-81	-107
D	23	-48	-97	-184	-228	-147	-83	-211	-524	-876	-981	-548	-340	-1023	-320	-103	-295	-257	-274	-574	-621	-368	-309	-255	-531	-383
D	24	-418	-225	-211	-228	-204	-145	-398	-337	-375	-988	-648	-716	-878	-596	-832	-504	-474	-189	-65	-47	-112	-227	-246	-265	-389
	25	-141	-76	-89	-83	-115	-301	-277	-112	-48	-42	-113	-64	-161	-427	-481	-323	-77	-64	-100	-214	-241	-199	-139	-108	-166
	26	-118	-338	-170	-177	-163	-282	-80	-167	-233	-212	-253	-158	-625	-513	-309	-112	-183	-401	-93	-30	-27	-32	-115	-361	-215
	27	-208	-265	-438	-487	-453	-358	-352	-361	-542	-423	-473	-475	-278	-138	-595	-318	-502	-347	-80	-30	-56	-89	-30	-32	-305
	28	-34	-51	-92	-141	-172	-185	-155	-81	-45	-127	-449	-254	-179	-66	-29	-96	-45	-175	-186	-163	-5	-34	-33	-28	-118
Q	29	-12	-7	-8	-7	-9	-15	-9	-5	-5	-6	-12	-9	-12	-10	-14	-20	-21	-17	-15	-13	-9	-10	-13	-13	-11
Q	30	-10	-8	-6	-4	-4	-5	-7	-2	-13	-4	-4	-9	-14	-12	-12	-15	-15	-11	-29	-81	-9	-13	-7	-9	-13
	Mean	-109	-109	-111	-111	-114	-120	-126	-131	-135	-174	-168	-158	-181	-141	-163	-158	-190	-182	-144	-152	-110	-121	-121	-132	-140
5Q	Mean	-10	-8	-12	-6	-16	-11	-13	-23	-23	-15	-13	-10	-14	-15	-16	-18	-19	-16	-17	-42	-41	-20	-18	-14	-17
5D	Mean	-156	-176	-225	-202	-135	-98	-201	-307	-357	-492	-362	-356	-606	-394	-411	-351	-489	-349	-356	-365	-259	-346	-242	-281	-313

AL Index (Hourly mean values, unit nT) December 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	-12	-9	-2	-6	-2	-3	-11	-45	-15	-5	-22	-137	-85	-87	-63	-88	-50	-13	-34	-129	-56	-31	-16	-8	-39
	2	-12	-10	-5	-7	-12	-5	-1	0	-2	-3	-7	-5	-6	-7	-6	-13	-11	-9	-9	-33	-16	-15	-22	-32	-10
	3	-99	-64	-29	1	-28	-206	-117	-3	1	-1	-3	-20	-18	-25	-391	-526	-239	-72	-64	-93	-125	-113	-56	-177	-103
	4	-59	-10	-12	-11	-13	-12	-12	-65	-52	-4	-8	-12	-17	-17	-23	-42	-104	-186	-143	-132	-89	-70	-298	-519	-79
D	5	-414	-214	-115	-116	-112	-274	-281	-386	-586	-133	-23	-35	-58	-86	-73	-68	-160	-114	-174	-58	-33	-29	-29	-33	-150
	6	-38	-51	-73	-69	-131	-55	-16	-28	-44	-29	-16	-15	-10	-19	-94	-150	-81	-86	-119	-91	-50	-146	-113	-46	-65
	7	-13	-33	-44	-48	-8	-12	-30	-26	-10	-37	-12	-28	-45	-29	-130	-132	-112	-70	-84	-45	-29	-13	-19	-14	-43
Q	8	-6	-6	-7	-4	-3	-4	-6	-3	-3	-4	-3	-4	-6	-8	-12	-13	-12	-16	-14	-14	-8	-8	-9	-6	-7
	9	-9	-7	-4	-4	-1	-2	-2	-2	-1	-5	-22	-28	-11	-6	-8	-14	-9	-5	-9	-42	-79	-25	-26	-40	-15
D	10	-23	-13	-10	-27	-32	-21	-58	-92	-97	-189	-348	-343	-119	-91	-396	-831	-442	-513	-326	-516	-506	-298	-176	-73	-231
	11	-210	-455	-188	-43	-29	-58	-17	-16	-14	-34	-62	-110	-62	-138	-93	-408	-190	-174	-391	-210	-132	-74	-106	-100	-138
	12	-166	-59	-37	-7	-23	-93	-87	-33	-53	-45	-203	-121	-85	-65	-101	-141	-105	-43	-81	-107	-53	-34	-27	-14	-74
Q	13	-13	-18	-8	-5	-6	-8	-10	-51	-96	-99	-112	-68	-29	-29	-70	-73	-92	-31	-29	-65	-40	-60	-14	-10	-43
	14	-7	-10	-5	-21	-16	-6	-10	-61	-115	-100	-85	-38	-47	-110	-87	-38	-30	-84	-42	-61	-34	-145	-12	-4	-49
	15	-12	-4	-4	-9	-3	-5	-5	-8	-36	-48	-23	-12	-15	-32	-111	-494	-393	-177	-180	-435	-158	-82	-145	-206	-108
D	16	-416	-382	-575	-433	-422	-304	-452	-208	-139	-319	-413	-321	-311	-421	-429	-454	-389	-285	-191	-193	-196	-299	-450	-386	-350
D	17	-134	-111	-117	-238	-123	-25	-35	-48	-35	-90	-187	-585	-596	-448	-449	-368	-284	-226	-81	-294	-208	-64	-100	-242	-212
	18	-109	-58	-105	-122	-9	-20	-77	-235	-142	-96	-67	-121	-108	-124	-23	-67	-46	-36	-107	-76	-54	-65	-71	-41	-83
	19	-20	-19	-21	-38	-78	-20	-31	-85	-176	-117	-120	-353	-281	-142	-105	-126	-242	-184	-242	-278	-49	-41	-51	-54	-120
	20	-19	-17	-24	-36	-63	-22	-24	-62	-65	-60	-78	-229	-65	-82	-287	-113	-114	-221	-104	-30	-15	-10	-12	-13	-73
	21	-12	-18	-19	-100	-179	-79	-25	-36	-89	-102	-98	-329	-368	-325	-354	-393	-399	-425	-511	-540	-471	-352	-283	-274	-241
D	22	-408	-236	-162	-193	-222	-287	-266	-102	-87	-155	-349	-157	-346	-297	-124	-164	-139	-370	-388	-277	-395	-414	-40	-46	-234
	23	-132	-76	-125	-151	-181	-98	-43	-62	-203	-245	-199	-210	-256	-169	-190	-84	-202	-186	-80	-25	-19	-16	-10	-10	-124
	24	-10	-10	-35	-75	-30	-71	-140	-171	-166	-141	-212	-216	-162	-131	-150	-227	-121	-39	-50	-117	-188	-52	-42	-80	-110
	25	-43	-16	-15	-73	-67	-114	-75	-44	-82	-287	-158	-88	-215	-215	-222	-61	-81	-59	-34	-80	-122	-150	-233	-129	-111
	26	-69	-51	-59	-82	0	-4	-12	-5	-6	-24	-125	-80	-90	-43	-56	-84	-56	-86	-81	-38	-23	-23	-21	-16	-47
Q	27	-16	-10	-5	-7	-6	-6	-5	-4	-8	-17	-26	-12	-6	-4	-3	-4	-29	-15	-41	-23	-12	-11	-6	-7	-12
Q	28	-3	-3	-4	-4	-5	-6	-3	-3	-24	-64	-36	-14	-62	-5	-8	-4	-9	-12	-50	-111	-60	-72	-26	-25	-26
	29	-36	-16	-105	-16	-4	1	-2	-14	-97	-139	-21	-28	-13	-27	-47	-33	-36	-6	-11	-1	-2	-4	-11	-15	-28
Q	30	-6	-9	-5	-7	-3	-2	-9	-60	-59	-116	-62	-84	-115	-75	-24	-12	-20	-17	-27	-23	-44	-17	-5	-1	-33
	31	-2	-4	-5	-12	-21	-32	-23	-40	-68	-16	-22	-125	-148	-113	-124	-141	-149	-177	-63	-41	-115	-118	-30	-8	-67
	Mean	-81	-64	-62	-63	-59	-59	-60	-64	-82	-87	-100	-126	-121	-108	-137	-173	-140	-127	-121	-134	-109	-91	-79	-84	-97
5Q	Mean	-8	-9	-5	-5	-4	-5	-6	-24	-38	-60	-47	-36	-43	-24	-23	-21	-32	-18	-32	-47	-32	-33	-12	-9	-24
5D	Mean	-279	-191	-195	-201	-182	-182	-218	-167	-188	-177	-264	-288	-286	-268	-294	-377	-282	-301	-232	-267	-267	-220	-159	-156	-235

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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
Q	1	58	55	47	36	30	21	31	38	49	54	62	58	58	57	59	67	57	51	52	62	113	86	100	83	58
Q	2	67	65	88	101	220	155	74	64	46	54	59	45	49	48	49	67	66	69	77	104	303	219	217	184	104
	3	89	90	70	37	101	39	69	98	121	121	113	69	81	76	79	62	66	66	63	88	136	168	222	324	102
	4	264	153	182	157	111	187	267	116	49	49	49	49	64	65	62	103	137	136	55	58	126	125	139	116	117
	5	136	235	270	249	198	193	184	121	69	142	244	254	183	131	118	140	218	99	50	62	150	147	154	211	165
Q	6	144	89	126	200	65	54	55	60	77	147	160	216	184	238	190	151	133	86	76	135	228	173	88	46	130
Q	7	44	57	53	57	33	19	18	30	53	73	61	67	90	166	155	201	229	196	87	101	161	92	73	65	91
	8	88	122	133	222	196	260	331	212	104	130	173	228	245	294	266	172	147	82	82	250	266	273	259	219	198
	9	81	67	161	379	275	368	409	253	412	506	233	54	49	68	124	64	70	84	94	125	135	321	268	100	196
	10	114	388	556	512	497	506	438	485	249	99	319	494	355	385	309	108	96	63	98	259	203	90	102	84	284
	11	136	127	130	211	277	236	459	510	262	152	197	323	315	223	130	146	109	117	71	70	50	59	153	214	195
	12	105	74	108	221	318	329	280	251	279	538	325	328	430	269	90	72	77	54	67	57	60	160	226	258	207
	13	186	156	116	67	47	73	53	41	46	57	59	74	78	74	52	40	49	60	70	67	85	63	108	132	77
	14	107	119	65	35	74	277	270	84	41	49	58	68	85	81	62	86	72	113	93	82	66	108	139	202	101
D	15	121	111	64	36	81	201	230	275	151	94	389	706	248	522	761	649	296	251	419	196	273	603	774	620	336
D	16	710	398	531	616	265	257	251	271	487	619	141	46	58	125	230	183	383	765	615	273	108	172	306	436	343
	17	295	229	306	414	638	586	193	134	188	232	252	438	365	360	303	204	78	63	104	393	269	222	236	454	290
	18	522	197	210	363	437	260	254	160	68	67	175	347	488	197	159	117	246	159	111	189	468	248	174	94	238
	19	113	281	219	128	204	217	82	57	48	152	369	302	127	181	372	341	132	93	159	199	194	343	345	295	206
	20	224	167	145	333	349	108	83	43	112	135	96	83	87	162	82	138	227	254	165	75	150	355	502	145	176
	21	216	77	60	53	103	69	217	375	298	175	89	132	135	90	76	100	91	161	52	49	70	63	94	124	124
	22	220	182	135	219	215	309	605	479	397	173	56	57	83	47	42	52	77	72	133	122	307	260	183	241	194
	23	112	89	60	48	80	149	179	72	53	49	64	92	114	123	256	166	196	211	314	234	211	304	140	113	143
	24	82	61	86	87	106	135	83	44	45	50	59	56	105	74	75	61	112	257	448	236	138	134	113	275	122
D	25	349	148	131	134	234	90	201	339	148	465	848	716	328	102	71	173	385	339	326	339	280	402	179	153	287
Q	26	131	124	90	55	45	46	94	93	80	103	75	46	41	66	50	42	48	54	48	42	45	49	56	58	66
	27	87	195	375	329	228	349	274	226	149	210	190	118	117	90	75	89	95	132	191	83	65	54	42	66	159
D	28	68	117	192	223	41	34	48	57	75	148	582	679	516	791	849	569	347	382	538	573	414	244	310	311	338
D	29	337	610	1053	730	1101	900	1200	1068	868	621	637	563	560	623	490	151	124	87	51	36	34	47	79	199	507
	30	265	409	324	133	123	193	274	170	221	262	267	319	338	419	452	92	81	68	37	52	60	95	153	448	219
	31	644	576	526	671	676	378	313	417	271	95	168	206	180	111	134	91	108	70	100	208	296	173	100	67	274
	Mean	197	186	213	227	237	225	242	214	177	187	211	233	198	201	200	151	146	151	156	155	176	188	194	204	195
5Q	Mean	88	78	80	89	78	59	54	57	61	86	83	86	84	115	100	105	106	91	68	88	170	123	106	87	89
5D	Mean	317	276	394	347	344	296	386	402	345	389	519	542	342	432	480	345	307	364	389	283	221	293	329	343	362

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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	105	345	408	544	679	342	175	90	108	211	170	57	109	75	76	139	61	175	178	164	166	150	225	230	208
Q	2	237	205	242	102	84	152	225	146	49	80	53	101	165	113	53	34	52	143	206	172	133	119	153	108	130
	3	118	141	173	138	230	100	67	56	55	78	355	634	692	604	763	738	650	434	310	184	139	76	79	76	287
	4	136	154	147	54	148	217	148	129	150	178	248	205	98	96	113	142	162	214	195	197	168	338	309	321	178
	5	403	540	346	279	477	315	312	650	545	676	605	344	190	173	370	223	142	147	125	244	290	145	65	58	319
	6	61	69	81	132	210	143	299	310	253	177	181	395	427	245	274	334	175	185	85	227	340	309	202	110	218
Q	7	136	376	185	79	76	73	90	103	76	126	136	145	212	177	113	49	52	67	76	60	50	54	64	54	110
	8	75	105	202	171	206	368	338	219	137	160	418	306	164	431	384	260	168	134	198	162	146	177	242	489	236
	9	450	241	105	198	384	400	212	108	169	154	207	201	320	706	559	336	230	135	156	114	95	62	53	91	237
Q	10	153	106	81	78	60	47	91	83	87	98	98	63	54	45	60	47	54	199	187	106	85	107	90	75	90
	11	75	101	115	91	40	43	41	42	46	53	59	52	52	53	77	72	134	244	343	196	215	194	118	139	108
	12	357	352	216	247	169	115	216	140	250	218	140	91	231	678	961	767	388	238	294	565	415	447	611	659	365
D	13	447	331	395	299	174	423	348	486	1180	616	217	95	134	134	100	84	137	204	198	126	264	591	401	260	319
	14	91	392	380	159	629	401	111	78	169	270	97	98	201	305	324	393	213	129	282	639	517	422	399	227	289
	15	256	208	115	110	371	401	197	321	715	601	362	336	357	238	292	288	93	82	240	508	378	762	543	420	341
	16	302	331	235	323	459	428	289	241	126	403	196	178	276	286	278	239	115	93	192	268	168	392	172	157	256
	17	116	143	191	150	218	88	140	183	193	135	230	71	68	131	631	698	495	246	178	127	230	118	180	150	213
Q	18	72	71	190	307	259	224	213	191	140	157	56	30	39	26	54	112	266	294	129	139	139	148	88	73	142
	19	69	126	263	364	447	362	188	208	105	71	64	102	148	470	417	195	92	191	150	150	140	118	151	186	199
	20	277	177	147	169	274	290	309	234	72	72	284	207	288	502	288	92	69	121	172	254	161	104	73	92	197
Q	21	245	293	319	162	128	148	226	80	110	207	156	137	109	89	67	55	129	157	267	156	69	57	55	45	144
	22	40	47	126	92	120	131	51	51	47	68	70	65	63	58	79	84	175	298	290	356	158	80	79	69	112
	23	77	152	121	275	262	172	176	88	232	209	247	533	529	327	391	380	584	636	371	415	377	371	162	113	300
	24	108	100	255	239	92	54	54	45	47	80	118	271	629	516	215	75	119	305	434	277	112	82	95	129	185
D	25	69	49	36	44	52	59	48	315	660	964	898	1329	798	1100	1305	560	987	1095	933	762	481	556	710	468	595
D	26	421	563	668	742	913	782	576	310	351	477	342	488	629	332	502	402	574	444	393	380	485	395	328	298	492
D	27	306	423	195	95	110	457	516	319	260	386	342	505	427	344	267	638	1029	577	587	584	174	83	73	49	364
	28	63	67	117	222	106	139	88	64	50	109	365	534	372	121	147	427	573	504	544	644	703	629	661	695	331
	29	463	265	246	109	55	81	183	125	43	53	58	86	40	38	48	112	349	493	560	655	325	255	337	287	220
	30	368	114	69	78	77	79	232	536	584	298	130	102	152	37	101	247	434	432	212	136	163	336	333	166	226
D	31	240	209	192	358	524	338	394	1083	877	204	286	339	479	797	708	623	1336	776	563	298	224	301	341	425	496
	Mean	204	219	211	206	259	237	211	226	254	244	231	261	272	298	323	285	323	302	291	298	242	257	238	216	255
5Q	Mean	168	210	203	145	121	128	169	120	92	133	99	95	115	90	69	59	110	172	173	126	95	97	90	71	123
5D	Mean	296	315	297	307	354	411	376	502	665	529	417	551	493	541	576	461	812	619	534	430	325	385	370	300	453

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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	650	777	723	690	592	781	710	662	360	449	634	470	1061	553	751	803	486	344	464	260	239	525	524	382	579
	2	556	387	385	320	332	621	479	331	485	182	305	201	451	324	131	109	155	332	362	350	246	132	61	40	303
Q	3	28	55	32	73	83	112	170	238	95	36	61	55	54	69	44	40	34	33	30	30	34	35	36	33	63
Q	4	46	52	148	210	165	96	43	70	88	59	88	168	269	233	249	350	435	227	115	100	349	263	172	261	177
Q	5	277	159	165	189	217	292	466	235	219	183	347	269	246	69	59	37	38	27	39	55	101	229	204	257	182
	6	277	281	306	200	127	77	92	102	105	103	266	415	84	42	43	93	199	434	334	153	272	152	154	89	183
	7	44	28	45	39	38	56	151	206	216	248	103	105	303	448	413	216	122	66	46	87	46	87	192	531	160
	8	364	166	173	255	100	59	51	71	103	155	281	120	242	136	161	299	152	71	68	110	188	195	181	95	158
	9	57	116	206	169	113	80	89	243	472	166	65	108	95	52	55	35	53	45	67	86	111	108	94	97	116
D	10	51	71	127	49	51	53	67	56	55	61	49	90	444	843	1014	868	256	256	248	363	496	1149	835	624	341
D	11	608	602	319	268	323	98	58	86	358	699	585	351	289	251	127	80	335	760	650	703	592	590	258	143	380
	12	166	161	71	232	454	411	296	144	199	339	198	74	89	296	364	349	456	371	521	650	293	368	718	390	317
	13	517	534	371	251	188	212	55	33	108	95	75	99	329	449	685	860	479	102	69	54	82	325	663	762	308
	14	698	679	547	615	182	324	195	198	437	234	145	624	246	184	111	309	156	167	410	395	794	295	119	88	340
	15	277	357	181	97	255	469	290	157	591	555	190	454	691	511	274	205	579	558	489	562	355	507	701	647	415
	16	541	471	237	65	190	284	411	207	108	280	593	286	134	317	214	148	253	406	202	193	174	356	517	318	288
	17	226	216	213	98	224	449	224	100	163	357	153	45	136	454	321	510	396	387	677	492	319	371	477	431	310
Q	18	224	90	77	109	219	145	152	220	348	213	232	200	90	60	82	149	66	80	94	84	42	79	72	86	134
Q	19	56	75	123	51	28	32	33	35	41	38	63	122	84	44	60	149	36	74	38	34	37	33	29	29	56
	20	29	28	33	44	46	44	46	54	55	46	73	166	259	128	143	180	310	443	714	440	185	153	106	73	158
	21	86	94	220	206	67	40	43	43	72	57	59	63	214	258	207	76	71	69	102	139	120	42	38	54	102
	22	131	447	331	383	502	419	298	350	301	237	206	165	89	33	39	80	279	929	1098	862	525	447	457	918	397
	23	528	533	416	250	161	212	290	480	376	221	200	204	240	142	84	140	155	174	185	55	48	97	35	37	219
	24	33	44	228	463	487	162	121	57	63	52	47	58	37	32	34	38	119	71	26	89	87	43	47	55	104
D	25	57	66	186	372	451	522	616	687	727	755	652	939	584	526	1028	1296	947	595	484	518	531	327	492	565	580
	26	234	87	134	348	533	655	616	613	673	645	333	273	415	335	97	57	47	232	270	230	70	70	52	49	294
	27	48	63	40	37	43	56	39	51	49	63	84	56	50	76	152	38	194	521	253	246	270	240	102	119	120
	28	512	667	298	119	60	39	31	117	136	197	247	738	579	204	101	136	239	284	383	582	346	404	518	387	305
	29	288	477	374	370	415	138	92	88	168	210	311	619	901	510	1027	804	654	738	978	735	534	502	606	228	490
D	30	243	818	961	809	484	275	519	873	850	499	460	627	452	352	607	837	880	958	338	207	349	222	150	215	541
	Mean	261	286	255	246	237	240	224	226	267	247	236	272	305	264	289	309	286	325	325	295	261	278	287	266	270
5Q	Mean	126	86	109	126	142	135	172	159	158	105	158	162	148	95	98	145	121	88	63	60	112	127	102	133	122
5D	Mean	321	466	463	437	380	345	394	472	470	492	476	495	566	505	705	776	580	582	436	410	441	562	451	385	484

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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	520	267	153	132	188	73	266	550	446	271	362	166	125	243	192	257	369	369	217	171	295	230	112	162	255
	2	245	152	324	296	210	215	213	176	165	134	421	582	329	154	111	113	80	145	224	118	33	30	33	28	189
D	3	23	37	46	57	140	218	234	549	697	526	663	708	974	1465	1099	1153	1094	1126	664	795	530	440	181	242	569
	4	250	275	308	303	291	270	150	408	382	380	283	593	543	339	547	365	288	80	57	40	31	54	75	63	266
Q	5	37	33	37	68	151	117	62	124	119	150	339	406	292	251	195	95	90	116	86	53	55	121	110	61	132
Q	6	44	26	54	85	79	94	130	130	150	161	85	56	52	40	37	42	42	61	65	91	188	121	114	72	84
	7	41	46	67	46	42	66	247	220	120	129	207	395	354	817	316	85	59	42	33	17	35	52	34	89	148
	8	87	136	225	135	47	61	139	67	159	167	91	171	111	55	72	110	156	99	178	56	102	84	36	28	107
Q	9	25	20	17	21	35	40	27	24	30	33	34	38	42	47	48	51	50	40	54	189	308	339	347	429	95
	10	371	254	210	68	154	205	180	79	35	43	31	35	42	46	45	49	53	93	219	118	61	53	49	82	107
D	11	79	144	339	312	305	310	524	141	57	166	151	69	60	47	296	921	1052	754	712	712	608	398	121	122	350
	12	92	63	58	42	53	33	32	37	47	34	31	39	44	60	124	269	86	76	117	92	46	40	111	123	73
	13	259	353	250	161	111	183	279	300	197	179	178	154	424	496	451	686	515	589	802	954	770	272	267	577	392
D	14	687	390	520	546	362	216	531	672	560	251	148	484	186	348	315	831	596	635	325	390	365	231	277	243	421
	15	250	272	349	410	786	498	291	423	319	215	720	593	448	315	462	506	603	300	360	200	245	188	68	108	372
	16	49	108	175	238	195	220	622	289	103	77	77	123	170	171	259	269	412	161	126	98	191	140	124	86	187
	17	104	137	121	108	90	79	65	70	107	312	345	199	241	785	725	413	439	443	434	93	230	300	225	130	258
Q	18	97	52	54	48	45	29	32	56	78	174	82	161	125	44	51	71	99	55	23	23	27	20	20	20	62
	19	27	42	60	54	63	45	24	36	29	37	99	231	391	274	96	90	233	167	98	93	118	91	90	159	110
	20	77	36	30	51	57	53	63	70	58	81	116	86	81	100	187	367	504	580	563	620	457	715	523	439	247
	21	411	431	373	322	356	345	319	230	132	195	150	83	138	355	496	383	343	489	595	601	384	98	63	40	305
Q	22	54	51	94	76	53	21	30	55	30	32	37	32	55	55	53	37	37	28	20	24	32	30	35	99	45
	23	341	319	266	267	185	453	354	294	273	333	281	87	83	176	164	235	516	82	59	76	122	105	50	33	215
	24	26	60	214	158	49	85	219	260	223	320	470	329	111	89	167	225	217	497	733	773	583	432	268	245	281
	25	659	674	579	530	673	701	266	216	422	781	756	704	536	534	245	71	98	132	310	364	353	452	253	148	436
	26	77	136	82	113	239	296	385	286	385	244	355	525	464	252	311	266	344	347	168	76	40	81	123	182	241
D	27	106	277	481	610	478	551	526	534	704	833	713	598	679	184	307	1156	746	675	816	759	334	549	536	514	570
D	28	821	542	306	240	585	905	631	594	492	344	961	766	723	536	694	548	664	786	770	462	459	396	104	286	567
	29	500	432	237	257	340	171	172	284	214	296	656	556	303	469	572	454	299	328	303	258	218	296	168	351	339
	30	328	303	244	218	374	415	305	376	381	499	525	302	106	202	202	49	43	86	86	59	82	229	139	100	236
	31	80	106	55	53	81	263	323	337	352	315	235	250	105	77	196	313	182	192	326	514	343	156	146	134	214
	Mean	218	199	204	194	219	233	246	254	240	248	309	307	268	291	291	338	332	308	307	286	246	217	154	174	253
5Q	Mean	51	36	51	59	72	60	56	77	81	110	115	138	113	87	76	59	63	60	49	76	122	126	125	136	83
5D	Mean	343	278	338	353	374	440	489	498	502	424	527	525	524	516	542	921	830	795	657	623	459	402	243	281	495

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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	145	168	284	381	187	215	293	321	246	318	351	367	270	252	262	208	133	268	187	125	39	27	26	20	212
D	2	36	152	234	242	282	287	204	368	353	246	219	424	536	583	463	657	1092	958	689	821	786	662	302	251	452
D	3	240	397	311	155	107	196	259	230	113	79	86	131	209	406	256	214	325	536	633	643	370	711	528	372	313
	4	251	113	69	51	50	53	76	83	31	25	38	53	45	36	36	38	89	124	69	75	71	70	114	99	73
	5	126	75	27	19	27	48	64	47	40	35	60	67	44	56	64	83	326	364	328	352	345	285	391	210	145
	6	206	284	204	226	319	288	238	175	160	189	229	41	39	108	235	159	51	40	105	101	33	39	90	96	152
	7	32	9	12	42	27	16	14	17	20	13	19	17	20	21	30	34	29	25	18	21	25	26	23	21	22
Q	8	19	22	45	28	28	39	100	64	36	32	44	34	36	40	70	59	58	37	36	21	23	19	22	22	39
	9	22	22	14	23	23	29	38	80	124	174	45	66	232	349	216	161	119	105	148	354	220	201	535	686	166
	10	540	306	185	105	151	247	394	101	41	97	349	451	147	86	68	109	43	26	32	71	66	86	111	140	165
	11	101	95	202	354	266	284	357	255	193	147	149	262	75	35	45	98	190	81	161	84	160	251	477	535	202
	12	575	478	349	157	49	55	128	337	330	264	88	129	93	67	62	68	189	151	81	399	492	368	430	398	239
D	13	288	291	452	420	250	202	311	334	309	451	623	512	702	361	790	390	756	317	139	111	147	270	223	344	375
	14	193	166	98	127	287	304	151	177	253	410	411	533	483	255	53	130	524	742	282	113	138	216	251	212	271
	15	154	379	177	82	167	115	191	227	162	96	137	263	73	84	158	289	173	360	377	413	276	142	101	42	193
	16	46	151	179	163	213	219	46	42	59	107	90	88	28	35	97	210	180	141	66	48	41	44	23	28	98
Q	17	34	28	27	22	34	32	41	39	61	72	39	27	24	24	21	19	18	26	27	41	27	26	22	20	31
Q	18	22	24	31	32	101	84	65	127	97	52	29	29	43	45	26	48	22	29	28	112	201	81	91	61	62
	19	76	24	22	89	338	402	369	364	286	390	371	390	98	172	275	317	432	229	176	128	84	88	81	41	218
	20	114	149	177	215	286	366	456	220	80	167	144	37	30	45	176	393	281	421	374	428	204	150	115	219	219
	21	298	176	152	144	157	307	286	172	109	358	196	66	80	53	29	43	30	33	88	89	18	16	16	28	123
	22	67	63	71	119	283	168	157	169	202	154	240	176	56	60	99	216	176	115	137	153	181	354	193	133	156
D	23	76	125	254	366	255	185	314	738	1225	1342	893	474	1196	458	177	368	294	377	741	775	552	453	385	644	528
D	24	539	323	287	309	290	228	551	476	522	1182	812	811	986	756	1018	616	530	240	125	93	168	316	316	343	493
	25	172	93	116	107	171	392	410	208	77	79	132	77	192	441	614	390	115	97	119	219	264	232	182	152	210
	26	164	406	244	237	225	382	182	223	288	336	378	209	692	621	376	151	232	507	135	62	50	51	141	412	279
	27	253	325	492	572	573	519	540	494	699	560	576	561	395	201	718	422	634	474	137	62	90	100	42	72	396
	28	43	67	136	176	234	263	213	116	74	169	556	354	299	149	79	144	77	219	244	199	44	71	58	60	169
Q	29	38	34	33	27	24	31	19	11	9	9	16	15	14	12	16	21	27	21	18	16	12	13	17	18	20
Q	30	14	13	13	9	9	10	13	10	18	11	10	20	21	18	18	24	26	28	48	109	30	32	20	32	23
	Mean	162	165	163	166	180	198	216	207	207	252	244	222	238	194	218	202	239	236	191	207	171	180	177	190	201
5Q	Mean	25	24	29	23	39	39	47	50	44	35	27	25	27	27	30	34	30	28	31	59	58	34	34	30	34
5D	Mean	235	257	307	298	236	219	327	429	504	660	526	470	725	512	540	449	599	485	465	488	404	482	350	390	432

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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	45	31	36	24	25	37	81	54	34	63	198	163	192	122	147	79	36	58	184	82	51	36	28	77
	2	29	26	23	31	49	67	68	39	35	19	26	19	18	19	18	20	16	15	21	51	29	27	40	60	32
	3	154	187	165	94	124	286	233	91	58	39	23	50	39	41	416	699	376	107	83	128	155	164	148	252	171
	4	108	47	33	30	32	45	47	138	148	60	47	48	35	31	59	70	121	270	174	213	154	161	421	706	133
D	5	624	334	174	166	168	369	385	463	773	222	62	66	99	179	155	123	205	202	288	192	93	64	59	51	230
	6	51	67	86	105	182	163	86	71	91	92	63	47	40	43	126	223	149	135	155	139	87	206	184	100	112
	7	38	64	81	89	36	40	66	49	27	54	24	40	55	48	157	176	155	110	101	54	48	27	30	29	66
Q	8	21	19	24	15	20	15	13	15	14	18	21	15	20	17	19	21	20	22	19	20	14	16	19	18	18
	9	22	21	20	21	20	21	21	21	19	23	43	49	22	16	19	32	26	19	19	58	106	119	144	177	44
D	10	117	74	78	97	97	76	123	180	186	268	424	418	165	162	567	1106	561	692	473	697	684	461	320	214	343
	11	332	577	352	148	50	96	47	34	33	50	79	129	80	180	111	447	283	238	470	282	211	136	157	188	196
	12	264	151	124	109	113	207	194	120	127	107	296	201	209	170	159	193	144	76	103	132	79	51	40	28	142
Q	13	25	33	23	23	21	24	27	76	114	115	140	93	52	51	111	89	120	52	38	69	47	66	22	27	61
	14	28	26	17	38	52	35	24	87	136	124	116	66	70	157	110	64	46	96	57	86	54	165	32	31	71
	15	37	29	29	35	40	33	32	46	96	98	75	55	54	66	151	762	667	265	255	601	224	133	220	301	179
D	16	529	527	739	659	680	474	781	358	270	433	546	553	467	535	582	588	533	442	290	274	260	373	550	513	498
D	17	239	235	200	324	229	82	61	69	55	121	243	694	675	548	583	480	370	249	96	340	259	106	146	274	278
	18	143	113	159	184	58	66	110	265	204	171	128	146	133	164	37	77	65	41	113	84	66	79	76	56	114
	19	43	40	42	61	109	53	58	105	199	138	143	437	360	201	134	147	293	216	276	329	70	64	78	72	153
	20	36	42	50	56	82	48	46	86	86	82	106	247	79	93	347	139	118	239	128	43	35	22	25	33	94
	21	32	42	37	124	221	121	66	67	146	170	157	407	483	471	461	587	644	616	710	777	609	512	411	315	341
D	22	477	418	325	336	316	374	365	186	180	260	426	208	452	408	209	191	169	454	512	376	516	503	127	114	329
	23	235	146	179	260	274	156	96	146	278	313	277	306	357	259	239	129	248	264	112	40	39	38	37	37	186
	24	32	43	63	94	51	100	166	230	217	195	276	295	258	192	182	250	129	49	64	136	200	66	74	106	145
	25	71	42	51	104	86	150	117	94	130	324	199	121	264	263	304	83	93	61	39	98	144	180	276	170	144
	26	113	79	107	137	42	29	24	19	19	67	172	109	107	53	71	97	64	93	90	46	36	39	39	34	70
Q	27	37	32	27	30	29	23	30	36	40	48	56	35	30	23	16	13	41	25	49	33	24	24	22	23	31
Q	28	18	19	21	22	26	31	33	30	58	83	68	49	83	32	29	16	23	21	66	156	121	123	96	101	55
	29	123	98	187	85	57	33	47	52	140	192	46	48	39	46	66	49	51	18	23	15	19	22	31	34	63
Q	30	24	25	22	27	24	16	22	74	70	148	83	108	138	91	42	32	34	25	34	33	54	28	17	15	49
	31	18	19	22	36	60	68	66	90	114	57	66	201	263	185	204	186	179	222	98	71	169	205	84	39	113
	Mean	131	116	112	115	108	107	112	110	132	133	144	176	171	159	187	233	194	173	161	185	151	136	127	133	146
5Q	Mean	25	25	23	23	24	21	25	46	59	82	73	60	64	42	43	34	47	29	41	62	52	51	35	36	42
5D	Mean	397	317	303	316	298	275	343	251	292	260	340	387	371	366	419	497	367	407	331	375	362	301	240	233	335

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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
Q	1	7	0	-3	-3	0	-1	0	3	3	0	0	2	2	6	6	0	-8	-4	-3	-7	-28	-12	-6	3	-1
Q	2	8	3	14	12	-9	4	3	-4	4	10	3	-1	-4	2	-4	-4	-9	-17	-8	0	-44	5	-2	19	0
	3	19	7	-1	-3	-21	7	18	27	7	9	2	2	5	1	-8	0	4	1	3	13	27	53	5	-33	6
	4	-20	4	-4	9	0	28	15	-6	4	1	-1	-2	-3	-1	-6	-18	-27	-33	6	9	-4	0	-6	14	-1
	5	8	-16	-33	-39	-21	6	28	31	10	19	-13	-9	13	6	-7	-15	-63	-16	6	1	-28	-8	13	1	-5
Q	6	22	16	3	-41	9	4	-4	10	16	33	5	5	-13	-29	-25	-31	-37	-9	3	-9	-19	-8	0	2	-4
Q	7	0	-3	2	0	0	-3	-2	0	10	9	-1	0	11	-14	-20	-40	-57	-60	-8	2	-2	14	9	18	-5
	8	17	11	21	-17	9	45	66	-5	9	34	44	31	-4	-34	-42	-16	-22	8	22	-41	-32	-17	-14	-15	2
	9	16	11	16	-80	17	-18	-3	4	-23	-14	3	13	12	19	19	18	11	3	7	8	36	18	-22	16	3
	10	12	-48	-137	-60	-11	4	19	-17	-28	7	25	-81	-20	-44	-65	-1	-6	1	3	-63	-10	22	19	15	-19
	11	-25	-21	8	-35	-34	2	-81	-63	0	15	17	0	-24	-25	-1	-14	-6	-9	28	9	5	15	-2	-22	-11
	12	8	14	16	-27	-22	8	3	-24	-17	-64	-8	-48	-63	-26	0	6	0	3	-3	3	2	3	-19	-30	-12
	13	-1	2	-11	0	3	-5	0	0	-2	-4	-10	-5	-2	-3	-2	0	-2	-2	-3	-1	0	0	-3	-5	-2
	14	4	14	8	4	13	37	-11	0	3	0	-5	-5	4	5	0	-22	-8	-14	-12	-13	-4	0	19	-17	0
D	15	14	8	2	-4	6	1	-22	17	16	6	-25	-1	-14	-52	-156	-109	43	27	-5	1	30	-59	-160	-107	-22
D	16	-225	-41	-106	-108	-31	18	0	-17	-44	-112	-6	4	8	-3	-31	-52	-69	-121	-106	-15	0	6	-31	-81	-48
	17	-44	-31	-56	-56	-142	-86	-16	2	16	-13	1	-44	-45	-46	-53	-48	3	11	9	-60	-22	18	-19	-92	-34
	18	-110	-20	7	-53	-100	-34	-31	-45	-7	5	-1	-12	-106	-28	-34	-19	-85	-32	0	-18	-102	-18	-19	5	-35
	19	-9	-65	-59	0	-27	-27	15	1	-3	36	-56	-61	10	7	-95	-107	-27	-3	-5	-4	18	-66	-28	-29	-24
	20	-9	1	8	-82	-53	5	4	-5	9	-6	-9	-6	10	-18	5	-27	-47	-54	-18	-2	-4	-45	-46	-5	-16
	21	16	0	-1	-12	16	-5	0	-60	-33	11	0	12	-4	10	5	6	14	-45	8	3	1	-5	-5	8	-2
	22	-18	-11	17	10	-22	-22	-124	-51	-40	-16	1	1	3	0	-3	-2	0	-5	-10	4	-10	-38	-1	13	-13
	23	9	-15	-10	1	0	-16	-15	0	-1	0	3	11	7	5	-46	-27	-40	-14	-35	-7	45	-22	0	0	-7
	24	2	-8	-7	-7	10	-14	-5	0	-2	-6	1	0	11	4	-6	-6	18	-13	-36	7	37	31	9	-29	0
D	25	-73	16	12	17	-17	5	-12	-27	4	25	-136	-9	7	5	13	30	-63	-33	-25	-34	32	-45	7	11	-11
Q	26	24	19	6	-8	-11	-8	2	-4	8	18	16	8	4	-3	-6	-3	0	1	8	8	2	-2	-6	-7	2
	27	-1	7	-33	-14	12	25	14	26	36	32	29	18	5	23	12	-2	-5	0	-17	11	13	7	3	8	8
D	28	4	9	-8	-37	9	6	1	0	9	41	-10	-5	-25	-131	-76	30	40	63	36	48	-12	41	61	62	6
D	29	0	-128	-128	-59	-196	-20	-26	-105	-184	-190	-97	-124	-149	-127	-92	-13	-4	7	3	-4	1	-2	5	9	-67
	30	2	-38	-55	-3	-1	1	-21	-16	8	48	29	19	-23	-99	-84	3	1	0	0	0	0	11	8	-53	-10
	31	-144	-114	-70	-74	-142	-62	-17	-61	-22	8	9	-25	-19	3	-7	1	-9	10	12	6	-17	15	18	4	-29
	Mean	-15	-13	-18	-24	-24	-3	-6	-12	-7	-1	-6	-10	-13	-18	-26	-15	-14	-11	-4	-4	-2	-2	-6	-10	-11
5Q	Mean	12	7	4	-8	-2	0	0	1	8	14	4	2	0	-7	-9	-15	-22	-17	-1	-1	-18	0	-1	7	-1
5D	Mean	-56	-27	-45	-38	-45	2	-11	-26	-39	-46	-54	-27	-34	-61	-68	-22	-10	-11	-19	0	10	-11	-23	-21	-28

AO Index (Hourly mean values, unit nT) August 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	4	-3	-71	-60	-25	-39	11	0	6	-14	-23	0	4	2	8	-23	11	-31	0	6	0	5	-6	-8	-10
Q	2	7	6	-19	13	14	27	-53	-17	-1	9	-4	22	-12	-13	14	3	1	-13	-27	-15	-4	-3	-12	2	-3
	3	2	12	5	15	-38	25	24	10	8	25	-16	-77	-87	-118	-64	-12	-18	69	20	15	20	13	8	0	-6
	4	-10	-7	-11	9	11	-56	-12	4	-10	8	-4	6	3	8	3	-33	-29	-49	-2	9	38	-25	-35	4	-7
	5	-14	-141	-48	39	-79	-8	-2	-102	-90	-39	-36	-13	6	-16	-87	-29	-16	-11	0	-19	-33	4	11	9	-30
	6	3	1	2	-2	-36	-6	-39	-68	-44	12	9	-98	-103	-10	-25	-71	-31	-9	21	-28	-45	-8	12	15	-23
Q	7	11	-83	-21	18	11	0	8	19	8	5	0	0	6	-14	-22	-5	5	12	12	22	17	9	5	3	1
	8	-3	3	-25	-8	-15	-9	-3	24	8	28	-47	-52	22	-63	-64	-34	-14	12	7	29	36	16	42	-74	-7
	9	-53	-6	11	5	-29	-67	-19	6	-22	11	41	15	-24	-183	-122	-46	-21	-6	-11	14	17	14	7	2	-19
Q	10	-11	-8	0	0	-1	2	-13	-2	-4	-12	-19	12	4	10	4	7	9	-28	-10	21	11	10	15	9	0
	11	11	10	-2	-16	3	0	0	0	4	3	1	1	5	6	4	7	-13	-46	-49	-14	-3	11	4	12	-2
	12	-55	-63	6	-12	13	43	-8	2	-35	25	11	10	3	-208	-244	-141	-25	-5	6	-60	-40	12	-34	-95	-37
D	13	-35	13	4	-48	15	-17	-52	-57	-203	-131	-8	12	-12	-22	0	-8	-24	-15	-11	32	1	-111	-18	-25	-30
	14	0	-37	-86	0	-86	-95	23	20	1	-60	-8	9	-15	-50	-73	-84	-12	12	-9	-166	-102	1	-47	-21	-37
	15	-11	-28	1	19	-15	-111	-14	0	-174	-89	-30	-33	-113	-40	-60	-61	12	20	-3	-73	-10	-142	-69	-65	-45
	16	-26	-49	-22	-52	-64	-50	-66	-16	13	-42	-26	-9	-41	-49	-43	-66	-8	13	-6	-47	7	-78	0	17	-29
	17	8	9	-18	-18	-1	-3	0	-7	17	18	-35	-3	26	13	-162	-124	-94	-41	-11	8	-21	25	-14	-21	-18
Q	18	9	6	-23	-81	-54	-11	-44	0	-9	-19	6	1	5	3	2	-3	-69	-84	-20	4	1	-26	6	0	-16
	19	0	2	-28	-62	-62	-59	-23	20	15	3	15	9	6	-80	-78	-50	23	-18	-17	-19	5	20	6	3	-15
	20	-18	29	14	23	-38	-26	-54	2	20	20	-64	-37	-56	-110	-65	-2	15	9	-2	-57	-14	0	6	8	-16
Q	21	-35	-63	-77	-18	3	3	-16	14	40	-17	1	6	-1	-2	-11	5	-6	-21	-58	-13	5	-4	-6	-1	-11
	22	-1	-1	-23	-8	-10	-22	-4	0	0	10	16	24	23	24	29	4	-33	-58	-16	17	-2	6	0	3	0
	23	3	14	6	-61	-53	-14	-19	3	-6	17	-25	-88	-55	-40	-54	-58	-53	-101	-2	11	0	-22	4	-4	-25
	24	-2	0	9	-5	18	8	8	2	1	14	28	10	-76	-57	-24	11	-3	-34	-46	-17	16	6	3	16	-4
D	25	9	6	-2	-1	-5	1	12	-48	-67	-73	-172	-461	-197	-135	-219	-77	-154	-249	-207	-86	-26	-118	-70	18	-96
D	26	-30	-63	-105	-119	-125	-122	-37	-23	17	-54	-19	-27	-126	-4	-17	-66	-129	-96	-55	-3	-53	-28	0	-21	-54
D	27	8	10	21	17	25	-76	-108	-7	21	-53	-47	-15	-35	-33	-8	-92	-219	-84	-96	-37	10	15	11	0	-32
	28	-9	-1	-17	-36	-4	-18	-18	-10	10	5	-65	-137	-83	-2	-13	-94	-129	-86	-44	-95	-58	-29	-122	-143	-50
	29	-49	-36	-43	16	19	20	1	-23	11	8	8	14	1	6	2	10	-70	-99	-44	-34	-34	9	-8	35	-11
	30	-40	10	12	8	24	23	-2	-102	-83	5	18	-15	-42	7	2	-41	-76	-96	-20	23	13	-14	-58	6	-18
D	31	19	-11	-27	-67	-98	-49	-77	-213	-196	-22	45	-9	-83	-132	-68	5	-202	-79	-76	-2	28	-41	-64	-79	-62
	Mean	-9	-15	-18	-15	-22	-22	-19	-18	-24	-12	-14	-29	-33	-42	-46	-37	-44	-39	-25	-18	-7	-15	-13	-12	-23
5Q	Mean	-3	-28	-28	-13	-5	4	-23	2	6	-6	-3	8	0	-3	-2	1	-12	-26	-20	3	6	-2	1	2	-5
5D	Mean	-5	-9	-21	-43	-37	-52	-52	-69	-85	-66	-40	-100	-90	-65	-62	-47	-145	-104	-89	-19	-8	-56	-28	-21	-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
D	1	-163	-210	-116	-66	-27	-29	-130	-124	-17	-82	-132	-77	-226	-64	-121	-154	-76	-39	-107	-23	0	-113	-128	-44	-94
	2	-111	-61	-34	-41	-63	-156	-115	-27	-83	-4	-44	-14	-80	-28	-9	0	-24	-88	-69	-78	-51	-9	14	6	-49
Q	3	3	-5	0	-3	1	0	-17	-70	-7	8	7	-3	3	-2	-1	-1	0	0	1	2	1	-1	-3	-2	-3
Q	4	3	3	-6	-15	-10	7	6	-7	-7	5	11	-16	-42	-38	-65	-78	-61	-23	2	17	-58	-28	-2	-46	-18
Q	5	-58	-1	14	2	4	17	-116	-36	-16	16	-30	-13	-21	9	9	11	8	13	13	18	25	-8	12	-13	-5
	6	-22	-34	-37	-21	0	19	24	10	14	27	50	-32	11	19	5	-7	-31	-102	-44	22	-26	7	-4	6	-6
	7	8	3	2	2	5	18	11	-19	-13	-27	27	0	-39	-123	-58	-51	-21	-6	11	0	8	18	10	-106	-14
	8	-64	20	3	-29	7	18	13	16	5	18	-69	0	-61	-26	-45	-77	-18	2	0	-12	-39	-21	-18	3	-15
	9	14	1	-30	-45	-3	13	24	0	-132	29	16	8	3	9	0	0	-6	5	4	-8	-14	-12	7	-4	-5
D	10	1	-2	-29	6	8	9	11	8	9	10	5	12	-108	-261	-189	-132	0	2	-33	-9	-23	-175	-116	-167	-48
D	11	-182	-205	-22	38	-12	17	9	17	-11	-170	-206	-78	-47	-65	-1	9	17	-121	-129	-91	-4	0	-11	-1	-52
	12	-6	-33	5	20	-50	-100	-53	0	-27	-92	-39	11	-2	-73	-71	-65	-128	-62	-93	-163	-26	-57	-157	-64	-55
	13	-81	-110	-43	-33	-26	-5	12	15	19	18	15	10	-52	-142	-88	-159	-105	6	-1	6	13	-34	-168	-262	-49
	14	-177	-104	-99	-94	-4	-35	-22	-11	-130	-3	-14	-158	-56	-10	4	-71	-32	-14	-91	-65	-176	-36	-5	1	-58
	15	-32	-89	-12	12	-17	-129	-46	11	-157	-130	5	-83	-165	-110	-40	-22	-104	-160	-94	-73	-7	-31	-180	-182	-76
	16	-105	-84	-11	14	-24	-38	-92	-17	20	-12	-170	-48	2	-75	-24	-13	-48	-103	-45	3	12	-72	-129	-76	-47
	17	-25	4	-30	5	26	-104	-36	7	9	-95	-26	7	3	-147	-88	-144	-81	-52	-103	-79	-33	-49	-96	-100	-51
Q	18	-9	22	16	-4	-37	6	12	-33	-60	2	-48	-42	-6	10	-6	-32	-1	-9	-12	-11	9	0	4	3	-9
Q	19	8	5	-21	5	11	8	3	3	4	3	13	-34	-18	-2	2	-39	-5	-22	0	9	10	10	9	8	0
	20	12	13	9	8	7	2	-2	-1	7	10	13	-20	-39	-5	-35	-33	-67	-74	-123	-54	25	59	25	19	-10
	21	4	9	-26	-8	22	17	23	22	21	20	16	17	3	-26	13	17	-5	-2	-13	-8	6	6	7	13	6
	22	7	-136	-71	-56	-60	-28	2	22	-67	9	14	16	11	12	1	15	13	-158	-181	-98	-22	17	-97	-337	-48
	23	-99	-134	-84	-5	26	6	-25	-48	-42	21	5	-17	7	-1	-24	-40	-27	-38	-48	2	1	-24	0	6	-24
	24	4	2	-8	-103	-65	17	7	10	12	12	11	5	7	15	11	9	-30	-6	16	-15	-6	17	7	-4	-3
D	25	-5	-15	-65	-143	-122	-96	-155	-73	-14	-51	-200	-299	-65	-63	-243	-281	-132	-1	6	-51	-37	21	-88	-116	-95
	26	-17	8	4	-65	-126	-144	-107	5	9	21	-25	11	-89	-61	10	10	1	-20	-43	-45	0	3	9	9	-26
	27	10	10	1	6	11	20	10	16	11	14	14	13	10	11	-11	0	-31	-120	6	54	-2	30	23	4	4
	28	-112	-145	-65	-9	6	4	10	33	32	7	-7	-283	-189	-27	-3	-21	-65	-64	-84	-174	-82	-55	-94	-60	-60
	29	-2	-49	-66	-51	-18	33	22	15	-16	-33	-45	-137	-286	-102	-195	-169	-135	-135	-163	-121	-91	-92	-161	-23	-84
D	30	-34	-265	-241	-144	-67	20	-53	-227	-186	-90	-117	-183	-118	-71	-173	-251	-259	-219	-56	-11	-79	-55	-15	-49	-122
	Mean	-41	-52	-35	-27	-19	-20	-25	-16	-27	-17	-31	-47	-54	-47	-47	-58	-48	-53	-49	-35	-22	-22	-44	-52	-37
5Q	Mean	-10	4	0	-3	-6	7	-22	-28	-17	6	-9	-21	-16	-4	-12	-27	-11	-8	0	7	-2	-5	4	-10	-7
5D	Mean	-76	-139	-94	-61	-44	-15	-63	-79	-43	-76	-130	-125	-112	-104	-145	-161	-90	-75	-63	-37	-28	-64	-71	-75	-82

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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	-180	-64	-33	-28	-47	9	-60	-182	-111	-42	-69	-16	-15	-79	-28	-86	-127	-115	-51	-14	-83	-53	-10	-38	-63
	2	-92	-41	-105	-108	-59	-2	-7	3	-13	18	-82	-176	-102	-38	-12	1	-16	-44	-72	-27	12	6	8	5	-39
D	3	5	-2	-2	0	-34	-52	-29	-122	-162	-78	-89	-237	-255	-338	-236	-300	-207	-331	-74	-155	-29	-12	18	-55	-116
	4	-59	-76	-88	-82	-28	5	-6	-78	-35	-48	-22	-187	-119	-104	-159	-110	-73	-7	6	16	10	12	3	7	-51
Q	5	9	5	7	-1	-48	-17	4	0	-22	-2	-87	-101	-54	-41	-34	1	0	-1	-2	2	8	-5	8	15	-14
Q	6	5	8	1	-7	-1	-8	-4	-27	-12	-38	-5	1	-2	-3	-2	-1	-3	-16	-15	-19	-60	-27	-28	-13	-11
	7	3	2	-10	-2	8	14	-38	-23	9	22	1	-67	-96	-266	-67	21	10	0	8	5	5	1	-3	-8	-19
	8	4	12	-36	13	16	9	-7	6	9	-5	16	-16	-13	1	3	-6	-37	-11	-24	2	-7	-13	5	9	-2
Q	9	6	3	3	4	9	12	7	4	2	0	-2	-4	-7	-6	-4	-6	-4	-1	-7	-45	-16	-27	-29	20	-3
	10	21	-25	4	25	20	6	42	17	16	17	5	1	0	0	-1	-4	-2	-1	-23	-3	0	9	5	5	5
D	11	10	-1	-55	-62	-5	-21	-111	18	26	11	20	30	15	1	-26	-203	-244	-133	-138	-52	-88	44	17	2	-39
	12	-9	8	14	12	8	6	5	4	9	6	0	-3	-6	-5	-16	-112	-10	-10	-13	-11	4	2	3	-15	-5
	13	-59	-53	-22	21	19	-4	-59	-68	-30	-7	-3	-4	-101	-134	-69	-183	-141	-114	-210	-323	-212	-55	6	-113	-80
D	14	-198	-60	-65	-111	-46	-12	-143	-131	-154	-17	16	-122	-4	-76	-87	-216	-158	-190	-58	-50	-99	-34	-59	-47	-88
	15	-69	-46	-92	-36	-120	-94	-60	-50	-43	2	-175	-168	-132	-56	-112	-113	-177	-53	-57	-29	-57	-34	16	7	-73
	16	12	5	-5	-42	-9	-18	-155	-44	32	12	10	1	-29	-14	-89	-62	-101	-23	-5	-12	-59	-37	-23	-4	-27
	17	-4	-31	-25	-11	10	17	21	28	30	-29	-62	-23	-4	-262	-247	-86	-87	-90	-115	11	-42	-81	-45	-16	-47
Q	18	0	14	13	7	9	8	9	13	-15	-51	-5	-43	-34	1	7	-8	-14	-1	1	3	-1	0	1	0	-3
	19	1	-8	-1	-3	-11	-5	4	7	6	6	11	-37	-91	-25	0	-8	-68	-48	-13	9	-5	9	21	3	-10
	20	11	6	7	9	13	18	9	32	25	6	-2	18	16	27	-19	-91	-114	-106	-79	-48	-23	-118	-16	11	-16
	21	24	-20	-35	-39	26	3	58	29	32	-2	12	23	4	-122	-175	-84	1	-59	-96	-109	-44	15	19	11	-22
Q	22	4	3	0	0	1	4	10	10	7	9	9	1	-6	4	3	-4	0	0	5	8	11	16	15	-11	4
	23	-88	-80	-70	-53	-14	-68	-42	10	-13	-29	-1	11	7	-32	-51	-56	-141	-10	-6	-20	-41	-17	5	6	-33
	24	4	-8	-80	-47	-5	10	-37	-59	-9	-68	-128	-32	4	-5	-51	-59	-64	-82	-203	-161	-51	-17	-24	-11	-49
	25	-268	-253	-199	-102	-73	-78	-13	-5	-95	-233	-161	-212	-146	-194	-90	-6	-32	-44	-120	-120	-100	-159	-68	-16	-116
	26	-1	-24	-7	-26	-51	-61	-98	-59	-73	-21	-73	-140	-112	-59	-79	-56	-106	-125	-53	-22	7	-5	-24	-42	-55
D	27	-14	-27	-154	-190	-117	-92	-133	-120	-173	-215	-155	-186	-131	-4	-85	-344	-174	-95	-194	-257	-91	-112	-76	-98	-135
D	28	-280	-148	-15	-21	-53	-230	-138	-104	-96	-48	-354	-172	-235	-162	-196	-132	-92	-183	-204	-126	-128	-86	-1	-44	-135
	29	-170	-103	-51	-65	-79	2	-11	-65	-36	-74	-241	-202	-57	-149	-218	-166	-94	-93	-88	-56	-28	-47	4	-70	-90
	30	-82	-43	-22	-45	-75	-120	-67	-60	-75	-97	-157	-58	-12	-58	-65	-6	-6	-28	-33	-8	-7	-72	-29	-12	-51
	31	-10	-14	-4	5	1	-24	-71	-48	-88	-64	-37	-59	-7	-6	-68	-126	-59	-47	-70	-141	-54	-5	-14	-19	-43
	Mean	-47	-34	-36	-31	-23	-25	-36	-34	-33	-34	-58	-70	-55	-71	-73	-84	-75	-66	-64	-56	-40	-29	-9	-17	-46
5Q	Mean	4	6	4	0	-6	0	5	0	-8	-16	-18	-29	-20	-9	-6	-3	-4	-3	-3	-10	-11	-8	-6	2	-5
5D	Mean	-95	-47	-58	-76	-51	-81	-110	-91	-111	-69	-112	-137	-122	-115	-126	-239	-175	-186	-133	-128	-87	-40	-20	-48	-102

