Magnetometer ASCII Data for Kiana, Alaska

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Location

- Kiana, Alaska.
- Latitude 66.975.
- Longitude -160.423.
- The elevation is 95 feet.

How to Collect ASCII Data!

- Go to http://themis.ssl.berkeley.edu/EPO_Access/
- Select your city and the dates you want data for.
- Wait for the data to download
- Your downloaded data has four columns. The first is the time beginning at .408 sec. after midnight and the last is 86,399.91 sec. after midnight or .09 sec. before the next midnight.
- The next three columns are the x, y, and z magnetic field intensities.

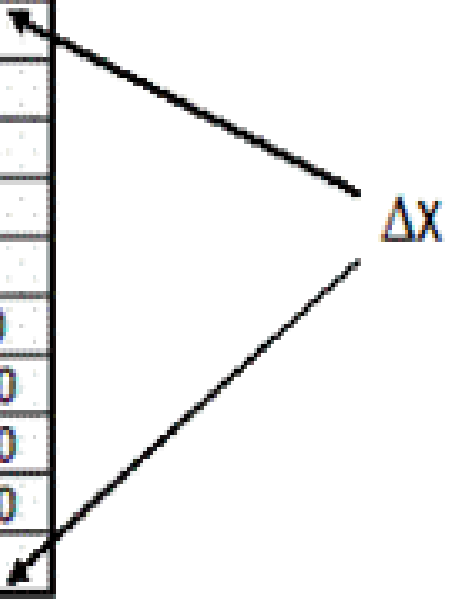
Analyzing the ASCII Data.

- In order to calculate the K value or the intensity of the magnetic distortion you first must find the range in your x component or Δx. By subtracting the x min from your x max.
- After you have found this you can compare this to the table to evaluate the K value.

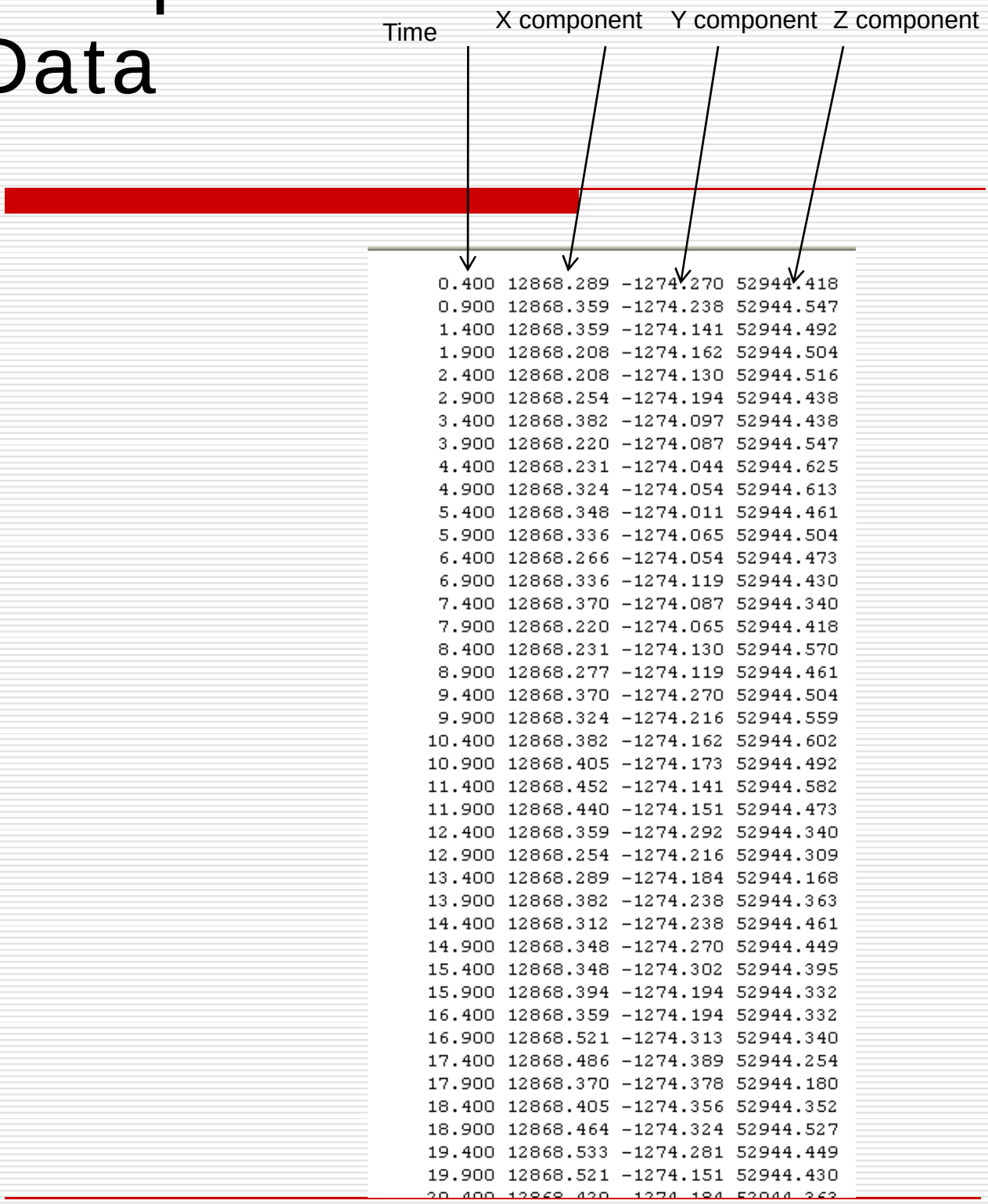
Universal Time	01:00- 03:00 (UT)	03:00- 06:00 (UT)	06:00- 09:00 (UT)	09:00- 12:00 (UT)	12:00- 15:00 (UT)	15:00- 18:00 (UT)	18:00- 21:00 (UT)	21:00- 24:00 (UT)
k-Indices (1 – 9) example	1	1	1	1	1	1	1	1

