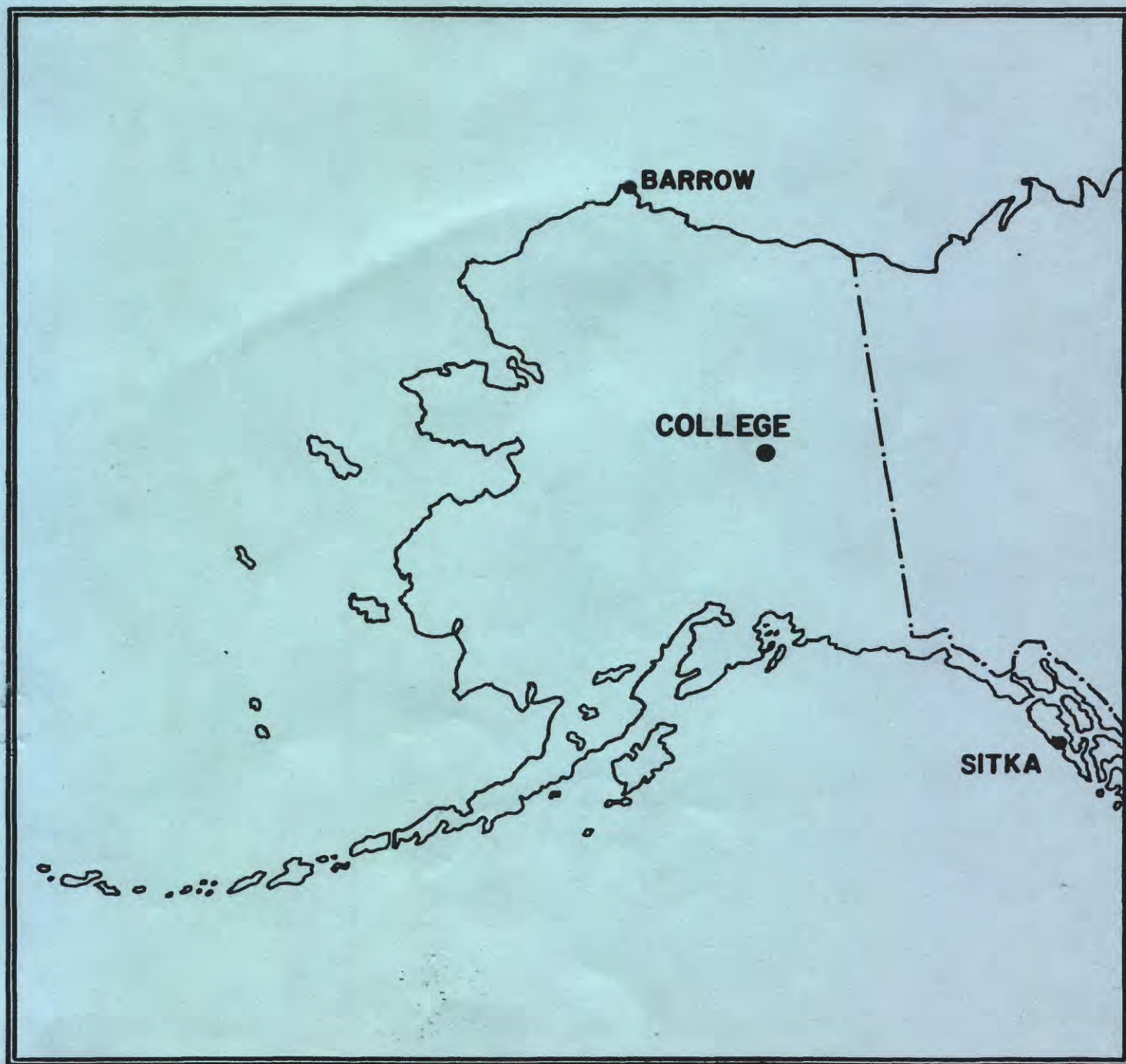


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOMAGNETIC DATA
COLLEGE OBSERVATORY
FAIRBANKS, ALASKA

FEBRUARY 1988

OPEN FILE REPORT 88-0300B



THIS REPORT WAS PREPARED UNDER THE DIRECTION OF JOHN B. TOWNSHEND, CHIEF OF THE COLLEGE OBSERVATORY, WITH THE ASSISTANCE OF THE OBSERVATORY STAFF MEMBERS: R.V. O'CONNELL AND L.Y. TORRENCE AND IN COOPERATION WITH THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA. THE COLLEGE OBSERVATORY IS A PART OF THE BRANCH OF GLOBAL SEISMOLOGY AND GEOMAGNETISM OF THE U.S. GEOLOGICAL SURVEY.

Explanation of Data and Reports

Magnetic Activity Report

Principal Magnetic Storms

Preliminary Calibration Data and Monthly Mean Absolute Values

Magnetogram Hourly Scalings - Five Quietest Days

Sample Format for Normal and Storm Magnetograms

Normal Magnetograms

Storm Magnetograms (When Normal is too disturbed to read)

COLLEGE OBSERVATORY PRELIMINARY GEOMAGNETIC DATA

EXPLANATION OF DATA AND REPORTS

INTRODUCTION

The preliminary geomagnetic data included here is made available to scientific personnel and organizations as part of a cooperative effort and on a data exchange basis because of the early need by some users. To avoid delay, all of the data is copied from original forms processed at the observatory; therefore, it should be regarded as preliminary. Inquiries about this report or about the College Observatory should be addressed to:

Chief, College Observatory
U.S. Geological Survey
800 Yukon Drive
Fairbanks, Alaska 99775-5160

Requests for copies of the magnetograms except for the current month should be addressed to:

World Data Center A
NOAA D63m 325 Broadway
Boulder, Colorado 80303

OBSERVATORY LOCATION

The College Observatory, operated by the U.S. Geological Survey, is located at the University of Alaska, Fairbanks, Alaska. It is near the Auroral Zone and the northern limit of the world's greatest earthquake belt, the Circum-Pacific Seismic Belt. Although the observatory's basic operation is in geomagnetism and seismology, it cooperates with other scientists and organizations in areas where the facility and personnel can be of service.

The observatory is one of three operated by the USGS in Alaska. The others are located at Barrow and Sitka.

The position of the observatory site is:
Geographic latitude..... $64^{\circ} 51.6'N$
Geographic longitude..... $147^{\circ} 50.2'W$
Geomagnetic latitude..... $+64.6^{\circ}$
Geomagnetic longitude..... $+256.5^{\circ}$
Elevation.....200 meters

GEOMAGNETIC DATA

Normal and storm magnetograms and appropriate calibration data are processed at the observatory and are available for analysis or copying. Also available are mean hourly scalings for the five quietest days for the month and K-Indices.

Magnetic Activity

The K-Index: The K-Index is a logarithmic measurement of the range of the most disturbed component (D or H) of the geomagnetic field for eight intervals 0000-0300, 0300-0600...2100-2400 UT. It is a measure of the difference between the highest and lowest deviation from a smooth curve to be expected for a component on a magnetically quiet day, within a three hour interval.

The Equivalent Daily Amplitude, AK: The K-Index is converted into an equivalent range, ak, which is near the center of the limiting gamma ranges for a given K. The average of the eight values is called equivalent daily amplitude AK. The unit 10γ has been chosen so as not to give the illusion of an accuracy not justified.

The schedule for converting gamma range to K, and K to ak is as follows:

Gamma Range	K - Index	ak
0< 25	0	0
25< 50	1	3
50< 100	2	7
100< 200	3	15
200< 350	4	27
350< 600	5	48
600< 1000	6	80
1000< 1650	7	140
1650< 2500	8	240
2500+	9	400 (10γ)

Principal Magnetic Storms

Gradual and sudden commencement magnetic disturbances with at least one K-Index of 5 or greater, which are believed to be part of a world-wide disturbance, are classified as principal magnetic storms. The time of the storm beginning and ending; direction and amplitude of sudden commencements; period of maximum activity; and storm range are reported. Monthly reports of these data are forwarded to the World Data Center A in Boulder, Colorado.

Magnetogram Hourly Scalings

Magnetogram hourly scalings are averaged for successive periods of one hour for the D, H, and Z elements. The Value in the column headed "01" is the average for the hour beginning 0000 and ending 0100. Note that the values on the scaling sheet are in tenths of mm with the decimal point omitted. The user of these scalings should keep in mind that the tabular values are hourly means and if one is interested in the detailed morphology of the magnetic field, refer directly to the magnetograms.

Magnetograms

The normal magnetograms in this report are reproduced at about one-third the size of the originals. Preliminary base-line values and scale values adopted for use with the original magnetograms are included. For days when the magnetic field is too disturbed for the Normal magnetogram to be readable, Storm magnetograms are reproduced.

Absolutes, Base-lines and Scale Values

To determine the absolute value of the magnetic field from the hourly means or from point scalings the following equations should be used:

$$D=B_D+d \cdot S_D; H=B_H+h \cdot S_H; Z=B_Z+z \cdot S_Z$$

where D, H and Z are absolute values;

B_D , B_H and B_Z are base-line values;

S_D , S_H and S_Z are scale values;

and d, h and z are scalings in millimeters.