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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
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D	2	-1	-30	-74	-54	-38	23	27	-74	-52	-9	-34	-46	-92	-171	-88	-166	-310	-165	-151	-238	-63	-148	-67	-33	-85
D	3	-15	-103	-81	-8	13	18	-25	-60	-22	-2	20	-1	-36	-115	-47	-32	-75	-105	-222	-120	-77	-172	-99	-36	-58
	4	-18	2	10	2	0	-4	-7	-16	-15	-10	-8	-5	-4	-7	-9	-17	-32	-43	-18	-14	8	0	-27	-23	-10
	5	-1	3	2	-1	1	0	2	4	5	1	11	10	3	3	8	-11	-47	-73	-27	-23	29	-10	-62	13	-6
	6	11	54	15	-28	-40	31	55	14	17	2	-50	-2	-4	-6	-28	6	0	-9	-13	-7	-4	-1	3	8	0
	7	2	-1	-2	7	9	1	2	1	0	0	1	-2	-2	-2	-5	-9	-9	-8	-4	-2	-1	0	1	0	0
Q	8	1	3	-2	5	14	13	16	-5	0	-2	0	5	0	0	7	0	-9	1	3	0	0	0	1	3	2
	9	5	5	4	7	9	9	10	16	9	-17	15	12	-16	-30	5	-6	-28	-20	-23	-64	-27	34	-107	-167	-15
	10	-103	-6	18	28	20	-2	-47	9	6	9	-45	-95	-11	1	4	-23	-3	-5	-5	-12	-9	3	8	24	-9
	11	28	25	-56	-82	-6	-36	-35	41	36	49	6	-75	-9	-2	-7	-31	-60	-7	-28	7	-6	-45	-144	-199	-26
	12	-196	-127	-65	14	19	14	12	-51	-59	-41	6	-22	3	6	-11	-16	-65	-44	-14	-110	-123	-14	-71	-55	-42
D	13	-18	-5	-78	-84	16	35	-14	-77	-73	-92	-138	-143	-279	-95	-231	-129	-245	-107	-42	-15	-27	-53	-16	-57	-82
	14	-23	-14	16	9	-58	-73	28	15	-49	-114	-115	-61	-118	-30	-10	-43	-168	-239	-49	-12	-4	-55	-48	-45	-52
	15	-22	-105	-28	17	18	0	-18	-31	-14	10	-10	-76	-6	-21	-51	-112	-51	-143	-159	-157	-114	-34	-23	1	-47
	16	3	-42	-60	-48	-49	-39	14	14	14	5	5	0	0	-2	-8	-84	-56	-56	-18	-15	-4	-8	-4	-8	-18
Q	17	0	0	-1	5	0	6	10	9	5	-1	0	2	-1	-1	-5	-5	-3	-7	-3	-6	0	0	2	4	0
Q	18	1	2	4	5	-1	19	20	-3	-8	14	4	0	3	0	-1	8	0	-1	2	-22	-63	-16	-10	-6	-2
	19	-14	4	5	-13	-88	-85	32	-27	-14	-92	-38	-62	-2	-54	-101	-91	-114	-56	-43	-12	-11	-21	-21	-4	-38
	20	-34	-38	-36	-52	-73	-88	-138	-48	-4	-30	-43	0	0	-7	-64	-152	-103	-163	-135	-76	0	-5	-3	-41	-56
	21	-78	-11	1	-14	-18	-103	-96	-59	0	-117	-50	-7	-14	-11	-3	-14	-8	-12	-36	-39	-3	-3	0	-1	-29
	22	-6	-4	0	3	-56	15	15	-19	-20	-3	-63	-52	0	-4	-17	-90	-74	-42	-41	-40	-32	-111	-36	-14	-29
D	23	-9	-34	-57	-45	-20	9	-54	-154	-263	-309	-102	-103	-424	-91	-15	-111	-110	-85	-203	-233	-92	-83	-63	-208	-119
D	24	-148	-62	-67	-73	-58	-30	-123	-99	-114	-396	-241	-310	-385	-219	-323	-196	-209	-69	-2	-1	-28	-68	-88	-93	-142
	25	-55	-28	-30	-29	-29	-105	-72	-8	-9	-2	-46	-24	-64	-205	-174	-128	-19	-16	-40	-104	-108	-82	-48	-31	-61
	26	-35	-134	-48	-58	-50	-90	9	-55	-88	-43	-63	-53	-278	-202	-121	-36	-67	-147	-26	0	-2	-7	-44	-154	-75
	27	-81	-101	-191	-200	-166	-98	-82	-113	-192	-142	-185	-193	-80	-36	-235	-106	-184	-110	-12	0	-11	-38	-9	4	-107
	28	-12	-17	-23	-52	-55	-52	-49	-23	-8	-43	-170	-77	-30	7	10	-24	-7	-65	-64	-63	15	1	-4	1	-33
Q	29	5	9	7	5	1	0	0	0	0	-1	-4	-1	-4	-4	-6	-9	-7	-6	-5	-4	-3	-3	-4	-4	-1
Q	30	-3	-1	0	0	0	0	-1	1	-4	0	0	0	-3	-2	-2	-3	-2	2	-5	-26	4	2	2	6	-1
	Mean	-28	-26	-30	-28	-24	-21	-19	-28	-32	-48	-45	-46	-62	-44	-54	-57	-70	-63	-48	-48	-25	-31	-32	-37	-39
5Q	Mean	0	2	1	4	2	7	9	0	-1	2	0	1	-1	-1	-1	-1	-4	-2	-1	-11	-12	-3	-1	0	0
5D	Mean	-38	-46	-71	-52	-17	11	-37	-92	-104	-161	-99	-120	-243	-138	-140	-126	-189	-106	-124	-121	-57	-104	-66	-85	-97

AO Index (Hourly mean values, unit nT) December 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	7	12	12	10	8	8	6	-4	11	11	9	-37	-4	7	-2	-14	-10	4	-5	-36	-15	-6	0	4	0
	2	1	1	5	6	11	28	32	18	14	5	4	3	2	1	2	-2	-2	0	0	-8	-2	-1	-3	-2	4
	3	-22	28	51	48	33	-62	-1	42	30	18	8	4	0	-4	-182	-176	-50	-18	-22	-29	-47	-30	17	-50	-17
	4	-5	12	3	3	2	9	10	3	21	24	14	10	0	-1	5	-7	-43	-50	-56	-25	-12	9	-87	-165	-13
D	5	-102	-48	-28	-32	-27	-89	-88	-154	-199	-21	7	-1	-7	2	3	-6	-57	-13	-30	37	13	2	0	-7	-35
	6	-12	-17	-29	-15	-40	25	26	7	0	16	15	7	9	1	-31	-39	-6	-18	-41	-21	-7	-43	-21	3	-9
	7	5	-2	-3	-4	8	7	2	-1	2	-10	0	-8	-17	-5	-51	-43	-35	-16	-33	-17	-5	0	-4	0	-9
Q	8	3	2	3	2	5	2	0	3	3	3	5	1	3	0	-2	-2	-1	-4	-3	-3	-1	0	0	1	0
	9	1	2	4	5	8	7	7	8	7	6	0	-3	-1	1	0	1	3	3	0	-13	-26	33	44	47	6
D	10	34	23	27	19	15	15	3	-2	-4	-54	-135	-133	-36	-10	-113	-278	-161	-167	-89	-168	-164	-67	-16	32	-59
	11	-44	-166	-13	29	-4	-9	6	0	1	-9	-22	-45	-21	-48	-37	-184	-48	-55	-155	-68	-26	-6	-27	-6	-40
	12	-34	15	23	46	32	10	9	26	9	7	-55	-20	18	19	-21	-44	-33	-5	-28	-41	-14	-8	-6	0	-4
Q	13	-1	-2	2	5	3	2	2	-13	-38	-41	-42	-22	-2	-3	-14	-28	-32	-5	-9	-29	-16	-26	-2	2	-13
	14	5	2	2	-1	9	10	1	-17	-47	-38	-27	-5	-11	-31	-31	-6	-7	-36	-13	-18	-6	-62	3	10	-13
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D	16	-151	-119	-206	-104	-82	-67	-61	-28	-4	-102	-139	-44	-76	-153	-138	-160	-122	-64	-45	-56	-66	-112	-174	-130	-100
D	17	-14	5	-17	-75	-8	15	-4	-13	-7	-29	-64	-238	-258	-173	-157	-127	-98	-101	-33	-123	-78	-11	-27	-105	-73
	18	-37	-2	-26	-30	18	11	-22	-102	-39	-10	-3	-48	-40	-42	-4	-29	-14	-15	-50	-33	-20	-26	-33	-13	-25
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D	22	-169	-27	0	-25	-64	-100	-83	-9	2	-25	-135	-52	-120	-93	-19	-68	-54	-142	-132	-89	-137	-162	21	9	-70
	23	-14	-3	-36	-21	-43	-19	3	11	-63	-88	-60	-56	-76	-39	-70	-18	-78	-54	-24	-5	0	2	7	7	-31
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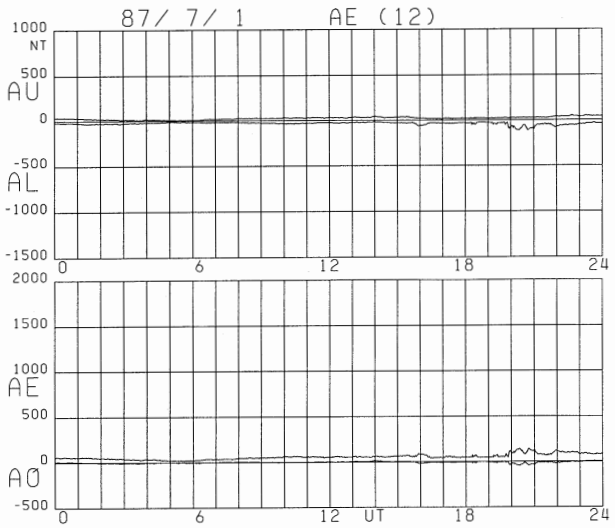
	26	-12	-11	-5	-14	20	8	0	3	2	8	-38	-25	-36	-16	-20	-35	-24	-39	-36	-15	-5	-3	-1	0	-12
Q	27	1	5	6	7	6	4	8	12	10	5	1	4	7	6	3	0	-8	-2	-16	-6	0	0	3	3	2
Q	28	4	5	5	5	6	7	12	11	4	-22	-2	9	-20	10	5	2	1	-1	-17	-32	0	-10	20	24	1
	29	23	32	-11	25	23	18	20	11	-27	-42	1	-4	5	-4	-13	-9	-11	1	0	5	6	5	3	0	2
Q	30	4	2	5	5	7	5	1	-22	-23	-41	-20	-30	-45	-29	-3	3	-3	-4	-9	-7	-16	-3	2	5	-9
	31	5	5	5	5	8	1	9	4	-11	11	9	-24	-16	-20	-21	-47	-60	-66	-14	-6	-30	-15	10	9	-10
	Mean	-16	-7	-6	-6	-5	-6	-5	-9	-16	-21	-28	-38	-35	-29	-43	-56	-42	-40	-40	-41	-33	-23	-15	-18	-24
5Q	Mean	2	2	4	4	5	4	4	-1	-8	-19	-11	-7	-11	-3	-2	-5	-8	-3	-10	-15	-6	-7	4	7	-3
5D	Mean	-80	-33	-44	-43	-33	-45	-46	-41	-42	-46	-93	-93	-99	-85	-84	-127	-98	-97	-65	-79	-86	-70	-39	-40	-67

FIGURE 4 (on even pages)

Daily graphs of 1.0 min AE indices (AU, AL, AE and AO) for July-December 1987. Graphs on disturbed days (Aug. 25 & 31 and Nov. 24) are reproduced on page 96.

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.


87/ 7/ 1 AE (12)
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NT
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AU
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-1500
0 6 12 18 24
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1000
AE
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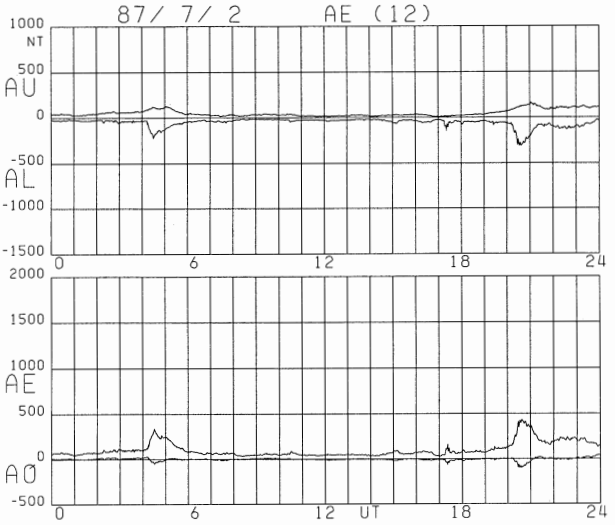
AO
-500
0 6 12 UT 18 24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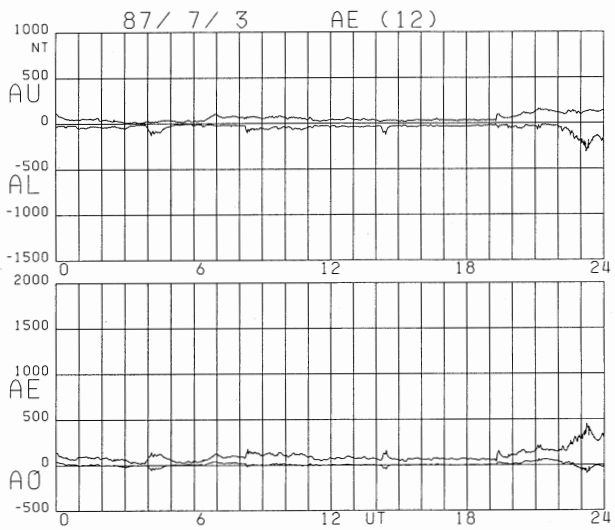
0 6 12 UT 18 24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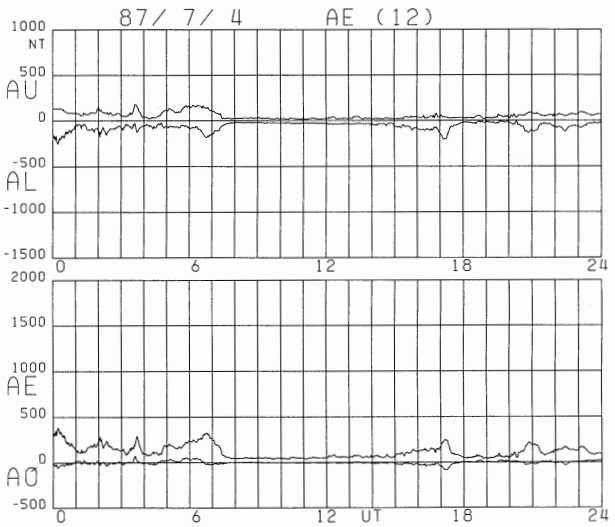
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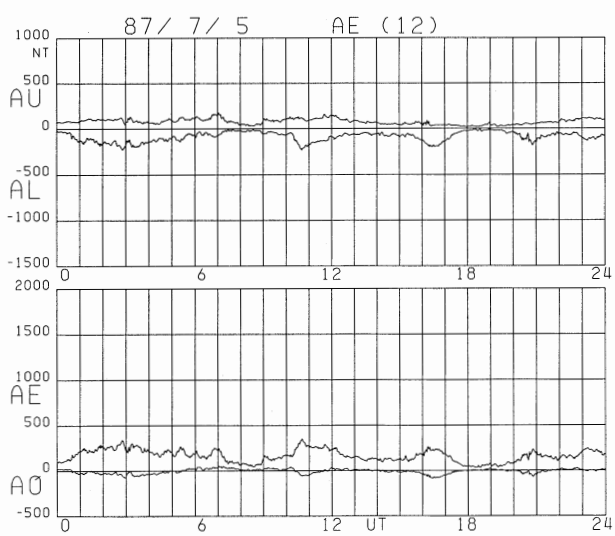
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AE
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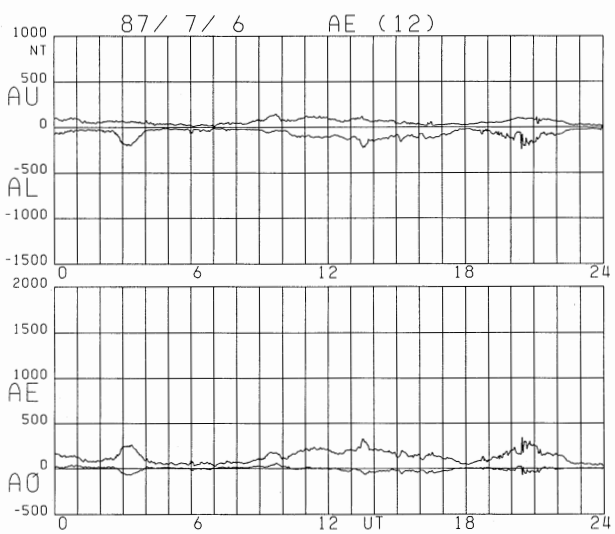
0 6 12 UT 18 24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NT
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AE
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0
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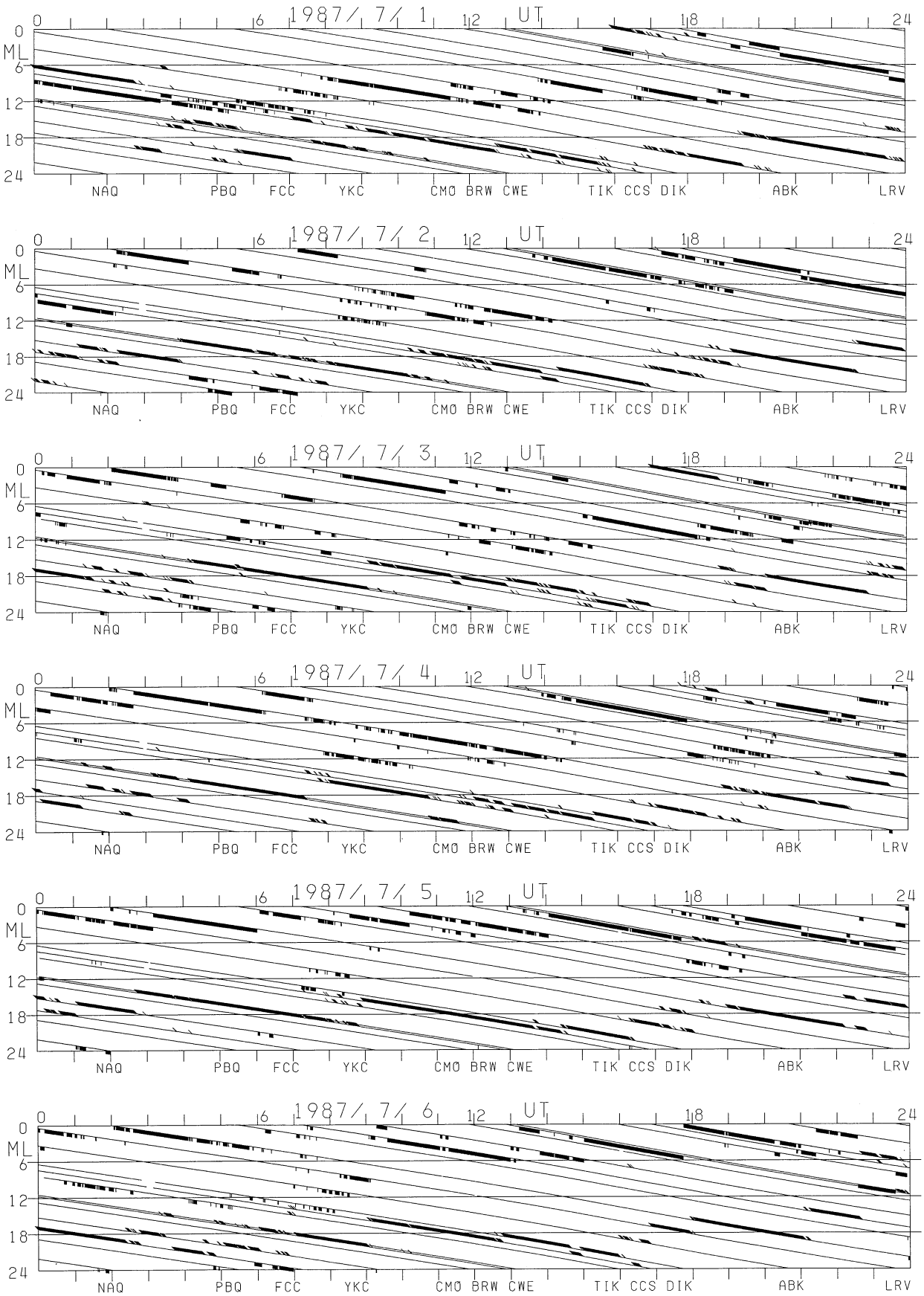
0 6 12 UT 18 24


1987/ 7/ 1 UT
1987/ 7/ 2 UT
1987/ 7/ 3 UT
1987/ 7/ 4 UT
1987/ 7/ 5 UT
1987/ 7/ 6 UT
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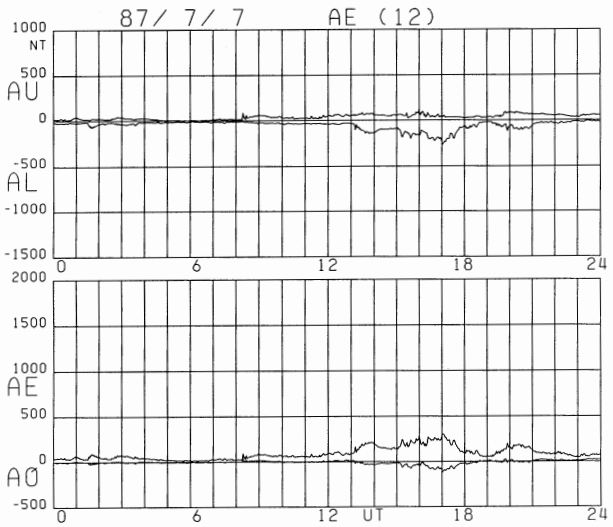
12
18
24
ML
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
LRV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-1500
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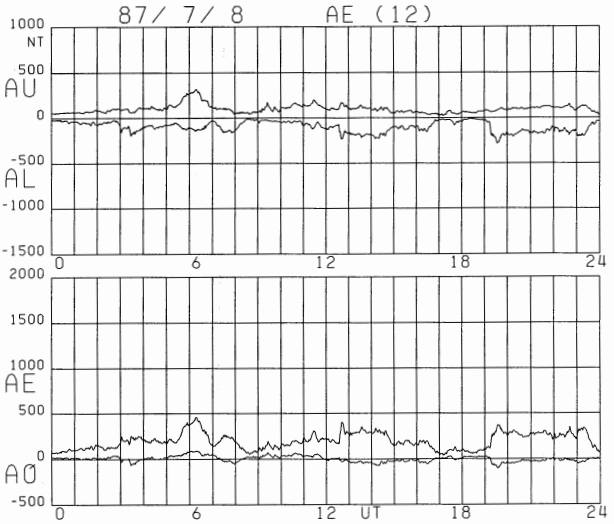
AE
500
0
AO
-500
0 6 12 UT 18 24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1000
AE
500
0
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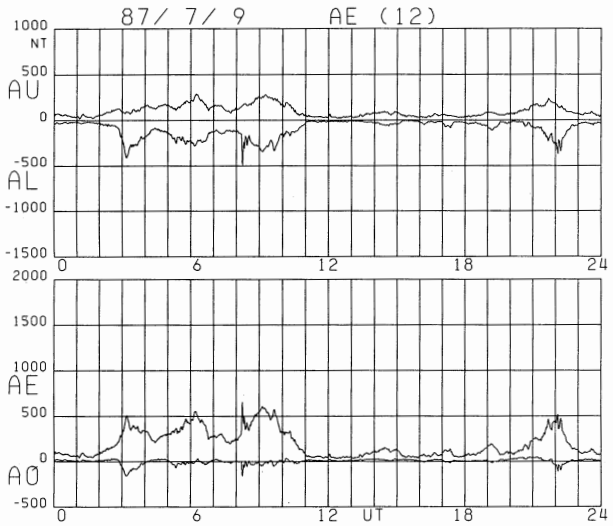
-500
0 6 12 UT 18 24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2000
1500
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AE
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AO
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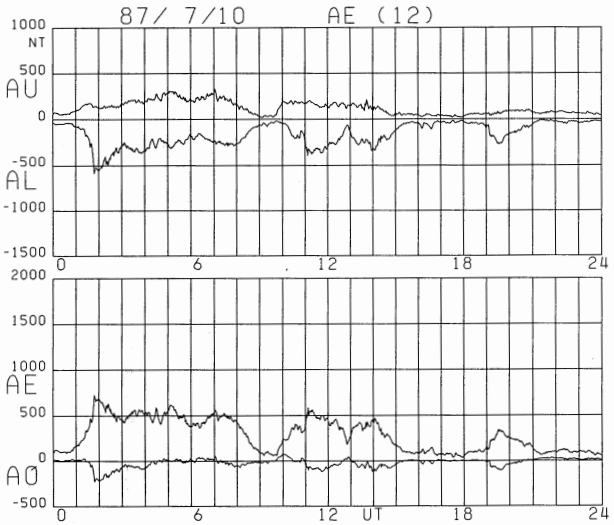
0 6 12 UT 18 24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2000
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AE
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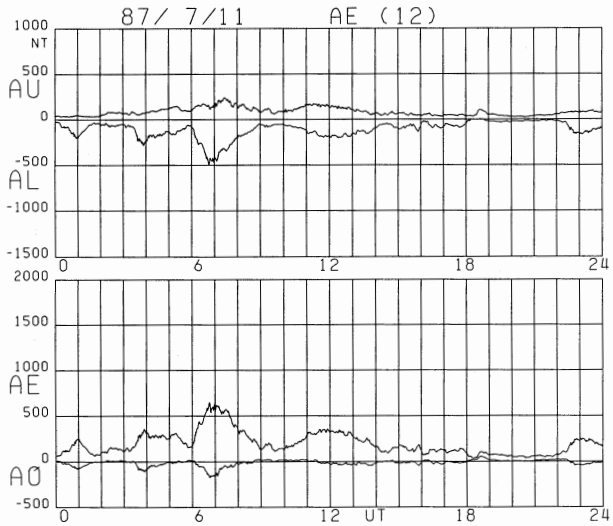
AO
-500
0 6 12 UT 18 24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AO
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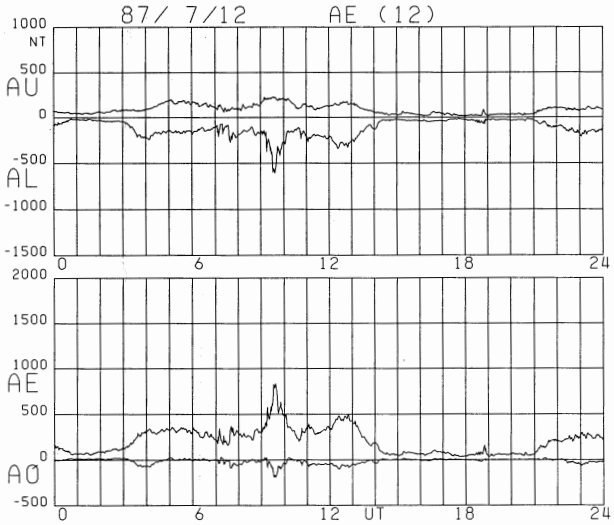
0 6 12 UT 18 24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AE
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AO
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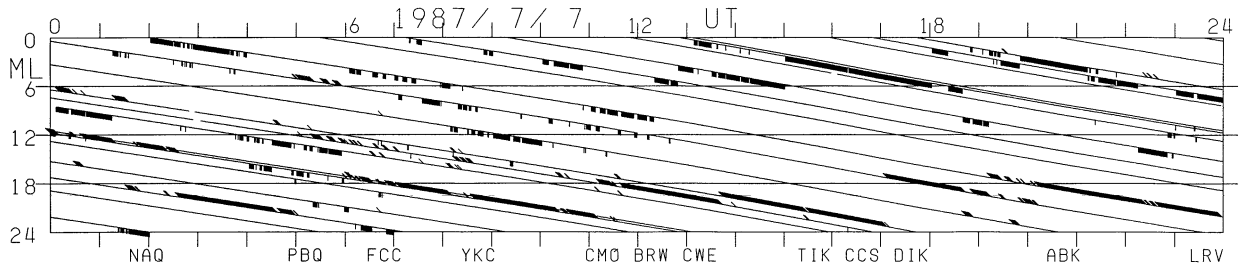
0 6 12 UT 18 24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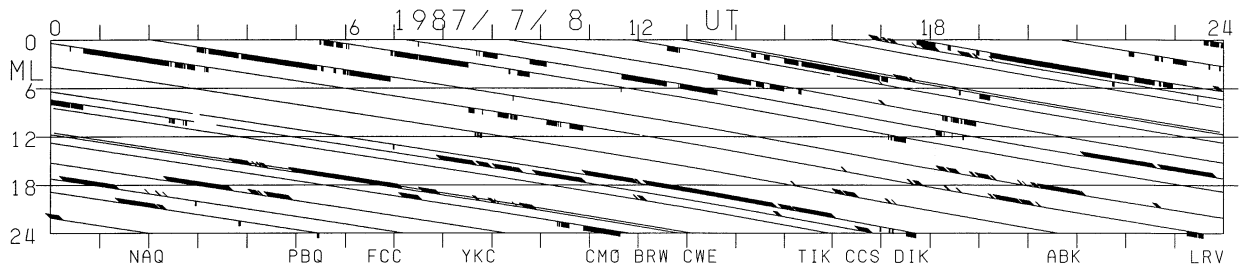
PBQ
FCC
YKC
CMO
BRW
CWE
TIK
CCS
DIK
ABK
LRV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PBQ
FCC
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CMO
BRW
CWE
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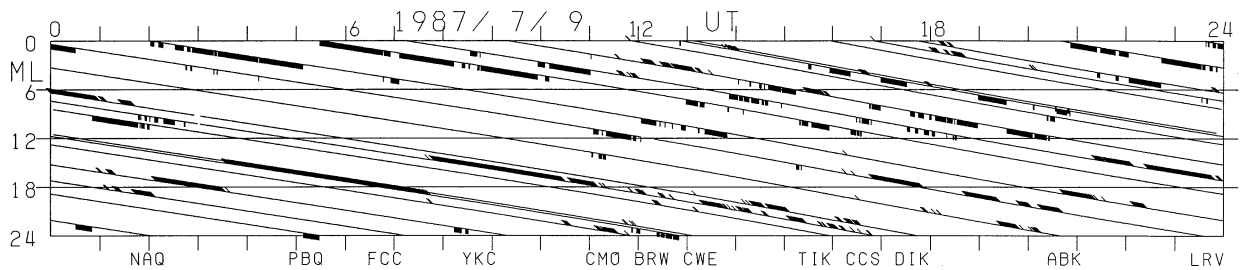
CCS
DIK
ABK
LRV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UT
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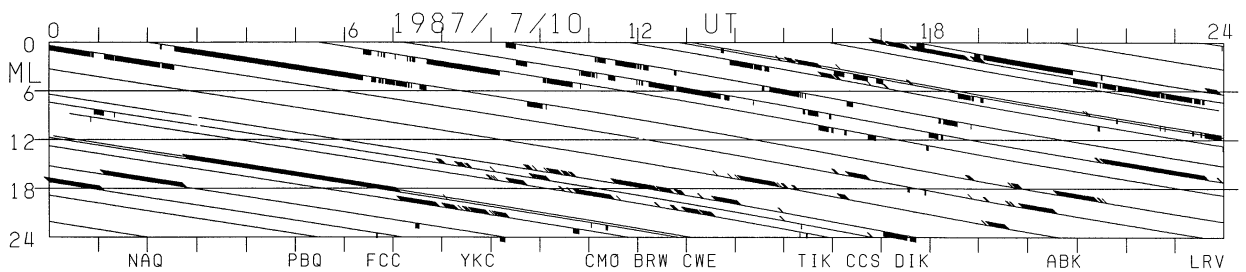
DIK
ABK
LRV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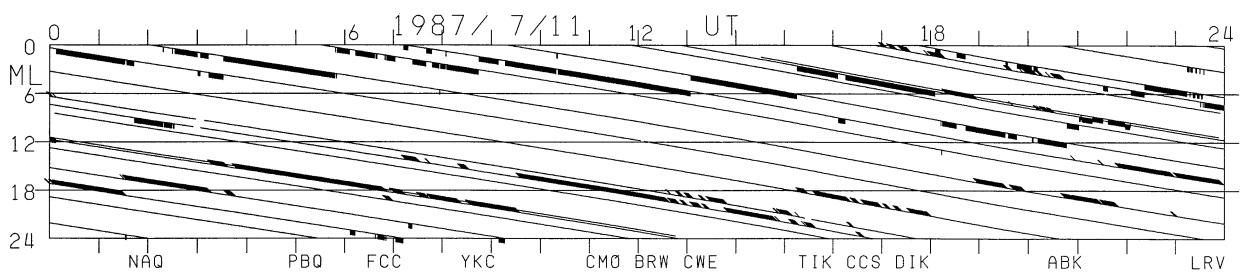
ABK
LRV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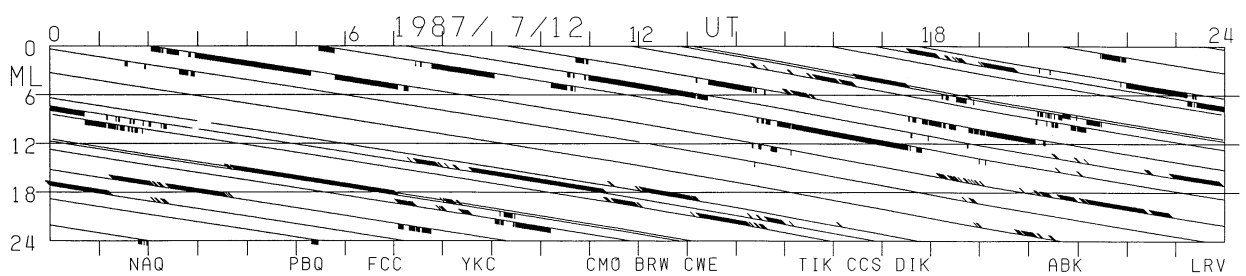
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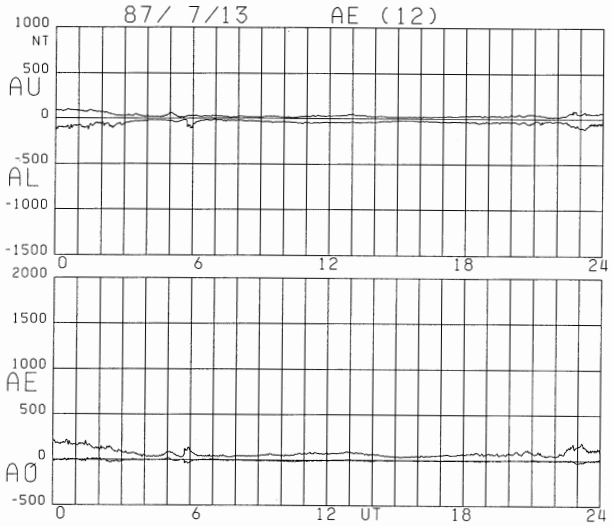
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AE
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AO
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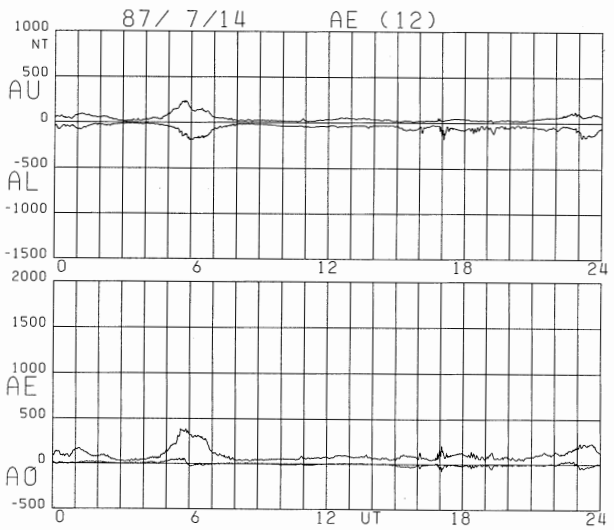
0 6 12 UT 18 24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2000
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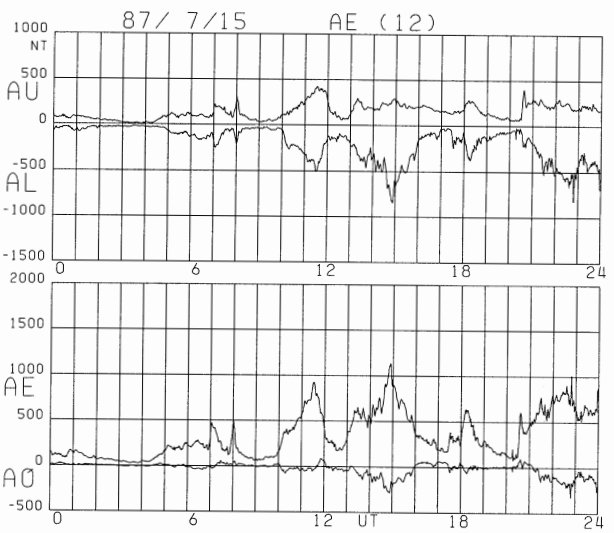
AE
500
0
AO
-500
0 6 12 UT 18 24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NT
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AU
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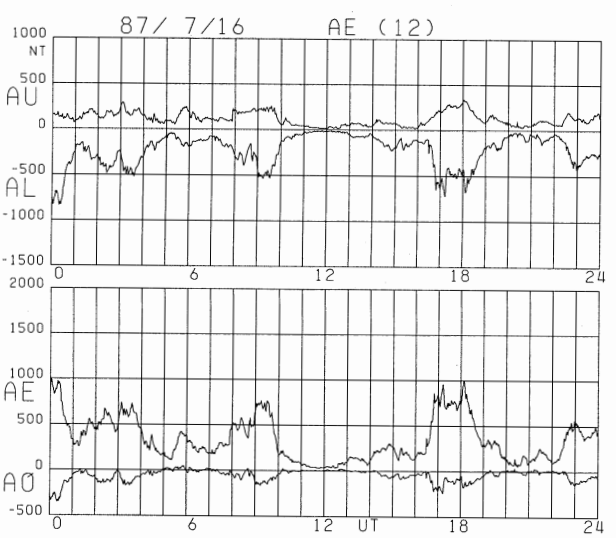
AE
500
0
AO
-500
0 6 12 UT 18 24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AO
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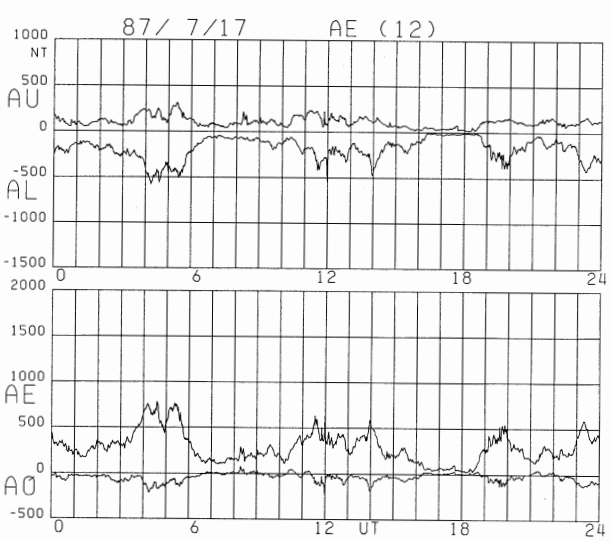
0 6 12 UT 18 24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AE
500
0
AO
-500
0 6 12 UT 18 24


