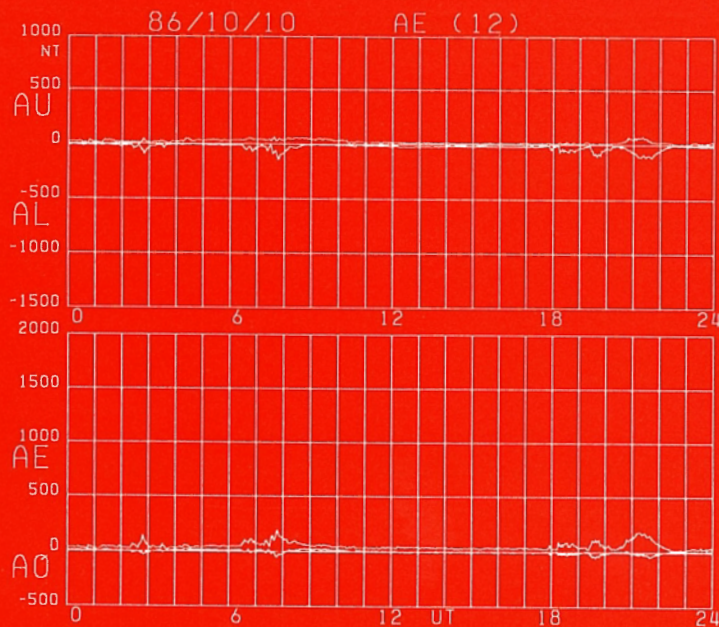


World Data Center C2 for Geomagnetism

# DATA BOOK

No. 20

Auroral electrojet (AE) indices  
for July-December 1986



MAY 1991

Data Analysis Center for  
Geomagnetism and Space Magnetism  
FACULTY OF SCIENCE  
**KYOTO UNIVERSITY**  
KYOTO

Division of  
Data Collection and Processing  
**NATIONAL INSTITUTE OF  
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TOKYO

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

Data Book No. 21	AE indices for January - June 1987.
Data Book No. 22	AE indices for July - December 1987.
Data Book	AE indices for January - June 1977.
Data Book	AE indices for July - December 1977.

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## PPREFACE

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

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

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

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

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# AURORAL ELECTROJET (AE) INDICES

FOR JULY - DECEMBER 1986

## 1. Derivation and Representation

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

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

## 2. Data Used

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

Table 1. List of AE(12) stations.

Observatory	Abbreviations		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
Poste-de-la-Baleine (Great Whale River)	PBQ	PBQ	55.27	282.22	66.58	347.36
Narssarssuaq	NAQ	NAS	61.20	314.16	71.21	36.79
Leirvogur	LRV	LR	64.18	338.30	70.22	71.04

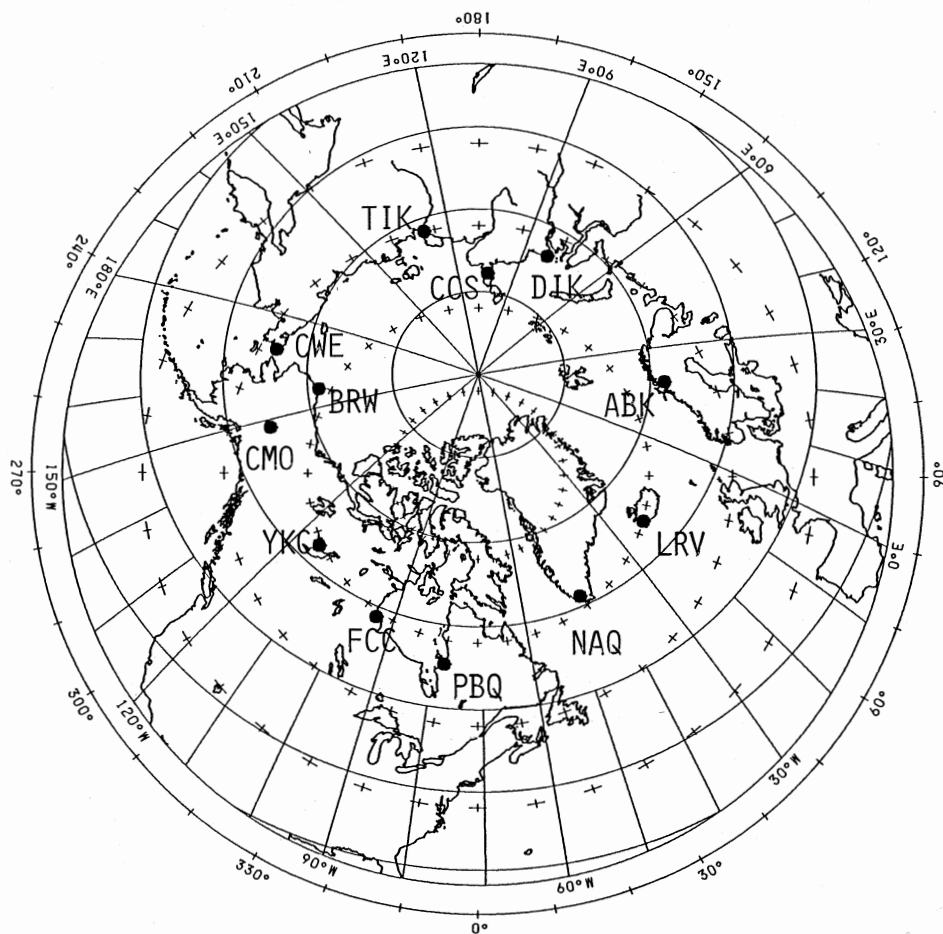


Figure 1. Distribution of AE(12) stations.

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



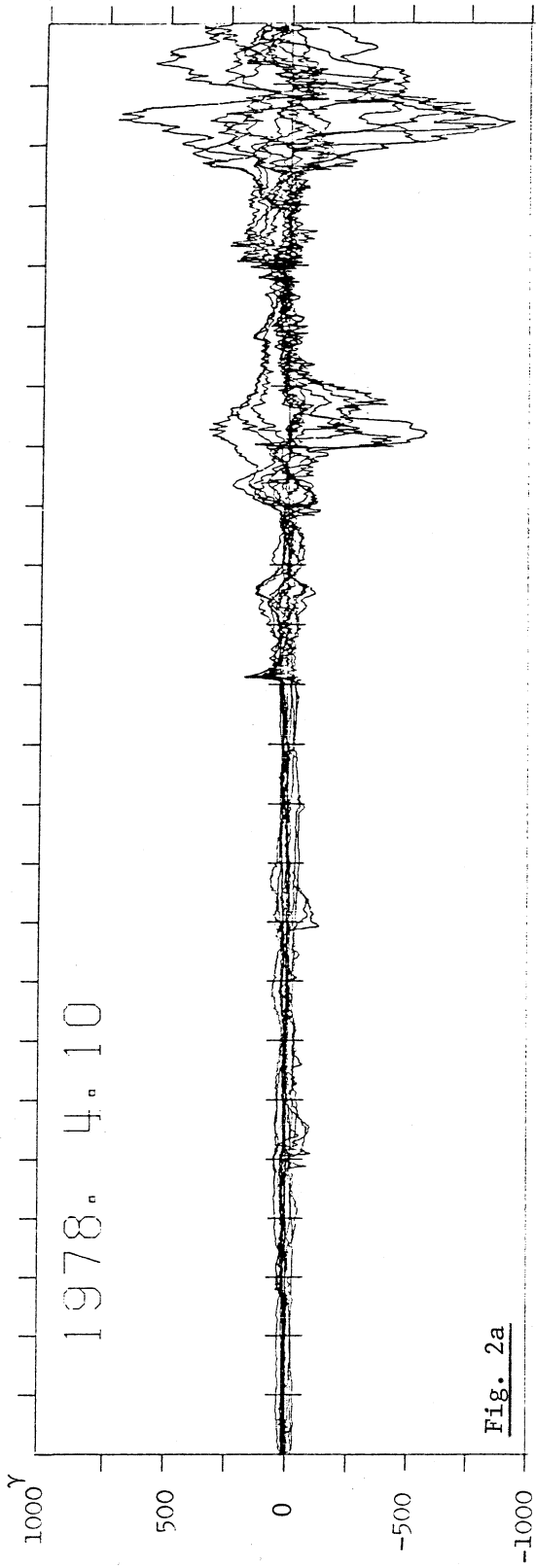


Fig. 2a

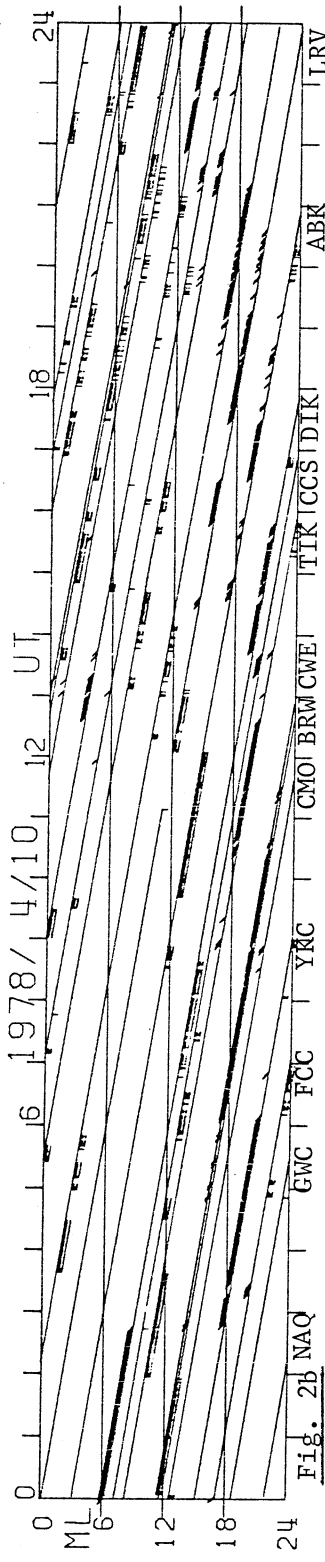


Fig. 2b

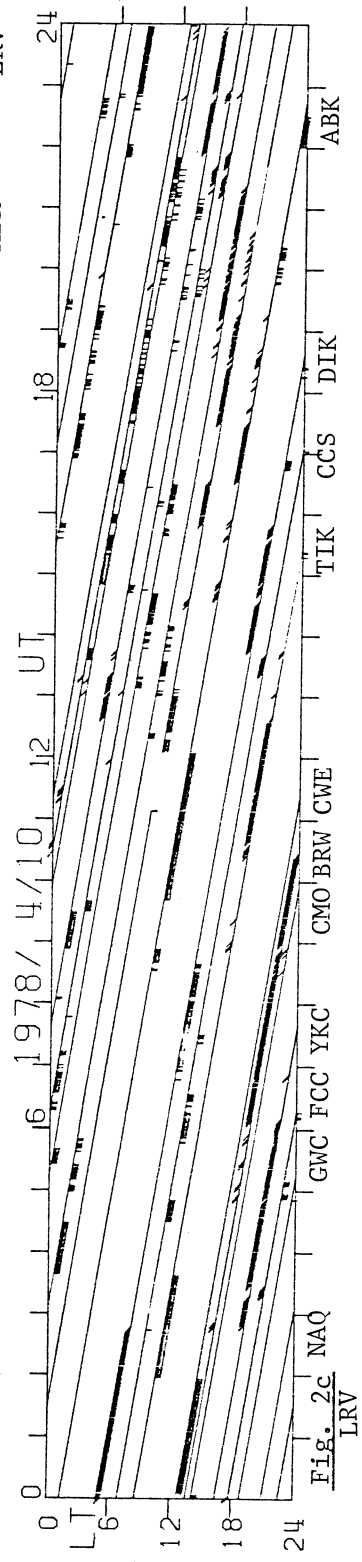


Fig. 2c

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

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

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

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

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

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

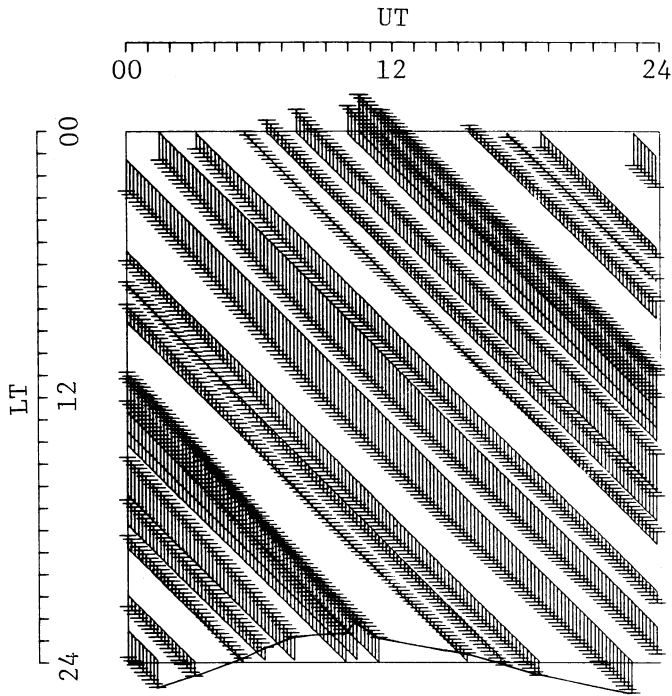


Fig. 3a Difference between GLT and MLT in winter.

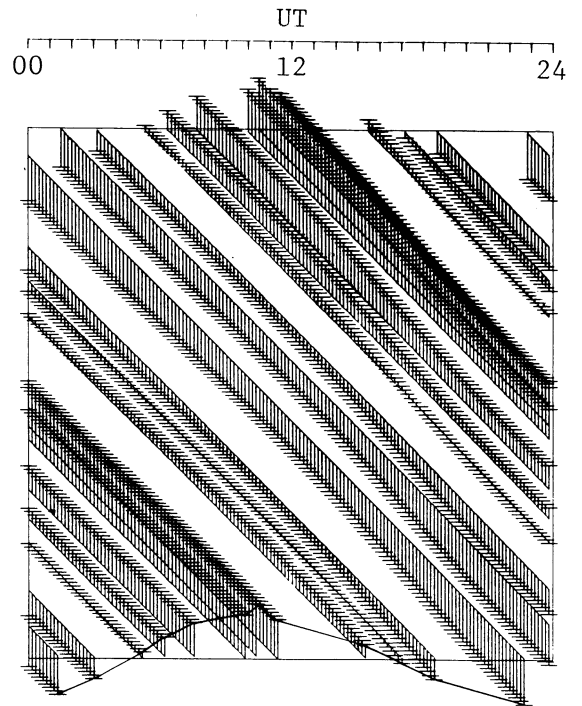


Fig. 3b Difference between GLT and MLT in summer.

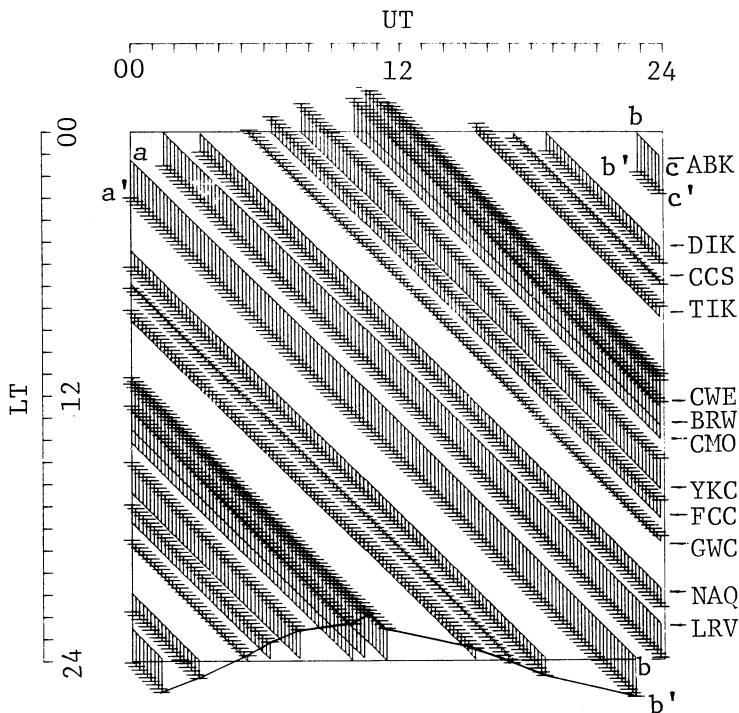


Fig. 3c Difference between GLT and MLT in equinox.

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

#### 4. Results

Monthly quiet-time H reference values for July–December 1986 are listed in Table 2. Table 3 gives hourly average values of the AE indices for each day from July to December 1986.

Daily graphs of 1.0-min AE indices (AU, AL, AE and AO) are shown in Fig. 4, and corresponding plots of the contributing stations are given in Fig. 5. Supplemental plots for disturbed days are given at the end of Fig. 4. Figure 6 shows the H-traces of magnetograms from AE(12) stations for each month from July to December 1986. Figure 7 shows hourly mean values of each index for one half year on each page. Finally, a summary plot of hourly values of AU and AL indices is given in Fig. 8.

#### 5. Acknowledgements

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

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Table 2. Monthly quiet-time H reference values (unit in nT)  
(Year 1986)

STATION	July	Aug.	Sep.	Oct.	Nov.	Dec.
Abisko	11664	11654	11653	11651	11651	11648
Dixon Island	-622	-633	-633	-639	-643	-649 (HO+)
Cape Chelyuskin	292	303	272	259	257	258 (HO+)
Tixie Bay	57	52	44	39	31	33 (HO+)
Cape Wellen	185	174	171	164	165	164 (HO+)
Barrow	9647	9647	9647	9633	9633	9634
College	12882	12870	12873	12863	12868	12870
Yellowknife	8737	8727	8729	8730	8731	8735
Fort Churchill	7764	7751	7757	7761	7766	7771
Poste-de-la-Baleine	10785	10782	10784	10792	10794	10802
Narssarssuaq	12223	12218	12210	12219	12224	12223
Leirvogur	12432	12426	12419	12420	12425	12424

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

TABLE 3

Hourly average AE indices (AU, AL, AE and AO)  
for July-December 1986.

July 1986

AU Index ( Hourly mean values, unit nT )

Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean	
D	139	85	86	65	141	116	62	20	13	15	25	44	39	17	7	11	16	43	65	50	49	51	50	78	54	
	47	89	79	76	105	112	138	167	251	254	142	51	77	136	81	61	68	91	148	156	120	66	106	98	113	
	59	135	193	116	74	76	136	135	109	104	57	46	39	34	44	25	25	29	21	38	29	44	71	111	73	
	161	125	121	104	77	101	71	94	116	84	40	37	55	79	48	47	63	85	134	74	30	27	53	85	80	
	119	128	89	58	26	31	60	53	60	41	53	88	58	40	31	22	28	22	31	54	68	65	85	114	59	
Q	90	107	92	119	92	69	41	23	21	36	52	52	35	35	32	38	23	27	33	28	24	27	22	21	47	
	19	19	17	21	28	44	52	47	47	35	29	45	62	54	46	43	33	33	24	27	44	50	55	65	39	
	68	65	39	25	33	49	109	59	44	23	22	22	22	40	65	87	73	84	103	155	148	134	122	99	70	
	95	146	94	72	91	105	124	64	49	43	66	123	137	138	47	29	35	36	31	21	30	18	30	59	70	
	122	155	128	122	79	61	52	34	23	54	28	24	31	44	44	21	27	30	26	31	41	48	52	64	56	
Q	56	45	48	52	69	135	109	123	80	63	35	32	44	55	59	57	32	28	33	47	62	65	49	40	59	
	31	25	41	32	49	37	67	76	47	38	27	27	38	50	56	69	33	29	28	61	79	69	86	73	49	
	57	66	61	75	141	158	142	130	58	54	50	62	91	171	68	38	26	22	23	21	18	22	16	30	67	
Q	30	41	50	51	32	24	34	23	55	42	84	111	86	91	52	43	37	28	26	15	16	24	31	29	44	
Q	31	26	43	47	36	27	30	21	23	46	42	46	56	53	35	37	37	30	30	34	37	31	43	55	37	
	90	83	52	49	35	21	30	61	71	74	98	110	70	42	73	58	38	29	34	51	42	49	69	68	58	
	93	84	92	180	258	150	111	145	105	126	86	65	50	30	24	21	26	43	25	29	26	42	70	46	80	
	75	101	138	77	57	41	34	15	34	90	132	83	78	90	70	45	24	21	23	28	40	36	64	75	61	
	62	51	49	34	32	42	47	46	39	56	49	42	35	45	40	43	24	23	27	23	15	25	38	43	39	
Q	34	53	49	30	21	22	33	21	32	57	54	76	43	43	48	44	34	31	39	36	29	28	55	82	41	
	65	36	13	19	25	23	19	43	33	26	33	33	31	28	27	21	30	33	38	44	59	111	113	117	42	
	140	83	103	68	28	12	22	24	55	87	121	194	167	103	38	23	29	51	60	40	71	63	42	34	69	
	62	85	57	56	32	49	33	13	19	37	128	131	119	84	57	47	38	32	36	32	29	33	52	29	54	
	20	42	38	54	47	44	77	92	78	56	64	67	34	29	21	20	25	41	87	107	104	77	196	253	70	
D	183	139	65	107	125	63	20	50	50	26	51	23	19	12	13	10	16	19	35	39	136	147	367	324	85	
D	110	143	182	178	151	203	162	136	209	144	85	108	172	138	82	86	99	95	115	89	127	93	171	163	135	
D	78	38	43	66	105	131	104	164	234	333	204	116	85	53	32	33	38	48	43	54	75	92	105	121	100	
	28	93	111	78	93	53	115	112	162	157	102	77	93	70	100	72	41	69	80	95	59	83	73	97	116	92
D	83	74	112	100	76	52	74	145	106	76	112	167	183	121	91	74	84	73	58	158	185	169	190	191	115	
	125	123	82	73	102	71	122	189	201	158	126	137	103	79	74	55	59	82	78	62	69	116	69	57	101	
	57	65	126	119	95	55	46	74	85	198	179	92	79	116	76	68	54	55	51	40	106	114	99	118	90	
Mean	80	82	79	75	74	72	73	79	80	83	75	75	71	69	50	42	40	44	51	54	64	64	86	86	92	69
5Q Mean	34	36	41	40	37	50	51	47	47	48	48	62	58	59	48	44	34	30	30	31	37	39	46	54	44	
5D Mean	100	96	96	105	112	112	99	132	170	166	118	93	107	92	59	52	61	65	79	99	128	113	187	179	109	

1986

August

AU Index ( Hourly mean values, unit nr )

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	113	84	75	81	67	64	49	82	91	71	48	56	81	72	42	36	24	51	70	92	61	32	41	38	63
Q	21	27	27	33	23	49	70	89	77	88	52	87	93	80	54	51	42	41	39	36	39	21	17	46	50
3	81	100	117	150	117	215	167	163	149	249	215	158	125	109	85	53	62	73	121	197	146	162	228	170	142
4	176	293	160	173	181	148	106	119	163	108	112	129	119	111	73	48	67	99	72	55	61	94	65	39	115
5	57	92	102	119	78	91	69	65	62	73	112	123	108	97	79	60	51	78	50	50	119	163	128	99	89
6	80	118	102	91	102	88	61	38	42	41	54	80	85	60	44	29	30	64	85	58	34	47	35	36	63
Q	34	30	31	27	31	26	63	90	85	61	53	43	47	68	65	71	29	34	40	52	46	61	100	122	54
8	142	146	171	73	42	73	124	123	149	105	85	78	82	121	72	62	138	94	44	46	85	56	38	29	91
9	52	62	85	100	85	60	33	47	46	35	30	39	31	35	80	56	117	196	89	60	94	98	138	108	74
10	108	120	117	89	44	29	47	88	96	106	58	26	35	47	81	53	51	57	70	75	42	31	30	40	64
11	42	61	69	82	111	181	152	77	69	70	131	143	136	86	62	56	35	41	46	61	92	72	37	25	81
12	24	21	25	38	91	186	142	188	272	233	105	84	59	40	17	20	52	53	28	27	39	38	46	26	77
13	19	32	47	48	55	122	106	117	176	321	278	163	150	63	58	37	33	79	47	35	38	46	48	54	91
14	51	43	28	31	32	23	27	20	34	24	34	29	52	51	41	25	40	66	46	63	66	93	72	84	45
15	112	131	77	48	31	56	105	84	35	49	69	87	35	29	25	53	28	35	38	48	32	53	76	113	60
16	105	78	71	55	27	20	47	66	52	26	26	22	20	13	11	16	22	23	31	35	32	33	31	41	38
17	55	67	58	71	55	62	41	31	31	26	25	28	23	25	19	28	18	28	34	35	30	23	26	32	36
Q	34	32	25	29	29	39	47	32	25	25	23	23	19	16	24	34	27	19	22	20	17	15	17	15	25
Q	20	38	39	31	36	25	27	42	52	89	127	241	176	81	61	64	46	42	41	44	55	69	121	114	70
20	121	137	101	55	43	37	37	60	50	40	17	21	18	25	72	88	71	52	68	179	294	305	210	127	93
21	77	84	39	36	61	34	40	73	147	239	214	177	299	200	163	285	321	192	146	153	130	126	168	181	149
D	168	109	132	248	132	103	89	144	315	126	50	81	158	131	78	82	77	52	71	181	207	148	129	165	132
D	150	118	91	109	134	140	107	161	144	108	184	111	131	128	72	142	172	124	161	123	75	102	147	109	127
24	89	136	128	89	139	75	103	68	43	43	35	61	55	60	80	87	157	228	204	155	158	121	205	172	112
25	176	185	196	178	87	59	73	80	121	70	47	60	35	44	39	21	26	55	85	106	72	60	117	105	87
26	141	127	87	119	116	99	132	82	81	43	39	21	64	111	202	76	39	28	26	23	42	54	66	83	79
27	96	201	176	112	128	112	68	78	130	52	53	116	117	164	71	51	47	32	32	36	80	110	81	83	93
28	67	48	44	34	28	52	43	41	53	56	33	54	120	85	46	121	146	113	176	98	57	33	57	79	70
D	89	163	90	73	128	118	82	62	115	165	140	163	114	178	213	151	159	90	99	77	110	108	135	225	127
D	154	84	49	78	139	97	113	121	72	55	99	91	140	136	135	89	63	49	96	181	337	193	123	165	119
31	170	128	216	195	93	63	48	41	30	40	28	36	74	46	46	41	57	35	41	38	137	112	113	113	81
Mean	91	99	89	86	79	82	78	82	97	91	83	84	90	81	71	67	72	71	71	78	91	86	91	91	83
5Q Mean	42	41	38	35	29	31	50	63	58	57	56	83	71	51	43	47	33	31	34	37	40	56	68	68	47
5D Mean	127	111	80	108	118	98	86	112	158	138	137	124	168	154	132	149	158	101	114	143	171	135	140	169	130



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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	120	74	95	67	74	72	70	58	70	65	50	58	34	18	14	21	31	46	58	70	91	104	59	45	61
2	88	86	112	111	181	225	161	103	98	124	69	69	61	88	78	81	95	58	55	51	57	50	58	37	91
3	44	57	80	80	51	41	58	25	21	22	34	23	23	16	14	15	38	33	33	45	39	51	92	76	42
4	121	83	132	85	70	39	34	34	26	23	15	18	35	23	20	31	25	50	43	64	51	62	66	73	51
5	90	120	120	53	46	31	66	43	53	64	66	50	42	69	51	47	48	44	60	92	102	78	63	118	67
6	172	169	147	87	40	25	18	16	38	84	95	145	75	39	30	45	25	22	24	26	41	42	55	33	62
Q	22	34	49	48	37	28	61	39	32	27	51	61	35	22	19	16	14	23	30	26	27	27	26	32	33
Q	53	62	62	45	56	100	94	88	64	58	22	25	27	22	32	25	25	19	25	18	28	66	69	64	48
9	63	52	40	19	56	98	71	47	51	67	75	65	53	52	44	24	24	31	23	22	19	21	23	35	45
Q	48	53	46	26	23	29	62	48	44	38	29	25	24	25	19	16	20	25	26	27	30	27	22	20	31
11	13	13	25	20	38	44	44	40	24	31	28	46	35	31	40	28	13	15	41	43	108	180	204	121	51
12	36	96	133	46	-5	300	163	252	214	104	129	148	112	62	76	144	167	156	140	81	141	131	93	89	125
13	74	107	119	72	135	45	141	139	170	138	110	133	109	86	21	29	39	54	119	155	114	144	171	150	107
14	106	95	130	53	79	43	49	33	24	25	33	26	30	32	67	17	18	52	63	56	52	67	49	59	53
15	56	70	60	51	58	43	40	36	61	90	116	145	111	102	103	142	205	235	170	215	168	77	26	18	100
16	23	42	60	31	29	38	36	17	10	8	11	19	14	4	7	8	15	13	16	20	33	26	33	79	25
17	83	62	43	37	95	114	169	140	81	62	16	7	3	21	11	16	29	50	36	63	64	120	159	145	68
18	138	128	84	117	143	98	151	67	88	94	82	69	47	69	35	31	95	121	276	99	58	67	47	65	95
19	74	147	151	101	97	103	104	118	110	65	46	42	52	41	66	187	274	169	68	70	37	60	102	104	100
20	88	79	50	54	44	44	79	123	139	71	43	22	24	30	33	22	28	64	84	51	51	84	132	156	66
21	154	104	67	60	54	41	34	30	25	23	36	27	26	21	15	12	15	32	36	56	33	25	24	35	41
Q	26	40	31	23	20	18	18	23	19	29	22	16	16	9	13	5	11	14	21	46	44	43	49	41	25
D	36	52	69	89	131	203	201	125	133	78	97	103	61	68	81	224	296	202	221	186	134	188	127	62	132
D	81	152	83	57	88	121	199	137	143	94	112	67	39	95	132	76	41	61	172	164	134	178	98	92	109
D	59	28	65	33	42	55	61	39	64	74	98	99	123	169	175	88	77	150	71	38	25	64	126	96	80
26	93	109	99	173	151	72	51	110	131	106	76	81	101	43	25	74	148	142	71	97	61	58	50	54	91
27	90	62	65	33	32	55	93	73	104	96	75	62	58	53	74	53	34	21	65	183	203	143	109	96	81
28	125	111	130	69	29	44	60	50	39	25	25	26	19	13	16	22	11	14	19	33	67	74	83	186	54
29	132	97	103	102	99	40	36	42	34	56	41	38	38	12	30	40	37	53	63	40	71	120	91	56	61
Q	68	44	24	33	47	43	52	35	26	23	52	82	29	11	7	15	11	14	14	12	14	14	14	15	29
Mean	79	80	82	62	68	75	82	71	71	62	58	59	48	44	44	51	63	66	71	71	69	79	77	75	67
5Q Mean	43	46	42	35	36	43	57	46	37	35	35	41	26	17	18	15	16	19	23	25	28	35	36	34	33
5D Mean	61	87	89	79	81	150	135	132	137	91	102	99	87	87	97	121	145	142	135	113	99	123	98	78	107

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	13	13	14	15	25	22	19	27	37	34	29	39	33	50	36	26	19	20	20	20	30	38	46	61	29
D	49	60	66	70	98	105	170	136	162	126	134	157	142	116	131	281	198	103	103	171	144	109	114	110	127
3	122	81	54	45	67	42	37	47	56	44	28	19	15	16	14	15	19	22	20	38	77	54	63	44	
4	79	78	62	56	60	75	67	67	49	44	44	33	34	50	35	28	21	35	52	51	67	51	58	53	52
D	109	111	98	117	84	83	96	60	54	54	92	142	89	60	103	57	74	80	55	73	80	97	119	93	87
6	40	48	108	98	92	130	118	167	173	78	39	42	23	14	22	35	38	32	25	26	31	30	25	28	61
7	27	22	16	25	30	36	35	44	52	56	33	40	32	16	14	25	21	22	20	18	27	20	27	22	28
8	23	24	17	13	20	23	40	39	52	65	75	66	52	43	43	47	47	40	27	28	32	55	77	68	42
9	44	32	35	27	37	52	56	57	41	30	29	27	26	28	29	18	26	21	18	30	60	41	48	38	35
Q	20	22	19	18	30	33	40	42	52	43	26	20	18	16	14	14	15	15	17	16	32	50	17	18	25
Q	17	20	24	17	21	19	28	36	32	30	30	28	27	67	59	60	23	20	21	16	15	11	18	25	28
Q	25	35	36	19	10	8	10	11	13	16	13	15	15	13	9	10	9	11	14	11	11	11	10	12	15
D	14	16	18	23	19	33	43	44	47	94	119	135	230	152	67	65	27	34	118	105	-23	145	70	33	68
D	82	49	103	106	153	228	177	75	238	129	160	91	125	70	33	32	10	38	77	62	51	53	35	38	92
15	50	48	48	39	37	52	66	101	146	138	95	105	82	67	29	60	19	15	57	102	81	68	68	41	67
16	33	33	31	32	55	54	43	32	37	31	31	36	31	34	14	27	28	13	15	20	19	25	25	22	30
17	40	67	61	68	38	27	41	58	53	64	21	19	31	17	9	22	11	10	11	15	33	66	58	32	36
18	36	27	20	22	23	17	16	30	26	37	49	39	102	45	57	79	124	66	49	103	158	139	79	103	60
D	119	100	104	82	107	123	49	70	116	83	61	104	96	150	151	101	94	62	74	58	37	51	59	54	88
20	81	70	73	68	61	78	90	78	90	88	78	69	52	38	72	106	90	51	33	101	80	96	148	93	79
21	127	123	141	91	60	122	68	35	45	38	50	65	76	66	46	33	39	40	61	38	52	69	62	61	67
22	55	53	90	134	98	71	80	52	61	39	58	40	42	19	11	13	6	7	11	8	10	14	17	27	42
23	30	21	19	28	20	27	22	23	25	13	11	24	20	19	19	15	19	18	43	56	23	17	26	15	23
Q	13	8	7	6	6	6	6	8	9	13	14	11	9	7	28	17	12	7	13	9	7	5	12	9	10
25	9	12	11	8	12	15	14	14	36	26	32	32	14	14	11	9	10	11	11	13	13	38	78	72	22
Q	43	13	6	10	10	15	14	16	16	13	13	13	15	17	13	14	21	24	13	11	12	17	25	27	16
27	62	17	33	114	78	72	93	106	116	119	146	252	112	250	252	249	121	179	178	170	170	84	68	51	129
28	27	77	87	74	52	28	41	45	50	68	60	40	21	16	10	9	6	5	8	9	26	48	46	70	39
29	99	126	175	151	95	98	114	116	104	101	62	89	76	37	28	22	14	19	21	53	89	82	94	125	83
30	93	72	67	79	104	86	77	49	31	63	51	41	50	57	1	7	56	166	274	277	200	163	116	197	99
31	72	64	70	76	26	23	36	37	49	64	53	65	105	77	19	9	7	8	6	7	7	14	45	74	42
Mean	53	49	55	55	52	58	58	55	66	59	56	61	58	52	44	48	39	38	47	54	52	57	56	55	53
5Q Mean	23	19	18	14	15	16	19	22	24	23	19	17	16	24	24	23	16	15	15	12	15	18	16	18	18
5D Mean	74	67	77	79	92	114	107	77	123	97	113	125	136	109	97	107	80	63	85	93	57	91	79	65	92

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	117	62	149	166	145	135	136	175	171	101	83	45	26	11	16	10	9	8	11	10	9	13	14	15	68
2	13	15	18	26	28	22	19	24	35	71	59	28	28	16	23	13	14	31	31	23	24	19	19	32	26
D 3	32	44	35	49	89	82	68	63	69	40	43	62	44	70	30	22	18	53	75	25	29	53	68	97	53
D 4	198	381	199	214	540	591	200	55	66	102	76	155	243	226	147	117	65	22	-70	96	163	104	83	101	170
D 5	186	176	121	114	176	169	111	108	113	60	32	46	58	44	12	13	13	28	32	31	38	33	34	50	75
6	76	104	84	45	58	68	55	37	48	35	12	25	30	74	52	37	23	36	164	121	127	94	55	46	63
7	67	90	125	67	38	34	17	13	21	14	10	8	10	13	11	18	7	11	9	2	4	12	48	53	29
Q 8	50	58	47	47	39	35	21	40	41	101	62	40	43	16	10	20	6	24	12	17	7	9	8	16	32
Q 9	36	20	18	13	19	22	23	36	34	75	57	62	24	10	15	44	24	11	6	4	8	7	8	7	24
10	7	7	14	23	28	19	19	12	15	22	14	23	19	5	8	9	13	16	16	29	45	44	37	73	21
11	41	105	164	145	149	188	248	241	145	44	47	18	15	3	26	21	55	47	19	10	20	16	15	43	76
12	60	110	128	81	75	59	83	68	43	71	40	18	19	18	22	10	8	12	18	12	8	5	7	10	41
13	12	14	19	16	19	16	20	35	53	49	25	25	30	72	36	46	73	57	83	62	26	20	32	44	37
14	30	43	28	27	26	23	27	18	19	21	17	43	40	42	32	21	13	12	16	11	20	31	59	43	28
15	35	46	55	46	27	20	42	50	35	63	80	64	28	29	54	192	334	236	119	122	105	107	103	112	88
16	94	151	146	120	107	102	67	48	41	33	47	61	60	63	37	78	60	50	40	59	57	48	80	88	72
17	52	61	76	105	85	79	62	52	64	54	33	67	51	25	45	44	59	27	25	17	28	26	31	33	50
18	45	37	30	32	38	60	58	70	31	23	36	22	16	19	14	11	7	5	8	10	13	13	13	9	26
Q 19	10	12	13	14	10	8	11	14	13	13	13	25	18	16	21	36	48	31	20	23	78	69	80	49	27
20	83	100	58	49	37	48	19	33	38	27	26	26	23	26	28	13	20	9	9	12	11	18	18	14	31
Q 21	15	16	14	12	15	19	27	26	41	30	19	29	28	16	18	12	15	15	12	14	22	12	16	20	19
Q 22	20	13	14	25	14	15	12	10	15	12	13	11	9	9	6	7	8	7	7	6	8	13	9	12	12
23	15	18	14	9	16	16	20	21	16	23	19	17	27	19	62	49	27	78	133	120	200	179	145	170	59
D 24	202	123	77	181	149	49	28	12	11	48	85	53	9	26	43	82	147	78	-4	69	48	89	62	45	71
D 25	87	118	117	129	185	182	203	195	251	193	94	104	177	204	248	152	29	57	21	134	170	103	81	62	137
26	77	49	20	49	51	62	66	70	100	124	161	100	46	88	24	54	163	54	36	14	19	15	17	26	62
27	41	58	37	97	98	92	69	70	100	70	44	84	38	17	9	10	22	9	9	13	7	6	7	4	42
28	5	11	12	20	14	31	74	61	72	56	31	76	30	16	19	0	8	11	34	22	10	12	18	24	28
29	16	27	52	37	40	55	38	34	52	102	56	41	67	55	133	252	216	197	179	97	99	107	73	24	85
30	30	21	18	28	40	67	48	83	132	142	117	82	29	111	194	213	255	156	131	124	91	81	132	110	101
Mean	58	69	63	66	78	78	63	59	62	60	48	48	42	45	46	53	58	46	40	43	49	45	45	47	55
5Q Mean	26	23	21	22	19	19	18	25	28	46	32	33	24	13	14	23	20	17	11	12	24	22	24	20	22
5D Mean	141	168	109	137	227	214	122	86	102	88	66	84	106	114	96	77	54	47	10	71	89	76	65	71	101

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
D 1	172	183	142	53	71	80	104	94	66	180	134	74	31	17	13	21	47	23	38	25	28	18	10	23	69
2	30	34	35	35	55	75	94	86	56	51	63	79	44	73	20	25	24	19	27	15	9	28	29	35	43
3	58	25	26	26	18	21	37	39	71	102	65	55	77	20	13	36	26	21	18	21	16	32	34	25	37
4	19	25	34	24	21	21	36	32	30	66	46	54	114	107	33	23	13	20	66	141	150	108	124	78	58
Q 5	78	92	78	26	16	20	14	8	8	9	11	6	8	7	13	6	4	6	5	5	8	11	18	19	20
6	21	23	29	62	66	44	13	12	12	26	31	32	23	13	10	10	12	11	20	34	26	17	15	17	24
7	22	19	20	21	32	48	72	92	66	66	64	33	42	103	72	40	34	23	27	20	24	29	28	22	42
Q 8	16	19	35	46	42	21	18	21	38	30	39	27	28	17	13	12	27	34	42	49	46	91	124	67	38
9	50	45	49	24	14	17	16	17	31	18	16	12	12	8	11	20	26	21	26	43	95	91	174	116	40
10	91	106	133	226	148	41	14	10	35	42	43	36	44	100	75	38	18	70	102	137	129	98	77	49	78
11	59	92	65	49	44	57	53	63	39	33	39	37	85	108	62	39	24	23	25	27	17	15	21	15	45
12	17	16	14	20	20	31	34	31	29	40	27	13	11	6	7	15	11	28	74	89	89	69	66	78	35
13	52	38	39	41	34	23	34	36	33	32	32	32	50	96	128	38	18	42	118	96	109	176	176	212	70
D 14	234	71	72	75	122	125	77	35	84	114	87	101	177	188	84	39	21	23	61	93	45	46	37	34	85
Q 15	37	46	66	73	29	17	16	28	26	26	20	19	11	9	17	16	12	9	10	9	17	16	15	15	23
16	37	61	121	83	35	17	25	31	36	49	51	104	58	23	22	52	39	33	49	33	47	31	23	20	45
17	15	9	17	21	23	28	40	42	43	22	13	30	21	39	60	44	21	22	37	65	86	63	43	36	35
18	17	13	18	17	13	16	14	10	10	10	8	9	8	15	19	41	41	22	12	20	102	77	70	65	27
19	35	26	33	53	30	63	20	18	13	12	18	30	13	12	10	17	21	10	17	29	59	171	201	76	41
20	53	38	36	26	25	22	44	37	23	21	13	19	14	35	58	70	78	45	37	12	12	10	15	31	32
21	48	42	22	24	18	21	27	34	35	81	75	33	33	84	38	70	44	25	29	76	111	78	101	116	53
D 22	61	56	52	64	63	43	29	30	42	47	61	30	20	61	60	116	160	77	57	83	102	58	79	89	64
D 23	73	89	93	95	100	68	67	88	125	75	132	151	59	147	114	64	54	59	49	67	96	107	167	115	94
24	62	95	85	123	69	47	55	38	29	36	41	70	49	62	52	28	22	31	67	108	111	83	59	43	61
25	44	41	46	51	88	150	86	38	30	51	42	68	43	13	12	9	33	18	13	10	6	10	41	47	41
D 26	63	110	116	107	103	120	136	133	69	88	87	57	63	46	44	38	49	54	29	55	61	58	68	48	75
27	71	57	55	48	33	50	71	97	60	37	38	25	32	22	14	20	47	31	16	11	12	41	64	45	42
Q 28	35	30	38	30	17	20	15	25	19	60	40	36	23	8	8	13	12	12	12	3	3	3	6	7	20
Q 29	9	23	27	27	44	30	46	31	29	31	18	16	25	29	12	8	7	3	2	1	3	7	9	8	19
30	16	14	21	20	16	9	7	8	10	11	10	17	12	14	18	29	30	14	16	32	71	57	63	40	23
31	22	17	26	11	11	23	39	80	30	28	36	30	14	24	78	36	34	25	15	15	10	7	15	18	27
Mean	52	50	53	51	45	44	43	43	39	48	45	43	40	48	38	33	32	27	36	45	54	55	63	51	45
5Q Mean	35	42	48	40	29	21	21	22	24	31	25	20	19	14	12	11	12	12	14	13	15	25	34	23	23
5D Mean	120	101	95	78	91	87	82	76	77	100	100	82	70	91	63	55	66	47	46	64	66	57	72	61	77

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	-377	-204	-109	-120	-298	-234	-80	-19	-22	-20	-21	-29	-26	-40	-49	-58	-79	-109	-143	-73	-58	-39	-41	-68	-96
D	-33	-60	-91	-146	-303	-193	-244	-264	-432	-356	-124	-54	-69	-284	-198	-36	-122	-139	-246	-282	-169	-68	-156	-295	-182
3	-55	-105	-322	-246	-143	-66	-110	-312	-201	-224	-202	-86	-35	-58	-50	-79	-84	-103	-79	-97	-48	-54	-71	-137	-124
4	-297	-150	-170	-138	-80	-229	-108	-49	-67	-186	-77	-60	-31	-29	-123	-86	-148	-162	-323	-89	-33	-40	-53	-73	-117
5	-161	-111	-53	-42	-66	-68	-102	-147	-85	-123	-100	-79	-40	-91	-109	-97	-92	-58	-49	-129	-108	-69	-82	-231	-96
6	-132	-95	-103	-211	-171	-73	-23	-12	-21	-28	-139	-74	-24	-23	-26	-38	-40	-29	-81	-69	-39	-27	-35	-36	-65
7	-33	-26	-26	-31	-27	-34	-71	-97	-36	-82	-27	-27	-46	-34	-20	-29	-104	-116	-40	-21	-31	-39	-58	-71	-47
8	-57	-32	-28	-30	-33	-22	-93	-69	-29	-17	-23	-23	-15	-18	-102	-208	-337	-268	-193	-163	-302	-164	-173	-192	-108
9	-116	-200	-145	-60	-27	-141	-255	-79	-25	-27	-61	-122	-119	-344	-122	-45	-11	-21	-15	-30	-32	-34	-41	-53	-89
10	-90	-211	-226	-150	-118	-100	-35	-17	-16	-60	-43	-39	-29	-33	-113	-63	-31	-28	-39	-26	-42	-30	-61	-56	-69
Q	-33	-33	-34	-55	-57	-80	-105	-65	-76	-33	-37	-36	-34	-46	-34	-169	-13	-10	-27	-129	-144	-98	-55	-34	-60
12	-29	-32	-28	-36	-41	-33	-57	-55	-34	-32	-31	-37	-47	-49	-75	-65	-86	-92	-55	-50	-56	-49	-28	-78	-49
13	-50	-29	-38	-43	-229	-239	-129	-94	-74	-48	-45	-44	-146	-311	-172	-94	-16	-19	-20	-21	-24	-31	-35	-35	-83
14	-34	-41	-43	-59	-74	-44	-47	-34	-48	-55	-76	-214	-95	-51	-86	-168	-158	-78	-39	-28	-29	-36	-27	-30	-66
Q	-27	-30	-29	-52	-33	-18	-38	-24	-16	-25	-27	-27	-23	-16	-14	-20	-17	-20	-15	-13	-10	-20	-28	-41	-24
16	-78	-92	-52	-29	-29	-33	-24	-22	-24	-38	-47	-99	-82	-31	-38	-135	-197	-67	-29	-38	-25	-27	-36	-32	-54
17	-77	-54	-97	-332	-363	-203	-89	-100	-241	-87	-122	-81	-23	-49	-51	-67	-14	-43	-46	-29	-26	-39	-81	-53	-99
18	-69	-71	-140	-103	-44	-41	-32	-33	-23	-30	-185	-180	-211	-169	-167	-135	-15	-10	-22	-31	-34	-42	-94	-118	-83
19	-44	-49	-54	-28	-20	-62	-51	-61	-32	-36	-26	-24	-28	-28	-26	-46	-30	-53	-30	-21	-23	-49	-83	-38	-38
Q	-58	-52	-75	-21	-26	-23	-25	-30	-21	-51	-56	-66	-74	-53	-20	-13	-39	-19	-36	-20	-23	-25	-24	-135	-41
21	-102	-43	-28	-19	-11	-10	-25	-24	-28	-33	-25	-39	-61	-74	-15	-14	-17	-19	-13	-13	-64	-108	-159	-114	-44
22	-133	-89	-245	-246	-266	-96	-149	-90	-69	-101	-137	-230	-279	-110	-75	-23	-11	-20	-31	-95	-116	-61	-35	-25	-114
23	-102	-94	-103	-42	-30	-57	-52	-31	-29	-32	-92	-173	-242	-133	-96	-122	-21	-22	-27	-44	-23	-22	-71	-30	-70
24	-30	-29	-33	-45	-57	-76	-131	-152	-103	-37	-63	-117	-50	-29	-22	-37	-57	-31	-47	-28	-10	-27	-99	-339	-69
D	-147	-144	-71	-92	-141	-138	-52	-64	-115	-28	-53	-120	-73	-25	-48	-38	-36	-66	-50	-100	-284	-287	-227	-673	-128
26	-299	-273	-563	-550	-500	-226	-247	-129	-169	-131	-88	-67	-522	-341	-214	-194	-272	-257	-200	-123	-113	-96	-183	-372	-255
D	-147	-43	-43	-57	-206	-302	-161	-170	-322	-894	-862	-297	-81	-36	-44	-62	-73	-31	-42	-62	-128	-155	-224	-209	-194
28	-108	-119	-223	-140	-106	-165	-208	-204	-104	-168	-142	-72	-188	-231	-306	-116	-138	-210	-128	-101	-73	-116	-77	-154	-150
D	-204	-190	-473	-238	-53	-26	-40	-305	-168	-50	-58	-357	-610	-523	-259	-142	-259	-127	-73	-216	-539	-285	-415	-359	-249
30	-370	-175	-157	-75	-284	-236	-130	-248	-340	-186	-138	-224	-90	-90	-160	-201	-60	-244	-93	-68	-63	-194	-181	-60	-169
31	-45	-97	-188	-265	-92	-19	-24	-20	-49	-248	-514	-201	-116	-214	-154	0	-9	-30	-35	-63	-219	-106	-51	-187	-123
Mean	-114	-95	-128	-119	-126	-106	-94	-97	-97	-111	-117	-106	-113	-114	-96	-83	-83	-79	-73	-73	-93	-77	-95	-141	-101
5Q Mean	-37	-36	-41	-43	-43	-39	-57	-50	-39	-49	-44	-74	-54	-40	-34	-79	-66	-48	-31	-42	-47	-43	-38	-62	-47
5D Mean	-166	-142	-248	-216	-240	-177	-148	-186	-241	-291	-237	-179	-271	-241	-152	-94	-152	-124	-122	-156	-246	-178	-241	-381	-201

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
Q	-195	-144	-196	-144	-110	-50	-67	-56	-63	-46	-8	-13	-16	-11	-61	-122	-56	-72	-175	-195	-101	-19	-21	-26	-82
Q	-26	-23	-20	-37	-10	-59	-34	-45	-51	-54	-19	-42	-126	-40	-23	-22	-11	-13	-10	-13	-17	-25	-24	-27	-32
Q	-69	-163	-208	-303	-219	-163	-133	-233	-217	-260	-481	-140	-129	-135	-146	-65	-50	-3	-151	-178	-197	-318	-316	-381	-194
Q	-395	-541	-275	-285	-492	-328	-201	-124	-167	-151	-93	-133	-263	-244	-171	-110	-135	-386	-73	-18	-40	-157	-144	-24	-206
Q	-79	-282	-264	-254	-279	-169	-151	-37	-55	-29	-37	-208	-257	-58	-81	-88	-138	-143	-31	-44	-112	-412	-196	-91	-146
Q	-38	-95	-272	-145	-61	-51	-199	-34	-12	-13	-18	-19	-23	-46	-104	-55	-19	-88	-164	-127	-18	-16	-23	-33	-70
Q	-25	-25	-22	-19	-12	-4	-14	-65	-55	-41	-28	-30	-28	-28	-40	-178	-29	-18	-22	-22	-33	-54	-137	-137	-44
Q	-176	-99	-118	-34	-34	-81	-151	-144	-128	-74	-19	-33	-31	-32	-131	-269	-292	-189	-60	-54	-41	-34	-30	-51	-96
Q	-82	-112	-79	-92	-64	-60	-43	-52	-30	-25	-43	-43	-93	-19	-85	-229	-296	-621	-233	-13	-83	-48	-167	-170	-116
Q	-250	-327	-309	-78	-44	-46	-53	-50	-148	-145	-70	-25	-22	-30	-60	-105	-118	-89	-109	-180	-11	-24	-26	-39	-98
Q	-51	-59	-244	-201	-222	-219	-115	-26	-17	-30	-185	-328	-262	-290	-192	-152	-62	-25	-26	-155	-203	-117	-61	-27	-136
Q	-29	-38	-51	-62	-57	-327	-366	-366	-197	-221	-61	-11	-38	-35	-30	-27	-69	-161	-127	-21	-16	-26	-48	-54	-102
Q	-49	-52	-52	-49	-60	-141	-312	-220	-196	-209	-389	-227	-532	-323	-145	-94	-298	-169	-46	-26	-50	-41	-49	-52	-158
Q	-50	-30	-35	-45	-66	-55	-30	-31	-24	-24	-22	-15	-75	-108	-89	-60	-41	-146	-146	-74	-52	-237	-130	-152	-72
Q	-151	-211	-112	-59	-44	-72	-134	-63	-24	-18	-175	-255	-187	-20	-24	-26	-84	-131	-72	-84	-64	-54	-128	-304	-104
Q	-208	-109	-80	-68	-52	-41	-36	-38	-88	-45	-47	-61	-46	-32	-29	-39	-38	-26	-34	-24	-22	-22	-30	-41	-52
Q	-64	-55	-49	-96	-52	-133	-28	-31	-18	-23	-28	-39	-55	-59	-33	-33	-32	-104	-131	-120	-81	-47	-29	-28	-57
Q	-31	-41	-45	-42	-42	-81	-125	-42	-37	-30	-22	-22	-22	-22	-39	-53	-68	-20	-15	-18	-22	-31	-32	-40	-39
Q	-39	-47	-49	-42	-39	-35	-37	-26	-120	-170	-202	-328	-289	-133	-82	-84	-107	-85	-45	-25	-54	-74	-253	-210	-107
Q	-93	-92	-86	-82	-43	-72	-31	-30	-80	-78	-23	-24	-27	-28	-126	-229	-143	-66	-34	-172	-550	-437	-293	-197	-127
D	-62	-76	-60	-60	-62	-50	-32	-54	-203	-720	-407	-363	-957	-558	-421	-378	-640	-416	-312	-171	-82	-167	-278	-490	-292
D	-349	-229	-322	-346	-320	-103	-56	-234	-709	-105	-32	-82	-683	-413	-59	-134	-135	-164	-98	-405	-436	-293	-203	-403	-263
D	-482	-190	-118	-173	-217	-412	-717	-482	-303	-330	-252	-87	-255	-357	-88	-305	-650	-319	-255	-159	-150	-94	-351	-284	-293
D	-225	-286	-427	-175	-250	-184	-209	-290	-126	-81	-72	-47	-74	-33	-177	-286	-285	-358	-878	-337	-265	-168	-338	-439	-250
D	-362	-398	-551	-571	-341	-257	-285	-262	-405	-150	-54	-189	-102	-98	-112	-73	-92	-238	-187	-136	-96	-55	-173	-155	-223
D	-366	-429	-128	-101	-202	-138	-280	-133	-145	-131	-28	-21	-48	-418	-563	-143	-55	-40	-48	-37	-84	-69	-123	-183	-163
D	-174	-219	-312	-236	-220	-42	-45	-196	-560	-271	-89	-231	-462	-655	-271	-81	-144	-79	-38	-16	-150	-220	-100	-132	-206
D	-84	-93	-54	-52	-64	-49	-50	-33	-37	-25	-29	-51	-594	-217	-54	-283	-421	-366	-273	-118	-79	-58	-80	-149	-138
D	-161	-157	-193	-125	-186	-288	-210	-127	-263	-366	-205	-284	-400	-502	-528	-401	-232	-114	-137	-79	-163	-271	-293	-536	-259
D	-414	-79	-65	-171	-486	-314	-222	-287	-134	-84	-290	-141	-312	-273	-355	-150	-113	-67	-174	-371	-623	-521	-252	-516	-267
D	-727	-390	-502	-396	-95	-44	-83	-35	-21	-24	-25	-45	-115	-194	-171	-193	-108	-63	-55	-36	-211	-351	-227	-216	-180
Mean	-177	-164	-170	-146	-143	-131	-143	-124	-149	-128	-111	-114	-210	-174	-144	-144	-160	-154	-134	-110	-132	-143	-146	-180	-147
5Q Mean	-65	-49	-43	-41	-31	-44	-49	-43	-70	-68	-63	-96	-102	-51	-42	-75	-50	-32	-25	-20	-29	-40	-95	-91	-55
5D Mean	-293	-146	-151	-175	-254	-233	-247	-236	-322	-321	-237	-191	-521	-420	-290	-273	-354	-216	-195	-237	-290	-269	-275	-445	-274

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	-240	-172	-169	-184	-186	-198	-98	-97	-113	-239	-91	-51	-48	-27	-36	-53	-90	-94	-114	-102	-42	-117	-60	-47	-111
2	-84	-304	-206	-164	-325	-629	-443	-90	-43	-328	-265	-70	-68	-333	-141	-249	-282	-141	-107	-48	-69	-41	-41	-32	-188
3	-51	-78	-166	-196	-117	-7	-78	-16	-13	-14	-22	-15	-14	-15	-25	-44	-77	-175	-98	-42	-20	-31	-189	-136	-68
4	-167	-52	-106	-217	-144	-86	-25	-49	-70	-26	-20	-22	-45	-85	-43	-47	-36	-131	-78	-202	-51	-71	-76	-180	-84
5	-247	-260	-49	-37	-45	-22	-61	-152	-82	-67	-87	-37	-6	-55	-48	-178	-125	-85	-28	-114	-258	-185	-113	-252	-108
6	-553	-387	-215	-47	-12	-22	-23	-17	-6	-22	-138	-225	-131	-37	-16	-71	-21	-10	-15	-24	-26	-48	-34	-16	-88
7	-15	-13	-26	-95	-106	-28	-98	-93	-75	-39	-26	-74	-38	-25	-31	-24	-27	-22	-21	-47	-26	-23	-22	-21	-42
Q	-73	-184	-169	-72	-83	-92	-136	-82	-70	-54	-20	-20	-21	-27	-48	-34	-59	-80	-36	-24	-32	-65	-139	-117	-72
9	-109	-96	-56	-20	-46	-219	-170	-44	-31	-70	-149	-162	-47	-13	-15	-20	-20	-21	-10	-14	-15	-12	-12	-18	-58
Q	-32	-40	-68	-21	-13	-15	-115	-90	-36	-7	-13	-19	-11	-7	-1	-7	-16	-15	-11	-12	-10	-9	-9	-11	-25
11	-10	-11	-19	-45	-74	-26	-38	-38	-23	-29	-23	-33	-52	-77	-52	-32	-18	-9	-29	-23	-53	-338	-546	-271	-78
12	-63	-63	-262	-628	-1317	-453	-413	-421	-292	-233	-706	-785	-275	-110	-179	-298	-255	-305	-305	-135	-431	-680	-515	-449	-399
13	-429	-639	-530	-302	-299	-176	-336	-126	-216	-412	-187	-517	-173	-129	-83	-24	-73	-123	-210	-247	-144	-323	-584	-537	-284
14	-367	-306	-368	-183	-112	-160	-136	-35	-21	-30	-139	-92	-22	-47	-114	-97	-75	-299	-264	-86	-253	-130	-137	-242	-155
15	-246	-81	-40	-49	-98	-78	-145	-218	-85	-42	-307	-513	-595	-152	-216	-474	-465	-318	-246	-373	-252	-106	-18	-20	-214
16	-30	-79	-171	-126	-87	-23	-12	-15	-20	-26	-29	-37	-33	-77	-21	-23	-21	-18	-21	-17	-20	-11	-17	-89	-43
17	-143	-112	-63	-48	-100	-169	-275	-118	-43	-33	-24	-24	-24	-40	-27	-30	-133	-107	-67	-44	-170	-241	-273	-323	-110
18	-370	-265	-106	-289	-451	-241	-218	-52	-90	-223	-137	-67	-45	-74	-92	-63	-135	-236	-467	-205	-55	-102	-140	-88	-176
19	-150	-658	-781	-524	-346	-174	-307	-447	-113	-53	-48	-79	-99	-210	-135	-363	-697	-493	-78	-56	-47	-67	-202	-323	-269
20	-160	-99	-70	-68	-13	-10	-84	-523	-336	-77	-40	-46	-41	-45	-73	-96	-165	-143	-218	-199	-76	-103	-453	-656	-158
21	-465	-393	-160	-119	-94	-202	-109	-58	-11	-25	-52	-49	-59	-34	-57	-41	-52	-51	-103	-123	-172	-59	-28	-17	-105
22	-12	-17	-25	-19	-16	-26	-22	-20	-28	-36	-41	-38	-23	-21	-62	-24	-21	-17	-19	-31	-34	-18	-16	-14	-25
23	-24	-48	-318	-412	-408	-570	-415	-135	-77	-28	-80	-278	-84	-275	-197	-522	-670	-413	-571	-436	-186	-551	-447	-139	-303
24	-144	-414	-286	-137	-171	-341	-385	-440	-267	-135	-362	-130	-57	-299	-463	-162	-92	-51	-254	-315	-346	-415	-322	-113	-254
25	-49	-34	-66	-129	-120	-35	-61	-53	-54	-77	-236	-326	-296	-631	-517	-325	-206	-394	-143	-31	-33	-128	-461	-730	-214
26	-785	-546	-238	-390	-374	-163	-66	-208	-508	-436	-154	-561	-508	-97	-29	-96	-413	-432	-157	-138	-102	-99	-76	-45	-276
27	-89	-155	-118	-89	-74	-148	-535	-315	-290	-254	-197	-161	-190	-26	-250	-84	-65	-73	-118	-512	-520	-338	-246	-216	-211
28	-303	-183	-129	-93	-87	-75	-127	-285	-60	-39	-53	-199	-75	-14	-25	-45	-49	-34	-16	-59	-267	-298	-289	-443	-135
29	-314	-51	-194	-219	-73	-13	-35	-112	-59	-74	-50	-37	-16	-16	-59	-173	-168	-222	-429	-252	-133	-527	-467	-117	-159
Q	-42	-18	-21	-24	-68	-51	-93	-42	-45	-13	-71	-140	-174	-35	-14	-60	-31	-72	-38	-17	-14	-14	-13	-16	-47
Mean	-192	-191	-173	-164	-181	-148	-168	-146	-105	-104	-125	-160	-109	-101	-102	-125	-151	-152	-142	-130	-128	-171	-198	-189	-148
5Q Mean	-34	-54	-61	-46	-57	-42	-92	-65	-50	-29	-34	-58	-53	-23	-31	-29	-30	-41	-25	-26	-23	-25	-39	-35	-42
5D Mean	-213	-221	-234	-339	-478	-312	-268	-251	-239	-181	-307	-416	-244	-282	-277	-280	-327	-319	-286	-211	-219	-374	-364	-295	-289

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean	
D	1	-7	-11	-20	-20	-11	-5	-6	2	0	-6	-14	-17	-74	-221	-89	-27	-34	-9	-13	-36	-86	-98	-155	-40	
	2	-159	-124	-313	-332	-326	-312	-221	-142	-110	-143	-184	-430	-334	-380	-216	-599	-606	-105	-104	-259	-360	-234	-230	-257	
	3	-112	-165	-148	-54	-314	-286	-210	-47	-46	-66	-95	-17	-18	-20	-29	-34	-26	-20	-23	-8	-30	-111	-162	-141	
	4	-177	-70	-21	-12	-87	-94	-25	-13	-74	-113	-39	-17	-21	-91	-56	-75	-115	-73	-309	-138	-142	-41	-21	-61	
D	5	-344	-260	-223	-149	-175	-193	-149	-45	-22	-21	-58	-227	-557	-272	-225	-168	-302	-512	-233	-97	-362	-267	-78	-18	
	6	-11	-8	-119	-267	-207	-210	-384	-380	-436	-22	-21	-20	-16	-16	-29	-154	-246	-44	-9	-51	-84	-44	-20	-120	
	7	-8	-24	-71	-91	-69	-52	-18	-11	-53	-83	-14	-16	-21	-24	-25	-26	-36	-52	-36	-32	-52	-39	-35	-56	
	8	-5	-7	-10	-7	-3	-42	-58	-107	-150	-175	-217	-226	-95	-49	-72	-313	-381	-168	-19	-9	-36	-95	-108	-113	
	9	-39	-16	-14	-13	-19	-36	-49	-58	-36	-46	-33	-19	-38	-49	-115	-166	-79	-12	-29	-126	-107	-147	-64	-56	
Q	10	-9	-10	-31	-14	-5	-9	-25	-56	-24	-6	-10	-13	-20	-19	-16	-16	-17	-16	-39	-47	-26	-89	-13	-10	
	11	-15	-12	-20	-4	-3	-2	-14	-24	-90	-38	-21	-23	-28	-159	-195	-86	-23	-17	-10	-9	-7	-8	-10	-10	
Q	12	-31	-50	-13	-6	-3	-2	-4	-5	-11	-16	-15	-19	-15	-14	-17	-20	-18	-11	-6	-2	-3	-6	-7	-13	
D	13	-12	-10	-19	-12	-4	-21	-30	-48	-121	-243	-222	-261	-226	-70	-14	-28	-51	-55	-199	-791	-1032	-523	-99	-61	-173
D	14	-135	-128	-226	-304	-357	-368	-308	-85	-219	-216	-150	-195	-620	-263	-94	-90	-53	-112	-155	-206	-182	-199	-288	-39	
	15	-42	-22	-40	-37	-11	-14	-83	-448	-399	-169	-174	-335	-313	-67	-225	-184	-30	-24	-196	-379	-387	-125	-105	-117	
	16	-30	-7	-15	-17	-55	-104	-30	-11	-36	-33	-39	-59	-67	-44	-55	-62	-101	-35	-24	-94	-132	-36	-13	-36	
	17	-95	-75	-37	-21	-29	-10	-16	-121	-101	-32	-26	-16	-16	-20	-34	-48	-18	-15	-18	-42	-26	-40	-155	-43	
	18	-14	-10	-10	-8	-10	-5	-9	-7	-10	-16	-37	-75	-261	-281	-150	-195	-337	-287	-18	-207	-347	-214	-75	-170	
D	19	-223	-190	-118	-8	-12	-232	-109	-40	-244	-64	-23	-219	-605	-615	-357	-196	-205	-119	-111	-280	-110	-72	-170	-124	
	20	-42	-64	-31	-80	-117	-48	-48	-81	-139	-202	-87	-94	-17	-19	-217	-329	-261	-25	-37	-202	-230	-299	-160	-146	
	21	-75	-196	-137	-70	-13	-92	-170	-9	-49	-19	-70	-145	-101	-235	-85	-49	-53	-156	-307	-125	-97	-213	-171	-32	
	22	-73	-85	-165	-126	-30	-7	-133	-94	-148	-85	-70	-99	-32	-57	-22	-28	-35	-45	-80	-52	-27	-10	-11	-20	
	23	-21	-24	-14	-13	-16	-13	-6	-5	-14	-17	-13	-28	-33	-56	-21	-17	-33	-54	-213	-236	-67	-15	-55	-14	
Q	24	-11	-11	-13	-11	-8	-5	-10	-12	-13	-16	-18	-19	-17	-20	-136	-169	-147	-37	-22	-17	-11	-13	-22	-17	
	25	-12	-10	-10	-7	-5	-7	-10	-12	-17	-20	-39	-21	-17	-18	-19	-21	-20	-16	-11	-11	-10	-51	-189	-102	
	26	-16	-12	-13	-8	-4	-2	-3	-4	-7	-11	-14	-18	-21	-20	-19	-19	-60	-140	-30	-17	-14	-18	-21	-33	
Q	27	-24	-10	-12	-38	-9	-28	-225	-147	-54	-166	-197	-340	-498	-627	-772	-816	-660	-525	-301	-212	-70	-27	-105	-176	
	28	-29	-32	-265	-238	-37	-15	-28	-25	-25	-133	-132	-24	-14	-18	-18	-19	-21	-18	-22	-23	-103	-211	-237	-235	
	29	-149	-197	-187	-241	-69	-85	-109	-323	-194	-178	-156	-427	-221	-35	-29	-40	-81	-98	-294	-191	-206	-194	-315	-450	
	30	-201	-52	-114	-229	-124	-64	-76	-59	-33	-196	-129	-129	-261	-183	-183	-256	-220	-526	-673	-582	-358	-355	-422	-420	
	31	-119	-52	-106	-137	-36	-24	-46	-175	-207	-169	-193	-171	-131	-91	-34	-25	-129	-157	-130	-53	-32	-41	-86	-181	
Mean		-72	-62	-81	-83	-75	-77	-84	-83	-99	-87	-80	-119	-149	-125	-117	-137	-144	-115	-117	-142	-151	-123	-117	-107	
5Q Mean		-16	-19	-18	-8	-4	-4	-11	-20	-29	-17	-15	-17	-21	-46	-76	-61	-53	-45	-22	-19	-12	-26	-14	-15	
5D Mean		-174	-142	-179	-165	-204	-225	-163	-72	-143	-137	-127	-266	-468	-320	-181	-214	-243	-180	-160	-326	-409	-259	-173	-99	