NOAA FORM 76-133 (9-72) U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION										OBSERVATORY			
MAGNETIC ACTIVITY (Greenwich civil time, counted from midnight to midnight)										College Alaska MONTH AND YEAR February 1988			
DATE	K-INDICES								SUM	AK	TIME SCALE ON MAGNETOGRAMS		
	00-03	03-06	06-09	09-12	12-15	15-18	18-21	21-24			20 mm/hr		
1	0	0	0	0	0	0	1	0	01	00	SUDDEN COMMENCEMENTS d h m 21 01 56		
2	0	0	0	0	0	0	2	1	03	01			
3	0	0	0	2	0	0	0	0	02	01			
4	0	0	2	1	2	1	2	1	09	04			
5	2	4	7	6	3	5	4	2	33	44			
6	2	1	1	5	3	3	1	1	17	12			
7	2	1	1	2	0	0	0	0	06	03			
8	0	0	0	0	0	1	1	1	03	01			
9	0	0	3	4	3	4	2	2	18	12			
10	2	2	3	5	6	3	1	1	23	22			
11	0	0	3	6	5	3	2	2	21	22			
12	2	4	5	4	3	2	3	3	26	20			
13	1	3	3	6	5	5	2	1	26	27			
14	2	1	1	1	2	0	0	0	07	03			
15	0	2	5	7	4	6	2	1	27	39			
16	0	1	1	3	6	5	4	2	22	23			
17	2	1	0	5	3	5	2	3	21	18			
18	3	1	2	7	2	3	2	3	23	26			
19	1	1	1	3	3	2	1	1	13	07			
20	0	0	0	1	2	1	1	1	06	02			
21	3	4	5	5	6	2	2	4	31	32			
22	4	5	8	8	8	9	6	4	52	163			
23	4	6	6	7	4	5	2	1	35	52			
24	2	2	3	5	4	2	2	1	21	15			
25	2	3	2	3	4	3	2	2	21	13			
26	1	1	3	3	1	4	3	2	18	11			
27	1	1	3	3	3	1	0	0	12	07			
28	0	1	2	2	4	2	1	0	12	07			
29	0	1	1	0	0	1	1	0	04	02			
30													
31													

K SCALE USED:				D	H	Z	(mm) (γ/mm) (to nearest 10γ)
LOWER LIMIT FOR K = 9.....				675.7	322.2		
CURRENT SCALE VALUE.....				3.68	7.75		
LOWER LIMIT FOR K = 9.....				2490	2500		

SCALINGS AND COMPUTATIONS HAVE BEEN CHECKED.

APPROVED John B. Townshend, Chief, College Observatory

OBSERVER IN CHARGE

PRINCIPAL MAGNETIC STORMS
COLLEGE OBSERVATORY, COLLEGE, ALASKA
1988
February

WDC-A FOR SOLAR-TERRRESTRIAL PHYSICS
ENVIRONMENTAL DATA SERVICE, NOAA
BOULDER, COLORADO 80502 U.S.A.

Data from Individual Observatories:

Obs. 2 letter IAGA code	Geomag. lat.	Commencement			SC - amplitudes			Max. 3 hr - index K			Ranges			UT End day hr
		day	hr min (UT)	type	D(')	H(Y)	Z(Y)	day	(3 hr - period)	K	D(')	H(Y)	Z(Y)	
CO	64.96 N	5	04xx	..				5	3	7	172	1580	690	5 22
		21	0156	s.c.*	+15	+162	+30	22	6	9	653	3400	2450	23 21

NORMAL MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASLINE
D	0000 U.T., 2/1/88	2400 U.T., 2/29/88	1.0'/mm	3.7°/mm
				27° 01.2'E
H	(same)	(same)	7.8°/mm	12623°
Z	(same)	(same)	7.6°/mm	55172°

STORM MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	BASLINE
D	0000 U.T., 2/1/88	2400 U.T., 2/29/88	7.9'/mm	29.4°/mm
H	(same)	(same)	43.4°/mm	
Z	(same)	(same)	49.0°/mm	

RAPID RUN MAGNETOGRAPHS

COMPONENT	PERIOD		CALIBRATION	
	FROM	TO	SCALE VALUE	
D				
H				
Z				

MONTHLY MEAN ABSOLUTE VALUES*

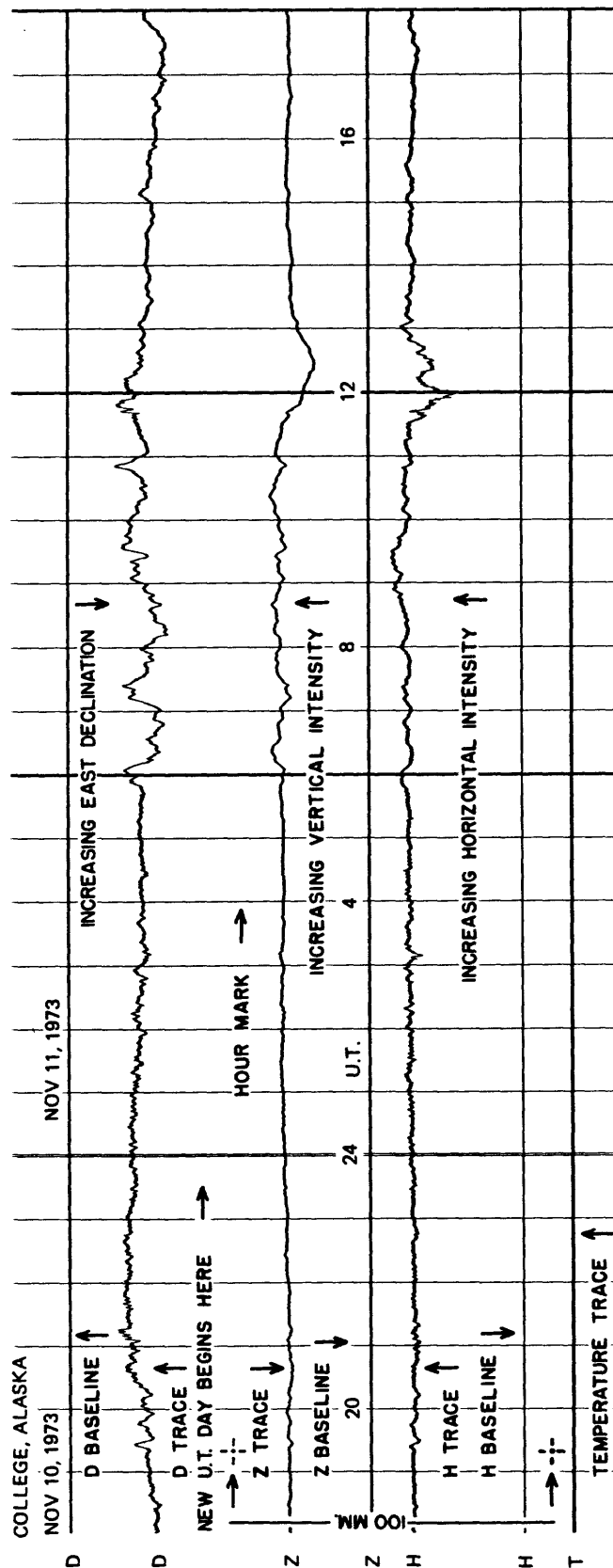
D	H	Z
27° 16.4'E	12835°	55313°

* COMPUTED FROM FIVE QUIETEST DAYS DURING MONTH.

DAYS USED: FEB 2, 3, 8, 20, 29.

U.S. Dept. of Interior Geological Survey			Observatory COLLEGE		Month FEBRUARY		Year 1988		Jep-CO - 1/86														
MAGNETOGRAM HOURLY SCALINGS - FIVE QUIETEST DAYS (UNIVERSAL TIME)																							
Values are in Tenths of mm and are Averages for Successive Periods of One Hour beginning at Midnight. Shrinkage Corrections have been applied. Negative Values in Red with Minus.																							
COMPONENT		D					H					Z					COMPONENT						
DAY		02		03		08		20		29		02		03		08		20		29		DAY	
A _k		01		01		01		02		02		01		01		01		02		02		A _k	
HOUR		01		02		03		04		05		06		07		08		09		10		HOUR	
01		146		136		127		130		130		276		271		260		259		180		01	
02		145		142		126		130		133		278		270		268		263		180		02	
03		147		151		130		129		134		281		273		279		269		182		03	
04		154		153		136		133		136		282		273		280		277		183		04	
05		153		159		138		137		133		281		275		279		280		183		05	
06		153		157		150		140		131		280		275		277		276		184		06	
07		157		153		153		145		131		282		275		274		282		185		07	
08		151		144		157		147		143		283		280		272		280		183		08	
09		150		149		153		148		122		281		275		273		284		181		09	
10		153		176		156		148		131		281		280		270		280		179		10	
11		153		189		158		147		143		286		289		270		277		177		11	
12		159		153		176		159		153		283		286		270		275		174		12	
13		160		148		166		155		158		286		285		273		268		167		13	
14		144		155		163		176		164		289		285		273		256		168		14	
15		149		156		158		171		164		290		286		273		270		170		15	
16		150		155		167		178		157		290		284		267		288		170		16	
17		173		168		171		158		152		289		283		260		279		172		17	
18		178		173		163		173		163		289		280		259		293		176		18	
19		195		182		182		220		193		281		280		258		280		176		19	
20		155		188		183		195		169		249		277		262		273		168		20	
21		93		187		183		167		152		256		270		243		257		126		21	
22		143		177		149		161		148		273		270		263		248		150		22	
23		160		171		149		147		137		275		270		267		253		168		23	
24		146		154		142		101		132		273		267		259		241		180		24	
DAILY SUM		3667		3876		3736		3695		3509		6714		6659		6429		6487		4162		4769	
DAILY MEAN		153		162		156		154		146		280		277		268		270		173		199	
MEAN						154										273						184	

