Kiruna Geophysical Data

Data Summary 17/10-12 (October-December 2017)

Swedish Institute of Space Physics

Kiruna Geophysical Data

Data Summary 17/10-12
October – December 2017

Urban Brändström
editor

Swedish Institute of Space Physics
P.O Box 812
SE-981 28 Kiruna
Sweden

Printed in Sweden
Swedish Institute of Space Physics
Kiruna 2018

ISSN 0453-9478

TABLE OF CONTENTS

INTRODUCTION

"Kiruna Geophysical Data" is a collection of results of ground-based more or less continuous measurements of upper atmosphere variables carried out at the Swedish Institute of Space Physics. Our objective with this data summary is to present current geophysical data, related to polar upper atmospheric conditions, to those who require it for their research work.

Coordinates of the Swedish Institute of Space Physics are:

Geogr.		Geomagn. Dipole		Corr. Geomagn.	
Lat.	Long.	Lat.	Long.	Lat.	Long.
67.8°N	20.4°E	65.2°N	116.0°E	64.8°N	104.2°E

The following ground-based measurements of upper atmospheric parameters have been conducted at the Swedish Institute of Space Physics in the period for which data is presented in this report.

	Geomagnetism		Optical aurora		Ionospheric ionization
1.	Geomagnetic digital recording	1.	All-sky camera	1.	Riometer 30.0 MHz
				2.	Riometer 38.2 MHz

In addition the Swedish Institute of Space Physics operates the Ionospheric Observatory at Lycksele (64.7°N, 18.8°E) where it conducts riometer and ionosonde measurements. The Geological Survey of Sweden (SGU) also operates a magnetometer there in collaboration with IRF. That data is not reported in this publication.

Universal time is used in all tables.

Ionosonde data obtained at the Swedish Institute of Space Physics in Kiruna have been published together with ionosonde data from Lycksele and Uppsala in a monthly report "Ionospheric Data Sweden" between January 1990 and March 2000. Copies are available from the Swedish Institute of Space Physics.

Scaled ionosonde parameters from 1965 – 1998 are also available from
`http://www.wdc.rl.ac.uk/wdcc1/ionosondes/data_archive.html`

The most recent data from all instruments are accessible via internet at
`http://www.irf.se/Data`

For more information contact urban.brandstrom@irf.se

GEOMAGNETIC DATA

Magnetograms

The magnetograms reproduced here are plots of data recorded by a three component digital fluxgate magnetometer with a sampling frequency of 1 sample/second.

The scaling is indicated by the tick mark values on the plots. Note that for large disturbances the normal scaling has been reduced. The positive direction of the components are: X north, Y east and Z down, in geographic coordinates.

K-indices

The K-indices give a measure of the amount of disturbance of the geomagnetic field.

A reading of maximum deflection has been made during each 3-hour interval (starting from 00 to 03 UT) of two components X and Y. The Sq + L variation has been compensated for. A detailed description of the determination of K-indices has been given by J. Bartels: The technique of scaling indices K and Q geomagnetic activity. IGY Annals 4, London 1957.

The following scale has been used:

K-indices	Deflection in nT		
0	0	-	15
1	15	-	30
2	30	-	60
3	60	-	120
4	120	-	210
5	210	-	360
6	360	-	600
7	600	-	990
8	990	-	1500
9	1500	and more	

ALL-SKY CAMERA DATA

Digital all-sky camera images are typically recorded in jpeg format at a rate of one frame per minute. The filename of each image contains information about UTC and exposure time. Longer exposure times are used at regular intervals (typically eight minutes). Data might be recorded at higher frame rates during selected periods. More information and image data are available from: `http://www.irf.se/allsky`

Information about available records of all-sky camera data is presented as colour keograms. Keograms are time sequences of poleward to equatorward slices through the centre of all-sky images. The top of the image points poleward, the bottom equatorward. Time is on the horizontal axis (0:00-24:00 UTC). Each page contains keograms for seven days. White areas indicate missing data (e.g. daylight conditions).

IONOSPHERIC ABSORPTION DATA

Ionospheric absorption at 30.0 MHz and 38.2 MHz is recorded by two La Jolla riometers. The riometer records of cosmic noise power are reproduced in this report. The zero power level is at bottom of each panel.

The absorption (in decibels) can be computed from the formula

$$A(dB) = 10\log_{10}\frac{P_o}{P}$$

where P is the received cosmic noise power, P_o the cosmic noise power expected under ionospherically quiet conditions at the same sidereal time.

GEOMAGNETIC K-INDICES, KIRUNA

October 2017

Lower limit of K=8 is 990 nT

Time in UT

Day	00 - 03	03 - 06	06 - 09	09 - 12	12 - 15	15 - 18	18 - 21	21 - 24	Sum
1	6	2	3	2	3	6	4	6	32
2	2	4	1	2	2	2	2	0	15
3	3	4	2	1	1	2	3	5	21
4	3	2	2	1	1	1	3	5	18
5	5	2	1	1	1	1	3	5	19
6	4	3	2	2	2	3	3	5	24
7	2	1	1	1	2	1	2	3	13
8	1	1	1	1	1	0	2	1	8
9	2	1	(0)	(1)	1	0	0	0	(5)
10	0	0	1	1	1	1	0	5	9
11	5	3	3	4	4	7	6	5	37
12	7	4	(4)	4	5	5	5	7	(41)
13	5	4	3	(3)	7	6	8	7	(43)
14	7	5	5	5	4	5	6	6	43
15	7	6	3	4	5	5	5	1	36
16	2	3	2	2	2	1	6	4	22
17	1	1	2	1	2	2	3	2	14
18	1	1	1	1	0	0	3	5	12
19	5	2	2	2	3	4	6	5	29
20	5	2	2	2	2	1	3	5	22
21	2	1	1	2	2	3	5	6	22
22	6	2	1	2	1	0	3	3	18
23	3	0	1	2	1	1	2	2	12
24	2	0	1	2	5	5	5	7	27
25	4	5	4	4	3	3	6	5	34
26	5	3	3	3	5	5	4	3	31
27	3	1	2	1	1	0	2	3	13
28	3	1	1	2	1	2	2	1	13
29	1	0	0	1	0	1	2	1	6
30	1	1	0	1	1	1	0	2	7
31	2	0	1	1	1	0	0	1	6
Sum	105	65	56	62	70	74	104	116	

GEOMAGNETIC K-INDICES, KIRUNA

November 2017

Lower limit of K=8 is 990 nT

Time in UT

Day	00 - 03	03 - 06	06 - 09	09 - 12	12 - 15	15 - 18	18 - 21	21 - 24	Sum
1	1	0	0	1	1	1	3	3	10
2	3	2	1	1	2	1	2	6	18
3	6	2	1	2	2	2	3	3	21
4	1	0	1	1	1	1	0	2	7
5	0	0	1	1	0	0	0	0	2
6	1	0	0	1	0	0	0	0	2
7	1	2	2	(5)	(5)	4	7	8	(34)
8	7	6	4	4	5	5	6	7	44
9	5	3	4	4	5	4	5	7	37
10	4	3	4	4	4	4	5	5	33
11	5	3	2	2	2	2	2	3	21
12	2	1	1	1	0	2	4	4	15
13	1	2	1	1	1	3	0	0	9
14	4	3	1	2	2	5	6	5	28
15	4	2	2	3	3	5	4	4	27
16	4	4	3	2	2	2	5	5	27
17	1	1	2	2	2	1	0	2	11
18	2	1	2	2	2	2	4	4	19
19	1	1	3	2	1	0	2	0	10
20	1	1	1	1	0	1	4	6	15
21	7	4	4	4	4	6	6	6	41
22	3	3	1	2	3	3	6	2	23
23	2	2	1	2	1	2	4	5	19
24	5	2	1	(1)	0	1	7	6	(23)
25	(3)	(2)	(1)	(2)	1	2	1	0	(12)
26	0	0	0	1	1	1	1	1	5
27	1	1	0	0	2	1	3	2	10
28	5	2	1	1	1	1	2	1	14
29	1	1	1	(0)	0	(1)	3	5	(12)
30	3	4	(1)	2	2	4	2	3	(21)
Sum	84	58	47	57	55	67	97	105	

GEOMAGNETIC K-INDICES, KIRUNA

December 2017

Lower limit of K=7 is 600 nT

Time in UT

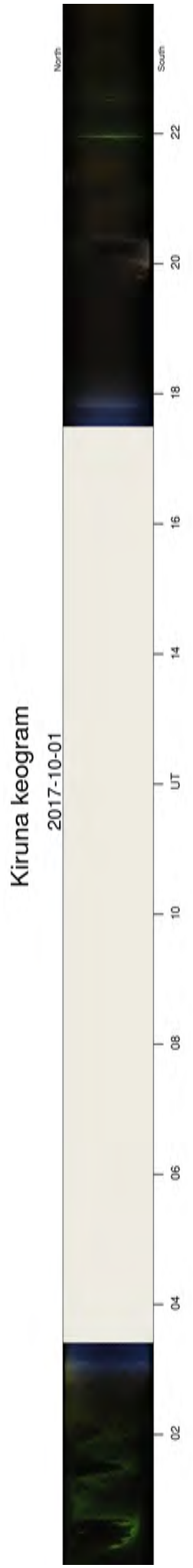
Day	00 - 03	03 - 06	06 - 09	09 - 12	12 - 15	15 - 18	18 - 21	21 - 24	Sum
1	1	1	1	1	1	3	5	1	14
2	1	0	0	1	1	3	1	1	8
3	0	0	0	0	0	1	0	2	3
4	0	0	1	1	2	5	5	5	19
5	5	5	3	4	5	6	5	6	39
6	4	3	3	2	(3)	2	4	4	(25)
7	3	1	2	1	2	3	3	4	19
8	2	1	3	1	1	1	1	2	12
9	2	0	0	1	2	2	2	0	9
10	0	0	0	1	0	3	2	2	8
11	2	2	(2)	(2)	(2)	3	4	3	(20)
12	3	2	(3)	2	1	3	6	5	(25)
13	2	1	(2)	1	1	2	3	4	(16)
14	3	1	(1)	(0)	0	0	2	2	(9)
15	0	0	1	1	1	1	2	1	7
16	0	0	(0)	0	1	1	1	2	(5)
17	3	3	3	2	4	6	7	7	35
18	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
19	5	1	(0)	1	2	1	4	5	(19)
20	3	2	(1)	(1)	(1)	1	3	0	(12)
21	0	0	(0)	(0)	1	0	1	0	(2)
22	0	0	(0)	0	0	0	0	2	(2)
23	1	2	1	1	1	0	1	1	8
24	1	2	1	1	4	5	(4)	5	(23)
25	4	1	1	2	1	5	6	5	25
26	4	3	2	1	1	3	(5)	6	(25)
27	3	1	2	1	1	3	(4)	4	(19)
28	2	0	0	1	1	1	3	4	12
29	0	1	0	1	1	1	3	1	8
30	0	1	0	1	1	2	2	5	12
31	1	0	0	1	0	1	2	5	10
Sum	55	34	33	33	42	68	91	94	

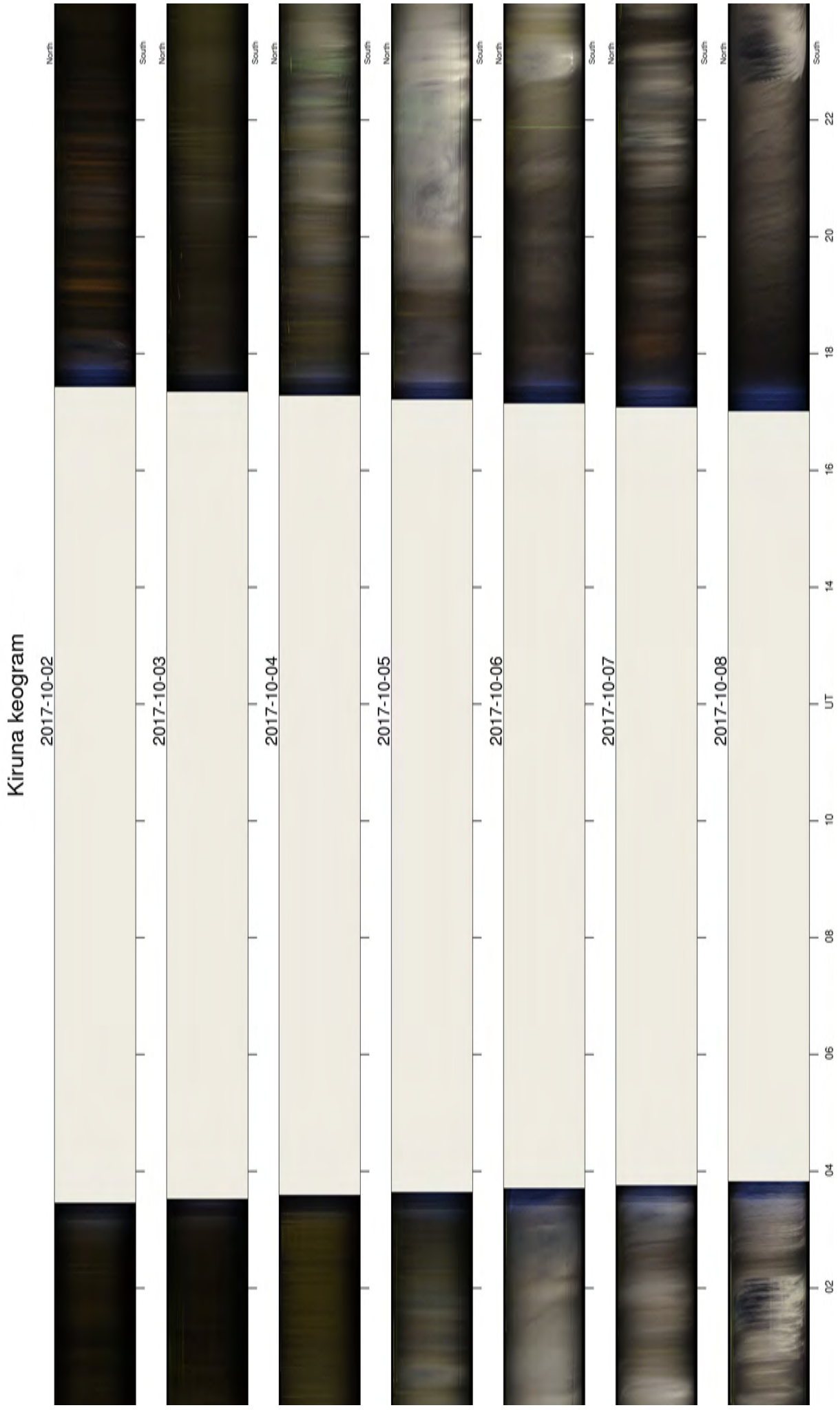
ALL-SKY CAMERA KEOGRAMS

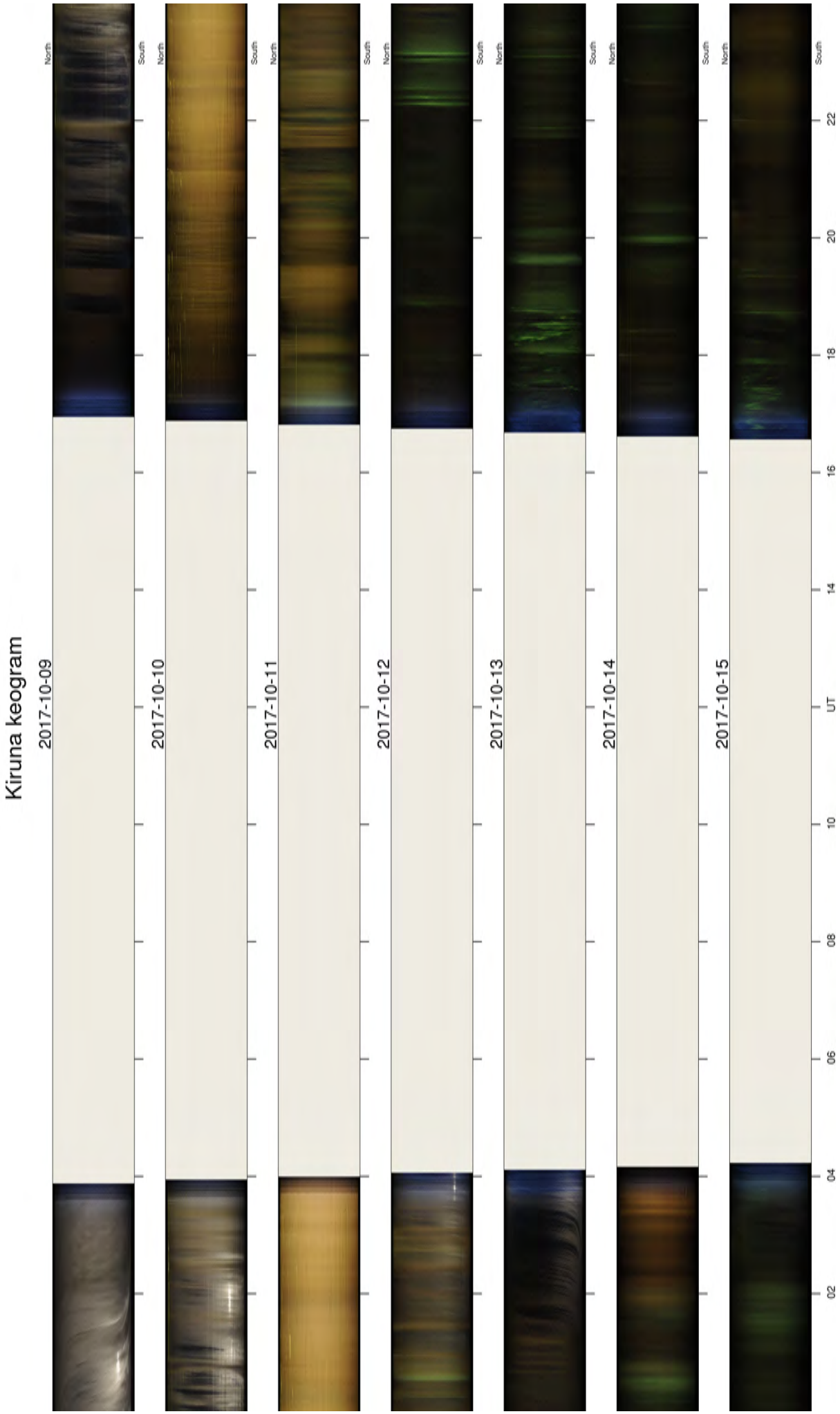
October - December 2017

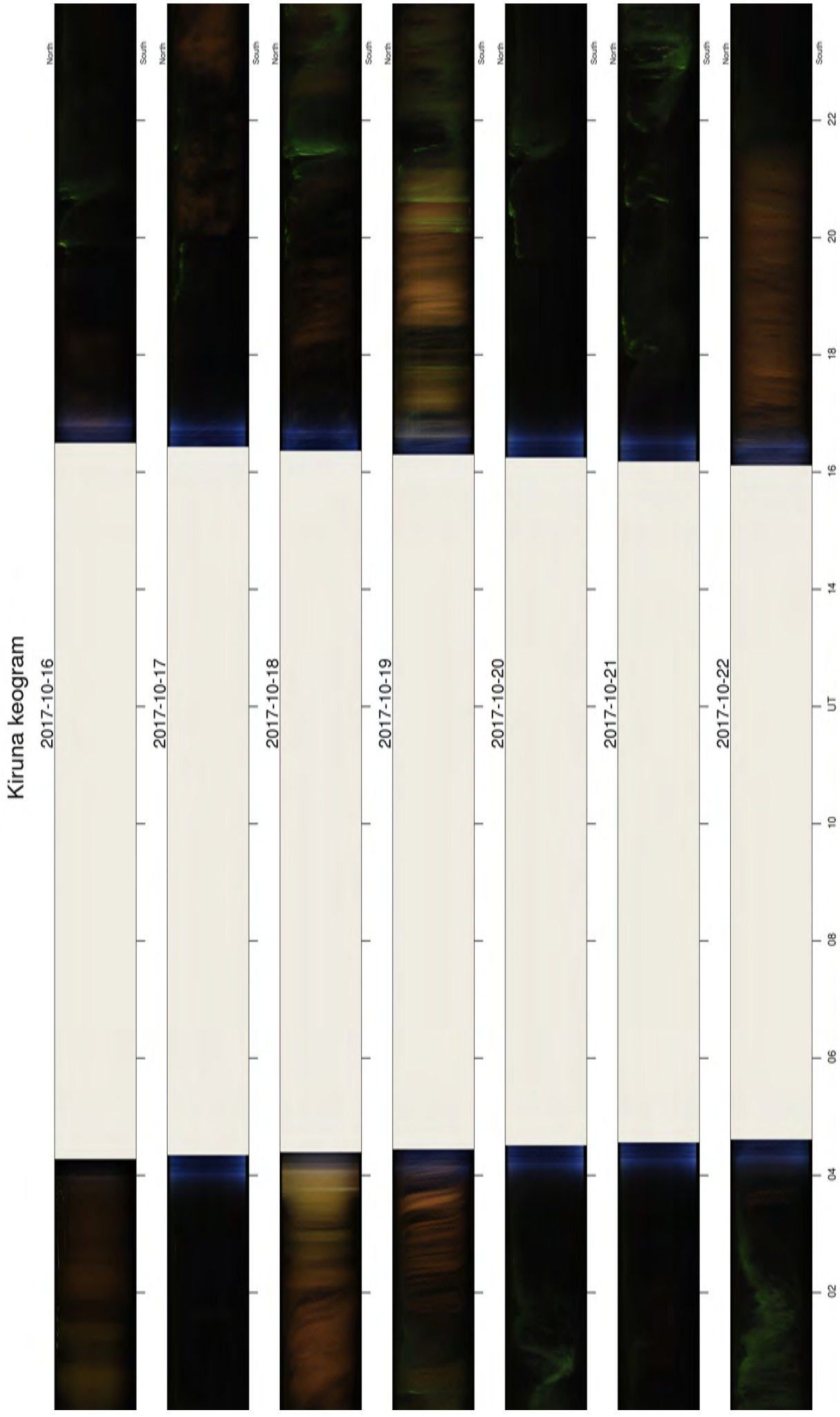
http://www.irf.se/allsky/kgd

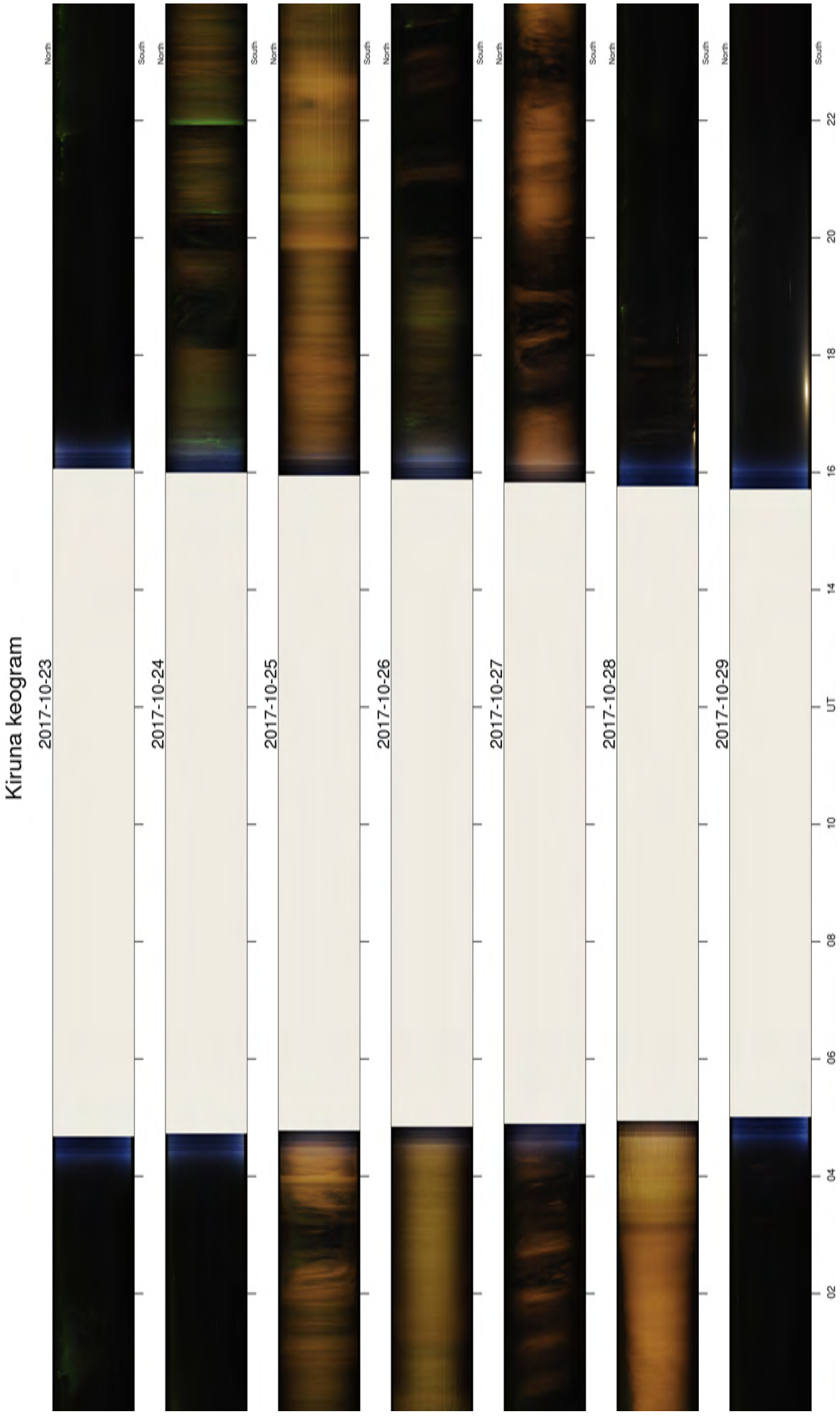
Camera fault 2017-12-19(night) – 2017-12-20(morning)

