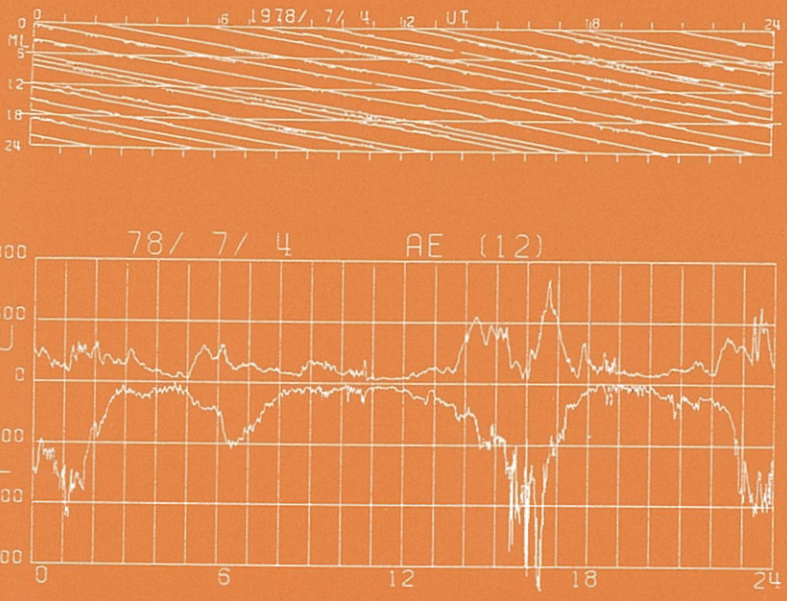
World Data Center C2 for Geomagnetism

DATA BOOK No. 4

Auroral electrojet indices (AE)
for July-December 1978



AUGUST 1981

Data Analysis Center for
Geomagnetism and Spacemagnetism
FACULTY OF SCIENCE
KYOTO UNIVERSITY

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T. Kamei and H. Maeda
WDC-C2 for Geomagnetism
Faculty of Science
Kyoto University

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Auroral Electrojet Indices (AE) for July - December 1978

by

T. Kamei and H. Maeda

1. Introduction

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

After that, the index was regularly published at the World Data Center A in Boulder, Colorado, and the Center published 2.5-min values for the years 1966 to 1974 and 1.0-min values for 1975 and a half of 1976. Because of manpower and other reasons, it became difficult to continue the production of the AE index at the WDC-A, and it was requested that the index be produced at the WDC-C2 for Geomagnetism in Kyoto. Upon such a request we discussed the possibility and agreed to cooperate in producing the index during the IMS at least.

2. Derivation and Representation

The AE index is derived from the horizontal component of geomagnetic variations observed at some (10-13) observatories along the auroral zone in the northern hemisphere. To normalize the data from each station, a base value of each station for each month is first calculated by averaging all the data of the station on the five international quiet days, and this base value is subtracted from every-day data of the station in that month. Then the largest and smallest values are selected from all the stations. The largest value is called the AU index and the smallest value is called the AL index. These names came from the upper and lower envelopes of the overlapped figure of the data from these stations. The difference between the AU and AL indices gives the AE index, and the mean value of the AU and AL indices gives the AO index. The term "AE indices" is usually used to describe those four indices (AU, AL, AE and AO) in all.

The AU and AL indices are understood to express the strongest current density of the eastward and westward auroral electrojet, respectively. The AE index is understood to represent the overall activity of the electrojets, and the AO index is regarded as a measure of the equivalent zonal current.

In this report we shall present every-day diagrams and houly values of the AE indices and also a trial plot named "contributing stations plot" of the AE indices which may give more information about the indices. That is, we named the stations which give the AU and AL indices "the contributing stations of the AU and the AL index, respectively, and a pair of these AU and AL contributing stations "the contributing stations of AE indices". The plot gives these AE contributing stations on a plane whose coordinates are UT in abscissa and LT in ordinate at the stations. For users who want to check the AE indices precisely, this plot gives an information about data availability of each station. Thus the plot will give us an idea which data are to be checked. For these users, we would like to suggest to check our way of derivation of the AE indices and our estimation of errors.

3. Selection of Observatories

To obtain good AE indices, we must use as many observatories as possible, but we meet two big difficulties: One is that the distribution of active observatories are not uniform over the auroral zone, and the other is that the digitization of analogue data (magnetograms) is a heavy job.

We selected 12 observatories listed in Table 1. Of these, only 5 stations are taking digital data directly (called digital stations). Our selection is almost the same as that of the WDC-A. (see Fig. 1)

Three of the stations (Fortchurchill, Great Whale River, and Yellowknife) are the digital stations which give data in the X, Y, Z coordinate system. To make these data more compatible to other stations, we converted the X and Y components to H component by $H=(X^2+Y^2)^{1/2}$, and we treated the resulted H component to be missing for the period either X or Y is missing. For other two digital stations (Barrow and College), we used the original digital H-component data. However, the digital data from College were missing from January to March 1978, so we digitized College analogue data in this period.

4. Digitizing Machine

Our digitizing machine is made of a semi-automatic sonic digitizer, a large size microfilm reader and a mini computer system.

Table 1. List of AE(12) stations.

Observatory	Abbreviations		Geographic		Geomagnetic	
	IAGA	WDC-A	Lat. (°N)	Long.(°E)	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
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

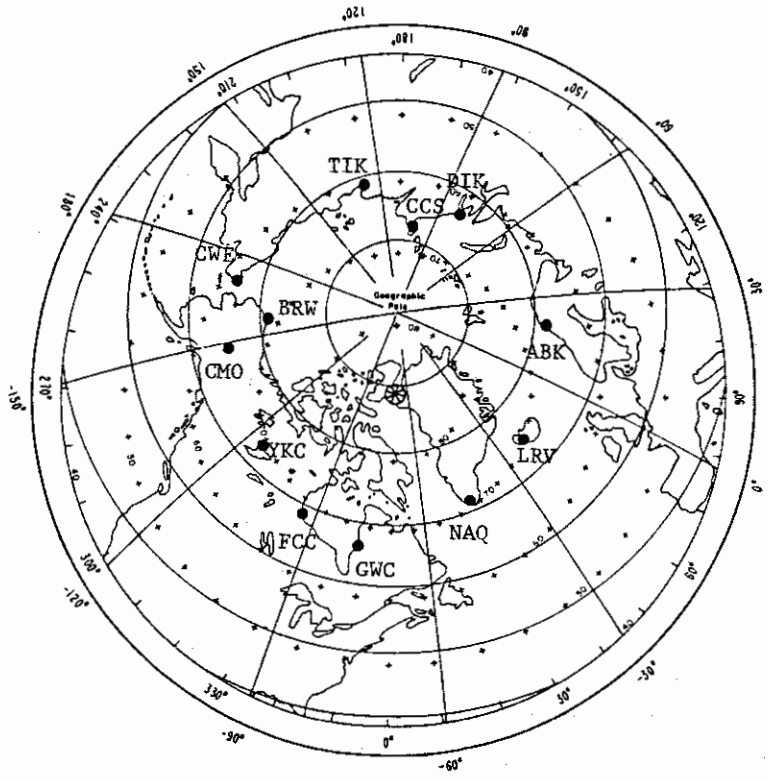

Fig. 1. Distribution of AE(12) stations.

Geographic latitude is indicated by the concentric circles of solid lines. Geomagnetic latitude is indicated by the numbered concentric circles formed by + signs. Geographic longitude is given by the outer circle of numerical values with meridians shown as solid lines every 30°. Geomagnetic longitude is given by the inner circle of numbers and the border of hash-marks at 10° intervals.

The sonic digitizer has a pointing pen and two microphone arrays. The pen emits a small sonic pulse from a small electric spark at the top of it. The position of the pen is detected by time lags between the spark and signals received by the microphone arrays. One of the microphone arrays is placed on the upper side of a microfilm reader and detects Y position of the pen, and another array is placed on the left side of the reader and detects X position of the pen.

The operator traces the projected figure (magnetogram) on the screen of the microfilm reader. The effective size of the screen is about 60 cm in width and about 40 cm in height. This screen is divided into 4000 x 3000 digital points. The emitting speed of the sparks can be controlled either by the computer or by the operator. Although the emitting speed can be as fast as 100 points per second, available speed is limited to 20 points per second, because of the speed of the CPU of computer and the recording media.

5. Digitization of Analogue Data

The magnetogram on 35 mm microfilm is projected directly on our microfilm reader. The projected figure is almost the same size as the original magnetogram whose size is about 2 cm/hour or 48 cm/day.

Usually, the magnetograms are digitized day by day. When the time marks on the magnetogram are not spaced uniformely or base lines are not straight enough, one magnetogram is divided into several uniform parts and then digitized. We used the ordinary magnetogram for all days. When the H trace crosses other traces, we tried to identify the H trace by referring the insensitive or storm magnetogram. When we trace the H component on magnetograms, we also feed three basic points to define the time and the absolute value of the digitized data, and feed other necessary information like the station identification and observation date.

In digitizing analog data, we could have trouble from the digitizer noise. To be free from such a noise, we digitized as many points as possible to get one value. In determining the three basic points we digitized each point more than 20 times, and we picked the point only when these consecutive 20 readings are all within a limited area. The traced digital data are logically checked by a quality control program to reject spikes caused by the noise. After cleaning by the quality program, the data are averaged to get the final one minute value. Usually, one-min value is determined from an average of 3 or 4 digital

readings. We checked all the digitized data visually by the plot on a monitoring graphic display at the reading stage and by the finer common scale plot made by a X-Y plotter after processed by the quality control program.

6. Estimation of Errors

Although we are very careful to read magnetogram, there can be some errors. Users should be aware of these possible errors.

First, a magnetogram is recorded on a photographic paper, and the recorded line is sometimes too wide and sometimes too faint. The wide line causes an ambiguity of the reading. Error by such a wide line is usually less than 1.5 nT (standard deviation), but in some cases it can be about 5 nT. The faint line is not readable in a disturbed condition and may cause a missing period or tracing mistakes whose error cannot be estimated.

Second, when the original magnetograms are photographed on the 35 mm microfilms, some distortions come about and make the base lines and time marks round lines. In some stations this may result in errors of about 5 nT and/or 2 min. Also, when the magnetogram is photographed the paper moves or shrinks which make double images resulting in errors of up to 5 nT and/or 2 min.

Third, though we are very careful to trace the data, it is very difficult to be free from parallax and to trace the data smoothly. This may cause 5 nT and/or 2 min errors.

Fourth, when recording the magnetogram, chart speed sometimes fluctuates, resulting in non-uniform spacing of the time marks. In this case we divided one magnetogram into several parts, but we neglected small changes which cause a temporal error less than 2 minutes.

Fifth, in calculating a base value for one station every month, we average the data on 5 quiet days, but the year 1978 was a quite disturbed year and so the quiet days contained a number of disturbed periods. This may result in errors from 1 to 3 nT.

The last most severe problem is the missing data of the contributing stations. It is suggested to users that if they use the one minute AE value for precise studies the availability of the possible contributing stations by the contributing stations plot is checked.

As a whole we estimate that the error in the one-minute AE indices is about 5 nT to 20 nT in quiet periods. For disturbed periods, however, it is difficult to estimate the error in the indices, and we will only be able to say

that most of the error are resulted from the error in the time scale (about 1.5 to 3.0 min).

For the hourly values of AE indices, the random errors are reduced by $1/(60)^{1/2}$. However, the base line error and errors caused by the distortion of magnetograms are still included in the hourly values. We may estimate that the total error in the hourly values is in the range between 4 and 15 nT.

7. The Overlapped Plot and the Plot of the Contributing Stations of the AE Indices.

Fig. 2a shows an example of the overlapped plot of the H traces from the AE stations on April 10, 1978. The upper envelope gives the AU index and the lower envelope gives the AL index. Figs. 2b and 2c show example plots of the contributing stations for the same day as in Fig. 2a, in the geomagnetic (2b) and geographic (2c) local times, where the upper and lower plumes on a diagonal line for each station show the contribution to the AU and AL indices of this station. In Fig. 2b, for example, the data of 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 this is a key station for the AL index at that time, the exact AL values at that time have been lost.

We think some explanation are necessary for our trial plots of the contributing stations. On the plots hereafter, the ordinate is the geomagnetic local time (MLT). The MLT is defined by the difference of the geomagnetic longitude of the station and the geomagnetic longitude of the Sun, and it is a function of the geomagnetic longitude of the station, season, and universal time. Figs. 3a, 3b, 3c show the difference between the GLT and the MLT of the stations used to derive AE indices for winter, summer and equinox, respectively. In these figures the GLT is shown by the straight line which runs diagonally, and the MLT is shown by the T (or inverted T) shaped mark. The length of the vertical line between the T (or inverted T) shaped mark and 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. The geomagnetic longitude of Cape Wellen (CWE) and Barrow (BRW) are very close, and so it is difficult to separate these two stations on the contributing stations plot. Sometimes, Cape Wellen gives AU and Barrow gives AL, and vice versa. This is thought to be an effect of local current system between the high latitude station and the low latitude station.

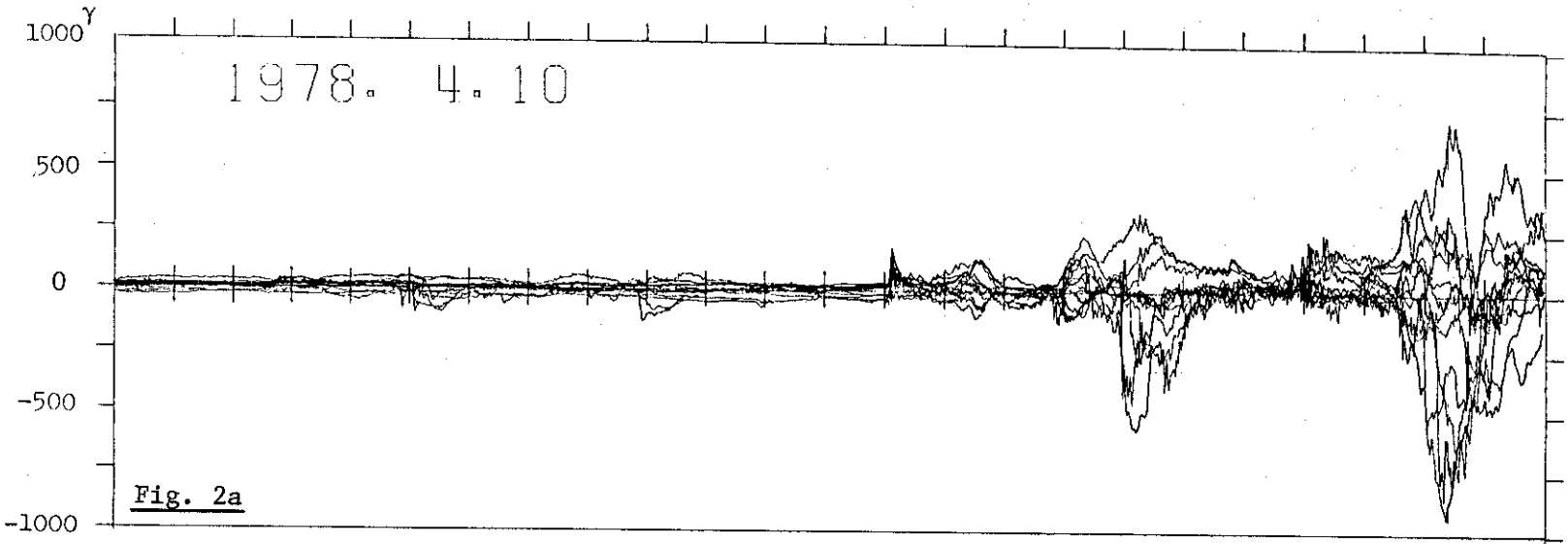

Fig. 2a

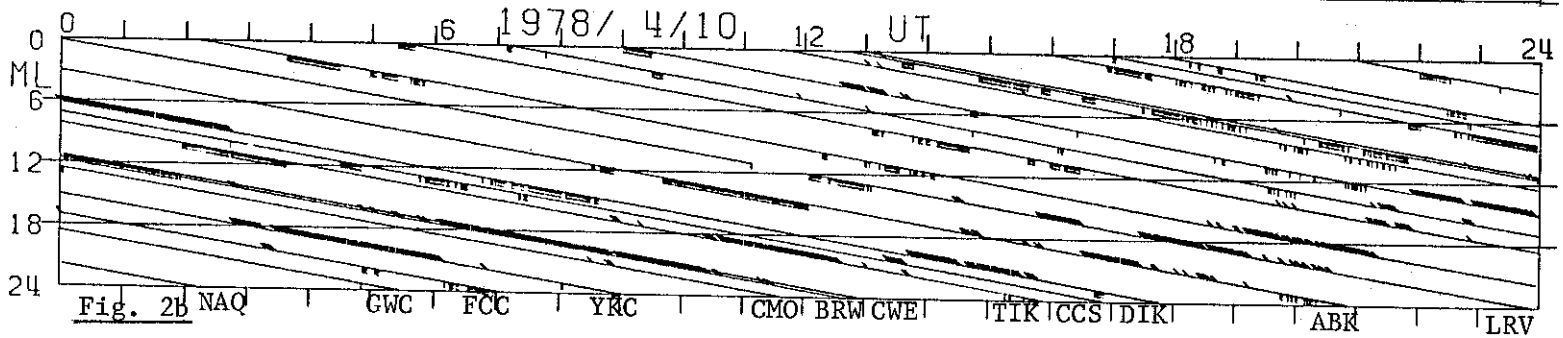

Fig. 2b

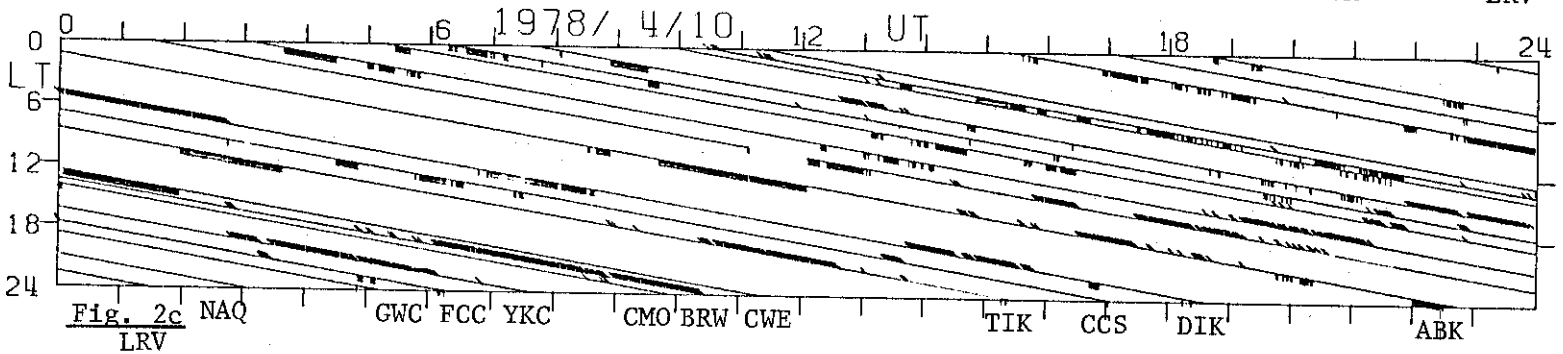

Fig. 2c

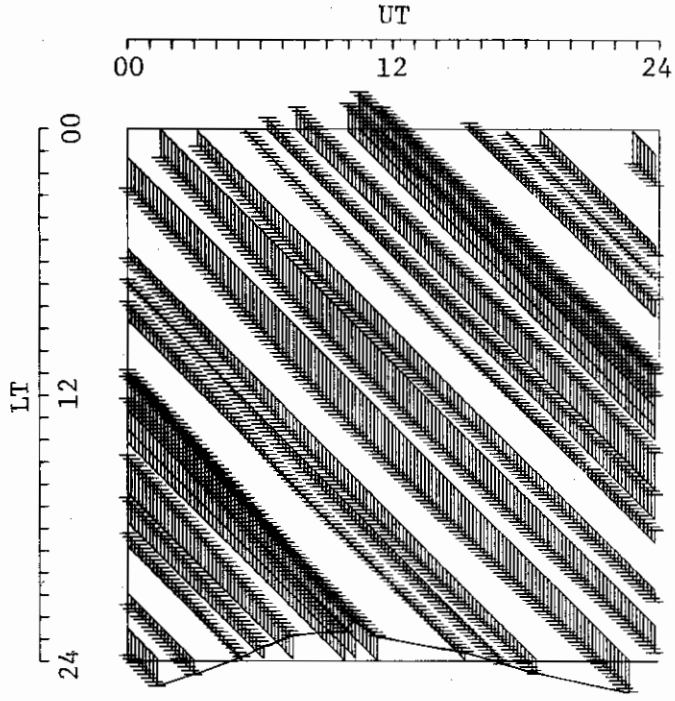

Fig. 3a Difference between GLT and MLT in winter.

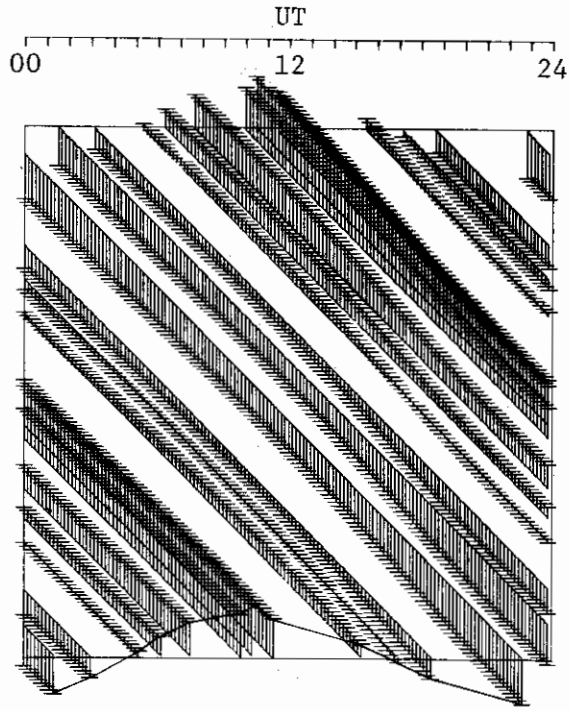

Fig. 3b Difference between GLT and MLT in summer.

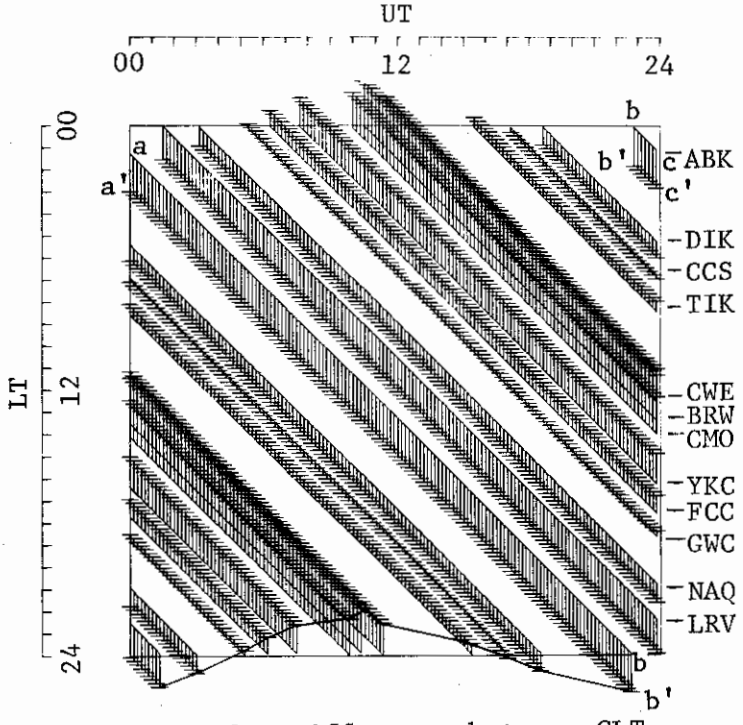

Fig. 3c Difference between GLT and MLT in equinox.

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.

When we assume that the observed geomagnetic H component is a result of a simple combination of some simple current systems, this plot of the contributing stations can be regarded as an index of dominant current system at a certain time, though the current system in the auroral zone is not very simple, and users must be very careful to check if local current systems may give a false impression of different current systems.

Although we have such limitation of the plot of the contributing stations, and we need more precise analyses, we can point out some characteristics from the plot, most of them confirm our previous knowledge.

(1) In quiet periods, the geomagnetic local time of the contributing stations to the AL index (called here AL time, shortly) is around noon. This is seen best in equinox. This may come from the low latitude Sq current system or from the field-aligned current system connected to the cusp region, or from both of them.

(2) In disturbed periods, the AL time is between midnight and morning.

(3) In some transition periods between quiet and disturbed states, the AL time moves gradually from noon to morning. Then, very sharp and short period AL spikes are seen and the AL time goes pre-midnight. Afterward, the AL time comes back to early morning.

(4) The geomagnetic local time of the AU contributing station (called AU time) is confined in the evening in disturbed periods. But in quiet periods, the AU time is distributed widely and it can be seen at midnight or in the morning.

8. Results

Monthly quiet-time H reference values for July-December 1978 are listed in Table 2, where for four stations only deviations ($H0^{+}$) from the H base line are given, because we did not find out any base values. Table 3 gives the hourly average of AE indices on every day from July to December 1978.

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. Finally, Fig. 6 shows the H-traces of magnetograms from AE(12) stations in every month from July to December 1978.

Table 2. MONTHLY QUIET-TIME H REFERENCE VALUES (UNITS : NT = GAMMAS)

(YEAR 1978)

STATION	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	
ABISKO	11833	11825	11816	11816	11813	11825	
DIXON ISLAND	-380	-387	-395	-393	-403	-391	(H0+)
CAPE CHELYUSKIN	548	538	529	529	518	524	(H0+)
TIXIE BAY	257	246	236	239	230	249	(H0+)
CAPE WELLEN	209	199	195	191	185	190	(H0+)
BARROW	9848	9841	9834	9829	9811	9837	
COLLEGE	13044	13038	13032	13029	13031	13037	
YELLOWKNIFE	8730	8735	8736	8734	8714	8733	
GREAT WHALE RIVER	10549	10543	10554	10549	10558	10568	
FORT CHURCHILL	7478	7468	7498	7473	7469	7492	
NARSSARSSUAQ	12047	12033	12036	12029	12037	12044	
LEIRVOGUR	12393	12382	12380	12372	12379	12385	

(H0+) : DEVIATION FROM THE H BASE LINE
ON THE ORDINARY MAGNETOGRAM

9. Acknowledgements

This volume has been accomplished by the data supply from the AE stations through the World Data Centers and the financial support from the Ministry of Education, Science and Culture of Japan. Acknowledgement is due to Ms. Y. Yamamoto for her assistance in digitizing the magnetograms.

TABLE 3

Hourly average AE indices (AU, AL, AE and AO) for July–December 1978.

AU INDEX (HOURLY VALUES) JULY 1978

	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	36	21	12	23	23	19	15	15	19	62	131	65	60	93	39	46	45	38	24	29	27	29	32	38	39
	2	86	183	97	34	11	6	15	84	46	53	50	30	27	27	21	30	46	39	62	60	66	74	108	132	58
	3	148	118	85	72	84	132	153	175	143	132	151	100	90	79	95	62	38	34	68	102	106	94	73	222	106
D	4	191	214	195	157	67	203	176	123	99	144	88	50	90	160	446	257	453	230	151	90	101	140	276	346	185
D	5	159	249	298	291	264	191	189	337	339	386	348	188	262	216	288	241	189	255	253	278	140	114	122	148	239
	6	77	48	33	25	22	20	68	70	52	26	25	40	26	23	28	130	166	198	172	96	48	51	38	77	65
	7	130	126	85	44	31	28	20	23	22	101	246	190	139	108	191	133	87	213	260	115	160	178	218	165	126
	8	213	179	191	217	209	161	158	148	101	39	51	96	103	85	82	267	289	206	204	161	126	107	133	69	150
	9	109	142	98	41	12	11	2	27	31	38	46	85	117	71	79	118	112	86	86	60	42	46	90	66	67
	10	71	93	95	91	143	49	79	141	216	81	49	109	161	64	31	38	54	69	64	73	105	109	161	77	93
	11	86	124	90	80	43	23	69	107	53	82	99	212	94	68	51	48	26	18	24	38	27	21	28	22	64
@	12	26	16	16	29	50	55	42	44	48	57	61	98	82	86	59	34	54	78	48	47	43	54	74	83	53
D	13	176	231	168	135	114	204	113	290	284	164	125	84	148	151	106	101	71	59	102	154	205	337	265	302	170
D	14	398	288	280	163	250	357	241	337	394	557	543	371	310	403	509	403	269	124	238	300	222	106	81	67	300
	15	62	45	47	41	42	42	28	21	14	13	18	16	11	18	22	23	14	10	13	19	27	30	31	68	28
	16	171	161	97	41	12	6	8	10	15	14	25	22	34	40	62	53	46	32	22	41	46	73	75	33	47
	17	89	116	105	82	107	63	30	15	46	124	193	129	53	50	29	29	25	24	57	108	71	43	75	66	72
D	18	129	157	142	82	54	33	26	23	25	32	47	83	157	85	106	178	368	394	225	268	336	383	273	250	161
	19	221	151	182	100	64	99	100	61	56	144	79	34	42	22	48	65	49	40	25	31	27	26	22	23	71
	20	31	24	38	41	82	117	152	174	187	223	155	144	76	48	39	16	15	16	21	69	121	113	133	138	91
	21	185	152	88	69	77	49	25	95	196	257	214	137	92	30	65	42	33	29	27	48	36	35	33	28	85
	22	58	89	151	191	256	245	141	89	80	64	49	71	25	25	25	42	60	61	100	150	81	71	105	105	97
	23	51	50	95	134	163	180	207	228	158	73	26	26	24	27	14	7	27	61	101	151	242	336	349	305	126
	24	262	162	118	45	34	36	86	146	139	80	67	65	56	46	53	46	56	77	109	151	146	154	220	247	108
	25	237	209	104	37	90	78	79	120	165	178	109	128	173	142	78	35	24	37	73	194	176	269	291	266	137
	26	239	191	127	132	171	137	65	35	13	8	12	48	75	60	44	32	28	27	41	18	30	77	93	74	74
@	27	45	31	18	13	6	4	6	6	14	26	32	53	61	44	33	20	9	8	26	29	17	38	81	156	32
	28	125	130	37	48	98	180	158	145	150	149	183	126	100	95	43	38	24	31	29	30	25	25	25	24	84
@	29	27	20	17	17	17	30	91	106	80	124	158	141	87	33	26	33	36	42	48	50	60	71	85	104	63
@	30	82	94	132	64	38	30	26	35	51	57	27	59	69	58	39	42	35	37	34	30	36	37	41	31	49
@	31	23	19	22	17	22	19	19	32	31	48	61	25	17	24	32	17	21	24	28	39	34	21	22	28	27
	MEAN	127	123	105	82	85	90	83	105	105	114	111	97	92	80	89	84	89	83	88	97	94	105	117	121	99
5@	MEAN	40	36	41	28	26	27	36	44	44	62	67	75	63	49	37	29	31	37	36	39	38	44	60	80	44
5D	MEAN	210	227	216	165	149	197	149	222	228	256	230	155	193	203	291	236	270	212	193	218	200	216	203	222	211

AU INDEX (HOURLY VALUES) AUGUST 1978

	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	38	60	80	119	147	149	134	84	130	164	144	146	81	63	53	43	32	39	80	95	89	113	167	198	102
	2	106	57	29	22	19	15	13	17	24	25	26	25	21	22	24	28	29	33	39	71	94	88	69	60	40
	3	75	76	73	99	84	156	188	210	179	66	110	238	215	122	76	95	179	286	286	164	87	100	227	194	149
D	4	226	130	197	445	181	226	195	134	91	215	263	271	132	97	58	91	104	128	180	159	100	71	56	38	158
	5	38	47	105	162	162	214	213	281	274	225	251	256	252	190	136	174	185	223	171	224	287	208	91	142	188
	6	100	59	109	144	154	146	242	255	81	48	49	70	152	145	208	179	189	100	113	100	100	109	80	102	126
	7	119	57	57	36	16	8	29	77	75	84	72	33	43	71	67	38	35	23	44	92	106	114	77	52	59
	8	34	50	50	46	22	26	31	98	108	117	125	99	97	102	91	53	103	79	49	48	41	34	38	48	66
	9	60	62	34	53	126	194	180	157	77	144	133	148	111	84	61	38	46	56	56	67	79	90	96	73	93
	10	80	75	88	90	91	50	29	72	98	156	177	158	143	125	89	90	70	76	113	139	96	73	75	46	96
	11	49	89	88	56	57	73	113	131	124	109	118	116	77	111	95	122	264	200	201	109	62	44	51	37	104
	12	38	47	112	177	239	220	249	343	204	195	254	152	199	89	42	95	99	104	157	125	122	148	77	86	149
	13	132	142	184	119	22	39	66	70	98	119	242	263	211	102	45	47	103	26	32	93	141	115	60	138	109
	14	105	85	55	27	17	5	30	23	20	33	51	66	60	36	28	35	18	28	38	45	38	37	27	25	39
Q	15	23	19	18	14	14	9	4	10	31	31	31	26	40	20	50	24	40	46	86	62	33	34	30	28	30
	16	32	28	16	14	14	12	11	12	18	25	36	50	63	64	65	44	60	29	46	79	80	48	59	65	40
	17	62	87	87	62	32	20	18	26	26	37	116	234	278	141	45	85	51	59	54	60	110	91	56	45	78
	18	115	75	81	96	39	40	31	38	41	38	45	67	55	61	59	53	49	166	257	327	110	237	152	114	98
	19	129	65	38	17	16	11	9	69	153	91	114	73	98	79	83	83	53	18	45	47	46	37	23	30	59
Q	20	30	20	21	15	32	13	20	12	12	18	15	23	41	19	16	18	18	23	32	35	34	23	24	24	22
	21	24	24	25	29	27	23	12	16	31	46	34	51	41	47	38	72	77	40	43	50	61	107	238	288	60
	22	291	273	243	139	61	43	30	16	13	27	25	32	29	24	33	30	27	22	38	22	25	36	34	50	65
Q	23	28	22	29	31	38	28	23	30	30	49	63	98	90	37	20	6	29	52	48	35	29	44	73	102	43
	24	108	77	45	65	64	38	33	41	45	35	59	59	54	41	36	39	23	29	35	44	38	33	33	35	46
	25	83	100	83	67	56	45	51	93	42	81	131	103	47	103	97	34	42	119	130	72	51	44	76	80	76
Q	26	91	64	42	22	27	24	34	24	15	26	40	77	79	49	35	34	34	27	41	42	40	38	39	30	41
	27	27	26	57	110	153	185	251	164	186	210	322	257	194	345	323	191	111	80	117	210	124	147	224	254	178
D	28	269	140	228	216	93	152	82	0	-86	188	249	205	213	75	364	311	198	59	59	62	180	183	106	73	151
D	29	106	148	124	160	195	167	214	265	129	89	187	213	198	185	125	50	98	200	229	136	130	82	76	56	148
D	30	130	131	82	110	173	114	147	176	196	211	238	212	104	189	182	165	301	339	226	217	327	243	246	110	190
D	31	179	141	122	102	108	131	174	175	250	283	202	227	200	138	256	352	255	210	184	165	174	100	56	112	179
	MEAN	94	79	83	92	79	83	92	100	87	102	126	130	116	96	93	87	94	94	104	103	97	92	88	88	96
50	MEAN	42	37	38	40	51	44	43	32	43	57	58	74	66	37	34	25	30	37	57	53	45	50	66	76	47
5D	MEAN	182	138	150	206	150	158	162	150	116	197	227	225	169	136	197	193	191	187	175	147	182	135	108	77	165

AU INDEX (HOURLY VALUES) SEPTEMBER 1978

	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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	2	90	53	67	51	43	120	131	140	168	84	79	146	170	124	74	71	26	74	223	186	172	144	101	90	109
	3	101	71	38	96	107	191	146	130	124	124	113	83	124	105	95	140	58	36	76	111	149	137	73	46	103
	4	44	28	32	49	55	57	68	83	98	64	110	95	98	79	75	80	76	96	140	162	107	81	70	49	79
	5	41	33	30	30	37	64	54	84	69	39	53	63	74	103	89	54	55	43	45	69	54	76	55	121	60
	6	103	97	86	106	86	158	167	226	235	276	260	158	88	49	72	39	19	28	33	30	20	17	10	8	99
	7	9	5	10	24	30	17	10	11	25	26	32	42	14	12	14	29	33	32	52	49	45	53	39	157	32
	8	167	208	300	359	230	186	63	73	43	56	8	27	22	26	21	13	14	25	20	21	23	25	30	26	83
	9	31	27	32	45	32	66	61	105	152	212	156	174	210	247	176	345	276	322	227	132	99	123	196	159	150
	10	112	134	64	28	32	27	19	21	37	50	57	55	50	111	110	34	24	21	40	25	28	62	36	21	50
	11	21	22	17	10	10	8	6	8	12	26	23	65	66	142	319	316	107	41	44	150	125	141	57	61	75
	12	36	65	59	53	39	37	57	84	182	289	339	187	94	129	150	94	112	161	194	157	189	82	126	101	126
	13	122	103	83	38	33	67	60	43	108	117	51	30	26	7	29	64	46	49	31	22	19	25	26	22	51
@	14	26	88	60	31	23	16	17	10	13	12	16	15	12	9	17	16	8	7	15	23	21	24	20	13	21
@	15	16	14	12	14	14	13	13	20	24	36	52	52	45	25	9	13	10	12	16	16	16	20	23	61	23
	16	50	52	45	42	116	97	87	73	20	14	12	10	14	15	22	20	20	31	29	25	24	38	51	57	40
	17	52	33	25	28	106	107	79	97	151	56	26	23	15	12	12	10	15	19	20	23	32	27	23	15	42
@	18	19	21	14	14	12	8	13	12	13	17	17	24	27	20	10	9	13	19	31	24	17	17	26	21	17
@	19	23	20	12	16	25	21	18	16	15	16	16	17	12	21	27	20	20	18	19	16	17	17	18	15	18
@	20	20	23	21	21	18	18	19	19	25	20	25	16	11	13	18	19	23	27	30	44	90	87	103	62	32
	21	53	35	39	56	113	196	151	63	37	32	61	23	23	16	22	34	77	38	29	19	21	23	21	22	50
	22	27	31	29	42	27	46	82	83	86	75	68	47	84	102	180	217	147	238	247	200	99	82	118	113	103
	23	53	37	34	51	70	94	90	73	110	130	157	120	130	72	56	74	68	134	123	176	132	159	115	66	97
	24	54	70	89	68	135	175	237	193	77	38	39	50	51	66	114	98	78	168	128	87	141	207	265	282	121
D	25	128	151	179	186	238	262	392	402	466	353	379	466	324	347	377	356	403	424	230	340	140	118	174	90	289
D	26	79	83	110	160	187	206	277	330	513	316	238	109	80	67	117	295	223	103	138	209	274	271	159	111	194
D	27	179	281	164	132	174	129	131	57	138	184	241	268	152	49	29	64	160	325	289	235	246	222	171	257	178
D	28	137	100	126	125	136	140	232	230	200	310	174	258	204	333	119	52	51	128	153	111	126	320	259	190	176
D	29	191	85	66	241	161	386	474	0	38	-38	8	59	44	147	324	269	333	272	95	55	17	23	12	5	136
	30	9	12	13	52	33	91	87	74	76	45	20	18	11	6	2	6	17	25	15	17	13	10	11	41	29
	MEAN	69	69	65	76	83	103	112	98	113	104	101	98	80	84	92	96	84	100	93	93	85	90	82	77	89
5Q	MEAN	20	33	23	19	18	15	16	15	18	20	25	24	21	17	16	15	14	16	22	24	32	33	38	34	22
5D	MEAN	142	140	129	168	179	224	301	203	271	225	208	232	160	188	193	207	234	250	181	190	160	190	155	130	194

AU INDEX (HOURLY VALUES) OCTOBER 1978

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	2	48	33	33	41	40	41	43	48	75	103	106	170	101	170	127	82	70	74	48	43	62	49	72	91	74
	3	54	56	55	91	71	115	81	85	106	82	68	58	75	67	72	46	28	19	32	42	65	53	49	78	65
	4	92	127	72	72	126	159	235	209	165	188	232	208	77	98	99	65	19	24	20	49	113	96	80	124	114
	5	92	57	59	72	99	63	44	47	59	43	57	46	62	54	28	20	13	45	54	21	17	17	16	18	46
@	6	21	21	29	40	24	23	31	32	31	36	23	16	19	15	13	22	34	50	16	14	22	38	26	38	26
@	7	43	74	63	32	43	66	47	39	41	28	50	53	46	71	79	49	28	12	14	16	22	33	30	21	42
	8	17	12	13	27	40	74	62	59	46	31	52	51	50	23	21	29	23	24	31	23	25	46	51	34	36
	9	27	20	14	19	38	45	51	40	61	111	97	154	124	44	21	11	25	43	41	42	38	49	107	86	54
	10	231	175	102	109	157	134	63	83	69	49	87	175	107	50	23	14	18	15	14	33	80	90	65	35	82
	11	42	54	67	78	40	48	60	42	59	53	83	46	17	16	17	10	14	16	16	13	17	23	32	39	38
	12	48	40	29	42	32	31	39	32	34	27	45	131	111	82	215	112	50	26	28	30	87	52	46	37	59
	13	96	123	74	41	43	23	70	86	103	63	28	23	20	13	8	7	8	8	33	63	72	128	138	85	56
@	14	65	38	45	29	26	38	44	37	37	32	26	19	25	24	37	51	36	60	75	28	26	28	35	44	38
@	15	37	50	27	20	20	22	26	20	29	38	30	23	24	36	30	44	27	20	22	17	20	19	33	26	28
@	16	47	35	28	38	22	30	29	24	26	27	35	24	26	21	26	19	21	23	22	21	21	27	31	33	27
	17	28	21	18	16	26	42	51	42	39	29	22	21	22	20	21	35	38	25	28	53	85	62	75	115	39
D	18	52	114	138	143	321	346	307	147	143	178	107	130	110	62	29	31	123	217	229	136	146	102	131	71	146
D	19	80	45	34	51	80	130	119	211	150	83	82	89	37	89	56	65	39	33	51	84	104	79	63	53	79
	20	47	45	69	59	33	22	18	33	27	32	23	56	29	52	67	23	23	59	85	71	57	26	35	22	42
	21	23	29	35	28	41	55	22	27	52	47	69	73	45	43	45	61	39	42	104	111	88	80	98	80	56
	22	77	67	61	65	48	48	109	102	78	91	90	80	42	20	42	28	28	66	100	63	37	25	27	28	59
	23	17	20	16	38	60	48	61	56	89	78	111	71	69	92	43	26	30	19	27	19	37	62	34	25	48
	24	37	27	55	23	35	60	64	72	41	26	9	9	8	7	11	20	11	20	29	74	61	74	64	59	37
	25	26	25	25	29	36	32	28	36	39	36	54	83	57	92	106	136	80	49	50	44	40	32	29	19	49
	26	17	22	18	32	46	44	49	66	62	53	89	98	65	88	127	158	116	151	91	109	74	95	171	211	86
D	27	95	79	157	177	169	105	163	214	176	128	189	107	90	90	33	42	98	61	50	27	30	59	52	55	102
	28	52	74	35	79	127	113	210	108	93	83	49	22	13	36	30	37	36	36	23	18	41	70	60	92	64
	29	76	45	43	49	48	83	85	55	73	85	146	132	137	184	262	221	238	200	188	130	59	37	38	24	110
D	30	26	40	46	115	51	111	157	123	216	167	137	180	221	151	167	67	138	170	193	204	202	186	95	65	134
D	31	77	38	42	31	34	72	59	74	75	62	39	33	50	171	244	199	208	129	44	22	65	47	35	30	78
	MEAN	56	54	50	55	65	73	79	75	77	69	75	80	64	65	70	58	55	57	59	54	60	60	61	57	64
5Q	MEAN	42	43	38	31	27	35	35	30	32	32	32	27	28	33	37	37	29	33	29	19	22	29	31	32	32
5D	MEAN	66	63	83	103	131	152	161	153	152	123	110	107	101	112	105	80	121	122	113	94	109	94	75	54	108

AU INDEX (HOURLY VALUES) NOVEMBER 1978

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	2	35	31	41	59	42	54	101	96	113	176	199	151	146	140	173	194	242	177	50	22	34	44	60	77	102
	3	52	67	55	64	67	51	57	48	61	72	39	49	40	34	43	38	45	37	103	104	97	90	91	97	62
	4	57	68	37	34	40	68	27	25	42	31	29	20	38	35	45	23	14	25	44	33	32	32	31	28	36
	5	24	33	60	136	98	73	84	61	52	38	34	31	27	26	31	30	17	17	17	20	21	20	20	21	41
Q	6	25	25	28	30	27	28	30	35	37	29	39	29	29	42	33	9	15	28	27	28	37	37	30	30	29
	7	29	30	34	38	39	43	41	38	40	37	40	35	37	39	37	34	29	21	27	65	74	68	67	263	50
	8	114	58	110	110	88	76	37	37	27	41	32	26	27	28	23	38	35	28	27	28	37	35	53	57	49
	9	91	135	121	91	68	100	42	52	109	102	55	45	38	34	34	41	36	24	21	16	15	17	21	18	55
	10	21	28	33	40	36	39	36	37	36	53	74	33	41	44	59	64	232	238	254	116	135	116	195	224	91
	11	204	177	110	115	115	117	94	91	101	57	51	41	56	64	52	44	25	37	67	84	85	82	110	114	87
D	12	117	353	233	114	148	136	404	372	369	280	361	305	122	121	187	73	100	113	116	75	135	178	164	51	193
	13	123	180	90	83	121	128	118	80	50	39	66	49	83	127	107	182	212	252	268	122	70	61	47	43	113
	14	36	30	28	31	27	32	39	41	36	37	34	37	30	96	157	211	167	160	131	85	127	64	46	27	71
	15	28	53	51	41	116	99	45	53	61	55	45	18	10	19	27	32	20	14	25	80	29	71	55	31	45
	16	39	65	47	45	41	36	39	44	36	29	24	37	66	80	72	40	25	28	36	50	45	32	36	45	43
	17	53	57	47	51	48	49	61	59	72	101	101	76	100	100	70	47	17	26	33	39	57	65	49	54	60
Q	18	64	65	63	75	62	50	52	45	60	50	42	42	40	29	45	47	20	31	34	34	31	38	44	58	47
	19	82	100	93	107	104	72	74	54	118	89	103	138	149	127	55	64	40	64	50	39	38	36	48	62	79
D	20	62	63	58	69	112	92	98	86	157	140	87	86	64	55	134	261	276	325	201	216	164	113	169	114	133
	21	90	61	65	63	36	47	32	69	81	71	56	41	35	29	24	30	36	46	26	35	49	95	117	24	52
D	22	150	129	94	114	111	65	91	98	80	96	106	75	202	229	152	309	258	156	97	65	49	52	53	50	120
	23	41	38	41	38	32	35	29	24	33	36	44	42	54	117	75	58	67	77	45	120	131	126	82	90	61
	24	97	83	62	65	79	85	70	41	35	49	53	79	94	143	207	202	228	111	121	146	148	63	67	55	99
D	25	59	78	140	185	106	81	149	164	137	243	125	95	217	121	-1	31	80	80	194	139	70	102	68	43	113
D	26	102	104	138	66	110	134	166	99	93	115	71	73	42	48	123	240	236	190	101	83	108	88	74	74	112
	27	80	73	95	70	55	76	92	94	70	69	85	93	37	102	96	137	102	49	75	59	55	75	41	70	77
Q	28	58	55	40	42	48	44	38	43	32	16	58	27	18	31	19	19	20	33	19	21	23	20	20	26	32
Q	29	22	27	28	27	26	27	21	20	26	31	46	27	61	28	35	23	52	21	32	39	30	26	27	27	30
Q	30	33	27	29	35	35	25	31	33	47	48	39	26	65	34	37	14	19	25	35	49	25	52	46	48	36
	MEAN	67	77	72	74	74	69	77	74	80	80	79	66	68	73	72	85	89	82	76	68	66	64	65	65	73
50	MEAN	40	39	37	41	39	34	34	35	40	34	44	30	42	32	33	22	25	27	29	34	29	34	33	37	34
5D	MEAN	98	145	132	109	117	101	181	163	167	174	150	126	129	114	119	182	190	172	141	115	105	106	105	66	134

AU INDEX (HOURLY VALUES) DECEMBER 1978

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Q	2	13	23	13	12	8	11	17	10	13	18	8	7	6	9	8	12	16	15	11	11	11	10	25	44	14
	3	50	77	107	71	49	20	18	12	13	12	10	8	12	15	17	13	11	28	18	18	36	68	79	58	34
	4	41	33	26	29	51	20	52	46	53	48	78	147	147	118	92	38	114	174	76	90	117	116	99	113	80
	5	63	67	62	62	65	39	40	38	22	14	36	30	35	28	22	13	16	19	31	14	24	61	68	59	39
	6	38	30	39	27	32	36	39	60	36	27	28	25	20	19	42	63	40	34	60	88	70	55	54	57	42
Q	7	50	43	28	25	26	23	30	23	11	8	12	6	11	15	16	21	26	12	9	12	13	11	9	7	19
	8	6	5	10	13	12	15	25	35	20	28	46	46	55	34	16	39	34	27	15	23	57	27	26	16	26
Q	9	12	12	17	24	40	69	33	22	29	21	22	27	33	19	20	38	22	20	15	14	16	17	15	16	24
Q	10	19	25	22	14	22	14	12	17	29	23	31	21	10	8	7	10	9	12	10	12	13	10	9	9	15
Q	11	6	7	8	13	9	8	8	7	6	6	8	5	7	13	11	10	10	10	15	17	16	18	14	11	10
	12	13	16	15	13	14	14	15	16	17	18	34	41	38	84	79	31	20	26	32	52	55	34	30	39	31
	13	79	62	65	172	155	119	92	71	65	41	37	30	27	35	34	28	29	22	42	27	31	37	59	81	60
D	14	82	175	250	252	170	134	327	382	201	178	103	56	18	4	6	29	51	37	23	74	132	136	76	64	123
D	15	62	91	25	19	299	172	92	80	109	90	154	129	47	71	91	65	61	44	51	97	84	64	30	56	87
	16	43	64	59	64	78	67	76	43	63	46	61	49	40	31	23	21	38	99	37	83	116	124	62	41	60
	17	52	85	42	26	32	30	38	38	39	22	8	3	4	17	9	17	15	16	14	17	21	25	44	52	28
D	18	81	27	19	17	37	38	73	180	220	177	93	89	157	215	184	171	180	105	90	102	93	114	91	85	110
	19	122	102	47	62	103	126	126	115	99	70	53	66	76	129	177	107	110	117	185	205	122	74	64	61	105
D	20	60	83	121	93	120	156	109	76	130	188	83	104	193	164	160	152	116	65	66	81	93	79	88	68	110
	21	66	73	46	105	119	82	93	77	65	58	56	96	70	38	14	18	33	20	23	22	26	20	30	42	54
	22	33	41	60	93	175	108	53	96	55	39	79	215	222	153	60	136	70	97	42	33	41	44	54	37	85
	23	26	52	46	48	47	38	41	103	103	78	36	17	18	20	19	43	8	21	25	15	15	16	11	10	36
	24	14	13	15	14	14	20	28	46	33	31	56	62	46	25	19	12	15	14	14	10	10	8	10	8	22
	25	7	26	79	108	40	27	58	70	103	120	122	190	268	144	25	230	130	47	28	21	20	8	12	7	79
	26	10	11	9	26	29	36	34	49	77	139	93	29	46	38	32	24	19	22	18	24	54	27	28	33	38
	27	14	26	104	63	132	132	86	77	62	46	18	20	22	70	68	36	46	93	110	129	120	70	37	20	67
	28	18	18	29	36	50	20	10	14	14	23	22	40	46	38	54	70	136	26	164	160	91	81	56	40	52
	29	37	36	41	35	33	28	22	29	40	25	55	176	185	98	73	61	181	131	246	108	196	189	96	81	92
D	30	96	87	62	83	181	98	158	107	58	60	77	64	48	26	81	48	84	49	68	64	98	93	96	68	81
	31	39	12	125	87	81	78	83	52	52	57	68	67	44	62	35	87	33	26	50	32	27	32	26	22	53
	MEAN	41	46	51	56	73	59	63	66	61	58	54	64	66	57	49	53	54	47	52	54	59	54	45	42	55
5Q	MEAN	20	22	17	17	21	25	20	15	17	15	16	13	13	12	12	18	16	13	12	13	13	13	14	17	16
5D	MEAN	76	92	95	92	161	119	151	165	143	138	102	88	92	96	104	93	98	60	59	83	100	97	76	68	102

AL INDEX (HOURLY VALUES) JULY 1978

	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	-32	-40	-43	-55	-49	-45	-48	-44	-50	-58	-96	-143	-105	-147	-99	-60	-93	-50	-29	-34	-33	-33	-33	-29	-60
	2	-58	-144	-147	-63	-28	-26	-23	-78	-57	-40	-34	-31	-26	-25	-22	-44	-40	-39	-90	-86	-53	-25	-72	-58	-55
	3	-110	-80	-91	-107	-91	-71	-75	-100	-88	-65	-56	-65	-93	-30	-43	-40	-75	-58	-24	-44	-130	-73	-42	-353	-84
D	4	-647	-756	-207	-91	-59	-180	-421	-241	-60	-59	-58	-34	-88	-181	-370	-708	-919	-217	-36	-29	-106	-128	-307	-867	-282
D	5	-786	-718	-892	-681	-877	-1034	-597	-740	-556	-463	-362	-370	-293	-233	-447	-382	-272	-204	-149	-256	-95	-88	-116	-94	-446
	6	-142	-106	-65	-51	-97	-47	-61	-95	-50	-30	-28	-26	-23	-23	-34	-163	-107	-314	-188	-58	-19	-26	-32	-39	-76
	7	-72	-218	-238	-58	-41	-38	-28	-27	-30	-49	-100	-245	-211	-111	-221	-277	-276	-257	-368	-142	-177	-203	-210	-224	-159
	8	-248	-367	-422	-362	-325	-155	-130	-180	-76	-36	-27	-34	-90	-40	-46	-433	-467	-291	-199	-49	-24	-68	-110	-59	-177
	9	-98	-331	-192	-38	-26	-24	-31	-32	-31	-38	-36	-53	-125	-99	-84	-140	-222	-72	-54	-15	-9	-25	-61	-57	-79
	10	-40	-43	-53	-182	-124	-30	-38	-55	-243	-135	-32	-44	-199	-71	-22	-36	-48	-154	-112	-49	-45	-55	-157	-87	-86
	11	-64	-264	-126	-77	-35	-24	-25	-69	-73	-36	-32	-38	-61	-71	-86	-71	-89	-102	-21	-24	-28	-42	-44	-38	-64
@	12	-37	-31	-33	-39	-34	-38	-45	-59	-40	-31	-104	-124	-62	-117	-86	-42	-70	-42	-51	-26	-22	-53	-99	-53	-56
D	13	-105	-126	-199	-168	-157	-133	-71	-188	-367	-80	-56	-23	-63	-141	-190	-98	-59	-74	-70	-80	-273	-243	-184	-274	-143
D	14	-368	-410	-515	-204	-151	-436	-340	-450	-417	-512	-783	-698	-440	-568	-421	-402	-256	-98	-129	-374	-335	-80	-38	-25	-352
	15	-42	-33	-40	-37	-51	-47	-41	-38	-31	-31	-29	-33	-24	-26	-21	-14	-15	-16	-16	-23	-36	-30	-35	-52	-32
	16	-102	-304	-176	-61	-55	-49	-42	-37	-29	-36	-39	-39	-36	-37	-60	-52	-97	-91	-28	-27	-34	-55	-109	-73	-69
	17	-85	-170	-174	-99	-139	-77	-41	-28	-35	-52	-212	-145	-85	-41	-26	-35	-76	-27	-43	-99	-105	-35	-65	-47	-81
D	18	-128	-196	-110	-76	-51	-38	-26	-24	-18	-25	-35	-43	-155	-110	-74	-122	-445	-504	-262	-242	-281	-549	-229	-182	-163
	19	-206	-171	-126	-99	-63	-45	-82	-64	-45	-77	-105	-61	-45	-45	-64	-196	-183	-89	-57	-40	-43	-40	-39	-35	-84
	20	-41	-42	-55	-104	-89	-87	-188	-195	-131	-153	-83	-106	-46	-42	-58	-75	-56	-34	-24	-56	-103	-190	-167	-100	-93
	21	-185	-130	-58	-44	-74	-26	-22	-35	-176	-220	-169	-118	-74	-34	-19	-38	-30	-33	-20	-20	-18	-31	-41	-34	-69
	22	-41	-55	-234	-223	-240	-211	-176	-93	-121	-111	-73	-88	-38	-27	-51	-129	-151	-128	-94	-195	-151	-80	-88	-177	-124
	23	-68	-46	-62	-147	-205	-231	-190	-187	-92	-36	-42	-51	-36	-32	-32	-35	-54	-125	-120	-92	-295	-366	-309	-234	-129
	24	-199	-91	-86	-42	-18	-12	-64	-126	-85	-35	-32	-44	-46	-99	-68	-86	-122	-155	-123	-80	-101	-107	-126	-299	-94
	25	-340	-177	-67	-26	-89	-136	-71	-58	-92	-93	-107	-143	-204	-202	-134	-55	-25	-28	-68	-199	-343	-324	-261	-179	-142
	26	-154	-148	-138	-122	-156	-114	-48	-27	-26	-30	-34	-50	-92	-99	-67	-49	-50	-29	-56	-43	-44	-53	-115	-94	-77
@	27	-41	-48	-46	-41	-36	-30	-24	-24	-25	-28	-37	-39	-53	-39	-23	-14	-18	-26	-35	-48	-25	-40	-72	-159	-40
	28	-102	-57	-35	-35	-157	-231	-230	-179	-103	-90	-92	-103	-173	-124	-40	-11	-8	-7	-1	-5	-14	-16	-15	-22	-77
@	29	-21	-19	-26	-31	-36	-23	-41	-118	-128	-96	-201	-205	-110	-75	-54	-73	-90	-79	-35	-29	-23	-34	-70	-110	-72
@	30	-85	-52	-64	-85	-30	-14	-15	-17	-35	-40	-38	-32	-37	-35	-22	-47	-76	-56	-38	-27	-52	-33	-28	-27	-41
@	31	-21	-21	-24	-24	-30	-22	-17	-20	-25	-39	-27	-26	-36	-37	-32	-25	-30	-33	-32	-63	-54	-22	-18	-22	-29
	MEAN	-150	-174	-153	-112	-116	-118	-104	-117	-107	-91	-101	-104	-102	-95	-97	-127	-145	-110	-82	-82	-99	-101	-106	-132	-113
5@	MEAN	-41	-34	-38	-44	-33	-25	-28	-47	-50	-46	-81	-85	-59	-60	-43	-40	-56	-47	-38	-38	-35	-36	-57	-74	-47
5D	MEAN	-406	-441	-384	-244	-259	-364	-291	-328	-283	-227	-258	-233	-207	-246	-300	-342	-390	-219	-129	-196	-218	-217	-174	-288	-277