87/ 7/18 AE (12)
1000
NT
500
AU
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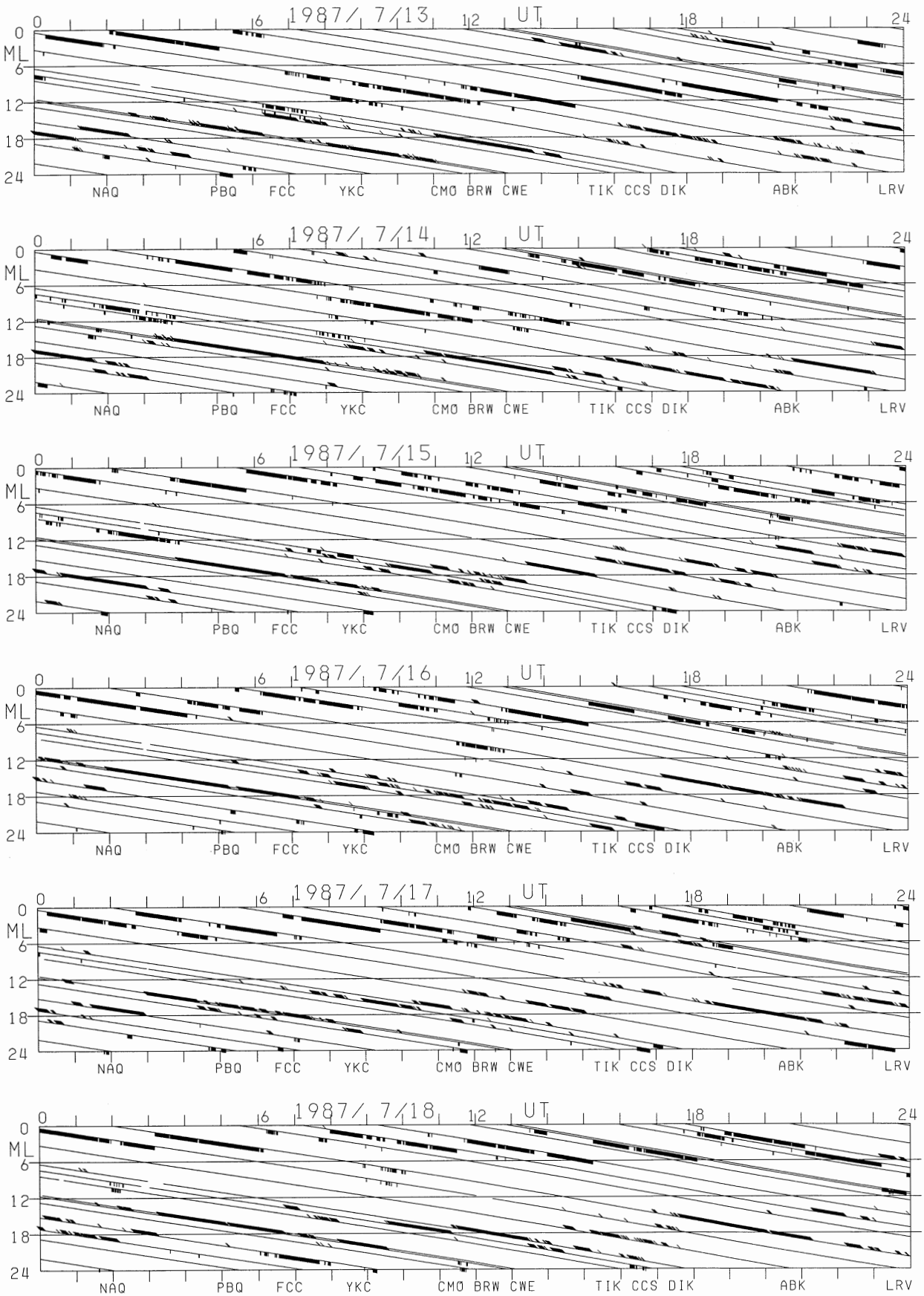
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1987/ 7/14 UT
1987/ 7/15 UT
1987/ 7/16 UT
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1987/ 7/18 UT
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18
24
ML
NAQ
PBQ
FCC
YKC
CMO
BRW
CWE
TIK
CCS
DIK
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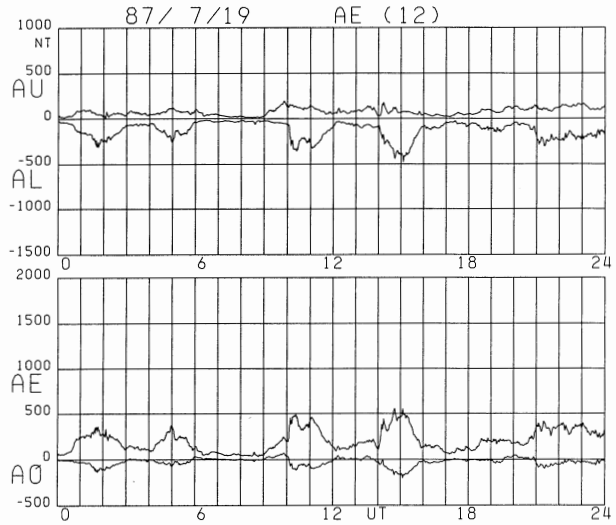
LRV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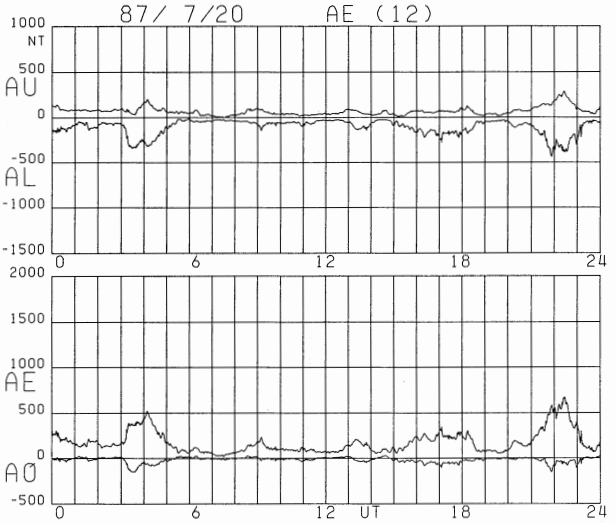
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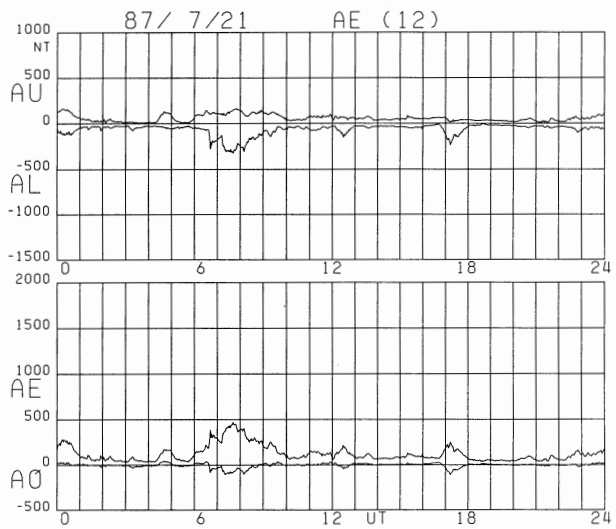
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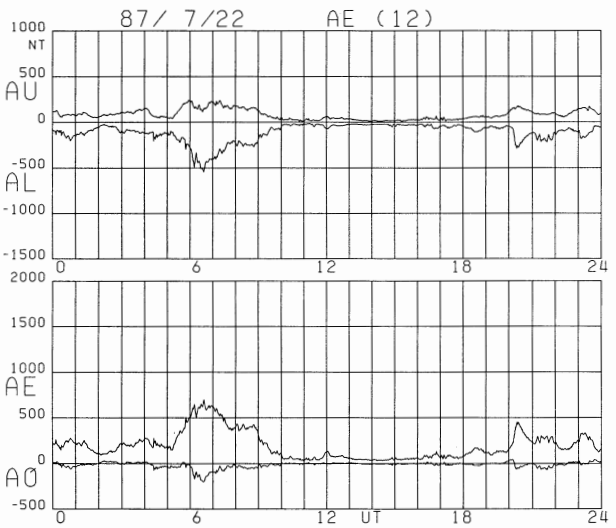
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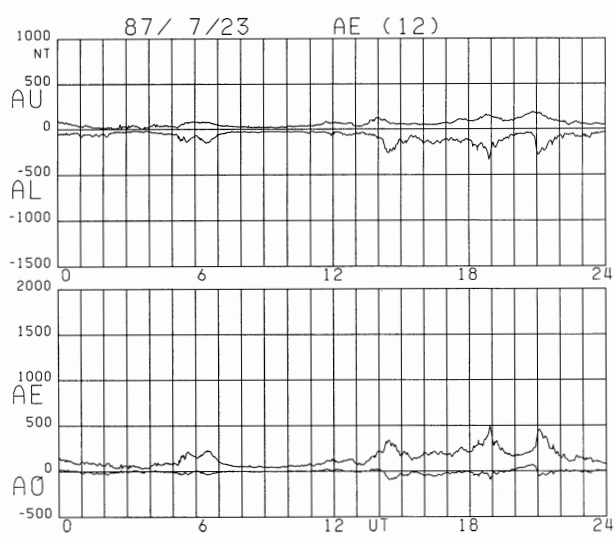
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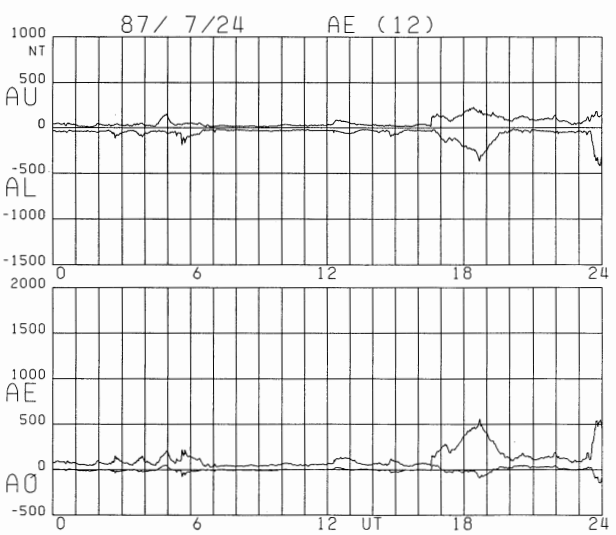
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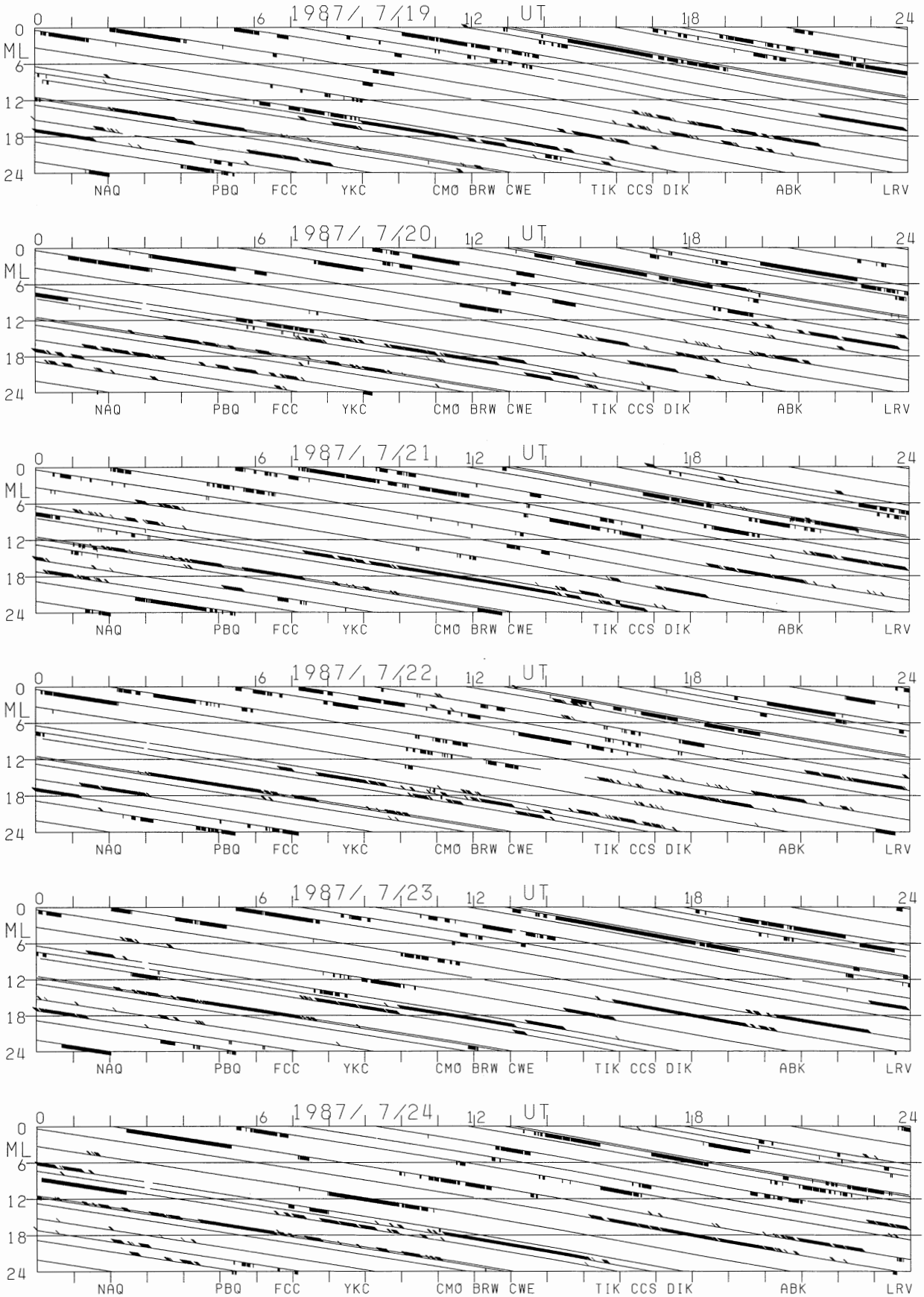
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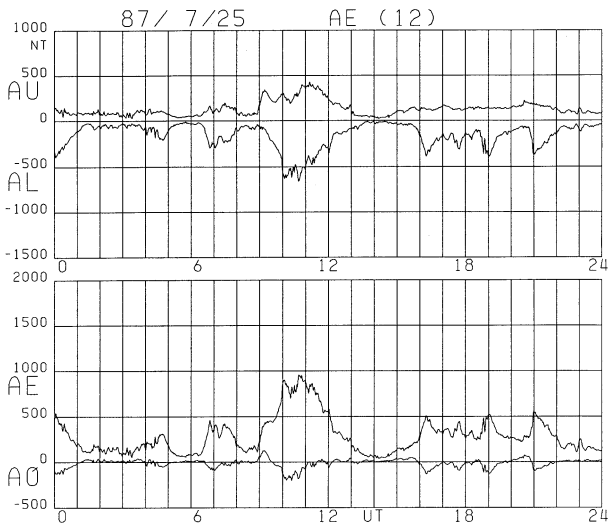
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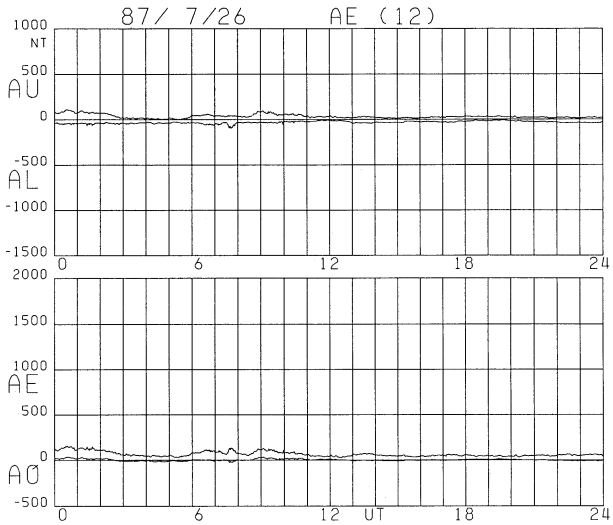
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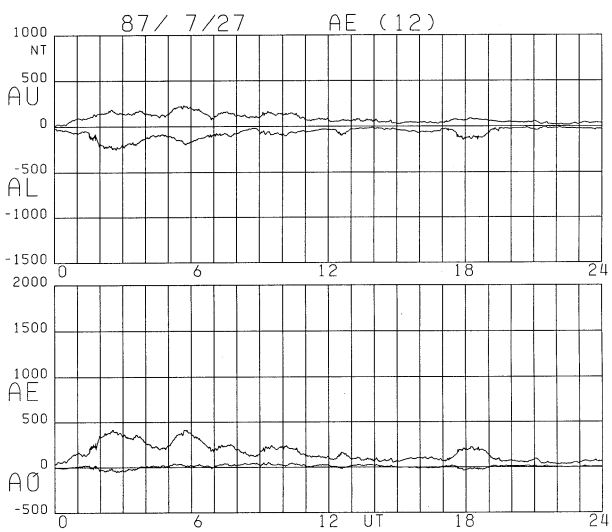
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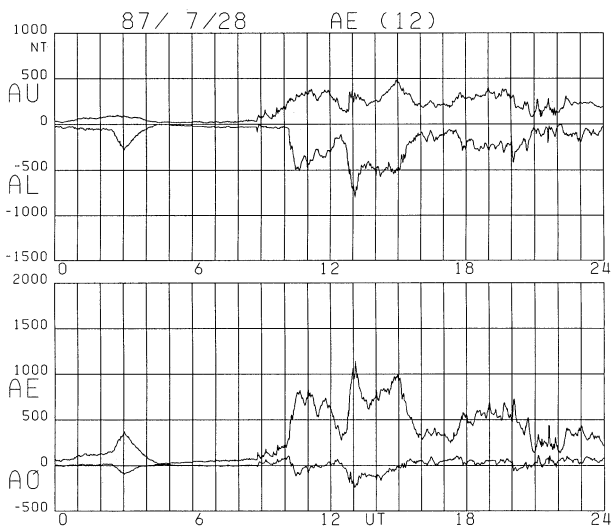
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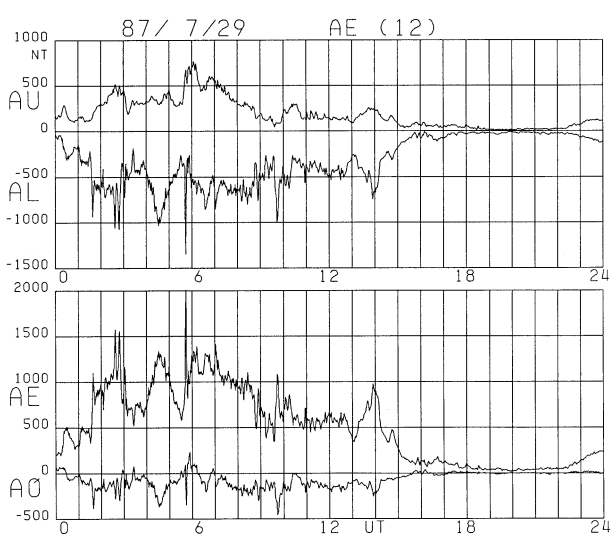
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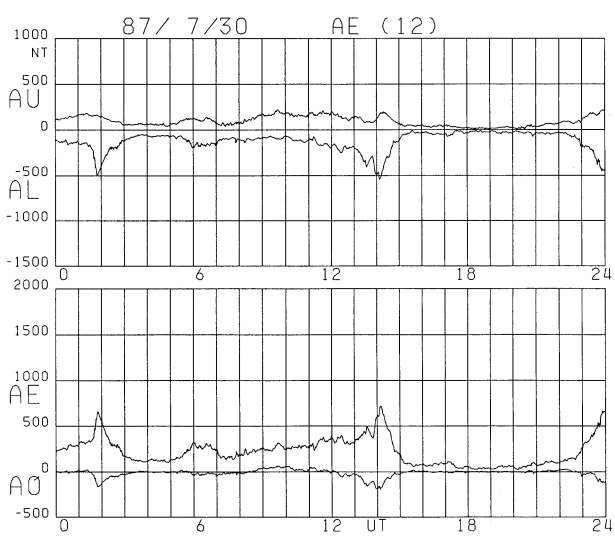
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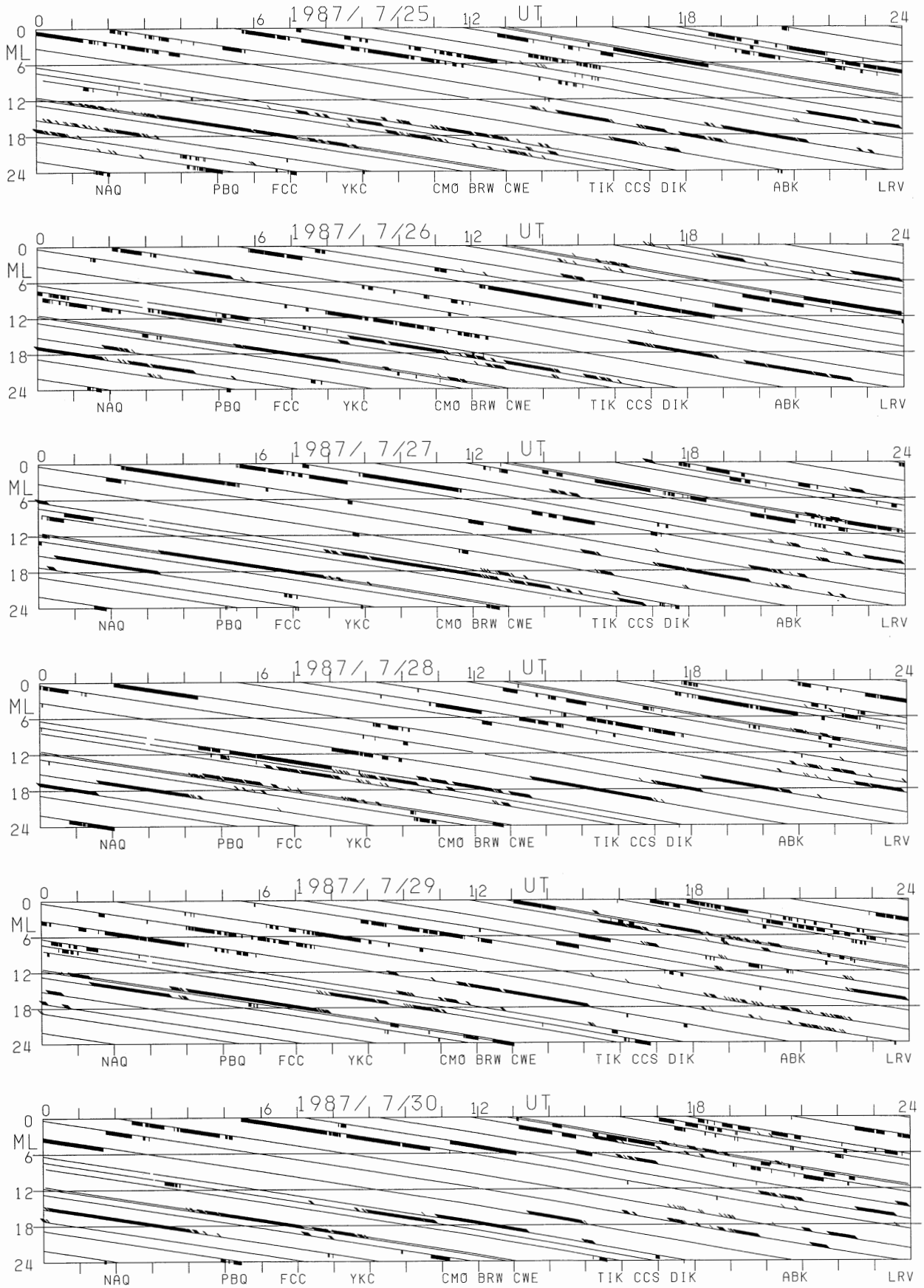
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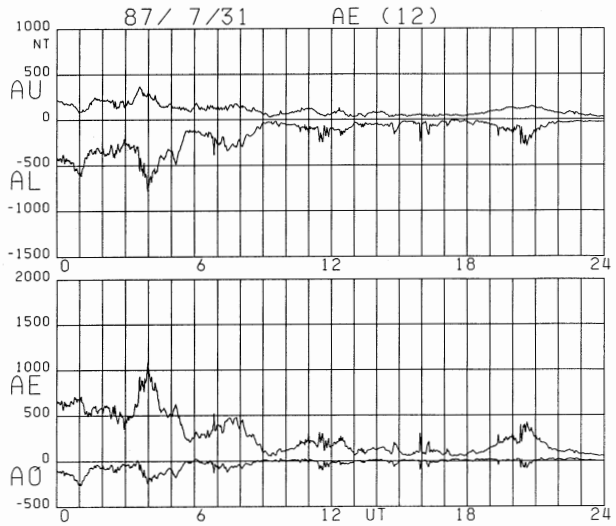
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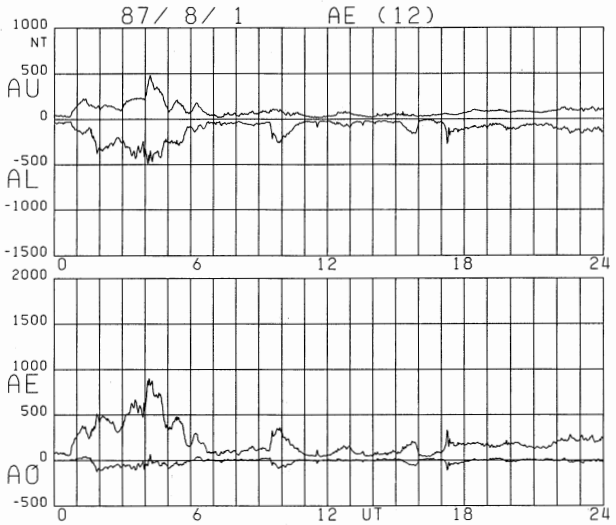
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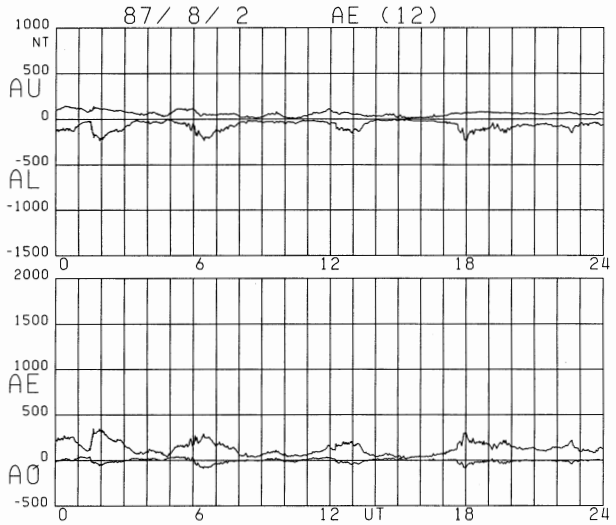
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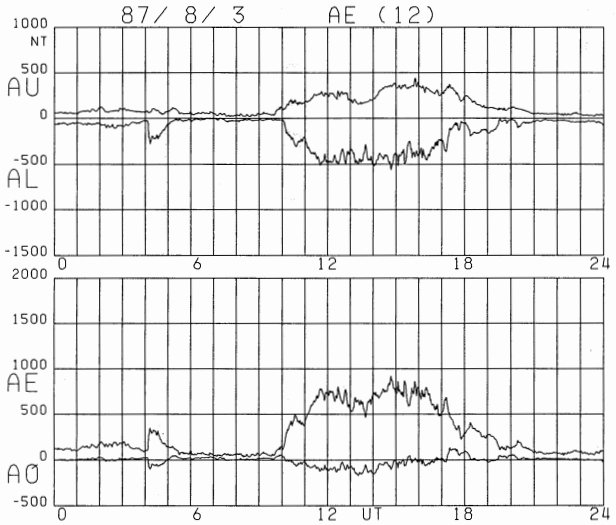
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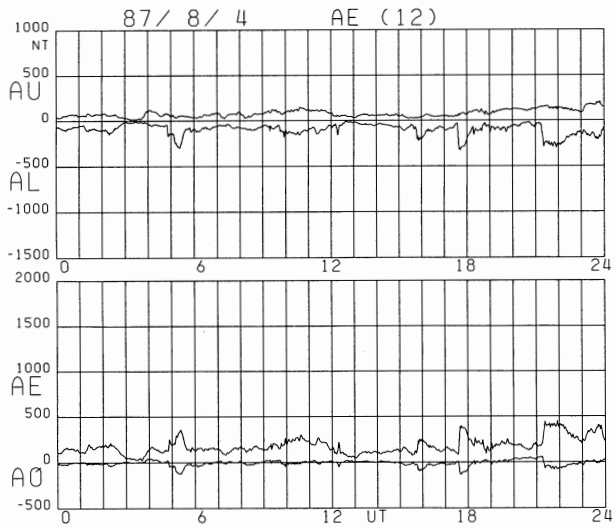
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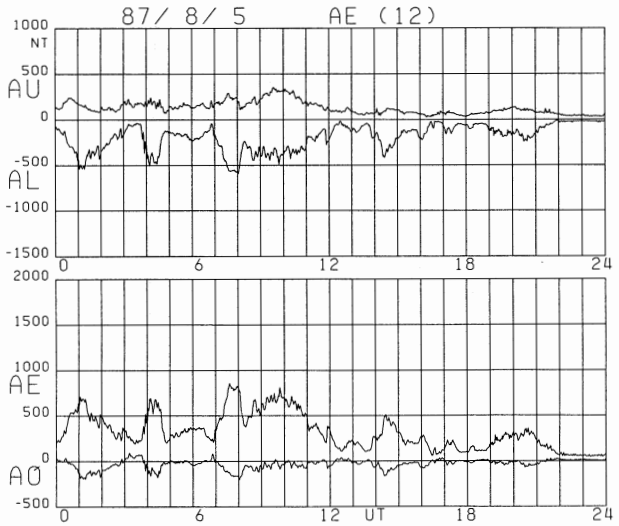
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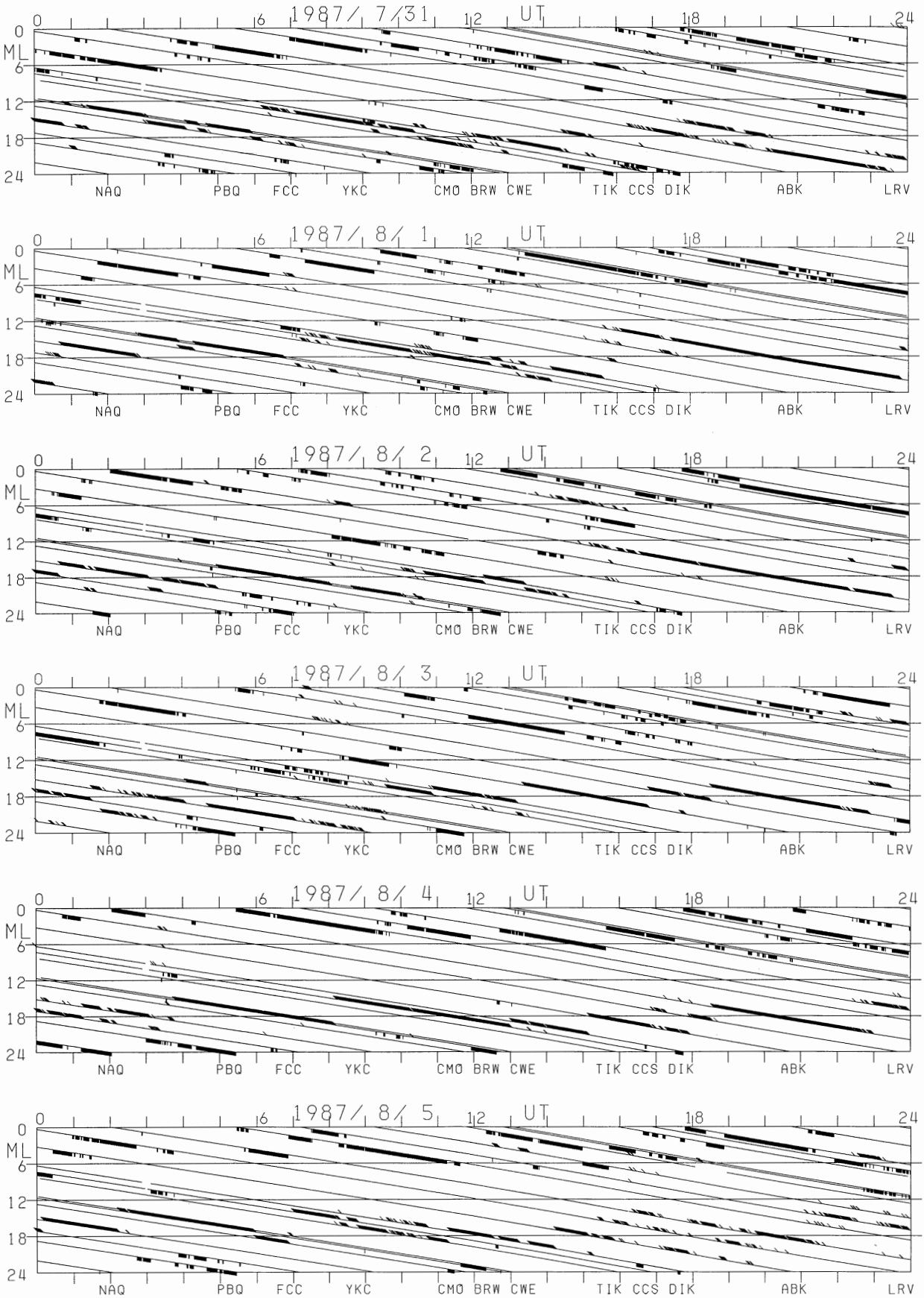
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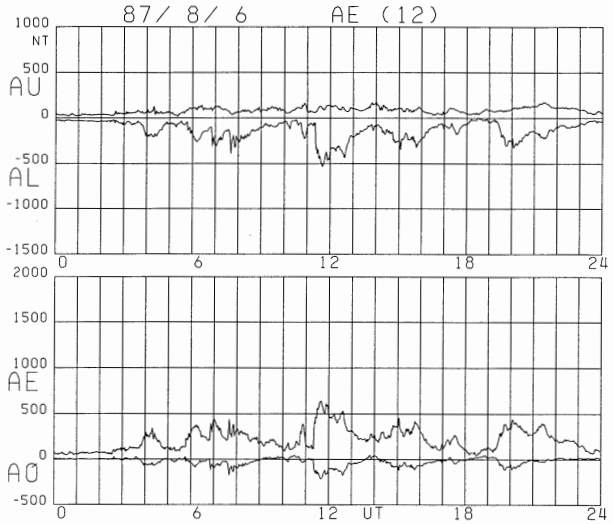
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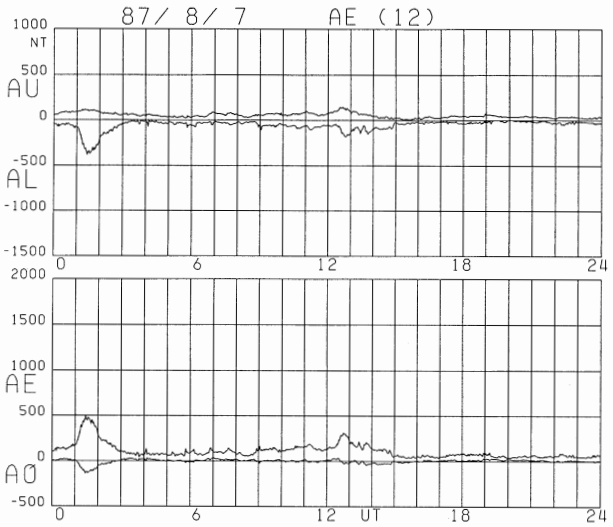
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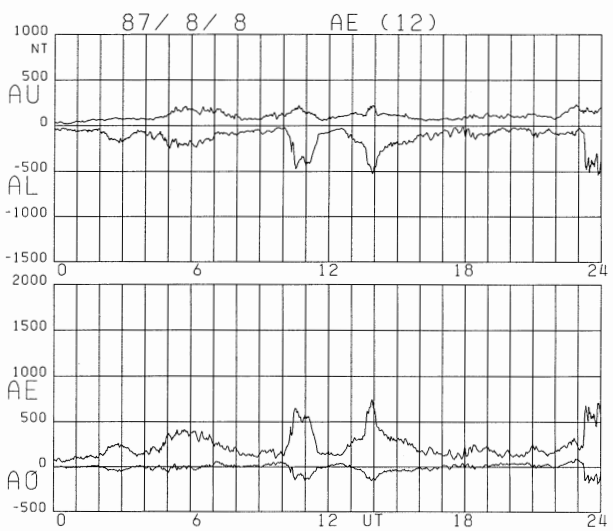
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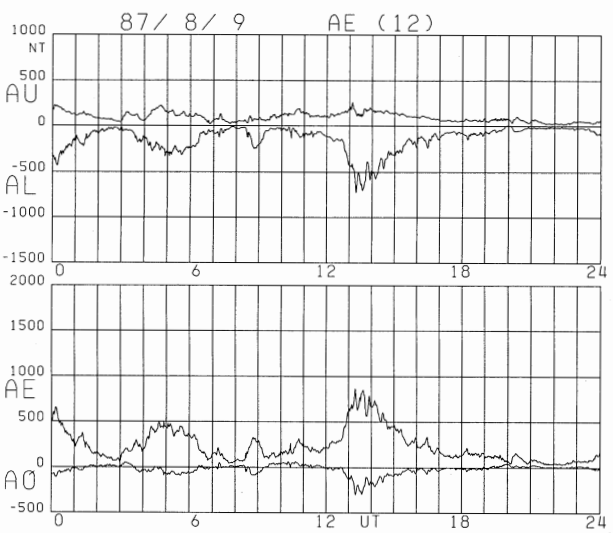
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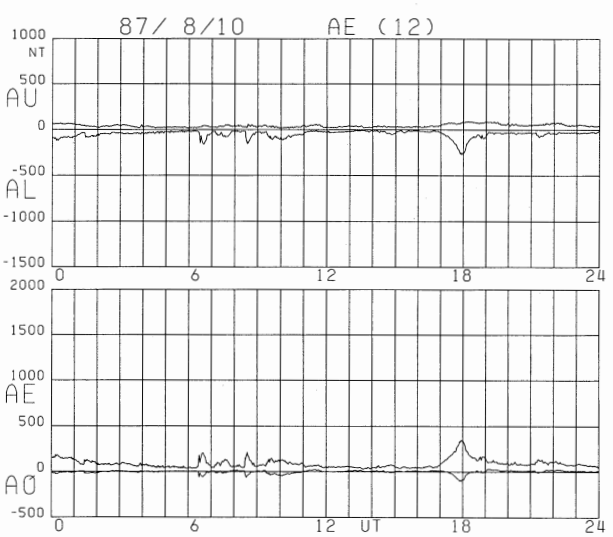
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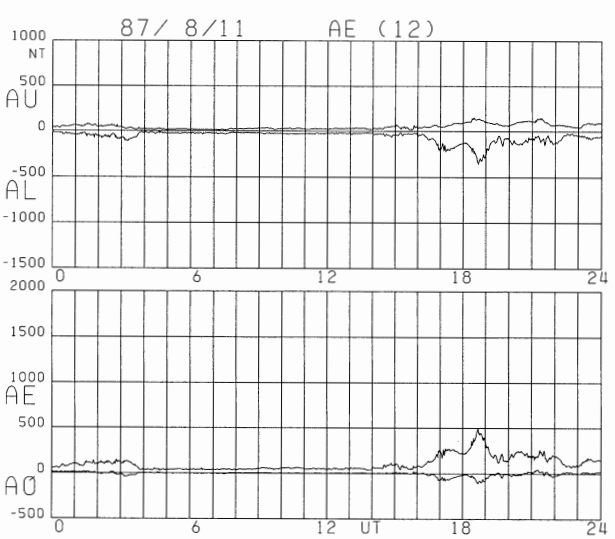
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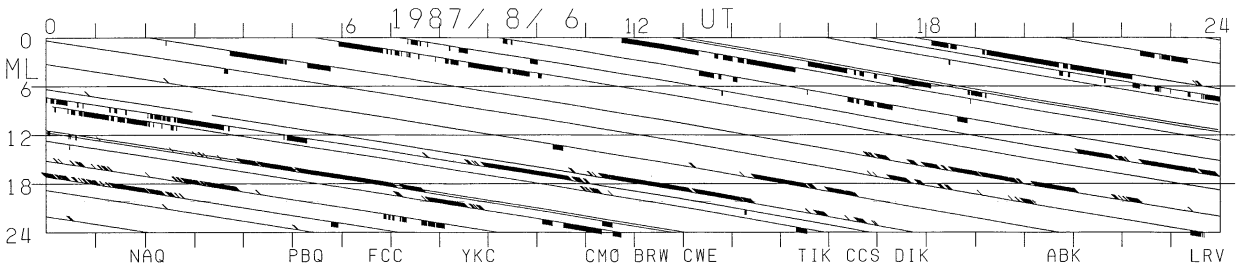
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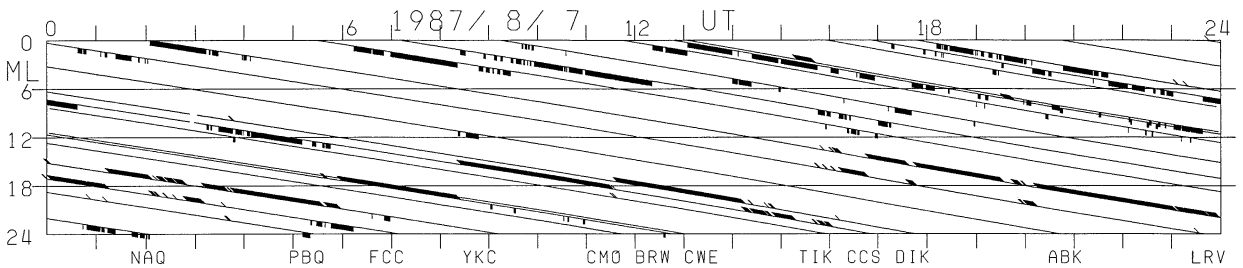
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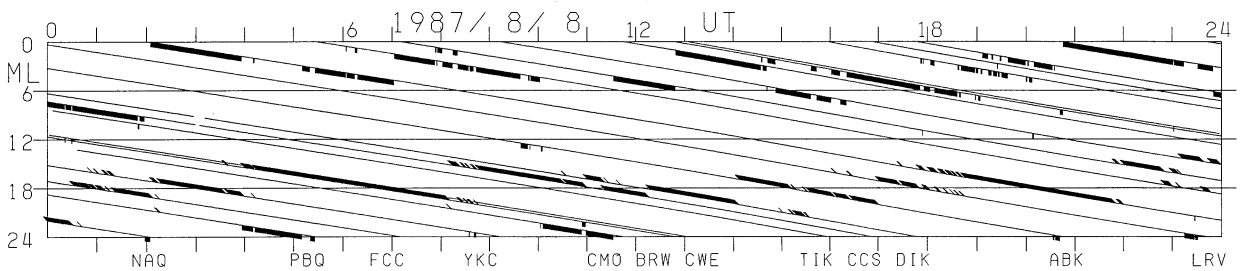
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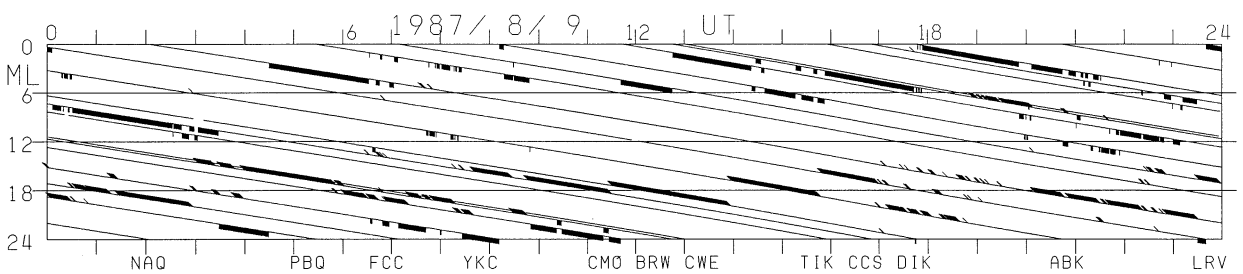
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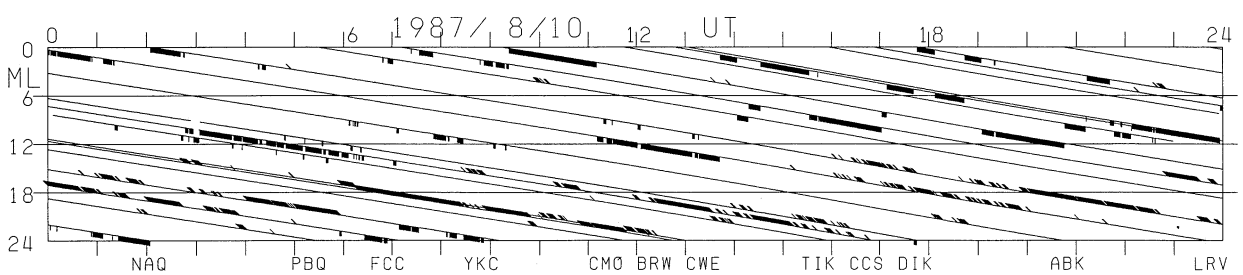
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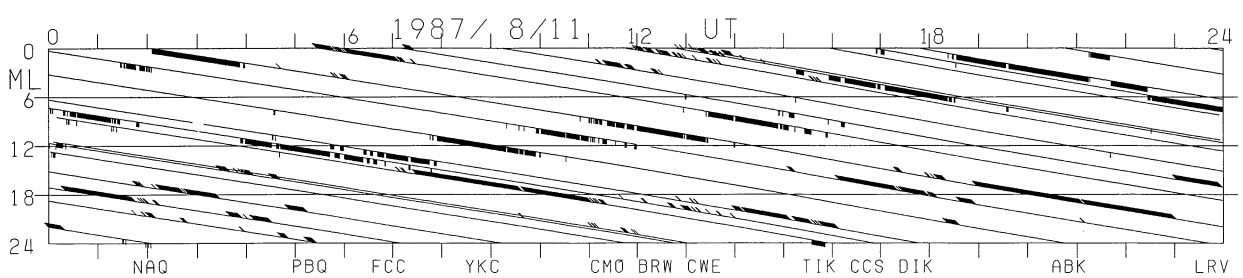
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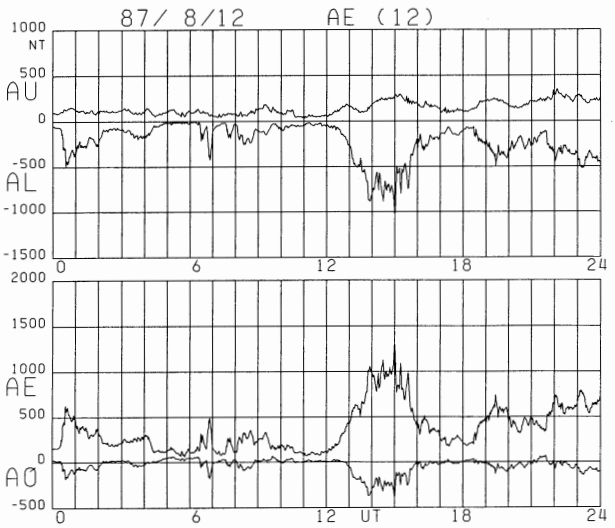
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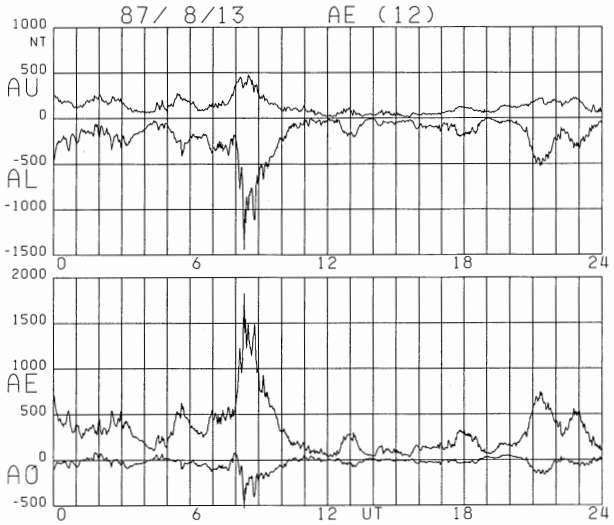
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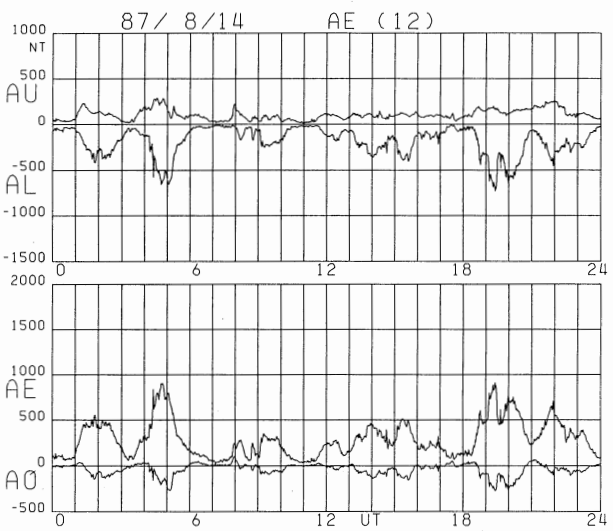
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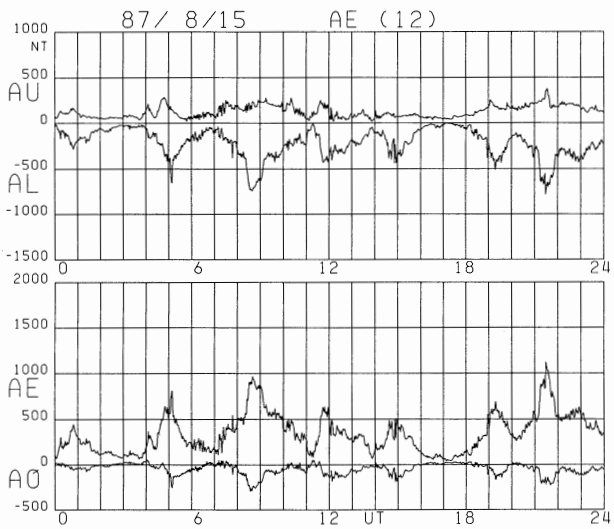
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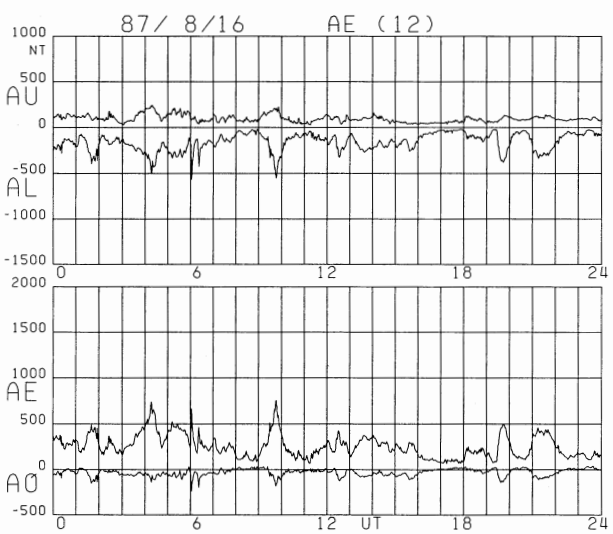
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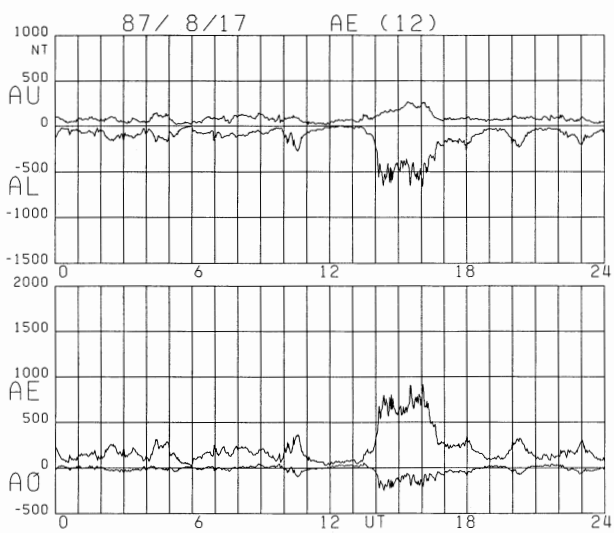
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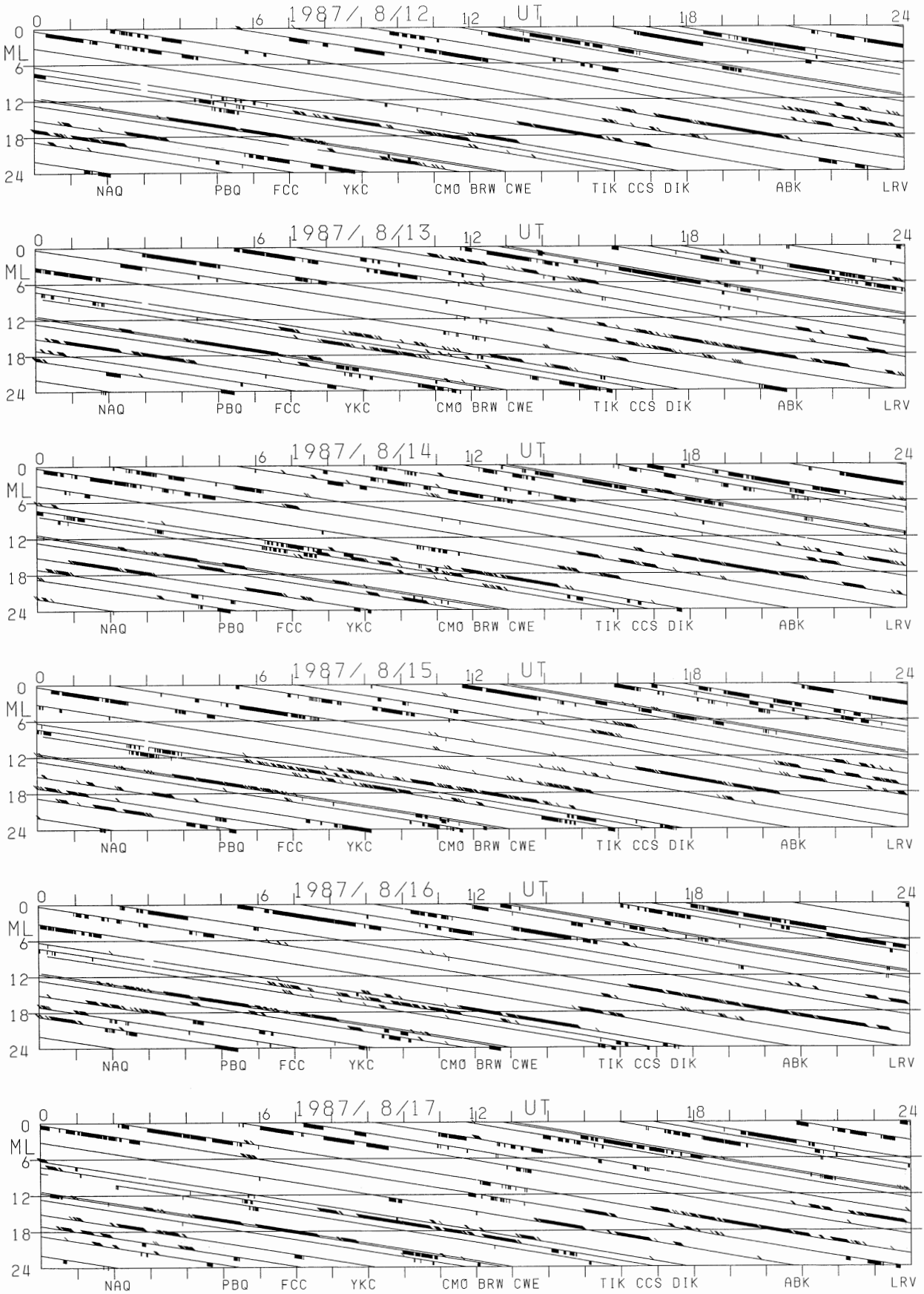
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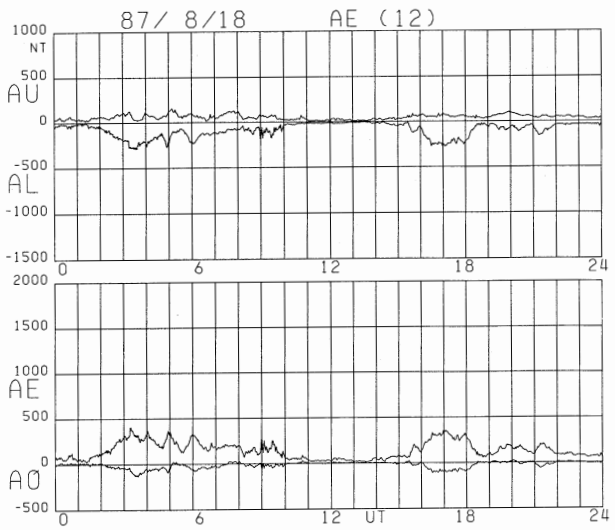
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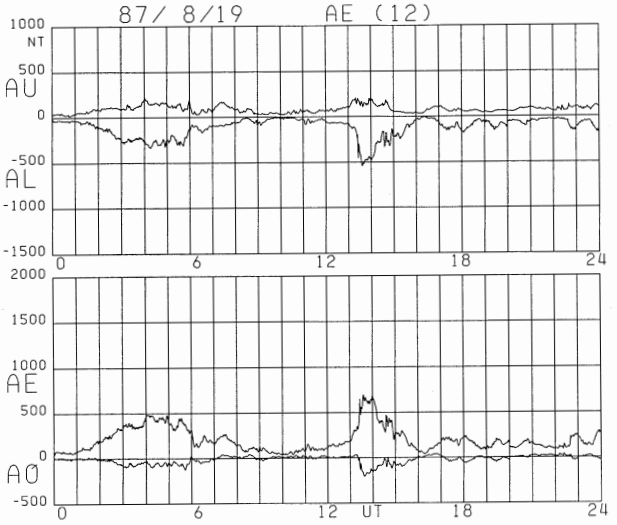
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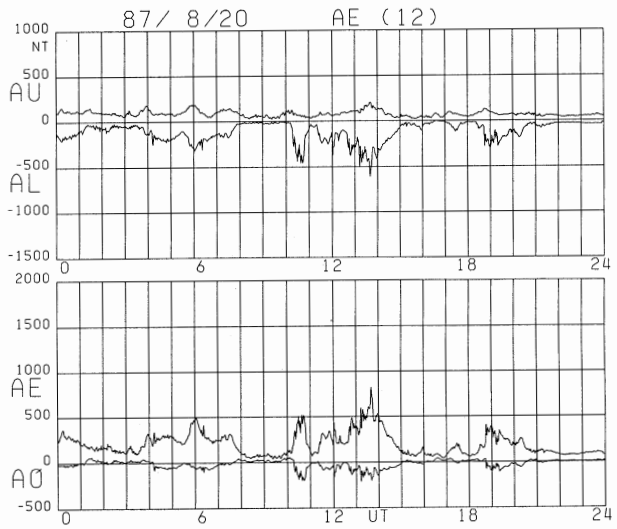
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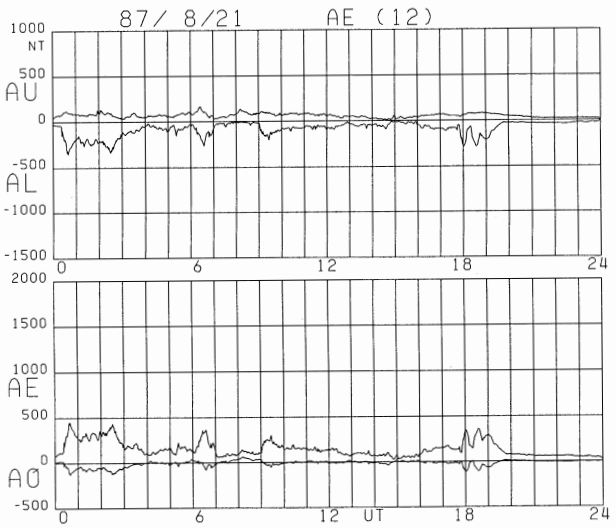
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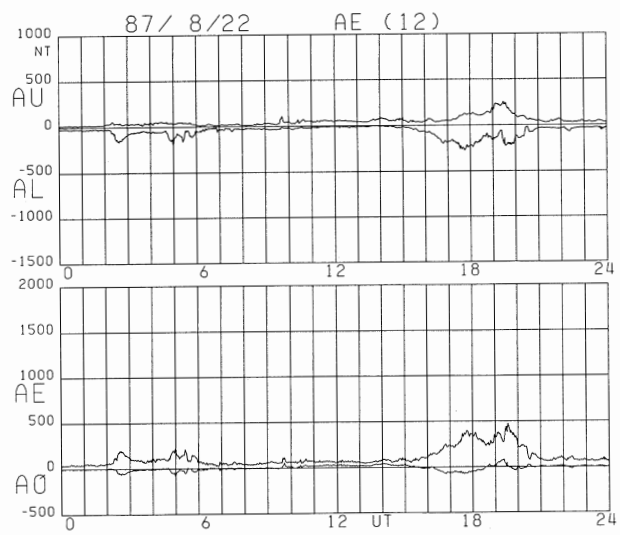
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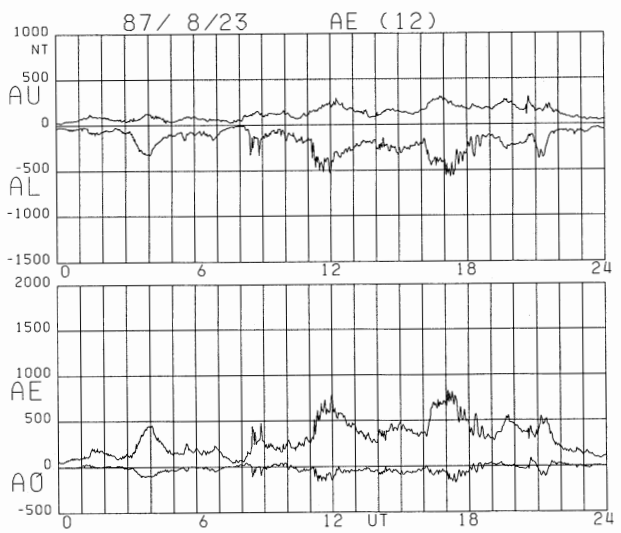
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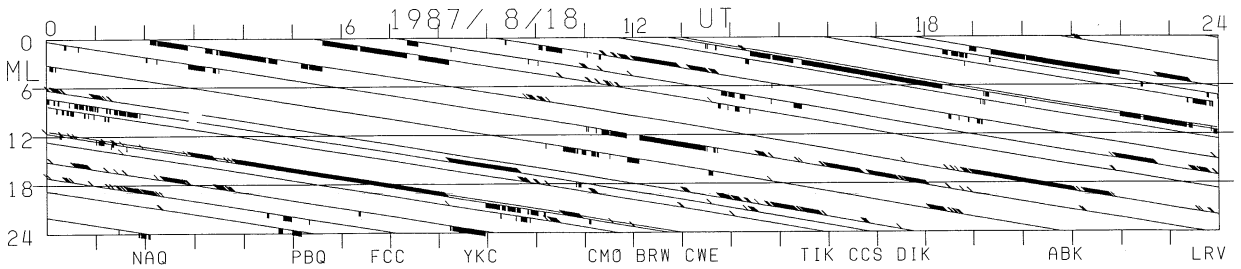
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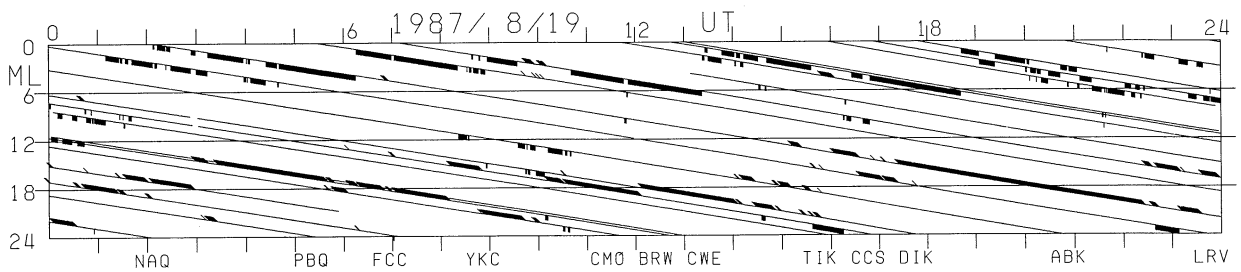
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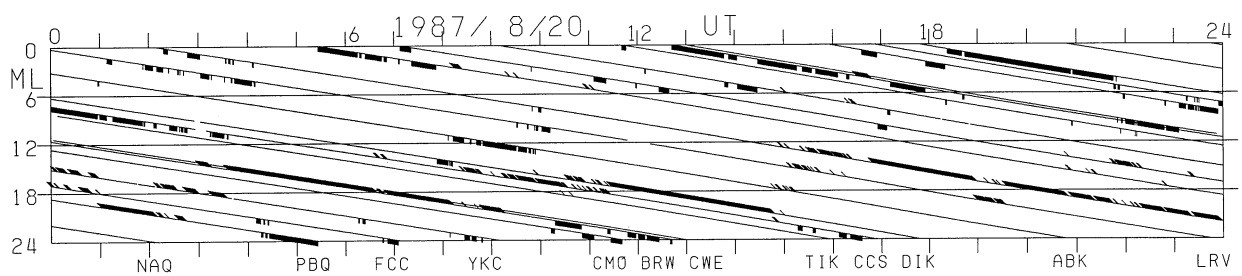
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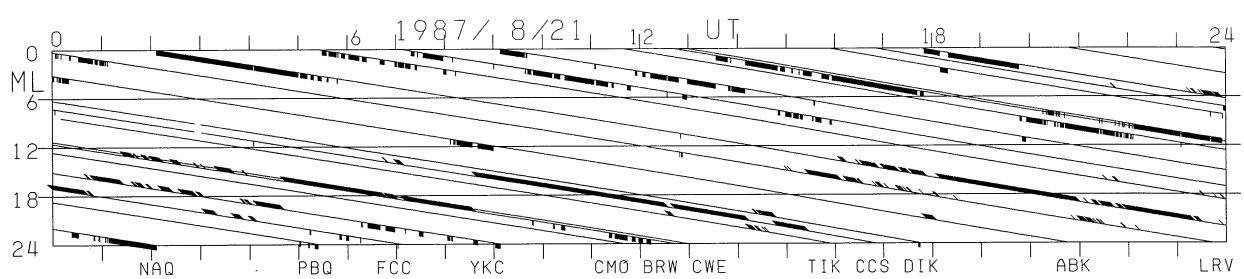
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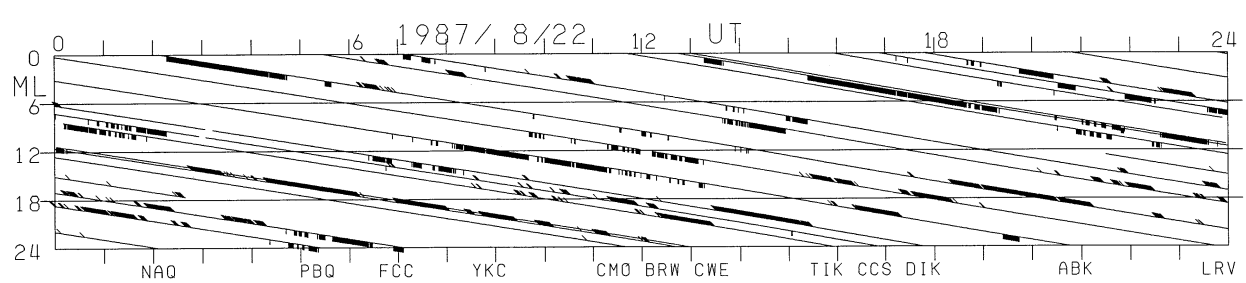
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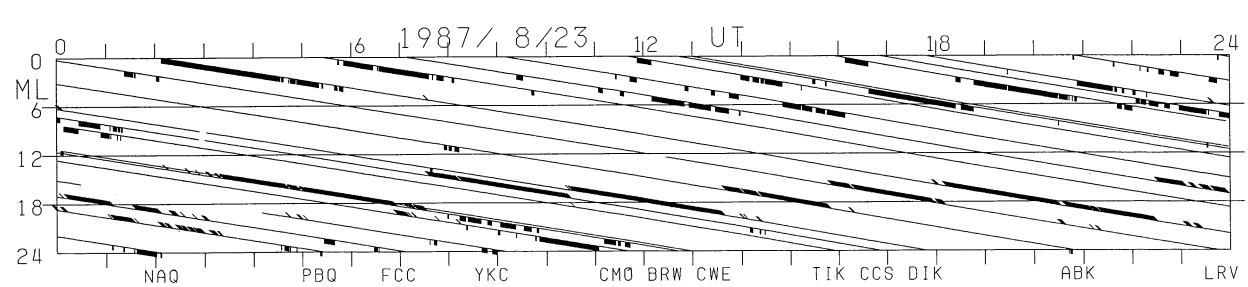
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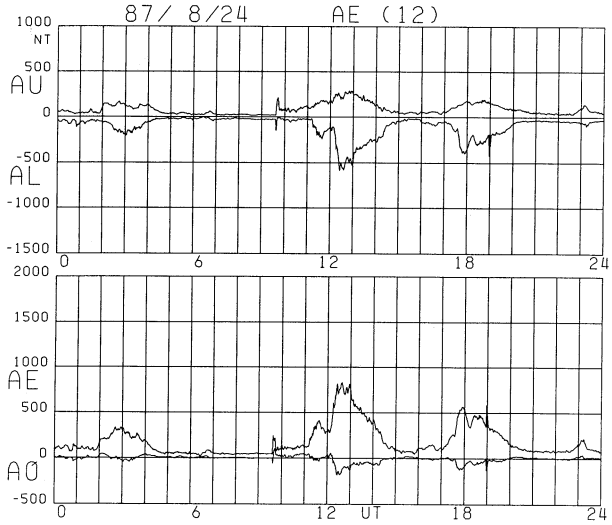
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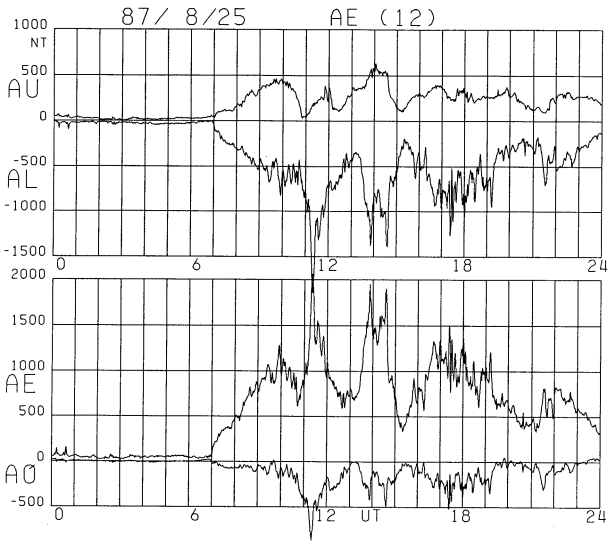
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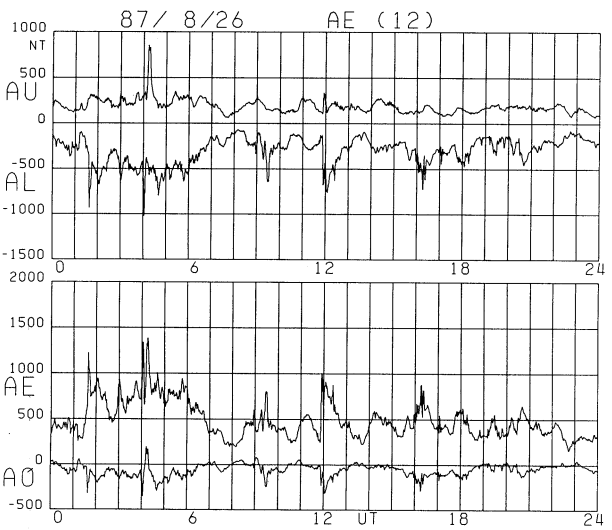
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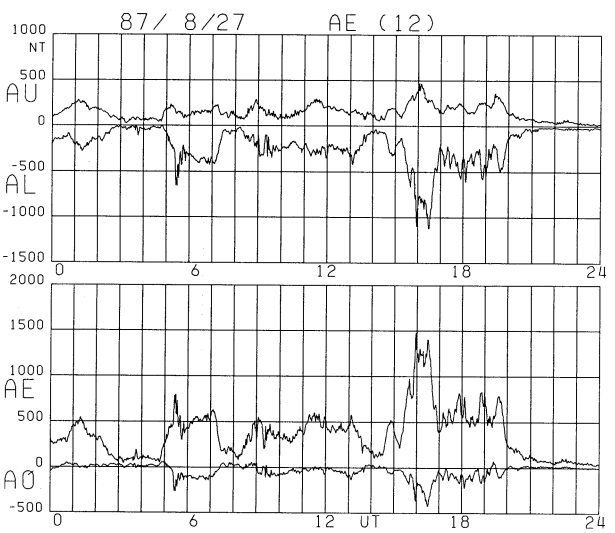