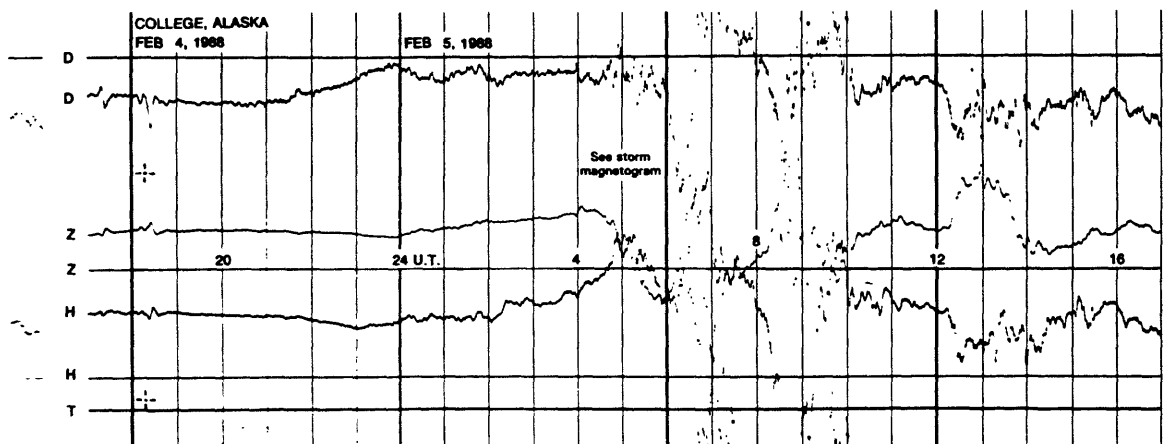
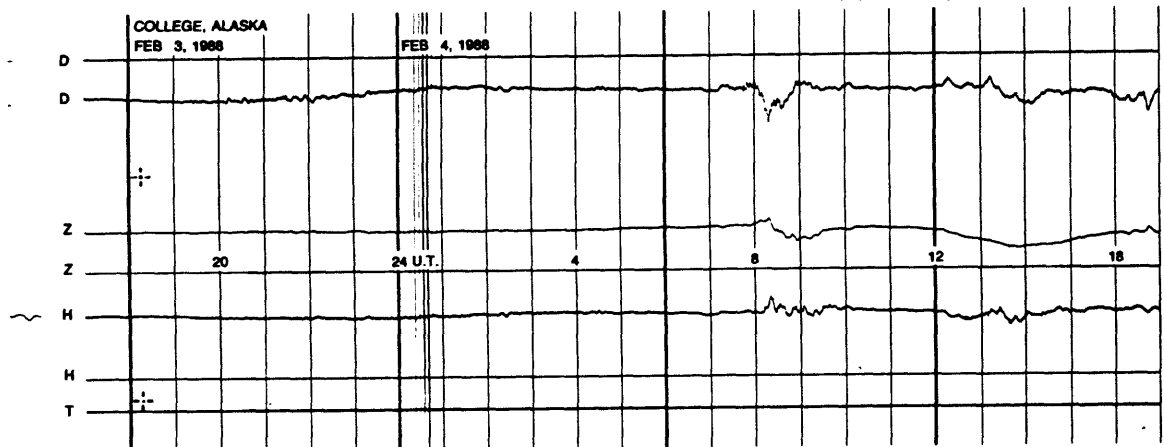
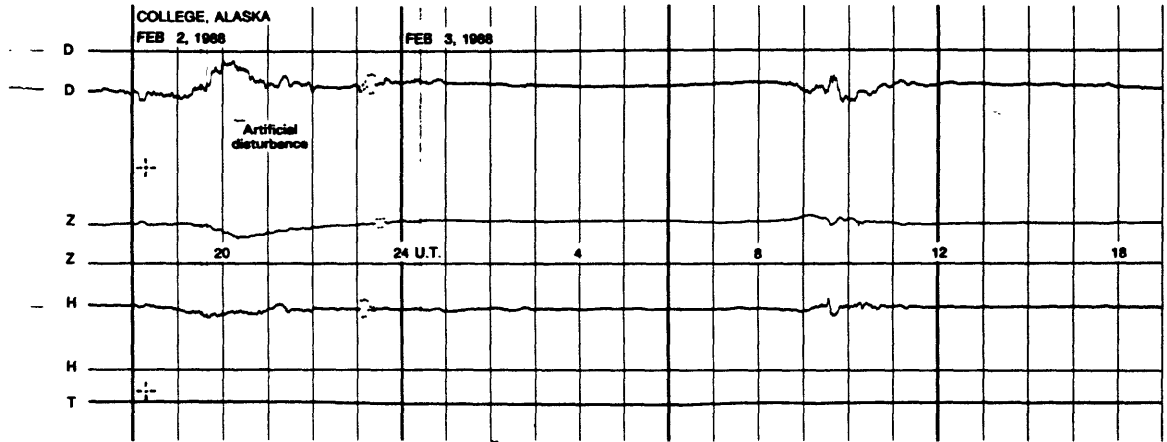
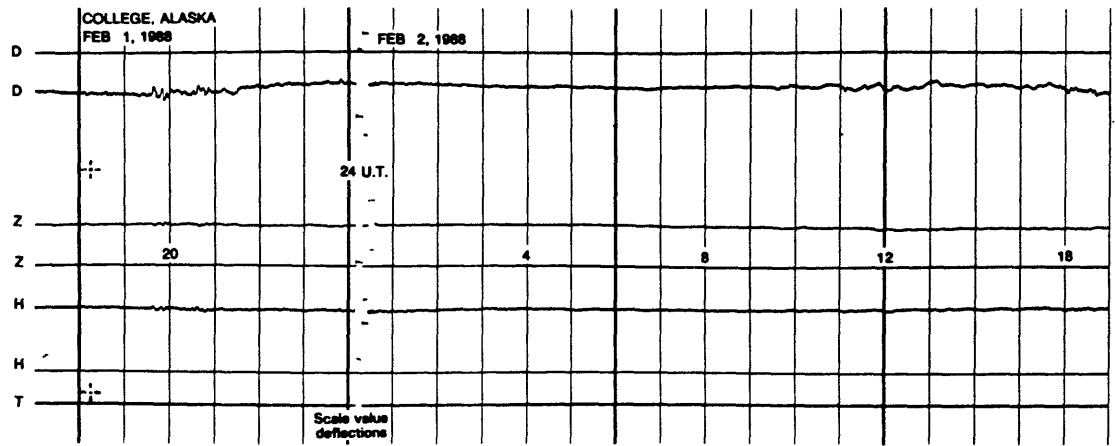
FORMAT FOR NORMAL & STORM MAGNETOGRAMS (SAMPLE ONLY)



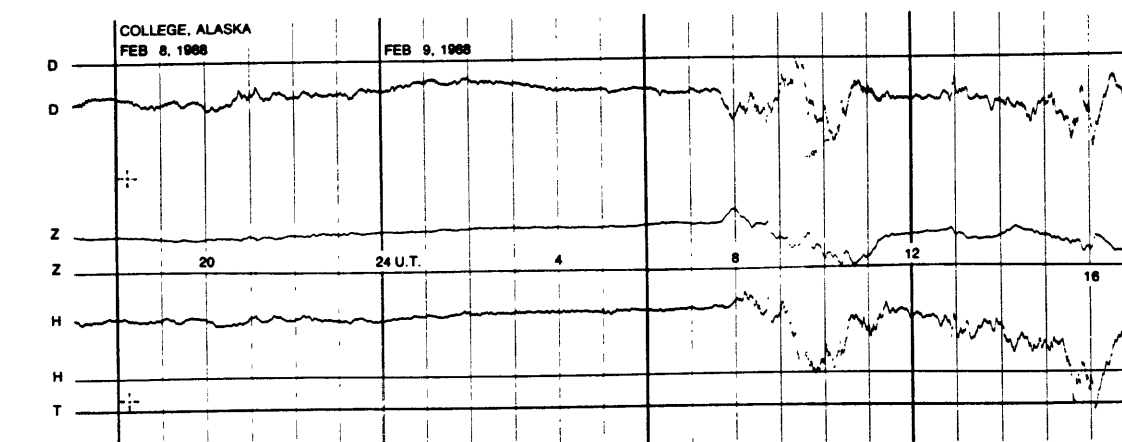
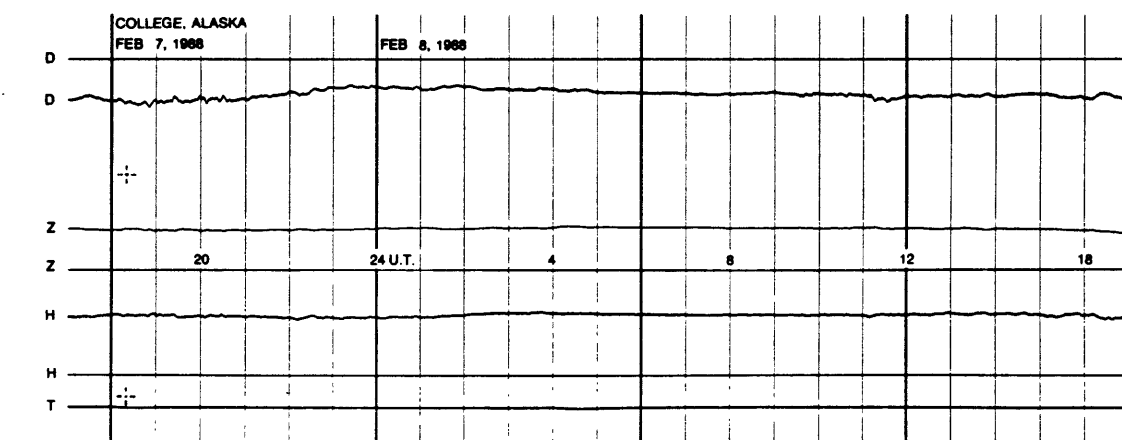
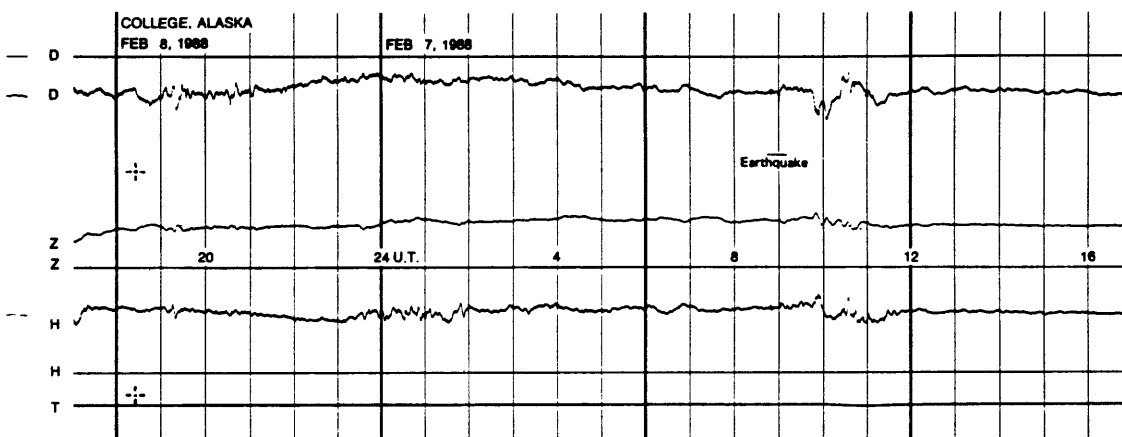
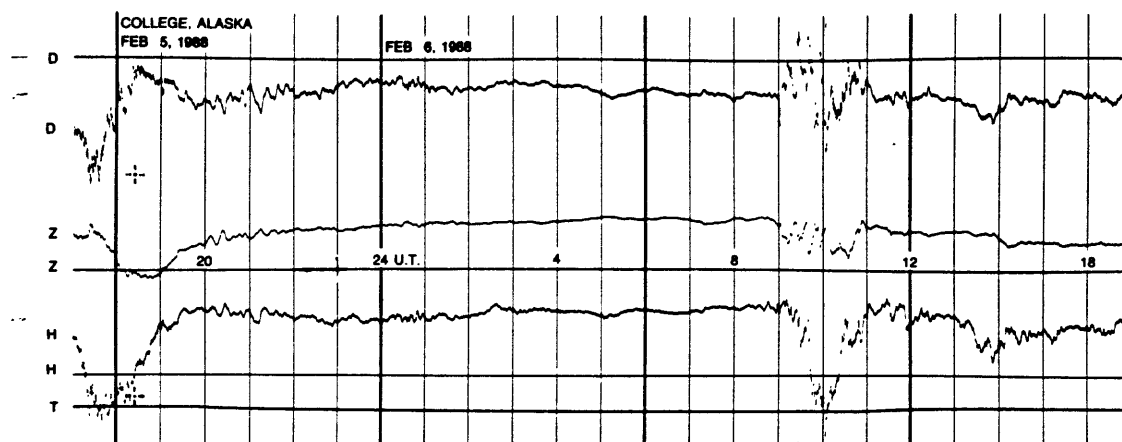
SEE PRELIMINARY CALIBRATION DATA FOR SCALE VALUES & BASELINE VALUES