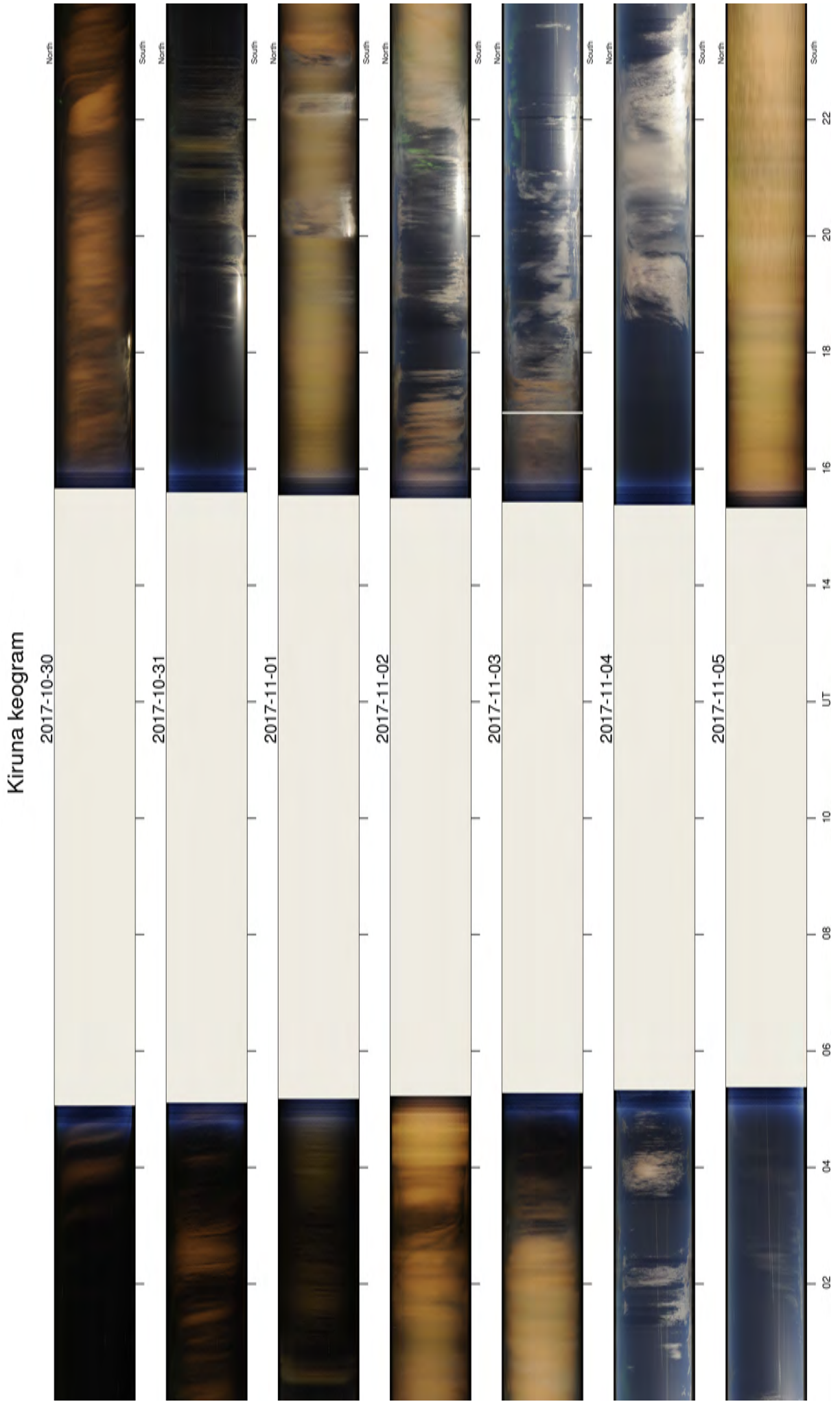

Kiruna keogram
2017-10-01
North
South
02
04
06
08
10
UT
14
16
18
20
22

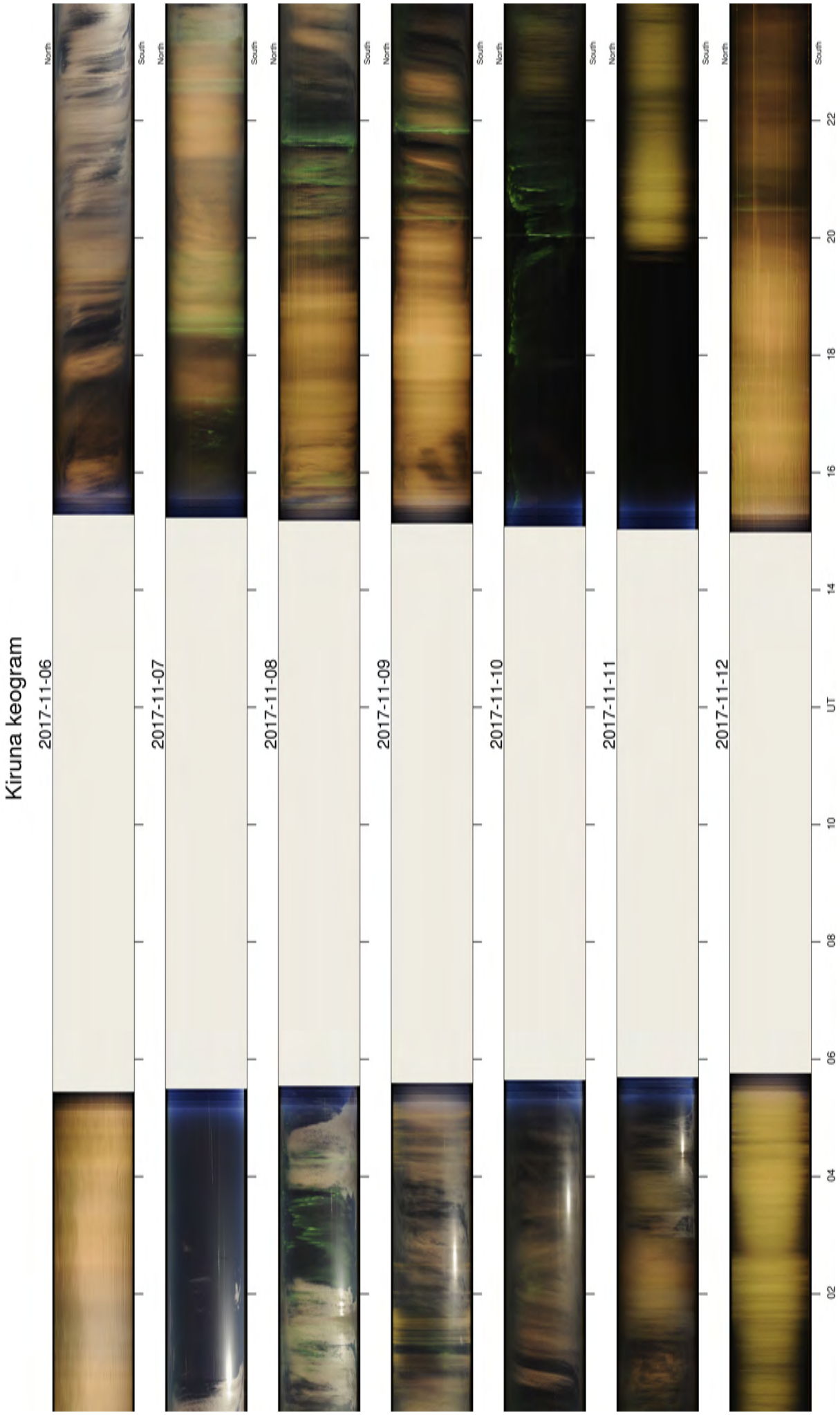

Kiruna keogram
2017-10-02
2017-10-03
2017-10-04
2017-10-05
2017-10-06
2017-10-07
2017-10-08
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

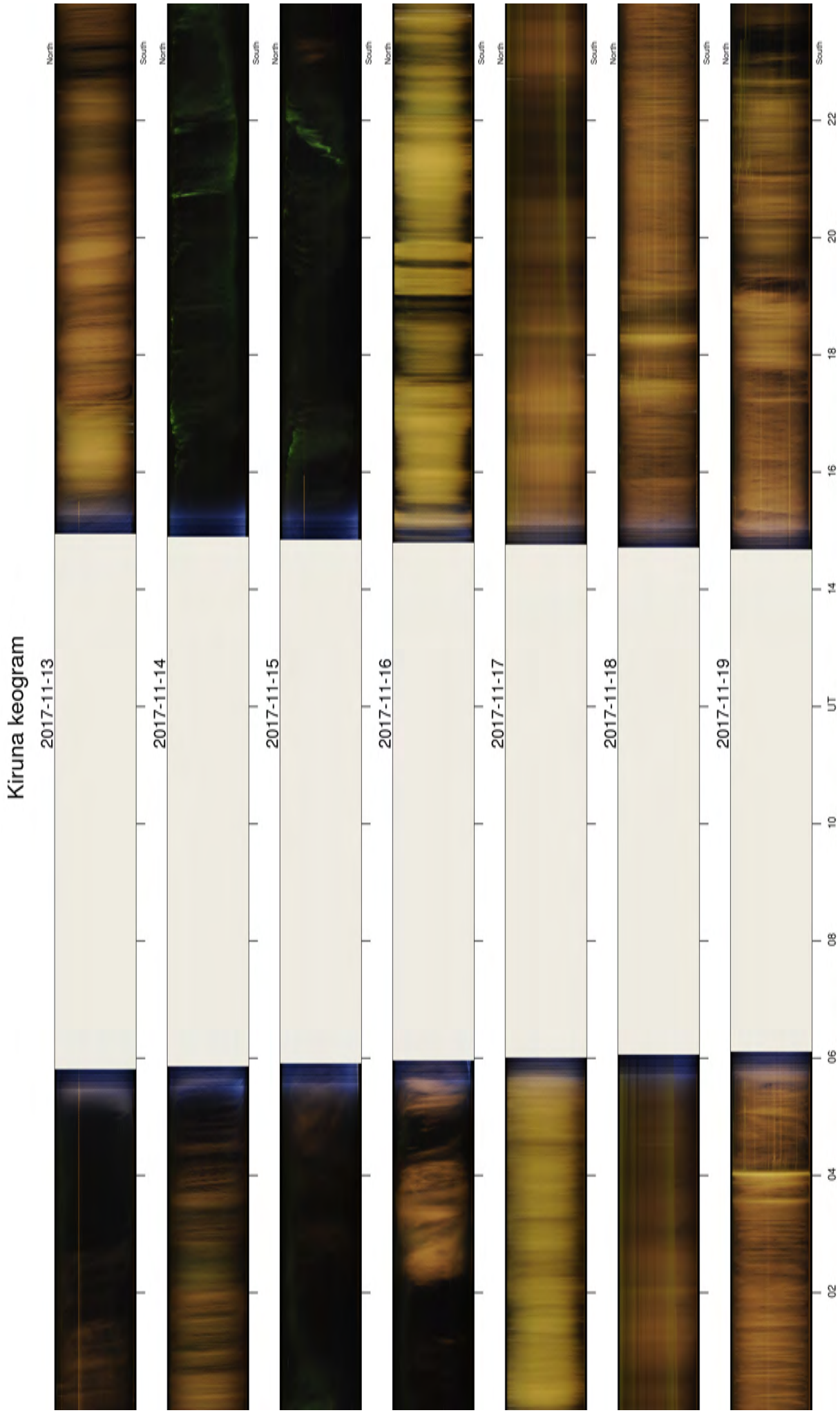

Kiruna keogram
2017-10-09
2017-10-10
2017-10-11
2017-10-12
2017-10-13
2017-10-14
2017-10-15
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

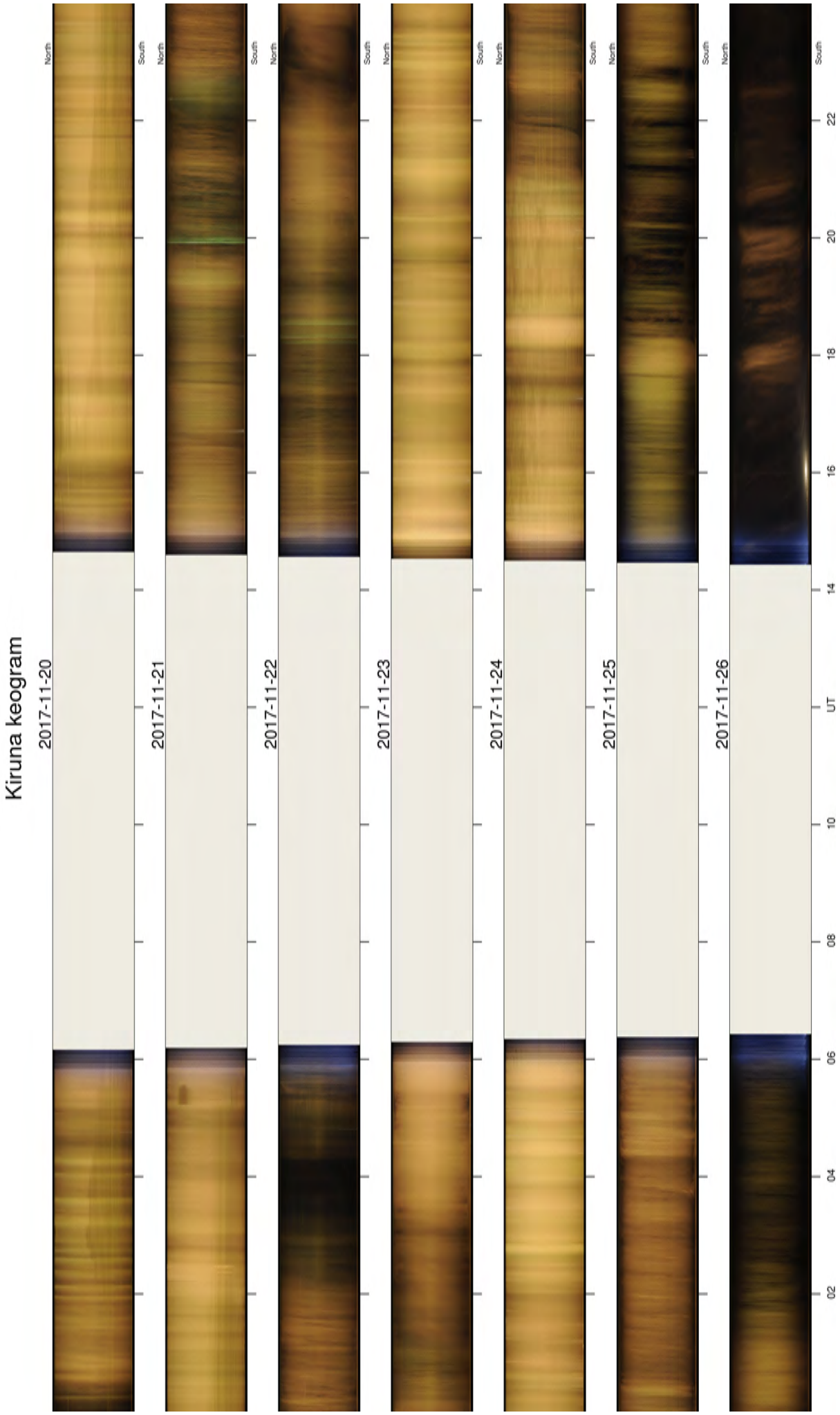

Kiruna keogram
2017-10-16
2017-10-17
2017-10-18
2017-10-19
2017-10-20
2017-10-21
2017-10-22
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

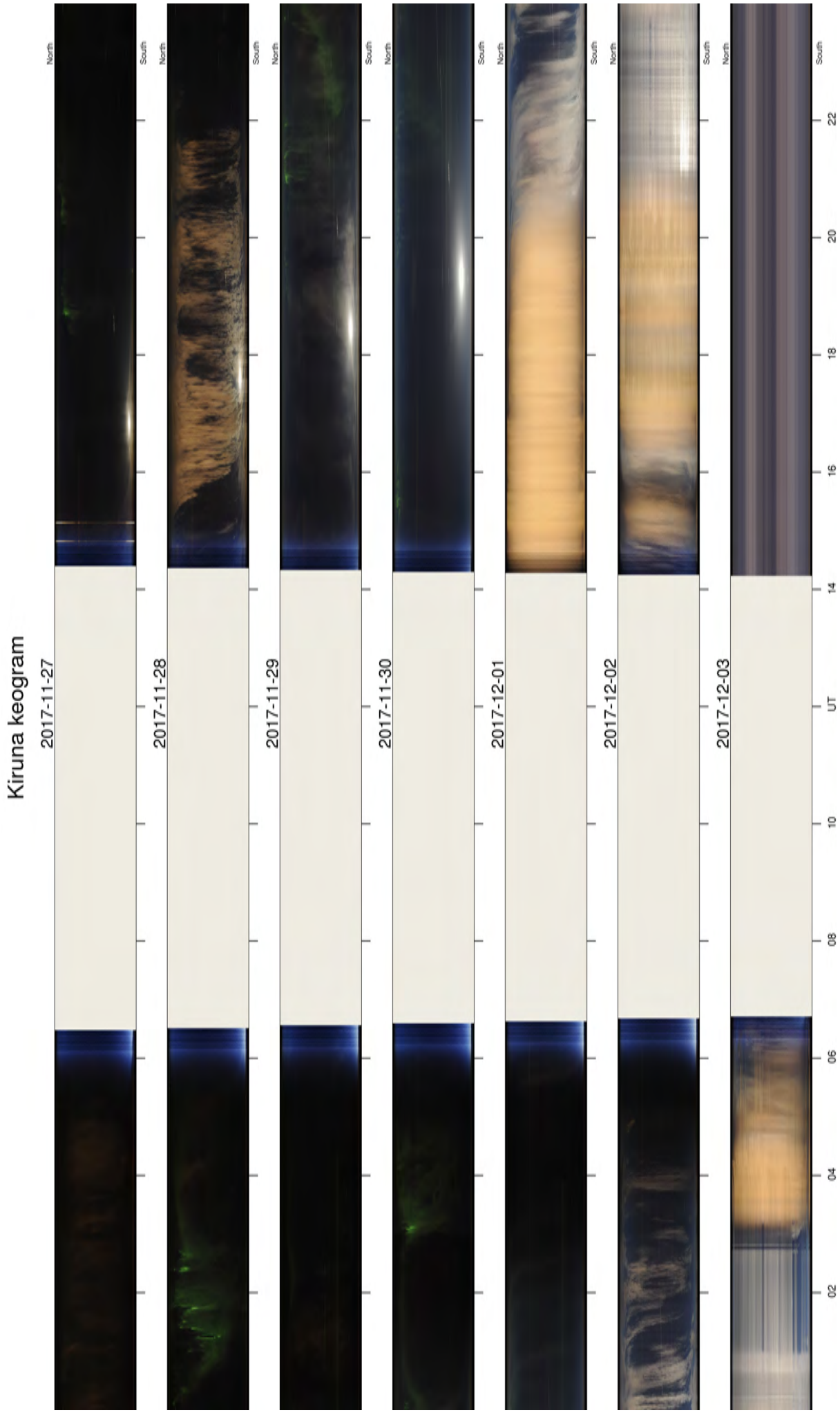

Kiruna keogram
2017-10-23
2017-10-24
2017-10-25
2017-10-26
2017-10-27
2017-10-28
2017-10-29
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

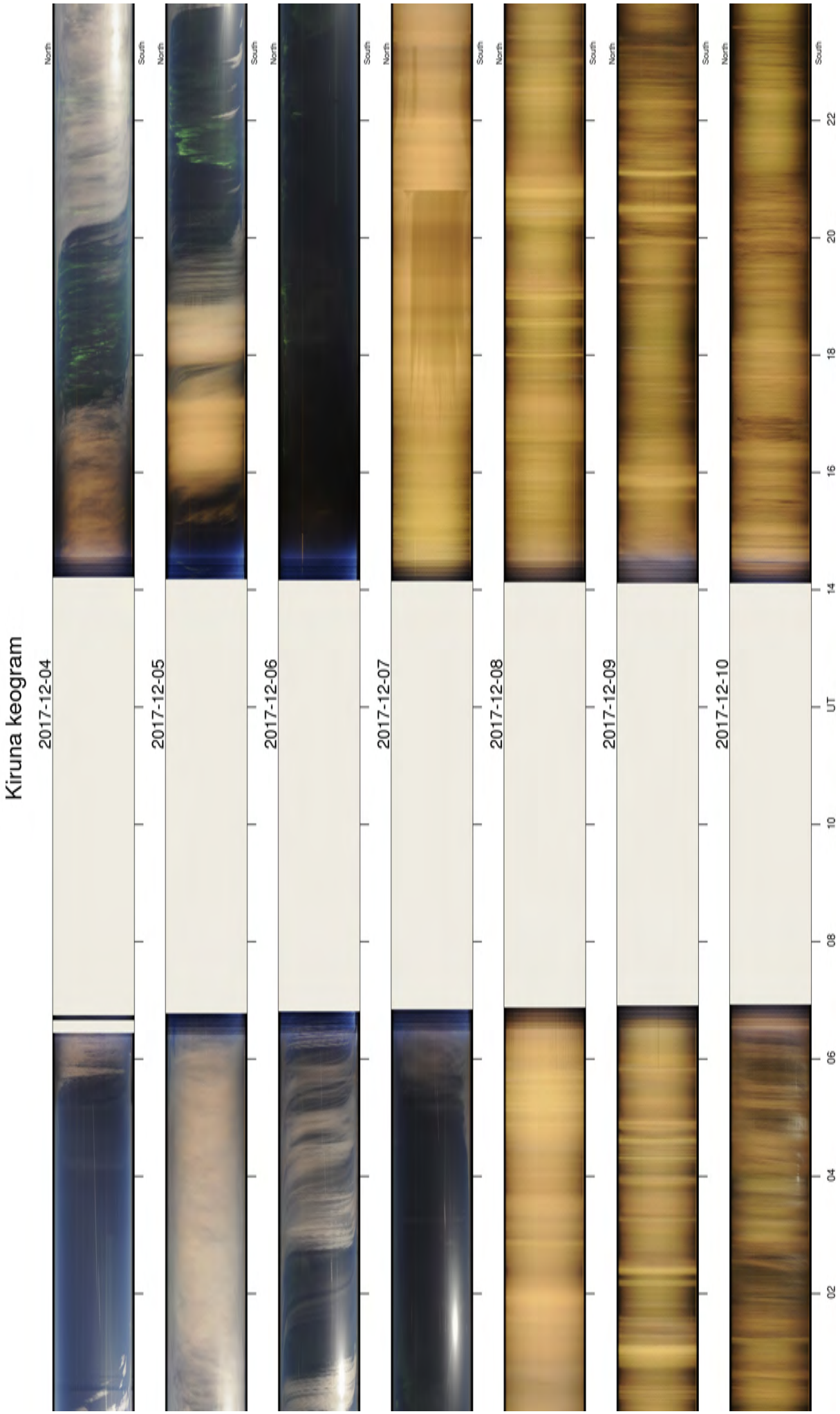

Kiruna keogram
2017-10-30
2017-10-31
2017-11-01
2017-11-02
2017-11-03
2017-11-04
2017-11-05
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