Δx is calculated for each of the eight-(8) time periods. A **k-index** is then assigned according to the chart below.

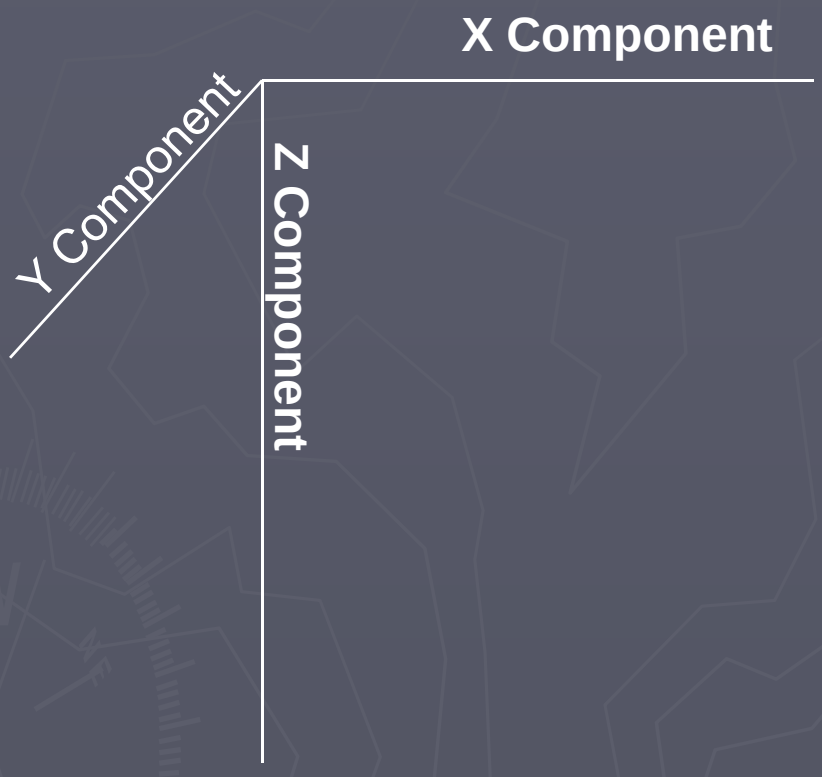
K	(nT)
0	0-5
1	5-10
2	10-20
3	20-40
4	40-70
5	70-120
6	120-200
7	200-330
8	330-500
9	>500



Sample ASCII Data



B-field Information



- This diagram shows the set-up of the b-field. In our data, we are measuring disturbances in the X component of the B-field.

CME (Coronal Mass Ejections)

- Coronal mass ejections are huge magnetic bubbles of plasma that erupt from the Sun's corona and travel through space at high speeds toward the Earth. When these CME’s reach the Earth, they cause disturbances in the X component of the magnetic field and in turn, they cause auroras.

Data averages for the months of June, July, August, and September.

B-Field or Strength of the magnetic field in the x direction

Mean	**56,443.0**
Std	**10.2**
Max	**56,468.8**
UQ	**56,448.6**
Median	**56,443.7**
LQ	**56,437.6**
Min	**56,416.0**

k-max or the highest intensity of the magnetic field

Mean	**5.1**
Std	**2.1**
Max	**9.0**
UQ	**7.0**
Median	**4.0**
LQ	**3.0**
Min	**2.0**

Data that supports geomagnetic storms. (**kmax > 4**)

- On the following dates, we have data that supports evidence of geomagnetic storms. Geomagnetic storms are a large disturbance in the X component of the B-field and they cause auroras.