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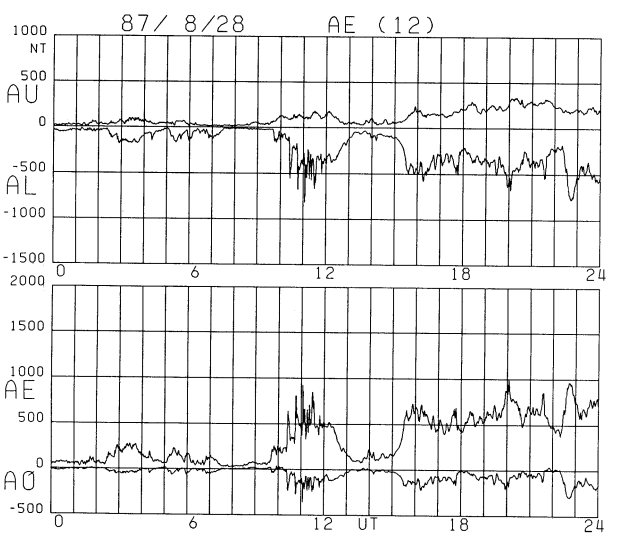
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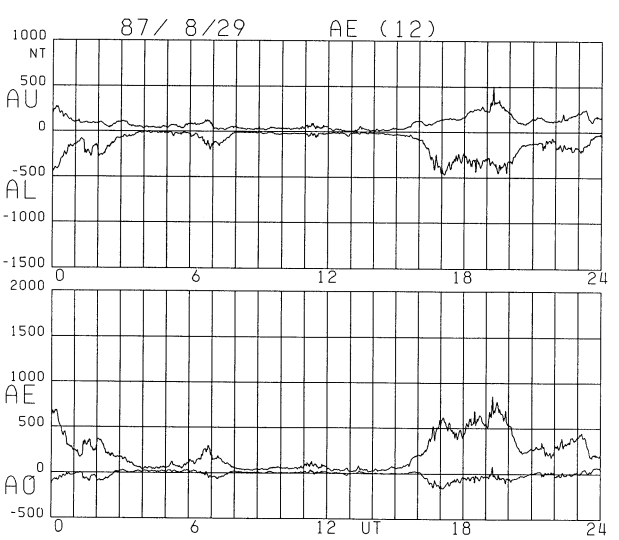
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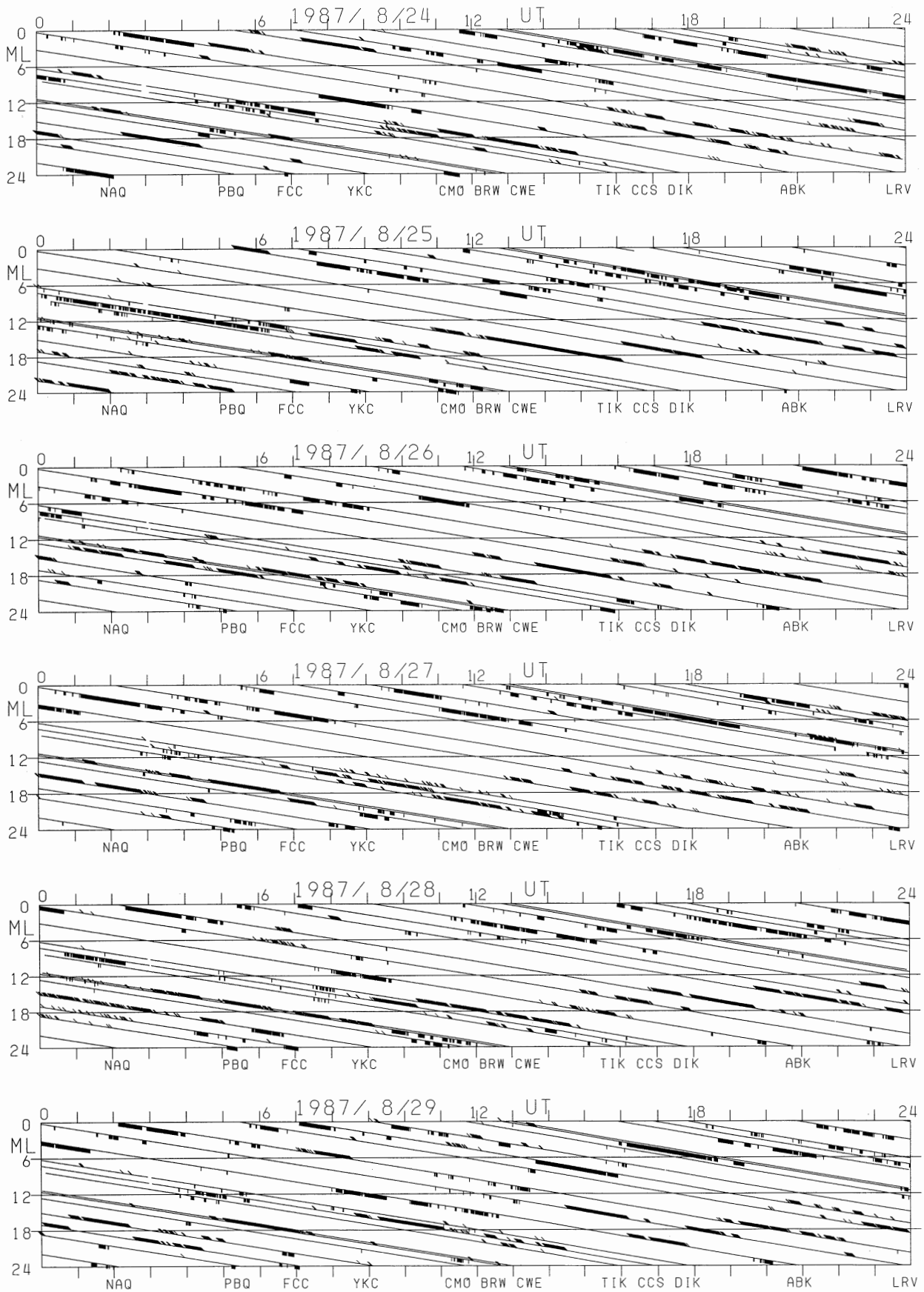
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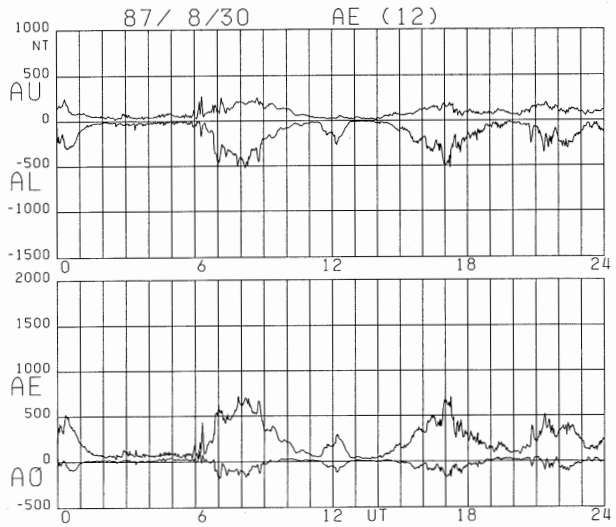
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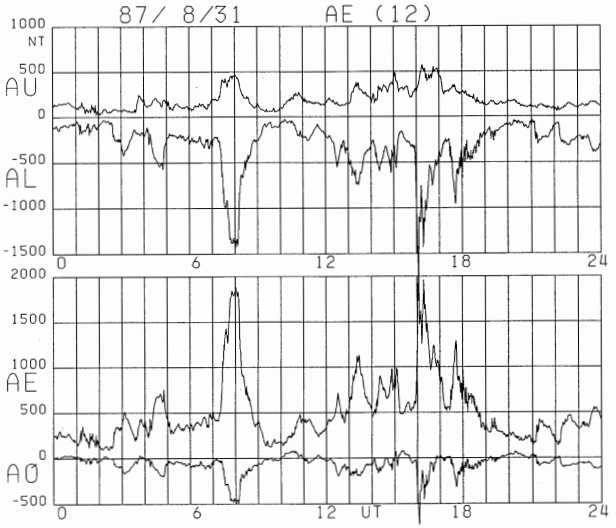
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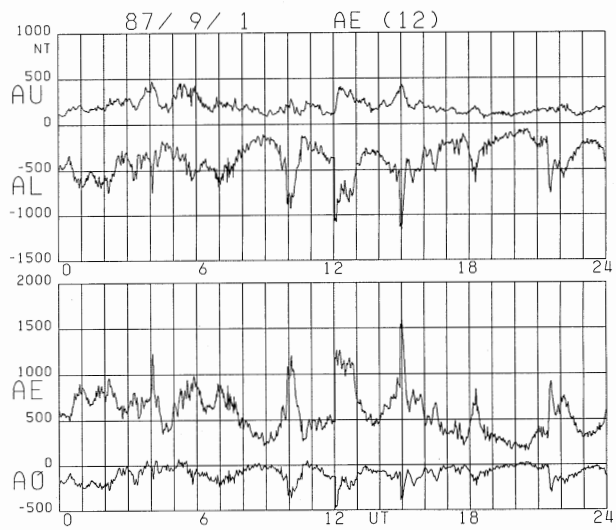
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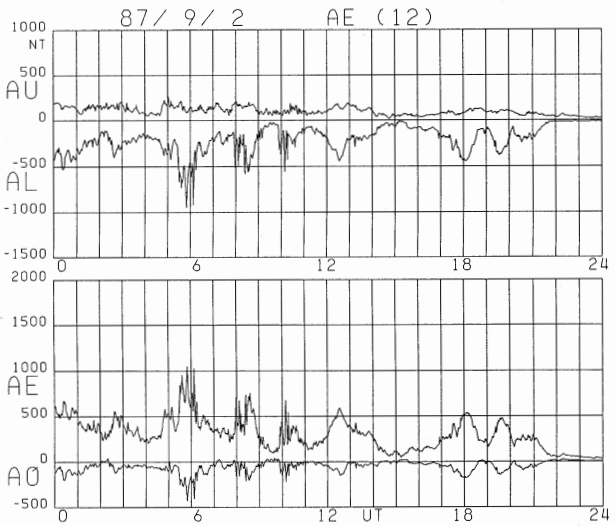
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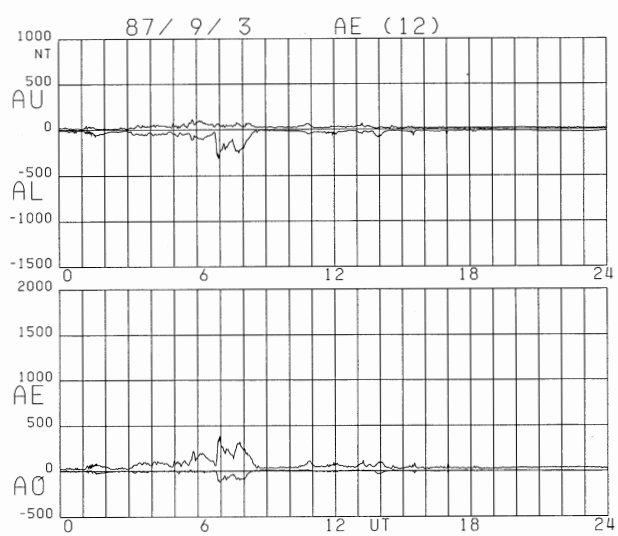
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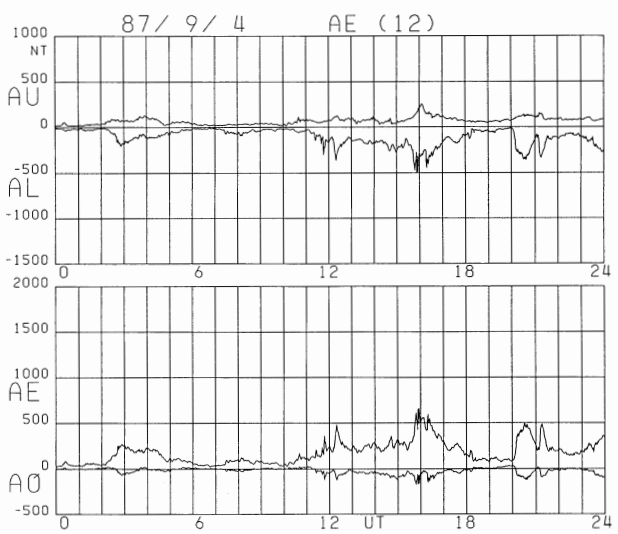
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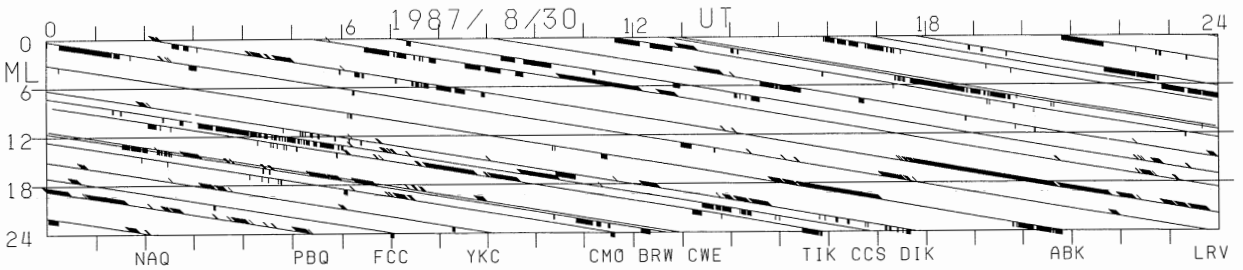
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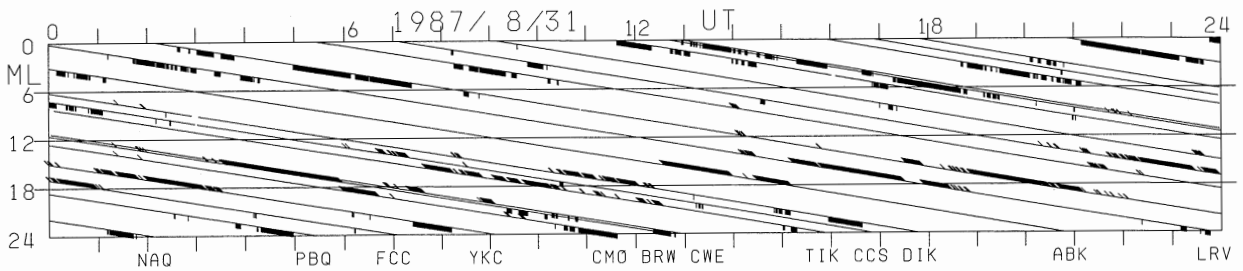
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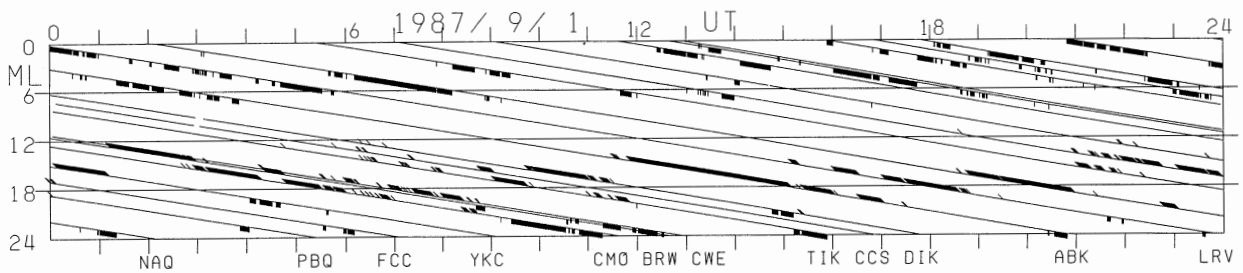
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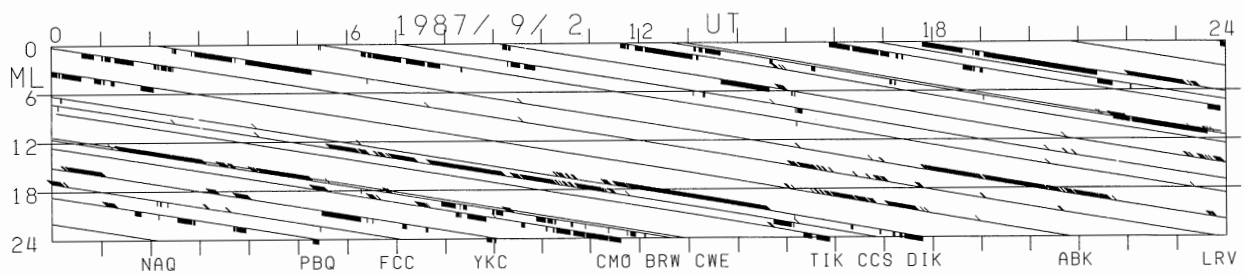
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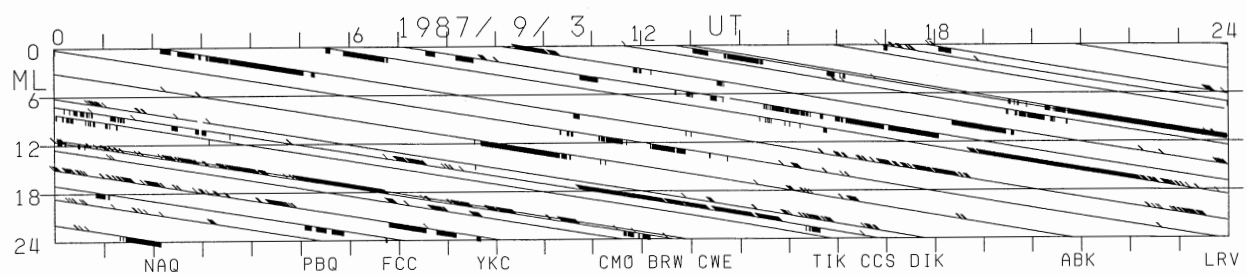
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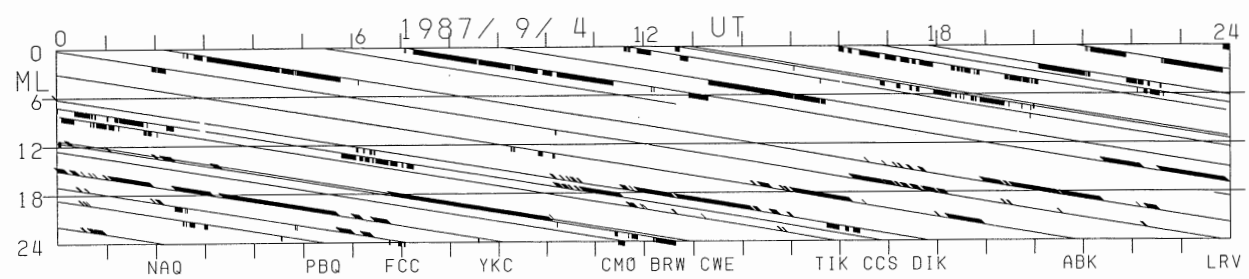
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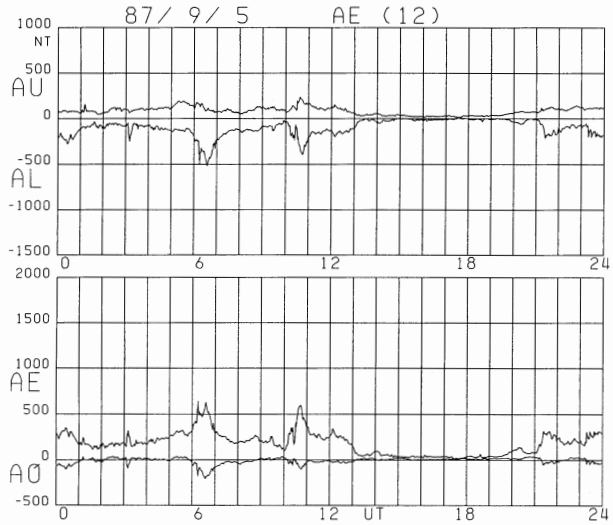
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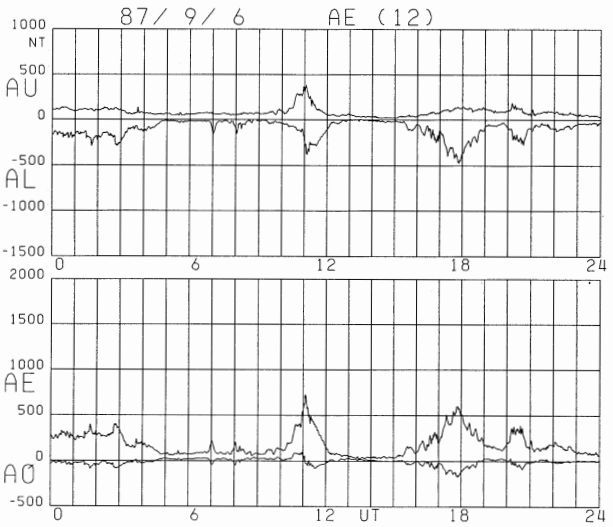
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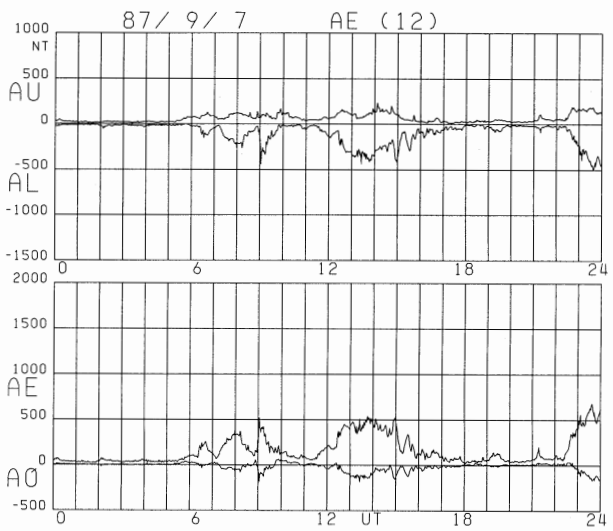
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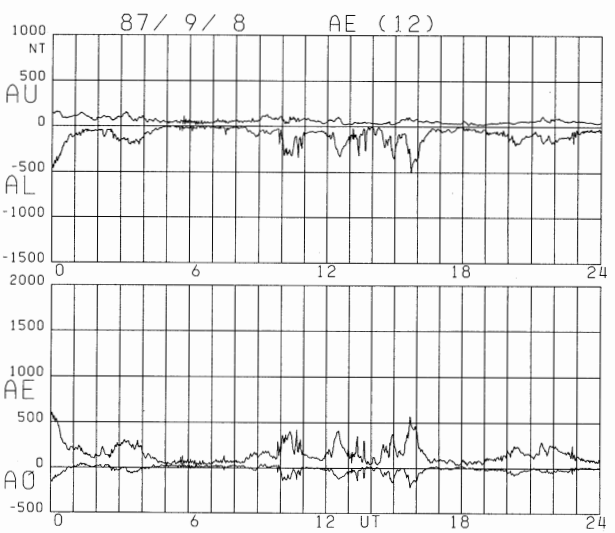
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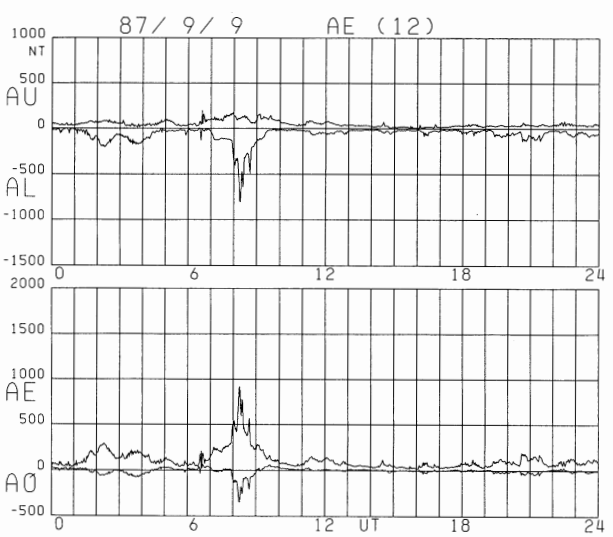
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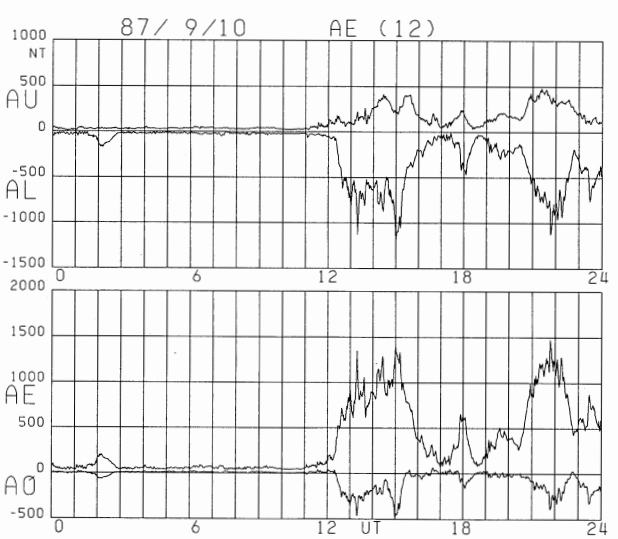
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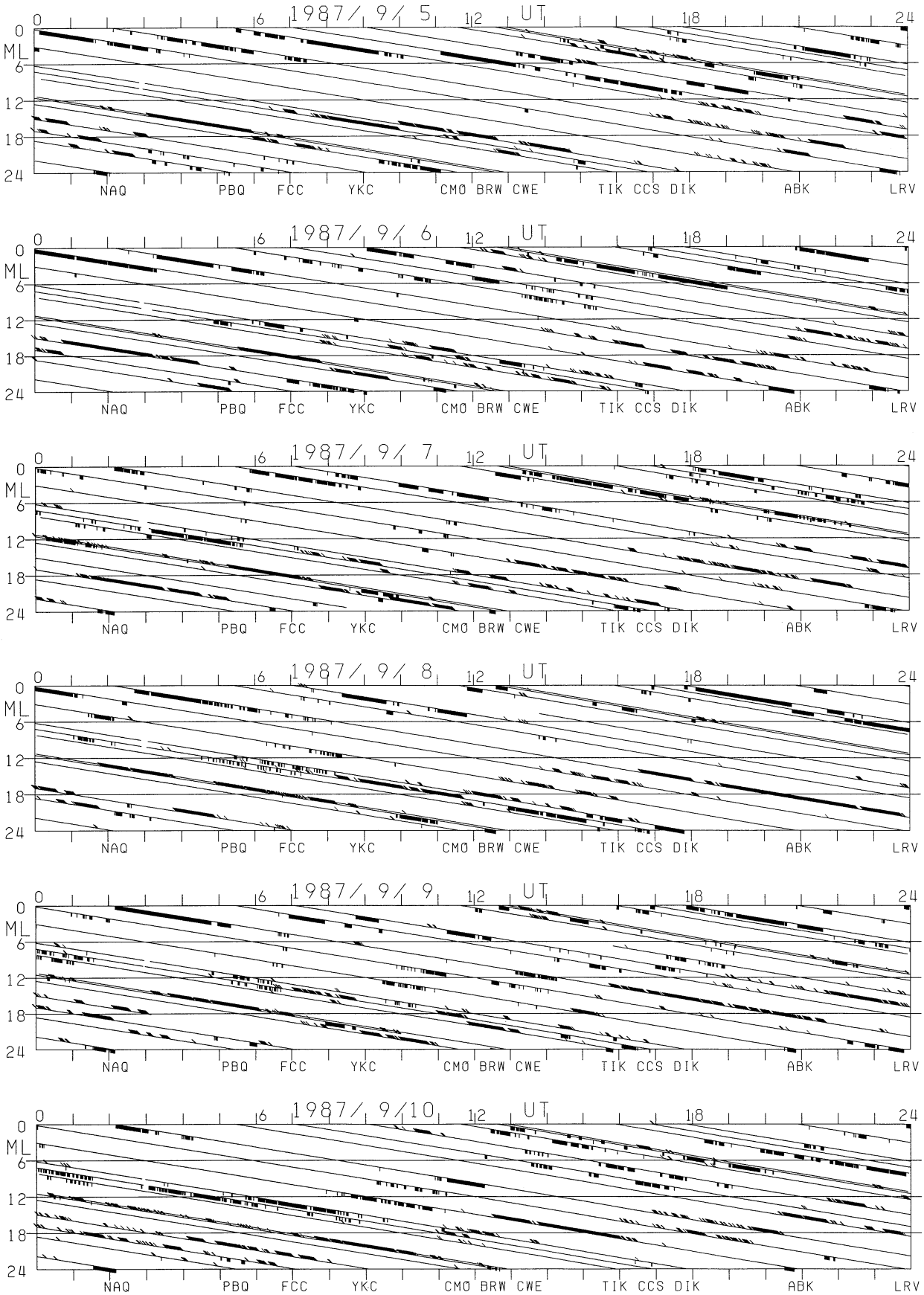
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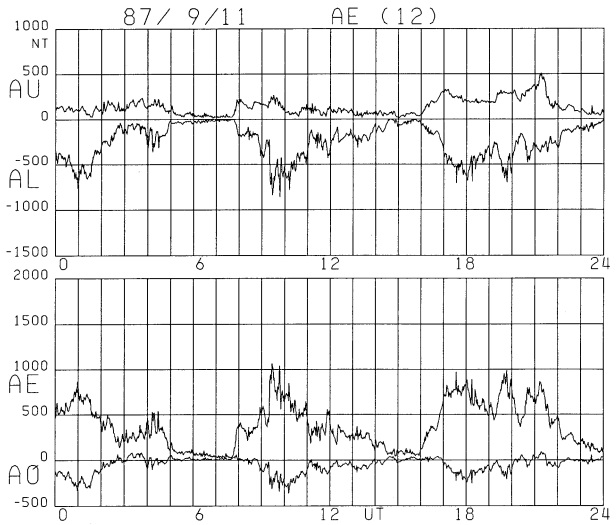
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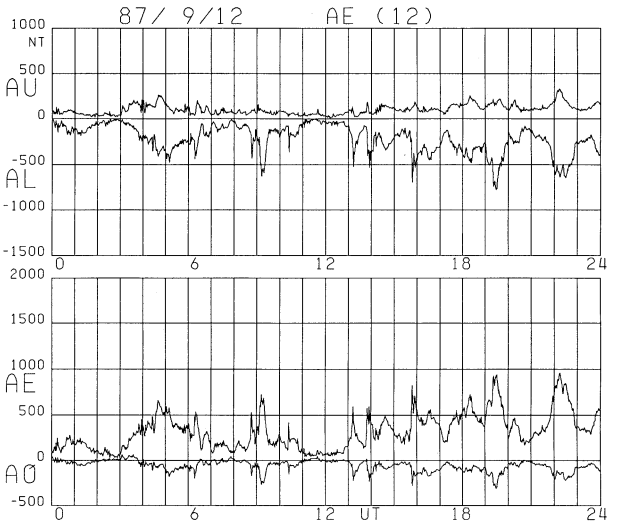
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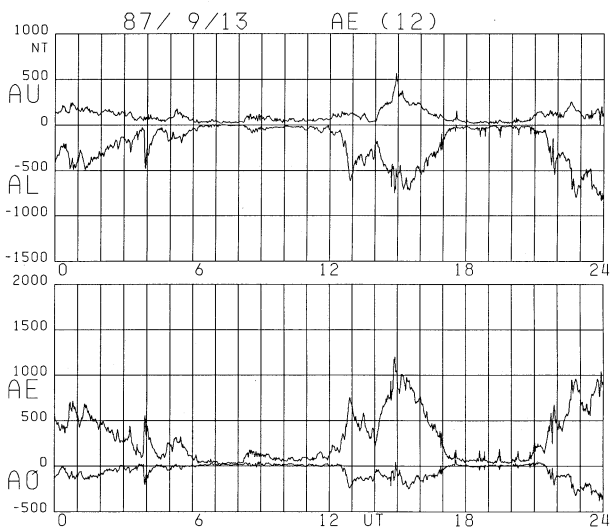
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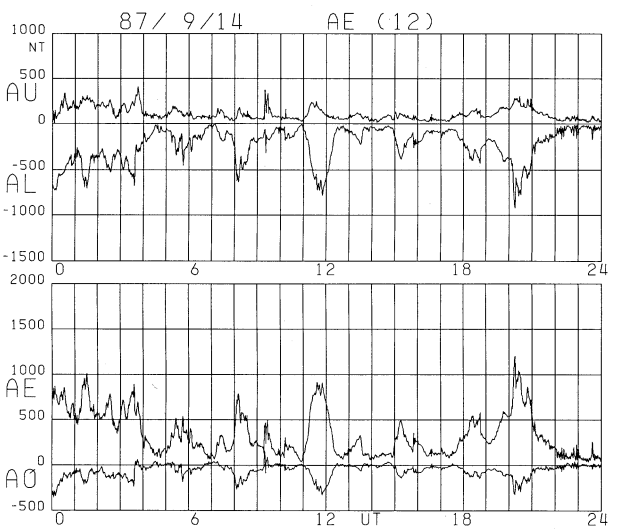
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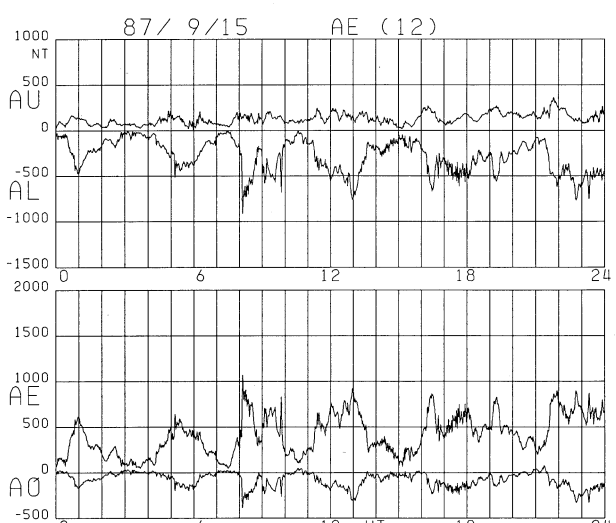
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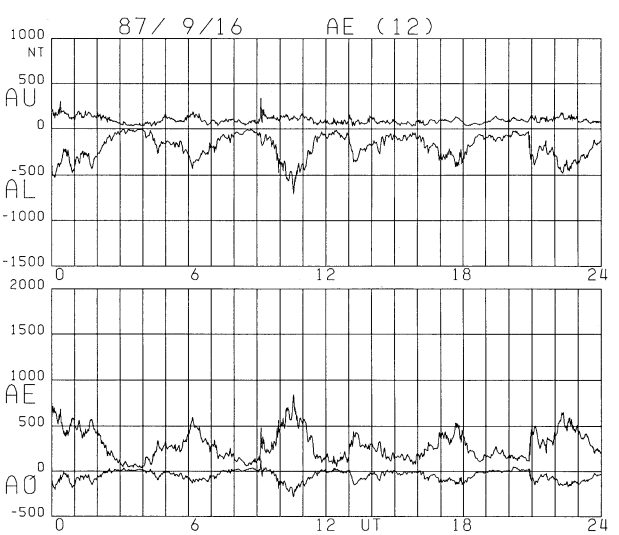
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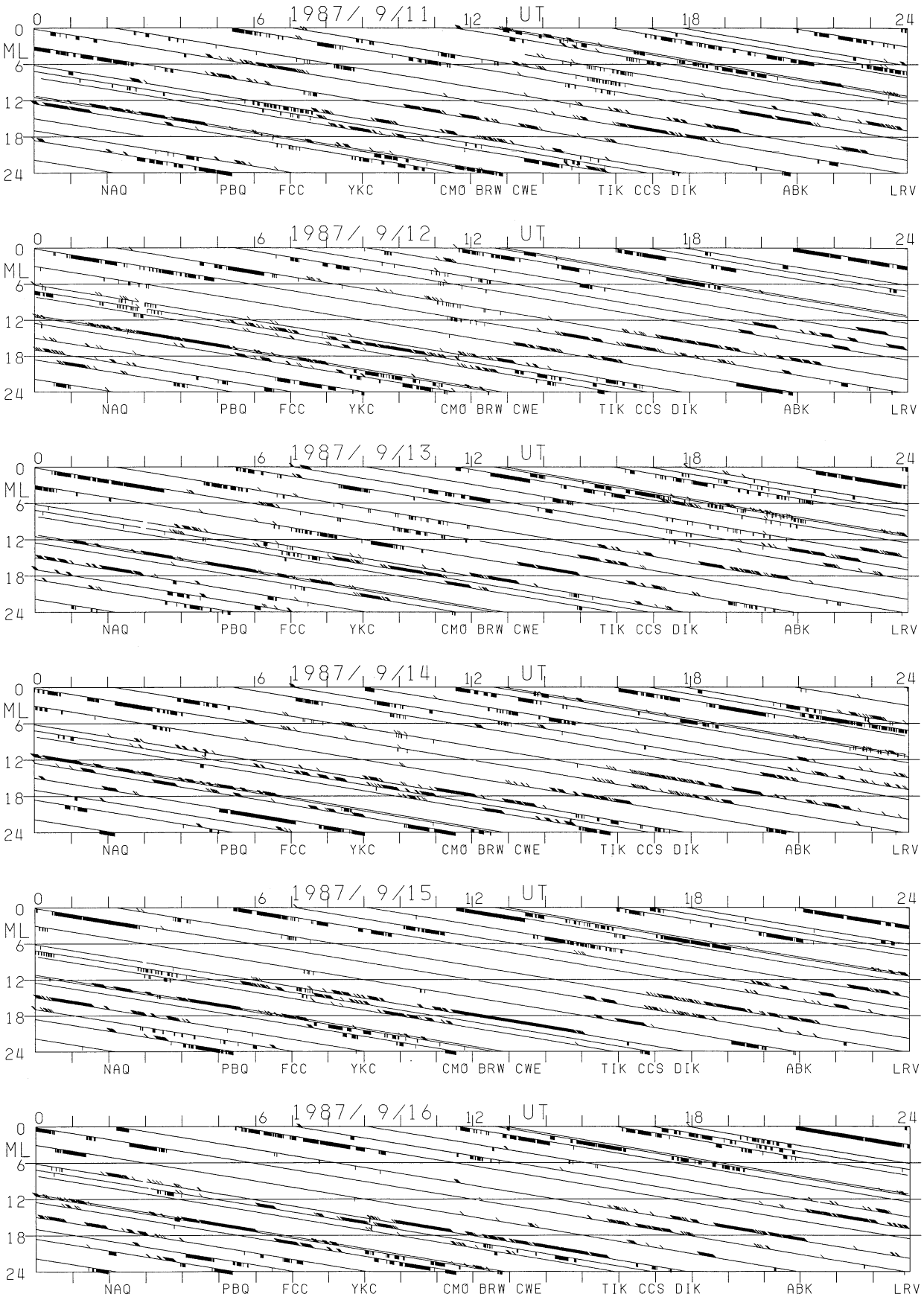
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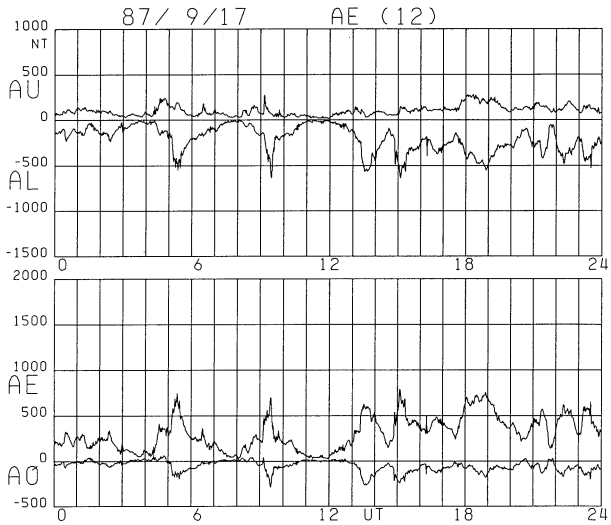
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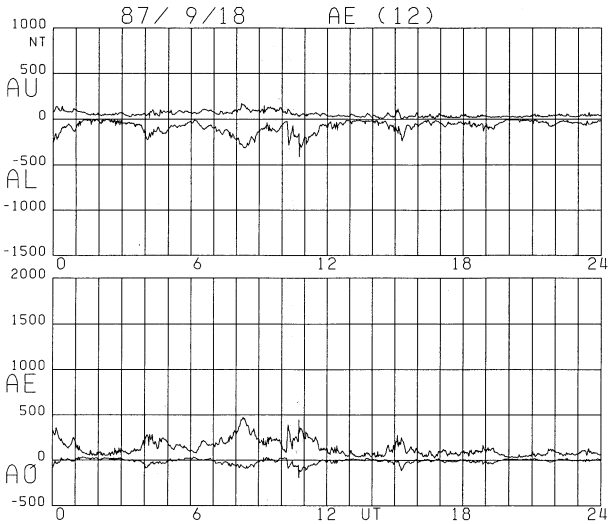
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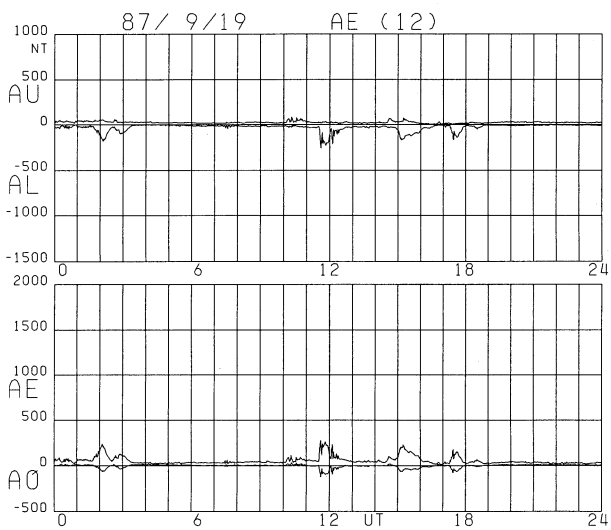
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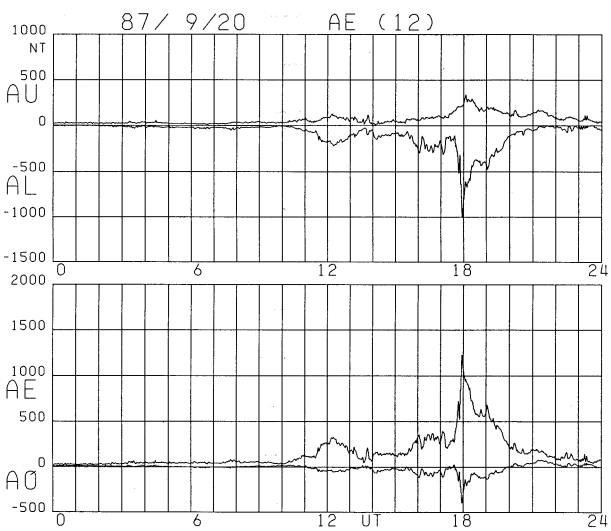
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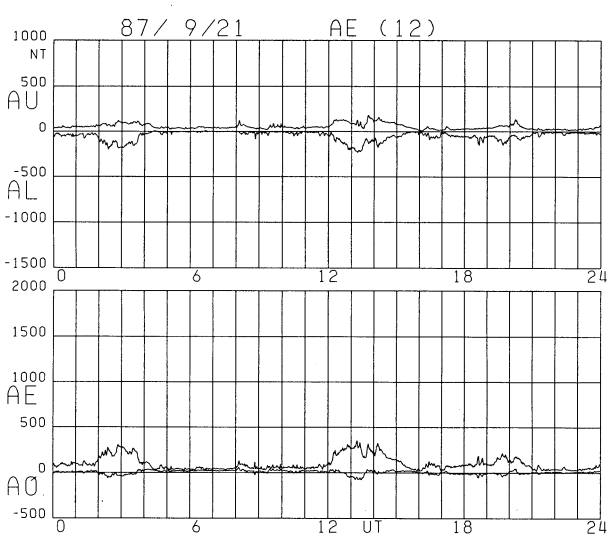
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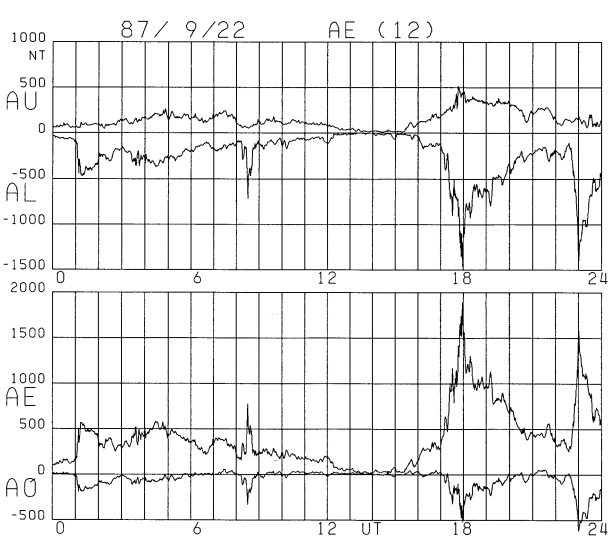
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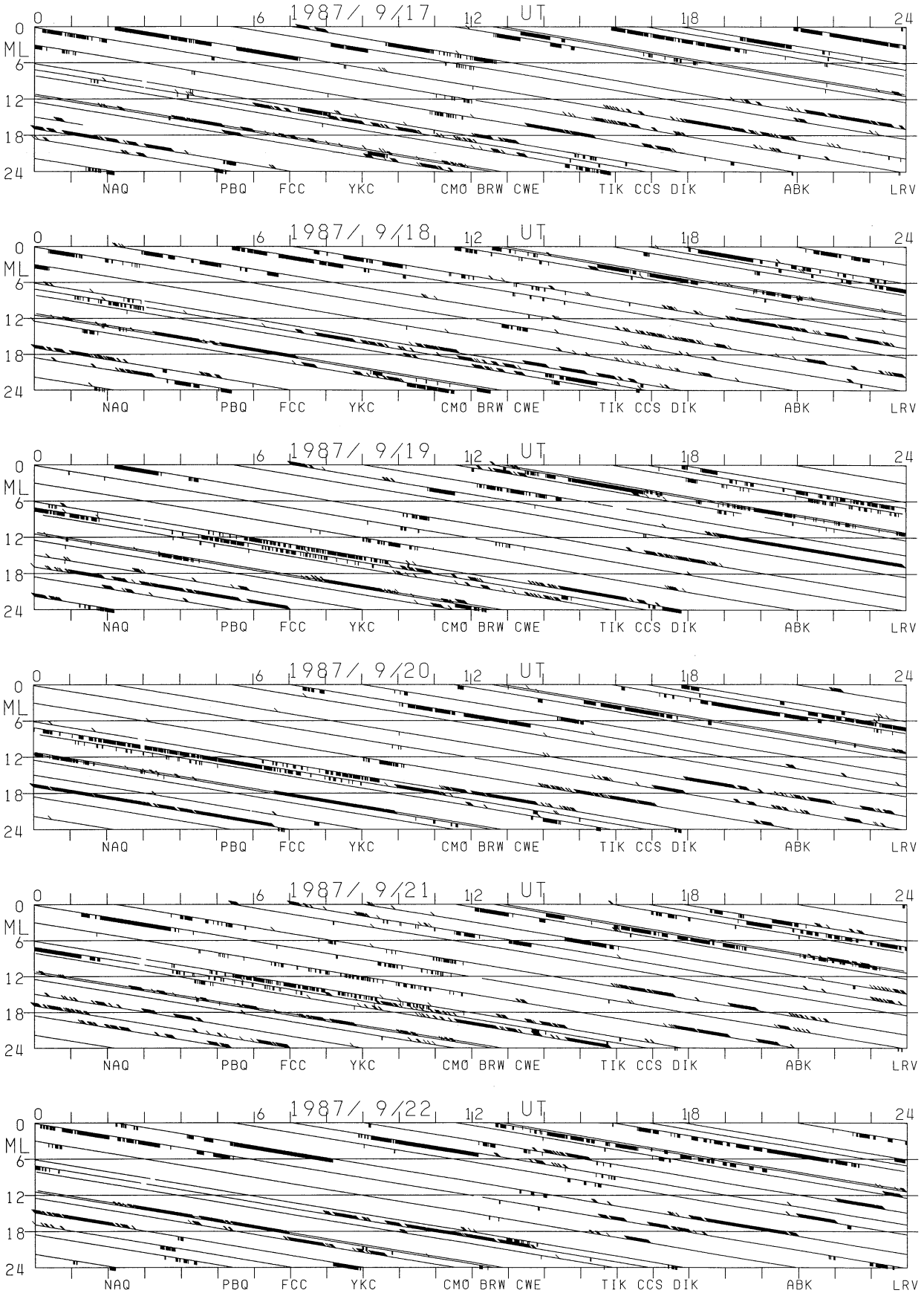
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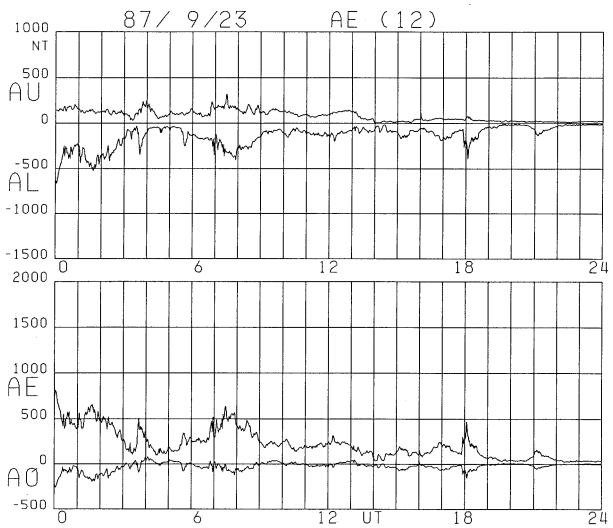
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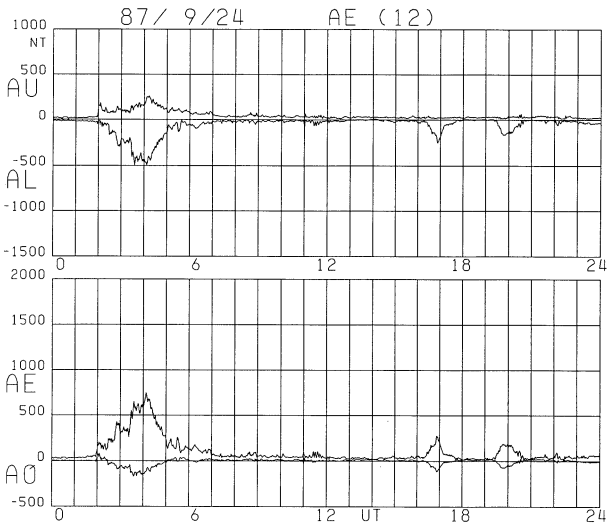
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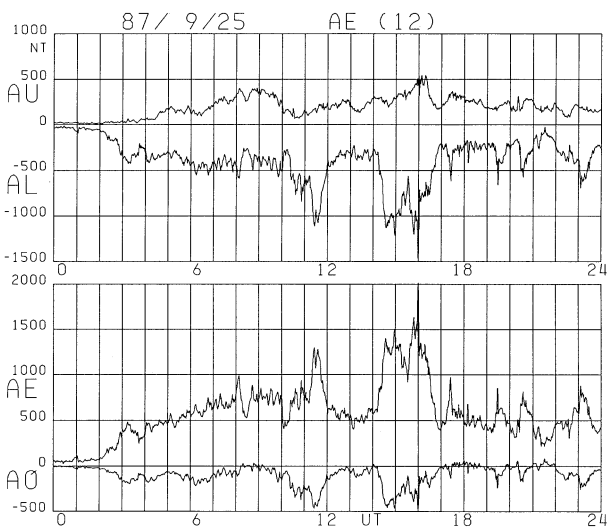
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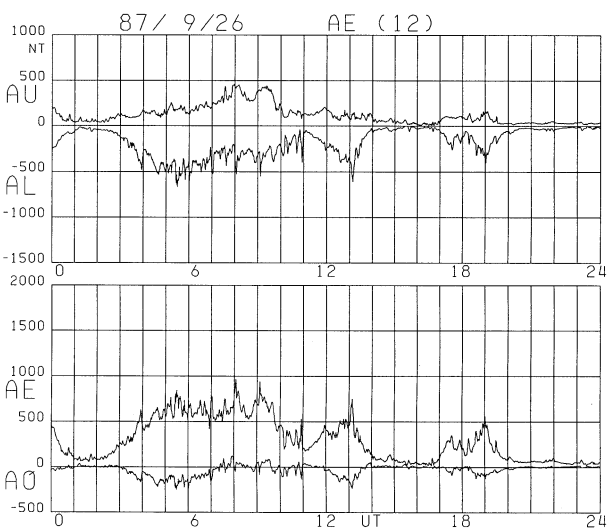
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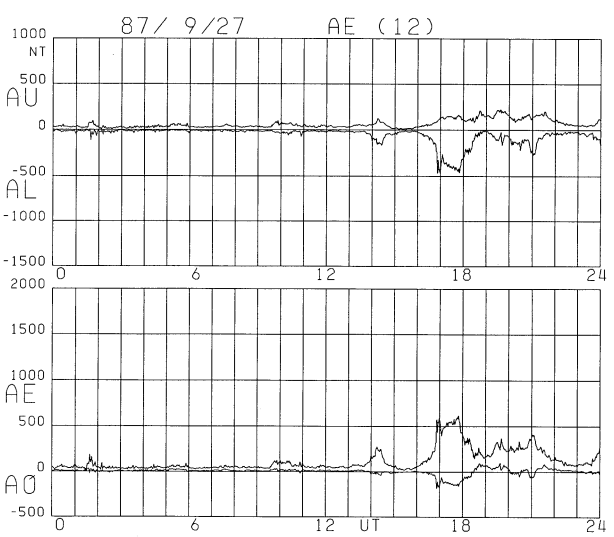
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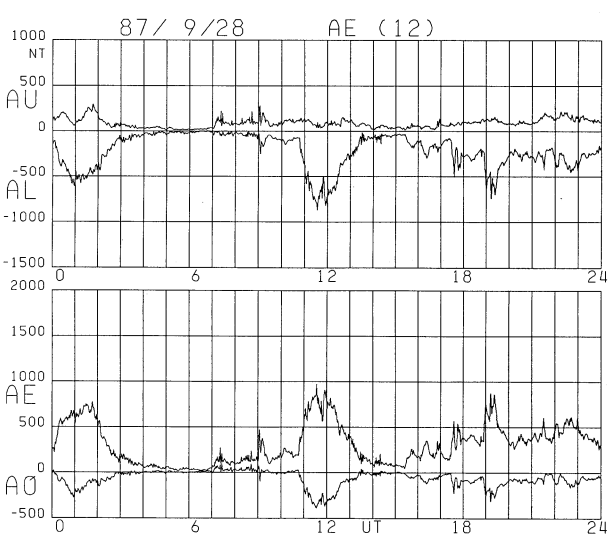
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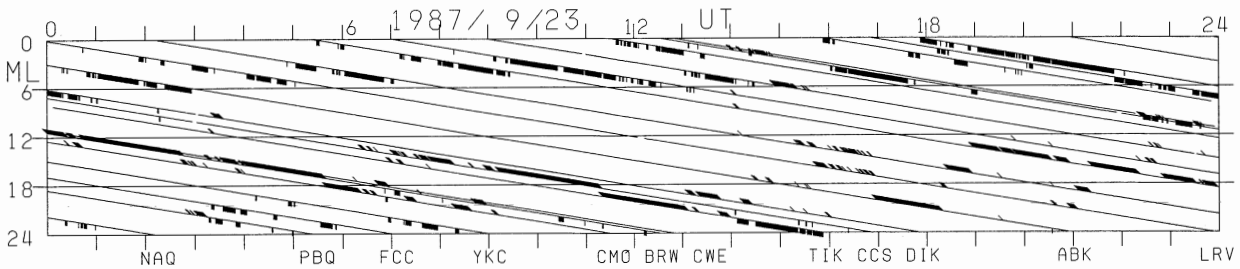
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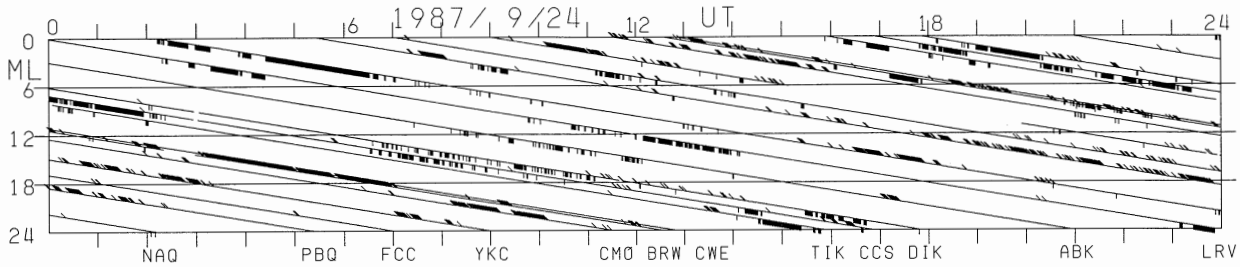
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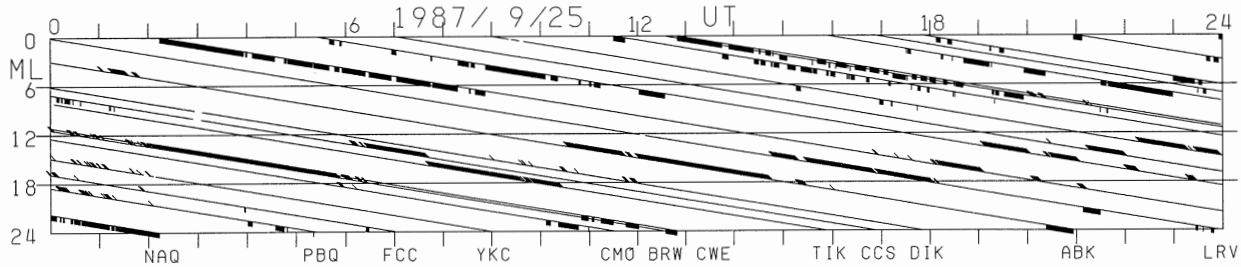
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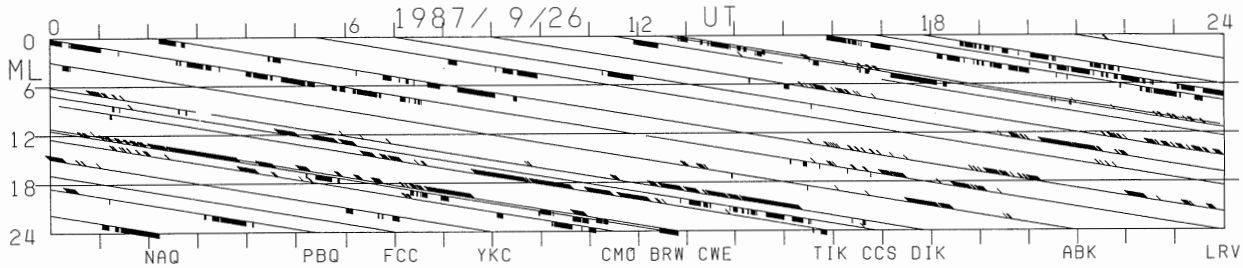
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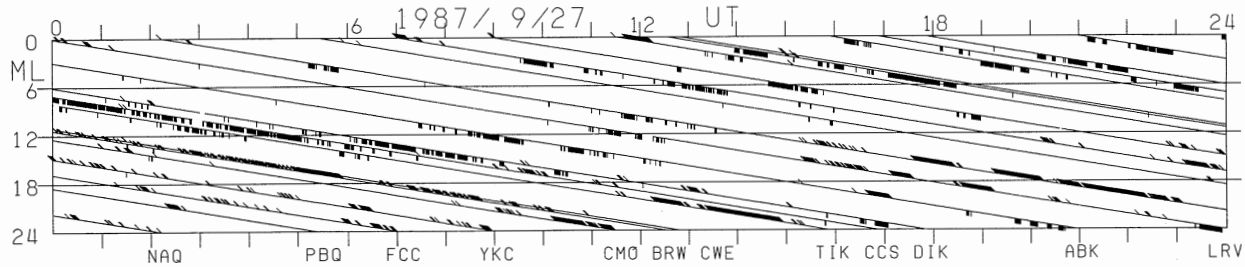
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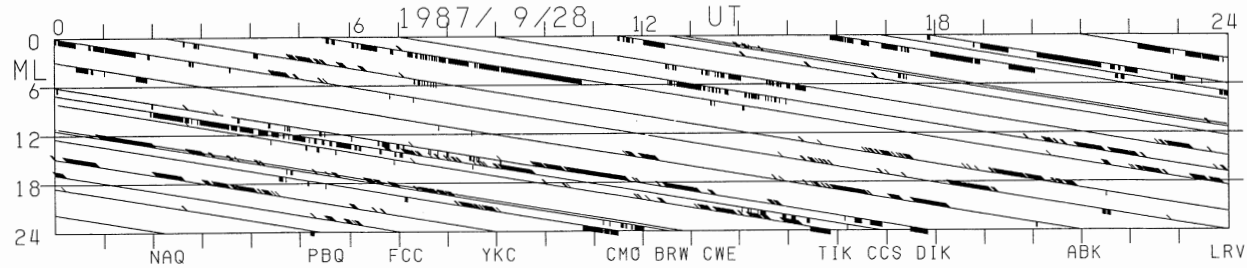
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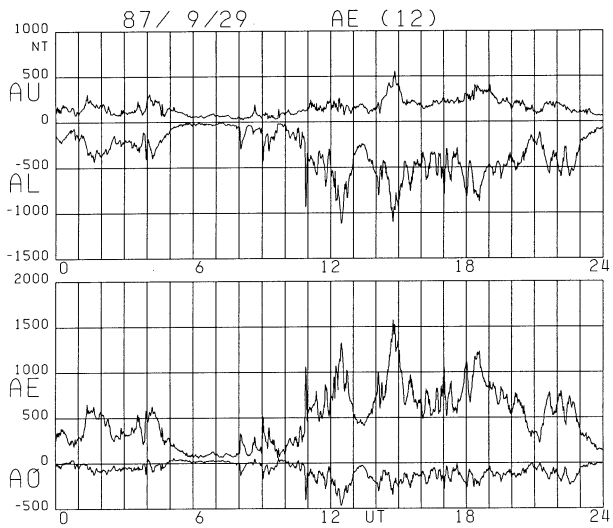
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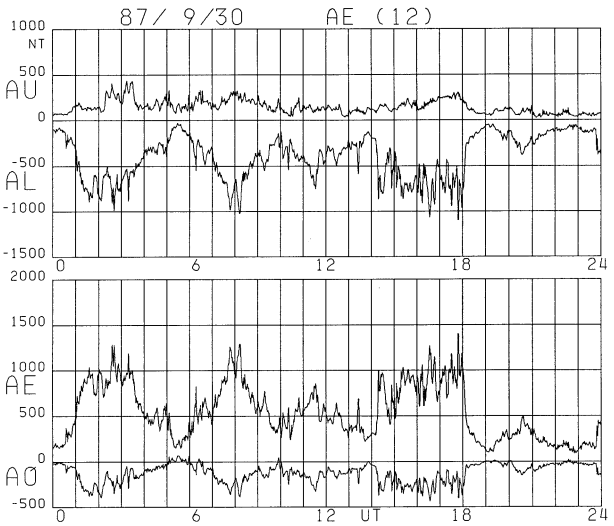
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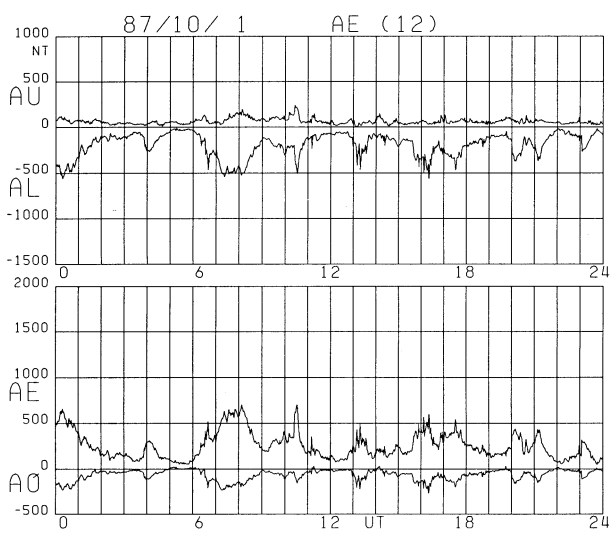
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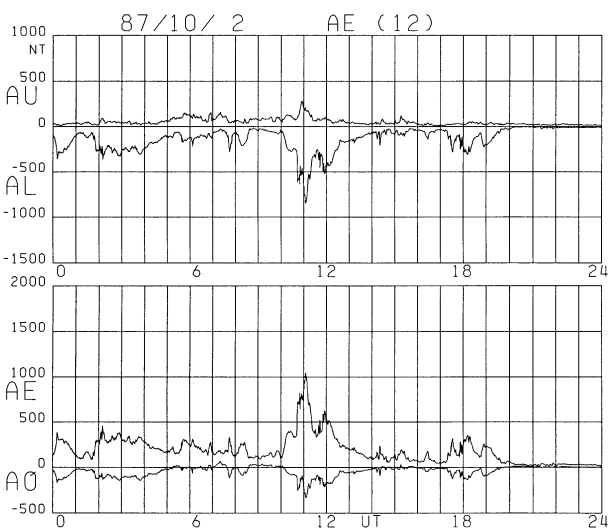
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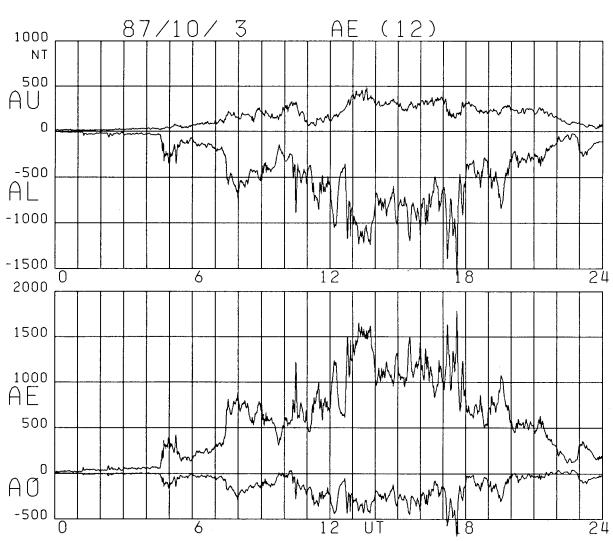
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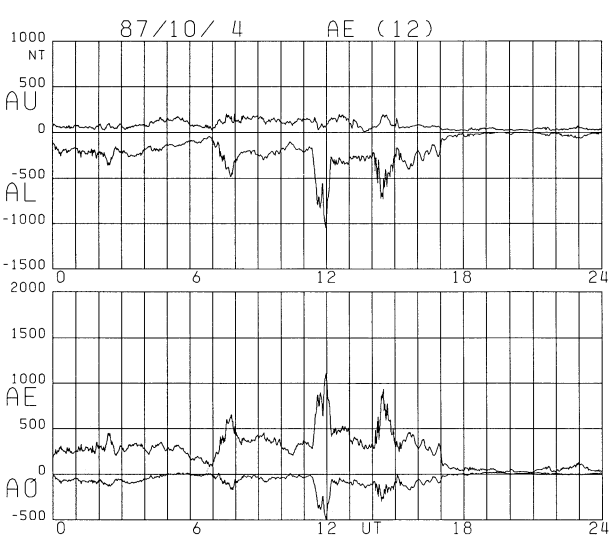
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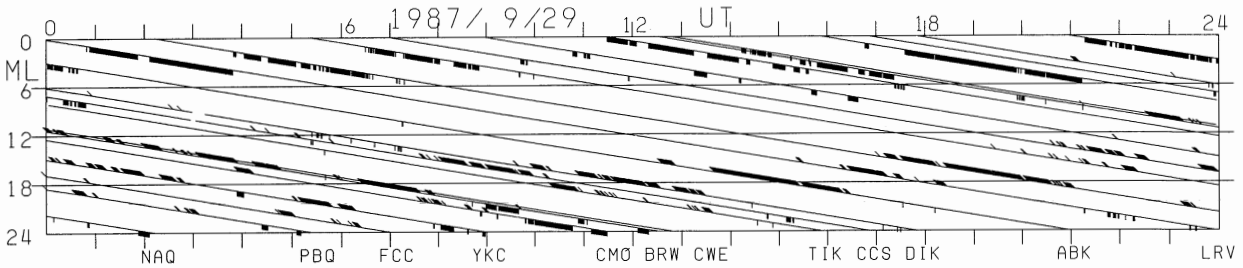
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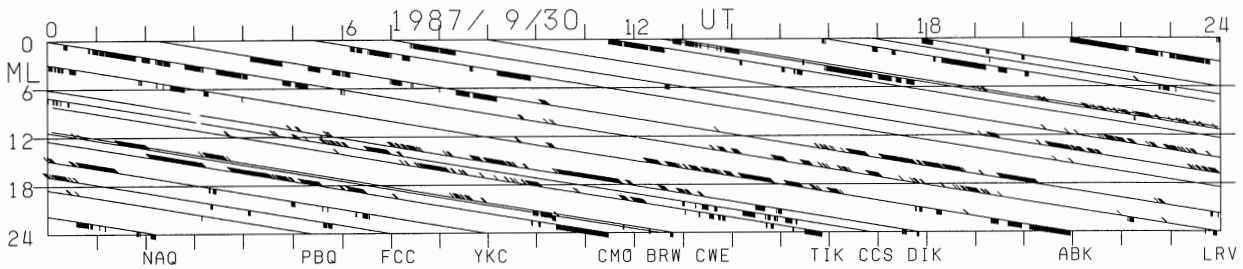
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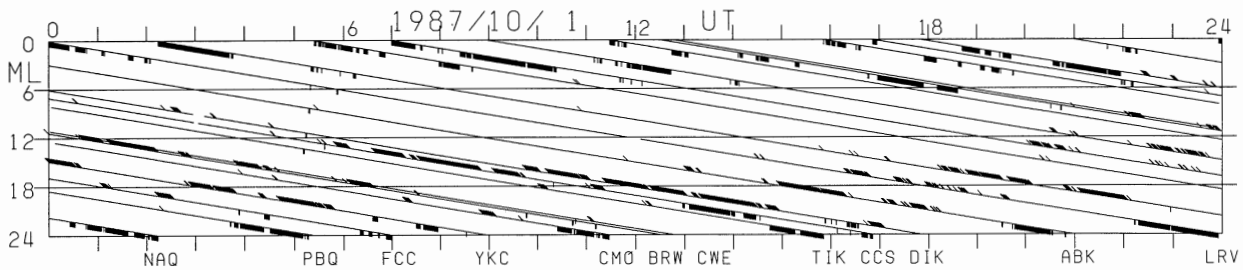
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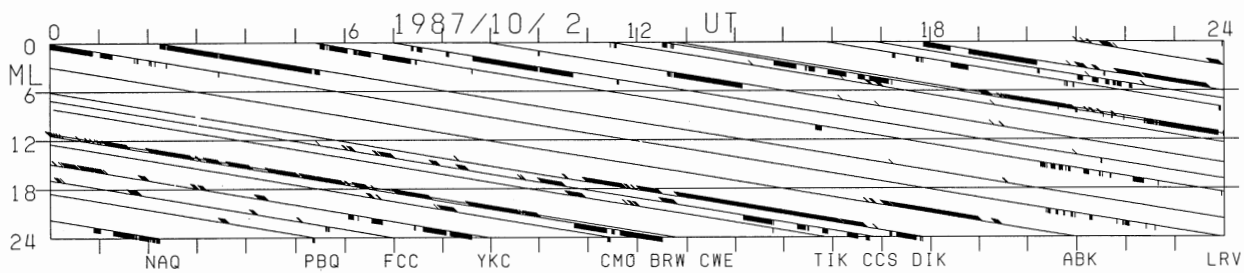
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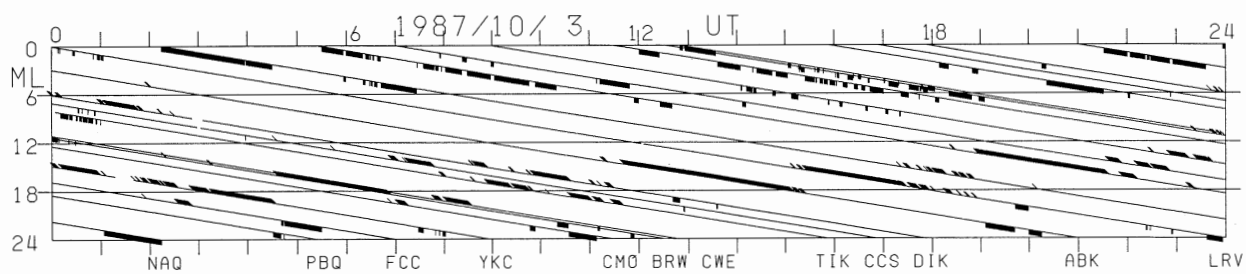
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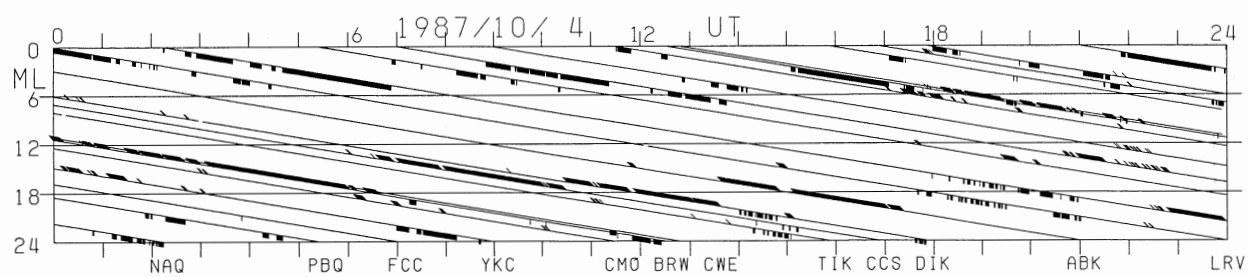
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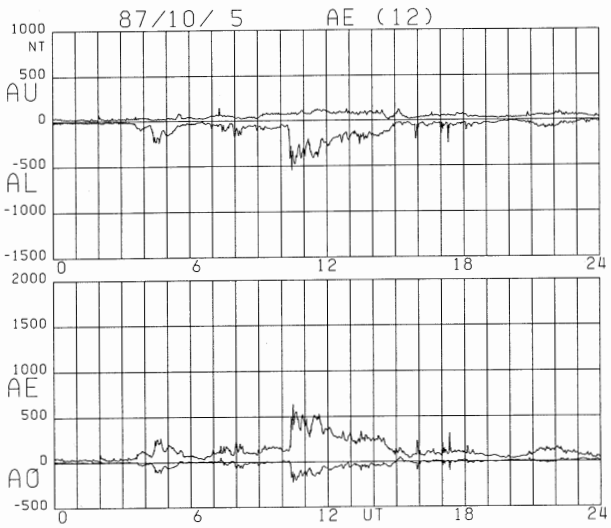