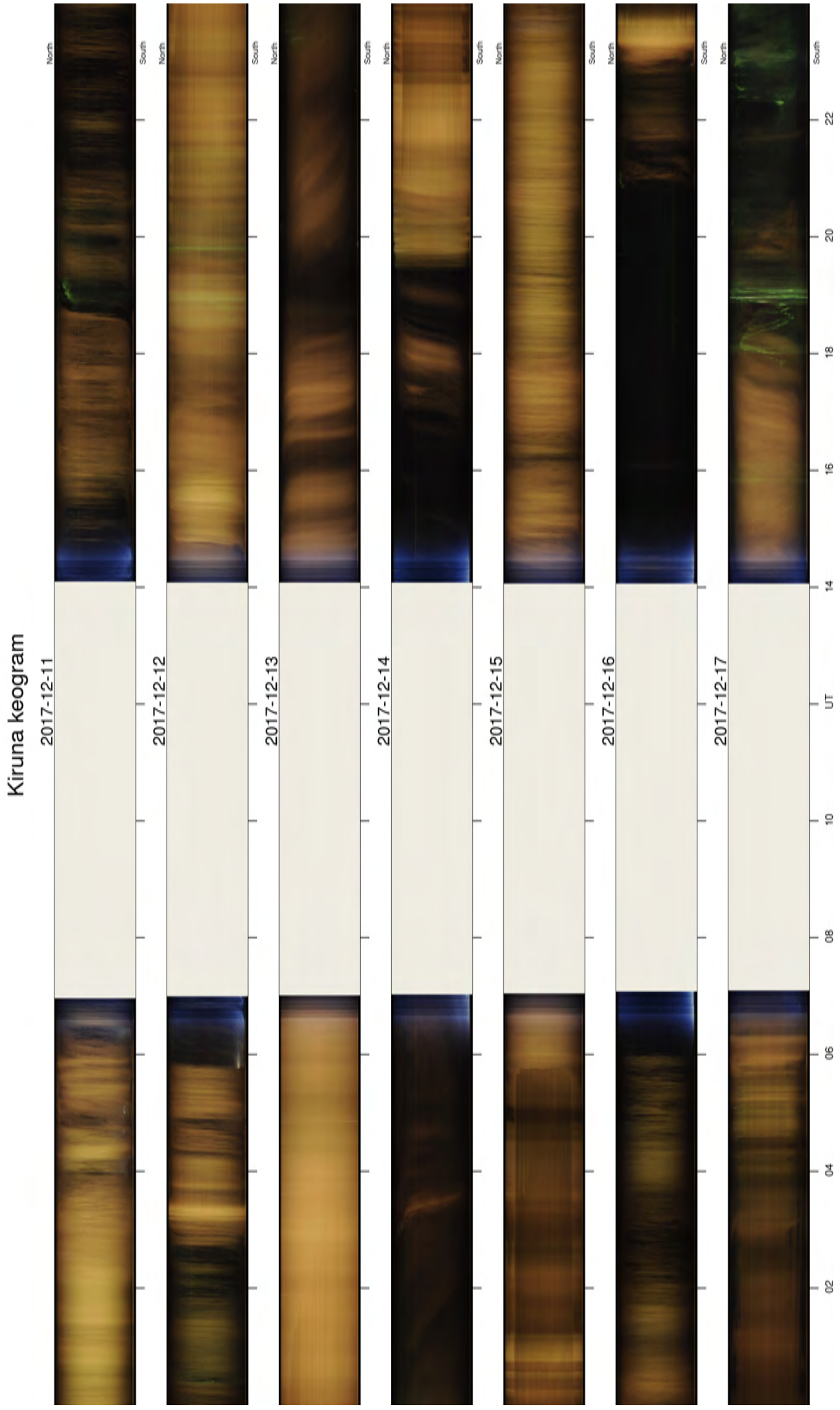

Kiruna keogram
2017-11-06
2017-11-07
2017-11-08
2017-11-09
2017-11-10
2017-11-11
2017-11-12
North
South
02
04
06
08
10
UT
14
16
18
20
22

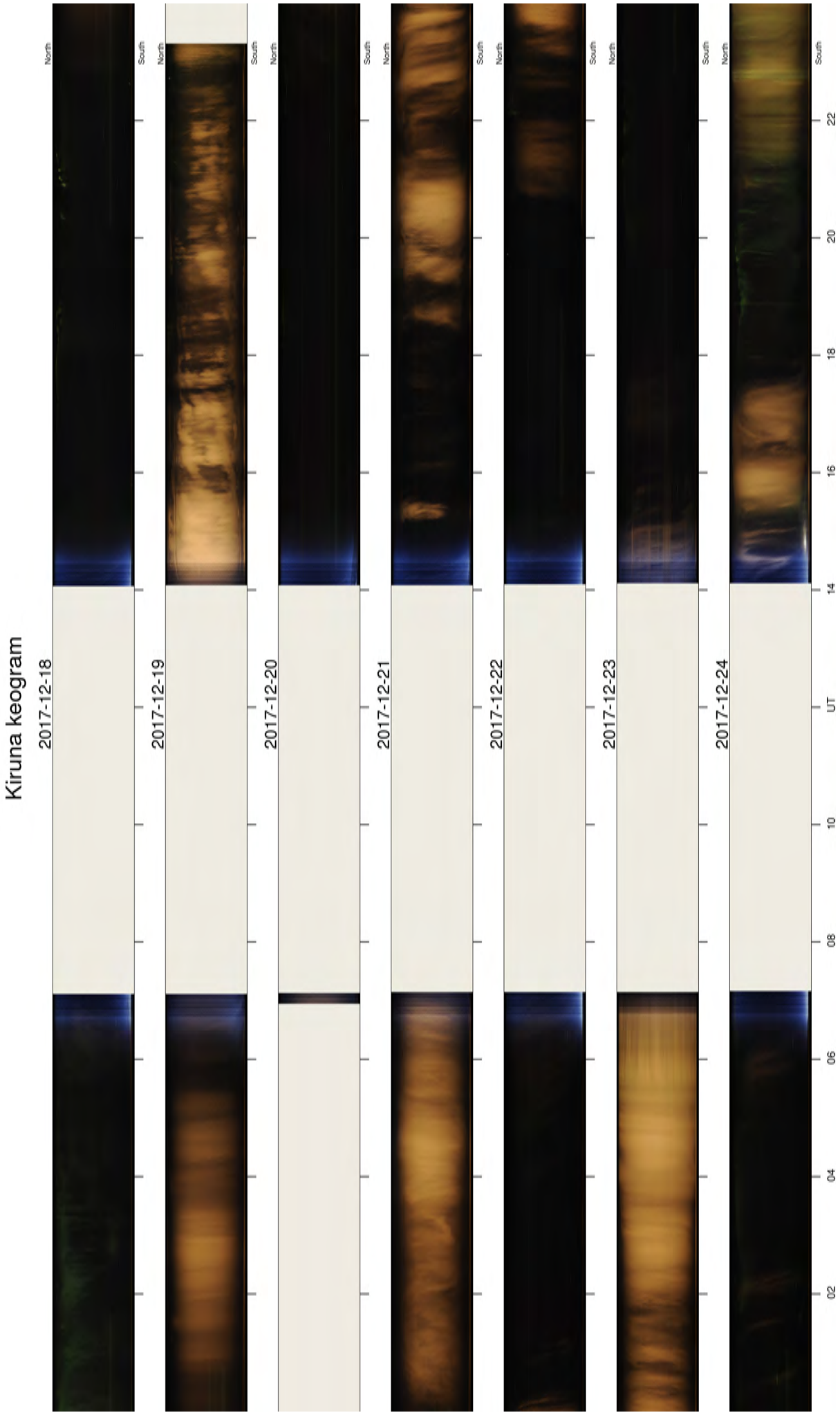

Kiruna keogram
2017-11-13
2017-11-14
2017-11-15
2017-11-16
2017-11-17
2017-11-18
2017-11-19
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

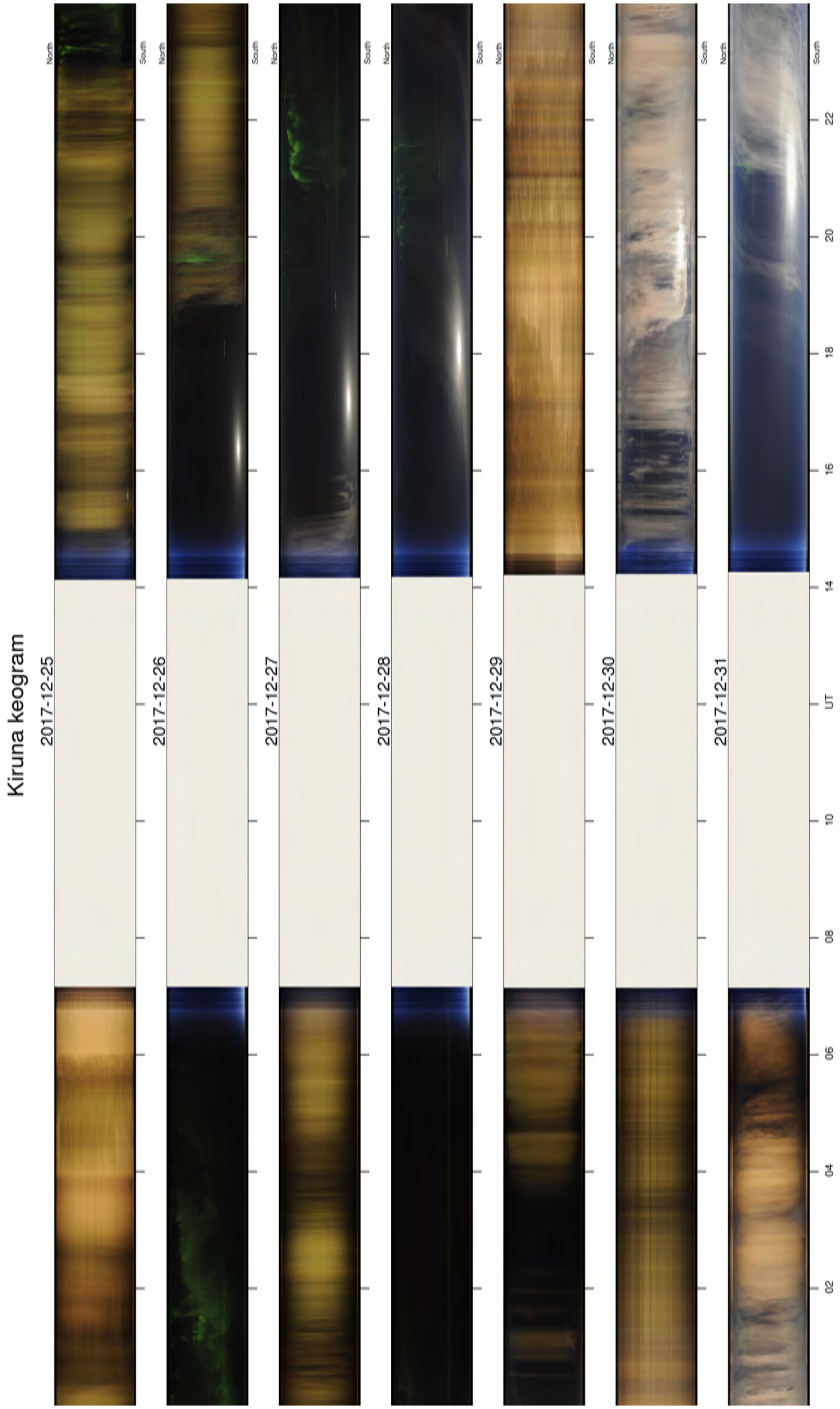

Kiruna keogram
2017-11-20
2017-11-21
2017-11-22
2017-11-23
2017-11-24
2017-11-25
2017-11-26
North
South
02
04
06
08
10
12
14
16
18
20
22
UT


Kiruna keogram
2017-11-27
2017-11-28
2017-11-29
2017-11-30
2017-12-01
2017-12-02
2017-12-03
North
South
02
04
06
08
10
UT
14
16
18
20
22


Kiruna keogram
2017-12-04
2017-12-05
2017-12-06
2017-12-07
2017-12-08
2017-12-09
2017-12-10
North
South
02
04
06
08
10
UT
14
16
18
20
22


Kiruna keogram
2017-12-11
2017-12-12
2017-12-13
2017-12-14
2017-12-15
2017-12-16
2017-12-17
North
South
02
04
06
08
10
12
14
16
18
20
22
UT


Kiruna keogram
2017-12-18
2017-12-19
2017-12-20
2017-12-21
2017-12-22
2017-12-23
2017-12-24
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

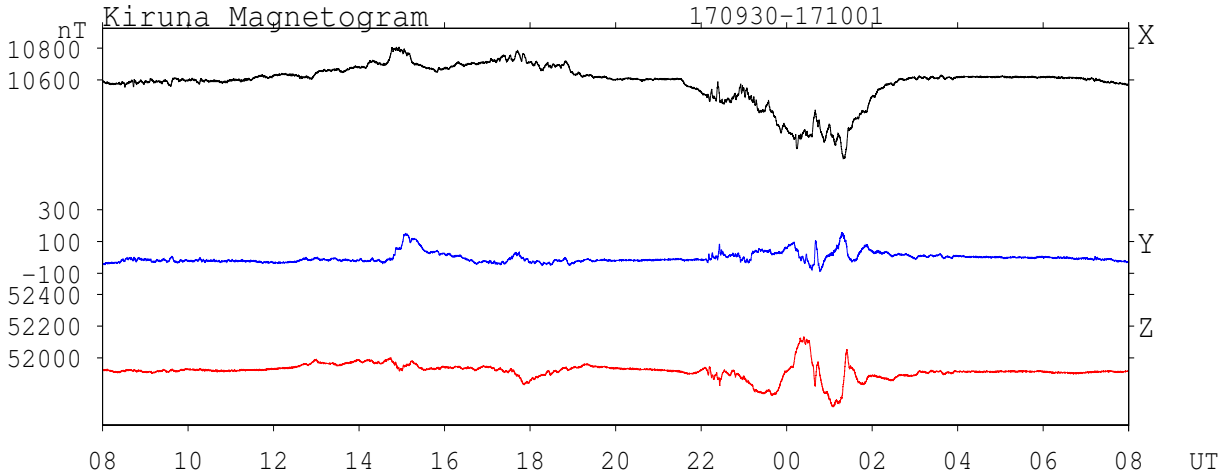

Kiruna keogram
2017-12-25
2017-12-26
2017-12-27
2017-12-28
2017-12-29
2017-12-30
2017-12-31
North
South
02
04
06
08
10
12
14
16
18
20
22
UT

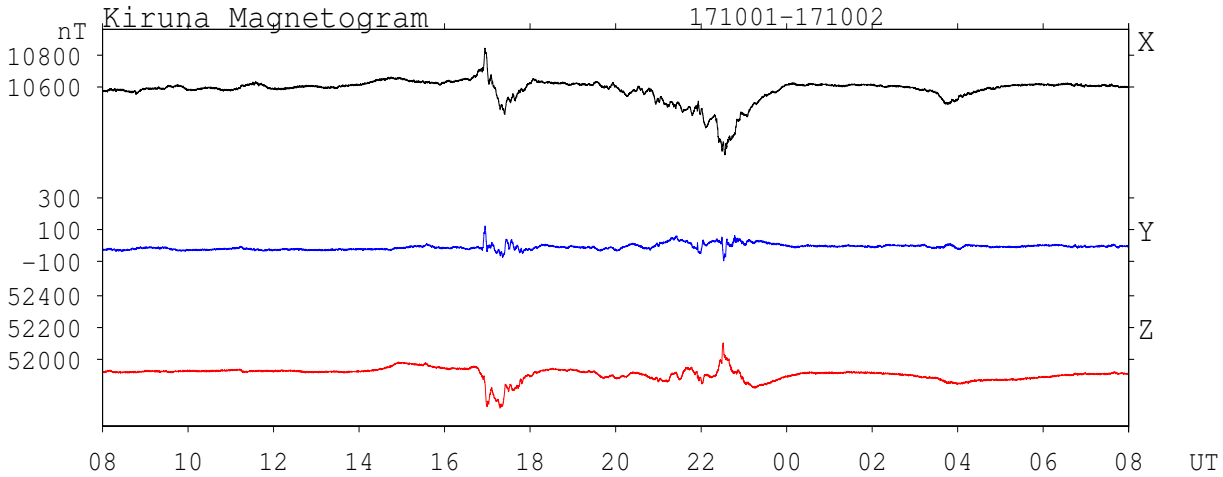
KIRUNA MAGNETOGRAM PLOTS

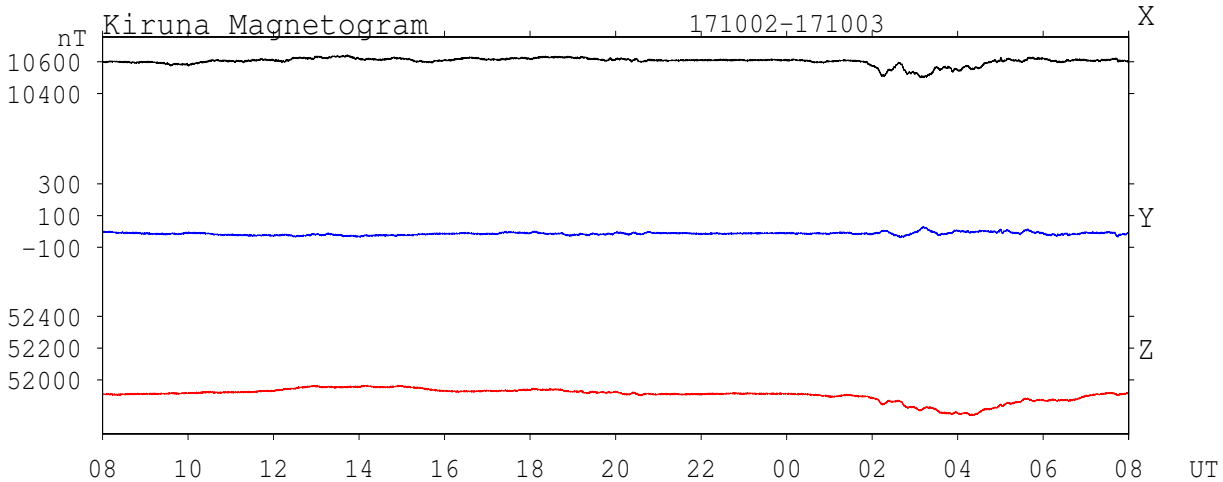
October - December 2017

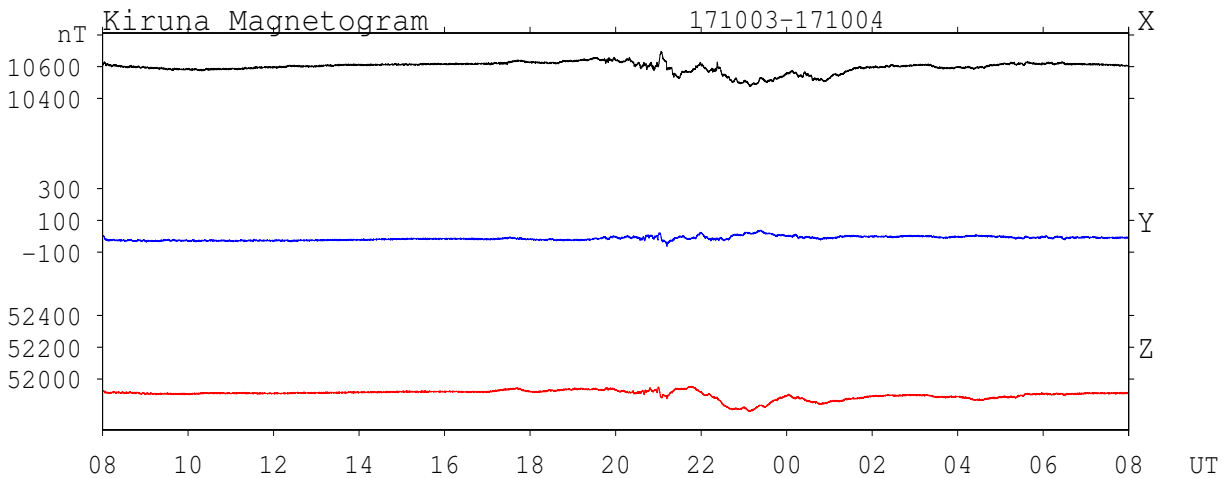
http://www.irf.se/mag

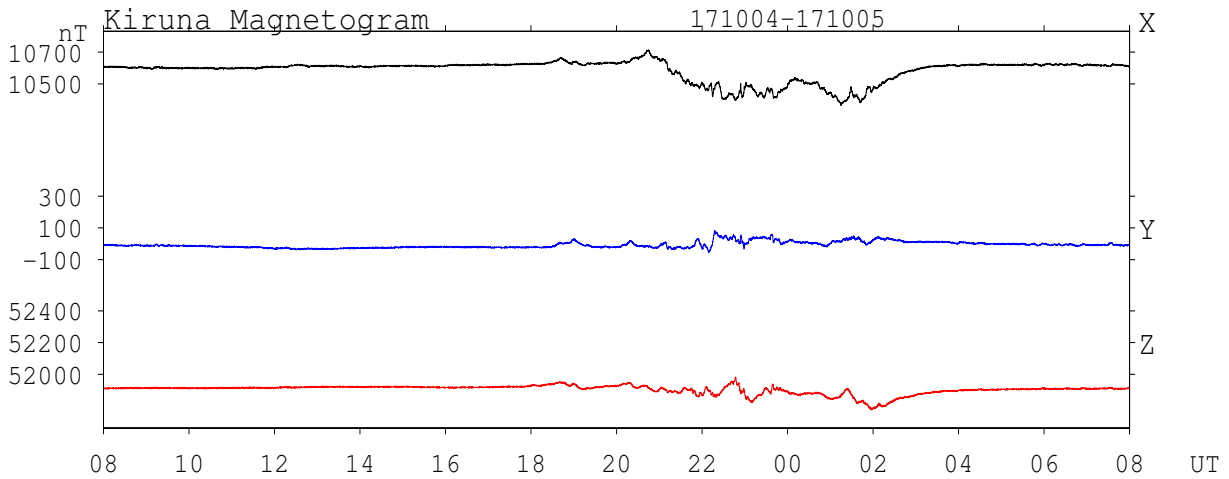
Note:
Scaling for 171013 and 171107 is 300 nT instead of 200 nT.
171108-171120: magnetometer is temporally removed for a calibration test.