- JUNE: 5,6,7,8,14,15,16,17,18,20,21,25,26,27,28,29,30

- JULY: 1,4,5,11,12,13,14,15,17,18,21,22,23,24,25,26,27,28

- AUGUST: 5,9,10,11,12,14,17,18,19,21,22

- SEPTEMBER: 14,15,16,18,19,24,28,29

Numerical Data

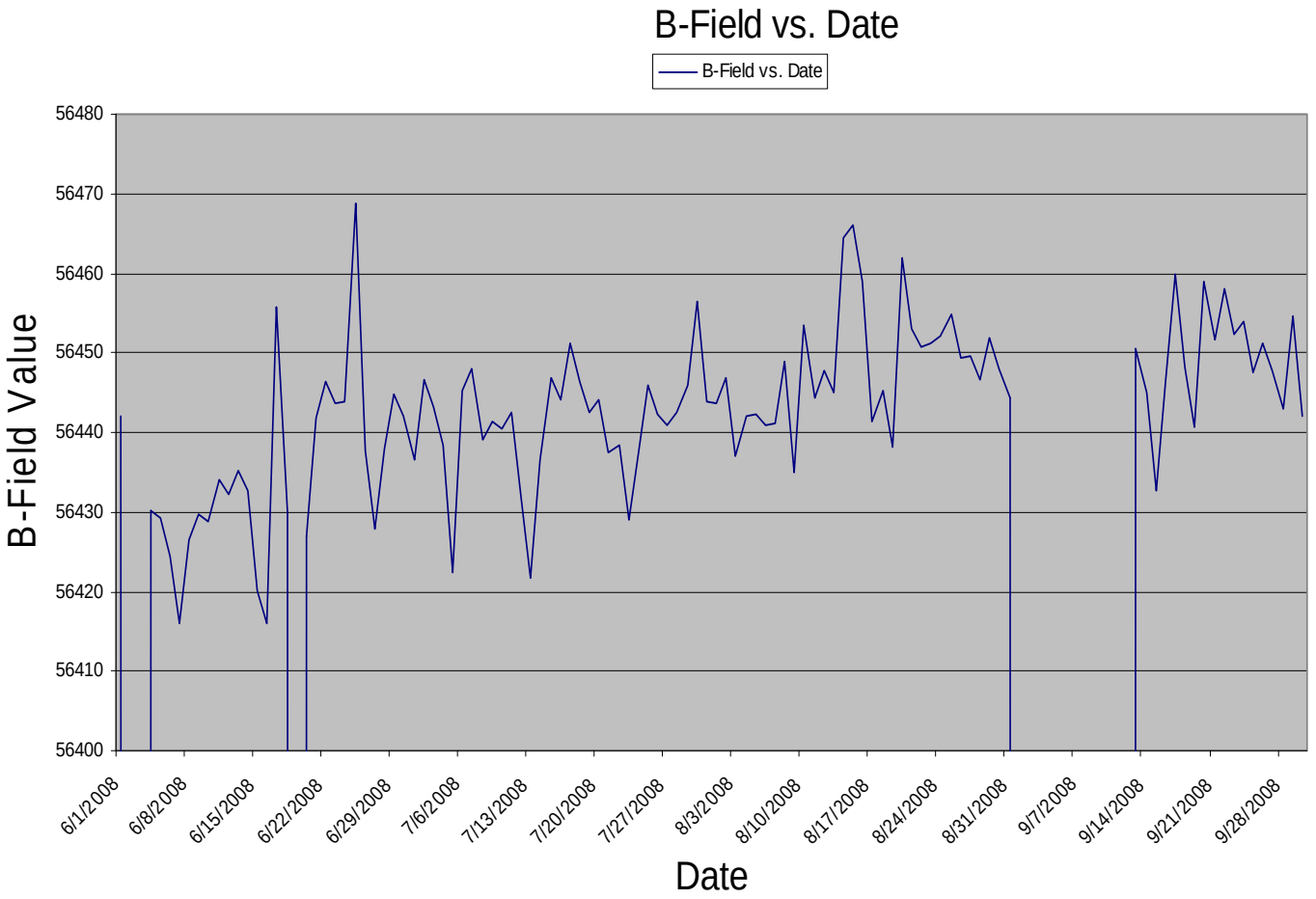
Yellow represents Days Where the K value was Larger than 5. The significance of which means that there was a Geomagnetic storm.