AL Index ( Hourly mean values, unit nT ) November 1986

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	-213	-264	-433	-271	-327	-282	-332	-331	-218	-110	-162	-147	-28	-16	-17	-19	-17	-13	-10	-9	-9	-7	-8	-8	-135
2	-5	-4	-7	-14	-3	-5	-3	-8	-36	-196	-53	-9	-11	-14	-18	-28	-55	-106	-154	-22	-16	-16	-16	-38	-35
3	-40	-41	-47	-83	-249	-112	-87	-83	-106	-44	-59	-176	-20	-25	-37	-20	-106	-248	-419	-233	-151	-158	-144	-69	-115
D 4	-918	-788	-410	-355	-720	-573	-231	-92	-101	-229	-741	-548	-455	-543	-838	-669	-1046	-773	-820	-679	-474	-202	-260	-113	-524
D 5	-484	-724	-423	-852	-835	-478	-379	-221	-330	-366	-81	-114	-92	-41	-71	-36	-116	-195	-207	-95	-163	-103	-180	-265	-285
6	-296	-131	-31	-50	-52	-95	-139	-94	-22	-27	-15	-32	-62	-77	-131	-144	-61	-77	-523	-436	-207	-51	-79	-172	-125
7	-127	-242	-111	-49	-15	-19	-9	-8	-12	-17	-12	-20	-26	-24	-29	-33	-38	-29	-18	-14	-13	-21	-81	-106	-45
8	-42	-41	-56	-32	-71	-24	-11	-14	-103	-57	-28	-17	-27	-37	-34	-40	-76	-52	-29	-18	-13	-14	-11	-20	-36
9	-16	-7	-6	-8	-9	-12	-14	-23	-68	-93	-38	-29	-69	-67	-22	-65	-46	-20	-15	-10	-12	-15	-12	-9	-29
10	-10	-21	-29	-31	-44	-8	-2	-8	-7	-24	-11	-19	-21	-15	-12	-12	-10	-9	-12	-38	-136	-146	-66	-86	-32
11	-55	-122	-58	-249	-424	-377	-174	-128	-188	-37	-34	-25	-26	-28	-31	-68	-142	-235	-65	-18	-43	-28	-31	-75	-111
12	-125	-320	-61	-44	-117	-136	-65	-7	-10	-39	-16	-14	-21	-26	-60	-46	-27	-85	-25	-8	-11	-11	-16	-56	-56
13	-79	-24	-3	-1	-1	0	-3	-6	-33	-6	-5	-8	-18	-65	-282	-389	-139	-69	-89	-167	-22	-22	-28	-35	-62
14	-39	-88	-28	-46	-3	0	-1	-5	-2	-26	-26	-85	-63	-38	-11	-15	-20	-29	-29	-12	-50	-85	-103	-32	-35
15	-73	-100	-118	-40	-9	-13	-59	-89	-153	-56	-92	-33	-13	-28	-234	-511	-352	-220	-68	-31	-84	-187	-142	-85	-116
16	-86	-103	-101	-87	-41	-117	-58	-110	-33	-33	-89	-247	-70	-76	-151	-509	-482	-157	-63	-82	-164	-106	-82	-32	-128
17	-57	-45	-30	-62	-56	-34	-1	-8	-34	-145	-78	-133	-79	-11	-32	-56	-192	-79	-44	-31	-23	-28	-44	-70	-57
18	-34	0	-9	-13	-102	-82	-23	-9	1	-10	-42	-19	-12	-25	-33	-23	-10	-41	-105	-58	-38	-25	-15	-10	-31
19	-6	-8	-4	-2	-2	-3	-2	-4	-1	-2	-6	-12	-10	-15	-16	-69	-115	-131	-74	-43	-196	-209	-106	-59	-46
20	-89	-122	-35	-52	-97	-13	-3	-43	-38	-5	-12	-29	-14	-35	-41	-7	-22	-37	-55	-92	-28	-47	-22	-6	-39
Q 21	-3	-5	-5	-4	-6	-38	-132	-109	-62	-10	-6	-10	-24	-17	-23	-12	-40	-39	-21	-16	-21	-7	-6	-4	-26
Q 22	-1	0	-3	0	0	-2	-4	-14	-4	-6	-6	-6	-9	-8	-5	-3	-8	-8	-4	-4	-21	-47	-30	-9	-8
23	-3	-2	-5	-6	-4	-2	-3	-4	-7	-11	-3	-4	-7	-20	-149	-37	-26	-152	-228	-130	-133	-283	-286	-331	-77
D 24	-287	-585	-401	-476	-463	-108	-33	-13	-12	-35	-80	-67	-41	-20	-44	-369	-486	-630	-807	-740	-599	-608	-398	-404	-321
D 25	-426	-427	-421	-406	-463	-523	-409	-368	-242	-375	-313	-565	-1262	-953	-1279	-1440	-1152	-555	-699	-563	-495	-204	-227	-323	-587
26	-506	-277	-280	-436	-413	-320	-246	-263	-253	-292	-256	-298	-715	-173	-109	-197	-537	-189	-58	-80	-28	-30	-25	-42	-251
27	-106	-178	-292	-218	-251	-210	-189	-240	-193	-93	-102	-305	-143	-40	-58	-150	-93	-37	-42	-18	-15	-16	-20	-14	-126
28	-18	-16	-21	-22	-89	-98	-84	-132	-139	-148	-110	-239	-98	-35	-64	-102	-103	-54	-267	-163	-37	-27	-26	-49	-89
29	-40	-90	-206	-142	-129	-80	-83	-120	-169	-191	-107	-92	-124	-213	-495	-565	-344	-403	-220	-129	-188	-194	-125	-35	-187
30	-21	-19	-15	-15	-51	-122	-78	-147	-317	-276	-185	-236	-515	-464	-293	-363	-649	-310	-145	-315	-212	-132	-161	-473	-230
Mean	-140	-159	-121	-135	-168	-129	-95	-89	-96	-98	-92	-117	-135	-104	-153	-199	-217	-166	-177	-141	-120	-100	-91	-101	-131
5Q Mean	-13	-12	-14	-9	-17	-15	-32	-30	-49	-33	-16	-14	-27	-28	-20	-37	-57	-50	-28	-18	-52	-58	-33	-20	-28
5D Mean	-431	-513	-340	-434	-546	-358	-227	-155	-158	-209	-254	-294	-374	-316	-453	-506	-581	-480	-590	-462	-376	-255	-241	-234	-366

December 1986

AL Index ( Hourly mean values, unit nT )

Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean	
D 1	-385	-321	-164	-46	-48	-99	-226	-361	-134	-453	-245	-144	-75	-19	-23	-128	-294	-189	-228	-60	-11	-9	-11	-22	-154	
2	-41	-71	-89	-78	-116	-86	-99	-129	-199	-212	-210	-278	-279	-197	-198	-188	-112	-83	-43	-20	-43	-102	-133	-165	-132	
3	-109	-27	-37	-58	-41	-46	-136	-97	-137	-336	-134	-148	-130	-111	-311	-186	-82	-40	-62	-109	-28	-63	-119	-59	-109	
4	-31	-45	-146	-40	-9	-28	-49	-225	-163	-82	-98	-129	-278	-194	-18	-33	-41	-93	-264	-321	-157	-149	-100	-48	-114	
Q 5	-118	-102	-7	-8	-7	-7	-8	-7	-7	-9	-10	-10	-13	-41	-12	-15	-14	-13	-9	-5	-20	-24	-7	-9	-20	
6	-14	-9	-19	-143	-53	0	-3	-1	-3	-7	-46	-46	-22	-19	-10	-15	-13	-12	-44	-73	-34	-22	-3	-12	-26	
7	-19	-28	0	-3	-5	-57	-157	-70	2	-30	-137	-89	-39	-174	-175	-176	-46	-23	-13	-90	-186	-94	-3	-2	-67	
Q 8	-4	-6	-55	-60	3	3	0	-3	-25	-17	-11	-5	-7	-11	-10	-18	-71	-100	-97	-72	-23	-46	-62	-51	-31	
9	-113	-69	-54	-12	-3	-4	-3	-3	-8	-16	-8	-7	-10	-8	-7	-24	-136	-40	-32	-27	-176	-138	-90	-54	-43	
10	-49	-47	-202	-94	-26	-1	-9	-7	-29	-37	-106	-224	-227	-194	-88	-41	-78	-389	-399	-274	-84	-233	-160	-56	-127	
11	-62	-98	-140	-56	-36	-64	-148	-85	-19	-14	-64	-108	-228	-167	-91	-66	-130	-95	-66	-138	-73	-35	-15	-11	-84	
12	-8	-6	-8	-24	-55	-34	-8	-9	0	-1	0	-3	-10	-12	-9	-22	-100	-164	-127	-70	-83	-27	-111	-49	-39	
13	-20	-21	-41	-94	-19	-8	-40	-96	-129	-73	-77	-64	-107	-199	-116	-46	-9	-110	-224	-106	-98	-287	-390	-364	-114	
D 14	-96	-14	-36	-47	-91	-284	-35	-40	-148	-266	-134	-184	-173	-120	-43	-48	-44	-118	-194	-413	-102	-99	-54	-52	-118	
Q 15	-33	-14	-10	-2	-3	-9	-9	-16	-27	-83	-73	-72	-17	-11	-19	-83	-48	-76	-27	-6	-98	-87	-7	-9	-7	-35
16	-48	-244	-281	-72	-16	-27	-31	-111	-70	-67	-248	-125	-88	-46	-72	-625	-294	-57	-81	-291	-232	-65	-25	-16	-135	
17	-21	-21	-15	-13	-20	-34	-53	-64	-15	-1	-5	-27	-20	-47	-52	-58	-183	-92	-54	-84	-82	-37	-23	-9	-43	
18	-6	-6	-8	-8	-7	-7	-6	-5	-2	-5	-6	-6	-8	-3	-5	-36	-28	-9	-8	-24	-203	-166	-99	-51	-30	
19	-13	-14	-9	-28	-21	-6	-3	-11	-7	-6	-17	-38	-21	-16	-9	-11	-24	-29	-55	-43	-120	-275	-85	-14	-36	
20	-20	-42	-25	-11	-11	-11	-33	-22	-12	-7	-9	-10	-37	-45	-256	-292	-78	-22	-10	-18	-17	-27	-35	-131	-49	
21	-122	-26	-6	-6	-6	-3	-11	-4	-32	-217	-117	0	-45	-84	-186	-198	-25	-20	-51	-172	-378	-107	-145	-232	-91	
D 22	-22	-21	-97	-337	-180	-109	-32	-37	-35	-131	-204	-61	-31	-161	-466	-585	-584	-355	-226	-164	-97	-146	-158	-188	-184	
D 23	-155	-230	-316	-127	-80	-39	-81	-26	-73	-98	-479	-256	-324	-864	-411	-84	-160	-330	-309	-241	-218	-358	-504	-174	-247	
24	-113	-166	-376	-236	-102	-101	-117	-160	-158	-152	-281	-400	-194	-142	-132	-82	-56	-110	-316	-413	-151	-64	-65	-24	-171	
25	-74	-111	-203	-103	-318	-429	-76	-100	-167	-260	-353	-146	-55	-83	-100	-160	-116	-57	-32	-29	-30	-38	-266	-202	-146	
D 26	-47	-115	-113	-152	-119	-163	-229	-187	-73	-133	-403	-145	-136	-304	-94	-83	-250	-284	-111	-195	-304	-334	-101	-91	-174	
27	-151	-137	-77	-74	-94	-63	-136	-183	-88	-66	-74	-106	-118	-9	-48	-254	-133	-21	-14	-66	-52	-287	-259	-104	-109	
Q 28	-39	-32	-103	-23	-3	-4	-23	-74	-76	-241	-93	-48	-27	-36	-25	-17	-51	-22	-15	-11	-7	-7	-10	-11	-42	
Q 29	-12	-25	-51	-61	-48	-29	-104	-57	-71	-53	-16	-47	-16	-30	-6	-6	-6	-11	-10	-8	-13	-11	-16	-24	-31	
30	-38	-11	-17	-9	-7	-3	-4	-6	-16	-46	-36	-38	-82	-59	-111	-139	-74	-114	-104	-106	-140	-222	-91	-80	-65	
31	-47	-38	-112	-62	-14	-49	-111	-177	-20	-17	-35	-243	-144	-182	-314	-141	-72	-65	-19	-18	-12	-11	-26	-17	-81	
Mean	-65	-68	-90	-67	-50	-58	-64	-76	-64	-100	-120	-101	-95	-116	-112	-123	-109	-99	-103	-121	-105	-112	-102	-75	-91	
5Q Mean	-41	-35	-45	-30	-11	-9	-30	-33	-52	-78	-40	-25	-14	-27	-27	-20	-45	-34	-27	-38	-30	-19	-20	-20	-31	
5D Mean	-141	-140	-145	-141	-103	-138	-120	-130	-92	-216	-293	-158	-147	-293	-207	-185	-266	-255	-213	-214	-146	-189	-165	-105	-175	

1986

July

AE Index ( Hourly mean values, unit nT )

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	516	290	196	186	440	351	143	40	36	35	47	74	67	58	56	70	95	153	208	125	109	92	92	147	151
D	82	150	171	223	409	306	383	432	684	611	266	106	147	421	280	98	190	231	395	440	290	135	263	394	296
3	116	241	516	362	218	144	247	447	310	330	260	134	75	92	94	104	110	133	101	135	78	99	144	249	197
4	459	276	291	242	158	330	179	143	183	271	117	98	87	109	172	134	212	248	458	164	64	69	107	159	197
5	280	240	143	101	93	99	163	201	146	165	155	168	98	132	141	121	121	81	81	184	177	136	169	346	156
6	223	203	195	331	264	142	64	37	42	66	193	127	60	58	58	77	63	57	115	98	64	56	58	58	113
7	54	46	44	53	55	80	124	144	83	118	57	73	109	89	67	72	138	150	66	49	76	90	114	137	87
8	126	98	69	56	67	72	203	129	74	41	46	46	37	58	169	295	412	353	297	319	450	300	296	292	179
9	213	346	241	133	119	247	379	144	75	71	127	246	256	483	170	75	46	58	47	52	63	54	72	114	160
10	213	367	355	273	198	162	88	52	40	115	71	63	61	78	158	84	59	58	67	57	84	79	115	121	126
Q	91	79	84	108	128	216	215	189	156	97	72	68	78	102	94	226	46	39	60	177	206	165	105	76	120
12	62	58	70	69	91	71	125	132	82	70	59	65	85	99	132	135	120	123	84	112	136	119	115	152	99
13	109	97	101	119	371	397	272	224	133	103	96	107	238	483	240	133	42	42	44	43	43	54	52	66	150
Q	66	83	94	110	106	68	82	58	104	98	161	326	182	143	139	212	197	108	67	44	46	61	60	61	111
Q	60	57	74	100	70	45	69	46	40	71	70	74	80	70	50	57	55	50	46	49	48	52	71	97	63
16	169	176	105	79	64	54	55	84	95	113	146	210	153	74	113	194	236	97	64	90	68	77	106	101	113
17	171	139	190	513	622	354	201	246	346	213	209	147	74	79	75	88	41	87	72	59	53	81	151	100	180
18	146	172	279	181	103	83	67	49	57	121	318	263	289	261	238	181	40	32	46	60	76	80	160	195	146
19	107	102	105	63	52	104	99	107	72	92	76	67	64	68	63	69	70	55	81	53	38	49	89	127	78
Q	94	106	125	52	49	46	58	51	54	109	111	144	119	97	69	57	74	50	76	57	53	54	81	218	83
21	169	81	42	39	38	34	45	69	63	59	59	73	92	103	43	37	47	53	52	58	123	219	272	232	88
22	274	173	349	314	295	109	171	115	125	188	259	425	447	214	114	47	41	72	91	135	187	125	78	60	184
23	166	180	161	98	62	106	86	45	49	70	221	305	362	218	154	170	60	54	64	77	53	56	124	60	125
24	51	72	71	100	104	120	208	244	181	94	128	184	86	59	43	58	83	72	135	136	116	105	297	593	139
D	332	284	137	200	267	202	72	115	166	55	106	144	94	38	62	48	52	87	87	139	421	435	595	997	214
D	409	417	746	730	652	431	410	265	378	275	174	176	695	480	297	281	373	353	315	212	240	191	354	535	391
D	227	82	88	124	313	434	266	335	557	1229	1067	414	168	90	76	96	111	80	86	117	203	248	330	331	294
28	202	231	302	335	160	281	321	366	261	271	220	166	259	333	379	157	207	291	224	161	157	190	175	271	242
D	288	264	587	339	130	79	115	451	274	126	171	524	794	645	351	217	344	200	132	374	725	455	606	551	364
30	495	299	240	149	387	308	253	438	542	344	265	362	194	170	235	257	120	326	172	131	132	311	250	118	271
31	103	163	315	385	188	75	71	95	134	447	694	294	195	331	232	68	64	86	87	104	325	221	151	306	214
Mean	195	179	209	195	202	179	168	177	178	195	194	183	185	185	147	126	124	125	126	129	158	143	182	234	172
5Q Mean	73	74	84	84	81	91	109	97	87	98	94	137	113	100	83	124	102	79	63	75	85	84	86	117	92
5D Mean	267	239	345	323	354	290	249	319	411	459	356	272	379	334	213	148	214	190	203	256	375	292	429	561	312

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean	
Q	1	309	229	271	226	178	115	117	138	155	118	58	70	98	85	103	158	80	124	246	287	163	51	63	65	146
	2	47	50	48	72	34	109	105	136	129	144	72	130	221	121	78	74	55	55	50	51	57	47	42	73	83
	3	150	263	326	454	337	379	301	398	367	510	696	300	256	245	233	119	113	77	272	376	344	482	545	337	337
	4	572	835	437	460	675	477	307	244	332	260	207	264	384	356	246	159	202	486	145	73	102	252	209	64	323
	5	137	375	367	374	358	261	220	103	119	104	151	332	366	157	161	149	190	221	82	95	231	576	325	190	235
	6	119	214	374	238	163	141	260	73	55	73	101	110	107	149	85	51	152	249	185	52	65	59	69	133	133
Q	7	60	56	53	46	44	30	78	156	142	103	82	75	77	97	105	249	58	54	64	76	80	115	237	260	100
	8	319	246	291	108	78	154	275	267	277	180	105	112	115	154	205	331	431	284	105	101	126	91	69	81	188
	9	135	175	164	192	150	122	77	100	78	61	74	83	125	55	166	286	414	817	323	74	177	147	306	280	191
	10	359	448	427	167	89	76	102	139	245	252	130	52	58	79	143	159	170	146	180	256	53	56	57	80	163
	11	93	120	314	283	334	401	268	105	87	102	318	473	399	378	255	209	97	67	72	217	295	189	99	54	218
	12	53	59	76	101	150	514	509	555	470	455	167	96	97	76	48	48	121	214	155	48	55	65	94	80	179
	13	69	85	100	98	116	265	419	337	373	532	668	392	683	387	205	133	332	249	94	62	89	88	98	107	249
	14	101	73	63	76	99	79	58	52	60	49	57	45	128	160	130	86	82	213	192	138	118	330	202	237	118
	15	263	344	190	108	76	129	240	148	59	68	245	343	222	49	49	80	113	168	111	133	97	107	205	419	165
Q	16	314	188	151	123	79	62	84	104	142	72	73	84	67	46	40	55	60	49	65	60	54	50	62	83	90
	17	120	123	108	167	108	196	69	63	50	50	55	68	79	84	53	61	50	133	166	156	112	71	55	60	94
Q	18	66	74	71	72	71	120	173	76	64	57	47	46	42	39	63	87	96	39	37	39	40	48	47	57	65
Q	19	60	86	88	74	76	61	65	69	173	261	330	571	466	216	145	148	153	129	87	70	109	144	374	325	178
	20	215	230	188	138	87	110	68	91	131	120	41	45	46	53	200	318	215	118	102	351	846	743	504	325	220
D	21	140	160	100	97	124	86	74	127	351	961	622	542	1257	760	586	664	962	608	458	324	212	294	447	672	443
D	22	518	340	455	596	453	208	146	379	1026	232	83	165	842	545	138	217	213	217	170	586	644	442	332	569	396
D	23	632	310	210	283	352	554	825	644	448	439	438	200	387	486	161	448	822	443	416	283	225	197	498	393	421
	24	315	423	556	265	391	260	313	359	170	124	108	109	131	95	258	375	442	587	1083	492	424	290	544	611	364
	25	539	584	748	751	430	318	359	343	527	221	102	250	137	143	151	95	118	293	273	242	168	115	291	261	311
	26	508	557	216	221	319	237	413	216	227	175	67	43	113	530	767	220	95	69	75	61	126	123	190	266	243
	27	271	420	490	349	348	155	114	276	692	324	143	349	581	820	343	133	192	112	70	53	231	330	181	216	300
	28	152	142	98	86	93	102	95	75	90	82	63	107	715	303	101	404	567	480	449	217	137	91	138	228	209
D	29	252	320	285	198	315	408	293	190	379	532	346	448	516	681	742	553	392	204	236	157	273	380	429	762	387
D	30	569	164	114	249	627	412	336	409	206	140	390	234	454	410	492	240	176	117	271	553	960	715	376	682	387
	31	898	519	719	592	189	109	132	77	52	65	54	82	190	242	218	236	165	99	96	76	348	464	340	330	262
Mean		269	264	261	234	223	214	222	208	247	220	195	200	302	256	217	212	233	226	206	190	224	230	239	272	232
5Q Mean		109	90	82	77	60	76	101	108	130	127	120	181	174	103	86	122	84	65	60	59	68	80	152	159	103
5D Mean		422	258	232	284	374	333	334	349	482	460	375	317	691	576	423	424	513	317	310	380	462	405	416	615	406

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	361	247	265	251	261	270	168	156	184	305	141	110	82	46	51	75	123	142	172	174	134	222	119	93	173
2	172	391	320	276	507	855	604	194	142	452	335	139	130	422	220	330	378	200	163	100	127	93	100	70	280
3	96	136	247	277	168	49	136	42	35	37	56	39	38	31	39	60	116	209	132	87	60	84	283	212	111
4	289	136	240	304	215	125	60	83	97	50	36	40	81	108	64	79	62	182	122	267	104	134	142	254	136
5	338	382	170	91	91	53	127	195	135	132	154	88	49	125	100	226	173	130	89	207	361	264	177	372	176
6	726	558	364	135	52	47	41	33	45	107	234	371	206	77	47	117	47	33	41	51	69	91	90	50	151
7	39	48	77	144	144	58	159	133	107	66	78	136	73	47	51	40	42	46	52	75	55	51	50	54	76
8	128	247	231	117	140	192	231	171	135	113	43	46	48	50	82	60	85	100	62	43	61	133	209	183	121
9	174	148	97	40	103	318	241	92	82	138	225	227	101	66	61	45	44	54	34	36	34	34	37	54	104
10	81	94	114	49	37	44	178	138	81	46	42	45	37	33	21	24	37	42	38	40	42	36	32	32	57
11	24	26	45	66	113	71	83	78	48	61	51	80	87	109	93	61	32	25	71	68	163	519	752	394	130
12	100	159	395	674	1312	754	577	674	507	338	837	934	389	173	255	443	424	462	446	218	573	811	608	539	525
13	505	747	650	376	434	221	478	266	386	551	298	651	283	216	105	54	113	179	331	404	260	468	757	689	393
14	474	402	499	238	191	204	185	69	46	56	173	119	53	80	181	115	95	352	328	143	307	198	188	303	208
15	303	153	101	101	157	121	186	254	147	132	423	660	708	254	320	617	671	553	418	589	421	184	46	39	315
16	54	122	232	158	117	62	49	34	31	35	41	56	48	82	28	32	38	32	38	38	54	39	51	169	68
17	227	176	108	86	195	283	444	258	125	95	41	31	27	61	39	47	162	159	104	109	235	362	433	469	178
18	510	394	191	407	595	339	369	120	179	317	220	136	93	144	127	95	232	359	745	306	114	171	189	154	271
19	226	807	933	625	444	277	411	566	223	118	95	123	152	251	201	551	972	663	147	126	85	127	305	428	369
20	248	179	122	123	59	54	164	646	476	148	83	68	66	76	107	119	194	208	304	251	128	189	586	814	225
21	621	498	228	179	148	243	144	89	37	49	88	76	85	55	74	54	68	84	140	180	206	84	52	53	147
22	39	58	58	43	37	44	41	43	47	65	63	55	41	31	76	30	33	33	41	78	79	62	66	55	51
23	61	101	389	502	539	774	617	260	211	108	179	383	146	345	279	747	967	616	794	623	321	739	575	202	437
24	226	567	371	196	260	462	584	577	411	231	475	199	97	394	596	238	134	114	428	480	481	594	421	206	364
25	109	63	132	163	162	91	122	93	118	151	335	427	420	801	693	414	285	545	216	70	59	194	588	828	295
26	879	656	339	564	525	236	118	319	641	544	230	644	610	142	54	172	562	576	229	237	165	158	127	100	368
27	179	218	184	123	106	204	628	389	395	351	273	224	250	80	324	138	100	95	184	696	724	483	357	313	293
28	429	296	260	163	117	119	188	336	99	65	78	225	95	28	41	68	61	49	37	93	335	373	373	629	190
29	447	149	298	323	173	54	71	155	94	130	91	76	55	28	89	214	206	276	493	293	205	649	560	175	221
30	111	64	46	57	115	95	145	77	71	38	124	223	204	46	21	77	43	86	52	30	30	29	28	32	77
Mean	272	274	256	228	250	223	251	218	177	167	184	221	158	146	147	178	216	220	215	203	199	252	276	265	217
5Q Mean	79	102	105	82	94	86	150	112	88	65	70	101	80	41	50	46	48	61	49	53	53	62	77	71	76
5D Mean	275	309	325	419	559	463	403	384	377	274	411	517	332	371	375	402	474	462	422	325	319	499	463	375	397

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean	
D	1	21	25	36	46	34	24	34	33	34	36	53	51	125	258	117	47	56	31	35	67	126	145	217	70	
	2	208	185	379	403	425	417	391	279	273	271	319	589	477	498	348	872	805	209	208	431	505	344	344	367	398
	3	234	246	203	99	383	354	253	85	94	124	140	46	38	37	46	49	43	40	47	30	69	190	218	205	136
	4	257	149	83	68	148	171	93	81	124	158	84	51	56	142	91	104	137	109	363	190	211	93	81	115	132
D	5	453	371	321	267	259	277	246	106	77	77	151	370	647	334	329	225	377	593	289	171	443	365	198	111	294
	6	53	56	228	365	299	341	503	548	610	101	61	63	40	32	52	190	285	76	35	78	117	114	69	49	182
	7	36	47	88	117	100	88	55	57	107	140	48	57	55	42	41	52	58	76	58	52	81	61	63	78	69
	8	29	31	28	21	23	67	99	147	203	242	293	293	148	93	116	360	430	209	48	38	69	152	186	182	146
	9	84	48	50	41	56	89	106	116	78	78	63	51	46	68	79	134	193	102	31	61	187	150	196	102	92
Q	10	29	33	50	32	36	43	67	98	77	49	36	34	39	36	30	32	34	33	58	64	60	141	31	29	49
	11	33	34	45	22	24	22	43	62	123	70	52	52	56	227	254	146	47	37	33	26	24	20	29	36	63
Q	12	57	86	50	26	14	11	14	17	25	32	29	31	35	30	25	29	30	31	26	18	15	16	18	20	28
D	13	26	27	37	36	24	54	74	93	170	338	343	398	457	224	82	94	79	90	318	897	1008	669	170	95	242
D	14	218	177	329	410	510	597	486	161	458	347	311	288	746	334	128	122	64	151	233	269	234	252	324	77	301
	15	93	71	88	76	48	67	150	550	546	308	270	442	397	135	255	245	49	41	254	483	470	194	174	159	232
	16	64	41	46	50	110	160	74	44	74	65	72	97	100	80	70	89	130	49	41	115	153	62	39	59	78
	17	136	143	99	89	68	38	58	181	155	97	48	36	49	38	45	71	29	26	31	58	61	107	215	76	81
	18	51	39	31	31	33	23	26	38	37	54	87	115	365	327	208	274	462	353	67	311	506	355	155	273	176
D	19	342	291	222	111	269	356	158	110	361	148	85	324	703	767	510	298	299	182	185	339	148	125	230	179	281
	20	124	134	104	148	179	128	139	160	231	292	166	164	71	59	291	435	352	77	71	304	311	396	309	239	204
	21	203	320	279	162	74	214	239	45	96	58	121	212	178	302	131	83	93	198	369	164	150	283	233	94	179
	22	129	139	255	260	129	79	214	148	210	125	129	140	76	77	35	42	42	54	92	61	38	25	29	48	107
	23	53	46	34	42	36	41	29	29	39	31	25	53	54	76	41	33	53	73	257	293	91	32	82	30	66
Q	24	26	20	21	17	14	12	17	21	22	29	32	30	27	29	165	187	160	45	36	27	20	19	35	27	43
	25	23	23	21	16	18	23	25	28	54	48	72	55	32	33	31	32	31	28	23	26	24	90	268	175	50
Q	26	60	26	19	14	17	18	21	23	25	28	32	37	38	34	35	83	165	44	29	27	37	48	61	39	
	27	86	29	45	153	88	101	318	254	171	286	345	593	612	878	1025	1067	782	705	480	382	241	112	174	228	382
	28	58	109	353	313	90	43	71	72	76	202	194	65	36	35	30	30	29	24	31	34	130	260	285	306	120
	29	248	324	363	393	164	184	224	441	299	280	219	518	298	72	57	62	97	118	316	245	296	277	409	576	270
	30	295	126	181	308	229	151	154	108	65	261	181	171	312	242	185	265	277	692	948	860	558	519	538	618	344
	31	191	117	177	213	63	48	84	214	257	234	247	237	237	169	54	34	136	165	137	62	40	56	132	256	148
Mean		126	113	137	140	128	137	143	140	166	148	138	182	208	179	162	187	184	155	166	198	204	182	175	164	161
5Q Mean		41	39	37	23	20	21	31	43	54	41	35	38	72	101	85	70	62	39	32	29	46	32	34	44	
5D Mean		249	210	257	245	297	340	271	149	267	236	241	393	606	431	279	322	324	245	246	421	467	351	253	165	303

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
1	331	327	583	438	472	417	469	507	390	213	247	193	56	28	34	30	27	23	23	20	20	21	23	25	205
2	19	20	25	41	32	28	23	33	72	268	113	38	40	31	41	42	70	137	185	45	41	36	36	71	62
D	74	86	83	134	339	195	156	147	175	85	104	240	66	97	69	43	125	303	494	258	180	211	213	168	168
D	1117	1169	610	570	1262	1165	433	148	168	333	818	705	699	770	986	787	1112	796	749	776	637	307	344	215	695
D	671	900	545	967	1012	647	490	331	445	427	114	161	152	86	85	50	130	224	240	126	202	136	214	315	361
6	373	237	116	96	111	163	194	132	71	62	28	58	92	152	184	182	86	115	687	558	334	146	135	219	189
7	195	333	238	117	53	53	26	22	35	33	24	29	38	38	41	52	47	42	28	17	18	34	129	159	75
8	92	100	104	81	111	60	32	55	144	158	91	59	71	54	45	61	82	77	42	35	22	24	19	36	69
Q	53	27	24	22	29	35	38	59	103	169	95	92	93	79	37	110	71	32	22	16	21	22	21	16	54
10	18	29	43	56	73	28	21	21	23	47	25	43	42	22	22	22	25	26	29	67	182	191	104	160	55
11	96	229	223	394	574	566	423	370	333	82	82	44	42	31	58	90	198	283	85	29	63	45	47	119	188
12	186	432	190	126	193	196	149	76	55	111	57	34	41	46	84	57	36	98	44	20	20	16	24	67	98
13	93	39	22	18	21	17	24	42	87	56	31	34	49	138	319	436	214	127	172	230	49	42	61	79	100
14	70	132	57	74	30	24	28	25	22	47	45	130	105	81	44	37	34	43	46	23	70	116	163	75	63
15	110	148	174	87	36	34	102	139	189	121	173	97	43	57	230	704	688	458	188	154	189	295	245	198	205
16	181	255	248	208	148	220	125	159	74	67	138	310	132	140	189	588	542	209	103	141	221	154	162	120	201
17	109	107	108	168	142	114	64	61	99	201	112	201	131	37	78	101	252	107	70	49	52	55	76	104	108
18	79	38	40	46	141	142	82	79	29	34	79	43	29	46	48	36	18	47	114	70	52	38	30	21	57
Q	17	22	19	17	13	12	14	20	15	15	21	38	30	33	38	107	164	164	95	67	274	278	187	109	74
20	174	224	93	102	134	62	23	77	77	32	39	56	39	62	71	22	43	47	65	104	40	66	41	22	71
Q	19	22	20	18	21	59	160	136	103	40	26	40	54	35	42	26	57	54	34	30	44	19	23	25	46
Q	21	14	17	26	16	17	15	15	30	17	20	17	20	18	13	12	17	17	12	11	29	61	40	21	21
23	19	22	20	17	21	20	25	27	23	34	22	22	36	40	213	87	54	232	361	251	334	463	431	502	136
D	490	708	478	658	613	158	63	26	25	84	166	121	51	47	88	452	635	709	803	809	647	699	461	449	393
D	514	546	538	535	649	705	613	565	495	570	408	670	1440	1157	1528	1593	1182	612	721	698	665	308	308	385	725
26	584	327	300	486	465	383	313	333	354	417	418	399	762	261	133	252	700	245	95	94	47	45	43	70	314
27	148	237	330	316	349	303	259	311	294	165	148	390	183	58	67	160	116	48	51	32	23	22	27	20	169
28	23	28	35	43	104	131	159	193	212	205	142	316	129	52	84	102	111	66	301	185	47	40	45	74	118
29	56	117	260	180	170	136	122	155	222	295	165	134	191	269	629	818	561	601	400	227	288	302	199	59	273
30	51	42	34	43	93	190	126	231	450	419	304	320	546	576	488	577	904	467	277	439	304	213	295	584	332
Mean	199	230	185	202	247	209	159	149	160	160	141	167	180	151	201	254	276	213	217	186	170	146	138	149	187
5Q Mean	40	37	36	32	38	36	51	57	79	79	50	49	53	43	35	63	78	68	41	31	78	80	58	41	52
5D Mean	573	681	450	572	775	574	351	243	261	299	322	379	481	431	551	585	636	528	601	533	466	332	308	306	468

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Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
D 1	557	505	307	100	119	179	331	455	200	633	380	219	107	38	36	150	342	213	266	86	39	28	22	46	223
2	72	107	125	114	171	162	194	216	256	263	274	358	323	271	220	215	137	103	71	36	53	131	164	200	176
3	169	53	63	85	59	68	173	137	208	438	200	204	208	133	326	223	110	62	81	131	45	96	155	85	146
4	51	70	180	65	32	49	86	257	194	148	145	183	392	303	52	57	55	114	332	463	308	259	225	128	173
Q 5	197	195	86	36	25	28	23	15	16	19	21	17	23	50	25	21	20	19	15	11	29	36	26	29	41
6	37	34	50	206	120	45	18	14	15	33	78	78	46	33	20	26	27	24	65	109	62	40	20	31	51
7	42	49	20	25	38	105	230	162	63	96	202	123	82	278	248	218	82	46	41	111	210	124	33	25	111
Q 8	22	25	91	107	38	17	19	25	64	48	50	32	35	29	23	31	100	136	140	122	71	138	187	120	69
9	165	115	104	38	17	21	20	20	39	34	25	19	23	17	18	46	163	63	59	71	272	230	265	171	84
10	141	154	336	321	174	43	24	18	64	80	150	261	273	295	164	80	97	460	503	411	214	333	238	107	206
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12	26	23	23	45	75	65	43	41	29	41	28	16	22	19	18	38	113	193	202	160	173	96	177	128	75
13	73	61	81	135	53	32	75	132	162	106	109	97	157	297	245	85	28	154	343	203	208	464	567	576	185
D 14	332	85	109	123	213	409	112	76	234	381	222	286	351	309	128	88	65	142	256	507	148	146	92	87	204
Q 15	71	61	77	76	33	27	32	56	109	100	93	37	23	29	101	65	89	37	17	107	105	25	25	23	59
16	86	306	404	156	52	46	56	144	107	117	300	230	147	71	95	678	335	91	131	325	280	97	50	38	181
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19	49	41	43	82	53	69	24	30	20	19	36	68	35	28	20	29	47	41	73	74	180	447	288	92	79
20	74	82	62	38	37	34	78	60	36	28	24	30	53	81	315	364	158	68	48	30	30	38	52	163	83
21	171	69	29	31	24	25	39	38	67	298	193	33	80	169	225	269	70	47	81	250	490	186	247	349	145
D 22	84	78	149	401	244	153	61	68	77	178	266	92	52	223	527	702	746	432	284	248	200	205	238	278	249
D 23	229	321	410	222	180	108	148	115	199	174	612	409	384	1012	527	150	215	391	359	310	314	466	672	290	342
24	176	262	462	360	171	149	173	198	187	189	323	471	244	206	185	112	79	142	385	521	263	148	125	67	233
25	119	153	250	155	406	580	162	139	198	312	395	214	99	97	113	171	150	76	46	40	36	49	308	250	188
D 26	111	226	230	259	223	283	365	320	142	221	491	203	200	351	140	123	300	339	141	251	366	393	170	141	250
27	223	195	133	123	127	113	207	281	148	104	112	132	151	32	63	275	182	53	31	78	65	330	325	150	151
Q 28	76	64	141	54	20	25	39	99	95	302	133	84	51	45	34	32	64	34	27	15	11	12	18	19	62
Q 29	23	49	79	89	92	60	150	88	101	84	34	64	41	59	18	15	21	15	12	9	17	19	25	34	50
30	56	27	39	30	24	13	12	14	27	57	47	55	95	74	131	170	105	130	122	139	212	281	155	122	89
31	71	56	139	73	27	73	150	258	51	45	71	274	159	207	394	178	107	91	36	34	23	19	42	37	109
Mean	118	119	144	119	96	102	108	120	104	149	166	145	136	165	151	158	143	128	141	168	160	168	167	128	138
5Q Mean	77	78	94	72	41	31	52	56	77	110	66	46	34	42	40	32	58	48	42	52	46	46	56	45	56
5D Mean	262	243	241	221	195	226	203	206	170	317	394	241	218	386	271	242	333	303	261	280	213	247	238	168	253



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	-20	5	-5	-45	-38	-1	8	5	0	3	-43	-11	4	5	2	0	-7	-1	-23	-19	-7	0	-5	-7	-8
Q	-6	-3	-4	0	4	-9	-24	5	-22	0	8	7	9	12	7	-34	-40	-7	2	5	5	-1	-3	-3	-3
	4	16	4	-2	0	13	8	-4	7	2	0	2	10	-18	-59	-131	-91	-44	-4	-76	-14	-4	-25	-45	-18
	-9	-26	-24	5	30	-17	-64	-6	11	7	2	0	8	-102	-36	-7	11	6	7	-4	-1	-7	-5	2	-9
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	7	14	-2	-76	-52	-25	10	22	-67	19	-18	-7	13	-8	-12	-22	5	0	-9	0	0	1	-4	-3	-9
	2	14	-1	-12	6	0	0	-8	5	29	-26	-47	-65	-39	-48	-44	4	4	0	0	2	-3	-14	-21	-11
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	-93	-64	-190	-185	-174	-11	-42	3	19	5	-1	20	-174	-100	-64	-53	-85	-80	-41	-16	7	-1	-5	-104	-59
D	-34	-2	0	4	-49	-84	-28	-2	-44	-280	-328	-89	1	8	-6	-14	-17	8	0	-4	-25	-30	-58	-43	-46
	-7	-4	-72	-22	-25	-24	-47	-21	26	-32	-32	9	-58	-65	-115	-36	-33	-64	-16	-20	4	-20	9	-18	-28
D	-60	-57	-180	-68	10	12	16	-79	-30	12	26	-94	-213	-200	-83	-33	-87	-26	-7	-28	-176	-57	-111	-83	-66
	-122	-25	-37	-1	-90	-81	-3	-29	-69	-14	-6	-43	6	-5	-42	-72	0	-80	-7	-2	2	-38	-55	-1	-34
	6	-15	-31	-72	0	17	10	26	17	-24	-166	-54	-18	-48	-38	33	22	11	7	-11	-55	3	23	-34	-16
Mean	-16	-6	-24	-21	-25	-16	-10	-8	-8	-14	-20	-15	-21	-22	-22	-19	-21	-17	-10	-8	-14	-6	-4	-24	-16
5Q Mean	-1	0	0	-1	-3	5	-2	-1	3	0	1	-6	1	8	6	-17	-15	-9	0	-5	-5	-2	3	-4	-1
5D Mean	-32	-22	-75	-55	-63	-32	-24	-26	-35	-62	-59	-42	-81	-74	-45	-20	-44	-28	-20	-27	-58	-31	-25	-100	-45

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4	-108	-123	-57	-55	-155	-89	-47	-2	-2	-21	9	-2	-71	-65	-47	-30	-33	-143	0	18	10	-30	-38	7	-45	
5	-11	-94	-80	-66	-100	-38	-40	13	3	21	37	-41	-73	19	-1	-13	-43	-32	9	3	3	-123	-33	4	-28	
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Q	18	1	-3	-9	-5	-20	-38	-4	-5	-2	0	0	-1	-2	-6	-8	-19	0	3	1	-2	-6	-7	-10	-6	
Q	19	-9	-3	-4	-4	-1	-4	-4	7	-33	-39	-37	-42	-55	-25	-9	-9	-30	-21	1	9	0	-2	-65	-18	
20	13	22	7	-13	0	-17	3	14	-13	-18	-2	0	-3	0	-26	-69	-35	-6	16	3	-127	-65	-40	-34	-16	
D	21	7	4	-10	-11	0	-7	3	9	-27	-239	-96	-92	-328	-177	-128	-46	-159	-111	-82	-8	23	-19	-53	-153	-71
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D	23	-165	-35	-13	-31	-41	-135	-304	-159	-78	-110	-33	12	-61	-113	-7	-80	-238	-96	-45	-17	-36	4	-101	-87	-82
24	-67	-74	-148	-42	-54	-53	-52	-110	-40	-18	-17	6	-9	13	-47	-98	-63	-64	-336	-90	-52	-22	-66	-133	-68	
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D	29	-35	3	-51	-25	-28	-84	-62	-31	-73	-99	-31	-60	-142	-161	-156	-124	-35	-11	0	-25	-80	-78	-154	-65	
D	30	-129	2	-7	-46	-172	-107	-53	-82	-30	-14	-94	-24	-85	-67	-109	-30	-24	-8	-38	-93	-142	-163	-64	-174	-73
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Mean	-42	-31	-40	-29	-31	-23	-32	-20	-25	-18	-13	-14	-59	-46	-35	-37	-43	-40	-30	-15	-20	-28	-26	-43	-31	
5Q Mean	-11	-3	-1	-2	0	-5	0	9	-5	-4	-4	-6	-15	0	0	-13	-8	0	4	7	3	0	-18	-11	-3	
5D Mean	-82	-17	-35	-32	-66	-66	-80	-61	-80	-90	-49	-32	-175	-131	-78	-61	-96	-56	-39	-45	-58	-65	-66	-137	-71	

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4	-22	15	13	-65	-36	-22	4	-7	-21	-1	-2	-1	-5	-30	-11	-7	-5	-40	-16	-68	0	-4	-4	-52	-16
5	-77	-69	35	7	0	4	2	-54	-14	-1	-10	6	17	6	1	-65	-37	-19	16	-11	-77	-52	-24	-66	-20
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Q	3	10	11	-22	-33	0	-18	-26	-20	-6	11	-6	-1	-1	-5	-3	-6	0	3	-9	0	1	2	5	-4
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19	-37	-255	-314	-210	-124	-35	-101	-163	-1	5	-1	-18	-23	-83	-33	-87	-211	-161	-4	6	-4	-3	-49	-108	-84
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Q	6	10	2	1	1	-3	-1	1	-4	-3	-8	-10	-3	-5	-23	-8	-4	0	1	7	5	11	16	13	0
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D	-31	-130	-100	-39	-41	-110	-92	-150	-61	-20	-124	-31	-8	-101	-165	-42	-25	4	-40	-74	-105	-118	-111	-10	-72
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D	-345	-218	-69	-108	-111	-45	-7	-48	-187	-164	-38	-240	-203	-26	-1	-10	-131	-144	-42	-20	-19	-19	-12	4	-92
27	0	-45	-25	-27	-20	-45	-220	-120	-92	-78	-60	-48	-65	13	-87	-15	-15	-25	-25	-164	-157	-96	-67	-59	-64
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Q	12	12	1	4	-10	-3	-20	-3	-9	4	-9	-28	-71	-11	-2	-21	-9	-28	-11	-1	0	0	0	0	-8
Mean	-56	-55	-44	-50	-56	-36	-42	-37	-17	-21	-33	-49	-29	-27	-27	-36	-43	-42	-34	-29	-29	-45	-59	-56	-40
5Q Mean	3	-4	-9	-5	-9	0	-17	-9	-6	2	0	-8	-13	-2	-5	-6	-6	-10	-1	0	2	4	-2	0	-4
5D Mean	-75	-66	-71	-129	-197	-80	-65	-58	-51	-45	-102	-157	-77	-96	-88	-79	-89	-87	-74	-48	-59	-124	-131	-107	-90

AO Index ( Hourly mean values, unit nT ) October 1986

Date	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean
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D 2	-54	-31	-123	-130	-113	-103	-24	-3	25	-8	-24	-136	-95	-131	-42	-153	-203	0	0	-43	-107	-62	-57	-72	-70
3	5	-41	-46	-4	-123	-109	-83	-4	0	-4	-25	5	0	-2	-5	-9	-5	0	0	5	3	-16	-53	-38	-23
4	-48	3	20	21	-12	-9	20	26	-12	-33	2	7	5	-20	-10	-23	-45	-18	-128	-43	-37	4	18	-3	-13
D 5	-117	-74	-62	-15	-44	-54	-26	7	15	16	16	-43	-233	-104	-60	-54	-113	-215	-88	-11	-140	-84	20	36	-59
6	14	19	-6	-83	-56	-39	-132	-105	-131	27	8	10	3	0	-3	-58	-103	-5	7	-12	-26	-26	-8	3	-29
7	9	0	-26	-32	-19	-7	8	16	0	-13	9	11	5	-3	-4	0	-6	-14	-7	-6	-12	-9	-3	-16	-5
8	8	7	3	2	7	-9	-8	-33	-48	-54	-70	-79	-21	-2	-14	-132	-165	-63	3	8	-2	-19	-15	-21	-30
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Q 10	5	5	-5	1	12	11	7	-6	13	17	8	3	0	0	0	0	0	0	-10	-15	3	-19	1	3	1
Q 11	0	3	2	6	8	8	6	5	-28	-4	4	2	0	-45	-67	-12	0	1	5	3	3	1	3	6	-3
Q 12	-2	-7	11	6	3	3	2	2	1	0	0	0	-1	0	-1	-2	-4	-2	1	2	4	3	1	2	0
D 13	1	2	0	5	7	5	5	-2	-36	-73	-50	-62	1	40	26	18	-11	-10	-40	-342	-527	-188	-13	-13	-52
D 14	-26	-39	-60	-98	-101	-70	-65	-4	9	-43	4	-51	-246	-95	-29	-28	-20	-36	-38	-71	-64	-72	-125	0	-57
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D 19	-51	-44	-6	26	-26	-54	-29	14	-63	9	19	-56	-253	-231	-102	-46	-54	-28	-17	-110	-36	-10	-55	-34	-51
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Q 24	0	-1	-2	-1	0	0	-1	-1	-1	-1	-1	-3	-3	-6	-53	-75	-67	-14	-3	-3	-1	-3	-4	-3	-10
25	-1	1	0	0	3	1	0	3	9	3	-3	5	0	-1	-3	-5	-4	-1	0	0	1	-6	-55	-14	-2
Q 26	13	0	-2	1	2	6	4	5	4	0	0	-1	-2	0	-2	-1	-18	-57	-8	-2	0	0	1	-2	-2
27	18	2	10	37	33	21	-65	-20	30	-23	-24	-43	-192	-187	-259	-283	-269	-172	-60	-20	49	27	-18	-61	-61
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5Q Mean	3	0	0	2	5	5	3	1	-2	2	2	0	-1	-10	-24	-18	-17	-14	-3	-3	1	-3	0	1	-2
5D Mean	-49	-37	-50	-42	-55	-55	-27	2	-10	-19	-7	-69	-165	-104	-41	-52	-80	-57	-36	-115	-174	-83	-46	-16	-58

AO Index ( Hourly mean values, unit nT ) November 1986

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D	-359	-203	-104	-70	-90	8	-15	-18	-17	-62	-332	-196	-105	-157	-344	-275	-489	-375	-445	-290	-154	-48	-87	-5	-176	
D	-148	-273	-150	-368	-328	-154	-133	-55	-108	-152	-23	-33	-16	1	-29	-11	-50	-83	-87	-31	-62	-34	-72	-107	-104	
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D	24	-42	-230	-161	-147	-156	-29	-2	0	6	2	-6	-15	2	0	-143	-169	-275	-405	-335	-274	-258	-167	-179	-124	
D	25	-169	-154	-151	-137	-138	-170	-102	-86	4	-90	-109	-230	-542	-374	-515	-643	-561	-248	-338	-213	-161	-49	-72	-130	-224
26	-214	-113	-130	-193	-180	-128	-89	-95	-75	-83	-47	-98	-334	-41	-41	-70	-186	-67	-10	-32	-4	-7	-3	-7	-94	
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Mean	-40	-44	-29	-34	-44	-25	-16	-15	-16	-18	-21	-34	-46	-29	-53	-72	-78	-59	-68	-48	-34	-27	-22	-26	-37	
5Q Mean	5	5	2	5	0	2	-7	-3	-10	6	7	8	-1	-7	-2	-6	-17	-15	-8	-2	-13	-17	-3	0	-3	
5D Mean	-144	-171	-114	-147	-158	-71	-52	-33	-27	-60	-94	-104	-133	-101	-178	-214	-262	-215	-289	-194	-142	-88	-87	-81	-131	

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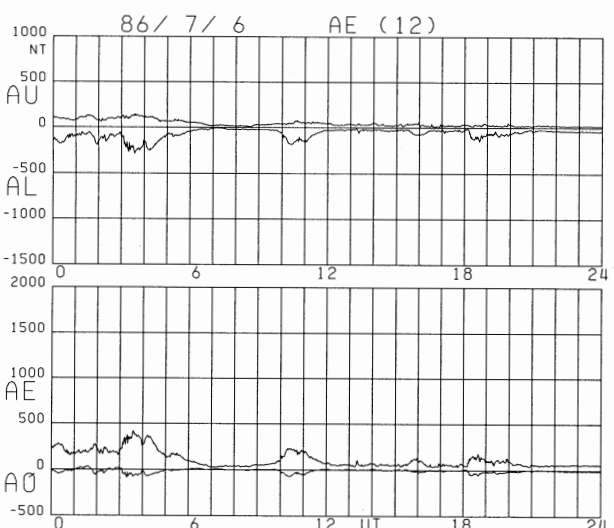
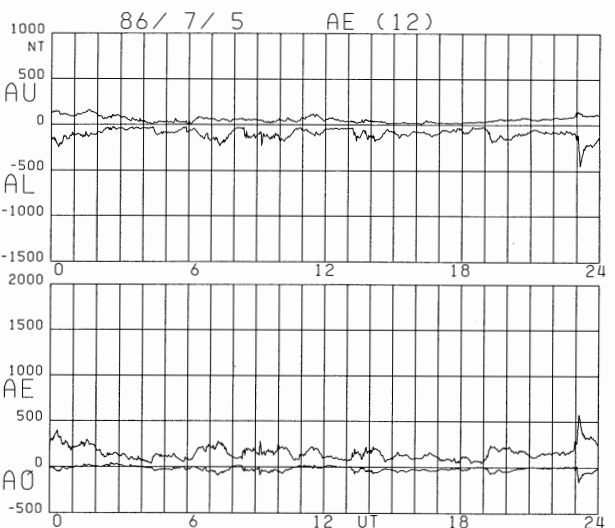
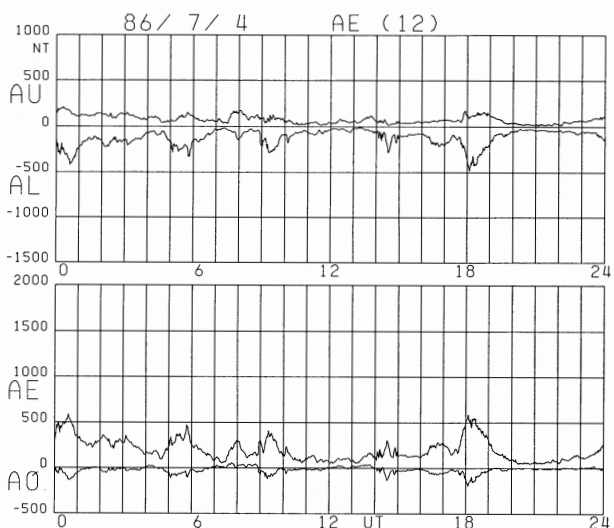
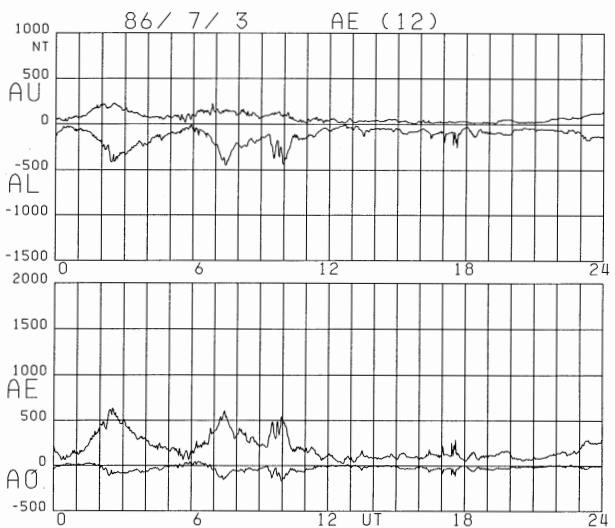
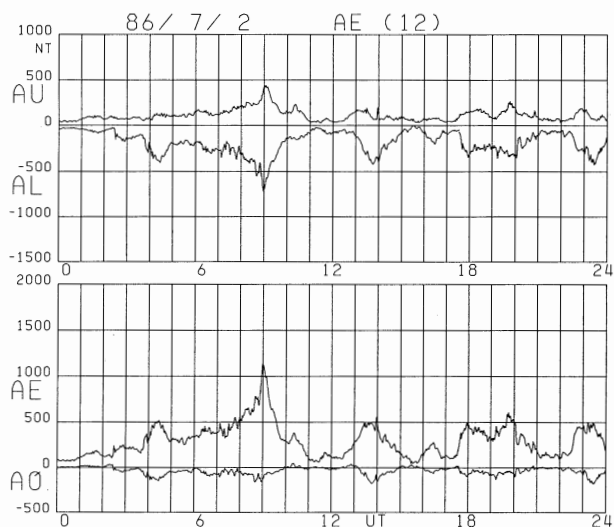
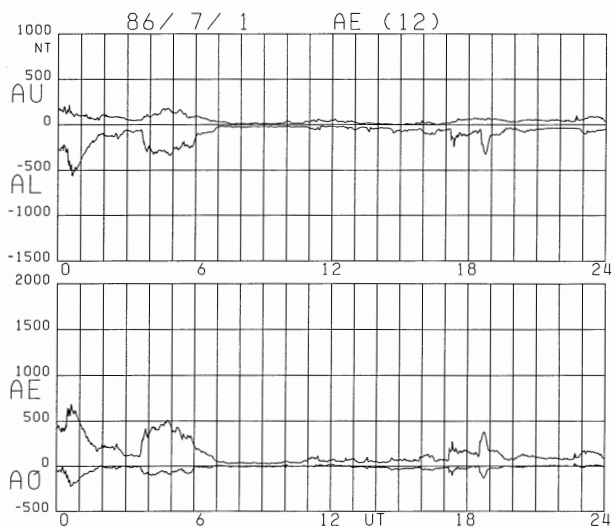
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	3	-24	0	-4	-15	-10	-12	-49	-28	-32	-116	-34	-46	-25	-45	-148	-74	-27	-9	-21	-43	-5	-14	-41	-16	-35
	4	-5	-9	-55	-7	5	-3	-6	-96	-65	-8	-25	-37	-81	-43	7	-5	-13	-35	-98	-89	-3	-20	11	14	-28
Q	5	-19	-4	35	8	4	5	2	0	0	0	-1	-2	-16	0	-3	-4	-2	-1	0	0	-5	-6	5	4	0
	6	3	6	4	-39	6	21	4	4	3	8	-7	-6	0	-3	0	0	0	0	-11	-18	-3	-2	5	1	-1
	7	1	-4	10	8	12	-4	-42	10	33	17	-36	-27	1	-35	-51	-67	-5	0	6	-34	-80	-32	11	9	-12
Q	8	5	5	-9	-6	23	12	8	8	6	6	13	10	9	2	1	-2	-21	-32	-27	-11	10	22	30	7	3
	9	-30	-11	-1	5	4	6	5	6	10	0	3	2	1	0	1	-2	-55	-9	-3	8	-40	-22	41	30	-2
	10	20	28	-34	65	60	19	2	1	2	1	-31	-93	-91	-46	-6	-1	-29	-158	-147	-67	22	-66	-41	-3	-24
	11	-1	-3	-36	-3	3	-3	-47	-11	9	9	-12	-34	-70	-29	-14	-13	-52	-35	-20	-54	-27	-9	2	1	-19
	12	4	4	3	-1	-16	-1	12	10	14	18	12	4	0	-2	-1	-3	-44	-68	-26	9	3	20	-21	13	-2
	13	15	8	-1	-26	7	7	-3	-29	-47	-20	-22	-15	-27	-51	5	-4	3	-33	-52	-4	5	-55	-106	-75	-21
D	14	68	27	17	13	15	-78	20	-2	-31	-75	-23	-40	1	34	19	-4	-11	-46	-65	-159	-28	-25	-8	-8	-16
Q	15	2	15	27	35	12	3	0	0	-28	-22	-25	0	0	-4	-32	-15	-31	-8	2	-43	-34	4	2	3	-5
	16	-5	-90	-79	5	8	-4	-2	-39	-17	-9	-98	-10	-14	-11	-24	-286	-126	-11	-15	-128	-91	-16	-1	1	-44
	17	-2	-5	0	3	1	-3	-7	-11	13	10	3	1	0	-3	3	-6	-80	-34	-8	-9	1	12	9	13	-4
	18	5	2	4	3	2	3	3	1	3	2	1	1	0	5	6	2	5	6	1	-1	-50	-43	-14	7	-1
	19	10	5	11	12	4	28	8	3	2	0	-4	-3	-1	0	3	-1	-8	-18	-6	-29	-51	57	30	2	2
	20	15	-2	5	7	6	5	4	6	4	6	1	4	-10	-4	-98	-110	0	10	12	-2	-2	-8	-9	-49	-8
	21	-36	7	7	8	5	8	7	14	1	-67	-21	16	-6	0	-73	-63	8	1	-10	-47	-133	-14	-21	-57	-19
D	22	18	16	-21	-136	-57	-32	-1	-3	3	-42	-71	-15	-5	-49	-202	-233	-211	-138	-83	-40	2	-43	-39	-48	-59
D	23	-40	-70	-110	-15	9	13	-6	30	25	-11	-173	-51	-131	-358	-147	-9	-52	-134	-129	-86	-60	-124	-168	-29	-76
	24	-25	-35	-145	-56	-16	-26	-30	-60	-64	-57	-119	-164	-71	-39	-39	-26	-16	-39	-123	-151	-20	9	-3	8	-54
	25	-14	-34	-77	-25	-114	-138	4	-30	-67	-104	-154	-38	-5	-34	-43	-74	-41	-18	-8	-9	-11	-13	-112	-77	-51
D	26	7	-2	1	-22	-7	-20	-46	-27	-2	-22	-157	-43	-35	-129	-25	-22	-99	-114	-40	-69	-120	-137	-16	-21	-48
	27	-39	-39	-10	-12	-29	-6	-32	-42	-14	-14	-18	-40	-43	6	-16	-116	-43	4	1	-27	-19	-122	-97	-28	-33
Q	28	-1	-1	-31	3	6	7	-4	-24	-28	-90	-26	-5	-2	-13	-8	-2	-19	-4	-1	-3	-1	-1	-1	-2	-10
Q	29	-1	0	-11	-15	-1	0	-28	-12	-20	-10	0	-14	3	0	2	0	-2	-3	-3	-2	-4	-1	-3	-8	-5
	30	-10	1	2	5	4	3	1	0	-2	-16	-12	-10	-34	-22	-46	-54	-21	-49	-43	-36	-33	-81	-13	-20	-20
	31	-12	-10	-42	-24	-1	-12	-36	-48	4	4	0	-106	-64	-78	-117	-52	-18	-19	-1	-1	0	-1	-5	0	-26
Mean	-6	-9	-18	-7	-2	-2	-6	-10	-16	-12	-26	-37	-28	-27	-33	-36	-44	-37	-35	-33	-36	-24	-28	-19	-11	-22
5Q Mean	-2	3	2	5	8	5	-4	-5	-14	-23	-7	-2	1	-6	-7	-4	-15	-9	-6	-11	-6	3	6	0	0	-3
5D Mean	-10	-19	-24	-31	-5	-25	-18	-26	-7	-57	-95	-36	-38	-100	-71	-64	-99	-102	-82	-74	-39	-65	-46	-21	-48	-48

FIGURE 4 (on even pages)

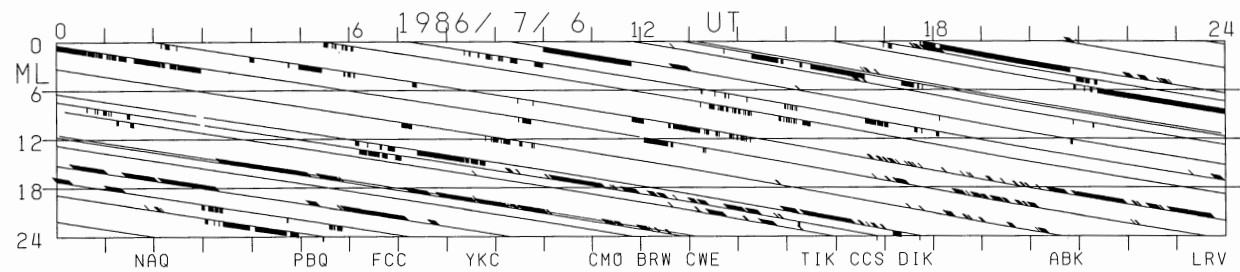
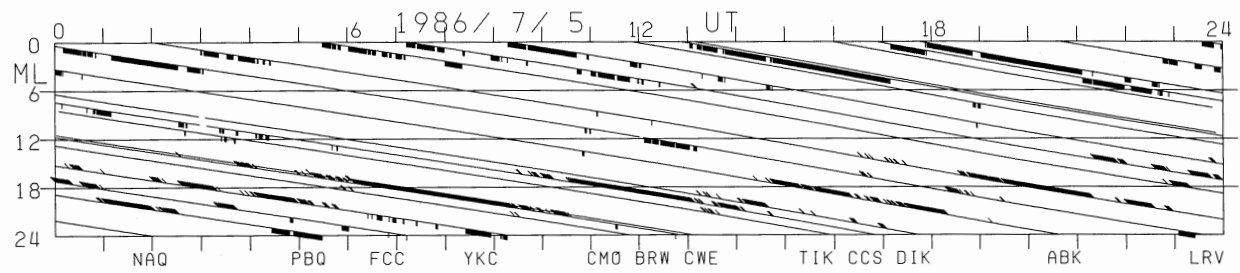
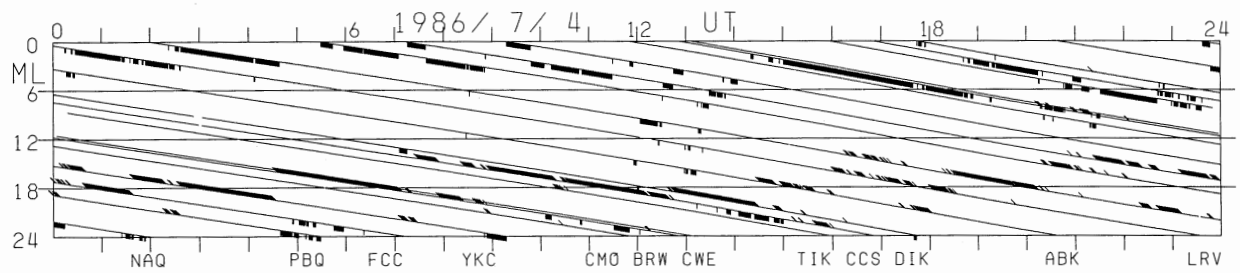
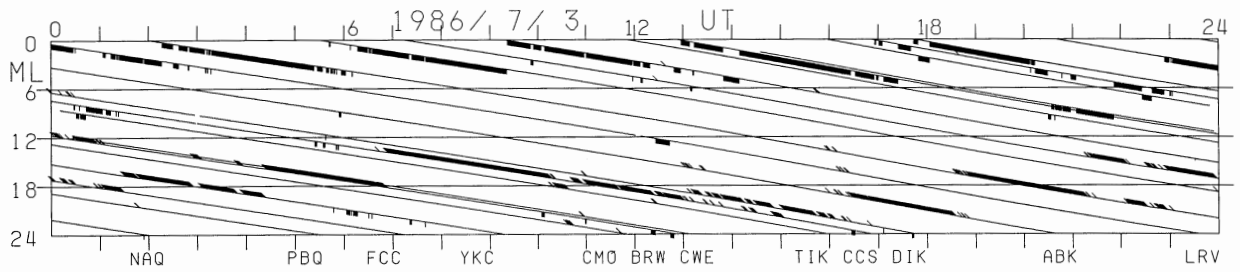
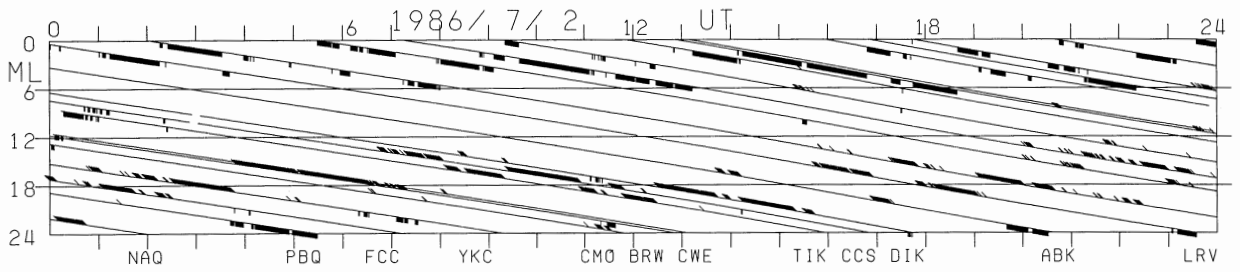
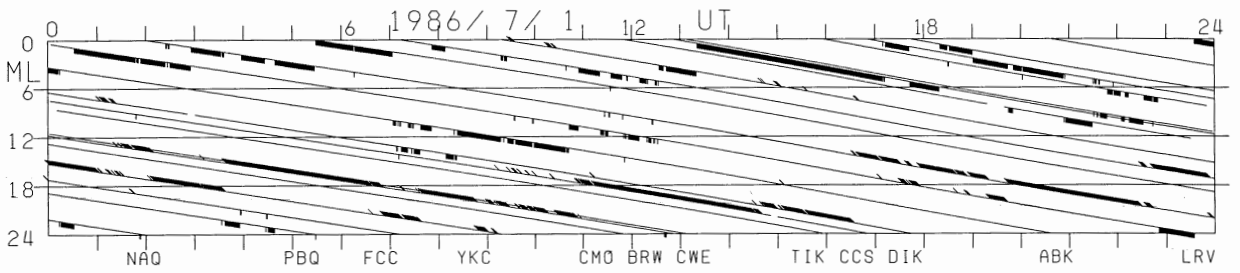
Daily graphs of 1.0 min AE indices (AU, AL, AE and AO) for July-December 1986. Graphs on disturbed days (Nov. 4, and Nov. 25) are reproduced on page 96.