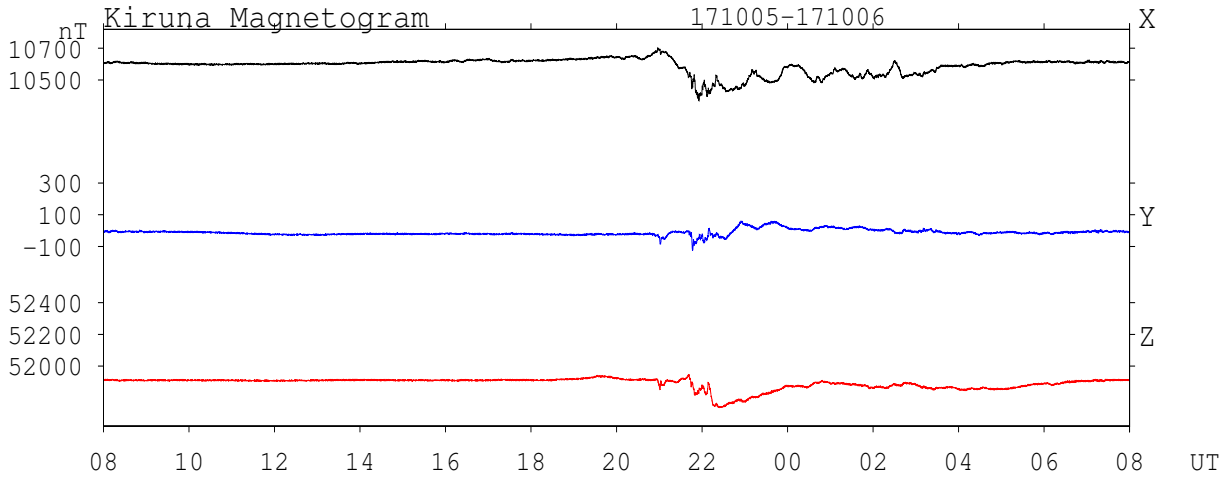

Kiruna Magnetogram
170930-171001
nT
10800
10600
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

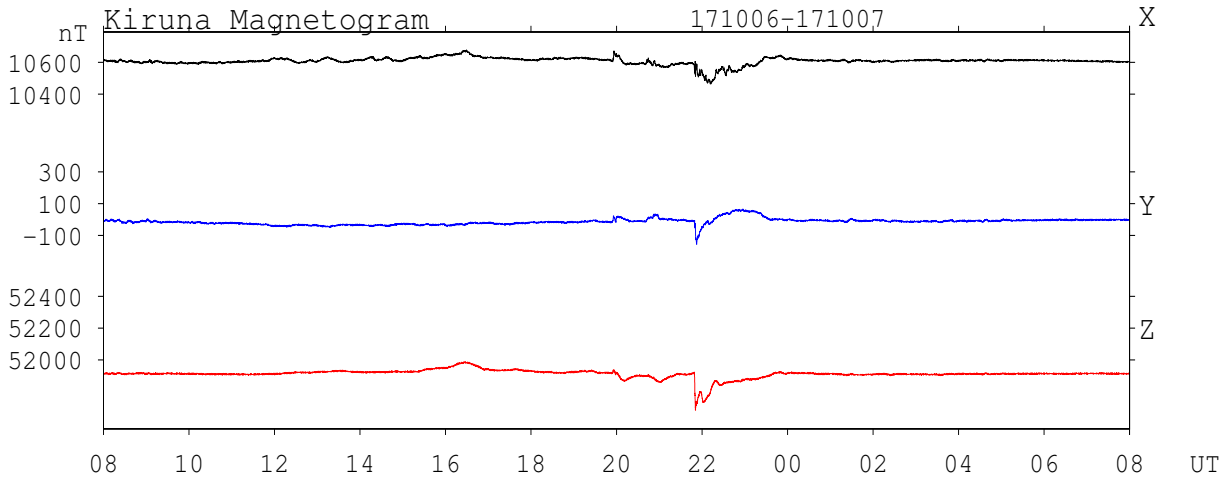

Kiruna Magnetogram
171001-171002
nT
10800
10600
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

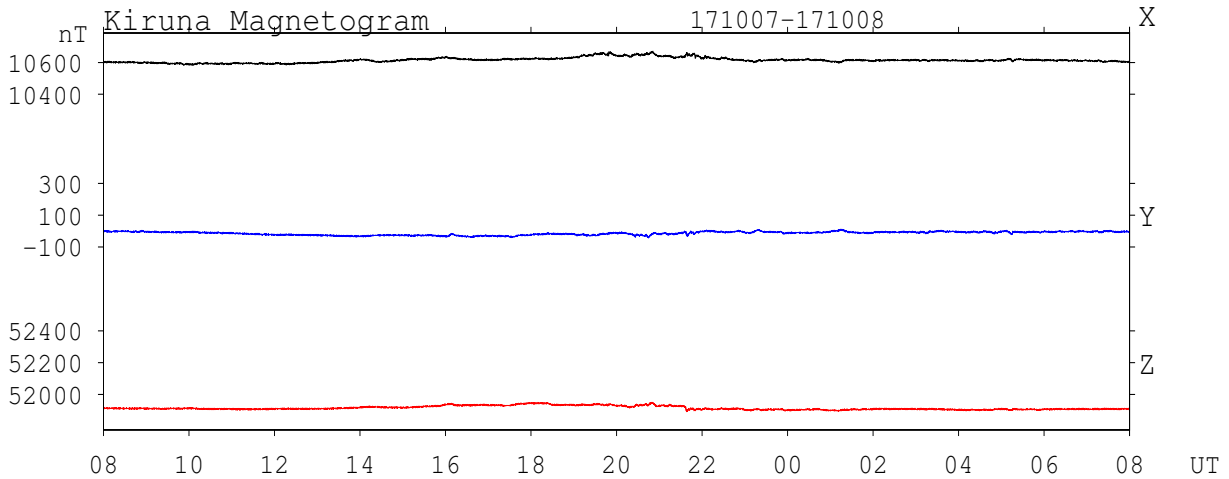

Kiruna Magnetogram
171002-171003
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

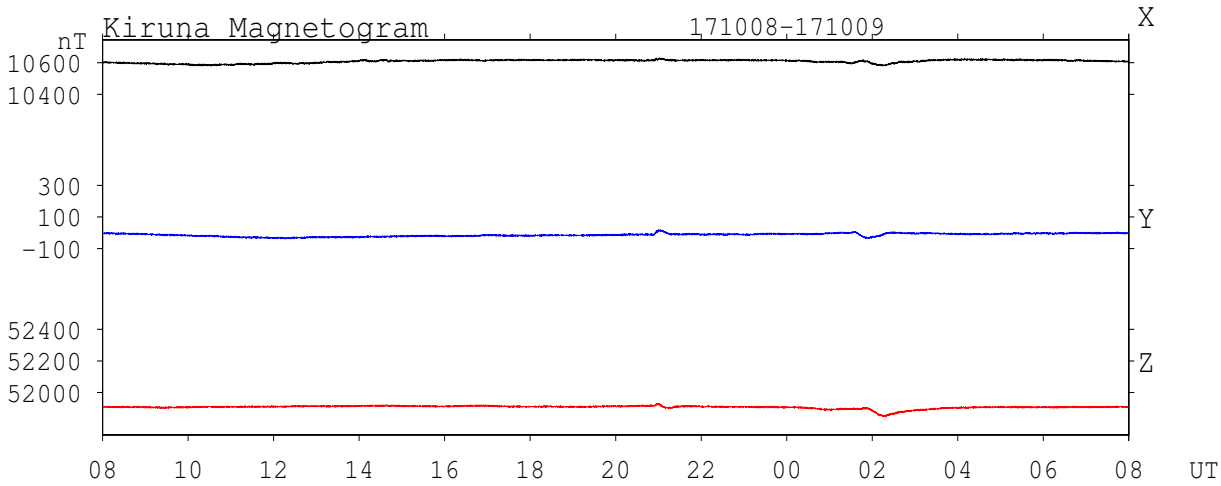

Kiruna Magnetogram
171003-171004
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

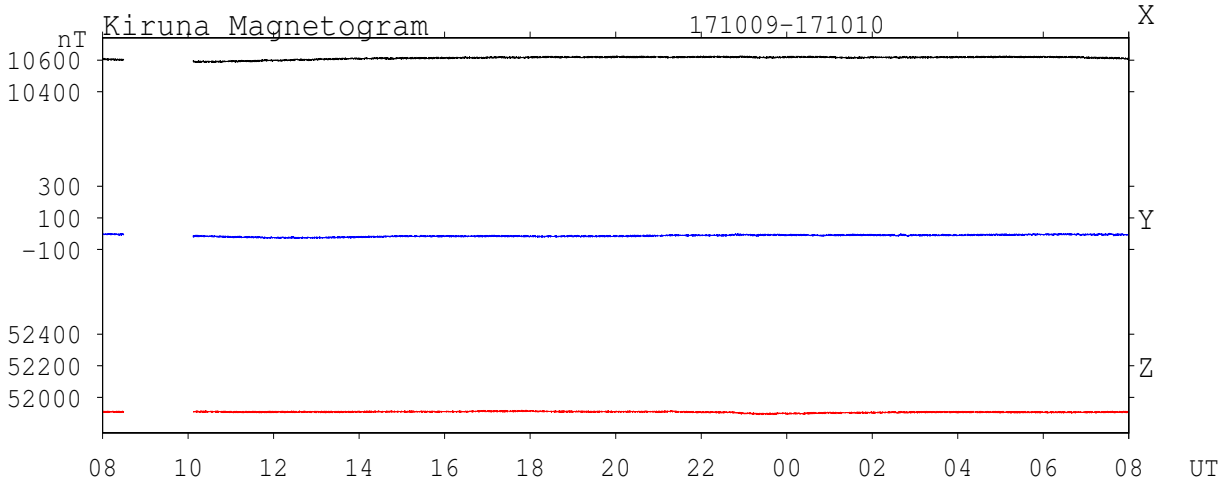

Kiruna Magnetogram
171004-171005
nT
X
10700
10500
300
100
-100
Y
52400
52200
52000
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

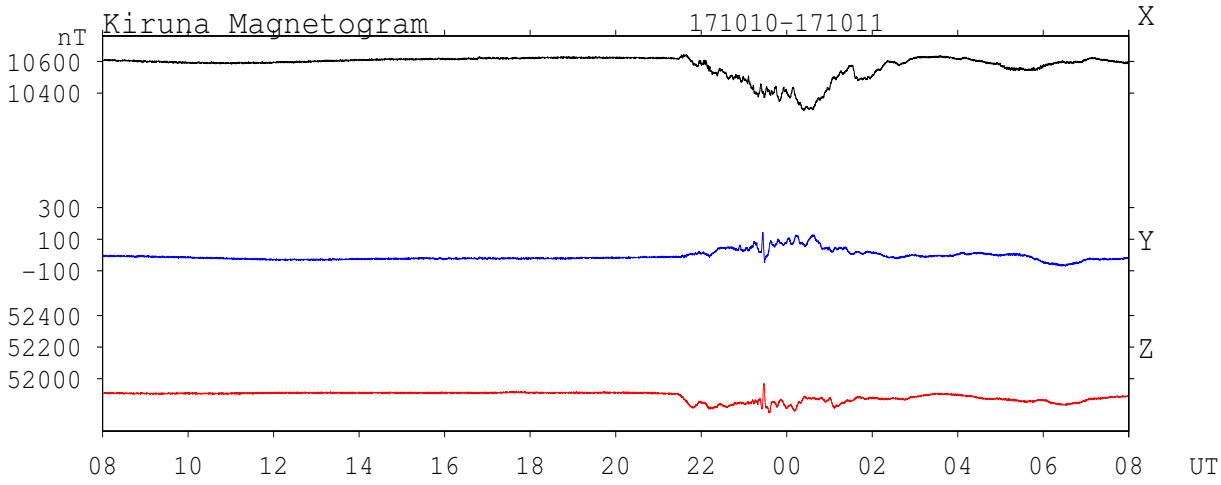

Kiruna Magnetogram
171005-171006
nT
X
10700
10500
300
100
-100
Y
52400
52200
52000
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

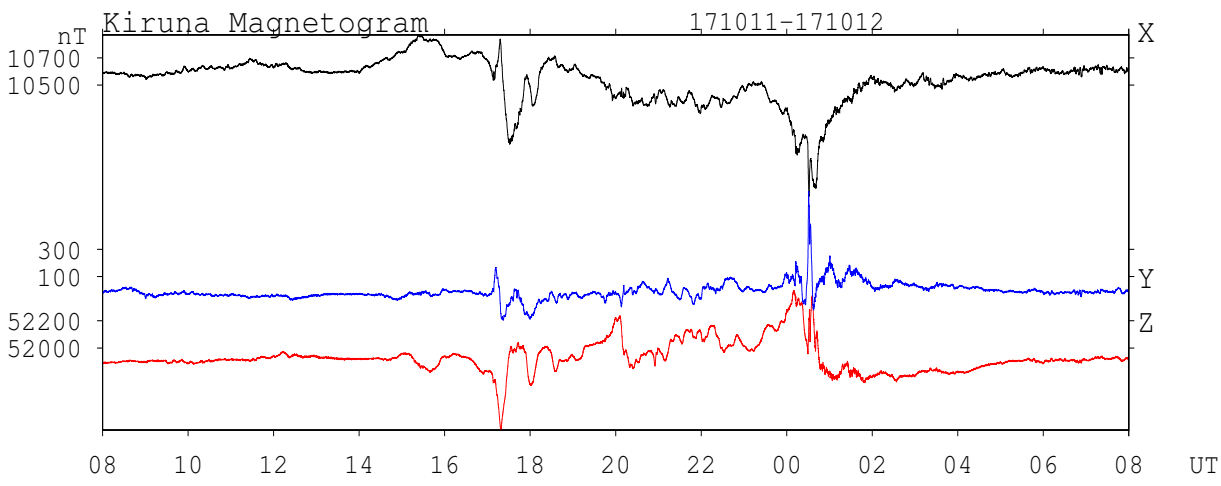

Kiruna Magnetogram
171006-171007
nT
X
10600
10400
300
100
-100
Y
52400
52200
52000
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

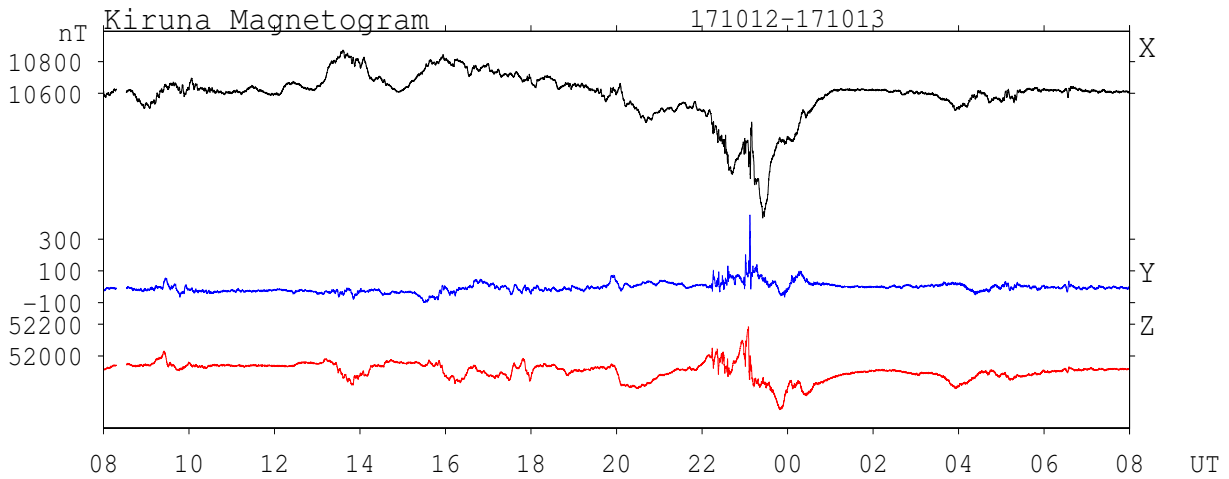

Kiruna Magnetogram
171007-171008
nT
X
10600
10400
300
100
-100
Y
52400
52200
52000
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

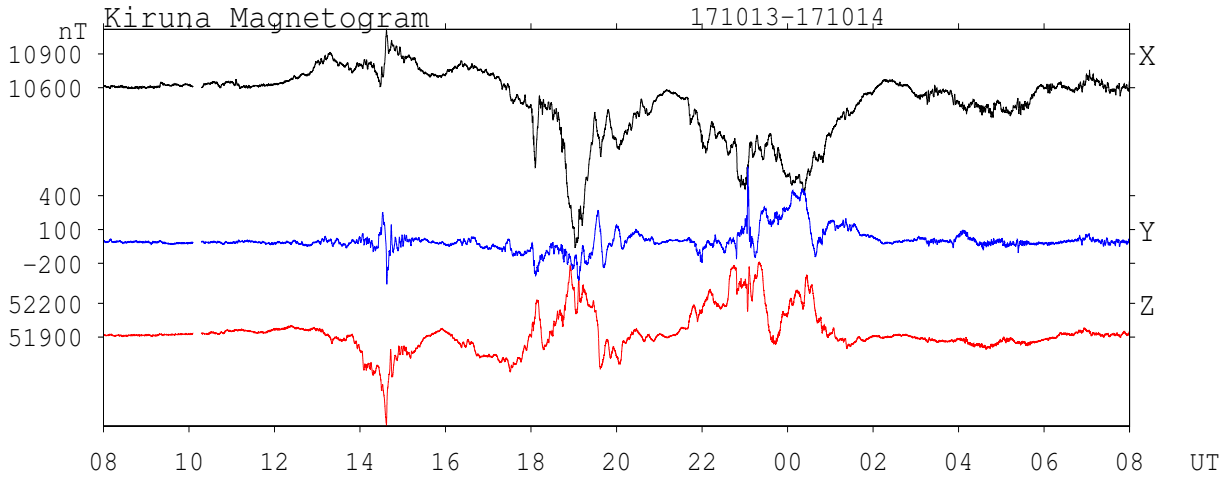

Kiruna Magnetogram
171008-171009
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

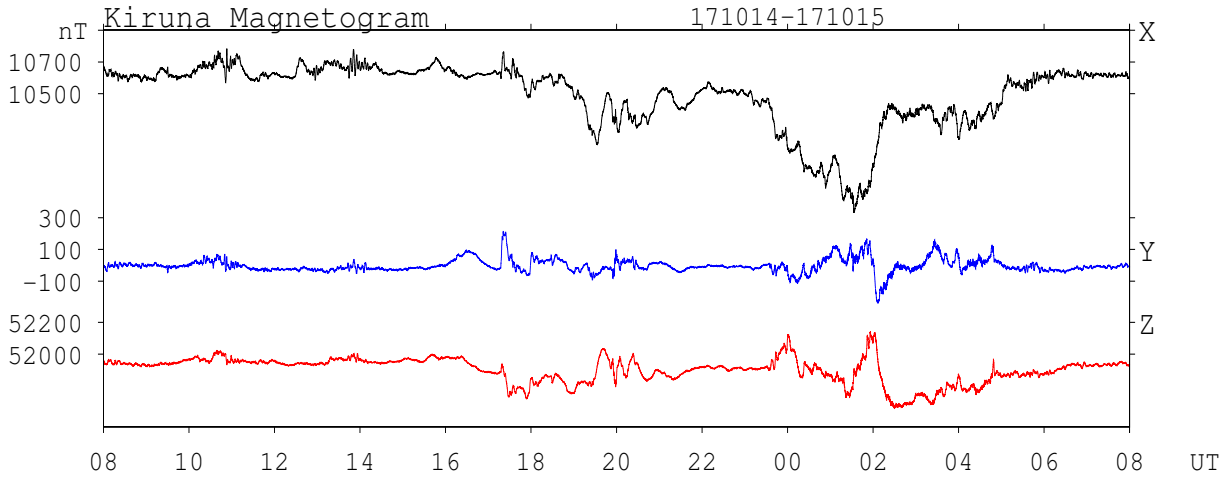

Kiruna Magnetogram
171009-171010
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

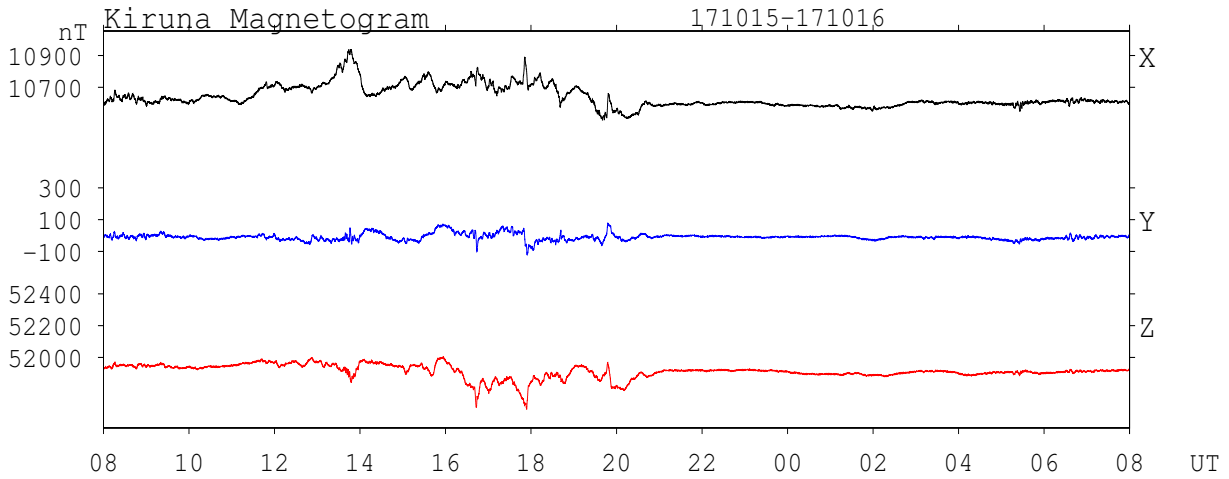

Kiruna Magnetogram
171010-171011
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

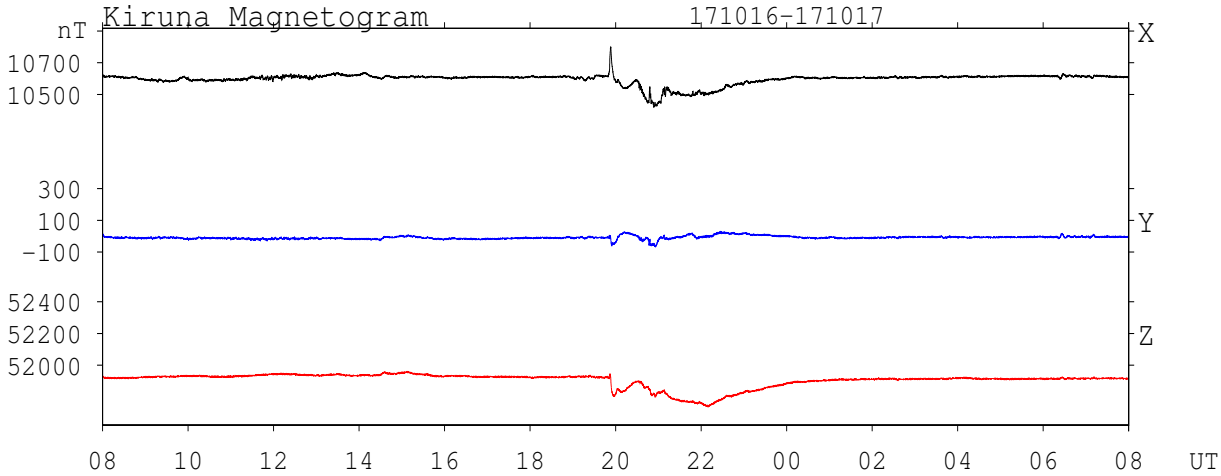

Kiruna Magnetogram
171011-171012
nT
10700
10500
300
100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

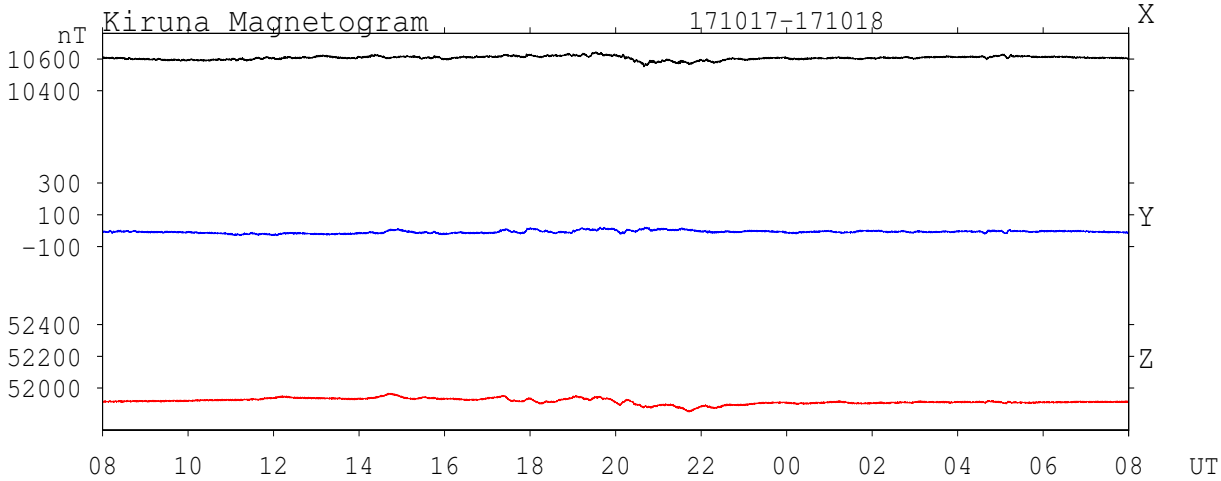

Kiruna Magnetogram
171012-171013
nT
10800
10600
300
100
-100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

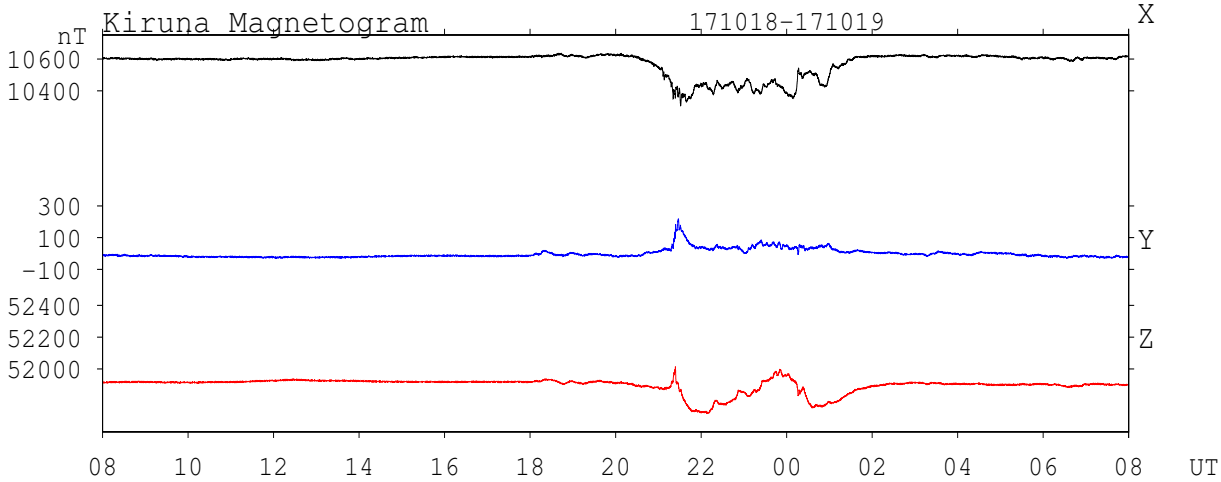

Kiruna Magnetogram
171013-171014
nT
10900
10600
400
100
-200
52200
51900
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