AL INDEX (HOURLY VALUES) AUGUST 1978

	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	-16	-26	-76	-173	-125	-103	-91	-70	-110	-126	-65	-76	-62	-27	-23	-19	-24	-1	-95	-130	-98	-93	-96	-90	-76
	2	-30	-20	-24	-22	-25	-17	-16	-20	-25	-29	-23	-14	-11	-15	-17	-36	-34	-47	-38	-47	-67	-110	-80	-32	-33
	3	-66	-42	-38	-26	-29	-49	-149	-151	-71	-38	-40	-146	-215	-104	-49	-47	-155	-436	-367	-104	-23	-34	-138	-325	-118
D	4	-487	-447	-301	-569	-126	-102	-130	-139	-56	-145	-605	-411	-214	-54	-81	-85	-120	-102	-164	-270	-153	-4	-7	-23	-200
	5	-23	-36	-121	-284	-301	-165	-235	-354	-344	-119	-215	-394	-401	-319	-178	-281	-239	-197	-117	-183	-397	-373	-83	-147	-229
	6	-150	-90	-93	-298	-323	-477	-428	-408	-88	-42	-47	-66	-371	-446	-476	-456	-361	-173	-143	-163	-28	-56	-43	-97	-222
	7	-246	-85	-57	-53	-63	-30	-73	-122	-221	-132	-48	-39	-38	-82	-222	-106	-78	-17	-17	-89	-123	-202	-142	-46	-97
	8	-41	-105	-131	-131	-29	-27	-18	-151	-182	-87	-57	-178	-241	-162	-159	-102	-159	-206	-23	-24	-34	-27	-32	-33	-97
	9	-39	-51	-72	-42	-135	-232	-114	-52	-52	-186	-78	-116	-89	-59	-58	-52	-49	-54	-30	-49	-97	-112	-64	-18	-79
	10	-61	-73	-95	-154	-90	-16	-21	-28	-180	-153	-101	-100	-132	-132	-185	-186	-145	-145	-112	-124	-99	-70	-93	-55	-106
	11	-49	-201	-260	-126	-38	-131	-232	-135	-57	-34	-35	-28	-62	-206	-186	-122	-413	-304	-234	-100	-15	-32	-28	-24	-127
	12	-16	-26	-77	-351	-396	-396	-349	-446	-158	-150	-202	-504	-289	-91	-31	-43	-63	-191	-199	-82	-81	-298	-60	-44	-189
	13	-129	-295	-318	-202	-44	-54	-65	-194	-68	-94	-449	-440	-357	-217	-41	-41	-155	-232	-78	-79	-152	-237	-51	-137	-172
	14	-269	-136	-79	-72	-63	-297	-153	-51	-28	-29	-37	-82	-48	-34	-16	-19	-23	-22	-20	-28	-32	-53	-23	-20	-68
Q	15	-26	-20	-18	-24	-32	-35	-30	-20	-50	-52	-39	-32	-34	-29	-72	-74	-76	-104	-170	-20	-23	-24	-22	-18	-44
	16	-9	-10	-30	-26	-26	-27	-26	-30	-24	-31	-41	-53	-64	-56	-46	-50	-81	-17	-16	-47	-131	-30	-38	-68	-41
	17	-55	-47	-28	-14	-16	-23	-21	-21	-35	-33	-50	-261	-377	-148	-41	-79	-109	-66	-26	-42	-61	-65	-44	-35	-71
	18	-126	-241	-34	-82	-60	-33	-25	-23	-21	-24	-29	-44	-99	-92	-35	-44	-69	-206	-339	-568	-96	-257	-655	-415	-151
	19	-204	-99	-32	-19	-15	-19	-22	-28	-295	-256	-110	-82	-205	-194	-350	-135	-64	-41	-50	-54	-58	-29	-25	-34	-101
Q	20	-27	-21	-20	-15	-11	-59	-18	-21	-34	-42	-42	-43	-43	-45	-52	-59	-45	-57	-65	-71	-47	-23	-23	-18	-37
	21	-27	-29	-55	-83	-29	-18	-15	-26	-38	-44	-61	-61	-31	-27	-42	-125	-224	-75	-26	-23	-23	-71	-318	-378	-77
	22	-364	-273	-294	-110	-26	-44	-42	-27	-20	-25	-33	-29	-37	-30	-29	-27	-50	-33	-36	-32	-27	-23	-21	-22	-69
Q	23	-19	-18	-18	-30	-43	-39	-36	-28	-45	-45	-46	-67	-77	-36	-28	-23	-34	-77	-53	-90	-16	-42	-105	-152	-49
	24	-78	-49	-31	-22	-21	-20	-24	-20	-27	-38	-40	-83	-70	-32	-18	-29	-13	-20	-12	-16	-21	-20	-21	-19	-31
	25	-24	-82	-61	-23	-18	-11	-13	-214	-194	-67	-223	-134	-87	-78	-163	-43	-15	-141	-189	-43	-18	-17	-24	-32	-80
Q	26	-49	-72	-41	-21	-69	-45	-25	-57	-28	-32	-31	-70	-110	-57	-69	-65	-60	-43	-42	-110	-55	-36	-17	-13	-51
	27	-18	-22	-55	-326	-295	-211	-205	-147	-80	-62	-318	-316	-234	-390	-318	-211	-135	-115	-98	-260	-85	-72	-229	-369	-190
D	28	-384	-463	-482	-591	-828	-873	-526	-1009	-680	-668	-802	-519	-490	-1202	-1139	-461	-201	-81	-66	-103	-394	-563	-533	-554	-567
D	29	-349	-585	-470	-366	-416	-449	-320	-626	-242	-84	-380	-832	-457	-539	-212	-135	-184	-412	-411	-202	-147	-167	-236	-176	-350
D	30	-178	-234	-309	-194	-227	-265	-248	-264	-170	-181	-556	-546	-178	-454	-537	-314	-402	-320	-447	-385	-639	-354	-455	-612	-353
D	31	-481	-302	-148	-118	-87	-209	-367	-217	-517	-705	-274	-257	-616	-223	-416	-889	-417	-294	-228	-291	-383	-208	-78	-121	-327
	MEAN	-130	-135	-124	-147	-129	-144	-130	-164	-133	-121	-163	-194	-185	-180	-170	-140	-135	-136	-126	-123	-116	-119	-122	-133	-142
5Q	MEAN	-27	-31	-34	-52	-56	-56	-40	-39	-53	-59	-44	-57	-65	-38	-48	-48	-47	-56	-85	-84	-47	-43	-52	-58	-51
5D	MEAN	-375	-406	-342	-367	-336	-379	-318	-451	-333	-356	-523	-513	-391	-494	-477	-376	-264	-241	-263	-250	-343	-259	-261	-297	-359

AL INDEX (HOURLY VALUES) SEPTEMBER 1978

	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	-247	-207	-307	-264	-186	-175	-708	-399	-378	-336	-416	-372	-197	-208	-142	-143	-382	-37	-66	-83	-213	-317	-174	-253
	2	-179	-120	-80	-184	-65	-143	-215	-755	-235	-110	-71	-303	-402	-194	-192	-63	-93	-93	-421	-405	-241	-224	-308	-163	-219
	3	-153	-111	-59	-214	-165	-279	-355	-377	-311	-117	-164	-186	-227	-182	-184	-233	-81	-60	-98	-201	-276	-191	-75	-67	-182
	4	-107	-107	-70	-87	-162	-93	-79	-197	-312	-76	-44	-220	-163	-114	-146	-183	-214	-224	-221	-163	-122	-90	-133	-101	-143
	5	-74	-41	-30	-52	-72	-195	-157	-58	-42	-42	-67	-86	-118	-113	-141	-109	-108	-123	-88	-104	-37	-34	-70	-182	-89
	6	-182	-196	-92	-90	-46	-123	-287	-366	-651	-388	-229	-171	-172	-214	-55	-74	-49	-19	-20	-21	-20	-21	-21	-22	-147
	7	-22	-24	-22	-39	-108	-102	-18	-14	-14	-30	-127	-51	-39	-41	-84	-90	-80	-78	-59	-46	-28	-26	-21	-105	-53
	8	-455	-373	-460	-582	-393	-193	-158	-135	-177	-30	-27	-27	-32	-39	-46	-55	-50	-39	-34	-23	-18	-17	-17	-23	-142
	9	-28	-23	-32	-52	-23	-47	-60	-81	-417	-496	-690	-649	-295	-281	-265	-623	-447	-365	-269	-216	-185	-191	-235	-433	-267
	10	-153	-12	-14	-12	-17	-26	-16	-25	-42	-37	-56	-114	-109	-172	-113	-61	-75	-48	-41	-28	-18	-31	-30	-58	-55
	11	-24	-44	-108	-29	-12	-11	-11	-15	-22	-25	-30	-35	-94	-237	-607	-584	-253	-65	-46	-187	-220	-237	-86	-23	-125
	12	-21	-48	-205	-189	-90	-32	-26	-161	-394	-436	-463	-368	-327	-340	-412	-188	-127	-196	-294	-203	-219	-88	-120	-137	-212
	13	-190	-62	-57	-35	-15	-42	-100	-45	-130	-205	-28	-27	-37	-34	-45	-116	-159	-184	-81	-42	-26	-29	-25	-19	-72
@	14	-15	-40	-70	-22	-14	-14	-19	-18	-20	-26	-31	-36	-21	-30	-25	-25	-23	-15	-19	-39	-20	-23	-20	-19	-25
@	15	-17	-19	-12	-9	-13	-8	-10	-25	-19	-28	-60	-79	-90	-33	-23	-20	-27	-24	-21	-16	-14	-15	-13	-98	-29
	16	-83	-23	-9	-3	-81	-188	-74	-30	-30	-32	-39	-39	-34	-36	-36	-33	-42	-91	-74	-29	-21	-30	-91	-27	-49
	17	-20	-20	-21	-21	-107	-241	-150	-173	-252	-48	-26	-35	-39	-36	-28	-31	-29	-36	-23	-27	-20	-29	-57	-40	-63
@	18	-7	-8	-13	-15	-18	-20	-16	-20	-23	-28	-30	-32	-77	-30	-34	-33	-27	-33	-39	-38	-23	-14	-13	-17	-25
@	19	-15	-18	-18	-13	-15	-11	-18	-15	-19	-24	-35	-36	-23	-30	-34	-27	-41	-25	-20	-20	-20	-18	-18	-15	-22
@	20	-13	-27	-18	-22	-20	-14	-14	-20	-29	-36	-40	-35	-35	-28	-21	-15	-12	-7	-11	-27	-110	-246	-155	-23	-41
	21	-10	-14	-17	-90	-309	-325	-139	-53	-36	-25	-31	-35	-29	-24	-27	-34	-130	-67	-33	-13	-14	-16	-14	-17	-63
	22	-16	-18	-78	-86	-127	-82	-75	-106	-246	-83	-58	-70	-127	-314	-344	-261	-233	-457	-386	-233	-66	-119	-101	-165	-160
	23	-133	-48	-25	-55	-183	-165	-71	-28	-117	-154	-115	-150	-244	-220	-30	-92	-165	-286	-227	-254	-158	-388	-167	-32	-146
	24	-24	-92	-133	-153	-275	-230	-244	-147	-38	-14	-17	-25	-35	-32	-42	-122	-172	-266	-220	-44	-54	-116	-440	-247	-132
D	25	-42	-59	-127	-270	-143	-206	-302	-423	-447	-165	-640	-751	-629	-428	-273	-355	-428	-621	-252	-510	-215	-137	-367	-106	-329
D	26	-68	-83	-56	-73	-220	-372	-488	-647	-863	-346	-201	-282	-106	-39	-207	-647	-640	-304	-250	-239	-375	-319	-50	-27	-287
D	27	-187	-278	-115	-178	-347	-361	-171	-85	-144	-284	-514	-393	-299	-195	-186	-157	-258	-716	-550	-497	-751	-600	-452	-643	-348
D	28	-466	-121	-164	-393	-532	-291	-398	-354	-414	-410	-387	-775	-492	-642	-258	-83	-59	-287	-566	-389	-214	-672	-863	-582	-409
D	29	-260	-232	-113	-380	-731	-460	-438	-1080	-552	-829	-524	-394	-747	-937	-520	-761	-506	-665	-196	-104	-96	-95	-94	-62	-449
	30	-57	-42	-36	-53	-83	-197	-268	-183	-261	-200	-108	-51	-37	-50	-83	-115	-105	-69	-161	-212	-107	-42	-33	-132	-112
	MEAN	-104	-85	-82	-123	-155	-155	-151	-211	-221	-170	-172	-195	-181	-175	-155	-177	-159	-194	-158	-146	-125	-142	-146	-125	-154
5Q	MEAN	-13	-22	-26	-16	-16	-13	-15	-19	-22	-28	-39	-43	-49	-30	-27	-24	-26	-20	-22	-28	-37	-63	-43	-34	-28
5D	MEAN	-204	-154	-115	-258	-394	-338	-359	-517	-484	-406	-453	-519	-454	-448	-288	-400	-378	-518	-362	-347	-330	-364	-365	-284	-364

AL INDEX (HOURLY VALUES) OCTOBER 1978

	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	-209	-121	-204	-106	-80	-78	-91	-199	-261	-262	-222	-178	-214	-382	-330	-417	-253	-130	-69	-174	-134	-203	-388	-139	-202
	2	-61	-36	-43	-216	-153	-68	-38	-73	-189	-198	-233	-390	-574	-518	-376	-220	-183	-243	-94	-40	-189	-195	-102	-231	-194
	3	-181	-119	-159	-109	-121	-170	-215	-174	-122	-130	-146	-116	-150	-221	-140	-159	-101	-146	-90	-100	-134	-81	-58	-118	-136
	4	-292	-369	-137	-28	-101	-263	-364	-219	-127	-372	-296	-290	-308	-426	-214	-96	-79	-57	-39	-45	-342	-272	-232	-369	-222
	5	-306	-208	-159	-191	-119	-64	-40	-27	-47	-38	-61	-268	-62	-24	-28	-36	-30	-53	-164	-65	-21	-22	-25	-20	-87
@	6	-17	-14	-9	-17	-28	-23	-25	-22	-15	-17	-23	-21	-22	-24	-22	-35	-101	-243	-54	-9	-15	-73	-49	-45	-38
@	7	-75	-73	-31	-24	-84	-100	-18	-17	-22	-23	-24	-27	-28	-60	-90	-29	-33	-29	-17	-11	-14	-20	-12	-18	-37
	8	-15	-17	-18	-16	-86	-205	-71	-9	-14	-20	-59	-240	-178	-37	-32	-38	-33	-52	-74	-7	-17	-90	-130	-70	-64
	9	-26	-20	-23	-16	0	1	-4	-9	-87	-244	-209	-122	-123	-27	-20	-27	-22	-21	-27	-74	-25	-32	-129	-231	-63
	10	-368	-171	-138	-140	-85	-51	-25	-62	-82	-31	-79	-410	-198	-43	-19	-26	-29	-10	-11	-40	-153	-199	-38	-23	-101
	11	-23	-31	-52	-37	-15	-17	-24	-40	-54	-47	-27	-27	-24	-18	-24	-31	-24	-15	-14	-15	-23	-20	-27	-37	-28
	12	-21	-15	-12	-12	-14	-10	-8	-11	-11	-19	-18	-305	-309	-253	-535	-383	-44	-21	-21	-19	-51	-179	-40	-10	-97
	13	-72	-108	-21	-10	-18	-13	-41	-66	-73	-40	-25	-28	-29	-30	-29	-30	-23	-34	-91	-172	-107	-155	-39	-9	-53
@	14	-7	-12	-39	-72	-68	-51	-81	-131	-9	-31	-17	-17	-16	-22	-60	-65	-115	-138	-134	-59	-15	-15	-15	-22	-51
@	15	-17	-37	-27	-8	-4	-6	-15	-19	-26	-43	-54	-23	-19	-34	-172	-59	-69	-49	-27	-23	-20	-13	-14	-11	-33
@	16	-113	-135	-123	-94	-23	-28	-15	-16	-16	-24	-35	-29	-17	-14	-64	-65	-36	-17	-16	-22	-20	-16	-23	-23	-41
	17	-21	-19	-14	-11	-5	-2	-4	-3	-8	-20	-29	-23	-25	-21	-26	-36	-83	-53	-28	-17	-137	-105	-71	-153	-38
D	18	-394	-350	-302	-211	-496	-313	-323	-153	-118	-184	-250	-342	-113	-64	-34	-98	-346	-393	-370	-409	-331	-140	-171	-436	-264
D	19	-468	-254	-87	-41	-75	-264	-496	-461	-510	-173	-158	-182	-520	-276	-216	-266	-103	-132	-98	-97	-315	-233	-122	-74	-234
	20	-45	-30	-155	-146	-3	-5	-12	-15	-48	-37	-31	-283	-191	-226	-279	-131	-110	-190	-285	-257	-99	-19	-10	-4	-109
	21	-13	-31	-32	-136	-115	-248	-38	-11	-114	-64	-333	-245	-105	-158	-398	-121	-116	-143	-316	-337	-122	-148	-299	-129	-157
	22	-109	-65	-81	-220	-253	-314	-238	-229	-209	-407	-147	-64	-72	-41	-64	-264	-111	-211	-255	-170	-109	-20	-6	-8	-153
	23	-6	-11	-13	-127	-207	-143	-107	-139	-232	-147	-109	-66	-96	-119	-156	-132	-159	-97	-18	-11	-36	-140	-25	-14	-96
	24	-16	-20	-188	-145	-108	-167	-107	-41	-38	-28	-25	-26	-15	-10	-15	-40	-18	-26	-44	-259	-198	-51	-12	-15	-67
	25	-12	-8	-16	-7	-4	0	0	-2	-123	-14	-75	-179	-283	-292	-179	-183	-308	-103	-129	-80	-30	-3	-9	-16	-86
	26	-19	-18	-14	-35	-42	-21	-8	-17	-16	-24	-37	-57	-52	-140	-306	-233	-180	-172	-302	-277	-67	-268	-589	-291	-133
D	27	-368	-409	-296	-140	-161	-329	-432	-344	-158	-466	-389	-264	-321	-328	-75	-87	-145	-154	-37	-10	-38	-101	-223	-159	-226
	28	-196	-209	-202	-265	-300	-263	-338	-67	-105	-189	-65	-49	-92	-137	-256	-242	-71	-36	-62	-44	-36	-102	-149	-204	-153
	29	-121	-25	-25	-48	-70	-69	-40	-73	-154	-195	-155	-153	-308	-534	-647	-420	-364	-526	-389	-187	-201	-168	-99	-45	-209
D	30	-25	-19	-24	-31	-51	-178	-114	-142	-374	-531	-449	-392	-520	-390	-515	-687	-769	-416	-427	-499	-476	-307	-411	-259	-334
D	31	-254	-182	-216	-282	-159	-154	-190	-259	-134	-121	-250	-280	-198	-566	-572	-388	-282	-208	-74	-35	-172	-257	-181	-189	-233
	MEAN	-124	-101	-92	-94	-98	-116	-113	-98	-112	-133	-130	-164	-167	-175	-190	-162	-140	-132	-121	-114	-117	-117	-119	-108	-127
5@	MEAN	-45	-54	-45	-43	-41	-41	-30	-41	-17	-27	-30	-23	-20	-30	-81	-50	-70	-95	-49	-24	-16	-27	-22	-23	-39
5D	MEAN	-301	-242	-185	-141	-188	-247	-311	-271	-258	-295	-299	-292	-334	-324	-282	-305	-329	-260	-201	-210	-266	-207	-221	-223	-258

AL INDEX (HOURLY VALUES) NOVEMBER 1978

	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	-162	-156	-276	-311	-170	-166	-307	-339	-385	-361	-472	-180	-176	-165	-52	-37	-24	-39	-37	-79	-66	-193	-56	-17	-176
	2	-18	-16	-17	-15	-77	-57	-44	-50	-118	-224	-285	-375	-354	-383	-330	-483	-501	-274	-60	-35	-31	-12	-29	-185	-166
	3	-104	-85	-75	-79	-22	-41	-47	-147	-304	-181	-37	-23	-21	-27	-32	-64	-40	-68	-333	-537	-428	-220	-74	-65	-127
	4	-62	-21	-13	-19	-9	-52	-145	-97	-94	-21	-21	-46	-139	-164	-197	-168	-83	-31	-23	-16	-8	-17	-79	-102	-68
	5	-34	-44	-161	-293	-42	-11	-22	-6	-2	-9	-12	-125	-119	-36	-26	-128	-97	-40	-46	-21	-14	-15	-12	-10	-55
@	6	-9	-8	-7	-1	0	0	2	-1	-34	-47	-46	-43	-51	-56	-101	-82	-43	-96	-94	-27	0	-1	-9	-6	-32
	7	-6	-5	-1	2	2	2	2	1	-2	-9	-7	-9	-17	-22	-23	-28	-23	-21	-26	-87	-10	-58	-258	-473	-45
	8	-244	-219	-285	-45	-13	1	-21	-25	-22	-22	-21	-16	-20	-18	-22	-29	-30	-26	-21	-34	-18	-25	-62	-44	-53
	9	-63	-43	-81	-18	-1	-43	-155	-121	-104	-66	-4	-9	-65	-15	-21	-30	-33	-28	-17	-8	-4	-8	-8	-20	-40
	10	-48	-70	-49	-13	-22	-15	1	0	-68	-69	-19	-18	-20	-18	-80	-183	-472	-690	-551	-374	-565	-488	-424	-190	-185
	11	-100	-156	-171	-101	-43	-97	-154	-55	-22	-9	-30	-29	-44	-29	-30	-40	-33	-73	-165	-173	-287	-343	-301	-183	-111
D	12	-147	-635	-170	-40	9	-47	-327	-335	-255	-182	-239	-434	-189	-84	-228	-116	-134	-295	-320	-207	-424	-428	-248	-171	-235
	13	-339	-185	-167	-91	-81	-123	-55	-25	-123	-42	-22	-24	-317	-445	-365	-397	-554	-697	-573	-193	-16	-21	-18	-33	-204
	14	-16	-19	-16	-12	-9	-8	-9	-10	-11	-16	-17	-22	-24	-168	-624	-740	-522	-320	-351	-389	-188	-23	-12	-13	-147
	15	-13	-33	-127	-249	-260	-126	-137	-171	-184	-134	-104	-91	-51	-33	-25	-22	-75	-84	-101	-209	-33	-62	-103	-65	-104
	16	-33	-83	-38	0	5	3	-4	-57	-153	-79	-71	-54	-189	-327	-302	-42	-38	-94	-170	-144	-71	-19	-9	-10	-82
	17	-27	-97	-56	-19	9	6	-4	-25	-135	-254	-141	-96	-279	-177	-79	-86	-53	-49	-184	-136	-98	-67	-37	-23	-88
@	18	-89	-120	-51	-39	-10	-27	-21	-170	-51	-16	-11	-6	-13	-6	-81	-122	-98	-97	-72	-131	-16	-7	-76	-71	-58
	19	-100	-110	-118	-249	-47	-16	-27	-19	-57	-171	-170	-341	-617	-246	-105	-127	-99	-96	-50	-35	2	1	4	9	-116
D	20	8	-10	-61	-65	-302	-299	-215	-124	-231	-268	-175	-190	-251	-212	-383	-445	-348	-325	-323	-419	-415	-95	-193	-437	-241
	21	-317	-127	-9	-46	-94	-270	-131	-109	-195	-107	-21	-10	-14	-8	-11	-131	-180	-132	-49	-44	-113	-417	-471	-567	-149
D	22	-290	-128	-5	-75	-294	-413	-405	-396	-273	-361	-420	-370	-715	-799	-397	-759	-506	-373	-82	-66	-15	-127	-24	-29	-305
	23	-63	-19	-29	-29	-24	-50	-34	-16	-28	-86	-171	-160	-329	-370	-187	-94	-419	-176	-169	-280	-464	-134	-137	-83	-148
	24	-152	-111	-32	-78	-50	3	8	0	-14	-148	-171	-75	-156	-222	-509	-477	-411	-559	-345	-386	-402	-198	-149	-255	-204
D	25	-159	-244	-320	-297	-334	-384	-352	-442	-366	-415	-401	-544	-531	-684	-619	-990	-591	-390	-362	-306	-170	-171	-433	-313	-409
D	26	-273	-295	-297	-43	-192	-460	-159	-213	-325	-335	-253	-213	-19	-77	-530	-704	-535	-323	-195	-343	-391	-101	-100	-93	-270
	27	-218	-194	-158	-101	-126	-216	-175	-49	-135	-389	-162	-184	-263	-297	-325	-390	-318	-102	-257	-438	-89	-173	-173	-25	-207
@	28	-7	-47	-75	-111	-27	-9	-18	-20	-37	-95	-37	-23	-24	-43	-155	-165	-145	-33	-7	-32	-17	-14	-8	-10	-48
@	29	-24	-10	-7	-11	-7	-7	-4	-3	-3	-22	-144	-182	-123	-30	-41	-64	-327	-162	-22	-1	0	-1	-3	-7	-50
@	30	-3	-9	-44	-70	-3	1	0	0	-14	-62	-128	-67	-193	-62	-32	-45	-139	-64	-34	-188	-26	-93	-179	-105	-65
	MEAN	-103	-109	-97	-83	-74	-97	-98	-100	-124	-140	-127	-131	-177	-174	-197	-239	-229	-191	-167	-177	-145	-117	-122	-119	-139
5@	MEAN	-26	-38	-36	-46	-9	-8	-8	-38	-27	-48	-73	-64	-80	-39	-82	-95	-150	-90	-45	-75	-11	-23	-55	-39	-50
5D	MEAN	-172	-262	-170	-104	-222	-320	-291	-302	-290	-312	-297	-350	-341	-371	-431	-602	-422	-341	-256	-268	-283	-184	-199	-208	-291

AL INDEX (HOURLY VALUES) DECEMBER 1978

	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	-78	-98	-67	-131	-161	-26	-52	-113	-279	-195	-180	-378	-152	-114	-165	-123	-112	-163	-100	-54	-43	-39	-80	-102	-125
Q	2	-75	-101	-51	-17	-17	-29	-100	-46	-30	-51	-32	-23	-16	-43	-21	-13	-34	-25	-22	-20	-11	-10	-16	-32	-35
	3	-46	-34	-11	-3	-9	-4	-4	-5	-8	-8	-10	-11	-8	-10	-16	-26	-56	-152	-65	-22	-73	-162	-102	-49	-37
	4	-21	-4	0	-8	-24	-12	-12	-58	-29	-19	-71	-206	-199	-82	-55	-47	-197	-212	-57	-100	-190	-136	-64	-86	-79
	5	-143	-73	-179	-82	-46	-7	-24	-42	-17	-24	-49	-40	-15	-14	-16	-22	-37	-90	-116	-45	-32	-138	-152	-36	-60
	6	-25	-14	-11	-10	-11	-10	-5	-18	-10	-13	-15	-11	-8	-10	-97	-78	-31	-24	-84	-63	-81	-21	-14	-20	-28
Q	7	-14	-13	-7	-4	-9	-16	-8	-6	-8	-13	-14	-20	-16	-19	-16	-19	-23	-22	-12	-14	-15	-11	-11	-12	-13
	8	-15	-10	-6	-8	-8	-15	-20	-13	-8	-10	-70	-113	-42	-14	-23	-30	-16	-11	-8	-49	-136	-56	-20	-17	-30
Q	9	-15	-13	-12	-13	-23	-12	-9	-4	-6	-7	-11	-20	-73	-64	-80	-66	-41	-26	-30	-57	-29	-8	-11	-12	-27
Q	10	-15	-14	-4	-1	-4	-7	-8	-7	-18	-33	-24	-7	-6	-10	-10	-19	-36	-42	-28	-29	-17	-12	-9	-8	-15
Q	11	-11	-6	-8	-5	-3	-2	0	0	0	0	-1	-6	-8	-11	-23	-10	-8	-8	-11	-15	-13	-7	-7	-8	-7
	12	-12	-8	0	1	4	3	3	1	0	-26	-90	-63	-91	-155	-166	-57	-44	-42	-35	-112	-94	-18	-8	-31	-43
	13	-70	-230	-332	-115	-14	-1	-8	-3	-9	-8	-21	-17	-15	-25	-19	-14	-14	-13	-12	-22	-10	-12	-17	-41	-43
D	14	-26	-104	-40	0	-1	-186	-355	-87	-226	-247	-160	-101	-256	-119	-76	-107	-98	-40	-40	-41	-113	-53	-22	-41	-106
D	15	-64	-73	-149	-445	-578	-192	-132	-146	-465	-249	-216	-246	-469	-279	-304	-307	-356	-216	-186	-235	-147	-38	-43	-141	-236
	16	-65	-81	-31	-164	-197	-31	-41	-17	-70	-288	-372	-150	-47	-30	-14	-35	-101	-338	-775	-596	-98	-23	-35	-70	-153
	17	-47	-94	-78	-81	-44	-22	-54	-104	-152	-54	-19	-21	-23	-19	-13	-13	-13	-10	-11	-16	-7	-22	-58	-143	-47
D	18	-208	-21	-20	-40	-77	-209	-328	-376	-393	-304	-302	-653	-1124	-739	-698	-504	-525	-761	-717	-561	-544	-324	-262	-316	-417
	19	-268	-152	-160	-191	-214	-194	-237	-219	-138	-238	-297	-187	-259	-666	-848	-329	-424	-522	-558	-256	-289	-141	-62	-147	-291
D	20	-298	-305	-439	-114	-145	-189	-96	-222	-161	-518	-229	-521	-687	-382	-596	-650	-407	-117	-36	-78	-476	-440	-225	-53	-308
	21	-114	-198	-168	-160	-147	-185	-250	-157	-71	-80	-114	-349	-128	-56	-17	-38	-181	-180	-50	-41	-53	-24	-42	-18	-118
	22	-19	-25	-126	-315	-505	-225	-17	-84	-158	-289	-266	-642	-386	-291	-154	-393	-316	-368	-263	-83	-43	-199	-59	-47	-220
	23	-67	-195	-77	-107	-100	-69	-126	-202	-124	-77	-65	-38	-46	-104	-151	-263	-226	-198	-107	-53	-43	-13	-11	-11	-103
	24	-13	-13	-17	-11	-15	-67	-93	-26	-12	-34	-68	-192	-99	-35	-28	-28	-88	-57	-53	-36	-101	-95	-56	-66	-54
	25	-35	-142	-240	-94	1	-1	-9	-41	-292	-304	-232	-364	-325	-514	-1061	-531	-113	-78	-85	-44	-64	-60	-41	-30	-196
	26	-44	-158	-152	-155	-103	-92	-159	-242	-347	-220	-142	-61	-110	-94	-187	-212	-138	-196	-117	-66	-137	-71	-40	-80	-139
	27	-285	-349	-344	-323	-382	-266	-146	-83	-79	-80	-48	-56	-118	-294	-139	-105	-156	-369	-341	-199	-118	-80	-46	-40	-185
	28	-61	-103	-56	-209	-52	-21	-35	-34	-36	-34	-30	-31	-32	-39	-39	-195	-325	-561	-377	-214	-81	-232	-101	-38	-122
	29	-32	-40	-44	-36	-15	-16	-30	-47	-60	-44	-66	-83	-65	-36	-51	-61	-567	-755	-260	-290	-307	-159	-151	-238	-144
D	30	-139	-37	-201	-421	-363	-155	-7	-109	-39	-80	-197	-166	-130	-285	-265	-163	-53	-43	-117	-742	-425	-313	-268	-308	-209
	31	-359	-268	-17	-26	-71	-53	-74	-69	-72	-93	-121	-187	-107	-150	-271	-77	-40	-67	-285	-225	-103	-63	-85	-180	-128
	MEAN	-86	-96	-98	-106	-107	-74	-78	-83	-107	-117	-113	-160	-163	-151	-181	-146	-154	-184	-159	-141	-125	-96	-68	-78	-119
5Q	MEAN	-26	-29	-16	-8	-11	-13	-25	-12	-12	-20	-16	-15	-23	-29	-30	-25	-28	-24	-20	-27	-17	-9	-10	-14	-19
5D	MEAN	-147	-108	-169	-204	-232	-186	-183	-188	-256	-279	-220	-337	-533	-360	-387	-346	-287	-235	-219	-331	-341	-233	-164	-171	-255

AE INDEX (HOURLY VALUES) JULY 1978

	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	68	61	56	78	73	64	63	60	70	120	228	209	165	240	138	108	139	89	55	65	61	64	66	68	100
	2	146	328	245	97	39	33	39	163	103	93	85	61	54	53	45	75	87	80	154	147	120	101	181	191	113
	3	259	199	176	179	175	203	229	276	231	198	207	166	184	110	139	103	114	94	94	148	237	169	116	576	191
D	4	839	971	402	248	127	383	598	365	160	204	147	85	178	341	817	966	1374	448	188	120	209	270	584	1215	468
D	5	946	967	1191	972	1143	1226	787	1077	895	849	710	559	556	450	737	624	463	461	403	536	237	204	239	242	686
	6	219	155	99	77	120	68	129	165	103	57	54	67	49	47	64	295	275	513	362	156	68	78	70	118	142
	7	203	344	323	102	73	67	48	51	52	151	347	436	350	219	413	411	364	472	630	259	339	383	430	390	286
	8	461	546	613	580	534	316	289	329	178	75	78	130	193	126	129	702	757	498	404	212	152	176	244	129	327
	9	207	473	291	80	39	36	34	60	62	76	83	139	242	172	164	258	336	159	141	76	52	72	153	124	147
	10	113	138	148	273	268	80	118	197	461	216	81	154	361	136	54	75	103	225	177	123	152	165	319	166	179
	11	151	389	216	157	79	48	95	176	126	119	131	250	155	140	138	121	116	122	47	63	56	63	72	62	129
@	12	65	48	50	69	85	93	88	103	89	88	166	223	144	204	146	78	126	122	100	75	67	108	174	137	110
D	13	282	358	368	303	271	338	185	478	651	245	182	108	212	292	298	201	131	134	173	235	479	581	451	577	314
D	14	767	698	795	367	401	793	582	787	811	1070	1327	1070	752	973	932	807	526	223	368	676	559	186	120	92	653
	15	105	79	88	78	93	90	69	60	45	45	48	49	36	45	44	38	29	27	30	43	64	61	66	121	61
	16	274	465	274	103	68	56	51	48	44	50	64	61	70	78	122	106	144	124	52	70	81	130	185	107	118
	17	176	287	279	182	247	141	72	43	82	176	406	275	139	92	56	65	103	51	101	208	178	79	141	114	154
D	18	259	353	253	158	105	71	53	48	44	58	82	127	313	196	181	300	814	900	488	511	619	933	503	433	325
	19	428	322	308	199	127	145	183	125	102	222	184	96	87	67	113	263	233	131	82	72	71	67	62	59	156
	20	73	67	94	145	171	205	340	369	319	377	239	251	123	91	98	93	72	52	46	127	225	305	302	240	184
	21	372	283	147	113	152	76	47	130	373	478	385	256	167	65	85	81	64	63	49	70	56	67	75	64	155
	22	101	146	385	415	497	457	318	183	203	176	123	160	64	53	78	172	212	191	196	347	233	152	194	283	222
	23	120	98	158	281	369	412	397	416	250	109	69	77	61	60	47	44	83	187	222	245	538	704	658	541	256
	24	462	254	204	87	53	49	150	273	225	115	99	110	103	147	123	133	180	233	233	232	249	263	347	548	203
	25	578	387	171	65	179	214	151	179	257	272	216	272	378	345	213	91	50	66	142	394	520	594	553	446	281
	26	394	339	265	254	328	251	114	64	41	38	47	98	168	160	113	82	79	57	98	63	75	131	209	170	152
@	27	87	80	65	56	43	35	30	31	40	55	70	92	115	84	57	35	27	34	63	79	43	79	154	317	74
	28	228	188	74	84	256	411	389	325	253	241	276	230	274	220	84	50	33	38	31	35	39	42	41	47	162
@	29	49	40	45	50	53	53	133	224	208	221	360	347	198	110	82	108	127	122	84	80	85	106	157	216	136
@	30	168	148	196	149	68	45	41	53	87	98	65	91	107	95	63	91	113	95	73	59	90	72	70	60	91
@	31	45	42	47	42	53	42	36	52	57	87	89	51	54	62	65	43	52	59	61	103	89	45	41	51	57
	MEAN	278	298	258	194	202	209	188	222	213	205	214	203	195	176	188	213	236	195	172	181	194	208	225	254	213
5@	MEAN	82	71	80	73	60	53	65	92	96	109	150	160	123	111	82	71	89	86	76	79	74	82	119	156	93
5D	MEAN	618	669	601	409	409	562	441	551	512	485	489	389	402	450	593	579	661	433	324	415	420	434	379	511	489

AE INDEX (HOURLY VALUES) AUGUST 1978

	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	55	86	158	293	273	253	227	155	241	292	210	223	144	90	77	63	57	40	177	226	187	206	263	289	179
	2	136	78	54	45	44	33	30	39	50	54	50	39	34	39	42	65	64	81	78	119	162	199	149	92	74
	3	142	118	111	126	114	207	338	363	251	105	151	385	431	227	126	143	335	723	653	268	110	135	366	520	269
D	4	714	578	500	1014	308	330	327	273	148	361	868	682	347	152	140	177	225	230	344	430	254	76	63	62	358
	5	62	84	227	448	465	380	449	636	619	346	467	651	654	510	315	457	425	421	289	407	686	583	175	290	419
	6	252	149	204	443	479	625	672	664	169	90	98	137	524	592	685	636	551	273	256	264	129	166	124	199	349
	7	366	144	116	90	80	39	104	200	297	218	122	74	83	154	289	145	113	41	62	182	231	317	220	99	158
	8	76	156	183	178	52	55	50	250	291	205	184	278	339	265	250	156	262	285	72	73	75	63	71	82	165
	9	99	114	108	96	263	428	295	210	130	331	213	266	201	143	120	91	95	110	87	116	177	202	160	91	173
	10	143	150	185	245	182	68	52	101	279	311	280	259	276	257	275	276	216	221	225	264	196	143	170	102	203
	11	98	291	350	184	97	206	347	267	183	145	155	145	140	318	282	246	677	504	435	210	78	77	79	62	232
	12	54	75	190	530	636	617	599	790	364	345	456	656	489	181	74	139	164	295	357	208	203	446	138	130	339
	13	262	438	503	322	67	94	132	265	168	214	691	704	569	320	87	89	259	258	110	172	294	354	112	276	282
	14	374	222	136	100	81	303	184	75	48	62	89	149	109	72	45	54	42	51	59	73	72	90	51	46	108
Q	15	50	39	37	39	46	44	34	32	83	84	72	59	76	50	124	99	116	151	257	83	57	58	53	47	75
	16	42	39	47	40	41	39	38	42	43	58	78	105	128	121	111	95	141	47	63	126	212	79	97	134	82
	17	117	135	116	76	49	44	40	48	62	72	167	495	656	290	87	165	161	126	80	103	171	158	101	81	150
	18	241	318	116	179	100	75	57	62	64	64	76	112	154	153	95	99	119	372	597	895	207	494	808	531	249
	19	333	165	72	38	33	32	32	98	449	348	225	156	304	274	433	218	117	60	96	102	106	67	48	65	161
Q	20	57	42	41	31	45	74	39	35	47	61	58	67	85	64	68	77	63	81	98	107	82	48	47	42	61
	21	52	53	82	113	57	43	28	43	71	92	96	113	73	76	80	198	301	115	70	73	84	179	557	666	138
	22	656	547	538	251	88	88	73	45	34	54	60	63	67	55	63	58	77	56	75	55	53	60	55	73	135
Q	23	47	41	48	62	82	68	60	60	76	96	111	166	168	74	49	31	64	129	102	126	46	86	179	254	93
	24	187	127	78	89	86	59	59	62	74	75	101	143	125	73	55	69	37	50	47	61	60	55	55	55	78
	25	107	183	145	90	74	57	65	308	237	149	355	238	134	181	261	77	57	261	320	117	69	62	100	113	157
Q	26	140	137	84	44	97	70	60	82	44	59	72	147	189	107	105	99	94	70	84	153	95	75	56	43	92
	27	45	48	113	437	450	397	457	312	267	273	641	573	428	736	643	403	248	195	216	471	210	219	455	624	369
D	28	654	604	711	807	922	1026	608	1008	593	858	1051	724	704	1278	1504	774	399	141	126	166	575	746	640	628	719
D	29	456	733	595	527	613	616	535	892	372	175	568	1045	656	725	337	185	284	613	641	339	277	249	314	233	499
D	30	309	367	393	305	401	380	397	440	367	392	795	758	283	645	720	480	704	660	673	603	967	598	702	723	544
D	31	662	445	272	222	196	341	542	394	768	988	477	485	817	362	673	1242	673	505	413	457	558	308	135	234	507
	MEAN	225	216	210	240	210	228	223	266	222	225	291	325	302	276	265	229	230	231	231	227	215	212	211	222	239
5Q	MEAN	69	69	73	93	108	101	84	72	98	118	104	132	132	77	84	73	78	94	143	139	93	94	119	135	99
5D	MEAN	559	545	494	575	488	538	481	601	449	554	751	738	561	632	674	571	457	429	439	399	526	395	370	376	525

AE INDEX (HOURLY VALUES) SEPTEMBER 1978

	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	186	346	314	438	439	277	295	911	546	532	537	659	525	286	302	197	181	473	103	151	201	311	416	227	369
	2	269	174	148	236	109	264	347	896	404	195	151	451	574	320	266	135	120	168	644	592	414	369	409	253	329
	3	256	183	98	311	273	470	502	508	437	242	278	271	352	289	280	374	140	97	175	313	425	329	149	114	286
	4	152	136	103	137	218	151	147	280	411	141	155	316	263	195	223	264	290	321	361	326	229	172	204	151	223
	5	115	74	61	84	111	260	212	142	112	83	121	151	193	217	232	164	164	167	133	173	91	110	126	305	150
	6	286	294	179	197	133	282	454	594	887	665	490	330	261	264	128	113	69	48	54	52	41	38	32	31	247
	7	32	31	32	65	139	119	29	26	40	57	161	94	55	54	99	120	115	111	112	96	74	80	61	262	86
	8	623	582	761	942	624	380	222	209	221	88	36	55	56	66	69	69	66	65	55	45	42	43	48	50	226
	9	60	51	65	98	55	115	123	187	570	709	848	823	505	529	442	969	725	688	497	348	285	314	432	594	418
	10	267	148	79	41	50	55	36	47	81	88	115	170	161	284	225	96	100	70	82	53	46	93	67	80	106
	11	46	67	126	40	23	19	18	24	35	53	54	101	162	380	927	901	361	107	91	338	345	380	144	85	201
	12	58	114	265	243	130	70	84	246	578	726	802	556	423	469	563	283	241	358	489	360	409	171	247	239	338
	13	313	166	140	74	49	111	161	88	240	323	80	59	64	41	75	182	207	234	113	64	45	55	52	42	124
@	14	42	129	130	54	39	31	37	29	34	39	48	51	35	40	43	42	33	24	34	63	42	48	41	32	47
@	15	34	34	25	24	28	22	24	45	44	65	113	132	136	60	33	35	38	36	37	33	31	36	36	160	53
	16	134	76	54	46	198	286	162	104	52	48	51	50	50	52	59	54	63	123	103	54	47	69	143	85	90
	17	73	54	47	50	214	350	231	270	405	104	52	59	55	49	41	42	44	56	43	51	53	57	81	56	106
@	18	27	30	28	30	31	28	30	32	37	46	48	58	105	52	45	43	40	53	71	62	41	32	39	38	44
@	19	39	39	32	30	42	33	36	31	36	41	52	53	36	52	62	48	62	44	40	36	38	36	36	31	41
@	20	34	51	40	43	39	33	34	40	55	58	67	52	47	43	41	35	36	35	42	72	201	333	258	86	74
	21	64	50	56	147	423	523	291	117	73	58	94	60	53	40	49	68	208	106	62	33	35	40	37	40	114
	22	45	49	108	129	155	129	158	190	333	160	128	119	213	416	524	479	381	696	633	434	166	202	221	278	264
	23	187	87	60	107	255	259	161	103	228	285	274	272	375	293	88	167	234	421	351	430	291	549	283	99	244
	24	78	163	223	223	411	407	481	340	115	53	57	76	88	99	157	222	251	436	349	132	196	323	706	530	255
D	25	171	210	307	457	381	469	696	826	915	519	1020	1218	954	776	651	712	832	1046	483	851	356	257	542	196	619
D	26	148	167	167	234	407	579	766	979	1376	663	440	392	186	106	325	943	863	407	388	449	650	591	210	138	482
D	27	367	560	280	311	522	491	303	144	282	469	756	662	453	245	215	222	418	1042	840	733	998	824	623	901	528
D	28	604	221	291	519	669	433	632	586	614	722	562	1034	697	975	378	136	112	415	720	500	341	993	1123	773	585
D	29	453	319	181	623	894	847	914	1080	590	790	533	454	792	1085	845	1031	840	938	292	160	114	119	107	68	586
	30	68	55	51	106	118	290	356	258	338	247	129	70	49	58	85	121	123	94	177	230	121	53	45	173	142
	MEAN	174	155	148	201	239	259	264	311	336	275	275	294	263	261	249	275	245	295	252	241	212	234	230	203	245
5Q	MEAN	35	56	51	36	35	29	32	35	41	49	65	69	71	49	44	40	41	38	44	53	70	97	82	69	51
5D	MEAN	348	295	245	428	574	563	662	723	755	632	662	752	616	637	482	608	613	769	544	538	491	556	521	415	559

AE INDEX (HOURLY VALUES) OCTOBER 1978

	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	256	191	256	146	130	120	138	278	365	339	317	298	335	443	421	510	320	162	141	256	198	309	488	193	275
	2	110	69	77	259	194	110	82	122	265	302	340	562	676	690	504	303	254	319	143	84	253	246	175	323	269
	3	236	176	216	202	193	286	297	260	229	212	215	176	225	288	213	206	129	166	123	143	200	135	108	197	201
	4	384	497	209	101	228	422	599	429	293	561	529	500	385	525	313	163	100	82	60	94	456	369	314	494	338
	5	399	265	219	265	219	128	85	75	107	82	119	315	125	78	56	57	43	99	219	88	38	40	43	39	133
Q	6	40	36	39	58	53	48	58	55	48	54	47	38	42	40	36	57	136	293	71	25	38	112	76	83	66
Q	7	120	148	96	57	128	167	66	58	65	52	75	81	75	131	169	79	61	43	32	28	37	53	44	40	79
	8	32	30	32	43	127	280	135	69	62	52	111	292	229	61	53	67	57	76	107	30	44	137	182	105	100
	9	54	40	37	35	38	43	57	51	150	356	306	278	248	73	42	39	47	65	70	117	65	82	238	318	119
	10	601	347	241	250	243	187	89	146	151	80	167	586	306	94	42	41	47	26	26	73	233	290	103	60	185
	11	65	86	119	116	55	66	85	83	114	101	110	74	42	35	42	42	39	32	31	29	41	45	60	77	66
	12	69	56	42	55	47	42	49	44	47	47	63	437	421	336	751	495	94	48	50	50	140	232	86	48	156
	13	169	231	97	52	62	38	113	152	176	104	53	52	49	43	38	37	32	43	124	236	180	285	178	95	110
Q	14	73	51	85	103	95	91	126	170	47	64	45	37	43	47	97	116	152	198	210	88	42	44	51	67	89
Q	15	55	88	55	29	26	30	43	41	57	82	85	46	44	71	203	104	97	70	50	41	42	34	48	38	62
Q	16	161	171	152	133	46	59	45	41	44	52	71	54	44	37	91	84	57	42	39	45	42	45	56	57	70
	17	50	41	33	28	31	45	56	46	48	50	53	46	48	42	48	72	122	79	57	71	224	169	146	269	78
D	18	447	465	441	355	818	660	631	300	262	363	358	472	223	127	63	129	470	610	600	545	478	244	302	508	411
D	19	549	300	121	93	155	394	616	673	662	257	241	272	558	366	274	332	143	166	151	182	420	314	186	128	315
	20	94	76	225	207	36	28	31	50	76	70	55	341	220	279	346	155	134	250	370	329	157	47	46	28	152
	21	38	61	68	165	157	304	61	39	167	112	404	318	151	202	443	183	155	186	421	449	211	229	398	209	214
	22	187	134	143	286	302	363	349	332	288	499	238	145	115	62	107	293	140	278	356	234	148	46	34	37	213
	23	24	33	30	166	268	192	169	195	322	226	220	137	165	212	200	159	190	116	46	31	75	204	60	40	145
	24	54	48	243	170	145	228	173	115	80	55	35	36	23	18	27	61	30	48	74	335	261	125	77	75	106
	25	38	33	42	37	41	32	28	39	163	51	130	264	341	385	286	320	389	152	180	125	71	35	40	36	136
	26	36	41	33	68	89	66	59	85	80	78	127	156	118	230	435	392	296	323	394	386	142	364	762	503	219
D	27	465	488	453	317	330	435	596	558	335	596	578	372	412	420	108	130	244	216	88	38	69	162	277	216	329
	28	249	284	239	346	428	377	549	176	199	273	115	72	106	174	287	280	108	73	87	64	78	173	210	298	219
	29	199	71	70	98	119	153	127	128	227	280	302	286	446	719	910	643	603	726	578	317	261	207	138	70	320
D	30	53	61	71	147	104	290	271	266	591	699	587	572	742	542	683	755	908	586	621	704	679	494	507	325	469
D	31	332	221	259	314	195	227	250	334	210	184	290	313	249	738	817	589	490	337	120	58	238	305	217	221	313
	MEAN	181	156	143	151	164	190	194	174	191	204	206	246	232	242	261	222	196	190	181	170	179	179	182	167	192
5Q	MEAN	89	98	85	76	69	79	67	73	52	60	64	51	49	65	119	88	100	129	80	45	40	57	55	57	73
5D	MEAN	369	307	269	245	320	401	472	426	412	419	410	400	436	438	389	387	451	383	316	305	376	303	297	279	367

AE INDEX (HOURLY VALUES) NOVEMBER 1978

	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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	2	54	49	60	76	120	112	146	147	232	401	485	527	501	524	503	678	744	452	111	58	66	57	90	263	269
	3	158	153	130	144	90	93	104	196	366	253	77	73	63	62	77	104	86	107	436	642	525	312	167	164	191
	4	120	90	51	54	50	120	173	124	137	53	51	67	179	201	243	193	99	57	67	49	40	49	111	131	104
	5	60	79	222	430	142	86	107	68	55	47	47	158	148	63	58	159	116	58	64	42	36	36	33	32	98
Q	6	36	34	37	32	27	27	28	36	72	77	85	73	81	99	135	91	59	124	122	55	35	39	39	37	62
	7	36	36	36	35	36	40	39	37	43	47	48	45	55	62	62	64	54	43	54	153	84	127	326	737	96
	8	359	278	396	156	102	75	59	63	50	63	54	43	49	47	46	69	66	55	49	62	56	61	116	103	103
	9	156	180	204	110	69	143	197	173	215	170	61	55	104	50	57	73	70	54	39	25	20	26	30	40	97
	10	70	99	83	54	60	55	34	38	105	122	93	52	62	64	141	249	704	929	806	491	700	604	621	415	277
	11	306	334	282	217	159	215	248	146	124	66	81	71	101	95	83	86	59	111	233	258	373	426	412	299	199
D	12	266	989	405	155	138	184	732	707	624	463	601	739	313	206	415	189	235	409	437	283	560	606	413	223	429
	13	463	366	259	175	203	252	174	105	174	83	89	74	402	573	473	580	767	950	841	316	87	83	65	77	318
	14	53	50	46	44	38	41	50	53	48	54	53	59	54	265	782	952	689	481	482	474	315	88	59	41	220
	15	43	87	179	291	376	226	184	224	246	189	149	110	63	54	53	56	96	99	127	289	63	134	159	97	150
	16	74	149	87	44	36	32	43	101	189	108	97	91	257	408	375	83	63	123	207	194	117	52	47	56	126
	17	82	155	104	71	38	41	65	85	208	355	243	173	381	278	150	134	71	75	217	175	155	133	88	79	148
Q	18	155	187	116	116	73	78	73	216	112	66	53	49	54	36	128	170	120	129	107	166	48	47	121	131	106
	19	183	212	212	357	153	90	101	73	176	260	274	480	767	374	161	192	140	161	101	75	36	34	44	52	196
D	20	53	74	121	134	416	393	314	211	390	410	262	277	316	268	518	706	625	651	525	636	580	209	364	553	375
	21	408	189	75	110	131	318	164	179	276	179	78	51	49	38	36	162	217	179	76	79	163	513	589	592	202
D	22	441	259	100	190	405	479	497	495	354	458	528	445	917	1028	550	1068	764	529	180	133	65	180	79	80	426
	23	106	58	72	69	57	86	63	41	61	123	216	204	384	489	264	153	487	254	215	401	596	261	220	174	211
	24	250	196	95	144	131	81	62	43	49	198	224	155	251	366	717	679	639	670	466	533	551	263	217	311	304
D	25	220	324	460	483	440	467	503	608	505	660	527	640	749	807	617	1021	672	472	557	446	242	273	502	357	523
D	26	376	400	437	111	303	596	326	314	419	452	325	288	63	127	653	945	772	514	297	428	500	191	175	169	382
	27	299	268	254	171	183	293	268	143	207	459	248	279	301	400	422	527	421	152	332	497	145	249	216	97	285
Q	28	66	104	116	153	76	54	56	64	69	111	95	50	44	76	175	185	165	67	26	54	40	36	29	37	81
Q	29	48	38	36	39	34	35	26	24	30	53	190	211	185	59	78	88	379	184	55	39	30	28	32	35	82
Q	30	37	37	73	106	38	23	30	33	61	110	167	94	259	98	70	59	159	90	69	237	52	146	225	154	101
	MEAN	172	189	170	158	149	167	176	175	206	221	207	199	247	248	270	325	319	275	245	246	212	182	188	186	214
5Q	MEAN	68	80	75	89	49	43	42	74	68	83	118	95	124	73	117	118	176	118	75	110	41	59	89	78	86
5D	MEAN	271	409	304	214	340	423	474	467	458	488	448	477	471	487	550	785	613	515	399	385	389	291	306	276	427

AE INDEX (HOURLY VALUES) DECEMBER 1978

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Q	2	89	126	65	30	25	41	117	56	44	70	41	30	22	52	30	25	51	40	33	31	22	21	42	78	49
	3	97	112	120	74	59	25	22	19	23	21	21	20	21	25	33	40	67	180	84	41	111	231	183	109	72
	4	63	38	26	37	76	34	66	105	83	67	149	354	346	201	147	86	312	386	134	191	309	253	164	201	160
	5	207	141	243	144	111	47	65	81	40	39	85	70	50	43	39	36	53	110	148	61	58	200	222	97	100
	6	64	46	52	37	45	47	45	78	46	41	43	36	29	30	139	141	72	59	145	152	153	77	69	78	72
Q	7	66	57	36	31	36	40	39	30	21	23	27	27	27	35	33	40	50	35	23	27	29	23	20	20	33
	8	22	16	17	22	22	31	46	50	29	39	117	160	97	49	39	69	51	39	24	74	195	84	47	34	57
Q	9	28	26	31	38	63	81	44	28	36	30	34	48	106	84	101	105	64	48	46	73	46	26	27	29	52
Q	10	35	41	28	17	27	23	22	26	48	58	56	30	17	19	18	29	46	56	40	42	31	23	19	18	32
Q	11	19	15	17	19	13	11	10	6	5	6	10	12	16	25	34	20	19	19	27	32	30	25	22	21	18
	12	26	24	16	11	10	10	11	14	15	45	125	104	129	239	246	88	65	69	68	165	151	52	39	71	75
	13	151	294	399	288	169	120	101	76	75	50	59	47	42	60	53	42	43	35	55	50	41	49	76	123	104
D	14	110	281	291	252	172	322	684	470	427	426	264	157	275	123	82	137	149	77	64	117	247	191	99	106	230
D	15	128	165	175	464	878	365	225	227	574	339	371	375	516	351	396	373	417	261	238	333	232	103	74	198	324
	16	109	146	92	230	276	98	118	61	134	335	434	199	88	62	38	57	139	438	814	681	215	148	98	112	213
	17	100	181	122	108	77	53	93	142	191	76	29	25	27	37	22	31	29	26	25	35	28	49	103	197	75
D	18	290	49	40	57	116	248	402	557	613	482	396	742	1281	954	882	676	705	867	808	665	639	439	354	403	528
	19	392	255	209	254	318	321	364	335	238	309	350	254	336	795	1026	436	535	639	743	461	412	217	128	210	397
D	20	360	389	561	208	266	346	205	298	291	707	313	626	880	546	756	802	525	184	104	161	570	521	315	122	419
	21	181	272	215	267	267	268	344	234	136	139	171	445	199	95	32	57	215	202	75	64	81	46	73	61	172
	22	54	68	187	410	682	334	71	180	214	328	345	857	608	445	214	529	388	466	306	117	86	244	114	85	306
	23	95	248	125	156	148	108	168	305	227	155	102	56	64	124	171	307	235	220	133	70	60	30	23	23	140
	24	28	26	33	26	30	88	123	73	47	66	125	255	145	60	47	41	104	73	68	48	112	105	67	75	78
	25	43	168	320	203	38	28	68	112	396	424	354	555	594	659	1086	761	244	126	114	67	85	70	54	38	275
	26	56	171	163	182	134	129	194	291	424	360	235	90	157	133	220	237	158	219	135	92	192	99	69	115	177
	27	299	377	450	387	515	400	233	161	141	127	66	77	140	364	208	142	203	463	452	328	240	151	85	61	253
	28	80	122	87	246	104	43	46	48	50	58	53	71	78	77	94	266	461	587	542	375	173	314	159	80	176
	29	70	77	86	72	49	45	53	76	101	69	122	260	250	134	124	123	749	887	507	400	504	350	248	321	237
D	30	237	125	265	505	546	254	166	217	98	140	274	230	179	311	347	212	138	93	186	807	525	408	365	377	292
	31	400	281	143	114	154	132	157	122	125	150	189	254	151	213	306	165	74	93	336	259	131	97	112	203	182
	MEAN	129	143	151	163	181	134	142	150	169	176	168	225	229	210	231	200	209	232	213	197	186	151	115	121	176
5Q	MEAN	47	53	35	27	32	39	46	29	30	37	33	29	37	43	43	43	46	39	33	41	31	23	26	33	36
5D	MEAN	225	201	266	297	395	307	336	353	400	418	323	426	626	457	492	440	386	296	280	416	442	332	241	241	358