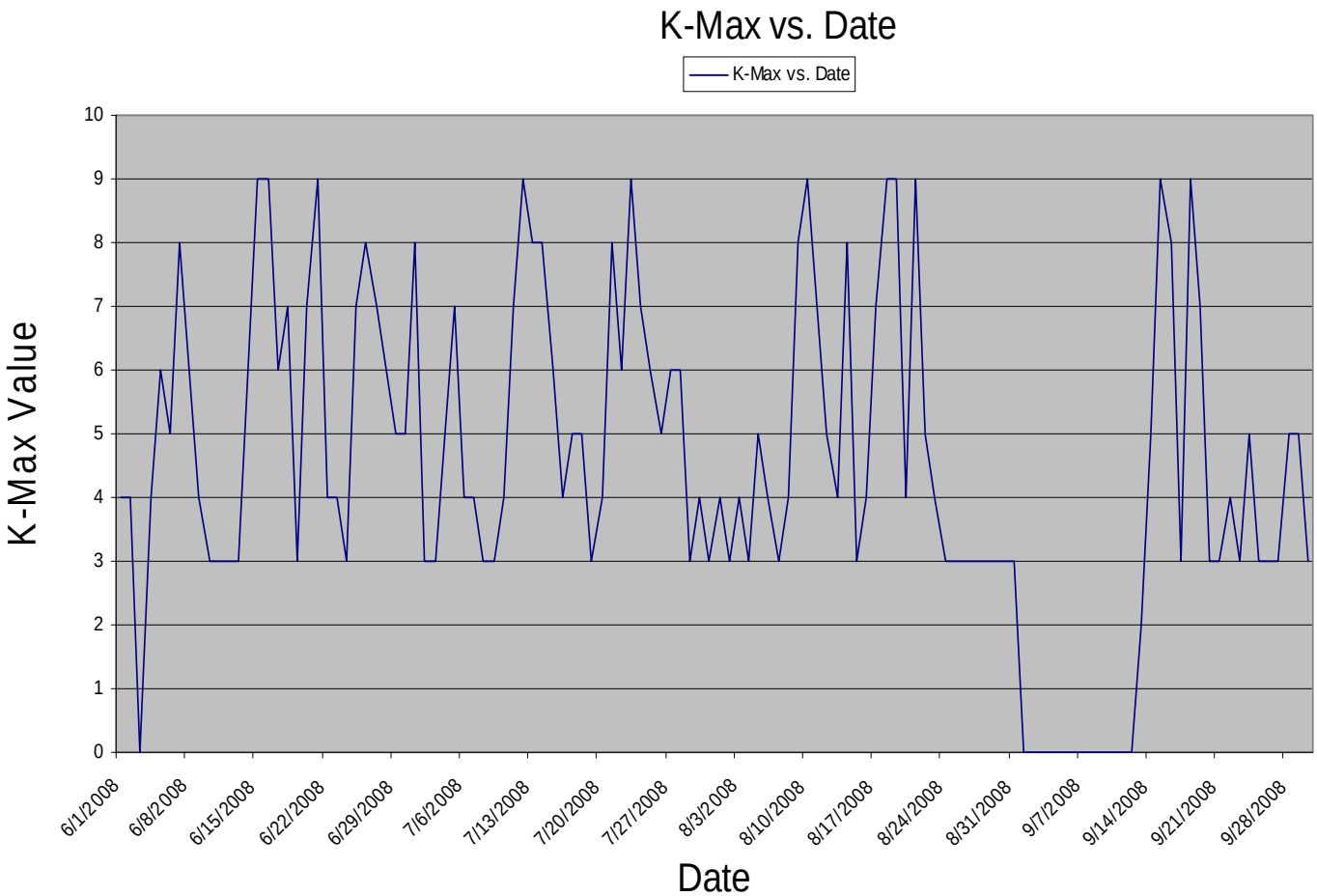
Date	B-Field	k-max
6/1	56442.008	4
6/2	n/a	4
6/3	n/a	n/a
6/4	56430.105	4
6/5	56429.324	6
6/6	56424.398	5
6/7	56415.955	8
6/8	56426.615	6
6/9	56429.786	4
6/10	56428.826	3
6/11	56434.168	3
6/12	56432.33	3
6/13	56435.146	3
6/14	56432.77	6
6/15	56420.102	9
6/16	56416.064	9
6/17	56455.676	6
6/18	56430.044	7
6/19	n/a	3
6/20	56426.887	7
6/21	56441.851	9
6/22	56446.356	4
6/23	56443.693	4
6/24	56443.905	3
6/25	56468.771	7
6/26	56437.69	8
6/27	56427.955	7
6/28	56438.054	6
6/29	56444.692	5
6/30	56441.949	5