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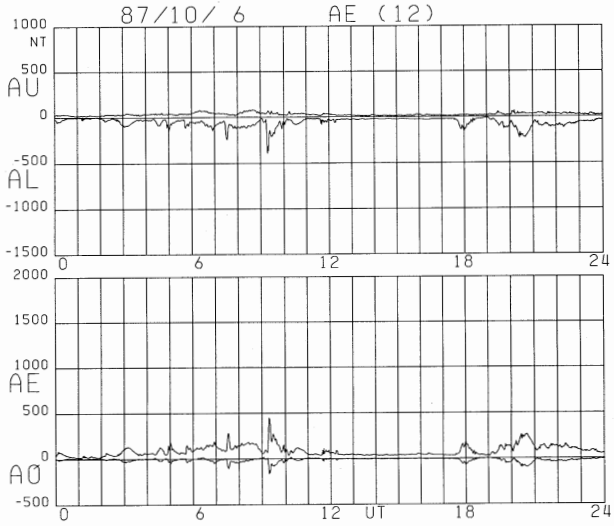
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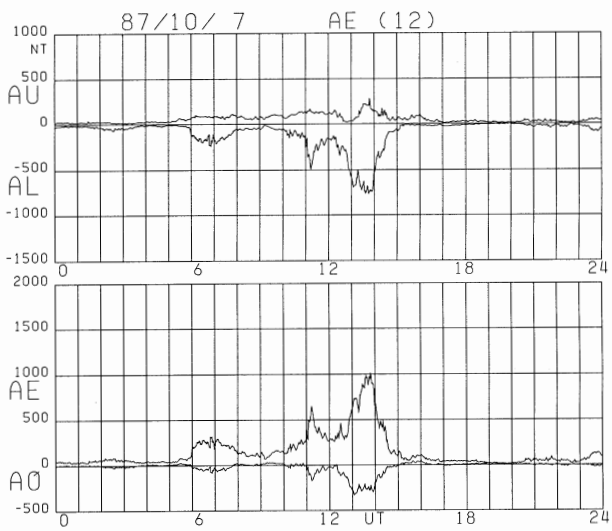
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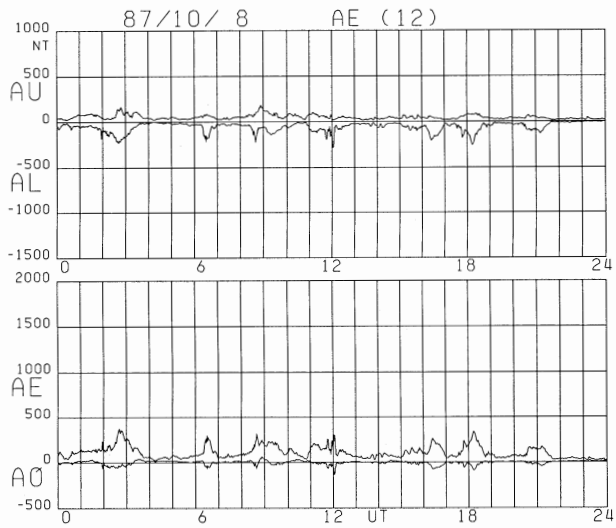
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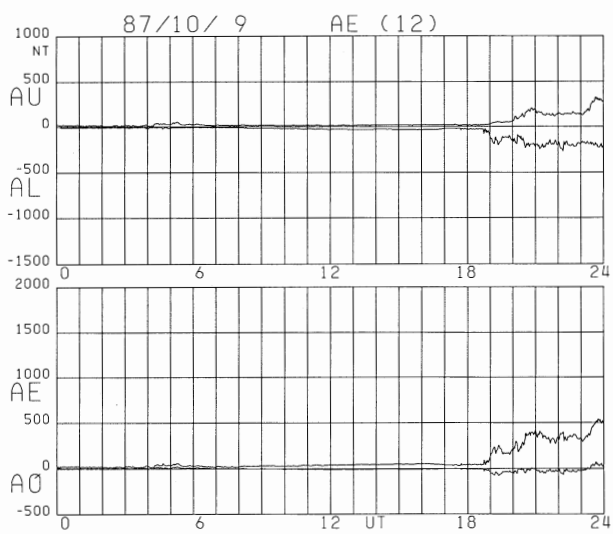
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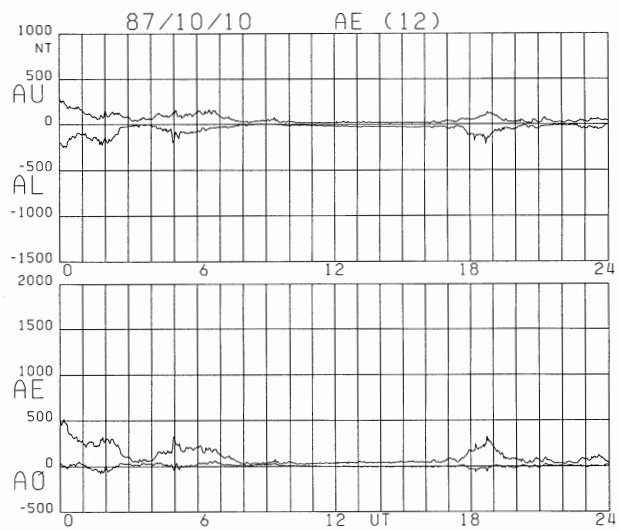
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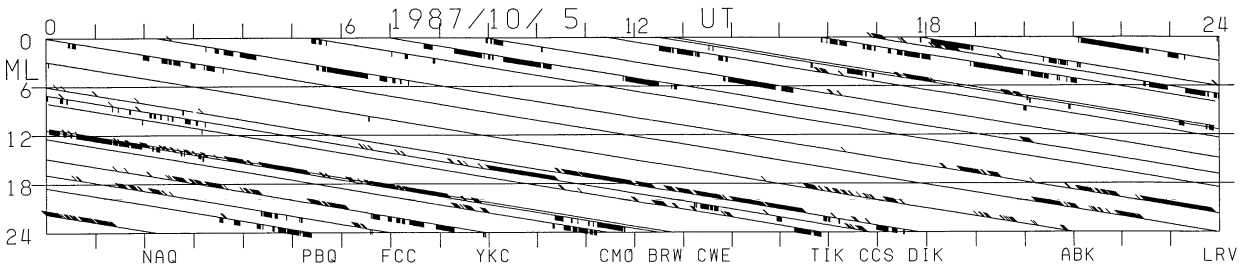
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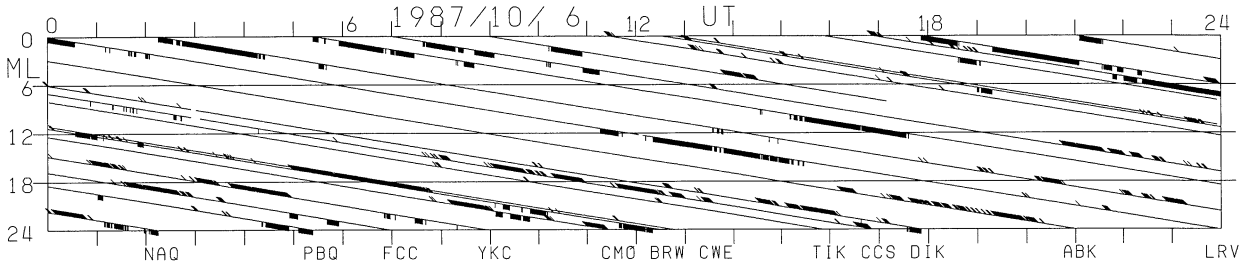
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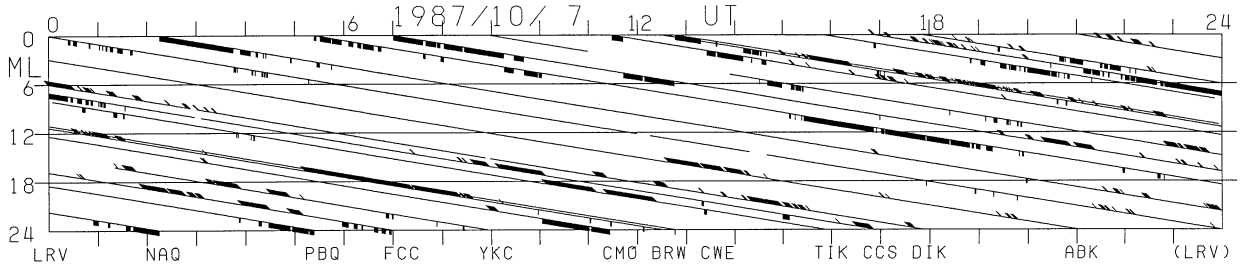
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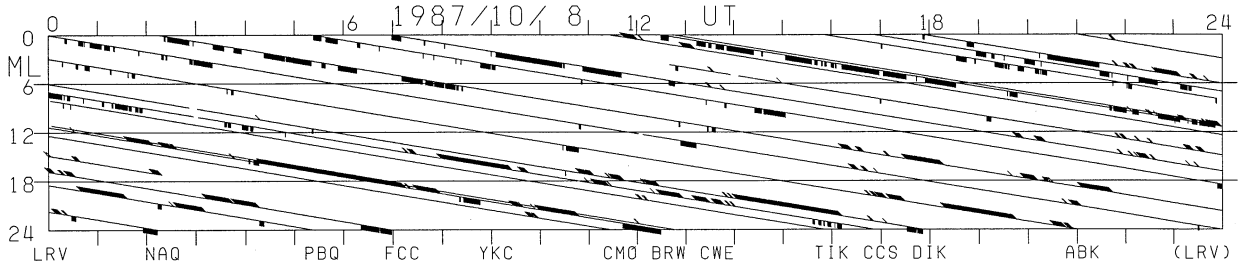
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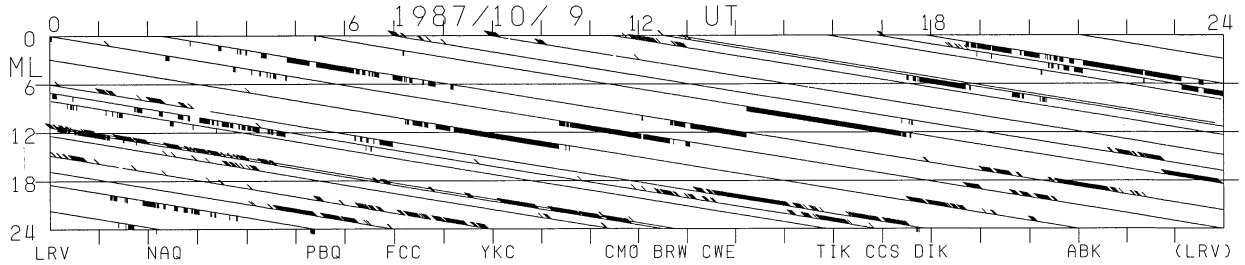
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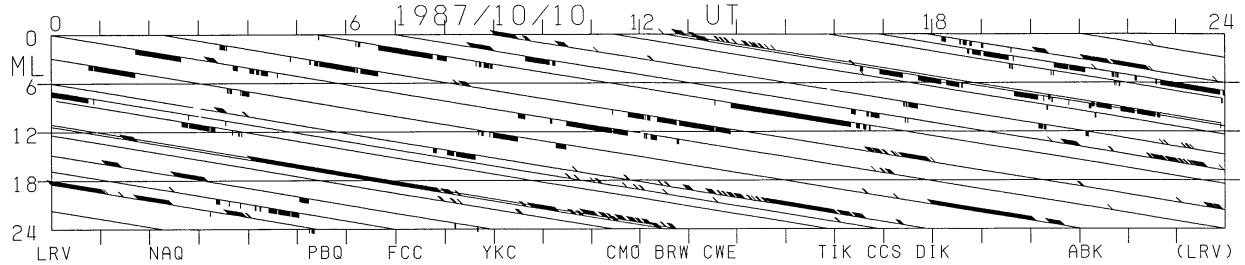
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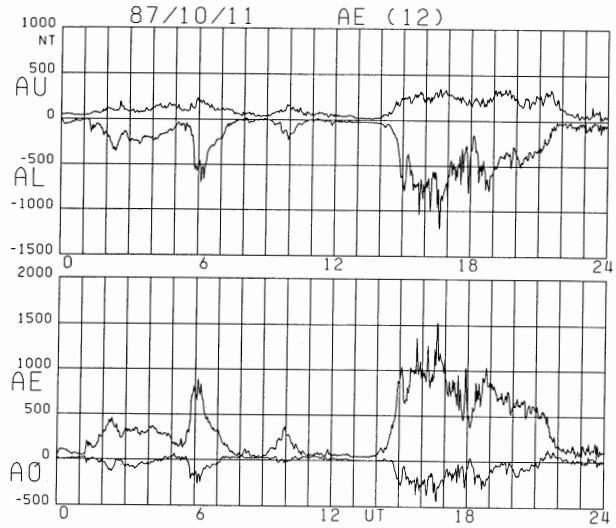
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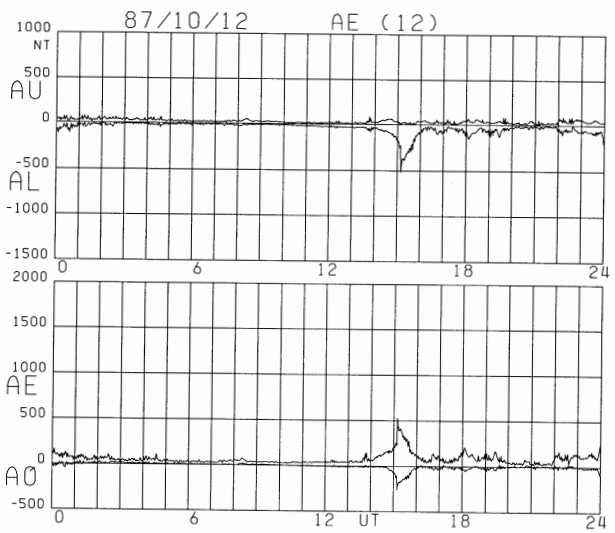
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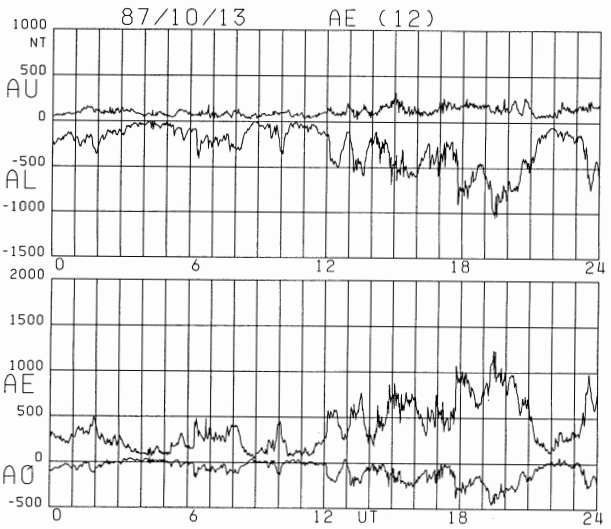
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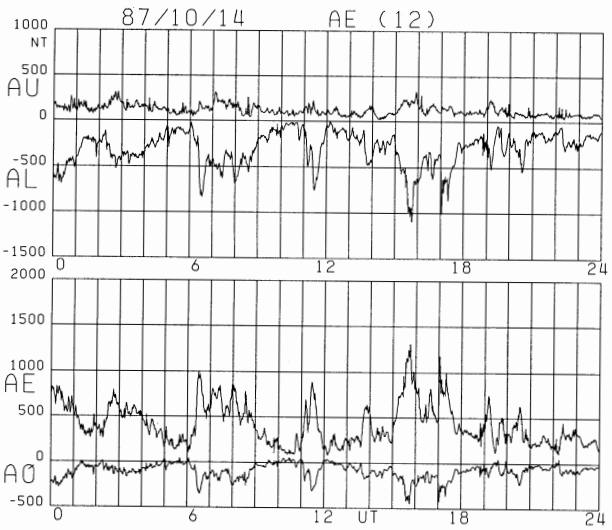
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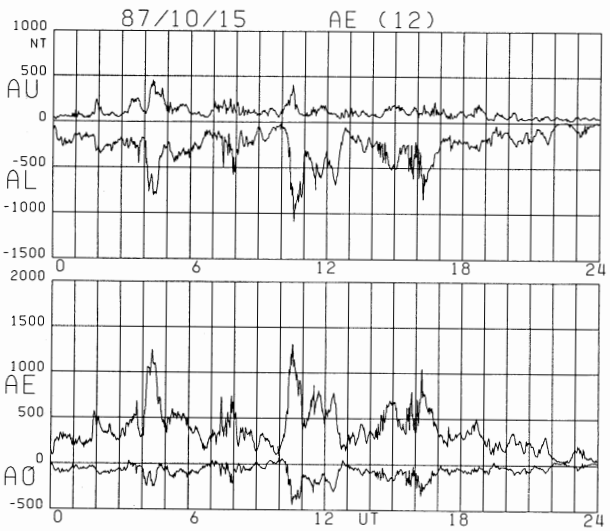
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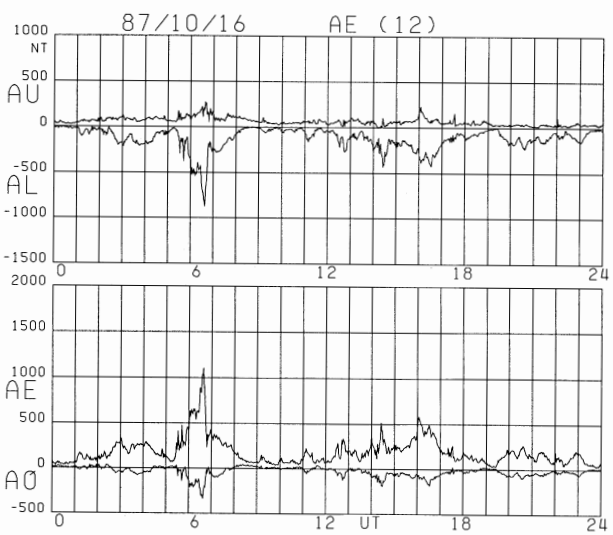
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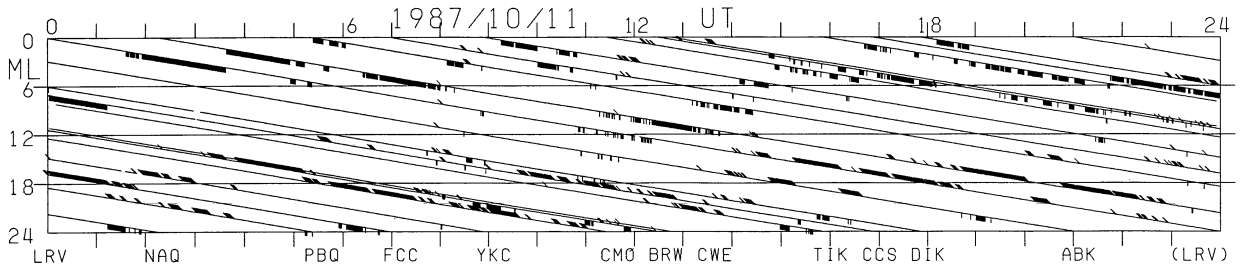
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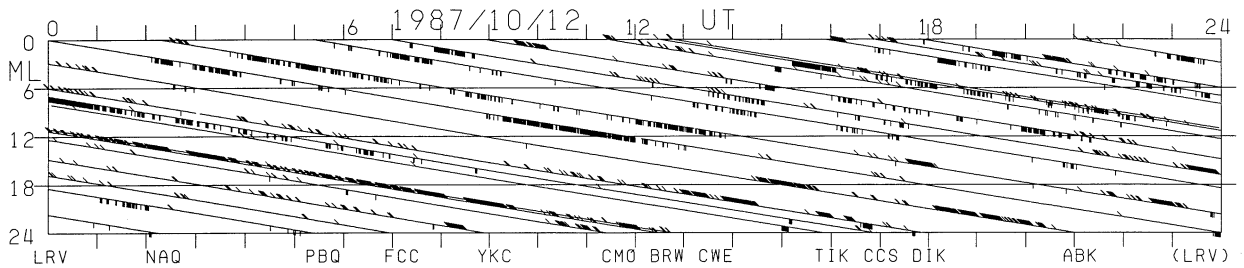
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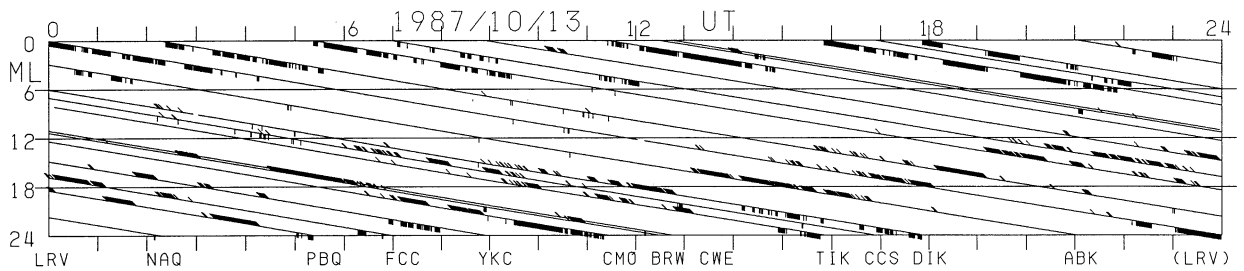
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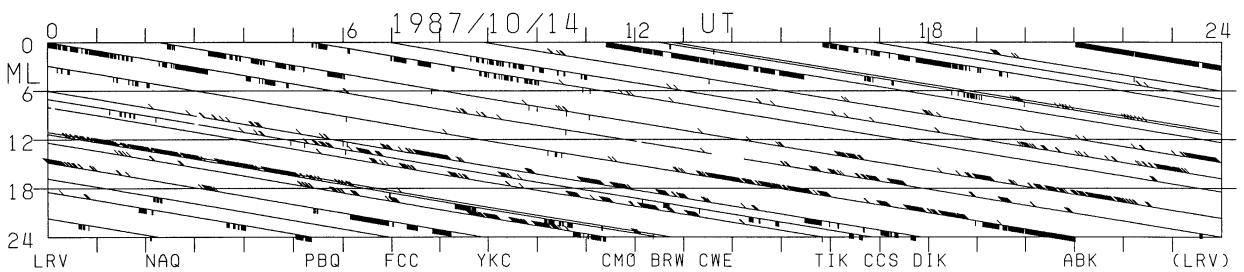
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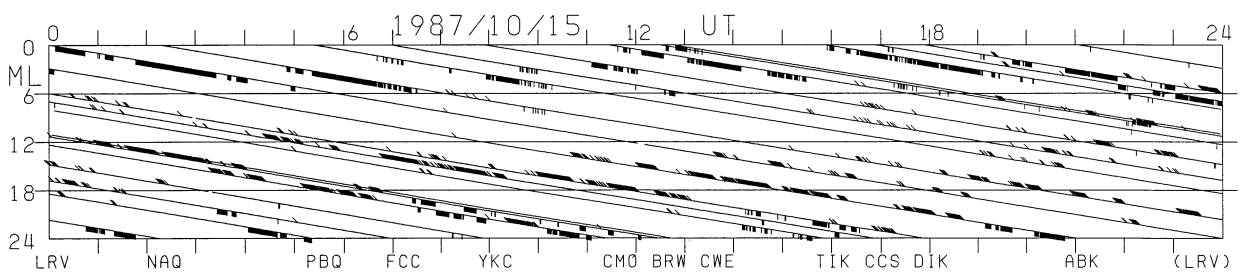
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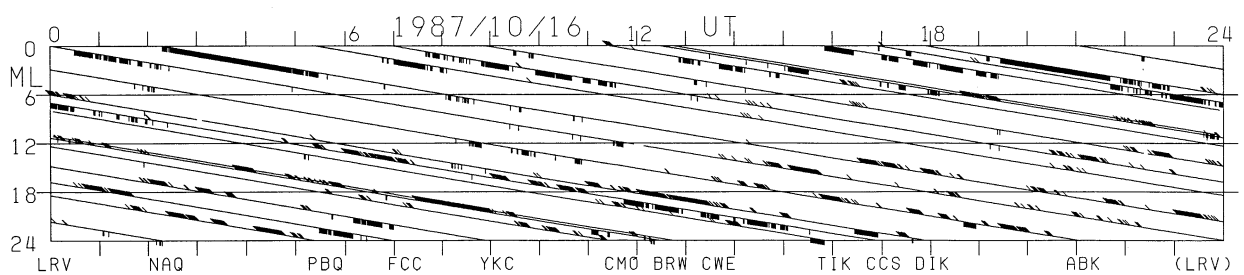
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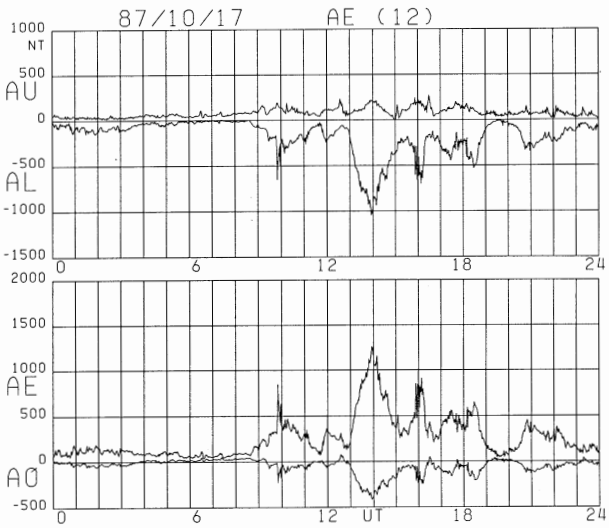
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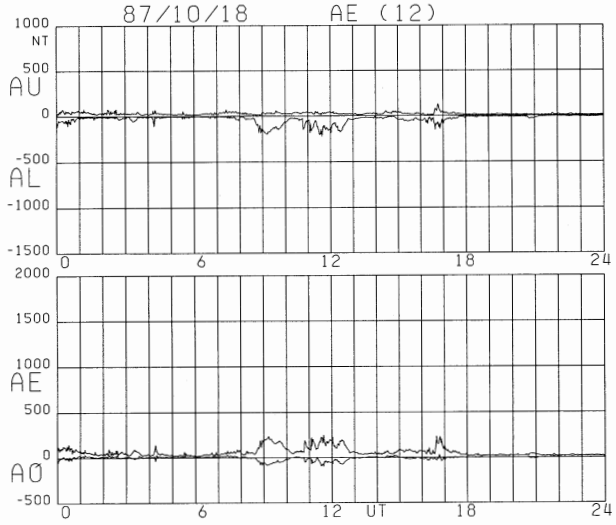
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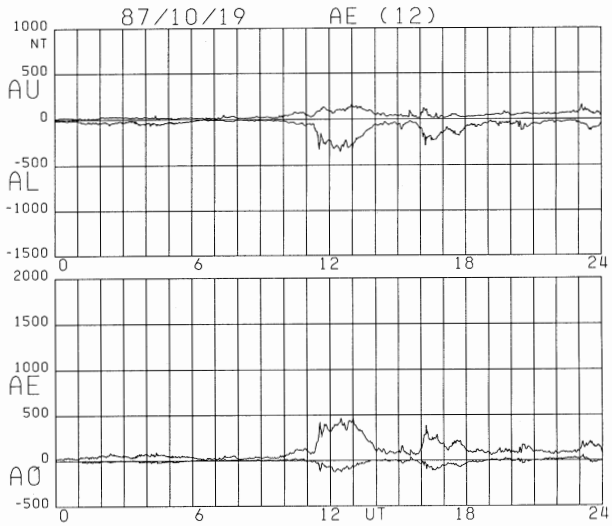
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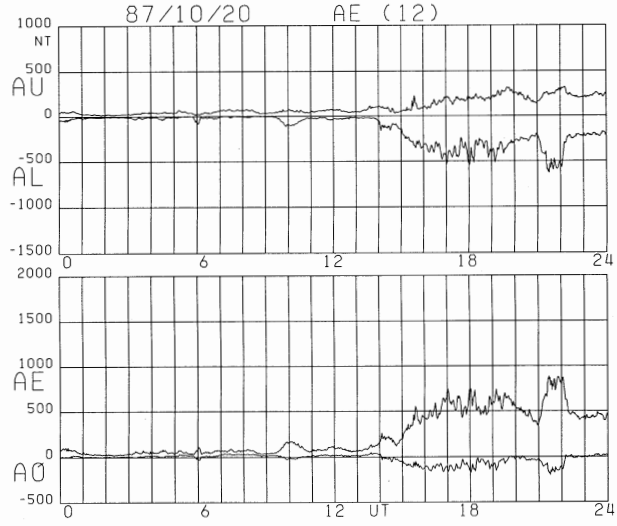
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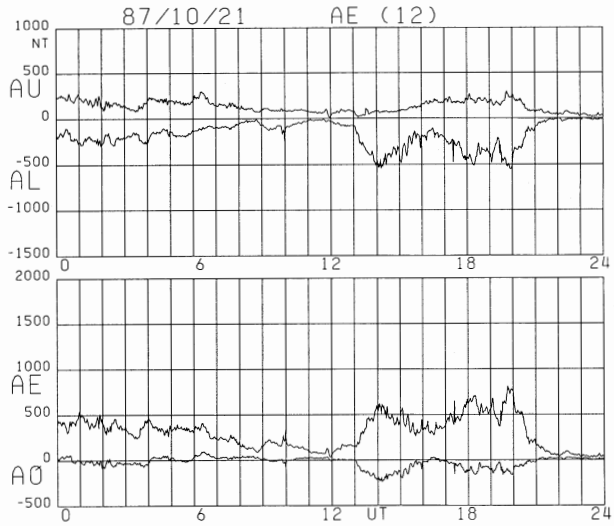
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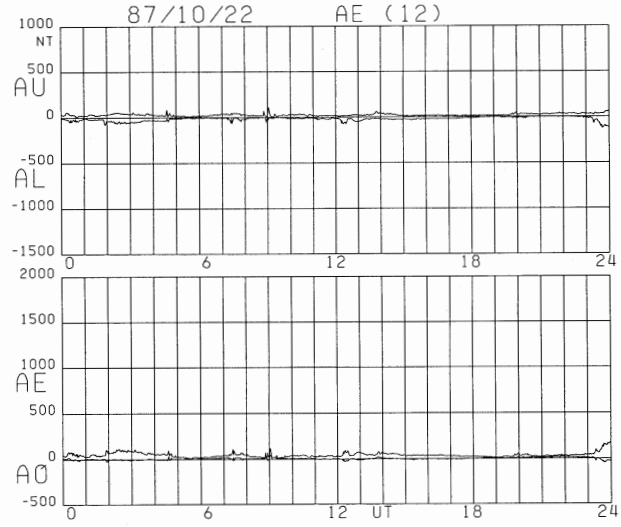
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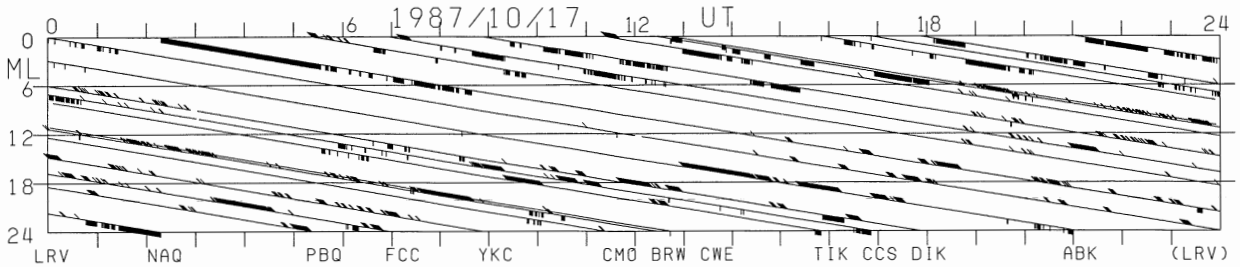
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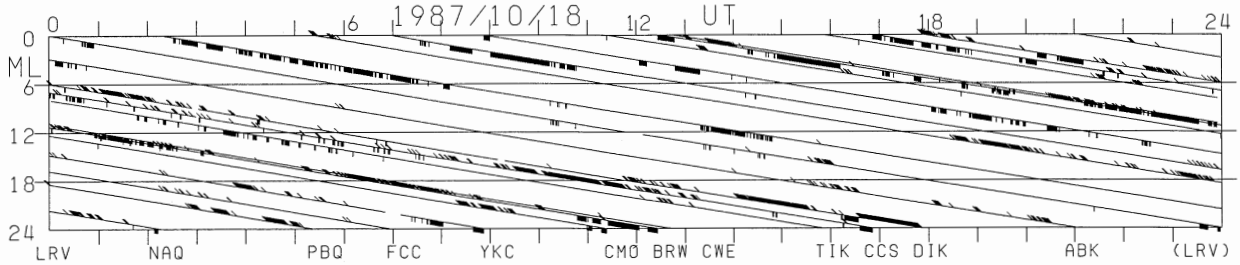
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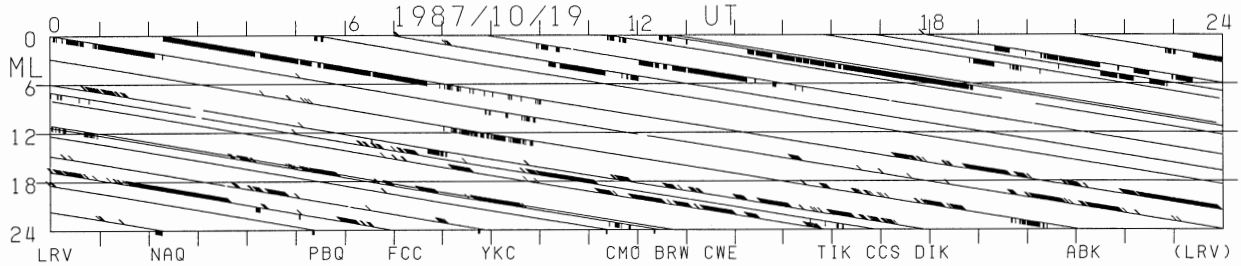
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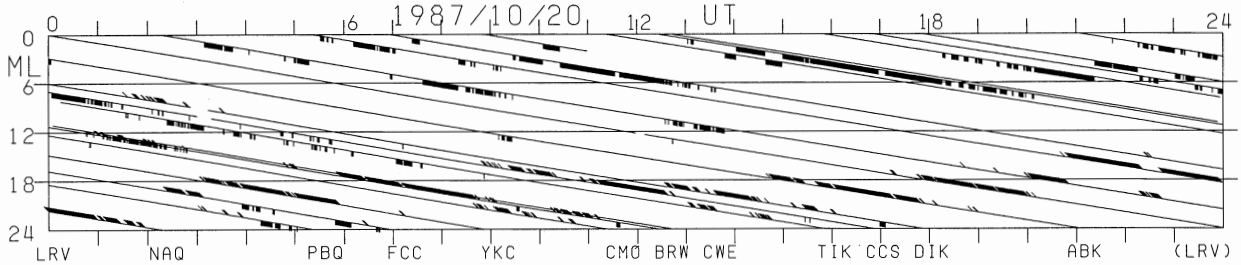
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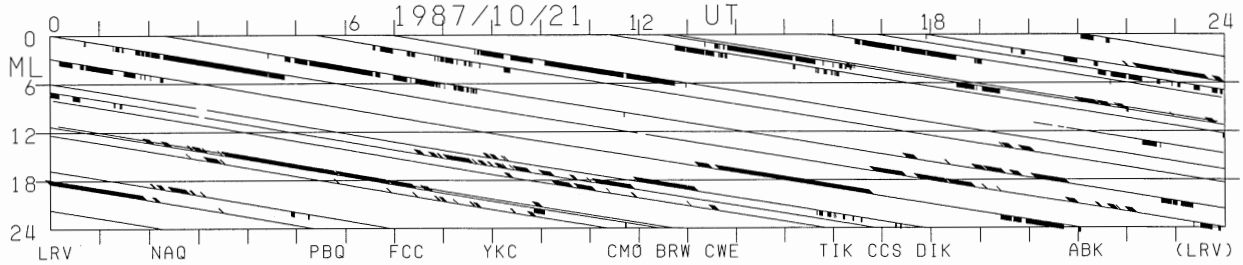
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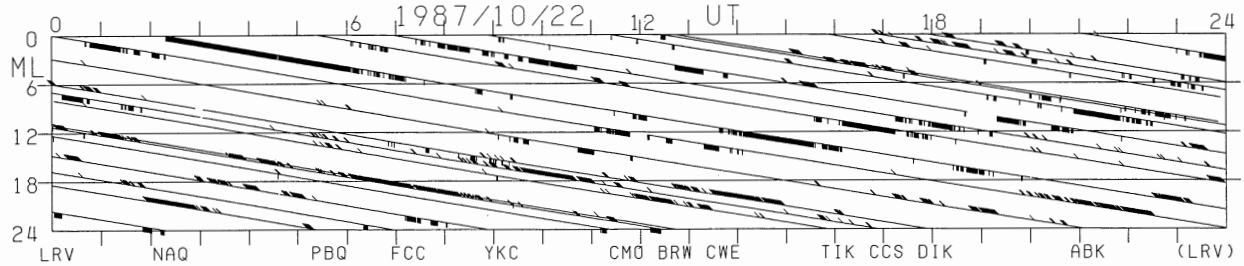
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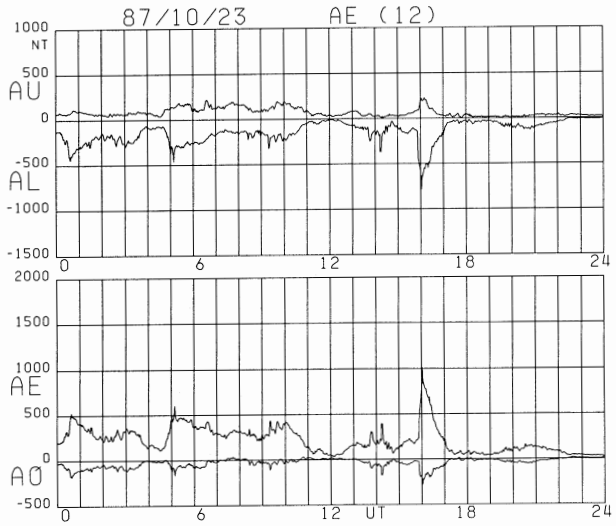
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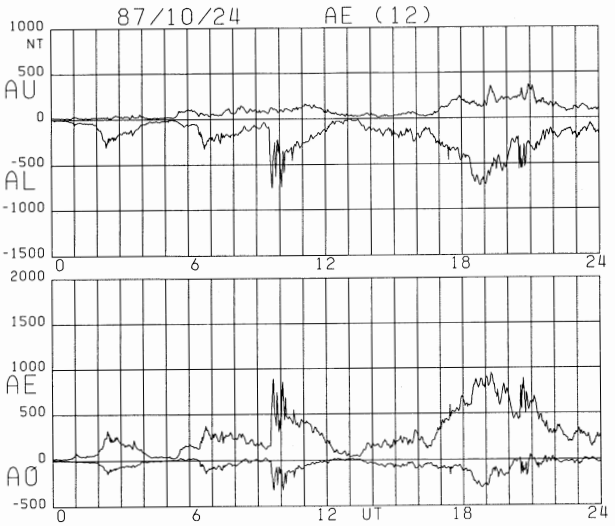
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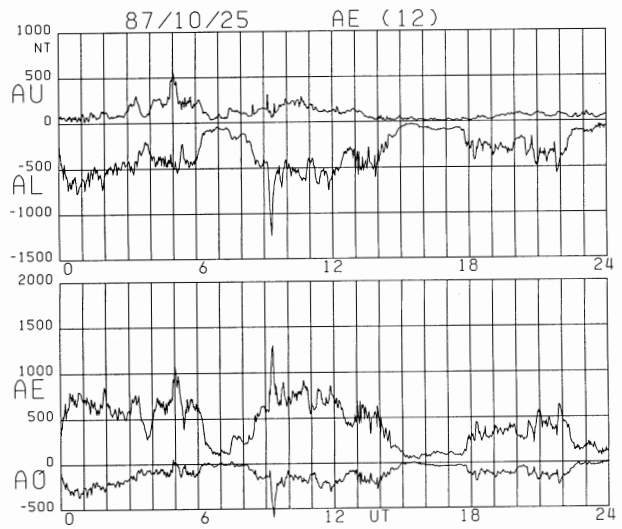
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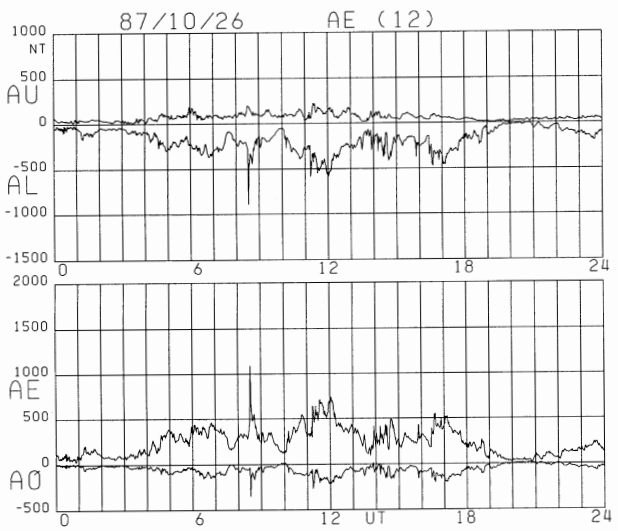
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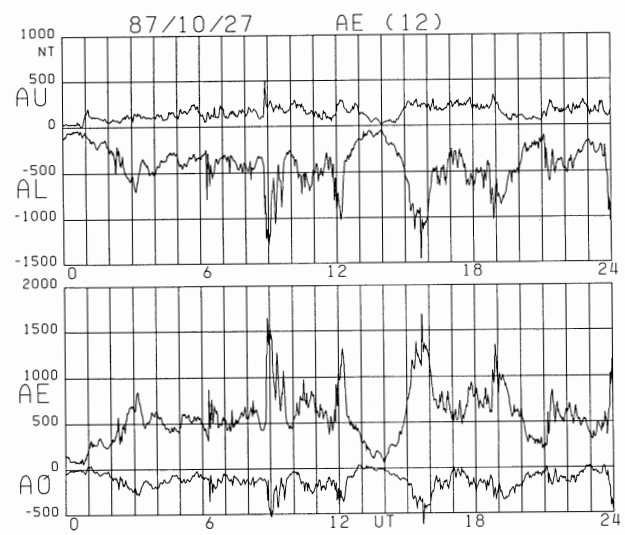
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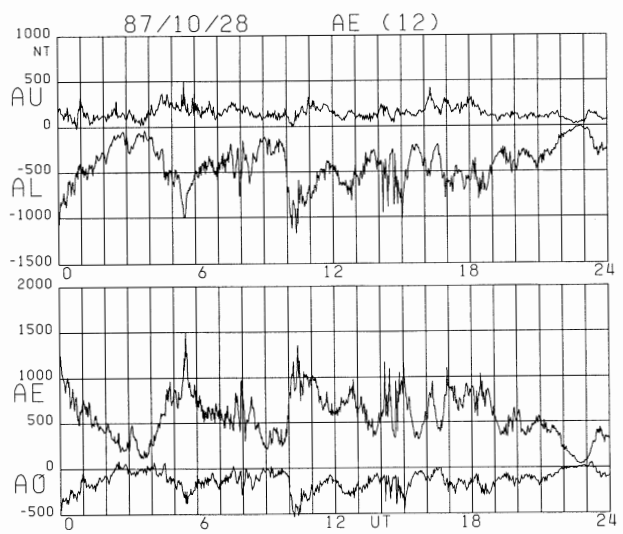
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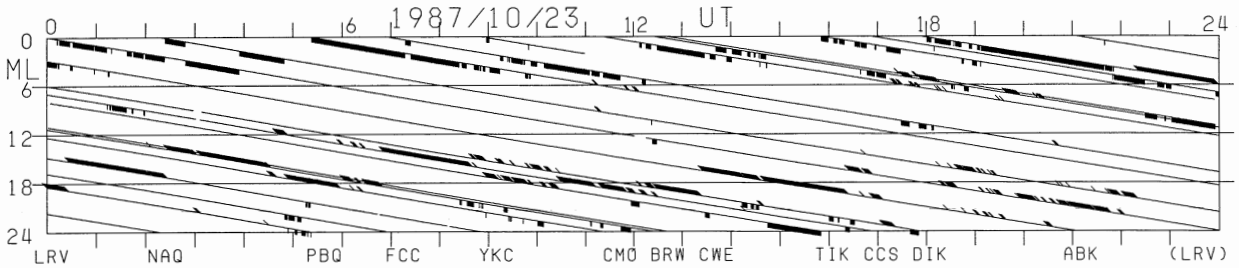
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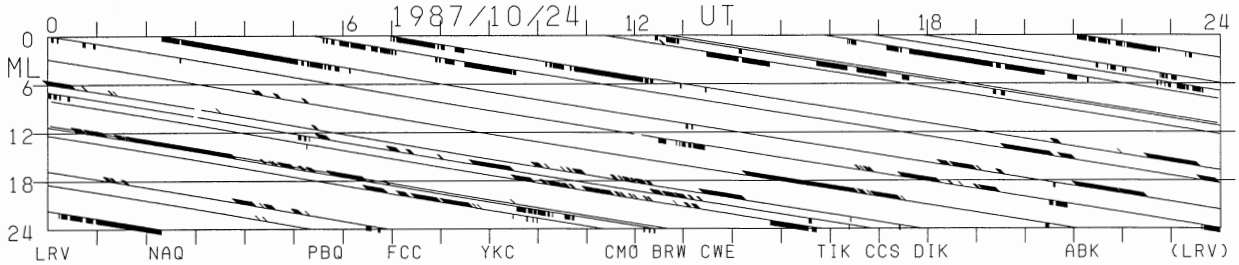
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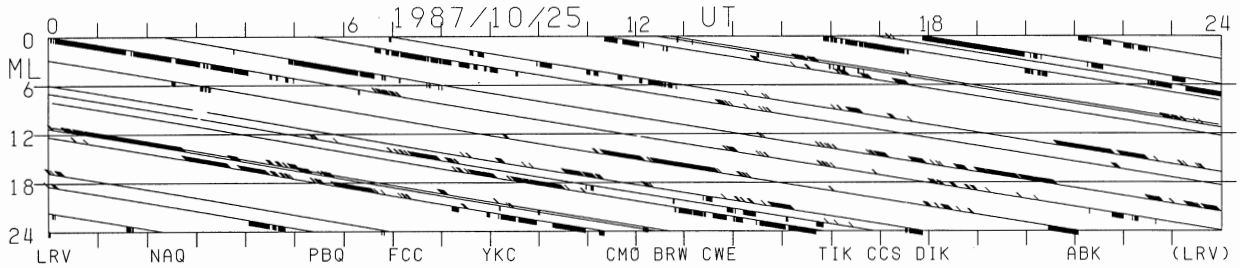
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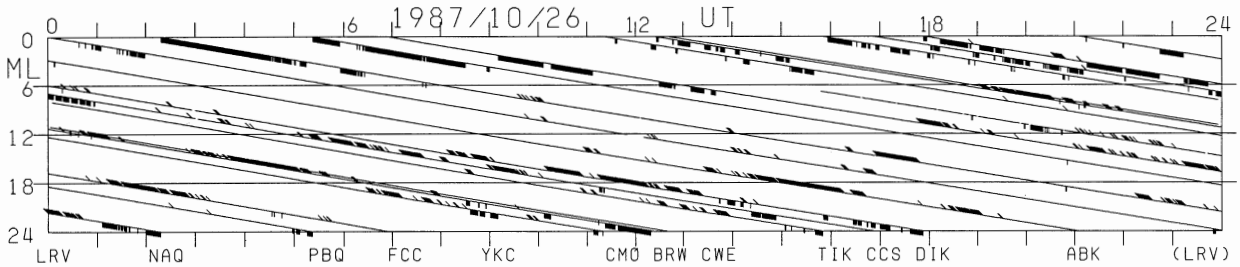
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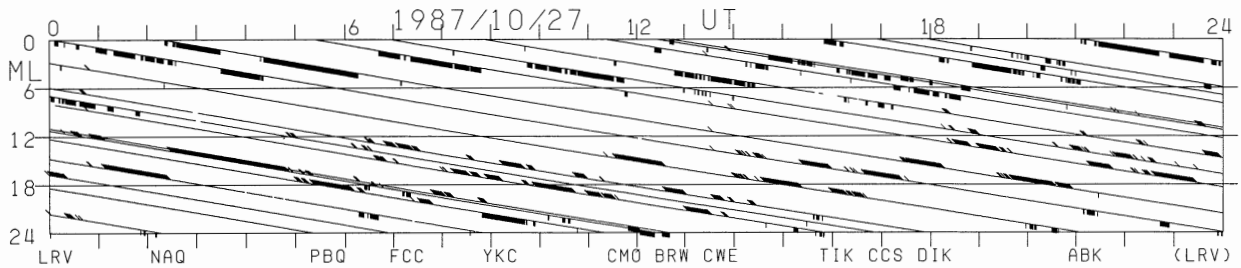
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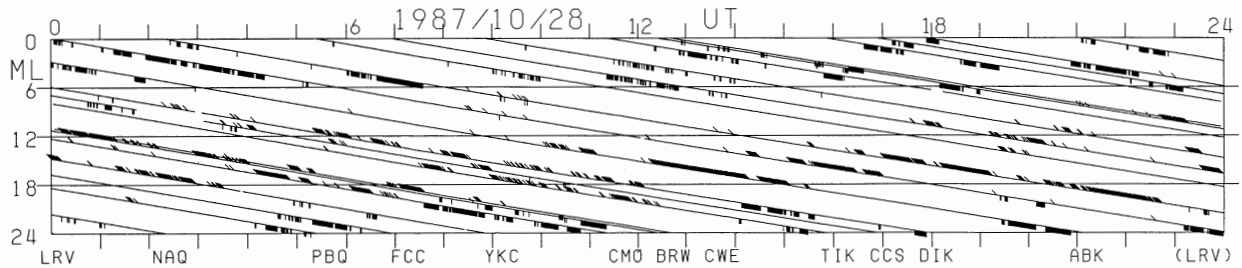
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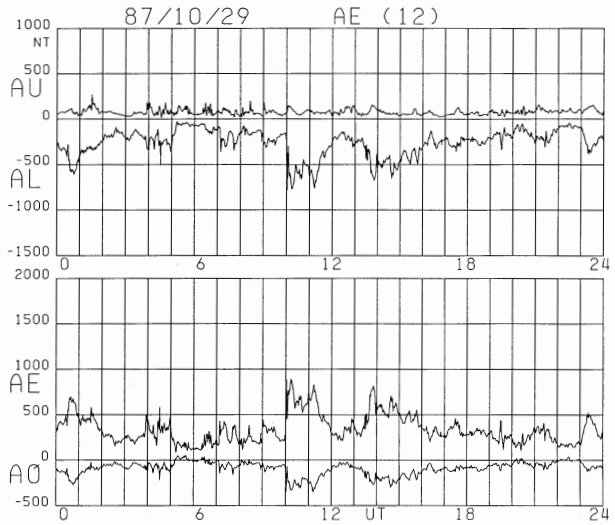
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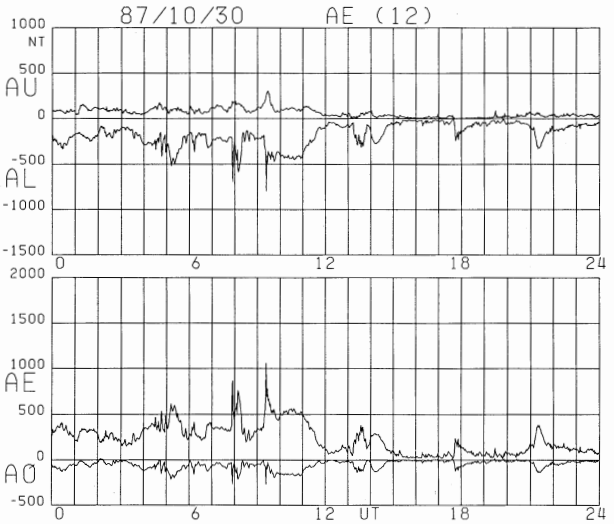
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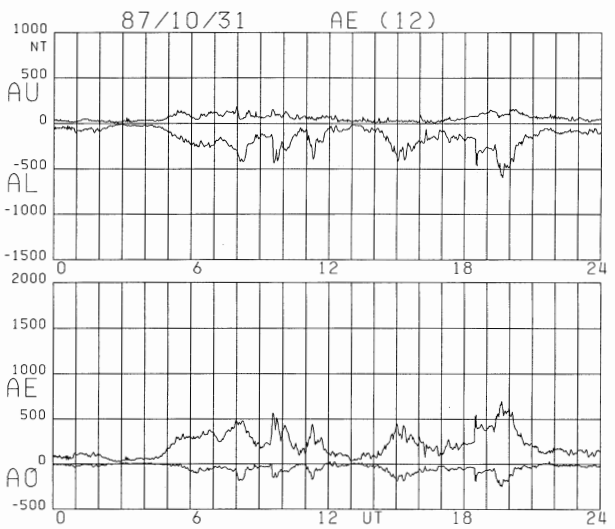
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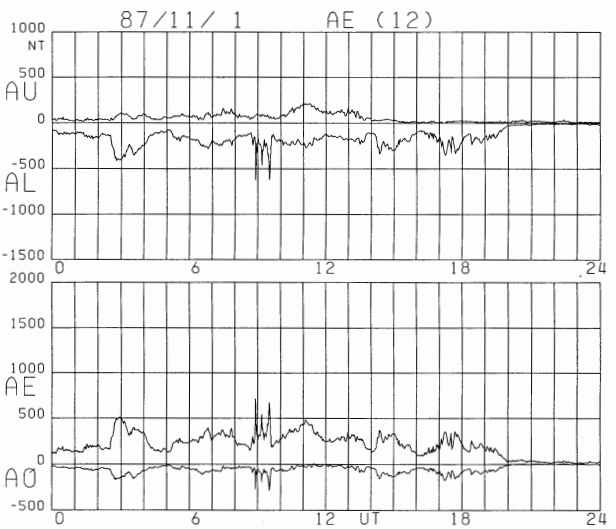
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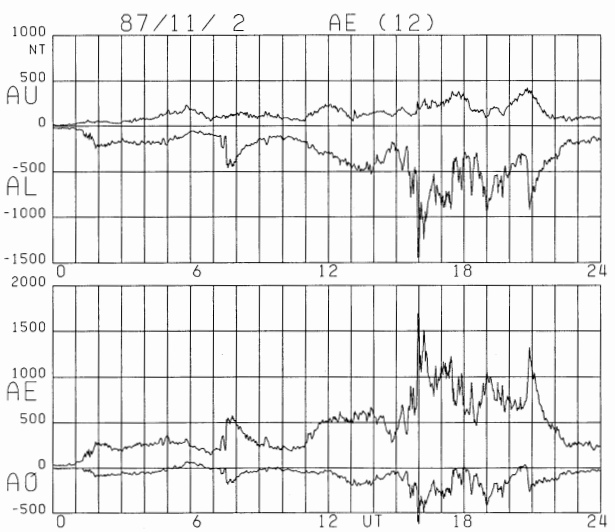
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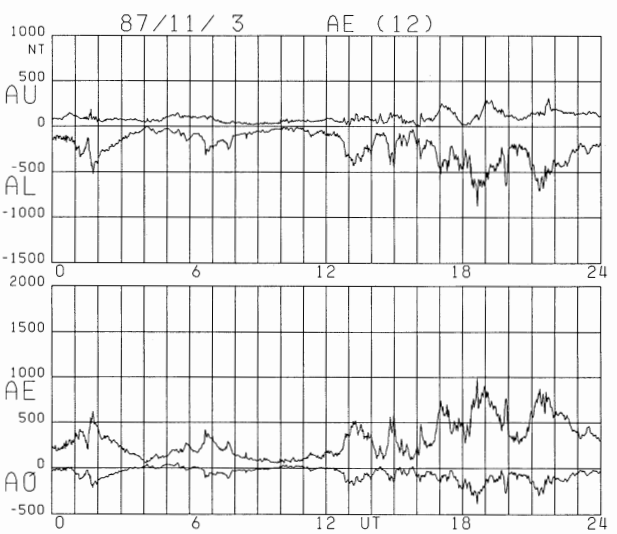
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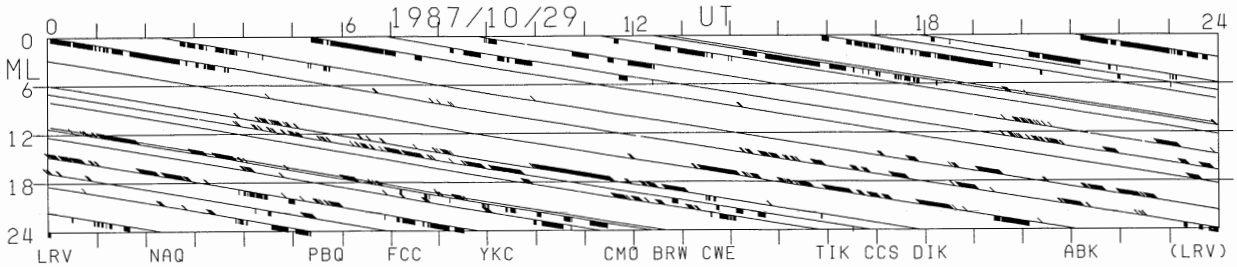
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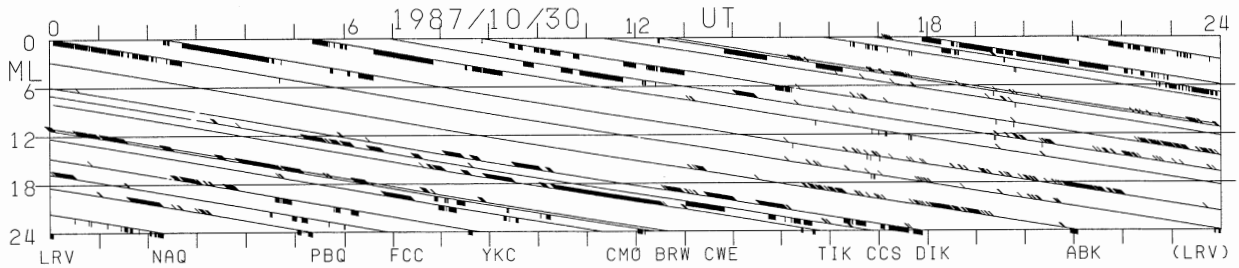
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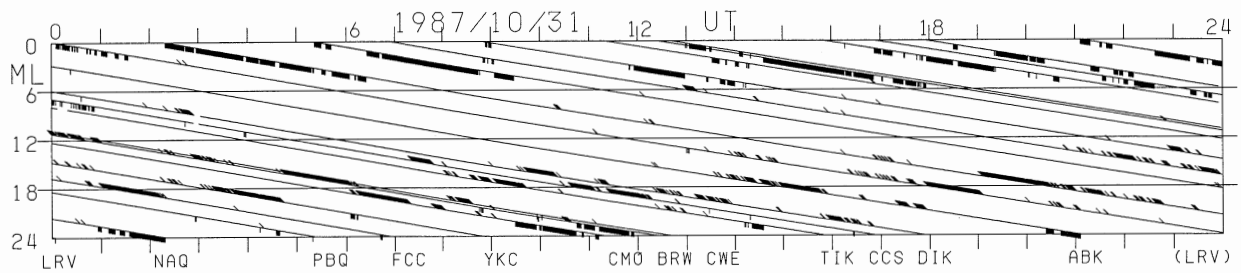
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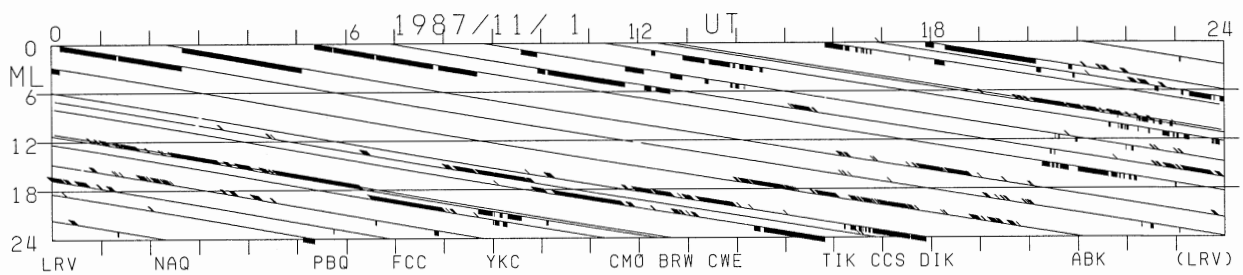
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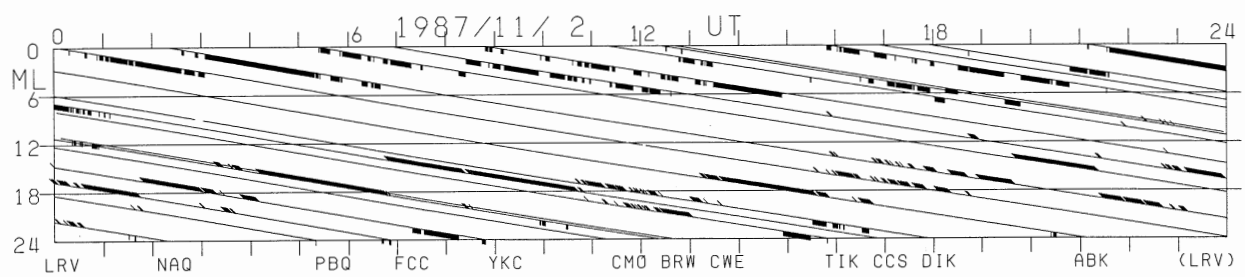
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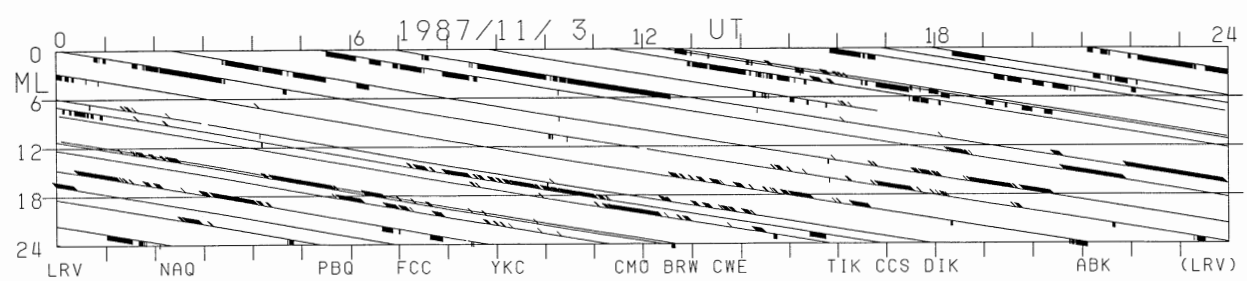
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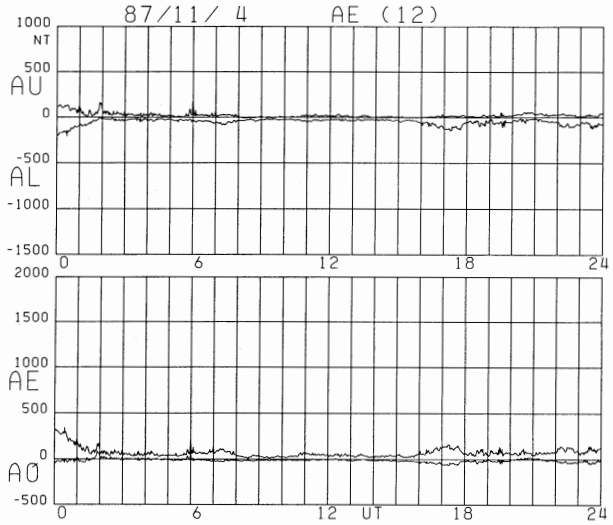