AO INDEX (HOURLY VALUES) JULY 1978

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	2	13	19	-24	-13	-8	-9	-4	2	-5	5	7	0	1	0	0	-7	2	0	-14	-12	6	23	17	36	1
	3	18	18	-2	-16	-3	29	38	36	27	32	46	17	-1	23	25	10	-18	-11	21	28	-11	10	15	-65	11
D	4	-227	-270	-6	32	3	11	-121	-58	19	42	14	7	1	-10	38	-224	-232	7	57	30	-2	5	-15	-260	-48
D	5	-313	-234	-296	-194	-305	-421	-203	-200	-108	-37	-7	-90	-15	-8	-78	-69	-40	25	51	11	22	12	2	26	-103
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	7	28	-45	-76	-6	-5	-5	-3	-2	-3	25	72	-26	-35	-1	-14	-71	-94	-21	-53	-13	-8	-12	3	-29	-16
	8	-16	-92	-115	-72	-57	2	13	-15	11	1	11	30	6	21	17	-82	-88	-42	2	55	51	19	11	4	-13
	9	5	-93	-46	1	-6	-6	-14	-2	0	0	4	16	-3	-14	-2	-10	-54	6	15	22	16	9	14	4	-5
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	11	11	-69	-17	1	4	0	20	18	-9	22	33	86	16	-1	-17	-11	-31	-41	1	7	0	-10	-7	-7	0
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D	13	35	52	-15	-16	-21	35	20	50	-41	41	33	30	42	5	-41	1	5	-7	15	36	-33	46	39	13	13
D	14	15	-60	-116	-19	49	-39	-49	-55	-11	22	-119	-163	-64	-81	43	1	6	13	54	-36	-56	12	20	20	-25
	15	9	5	3	1	-4	-2	-6	-8	-8	-8	-4	-7	-5	-3	0	4	0	-2	-1	-2	-4	0	-1	8	-1
	16	34	-70	-39	-9	-21	-20	-16	-12	-6	-10	-6	-7	-1	2	0	0	-25	-29	-2	6	5	8	-16	-19	-10
	17	2	-26	-34	-8	-15	-6	-5	-6	5	35	-9	-7	-15	4	1	-2	-25	-1	6	4	-16	3	5	9	-4
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	22	8	16	-41	-15	8	16	-17	-2	-20	-23	-11	-8	-6	0	-13	-43	-45	-33	2	-21	-34	-4	8	-35	-13
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	MEAN	-11	-24	-23	-14	-15	-14	-10	-5	-1	11	4	-3	-4	-7	-3	-21	-27	-13	2	7	-2	1	5	-5	-7
5@	MEAN	0	1	2	-7	-3	0	3	-1	-3	7	-6	-4	1	-5	-3	-5	-12	-4	0	0	1	4	1	3	-1
5D	MEAN	-98	-106	-83	-38	-54	-83	-70	-52	-27	14	-14	-39	-7	-21	-4	-52	-59	-3	31	10	-8	-1	13	-33	-32

AO INDEX (HOURLY VALUES) AUGUST 1978

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	2	37	18	2	0	-2	0	-1	0	0	-1	1	5	4	3	2	-3	-2	-6	0	11	13	-10	-4	13	3
	3	4	16	17	36	27	53	19	28	53	14	34	45	0	9	13	23	11	-74	-40	29	31	32	43	-65	15
D	4	-129	-157	-51	-61	27	61	32	-2	17	34	-170	-69	-40	21	-10	3	-7	13	8	-55	-26	33	24	6	-20
	5	7	5	-7	-59	-68	24	-11	-35	-34	52	18	-68	-74	-64	-20	-52	-26	13	27	20	-54	-82	4	-2	-20
	6	-24	-14	7	-76	-83	-165	-92	-75	-3	2	1	2	-109	-149	-132	-137	-85	-35	-15	-31	35	25	18	2	-47
	7	-63	-13	0	-7	-23	-10	-21	-22	-72	-23	11	-2	2	-5	-77	-33	-20	2	12	1	-8	-43	-31	2	-18
	8	-3	-26	-39	-41	-2	0	6	-26	-36	15	33	-38	-71	-29	-33	-23	-27	-63	12	11	2	3	2	7	-15
	9	10	5	-18	5	-4	-18	33	52	12	-20	27	15	10	12	1	-6	-1	0	12	9	-8	-10	15	26	6
	10	9	0	-2	-31	0	16	4	21	-40	1	37	28	5	-3	-47	-47	-36	-33	0	6	-1	1	-8	-4	-5
	11	0	-55	-85	-34	9	-28	-58	-2	33	37	41	43	6	-47	-44	0	-73	-51	-16	4	23	5	10	6	-11
	12	10	10	17	-86	-77	-87	-49	-51	22	22	25	-175	-44	-1	5	25	18	-42	-20	21	20	-74	8	20	-20
	13	1	-75	-66	-40	-10	-6	0	-61	15	12	-103	-88	-72	-57	2	2	-25	-102	-22	6	-5	-61	4	0	-31
	14	-81	-25	-12	-21	-22	-145	-60	-13	-3	2	6	-7	6	1	5	7	-2	2	8	7	2	-7	1	1	-14
Q	15	-1	0	0	-4	-7	-12	-12	-4	-8	-9	-3	-2	2	-4	-10	-24	-17	-28	-41	20	4	4	3	4	-6
	16	10	8	-6	-5	-5	-7	-6	-8	-2	-2	-2	-1	0	3	8	-2	-9	5	14	15	-25	8	9	0	0
	17	3	19	29	23	7	-1	-1	2	-3	1	32	-13	-49	-3	2	3	-28	-3	13	8	24	12	5	5	3
	18	-5	-81	23	7	-10	3	2	7	9	6	7	11	-21	-15	11	4	-9	-19	-40	-120	6	-10	-250	-149	-26
	19	-37	-16	3	0	0	-3	-5	20	-71	-81	2	-4	-53	-56	-132	-25	-5	-10	-2	-3	-6	3	-1	-1	-20
Q	20	1	0	0	0	10	-22	1	-3	-9	-11	-12	-9	0	-12	-17	-19	-12	-16	-15	-17	-6	0	0	2	-7
	21	-1	-1	-14	-26	0	2	-1	-3	-3	1	-12	-4	4	9	-1	-26	-72	-16	8	13	18	17	-39	-44	-8
	22	-35	0	-25	14	17	0	-5	-5	-3	0	-3	1	-3	-2	1	1	-10	-4	1	-4	0	6	5	13	-1
Q	23	3	1	5	1	-2	-5	-6	0	-7	2	8	14	6	0	-3	-8	-2	-12	-2	-27	5	0	-15	-24	-2
	24	15	14	6	20	21	9	4	10	8	0	9	-11	-8	4	8	4	4	4	10	13	7	6	5	7	7
	25	28	9	10	21	18	16	18	-59	-74	6	-45	-15	-19	12	-31	-4	13	-10	-29	13	16	12	25	23	-1
Q	26	20	-3	0	0	-20	-9	4	-15	-5	-2	4	3	-14	-3	-16	-14	-12	-7	0	-34	-6	0	10	8	-4
	27	4	1	0	-107	-69	-12	22	8	52	73	2	-29	-19	-22	2	-9	-12	-17	9	-24	19	36	-2	-56	-6
D	28	-56	-160	-126	-186	-366	-360	-221	-505	-383	-239	-275	-156	-137	-562	-386	-74	0	-10	-3	-19	-105	-189	-212	-239	-207
D	29	-120	-217	-172	-102	-109	-140	-52	-179	-55	2	-96	-308	-129	-176	-42	-42	-42	-105	-90	-32	-7	-41	-79	-58	-100
D	30	-23	-50	-112	-41	-26	-74	-49	-43	12	14	-158	-166	-36	-131	-176	-73	-49	9	-110	-82	-155	-54	-103	-250	-80
D	31	-150	-79	-12	-7	10	-39	-95	-20	-132	-210	-35	-14	-207	-41	-79	-267	-80	-41	-21	-62	-103	-53	-9	-4	-73
	MEAN	-17	-27	-20	-26	-24	-30	-18	-31	-22	-9	-18	-31	-33	-41	-38	-25	-19	-20	-10	-10	-9	-13	-17	-22	-22
5Q	MEAN	6	2	1	-5	-1	-5	1	-3	-3	0	7	8	0	0	-6	-10	-7	-9	-13	-15	-1	2	6	8	-1
5D	MEAN	-95	-132	-94	-79	-92	-110	-77	-149	-108	-79	-146	-142	-109	-177	-138	-90	-35	-26	-43	-50	-79	-60	-75	-109	-96

AO INDEX (HOURLY VALUES) SEPTEMBER 1978

	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	-14	-74	-49	-88	-43	-46	-27	-251	-126	-112	-67	-86	-109	-54	-56	-43	-52	-144	13	8	16	-57	-108	-59	-68
	2	-44	-32	-6	-66	-10	-11	-41	-306	-32	-13	3	-78	-115	-34	-58	4	-33	-9	-98	-109	-34	-39	-102	-36	-54
	3	-25	-19	-10	-58	-28	-43	-104	-122	-93	3	-25	-50	-51	-37	-44	-46	-10	-12	-11	-44	-63	-26	0	-10	-39
	4	-31	-39	-18	-18	-52	-17	-5	-56	-105	-5	32	-62	-31	-16	-34	-51	-68	-63	-40	0	-7	-4	-31	-25	-31
	5	-15	-4	0	-10	-17	-65	-51	12	12	-1	-6	-11	-21	-4	-25	-26	-26	-39	-21	-16	8	20	-7	-30	-14
	6	-39	-49	-3	7	19	17	-59	-69	-207	-55	15	-6	-41	-82	8	-16	-14	4	5	4	0	-2	-4	-6	-23
	7	-5	-8	-5	-7	-38	-41	-3	-1	4	-2	-46	-3	-11	-14	-34	-29	-22	-22	-3	1	7	13	8	25	-10
	8	-143	-82	-80	-110	-80	-3	-46	-30	-66	12	-8	0	-4	-5	-11	-20	-17	-6	-6	-1	2	3	6	1	-29
	9	1	1	0	-3	4	9	0	11	-131	-141	-266	-236	-42	-17	-44	-138	-85	-21	-21	-42	-42	-33	-18	-136	-58
	10	-20	60	24	7	7	0	1	-1	-2	6	0	-28	-28	-29	-1	-13	-25	-13	0	-1	4	15	2	-18	-2
	11	-1	-10	-45	-9	0	-1	-2	-3	-4	0	-3	14	-13	-47	-143	-133	-72	-11	-1	-18	-47	-47	-14	19	-24
	12	7	8	-72	-67	-24	2	15	-38	-105	-73	-61	-89	-115	-105	-131	-47	-7	-17	-49	-22	-15	-2	2	-17	-42
	13	-33	20	12	1	8	11	-19	0	-10	-43	11	1	-5	-12	-7	-25	-55	-67	-24	-9	-3	-1	1	1	-10
@	14	5	23	-5	4	4	1	0	-3	-2	-6	-6	-9	-3	-9	-3	-3	-6	-3	-1	-7	0	0	0	-2	-1
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	16	-15	13	18	18	17	-45	6	21	-4	-8	-12	-13	-9	-9	-6	-5	-10	-29	-22	-1	1	3	-19	14	-4
	17	15	6	1	3	0	-66	-34	-37	-49	3	0	-5	-11	-11	-7	-10	-6	-8	-1	-1	5	-1	-16	-12	-10
@	18	5	5	0	0	-2	-5	0	-3	-4	-5	-6	-3	-24	-5	-10	-11	-6	-6	-3	-6	-2	1	5	1	-3
@	19	3	0	-2	1	4	4	0	0	-1	-3	-9	-8	-4	-4	-3	-2	-10	-2	0	-1	-1	0	0	0	-1
@	20	3	-1	1	0	0	2	2	0	-2	-7	-7	-9	-11	-7	-1	1	5	9	8	7	-10	-79	-25	19	-4
	21	21	10	10	-16	-97	-64	5	4	0	3	14	-5	-2	-3	-1	0	-26	-14	-2	2	3	2	3	2	-6
	22	5	6	-24	-22	-49	-17	3	-10	-78	-3	5	-11	-20	-105	-81	-21	-42	-109	-69	-16	16	-18	8	-25	-28
	23	-39	-5	3	-1	-56	-35	9	22	-3	-11	20	-14	-56	-73	12	-9	-48	-76	-51	-38	-13	-113	-25	16	-24
	24	14	-11	-21	-41	-69	-26	-3	22	19	11	10	12	8	16	35	-11	-46	-48	-45	21	42	44	-87	17	-5
D	25	42	45	25	-41	46	27	44	-10	9	93	-130	-141	-152	-40	51	0	-12	-98	-11	-84	-36	-9	-96	-8	-20
D	26	4	0	26	42	-16	-82	-104	-158	-174	-14	18	-85	-12	13	-44	-176	-207	-100	-55	-15	-50	-23	54	41	-46
D	27	-3	1	24	-23	-86	-115	-20	-14	-2	-49	-135	-61	-72	-72	-78	-46	-48	-194	-130	-130	-252	-188	-140	-192	-84
D	28	-163	-9	-18	-133	-197	-75	-82	-61	-105	-49	-106	-257	-143	-153	-69	-15	-4	-78	-206	-138	-43	-175	-301	-195	-116
D	29	-34	-72	-23	-69	-284	-36	17	-539	-256	-433	-257	-166	-351	-394	-97	-245	-86	-195	-50	-24	-39	-35	-40	-28	-156
	30	-23	-14	-10	0	-24	-52	-90	-53	-91	-76	-43	-15	-12	-21	-39	-54	-43	-21	-72	-96	-46	-15	-10	-45	-40
	MEAN	-17	-7	-8	-23	-35	-25	-19	-55	-53	-32	-35	-47	-49	-44	-30	-39	-36	-46	-32	-25	-19	-25	-31	-23	-32
5@	MEAN	3	5	-1	1	1	0	0	-1	-1	-3	-6	-8	-12	-5	-4	-3	-4	-1	0	-1	-2	-15	-3	0	-2
5D	MEAN	-30	-7	6	-44	-107	-56	-29	-156	-105	-90	-122	-142	-146	-129	-47	-96	-71	-133	-90	-78	-84	-86	-104	-76	-84

AO INDEX (HOURLY VALUES) OCTOBER 1978

	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	-81	-25	-76	-33	-15	-18	-21	-59	-78	-92	-64	-29	-46	-161	-119	-161	-93	-48	1	-46	-35	-48	-143	-42	-64
	2	-6	-1	-4	-86	-55	-13	2	-12	-56	-47	-63	-109	-236	-173	-124	-68	-56	-84	-22	1	-63	-72	-14	-69	-60
	3	-63	-31	-51	-9	-24	-26	-66	-44	-7	-23	-38	-28	-37	-76	-33	-55	-35	-62	-28	-28	-33	-13	-4	-19	-35
	4	-99	-120	-32	21	11	-51	-63	-5	18	-91	-31	-40	-115	-163	-57	-15	-29	-16	-8	2	-114	-87	-75	-122	-53
	5	-106	-74	-49	-59	-9	0	1	9	6	1	-2	-110	0	14	0	-7	-8	-3	-54	-21	-1	-2	-4	0	-20
@	6	1	2	9	10	-2	0	3	4	7	9	0	-2	-1	-3	-4	-6	-32	-95	-18	1	2	-17	-11	-3	-6
@	7	-15	0	15	3	-19	-16	13	10	9	2	12	13	8	5	-5	8	-2	-7	-1	1	3	5	8	1	2
	8	0	-2	-2	4	-22	-64	-4	24	15	5	-4	-93	-63	-6	-5	-4	-4	-13	-21	7	3	-22	-38	-17	-13
	9	0	0	-3	1	18	23	22	14	-12	-66	-55	16	0	8	0	-7	1	10	6	-16	5	8	-11	-72	-4
	10	-68	1	-17	-15	35	41	18	9	-6	8	3	-117	-45	3	1	-5	-5	2	1	-3	-36	-54	13	5	-9
	11	8	11	7	19	12	15	17	0	2	2	27	8	-3	0	-3	-9	-4	0	0	0	-2	1	2	0	4
	12	12	11	8	13	8	9	14	9	11	3	12	-86	-98	-84	-159	-134	2	2	2	5	17	-63	2	12	-19
	13	11	7	26	14	11	5	13	9	14	10	1	-2	-4	-8	-10	-10	-6	-12	-28	-54	-17	-13	49	37	1
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@	16	-32	-49	-47	-27	0	0	6	3	4	1	0	-1	4	3	-18	-22	-7	2	2	0	0	4	3	4	-6
	17	2	0	1	2	9	19	23	18	14	4	-2	0	-1	0	-1	0	-21	-13	0	17	-25	-21	1	-18	0
D	18	-170	-117	-81	-33	-87	15	-7	-2	11	-3	-71	-105	-1	-1	-2	-33	-111	-87	-69	-135	-92	-18	-19	-182	-58
D	19	-193	-104	-26	5	2	-67	-187	-124	-179	-44	-37	-46	-241	-93	-79	-100	-31	-48	-23	-6	-105	-76	-29	-10	-77
	20	0	7	-42	-42	14	7	2	8	-10	-2	-3	-113	-80	-86	-105	-53	-42	-64	-99	-93	-21	2	11	8	-33
	21	4	0	1	-53	-36	-95	-7	7	-30	-8	-131	-86	-29	-57	-176	-29	-37	-50	-105	-112	-17	-33	-99	-23	-50
	22	-15	1	-9	-76	-102	-132	-63	-62	-65	-157	-28	7	-14	-10	-10	-117	-41	-71	-77	-53	-35	2	10	9	-46
	23	5	4	1	-44	-73	-47	-22	-41	-71	-34	0	2	-13	-13	-56	-52	-63	-38	4	3	0	-38	4	5	-24
	24	10	2	-66	-59	-35	-53	-20	15	1	-1	-7	-8	-2	-1	-1	-9	-3	-2	-7	-92	-68	11	25	21	-14
	25	6	7	3	10	15	15	13	17	-42	10	-11	-47	-112	-99	-36	-23	-113	-26	-38	-18	4	13	9	1	-18
	26	-1	1	1	-1	1	11	20	23	22	13	25	19	6	-25	-89	-36	-31	-10	-104	-83	3	-85	-208	-39	-23
D	27	-135	-164	-69	18	3	-111	-134	-64	8	-168	-99	-77	-115	-118	-20	-21	-22	-45	6	8	-3	-21	-85	-51	-61
	28	-71	-66	-82	-92	-86	-74	-63	20	-5	-52	-8	-12	-38	-50	-112	-101	-17	0	-19	-13	2	-15	-44	-55	-44
	29	-22	9	8	0	-10	7	22	-9	-40	-54	-4	-10	-84	-174	-192	-98	-62	-162	-99	-28	-70	-65	-30	-10	-49
D	30	0	10	10	41	0	-33	21	-9	-78	-182	-155	-105	-149	-118	-173	-309	-315	-122	-115	-146	-136	-59	-157	-96	-99
D	31	-87	-71	-86	-124	-61	-40	-64	-92	-28	-28	-105	-123	-73	-197	-163	-93	-36	-38	-14	-6	-53	-104	-72	-78	-77
	MEAN	-34	-23	-20	-19	-16	-21	-16	-11	-17	-31	-27	-41	-50	-54	-59	-51	-41	-37	-30	-29	-28	-28	-28	-25	-31
5@	MEAN	-1	-5	-4	-6	-6	-2	1	-5	6	2	0	2	3	1	-21	-6	-20	-30	-9	-3	2	0	3	3	-4
5D	MEAN	-117	-89	-50	-18	-28	-47	-74	-58	-53	-85	-93	-91	-115	-105	-87	-111	-103	-68	-43	-57	-77	-55	-72	-83	-74

AO INDEX (HOURLY VALUES) NOVEMBER 1978

	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	-65	-54	-89	-62	14	-26	-96	-73	-93	-83	-111	-1	-42	-42	-8	-5	-5	-2	-3	-23	-15	-82	-15	9	-40
	2	8	6	11	21	-17	-1	28	22	-2	-24	-42	-111	-103	-121	-78	-144	-128	-48	-5	-5	1	15	15	-53	-31
	3	-25	-9	-9	-6	22	4	4	-48	-120	-54	0	12	9	3	5	-12	2	-14	-114	-216	-164	-64	8	15	-32
	4	-2	23	11	7	15	7	-58	-35	-25	4	3	-12	-50	-64	-75	-72	-34	-2	9	7	11	7	-24	-36	-15
	5	-4	-4	-50	-77	27	30	30	26	24	13	10	-46	-45	-4	2	-48	-39	-10	-14	0	3	2	4	5	-6
Q	6	7	7	9	14	13	14	16	16	1	-8	-3	-6	-9	-5	-33	-35	-13	-33	-32	0	18	17	10	11	0
	7	11	11	16	20	21	23	22	20	17	13	15	12	9	8	6	2	2	0	0	-10	31	4	-95	-104	2
	8	-64	-80	-86	32	36	38	7	5	2	9	5	4	3	5	0	4	2	1	3	-3	8	5	-4	6	-2
	9	13	45	19	36	33	27	-56	-34	2	18	24	17	-12	9	6	5	1	-1	2	3	5	4	5	0	7
	10	-13	-20	-7	13	6	11	19	18	-15	-7	26	7	10	12	-9	-58	-119	-225	-148	-128	-214	-185	-114	16	-46
	11	51	10	-30	7	35	9	-29	17	38	23	10	5	5	17	10	1	-3	-17	-48	-43	-100	-130	-95	-34	-11
D	12	-14	-140	31	36	79	44	38	18	56	48	60	-64	-33	18	-20	-21	-16	-90	-101	-65	-144	-124	-40	-59	-21
	13	-107	-2	-38	-3	19	2	31	27	-36	-1	21	12	-116	-158	-128	-106	-170	-221	-151	-35	26	19	13	4	-45
	14	9	4	5	8	8	11	14	14	11	9	7	6	2	-35	-232	-264	-177	-79	-108	-151	-30	20	16	6	-38
	15	6	9	-37	-103	-71	-12	-45	-58	-60	-38	-29	-35	-19	-6	0	4	-26	-34	-37	-64	-1	4	-23	-17	-29
	16	3	-8	4	22	23	19	16	-6	-57	-24	-23	-8	-60	-122	-113	0	-6	-32	-66	-46	-12	6	13	16	-19
	17	12	-19	-3	15	28	27	28	16	-31	-75	-19	-9	-89	-37	-4	-18	-17	-10	-75	-47	-20	0	5	14	-13
Q	18	-12	-26	6	17	25	11	14	-61	4	16	15	17	13	11	-17	-36	-38	-32	-18	-47	7	14	-15	-5	-5
	19	-8	-4	-12	-70	28	27	22	16	30	-40	-33	-100	-233	-58	-24	-31	-28	-15	0	1	20	19	26	35	-18
D	20	35	26	-1	1	-94	-102	-57	-18	-36	-63	-43	-51	-92	-77	-123	-92	-35	0	-60	-100	-124	8	-12	-161	-53
	21	-112	-32	27	8	-28	-110	-49	-19	-56	-17	16	15	10	10	6	-50	-71	-42	-10	-4	-31	-160	-176	-270	-47
D	22	-69	0	44	19	-90	-173	-156	-148	-95	-132	-156	-147	-256	-284	-122	-224	-123	-107	7	0	16	-37	13	10	-92
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	27	-68	-59	-30	-15	-34	-69	-41	22	-31	-159	-38	-44	-112	-96	-114	-126	-107	-25	-90	-188	-16	-48	-65	22	-64
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Q	30	14	8	-7	-17	16	13	15	16	16	-6	-43	-19	-63	-13	2	-14	-59	-19	0	-68	0	-20	-65	-28	-14
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AO INDEX (HOURLY VALUES) DECEMBER 1978

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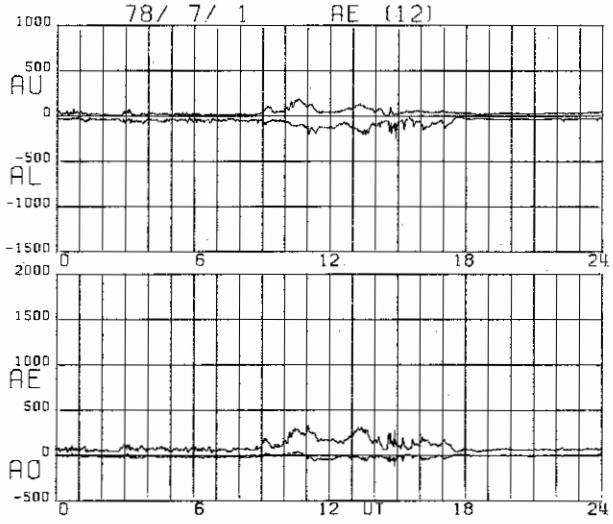
5D	MEAN	-35	-8	-37	-55	-35	-33	-15	-10	-56	-69	-58	-123	-219	-131	-140	-125	-94	-87	-79	-123	-120	-68	-43	-51	-76

FIGURE 4 (on even pages)

Daily graphs of 1.0–min AE indices (AU, AL, AE and AO) for July–December 1978. Graphs on very disturbed days (July 4, August 28 and September 29) are reproduced on page 100.

FIGURE 5 (on odd pages)