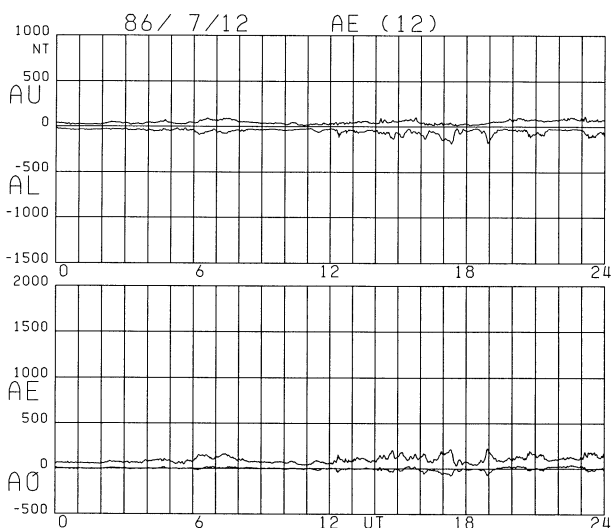
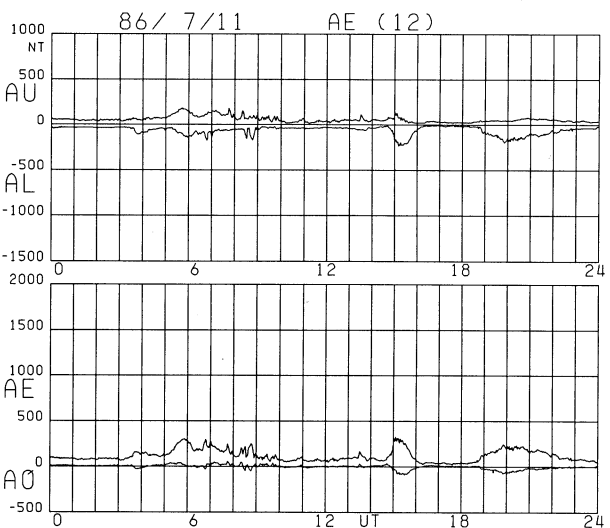
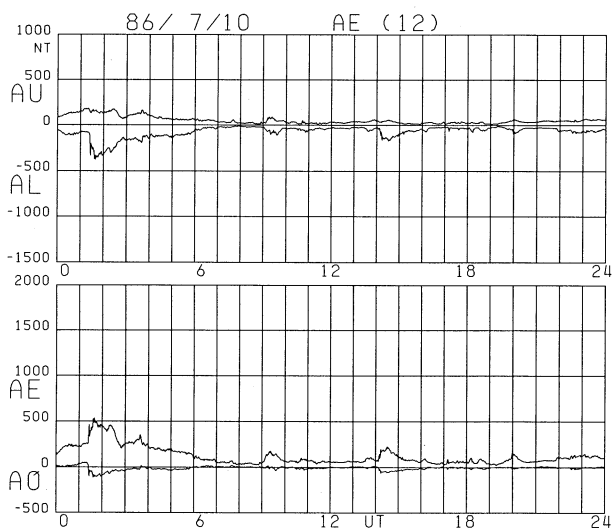
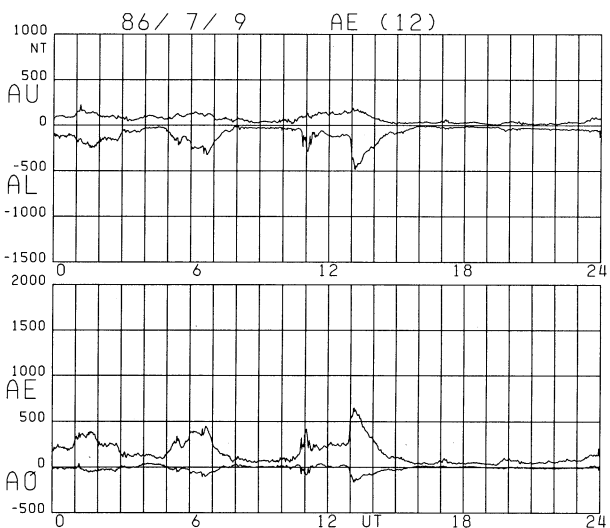
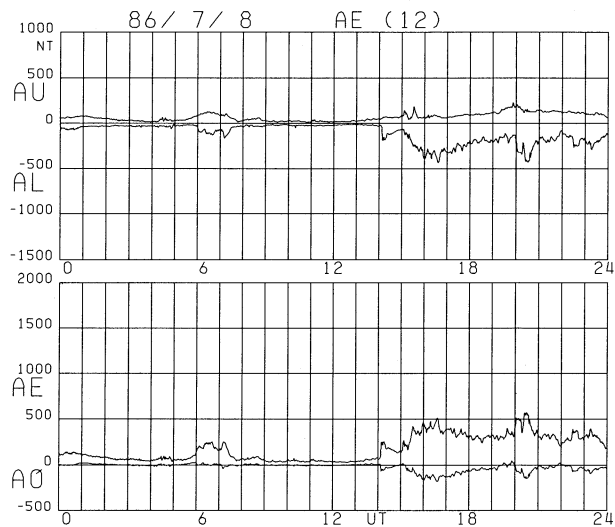
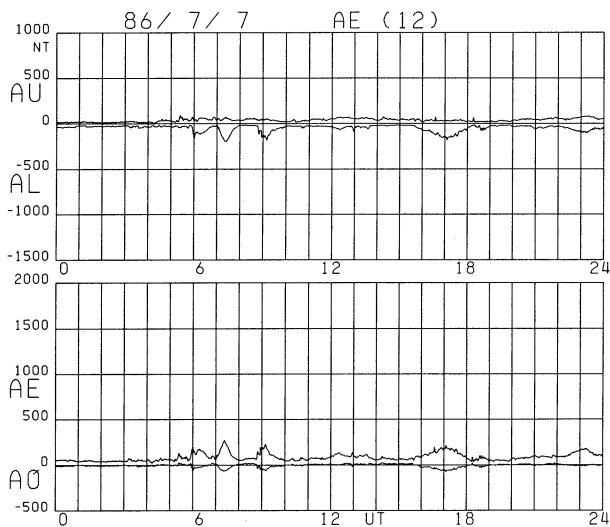
FIGURE 5 (on odd pages)

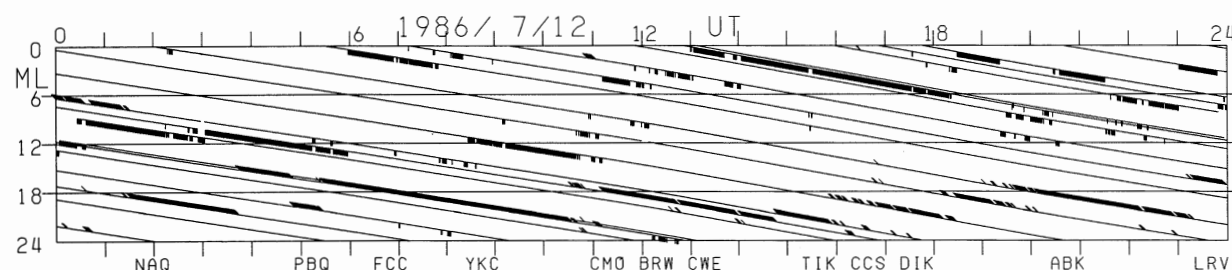
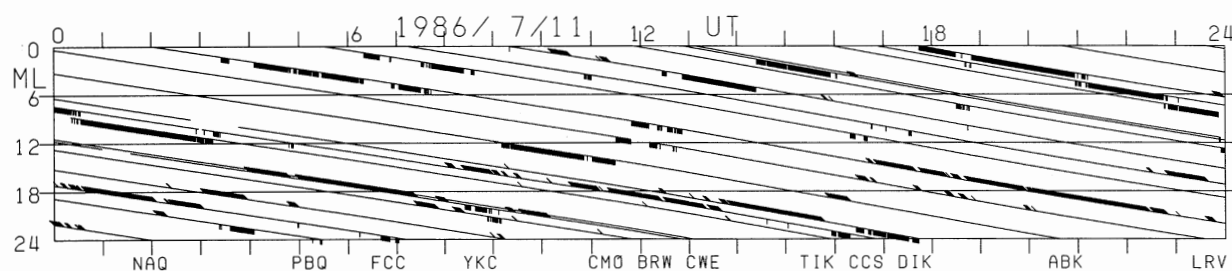
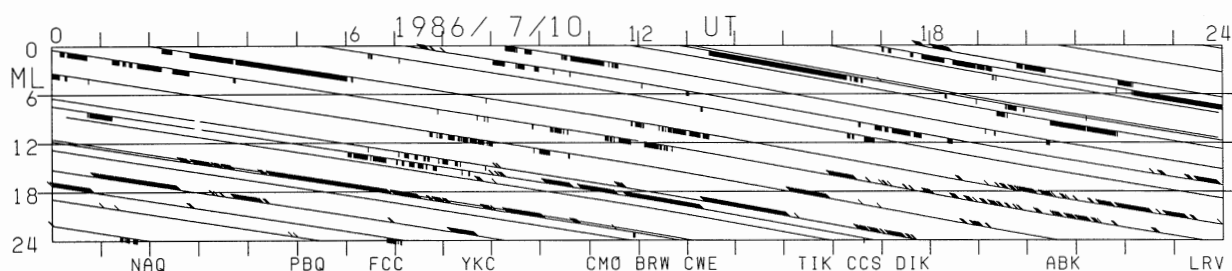
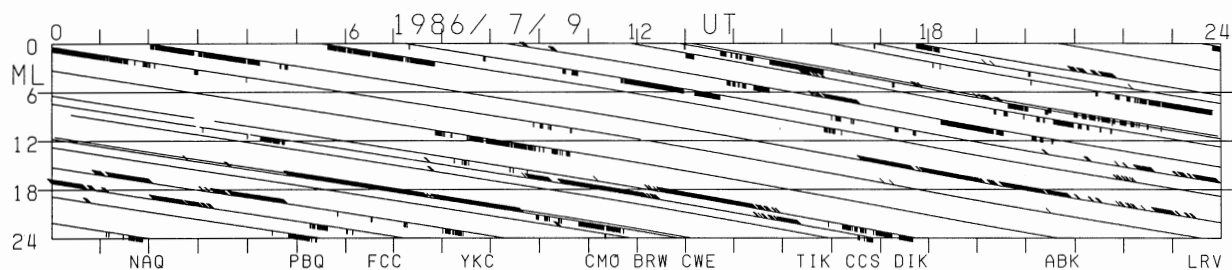
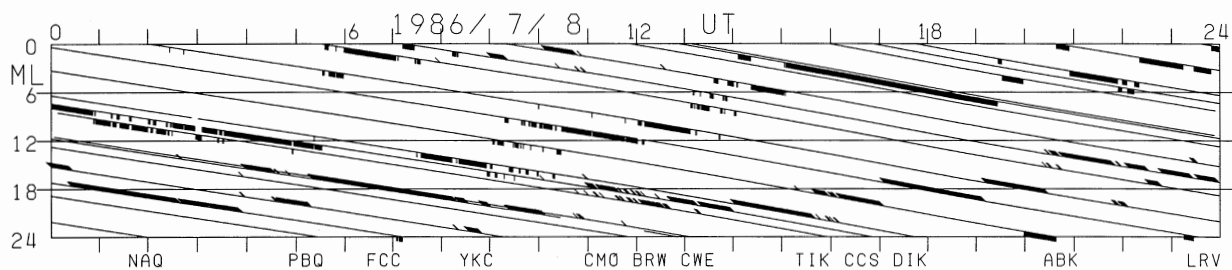
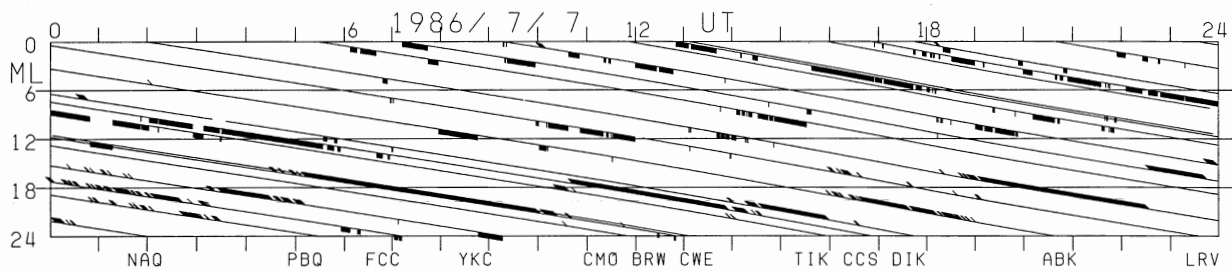
Plots of the contributing station to the AU (upper plumes) and AL (lower plumes) indices, showing which station contributes to these indices at each UT minute.

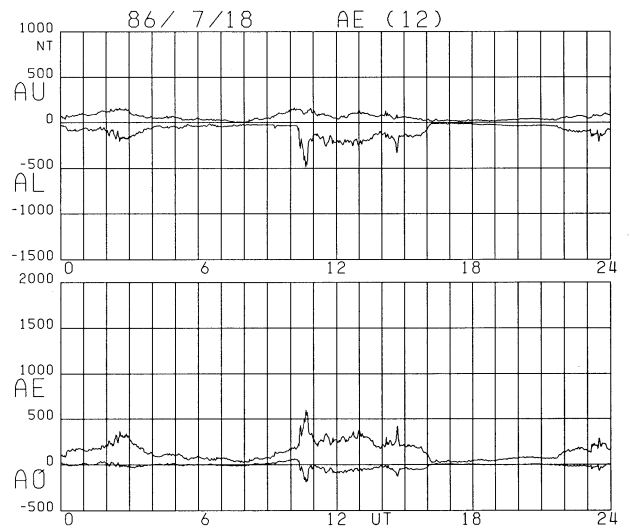
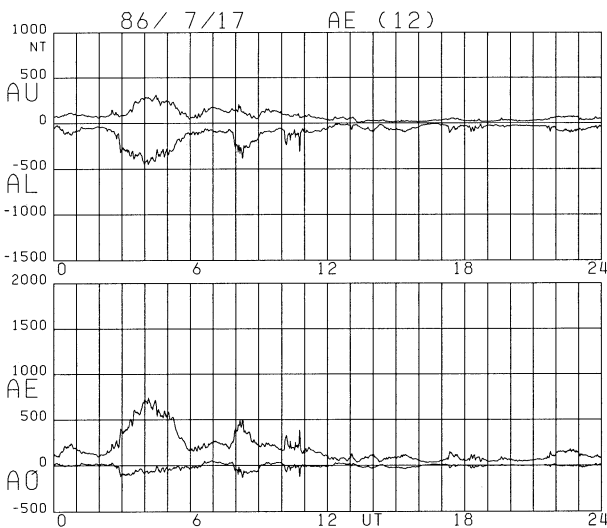
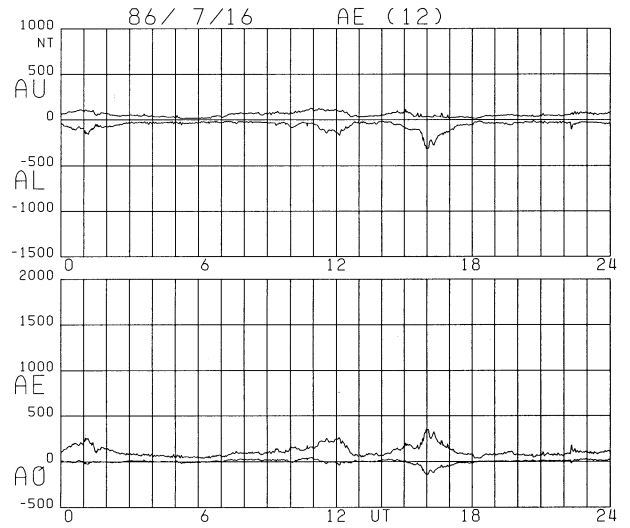
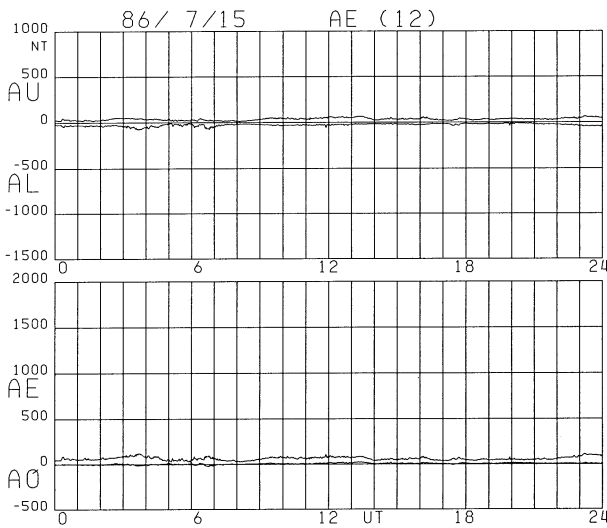
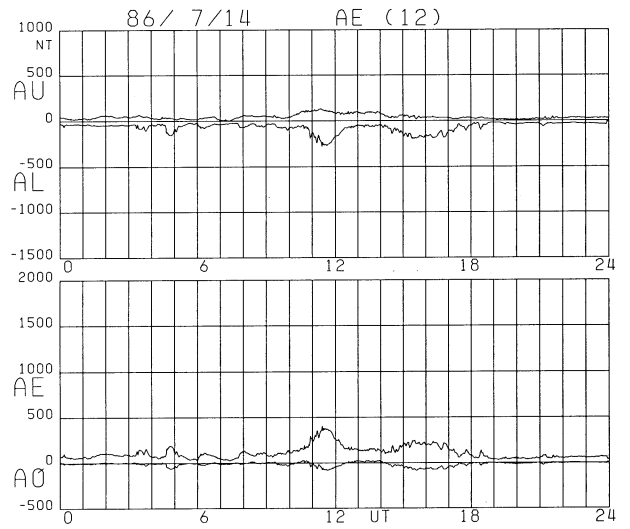
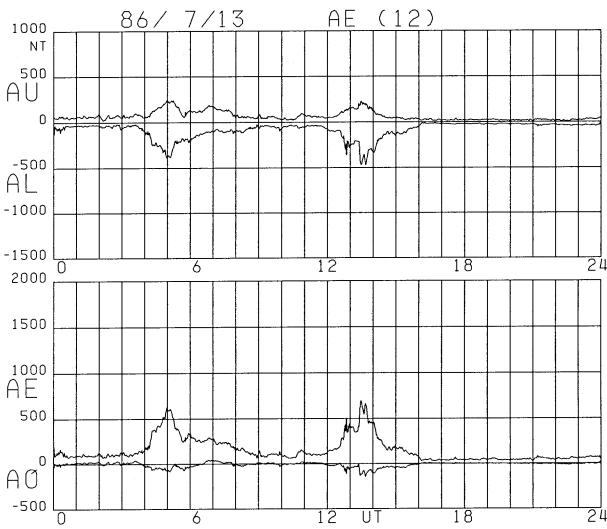


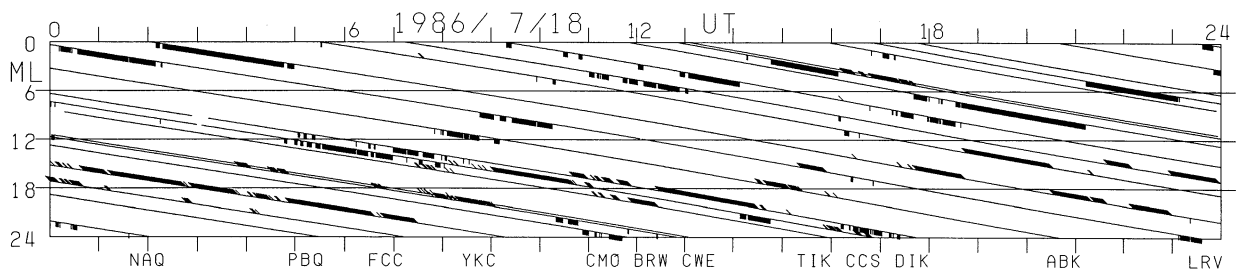
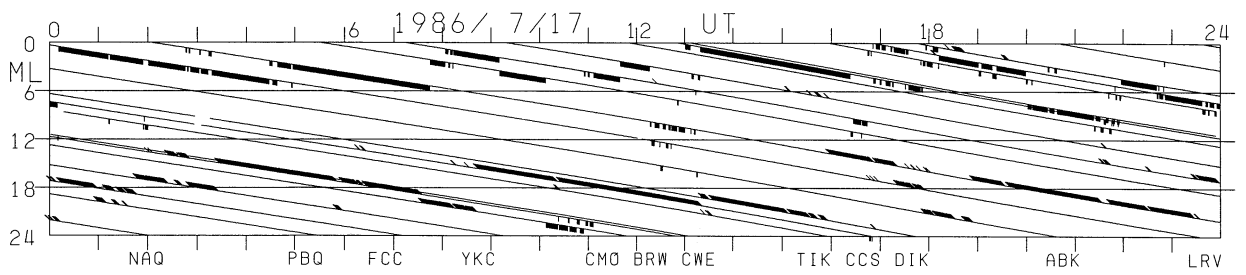
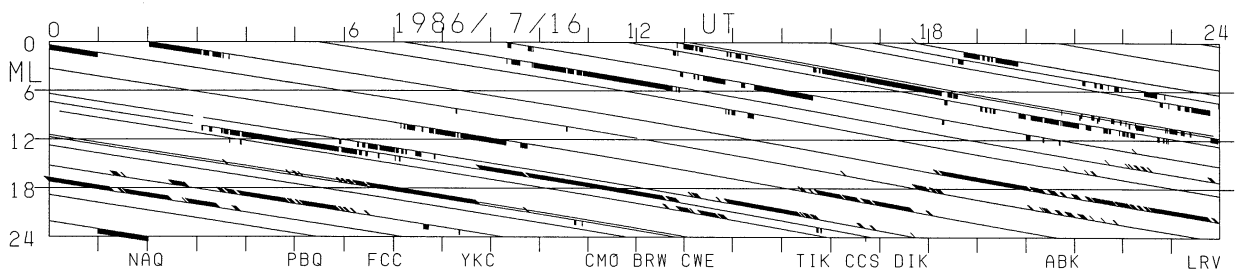
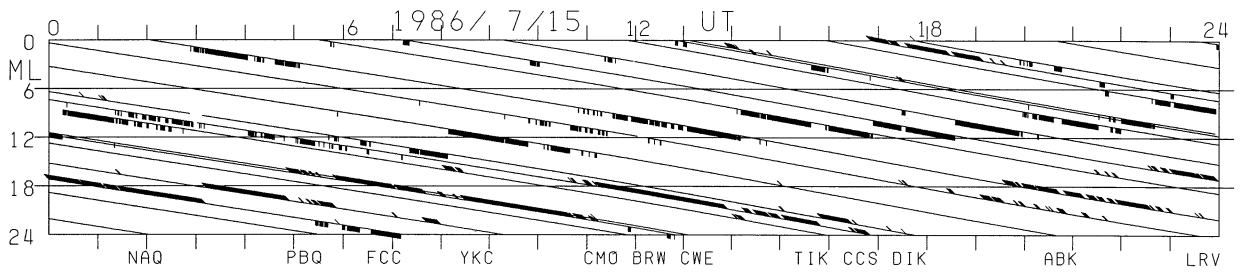
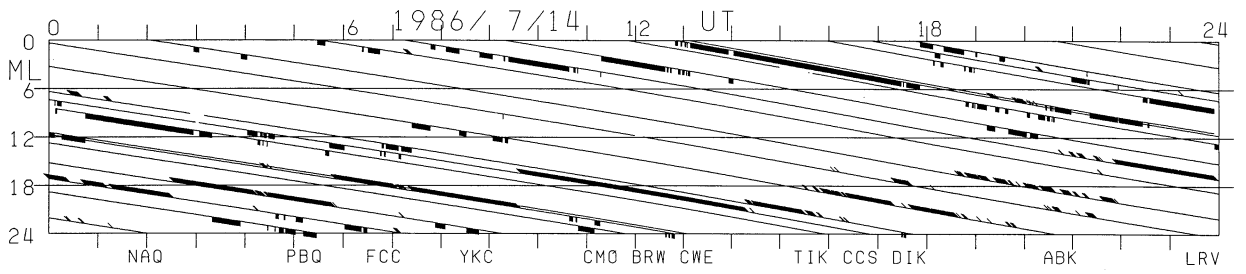
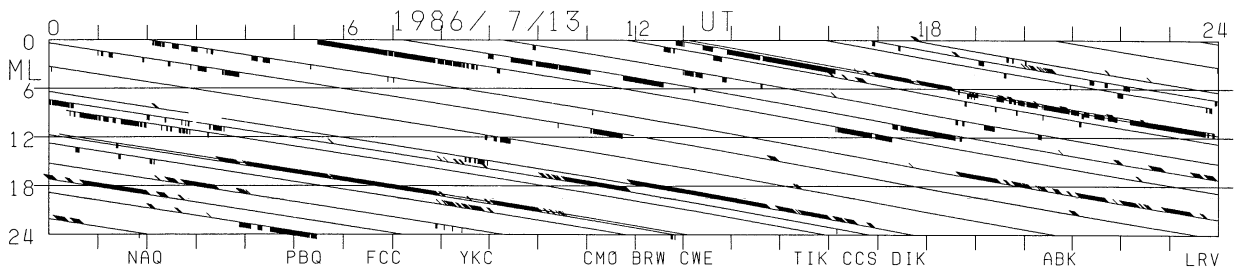


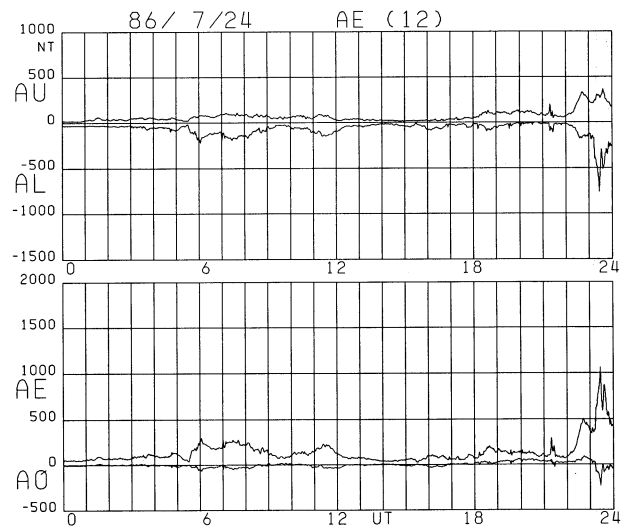
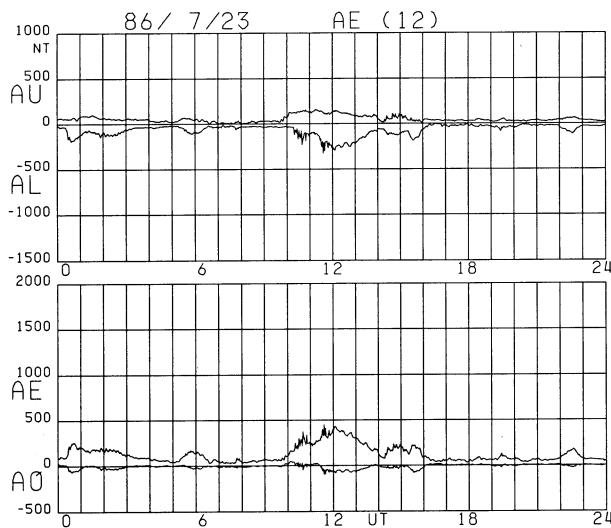
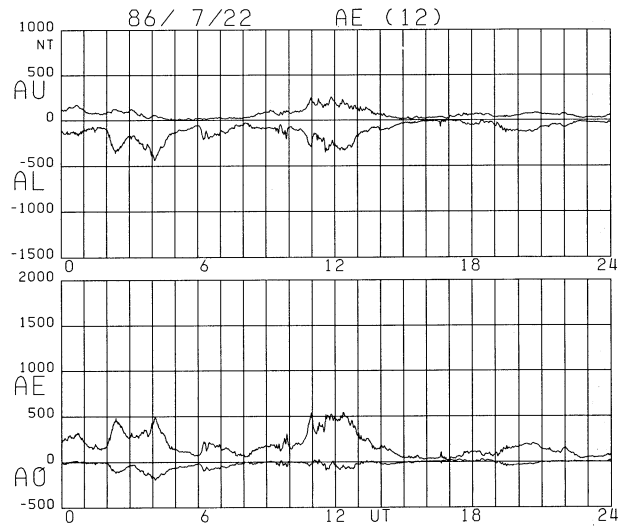
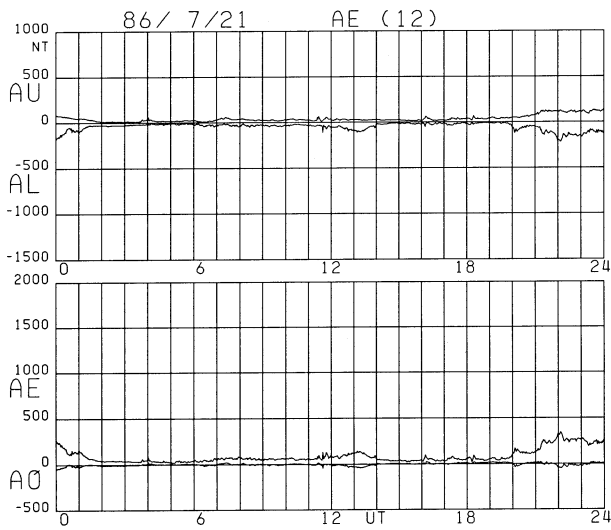
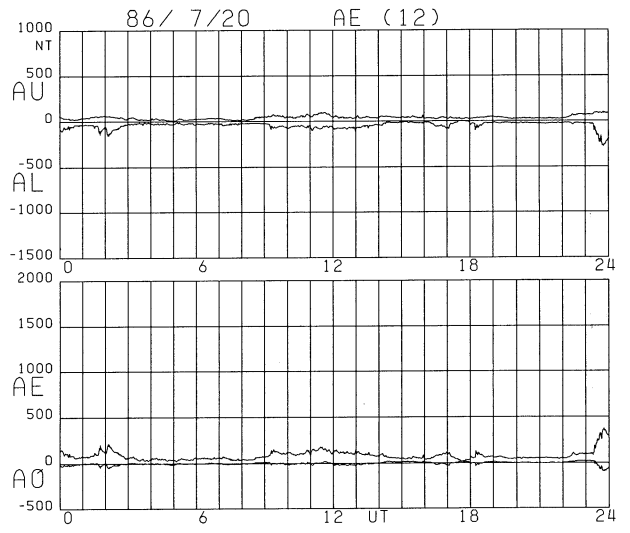
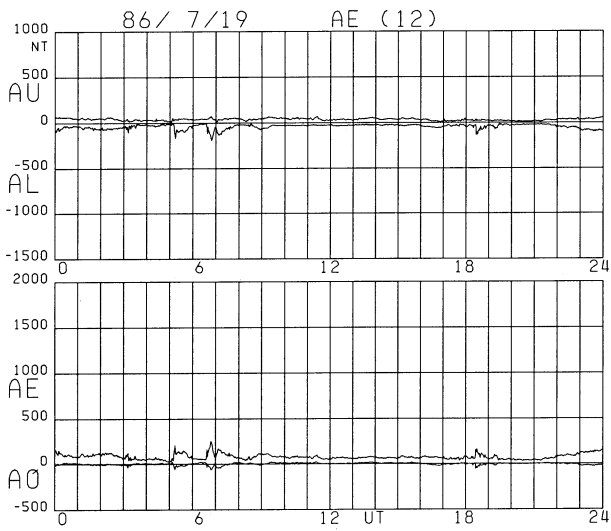


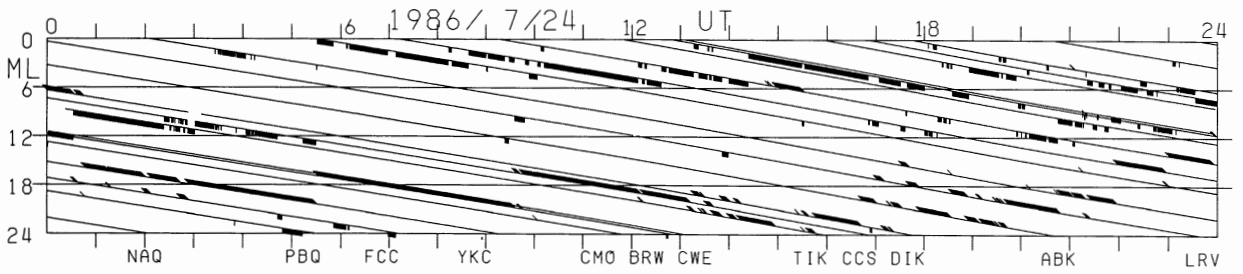
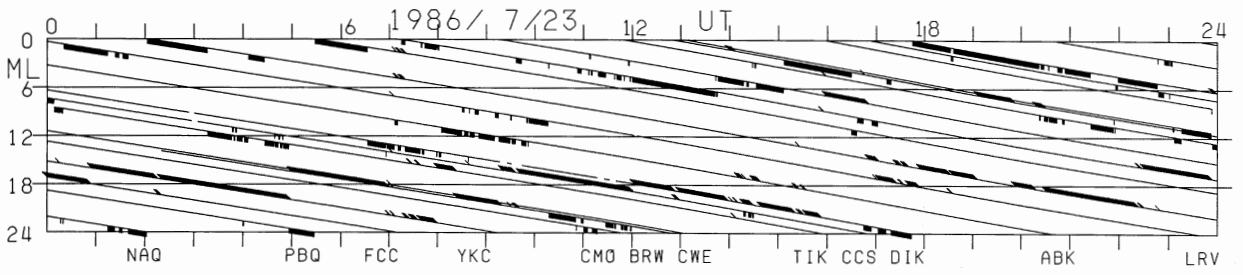
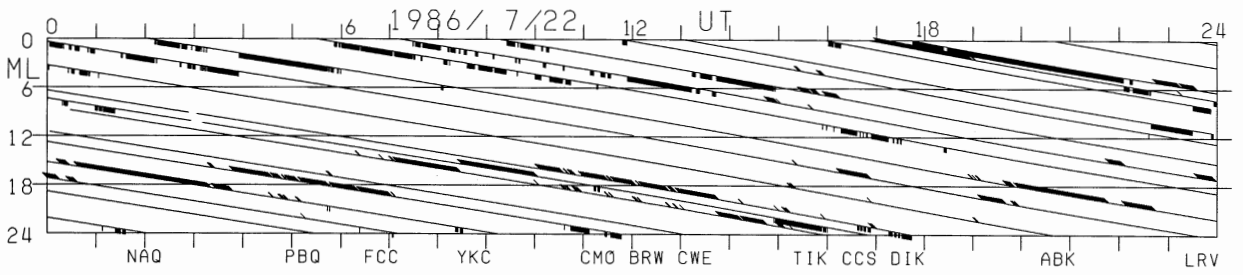
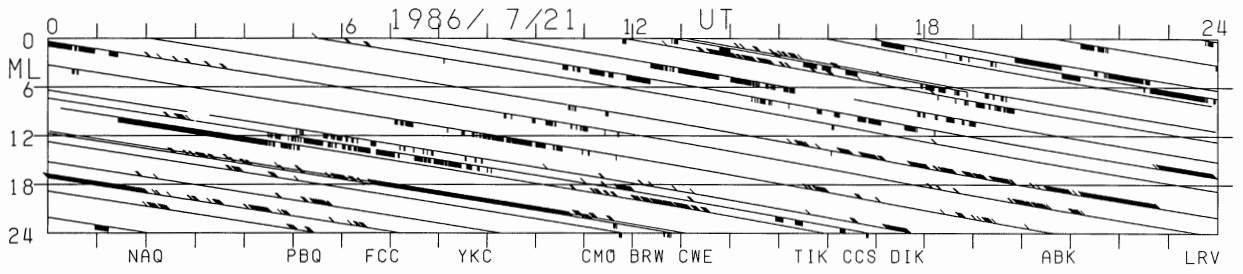
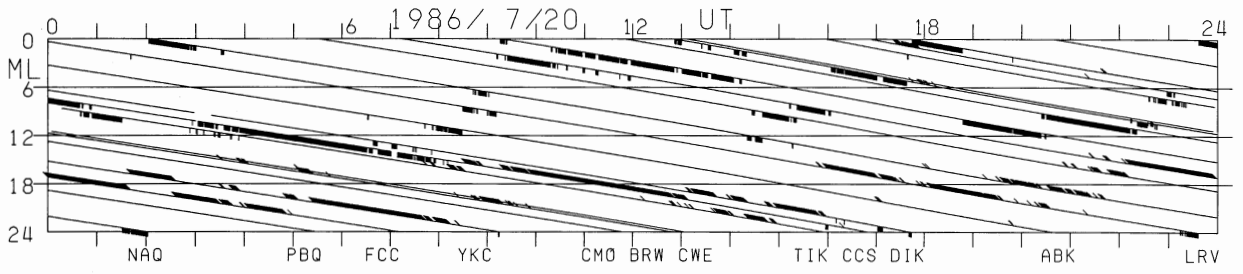
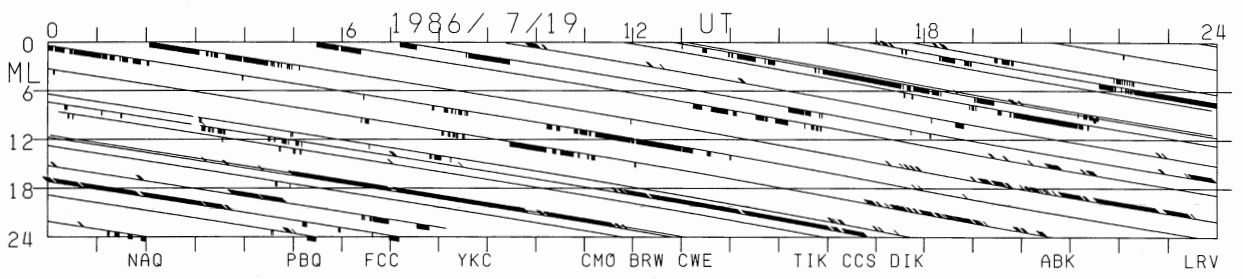


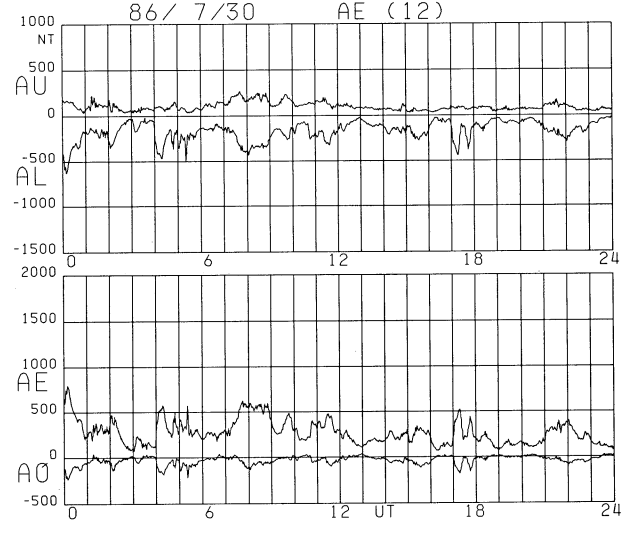
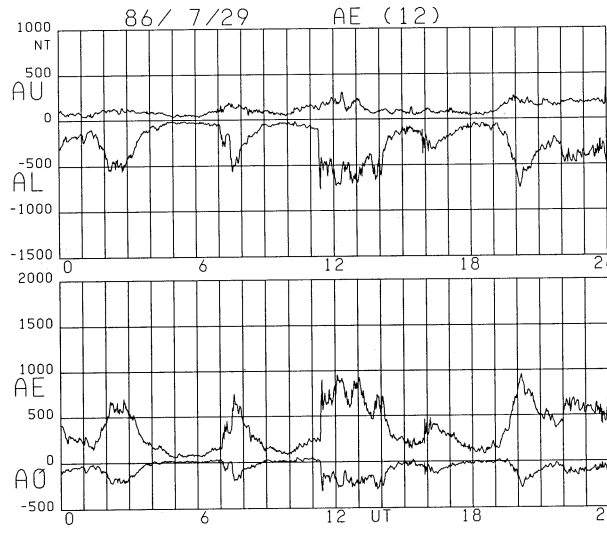
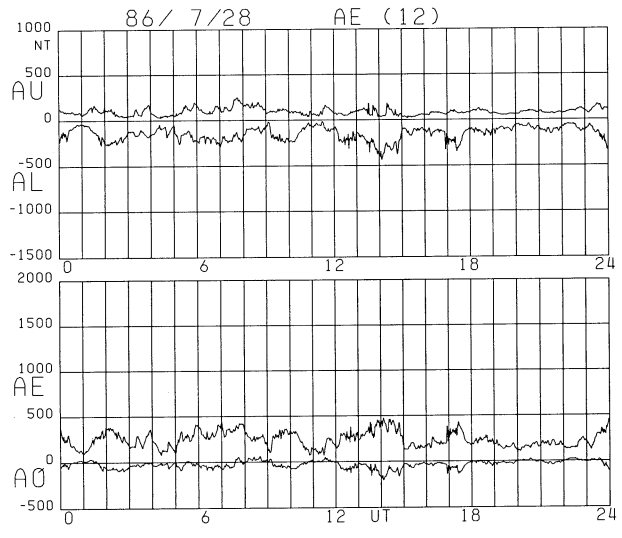
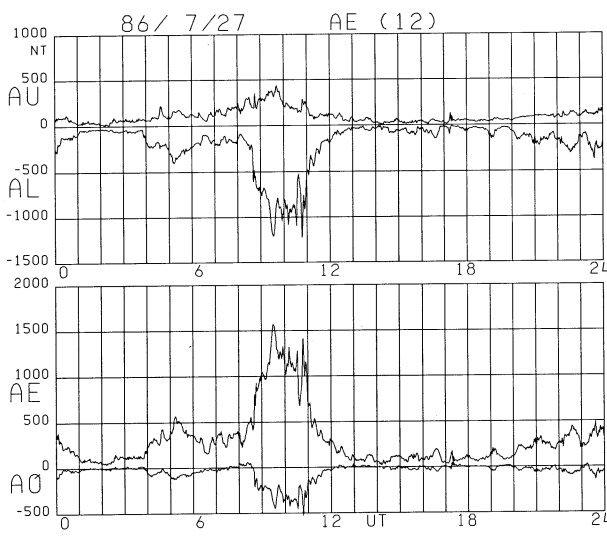
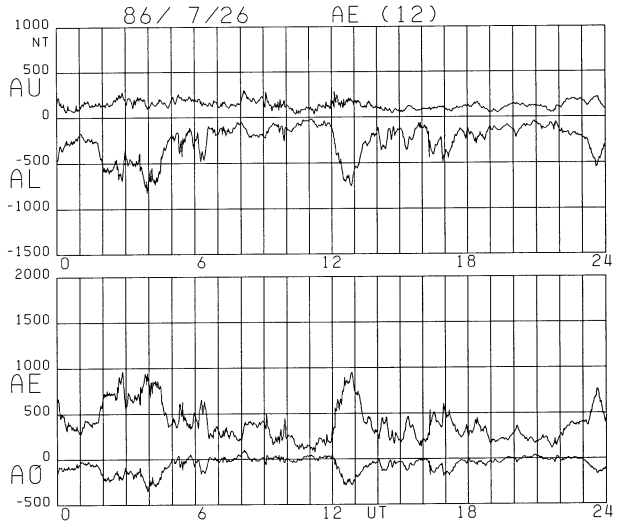
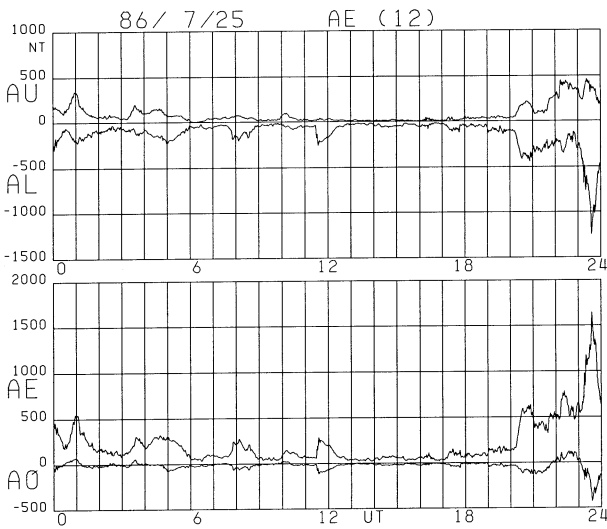




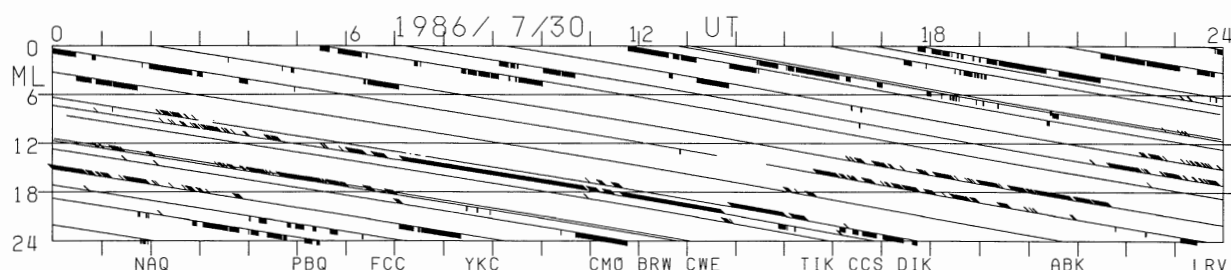
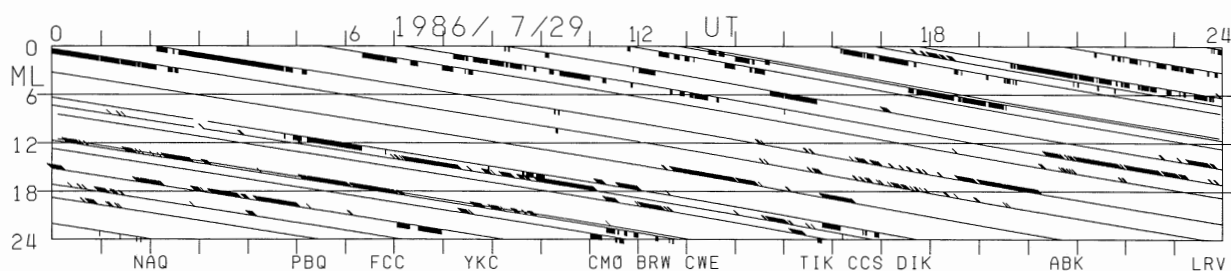
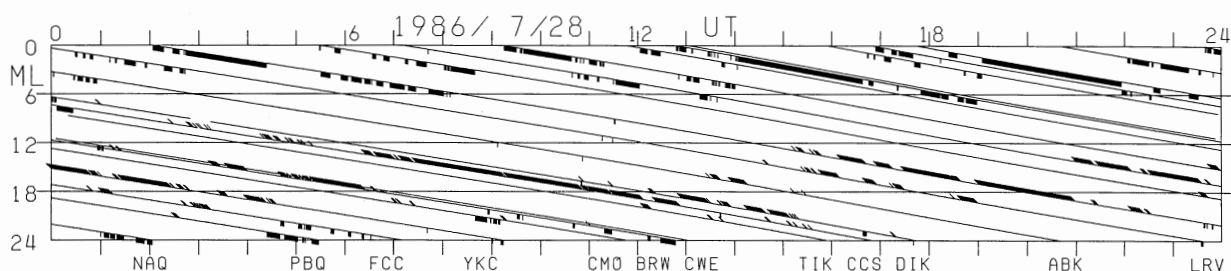
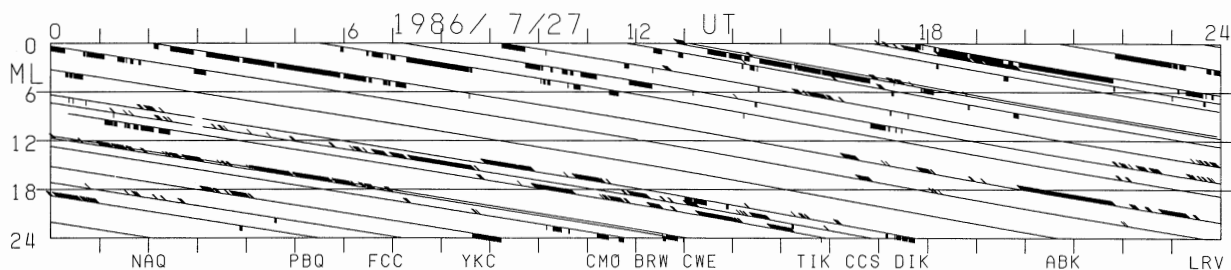
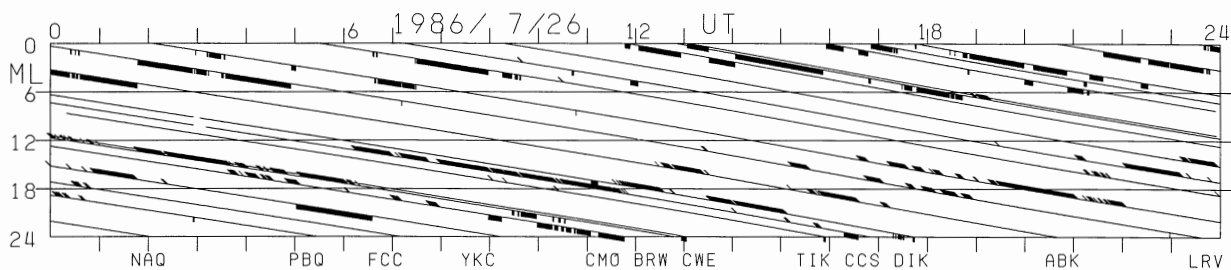
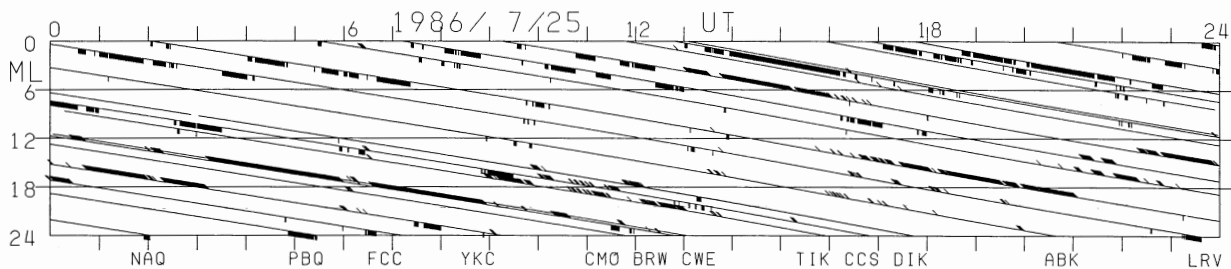


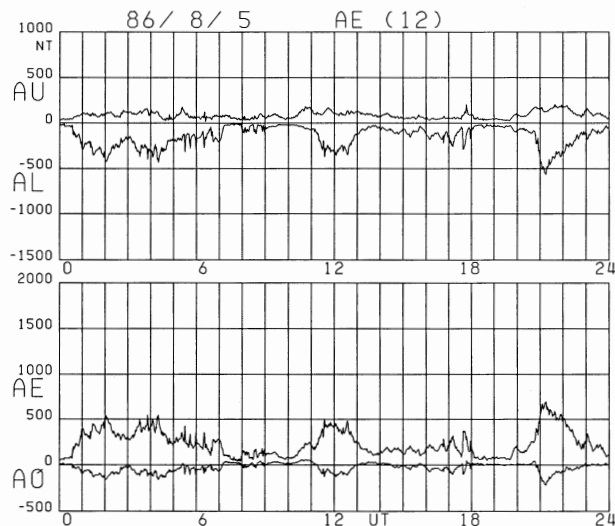
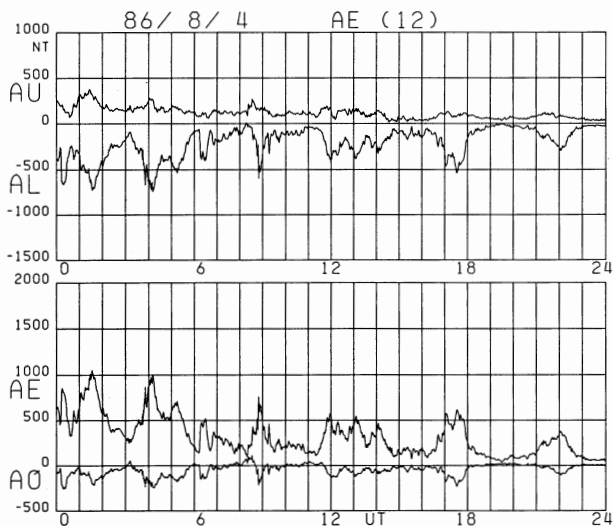
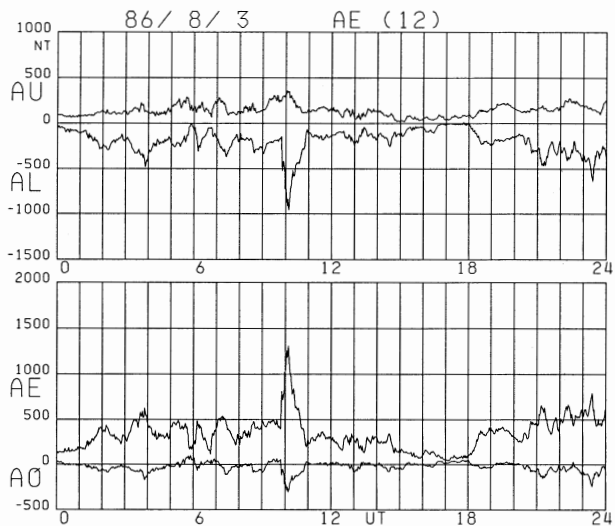
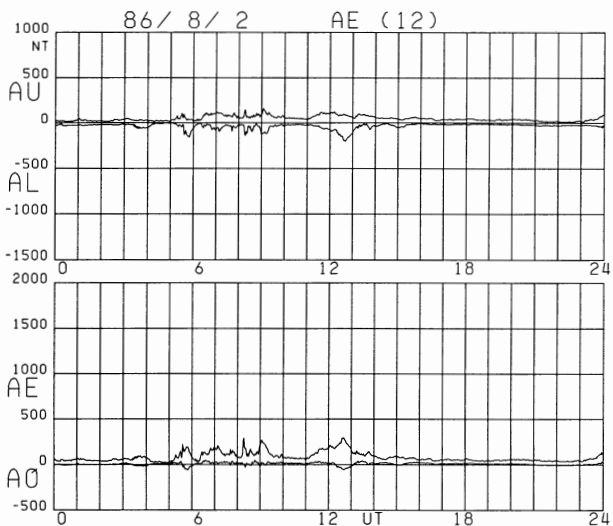
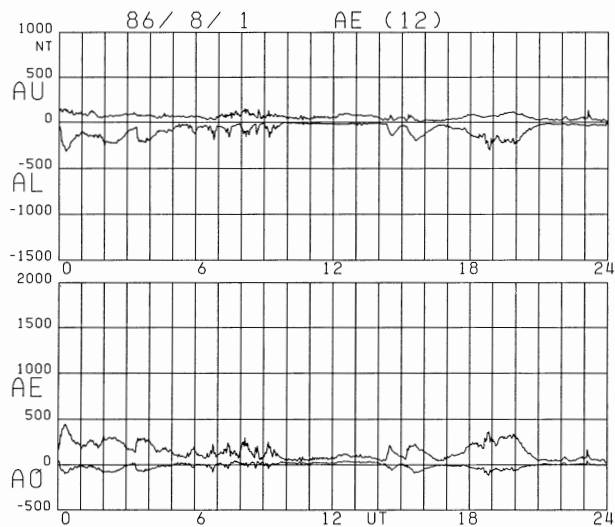
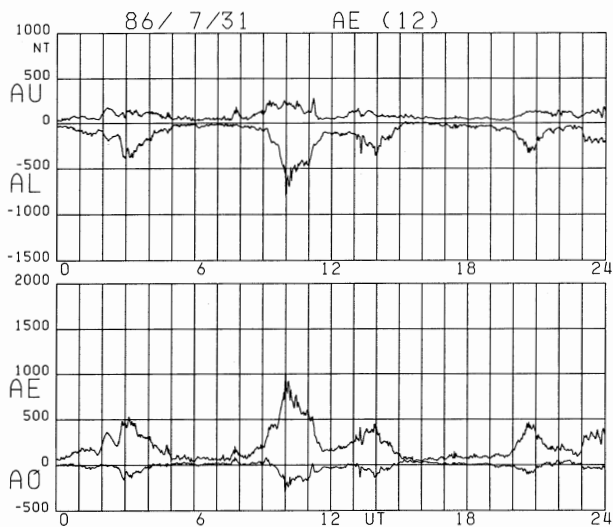


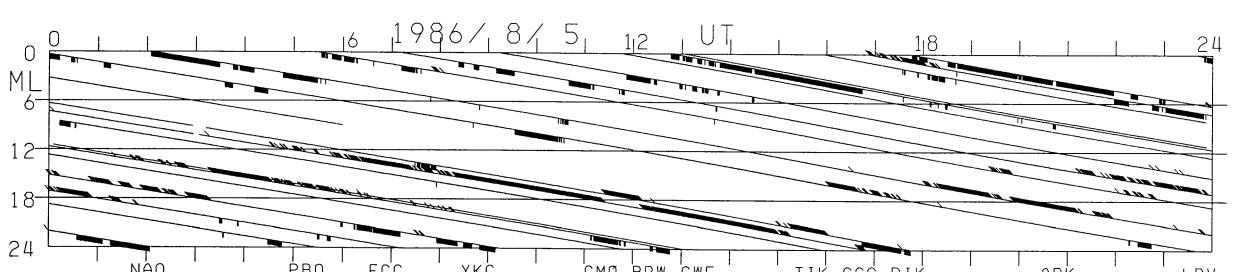
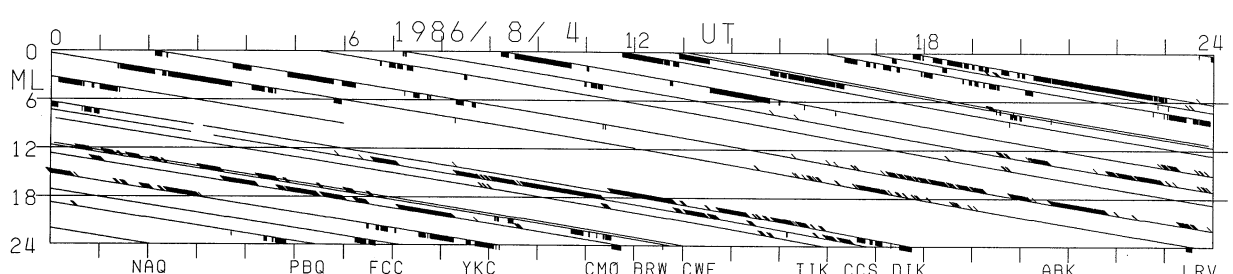
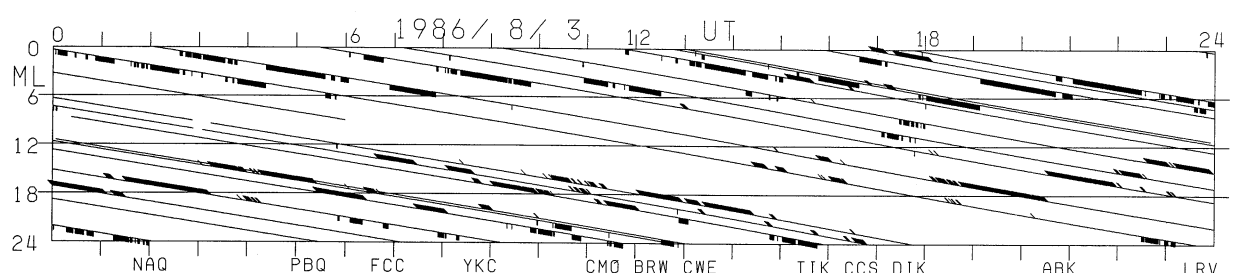
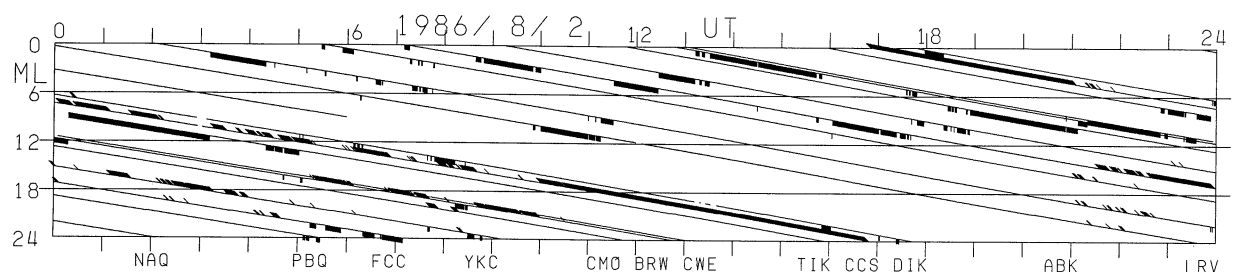
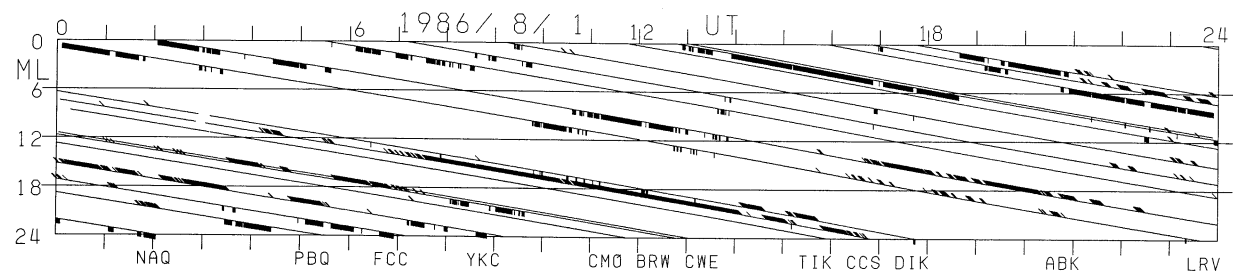
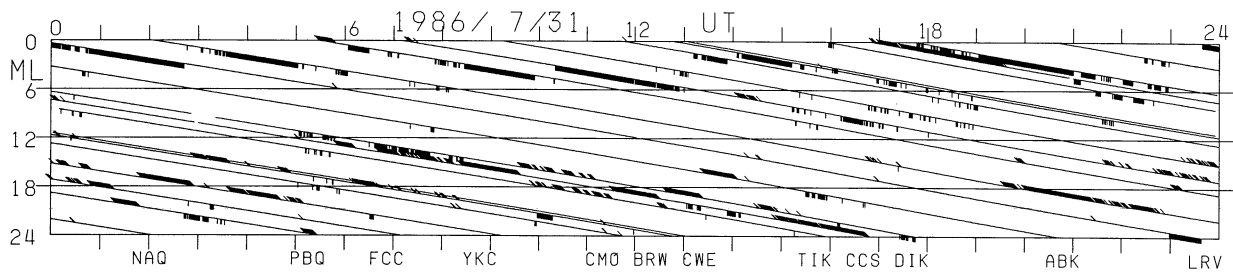


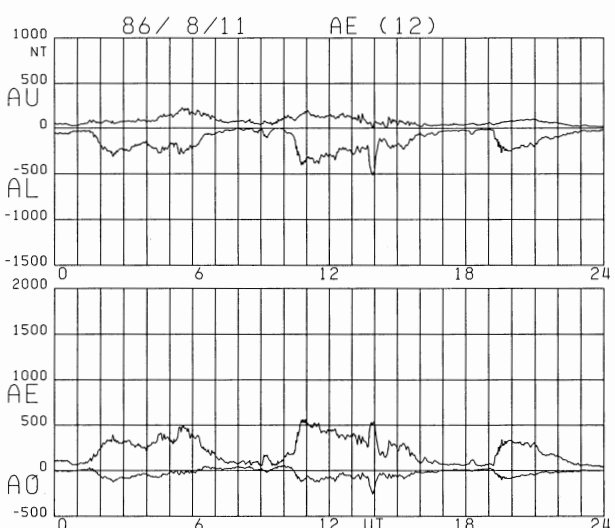
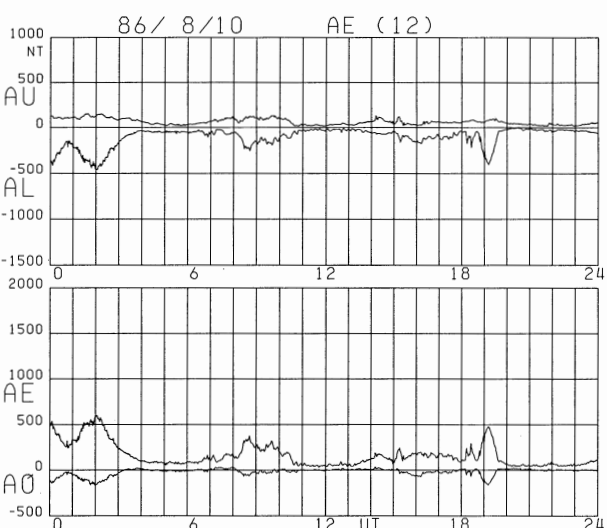
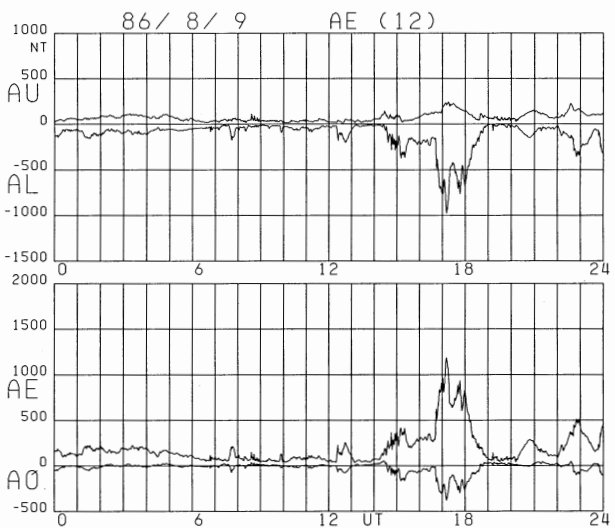
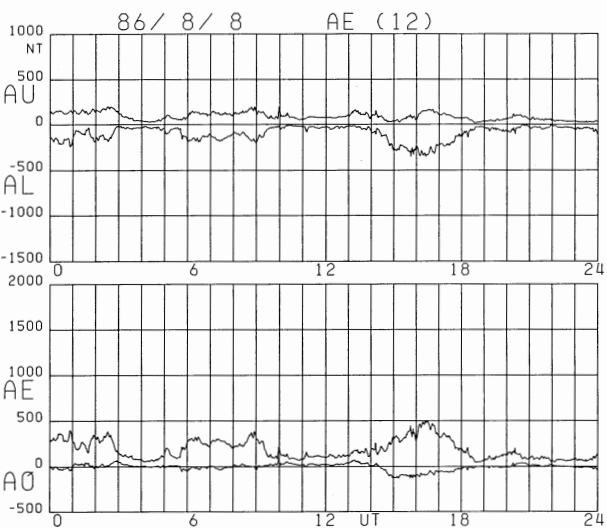
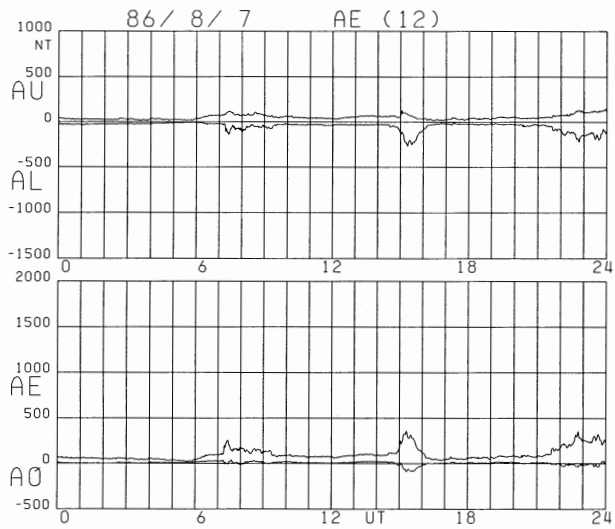
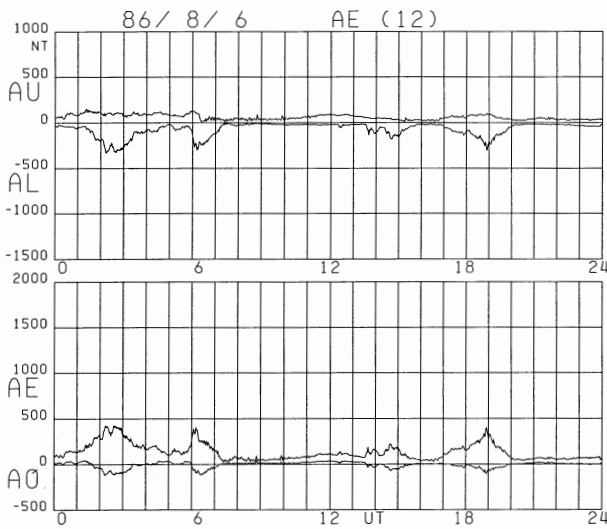