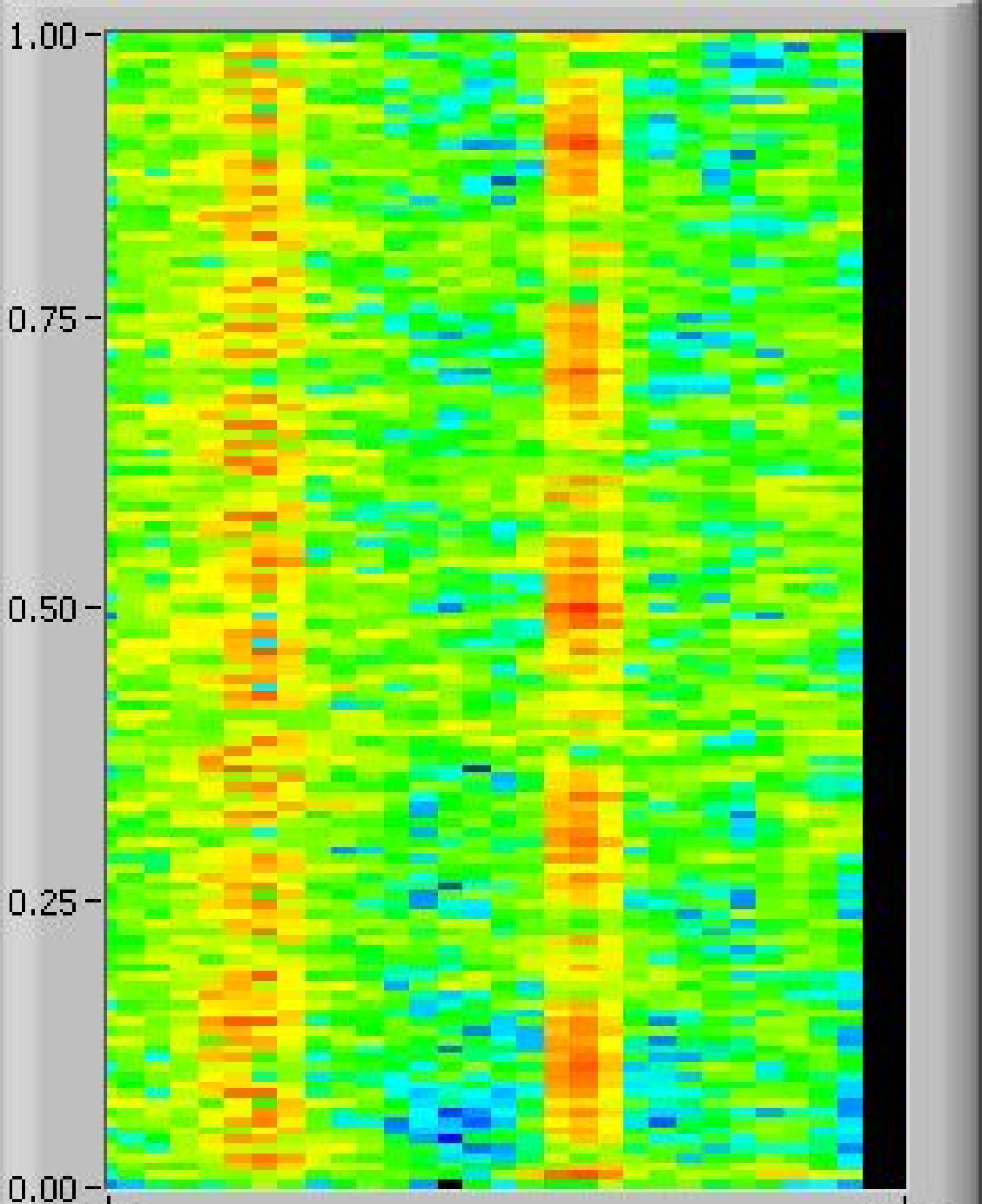
7/1	56436.51	8
7/2	56446.614	3
7/3	56443.1	3
7/4	56438.435	5
7/5	56422.362	7
7/6	56445.314	4
7/7	56447.98	4
7/8	56439	3
7/9	56441.316	3
7/10	56440.526	4
7/11	56442.403	7
7/12	56432.101	9
7/13	56421.651	8
7/14	56436.516	8
7/15	56446.955	6
7/16	56444.066	4
7/17	56451.275	5
7/18	56446.431	5
7/19	56442.569	3
7/20	56444.077	4
7/21	56437.428	8
7/22	56438.406	6
7/23	56429.016	9
7/24	56437.586	7
7/25	56445.945	6
7/26	56442.332	5
7/27	56440.923	6
7/28	56442.538	6
7/29	56445.92	3
7/30	56456.387	4
7/31	56443.922	3