Plots of the contributing stations to the AU (upper plumes) and AL (lower plumes) indices, where you can see which station contributes to these indices at every UT minute.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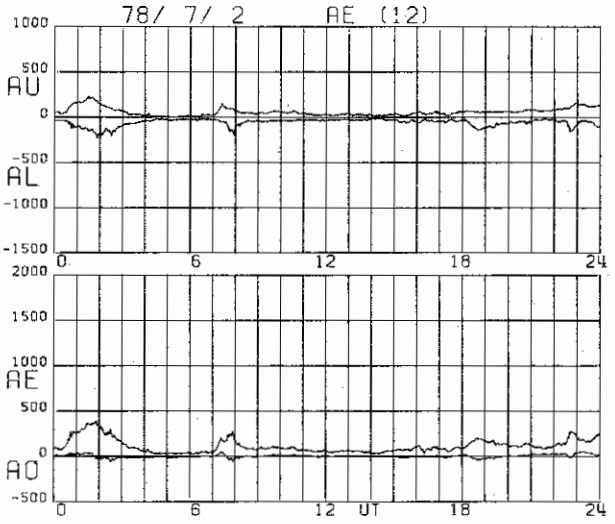
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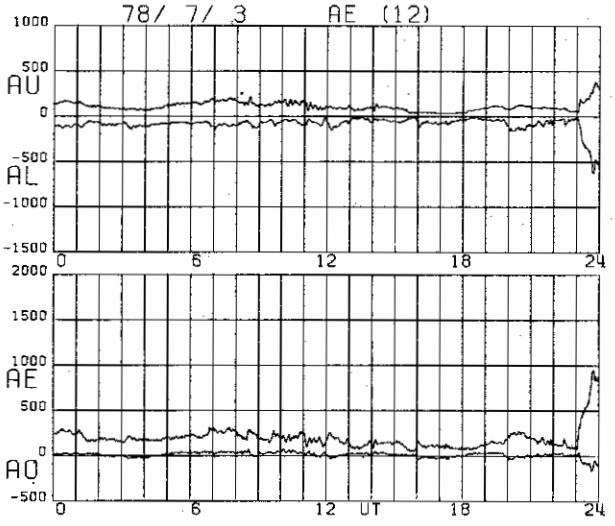
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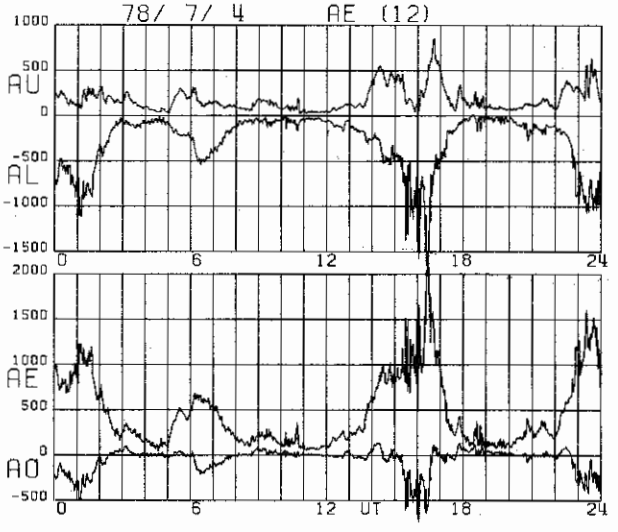
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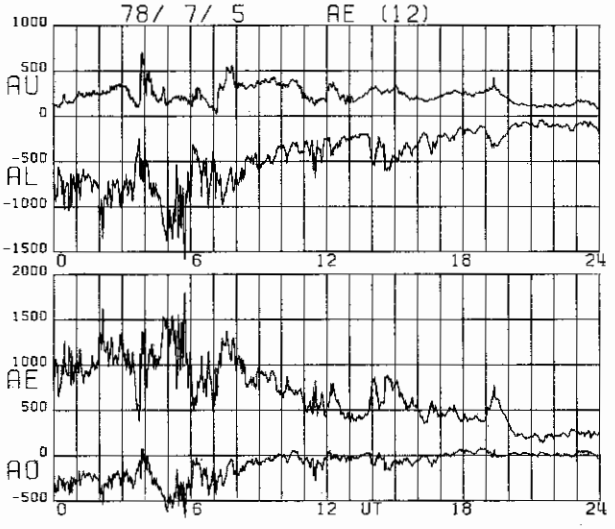
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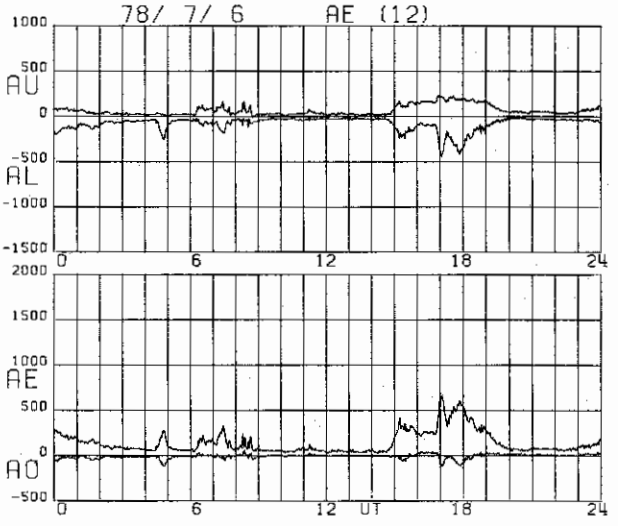
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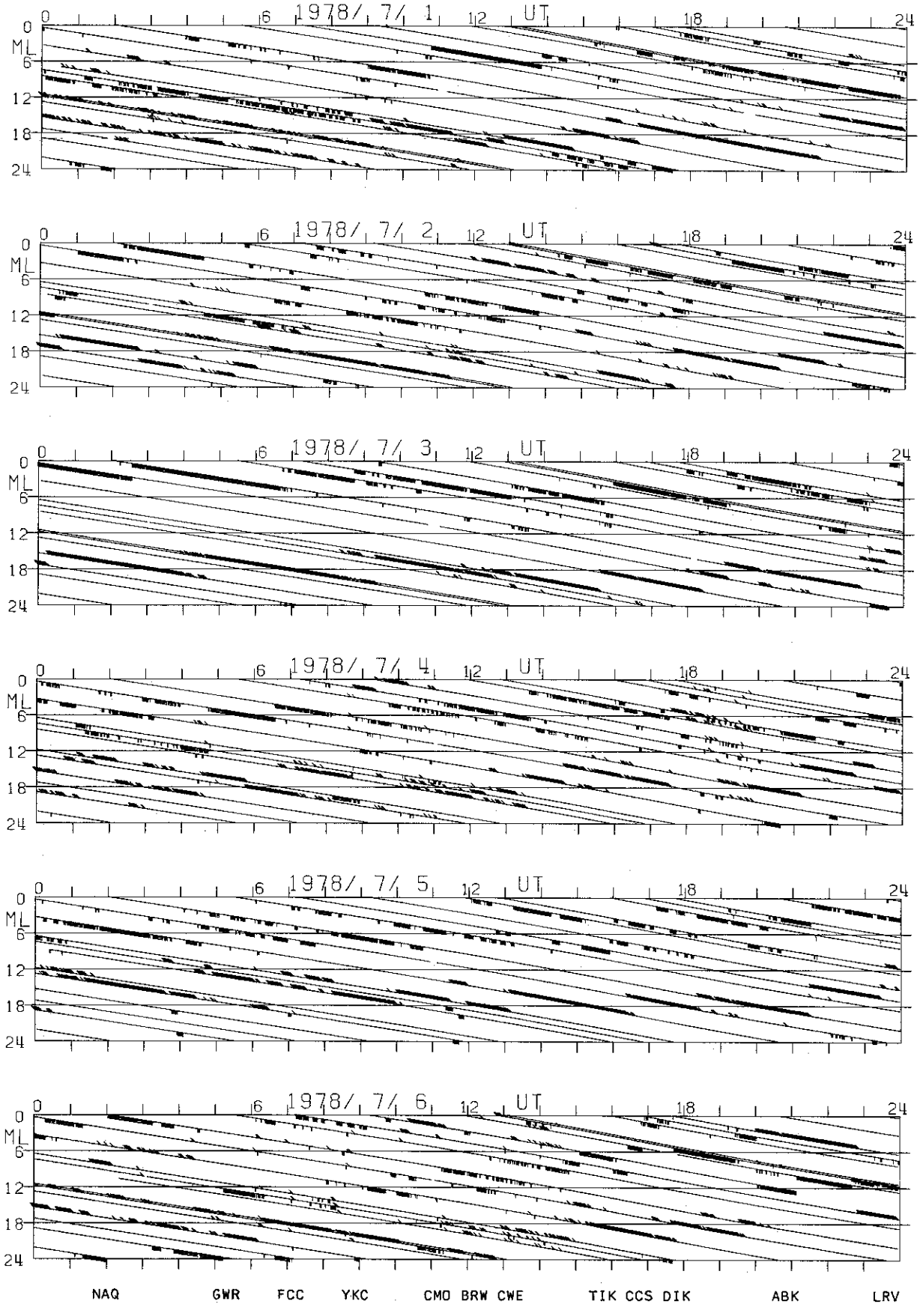
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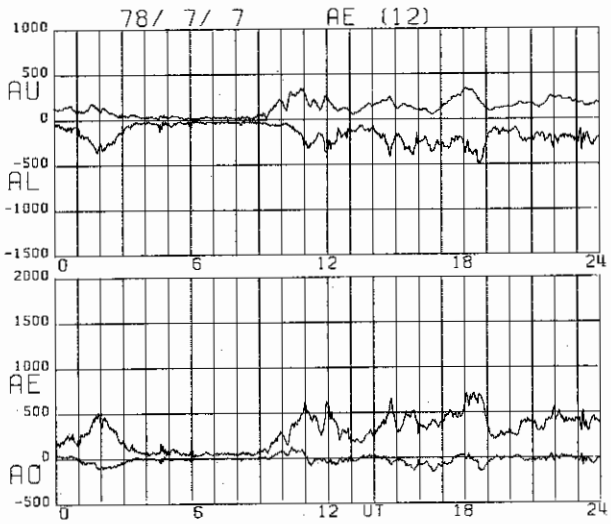
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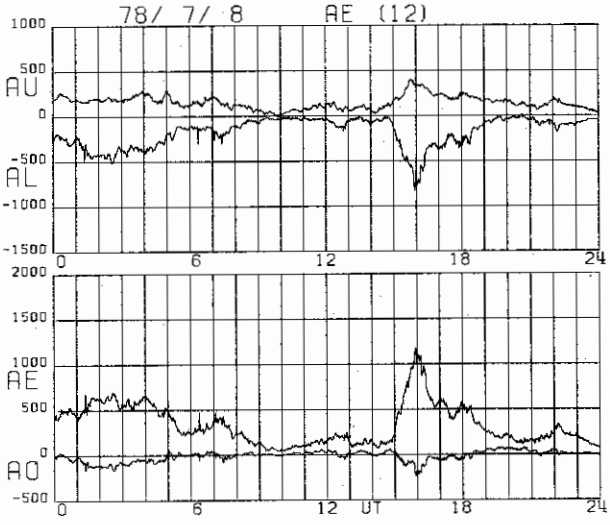
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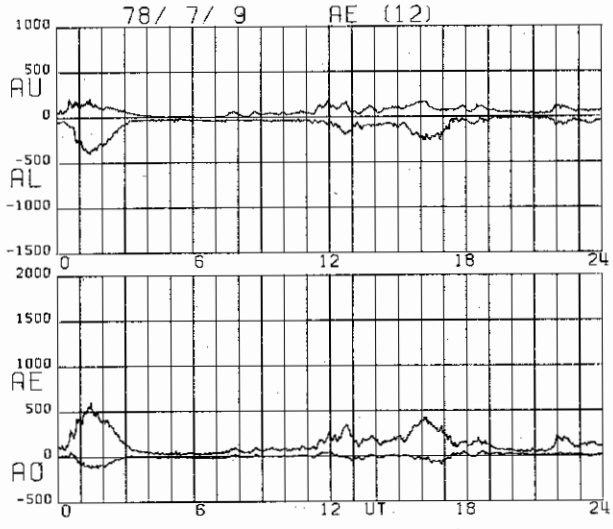
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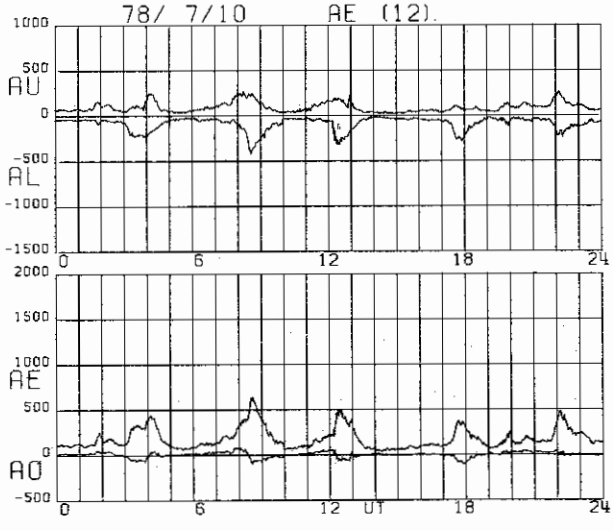
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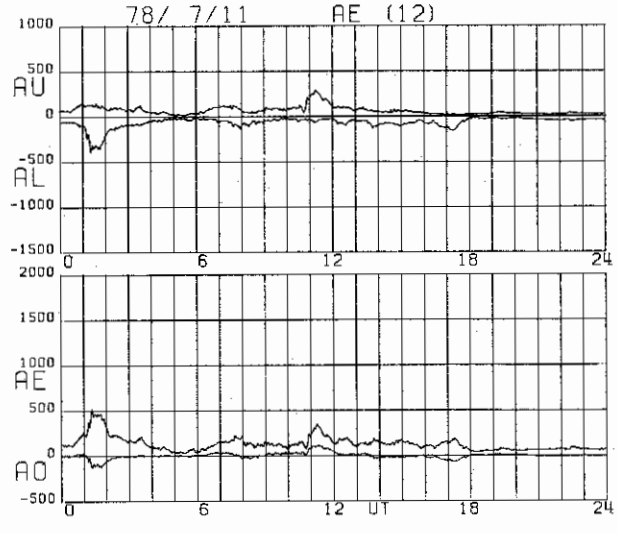
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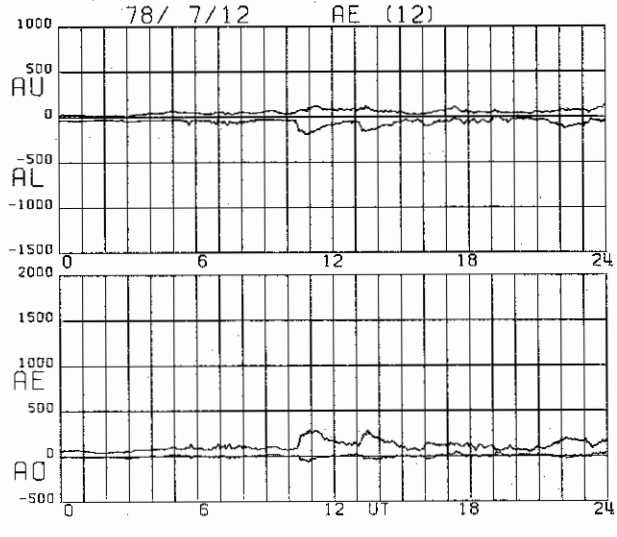
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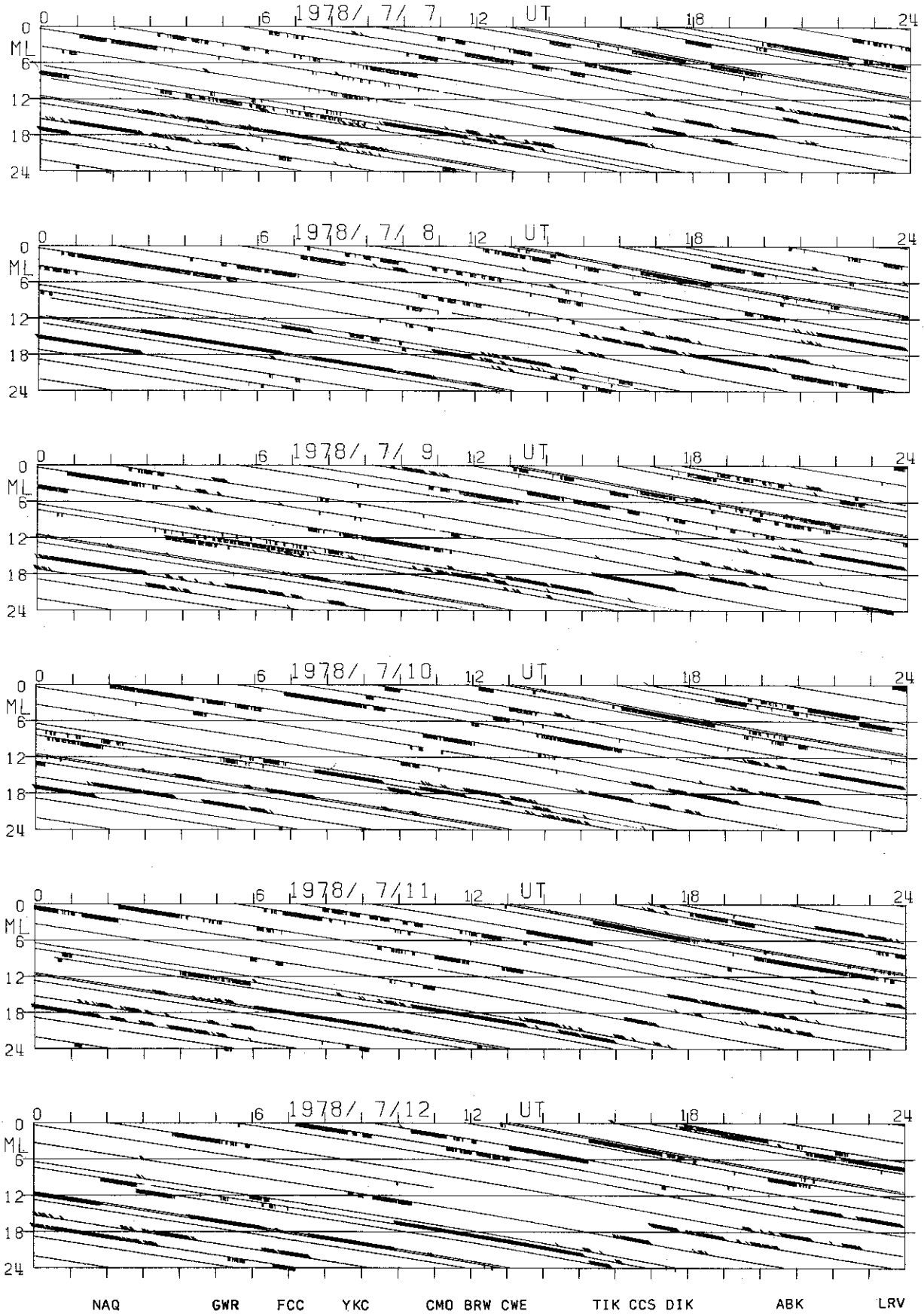
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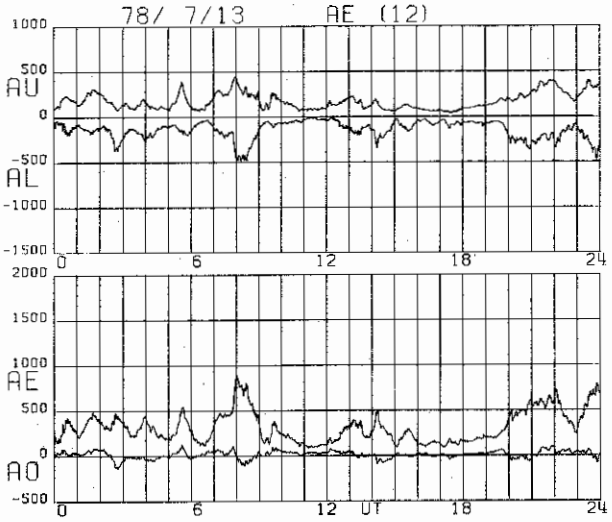
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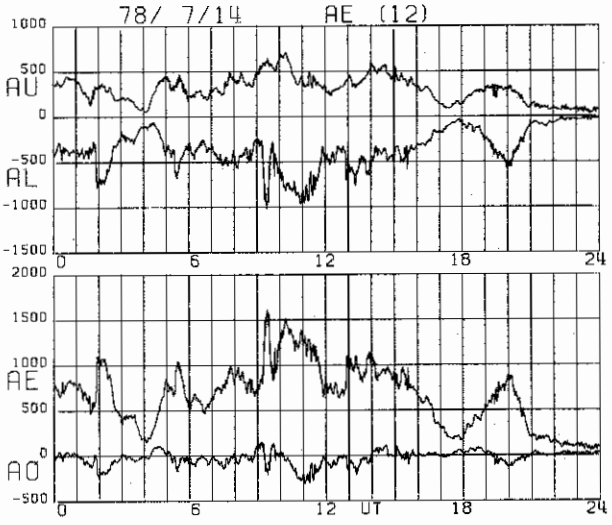
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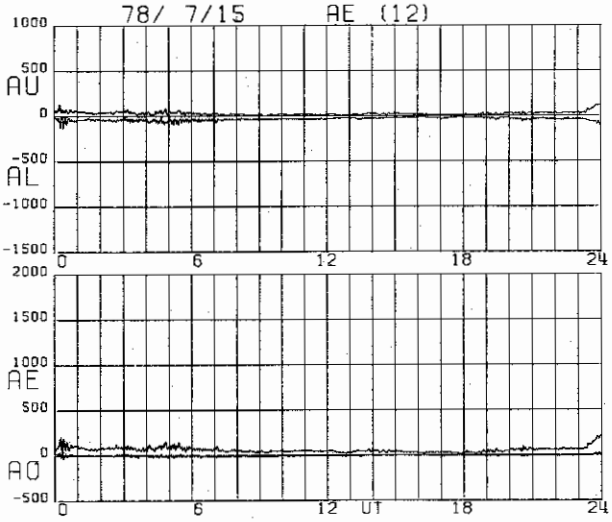
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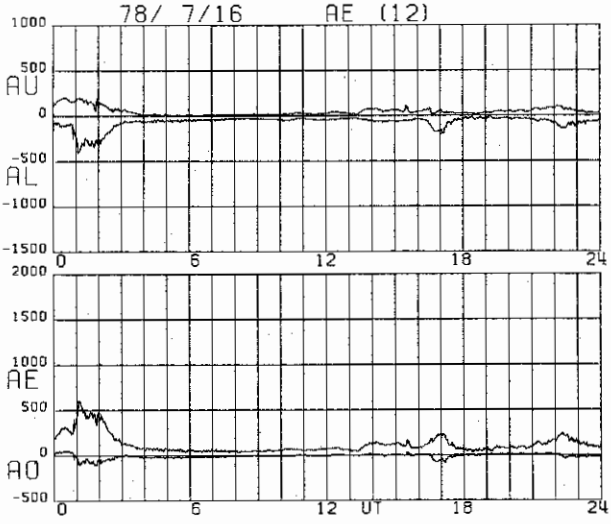
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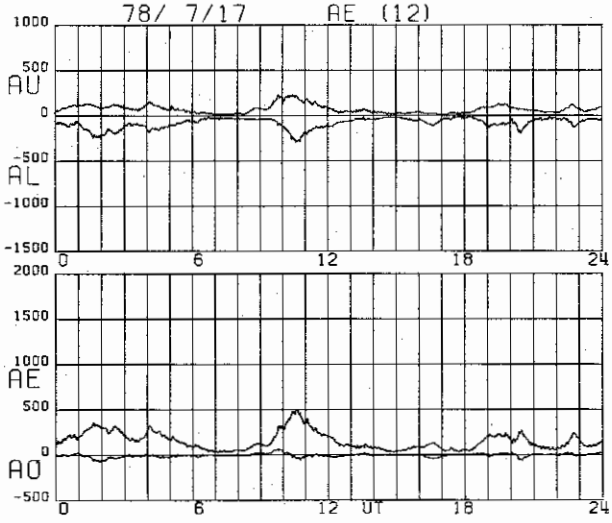
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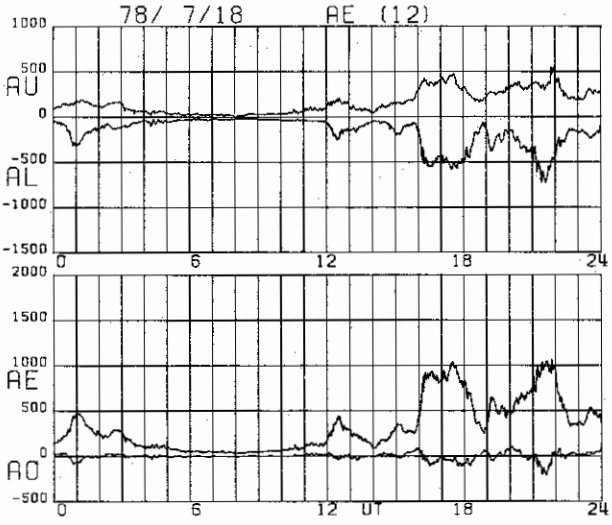
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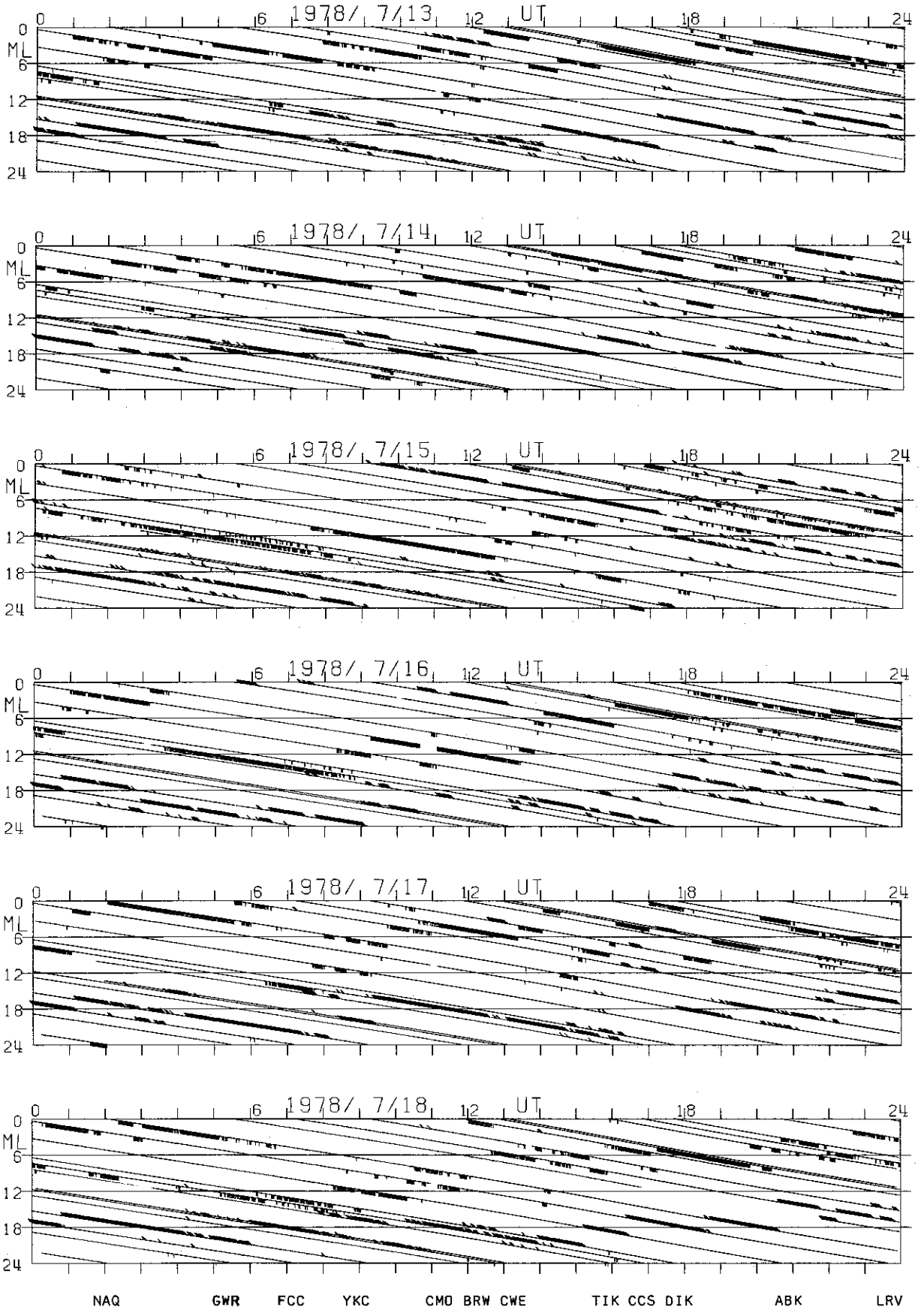
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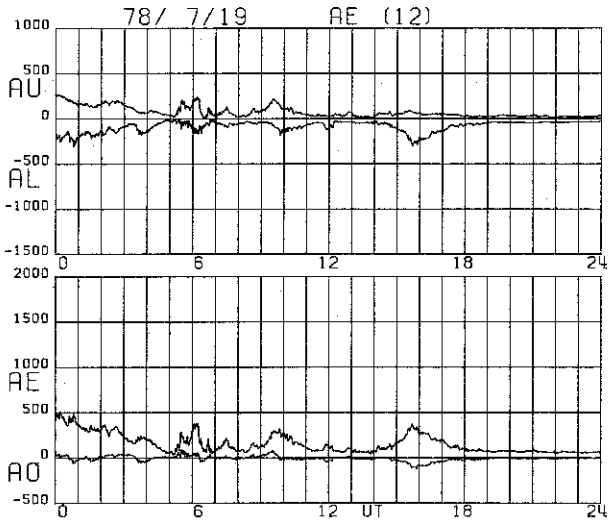
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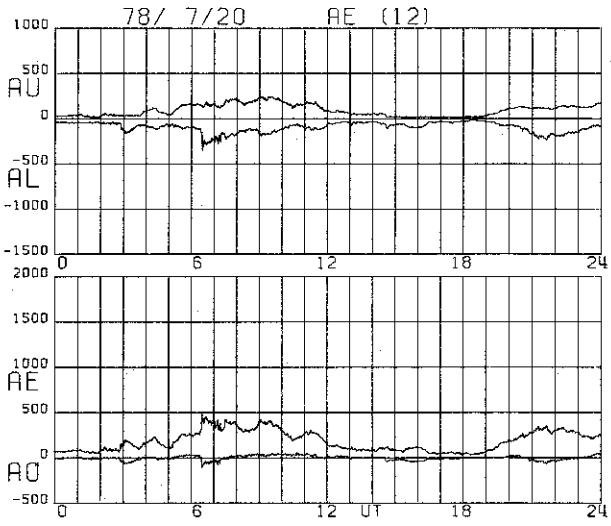
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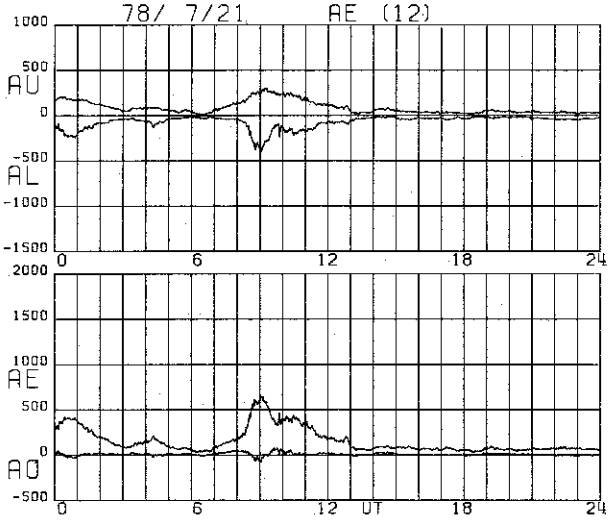
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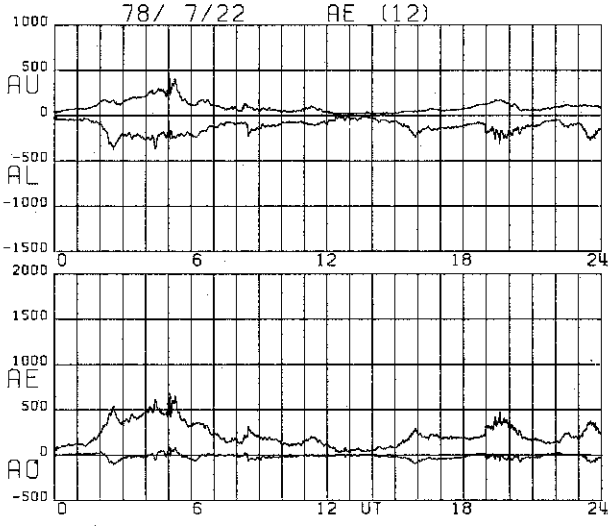
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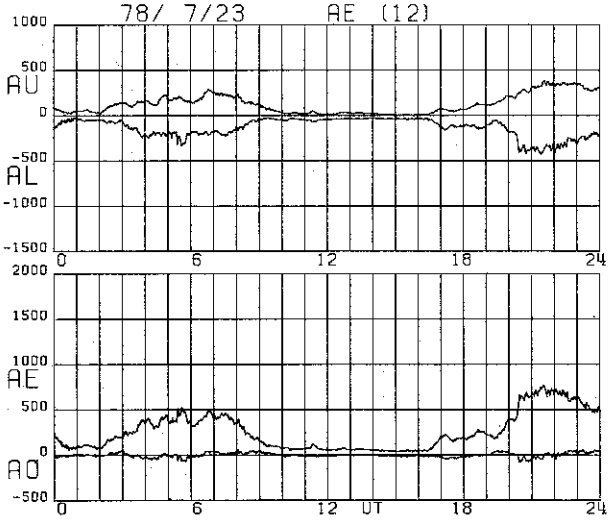
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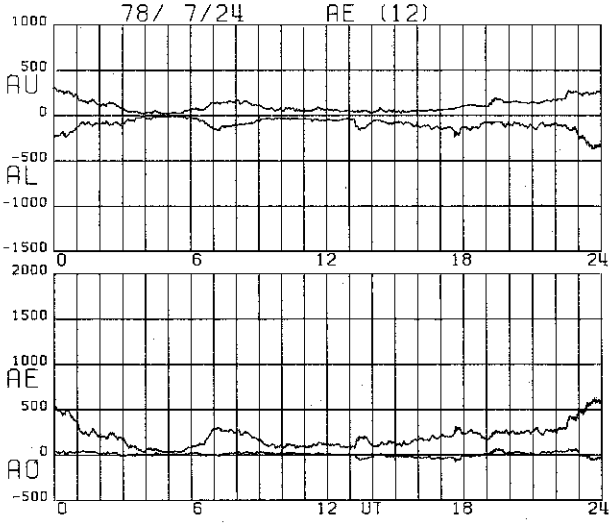
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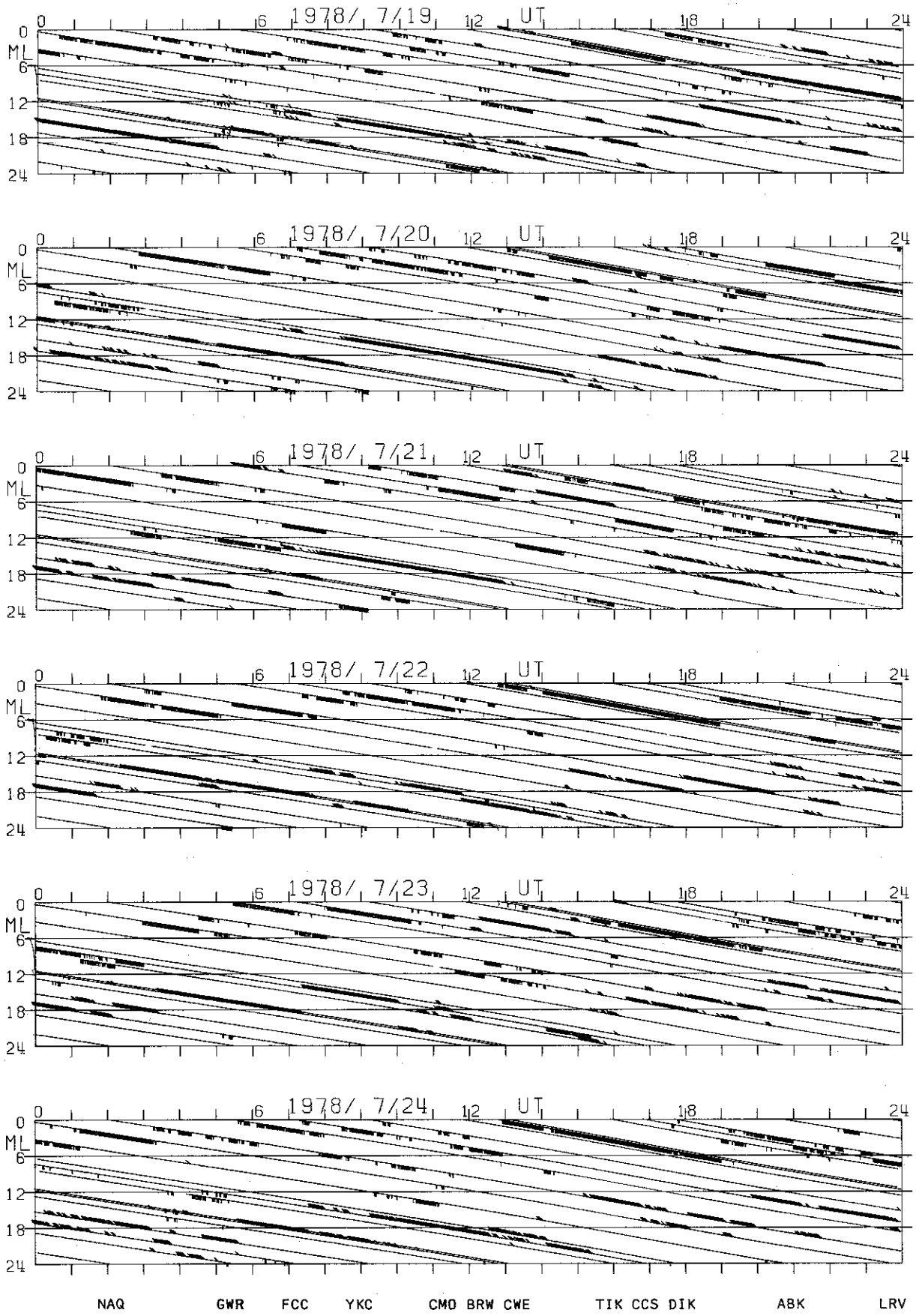
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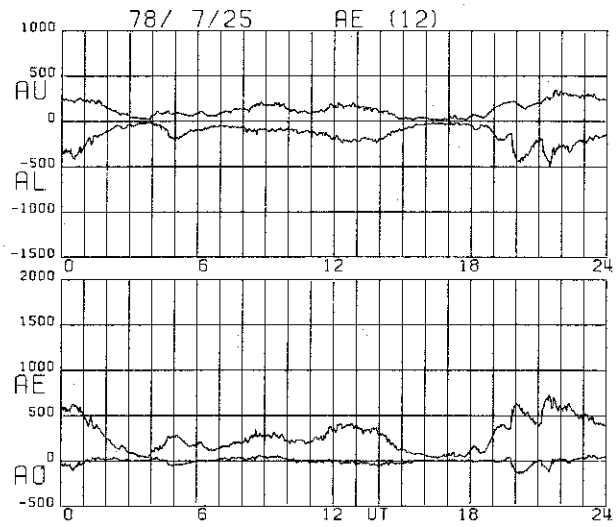
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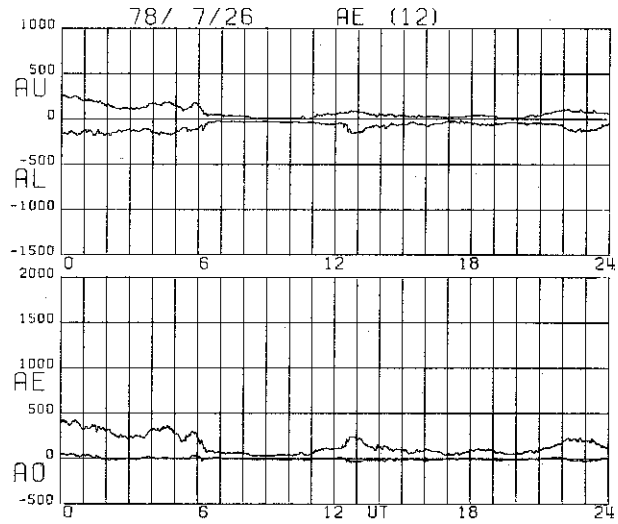
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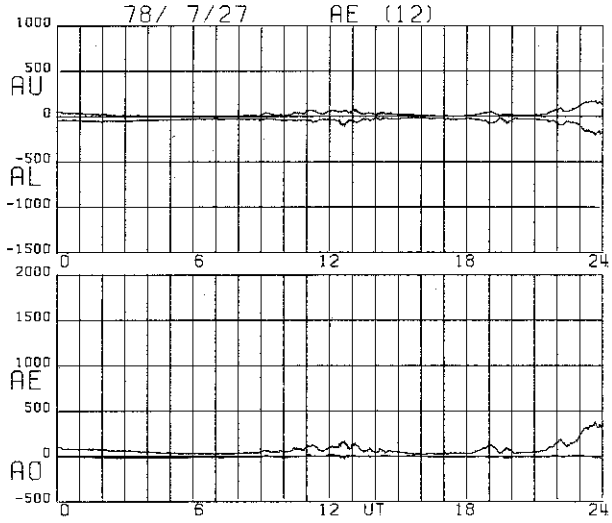
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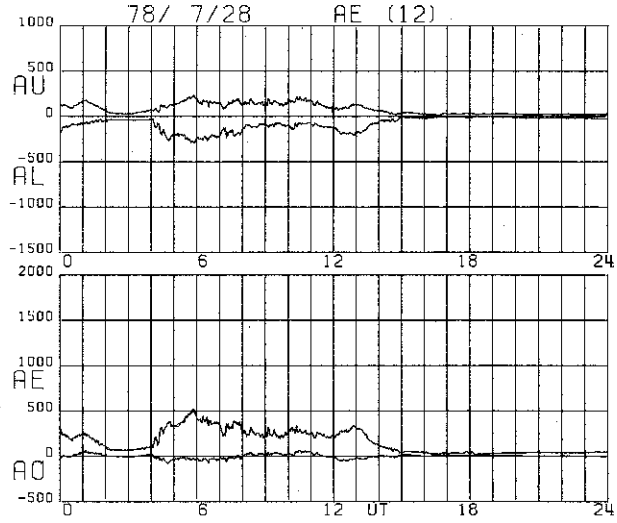
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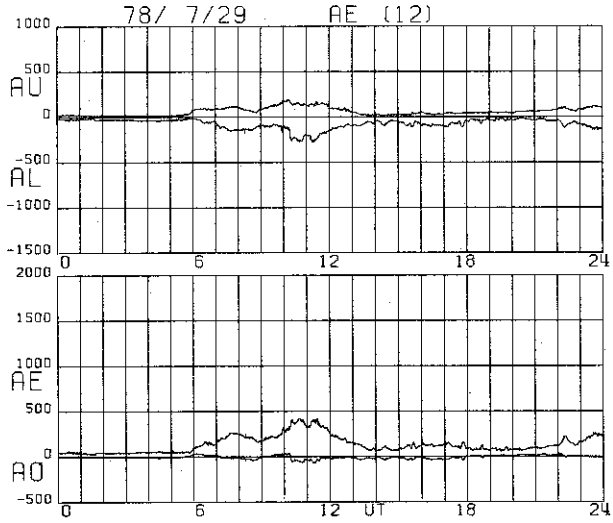
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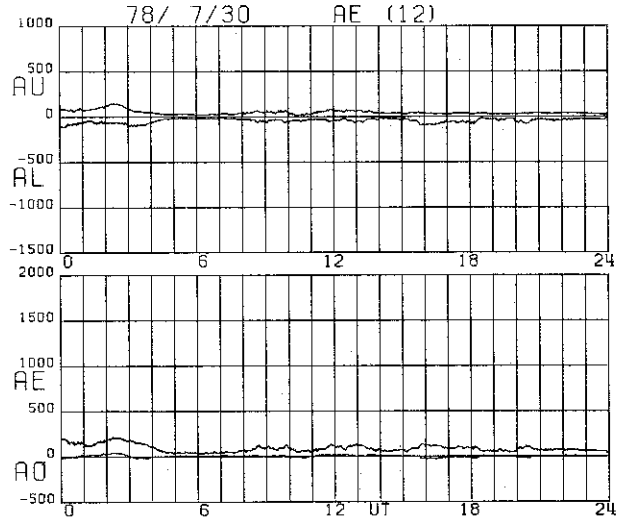
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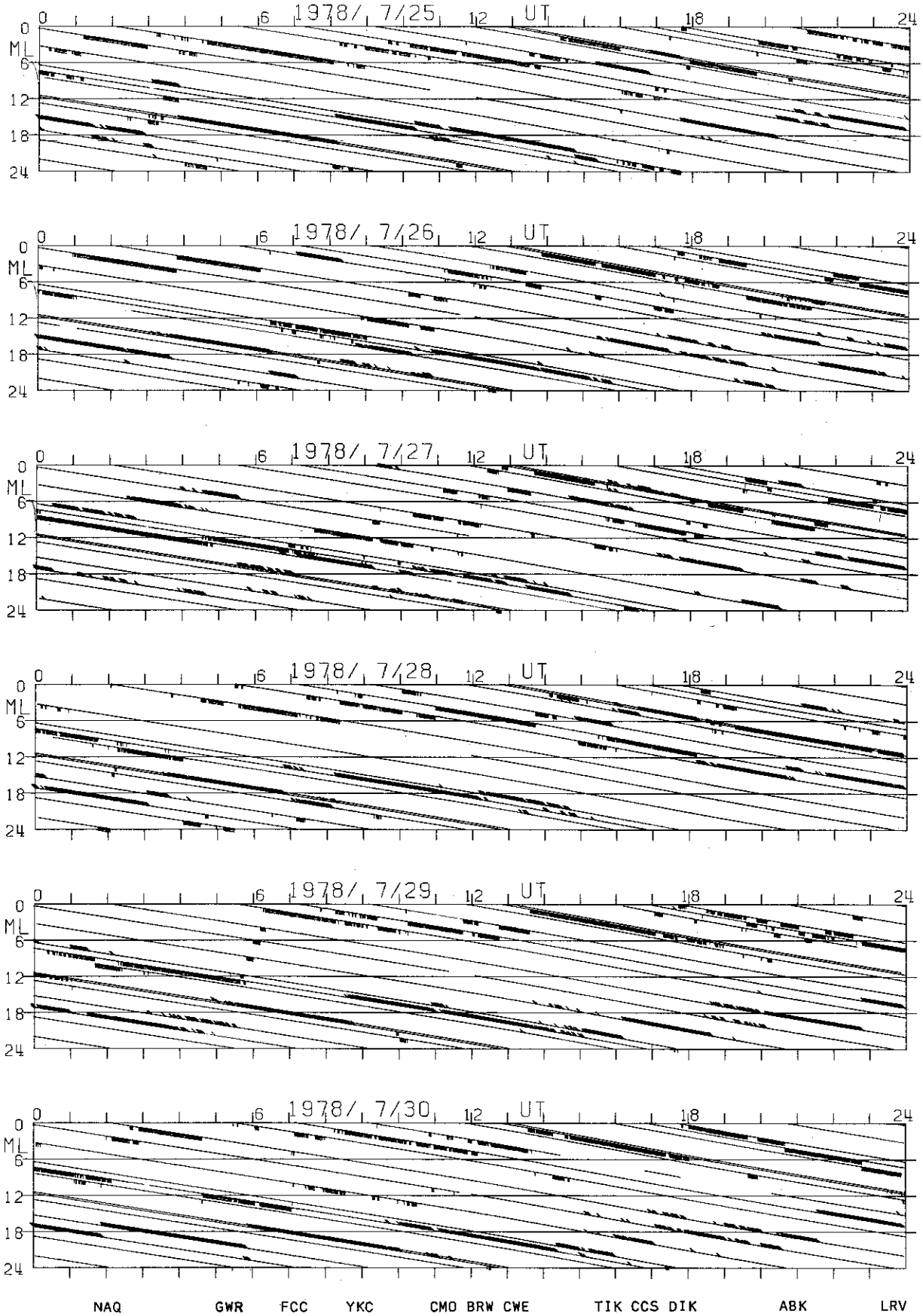
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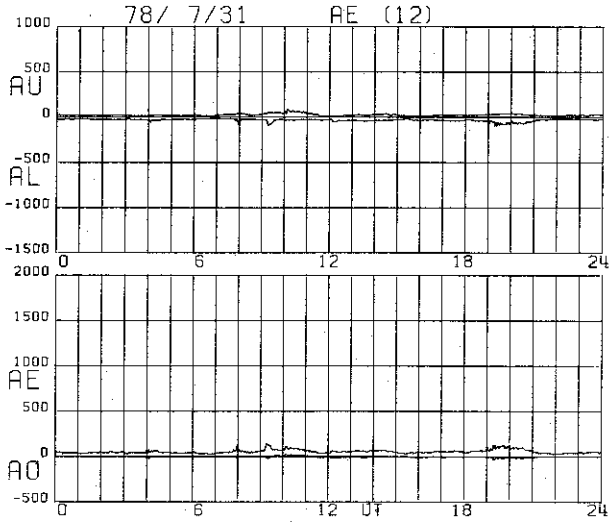
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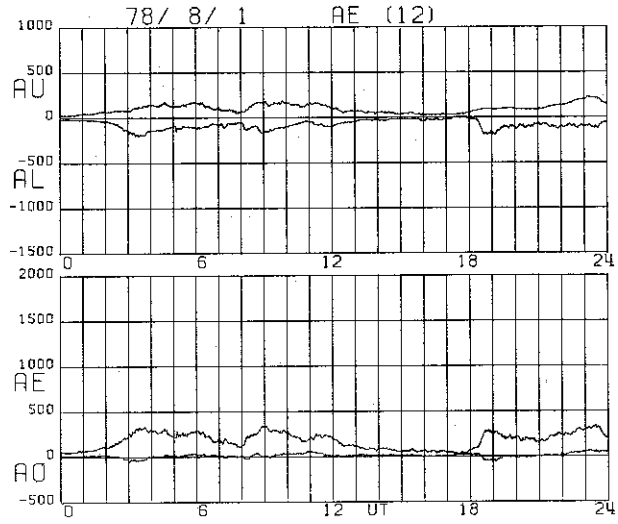
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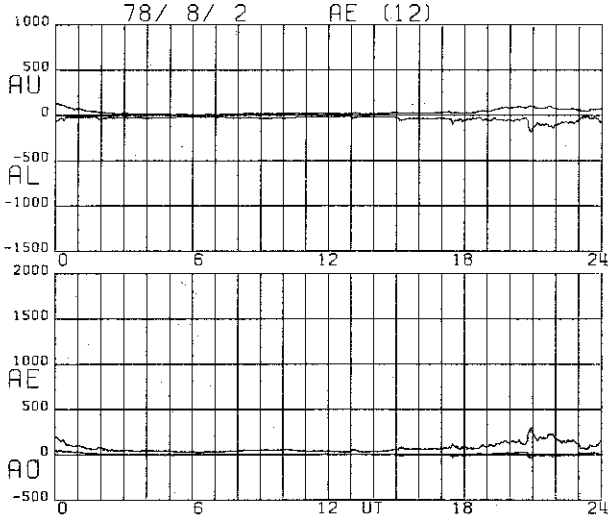
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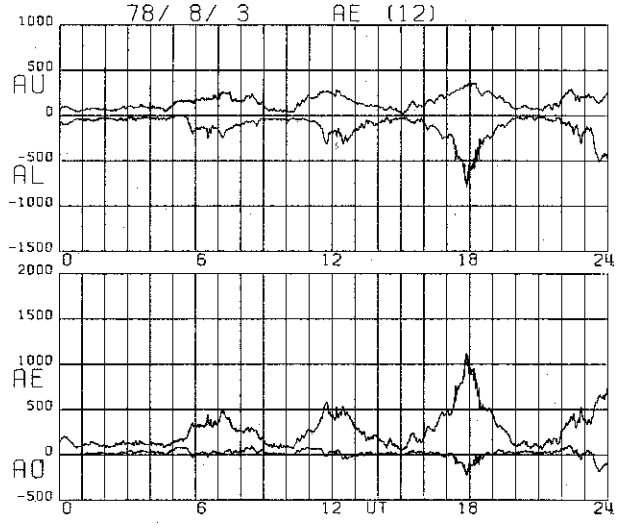
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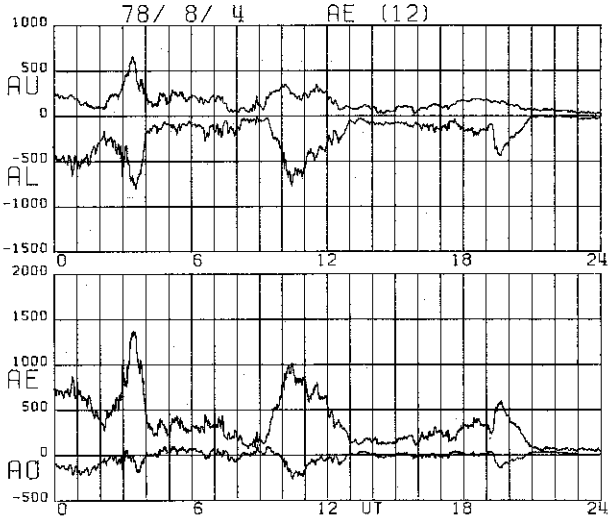
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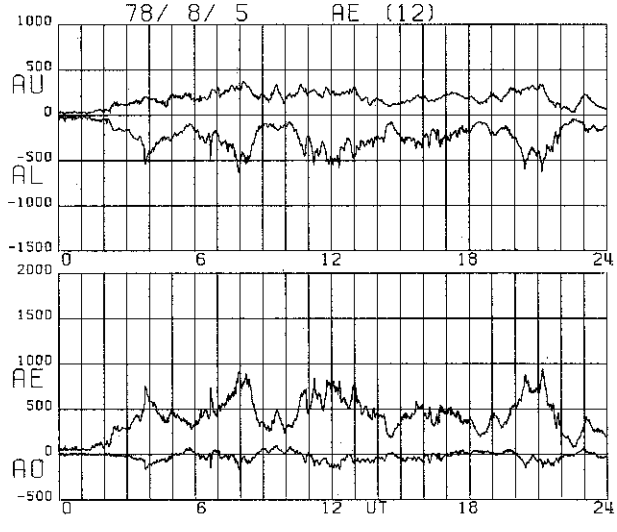
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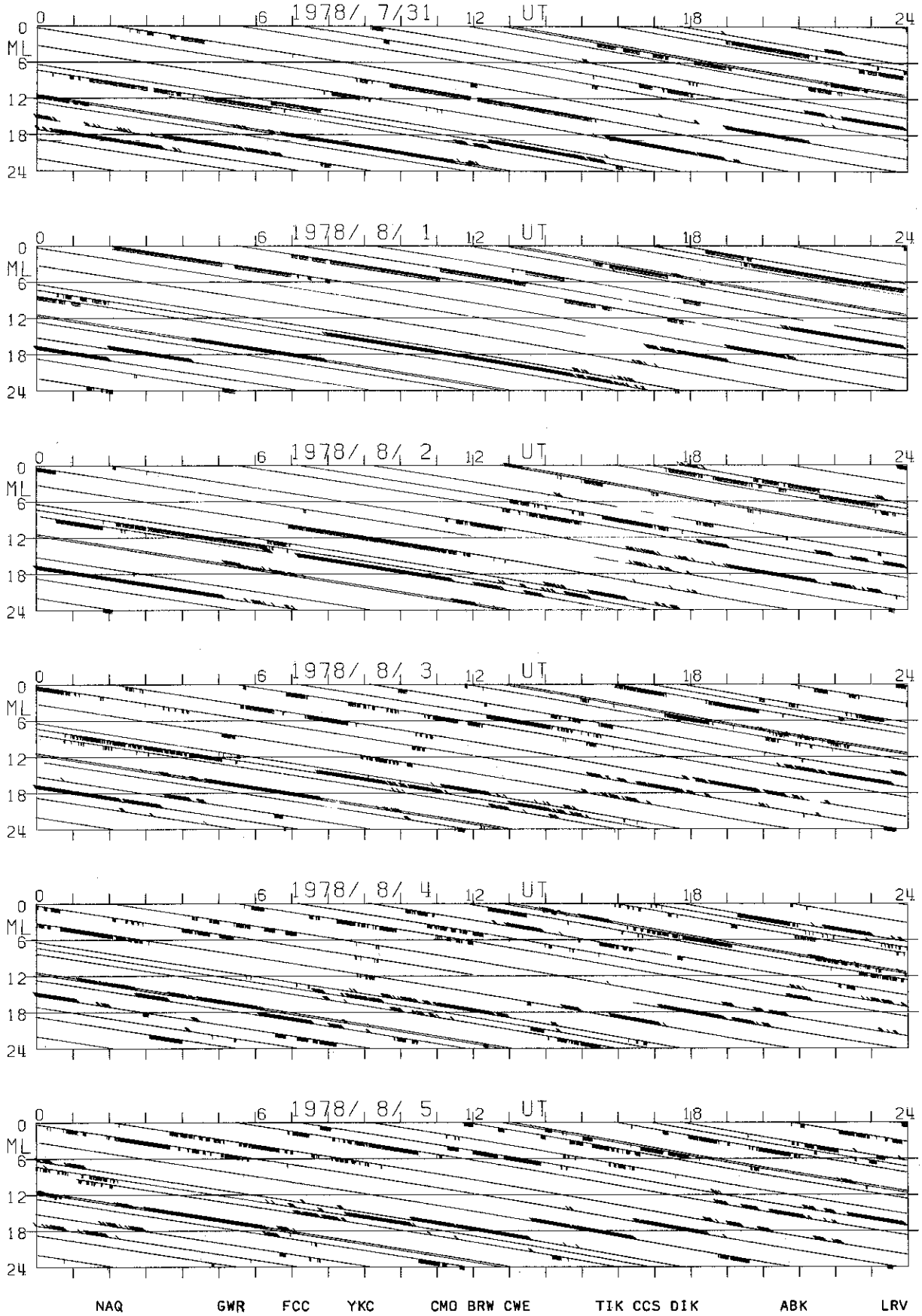
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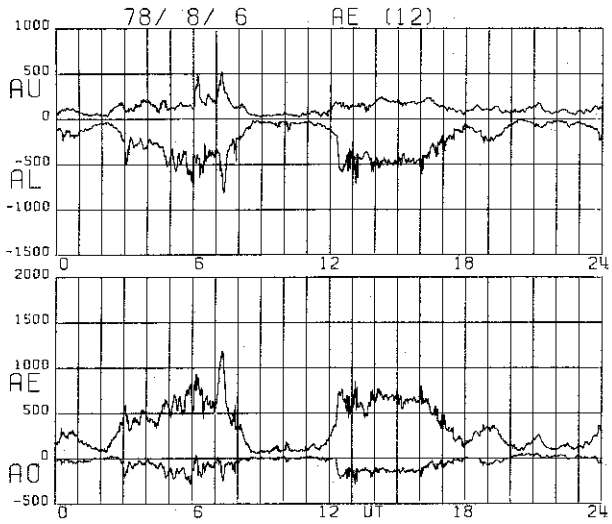
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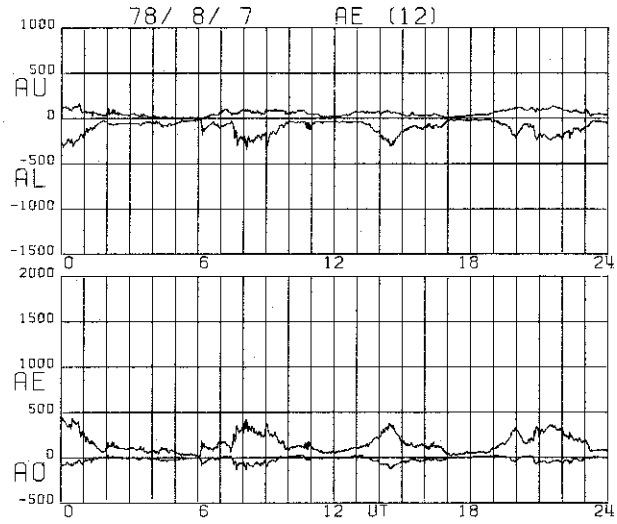
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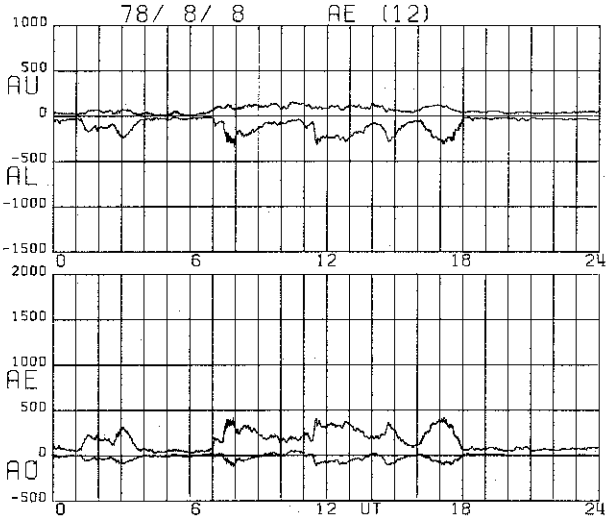
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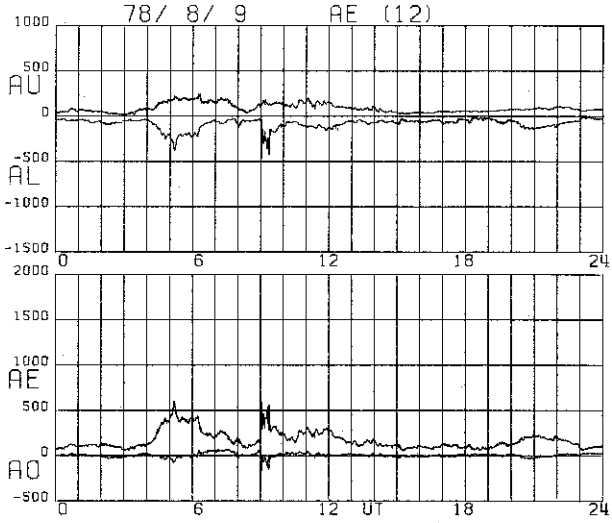
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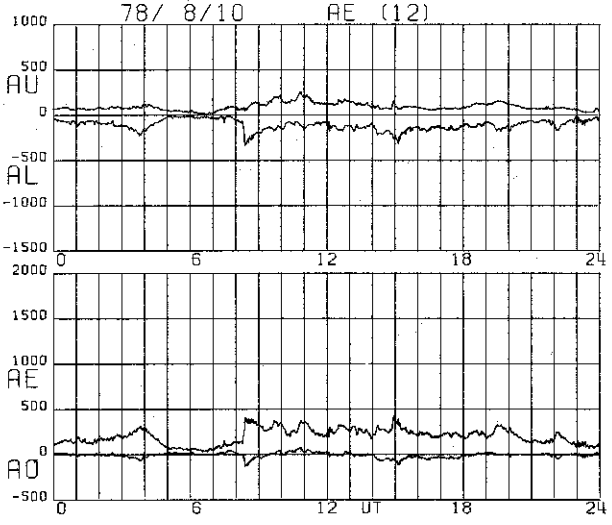
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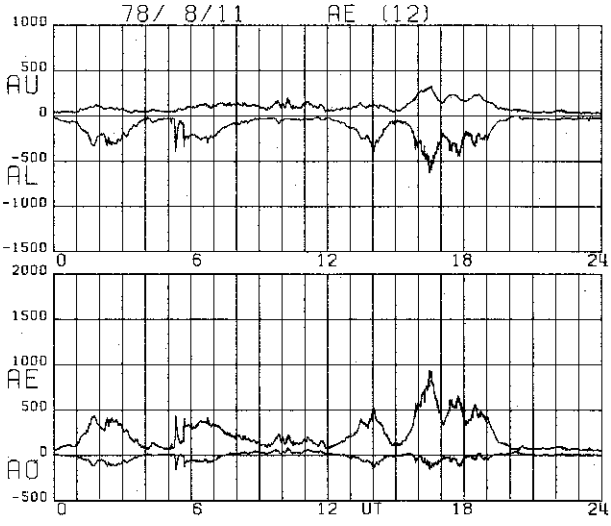
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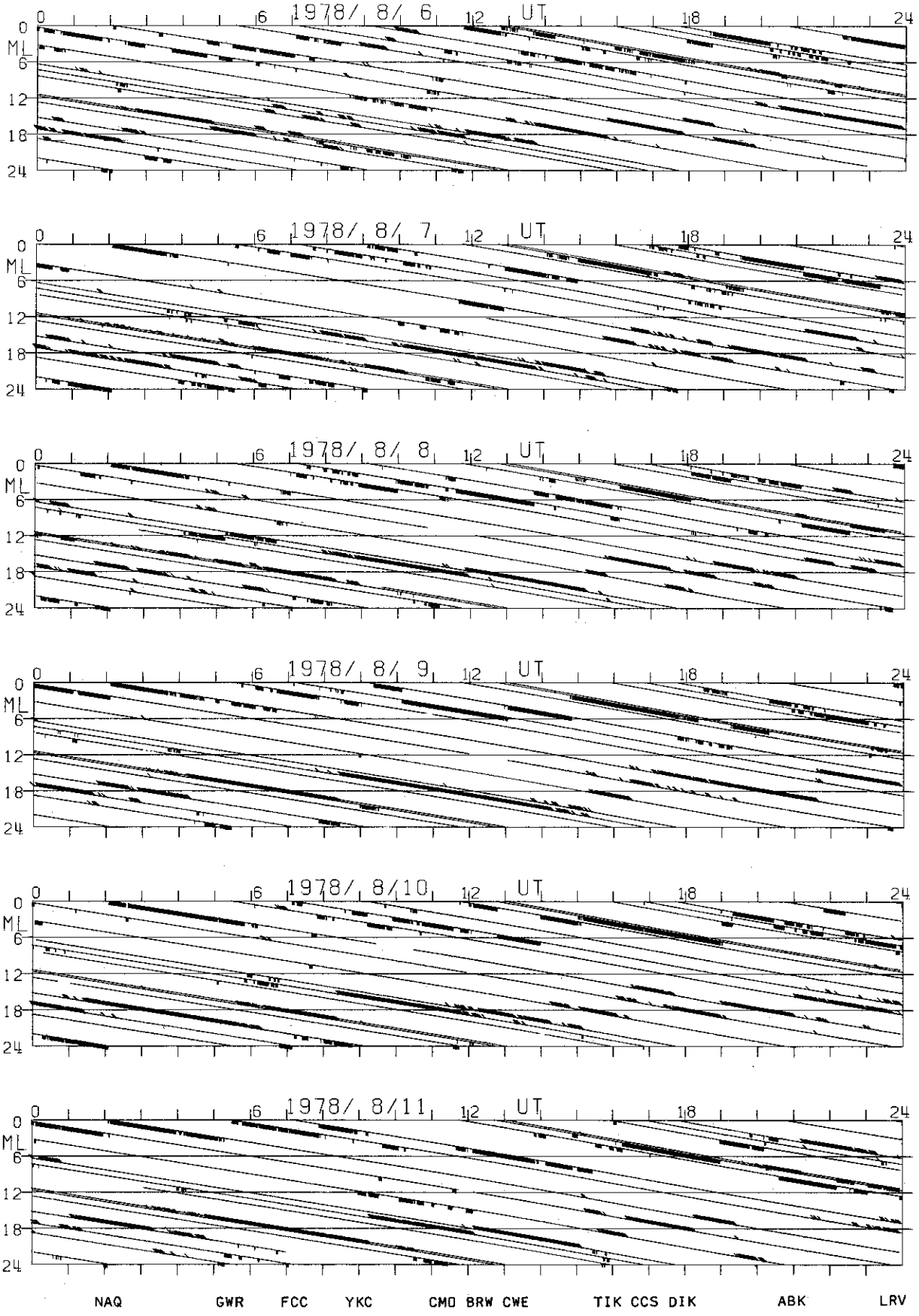
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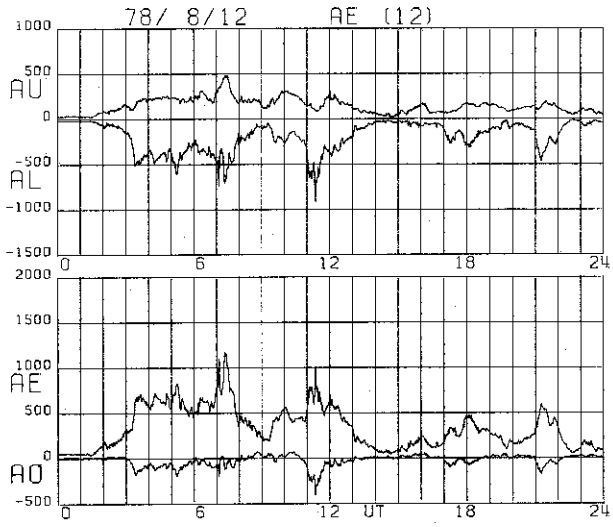
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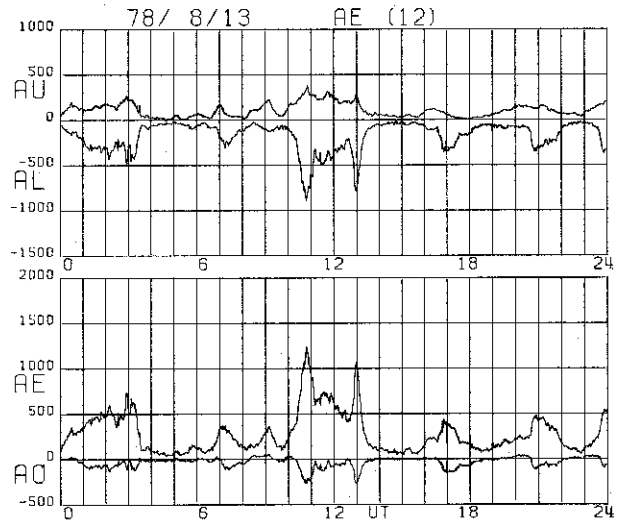
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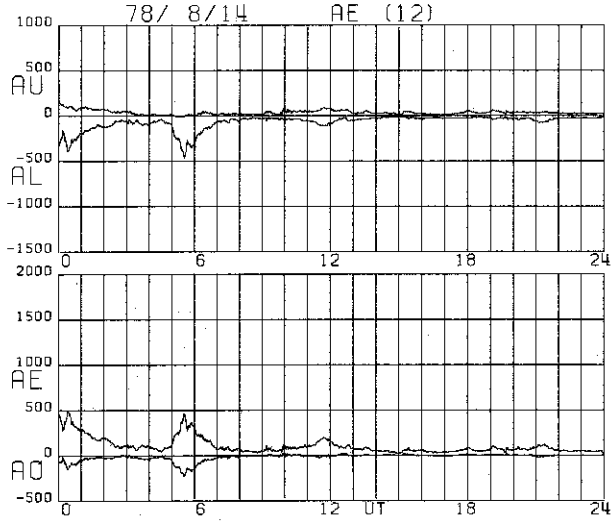
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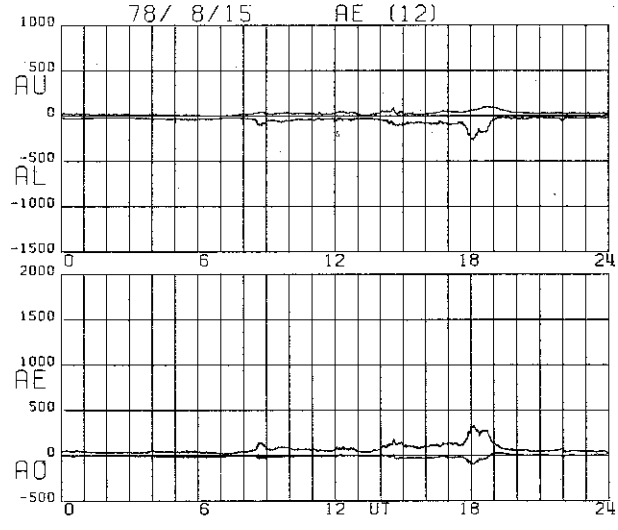
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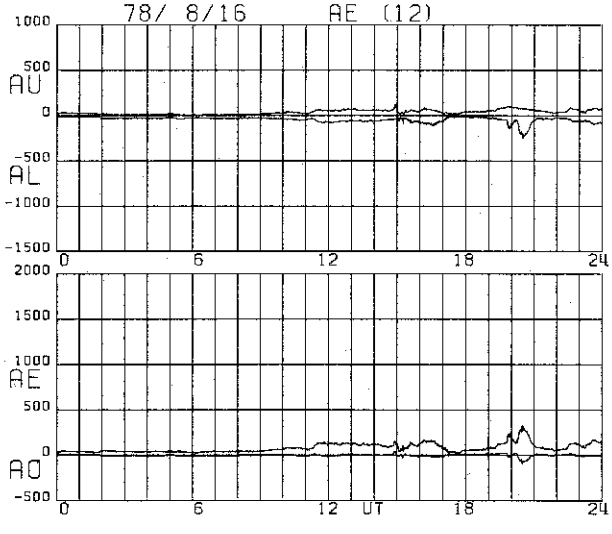
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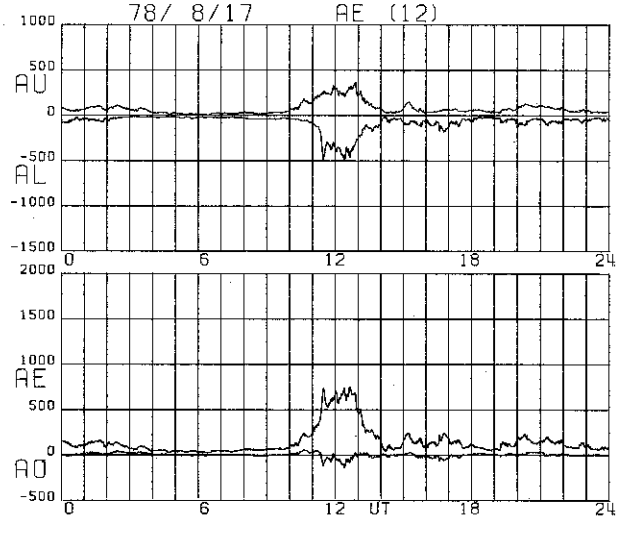
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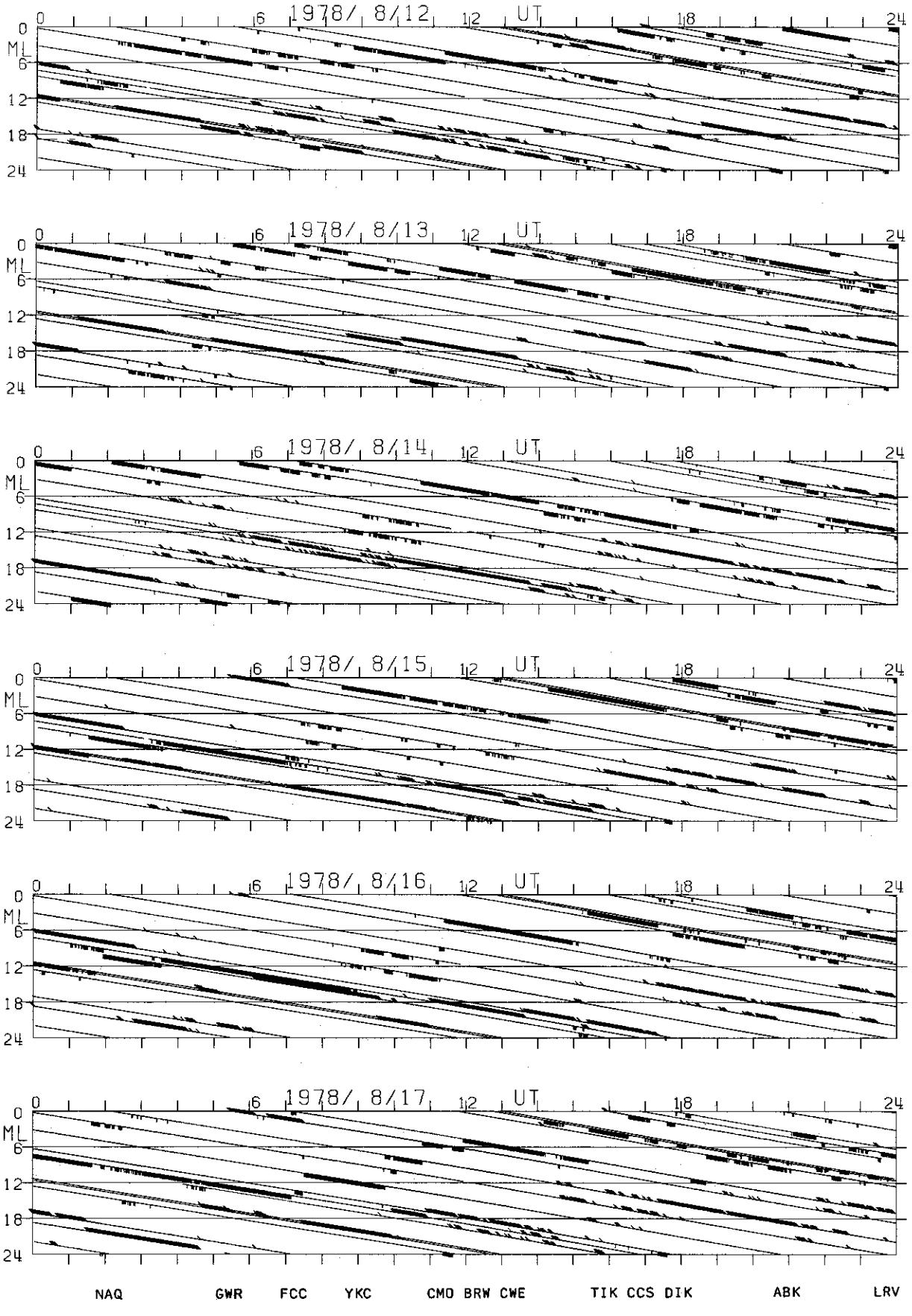
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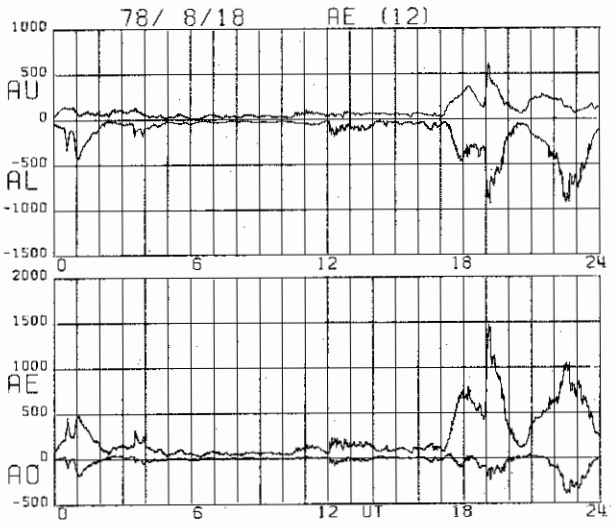
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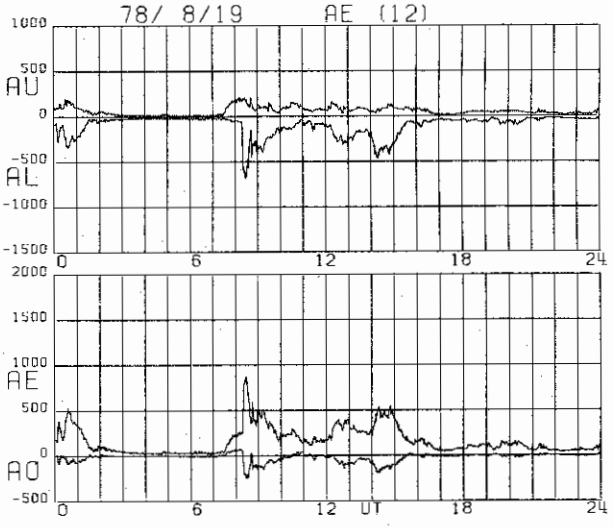
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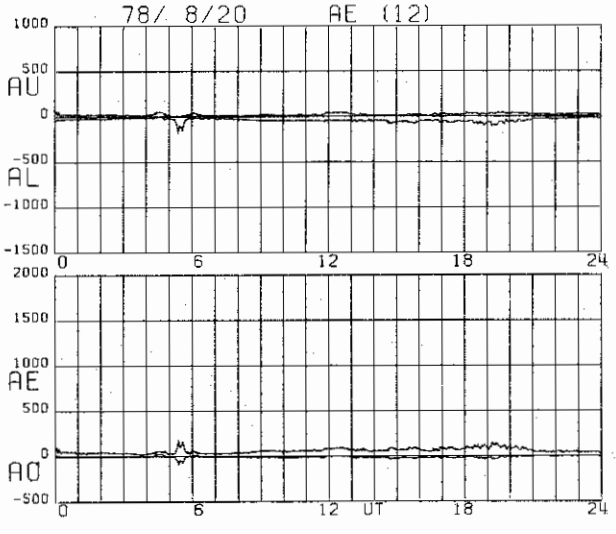
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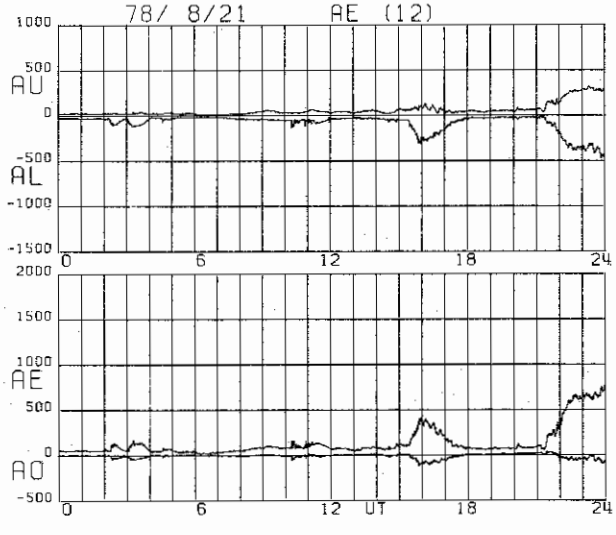
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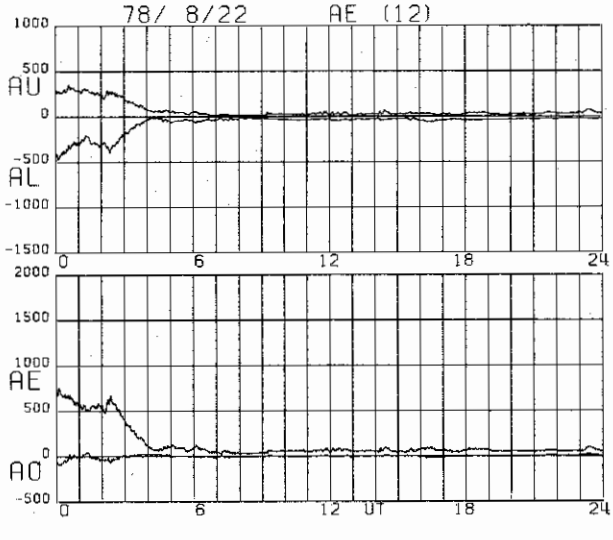
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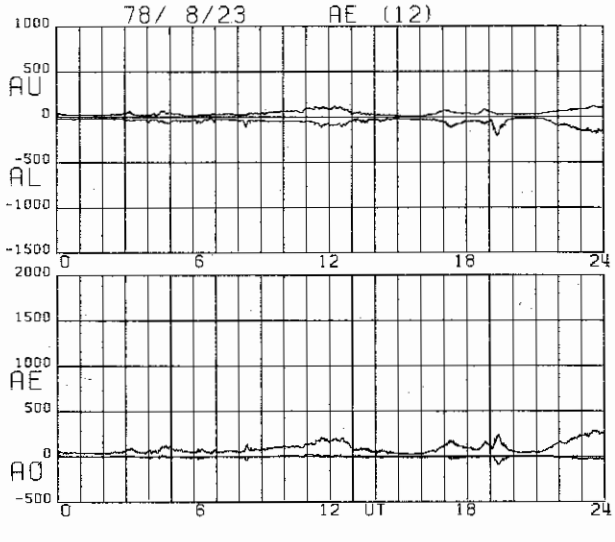
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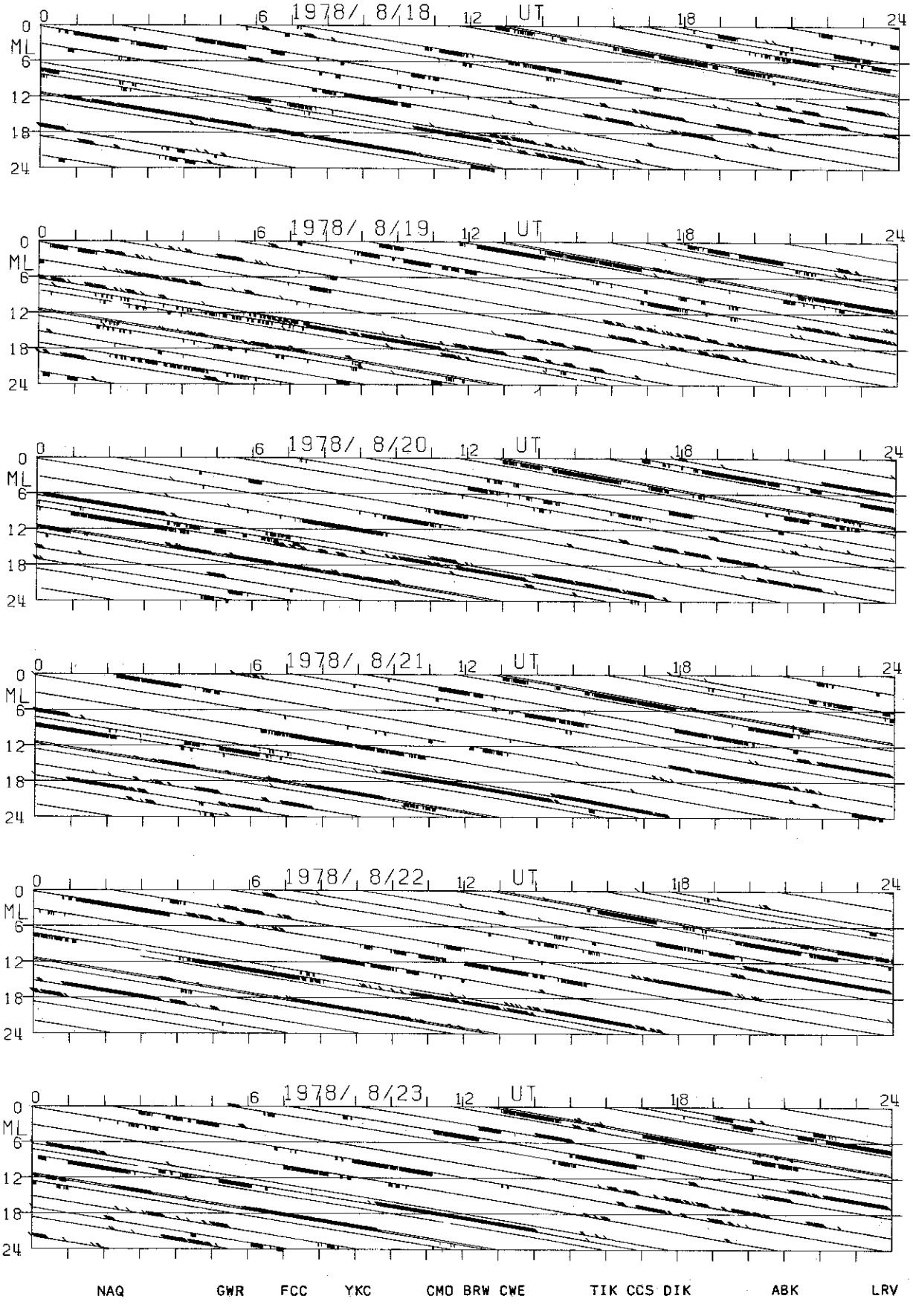
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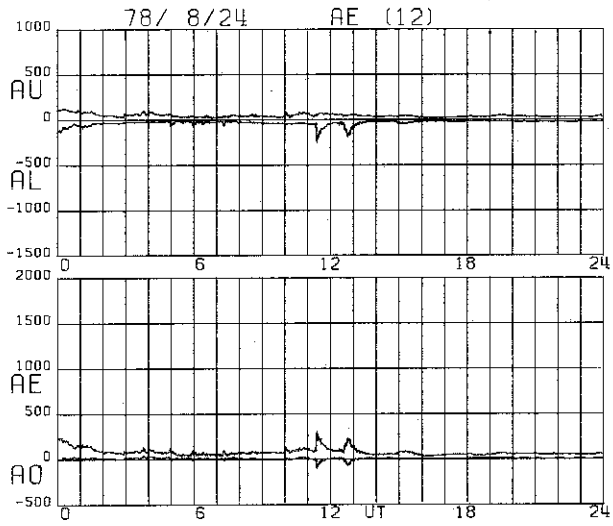
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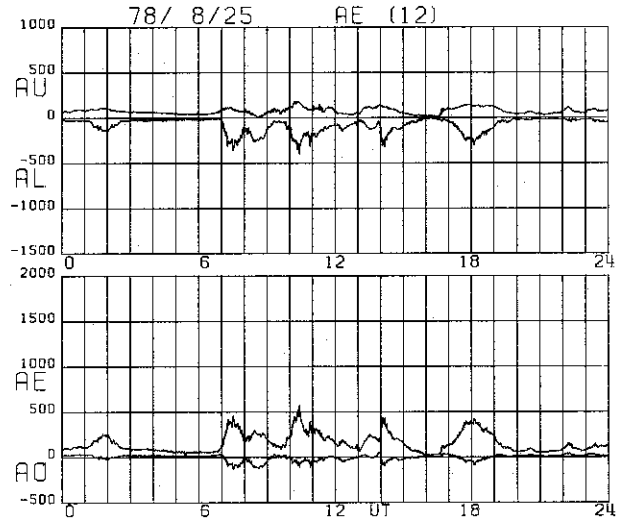
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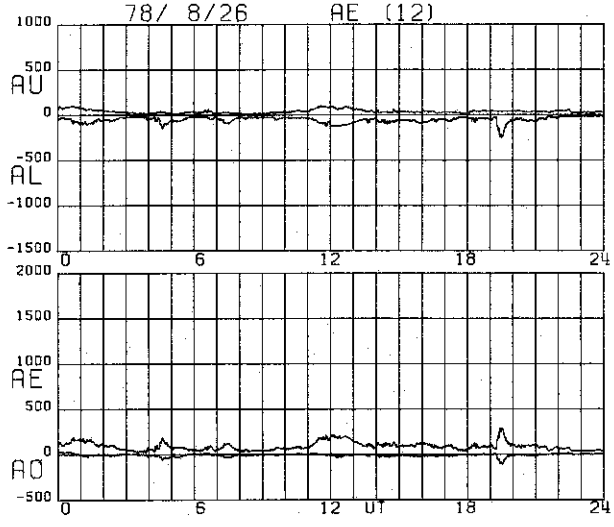
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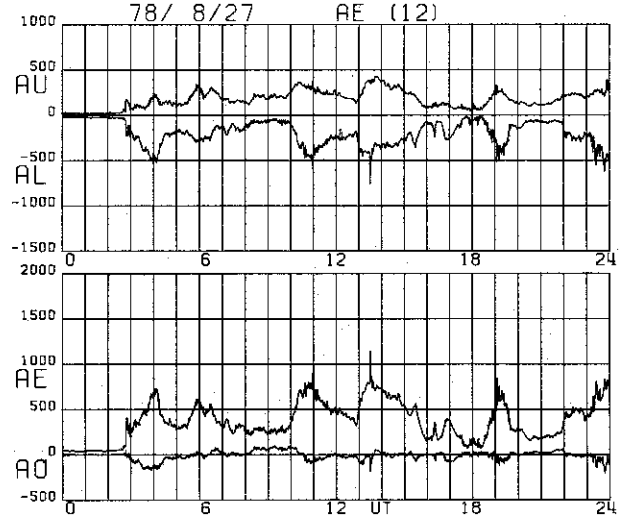
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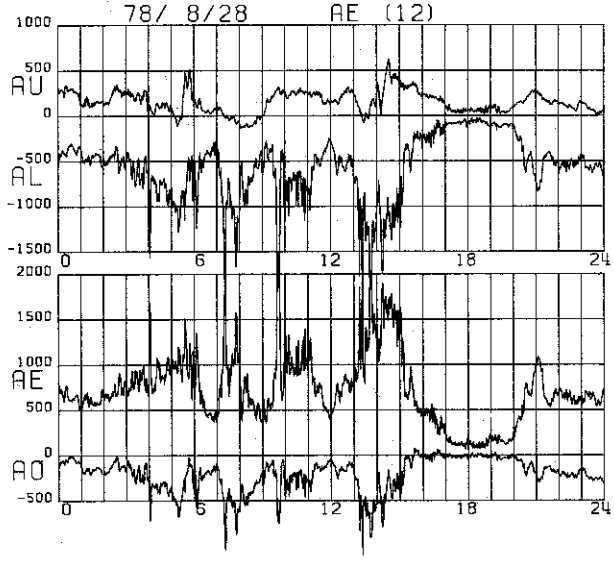
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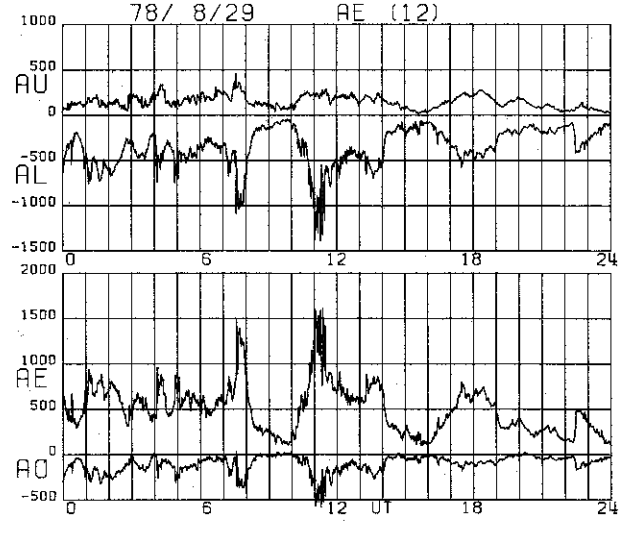
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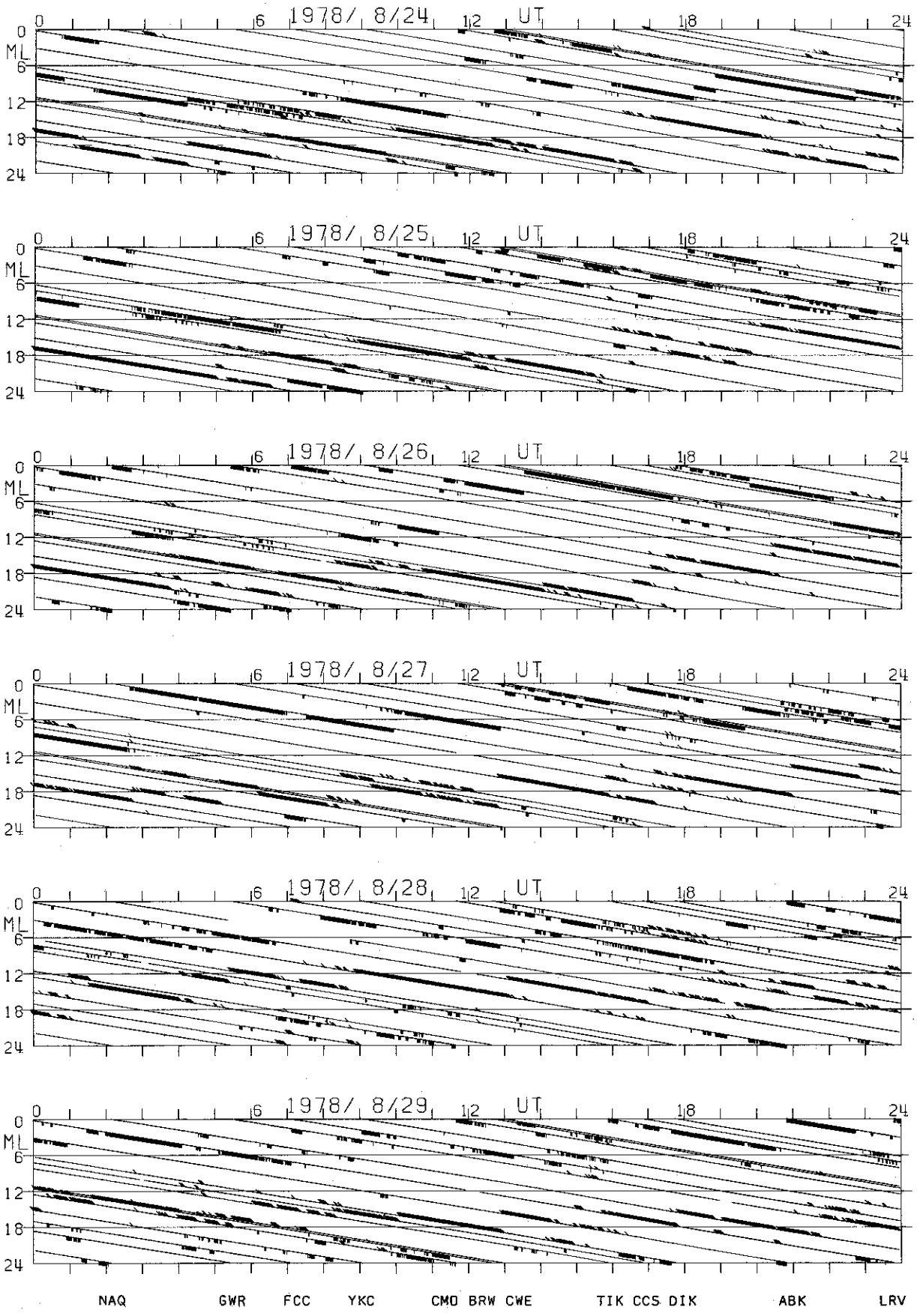
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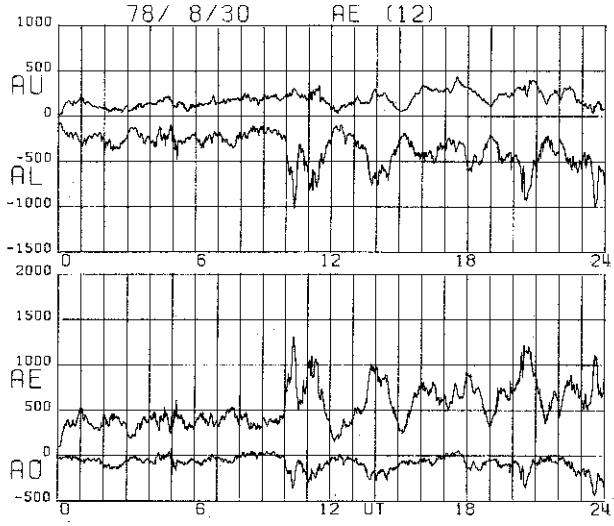
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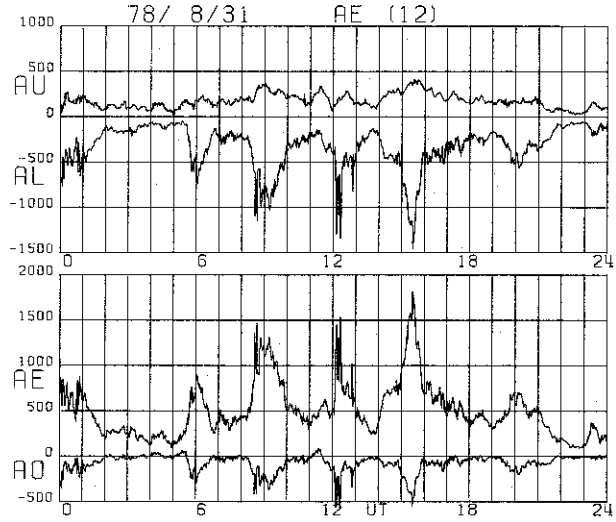
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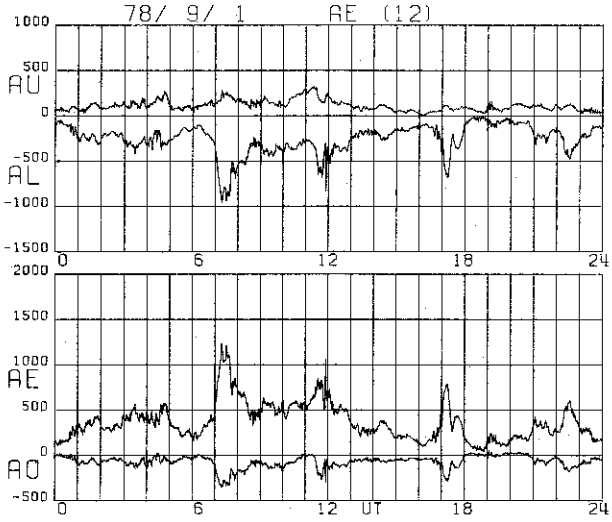
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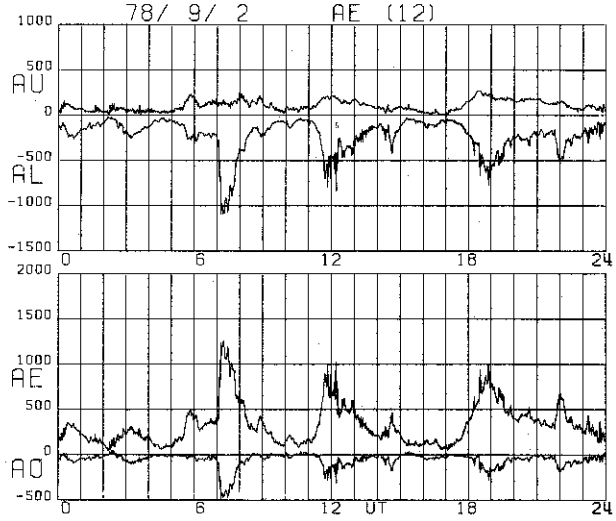