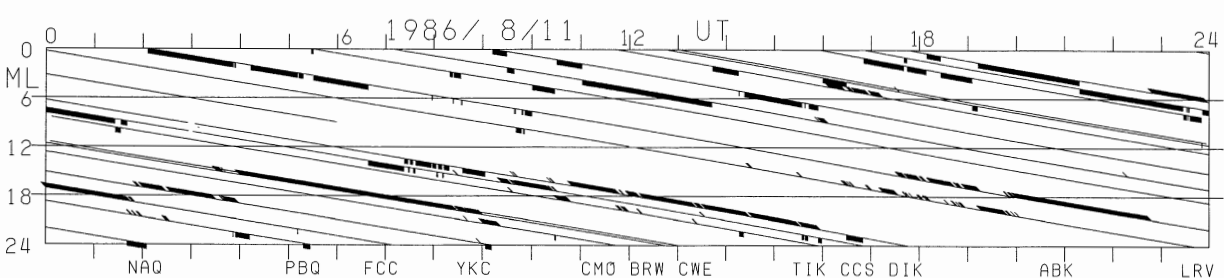
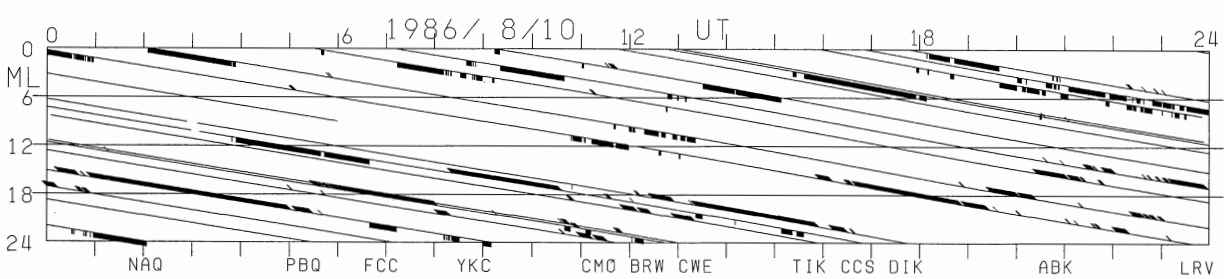
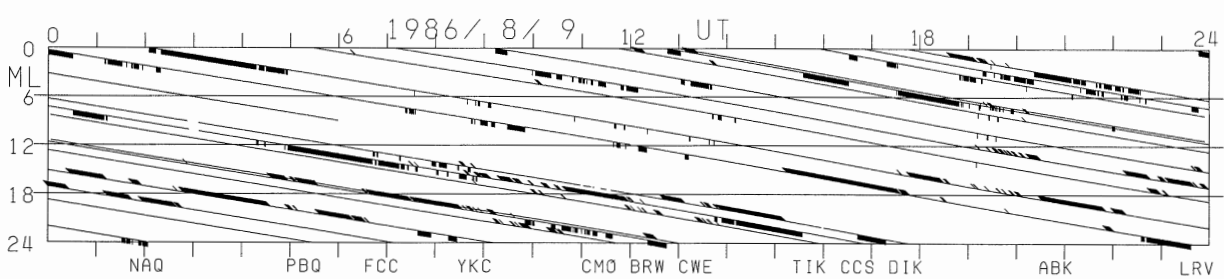
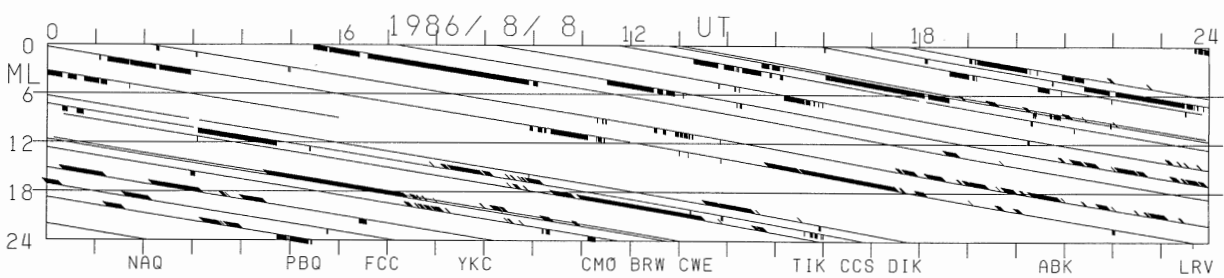
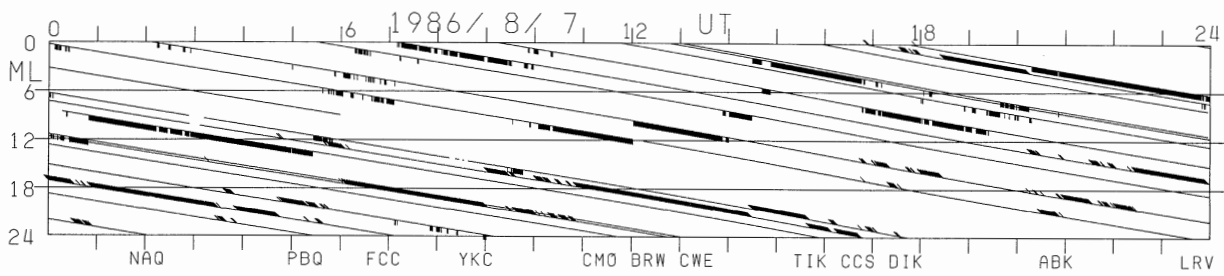
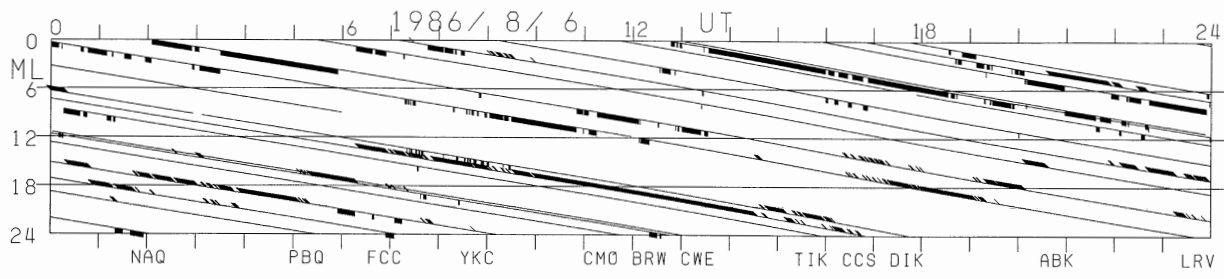


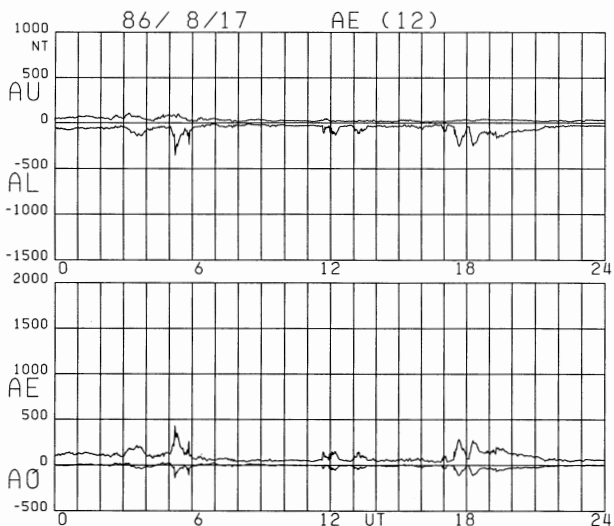
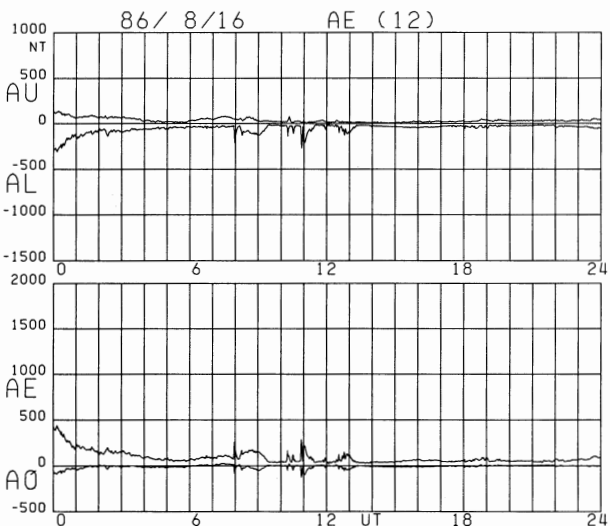
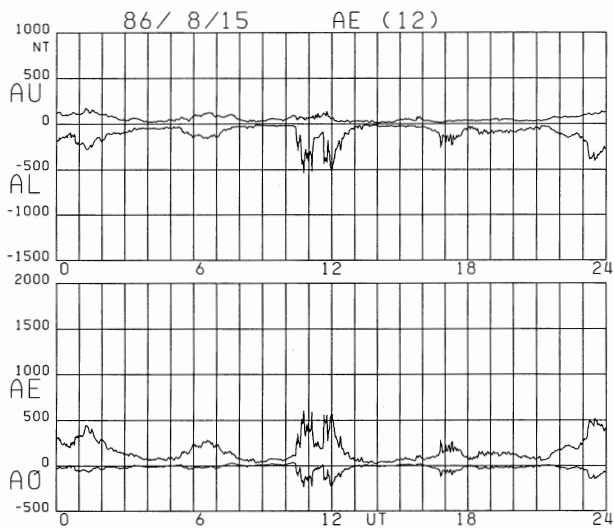
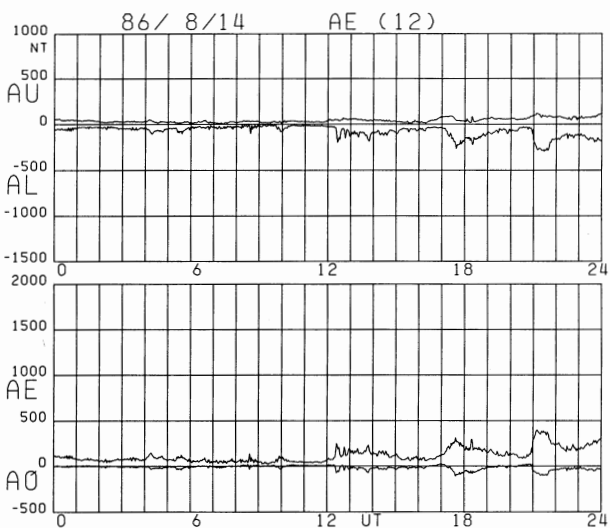
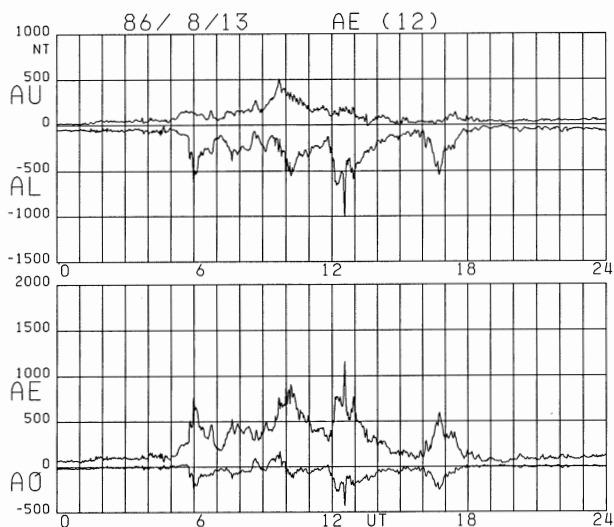
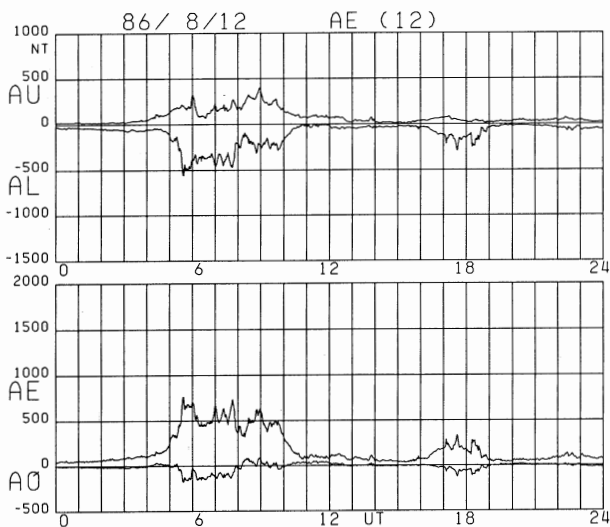


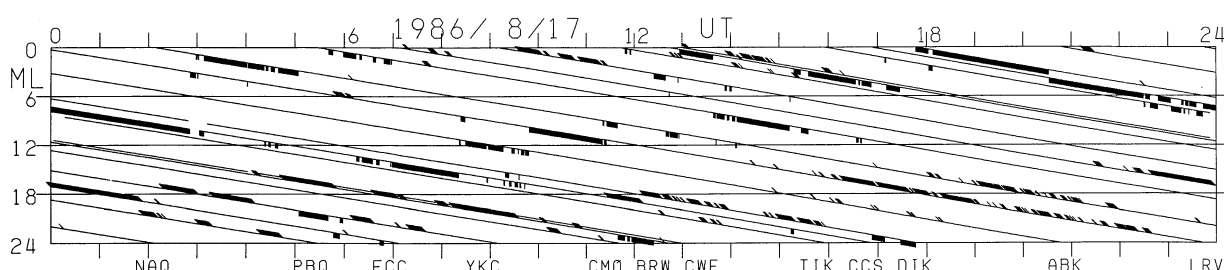
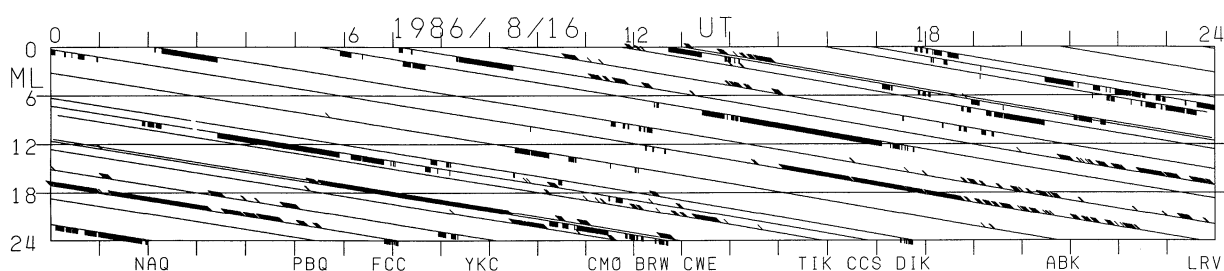
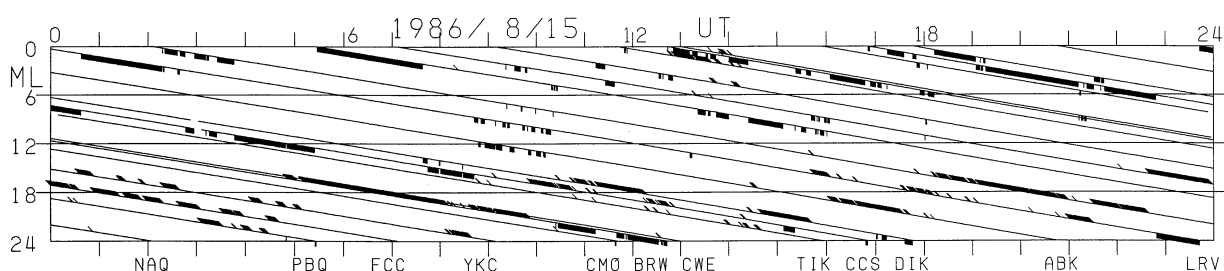
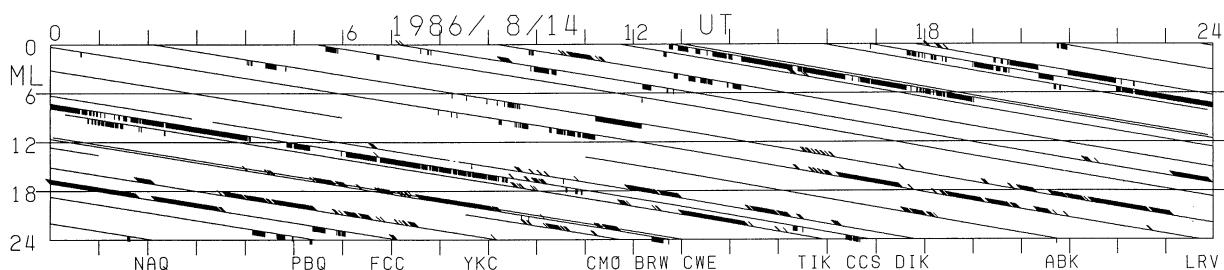
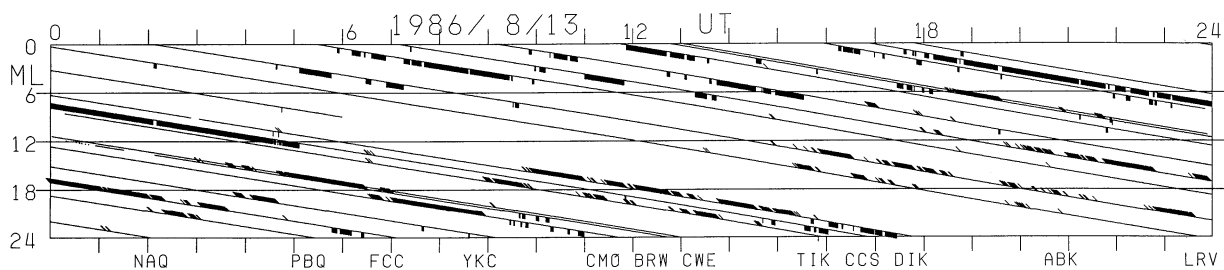
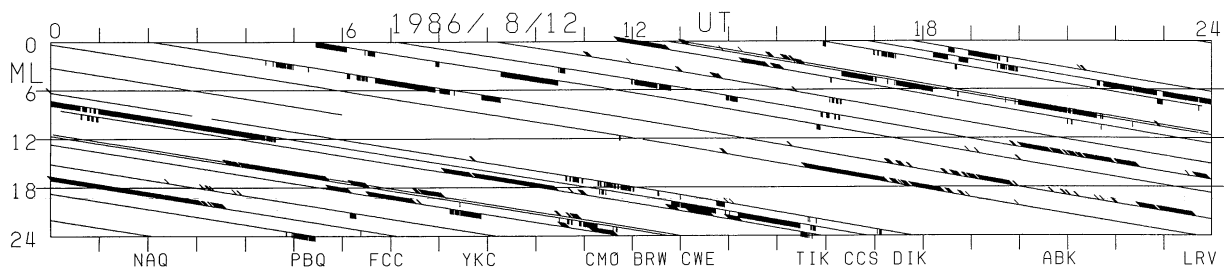


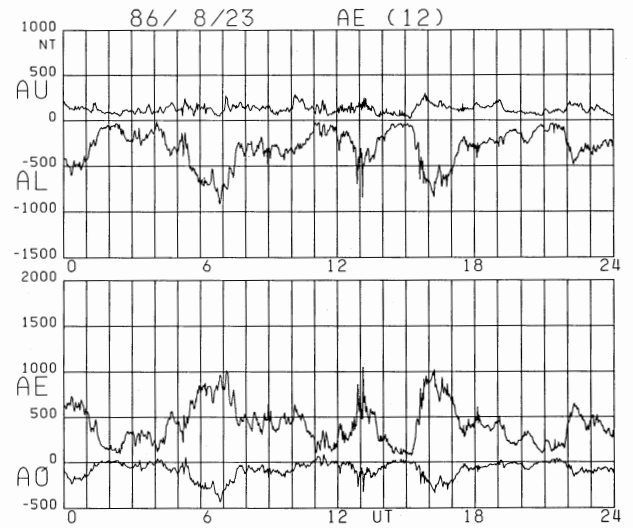
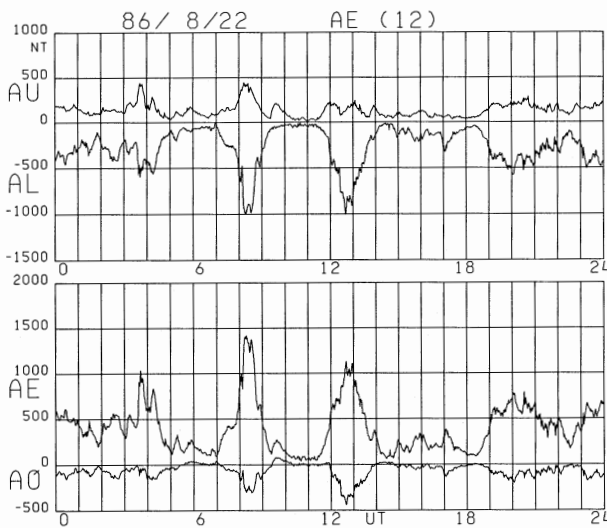
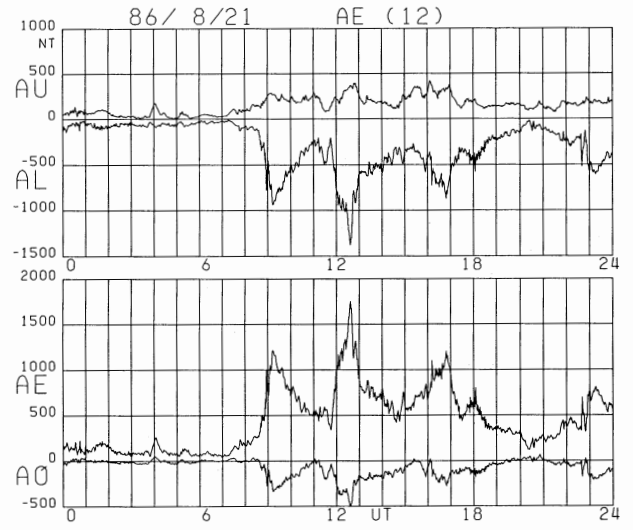
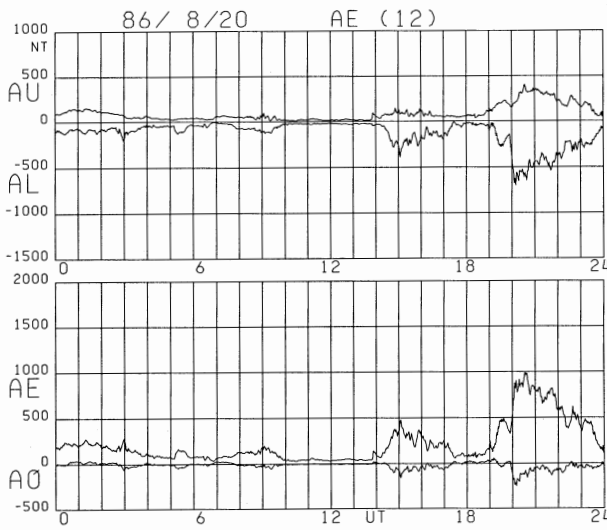
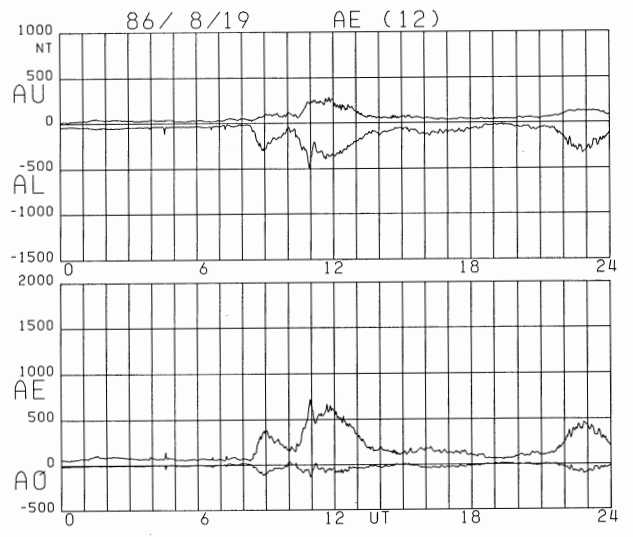
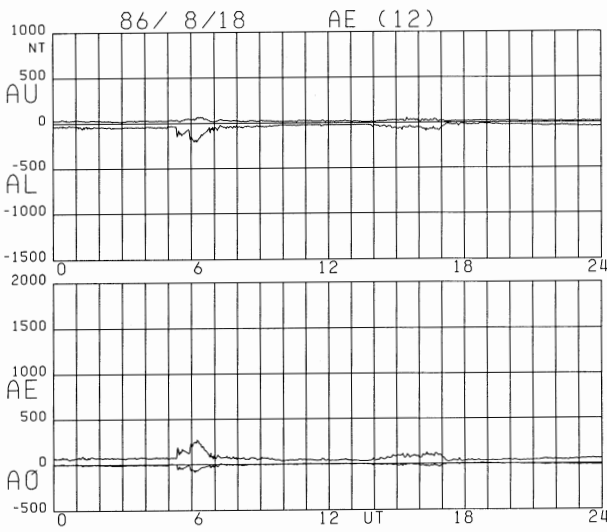




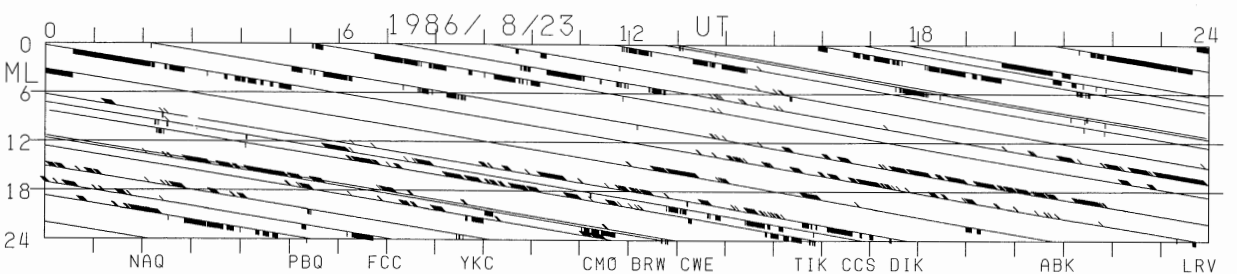
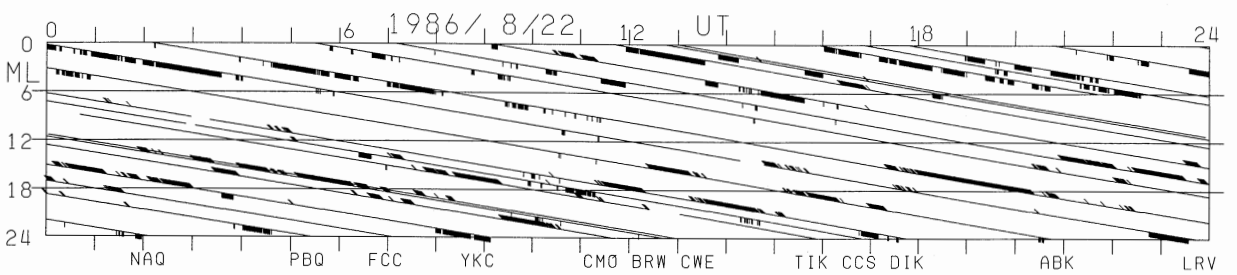
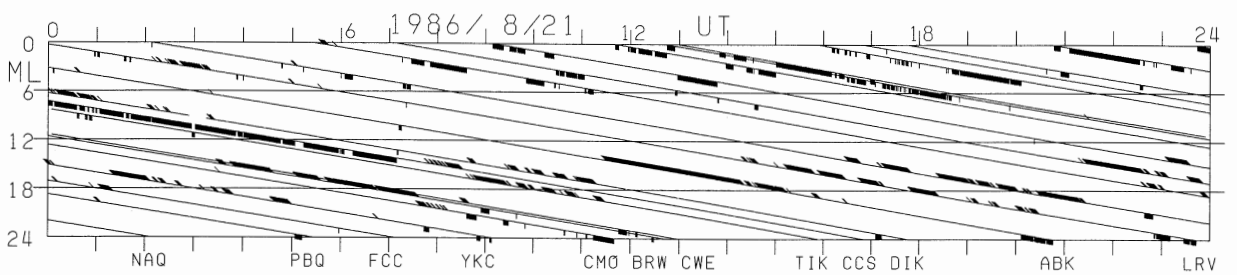
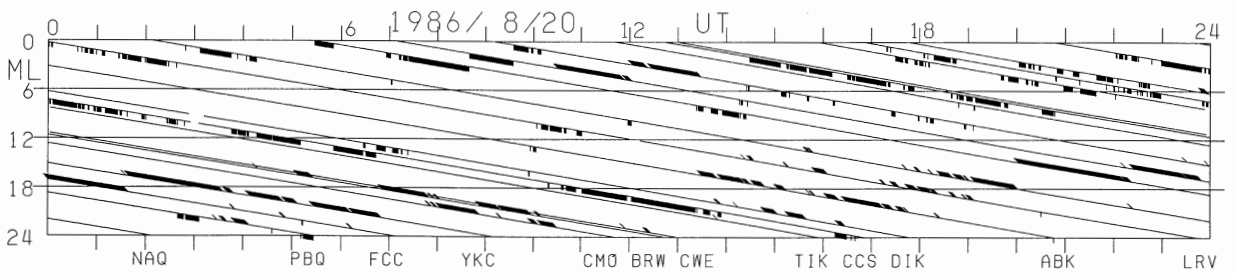
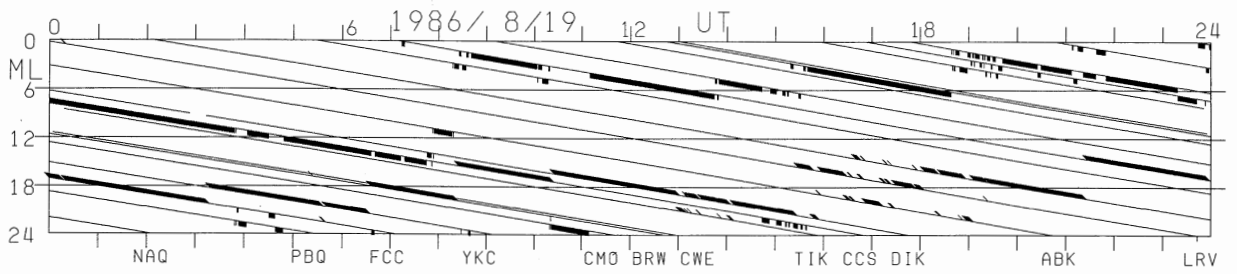
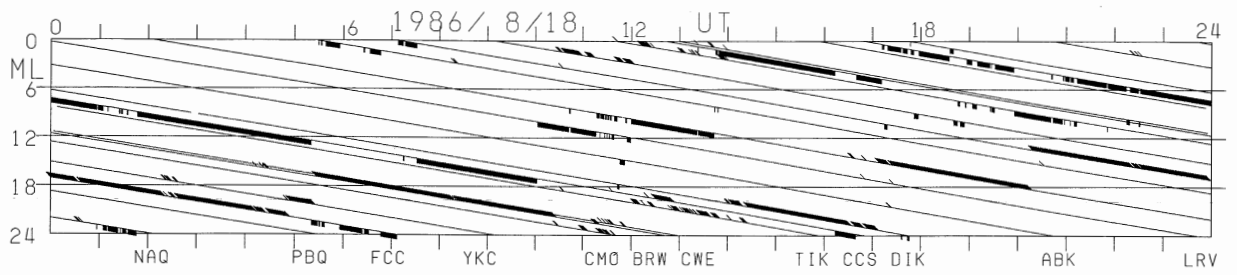


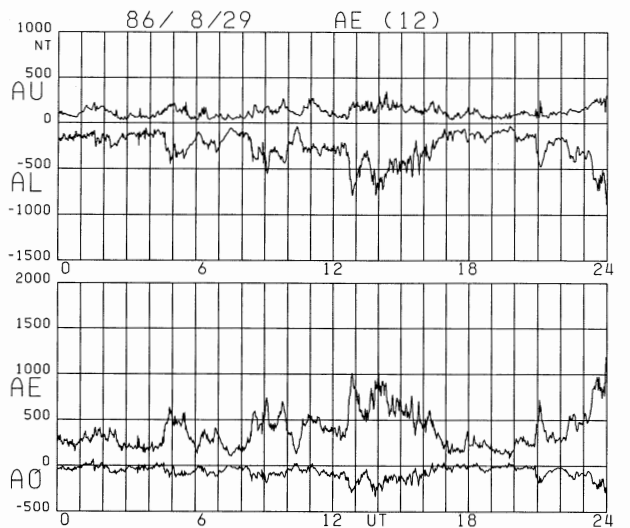
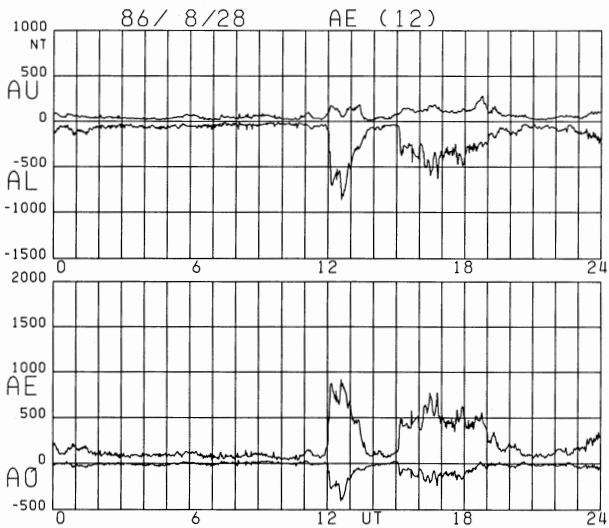
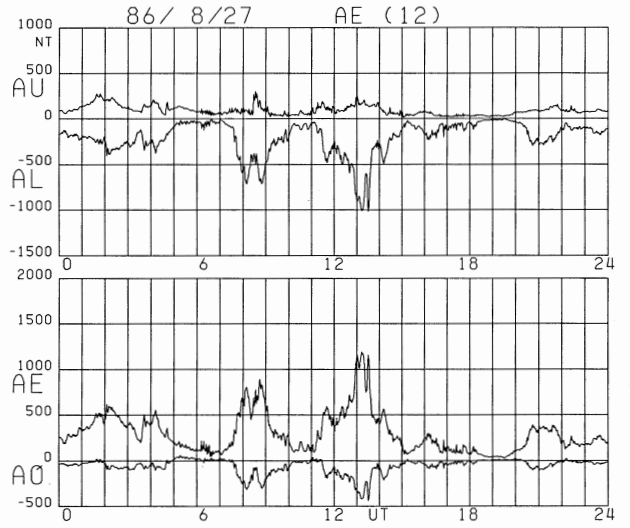
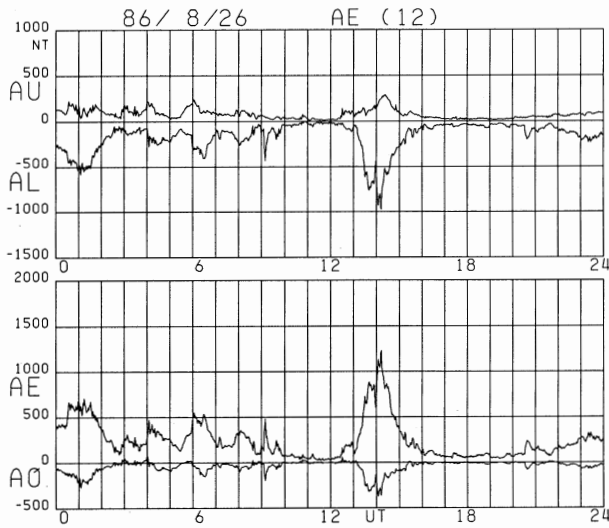
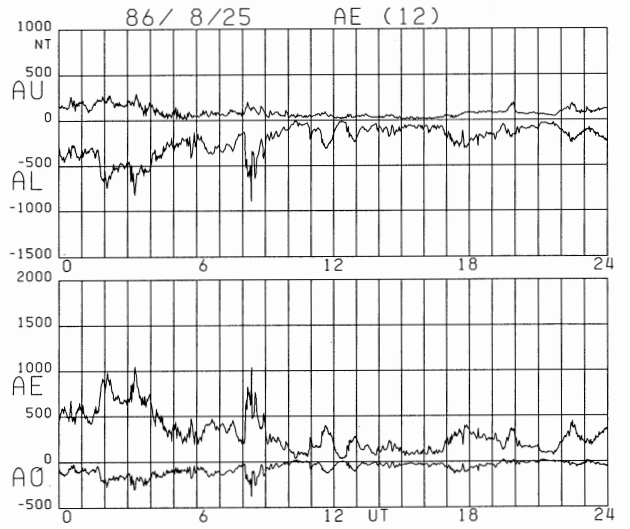
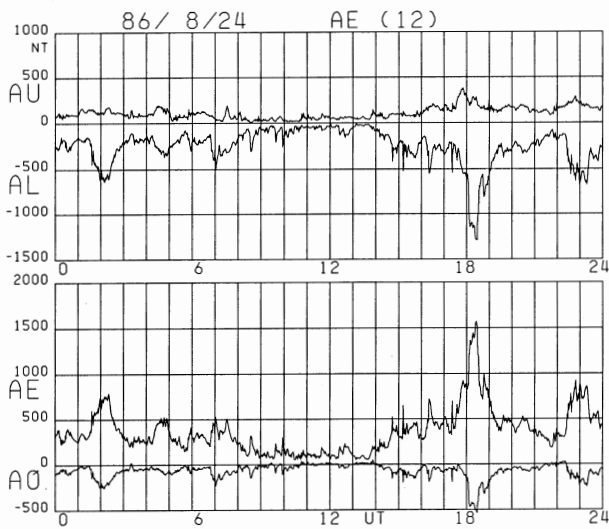


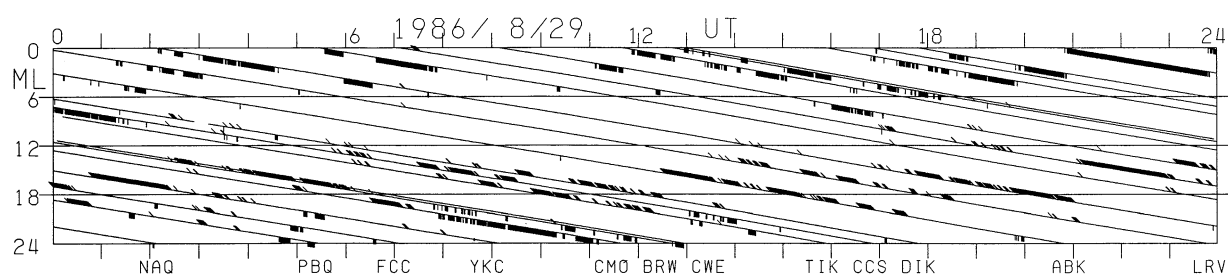
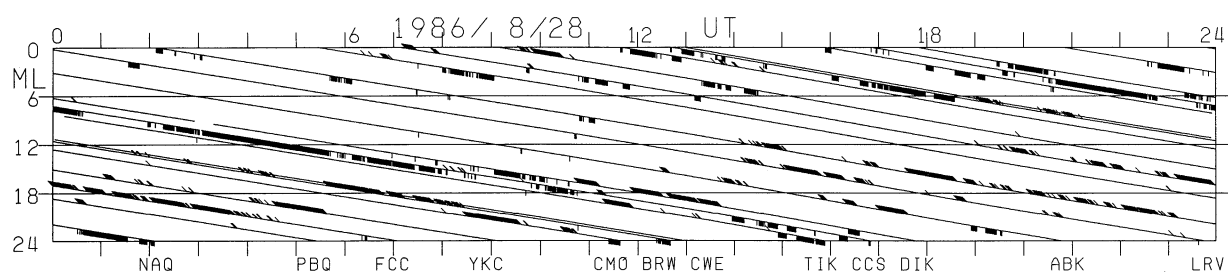
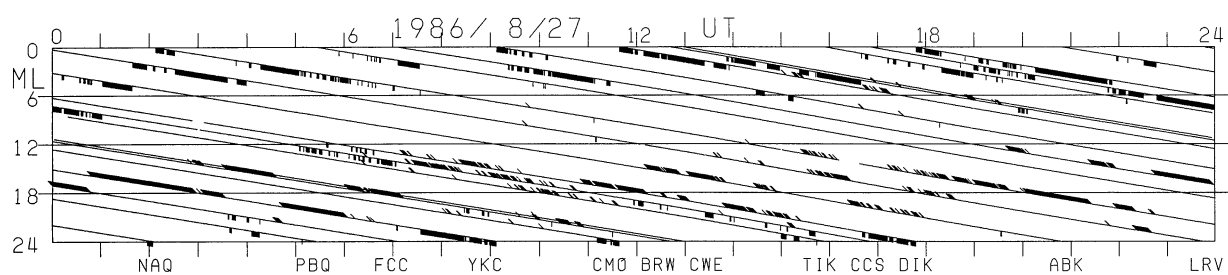
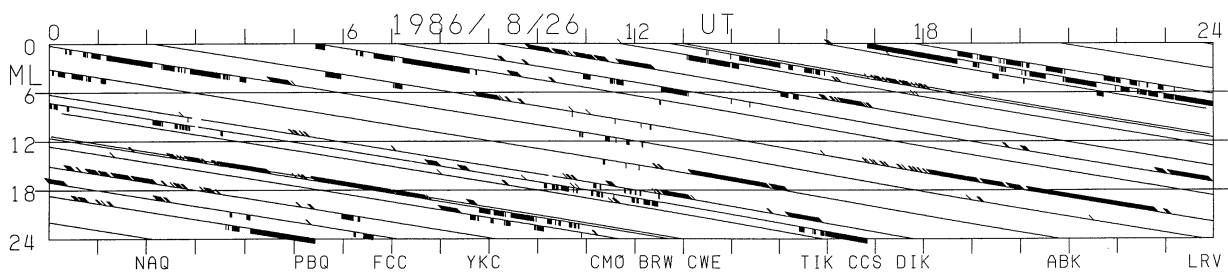
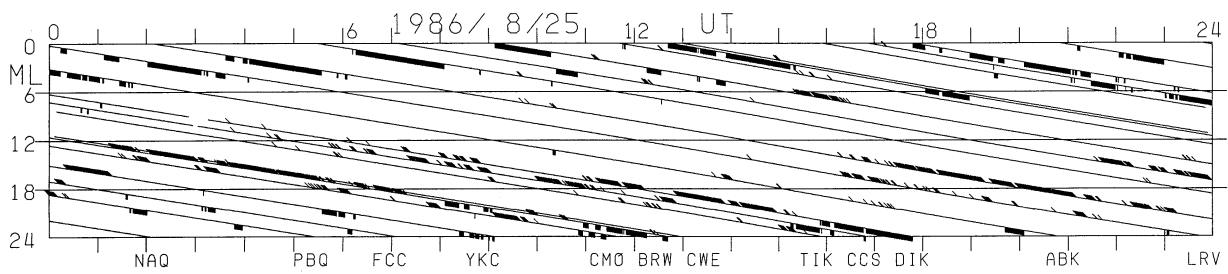
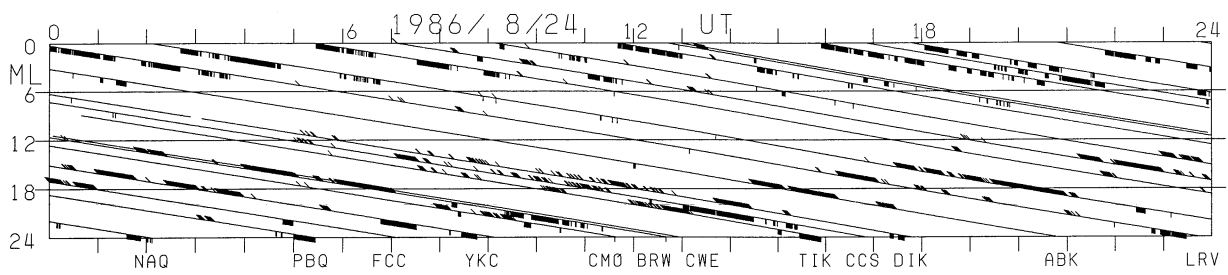


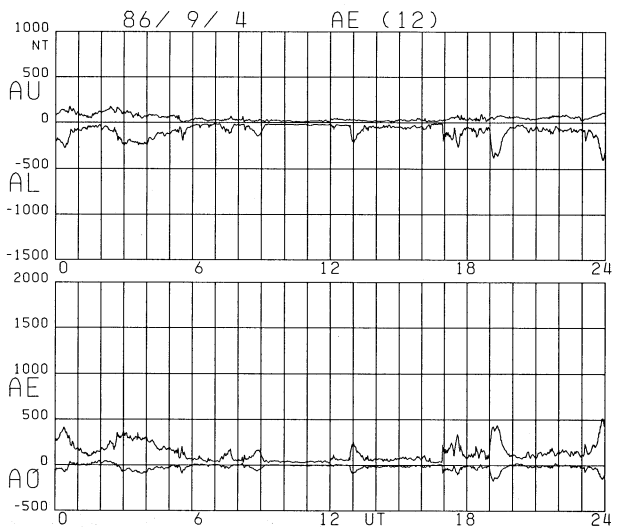
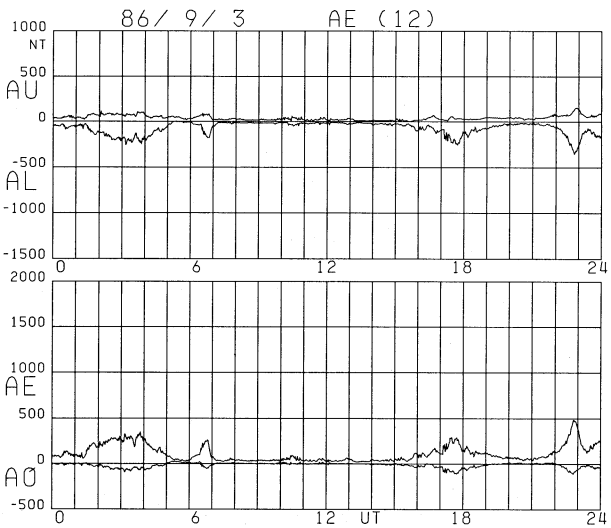
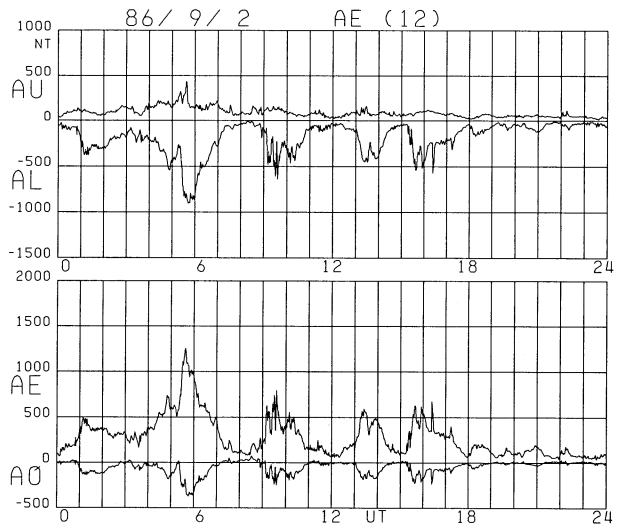
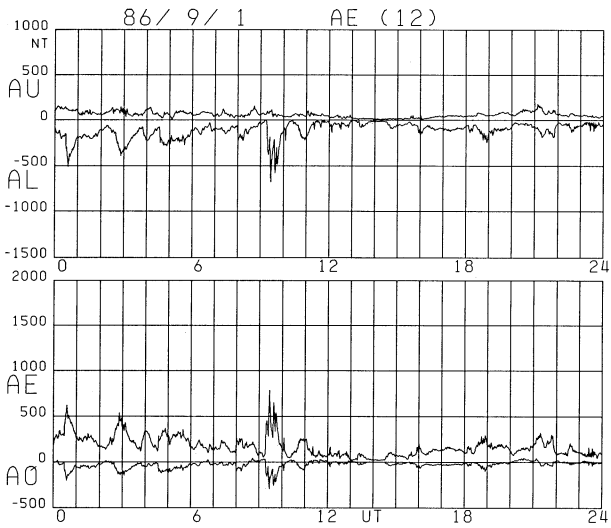
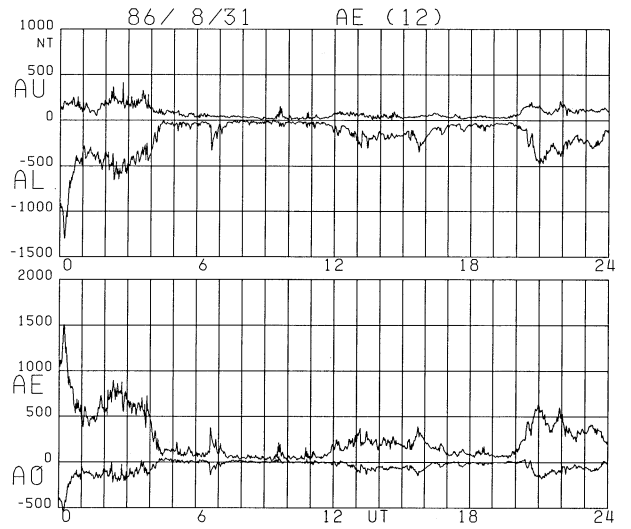
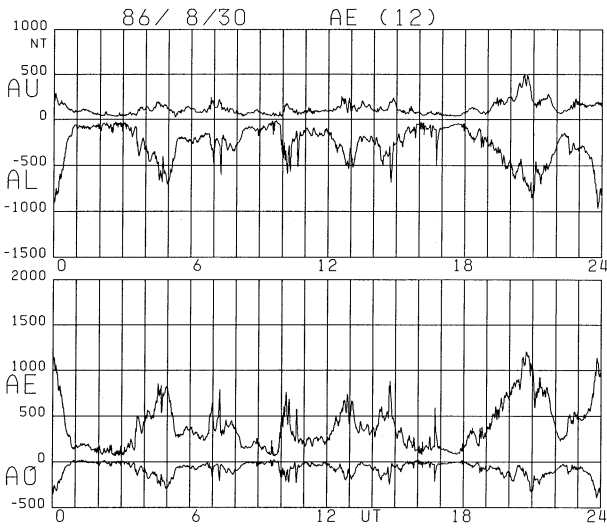


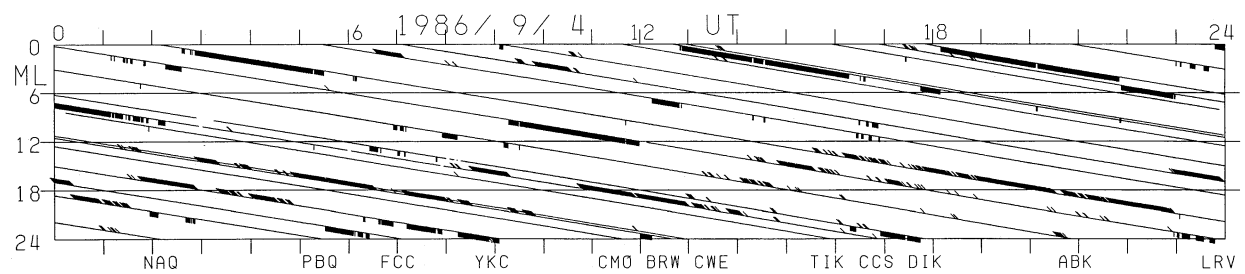
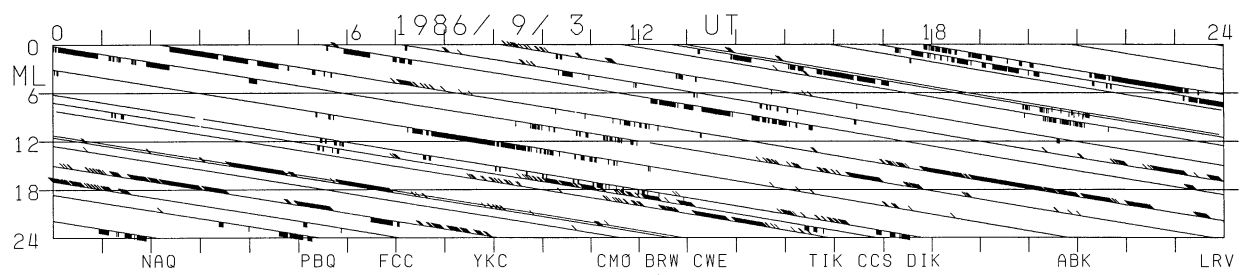
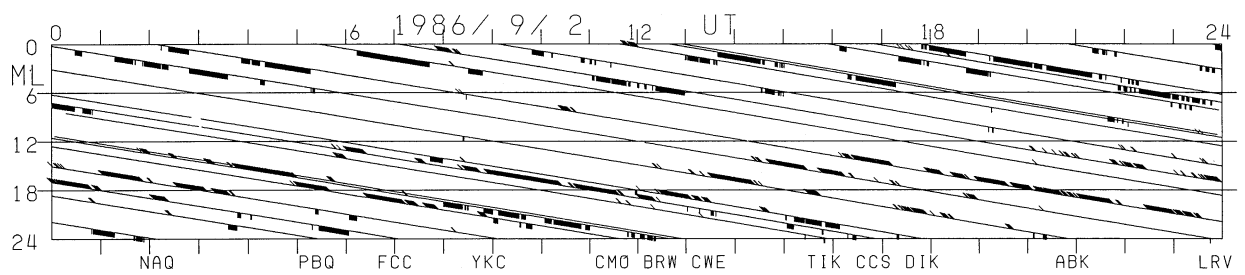
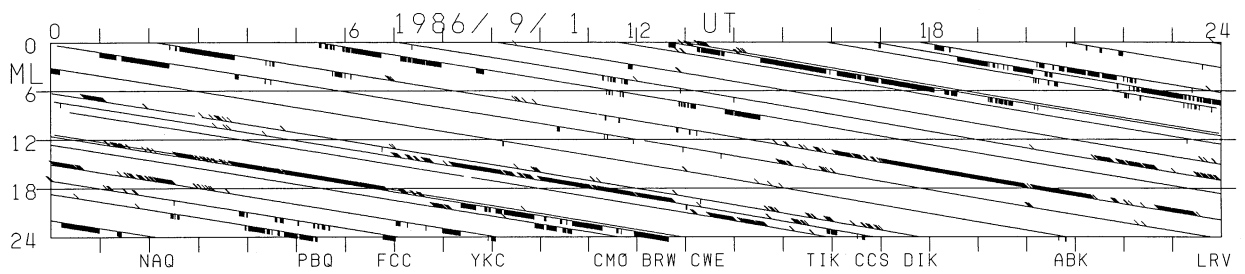
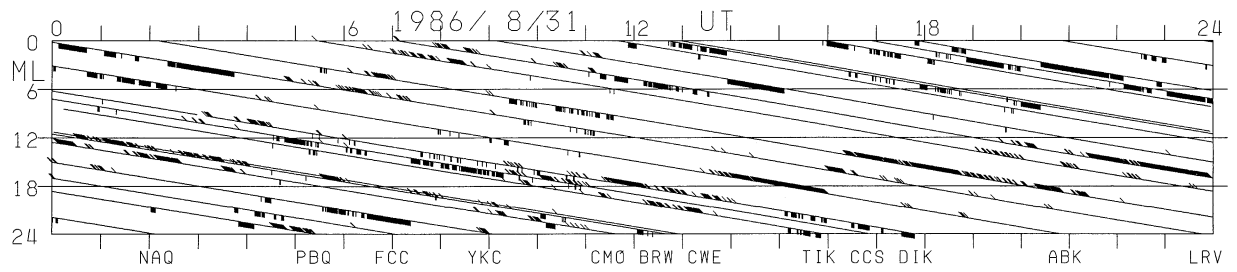
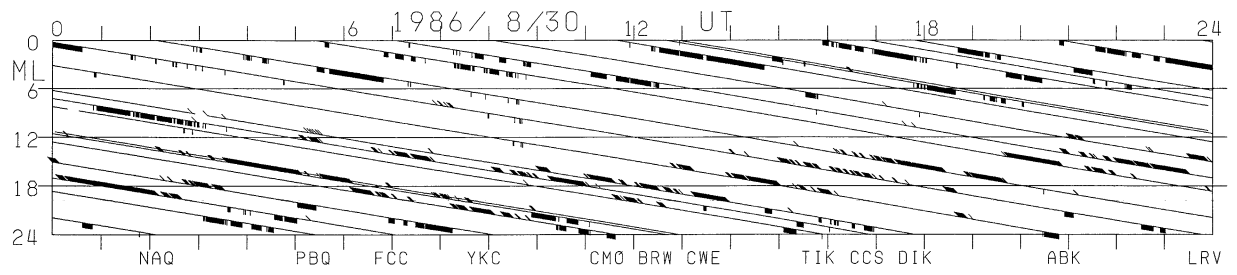


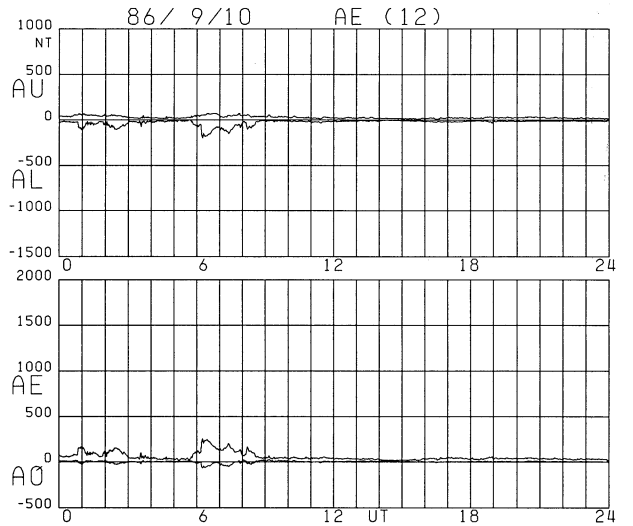
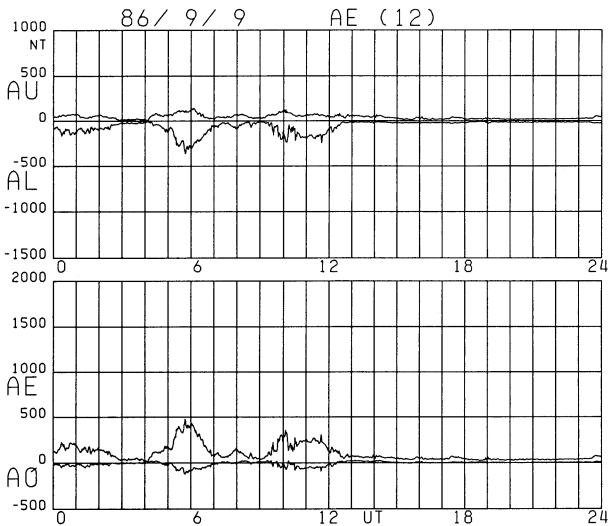
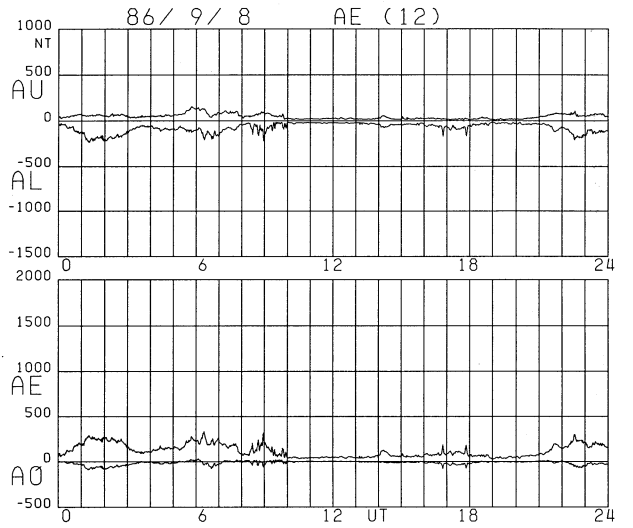
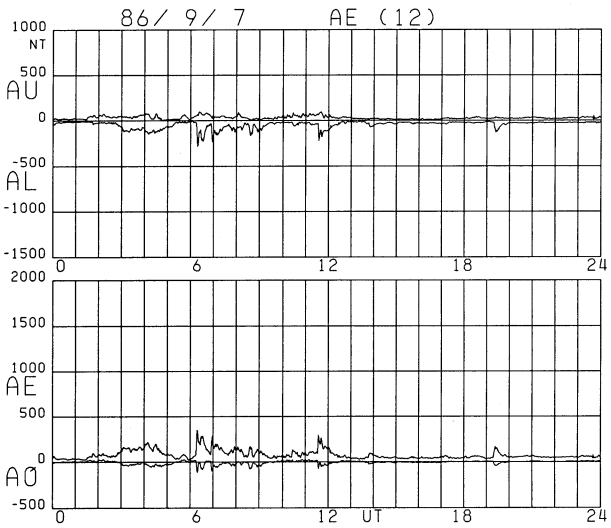
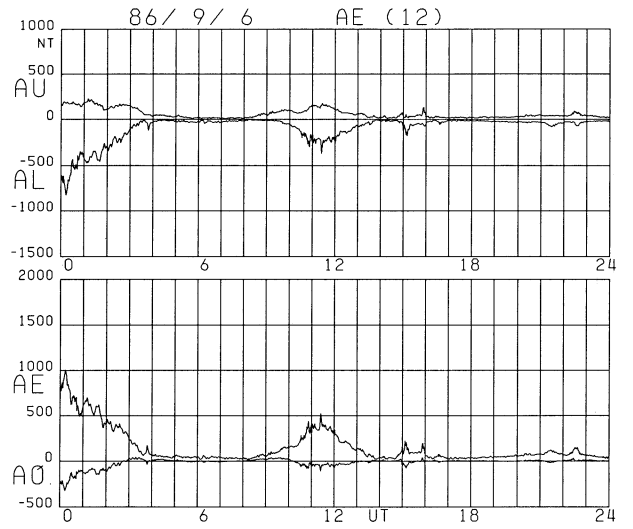
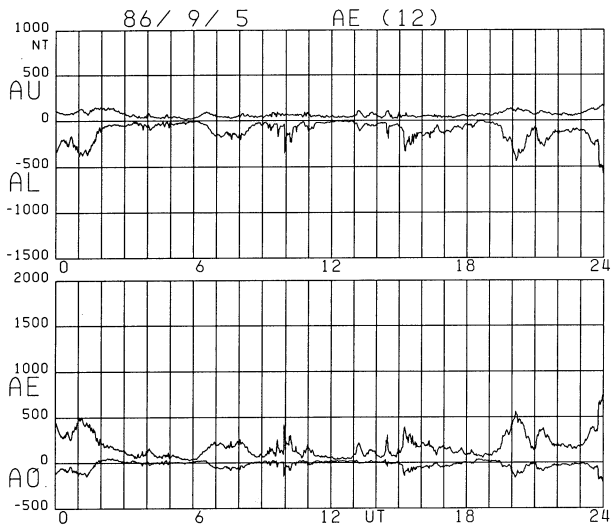


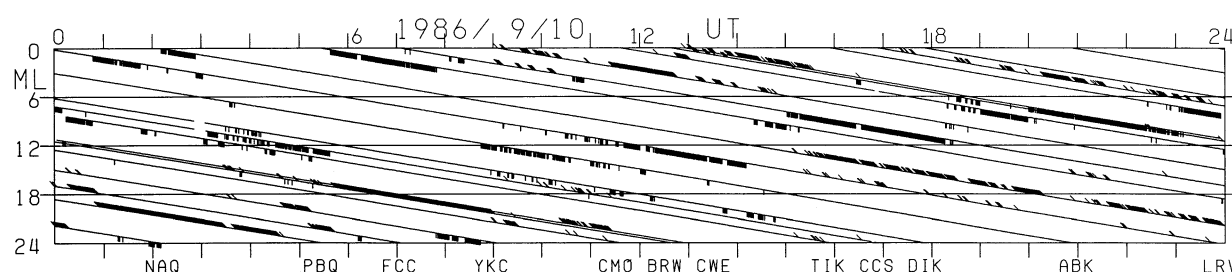
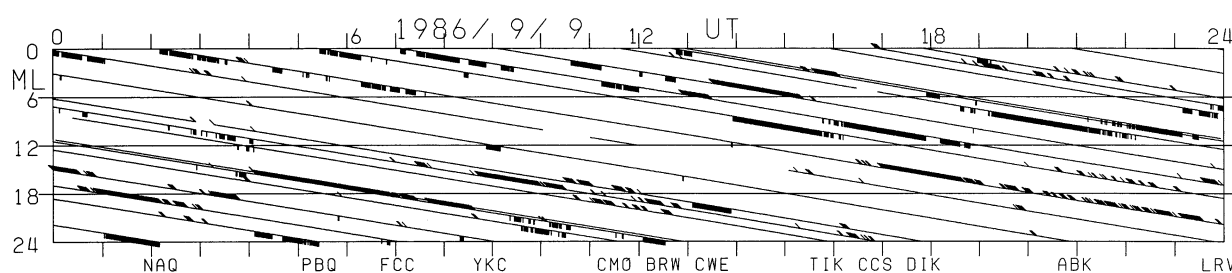
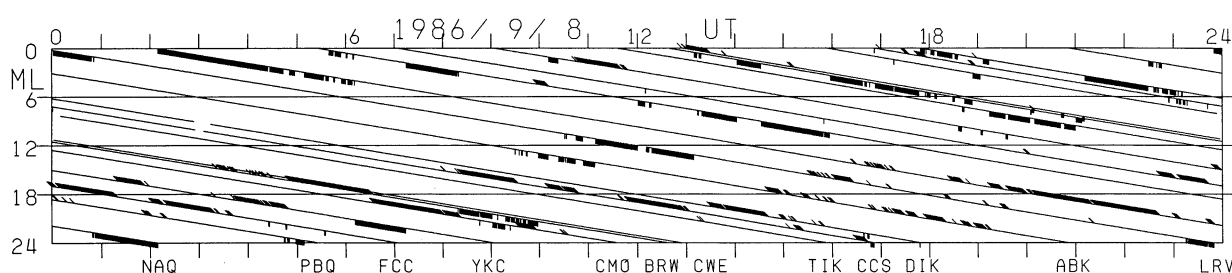
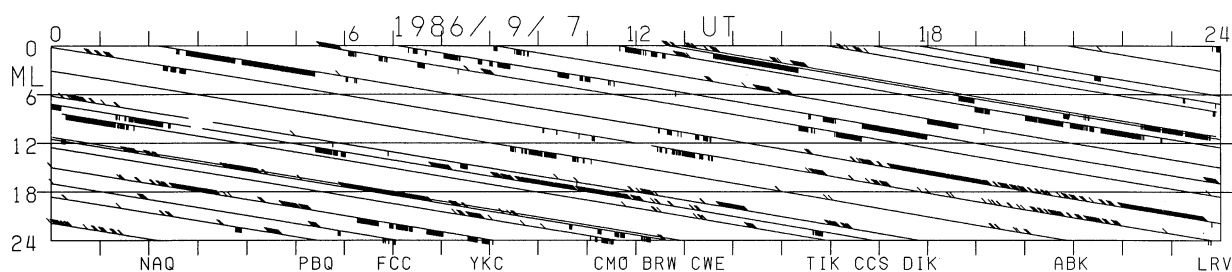
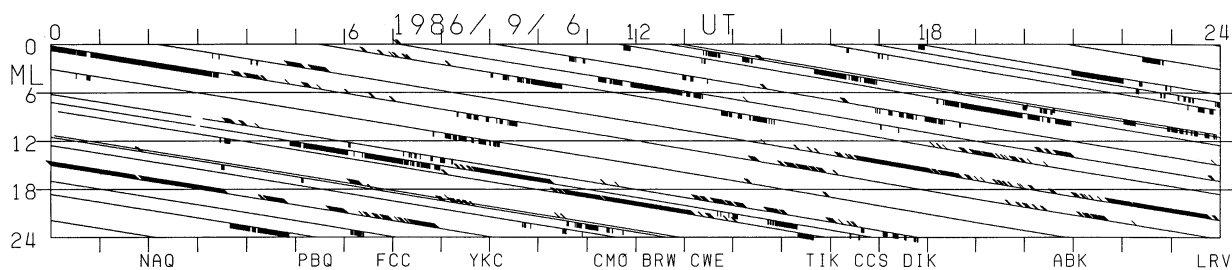
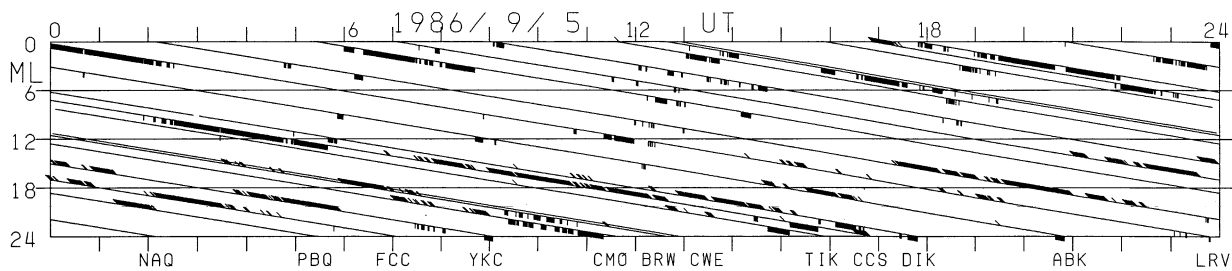