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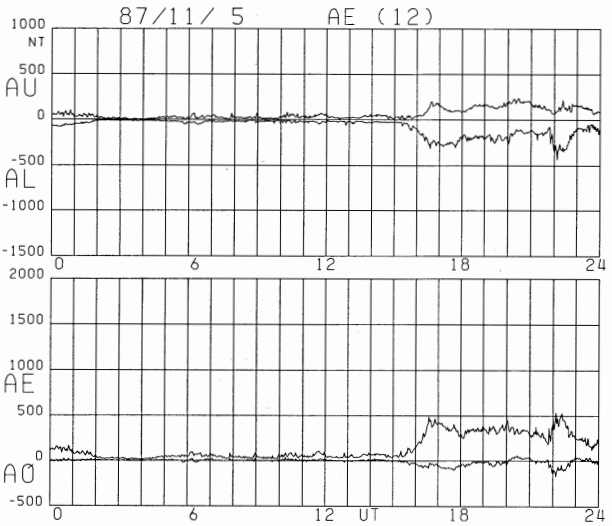
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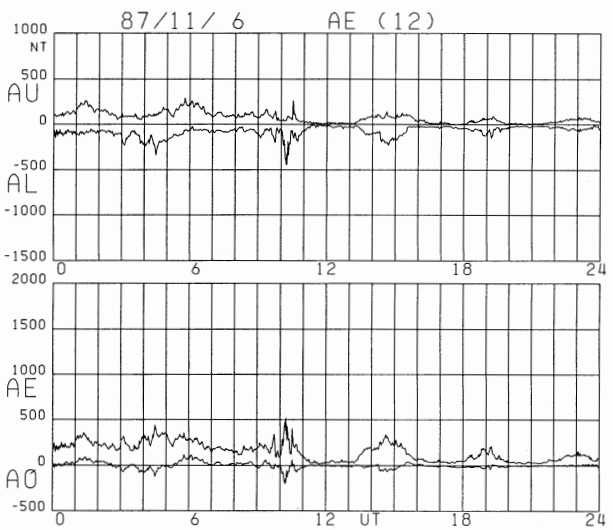
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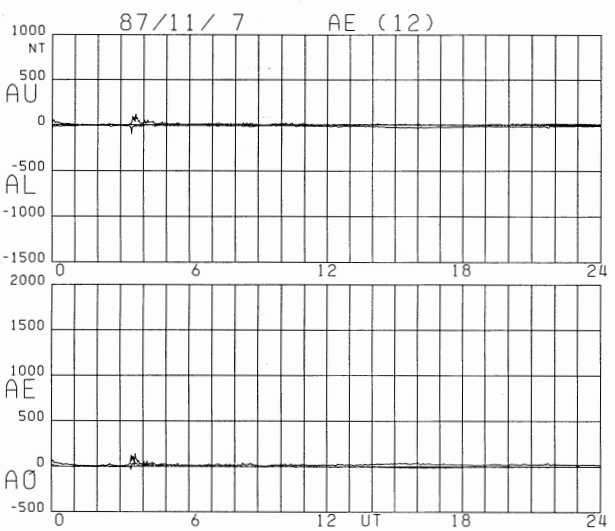
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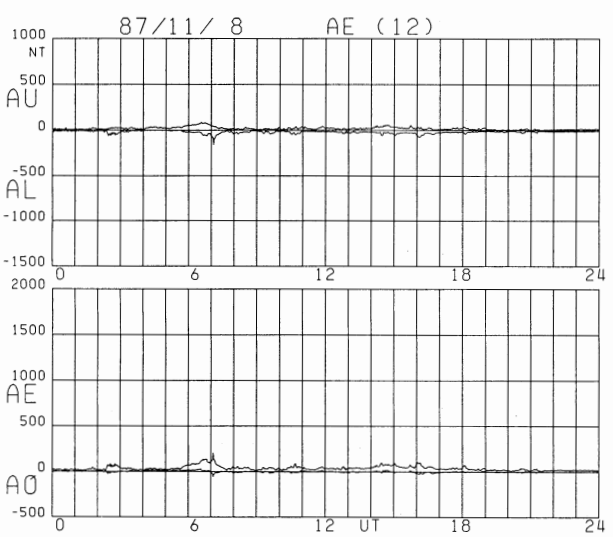
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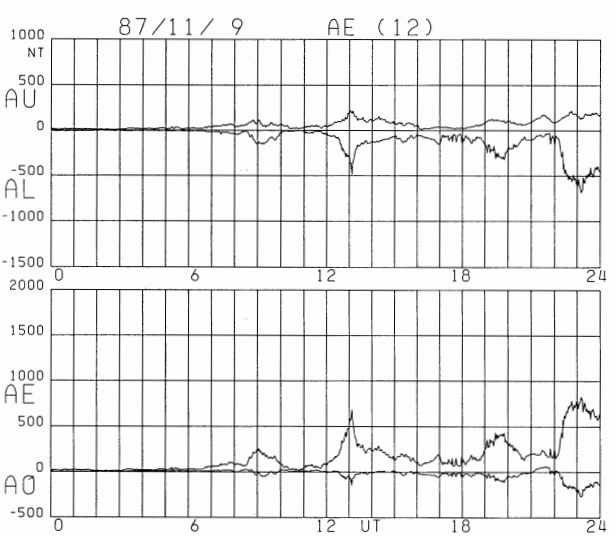
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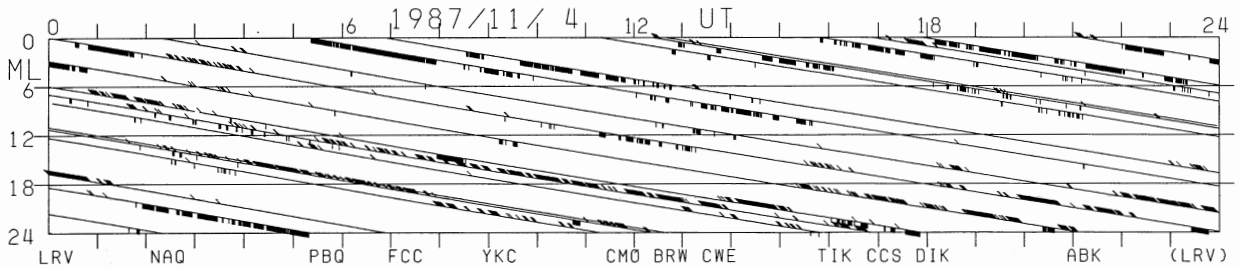
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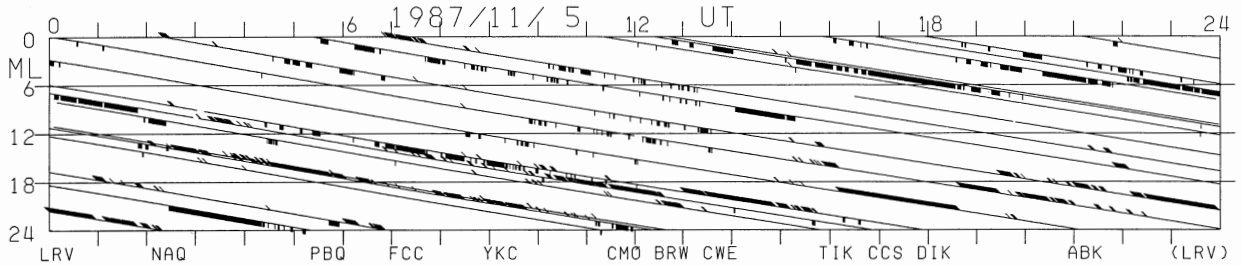
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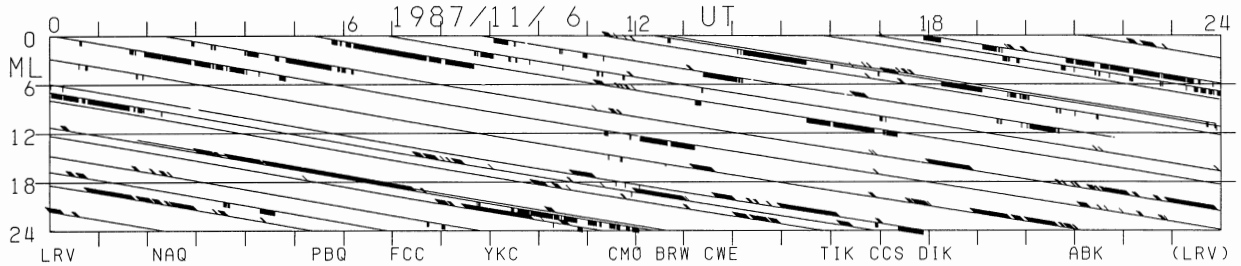
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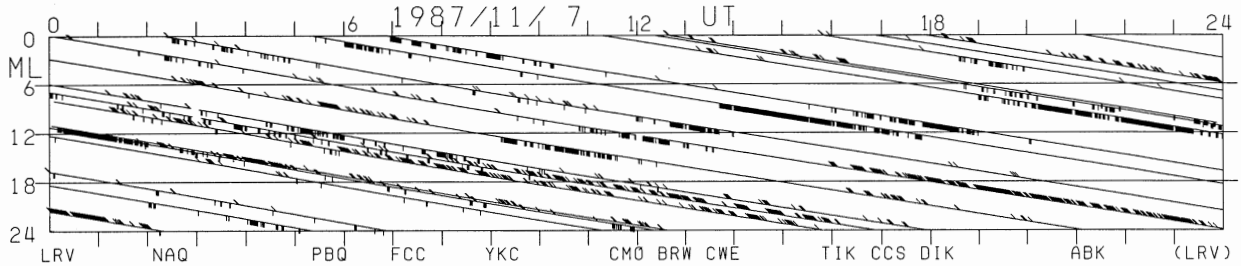
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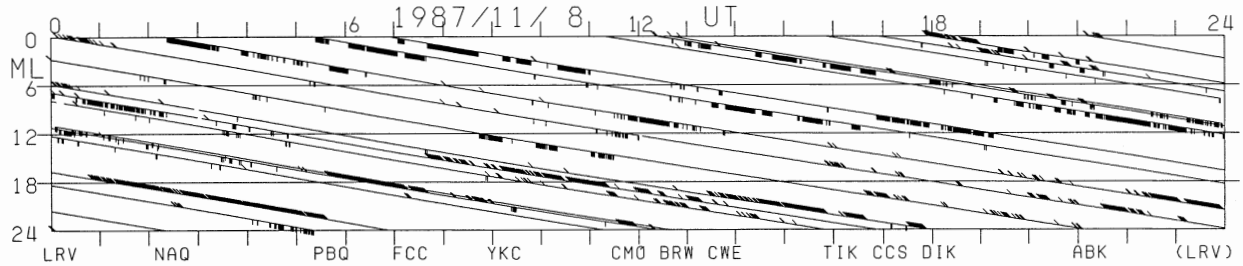
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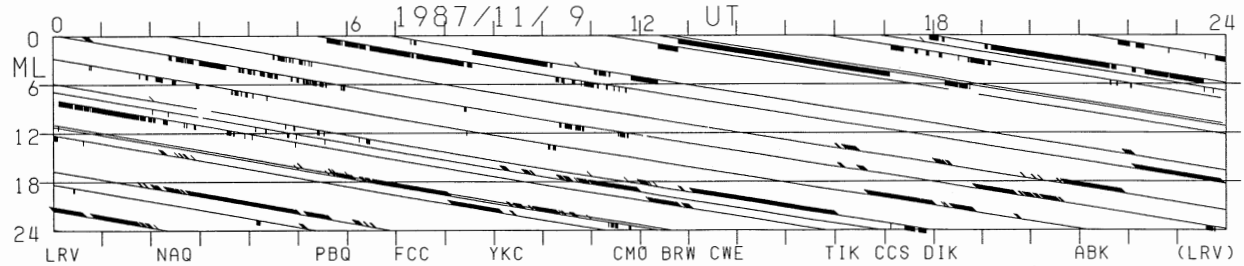
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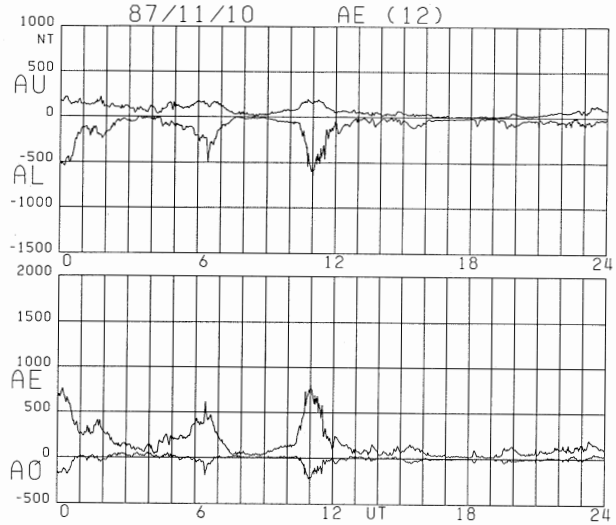
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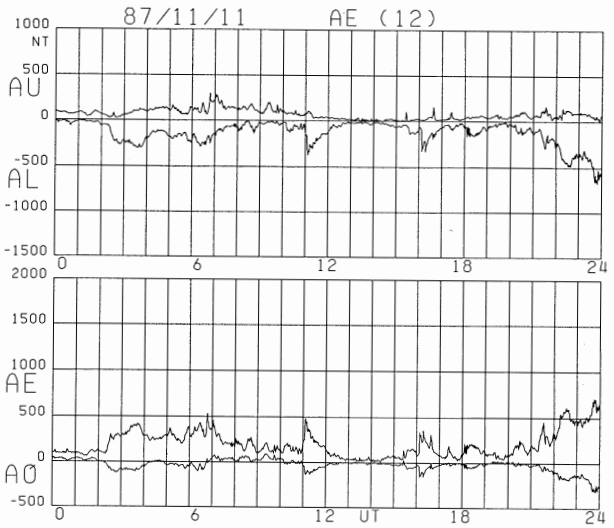
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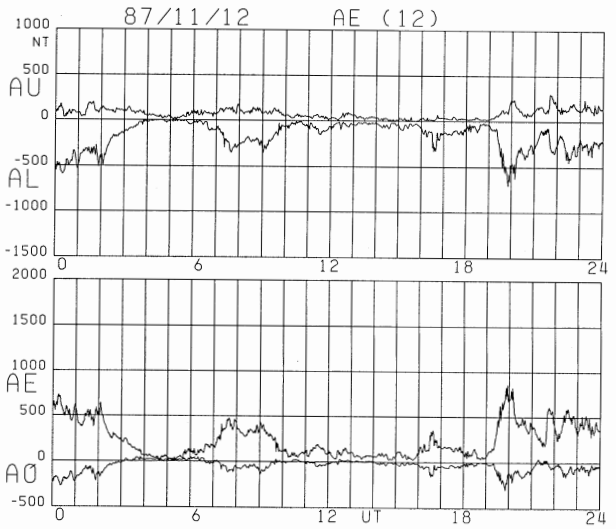
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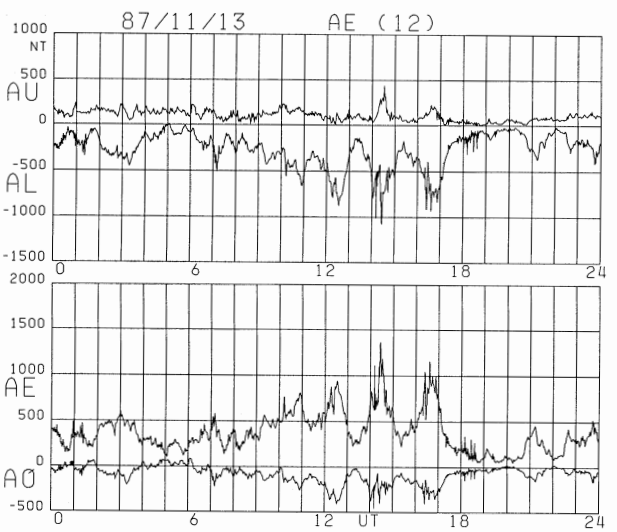
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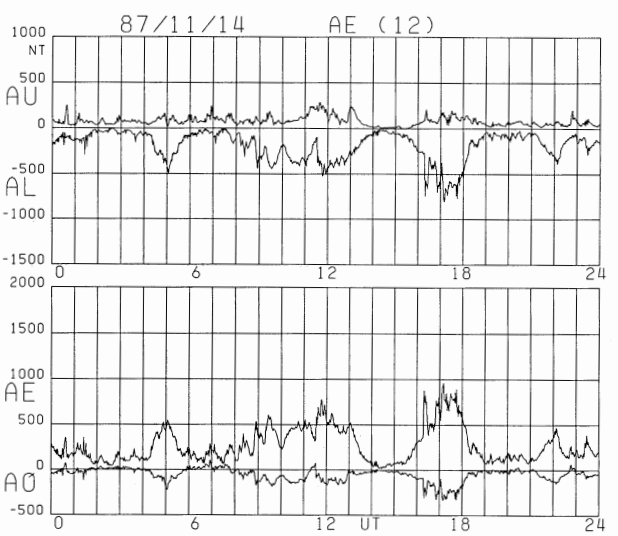
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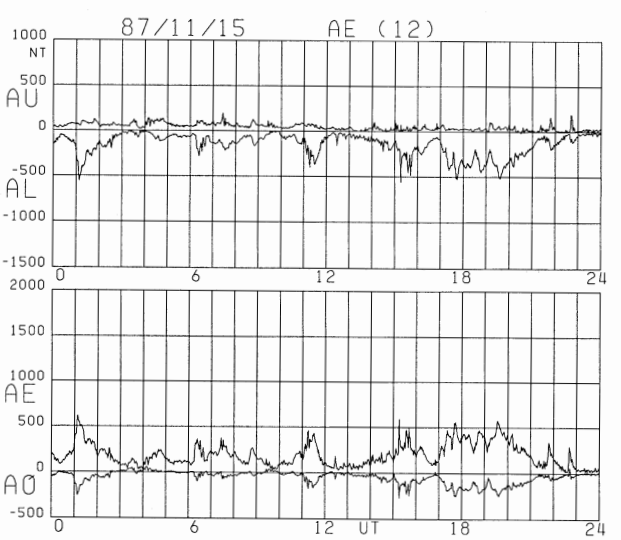
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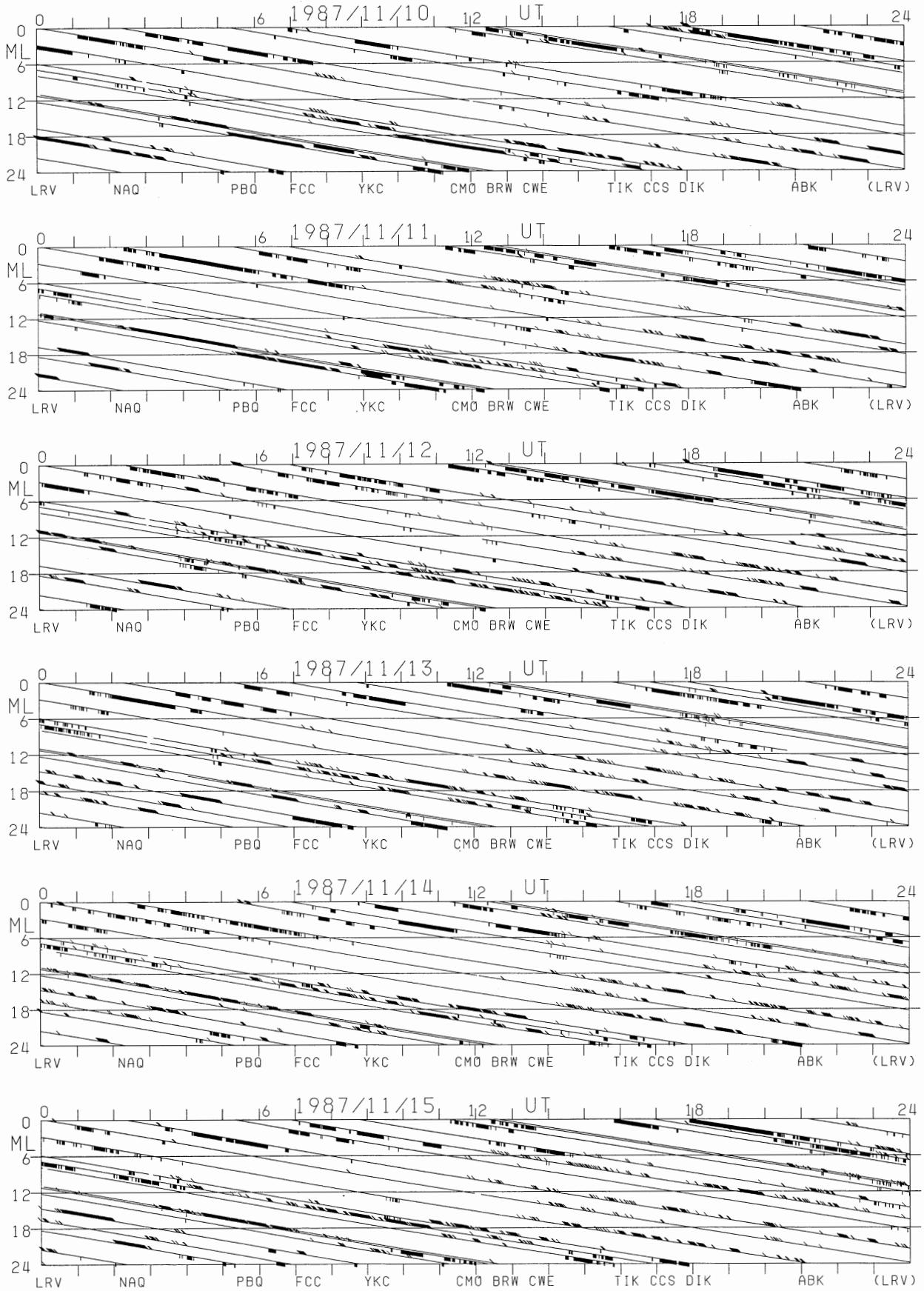
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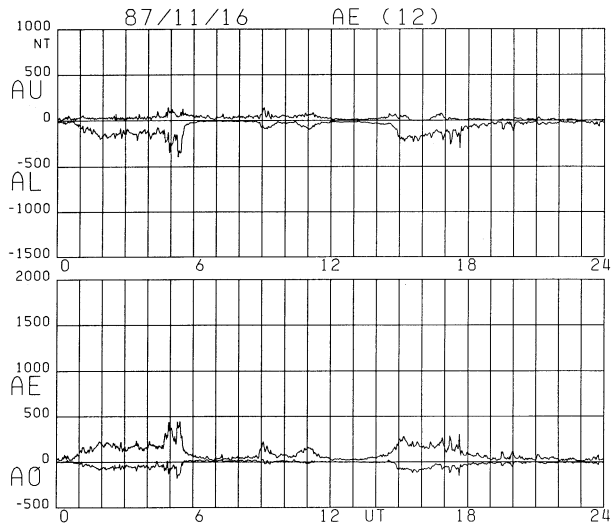
(LRV)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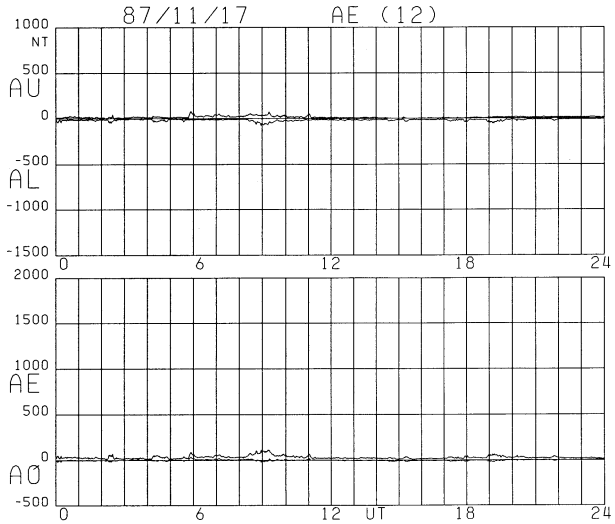
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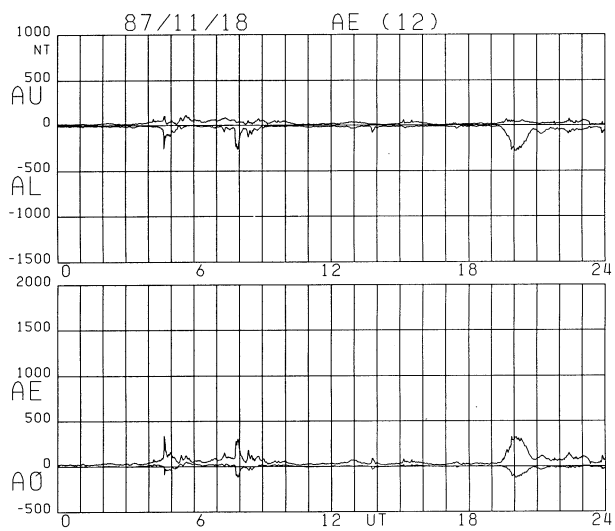
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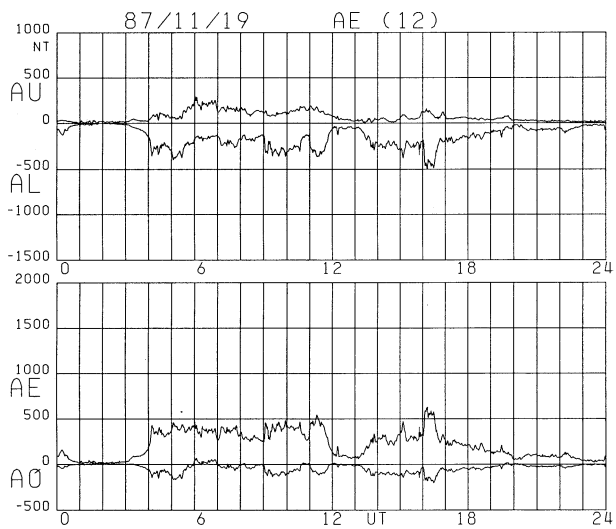
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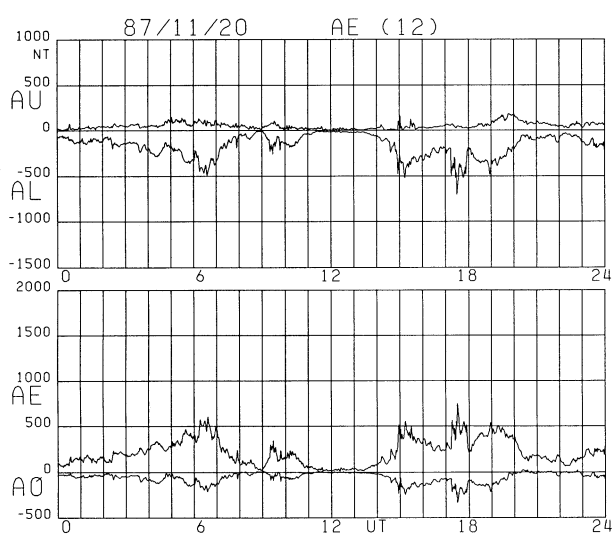
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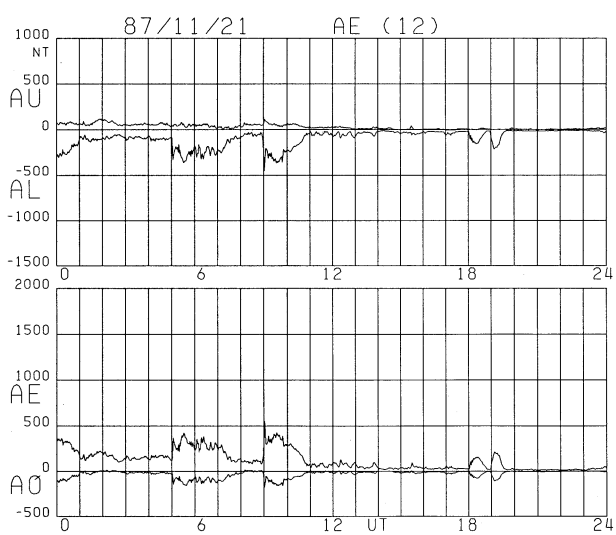
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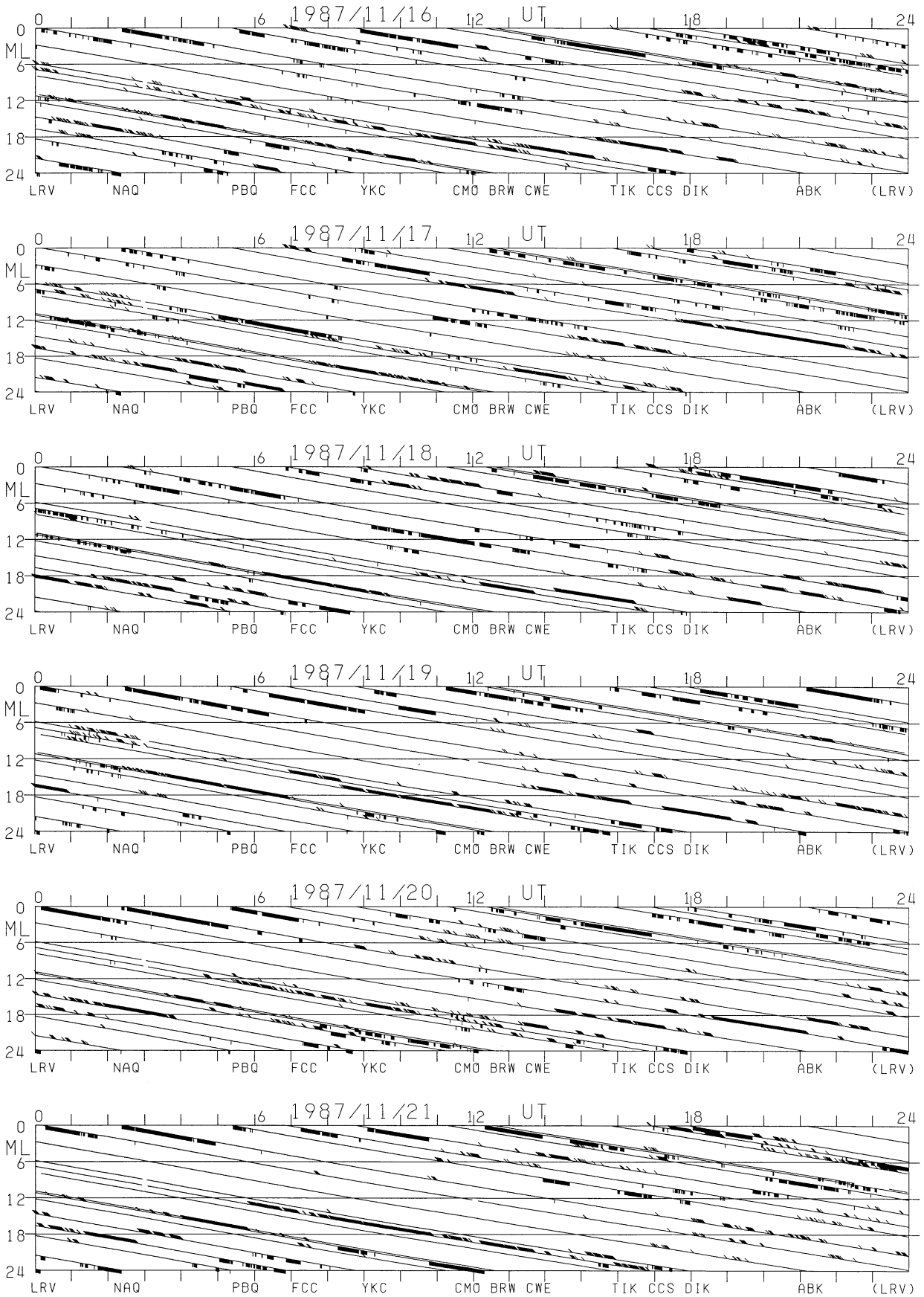
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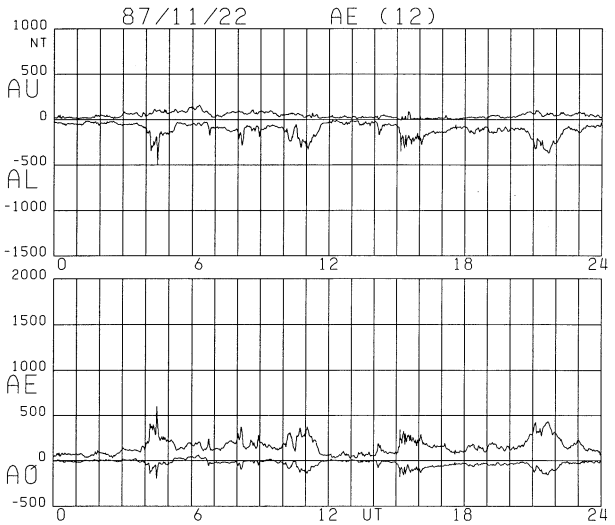
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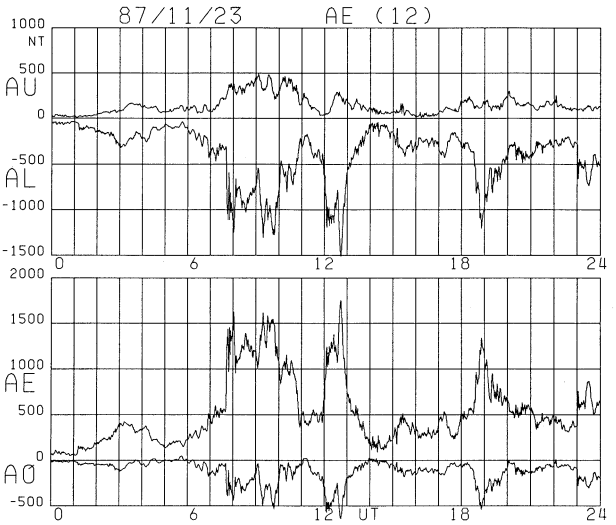
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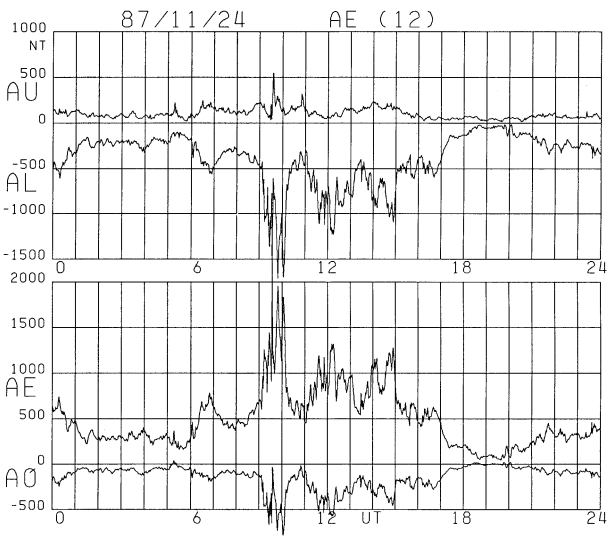
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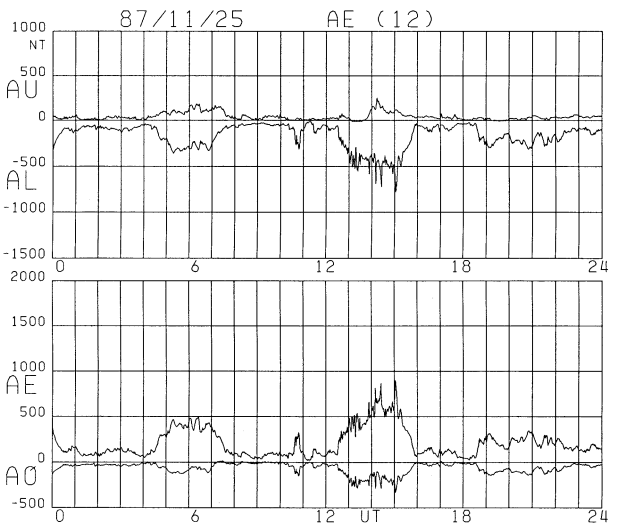
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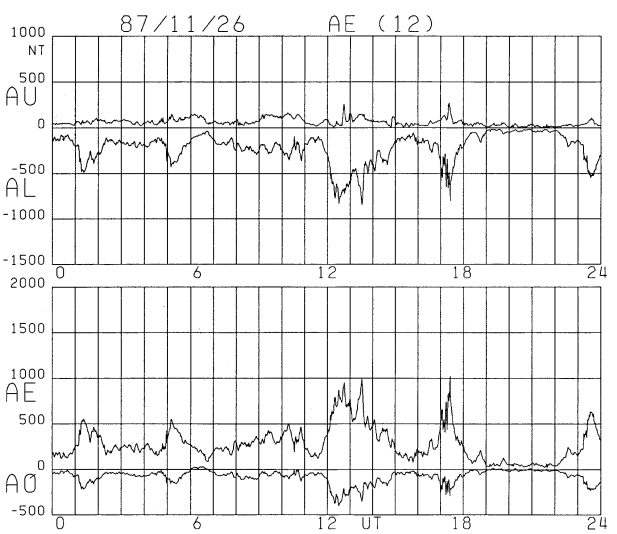
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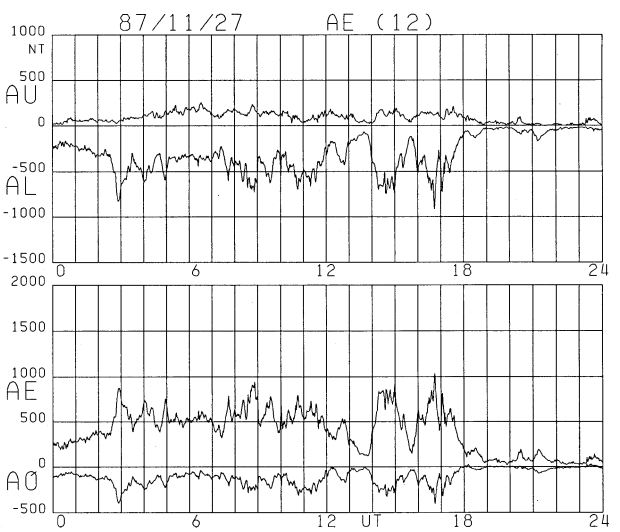
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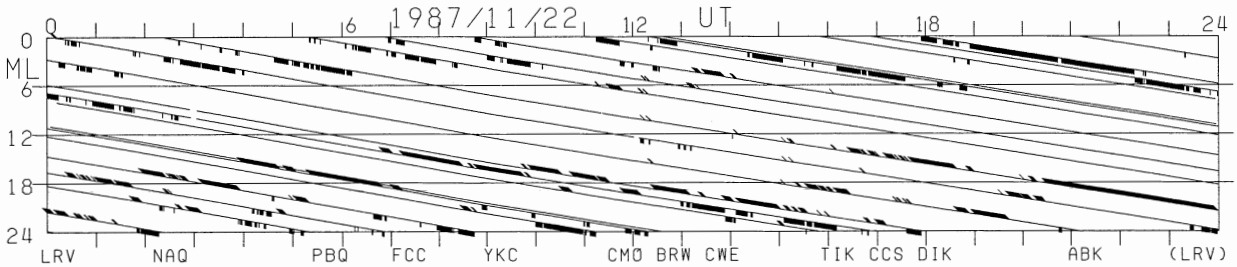
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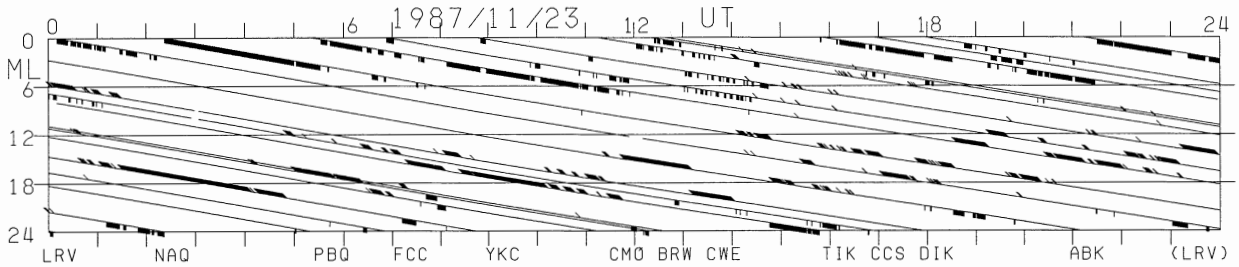
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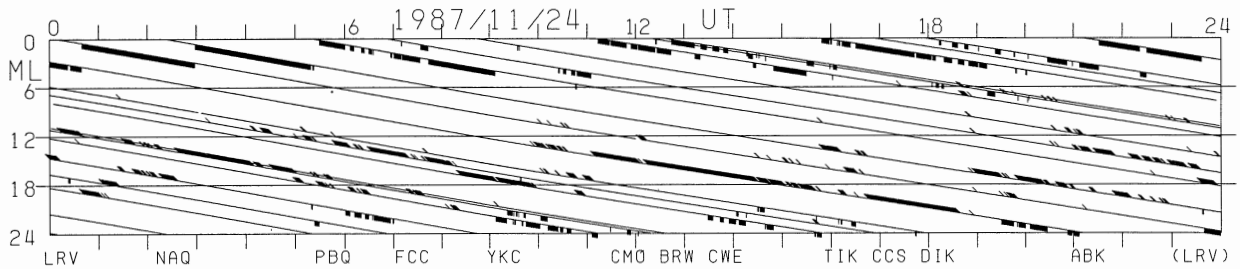
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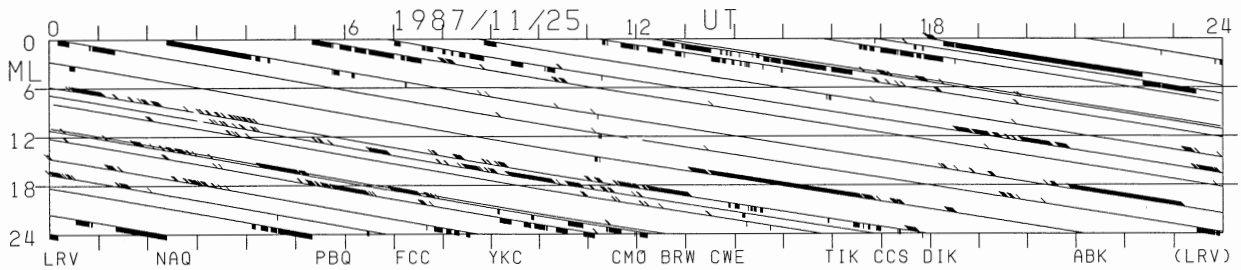
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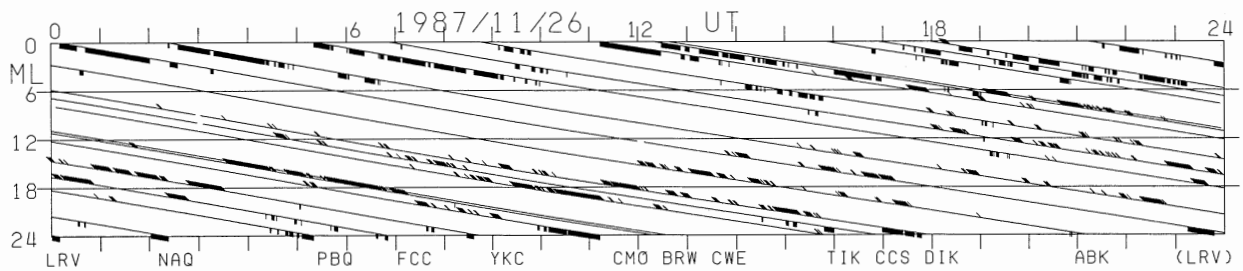
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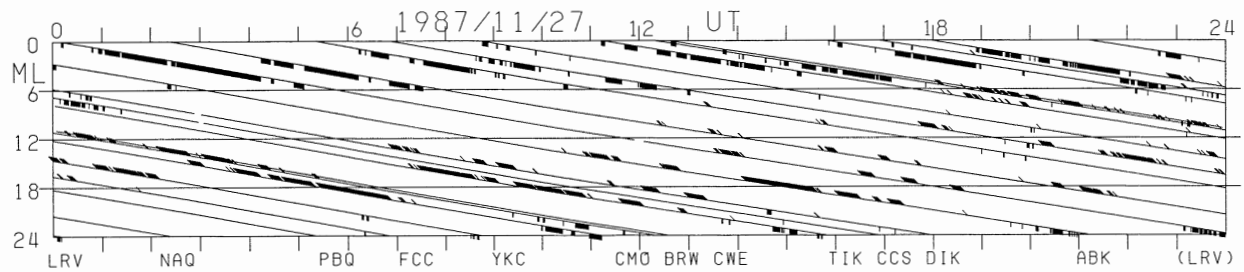
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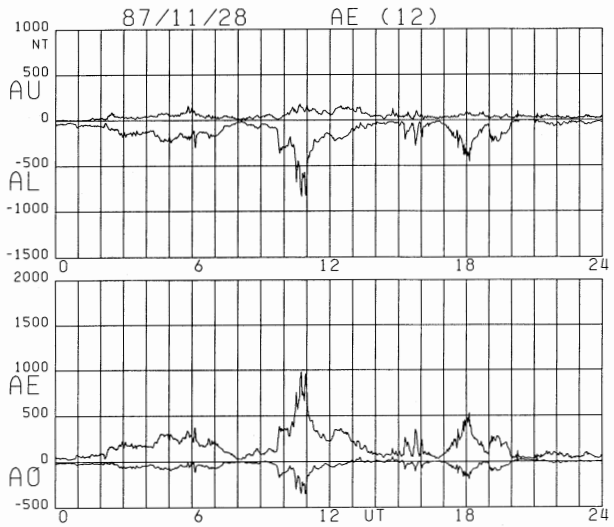
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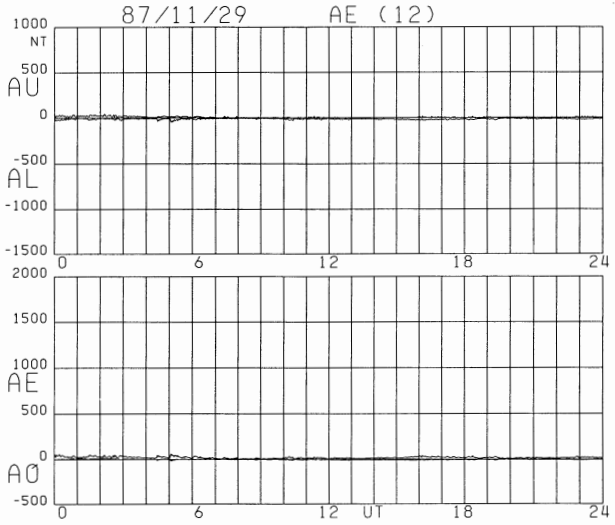
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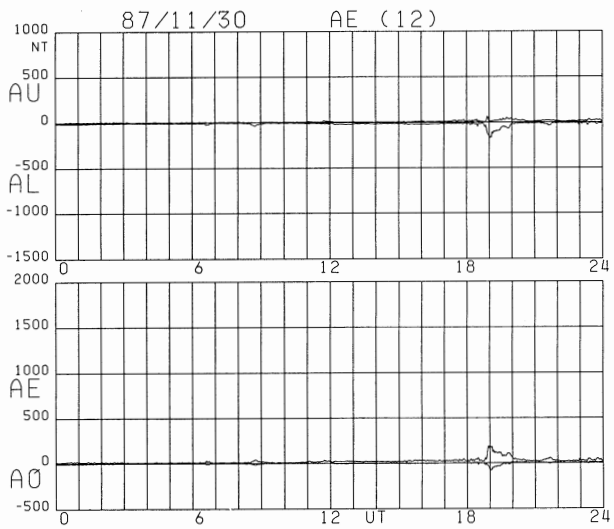
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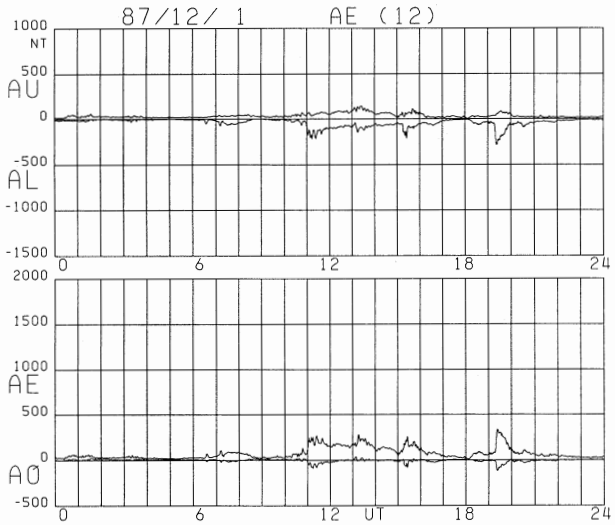
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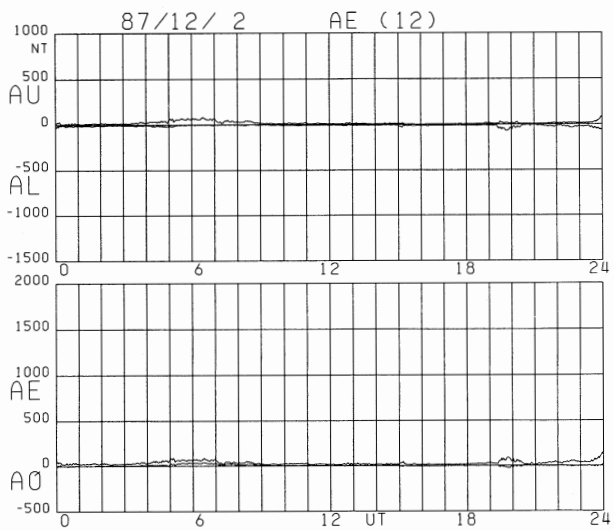
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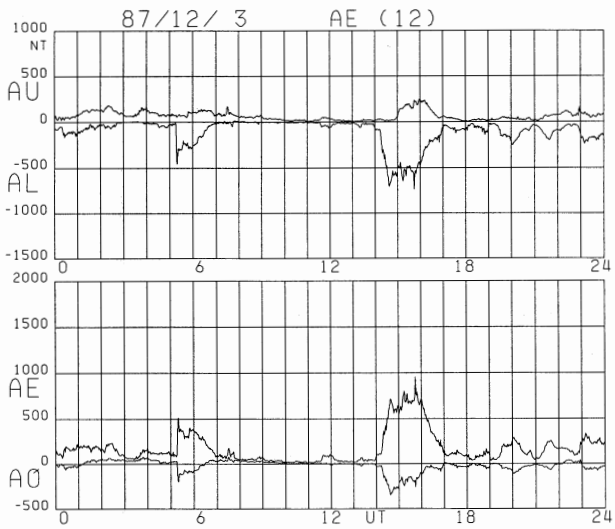
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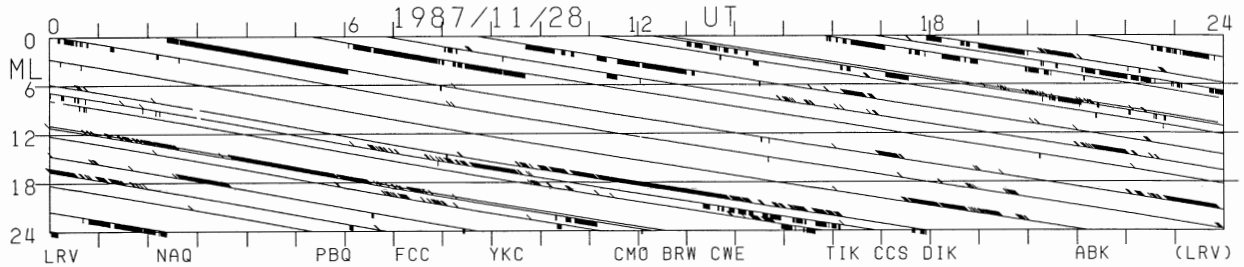
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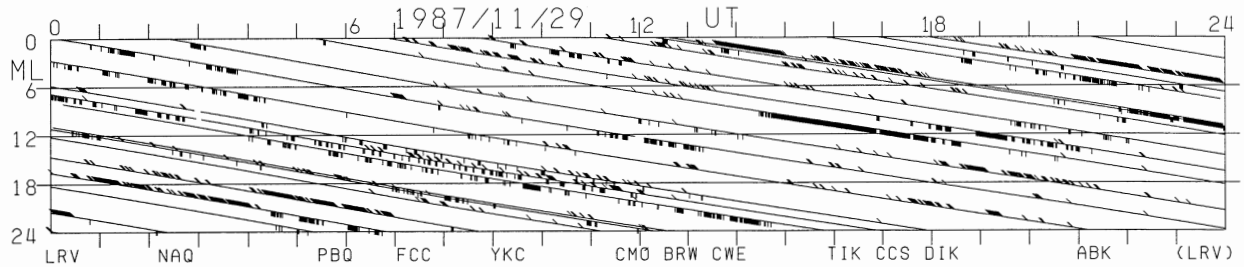
LRV NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)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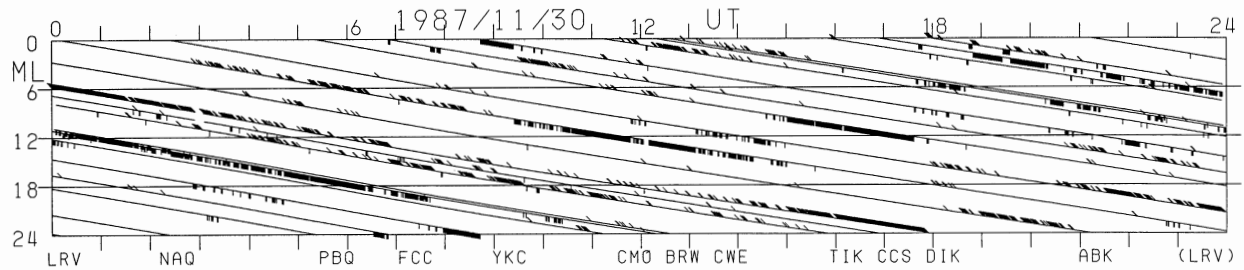
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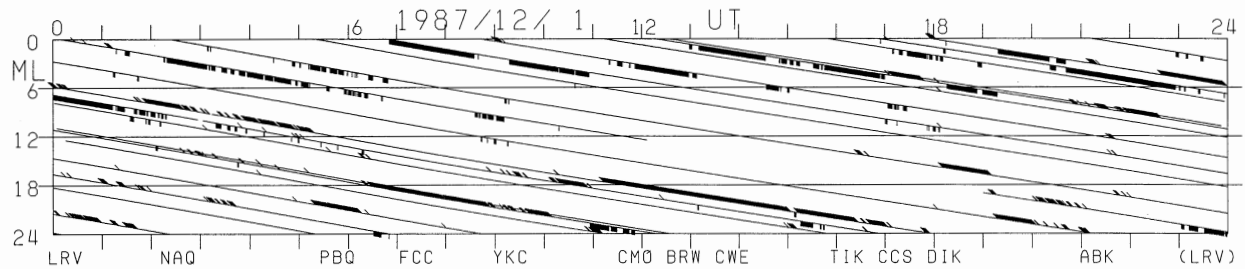
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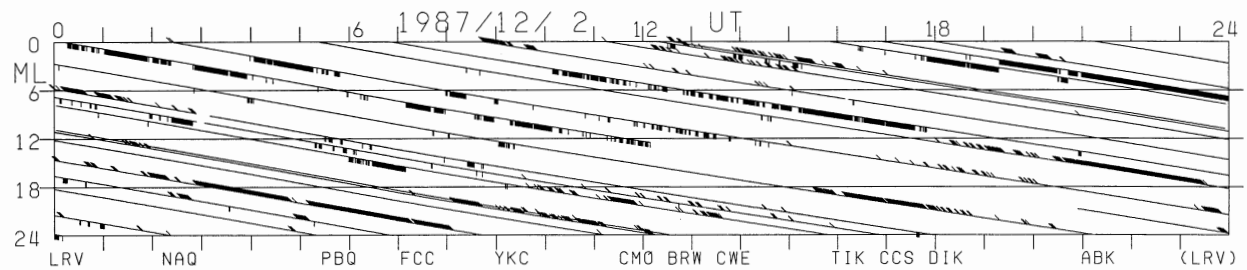
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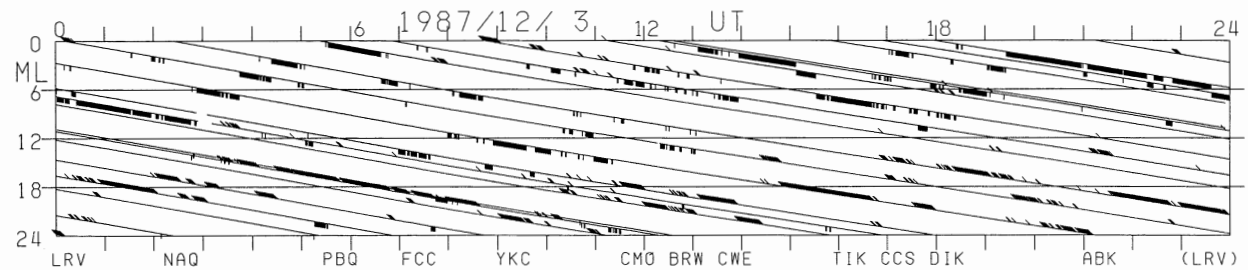
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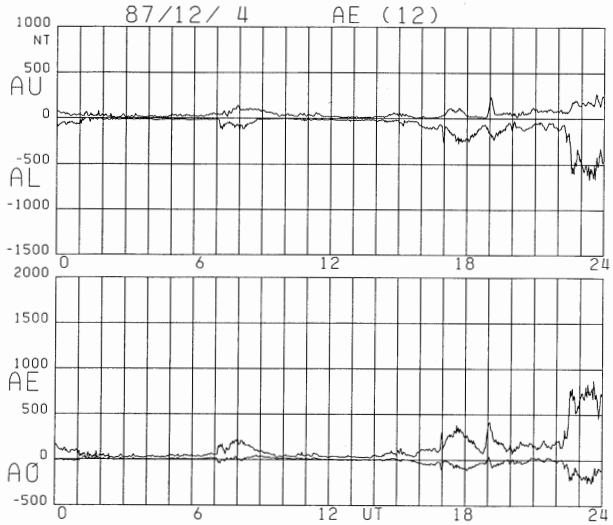
LRV NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)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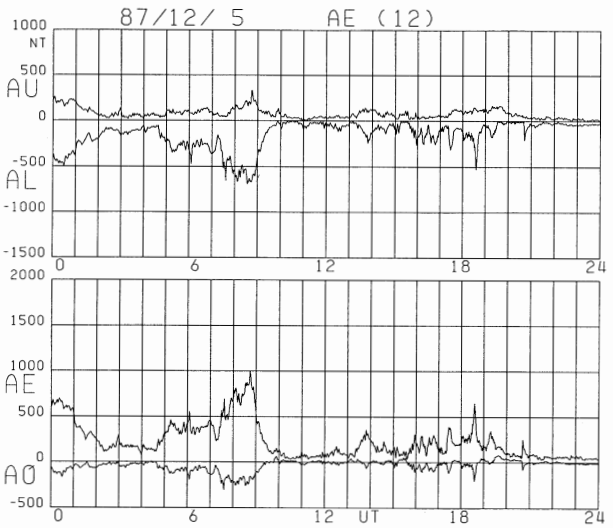
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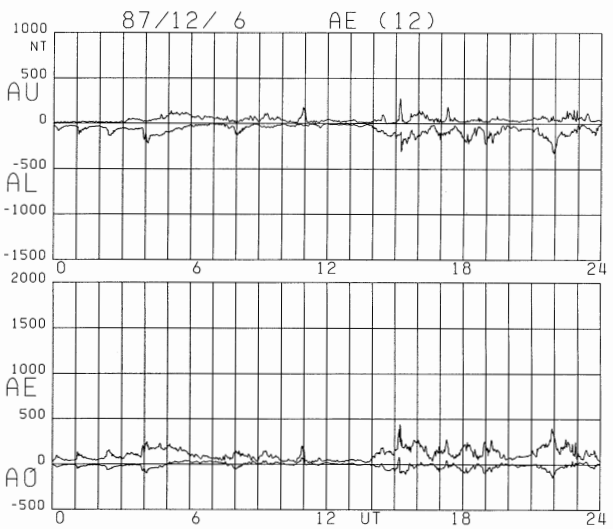
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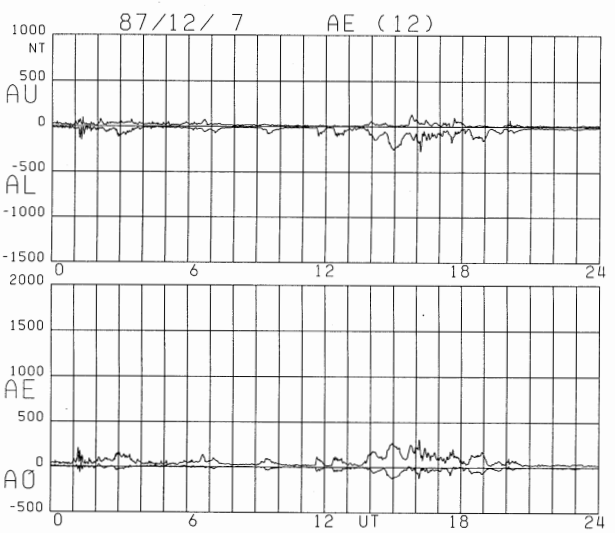
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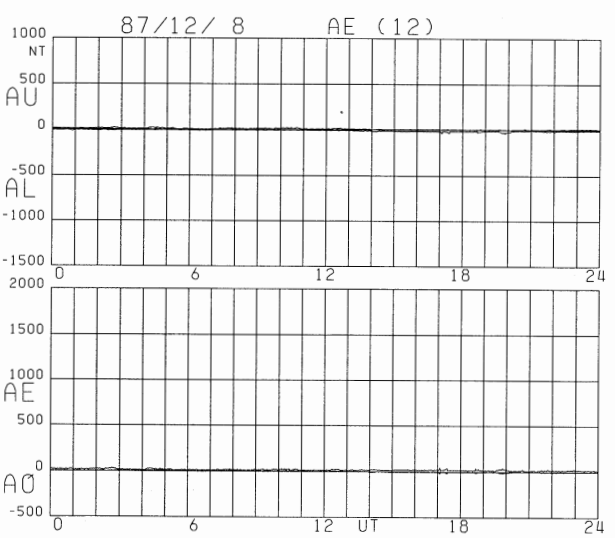
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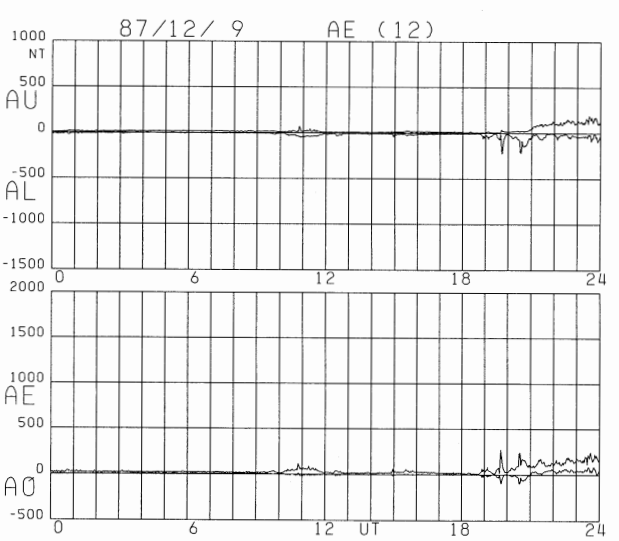
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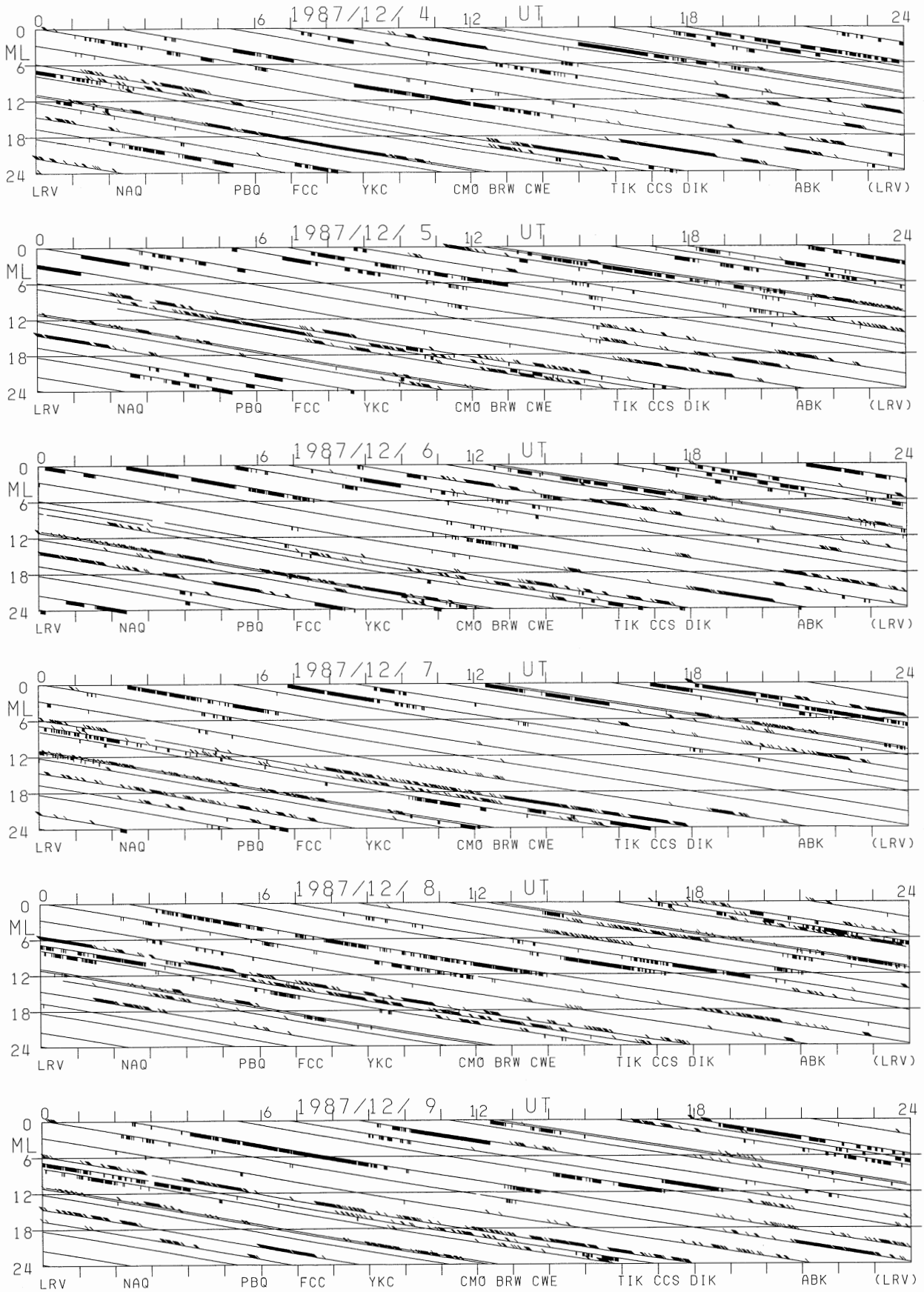
1987/12/ 4 UT
1987/12/ 5 UT
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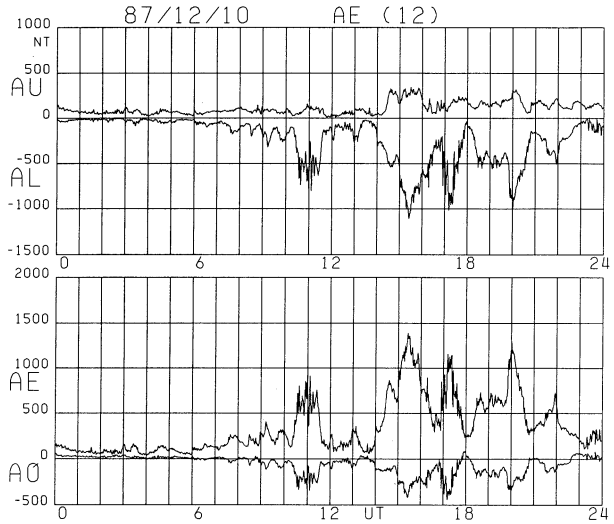
87/12/10 AE (12)
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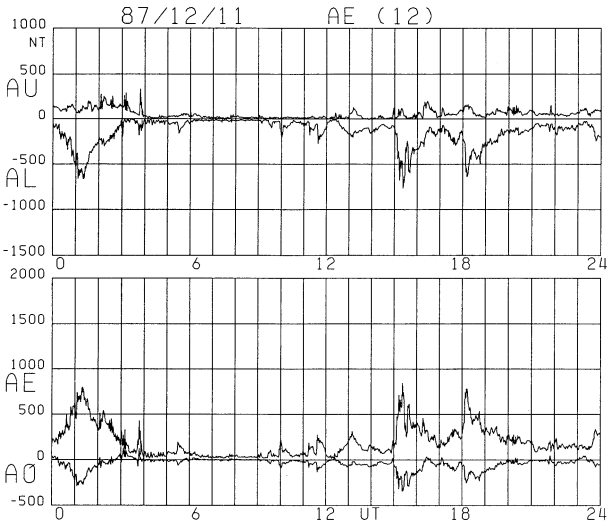
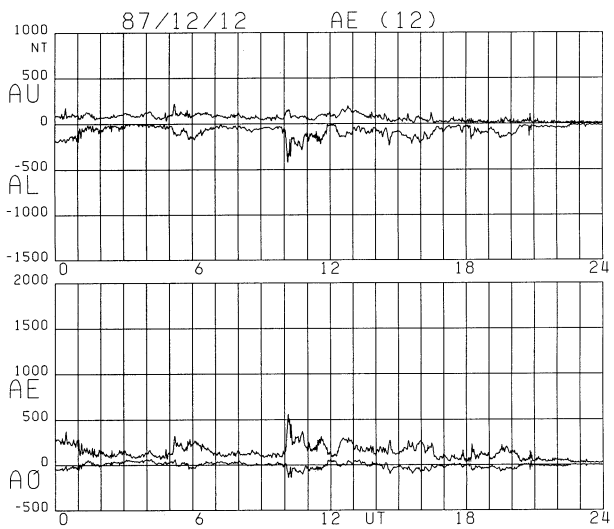
AO
-500
0 6 12 UT 18 24