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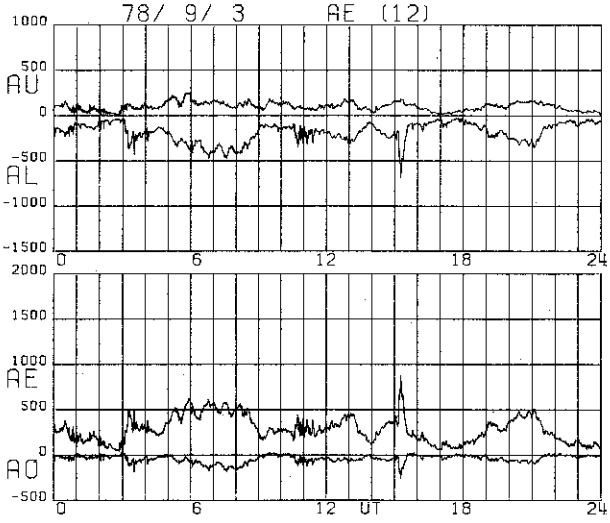
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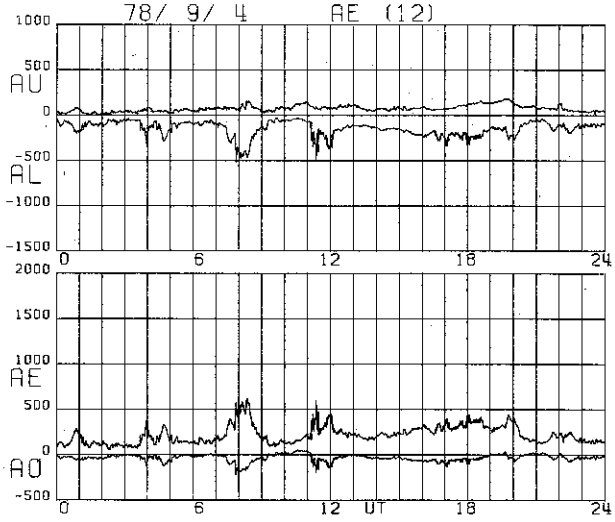
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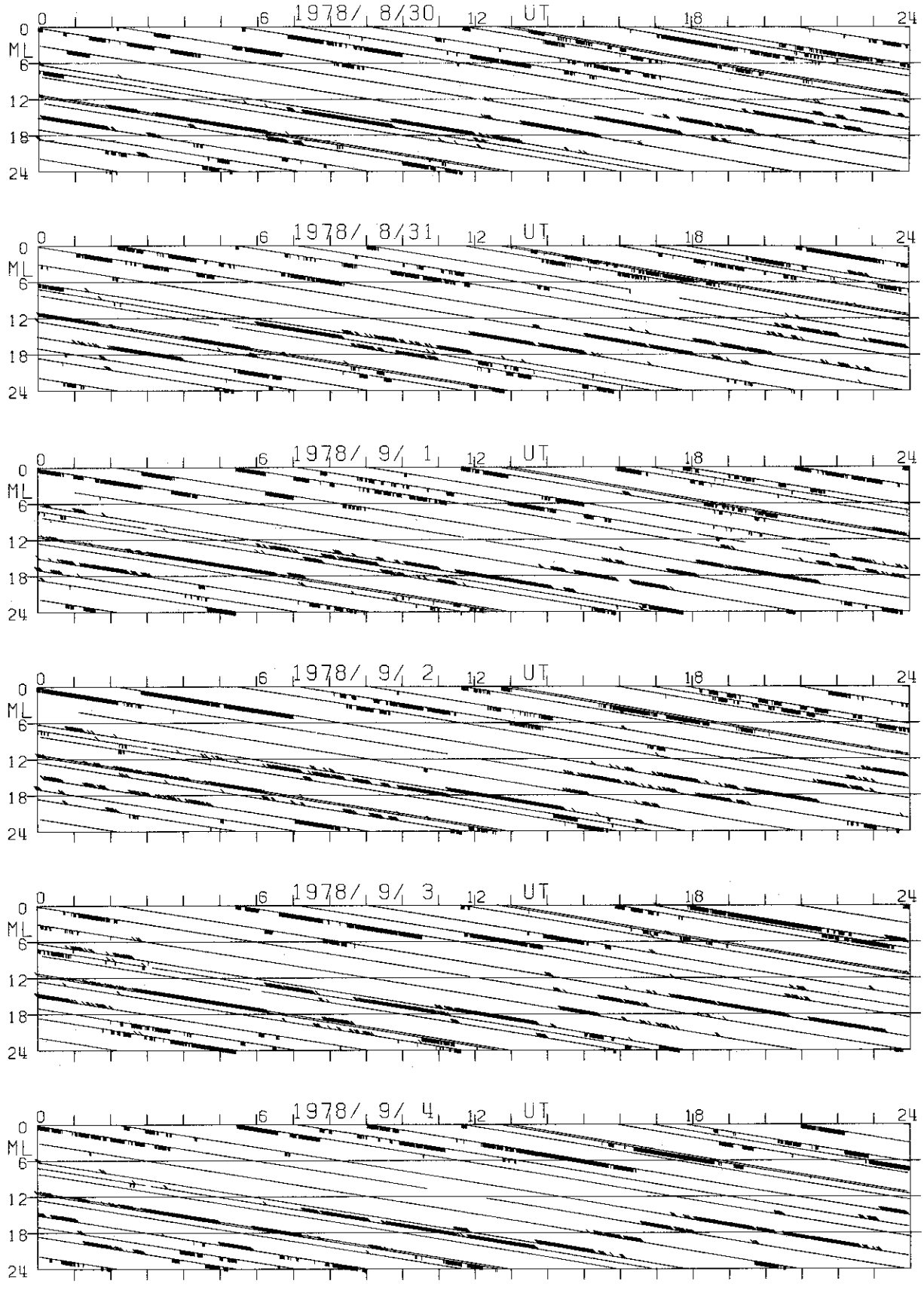
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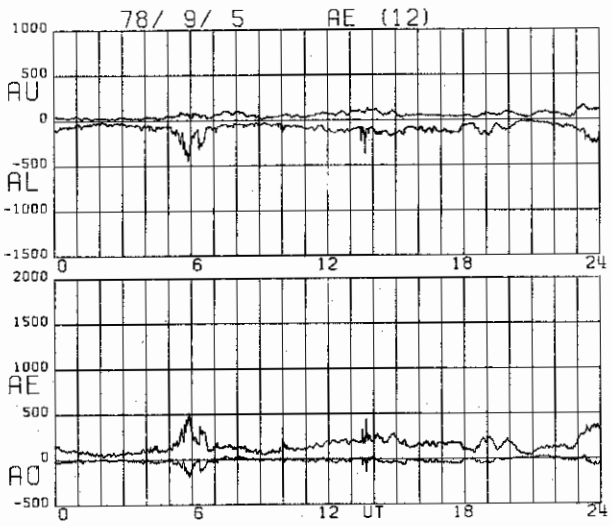
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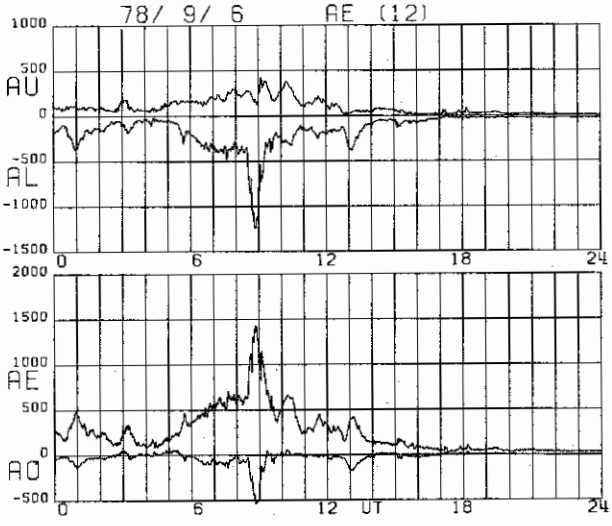
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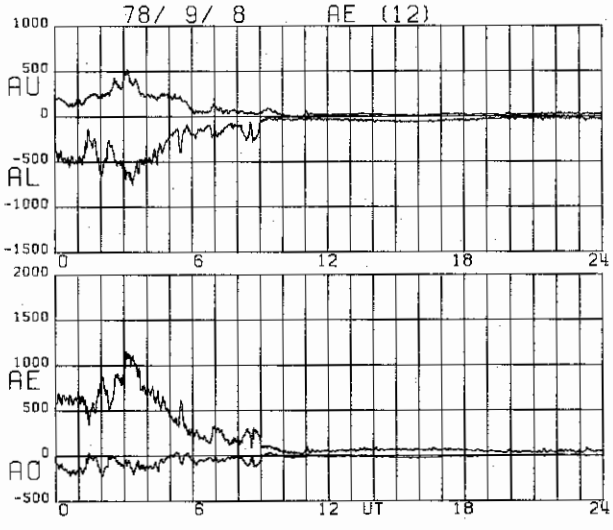
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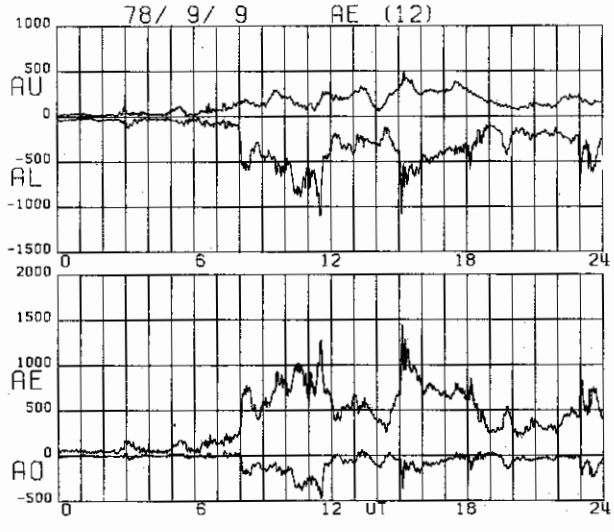
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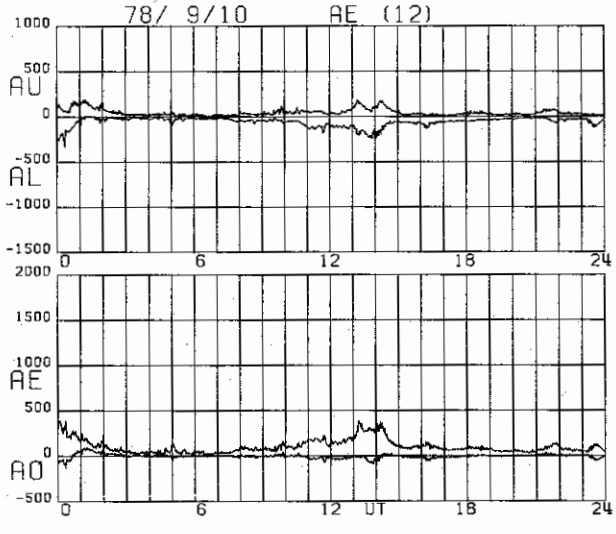
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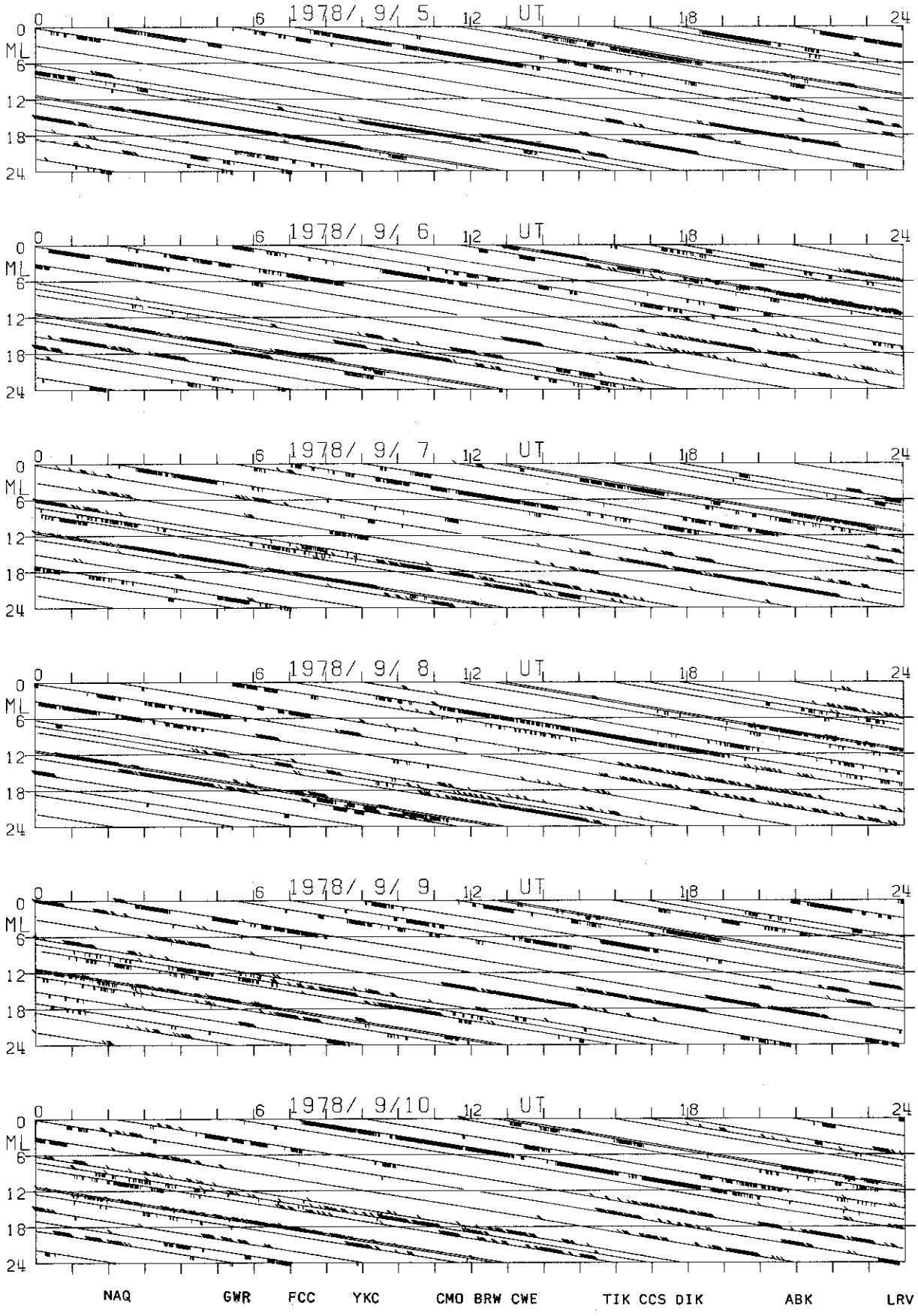
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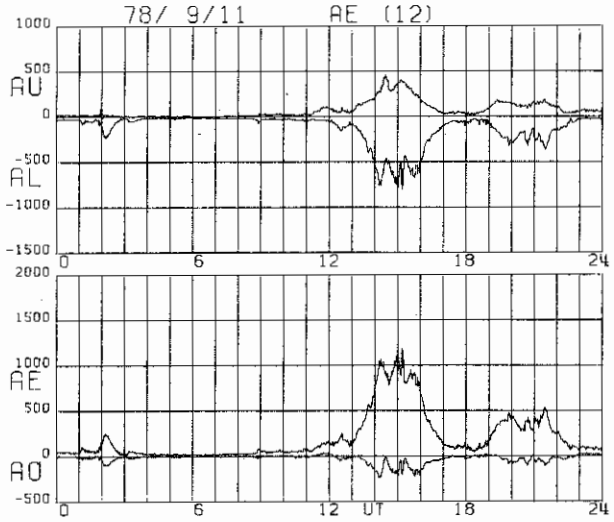
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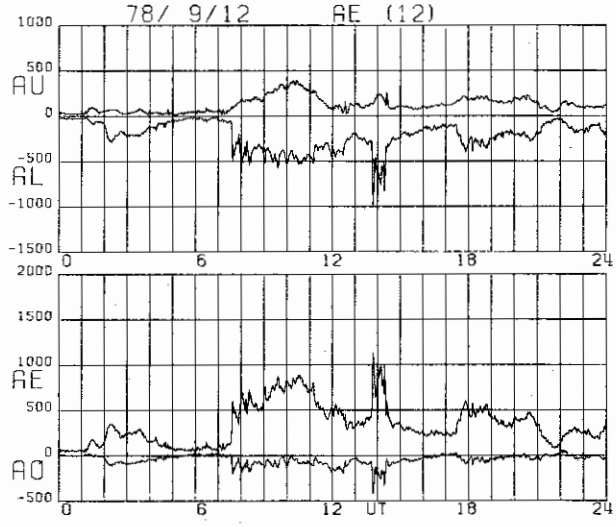
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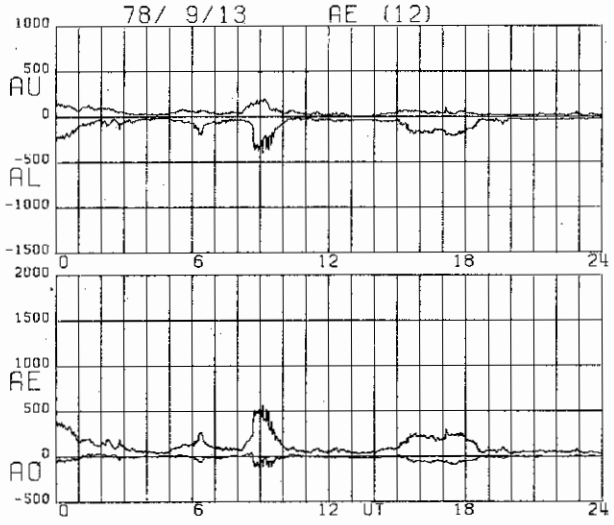
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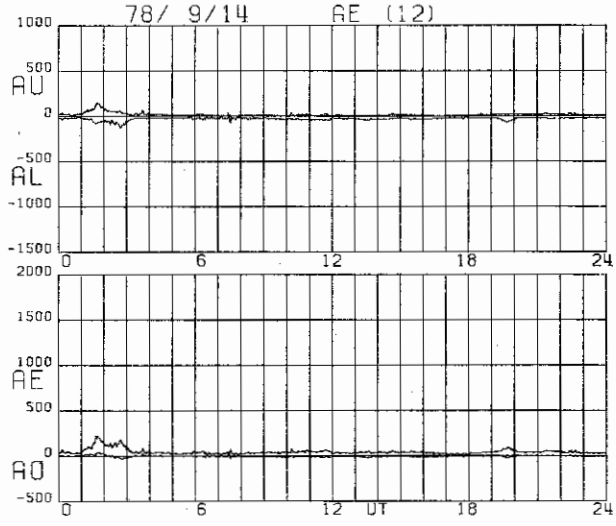
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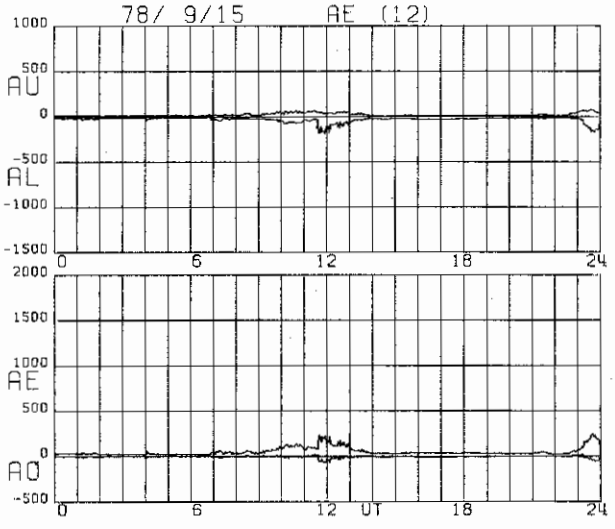
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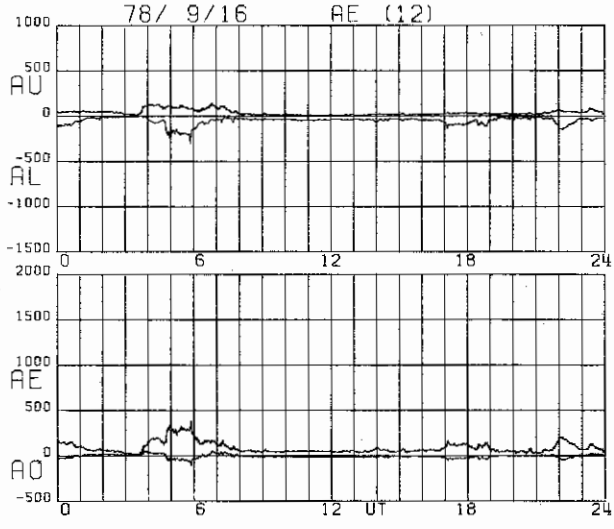
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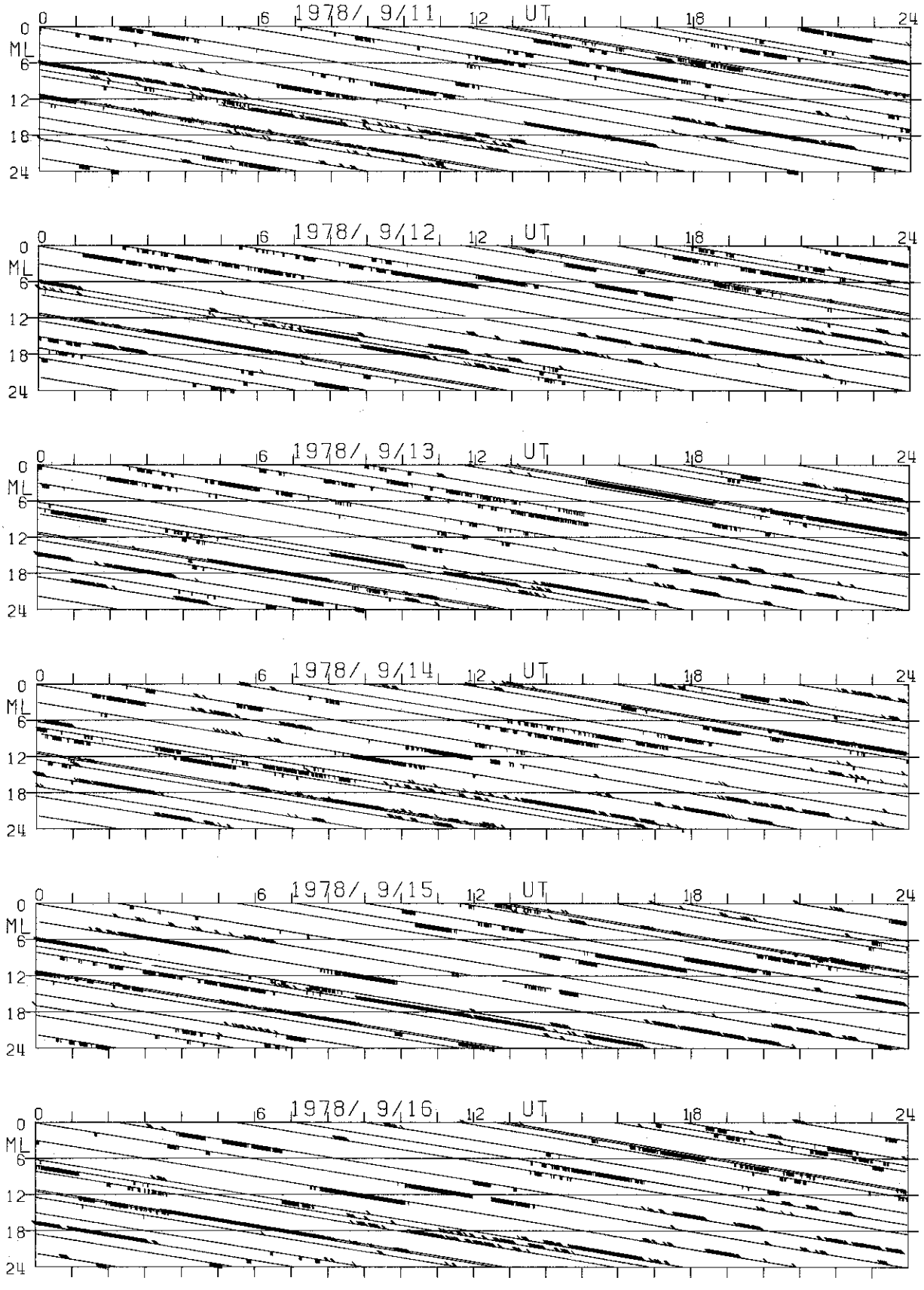
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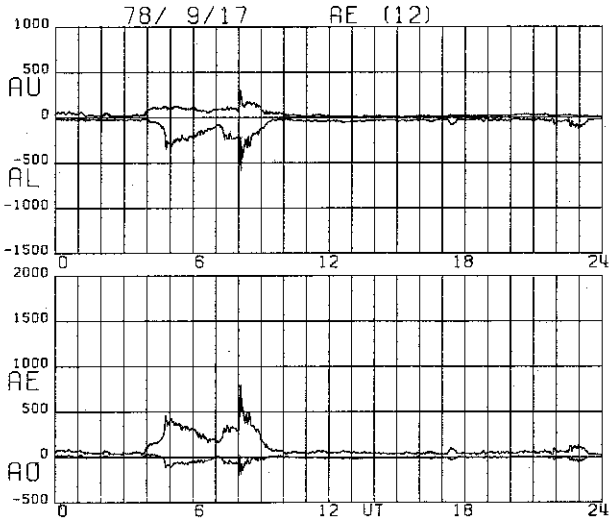
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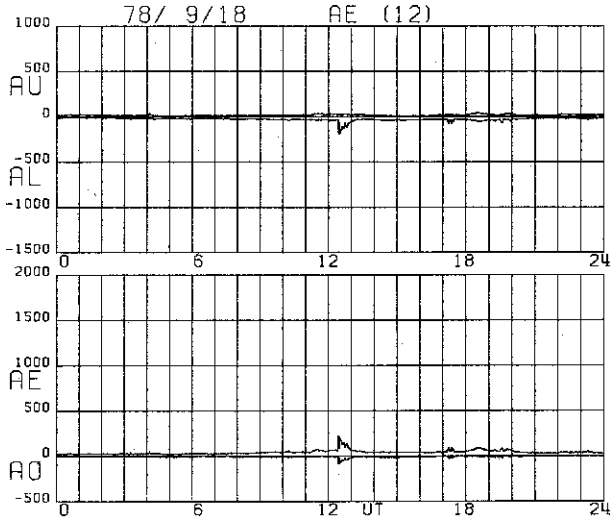
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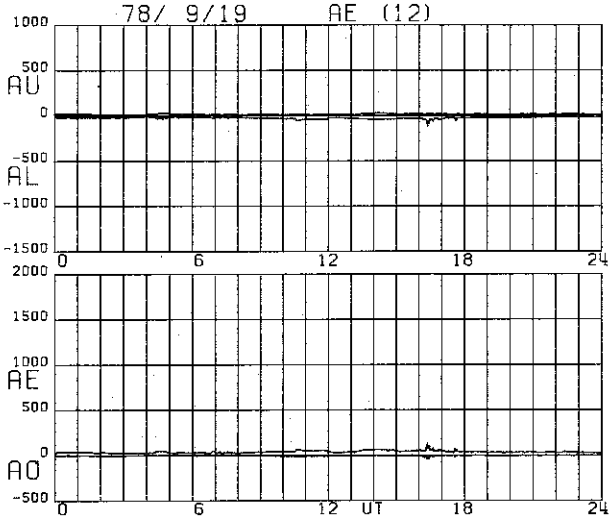
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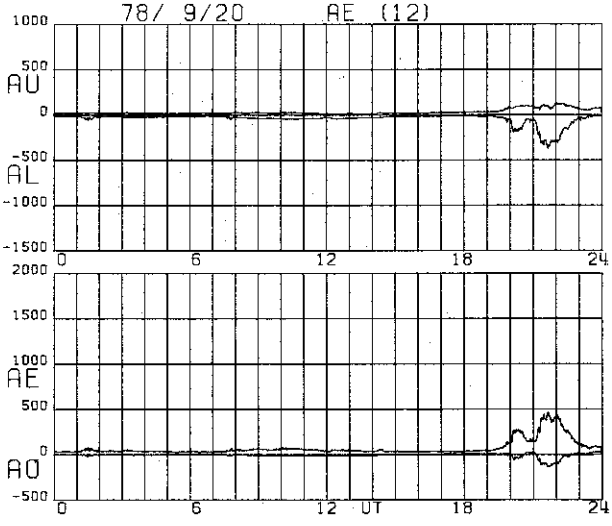
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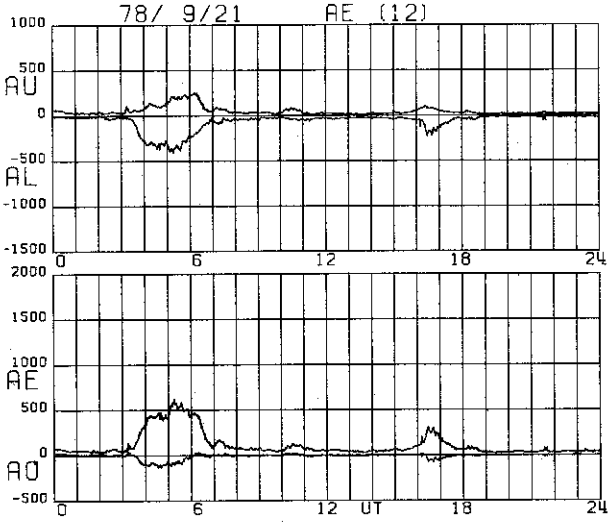
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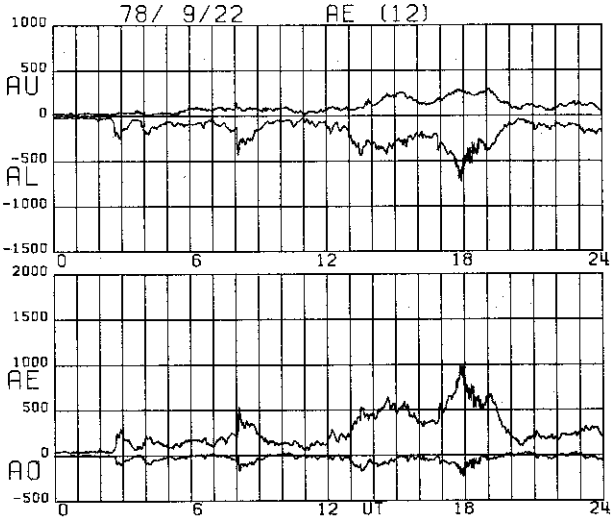
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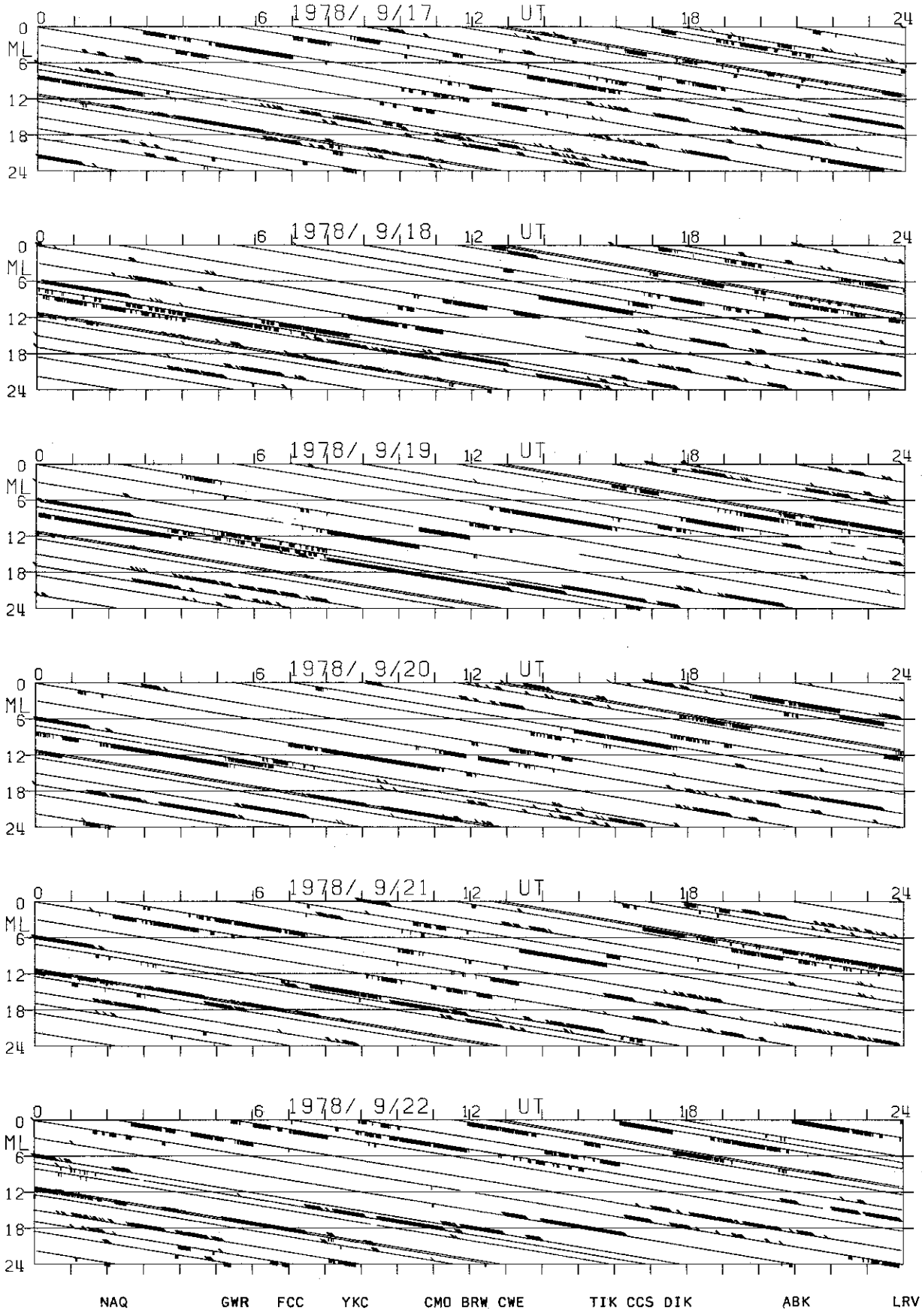
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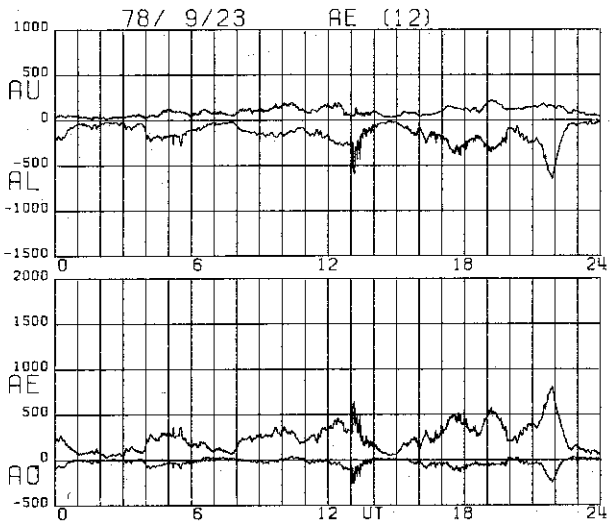
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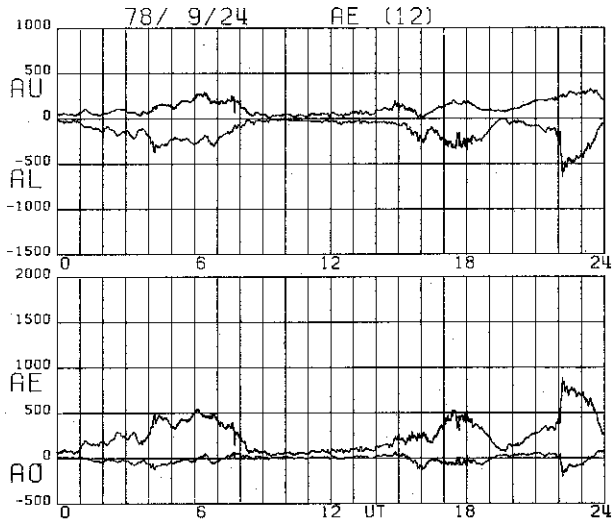
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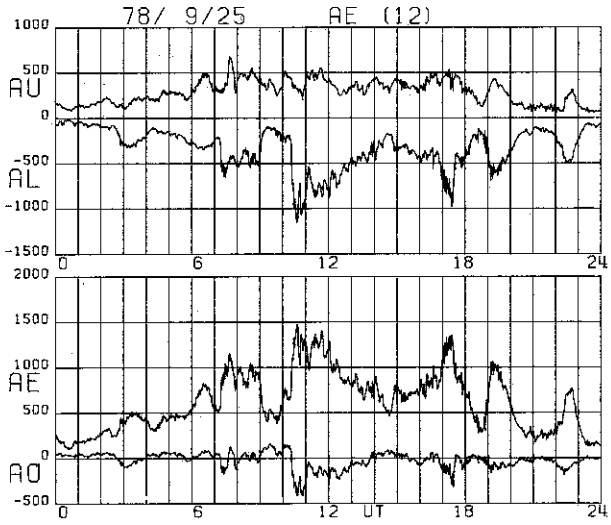
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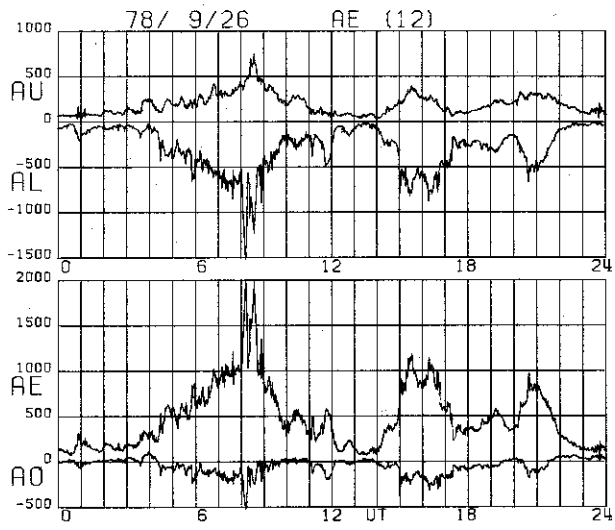
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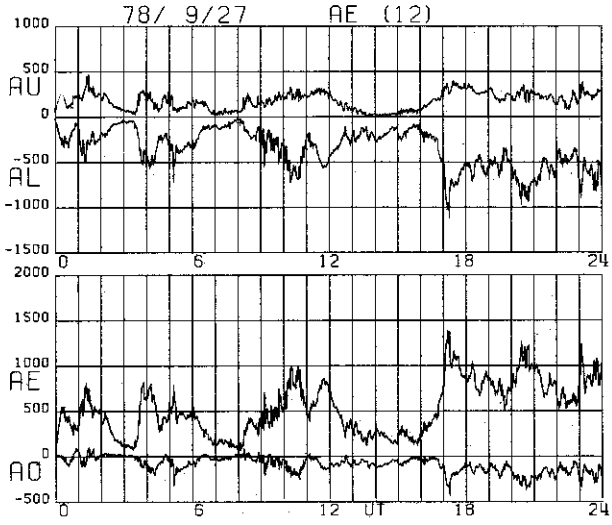
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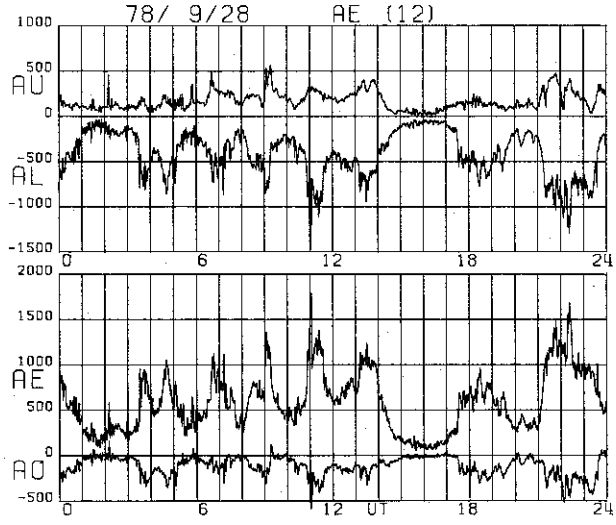
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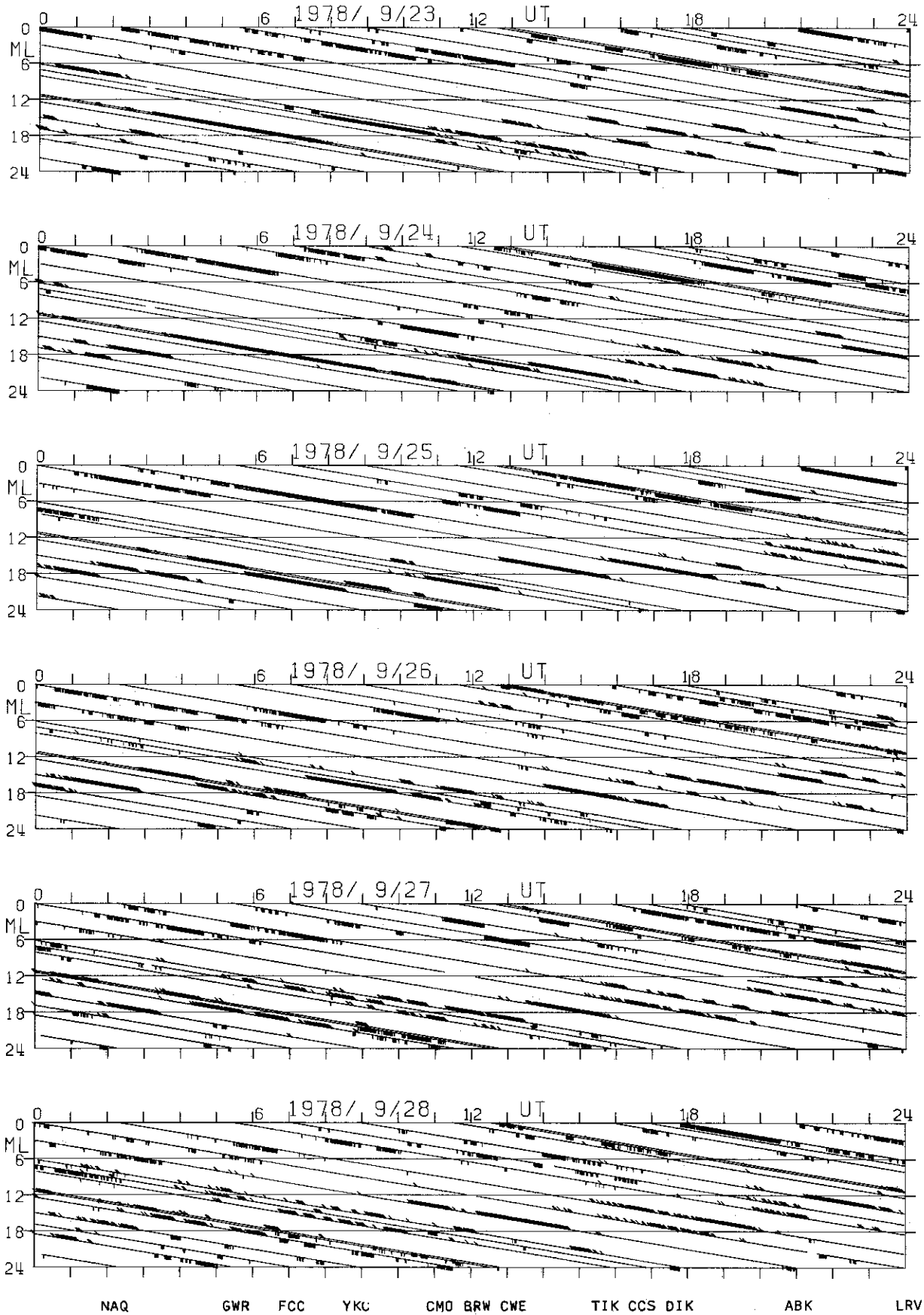
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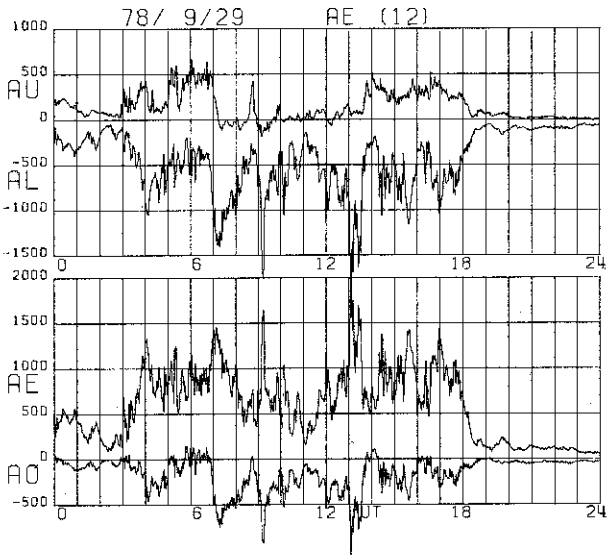
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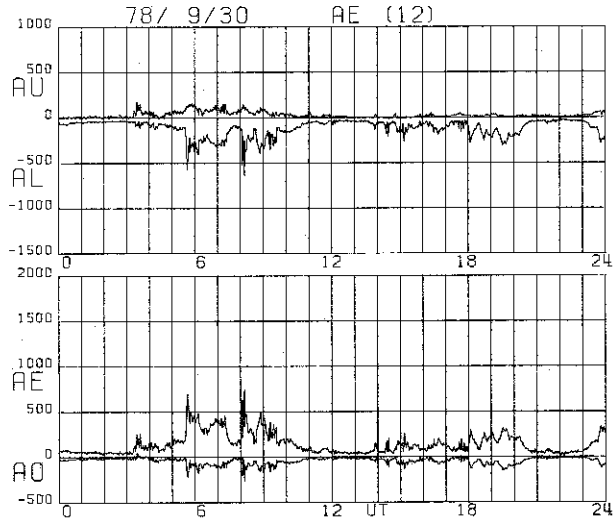
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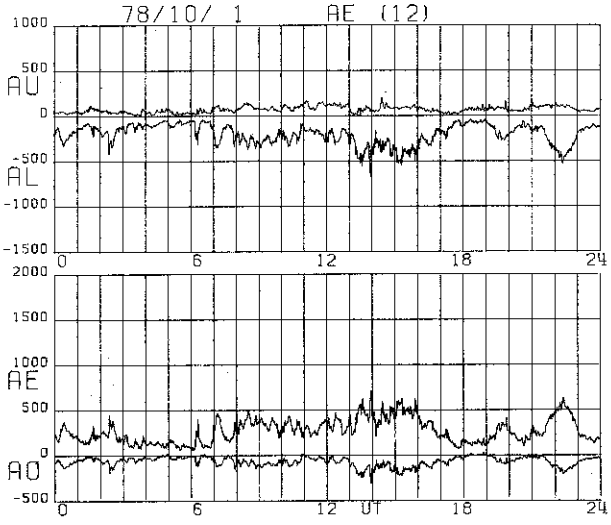
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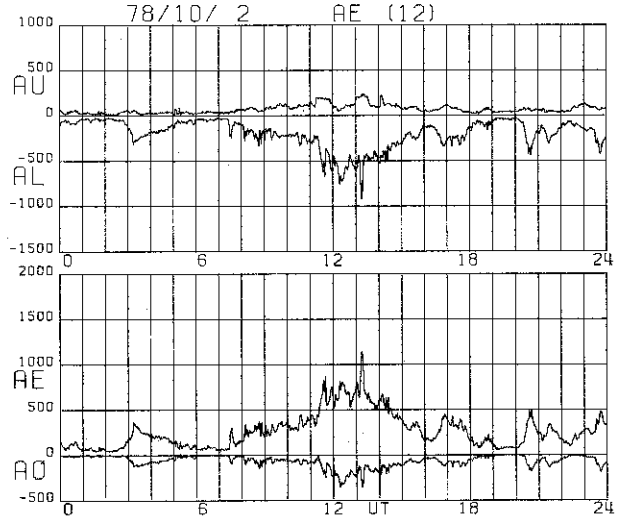
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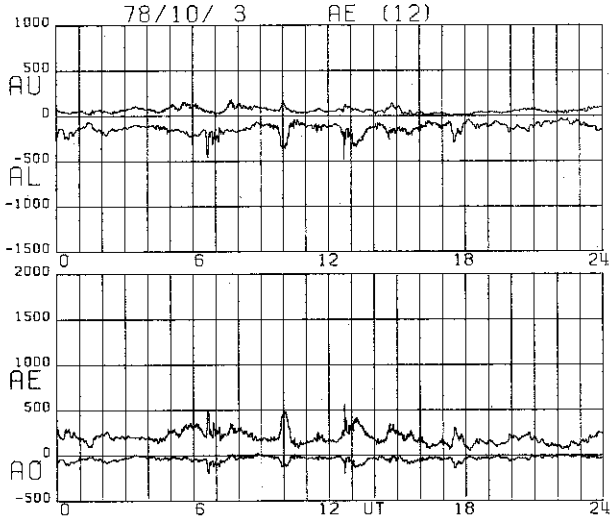
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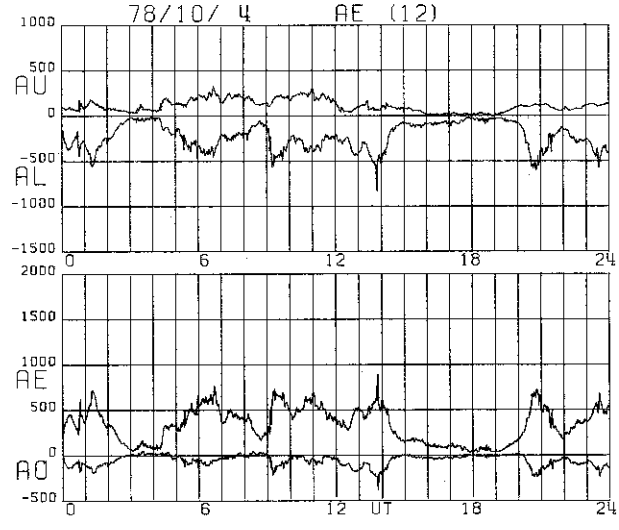
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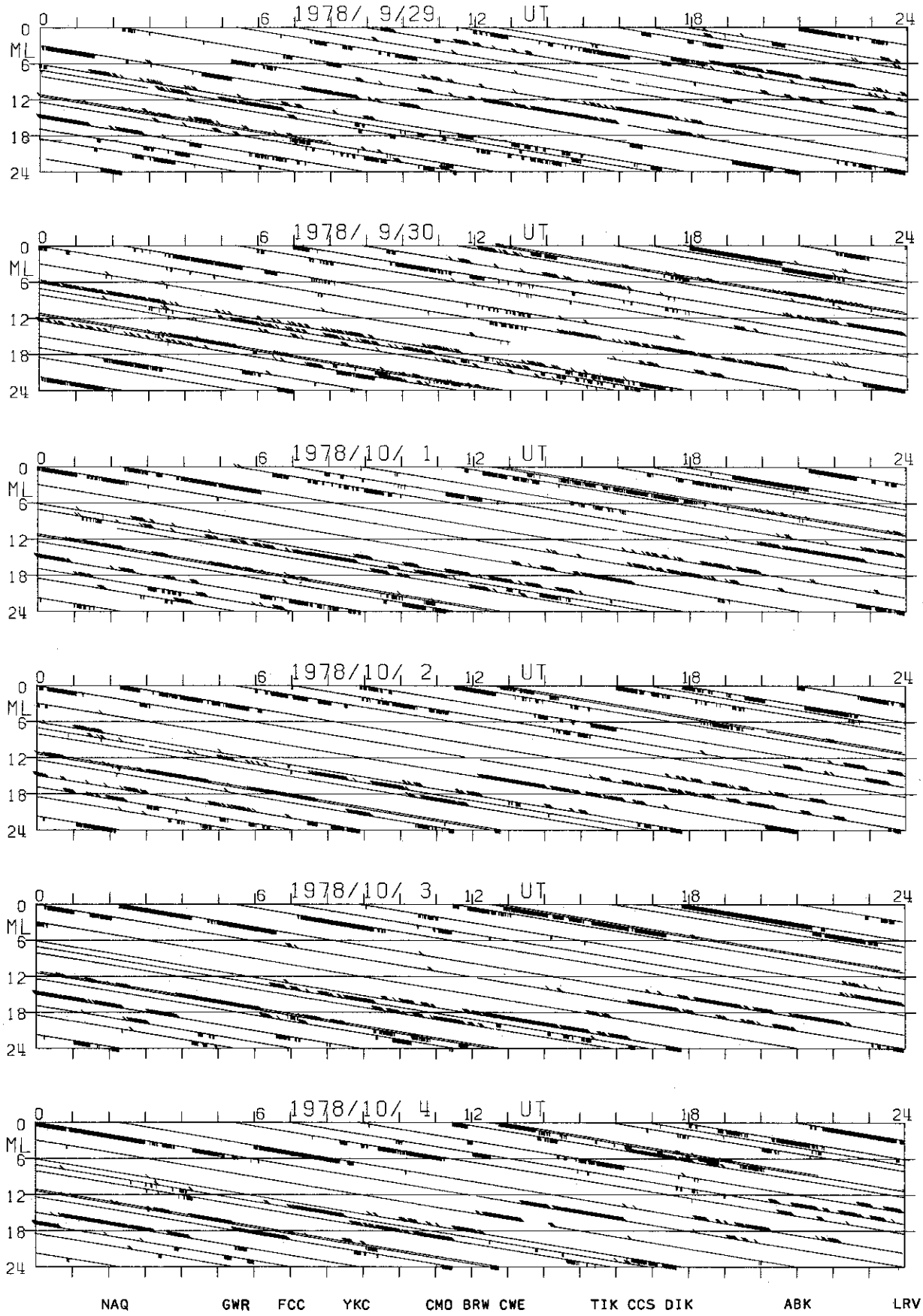
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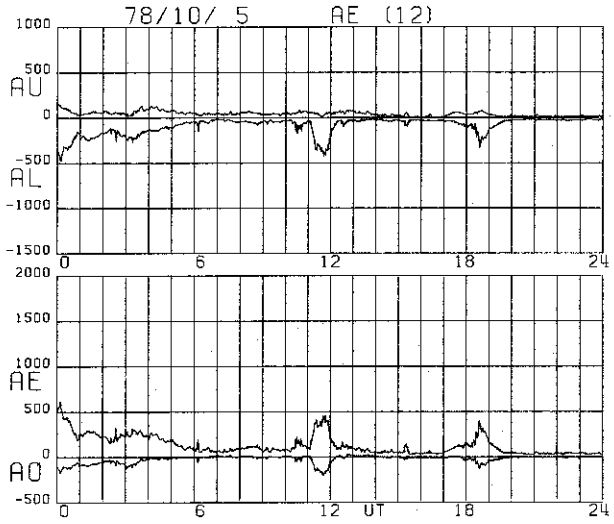
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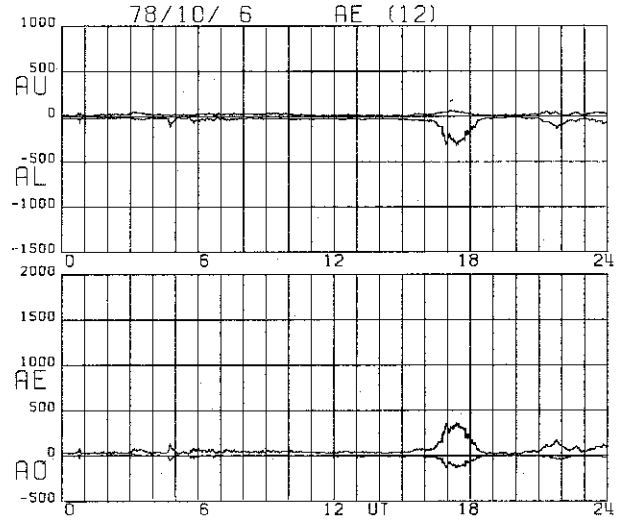
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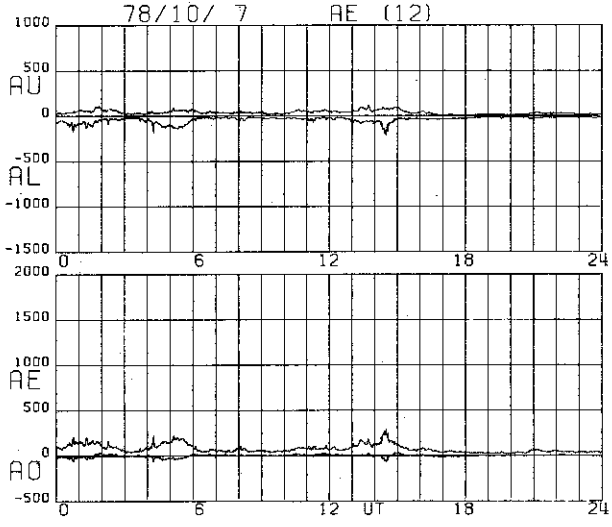
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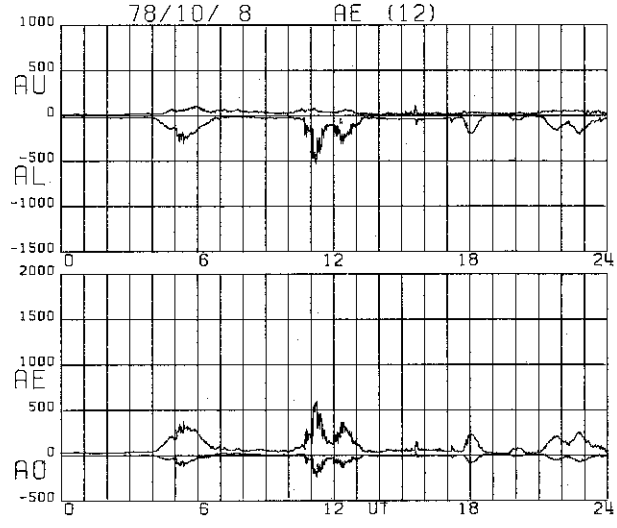
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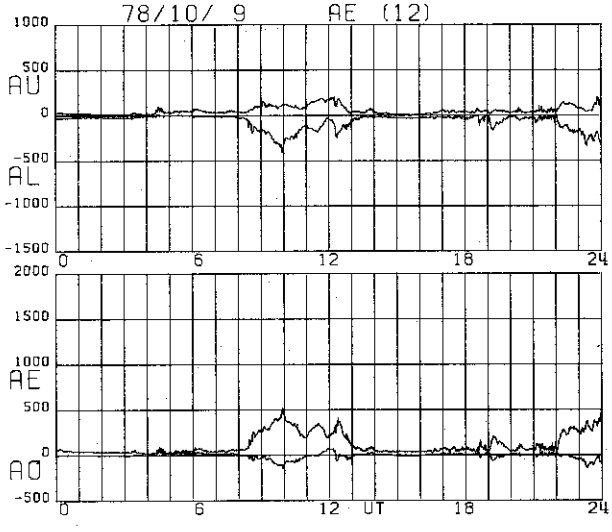
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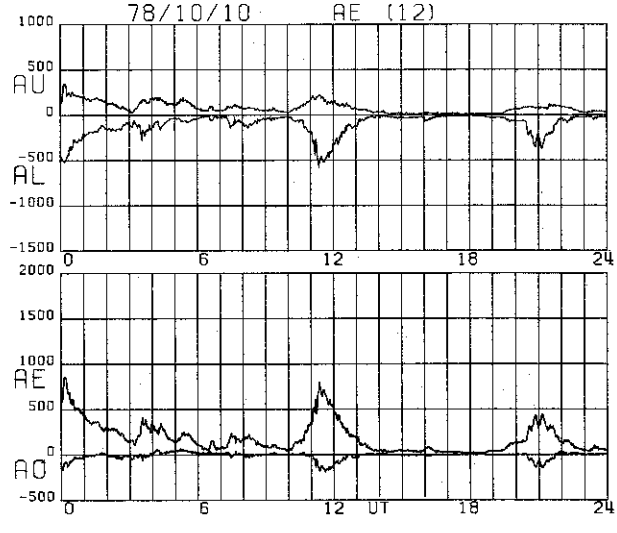
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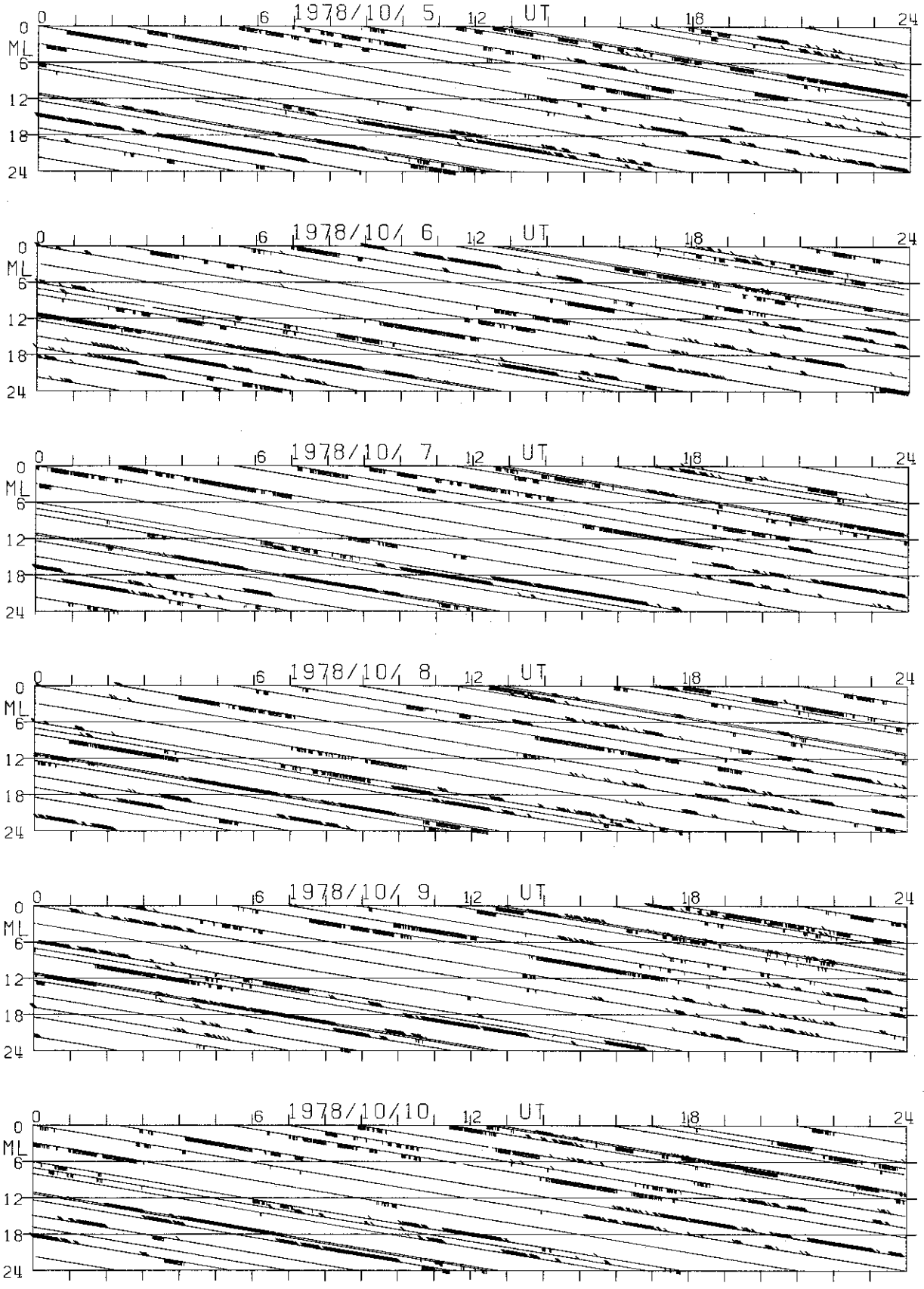
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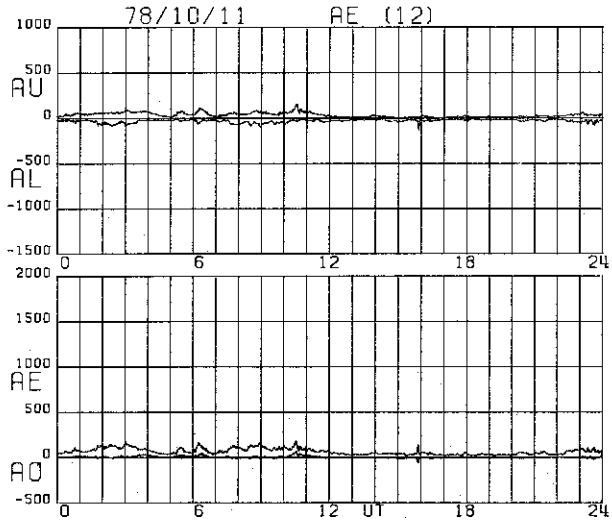
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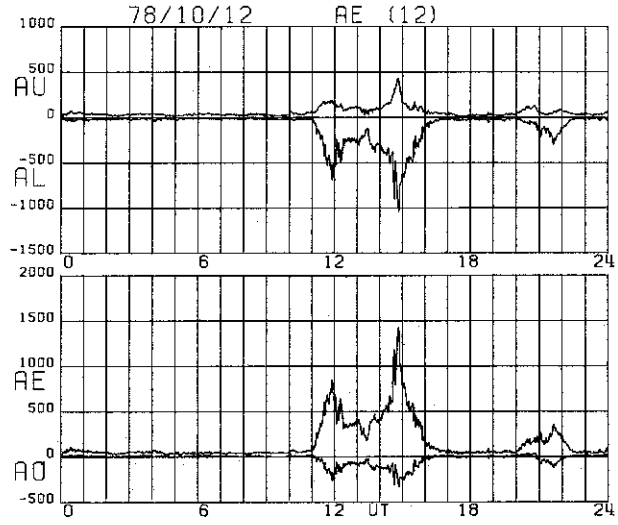
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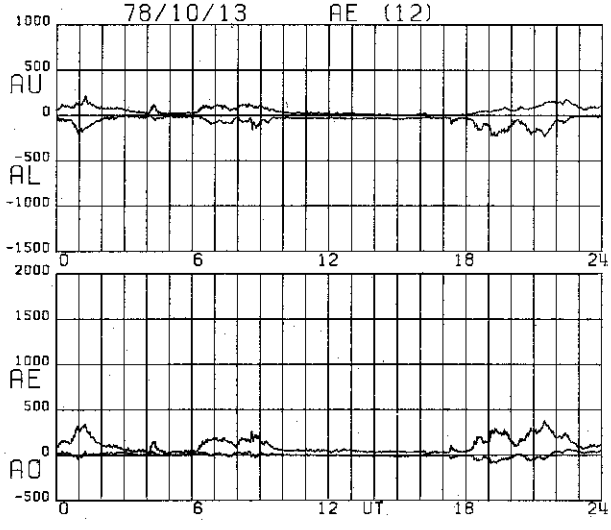
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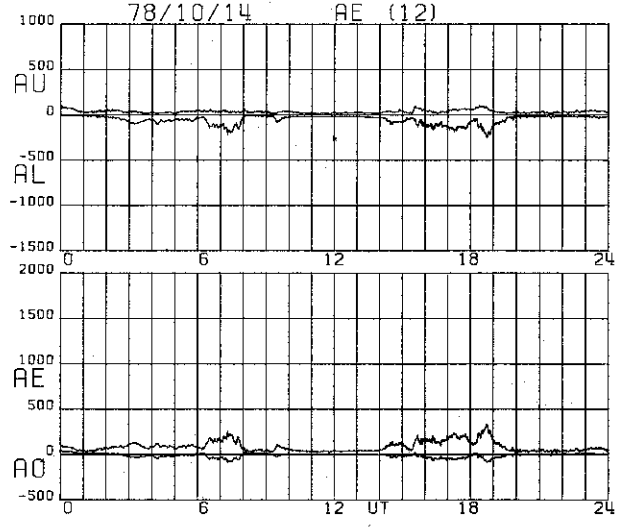
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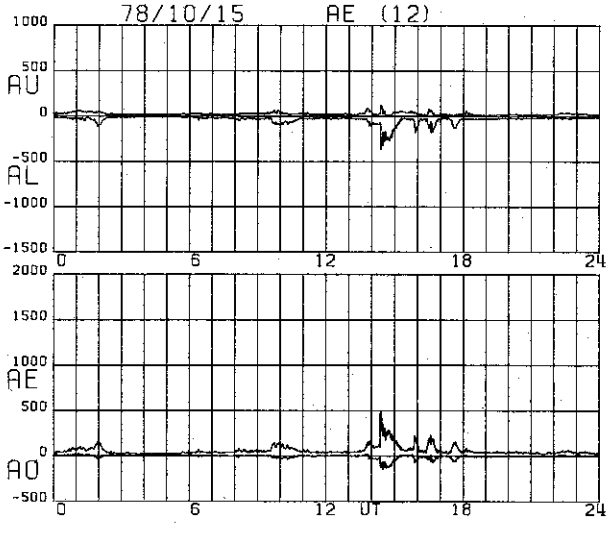
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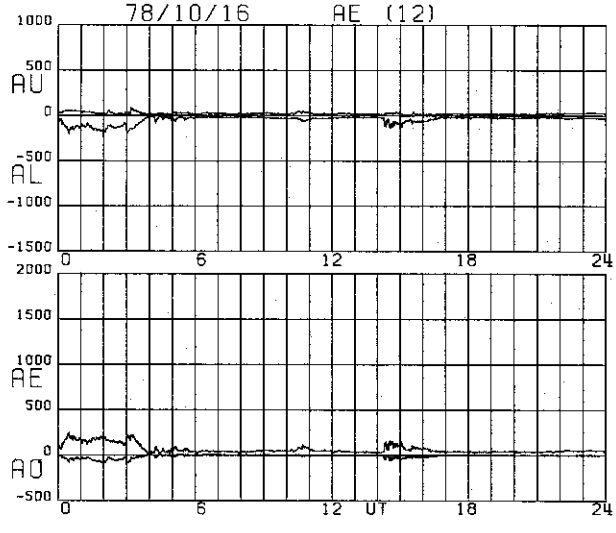
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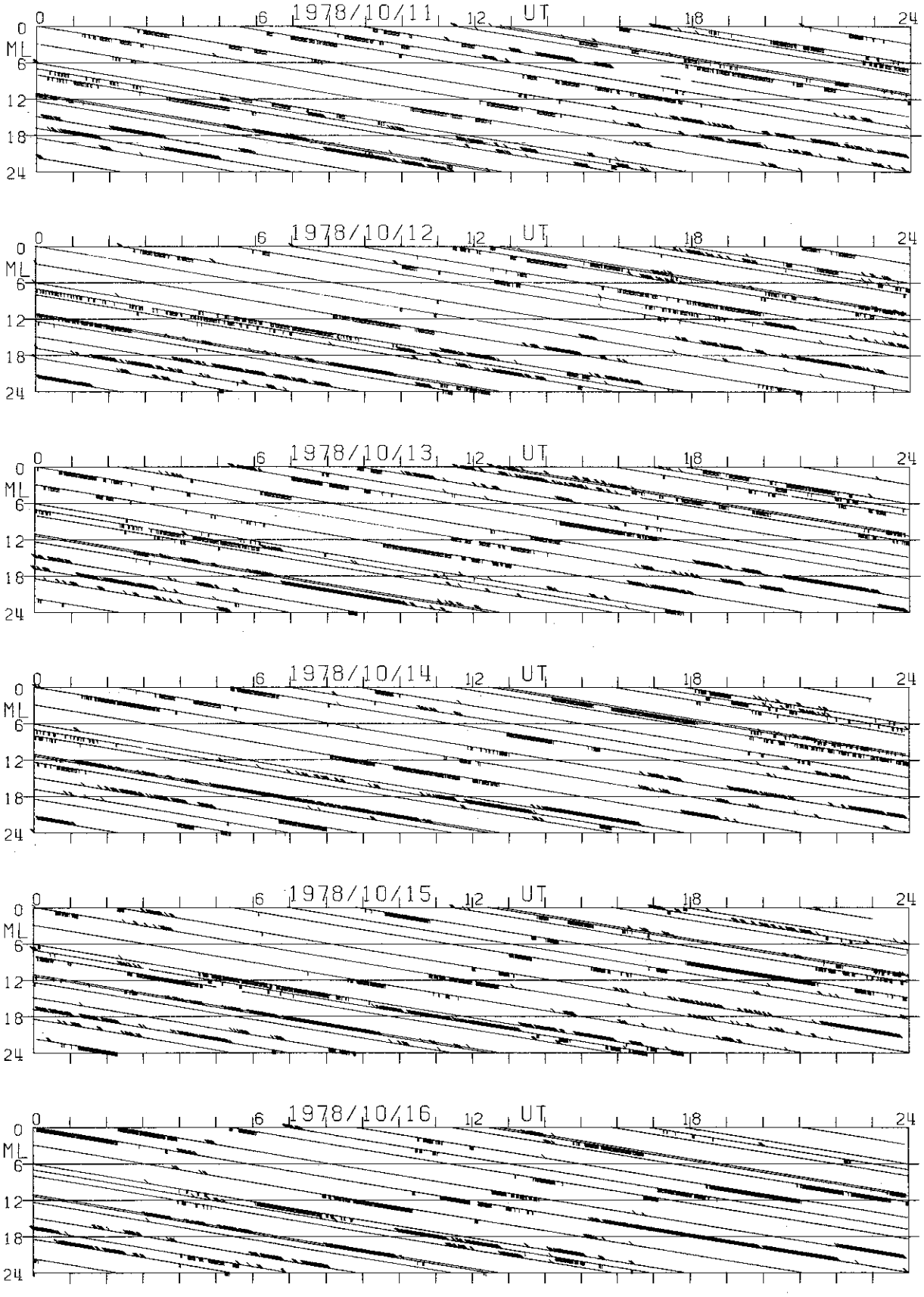
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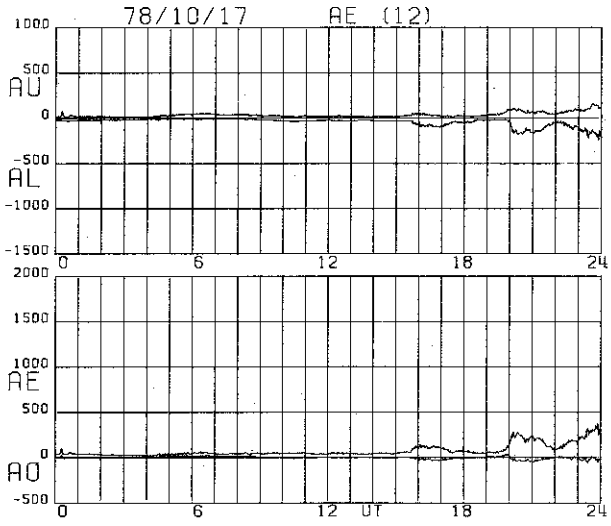
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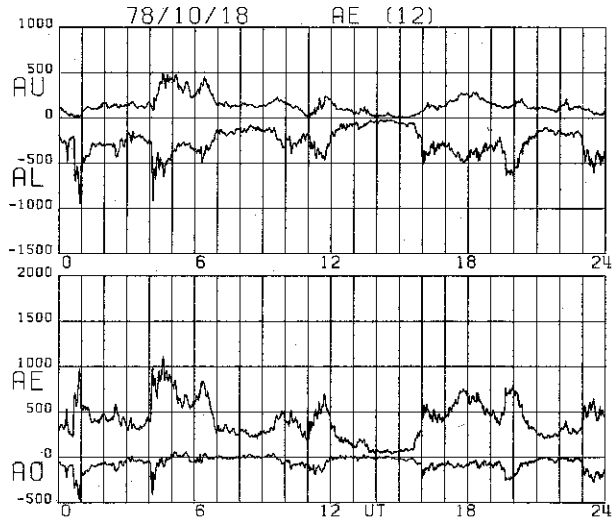
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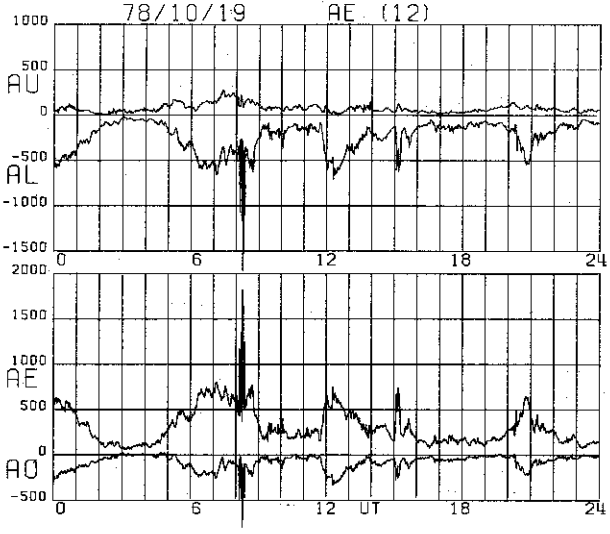
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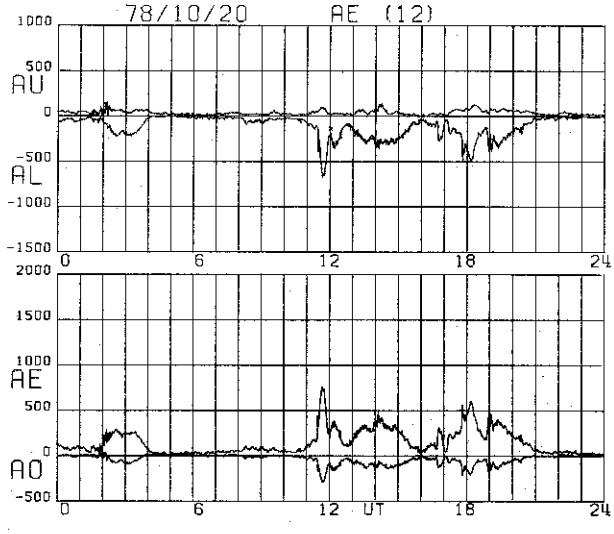
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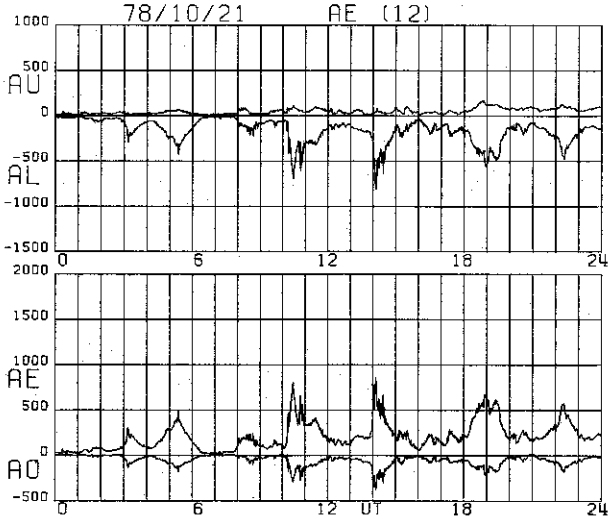
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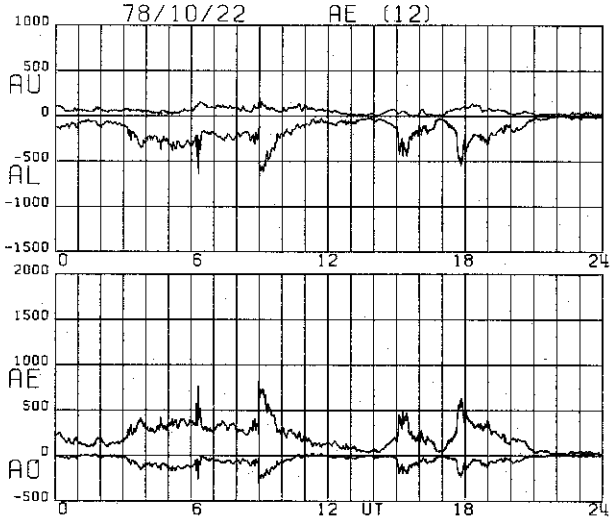
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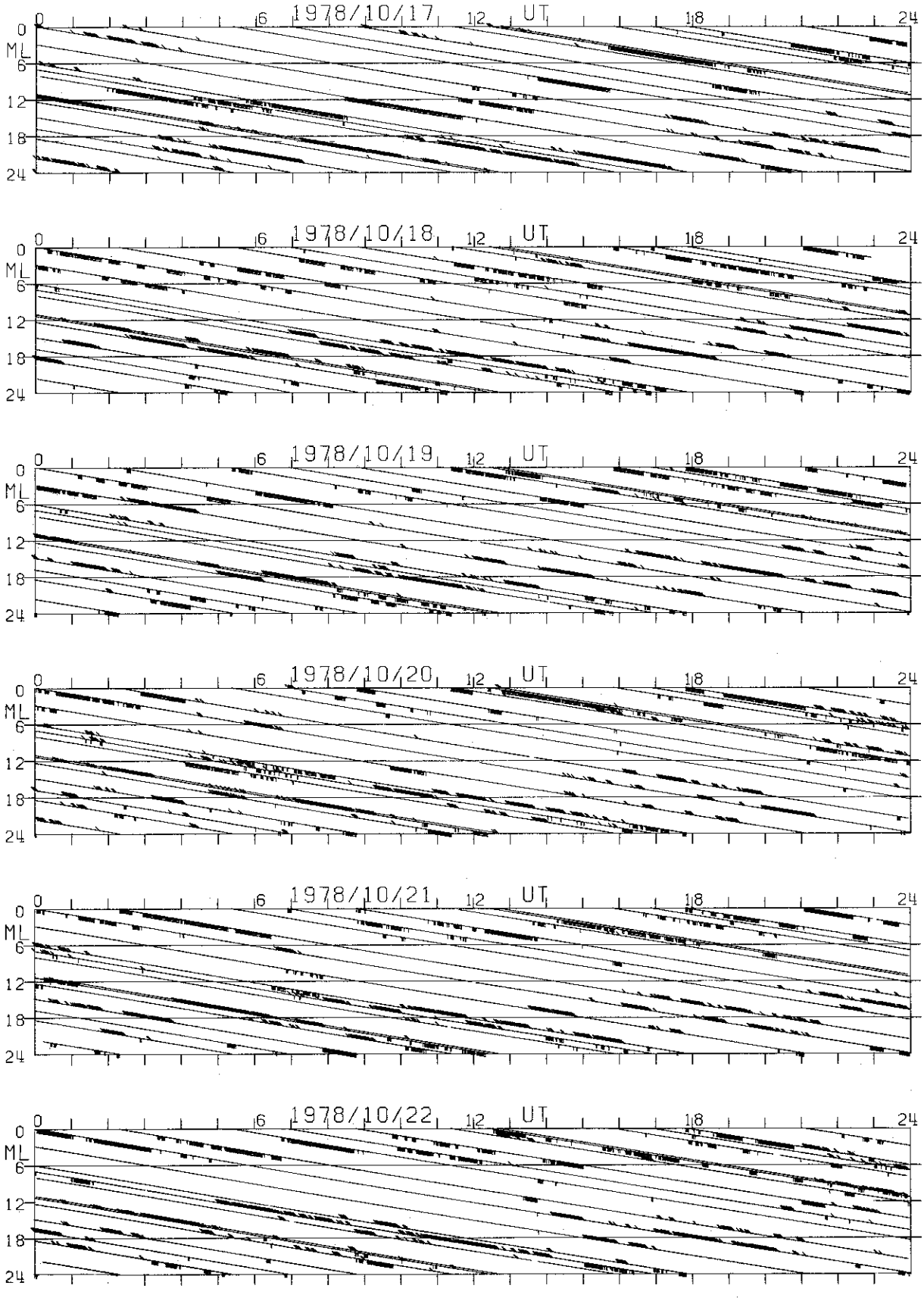
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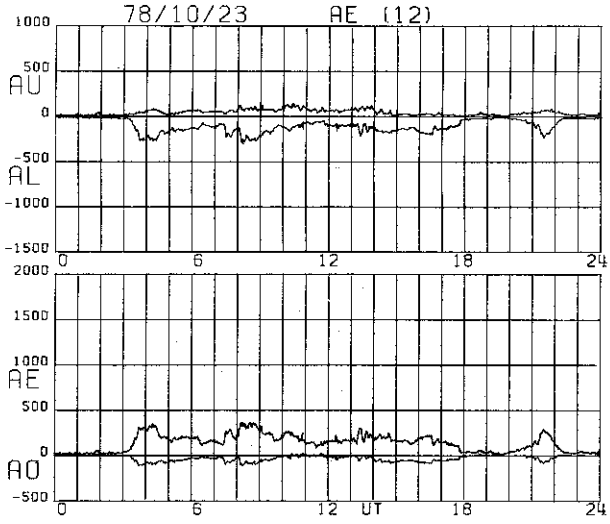
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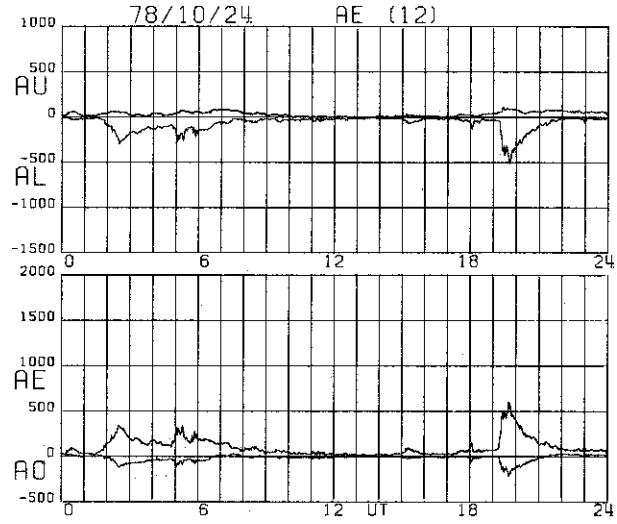
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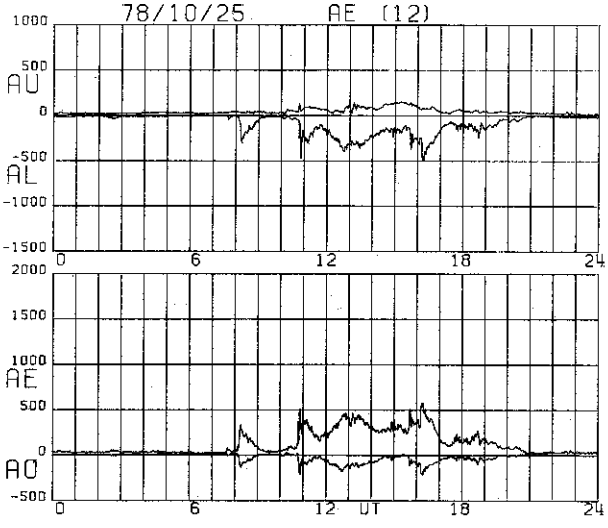
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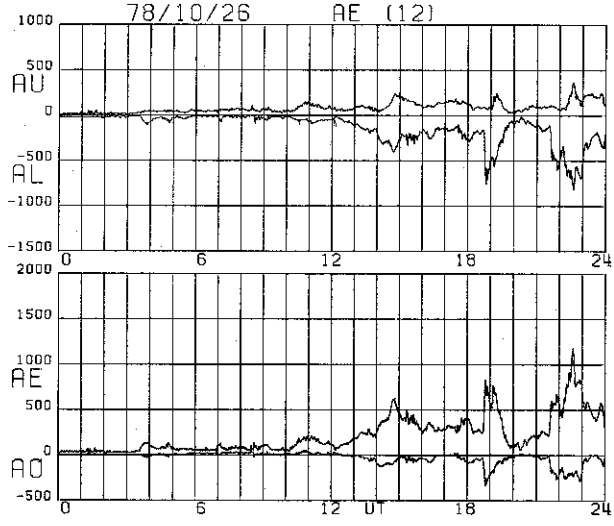
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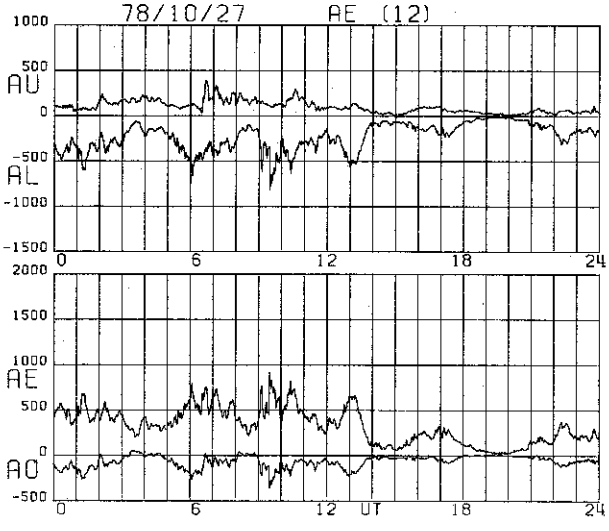
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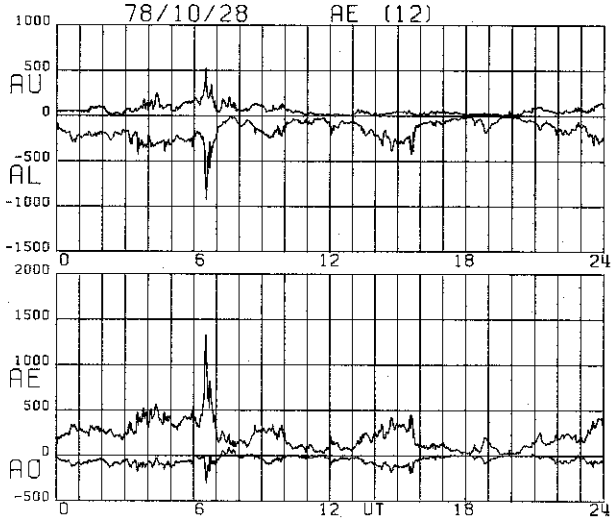
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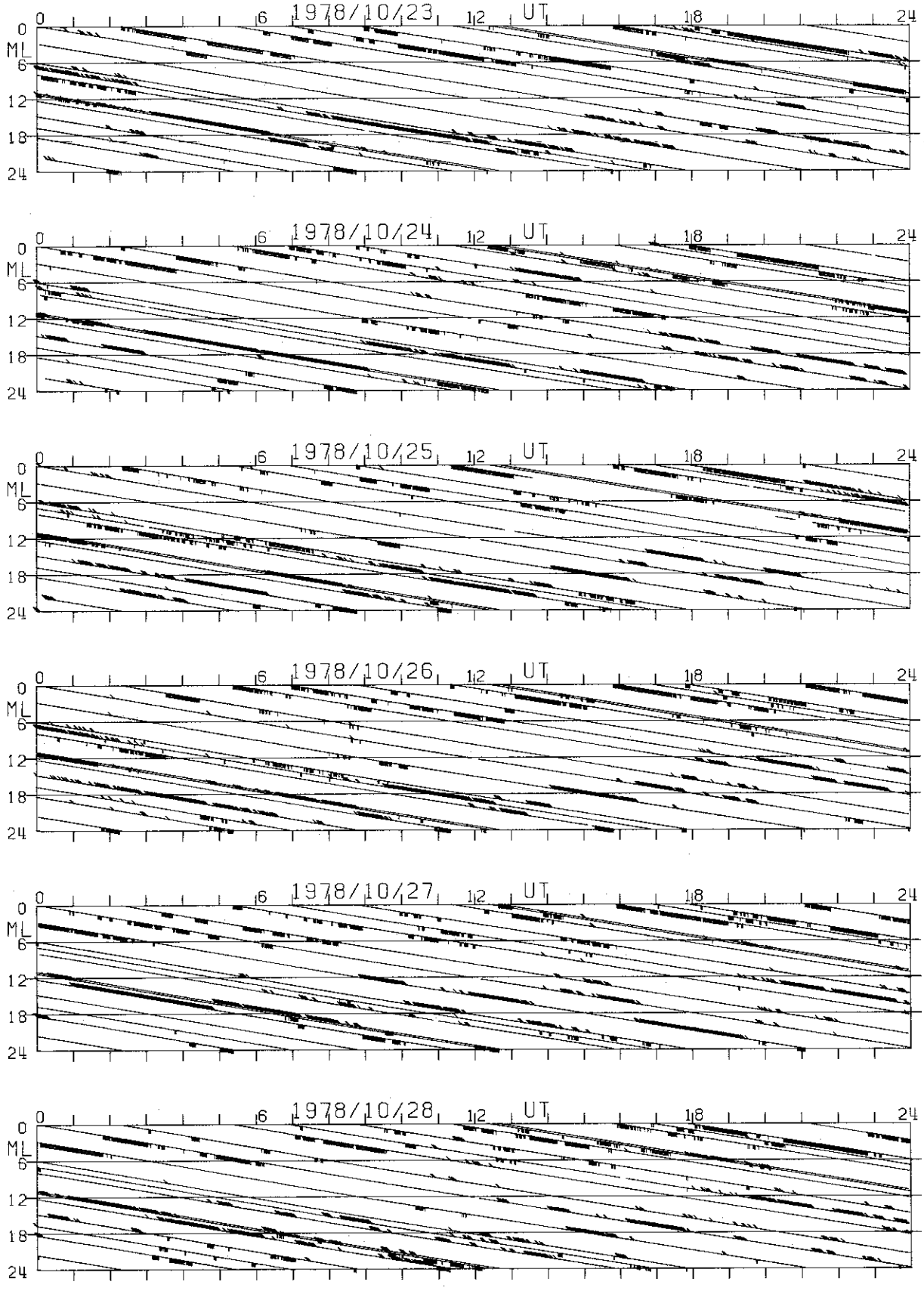
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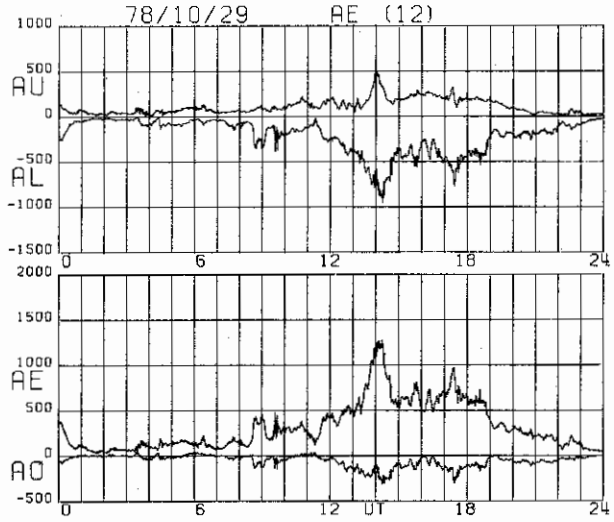
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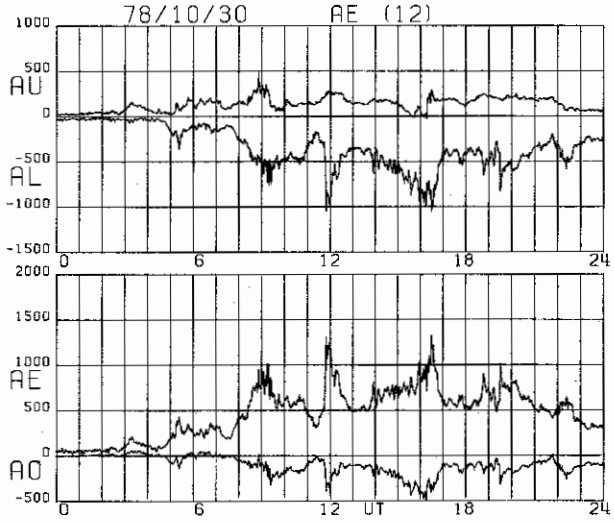
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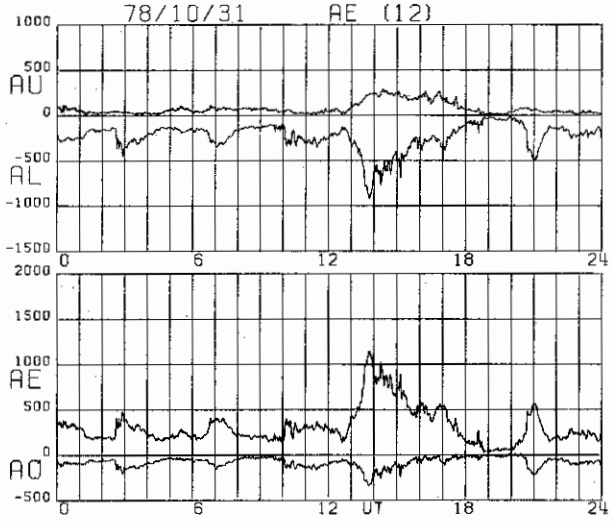
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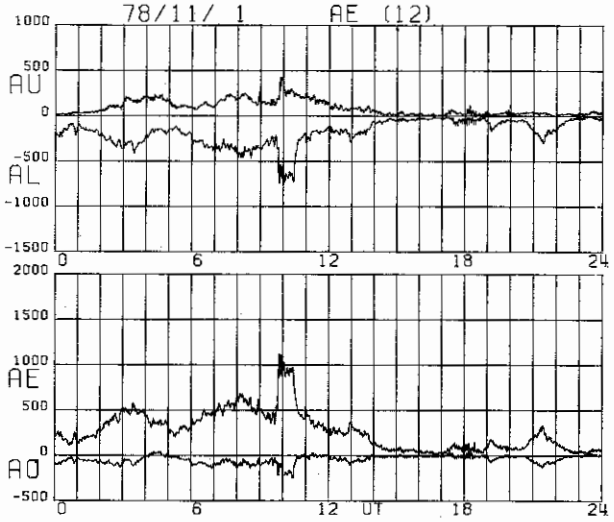
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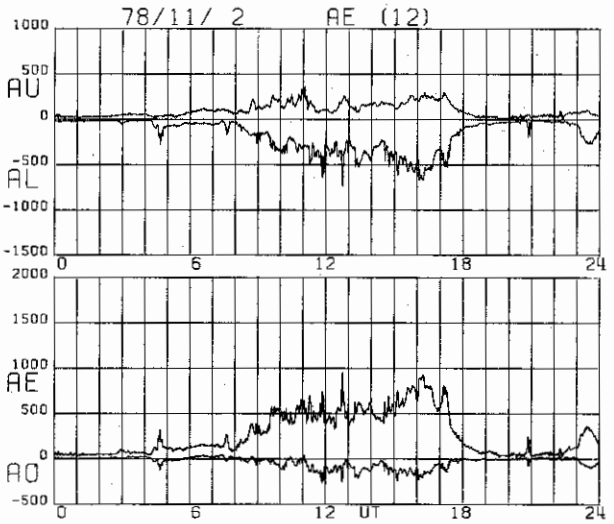
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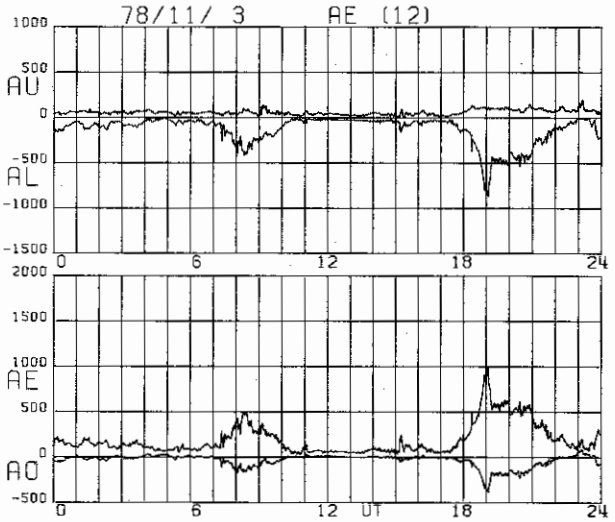
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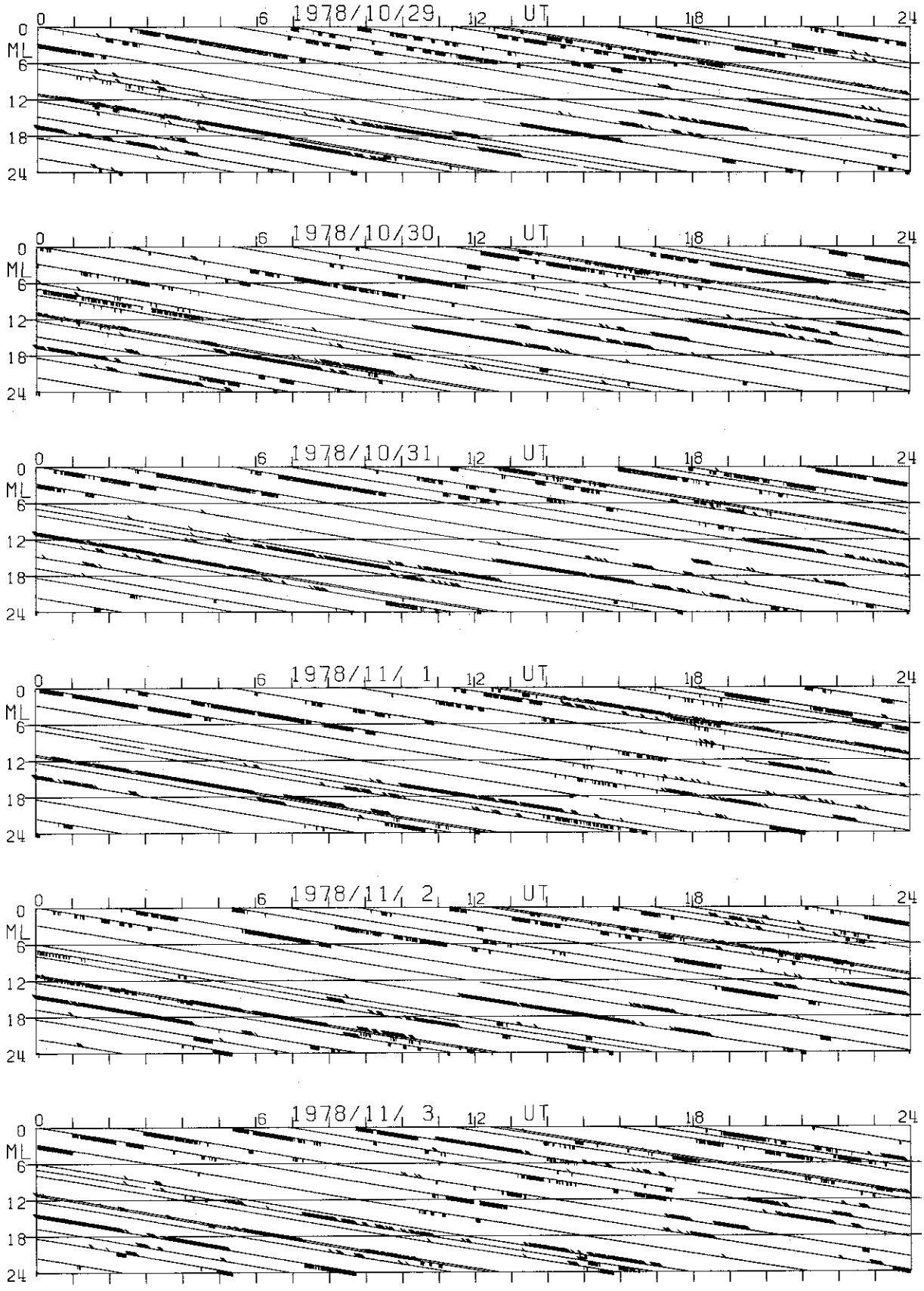
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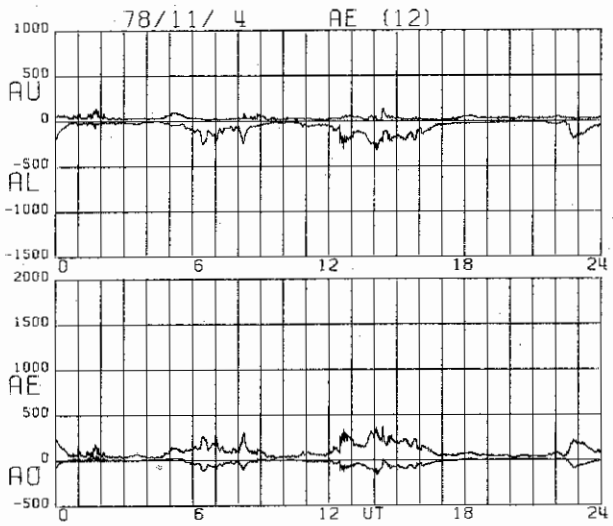
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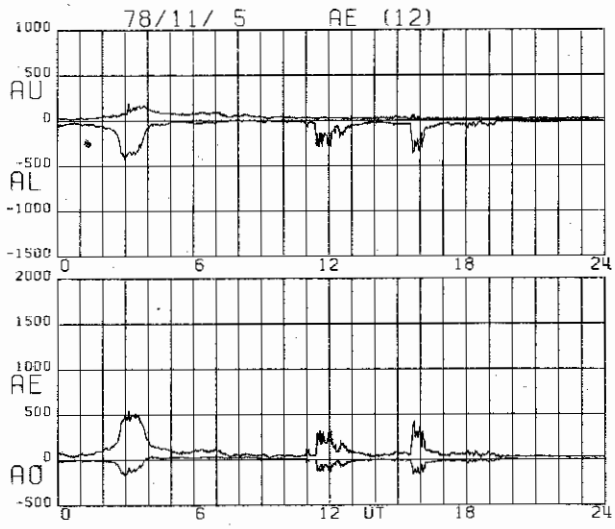
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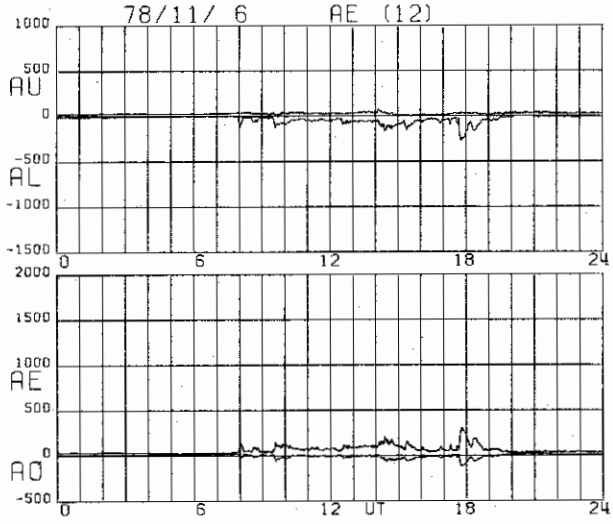
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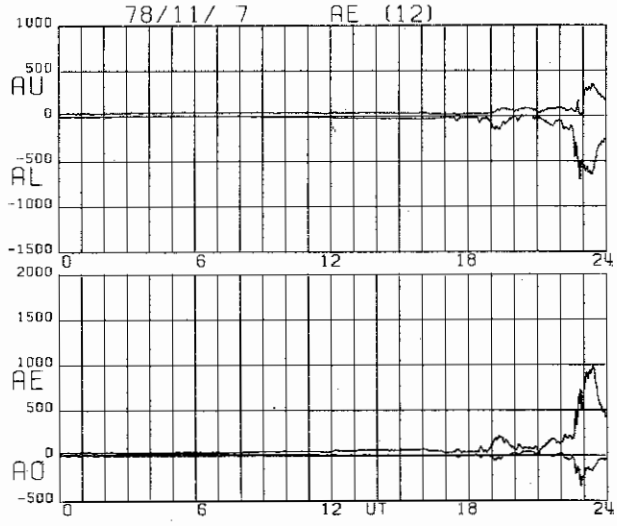