8/1	56443.696	4
8/2	56446.89	3
8/3	56436.933	4
8/4	56441.98	3
8/5	56442.177	5
8/6	56440.887	4
8/7	56441.037	3
8/8	56448.946	4
8/9	56434.878	8
8/10	56453.382	9
8/11	56444.415	7
8/12	56447.766	5
8/13	56445.095	4
8/14	56464.564	8
8/15	56465.952	3
8/16	56458.874	4
8/17	56441.335	7
8/18	56445.312	9
8/19	56438.247	9
8/20	56461.888	4
8/21	56453.002	9
8/22	56450.675	5
8/23	56451.274	4
8/24	56452.223	3
8/25	56454.842	3
8/26	56449.324	3
8/27	56449.594	3
8/28	56446.646	3
8/29	56451.807	3
8/30	56447.951	3
8/31	56444.352	3

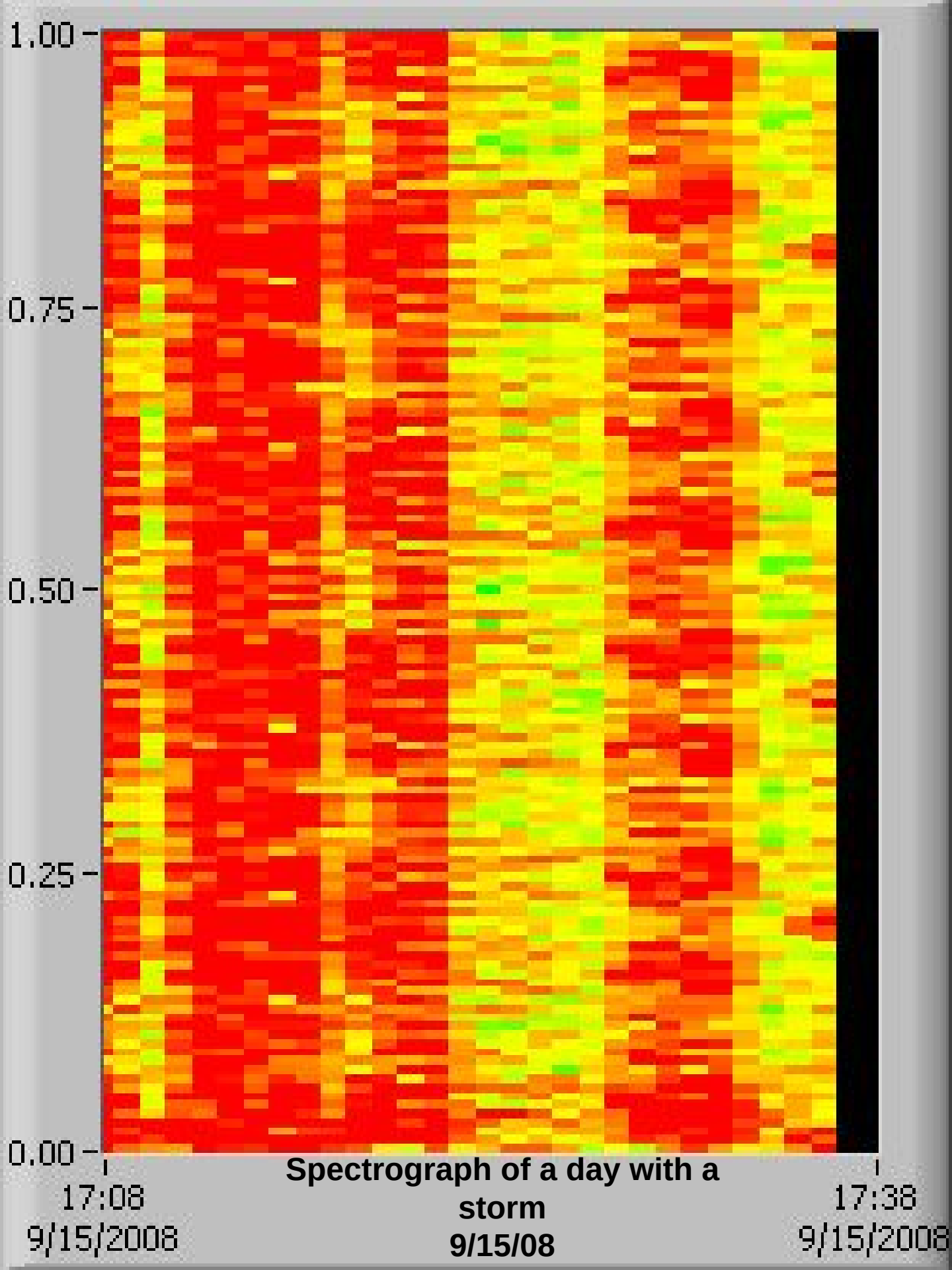
9/1	n/a	n/a
9/2	n/a	n/a
9/3	n/a	n/a
9/4	n/a	n/a
9/5	n/a	n/a
9/6	n/a	n/a
9/7	n/a	n/a
9/8	n/a	n/a
9/9	n/a	n/a
9/10	n/a	n/a
9/11	n/a	n/a
9/12	n/a	n/a
9/13	56450.569	2
9/14	56444.949	5
9/15	56432.786	9
9/16	56446.523	8
9/17	56459.806	3
9/18	56448.257	9
9/19	56440.768	7
9/20	56459.054	3
9/21	56451.634	3
9/22	56458.147	4
9/23	56452.36	3
9/24	56454.055	5
9/25	56447.558	3
9/26	56451.204	3
9/27	56447.812	3
9/28	56442.926	5
9/29	56454.658	5
9/30	56442.16	3