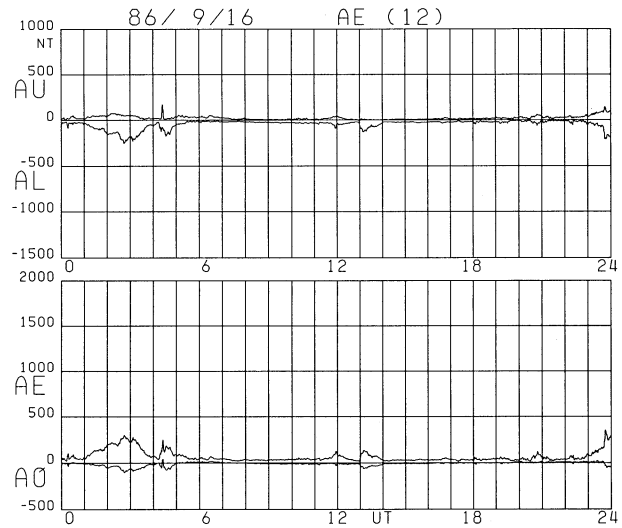
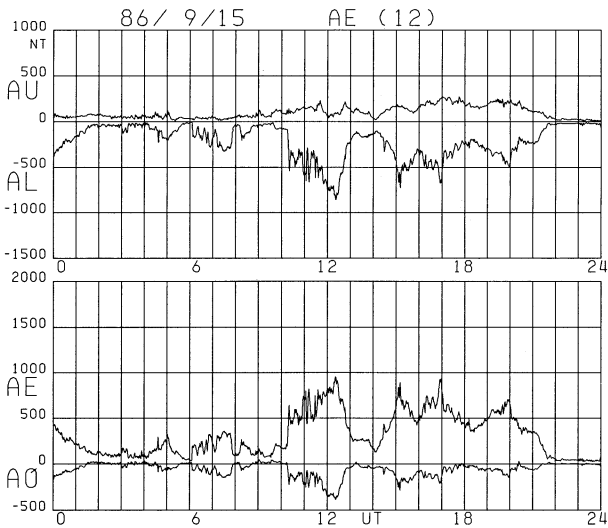
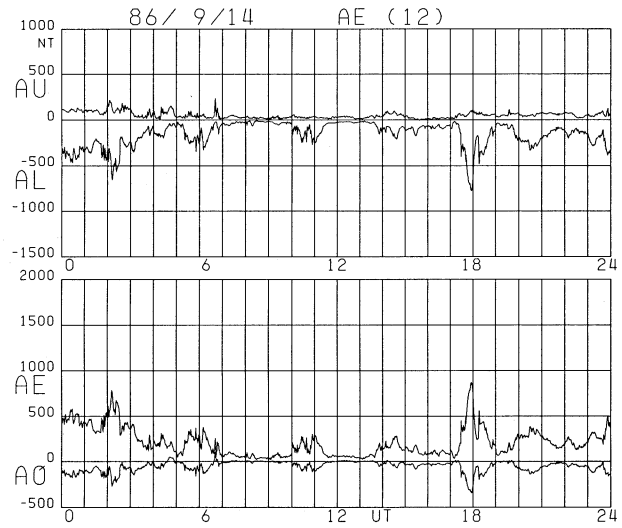
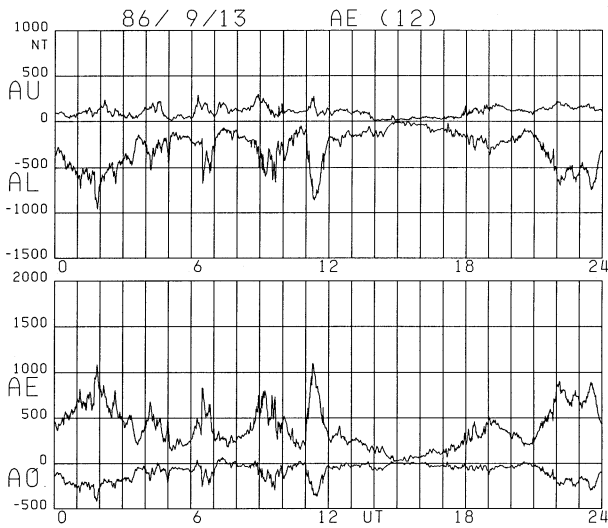
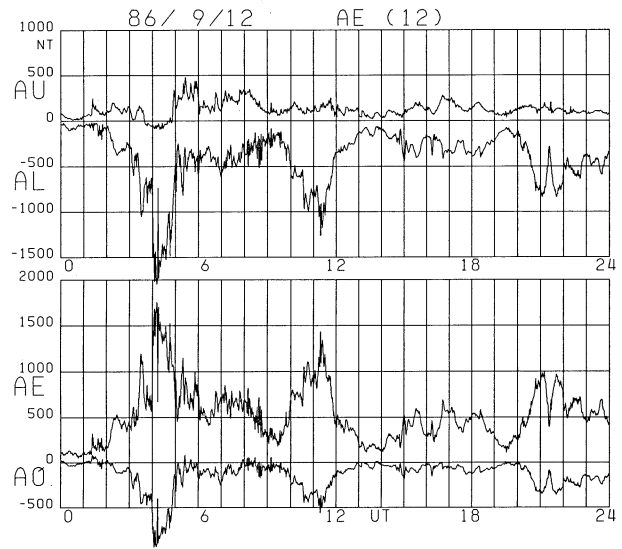
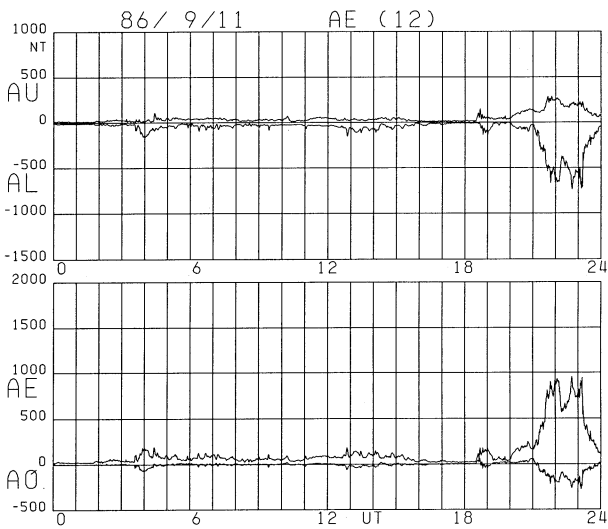




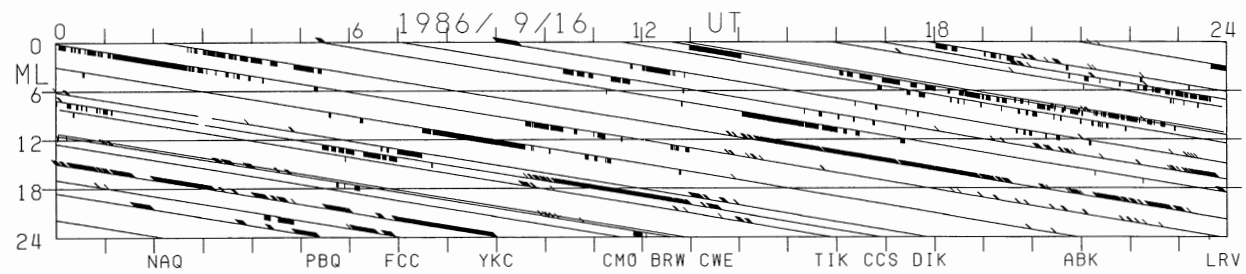
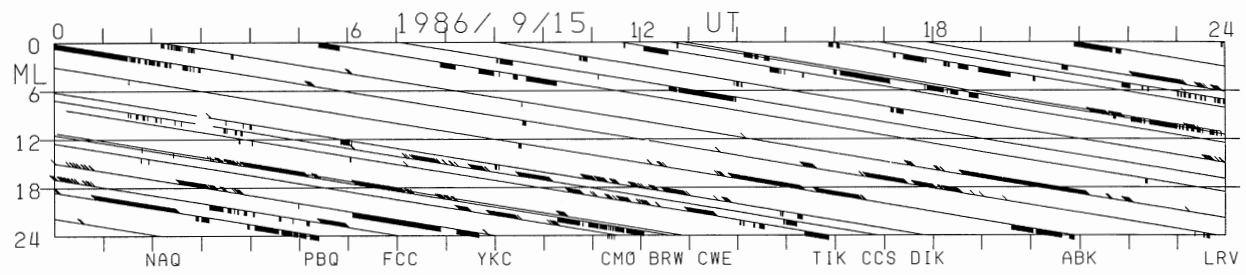
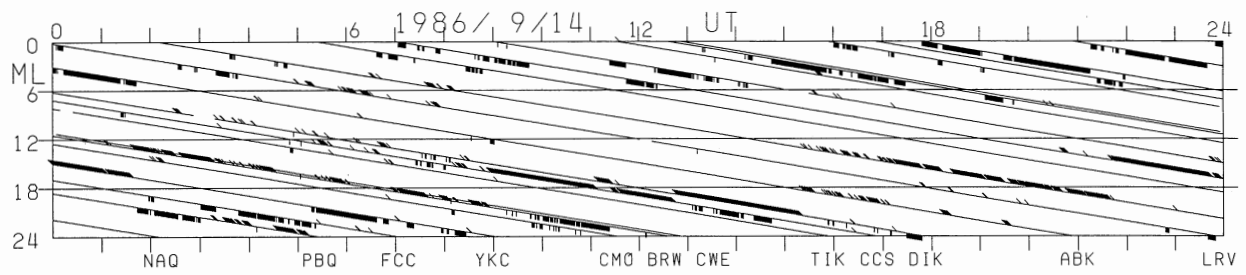
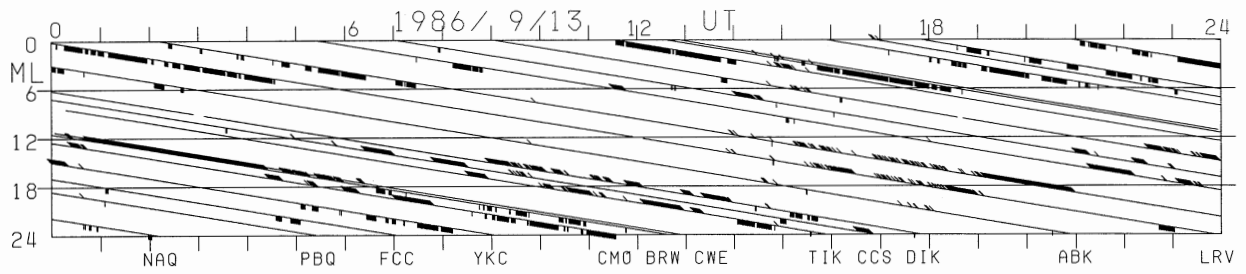
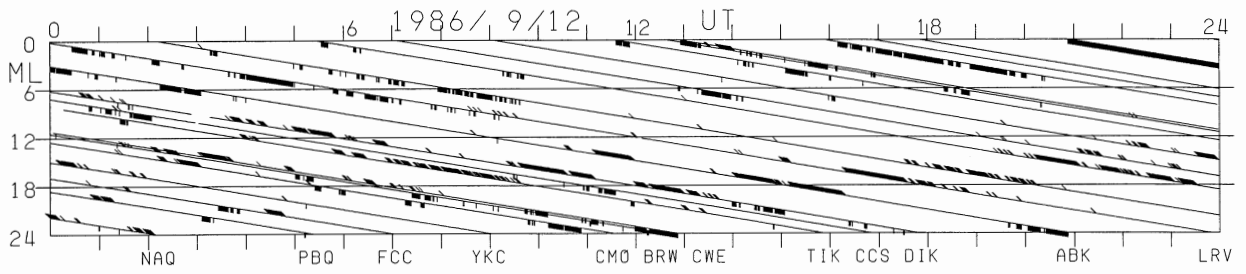
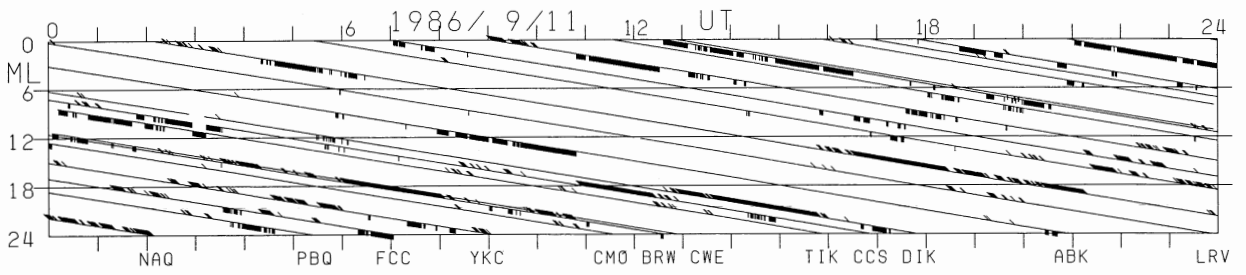


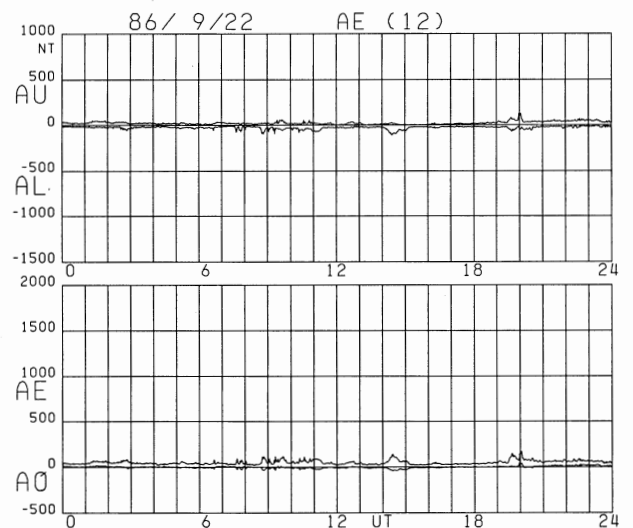
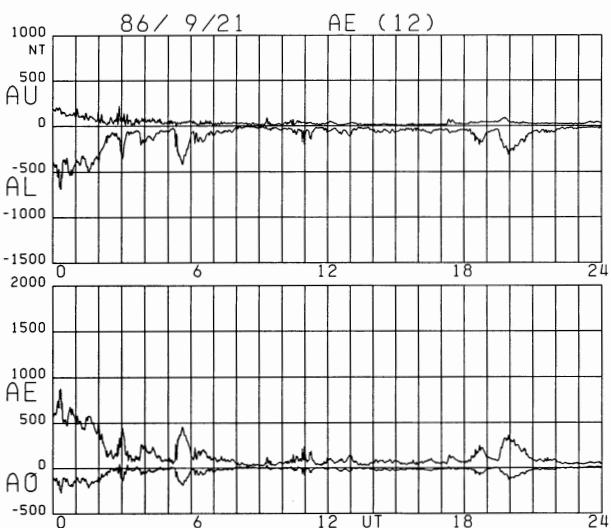
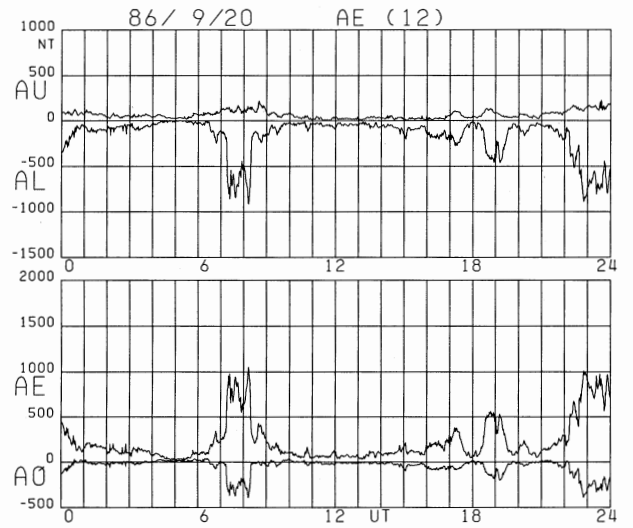
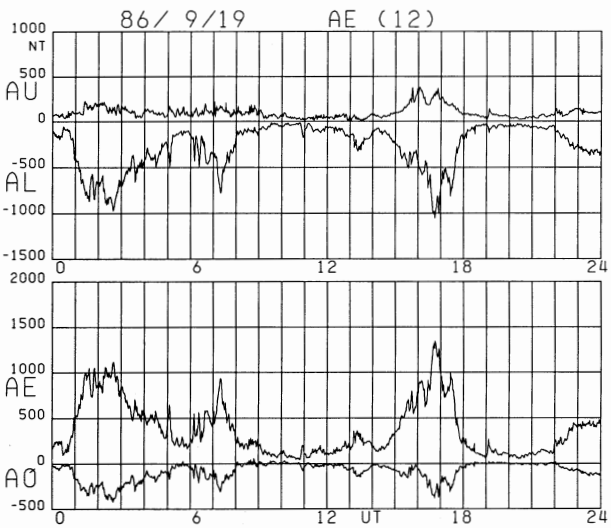
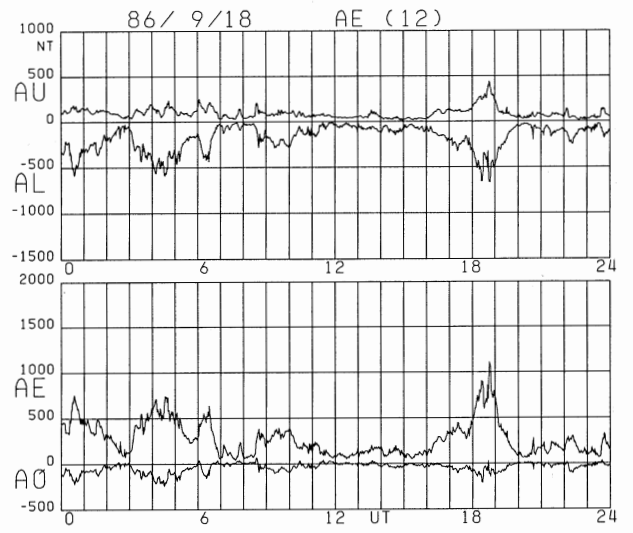
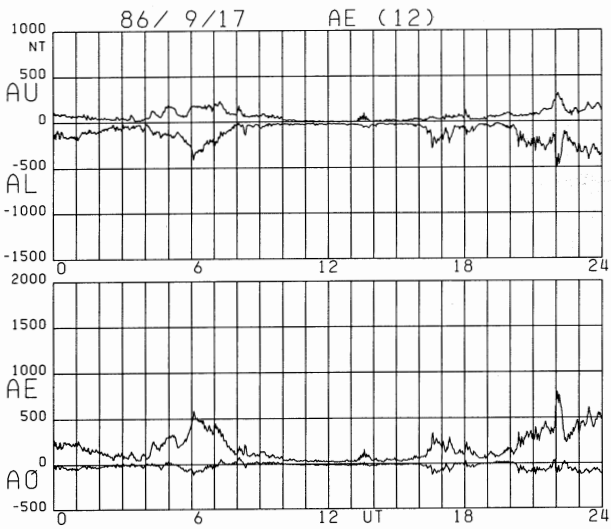


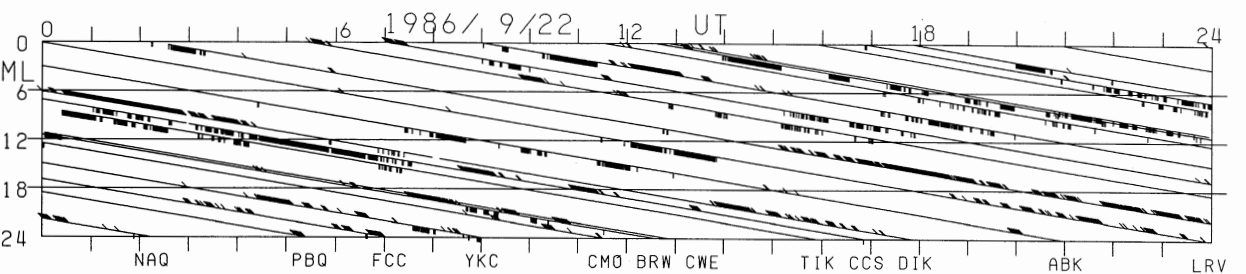
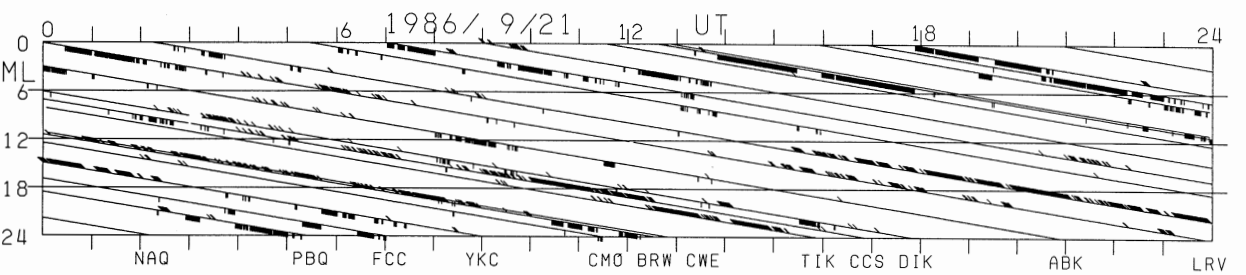
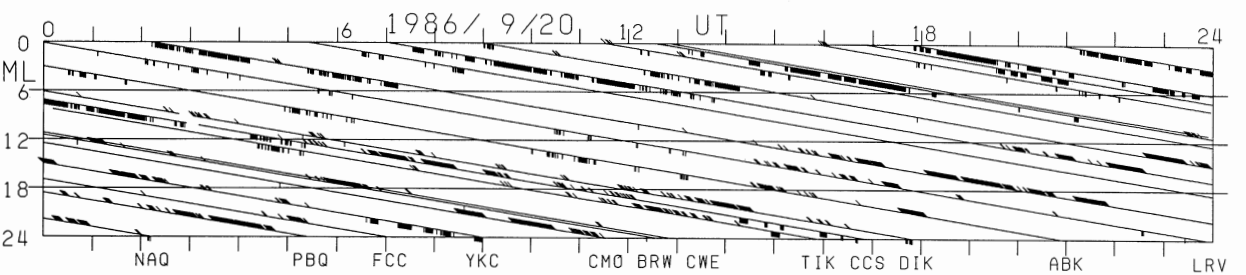
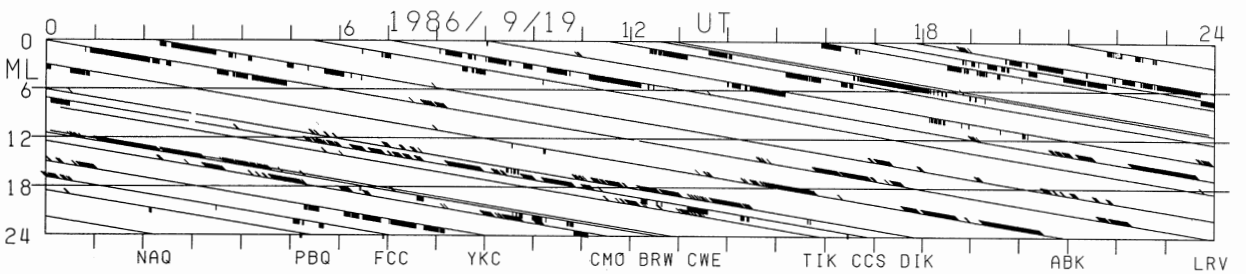
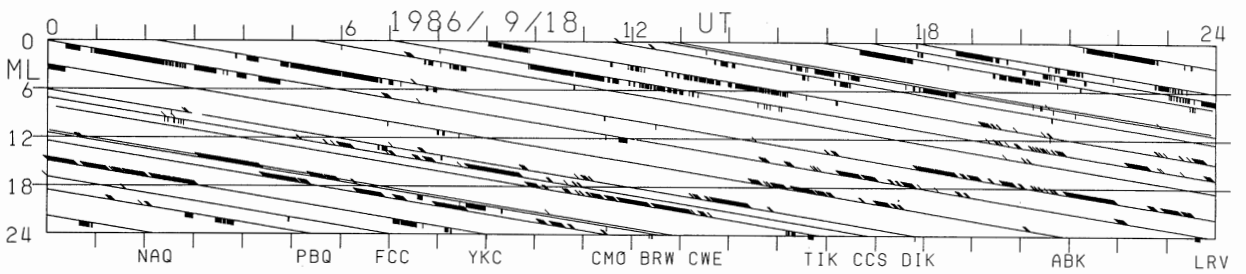
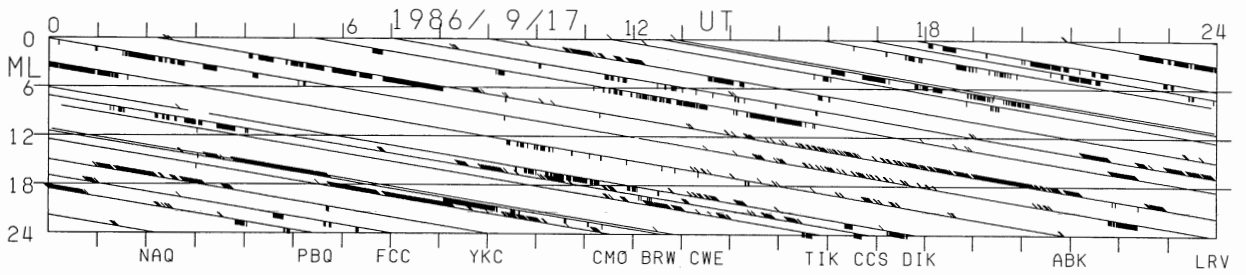


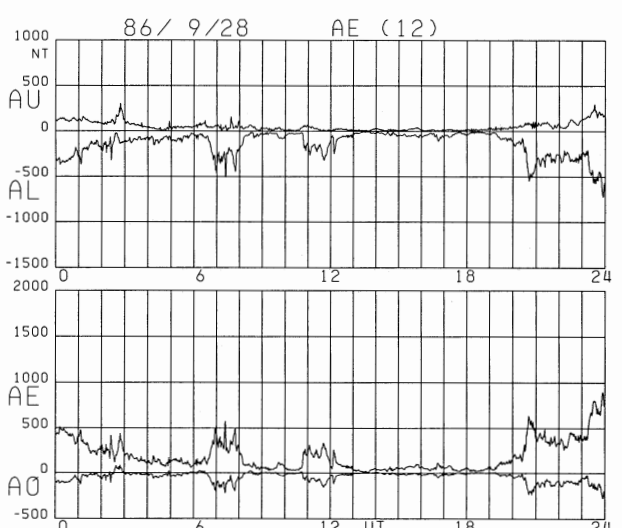
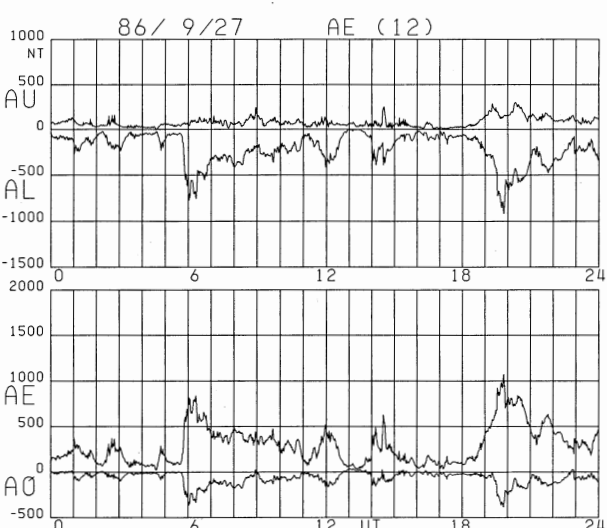
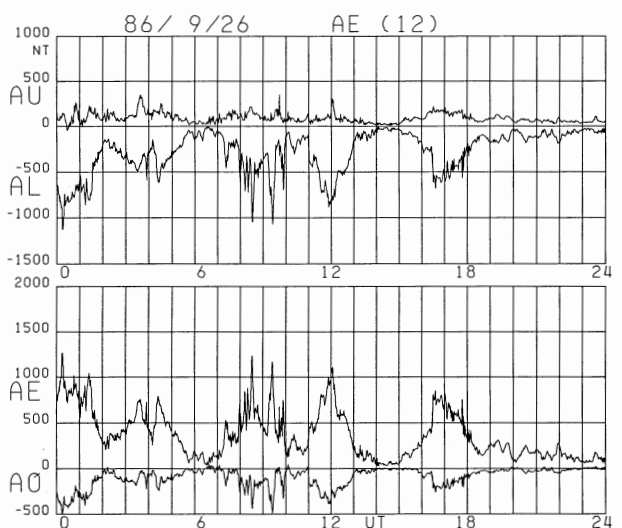
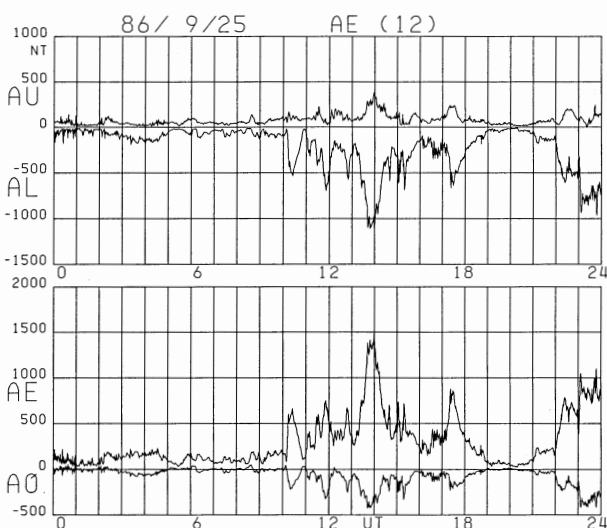
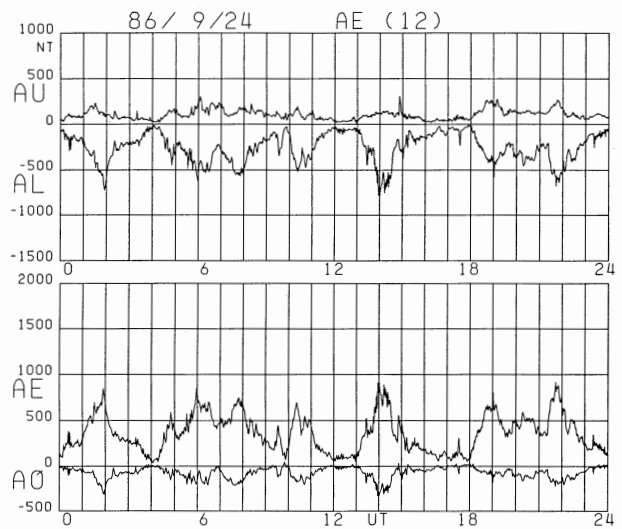
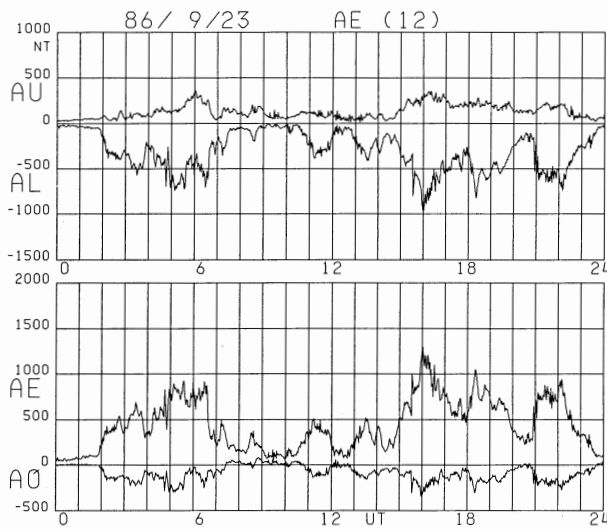


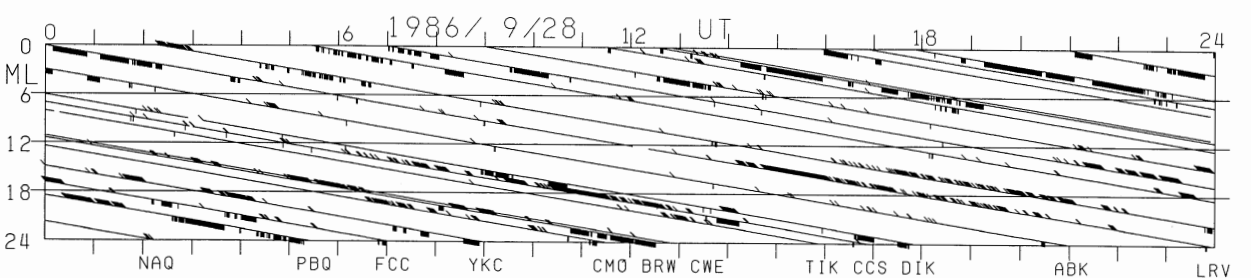
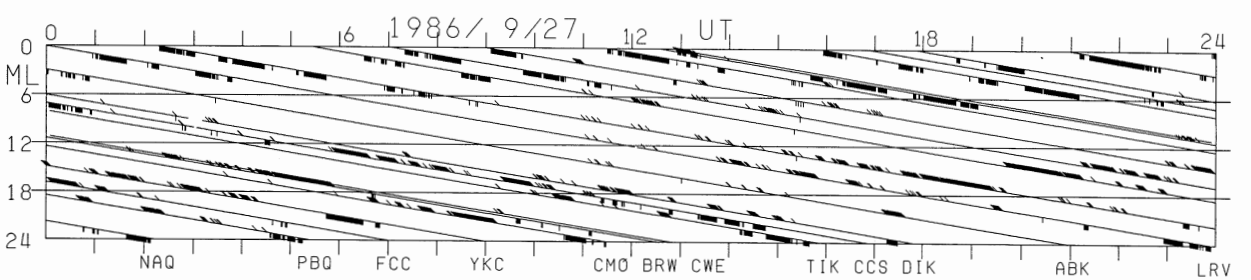
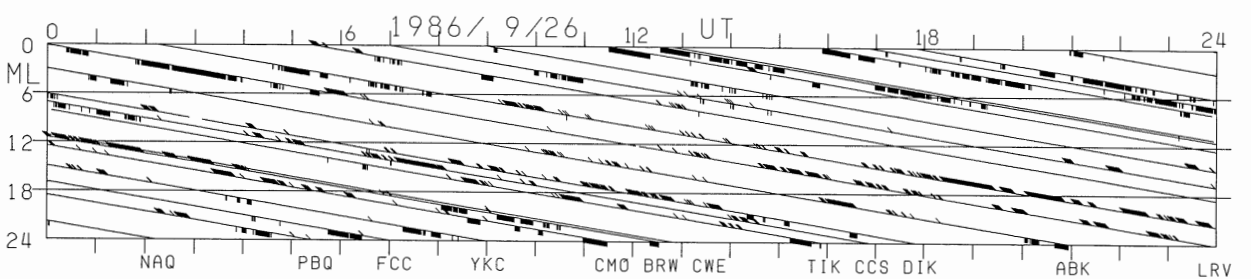
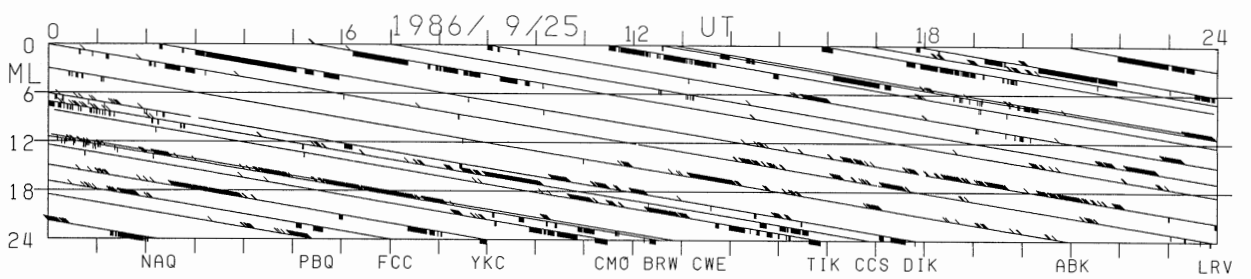
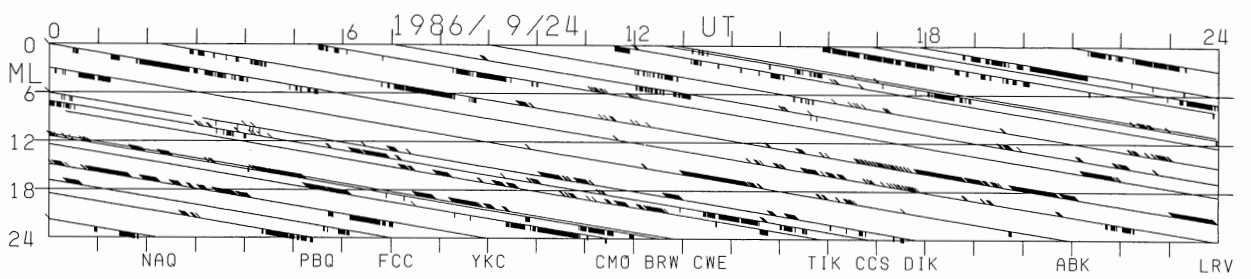
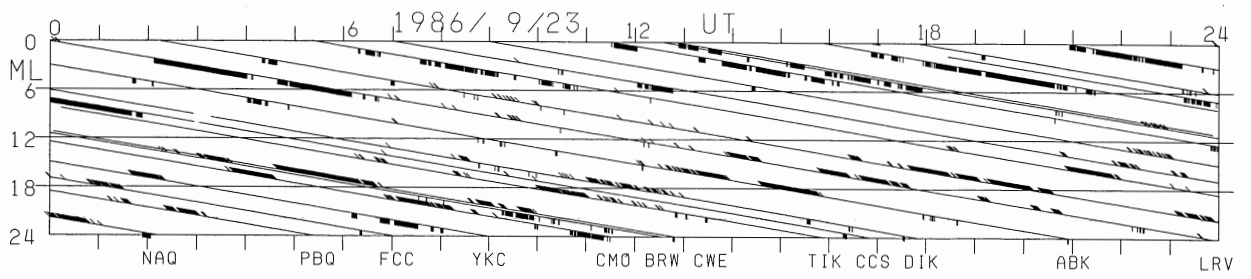


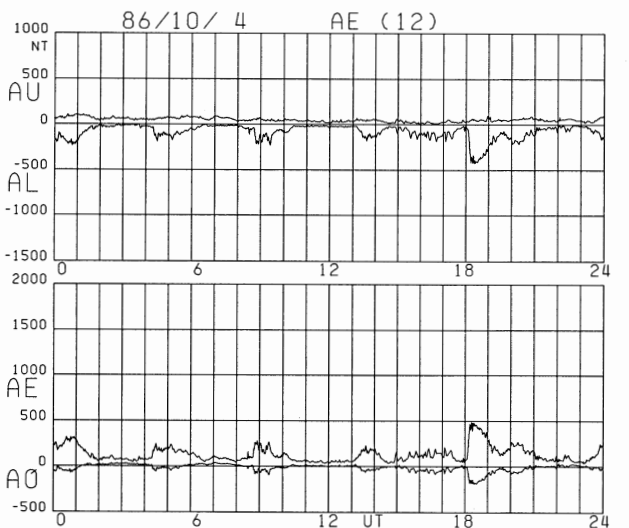
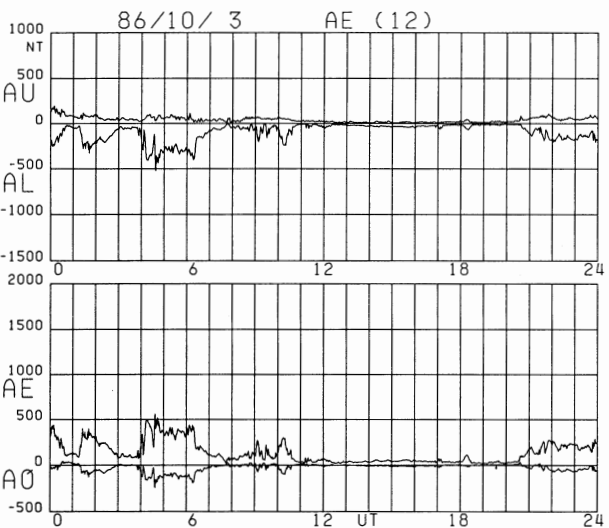
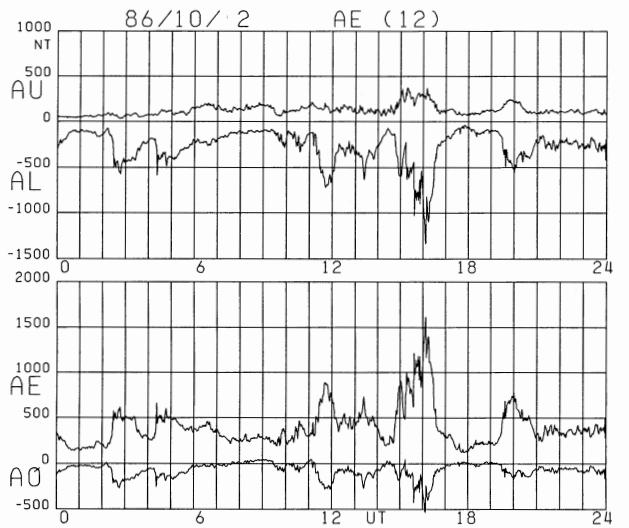
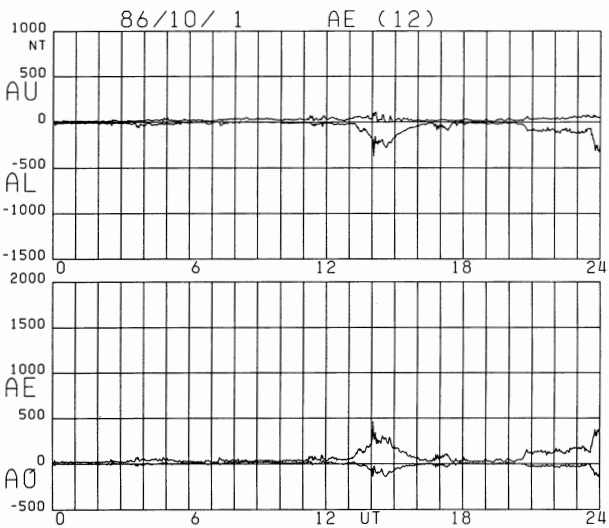
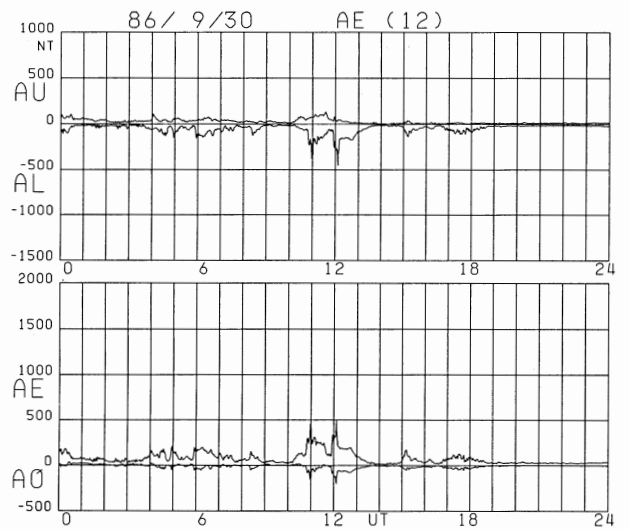
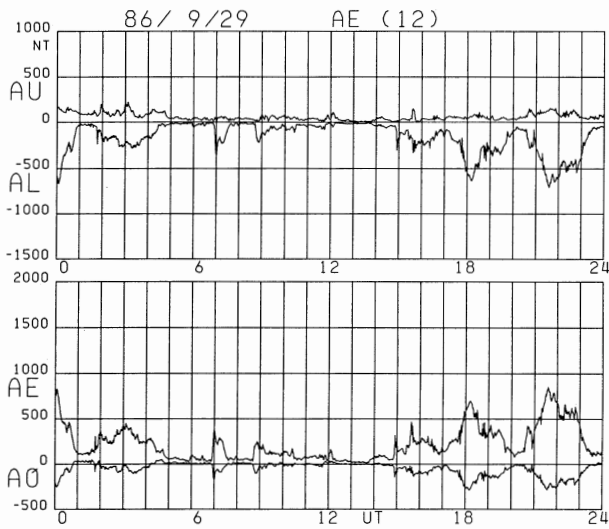


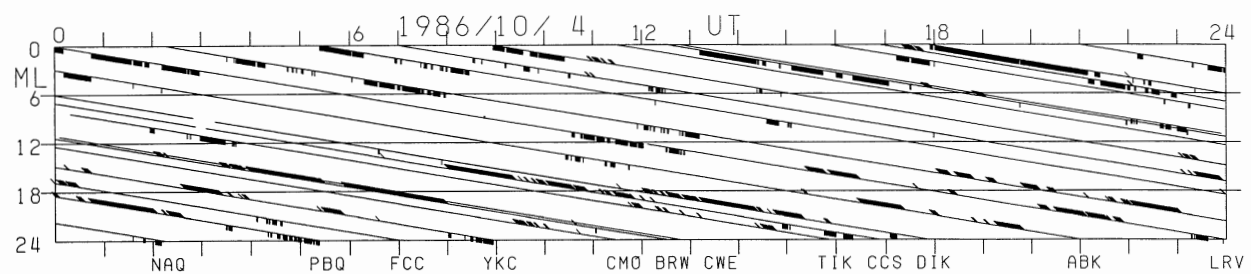
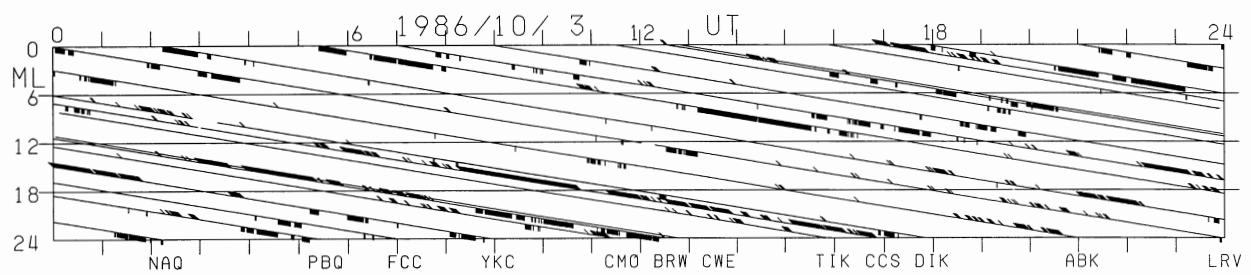
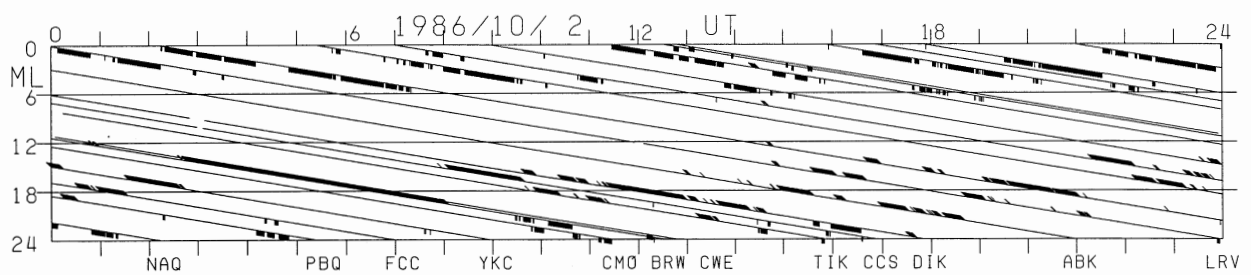
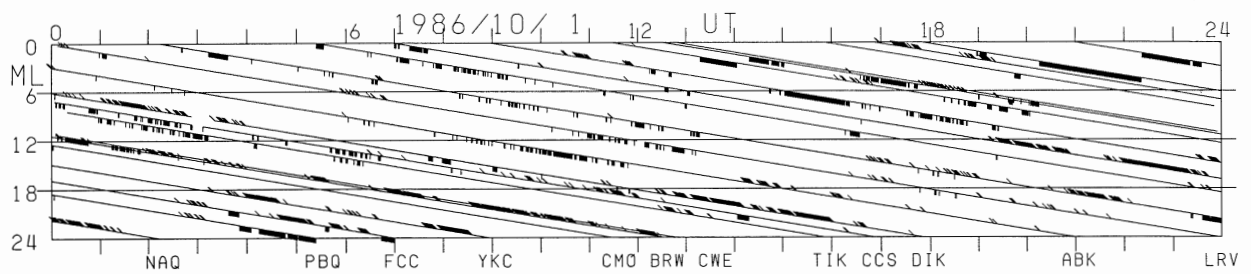
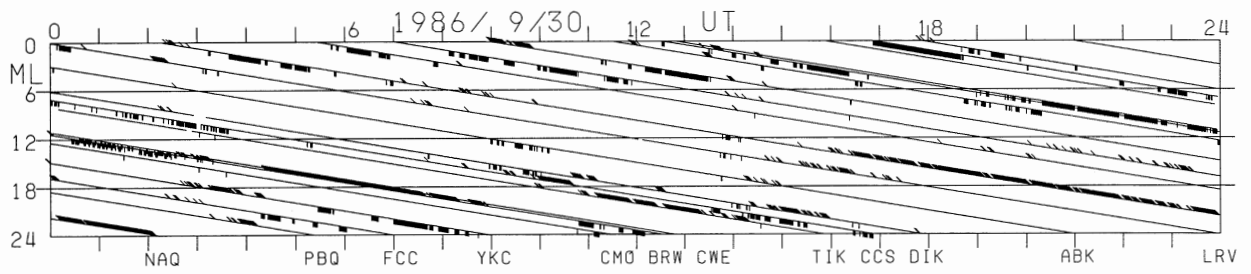
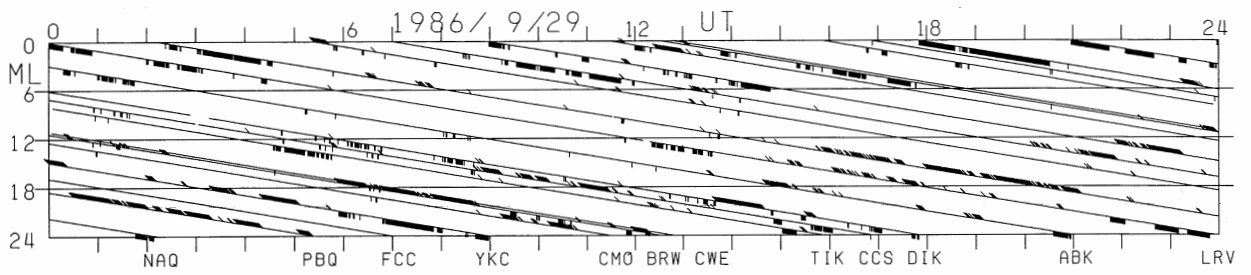


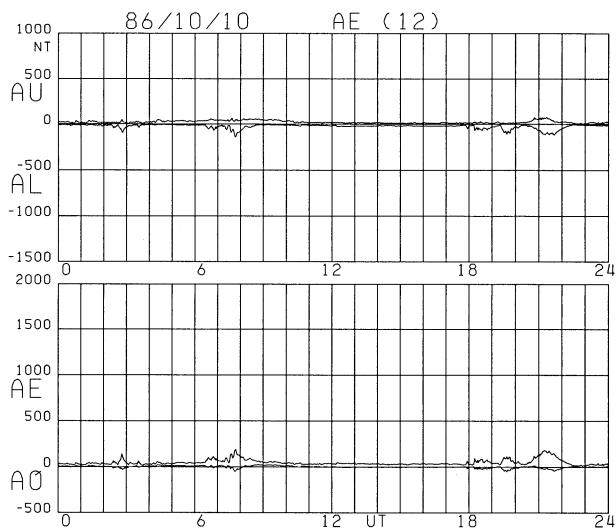
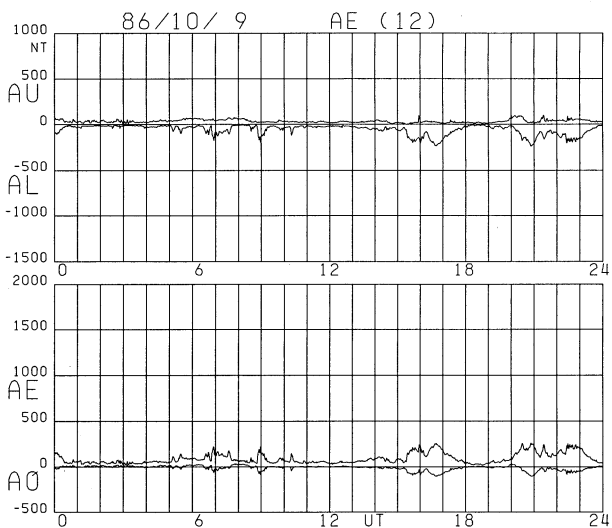
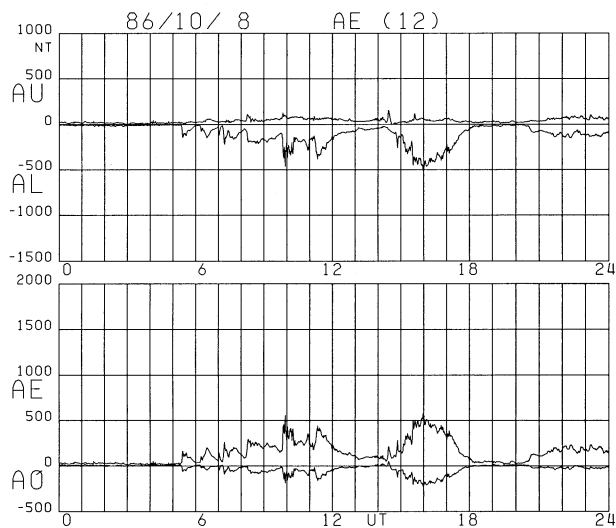
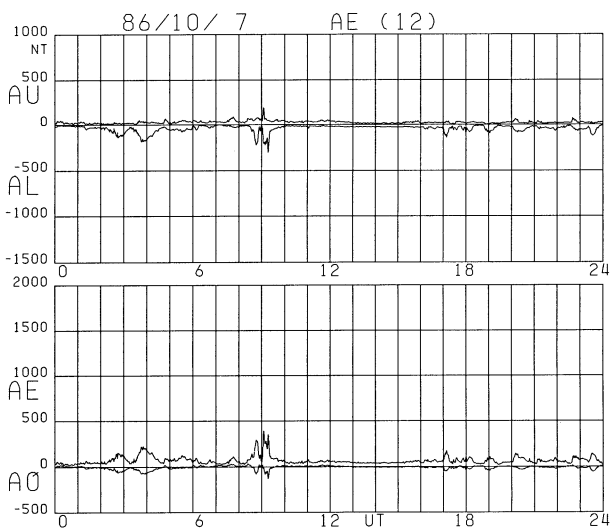
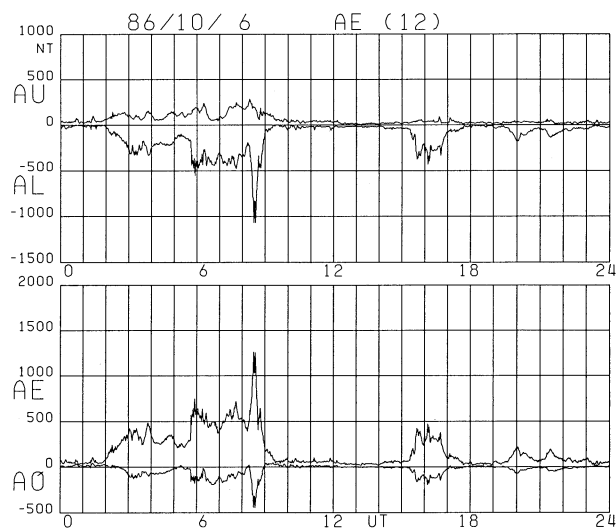
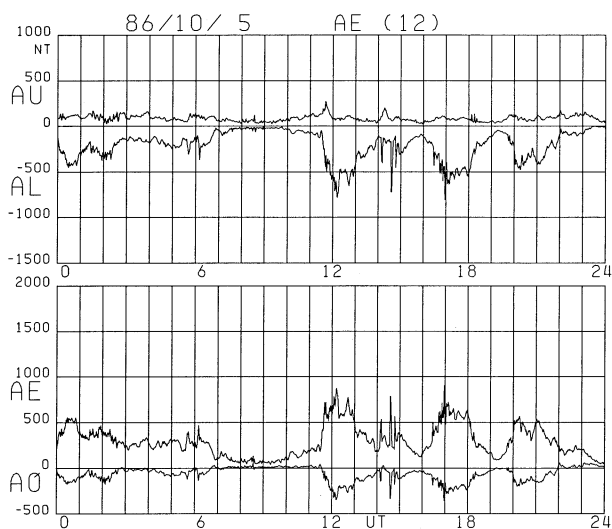




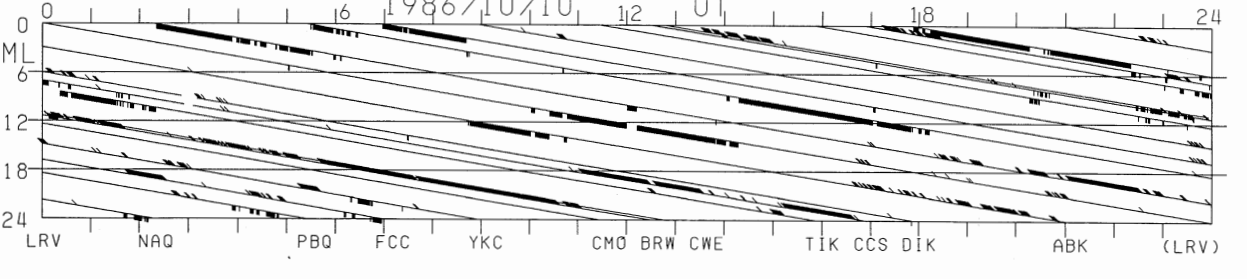
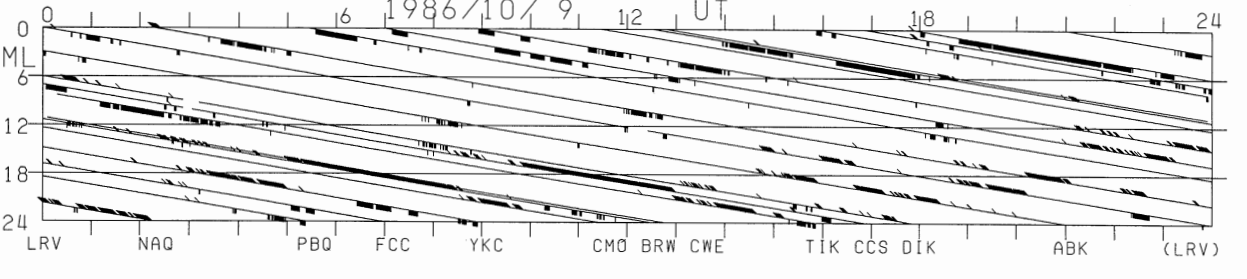
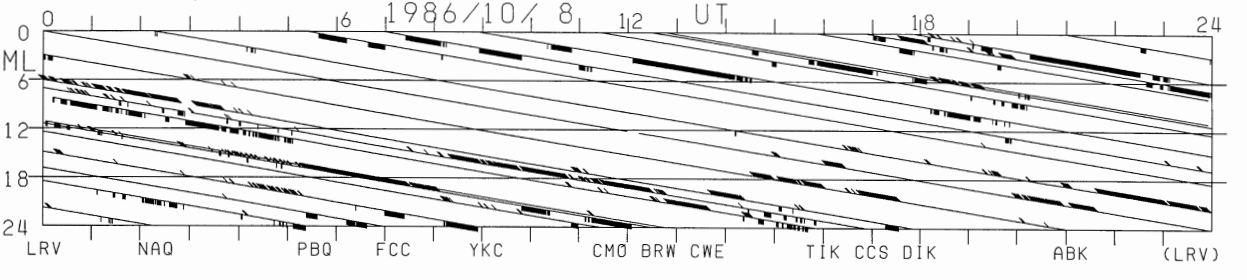
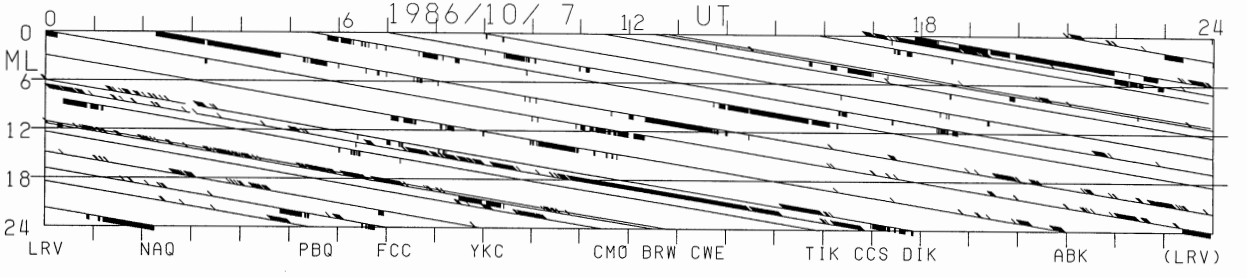
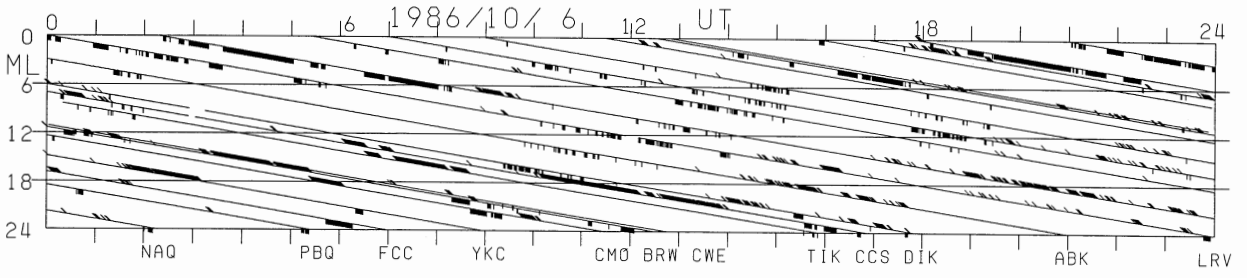
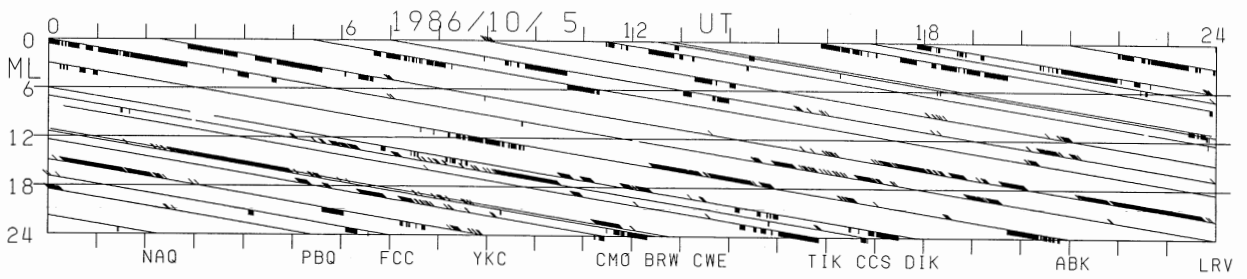


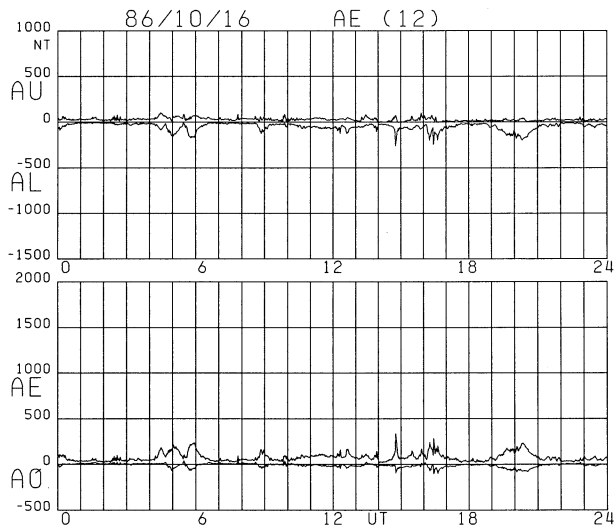
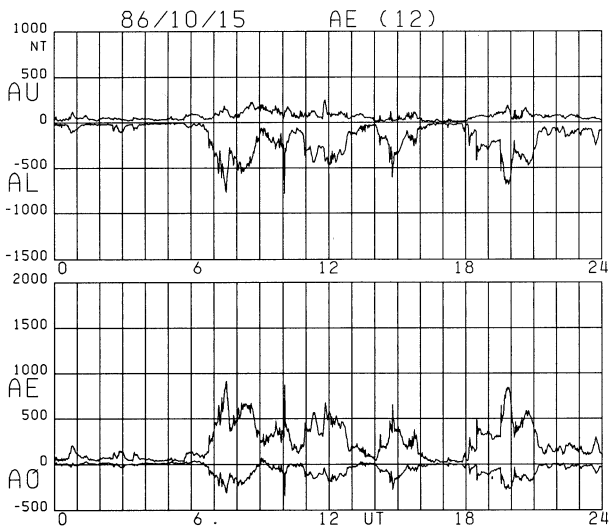
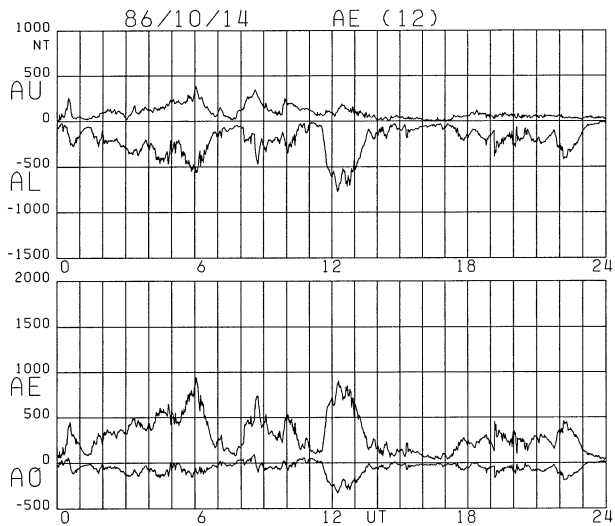
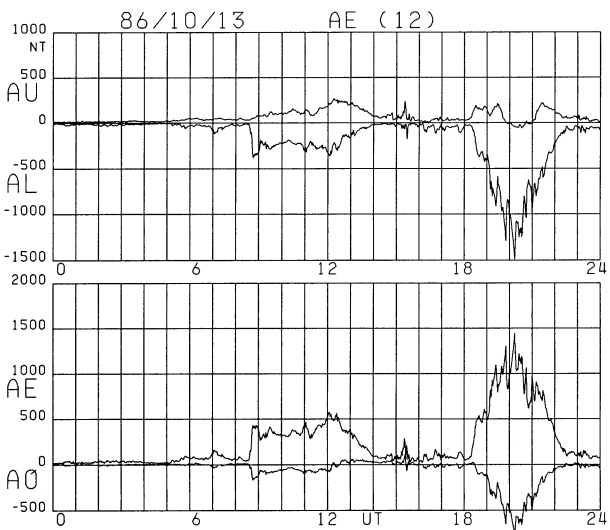
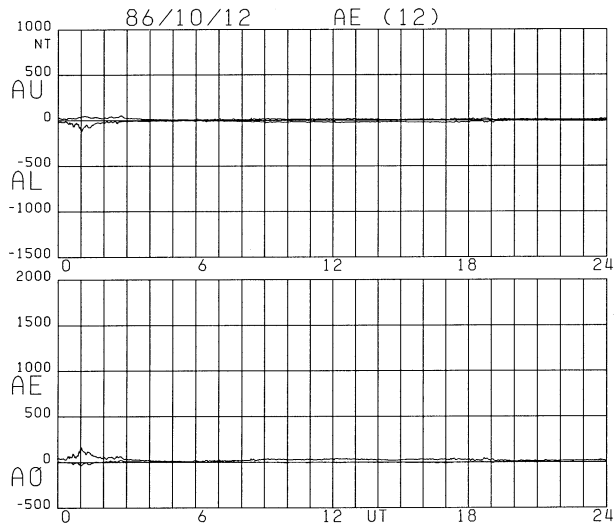
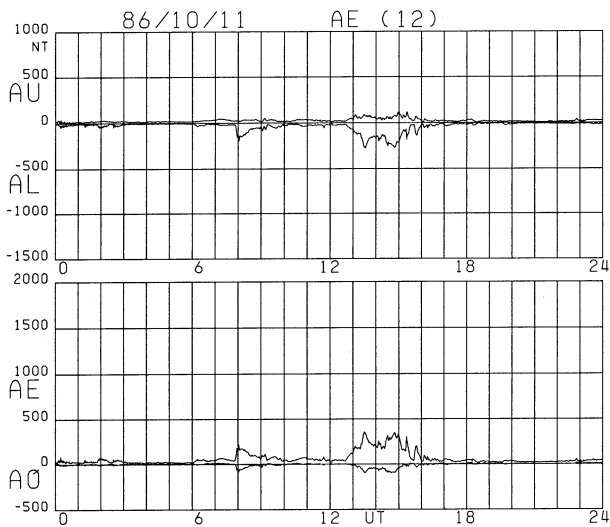