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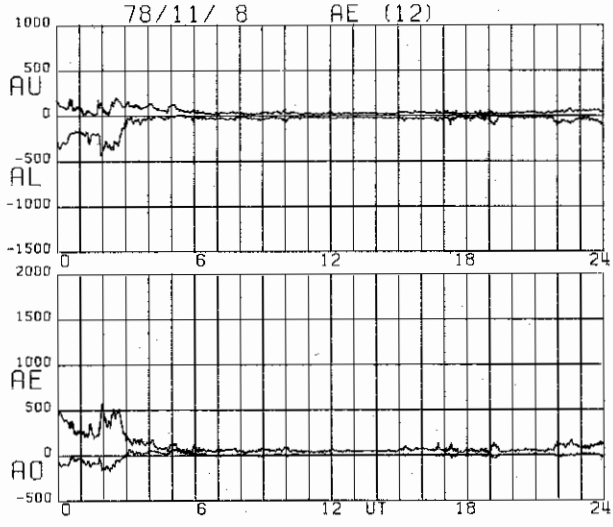
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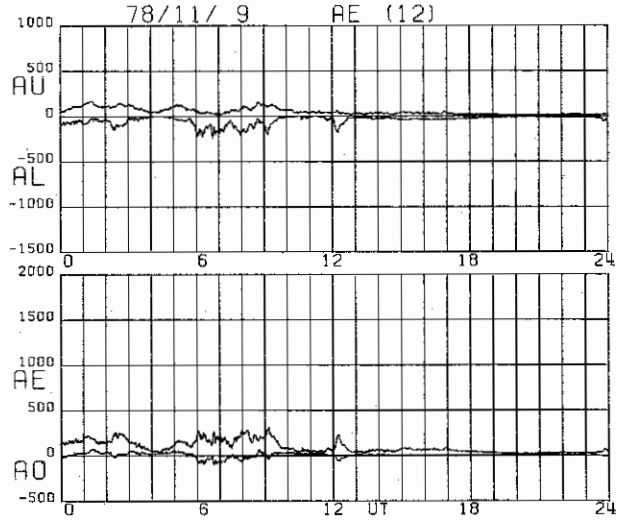
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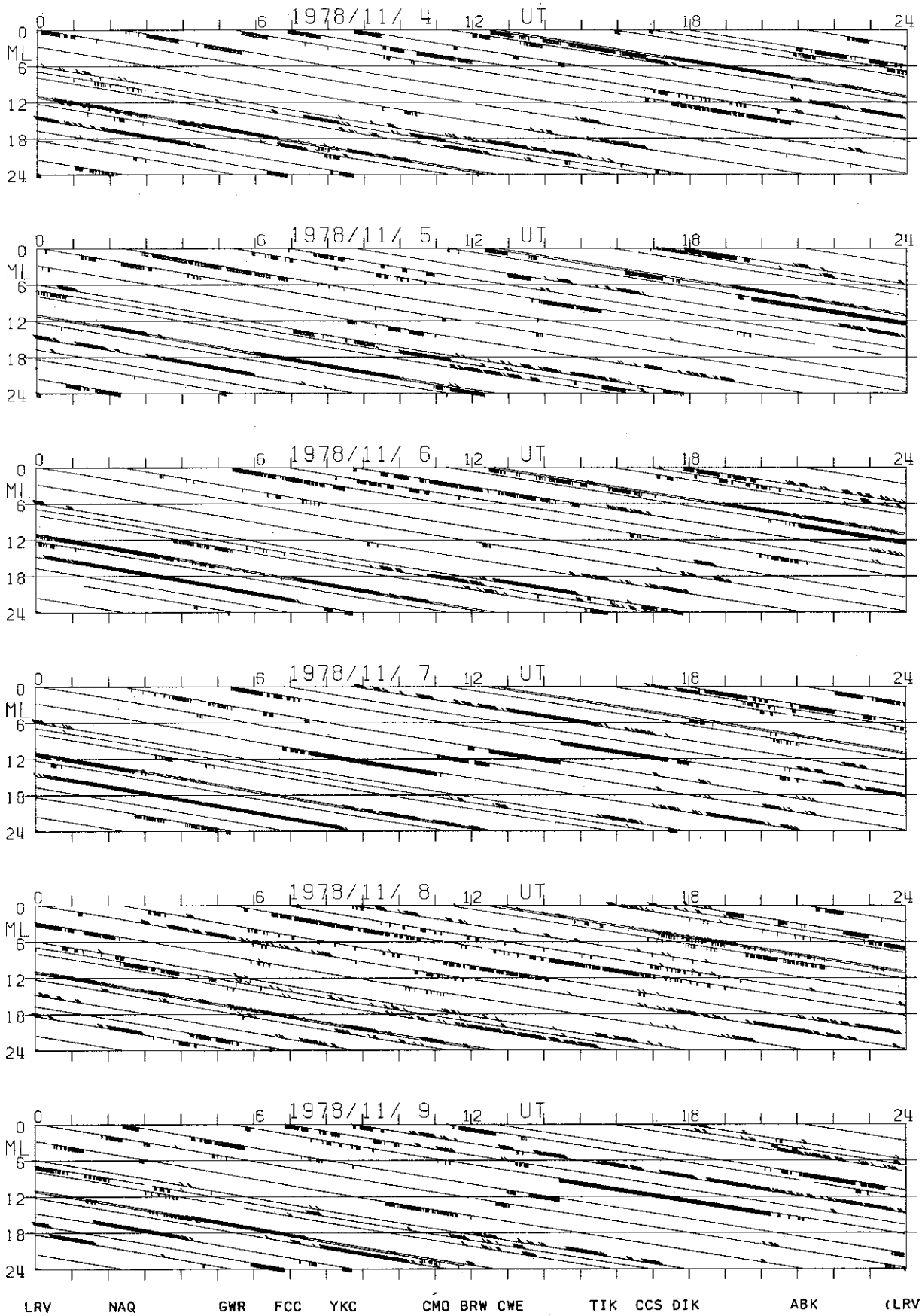
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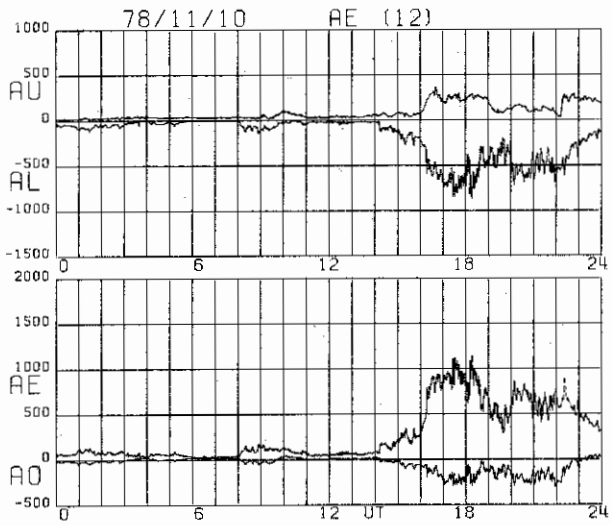
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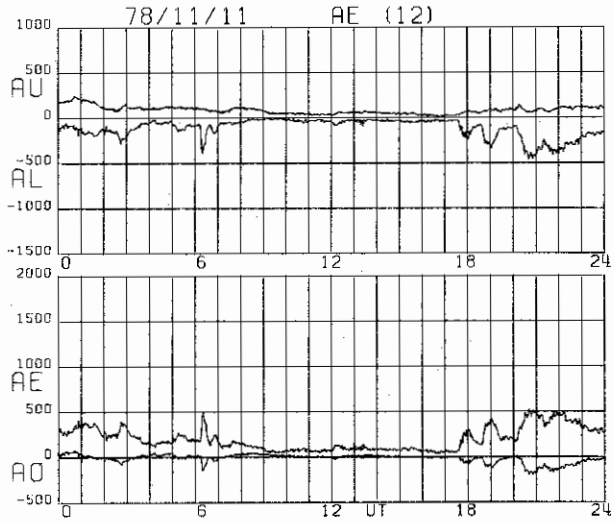
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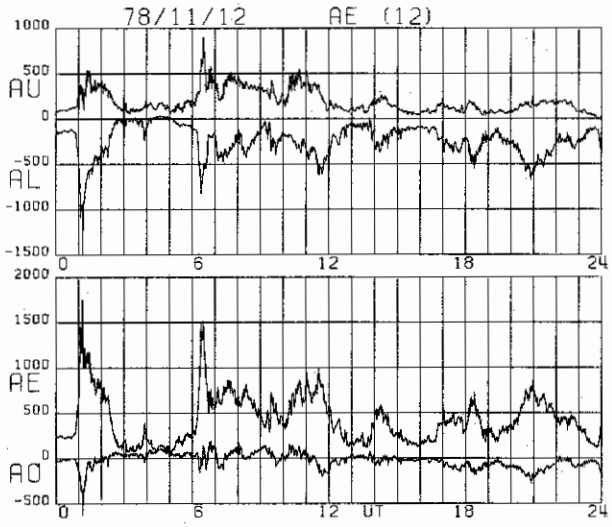
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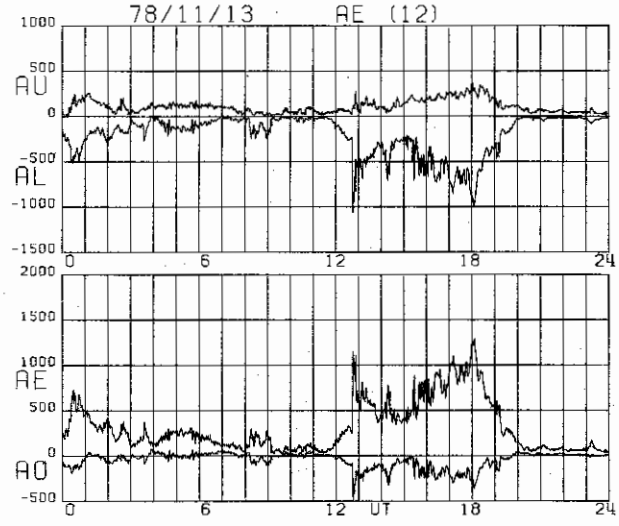
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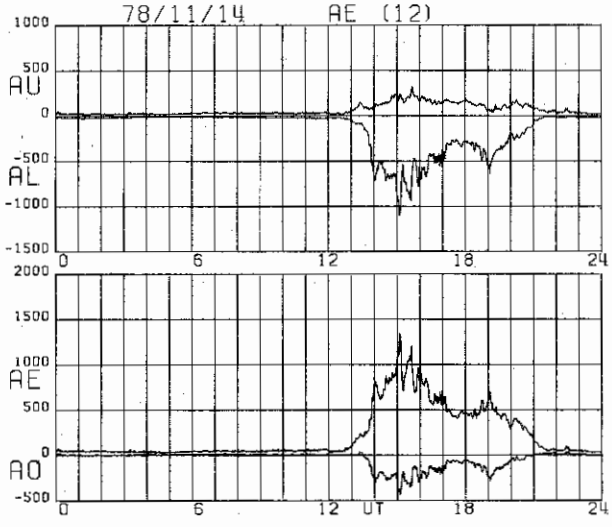
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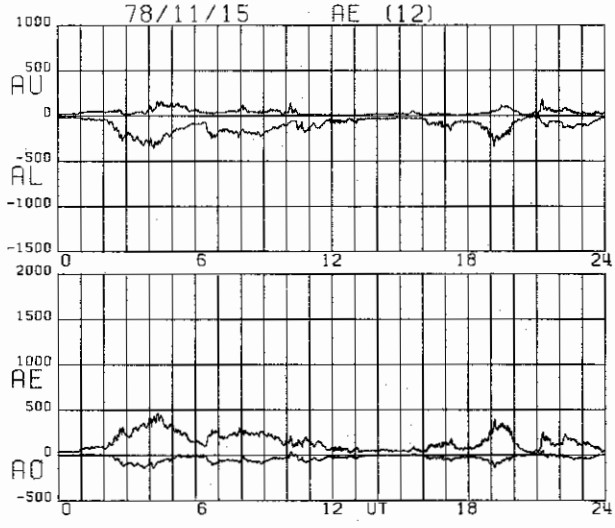
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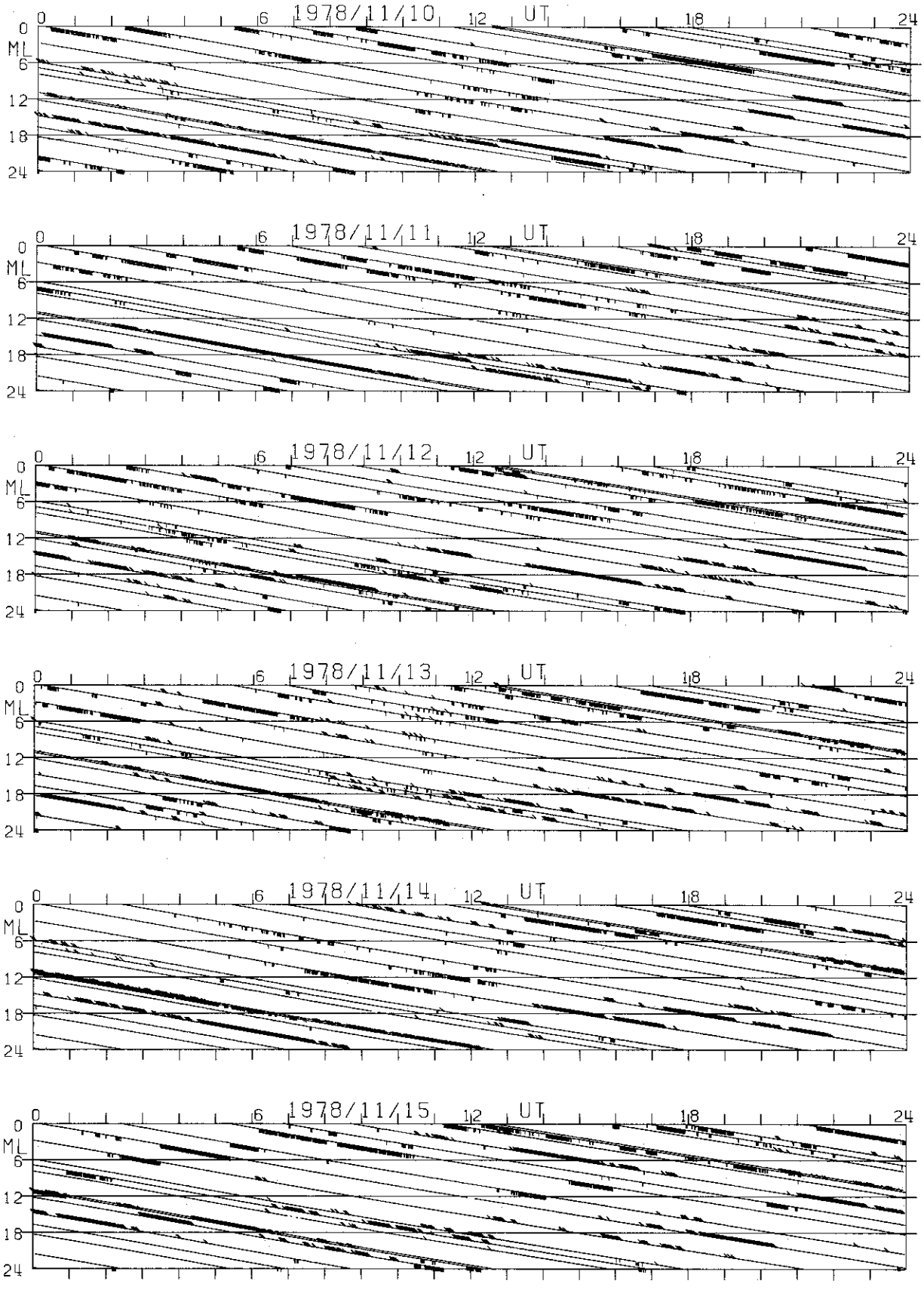
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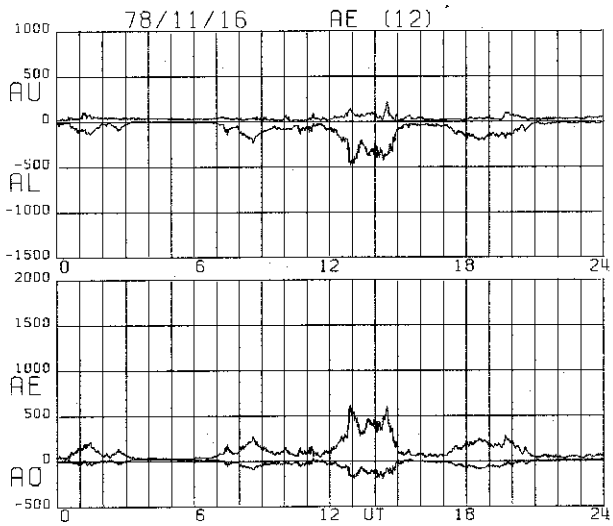
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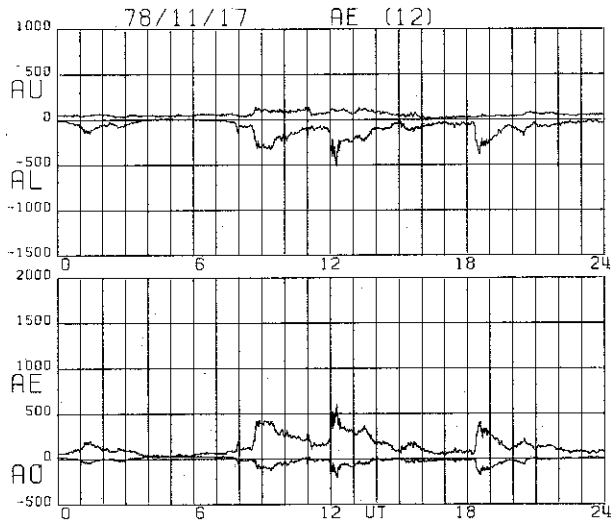
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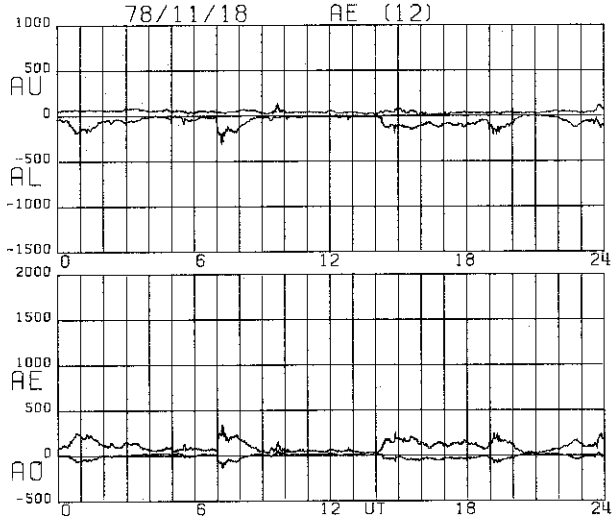
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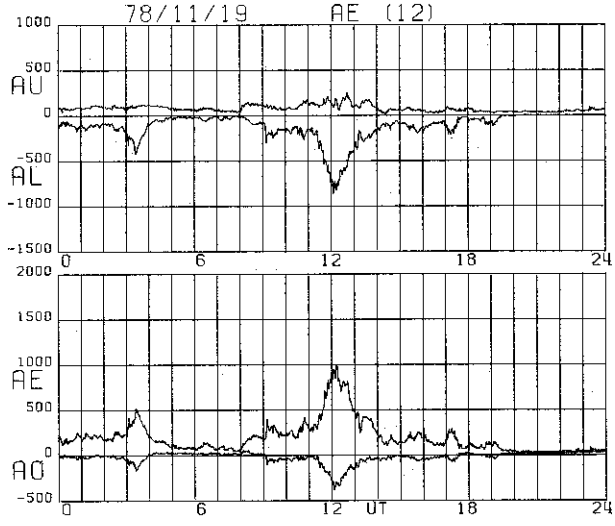
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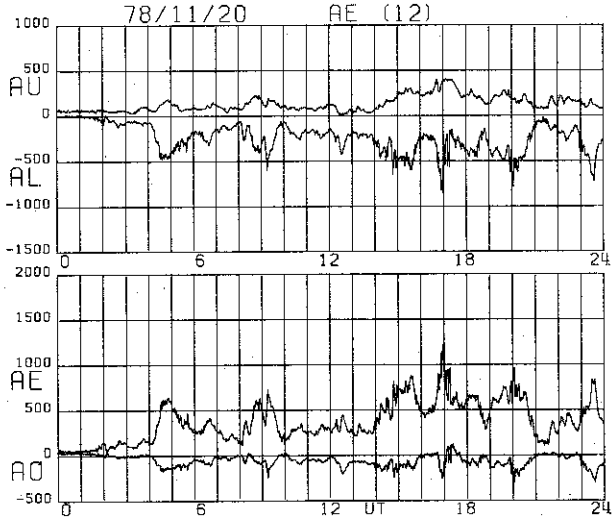
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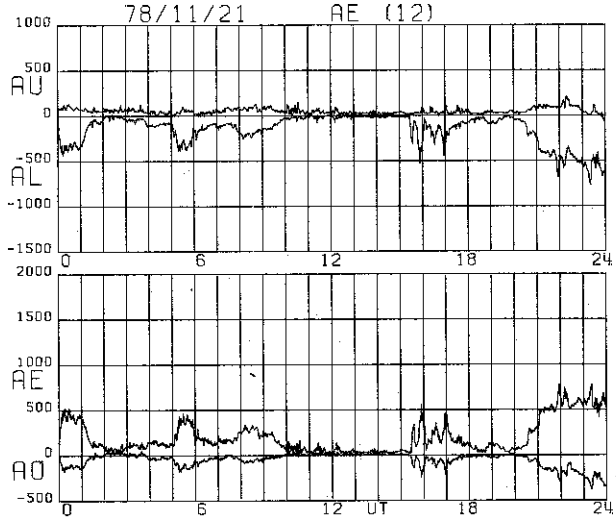
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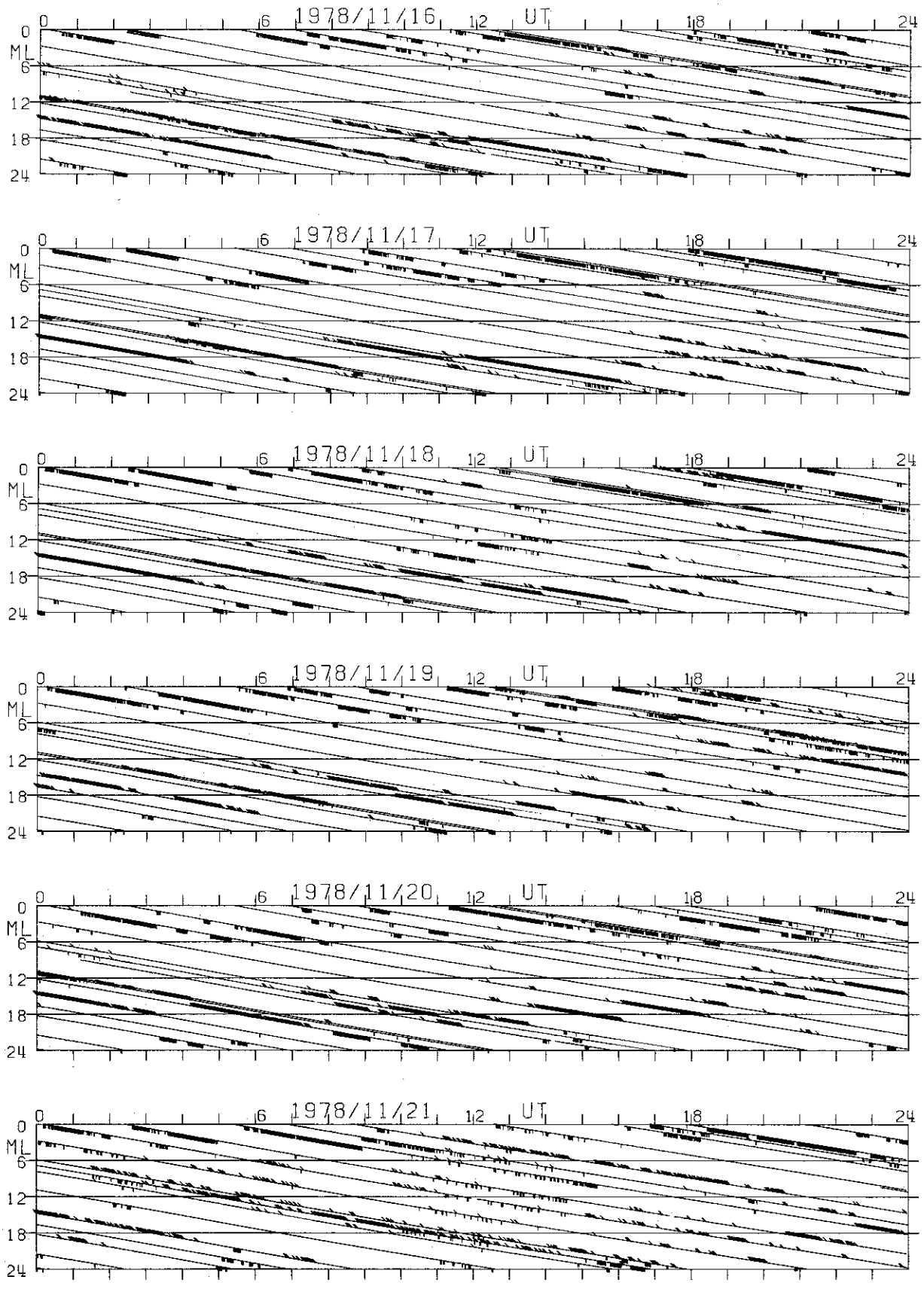
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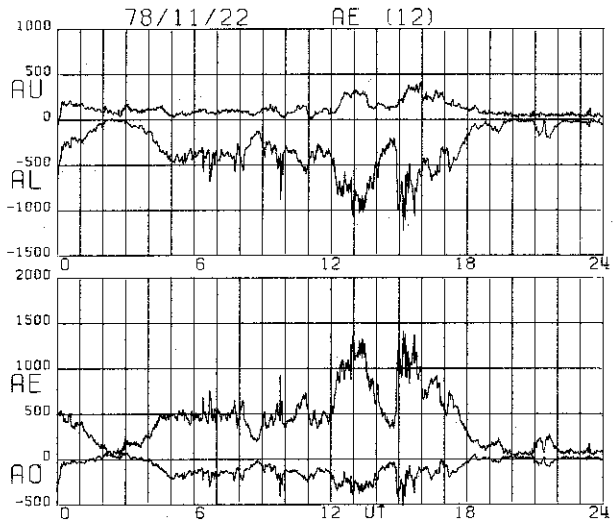
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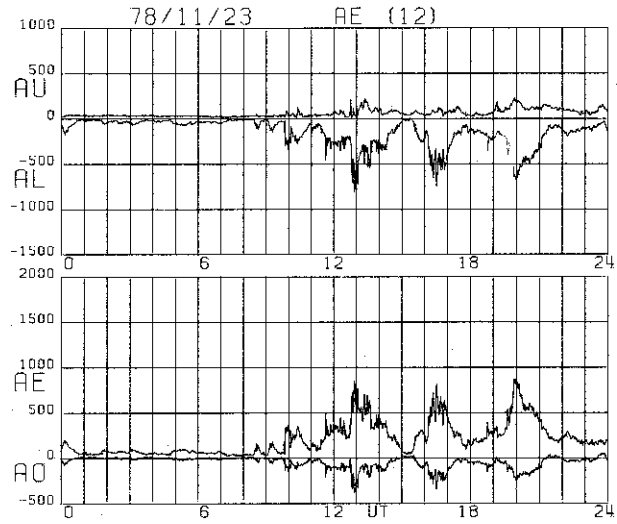
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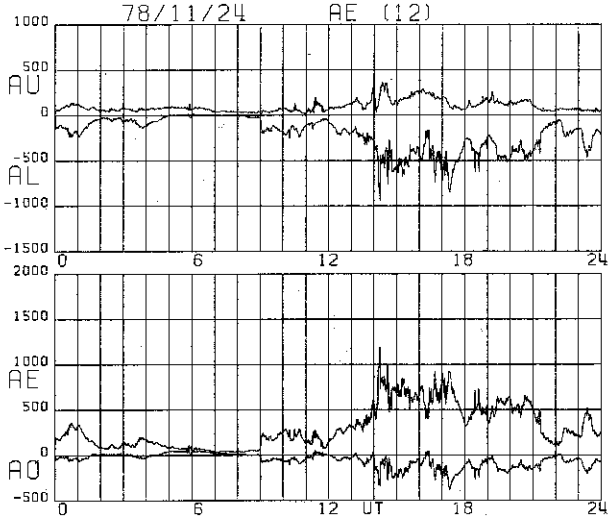
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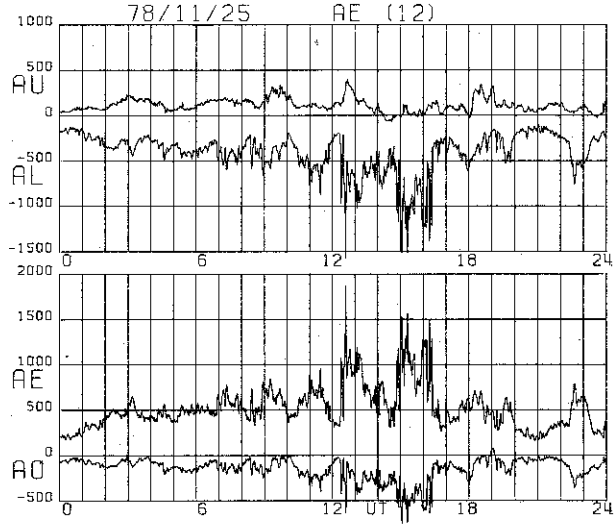
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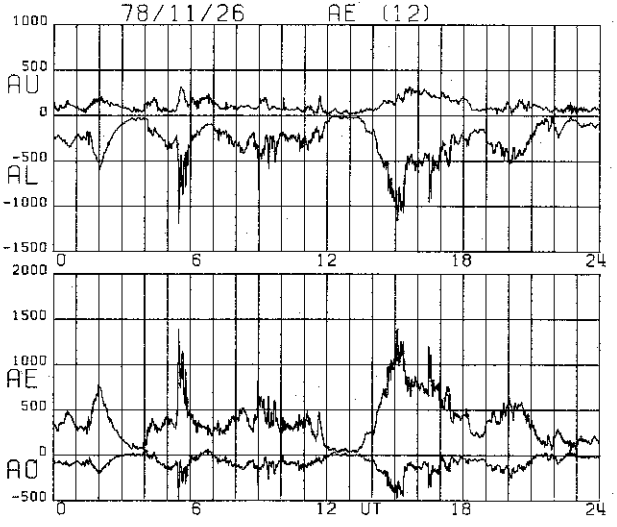
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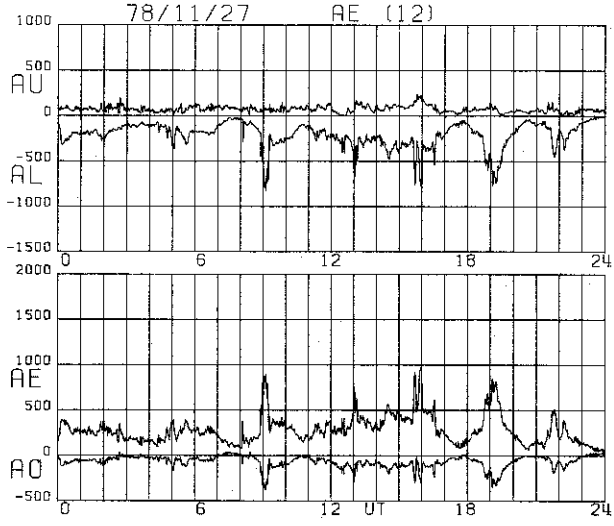
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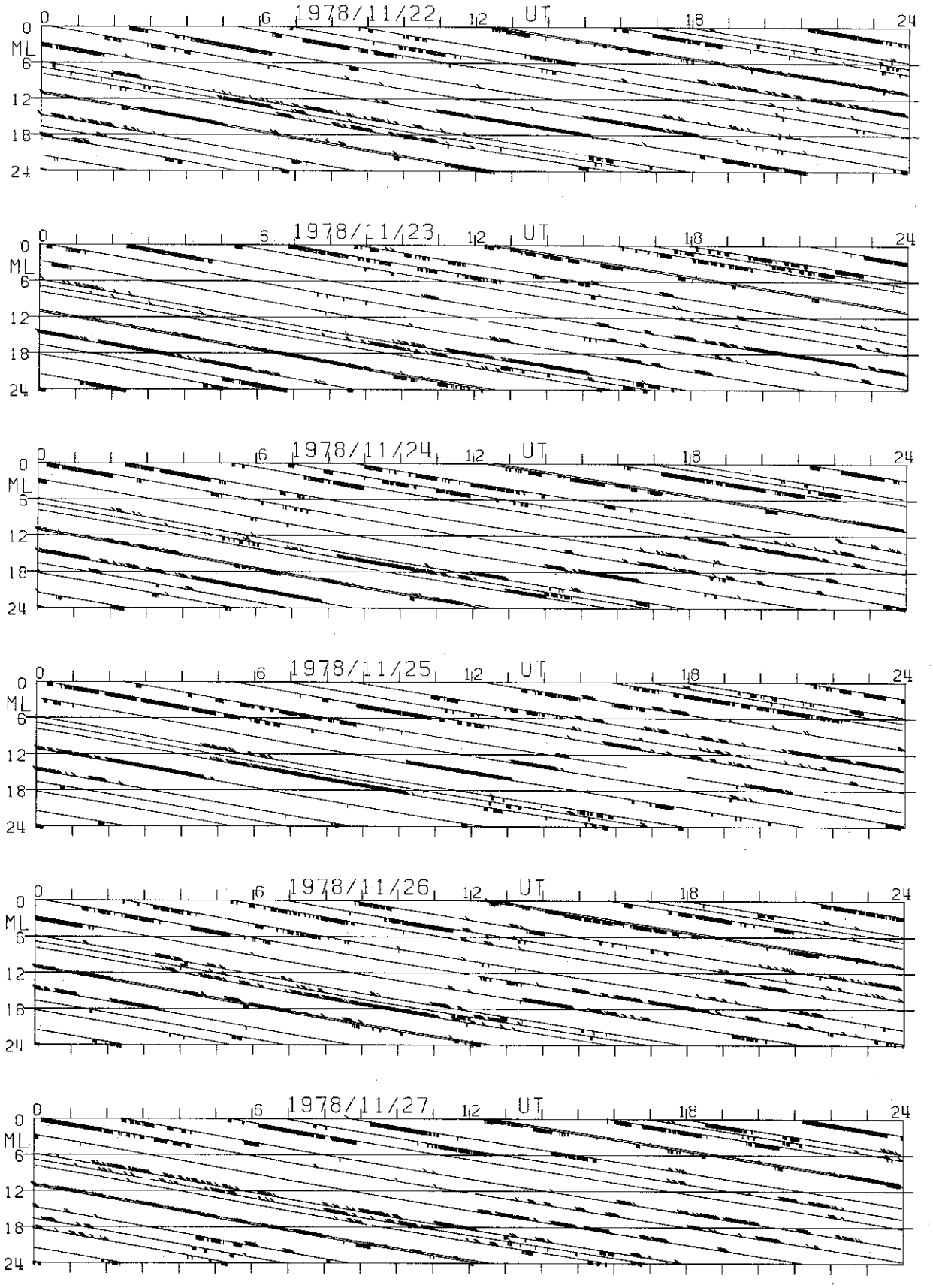
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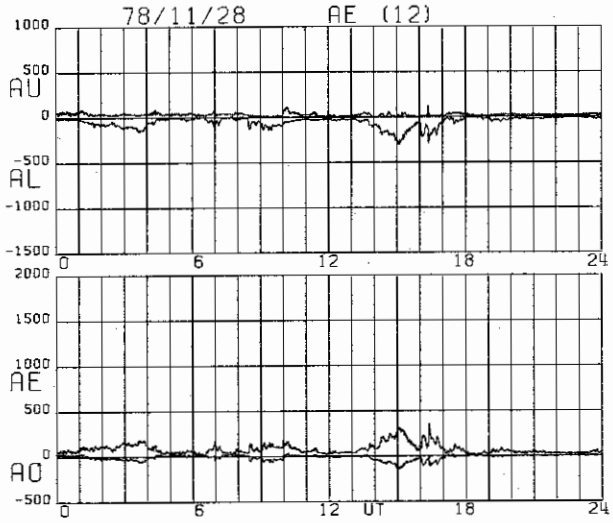
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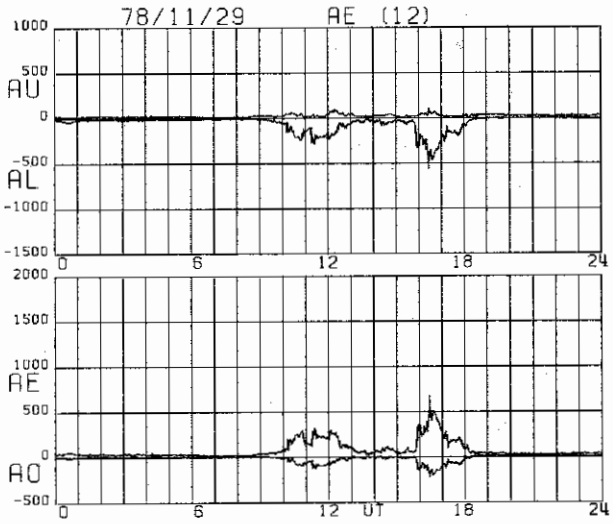
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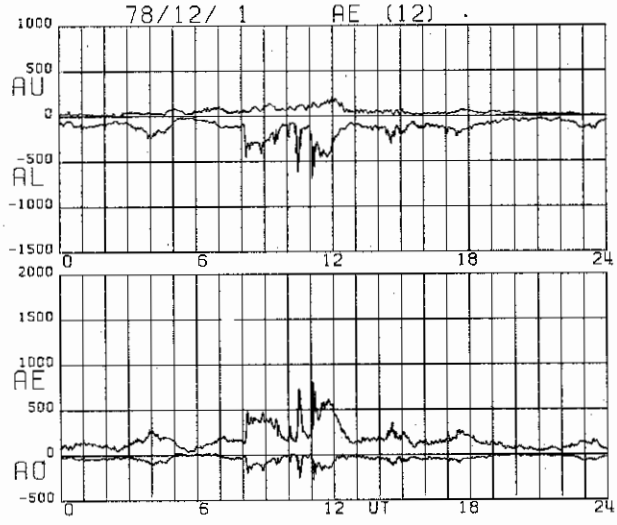
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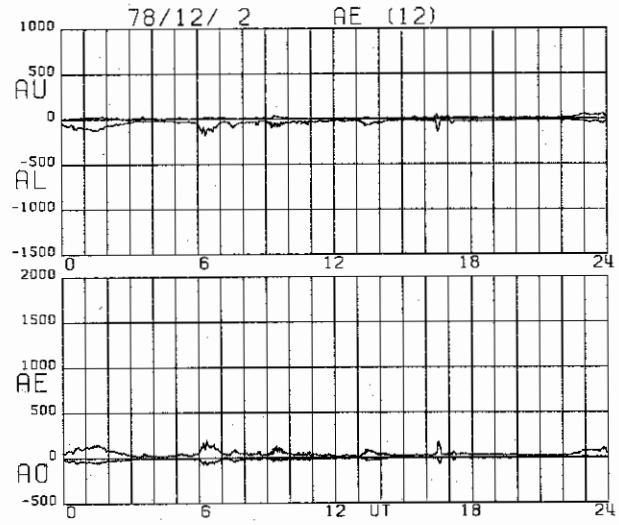
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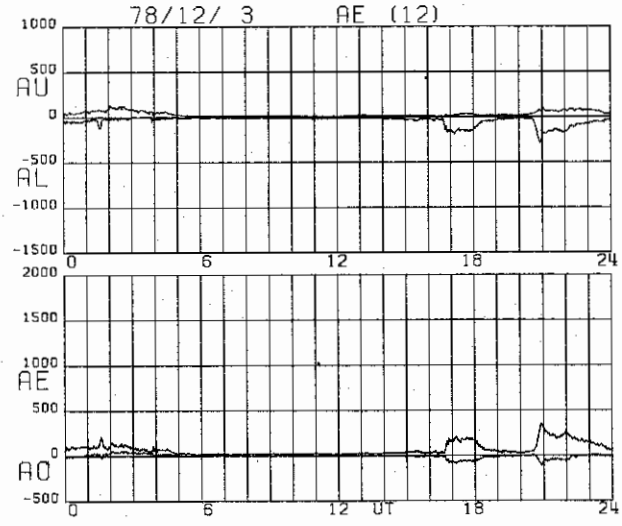
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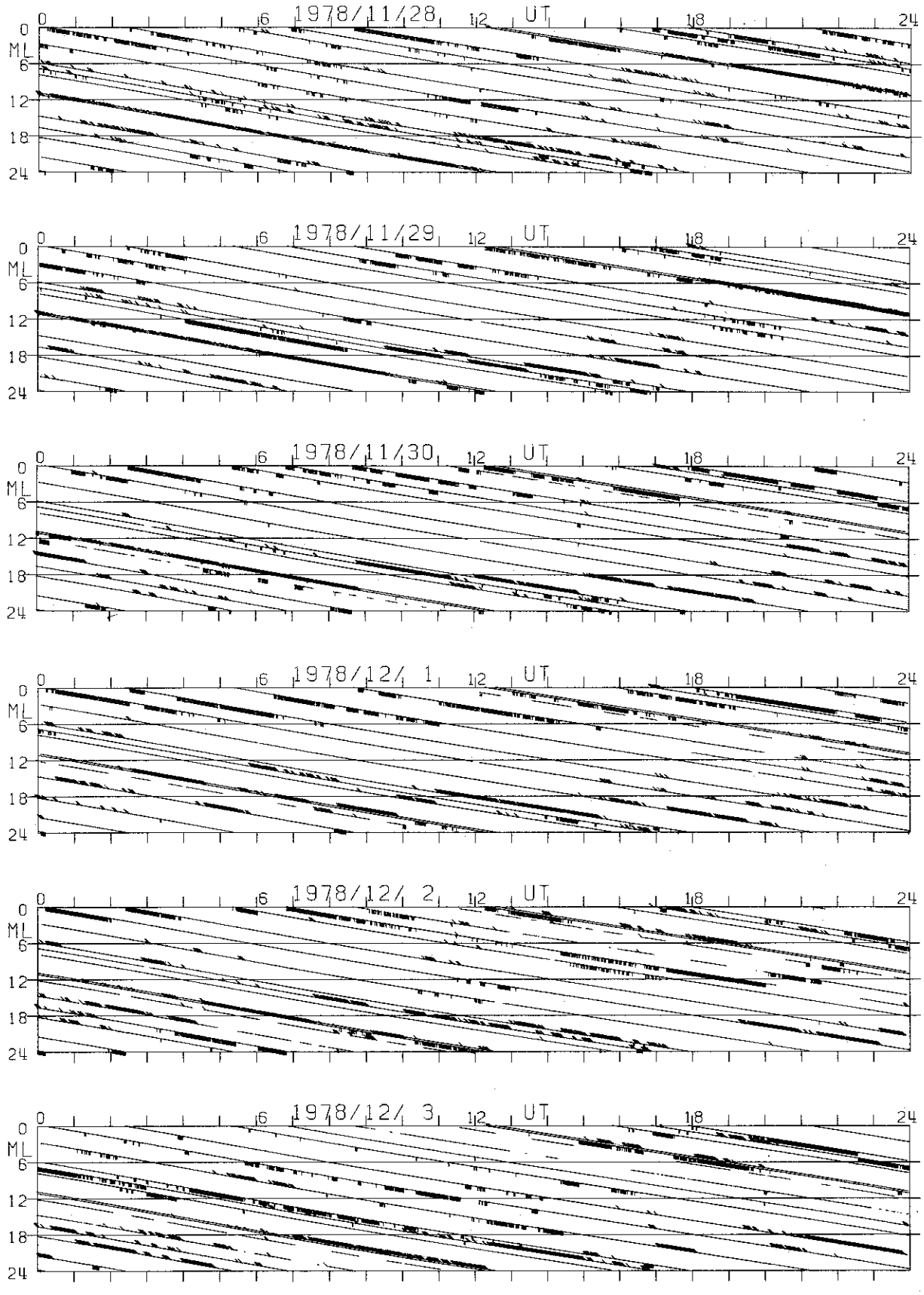
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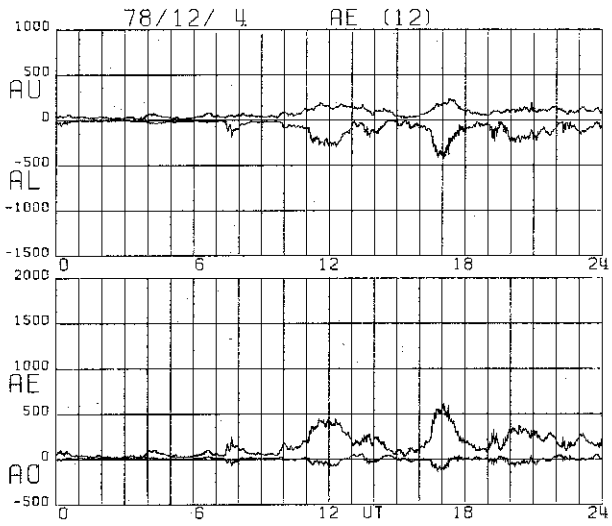
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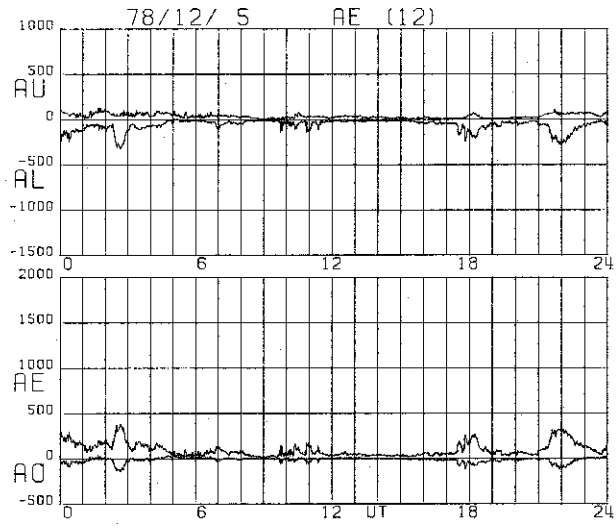
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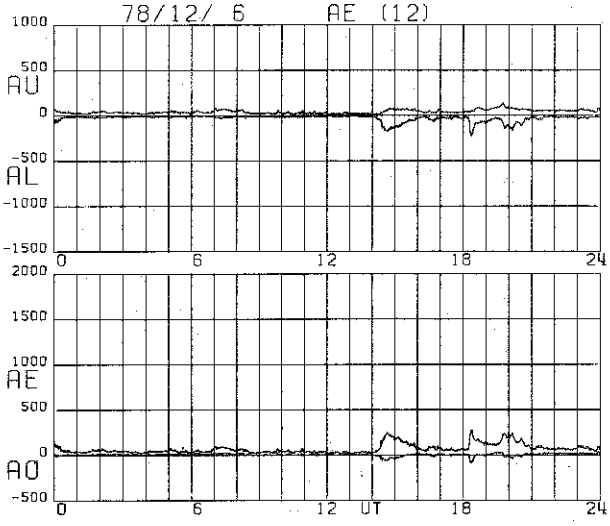
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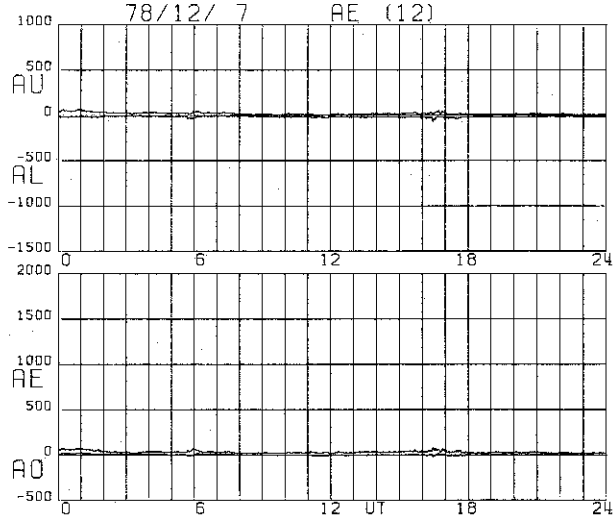
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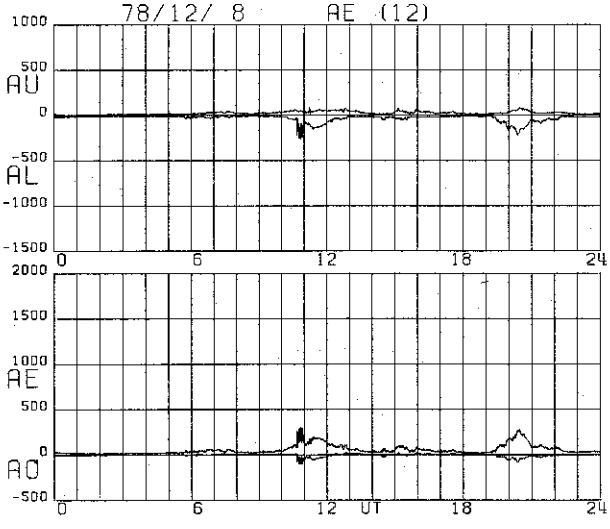
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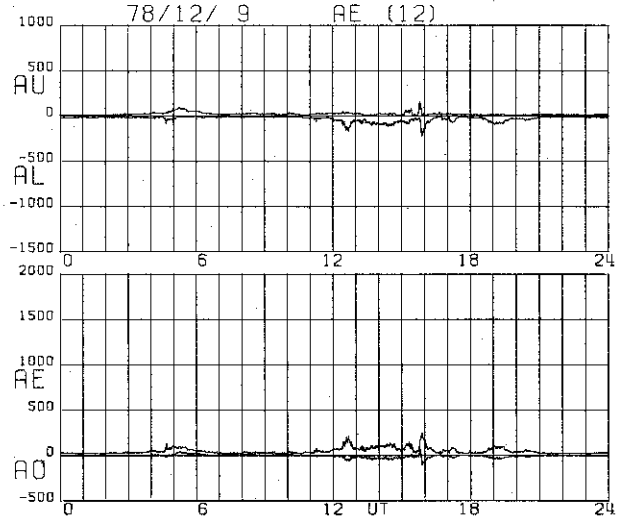
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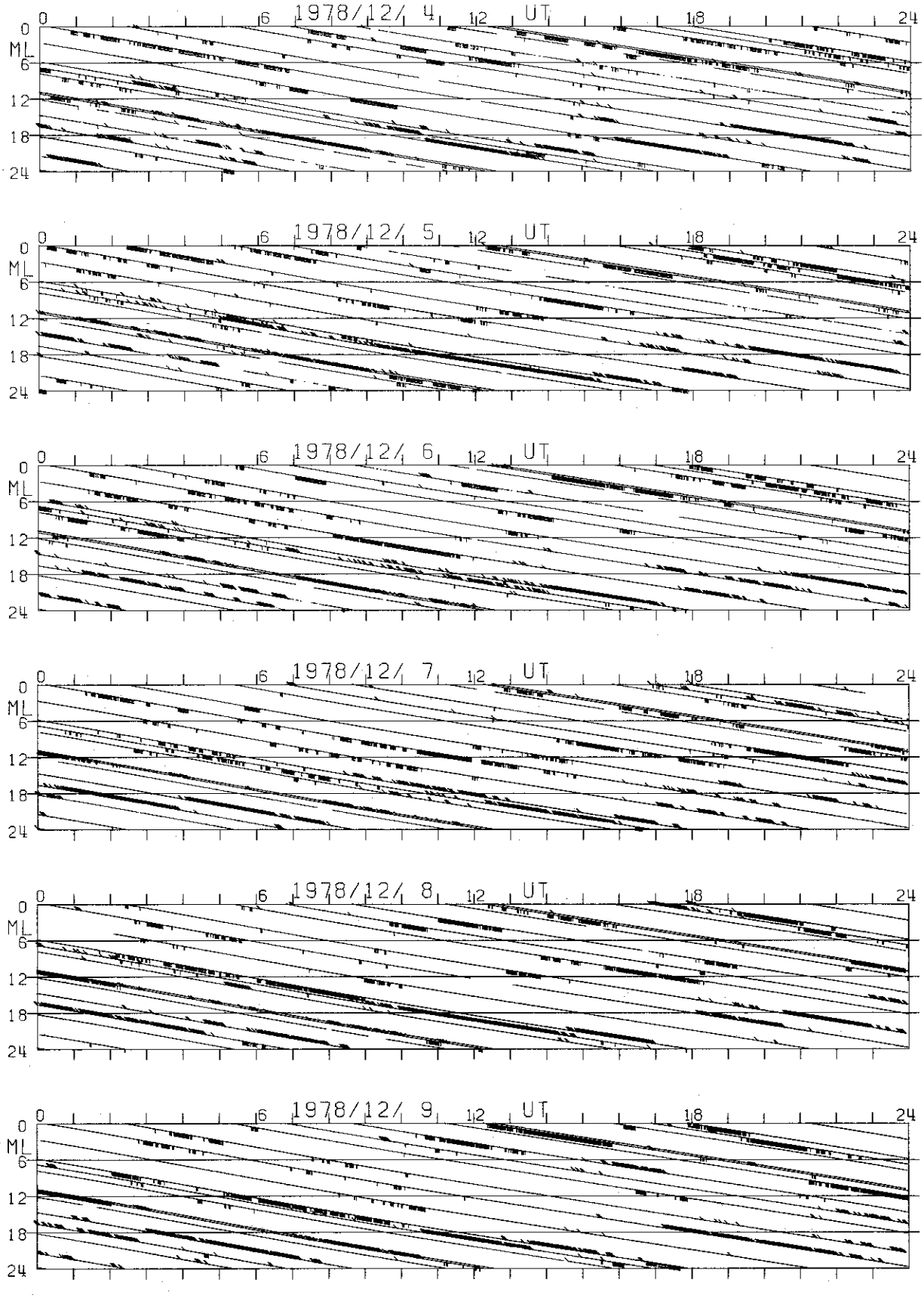
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1978/12/ 7 UT
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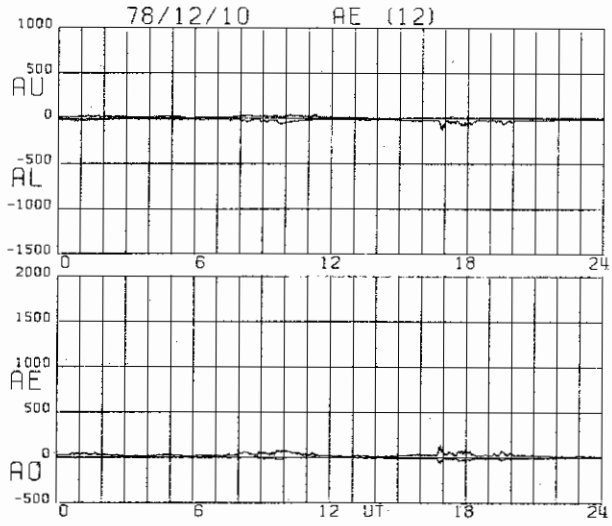
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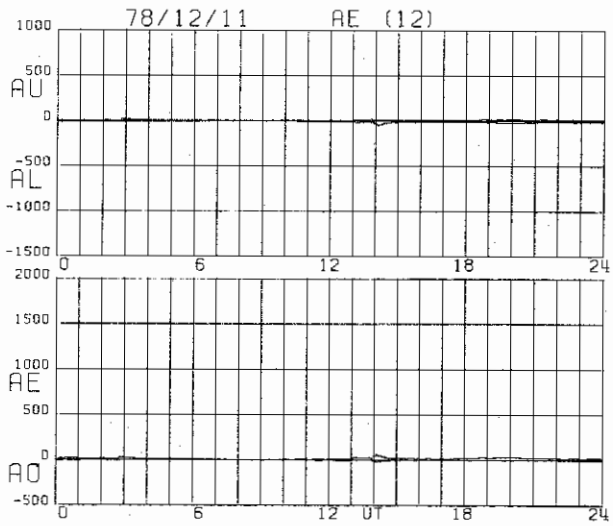
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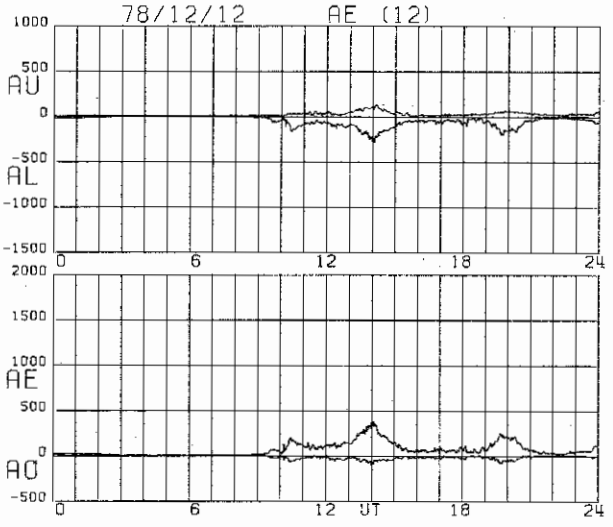
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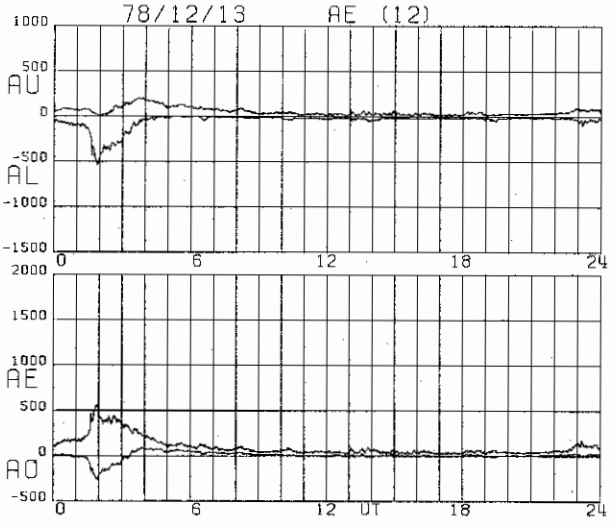
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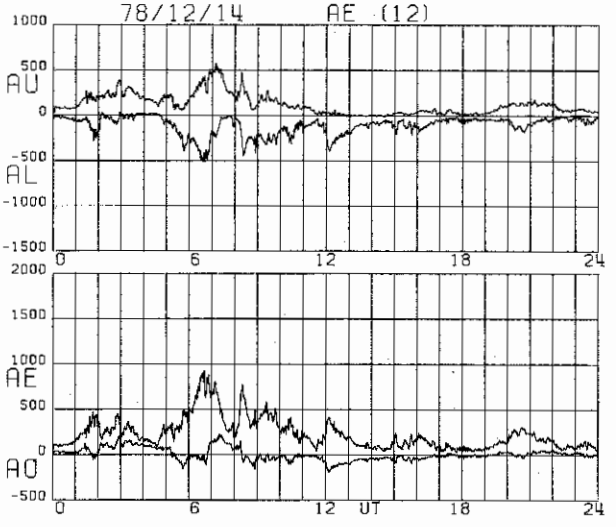
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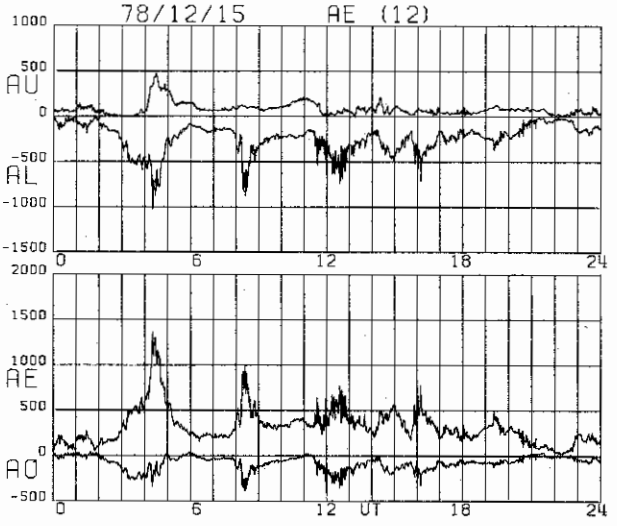
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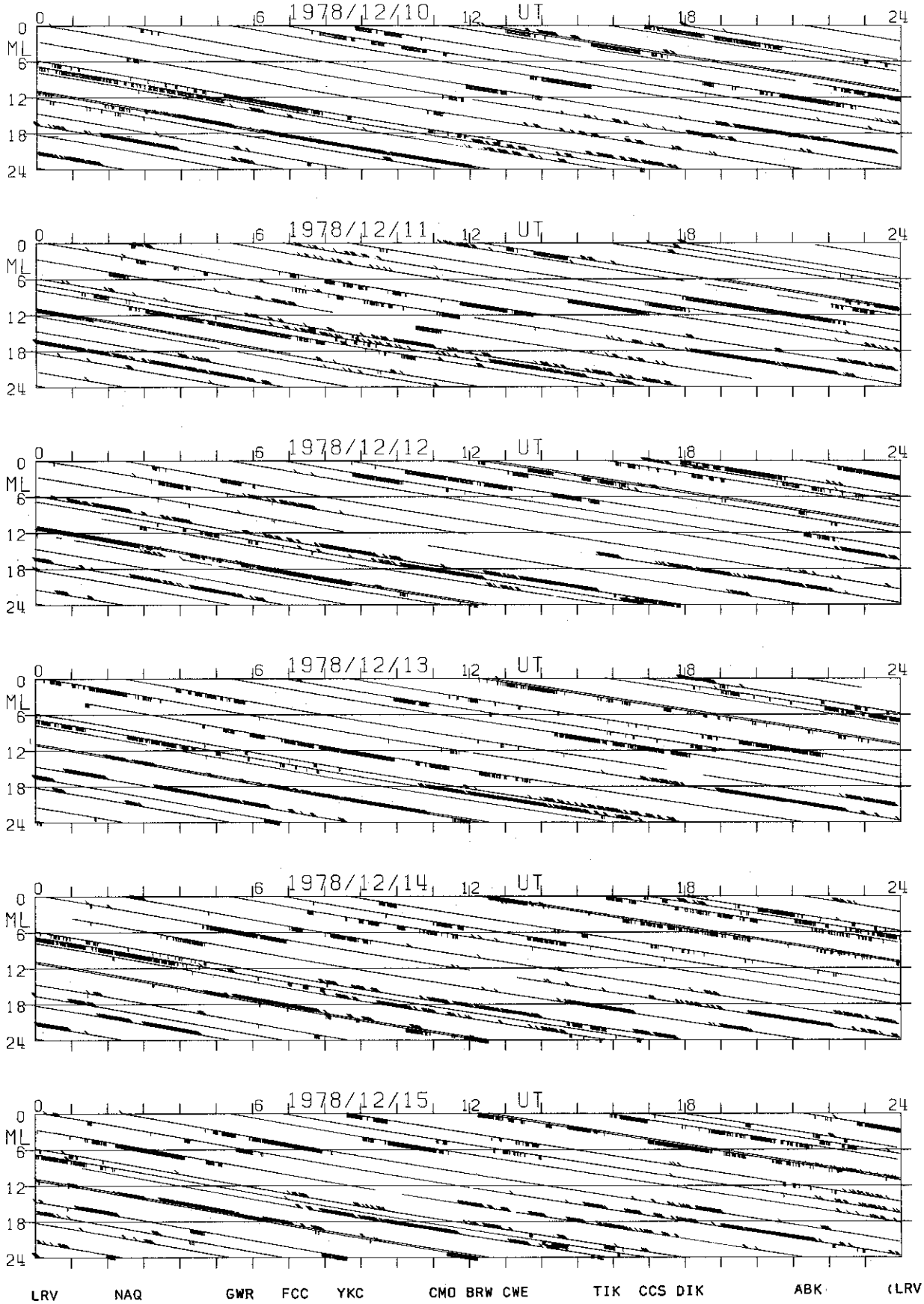
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1978/12/12 UT
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1978/12/14 UT
1978/12/15 UT
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ML
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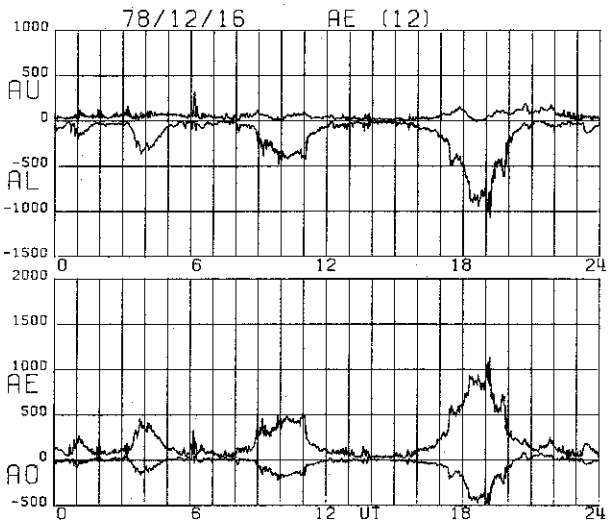
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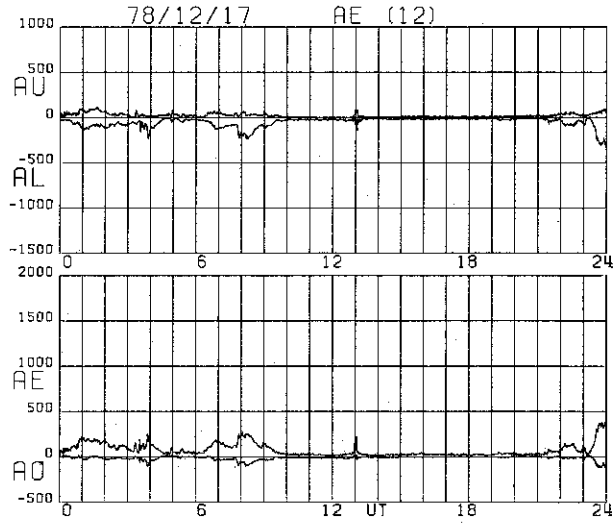
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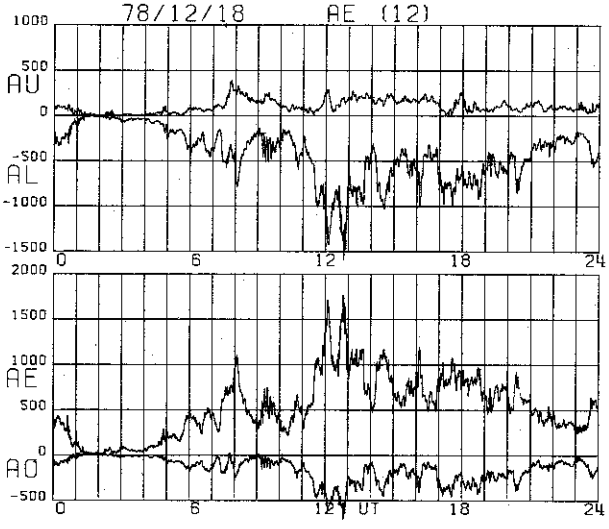
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AE
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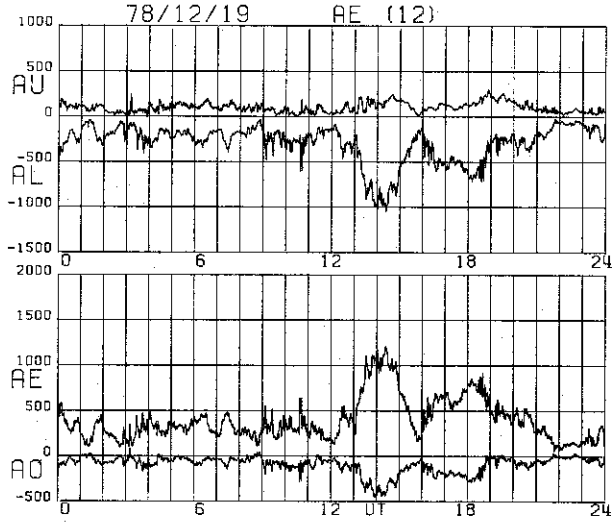
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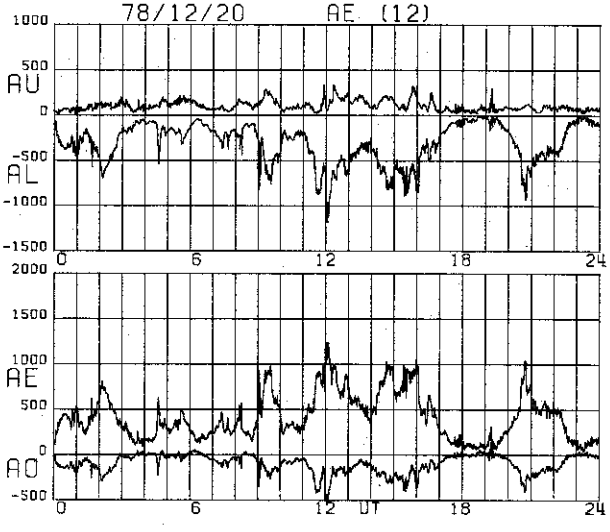
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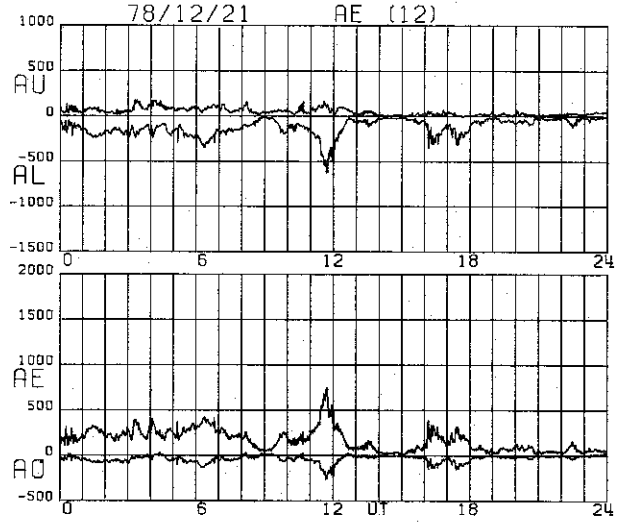
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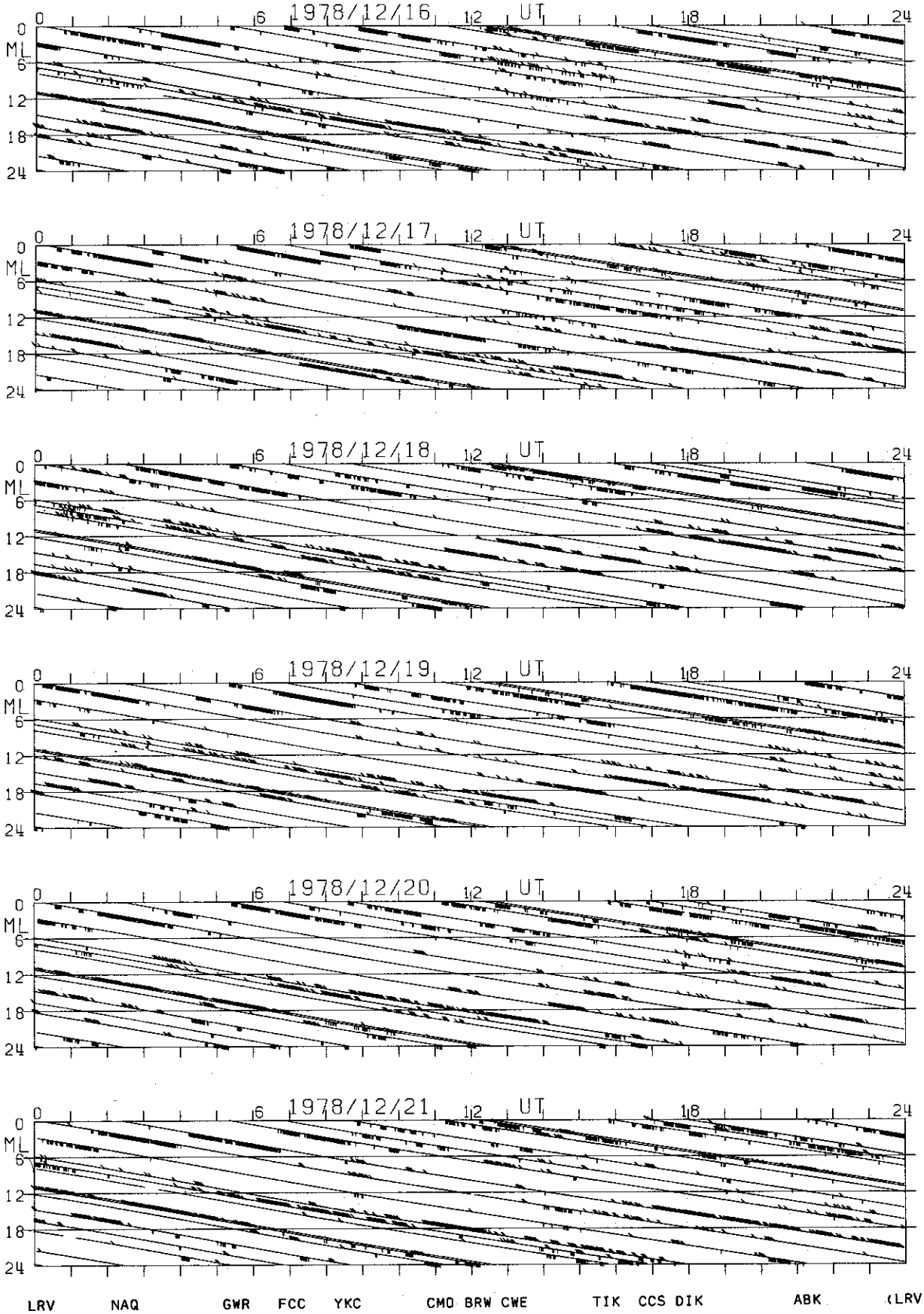
1978/12/16 UT
1978/12/17 UT
1978/12/18 UT
1978/12/19 UT
1978/12/20 UT
1978/12/21 UT
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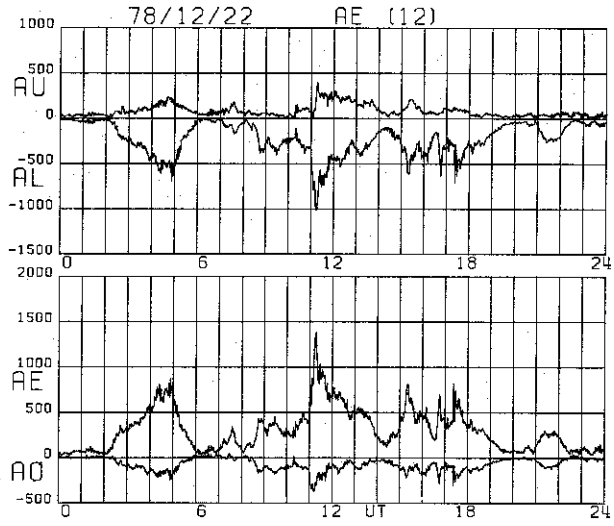
ML
LRV NAQ GWR FCC YKC CMO BRW CWE TIK CCS DIK ABK (LRV)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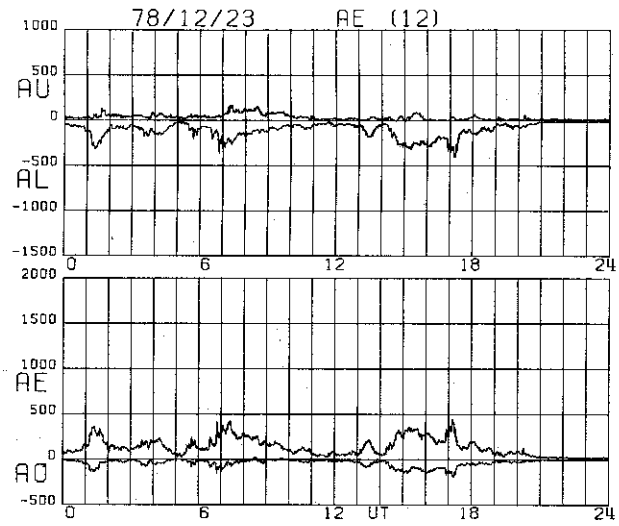
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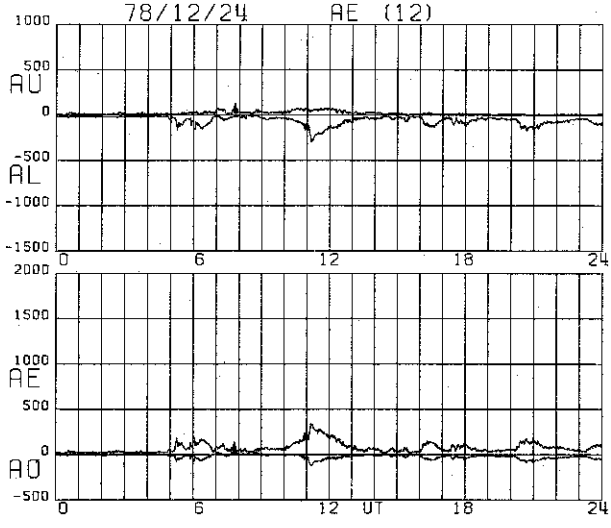
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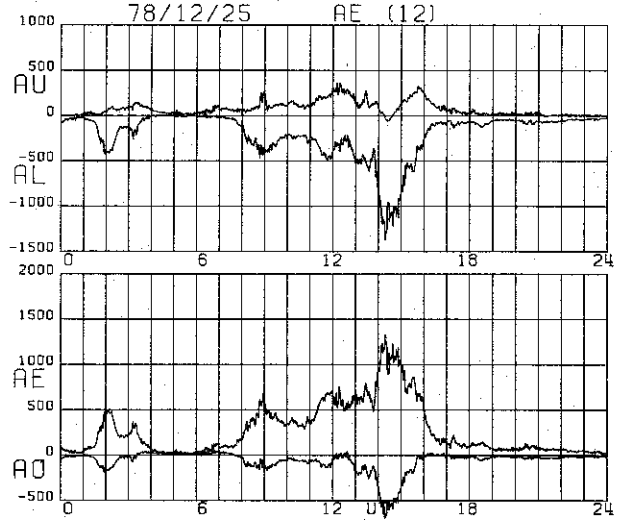
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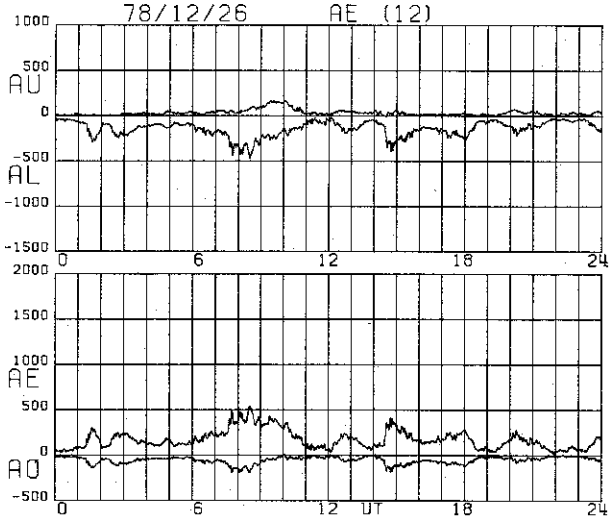
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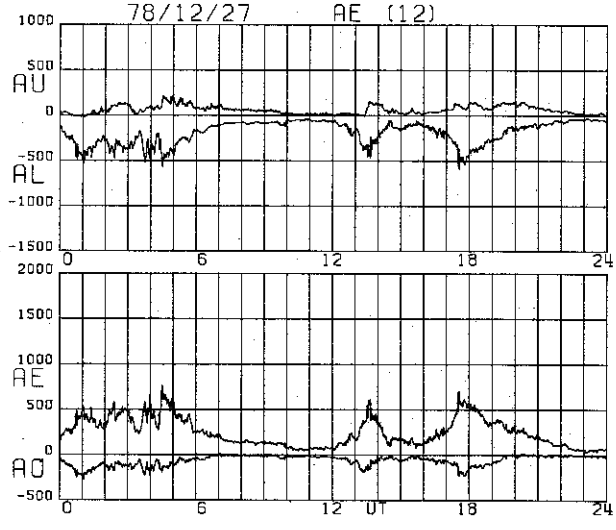
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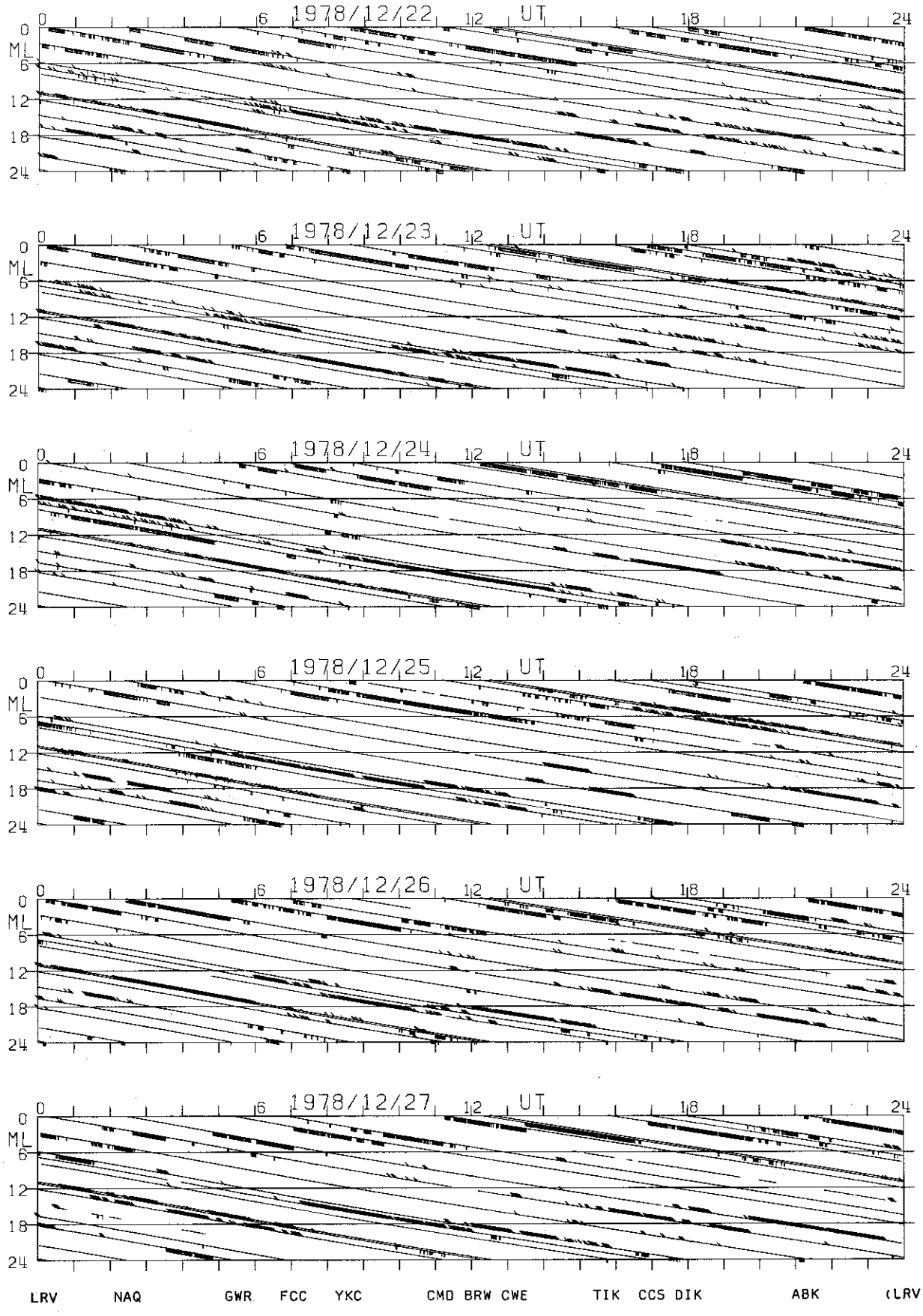
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ML
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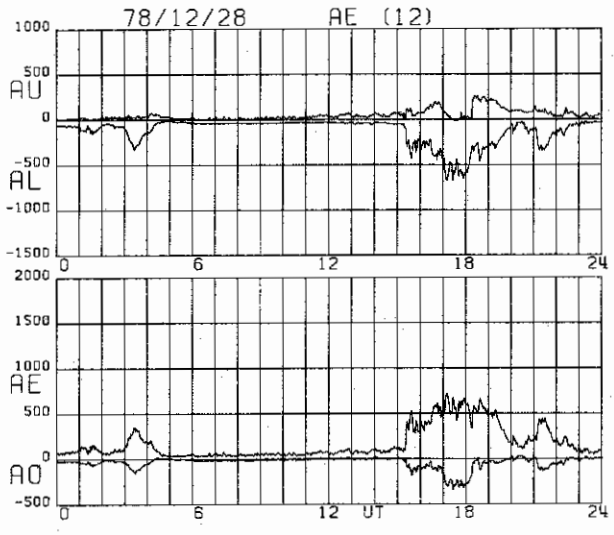
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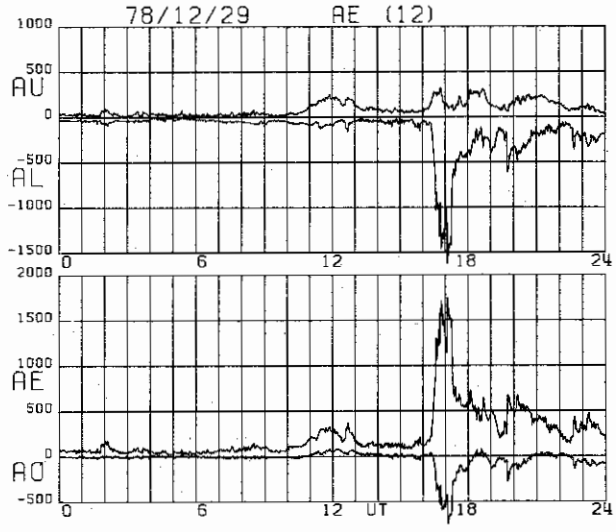
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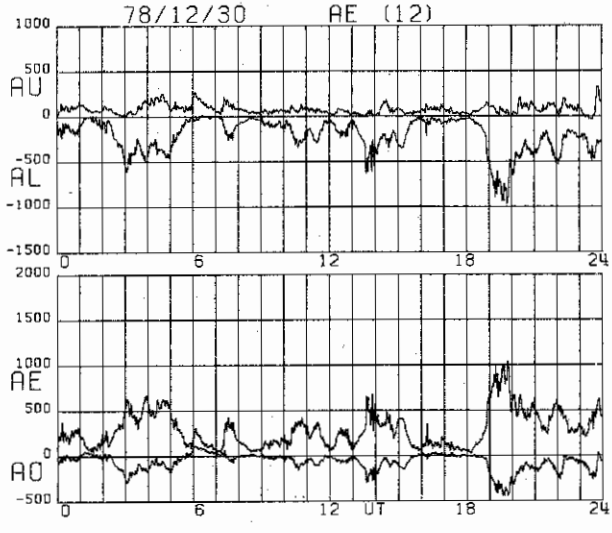
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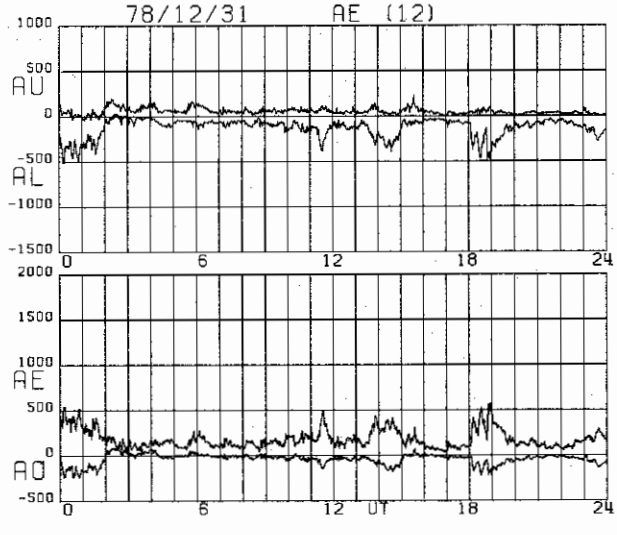
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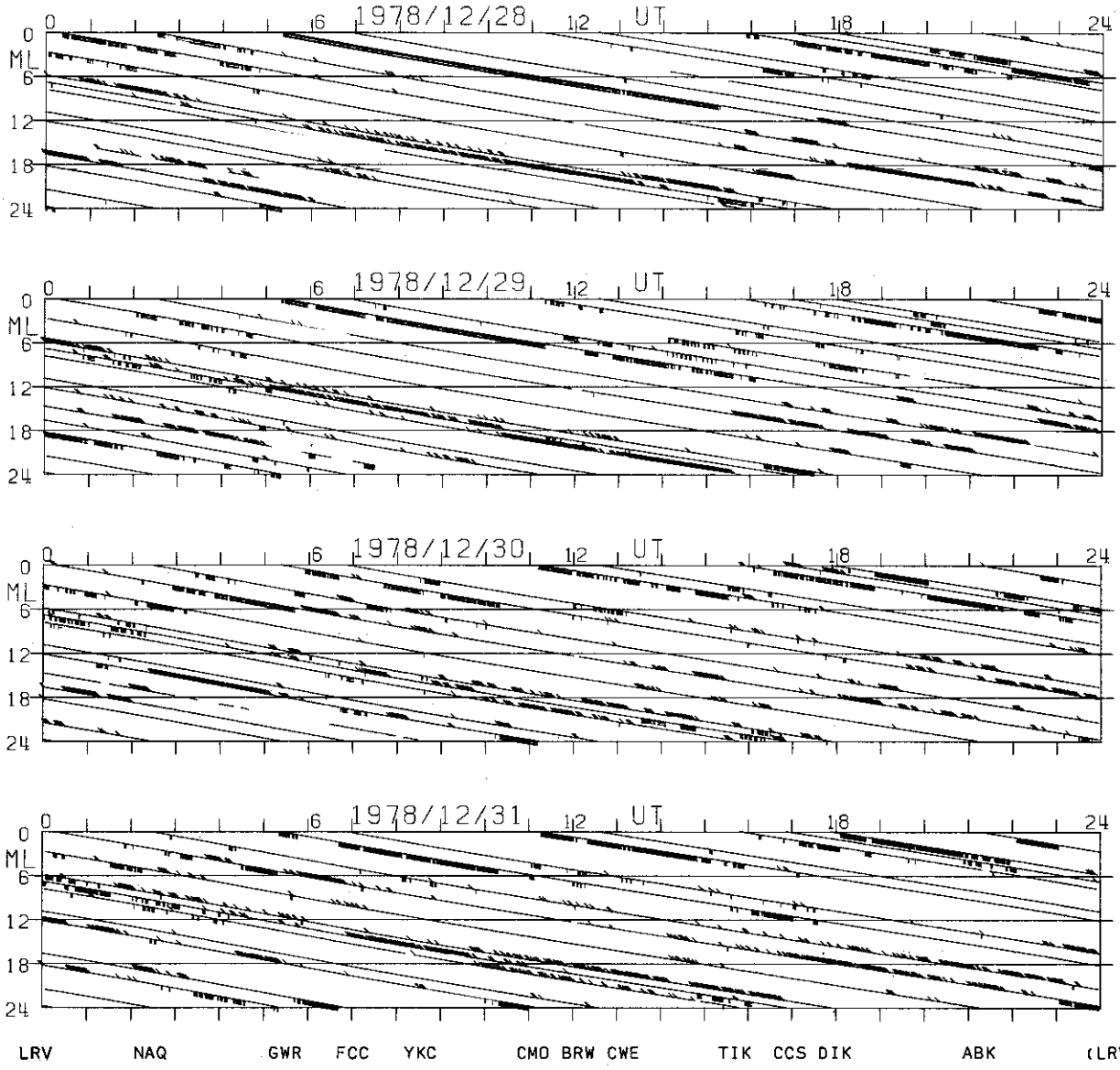
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1978/12/29 UT
1978/12/30 UT
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18
24
ML
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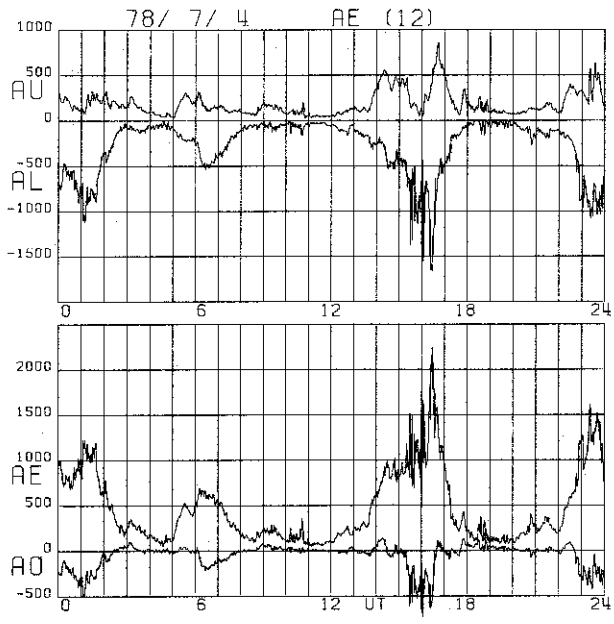
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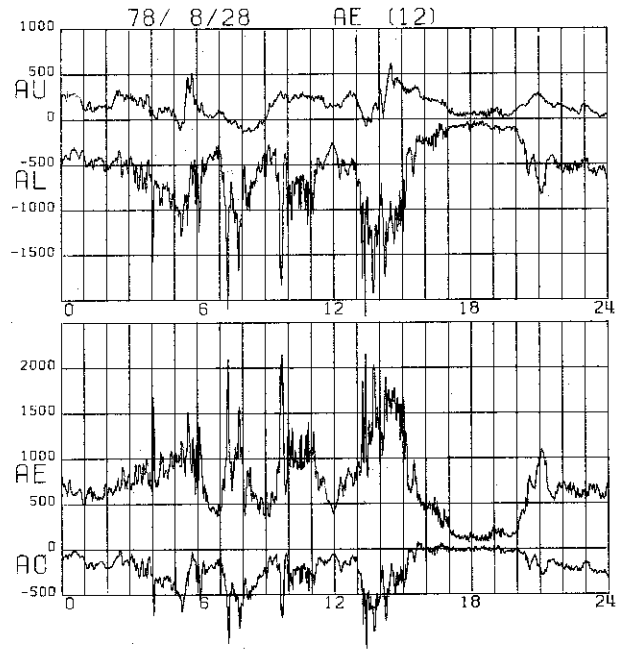
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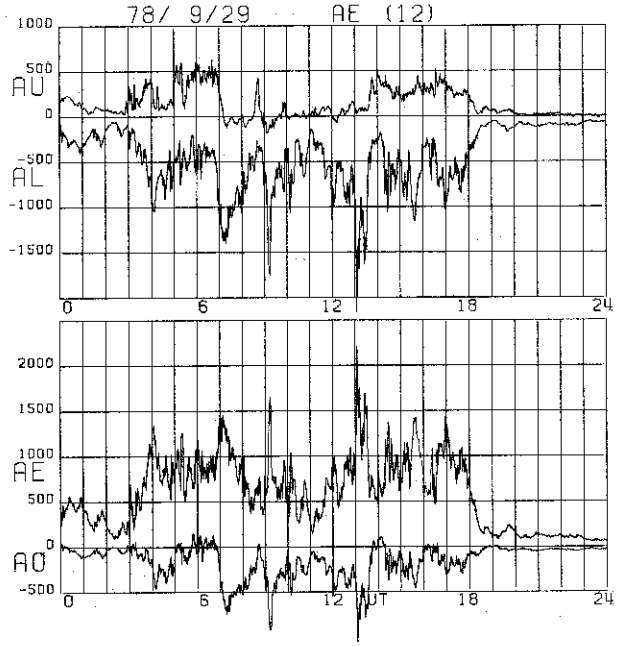
78/ 9/29 AE (12)
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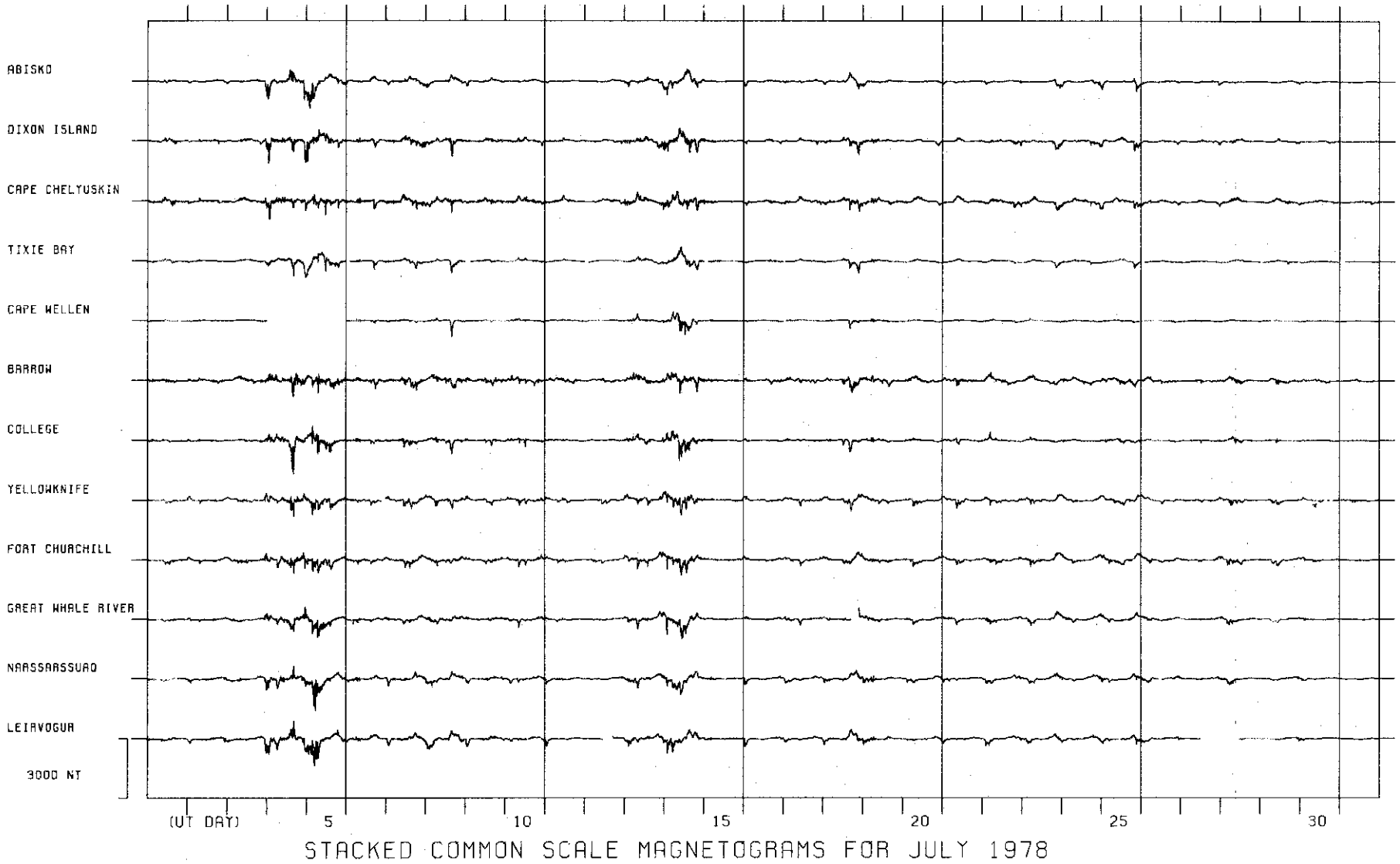
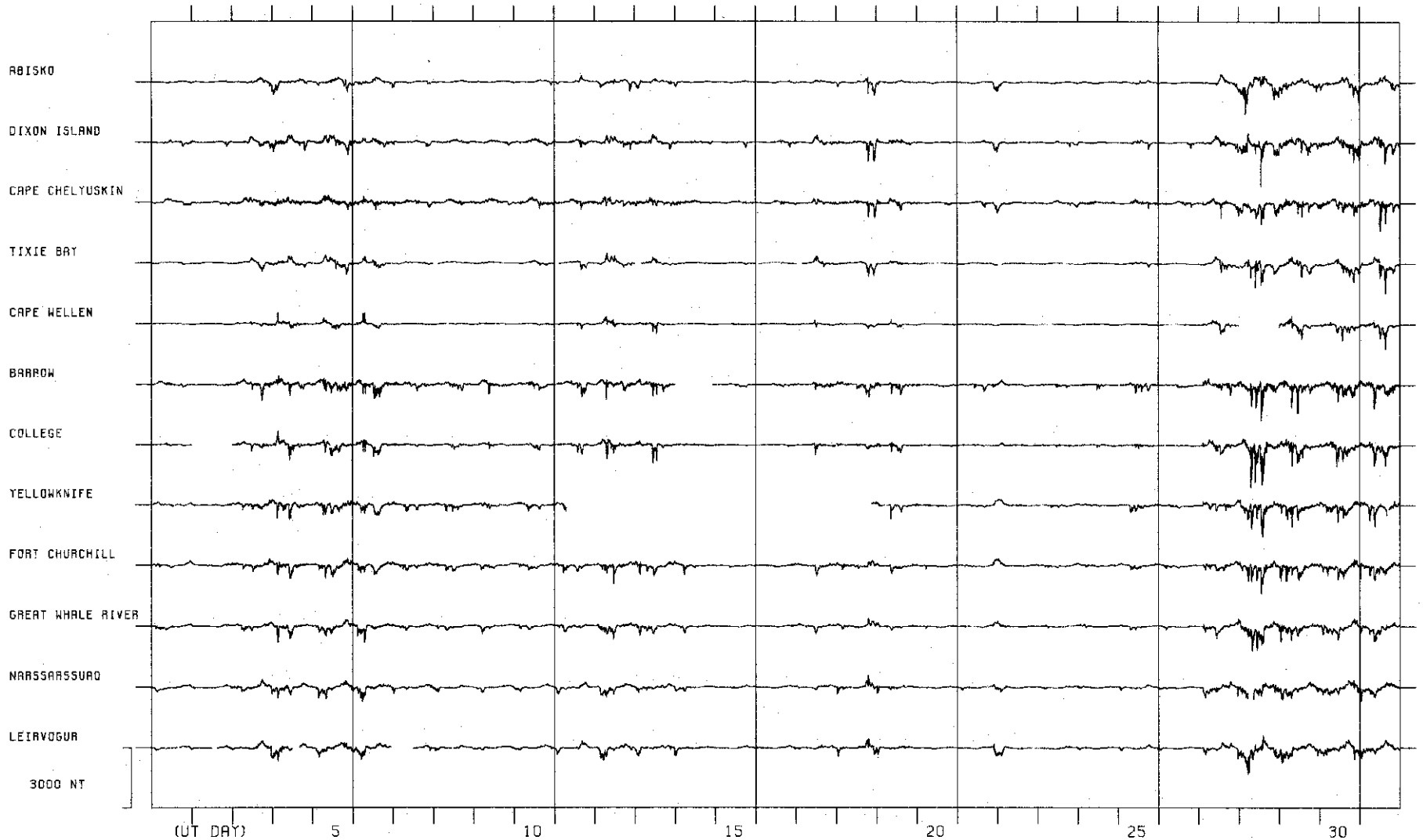
FIGURE 6