B-Field vs. Date
B-Field vs. Date
B-Field Value
56480
56470
56460
56450
56440
56430
56420
56410
56400
6/1/2008
6/8/2008
6/15/2008
6/22/2008
6/29/2008
7/6/2008
7/13/2008
7/20/2008
7/27/2008
8/3/2008
8/10/2008
8/17/2008
8/24/2008
8/31/2008
9/7/2008
9/14/2008
9/21/2008
9/28/2008
Date


K-Max vs. Date
K-Max vs. Date
K-Max Value
10
9
8
7
6
5
4
3
2
1
0
6/1/2008
6/8/2008
6/15/2008
6/22/2008
6/29/2008
7/6/2008
7/13/2008
7/20/2008
7/27/2008
8/3/2008
8/10/2008
8/17/2008
8/24/2008
8/31/2008
9/7/2008
9/14/2008
9/21/2008
9/28/2008
Date



Spectrograph of a typical day or a day without a geomagnetic storm 9/13/08



Spectrograph of a day with a storm
9/15/08

Kmax Comparisons

Our Calculated K

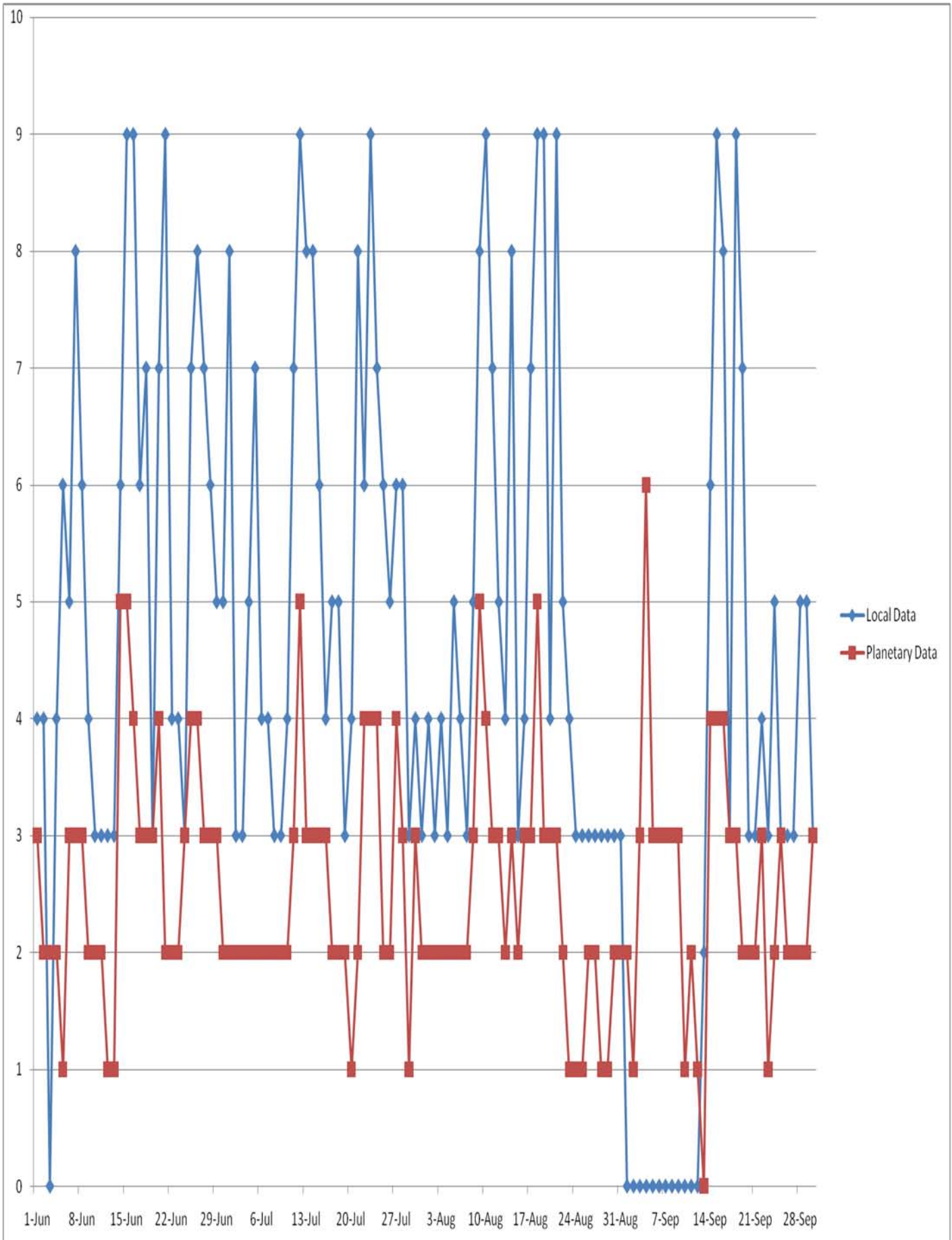
Vs

Planetary K

Date	local k-max	planetary k-max	1-Jul	8	2
1-Jun	4	3	2-Jul	3	2
2-Jun	4	2	3-Jul	3	2
3-Jun	n/a	2	4-Jul	5	2
4-Jun	4	2	5-Jul	7	2
5-Jun	6	1	6-Jul	4	2
6-Jun	5	3	7-Jul	4	2
7-Jun	8	3	8-Jul	3	2
8-Jun	6	3	9-Jul	3	2
9-Jun	4	2	10-Jul	4	2
10-Jun	3	2	11-Jul	7	3
11-Jun	3	2	12-Jul	9	5
12-Jun	3	1	13-Jul	8	3
13-Jun	3	1	14-Jul	8	3
14-Jun	6	5	15-Jul	6	3
15-Jun	9	5	16-Jul	4	3
16-Jun	9	4	17-Jul	5	2
17-Jun	6	3	18-Jul	5	2
18-Jun	7	3	19-Jul	3	2
19-Jun	3	3	20-Jul	4	1
20-Jun	7	4	21-Jul	8	2
21-Jun	9	2	22-Jul	6	4
22-Jun	4	2	23-Jul	9	4
23-Jun	4	2	24-Jul	7	4
24-Jun	3	3	25-Jul	6	2
25-Jun	7	4	26-Jul	5	2
26-Jun	8	4	27-Jul	6	4
27-Jun	7	3	28-Jul	6	3
28-Jun	6	3	29-Jul	3	1
29-Jun	5	3	30-Jul	4	3
30-Jun	5	2	31-Jul	3	2

1-Aug	4	2
2-Aug	3	2
3-Aug	4	2
4-Aug	3	2
5-Aug	5	2