NORMAL MAGNETOGRAMS

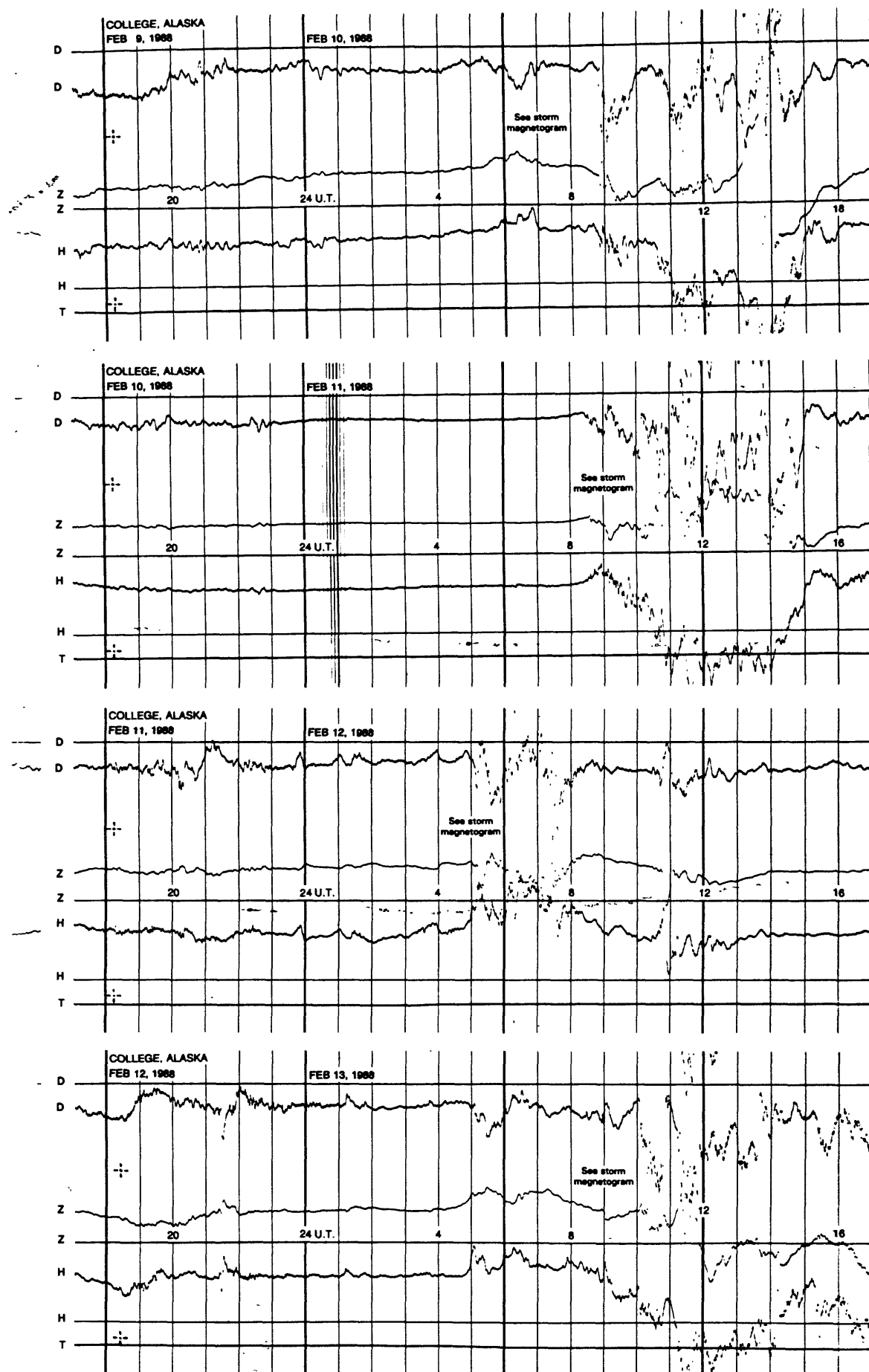
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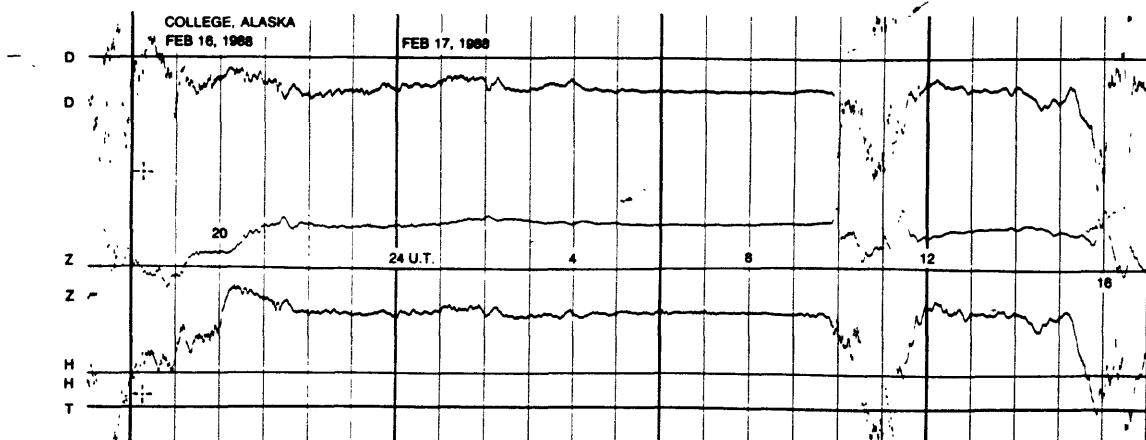
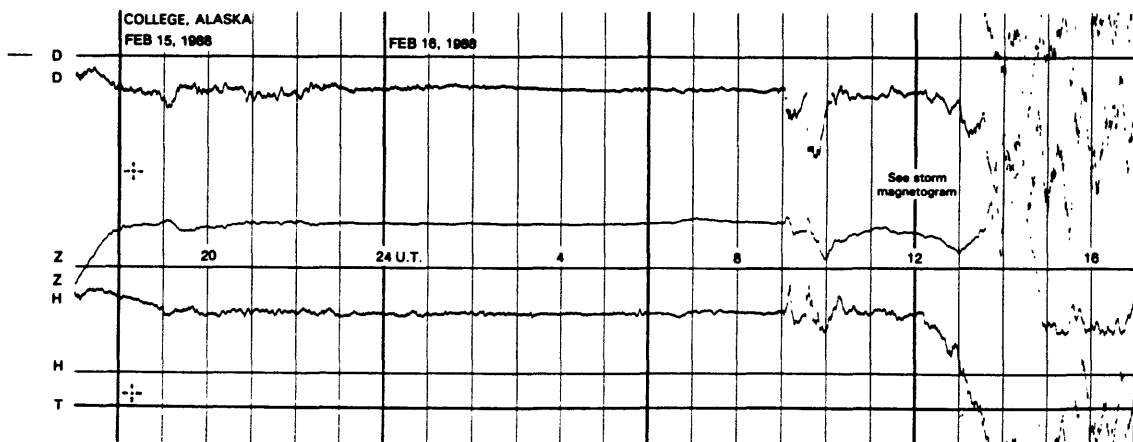
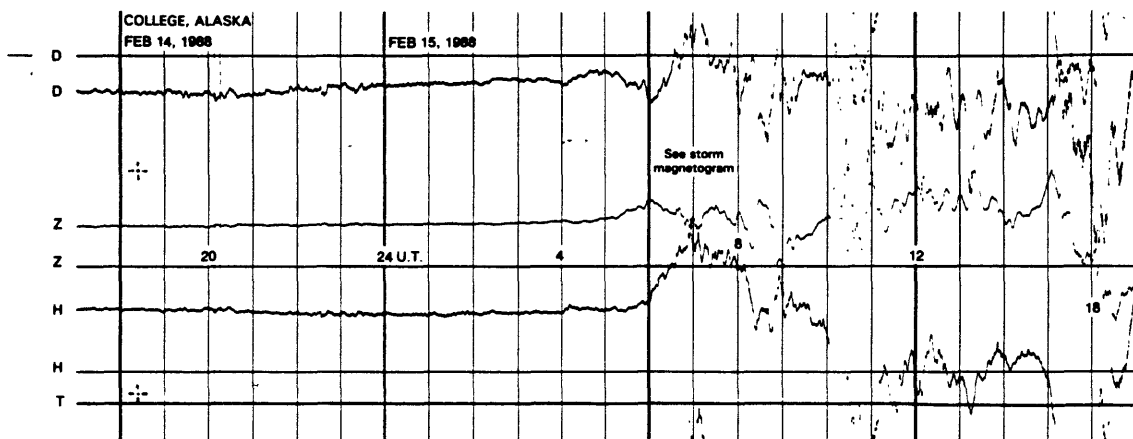
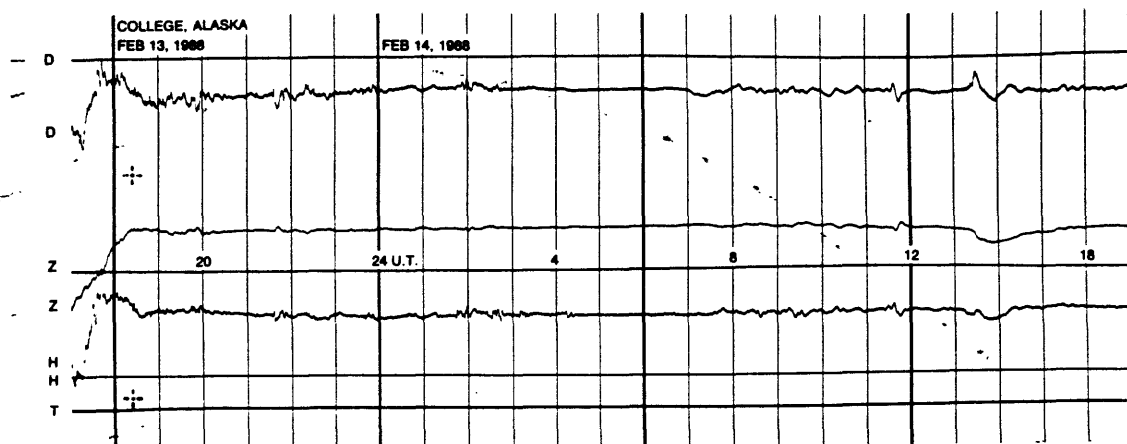
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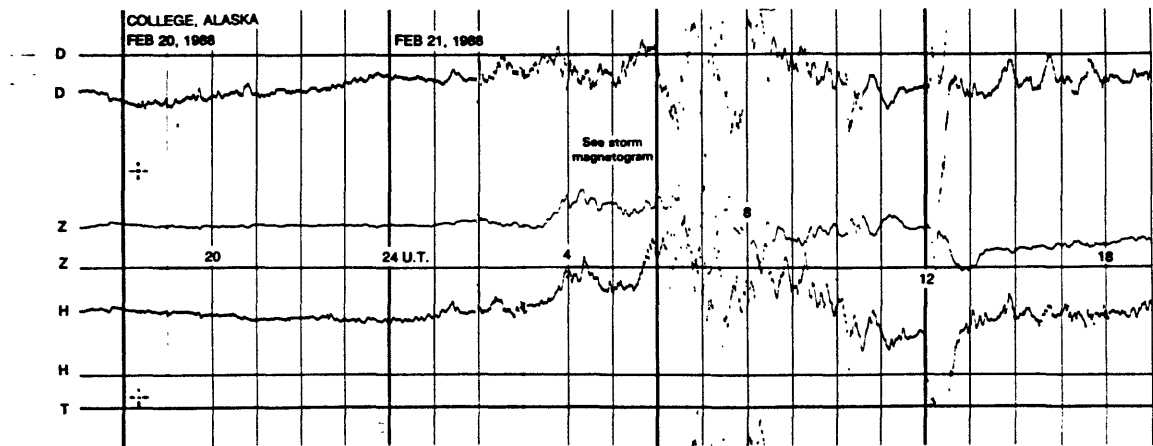
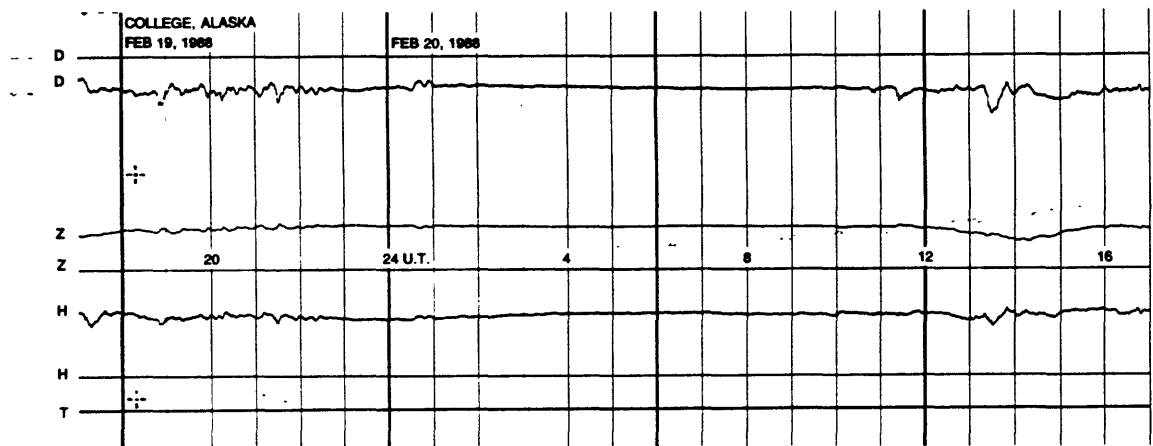