87/12/11 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24


87/12/12 AE (12)
1000
NT
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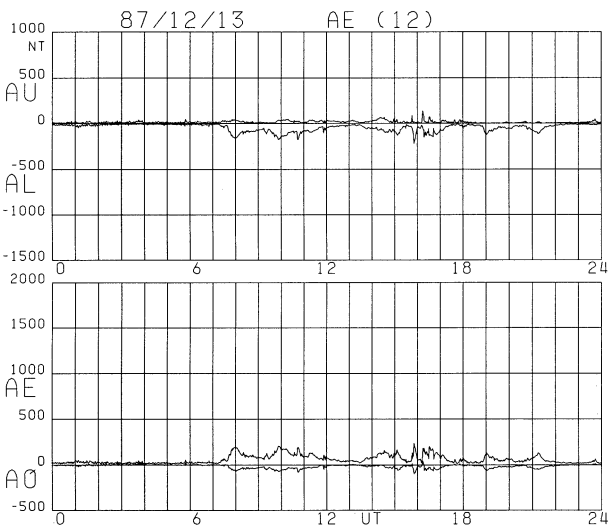
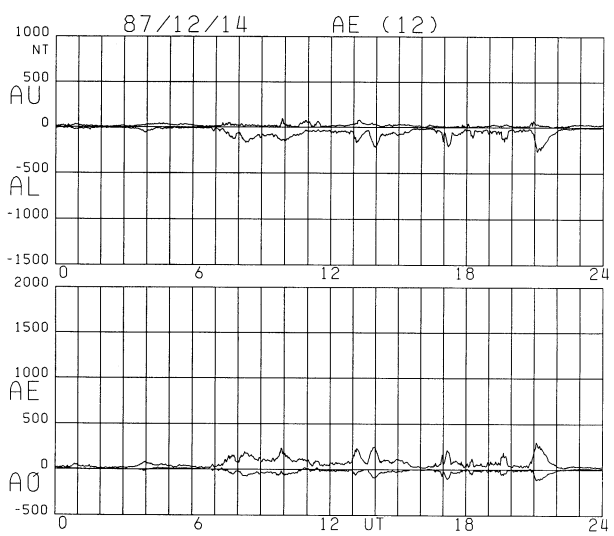
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24


87/12/13 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24


87/12/14 AE (12)
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NT
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AL
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-1500
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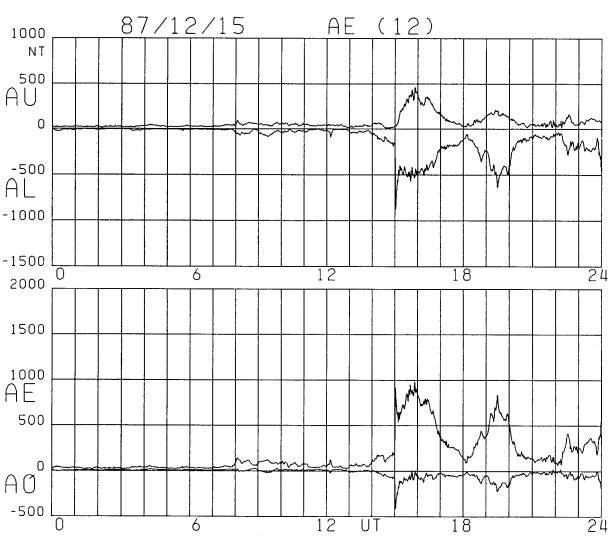
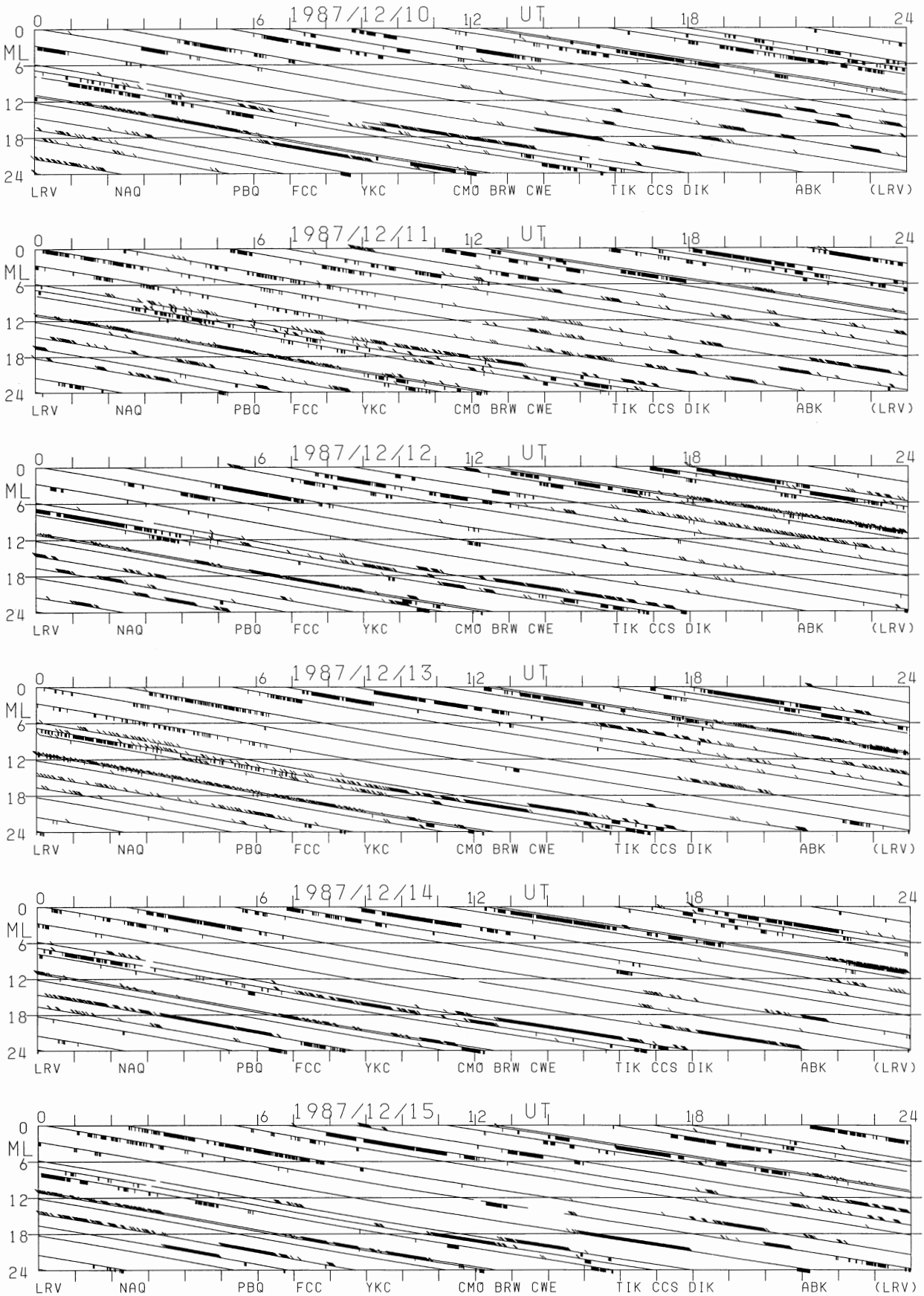
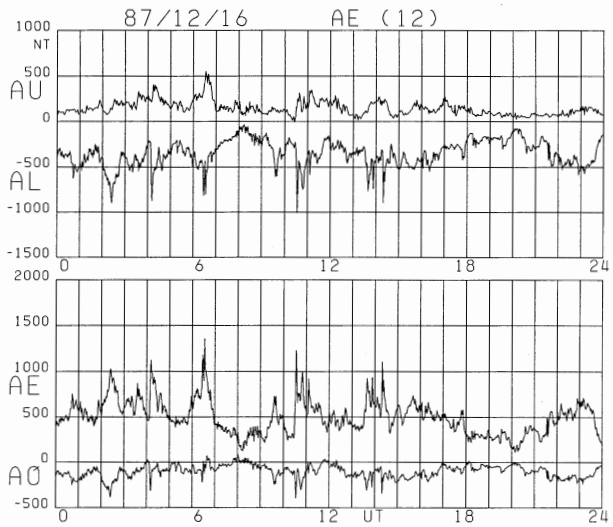
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24


87/12/15 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24


1987/12/10 UT
1987/12/11 UT
1987/12/12 UT
1987/12/13 UT
1987/12/14 UT
1987/12/15 UT
0
6
12
18
24
ML
LRV NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)


87/12/16 AE (12)
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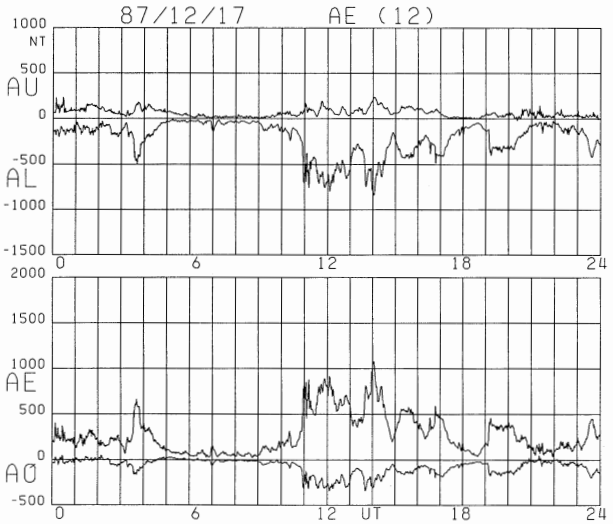
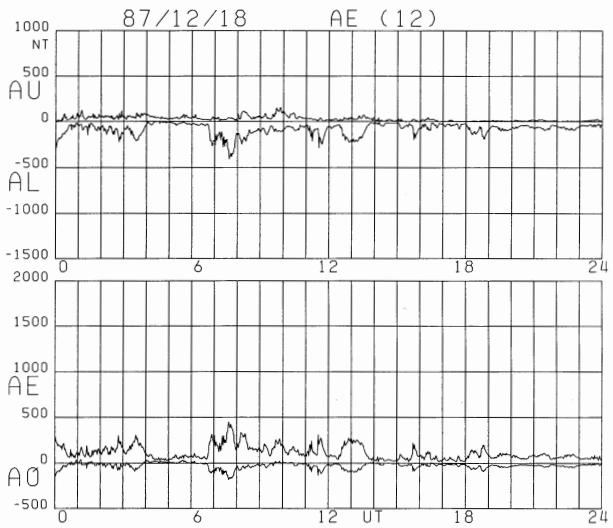
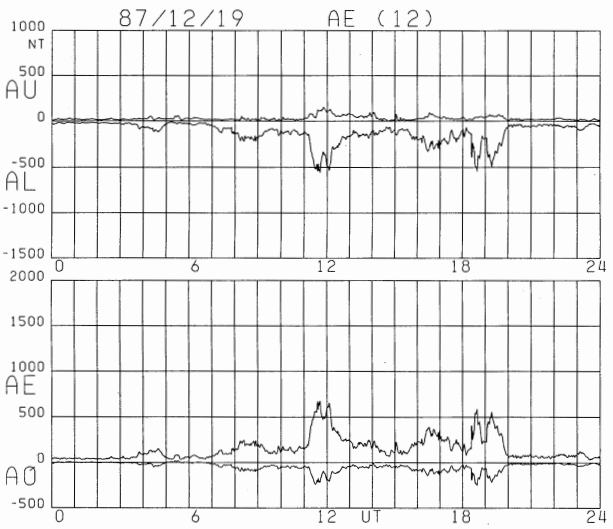
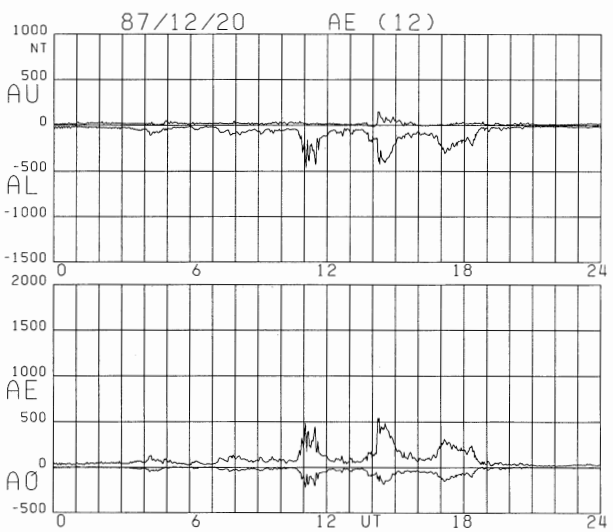
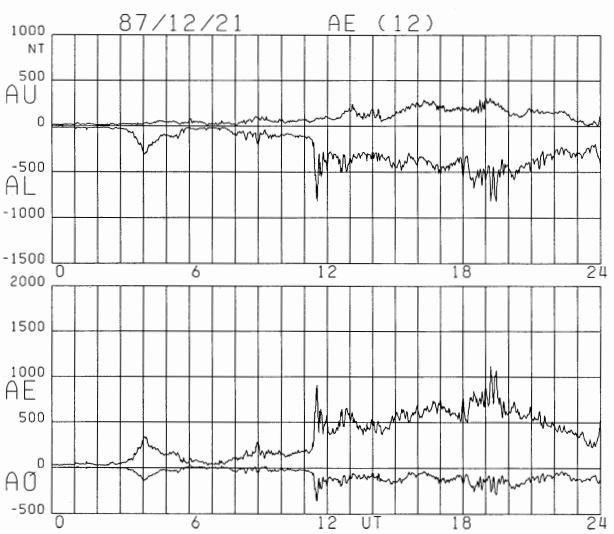
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

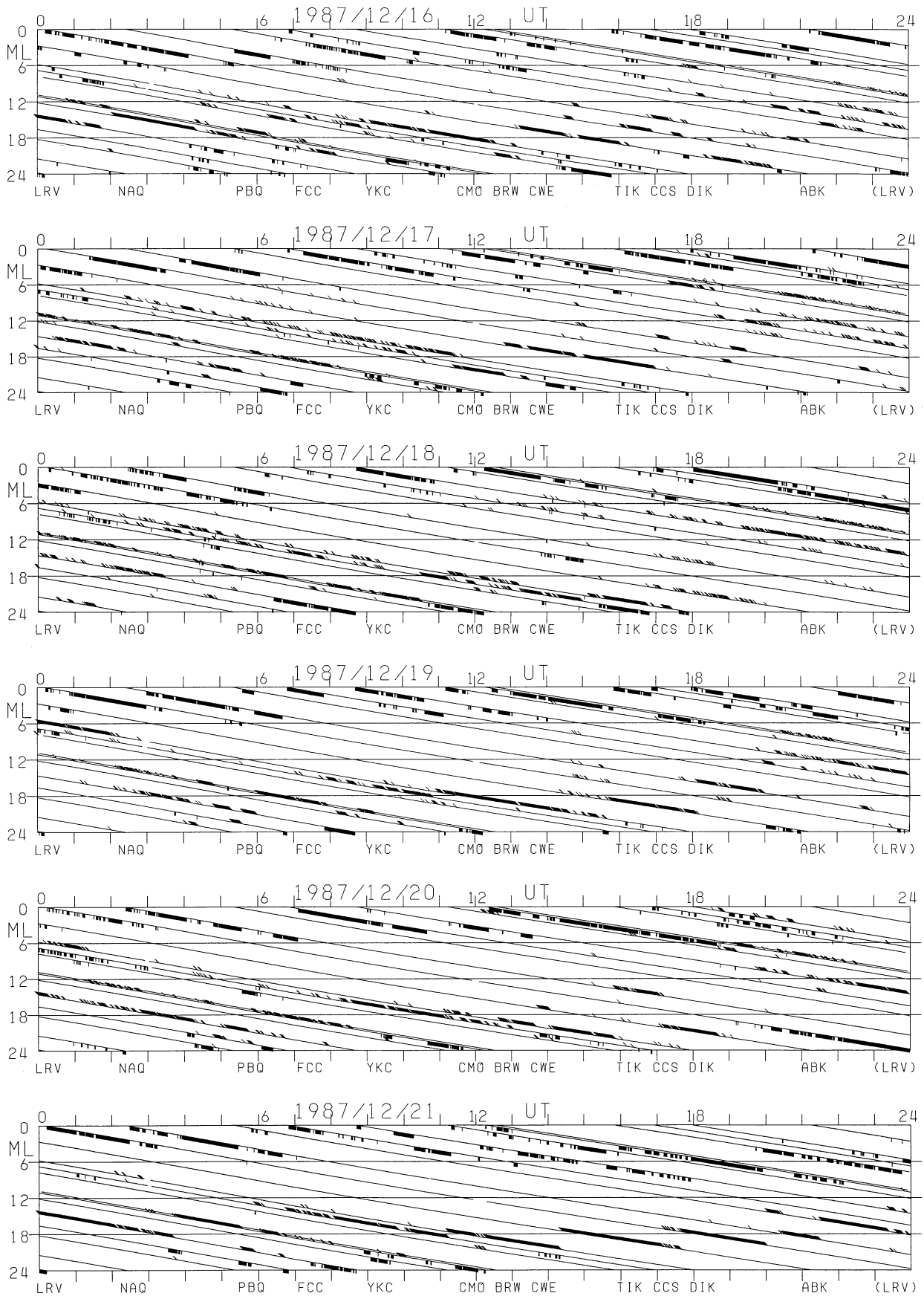

87/12/17 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

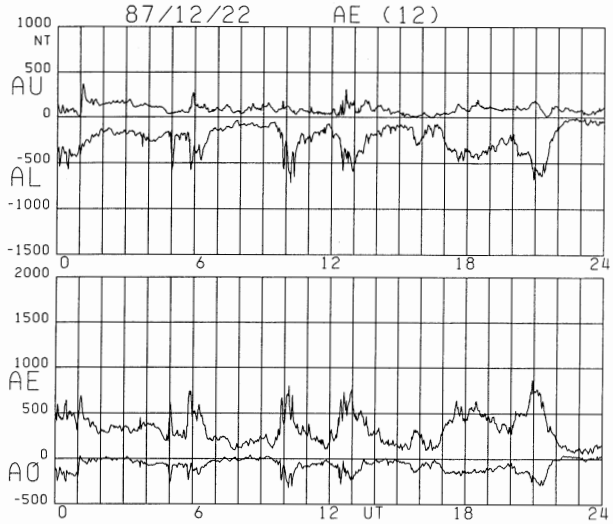

87/12/18 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

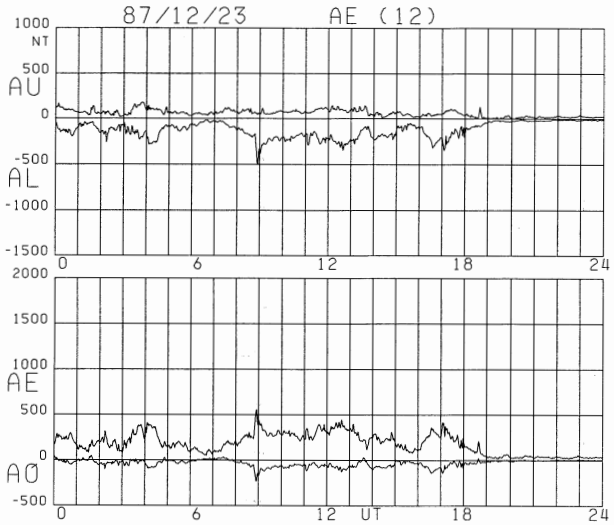

87/12/19 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

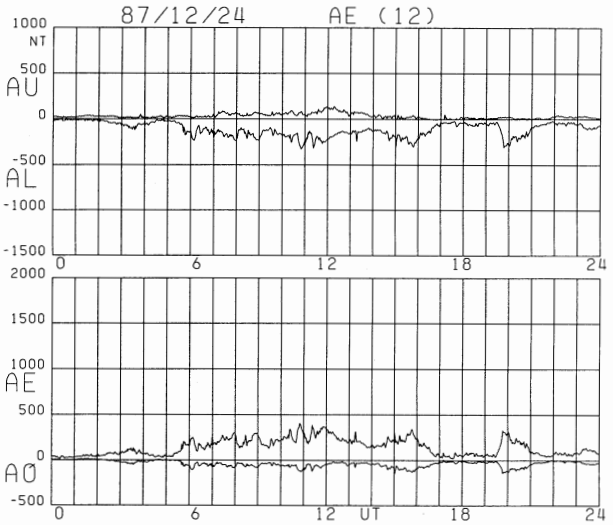

87/12/20 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

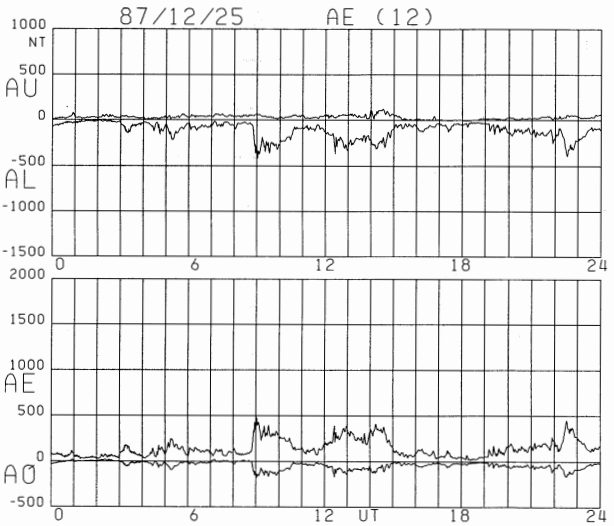

87/12/21 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24


1987/12/16 UT
1987/12/17 UT
1987/12/18 UT
1987/12/19 UT
1987/12/20 UT
1987/12/21 UT
0
6
12
18
24
ML
LRV NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)