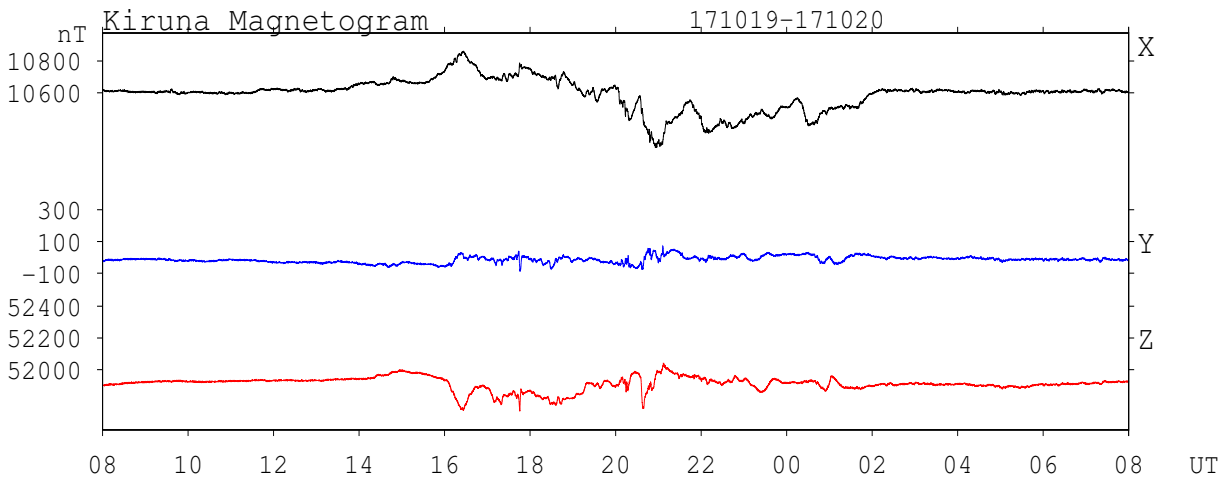

Kiruna Magnetogram
171014-171015
nT
10700
10500
300
100
-100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

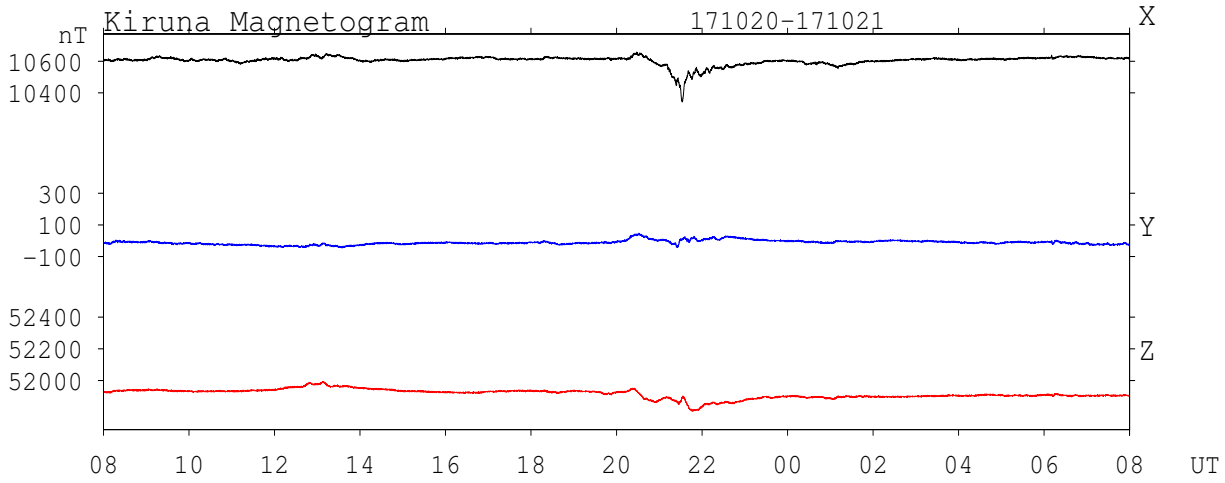

Kiruna Magnetogram
171015-171016
nT
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

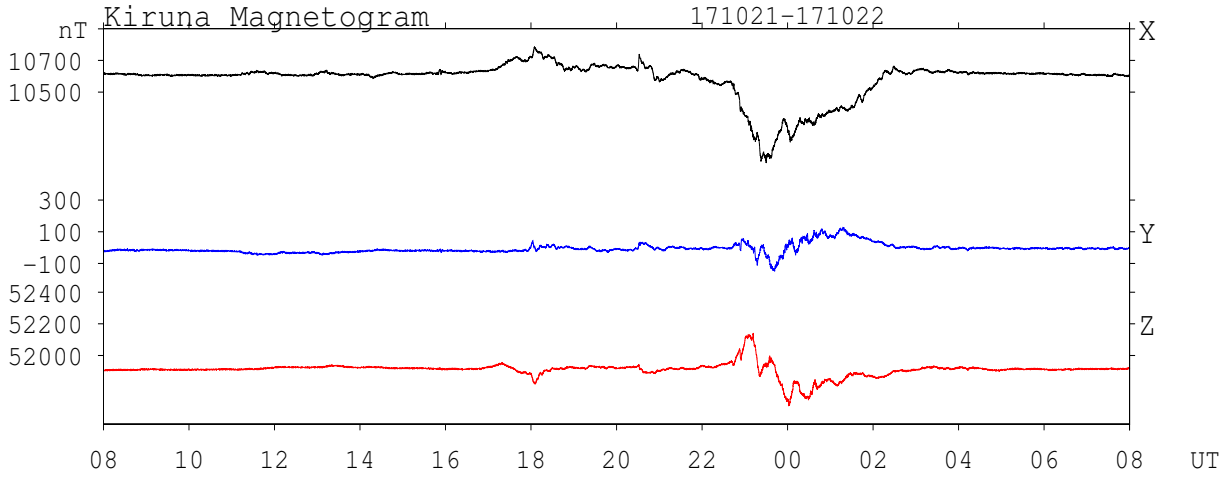

Kiruna Magnetogram
171016-171017
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

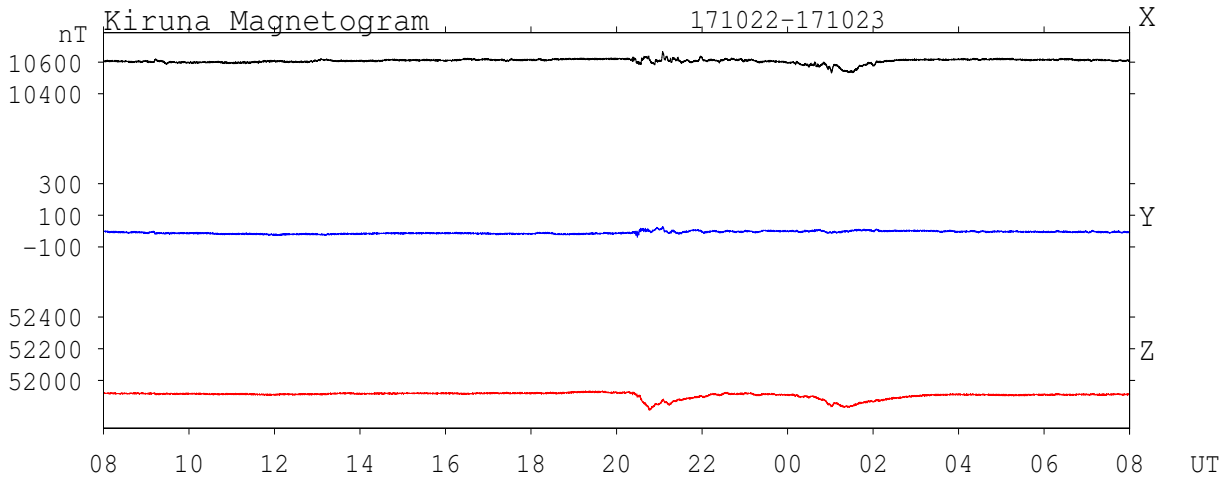

Kiruna Magnetogram
171017-171018
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

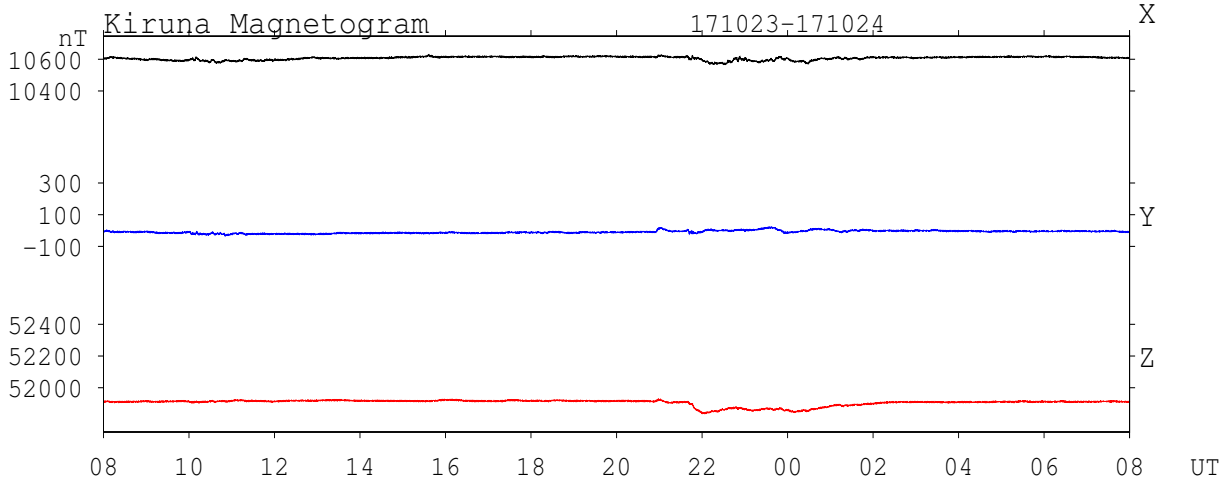

Kiruna Magnetogram
171018-171019
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

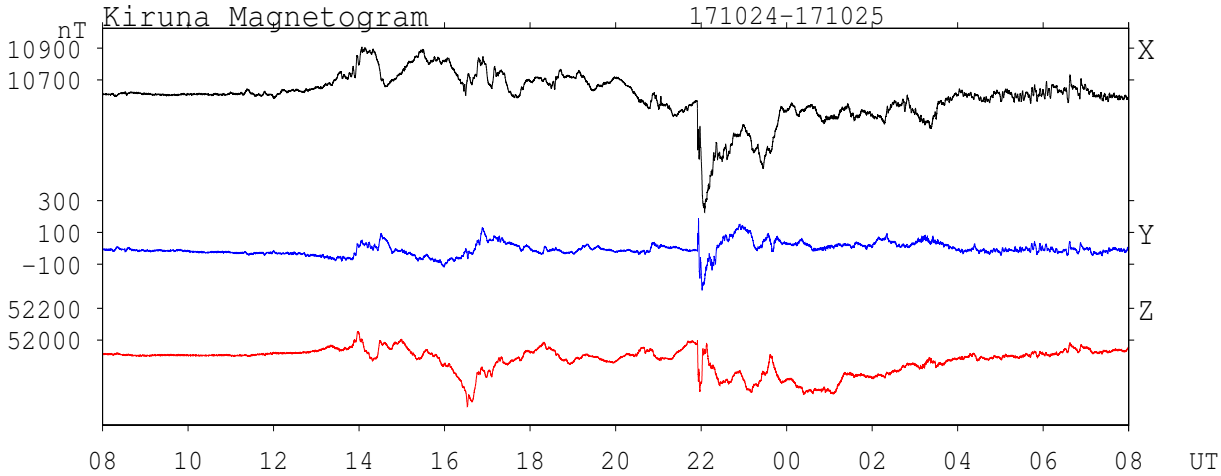

Kiruna Magnetogram
171019-171020
nT
10800
10600
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

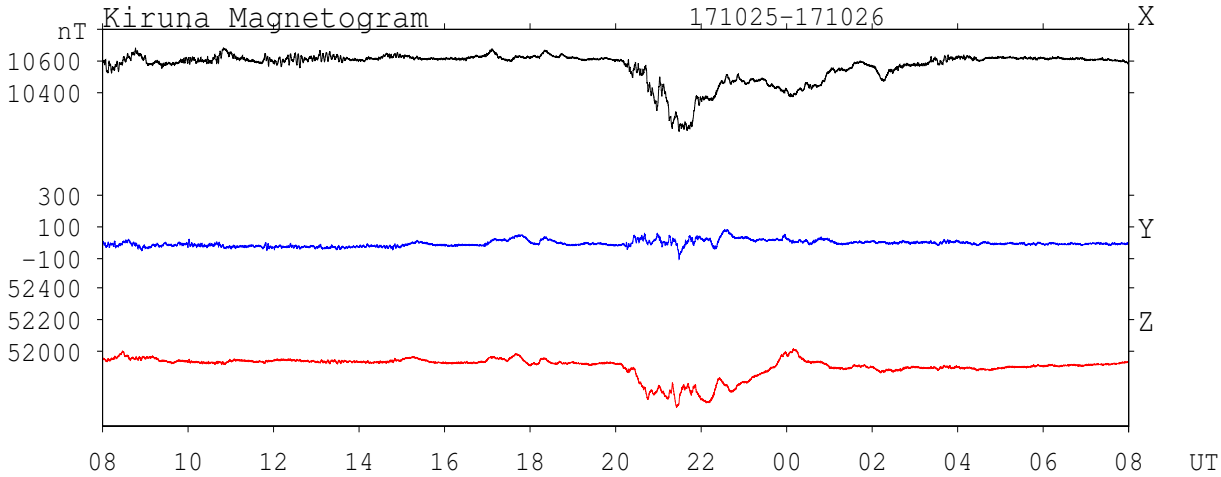

Kiruna Magnetogram
171020-171021
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

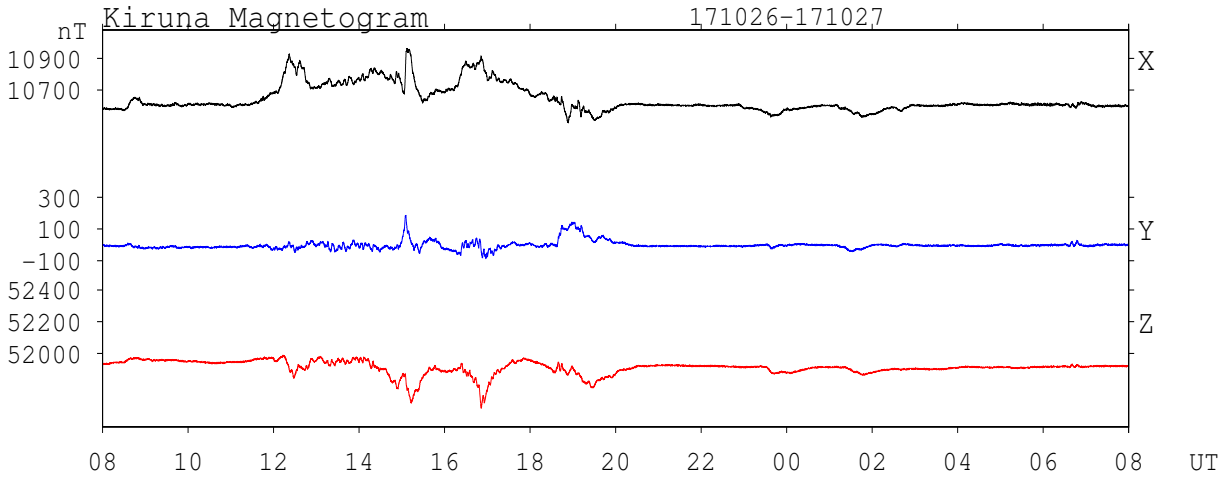

Kiruna Magnetogram
171021-171022
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

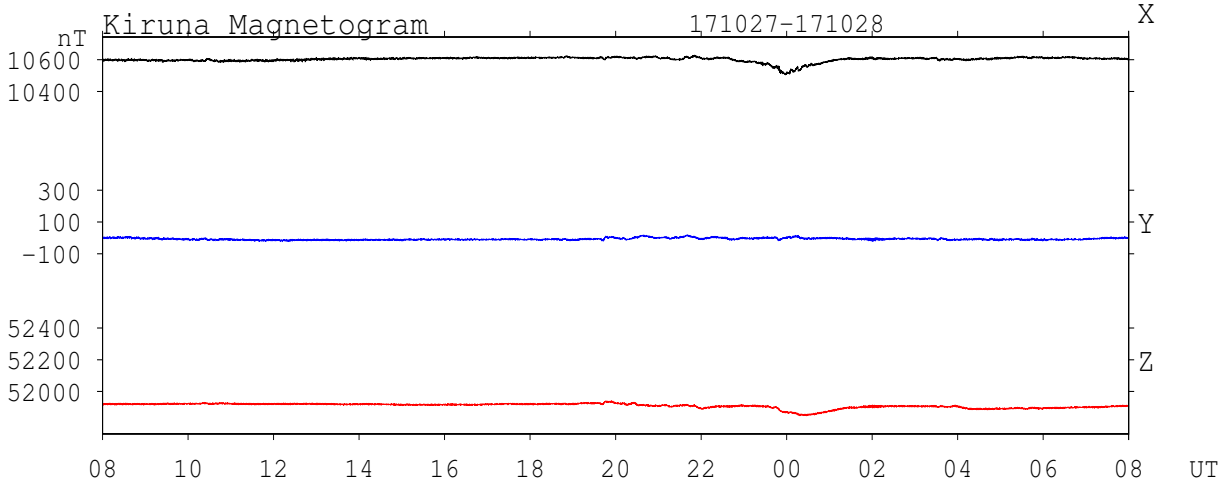

Kiruna Magnetogram
171022-171023
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

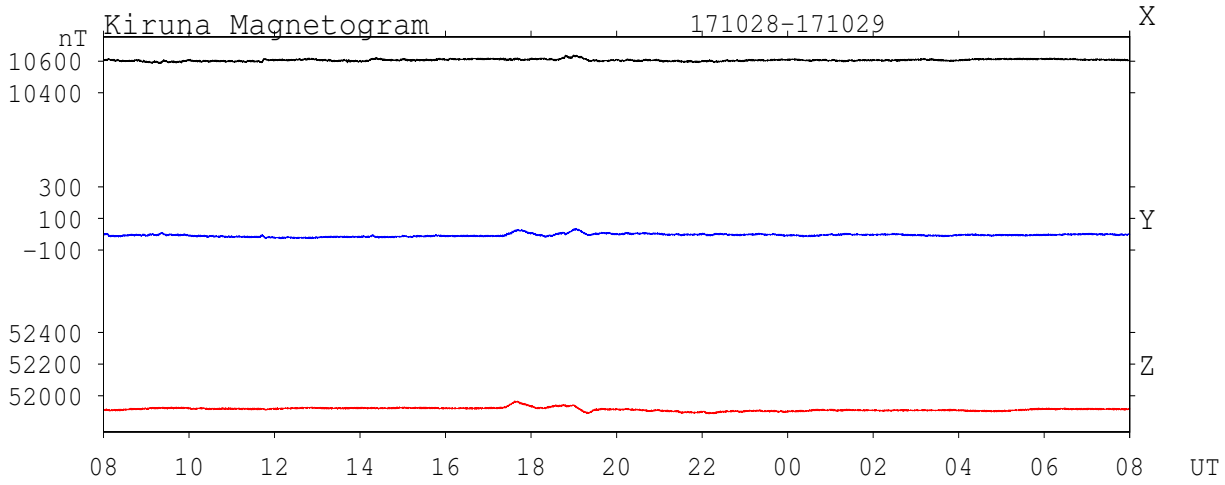

Kiruna Magnetogram
171023-171024
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

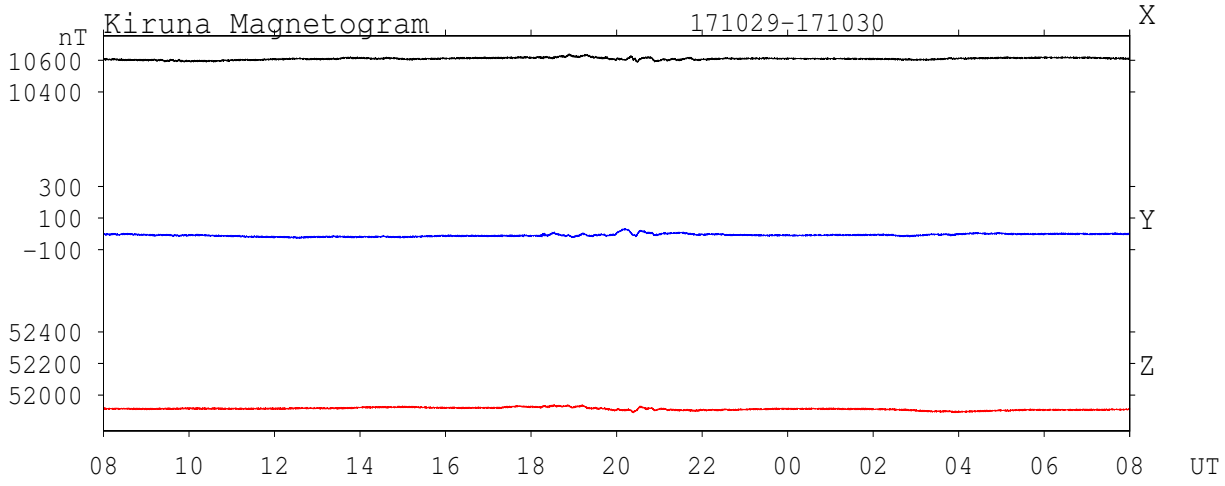

Kiruna Magnetogram
171024-171025
nT
10900
10700
300
100
-100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

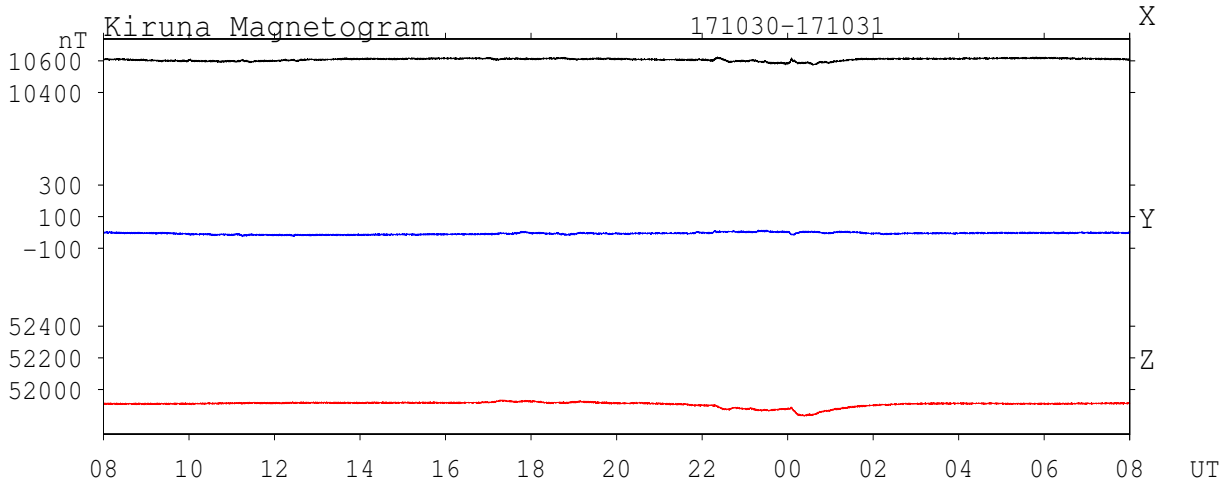

Kiruna Magnetogram
171025-171026
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