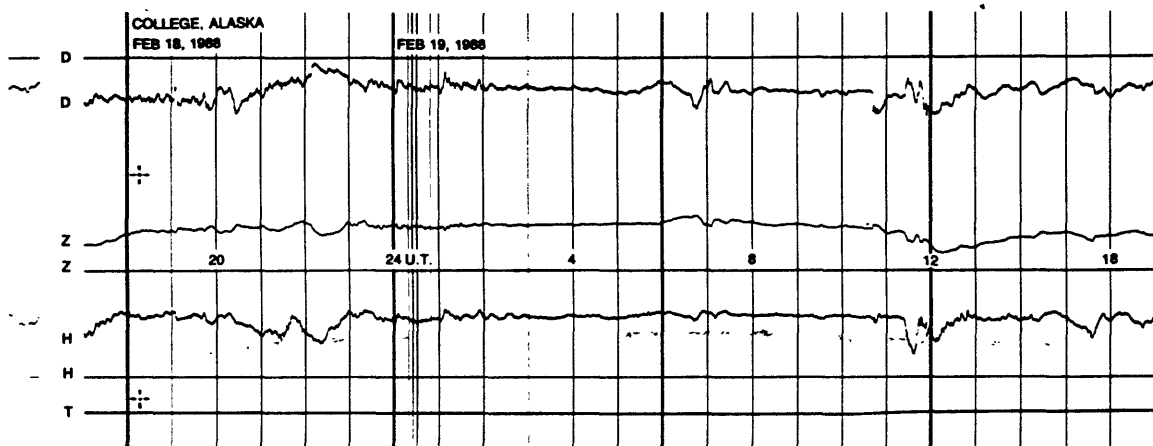
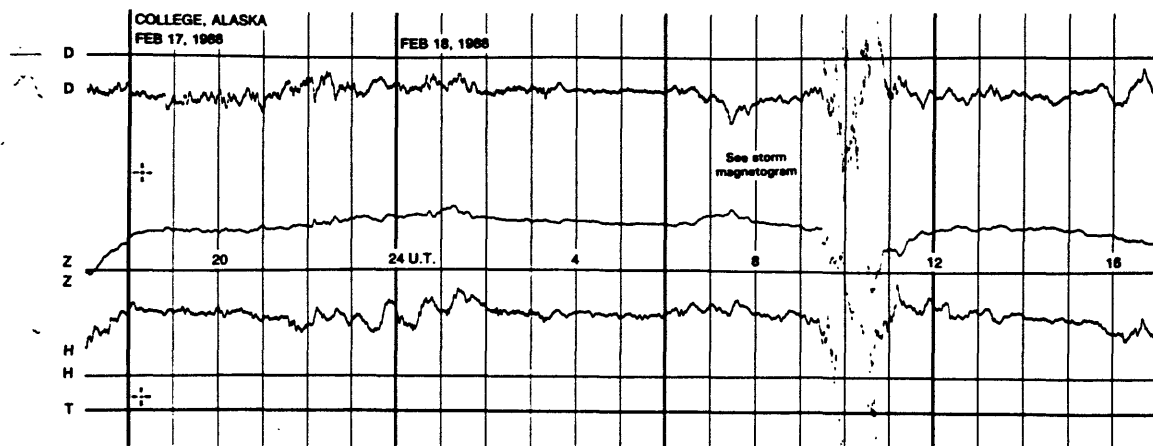
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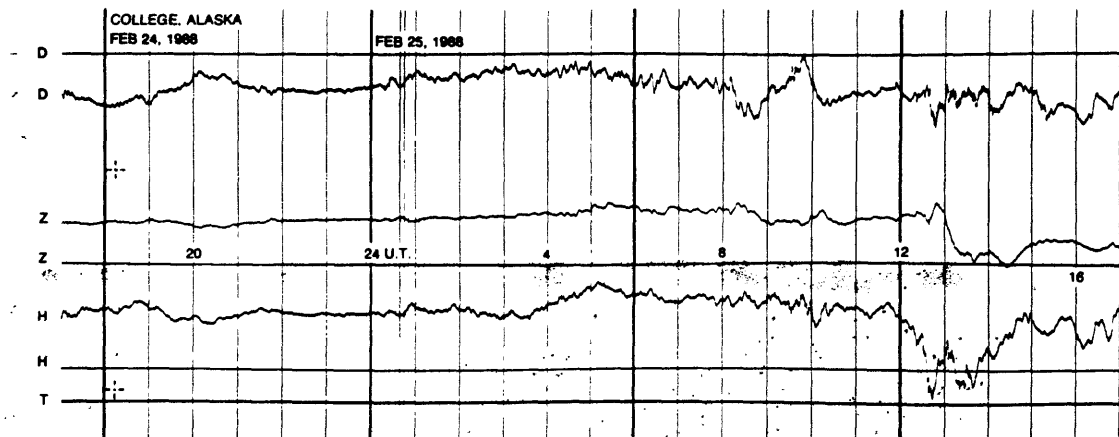
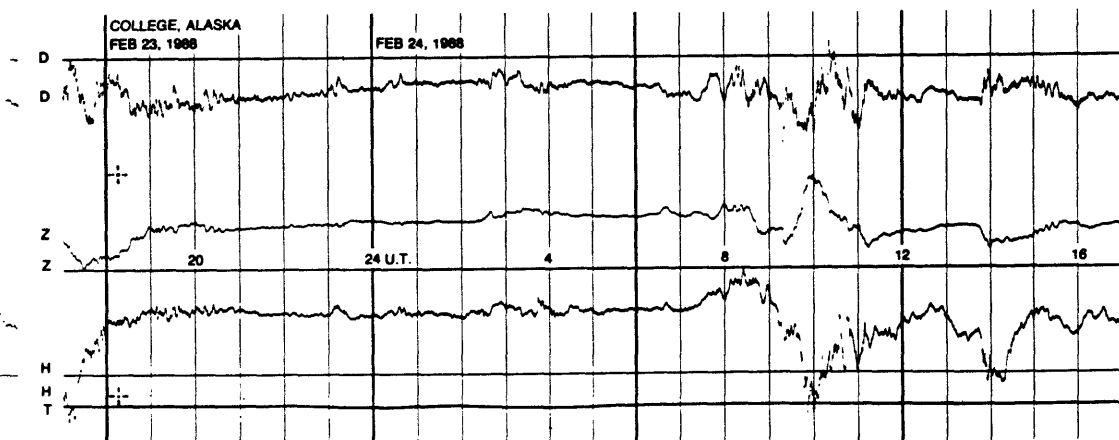
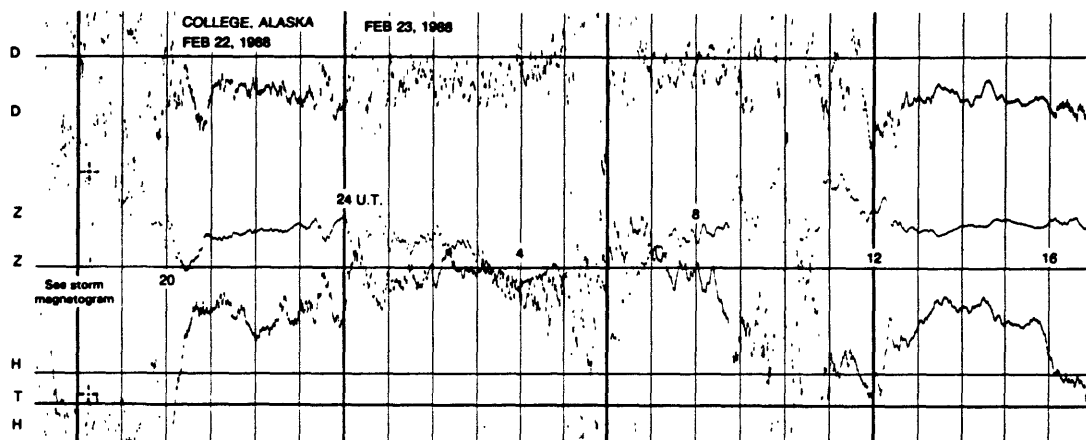
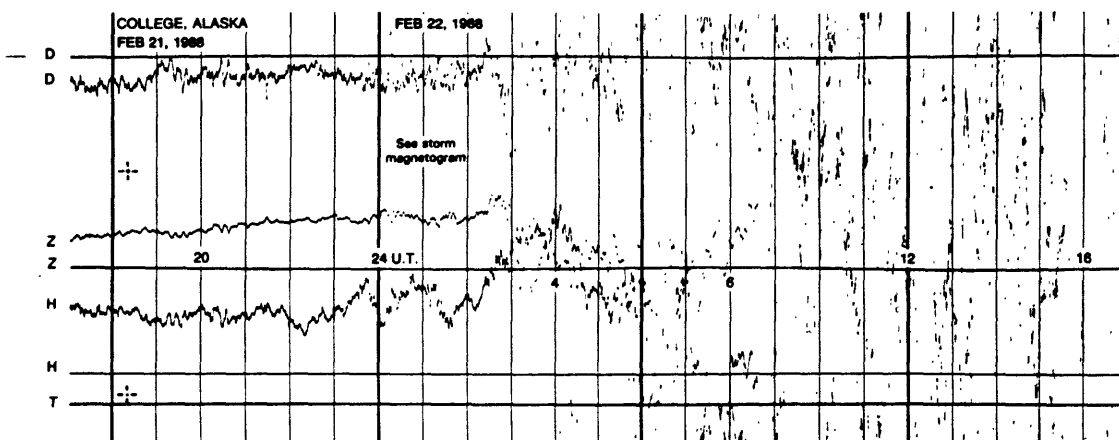
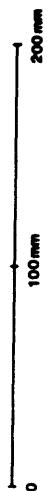
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NORMAL MAGNETOGRAMS