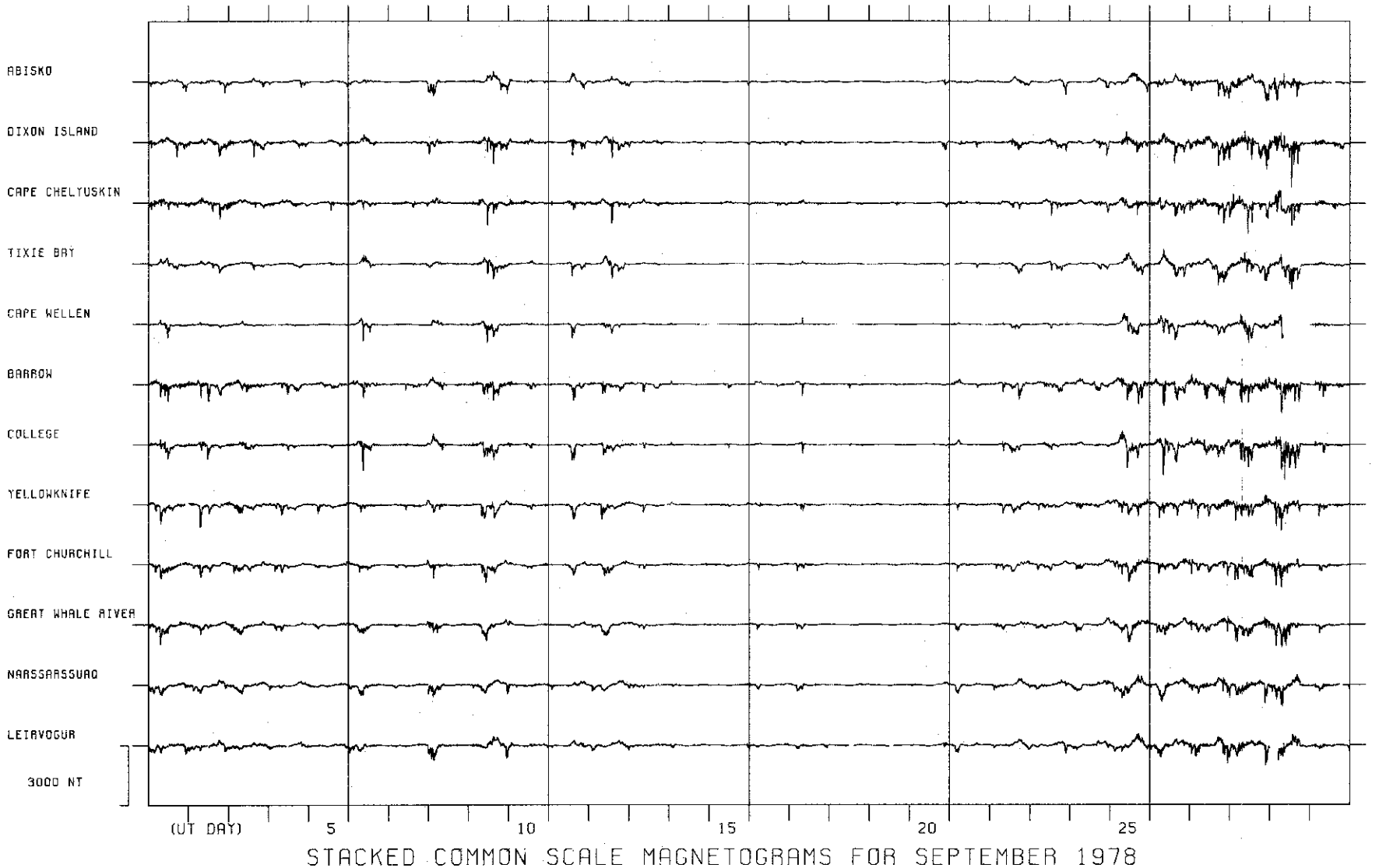
The H traces of magnetograms from AE(12) stations in every month from July to December 1978.