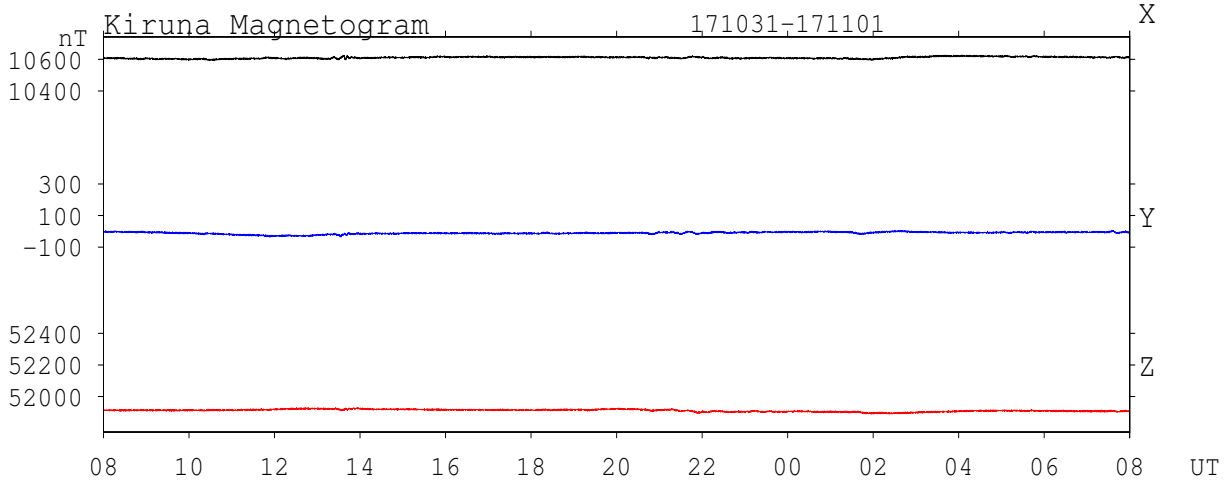

Kiruna Magnetogram
171026-171027
nT
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

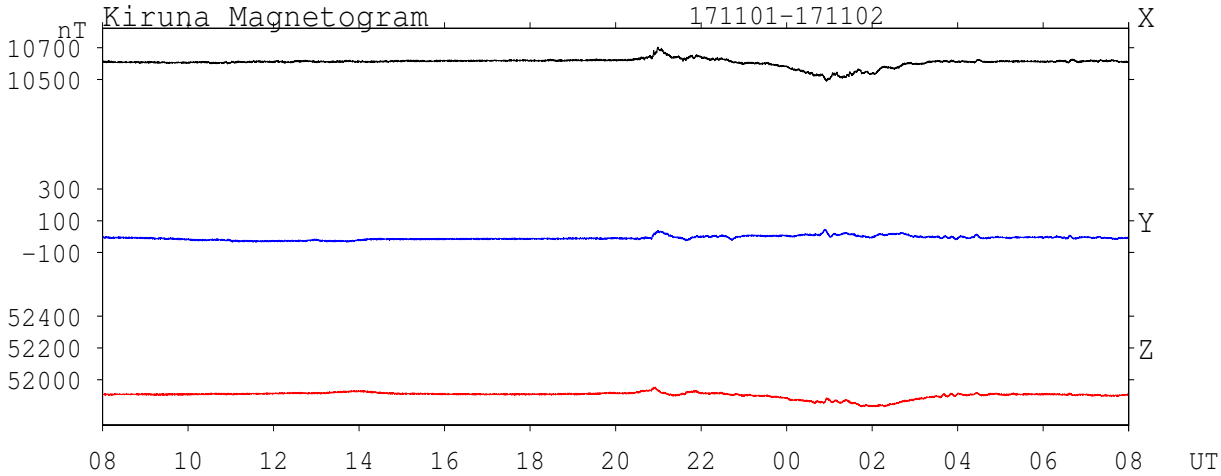

Kiruna Magnetogram
171027-171028
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

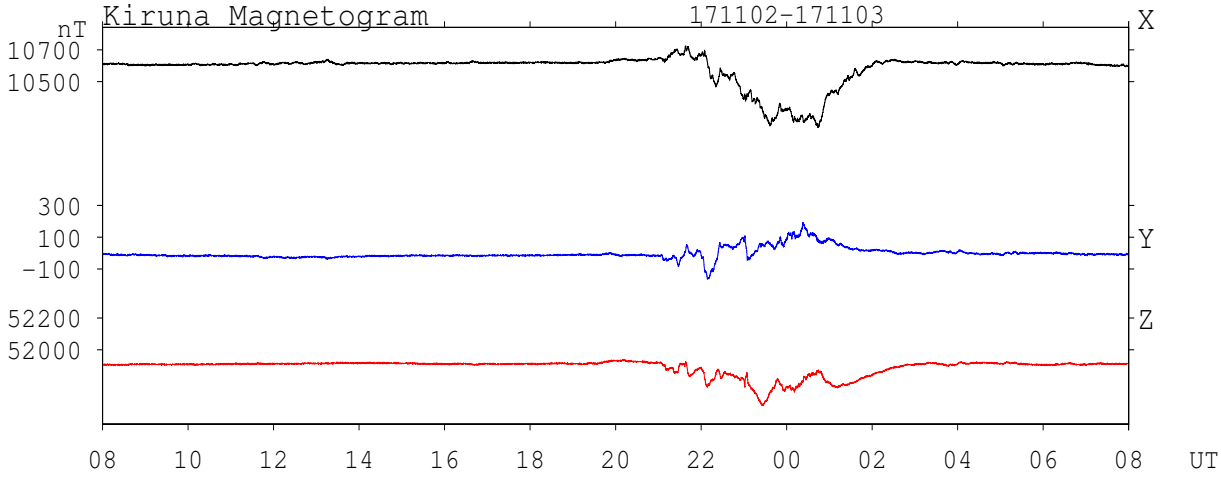

Kiruna Magnetogram
171028-171029
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

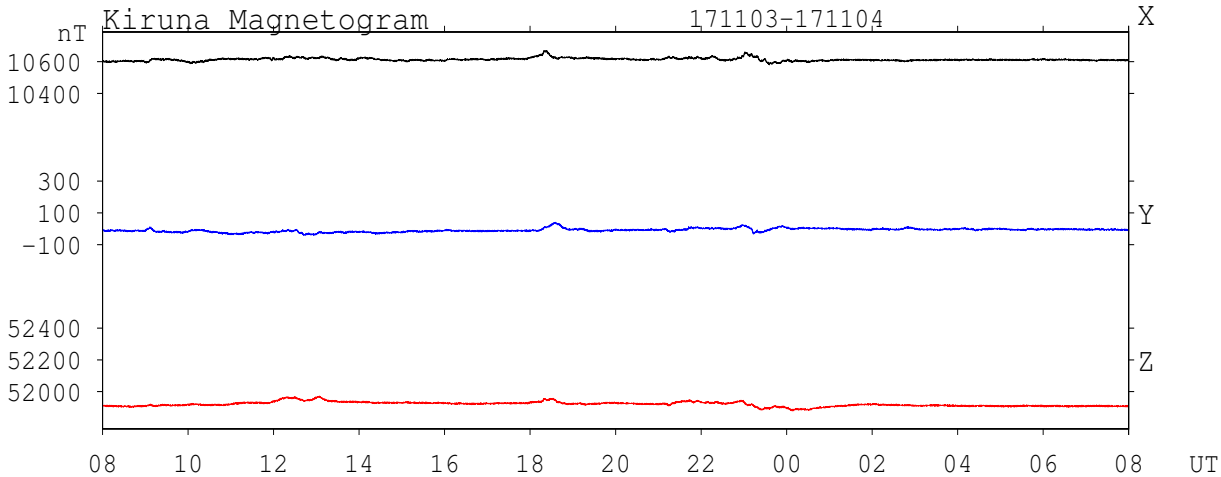

Kiruna Magnetogram
171029-171030
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

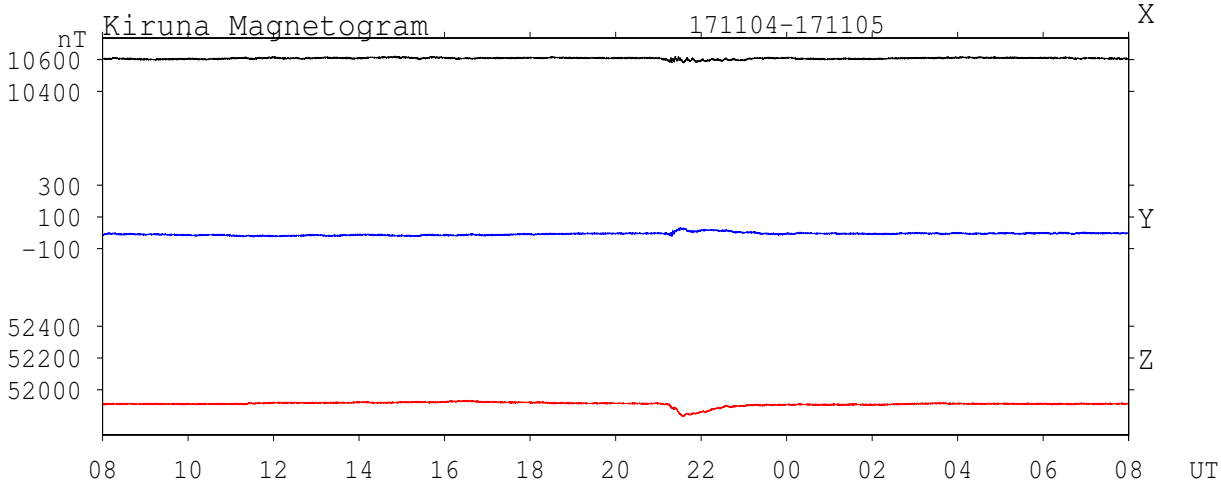

Kiruna Magnetogram
171030-171031
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

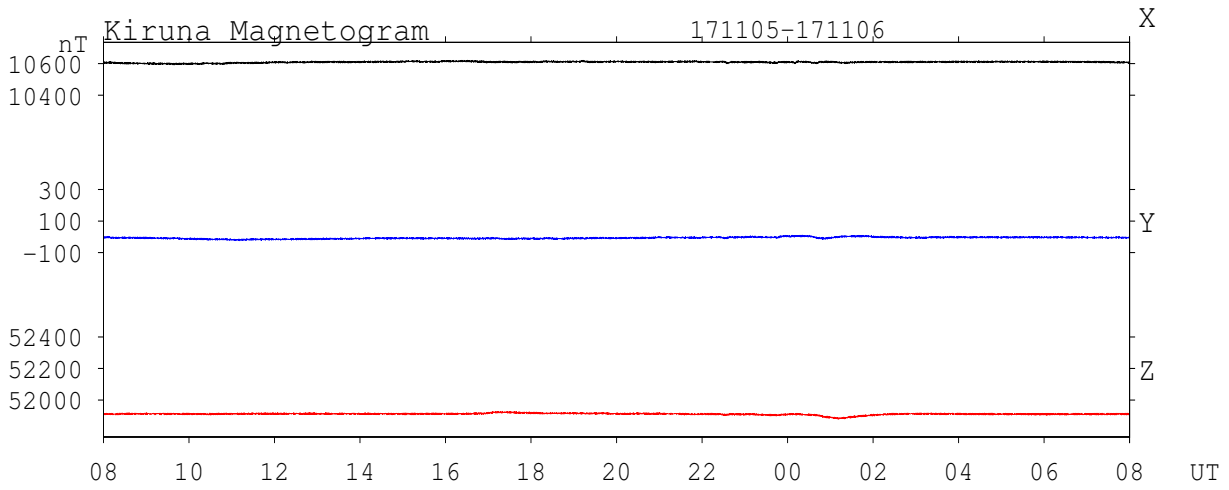

Kiruna Magnetogram
171031-171101
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

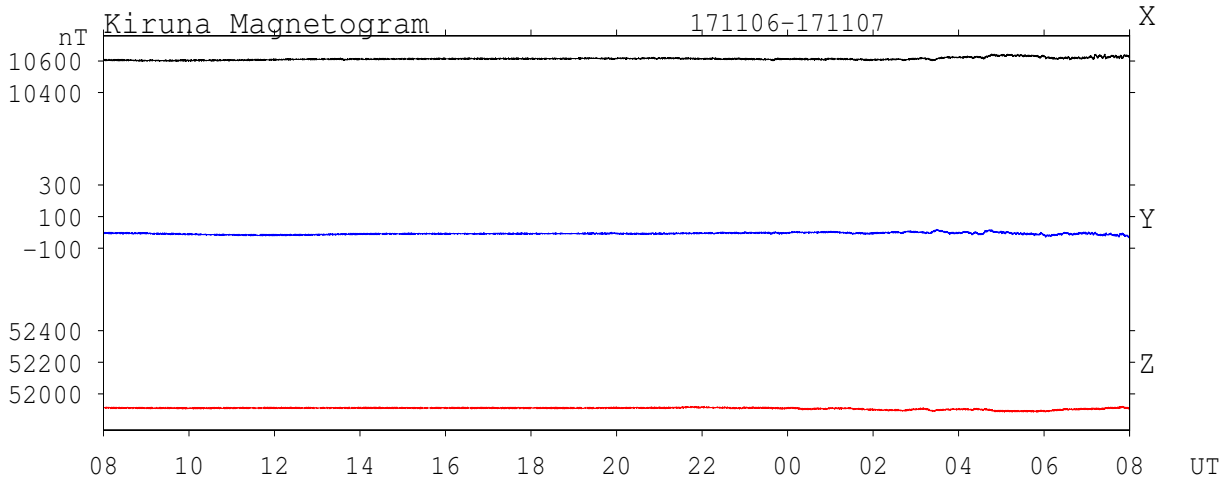

Kiruna Magnetogram
171101-171102
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

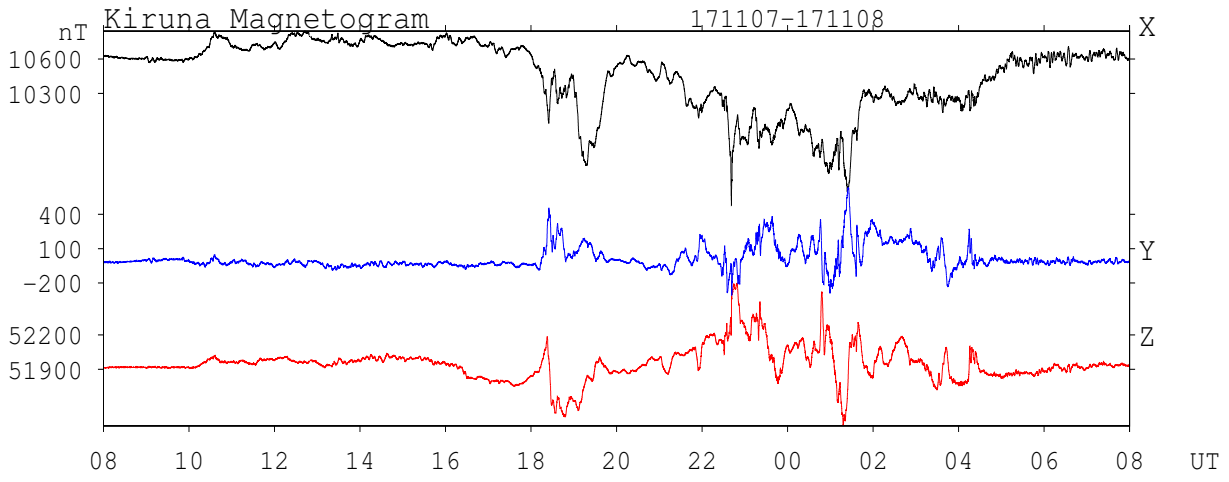

Kiruna Magnetogram
171102-171103
nT
10700
10500
300
100
-100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

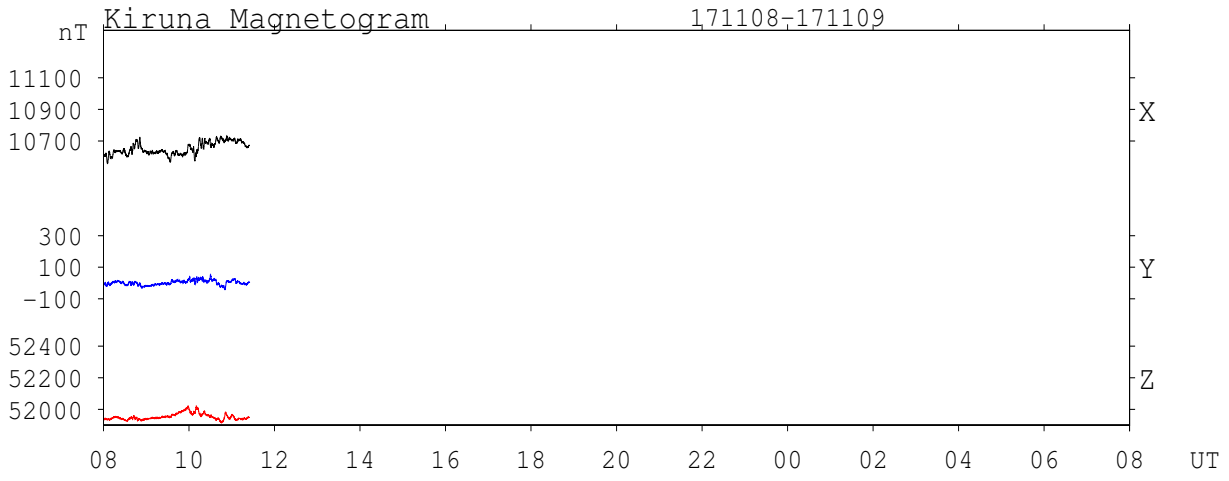

Kiruna Magnetogram
171103-171104
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

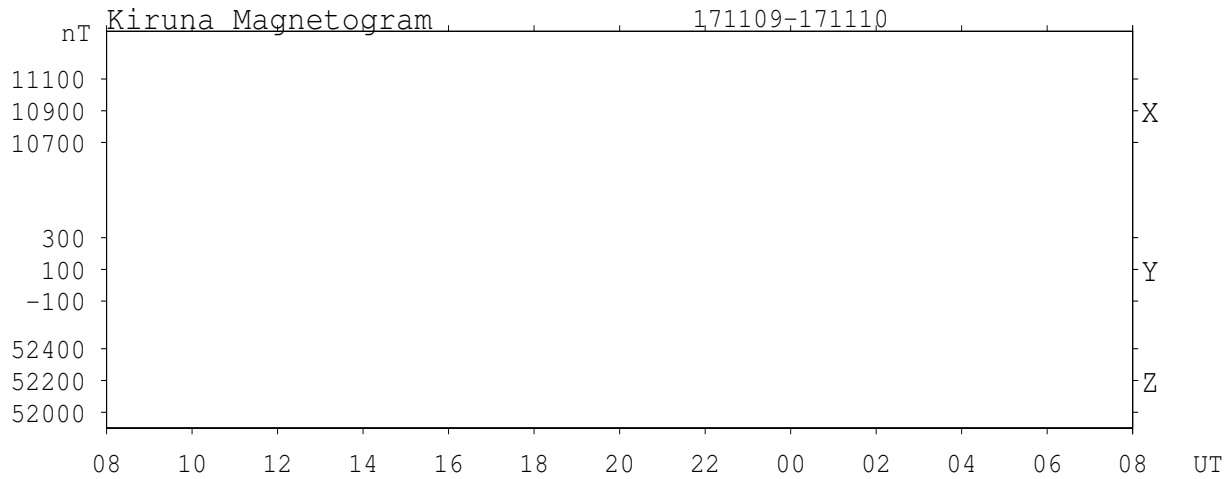

Kiruna Magnetogram
171104-171105
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

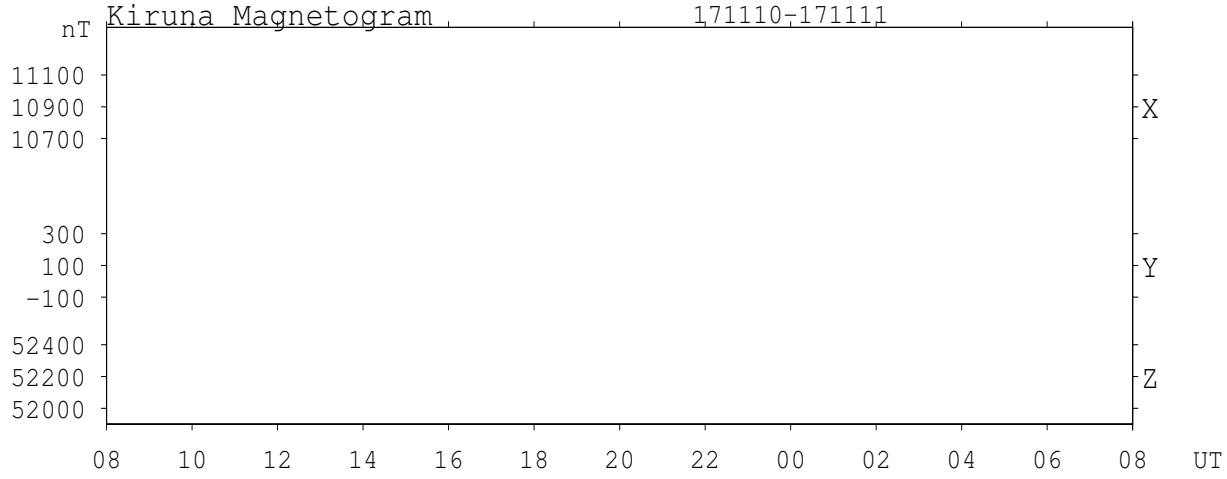

Kiruna Magnetogram
171105-171106
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

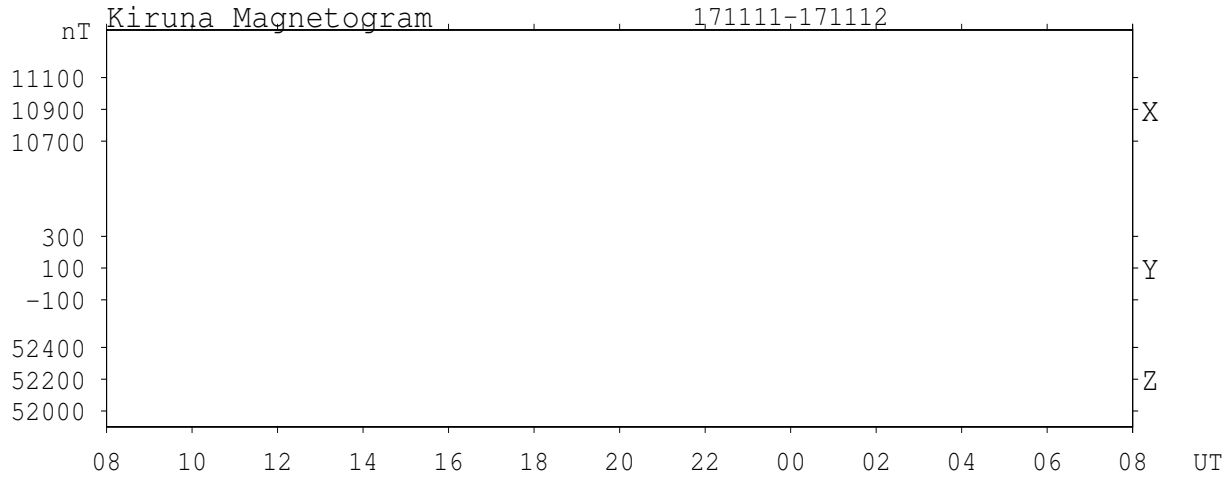

Kiruna Magnetogram
171106-171107
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

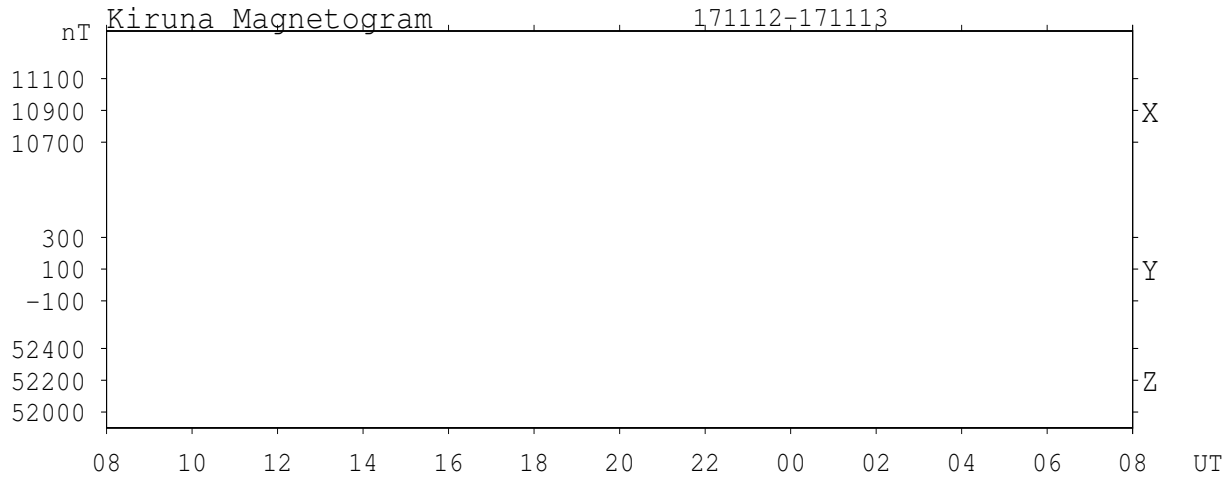

Kiruna Magnetogram
171107-171108
nT
10600
10300
400
100
-200
52200
51900
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