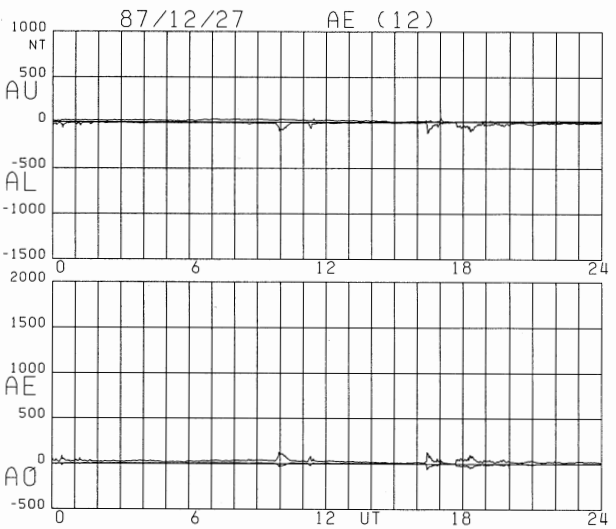

87/12/22 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

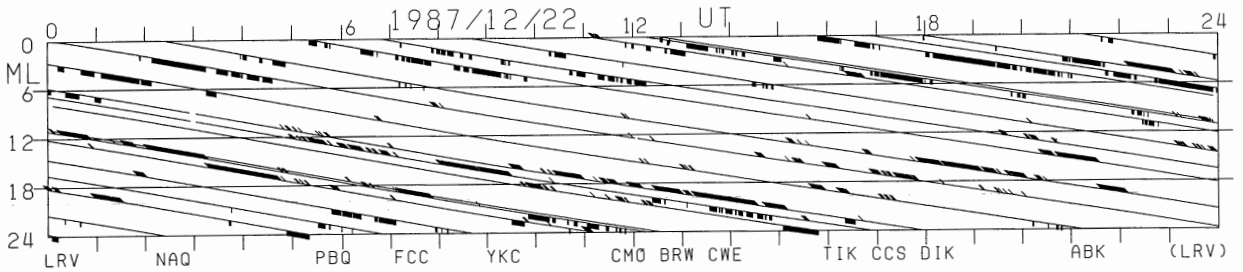

87/12/23 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

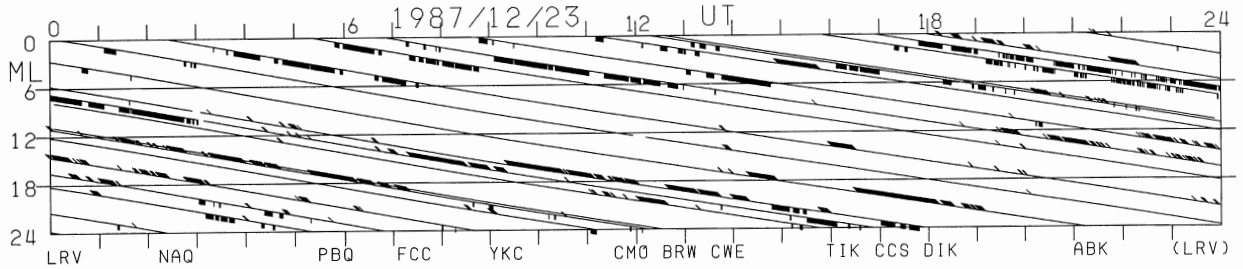

87/12/24 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

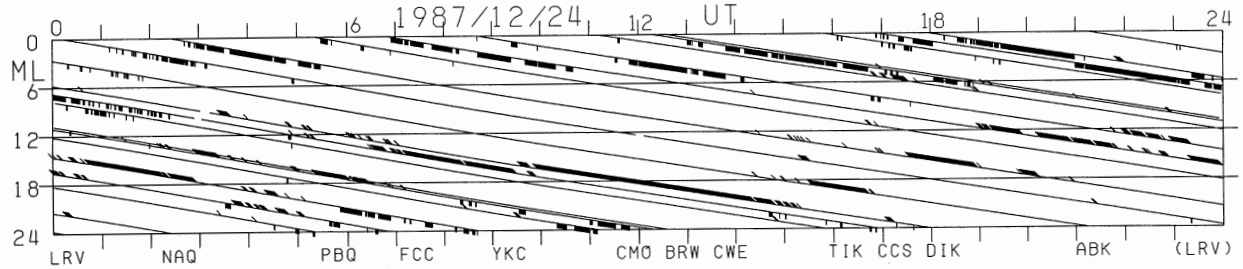

87/12/25 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

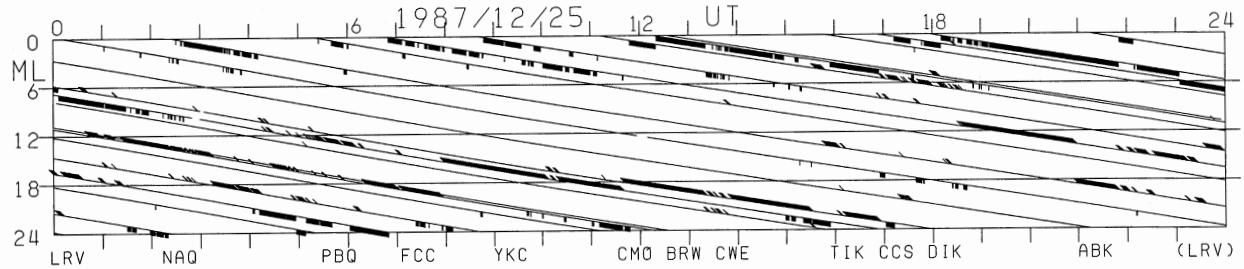

87/12/26 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

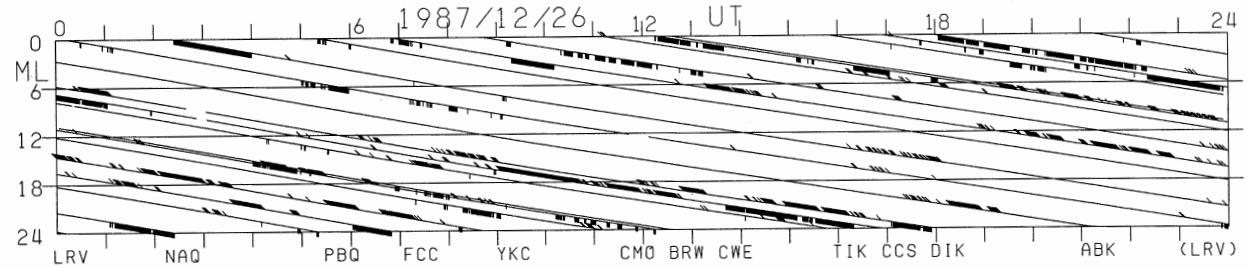

87/12/27 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0 6 12 18 24
2000
1500
1000
AE
500
0
AO
-500
0 6 12 UT 18 24

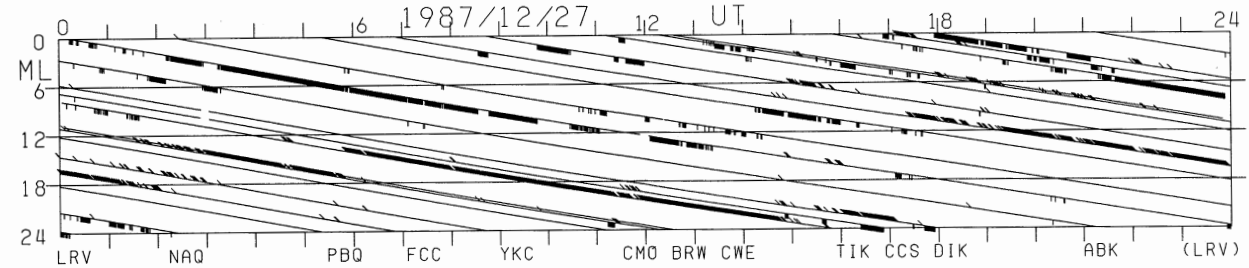

1987/12/22
UT
0
6
12
18
24
ML
LRV
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
(LRV)

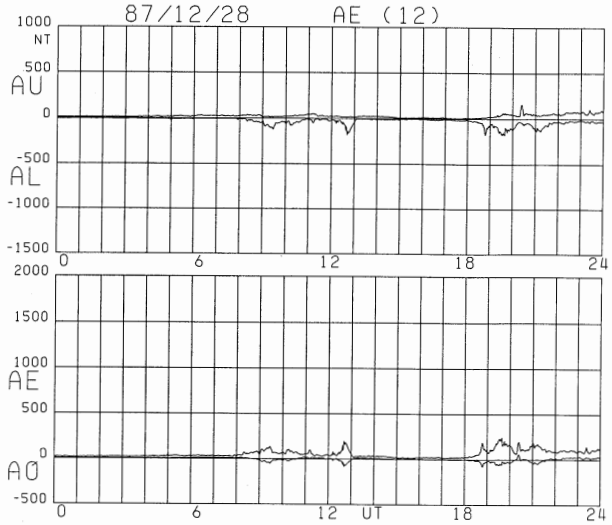

1987/12/23
UT
0
6
12
18
24
ML
LRV
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
(LRV)

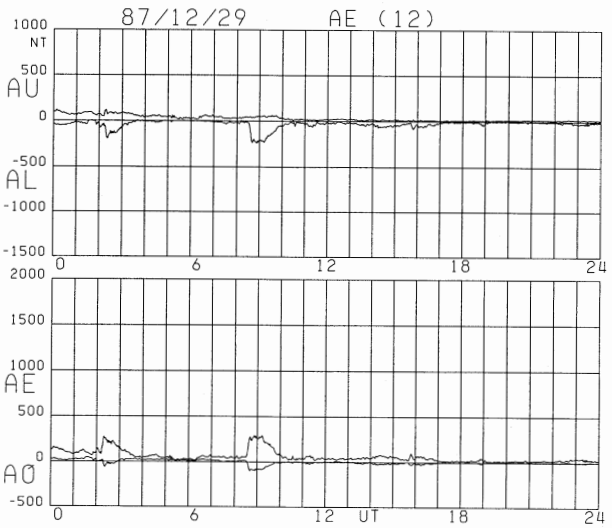

1987/12/24
UT
0
6
12
18
24
ML
LRV
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
(LRV)

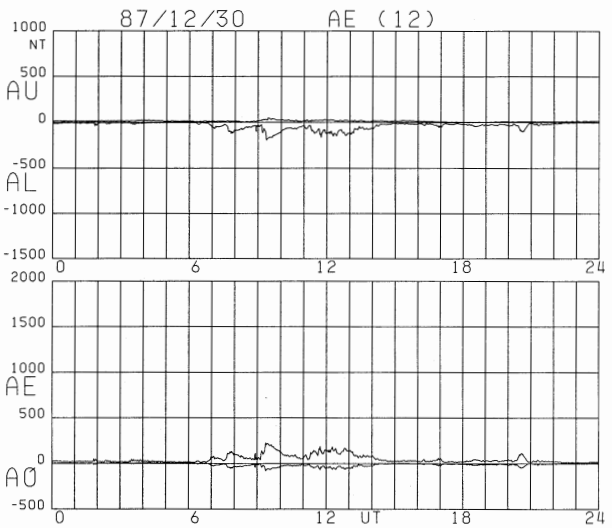

1987/12/25
UT
0
6
12
18
24
ML
LRV
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
(LRV)

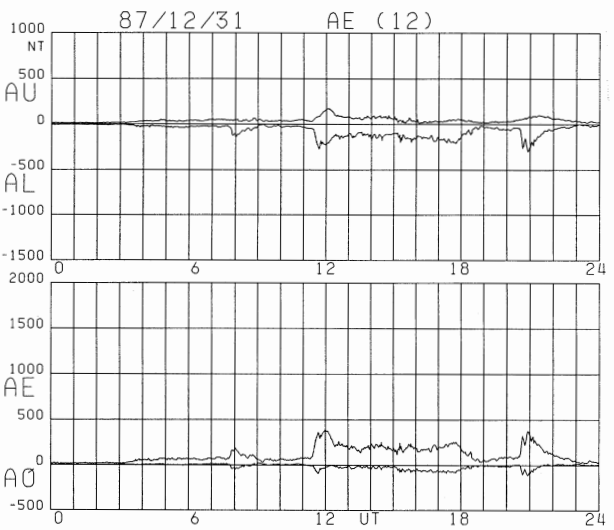

1987/12/26
UT
0
6
12
18
24
ML
LRV
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
(LRV)

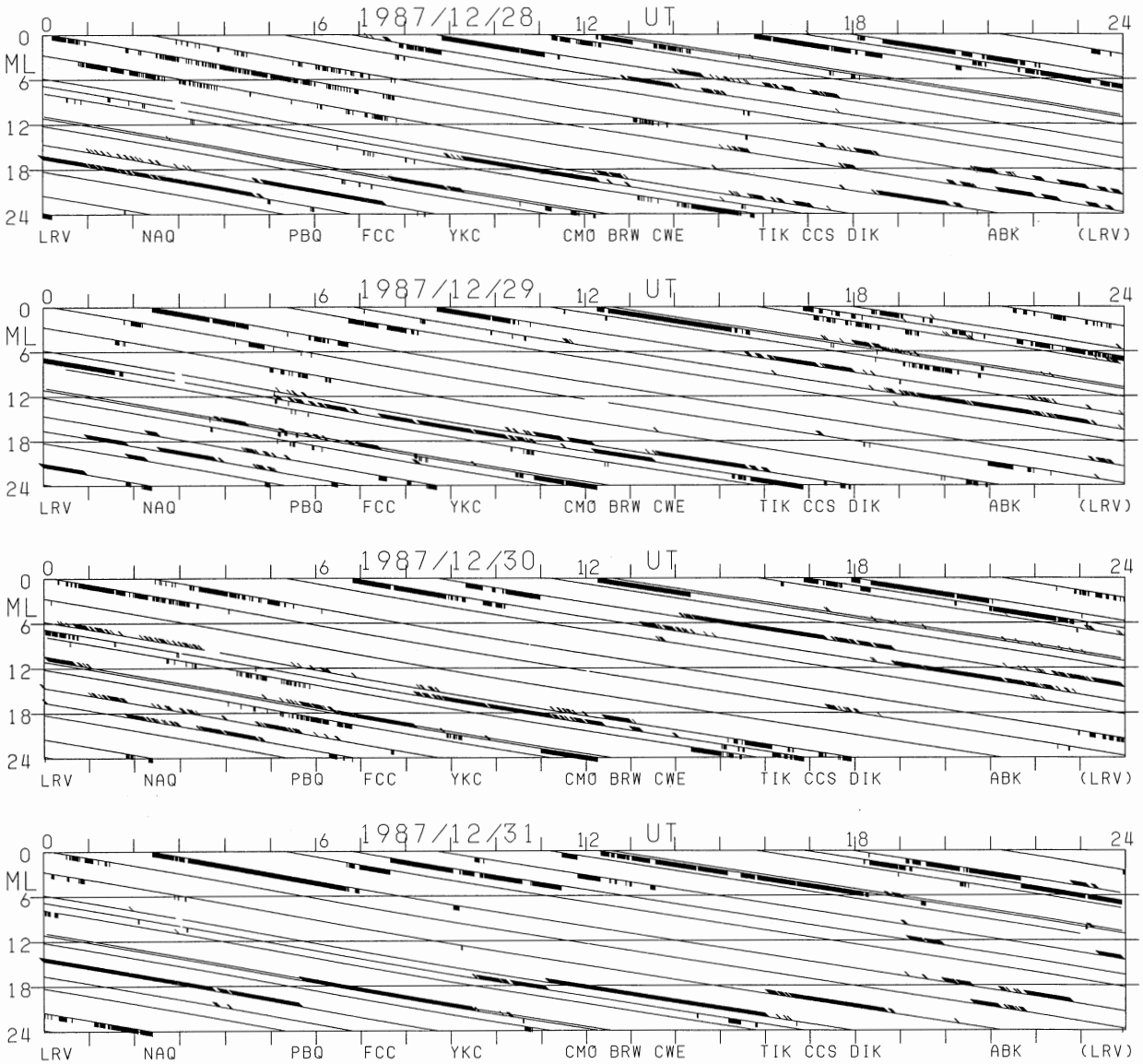

1987/12/27
UT
0
6
12
18
24
ML
LRV
NAQ
PBQ
FCC
YKC
CMO BRW CWE
TIK CCS DIK
ABK
(LRV)

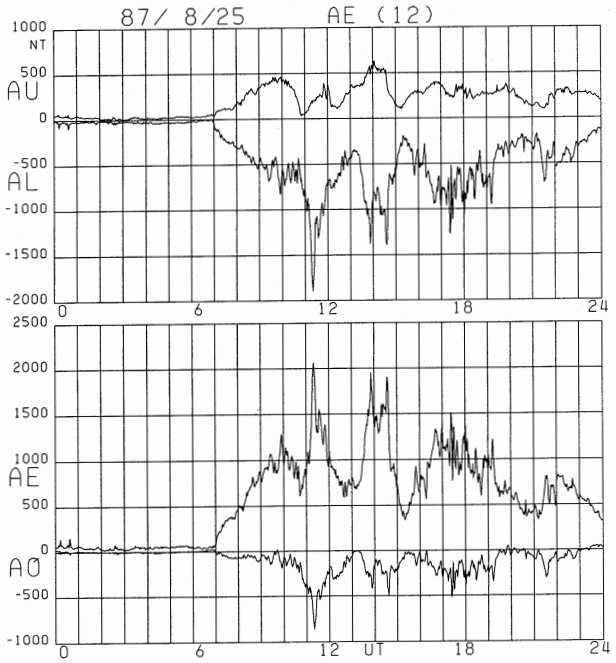

87/12/28 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0
6
12
18
24
2000
1500
1000
AE
500
0
AO
-500
0
6
12 UT
18
24

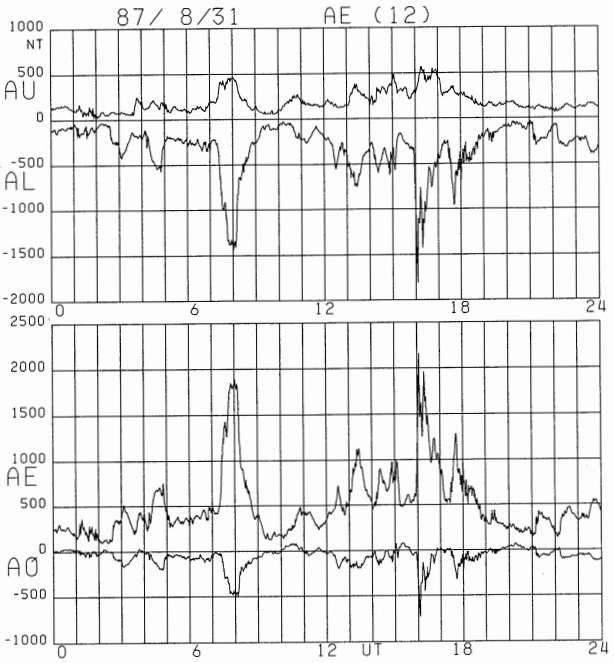

87/12/29 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0
6
12
18
24
2000
1500
1000
AE
500
0
AO
-500
0
6
12 UT
18
24


87/12/30 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0
6
12
18
24
2000
1500
1000
AE
500
0
AO
-500
0
6
12 UT
18
24


87/12/31 AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
0
6
12
18
24
2000
1500
1000
AE
500
0
AO
-500
0
6
12 UT
18
24


1987/12/28 UT
1987/12/29 UT
1987/12/30 UT
1987/12/31 UT
0
6
12
18
24
ML
LRV NAQ PBQ FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)


87/ 8/25
AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
-2000
0
6
12
18
24
2500
2000
1500
1000
AE
500
0
AO
-500
-1000
UT


87/ 8/31
AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
-2000
0
6
12
18
24
2500
2000
1500
1000
AE
500
0
AO
-500
-1000
UT

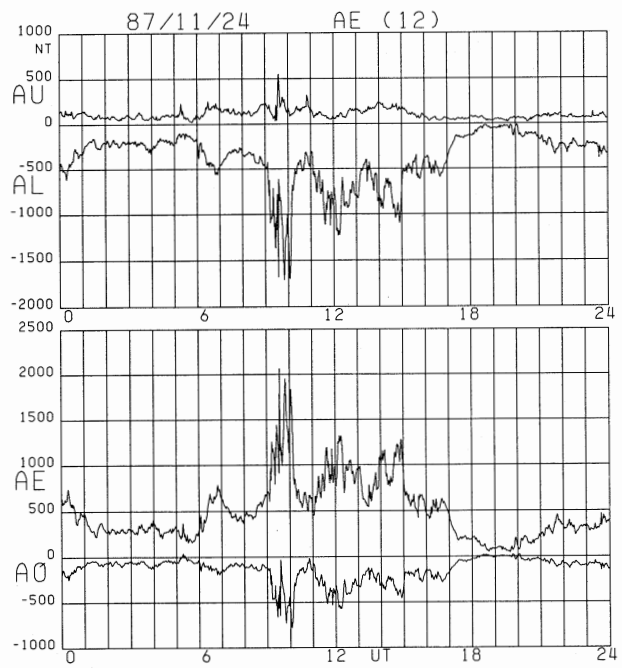
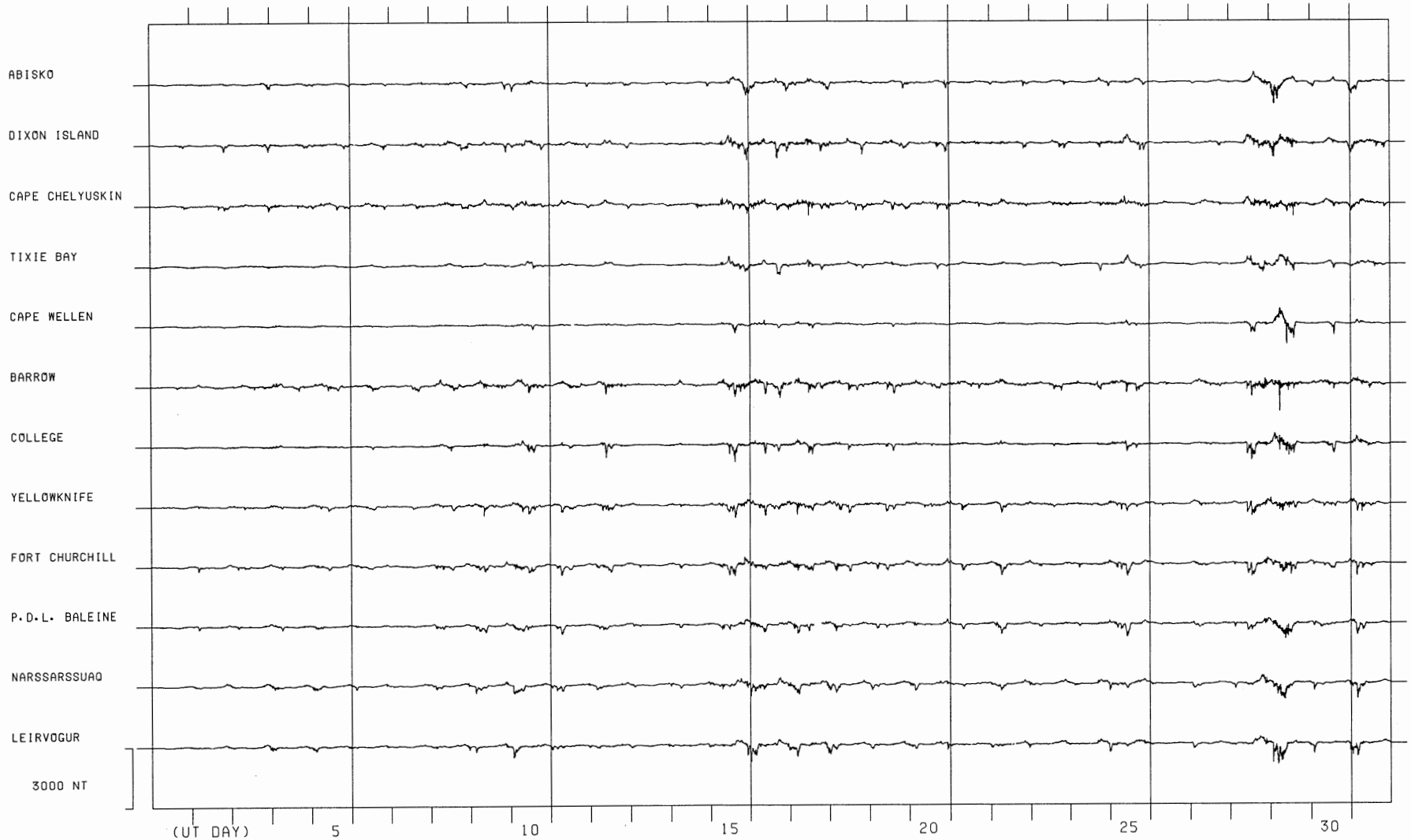
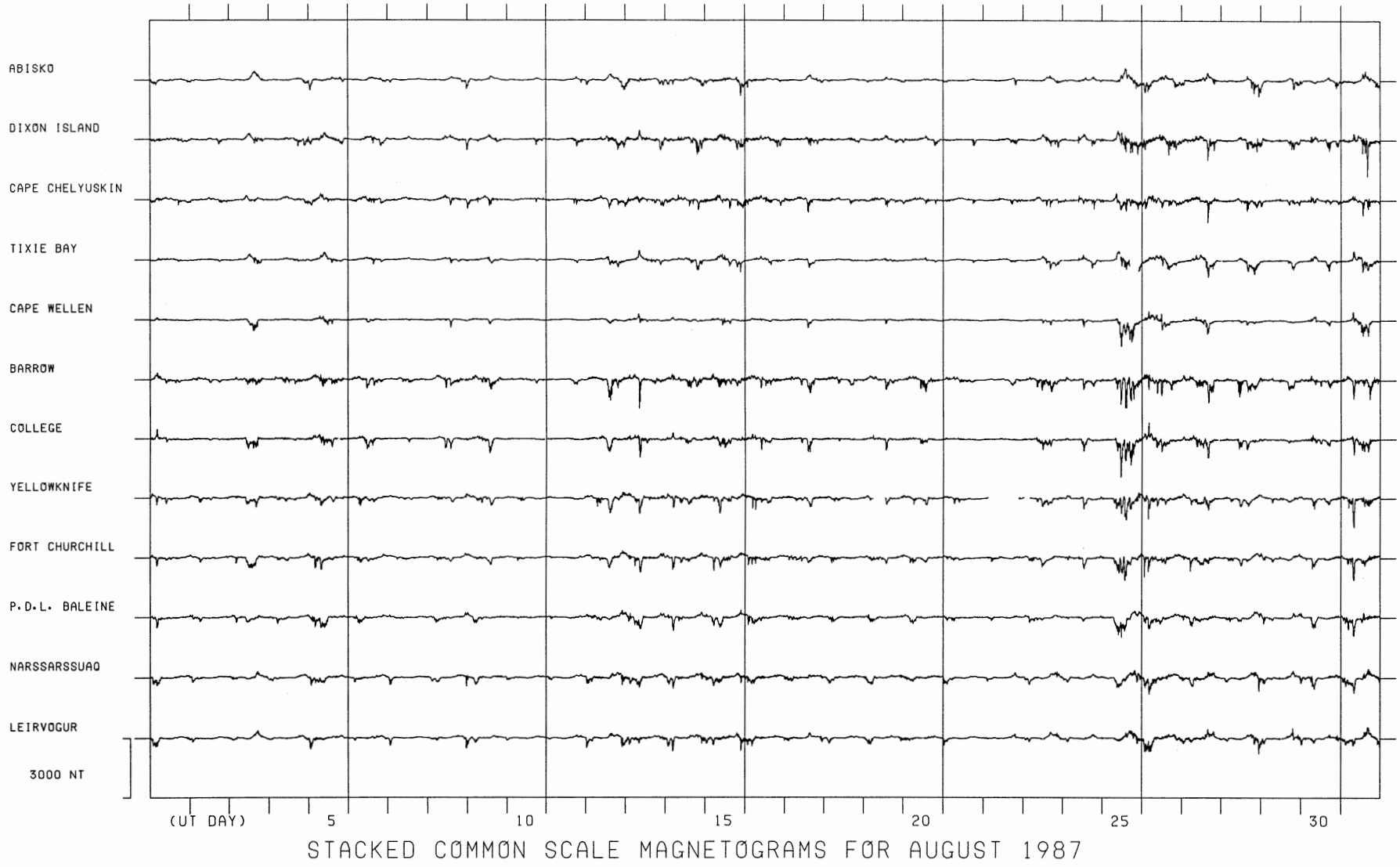

87/11/24
AE (12)
1000
NT
500
AU
0
-500
AL
-1000
-1500
-2000
0
6
12
18
24
2500
2000
1500
1000
AE
500
0
AO
-500
-1000
UT

FIGURE 6

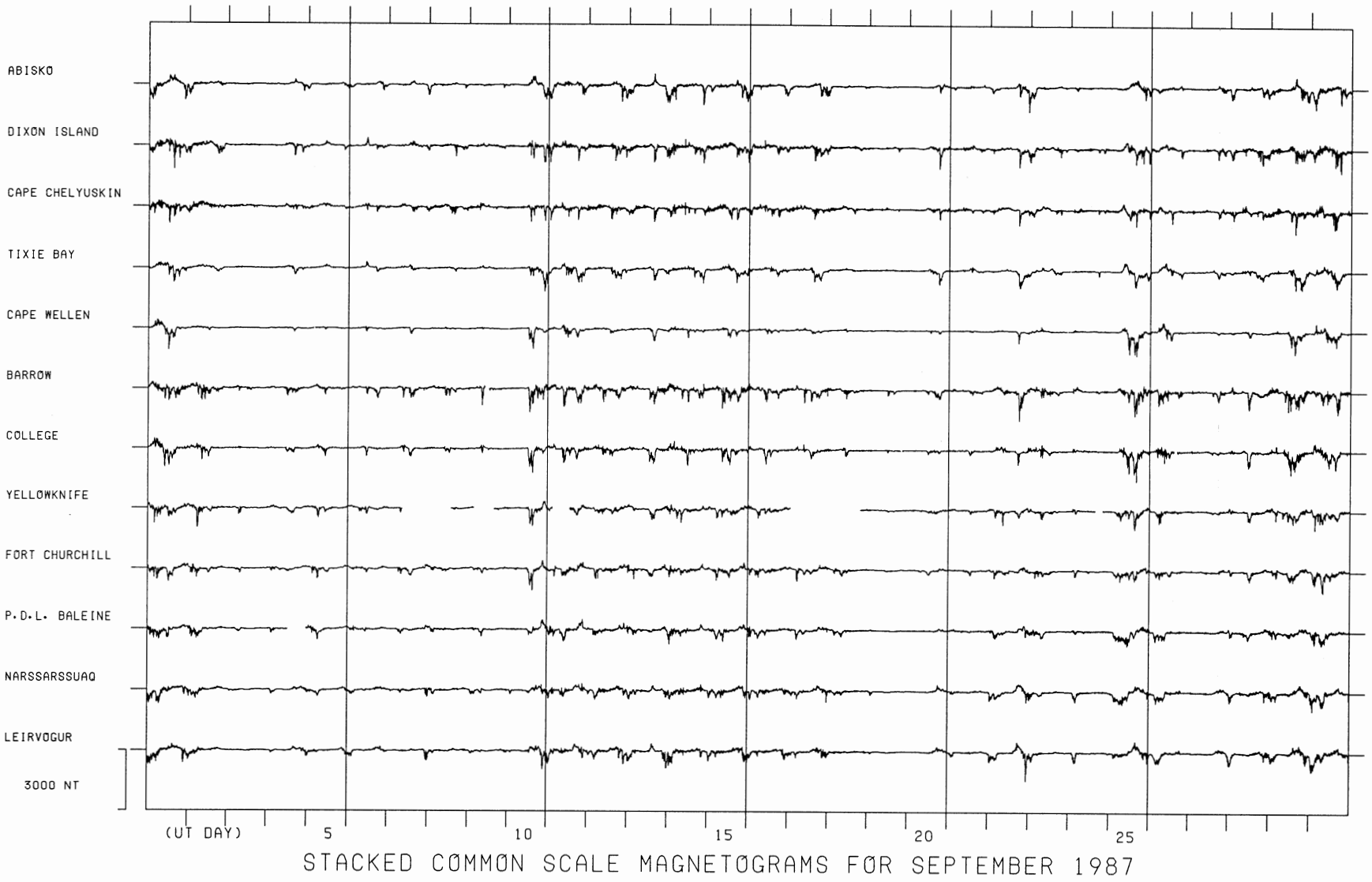
The H traces of magnetograms
from AE(12) stations
in each month
for July-December 1987.



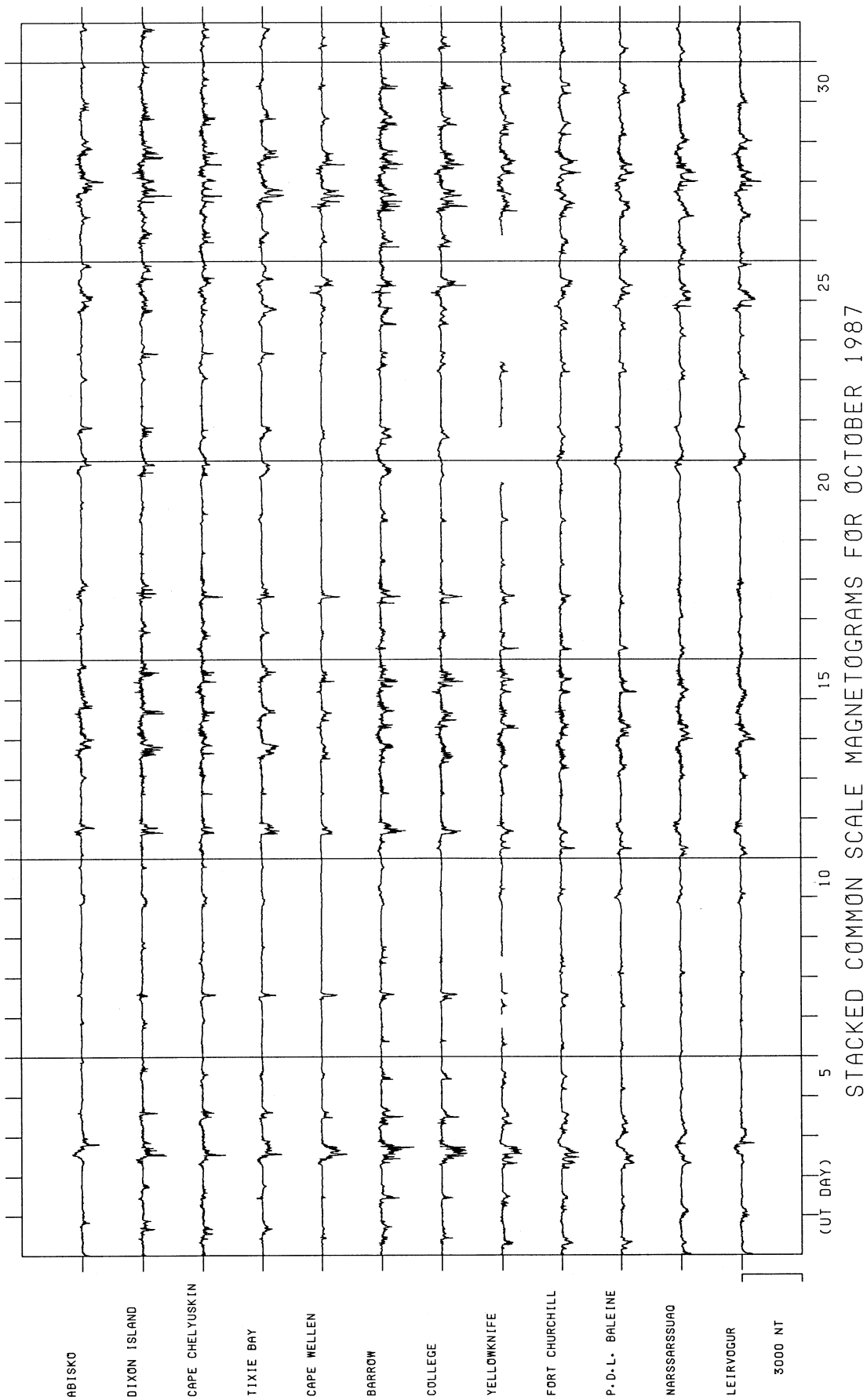
STACKED COMMON SCALE MAGNETOGRAMS FOR JULY 1987

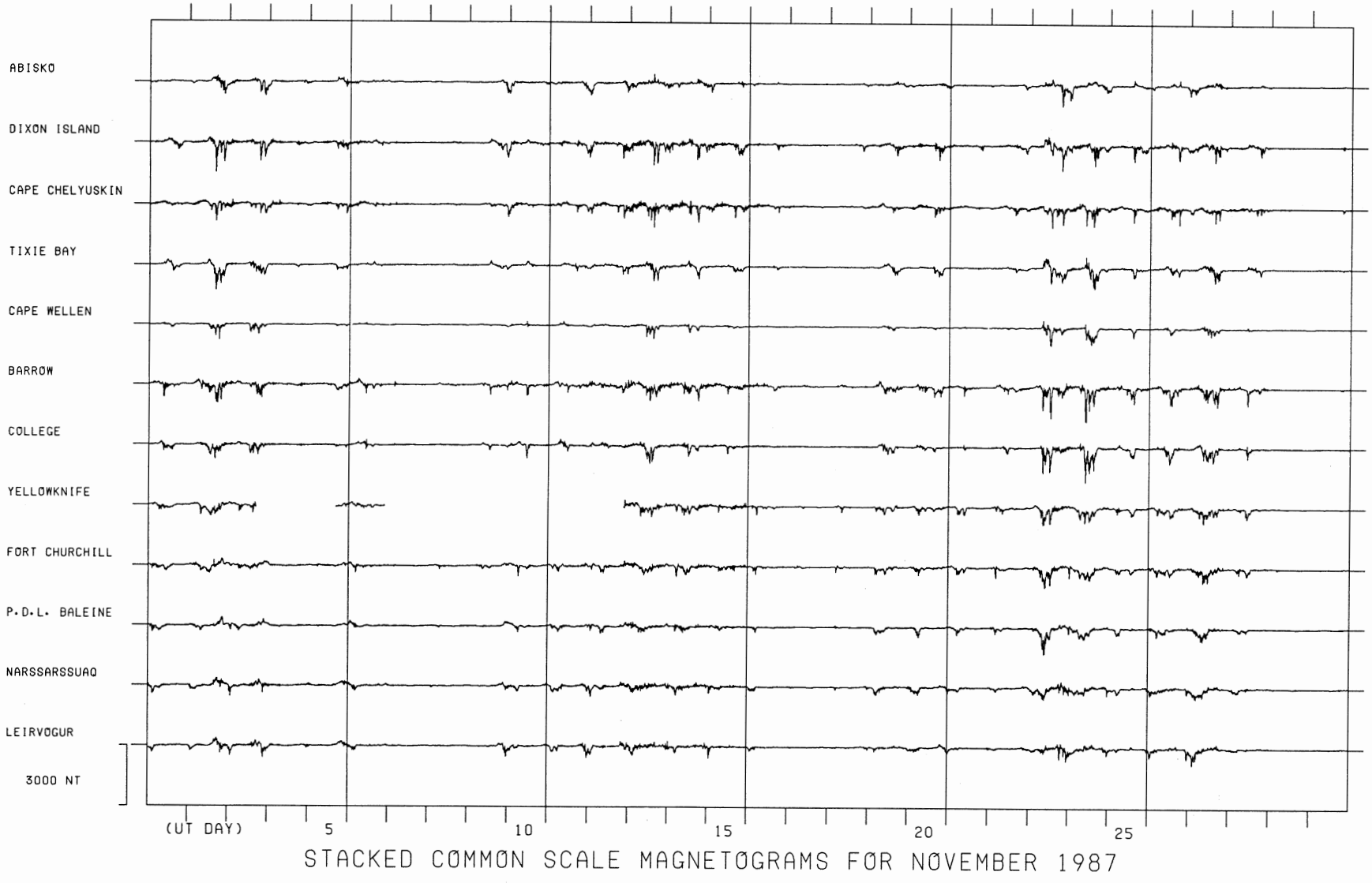


STACKED COMMON SCALE MAGNETOGRAMS FOR AUGUST 1987

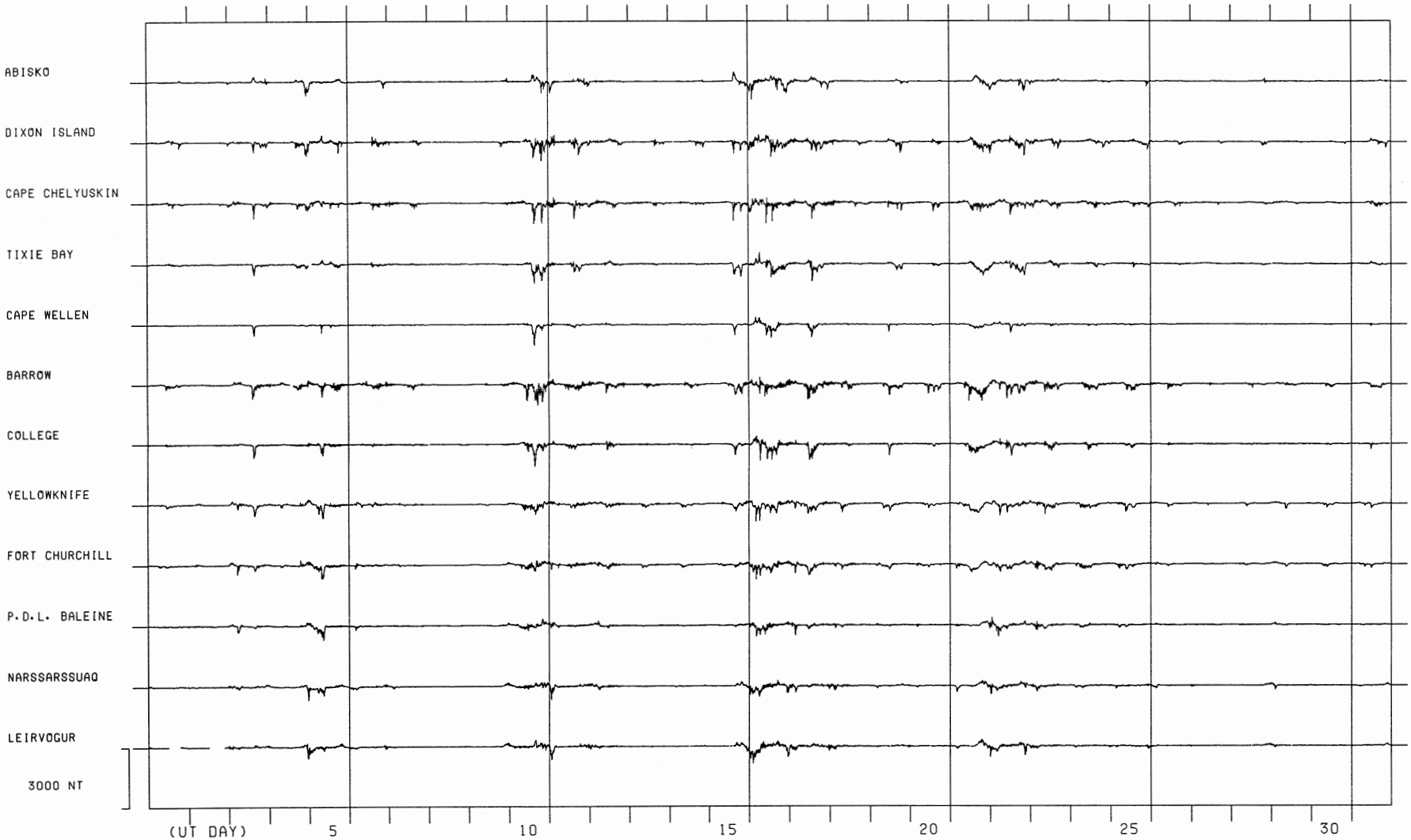


STACKED COMMON SCALE MAGNETOGRAMS FOR SEPTEMBER 1987


ABISKØ
DIXØN ISLAND
CAPE CHELYUSKIN
TIXIE BAY
CAPE WELLEN
BARRØW
COLLEGE
YELLØWKNIFE
FØRT CHURCHILL
P.Ø.L. BALEINE
NARSSARSSUAQ
LEIRVØGUR
3000 NT
5
10
15
20
25
30
(UT DAY)
STACKED CØMMØN SCALE MAGNETØGRAMS FØR ØCTØBER 1987



STACKED COMMON SCALE MAGNETOGRAMS FOR NOVEMBER 1987

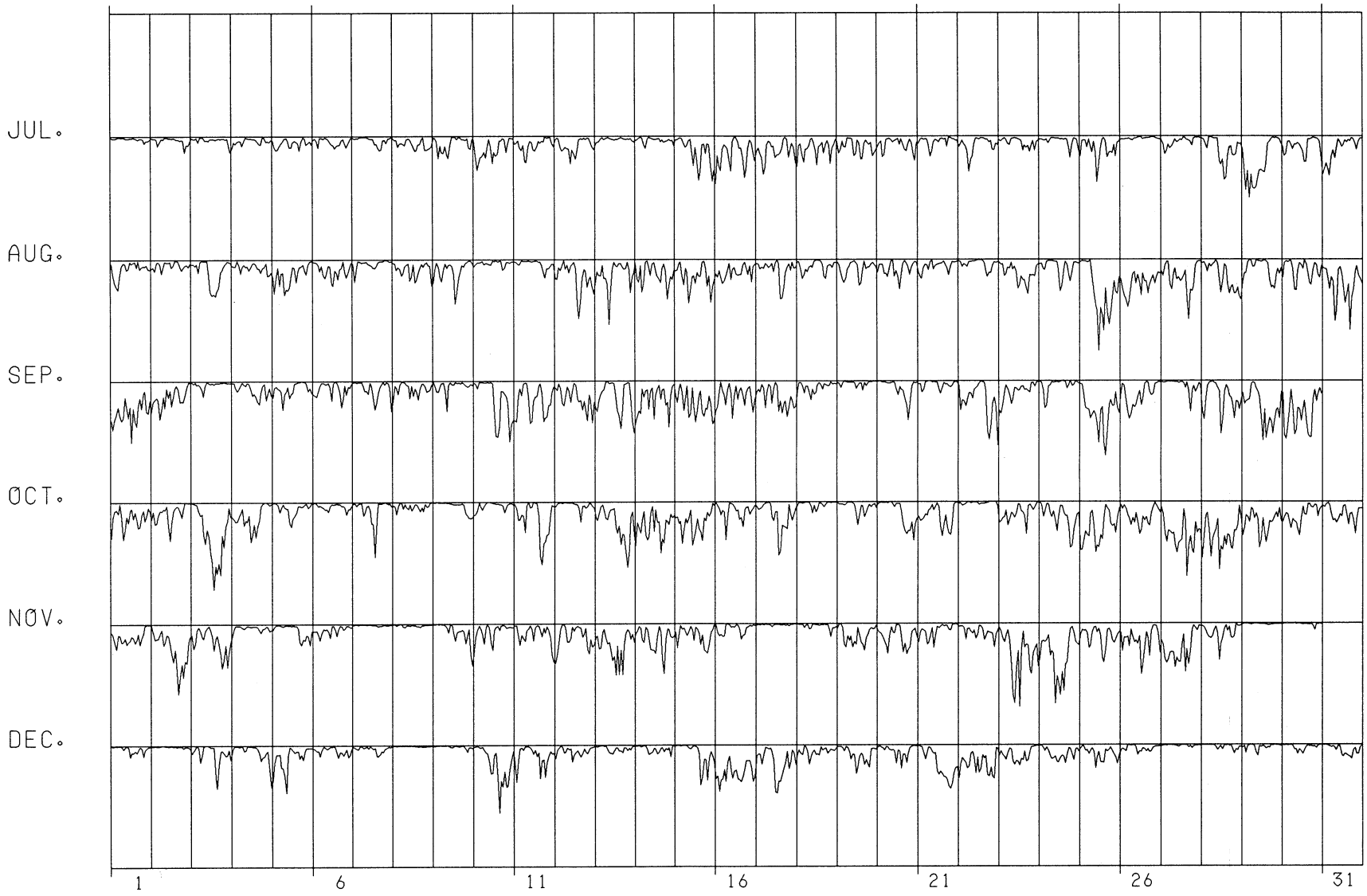


STACKED COMMON SCALE MAGNETOGRAMS FOR DECEMBER 1987

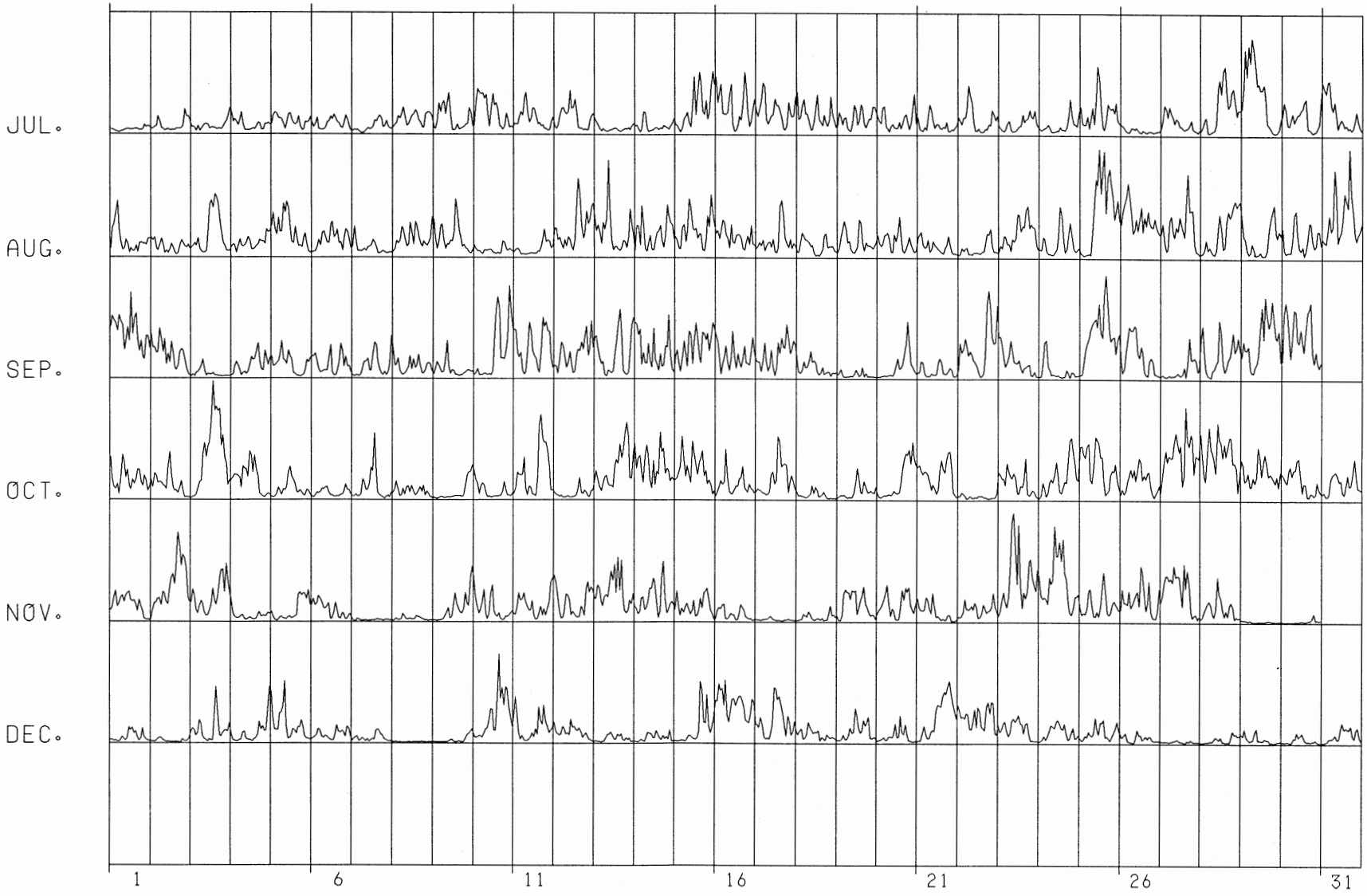
FIGURE 7

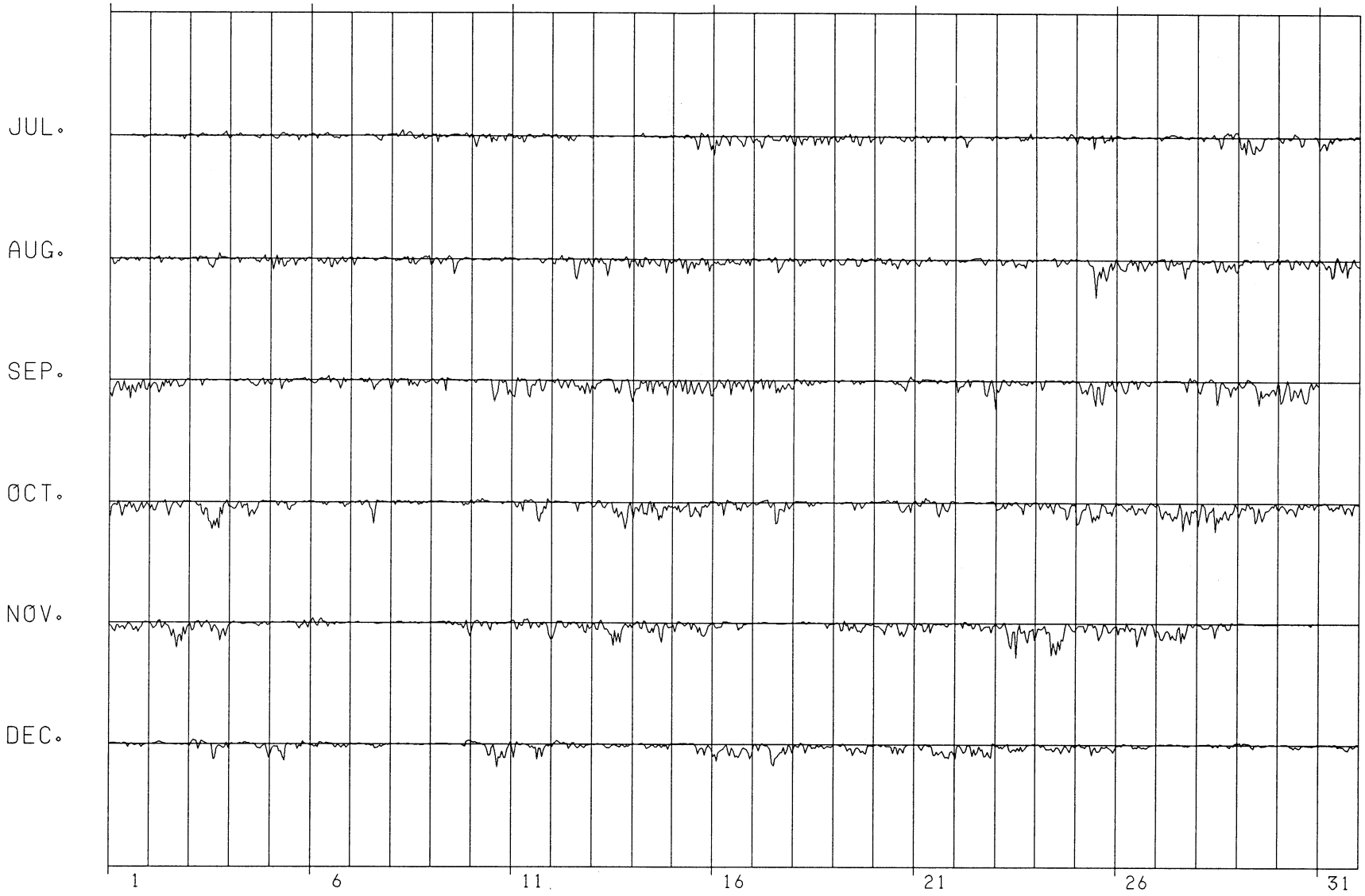
Plots of hourly values of each index
(AU, AL, AE and AO)
for July-December 1987.


JUL.
AUG.
SEP.
OCT.
NOV.
DEC.
1
6
11
16
21
26
31
AU HOURLY VALUES FOR THE LAST HALF OF 1987 (1500NT/DIV)



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

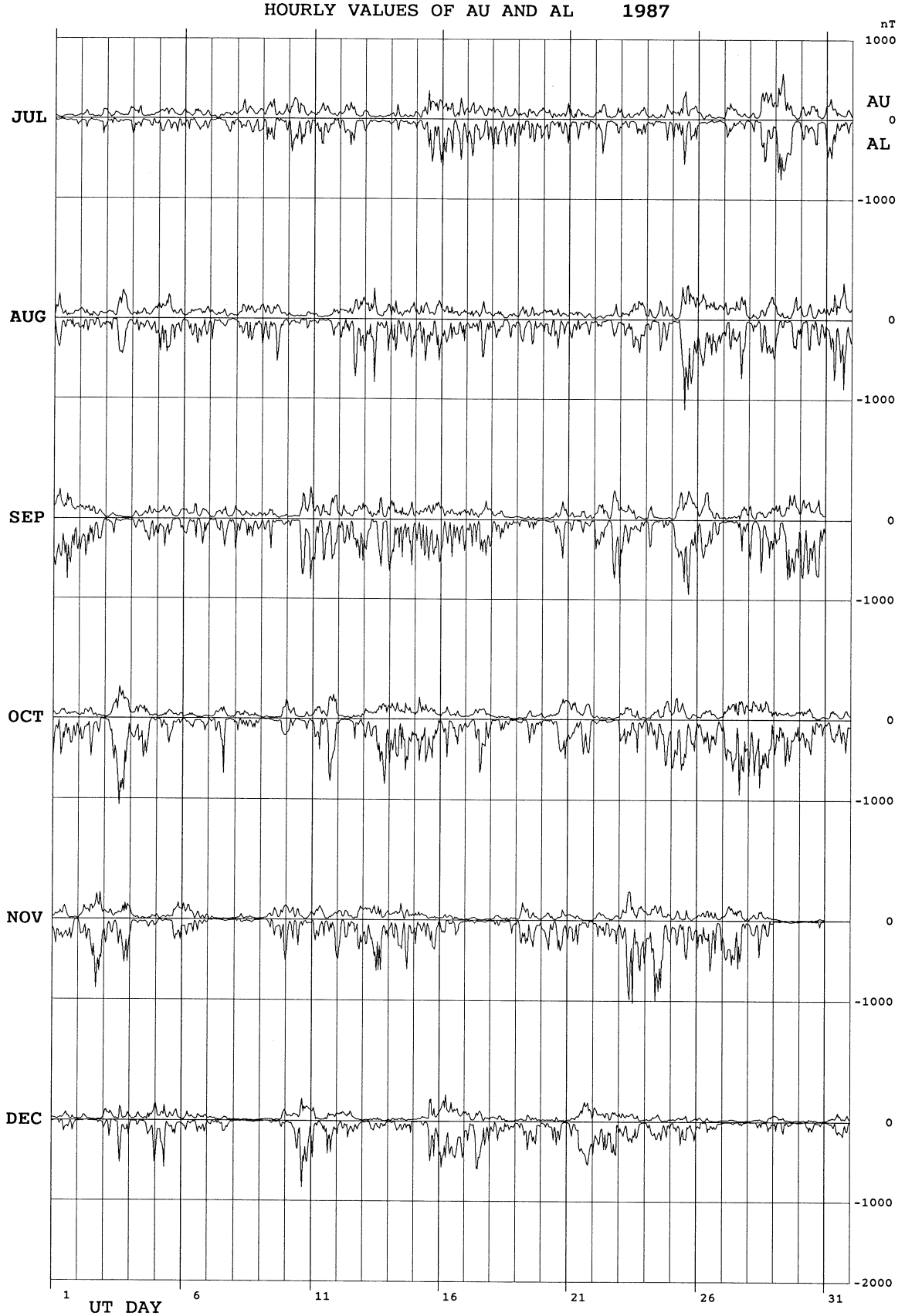

JUL.
AUG.
SEP.
OCT.
NOV.
DEC.
1
6
11
16
21
26
31
AE HOURLY VALUES FOR THE LAST HALF OF 1987 (1500NT/DIV)



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

FIGURE 8

A summary plot of hourly values of
AU and AL indices
for July-December 1987.


HOURLY VALUES OF AU AND AL 1987
nT
1000
AU
0
AL
-1000
JUL
AUG
SEP
OCT
NOV
DEC
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 January-June 1987	1992
No.22	Auroral electrojet (AE) indices for July-December 1987	1993

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
Provisional Geomagnetic Data Plots No6 (Jan-Jun 1992)	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
Mid-Latitude Geomagnetic Indices ASY and SYM (provisional) No.1 1989 - 1990	1992

(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

(The WDC-C2 for Geomagnetism is operated by the Data Analysis Center for Geomagnetism and Space Magnetism, Faculty of Science, Kyoto University, Kyoto 606, Japan.)