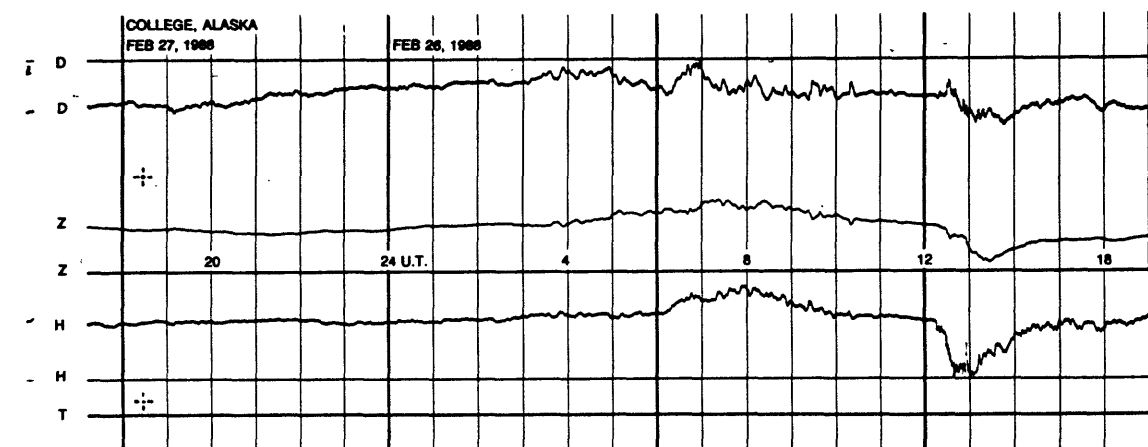
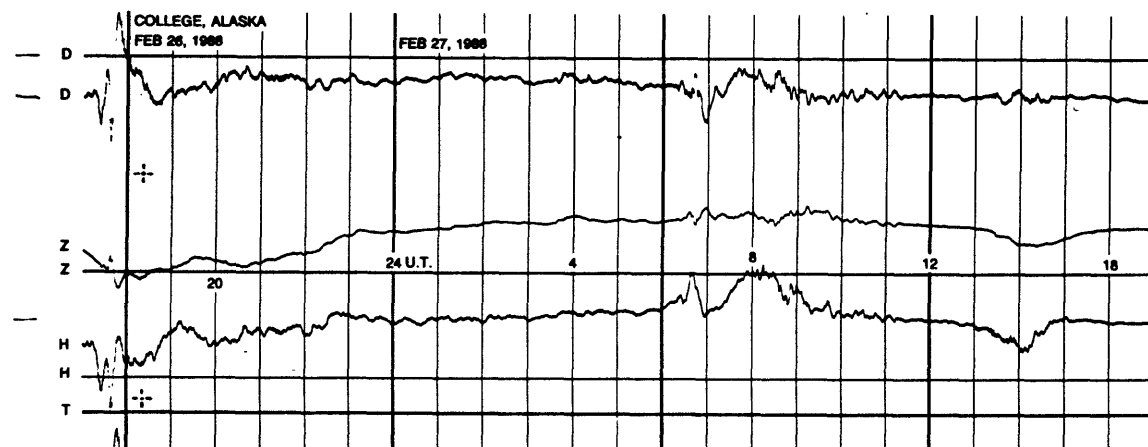
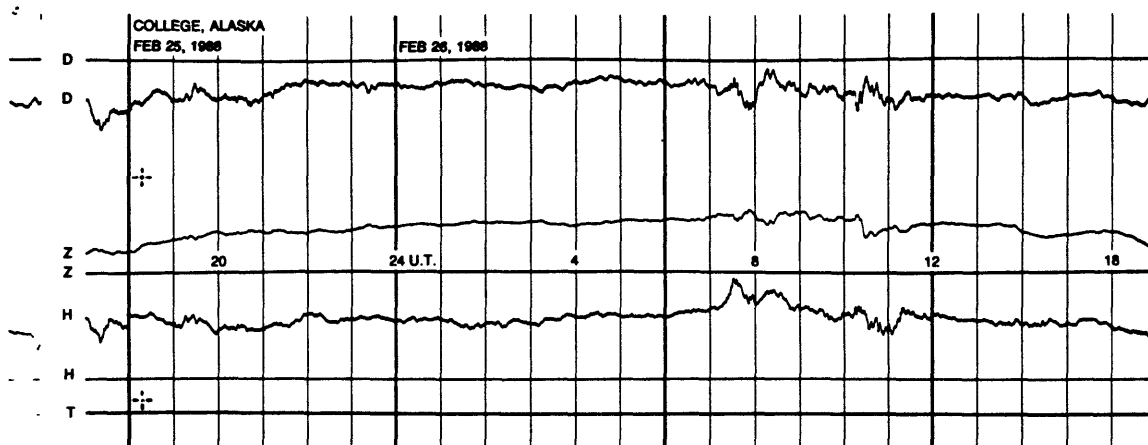