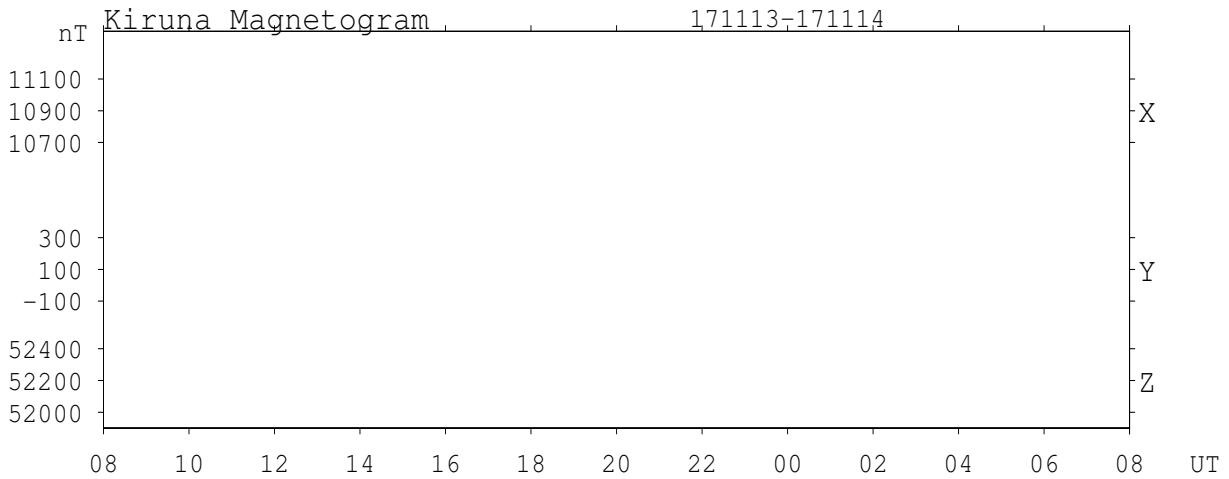

Kiruna Magnetogram
171108-171109
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

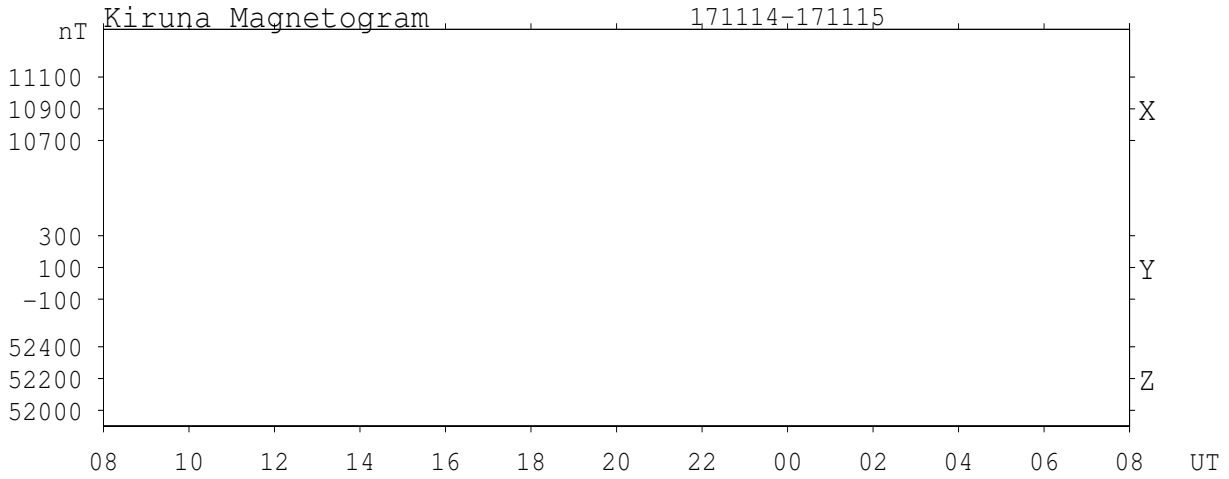

Kiruna Magnetogram
171109-171110
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

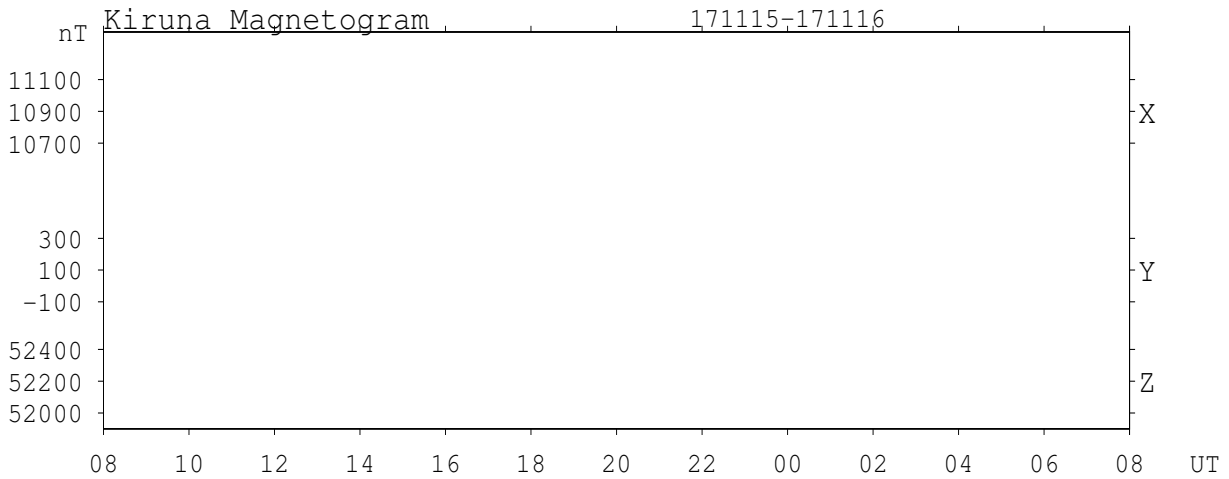

Kiruna Magnetogram
171110-171111
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

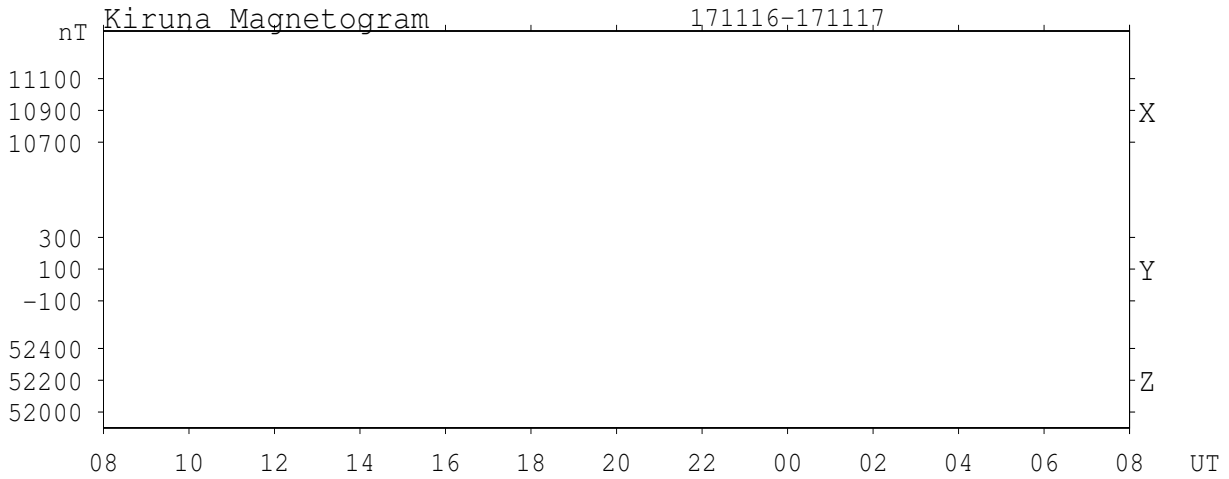

Kiruna Magnetogram
171111-171112
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

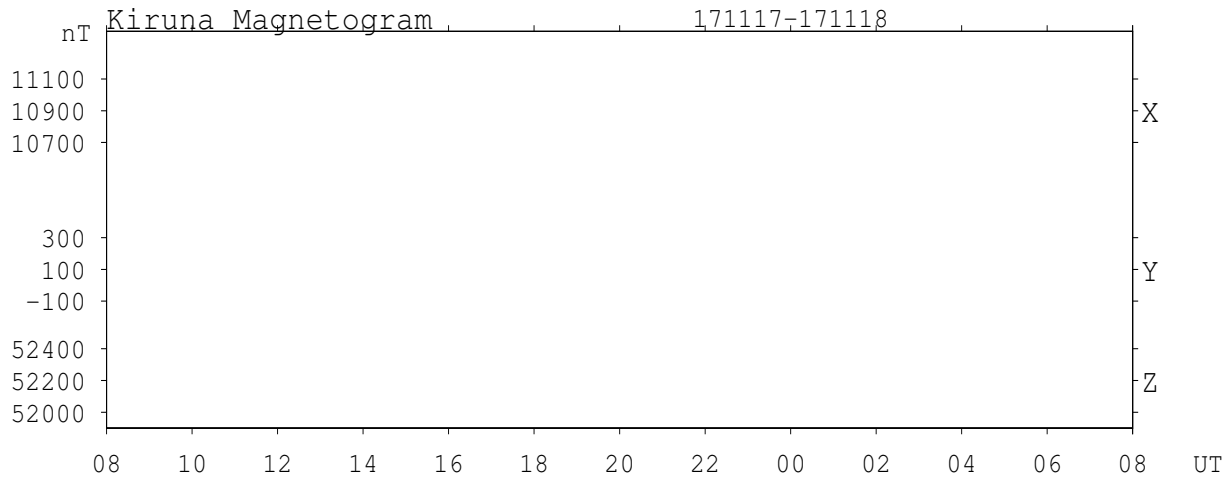

Kiruna Magnetogram
171112-171113
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

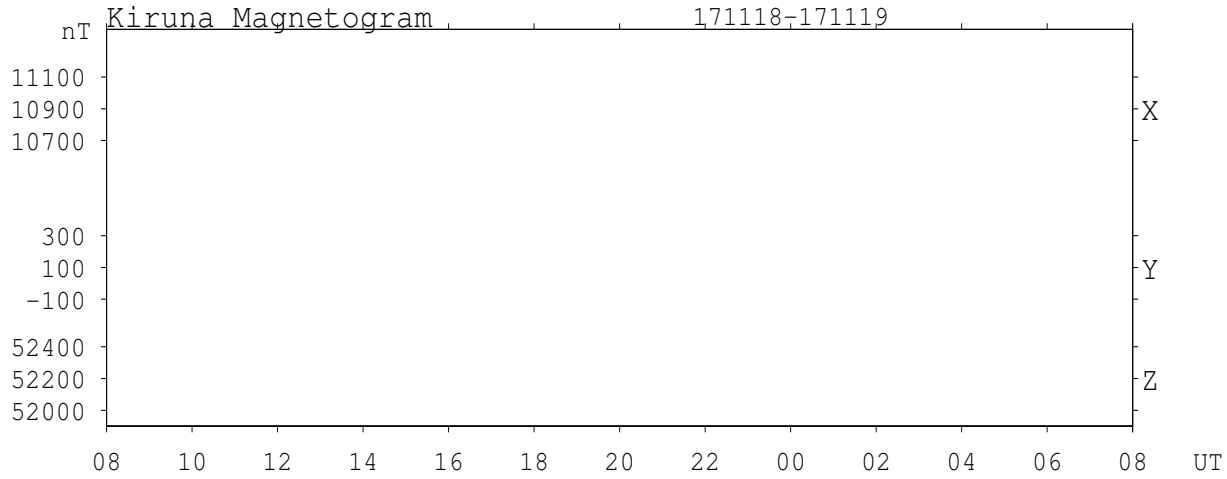

Kiruna Magnetogram
171113-171114
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

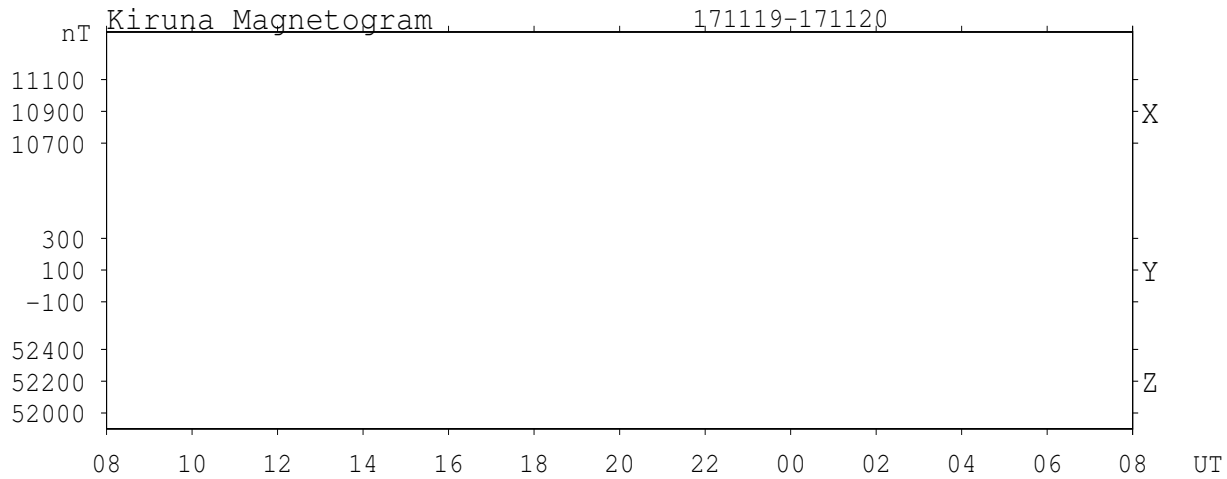

Kiruna Magnetogram
171114-171115
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

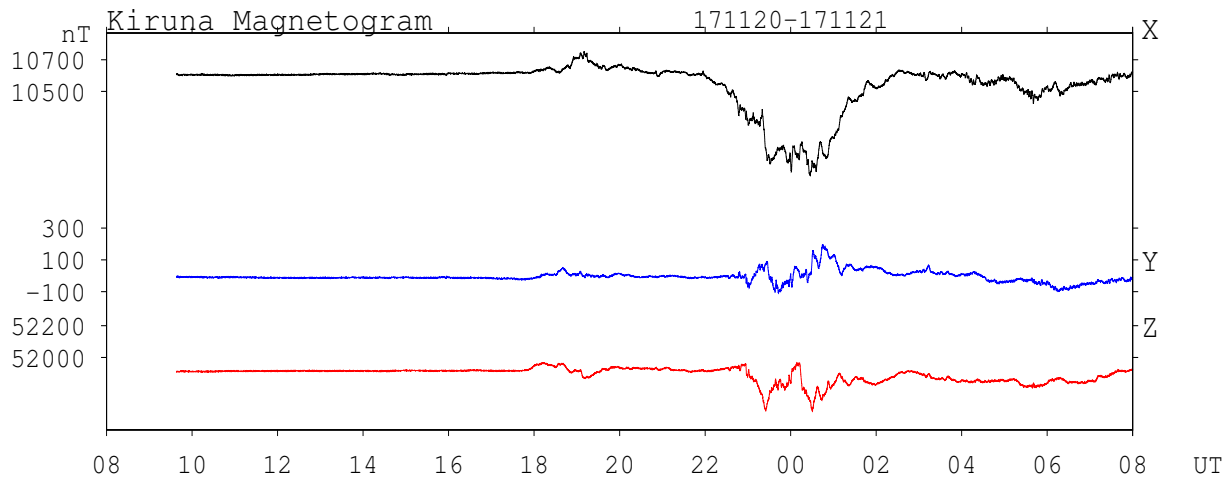

Kiruna Magnetogram
171115-171116
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

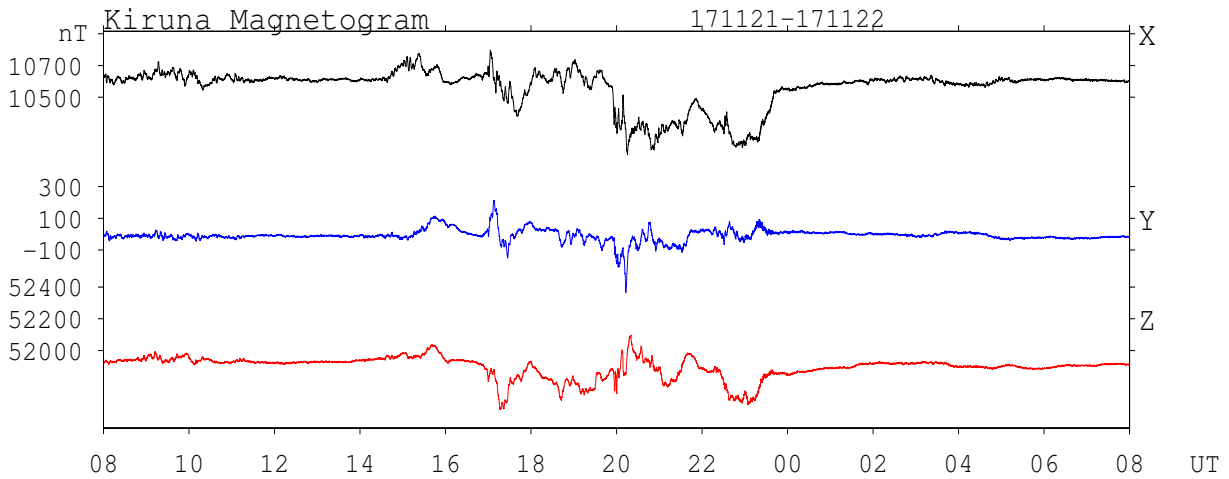

Kiruna Magnetogram
171116-171117
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

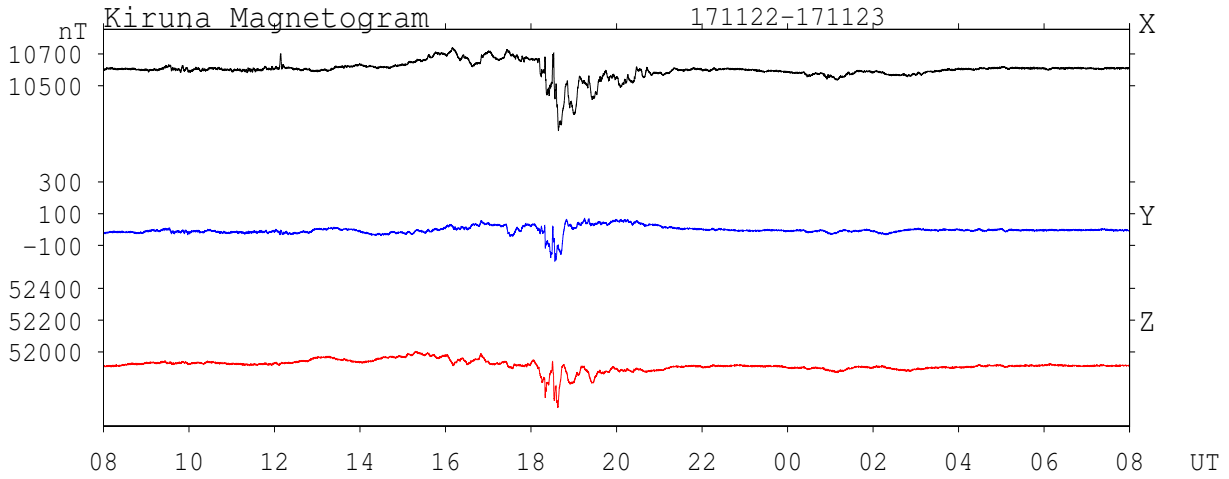

Kiruna Magnetogram
171117-171118
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

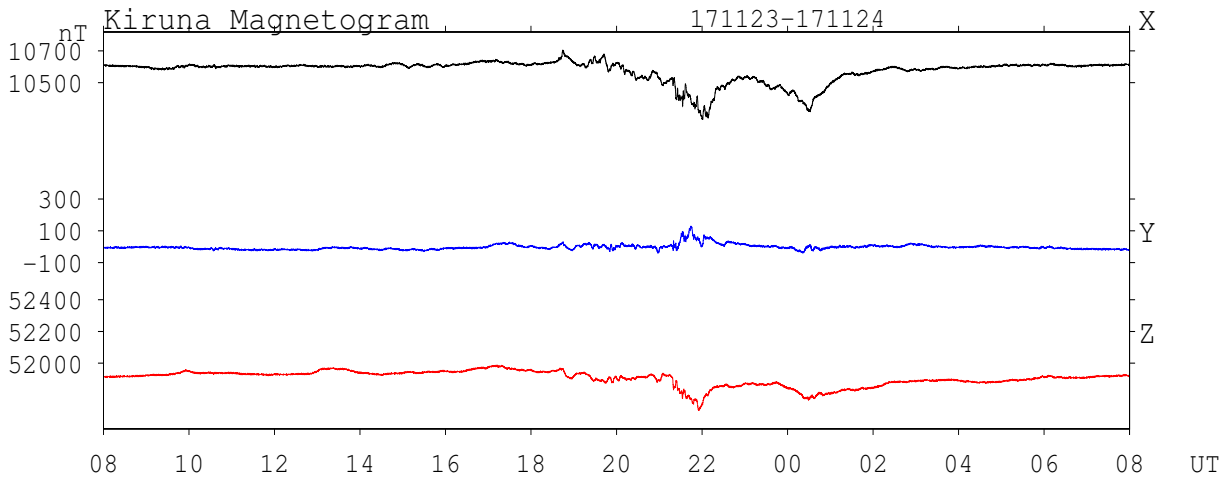

Kiruna Magnetogram
171118-171119
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

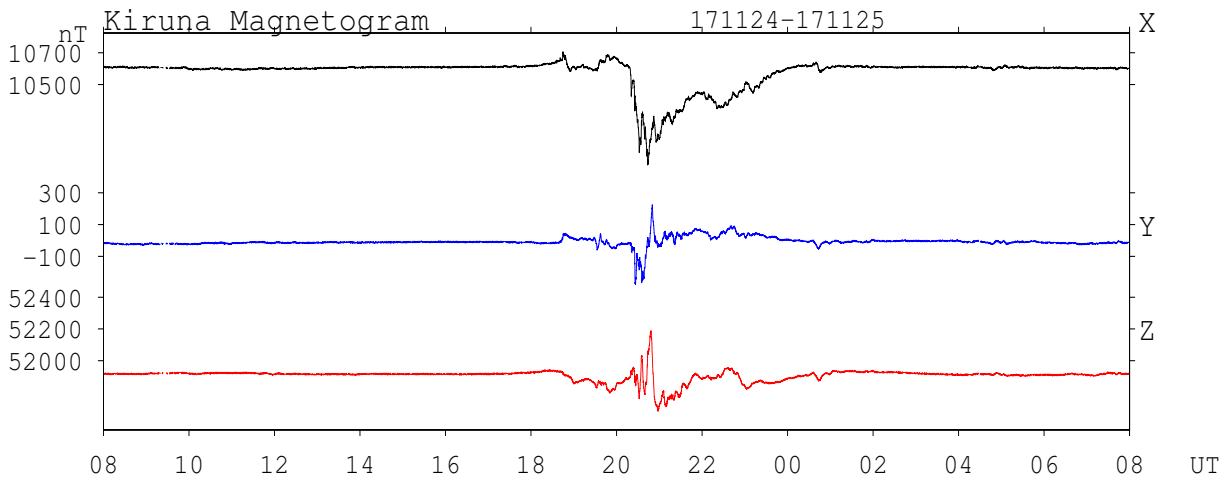

Kiruna Magnetogram
171119-171120
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