6-Aug	4	2
7-Aug	3	2
8-Aug	4	3
9-Aug	8	5
10-Aug	9	4
11-Aug	7	3
12-Aug	5	3
13-Aug	4	2
14-Aug	8	3
15-Aug	3	2
16-Aug	4	3
17-Aug	7	3
18-Aug	9	5
19-Aug	9	3
20-Aug	4	3
21-Aug	9	3
22-Aug	5	2
23-Aug	4	1
24-Aug	3	1
25-Aug	3	1
26-Aug	3	2
27-Aug	3	2
28-Aug	3	1
29-Aug	3	1
30-Aug	3	2
31-Aug	3	2

1-Sep	n/a	2
2-Sep	n/a	1
3-Sep	n/a	3
4-Sep	n/a	6
5-Sep	n/a	3
6-Sep	n/a	3
7-Sep	n/a	3
8-Sep	n/a	3
9-Sep	n/a	3
10-Sep	n/a	1
11-Sep	n/a	2
12-Sep	n/a	1
13-Sep	2	0
14-Sep	5	4
15-Sep	9	4
16-Sep	8	4
17-Sep	3	3
18-Sep	9	3
19-Sep	7	2
20-Sep	3	2
21-Sep	3	2
22-Sep	4	3
23-Sep	3	1
24-Sep	5	2
25-Sep	3	3
26-Sep	3	2
27-Sep	3	2
28-Sep	5	2
29-Sep	5	2
30-Sep	3	3


10
9
8
7
6
5
4
3
2
1
0
1-Jun
8-Jun
15-Jun
22-Jun
29-Jun
6-Jul
13-Jul
20-Jul
27-Jul
3-Aug
10-Aug
17-Aug
24-Aug
31-Aug
7-Sep
14-Sep
21-Sep
28-Sep
Local Data
Planetary Data

Conclusion

- Magnetometer data was collected for Kiana, AK
- Earth's magnetic field (B-field) has an x, y, and z component
  - Disturbances in the x component were measured.
- Coronal mass ejections (CMEs) are bursts of plasma that erupt from the sun's corona, and travel at high speeds through space
  - These are responsible for auroras.
  - These also cause the Geomagnetic storms that we recorded data for by causing the charged particles to interact with the magnetic field, which in turn causes detectable aberrations in the magnetic field
- When a disturbance of 4 or greater was found in the x component was found, there is evidence to support a geomagnetic storm has occurred.