NORMAL MAGNETOGRAMS

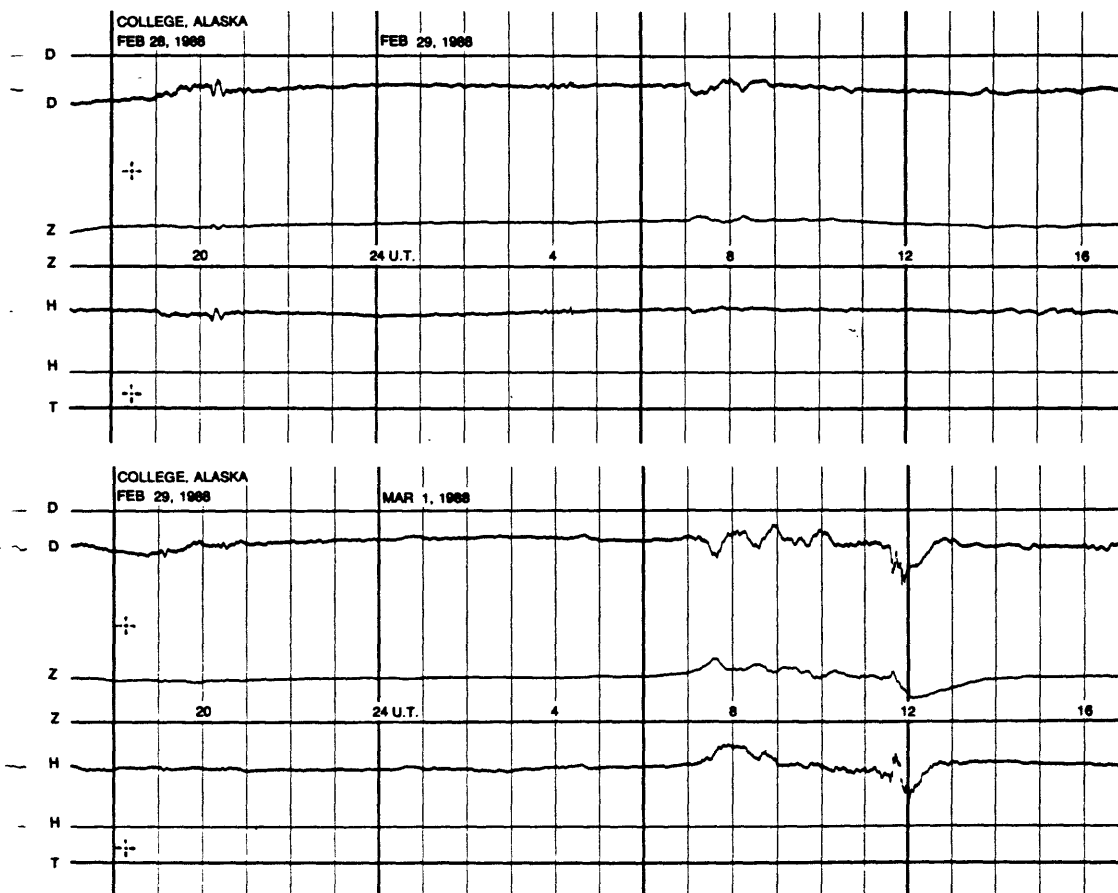
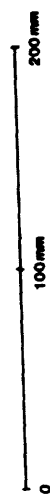


NORMAL MAGNETOGRAMS

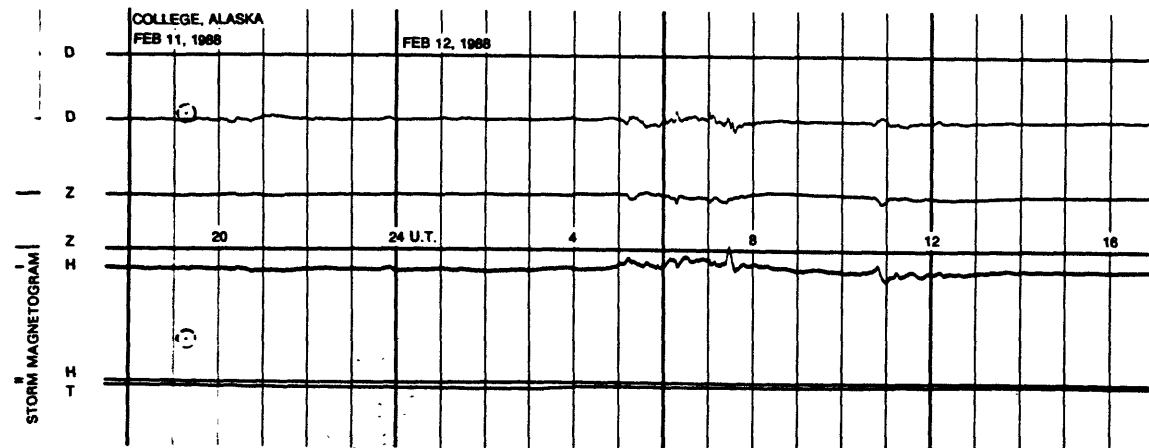
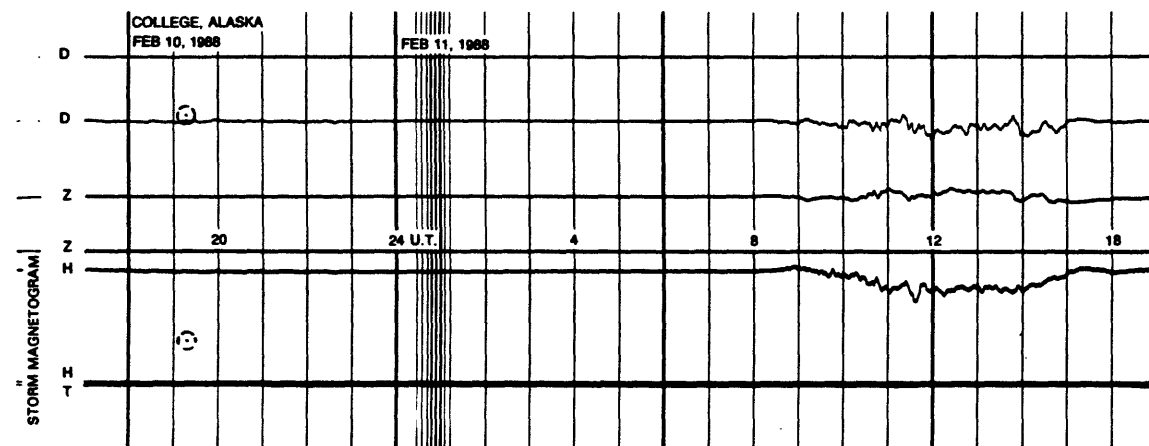
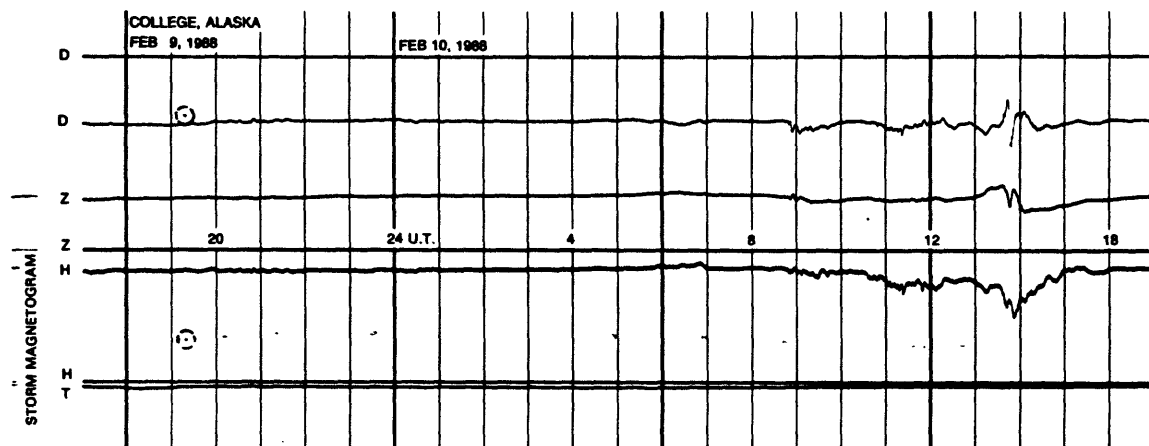
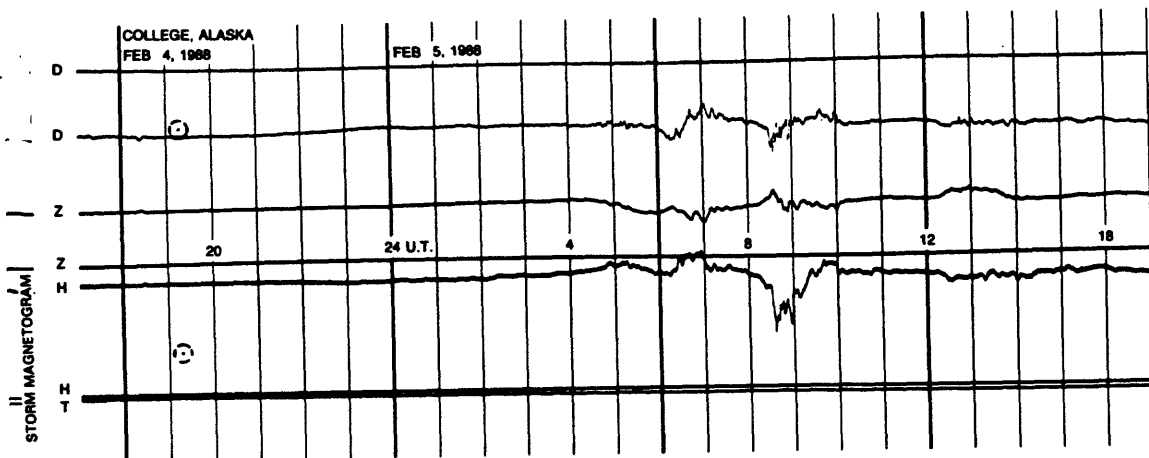
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NORMAL MAGNETOGRAMS