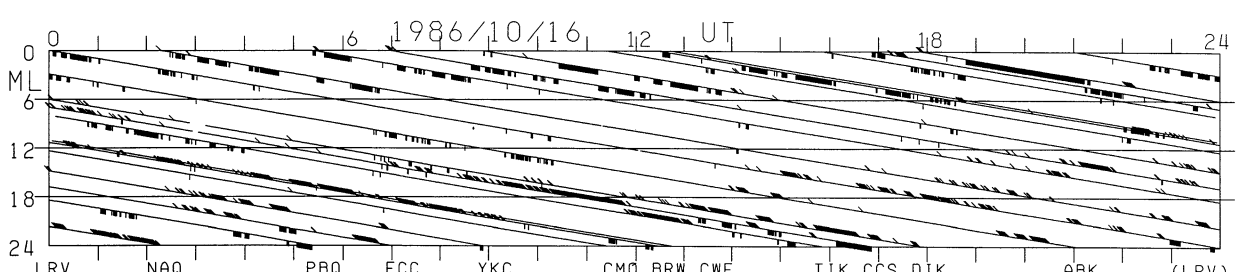
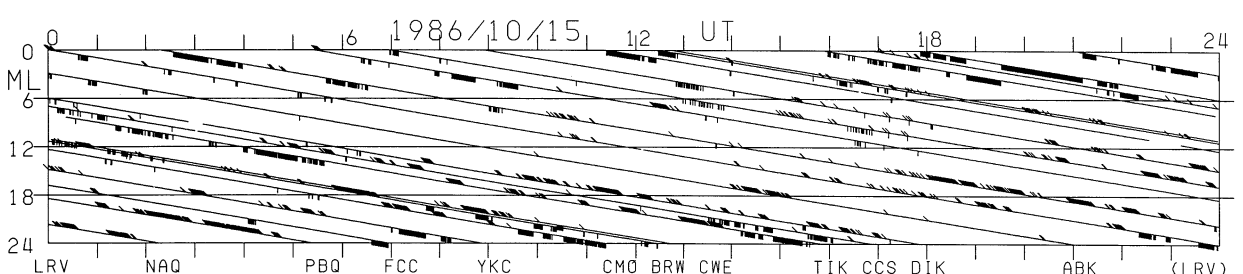
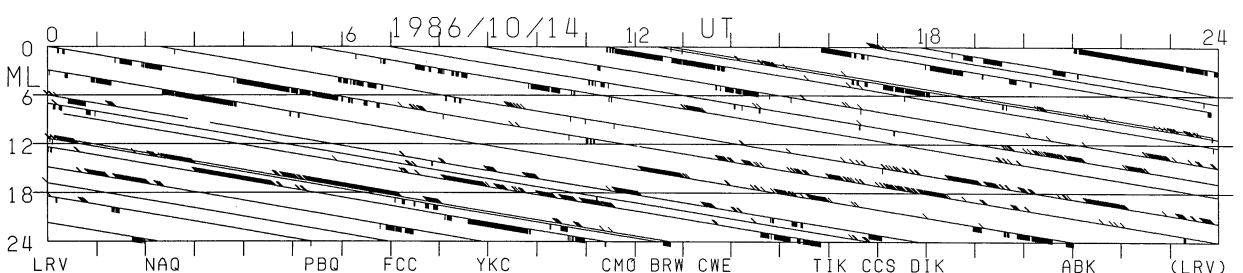
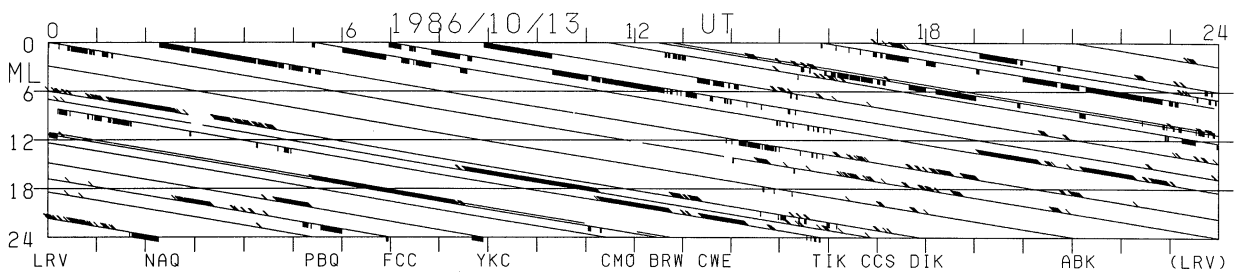
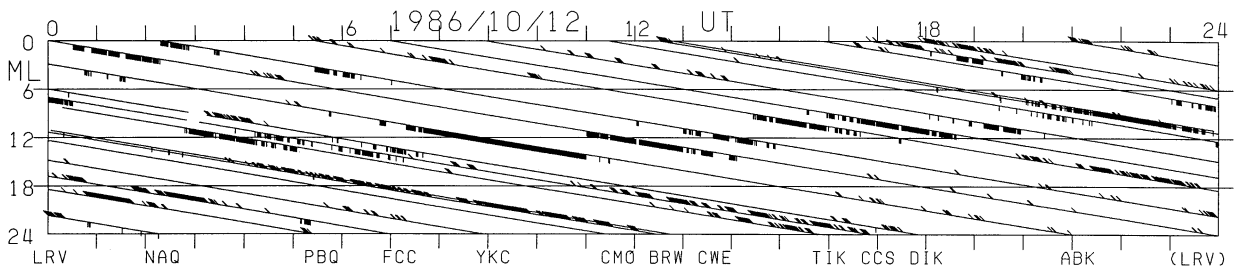
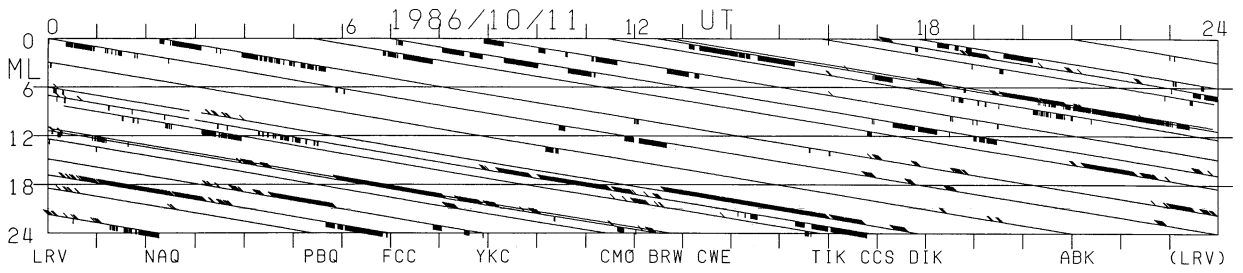


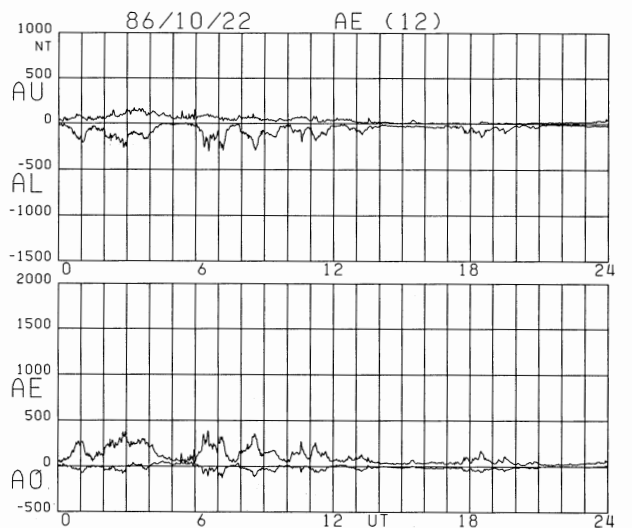
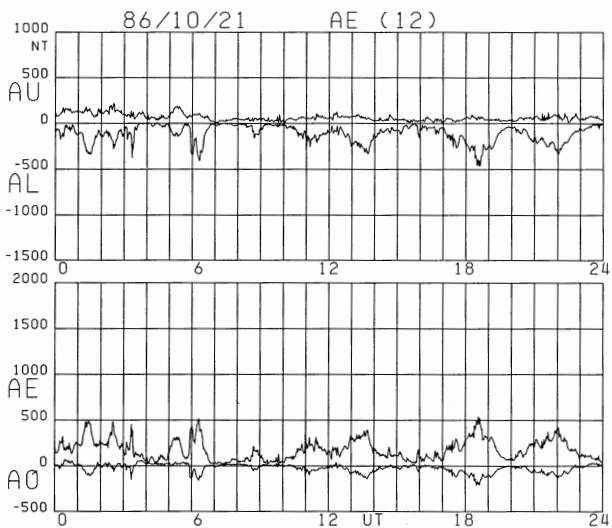
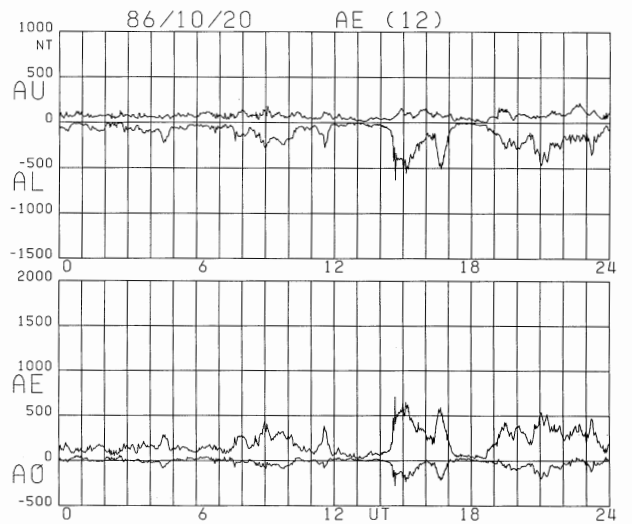
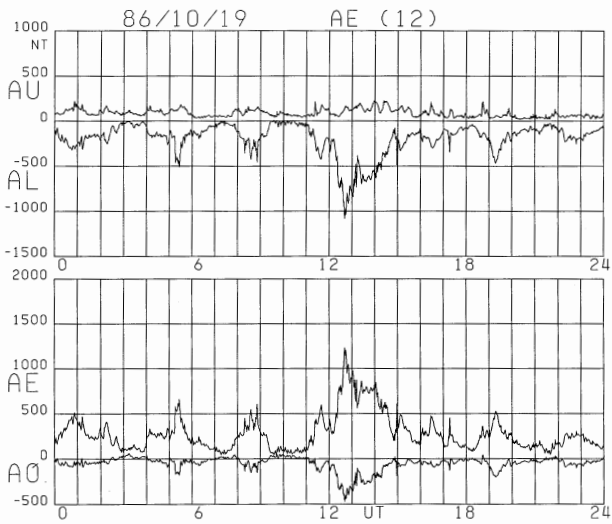
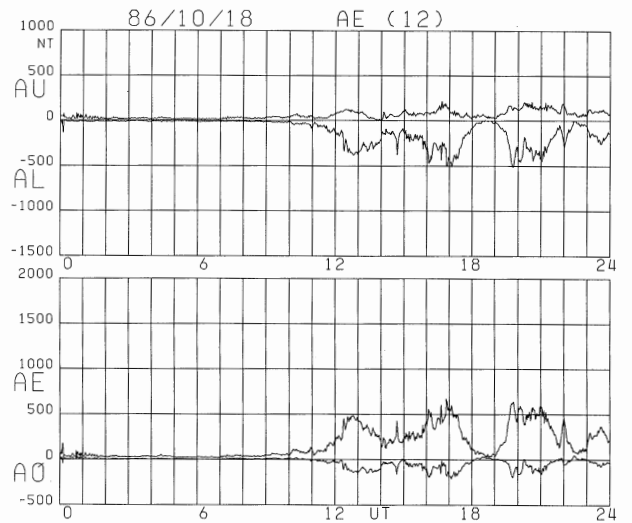
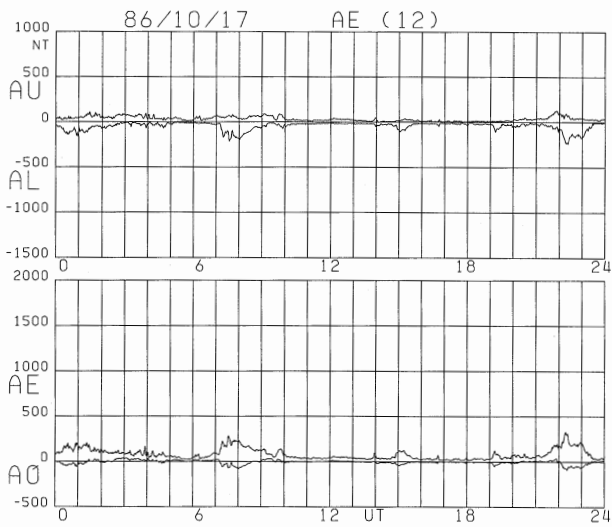


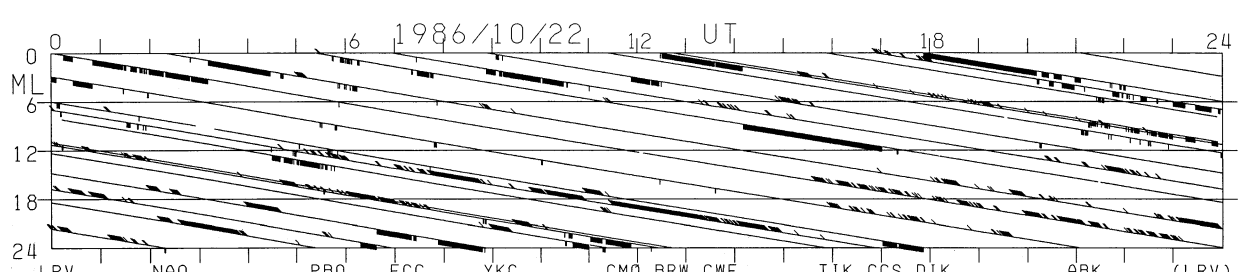
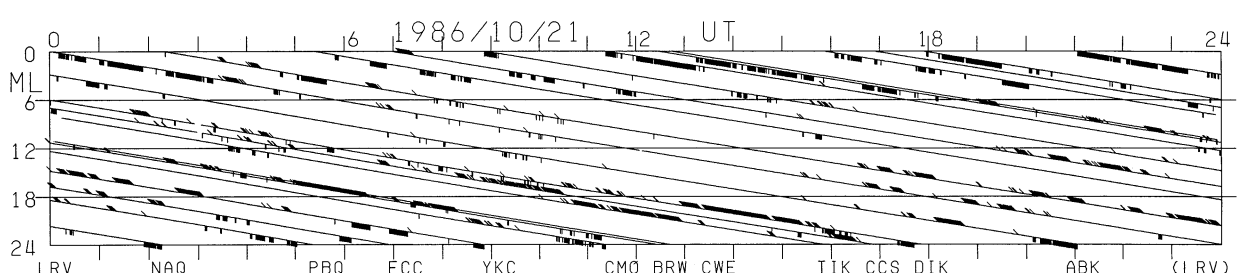
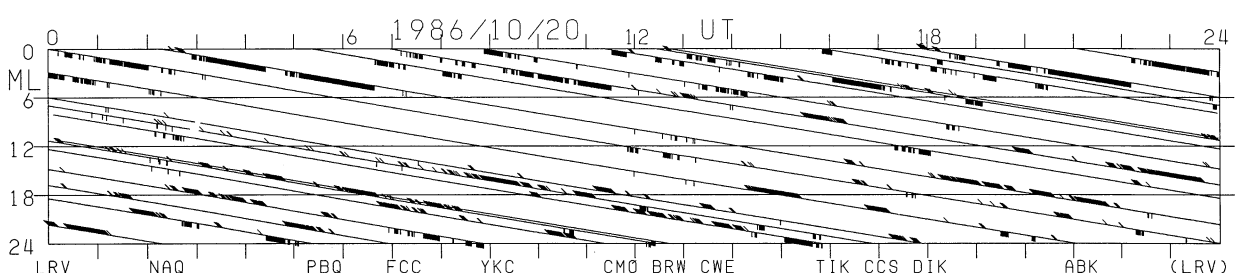
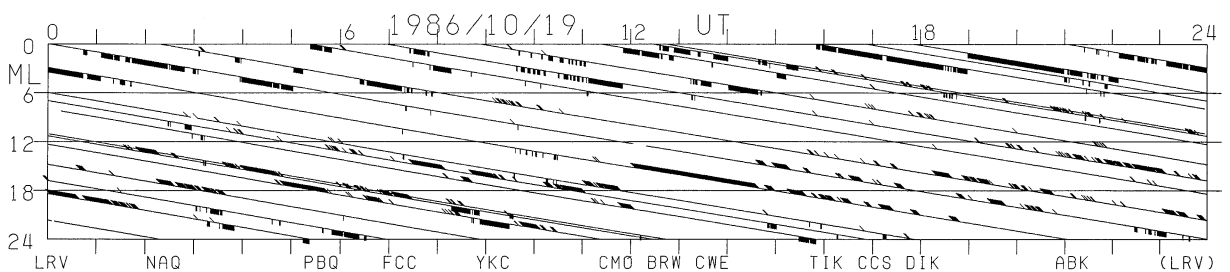
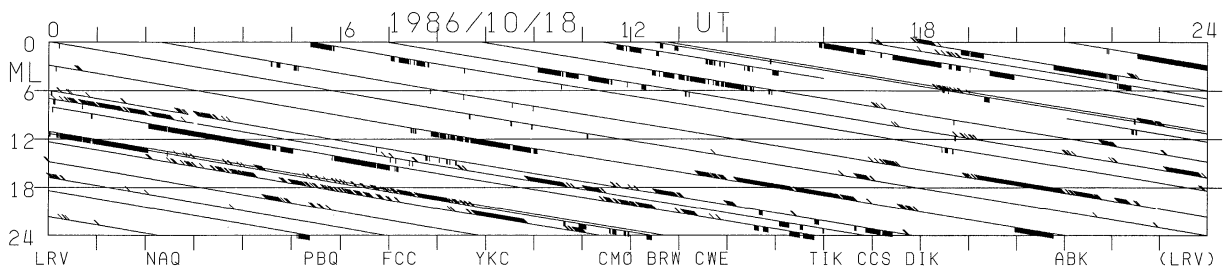
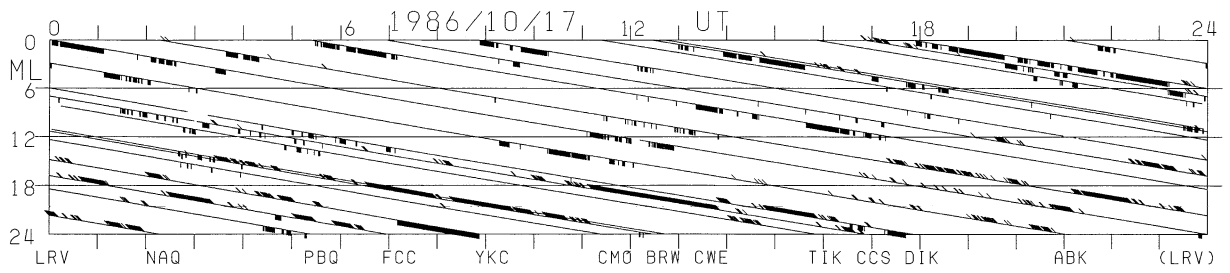


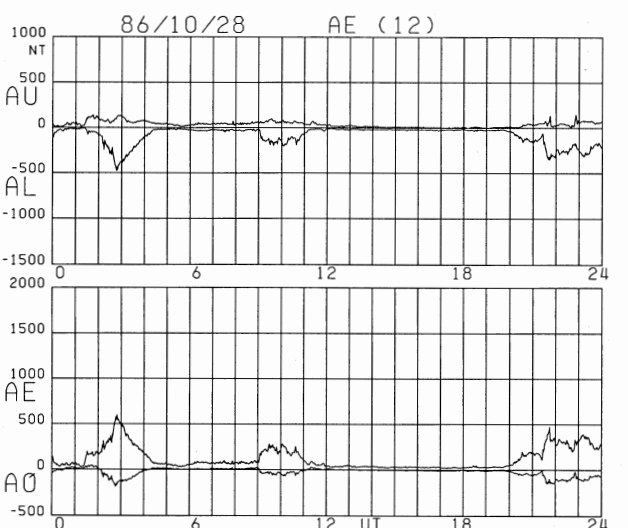
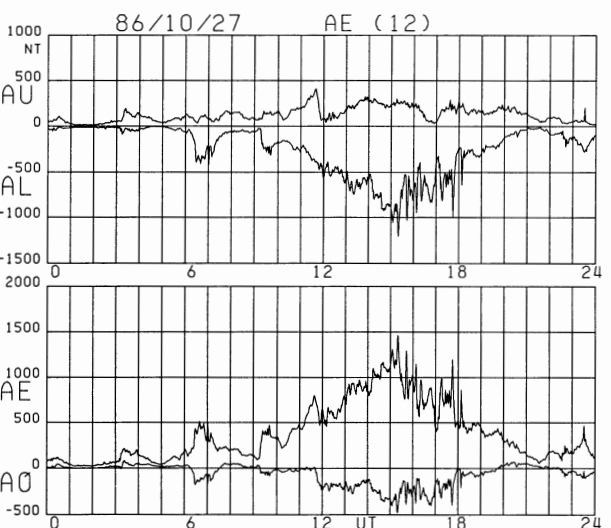
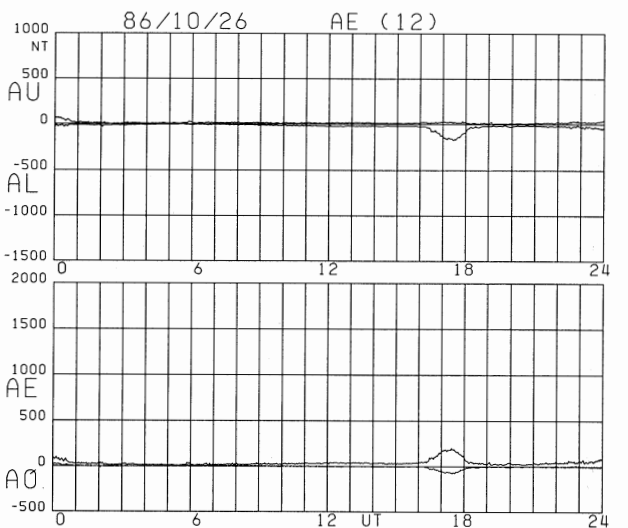
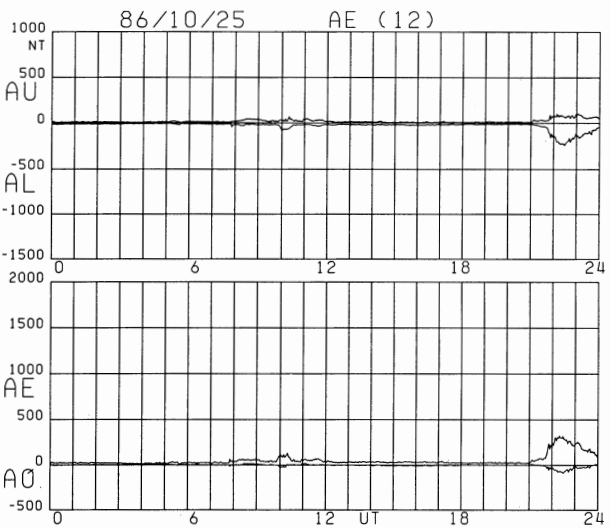
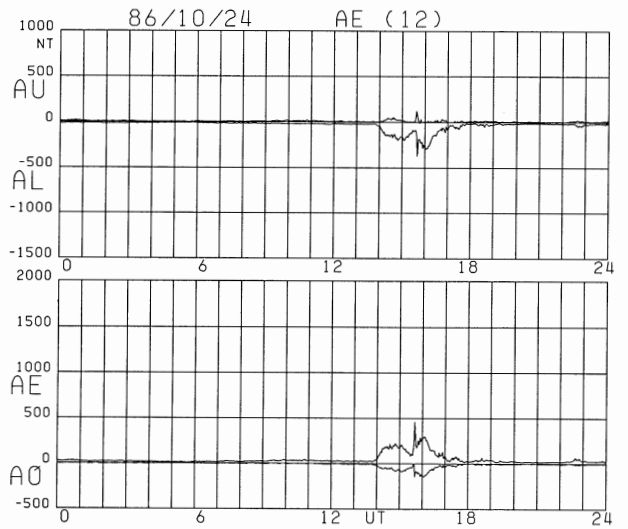
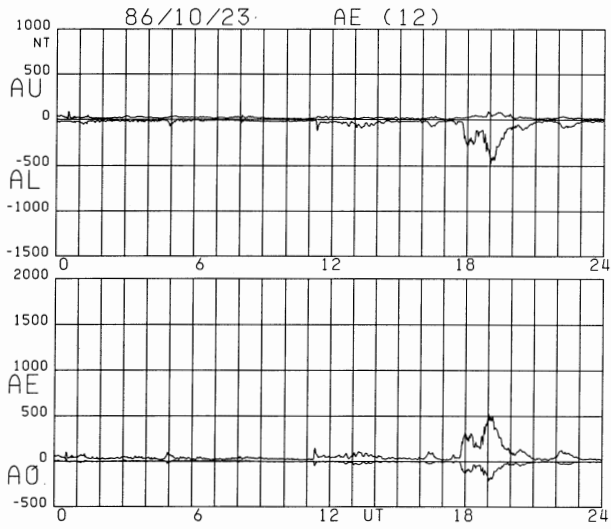


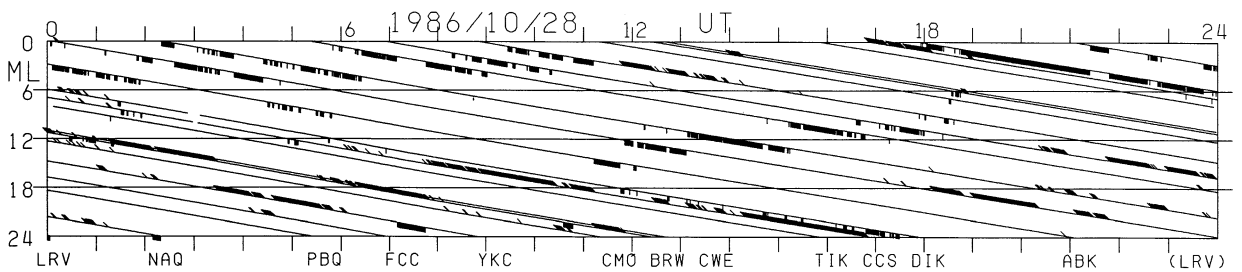
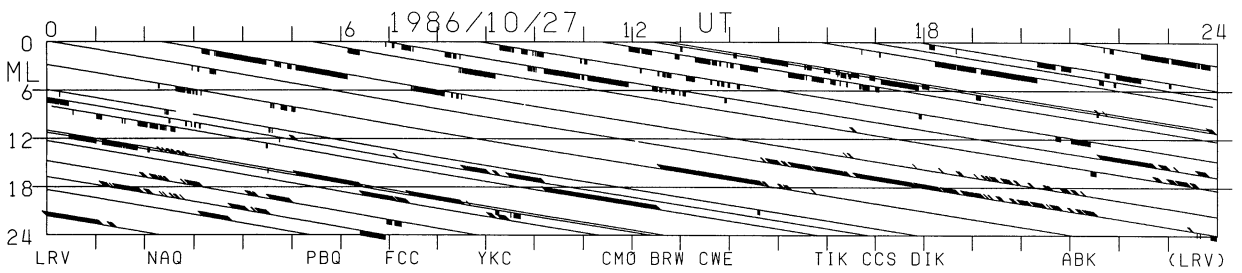
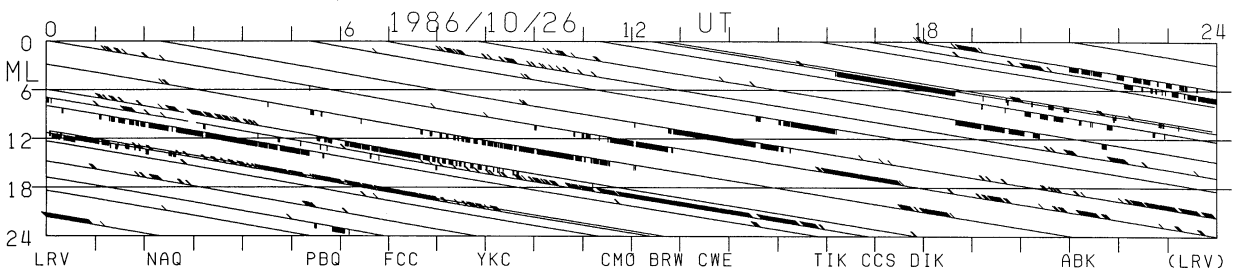
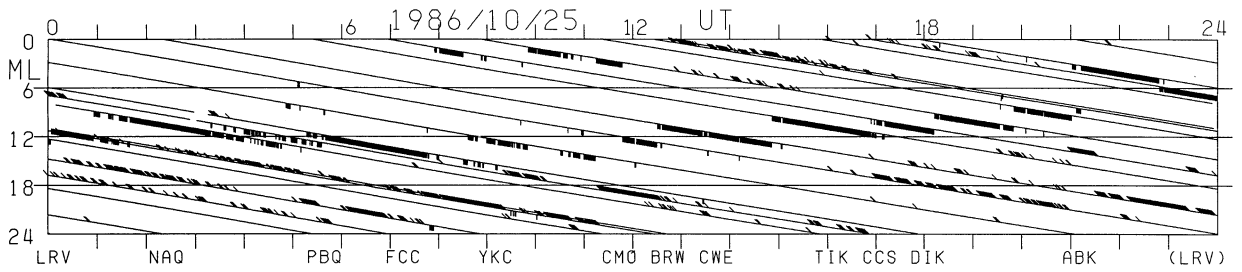
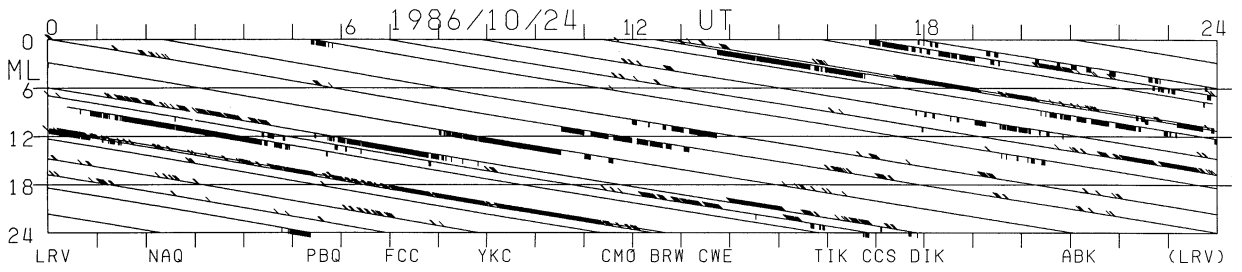
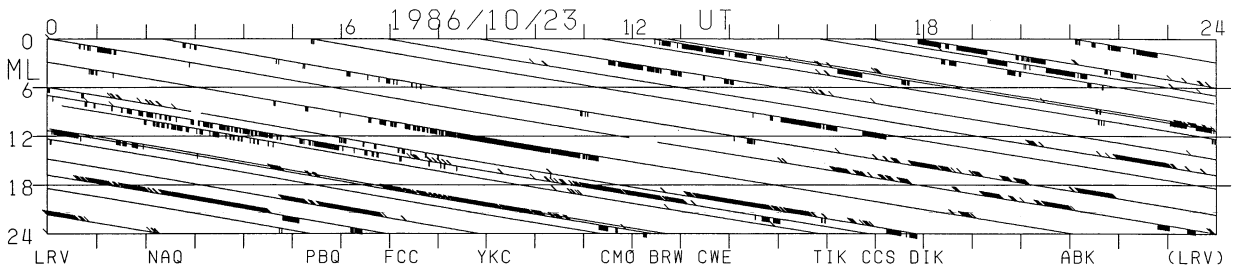


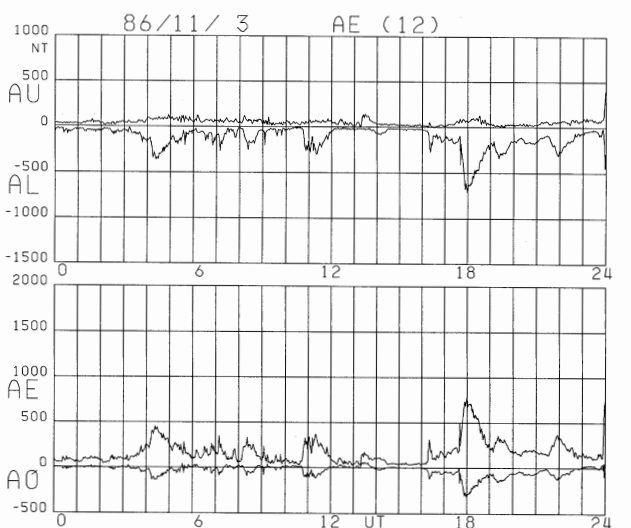
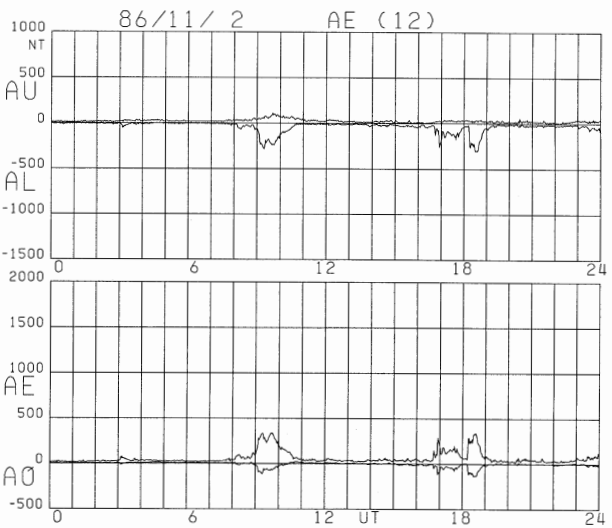
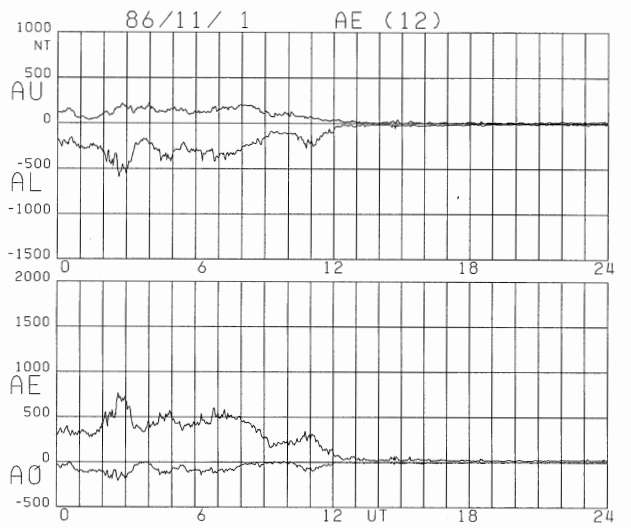
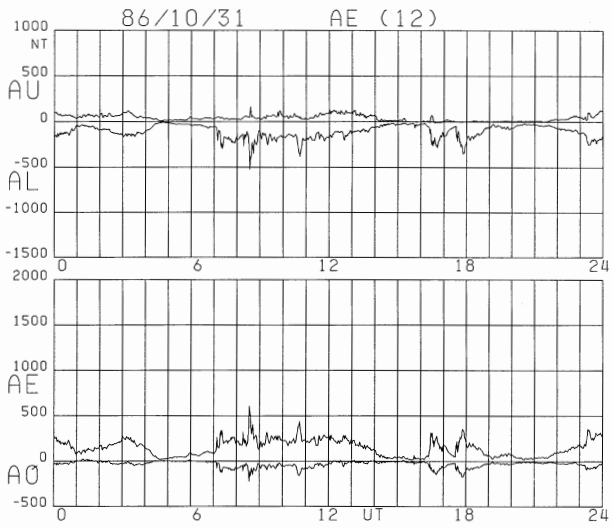
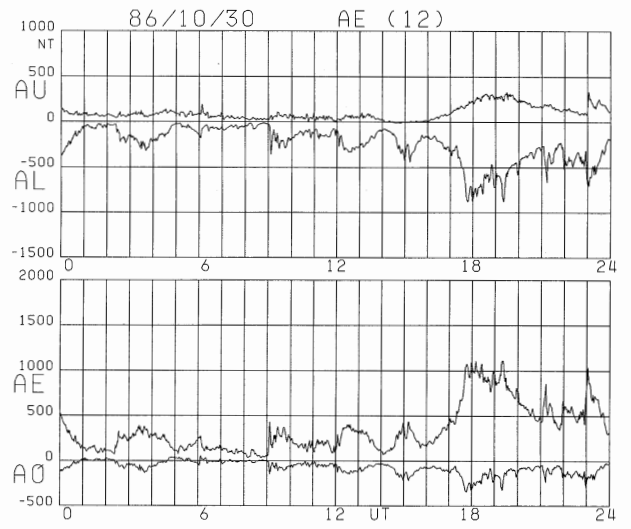
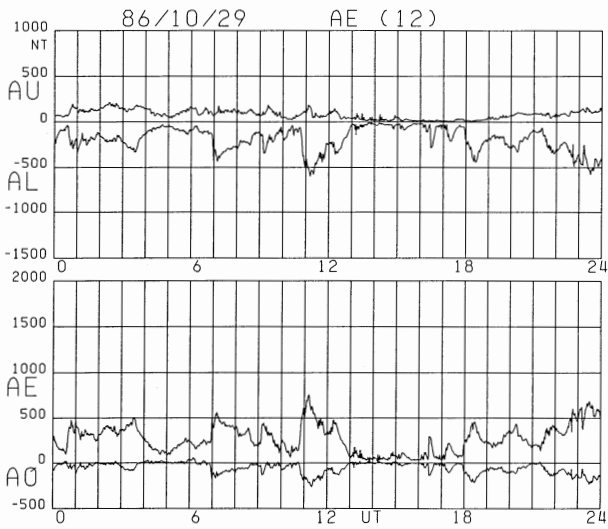




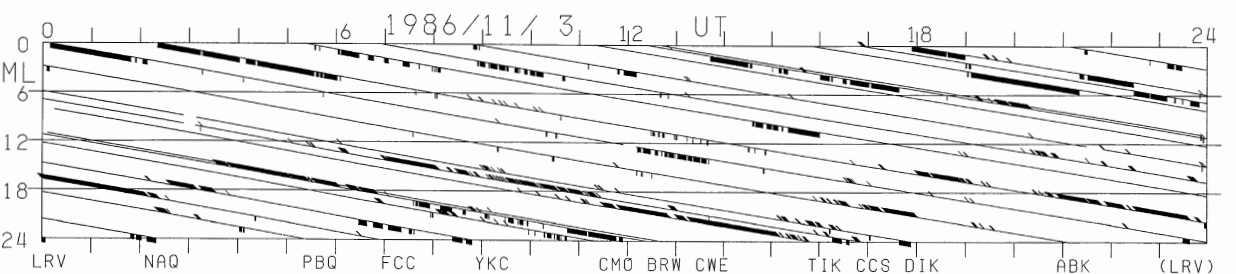
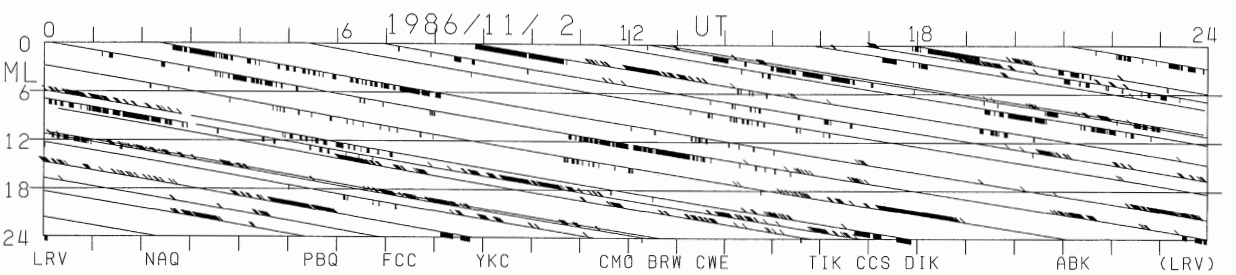
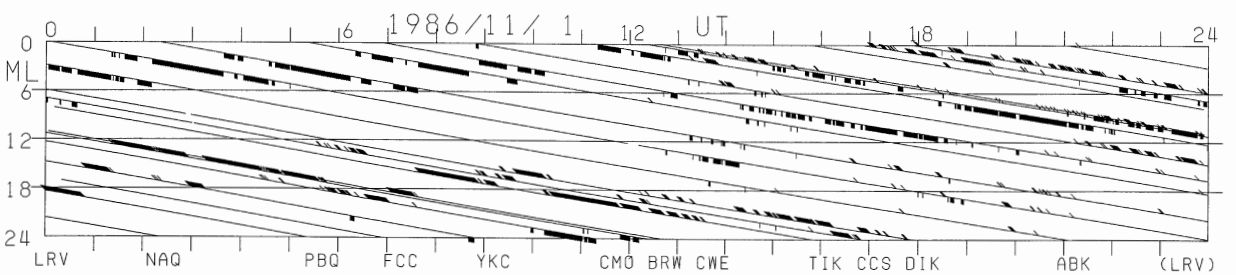
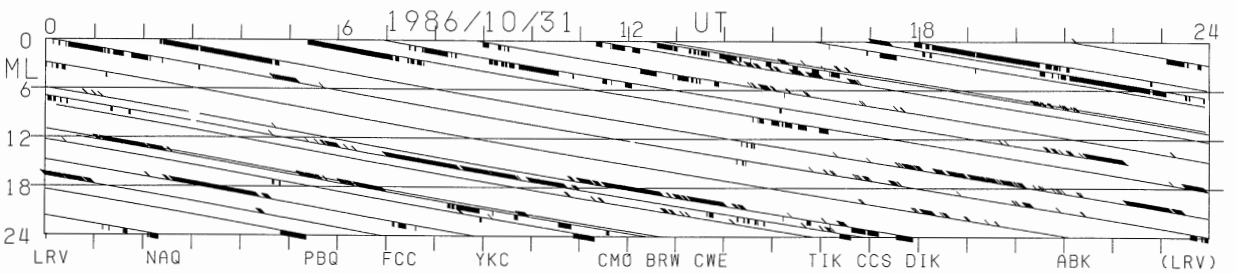
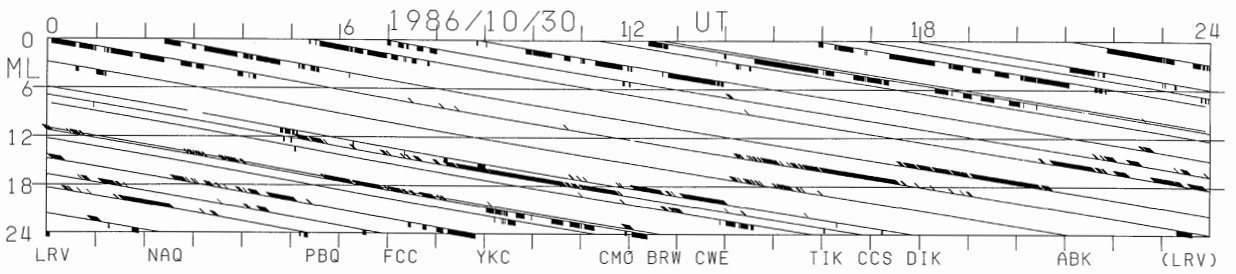
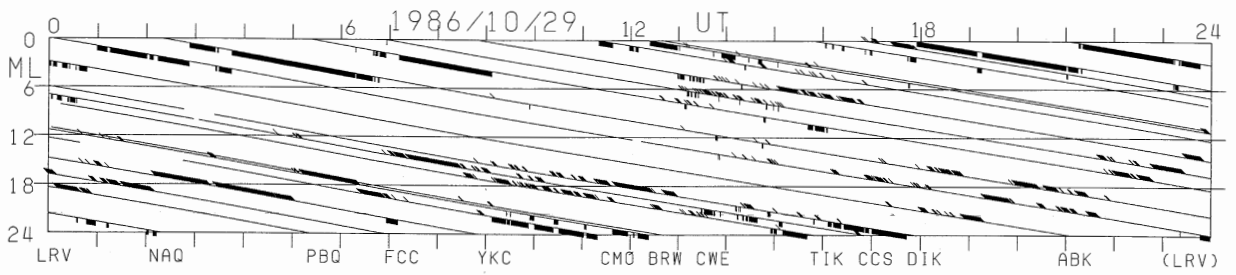


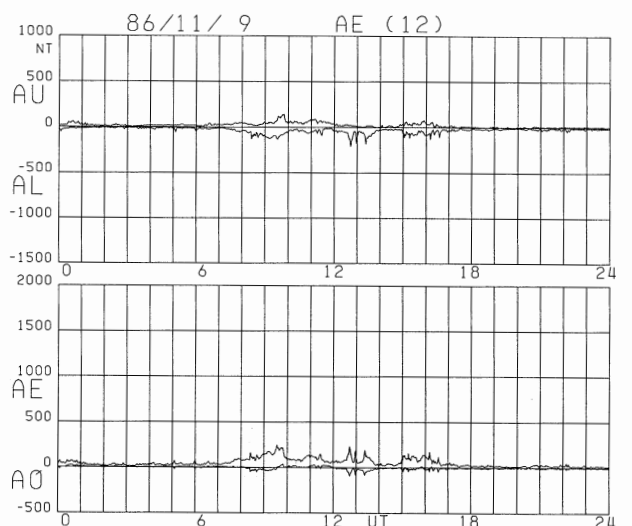
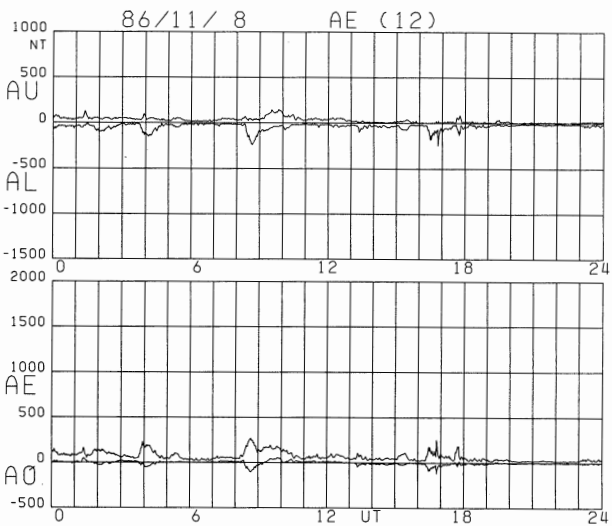
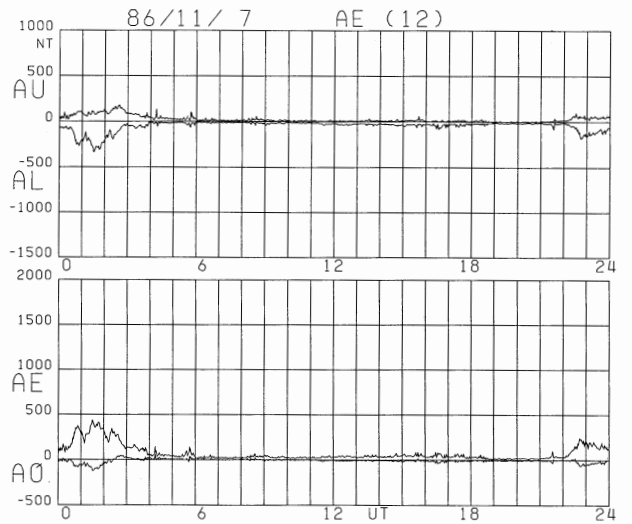
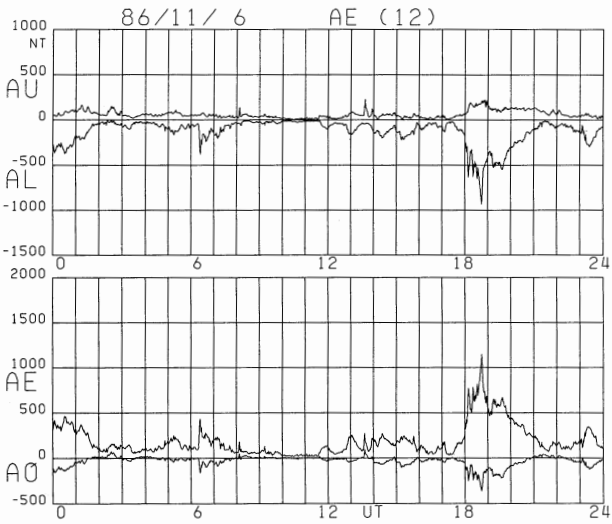
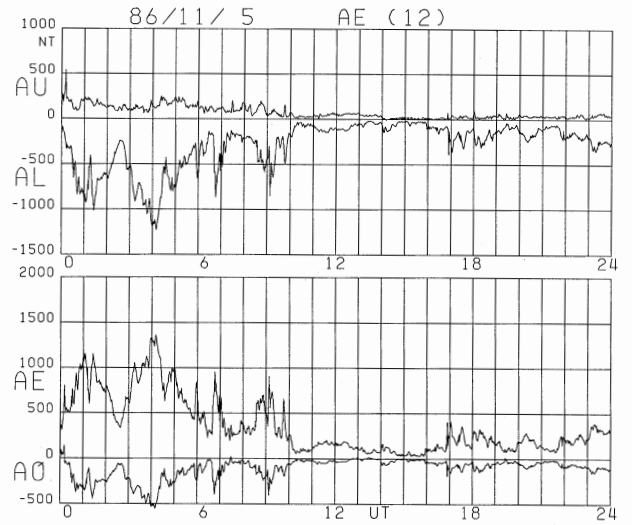
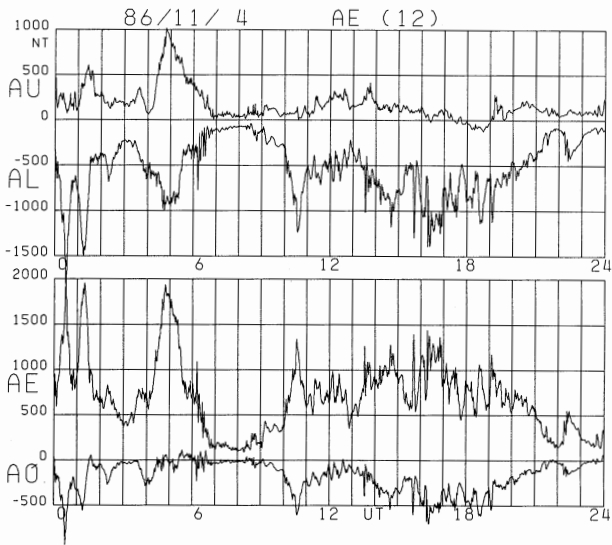


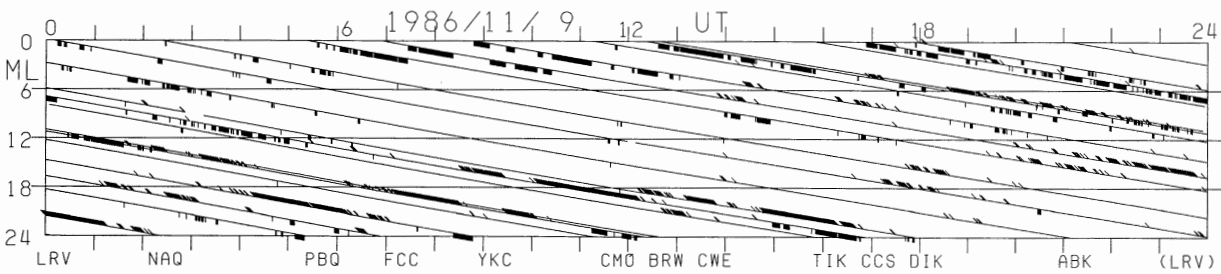
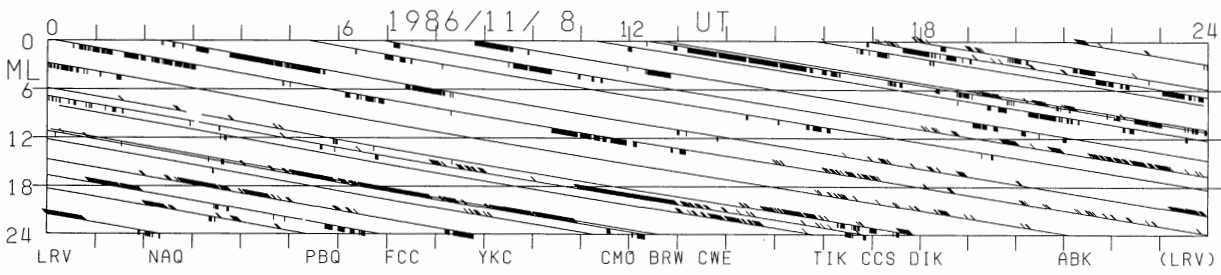
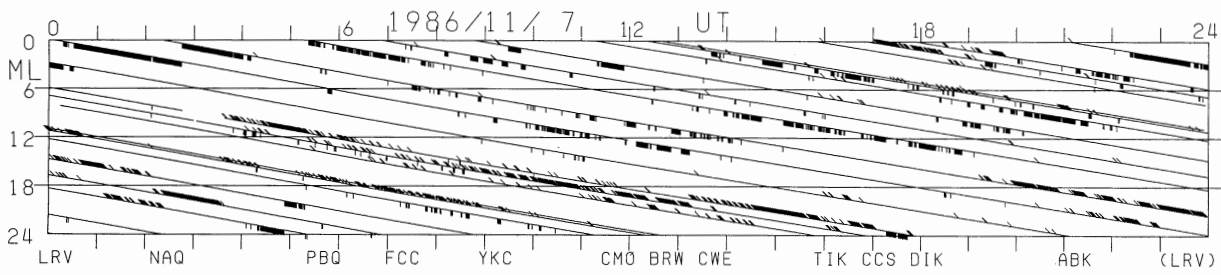
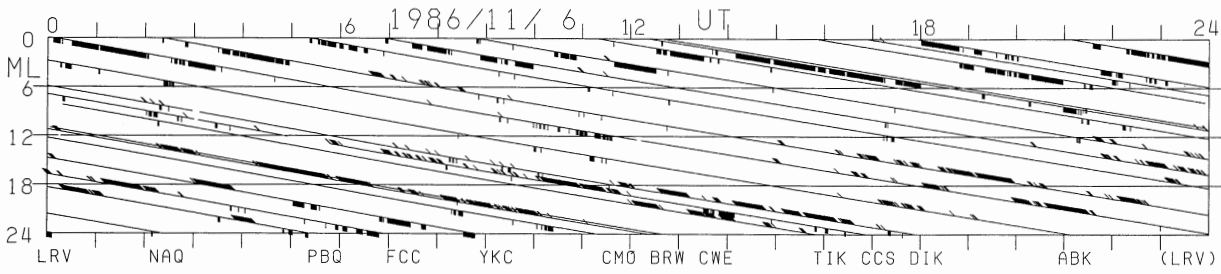
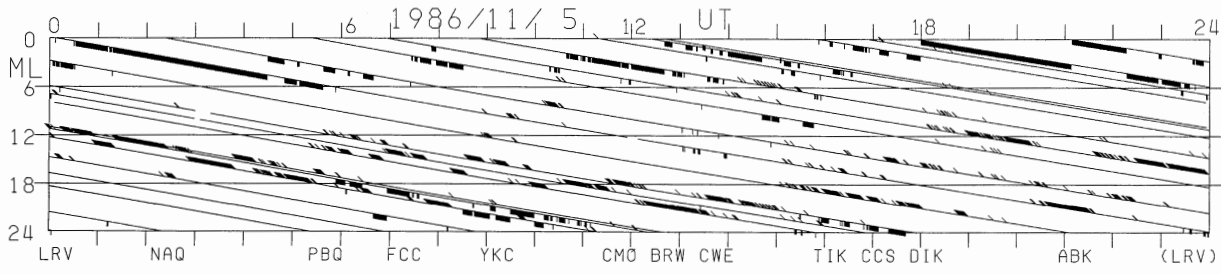
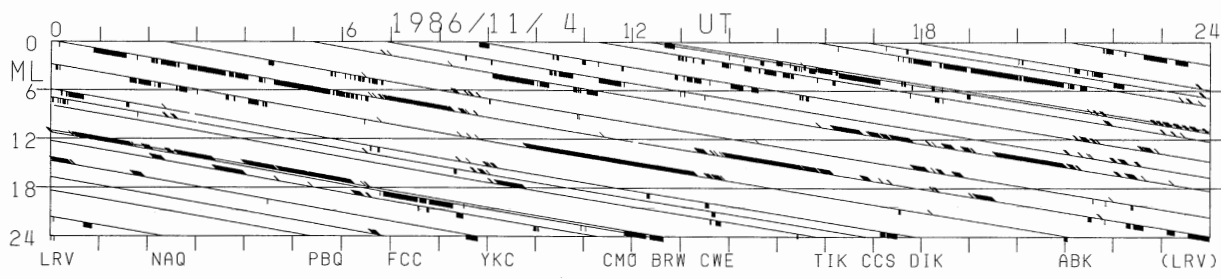


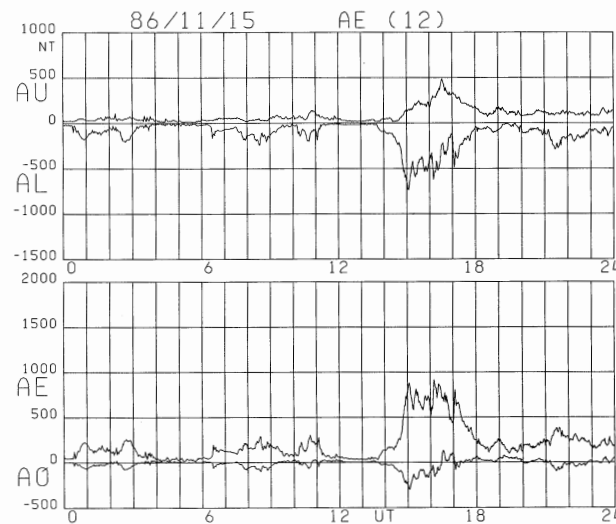
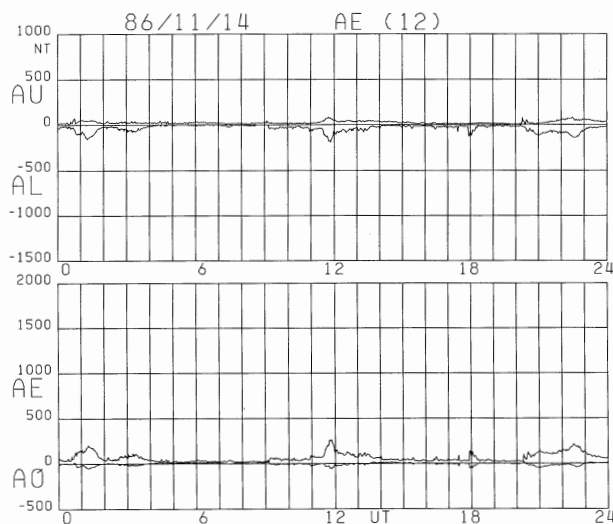
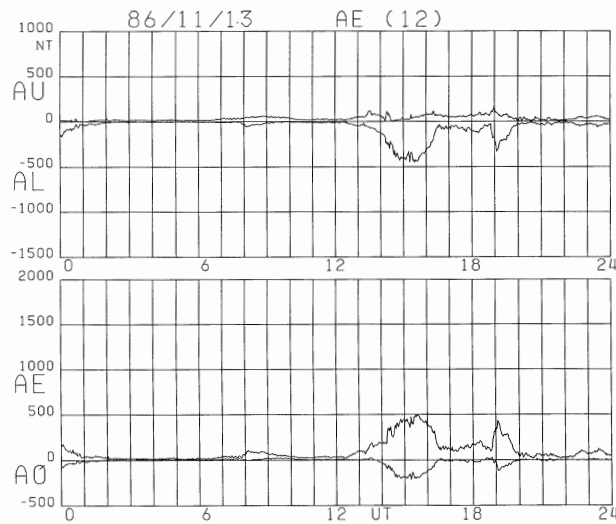
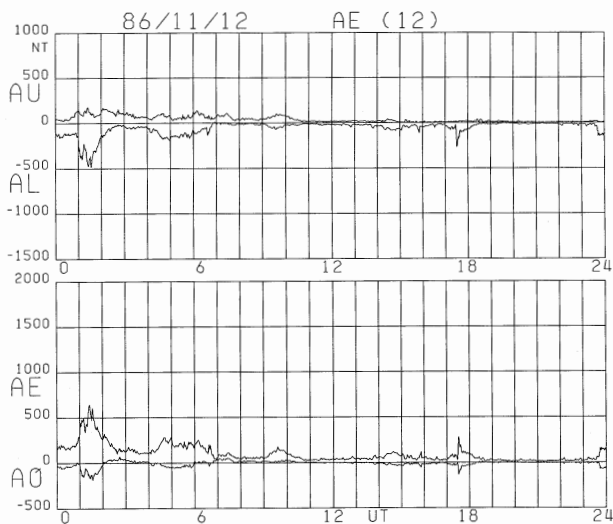
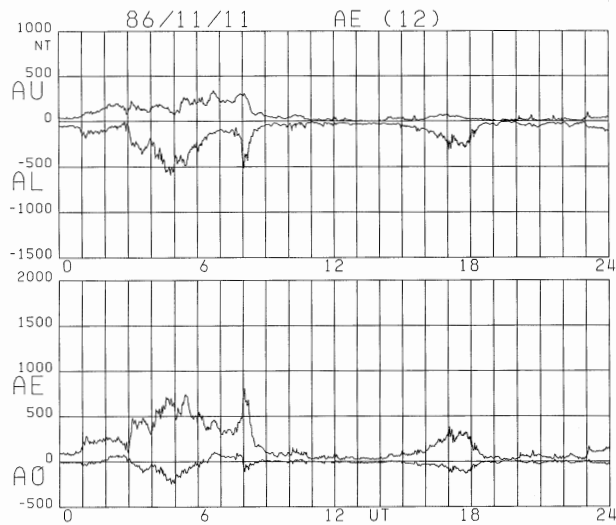
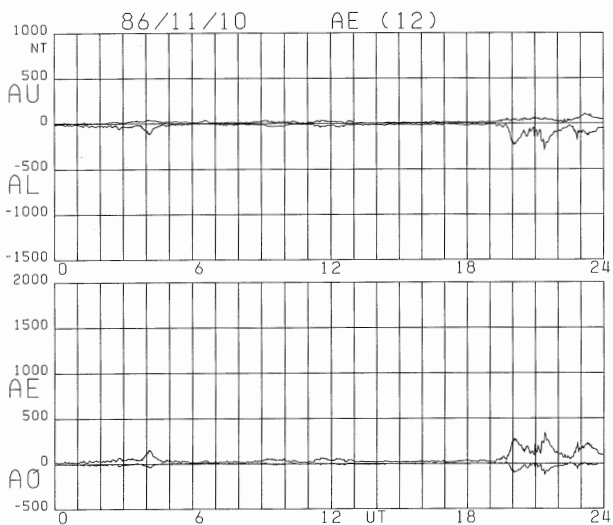


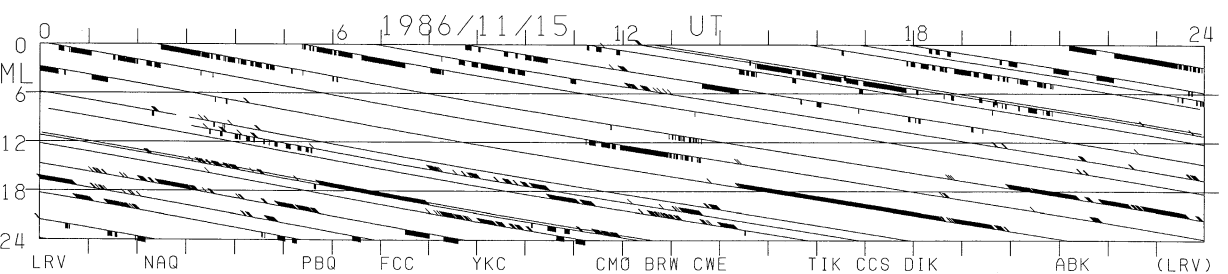
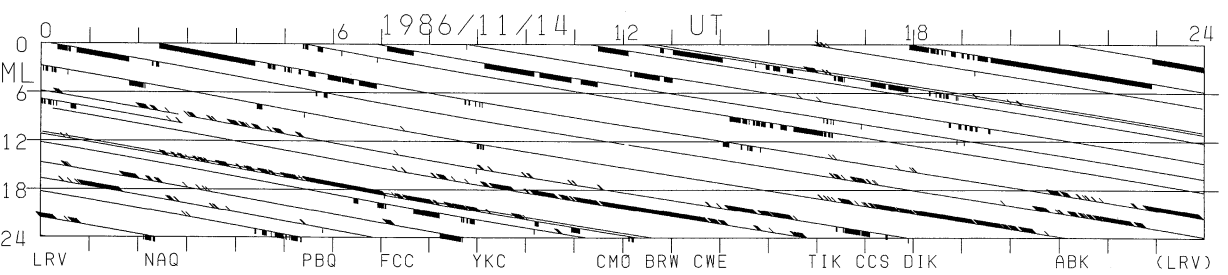
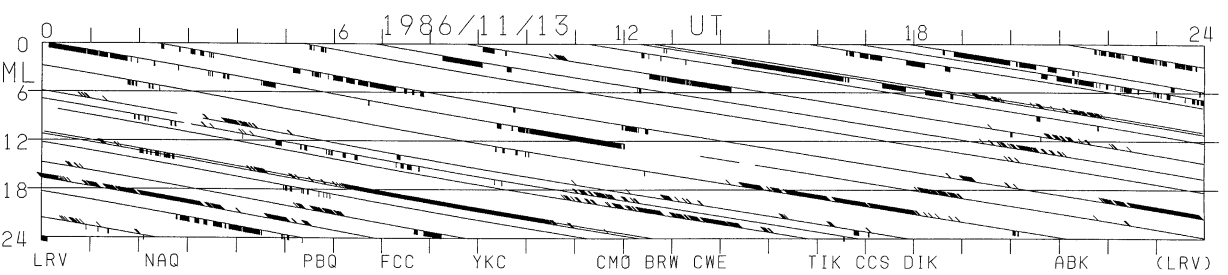
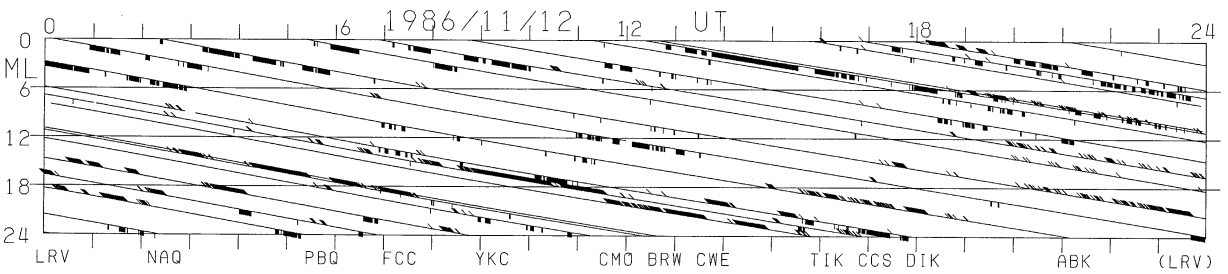
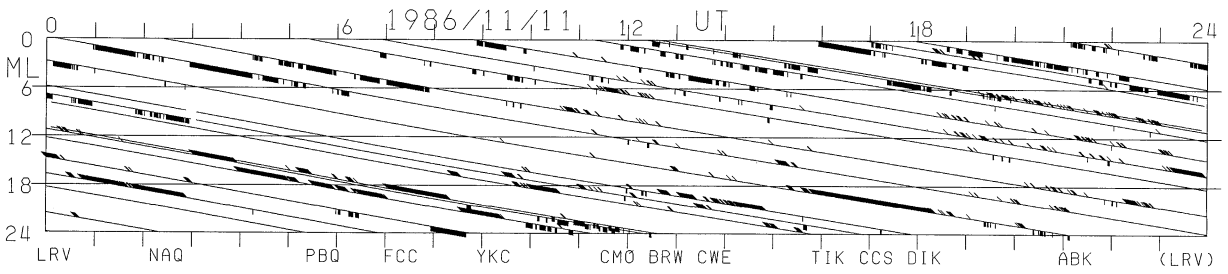
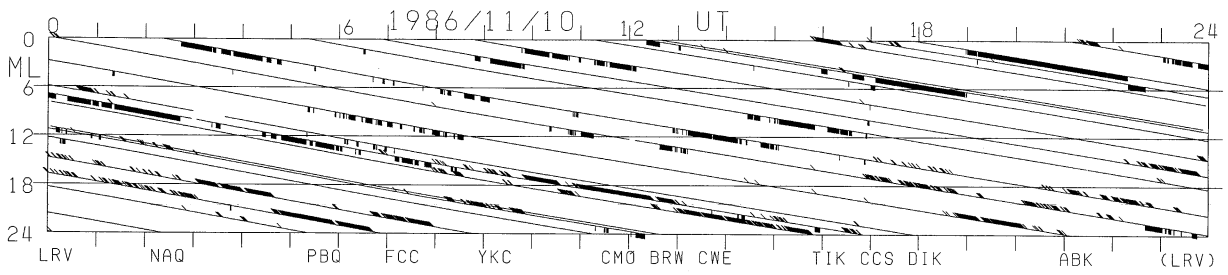