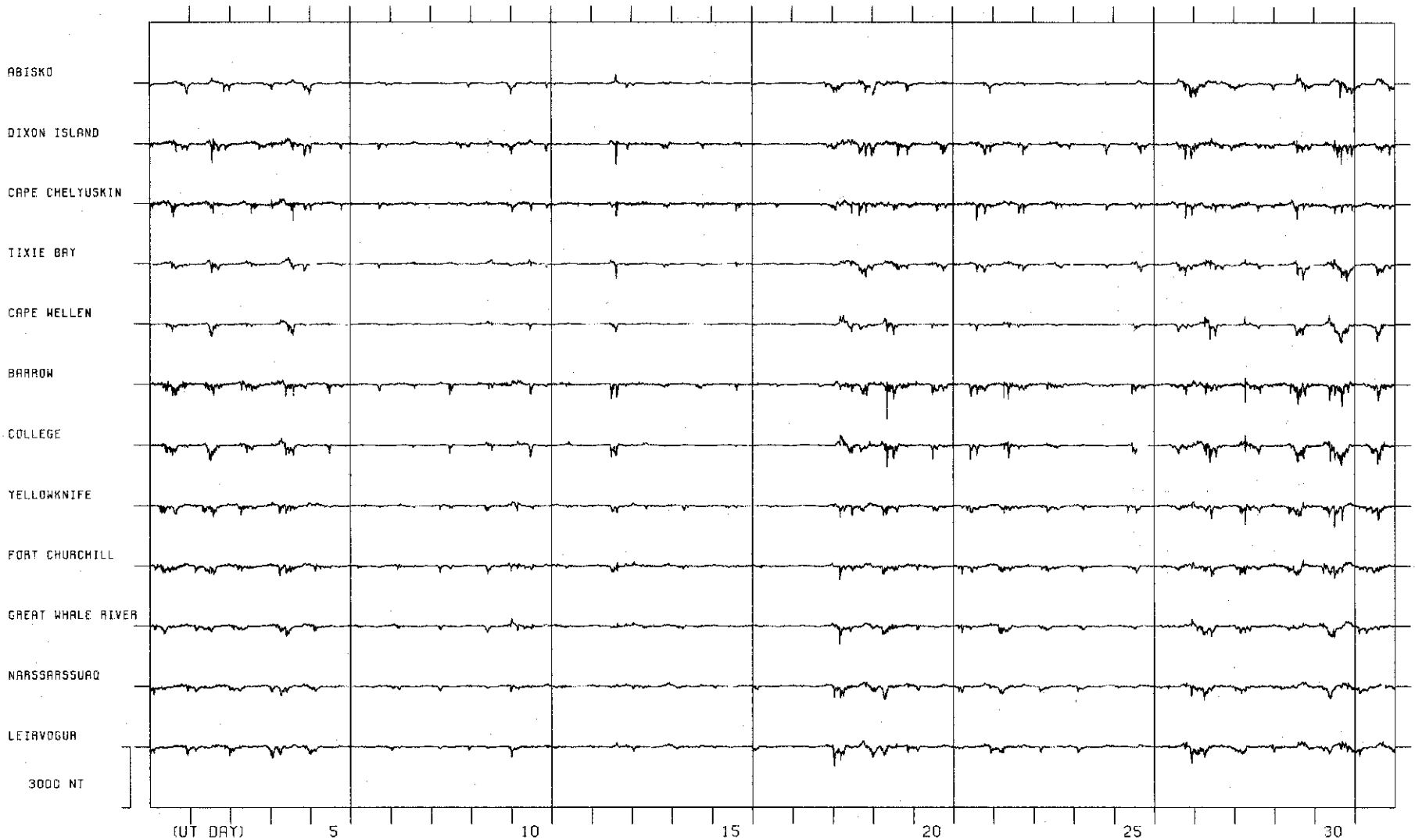
STACKED COMMON SCALE MAGNETOGRAMS FOR JULY 1978



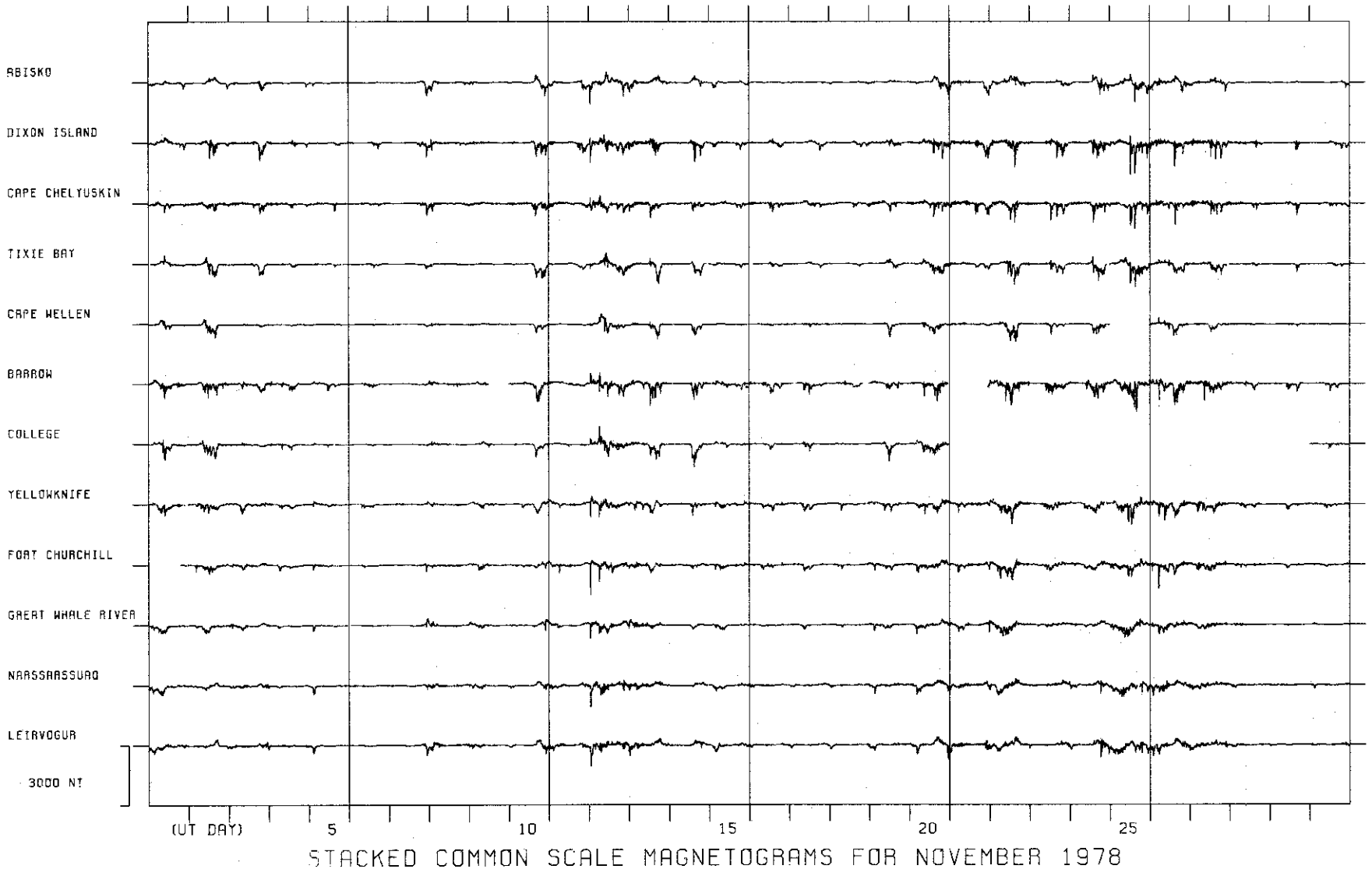
STACKED COMMON SCALE MAGNETOGRAMS FOR AUGUST 1978



STACKED COMMON SCALE MAGNETOGRAMS FOR SEPTEMBER 1978



STACKED COMMON SCALE MAGNETOGRAMS FOR OCTOBER 1978



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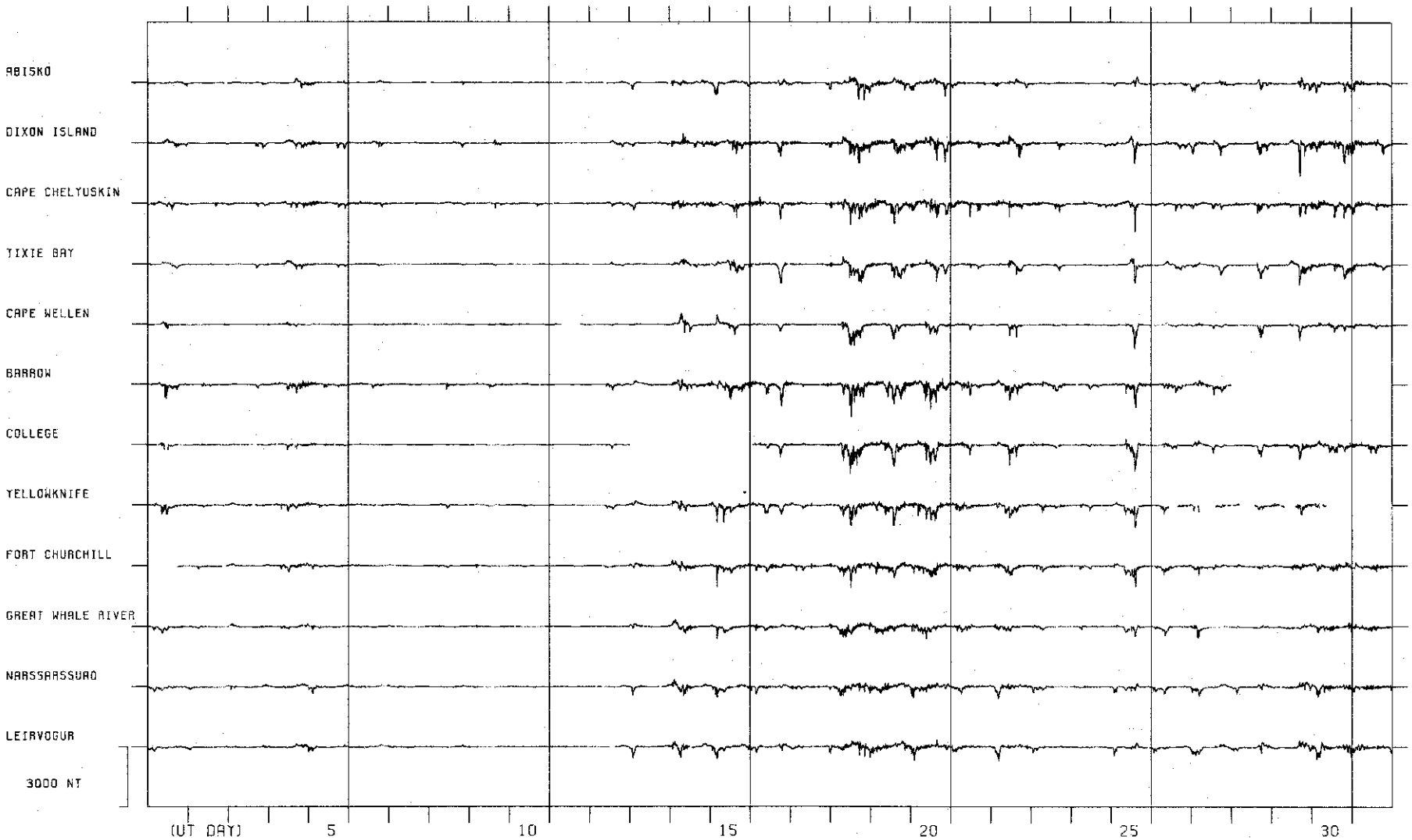

STACKED COMMON SCALE MAGNETOGRAMS FOR DECEMBER 1978