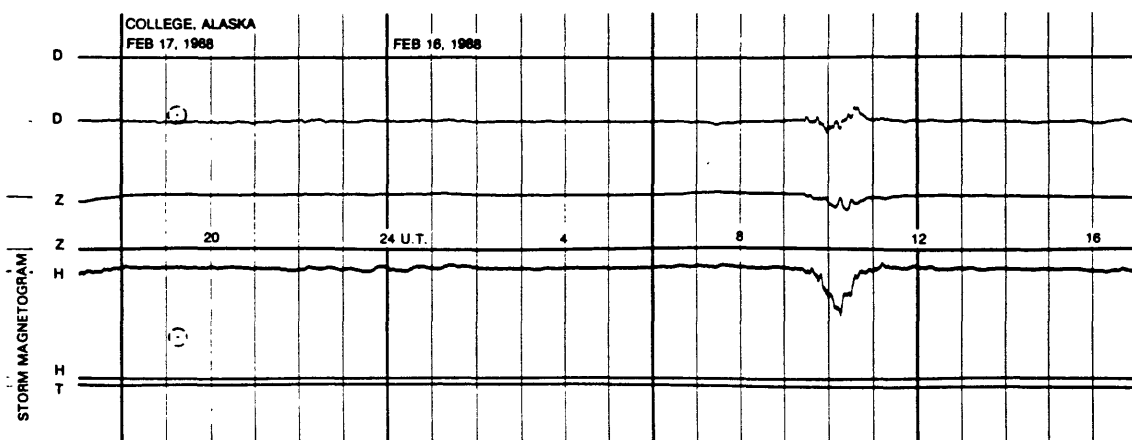
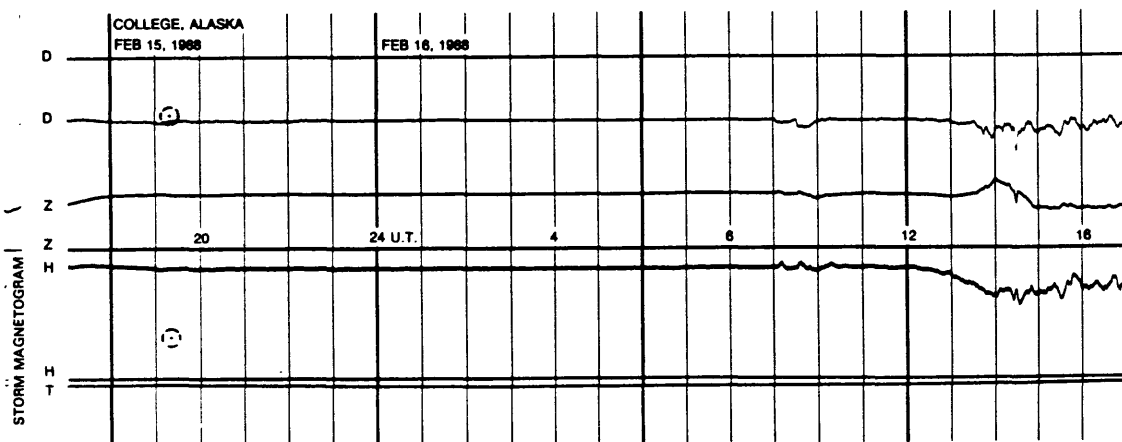
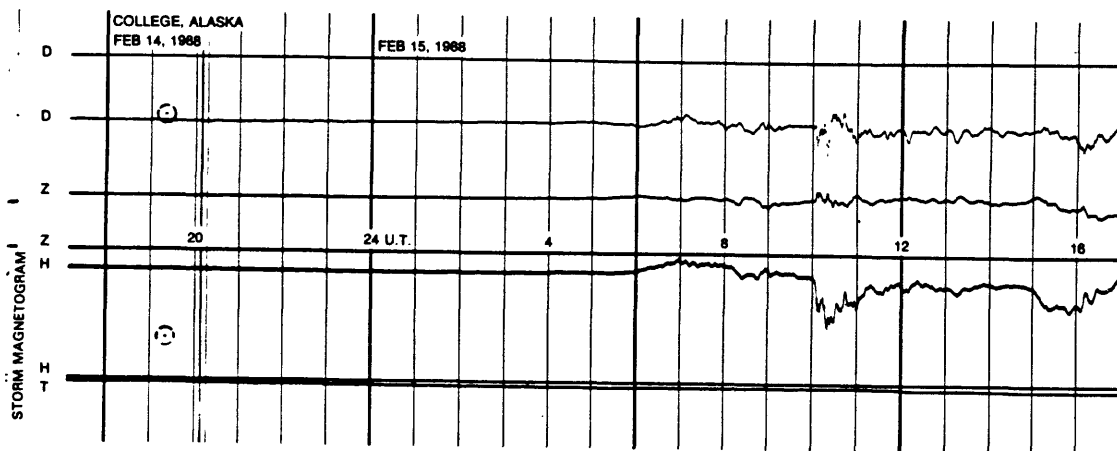
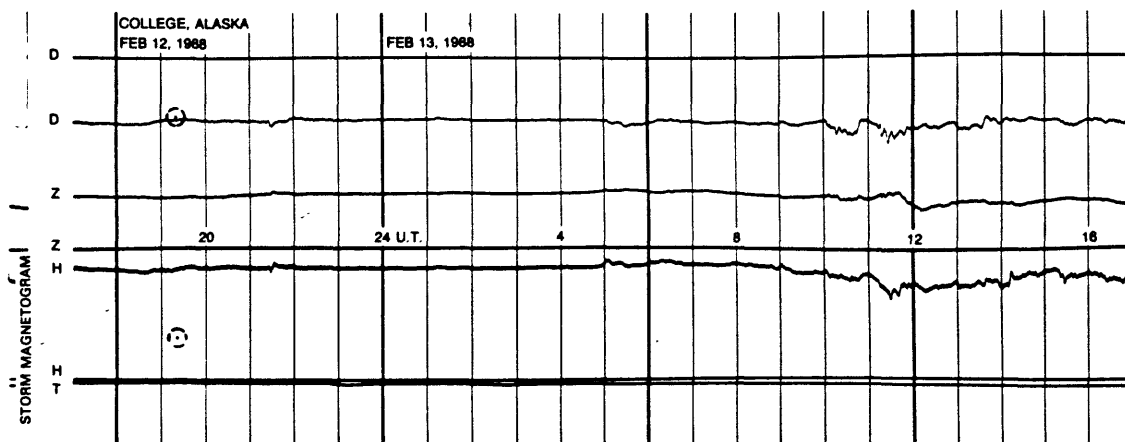


STORM MAGNETOGRAMS



STORM MAGNETOGRAMS

200mm
100mm
0



STORM MAGNETOGRAMS