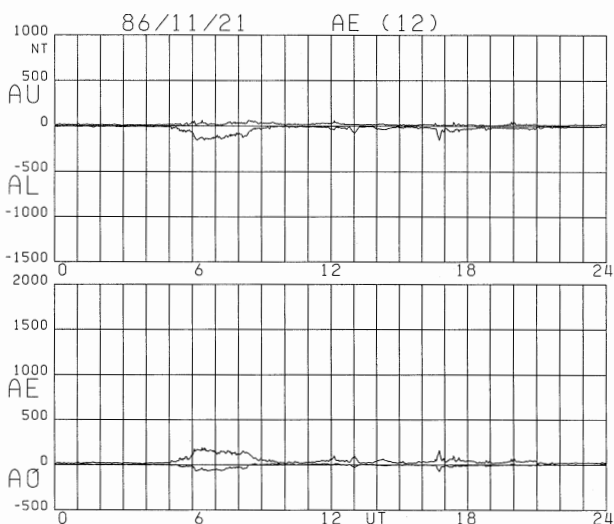
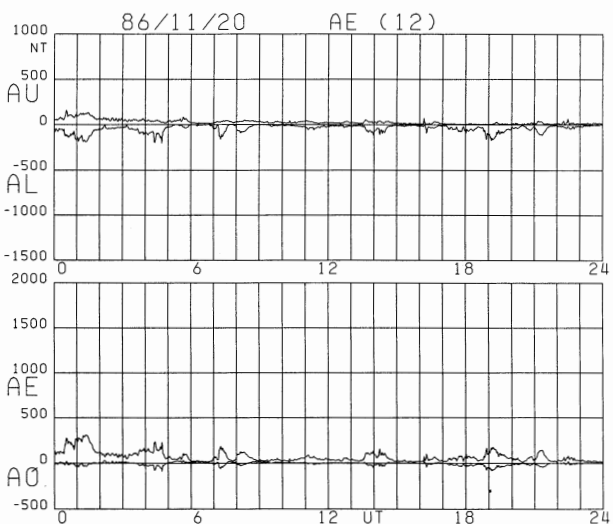
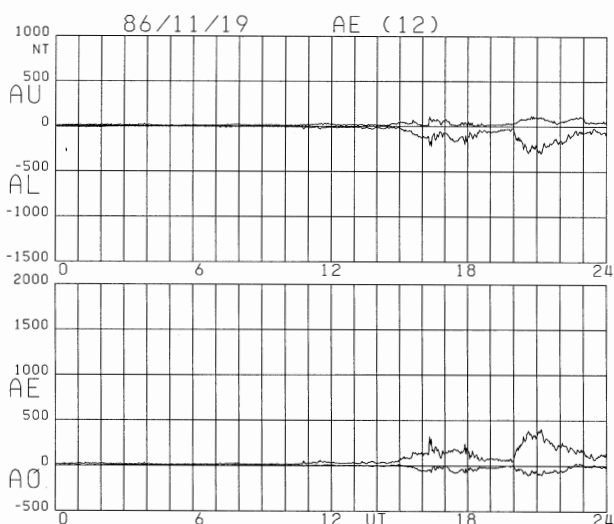
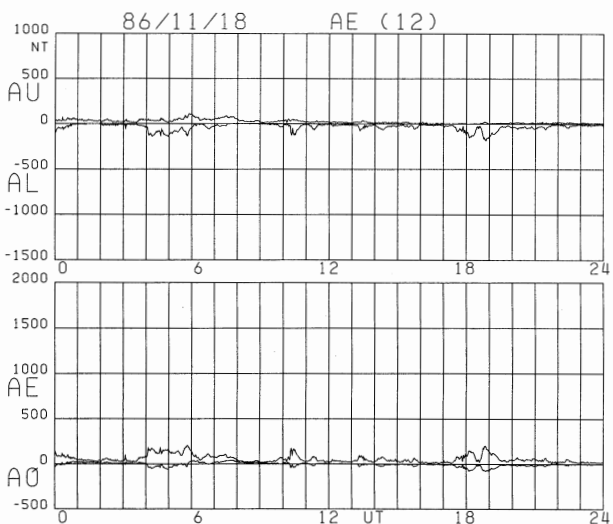
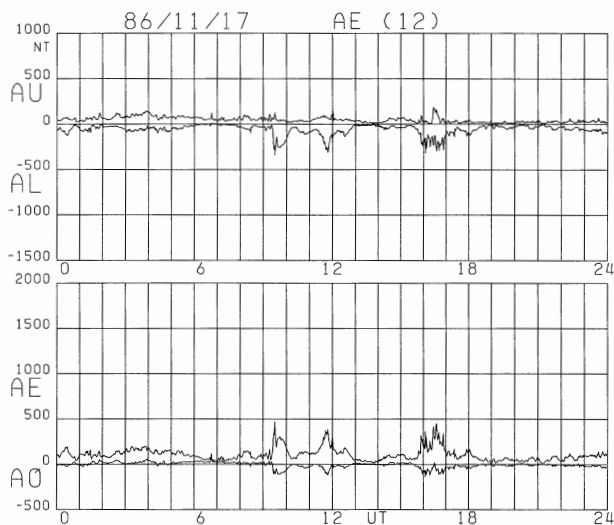
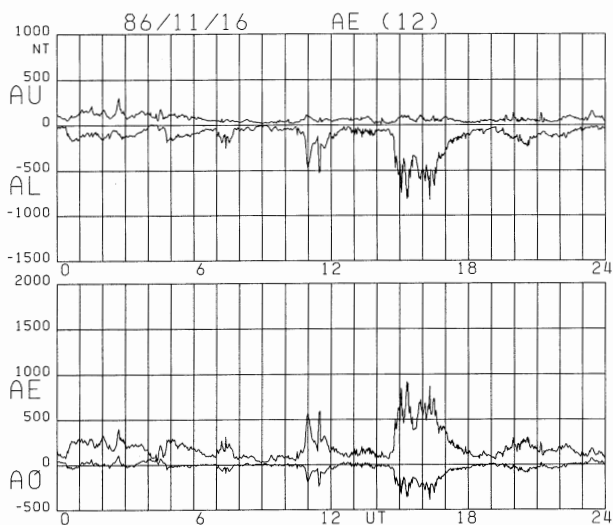


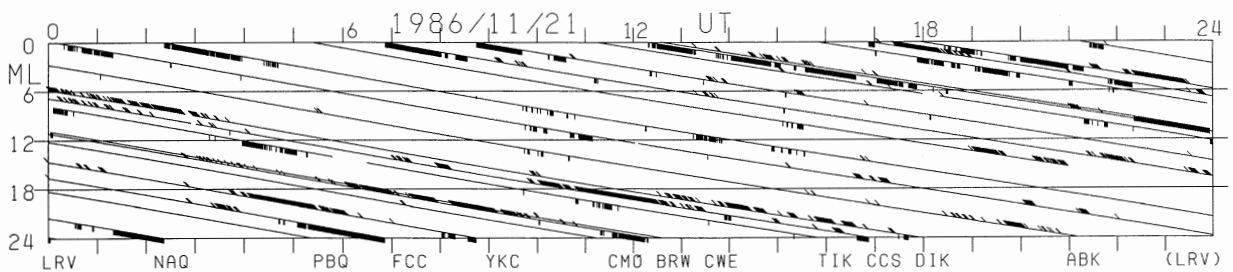
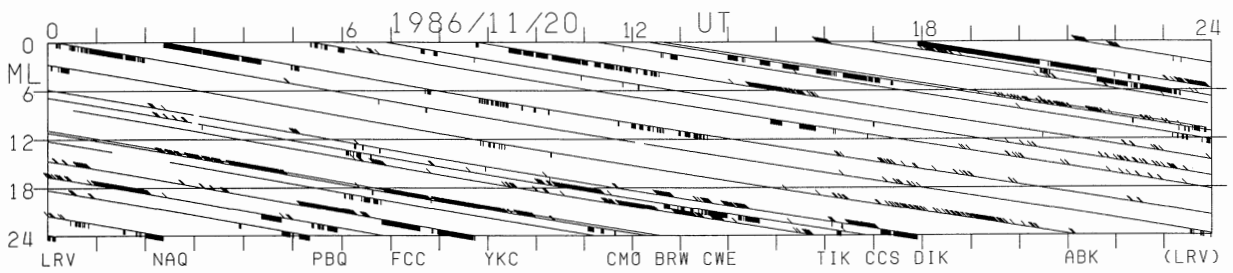
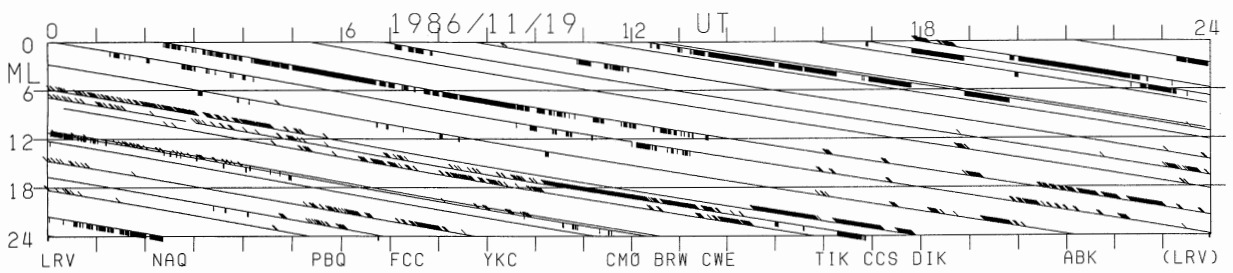
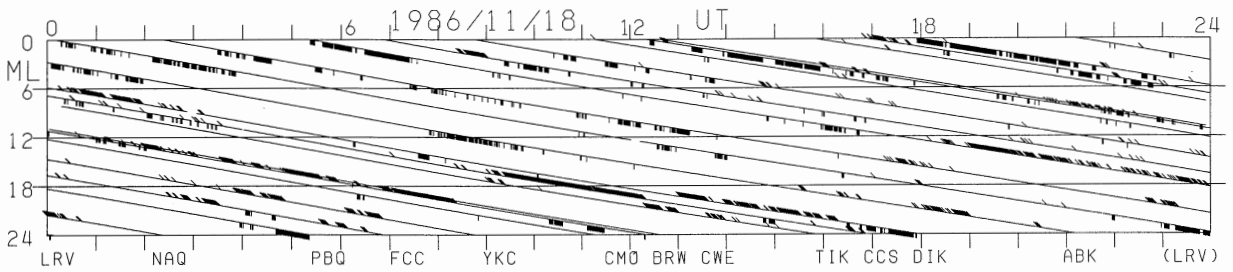
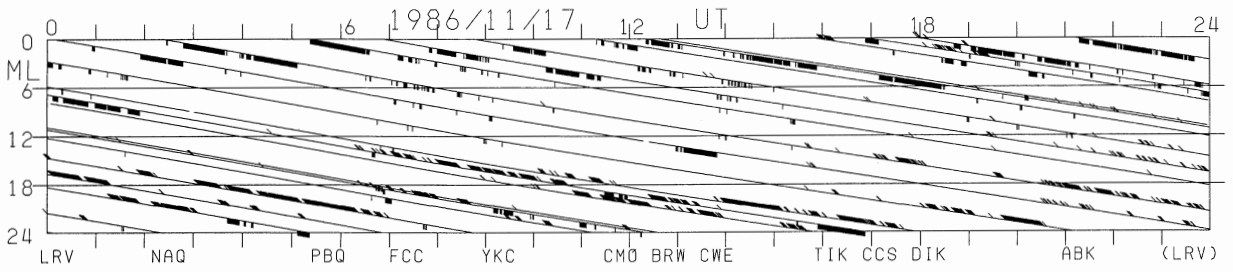
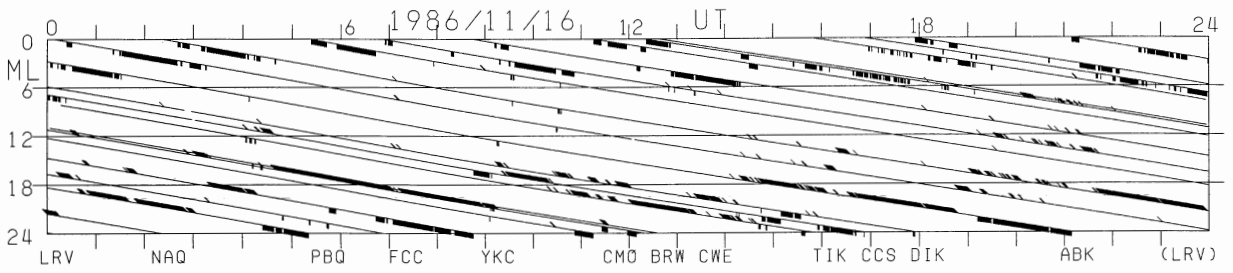


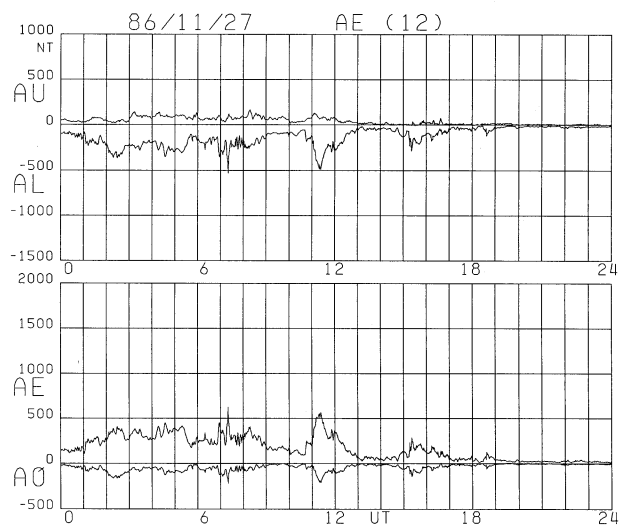
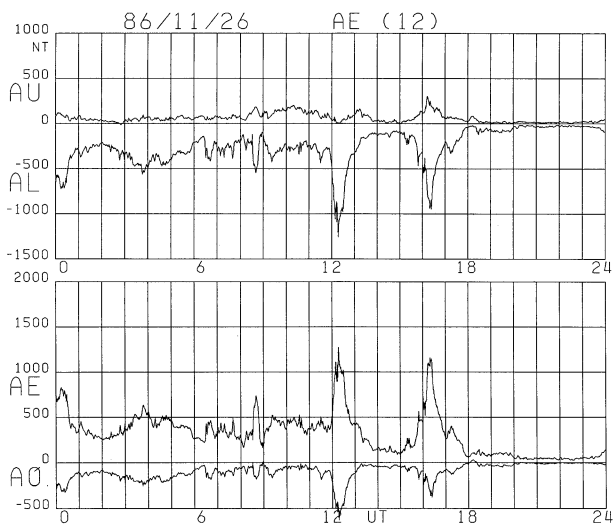
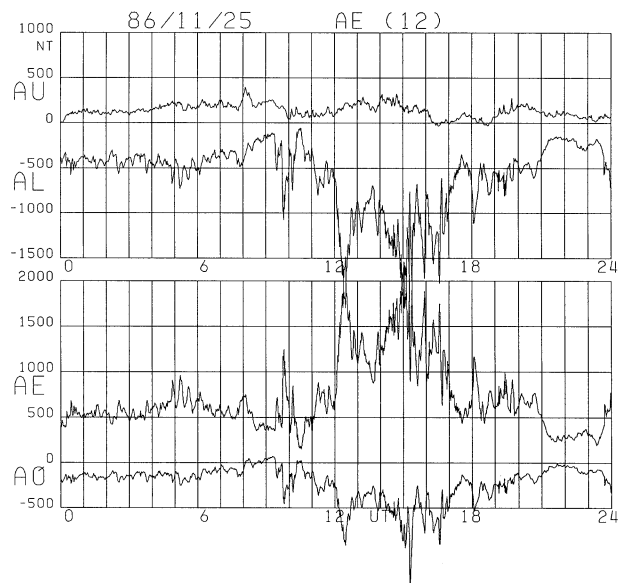
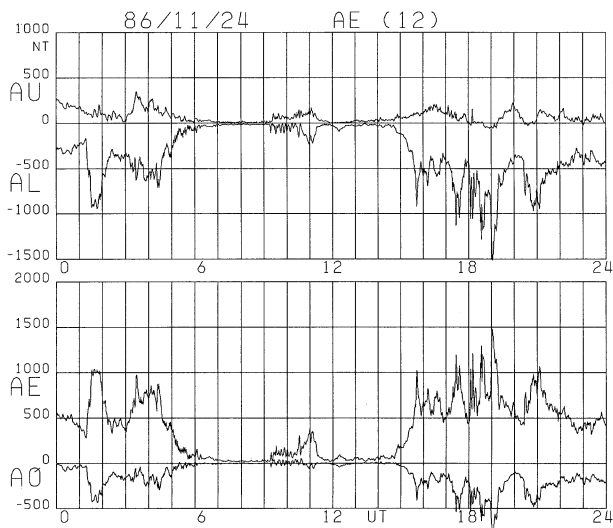
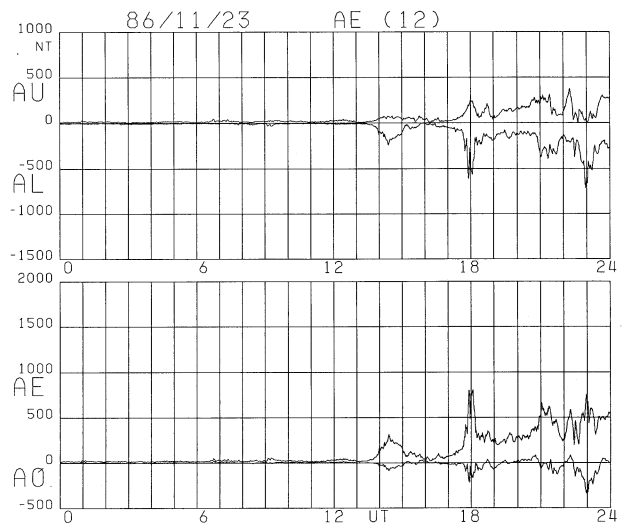
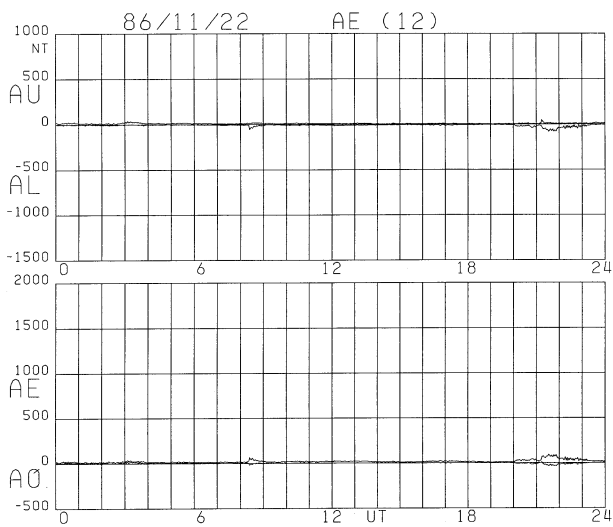




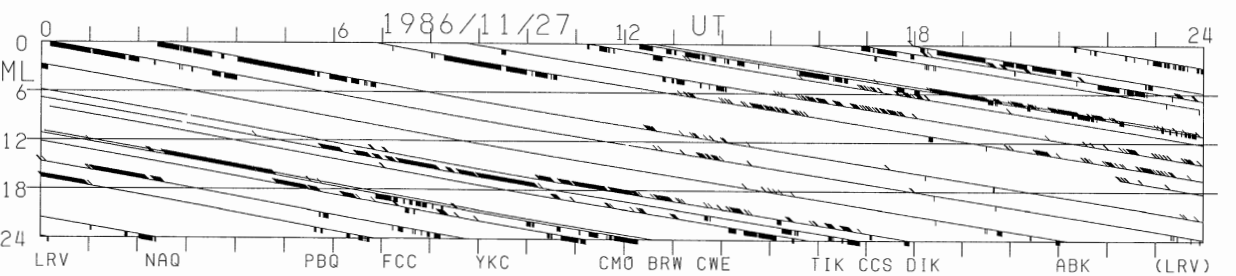
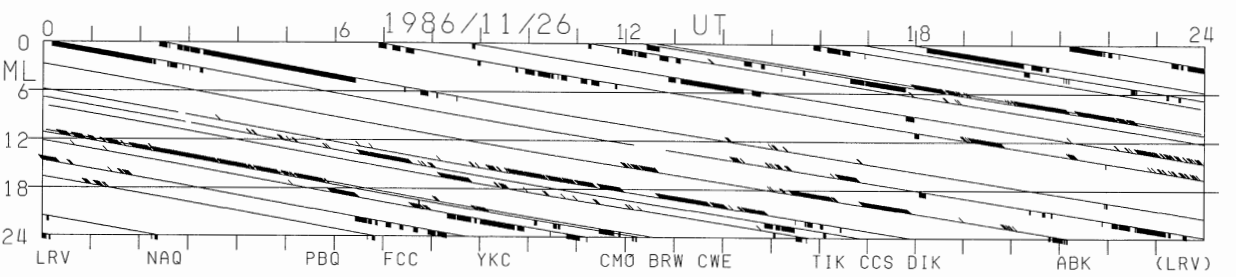
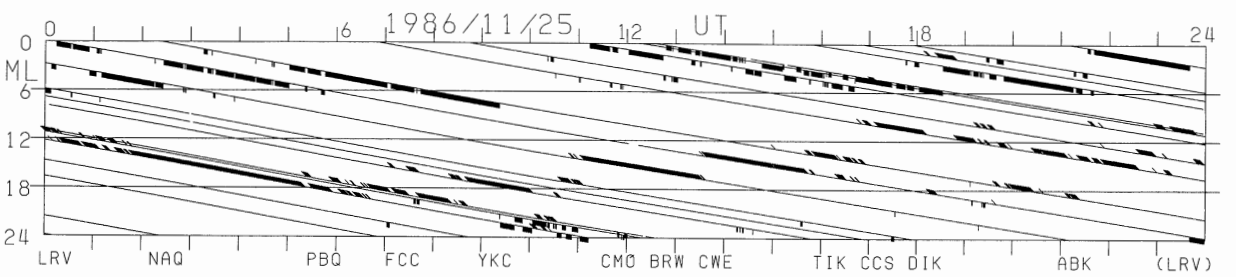
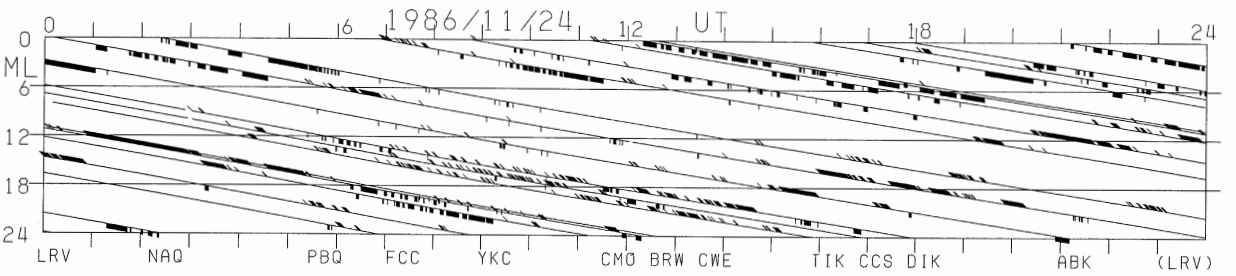
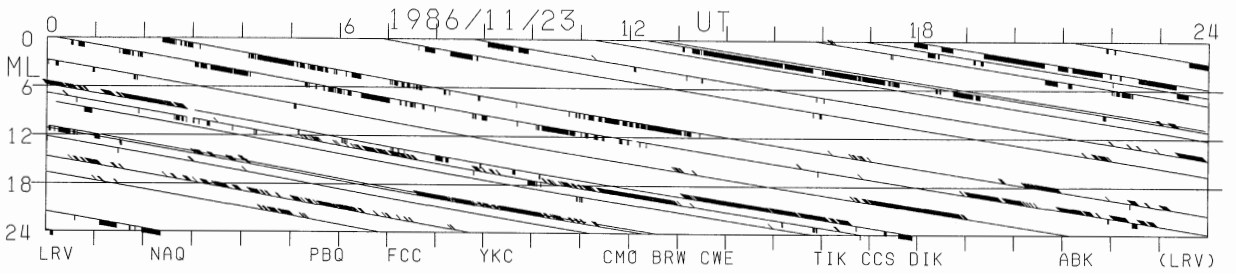
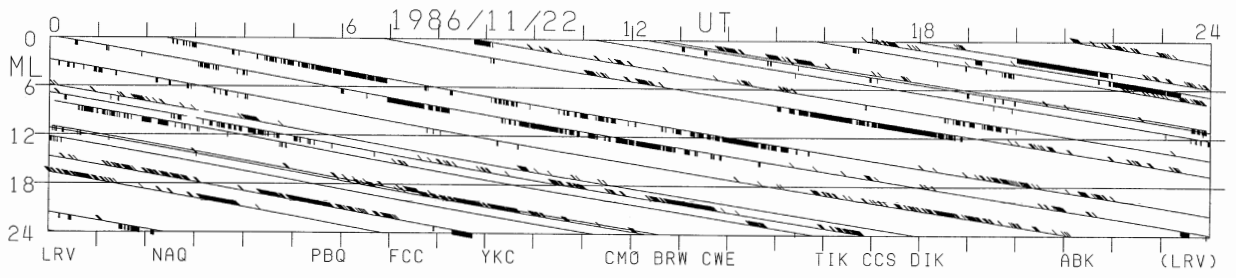


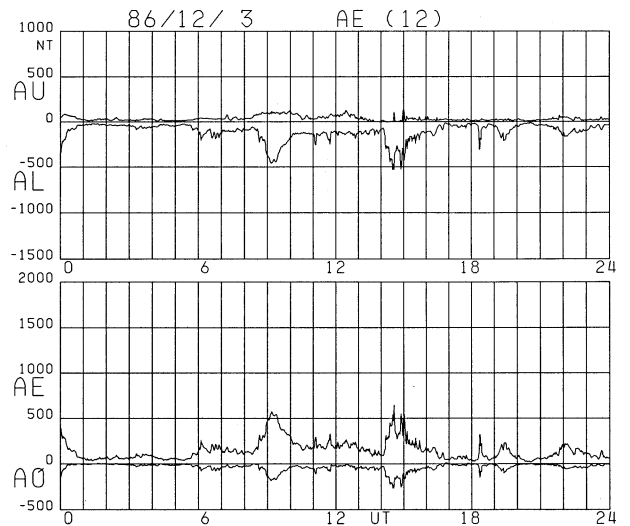
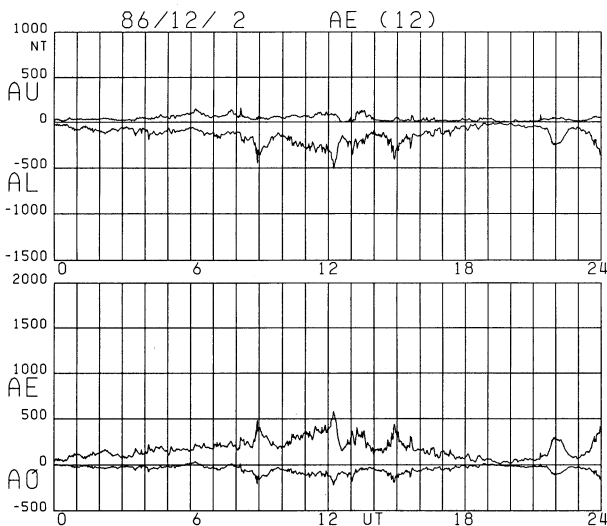
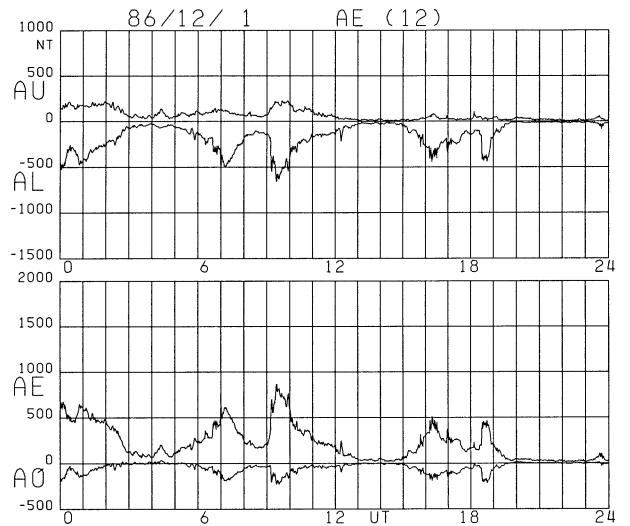
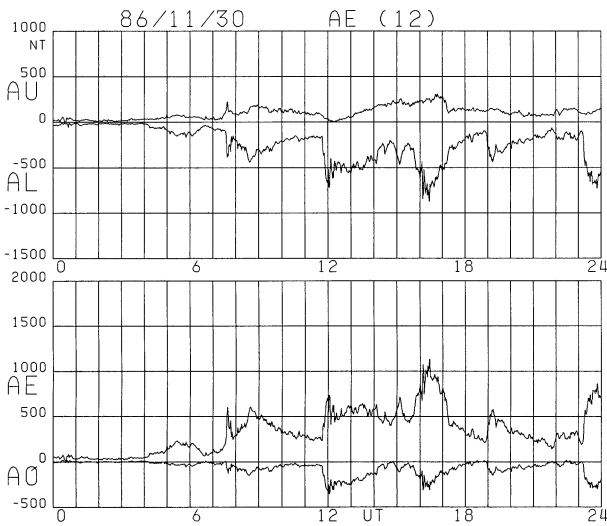
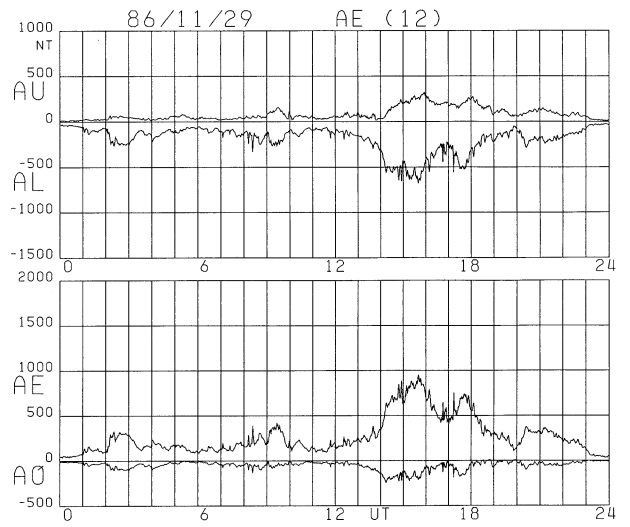
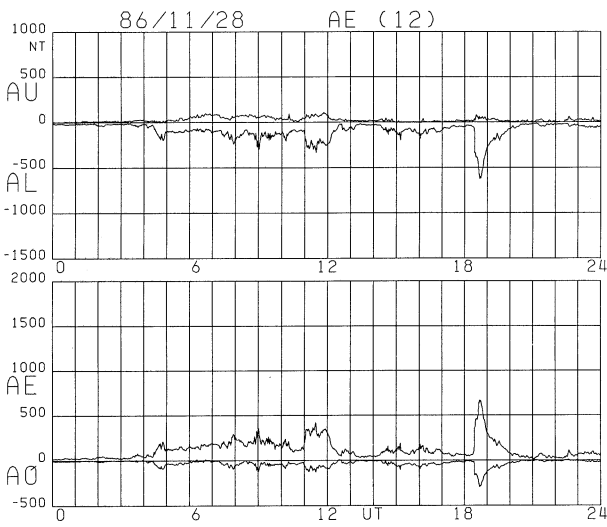


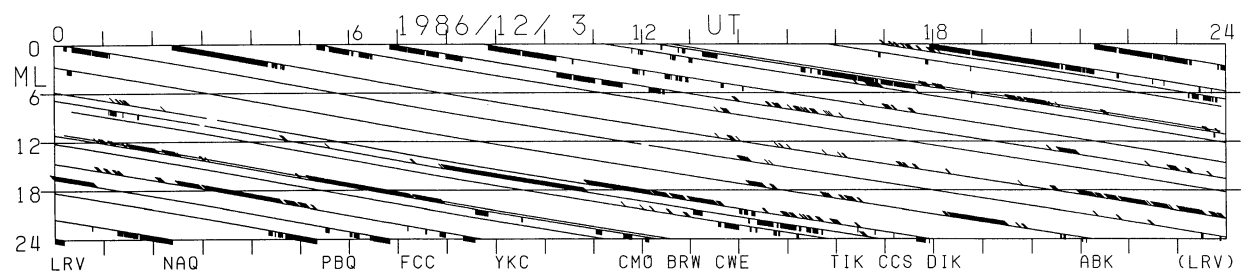
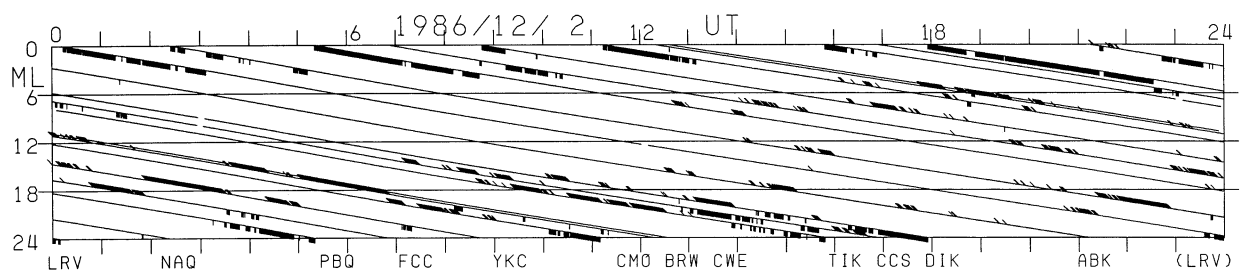
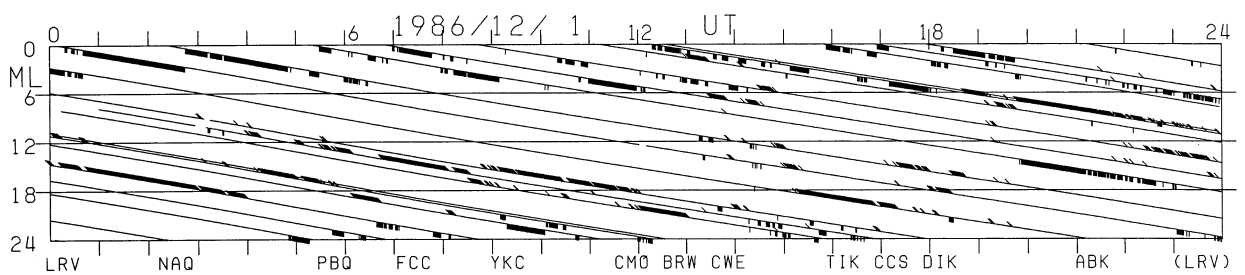
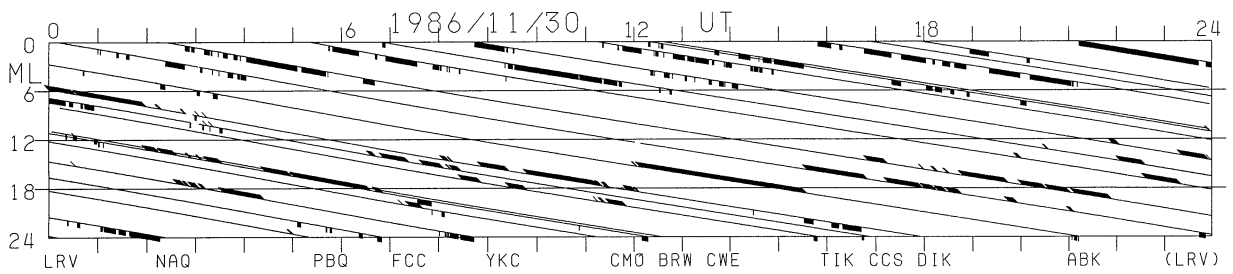
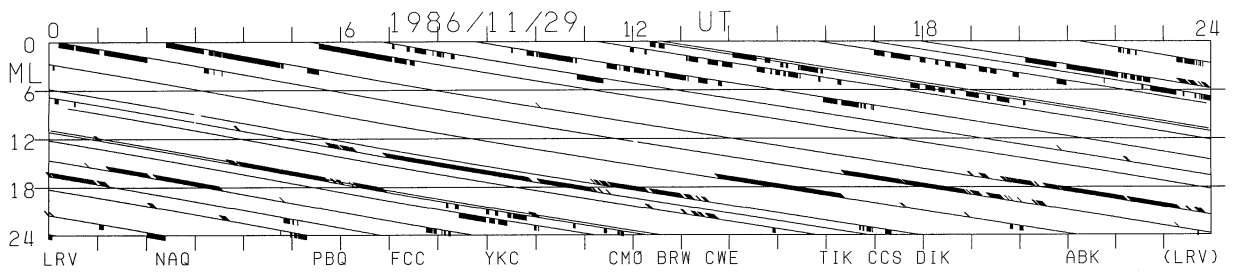
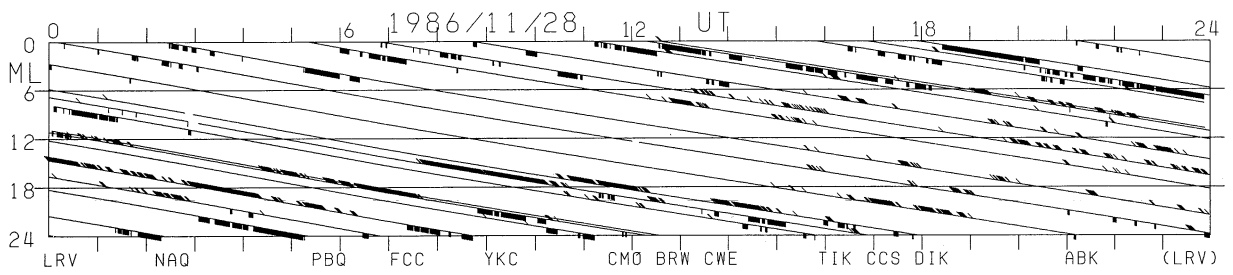


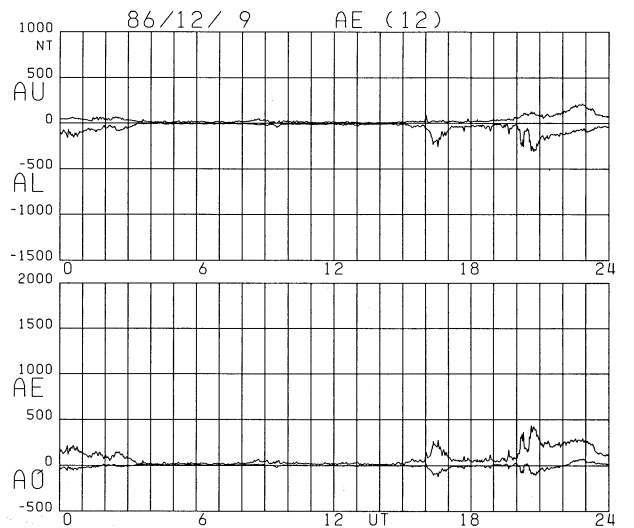
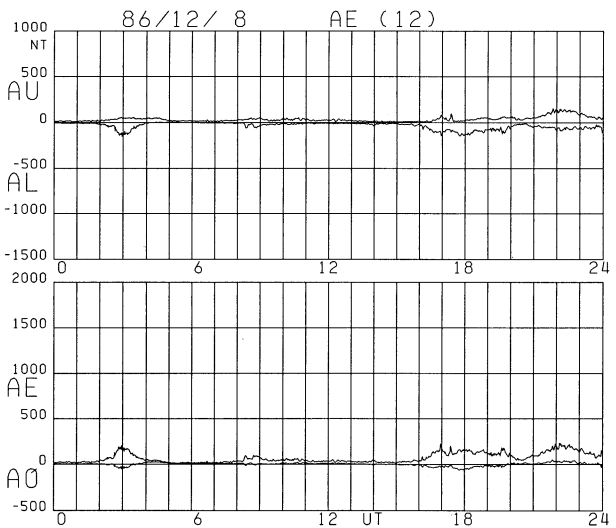
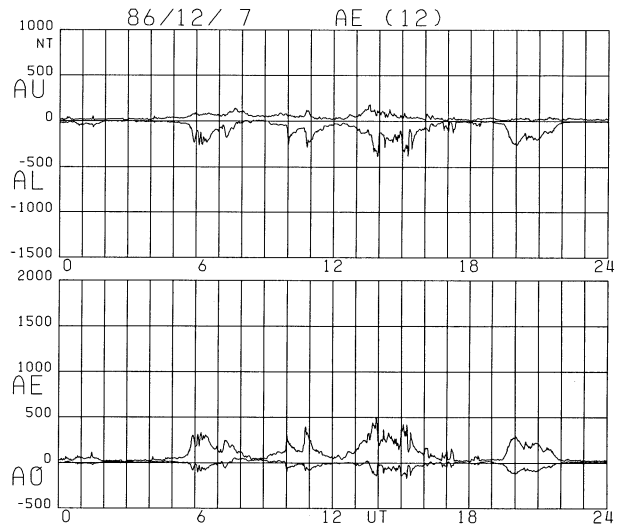
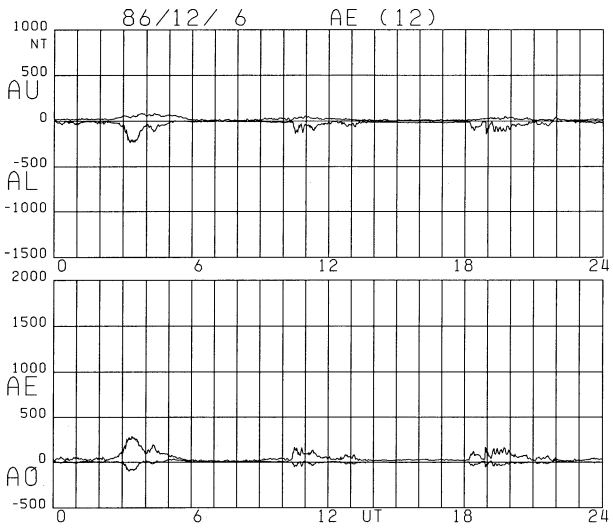
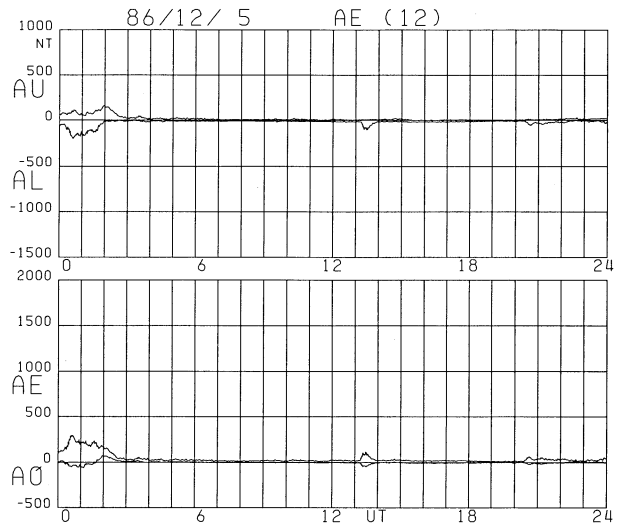
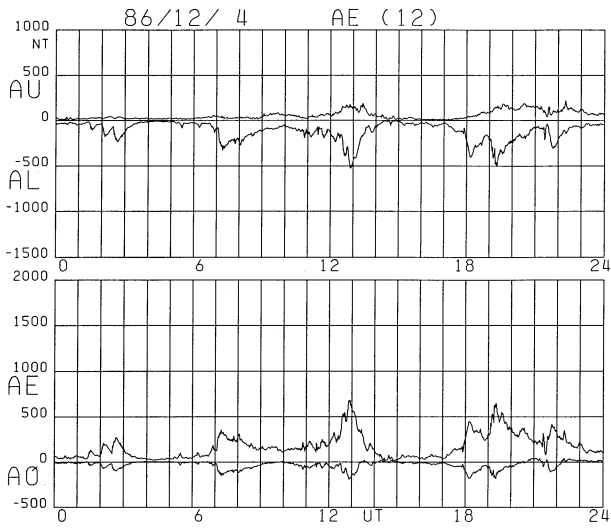


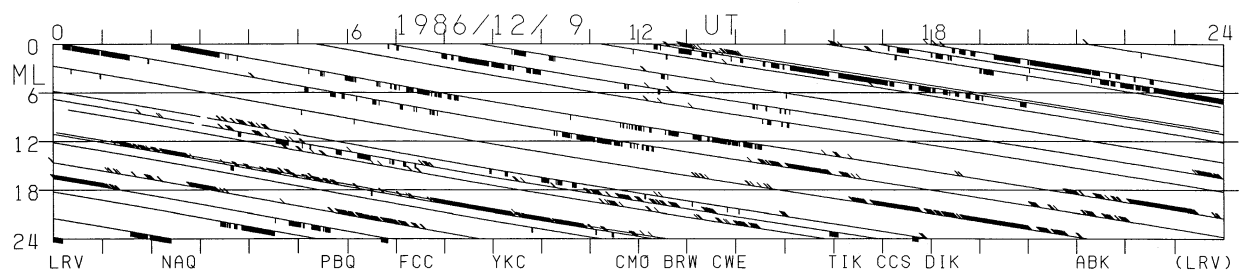
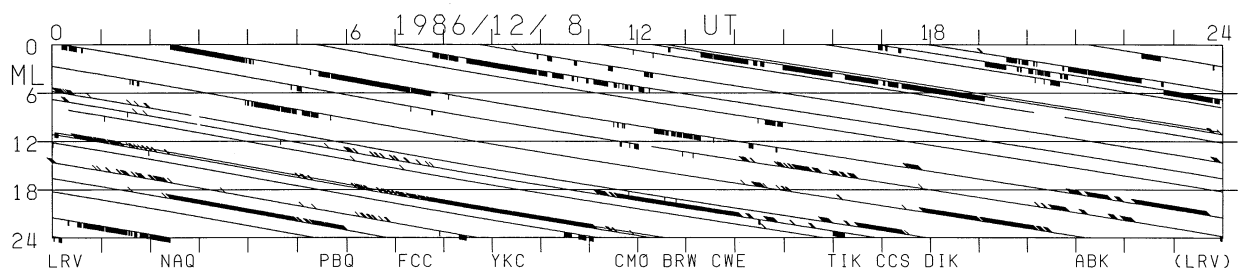
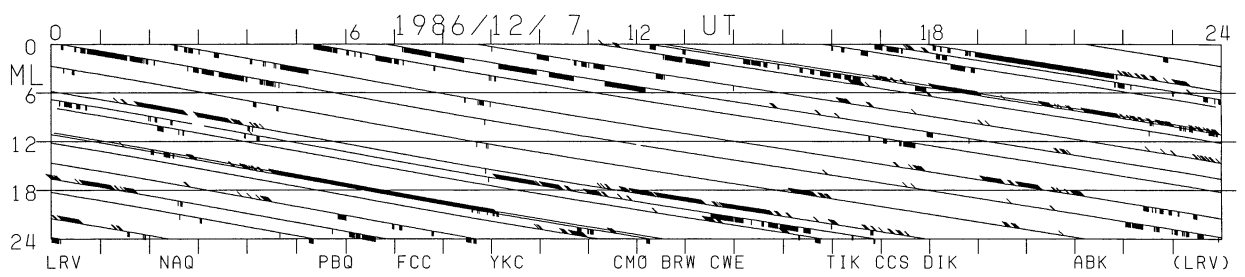
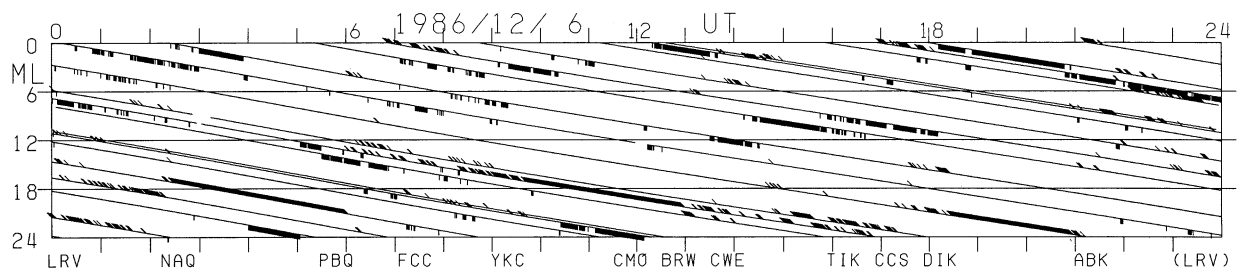
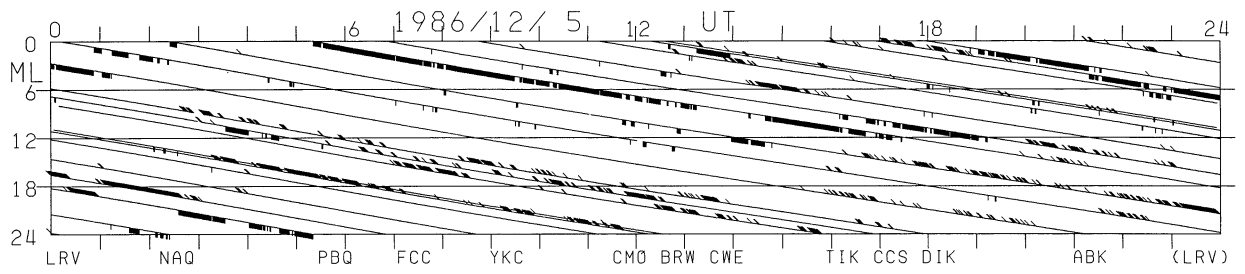
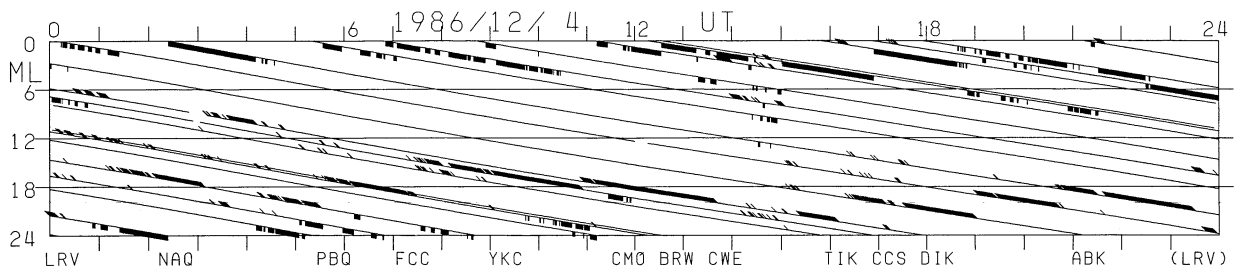


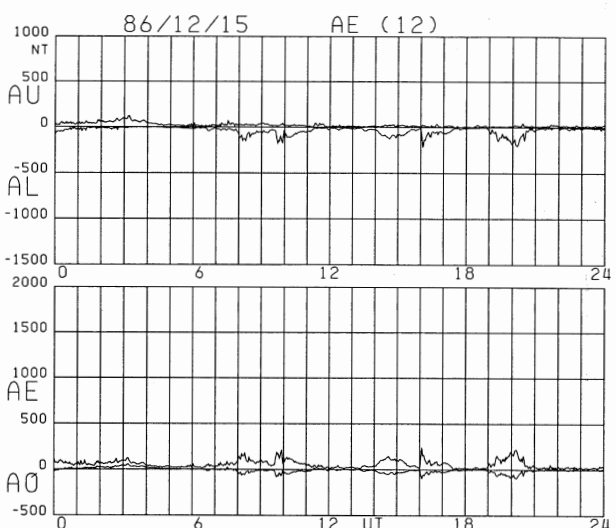
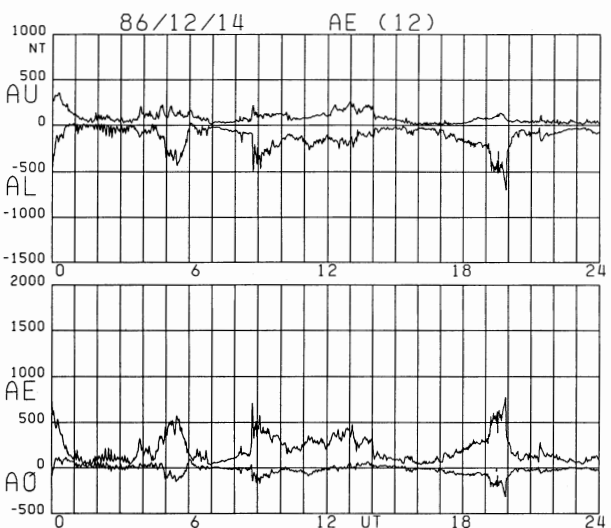
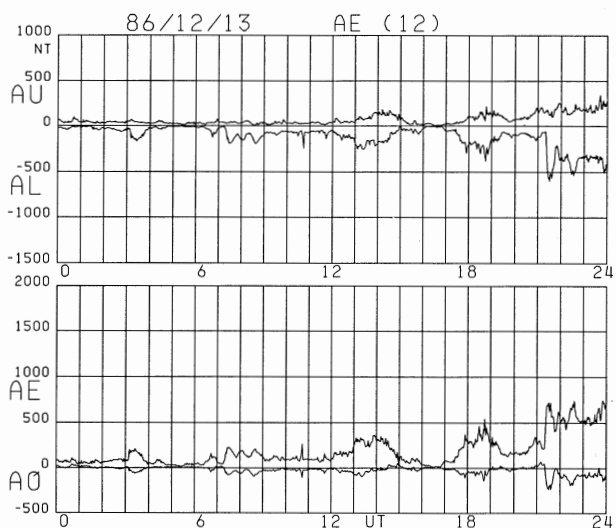
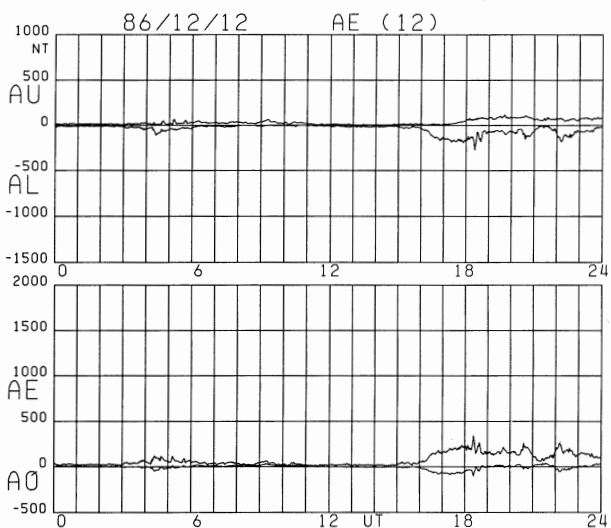
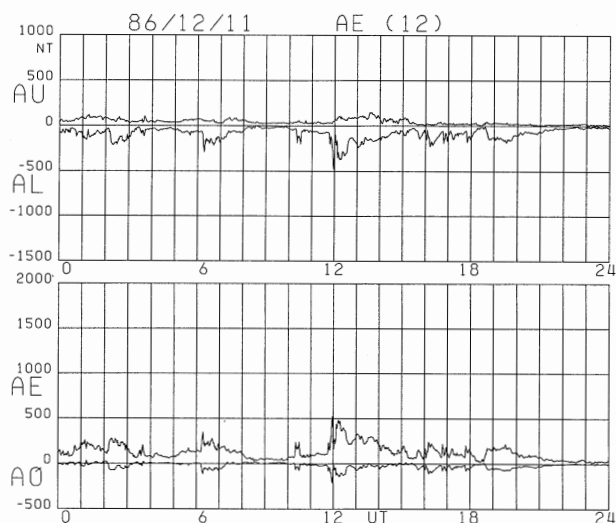
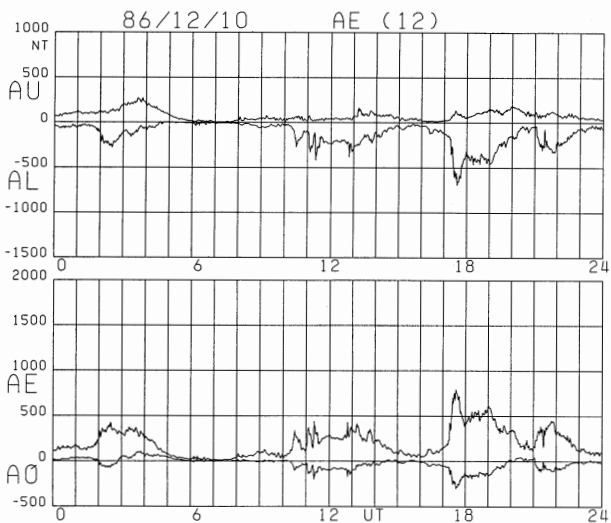


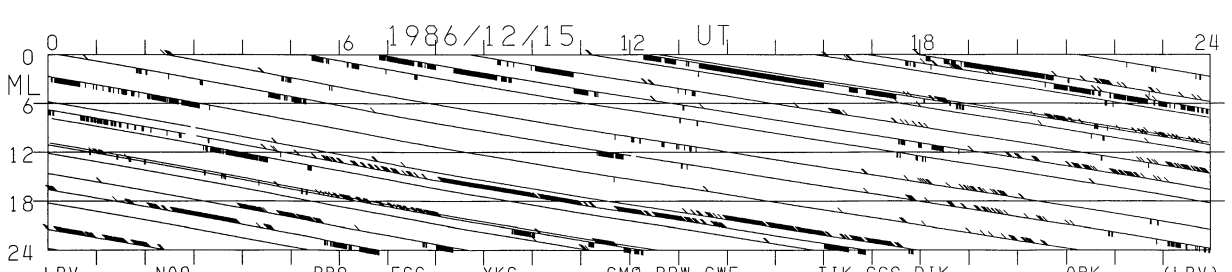
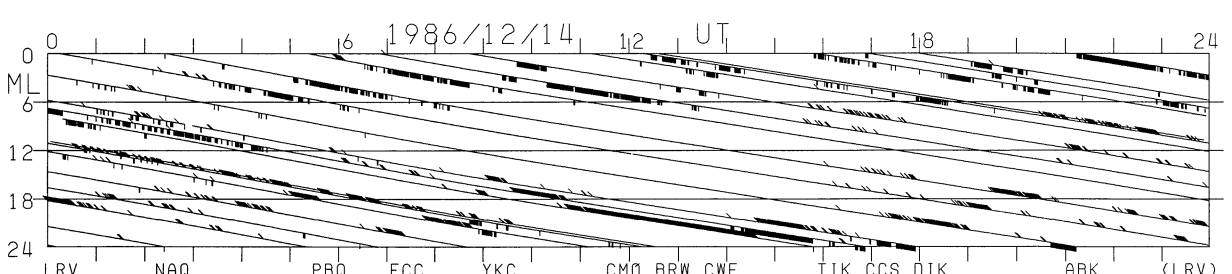
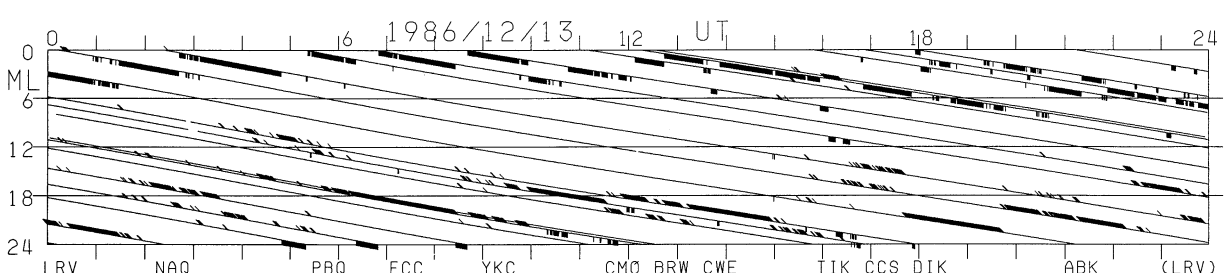
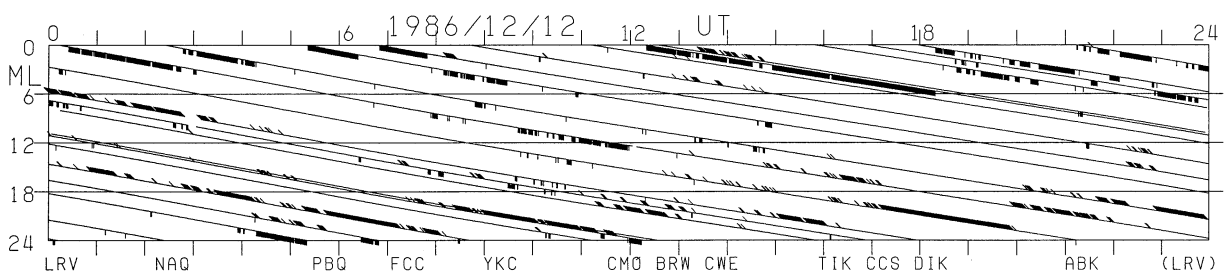
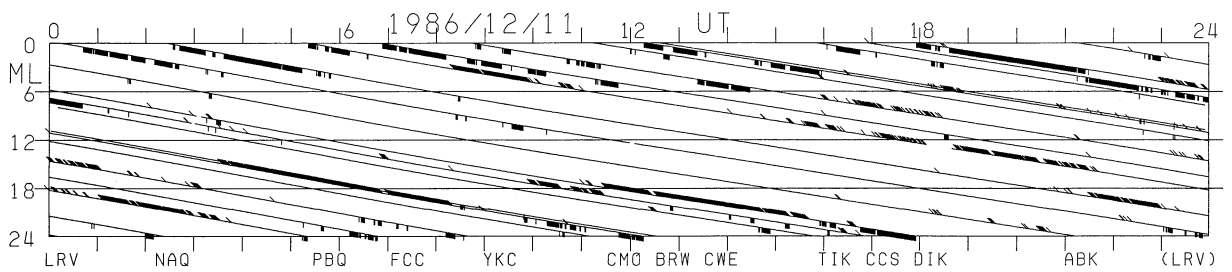
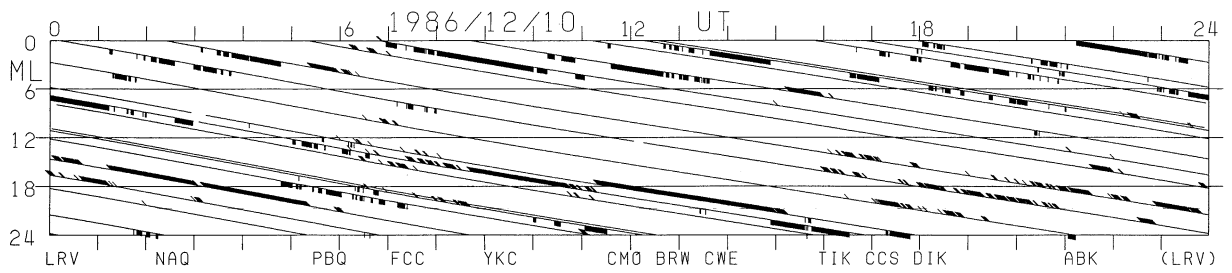


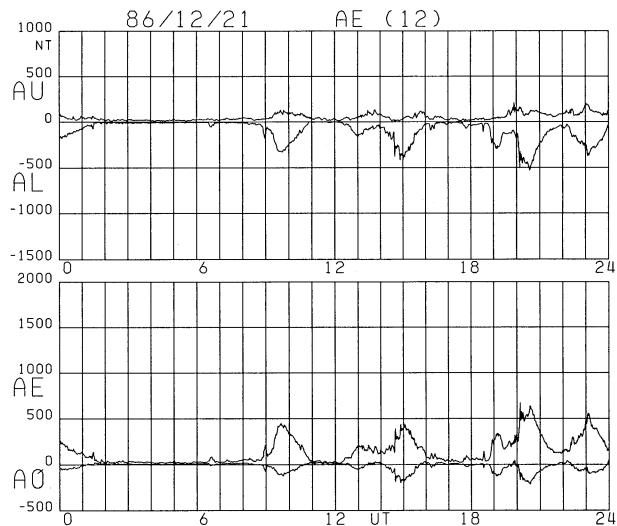
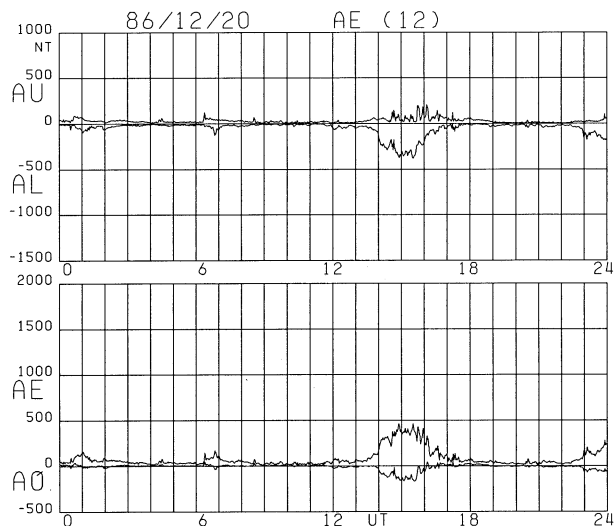
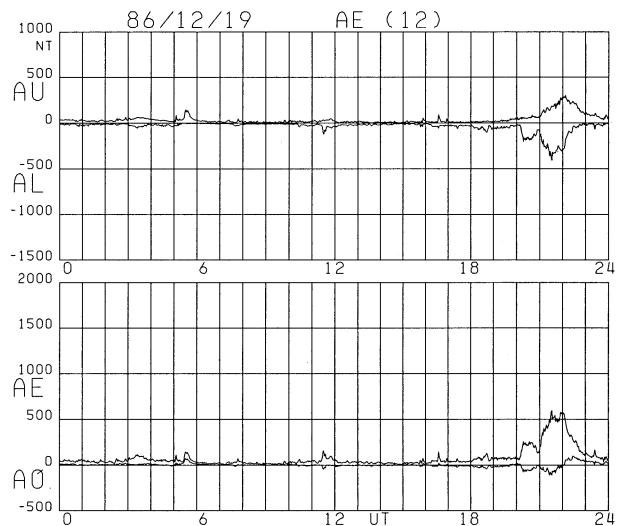
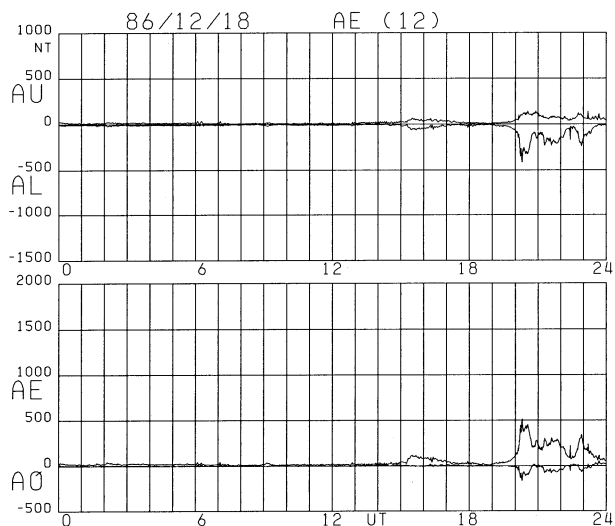
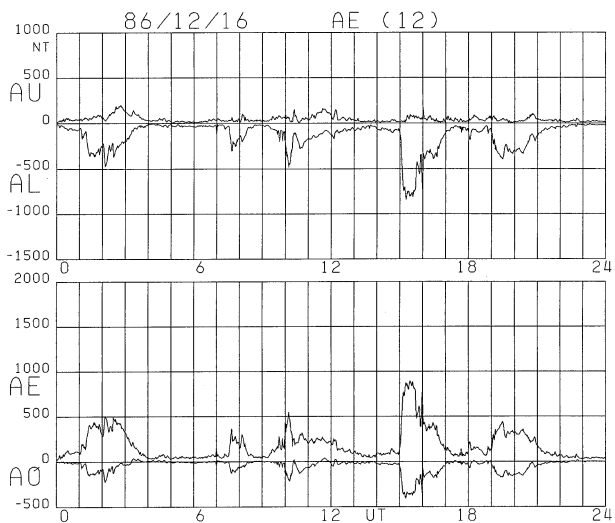




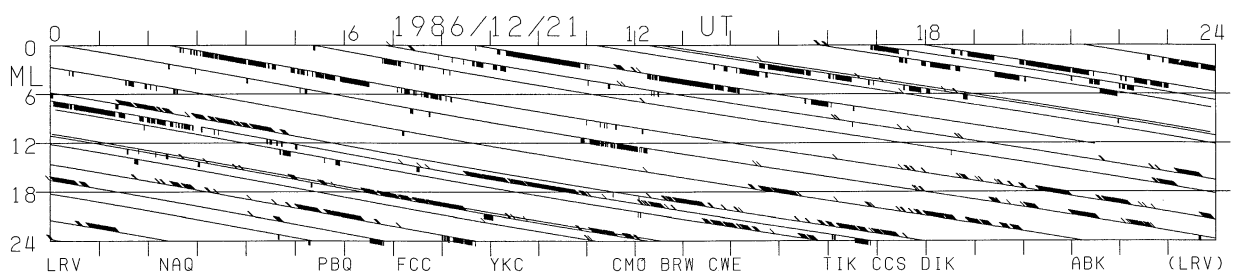
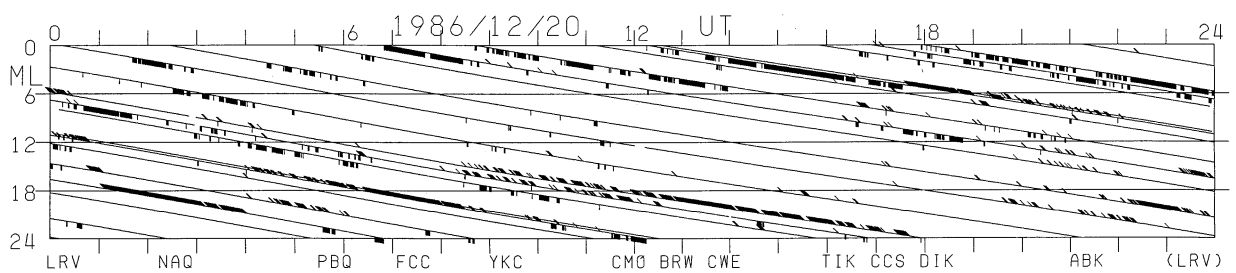
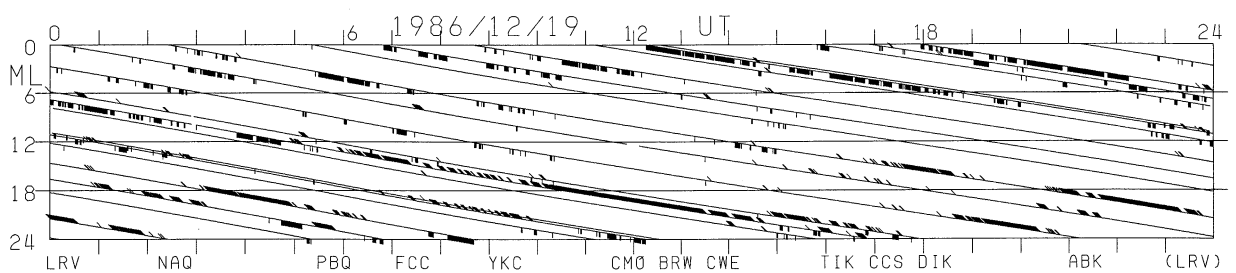
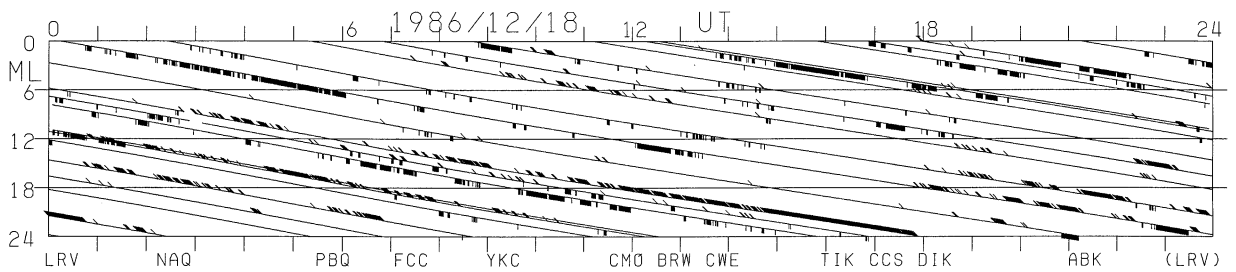
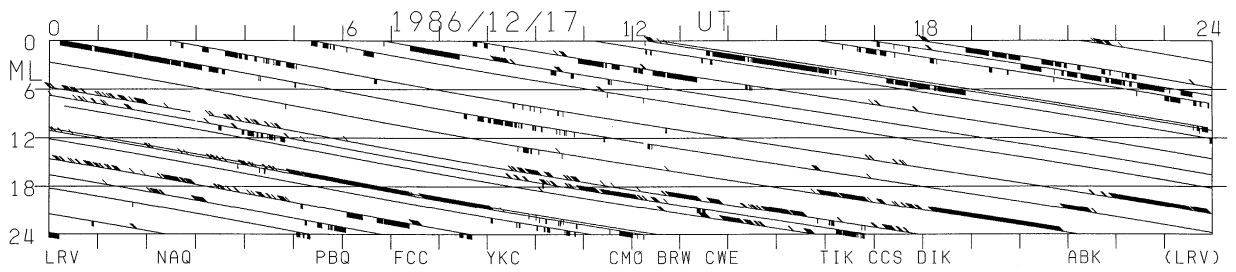
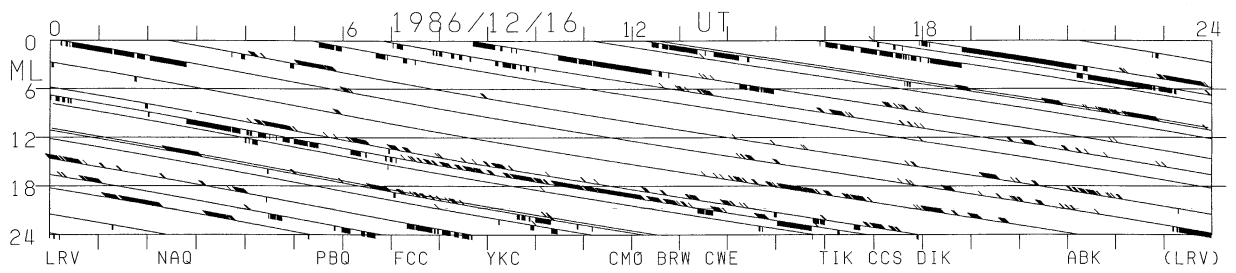


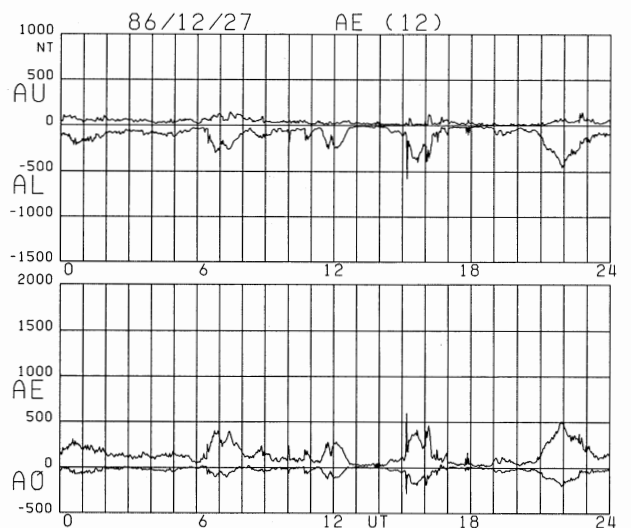
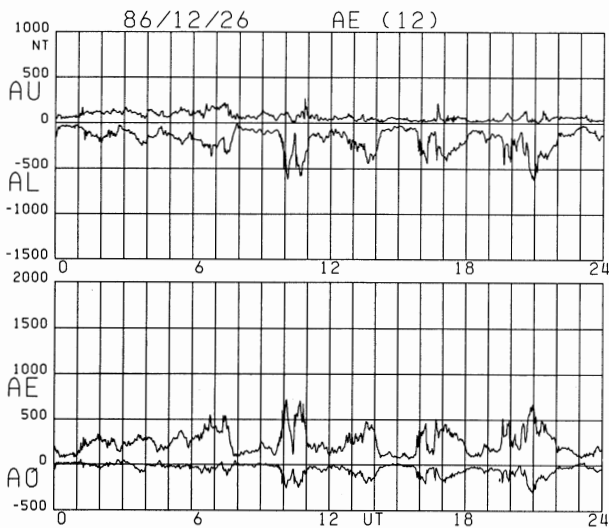
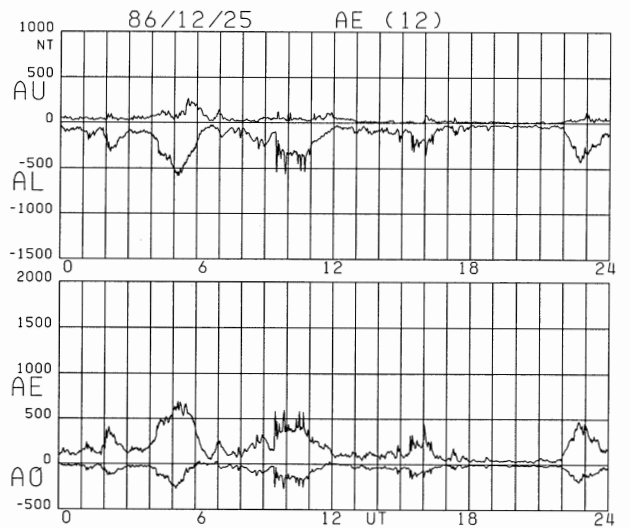
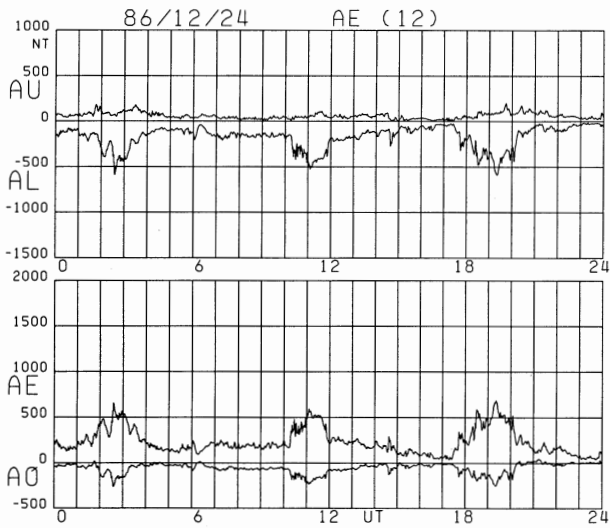
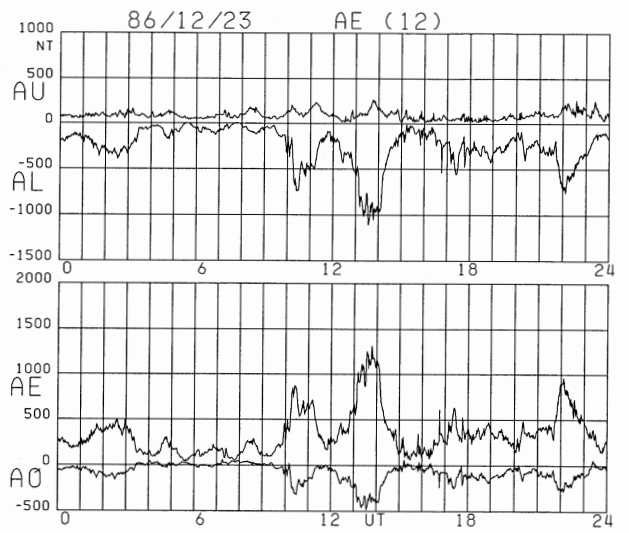
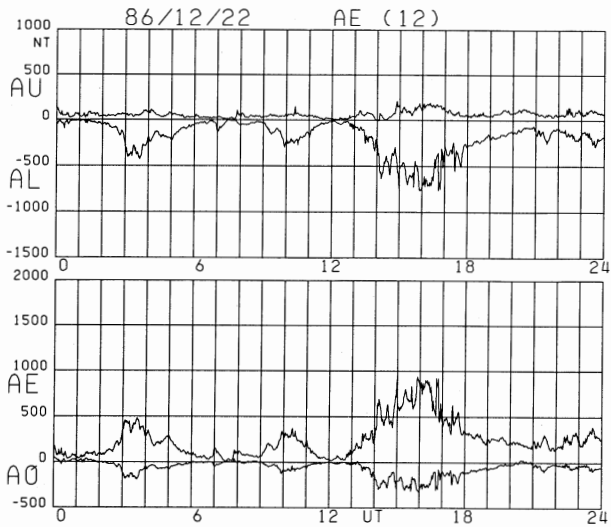


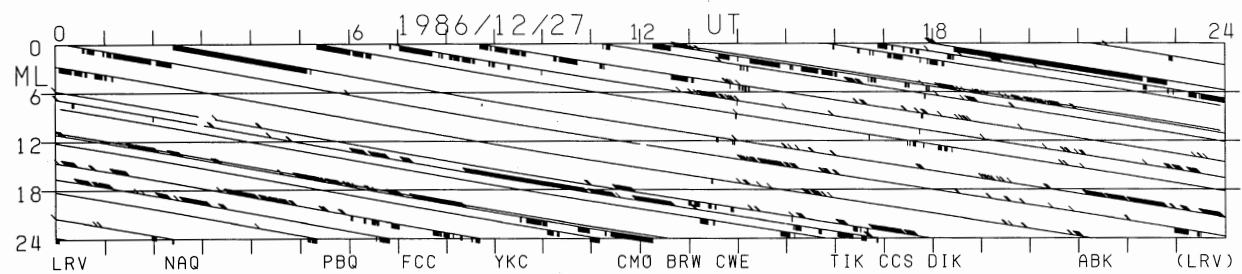
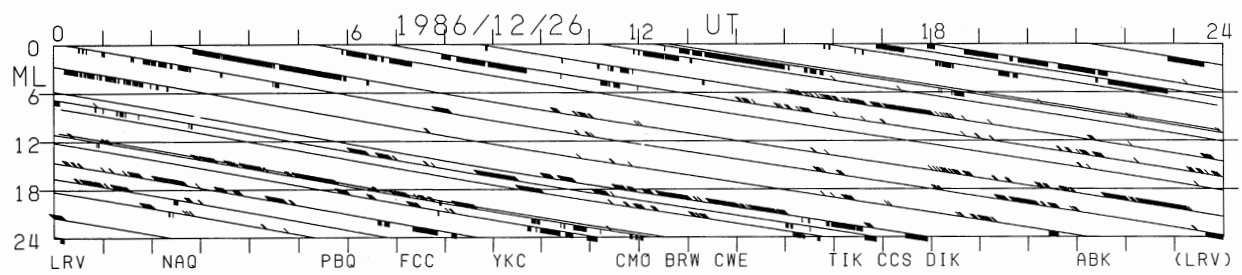
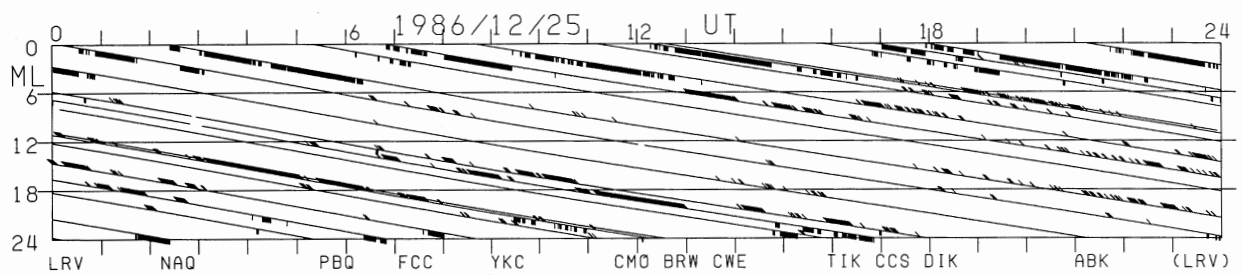
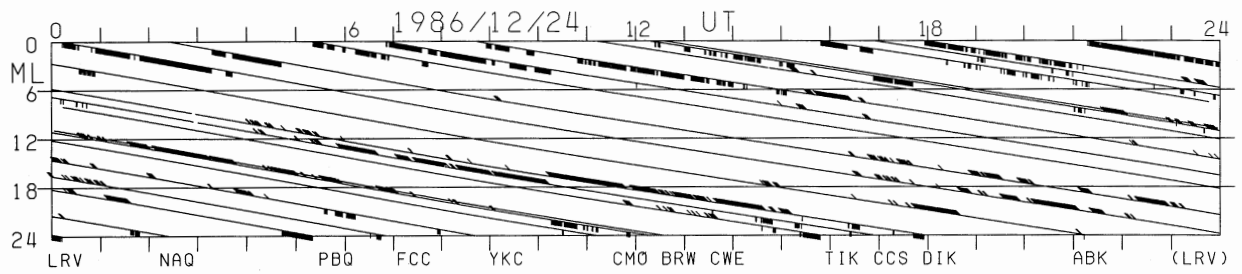
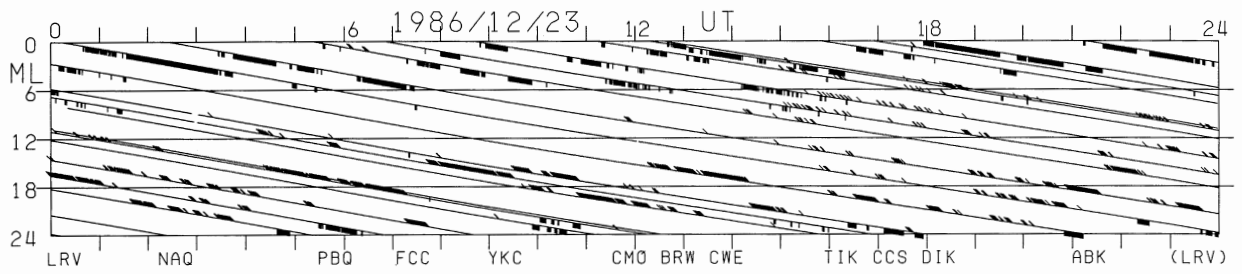
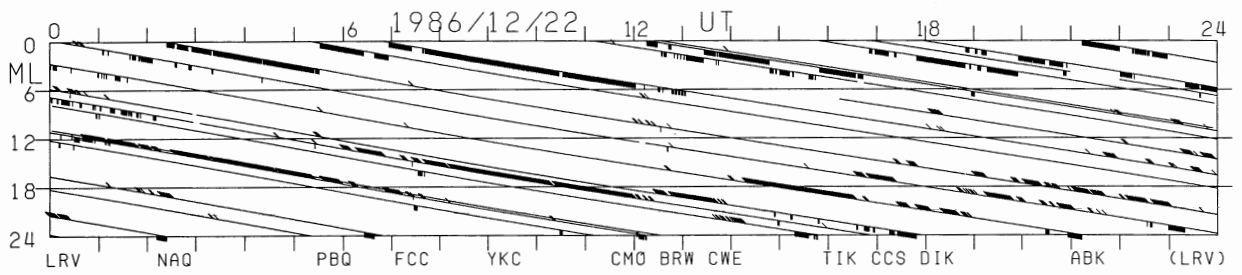


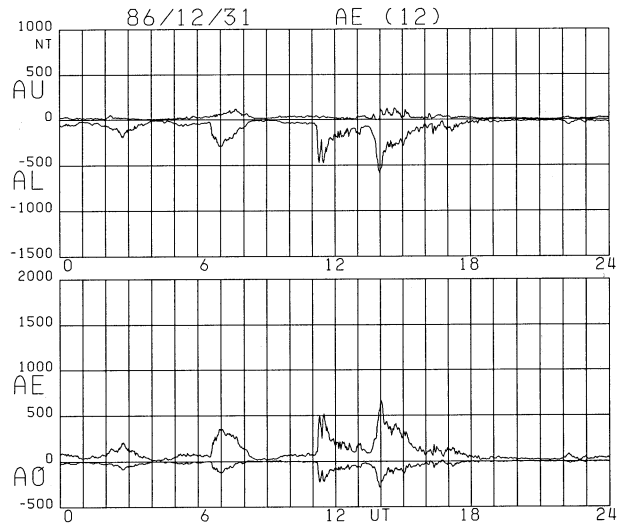
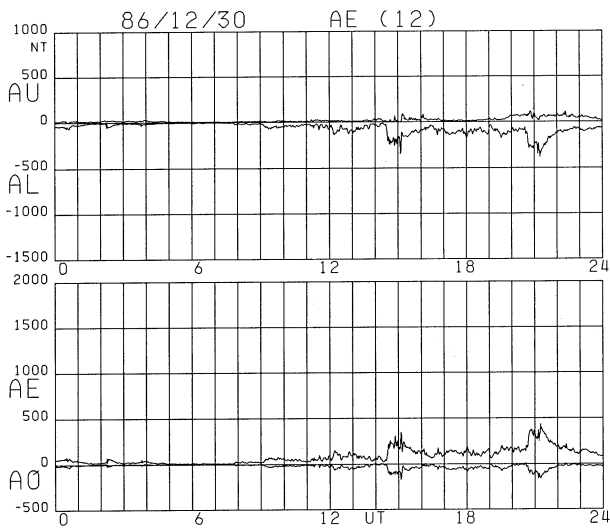
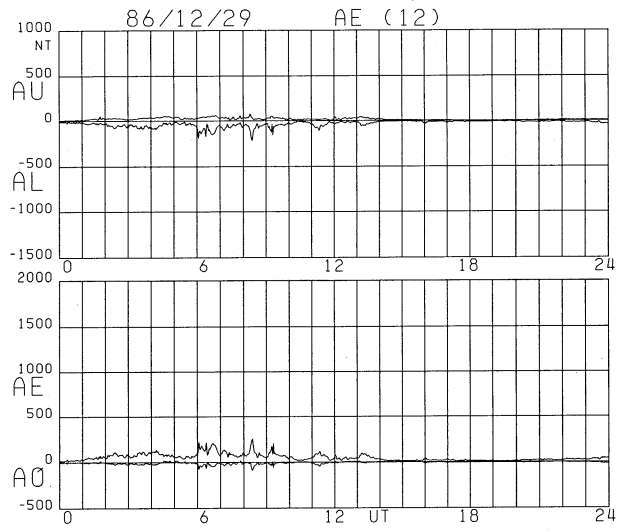
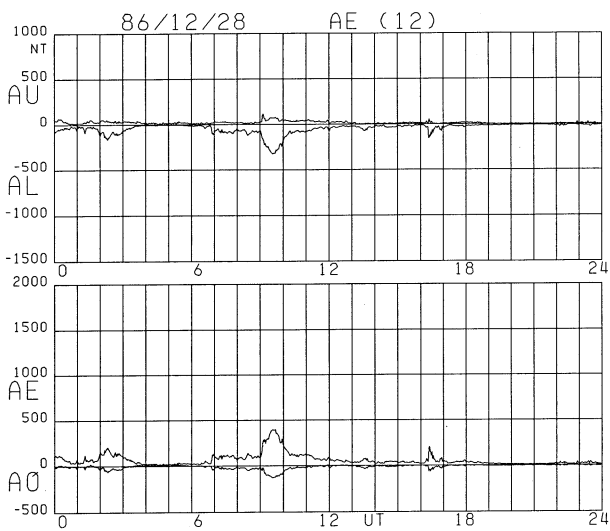


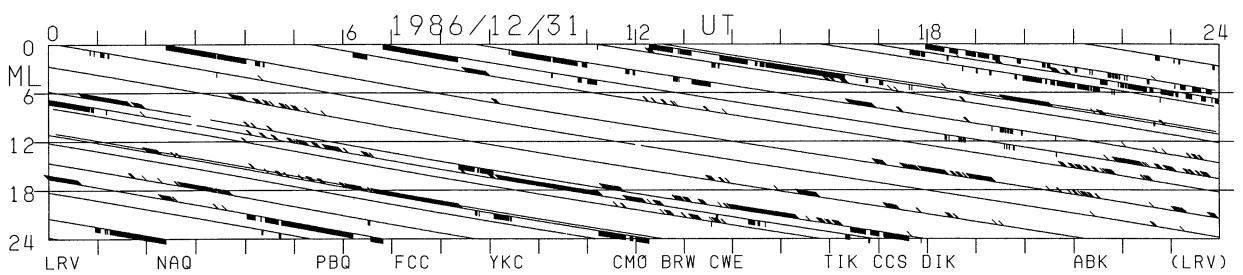
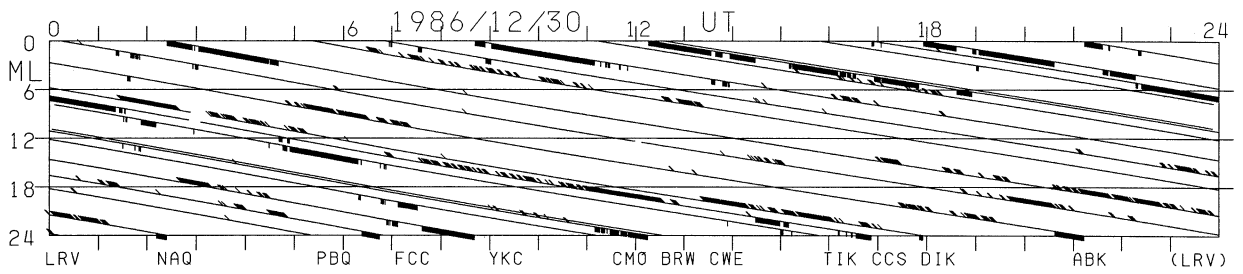
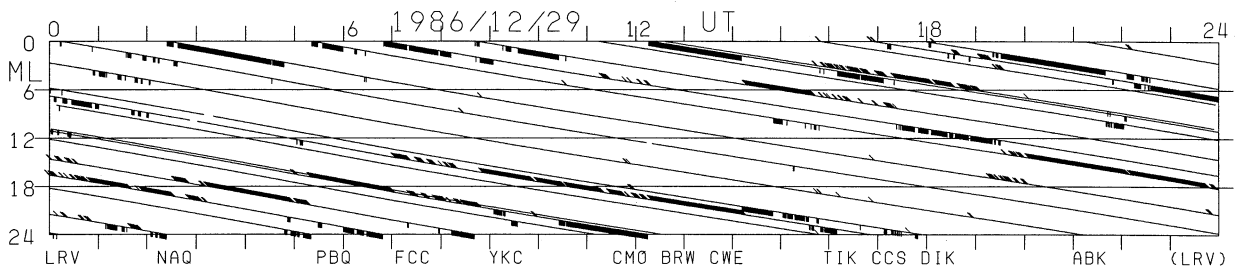
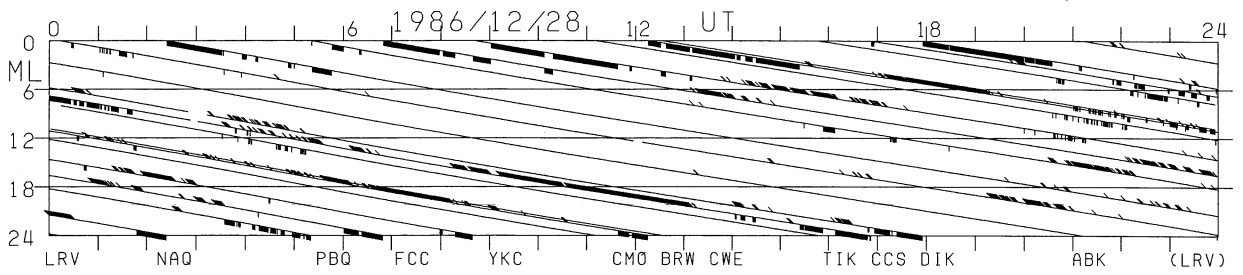












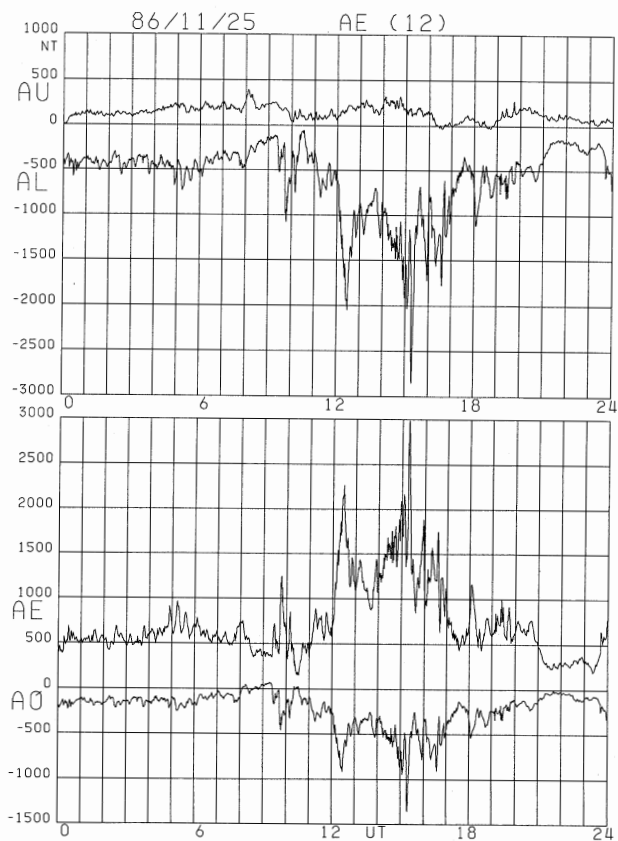
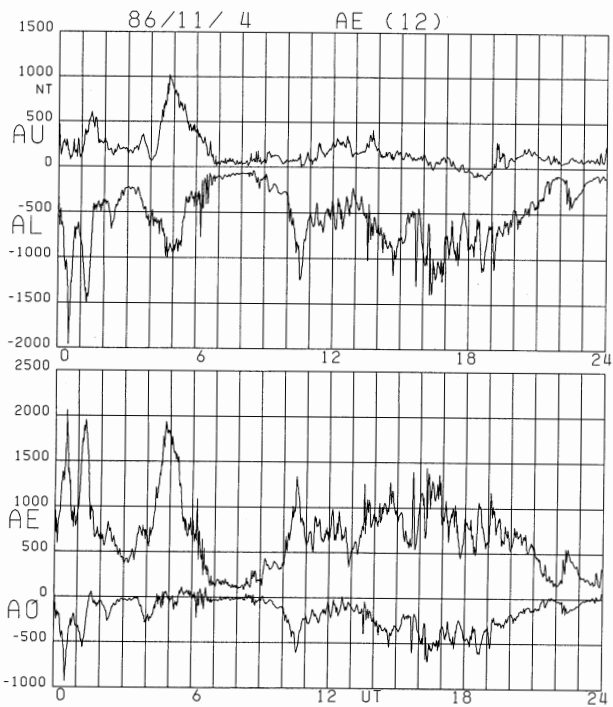
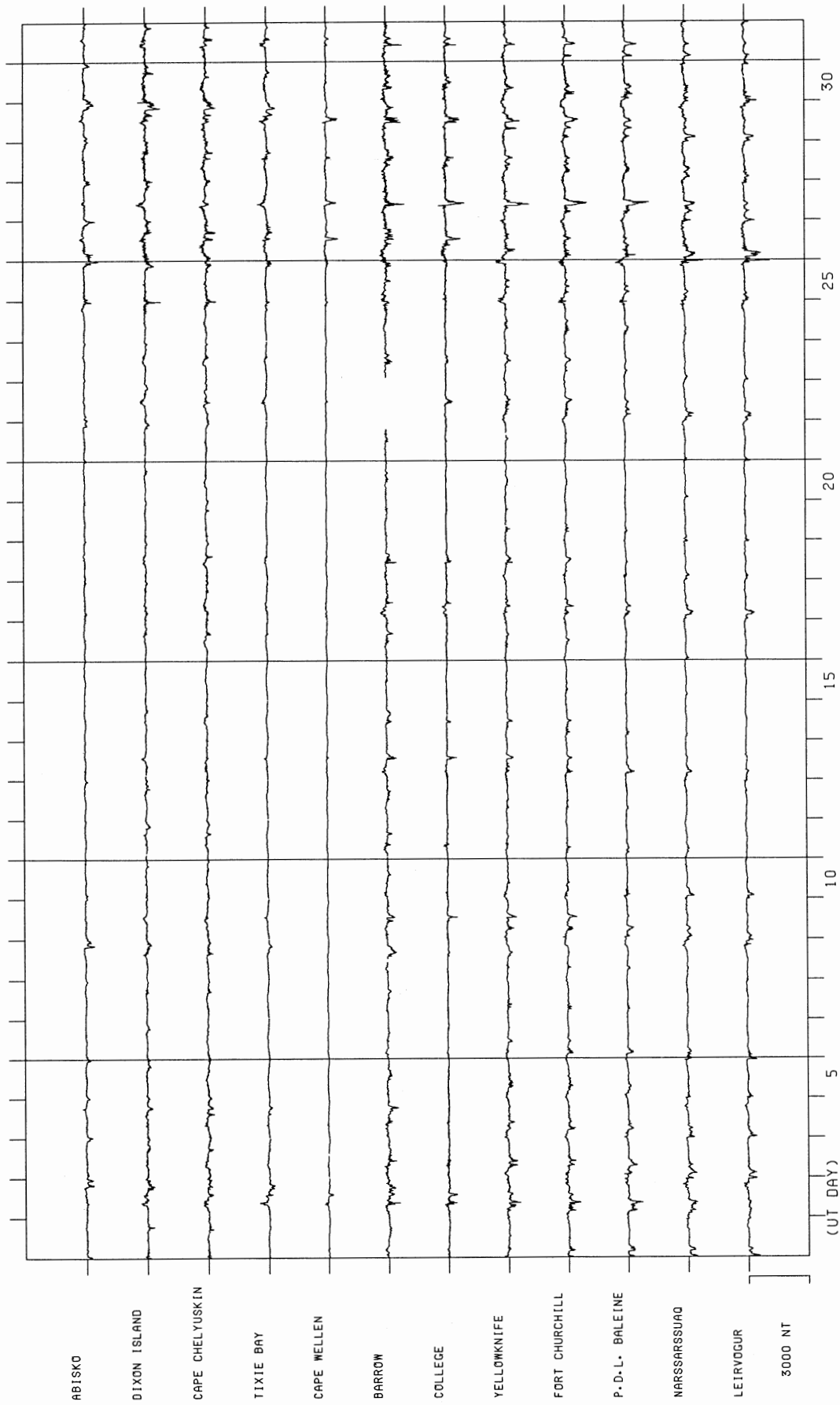


FIGURE 6

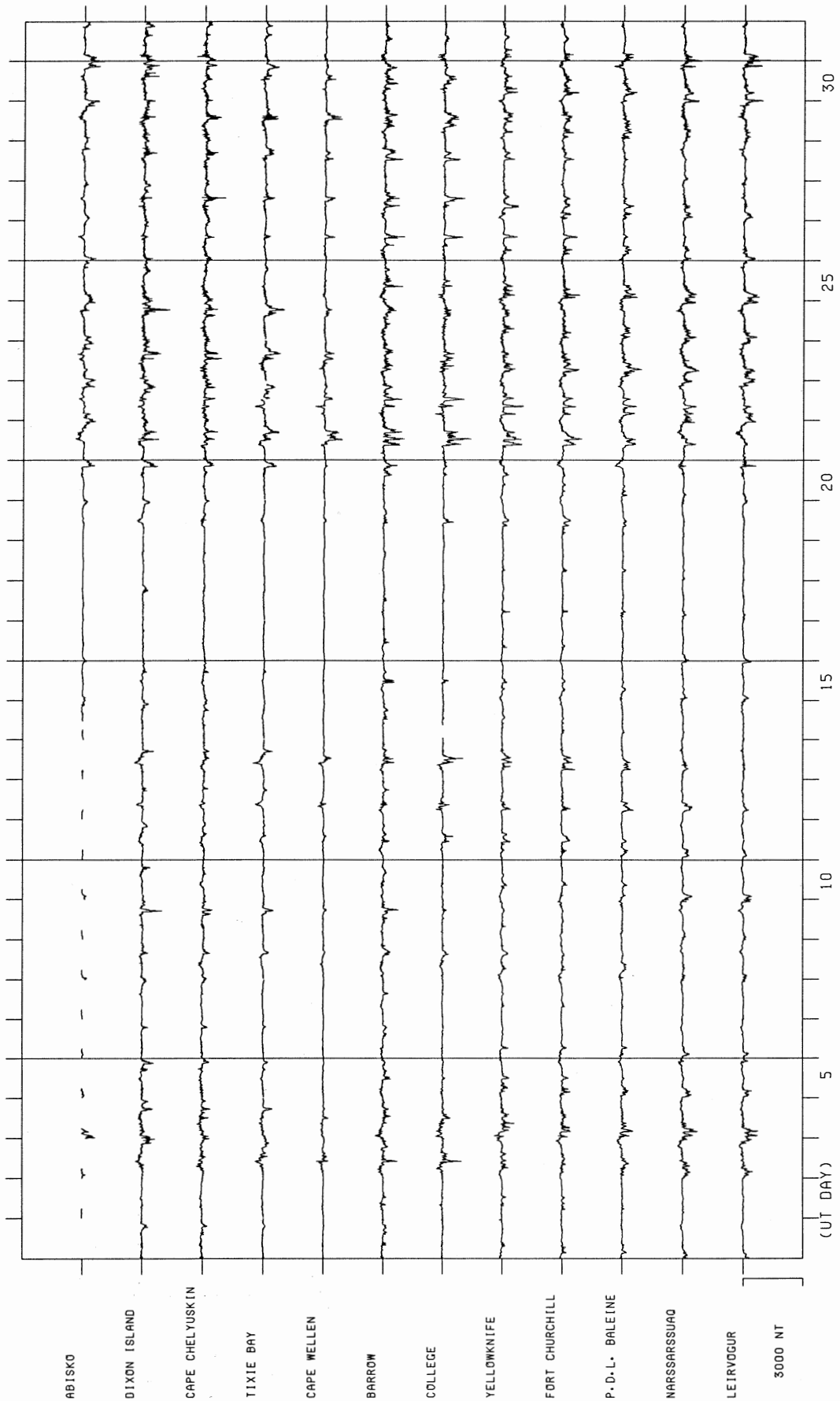
The H traces of magnetograms  
from AE(12) stations  
in each month  
for July-December 1986.



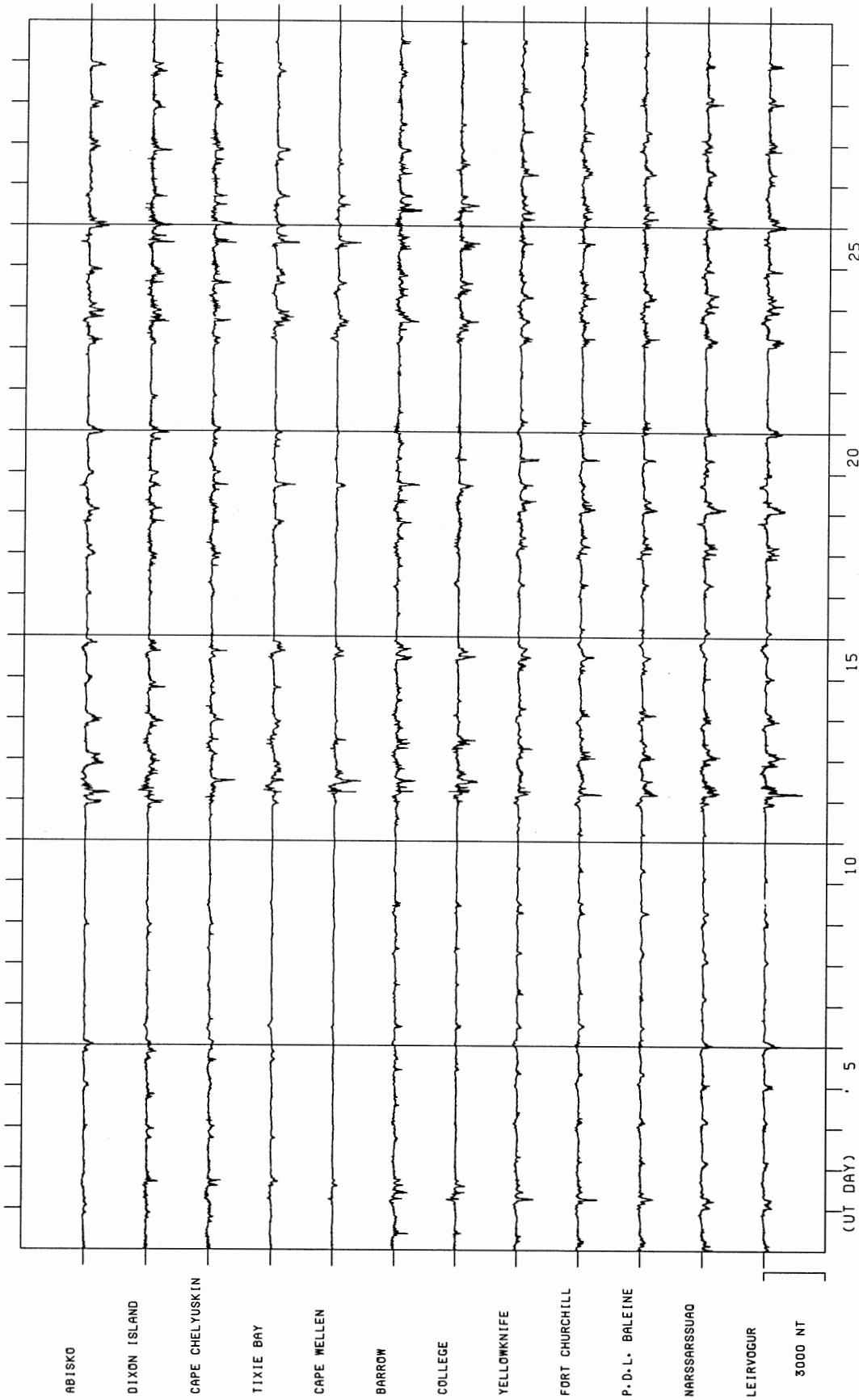




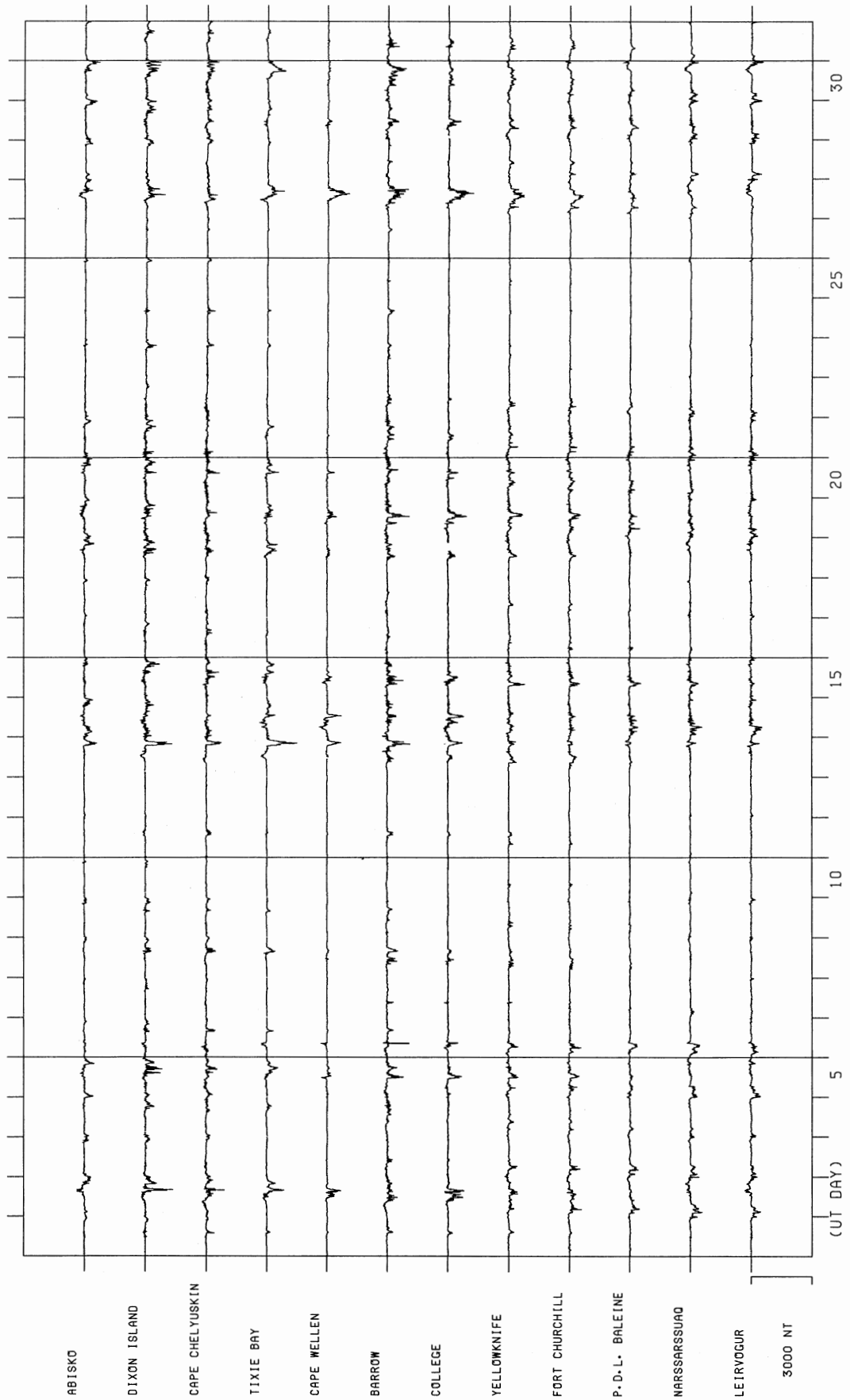
STACKED COMMON SCALE MAGNETOGRAMS FOR JULY 1986



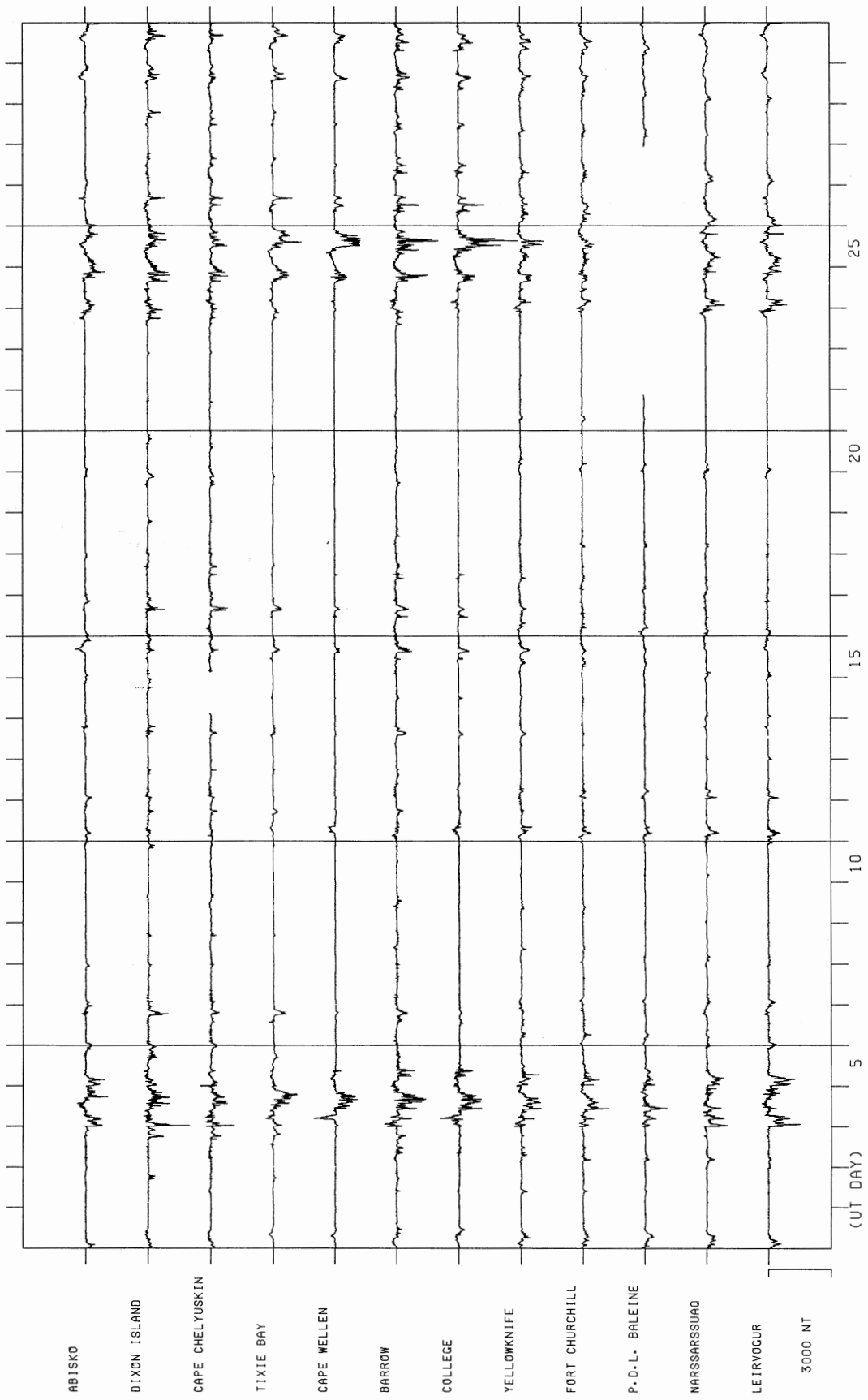
STACKED COMMON SCALE MAGNETOGRAMS FOR AUGUST 1986



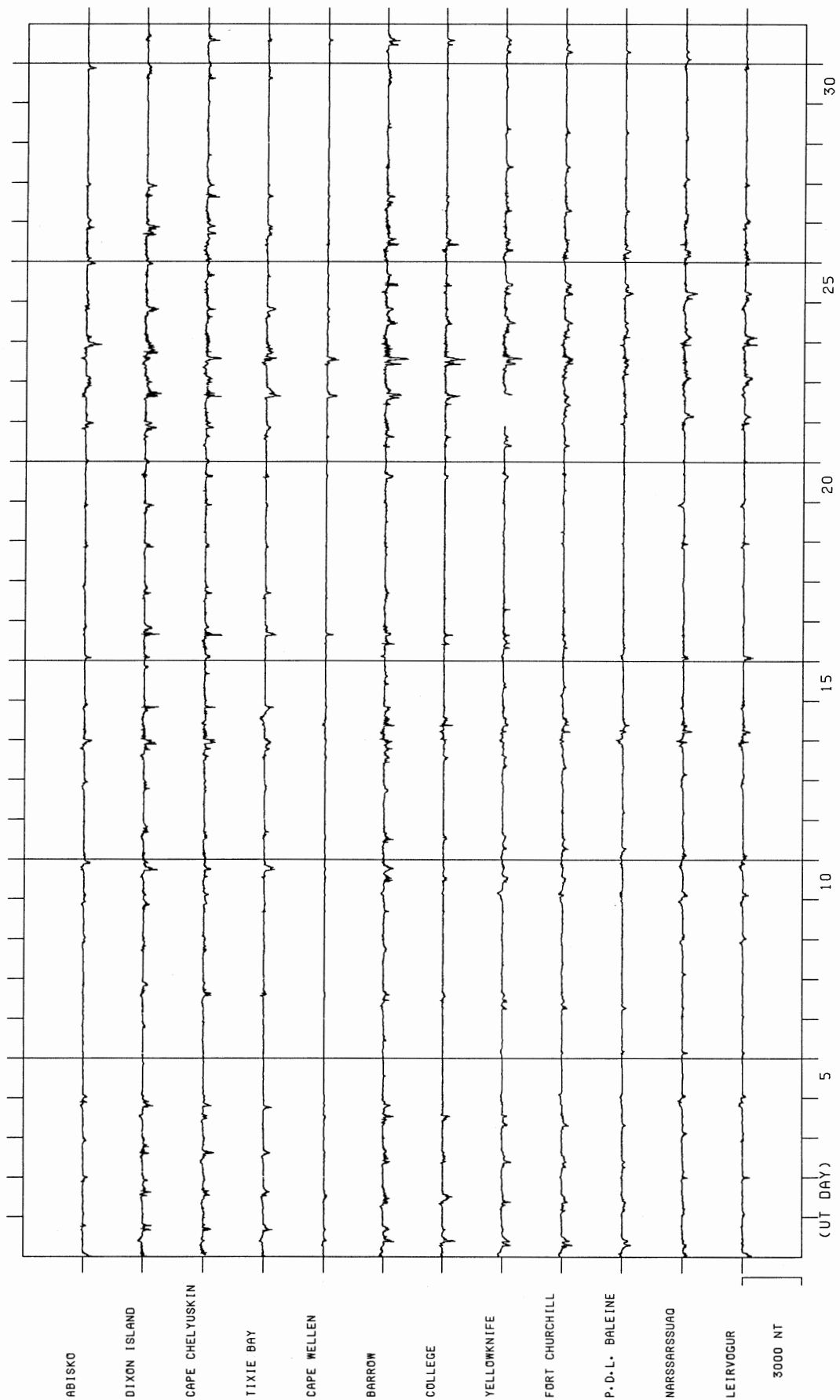
STACKED COMMON SCALE MAGNETOGRAMS FOR SEPTEMBER 1986



STACKED COMMON SCALE MAGNETOGRAMS FOR OCTOBER 1986



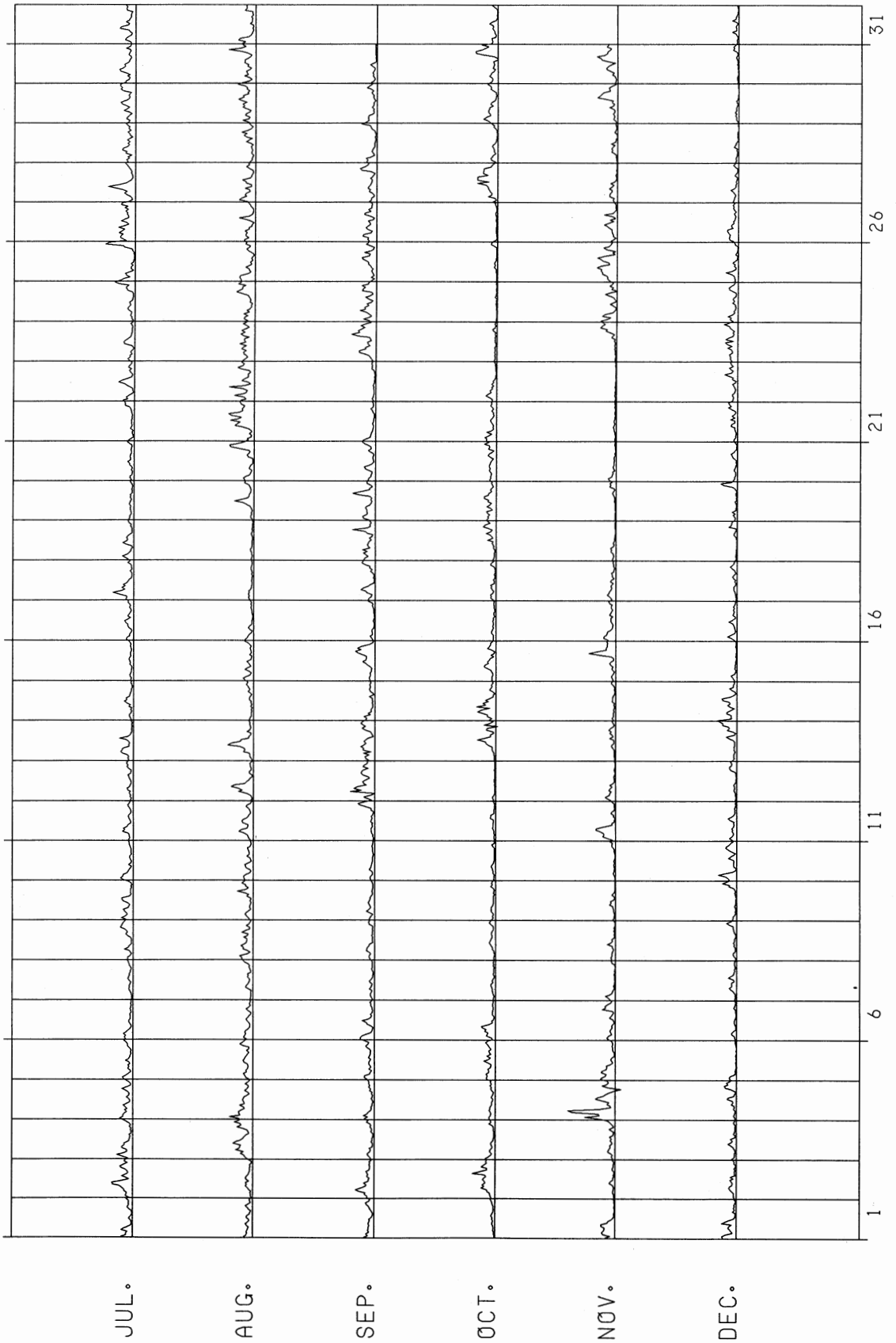
STACKED COMMON SCALE MAGNETOGRAMS FOR NOVEMBER 1986



STACKED COMMON SCALE MAGNETOGRAMS FOR DECEMBER 1986

FIGURE 7

Plots of hourly values of each index  
(AU, AL, AE and AO)  
for July-December 1986.

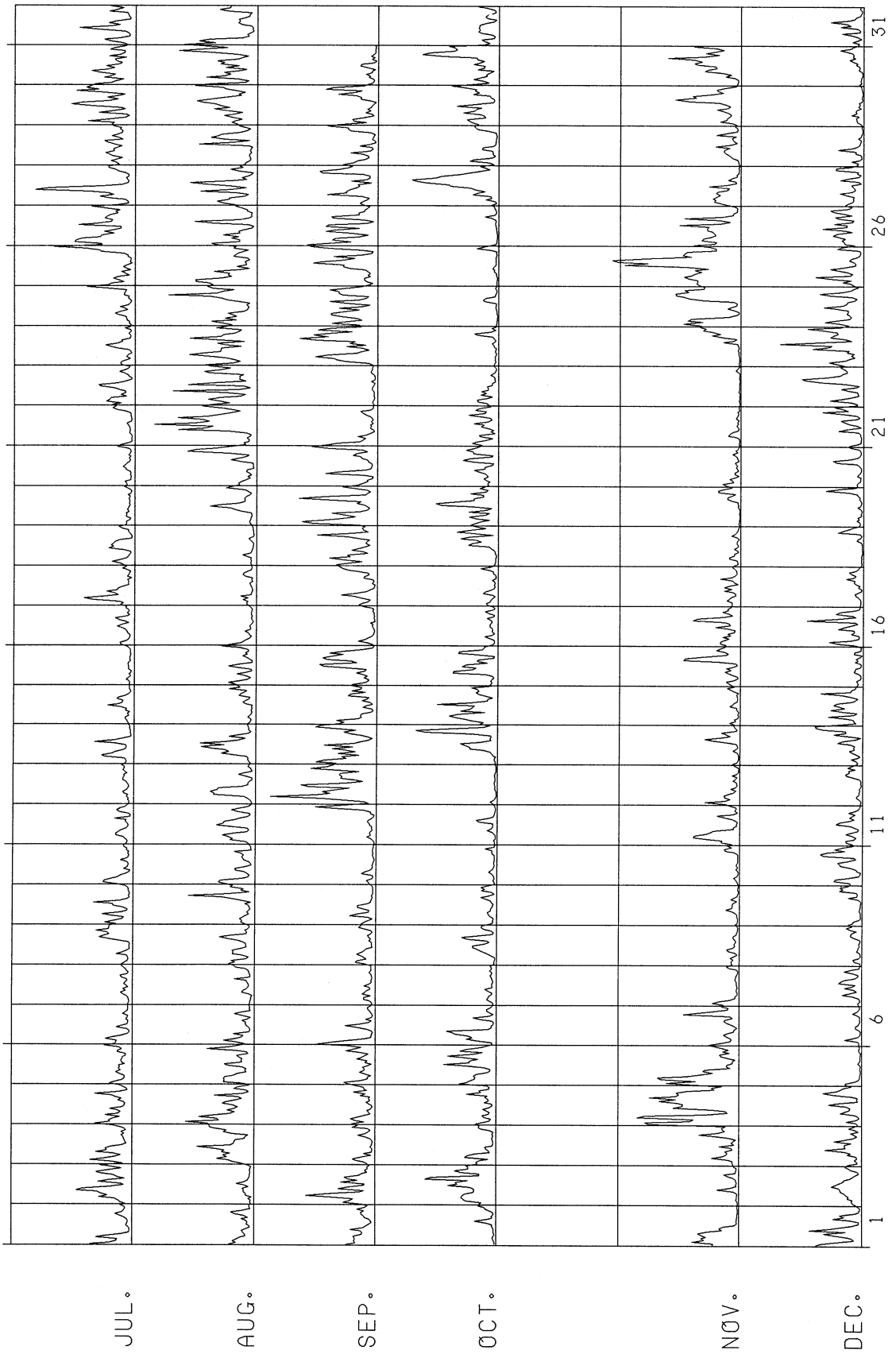


AU HOURLY VALUES FOR THE LAST HALF OF 1986 (1500NT/DIV)

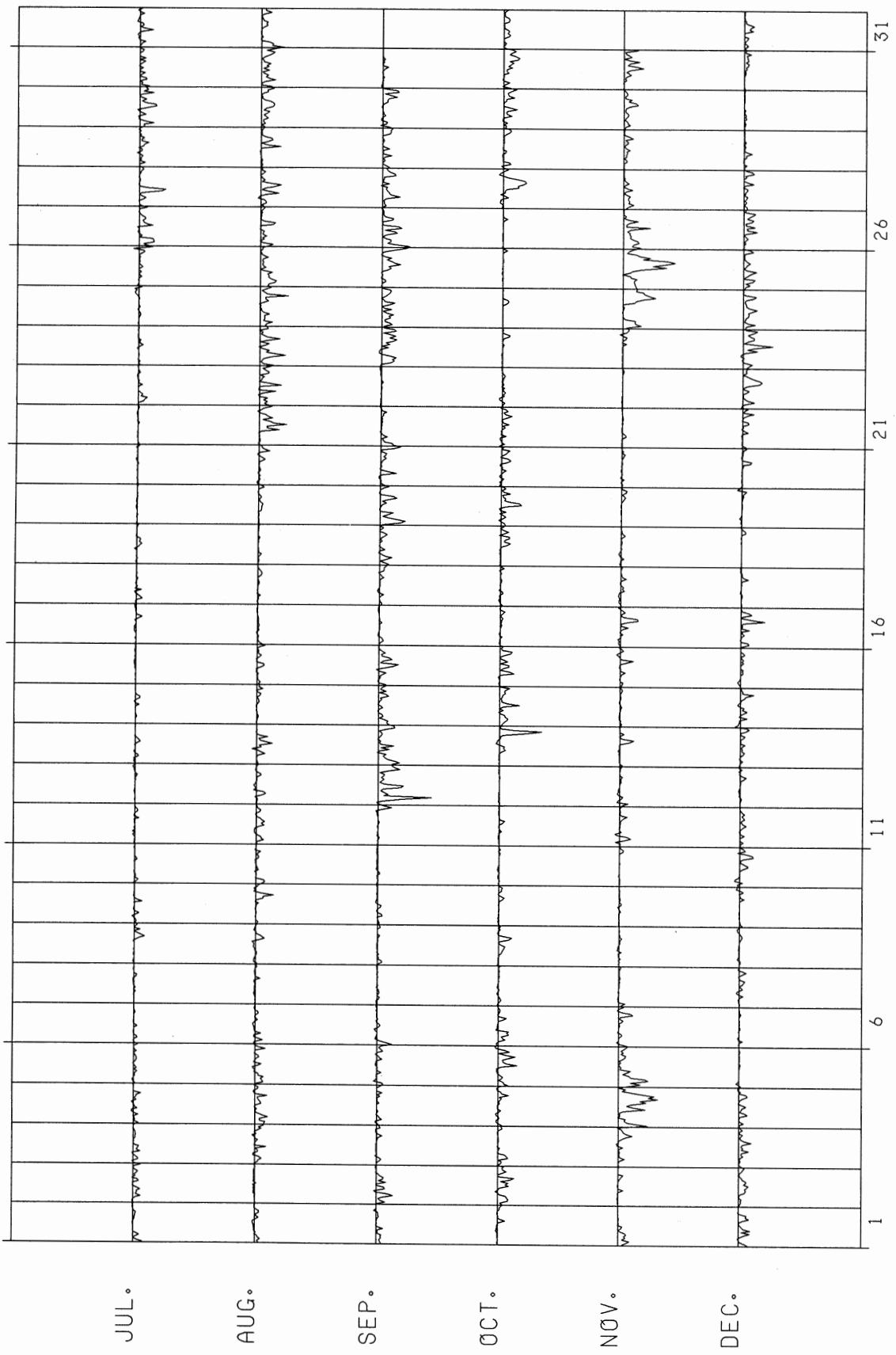




AL HOURLY VALUES FOR THE LAST HALF OF 1986 (15000T/DIV)



AE HOURLY VALUES FOR THE LAST HALF OF 1986 (1500NT/DIV)

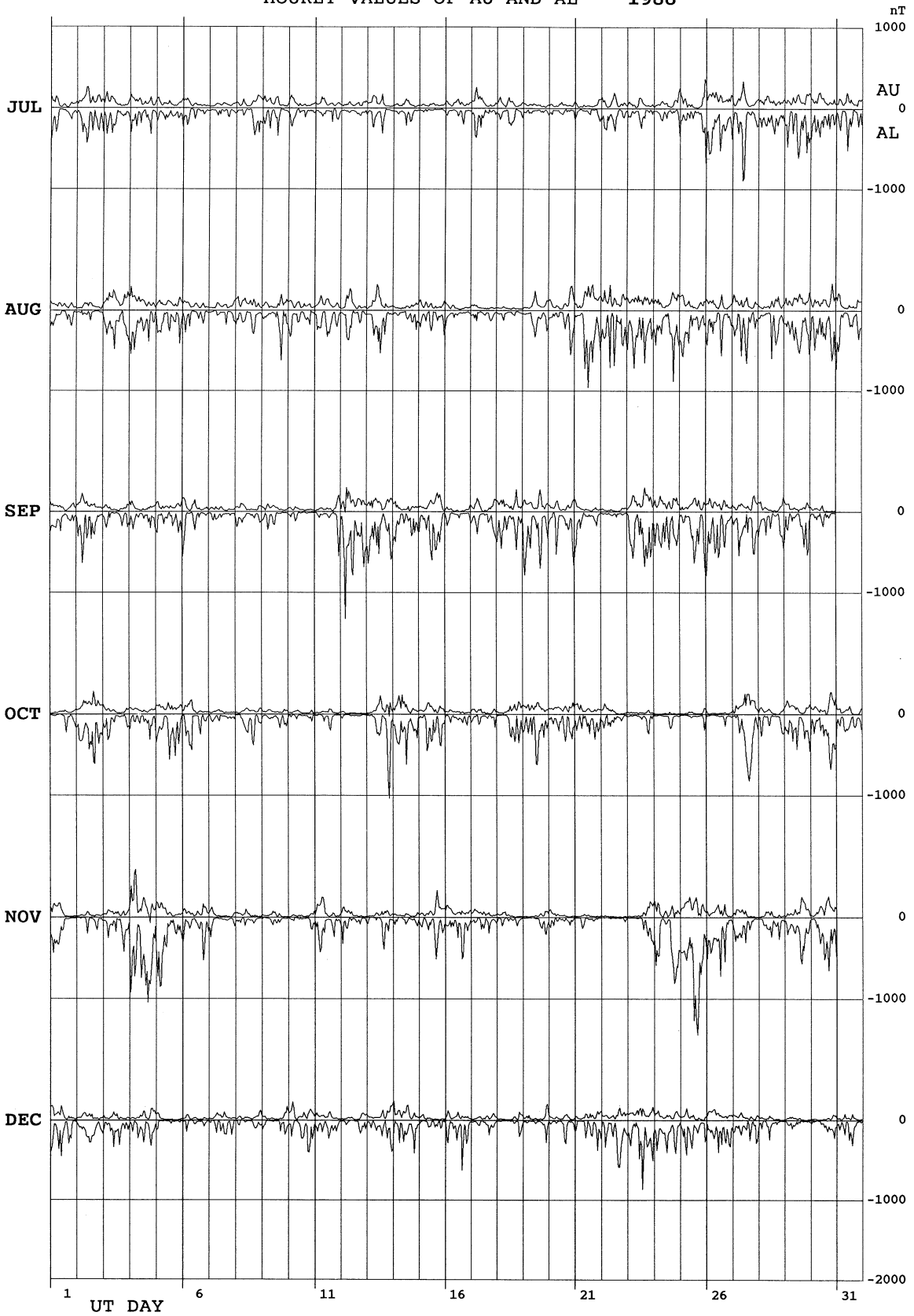


A0 HOURLY VALUES FOR THE LAST HALF OF 1986 (1500NT/DIV)

FIGURE 8

A summary plot of hourly values of  
AU and AL indices  
for July-December 1986.

HOURLY VALUES OF AU AND AL 1986



Publications by the World Data Center C2 for Geomagnetism.

1. Data Catalogue

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

2. Data Books

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

3. Prompt Reports

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

4. Other publications

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

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

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

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

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