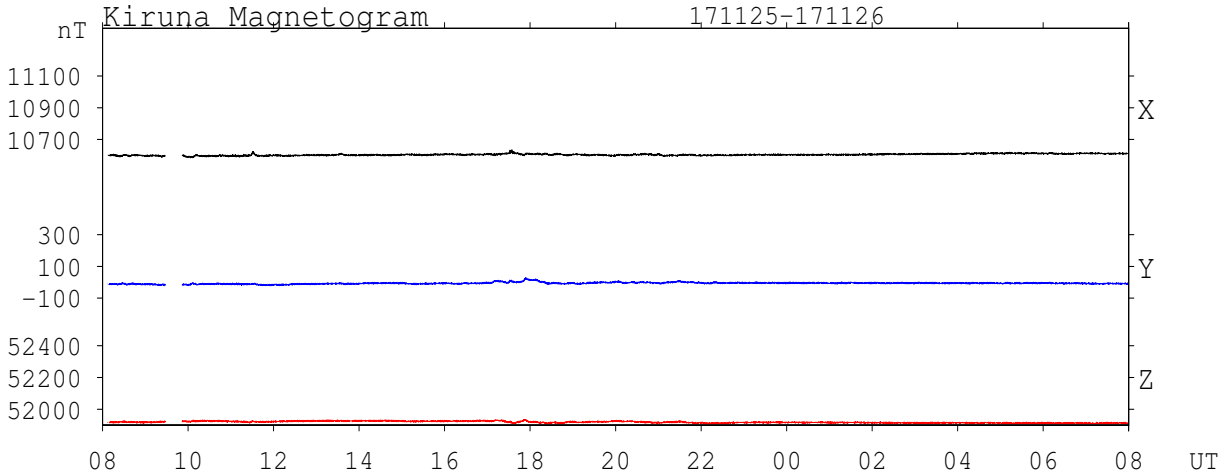

Kiruna Magnetogram
171120-171121
nT
10700
10500
300
100
-100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

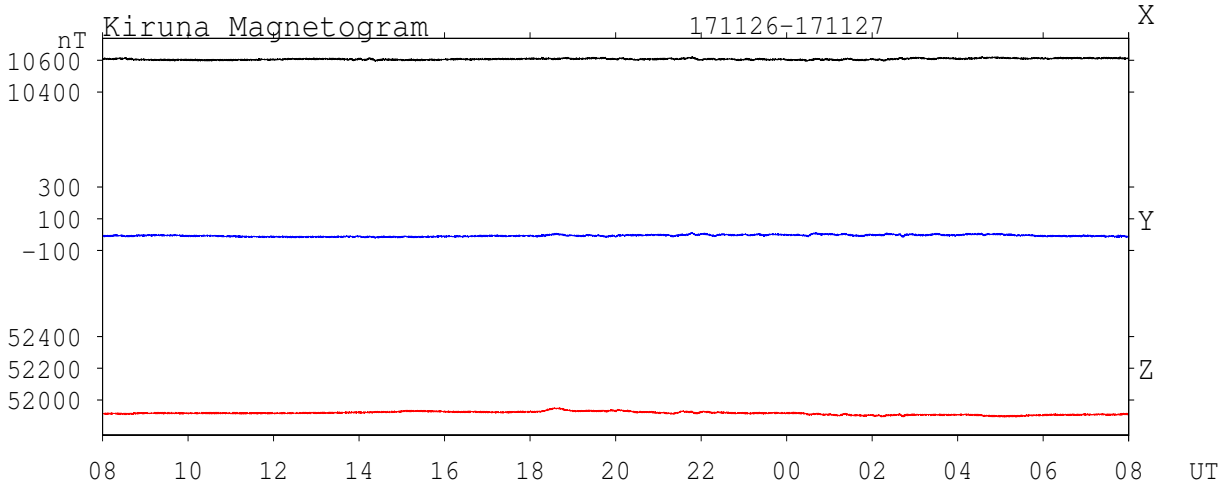

Kiruna Magnetogram
171121-171122
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

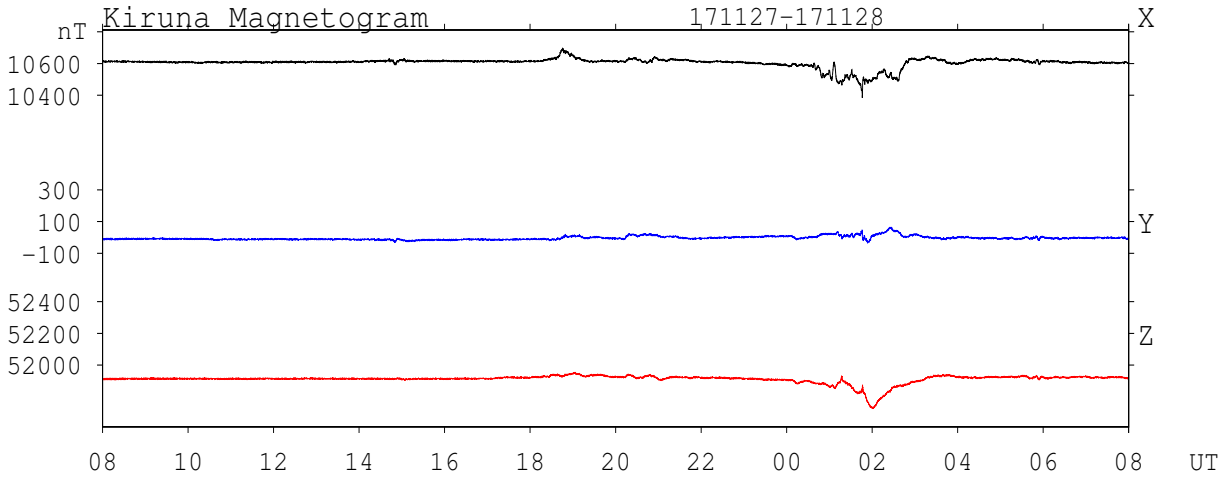

Kiruna Magnetogram
171122-171123
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

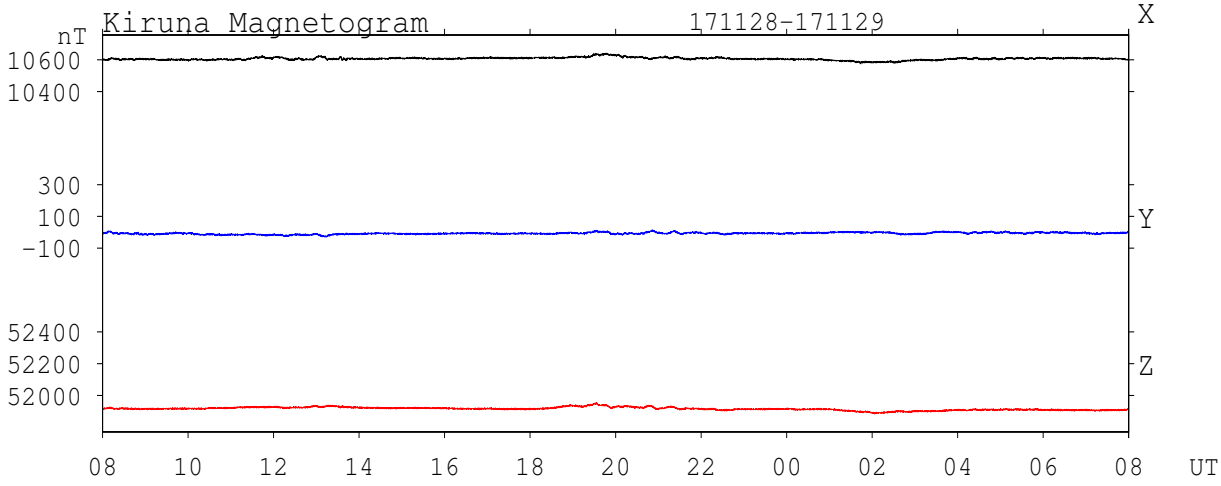

Kiruna Magnetogram
171123-171124
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

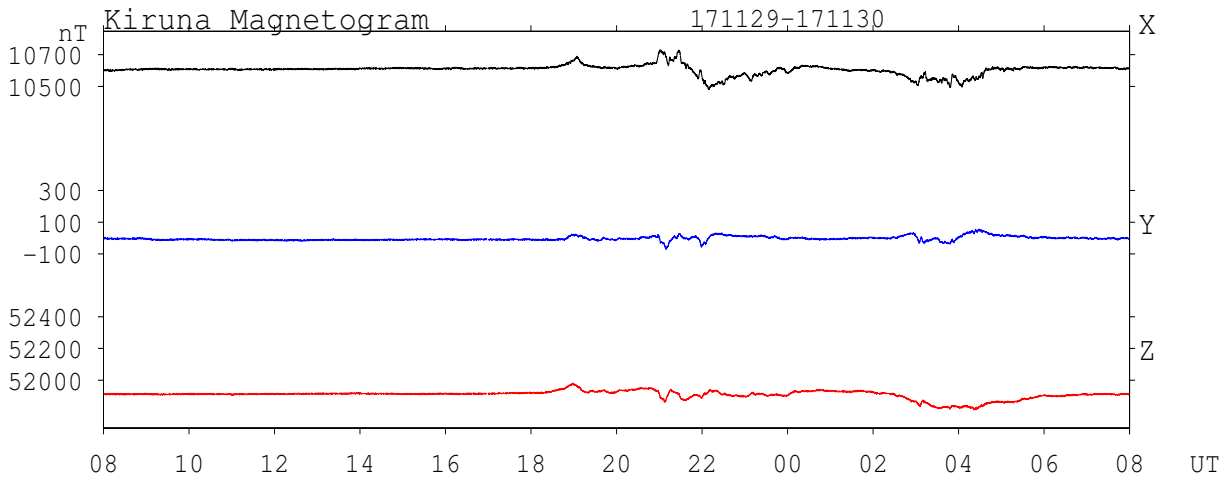

Kiruna Magnetogram
171124-171125
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

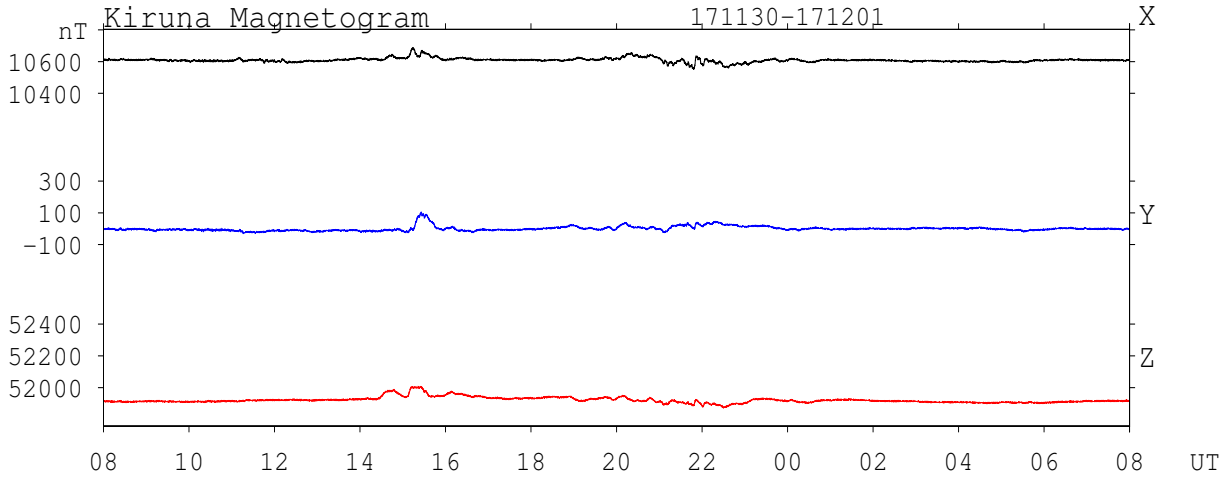

Kiruna Magnetogram
171125-171126
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

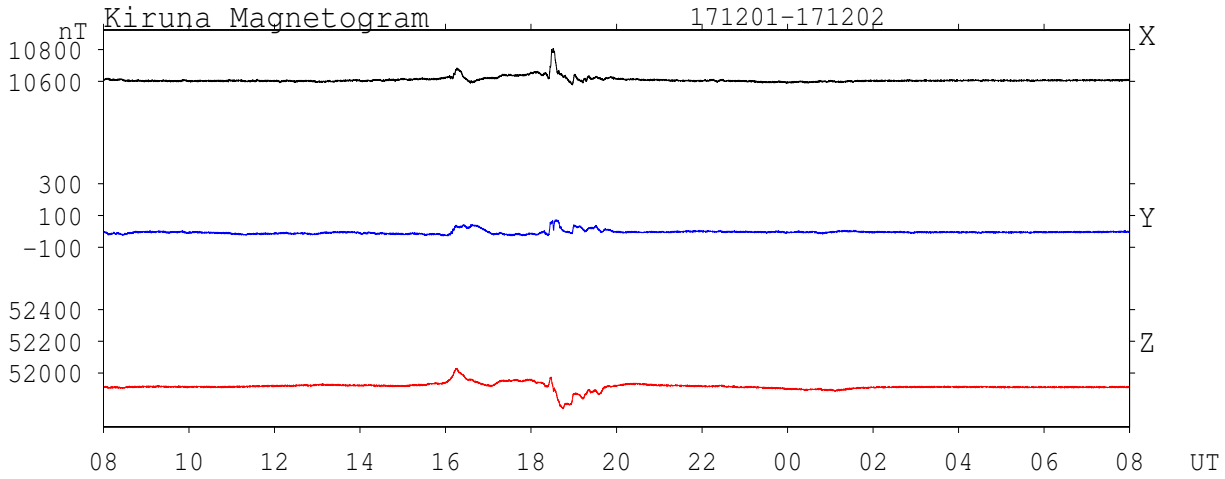

Kiruna Magnetogram
171126-171127
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

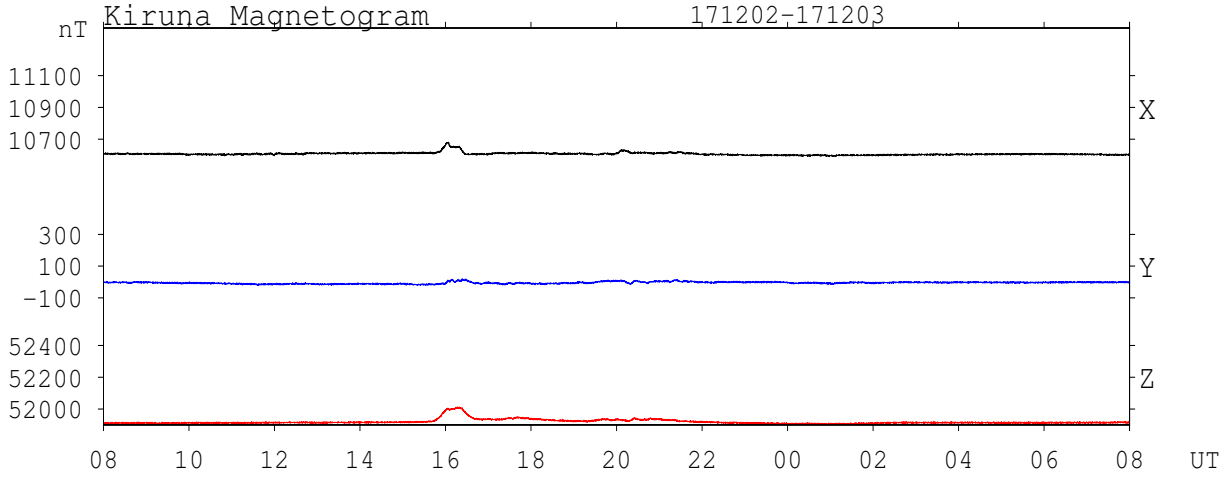

Kiruna Magnetogram
171127-171128
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

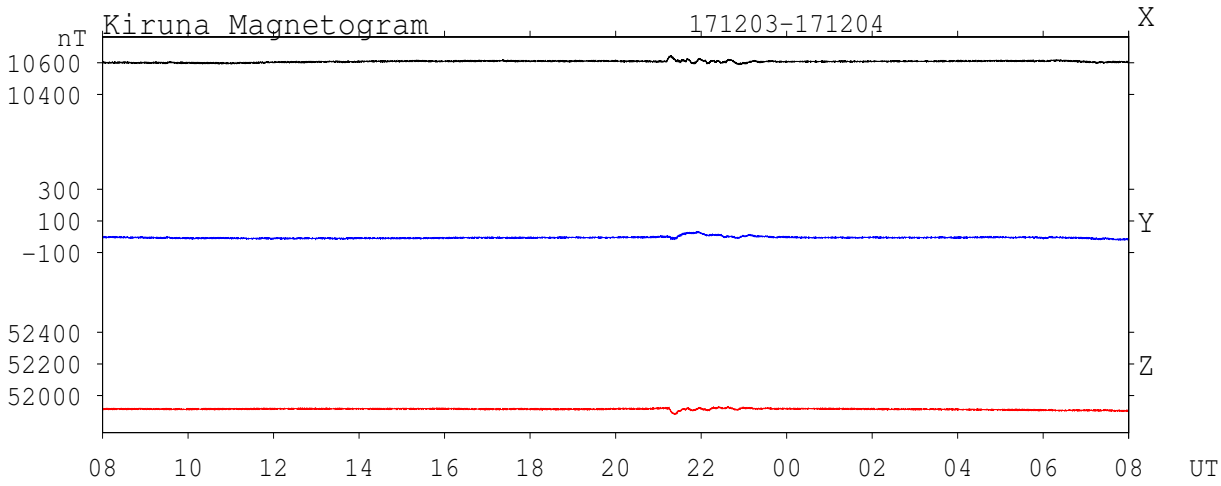

Kiruna Magnetogram
171128-171129
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

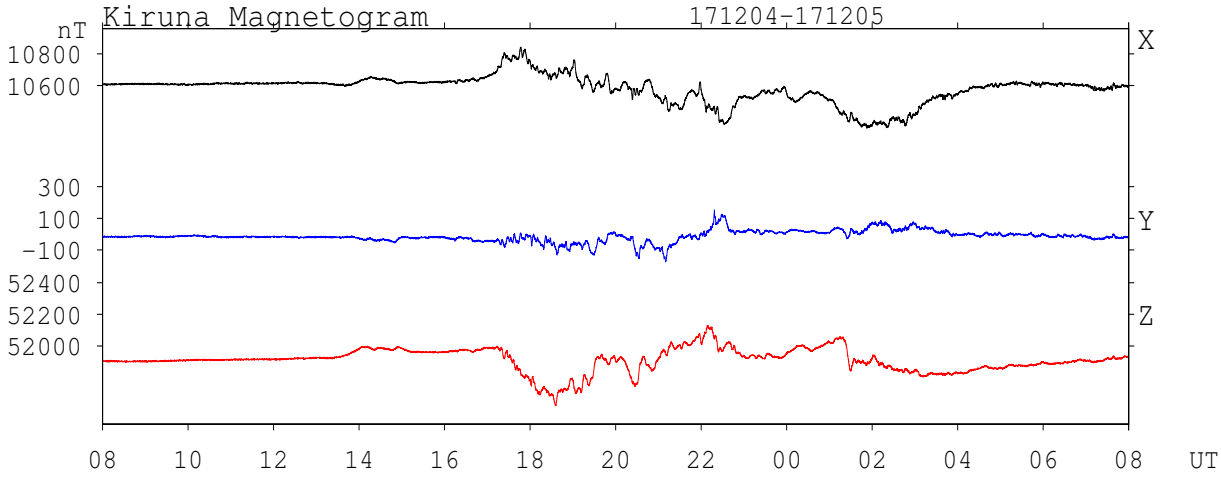

Kiruna Magnetogram
171129-171130
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

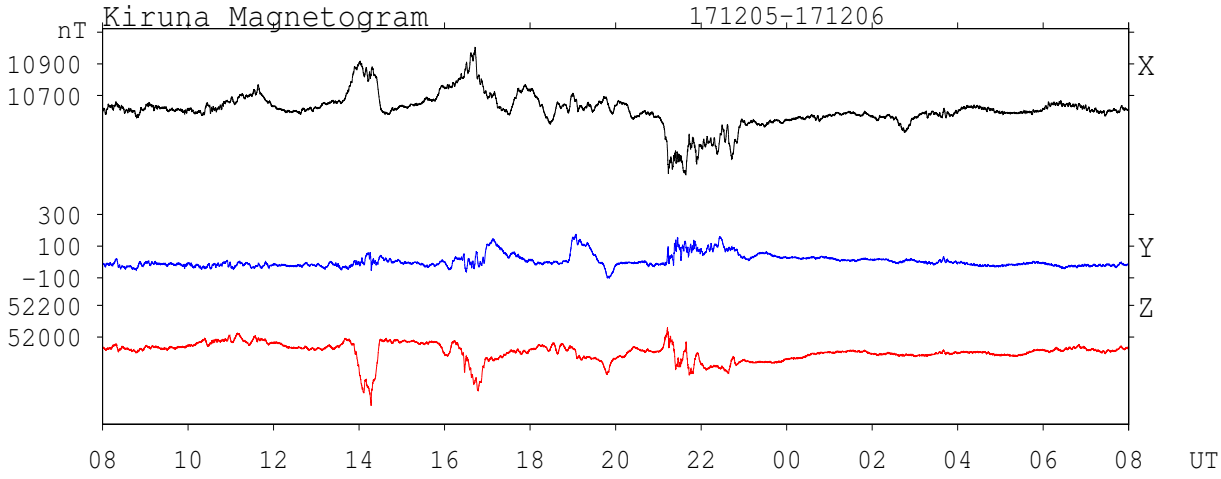

Kiruna Magnetogram
171130-171201
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

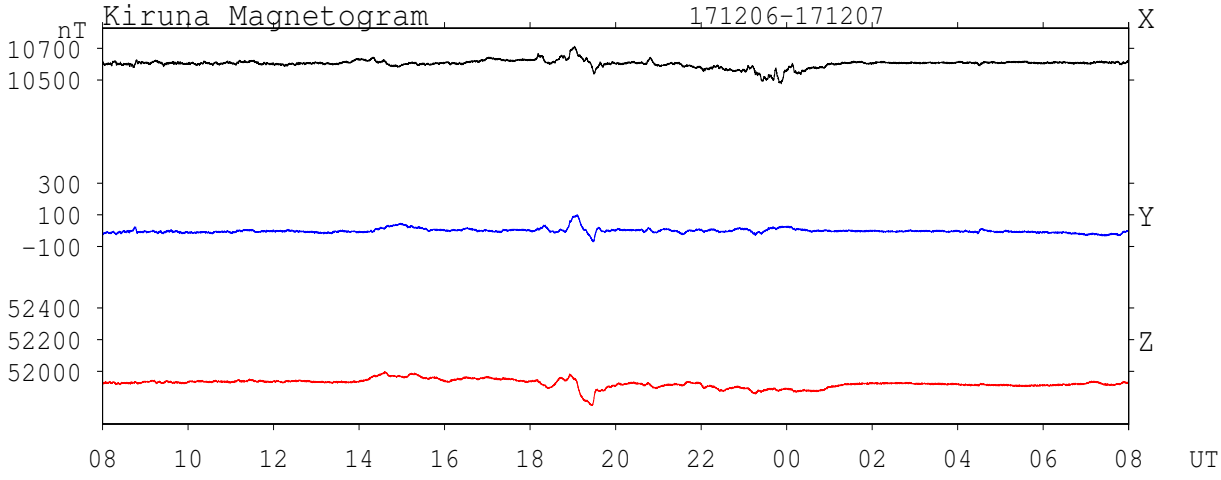

Kiruna Magnetogram
171201-171202
nT
10800
10600
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

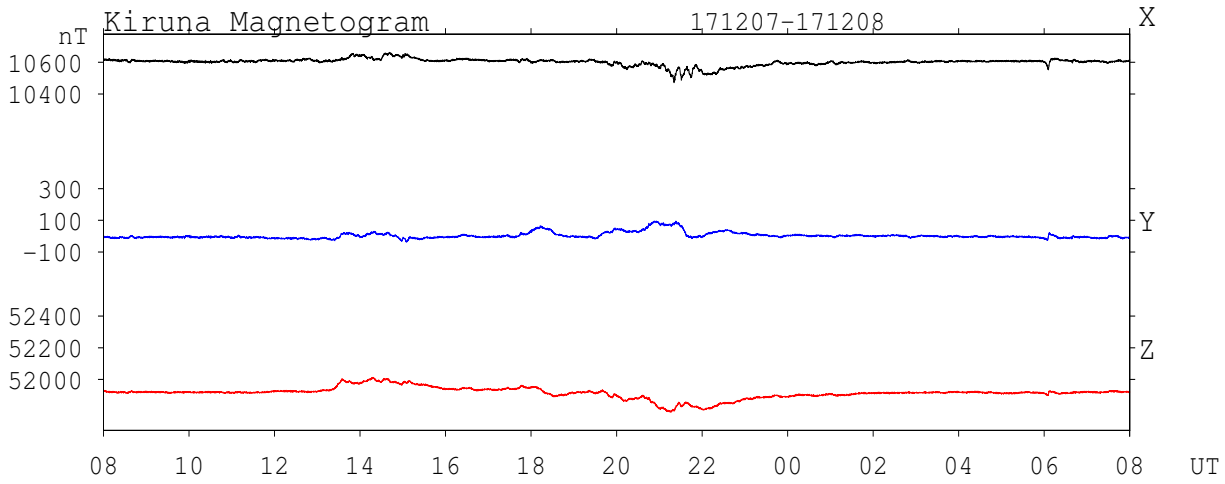

Kiruna Magnetogram
171202-171203
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

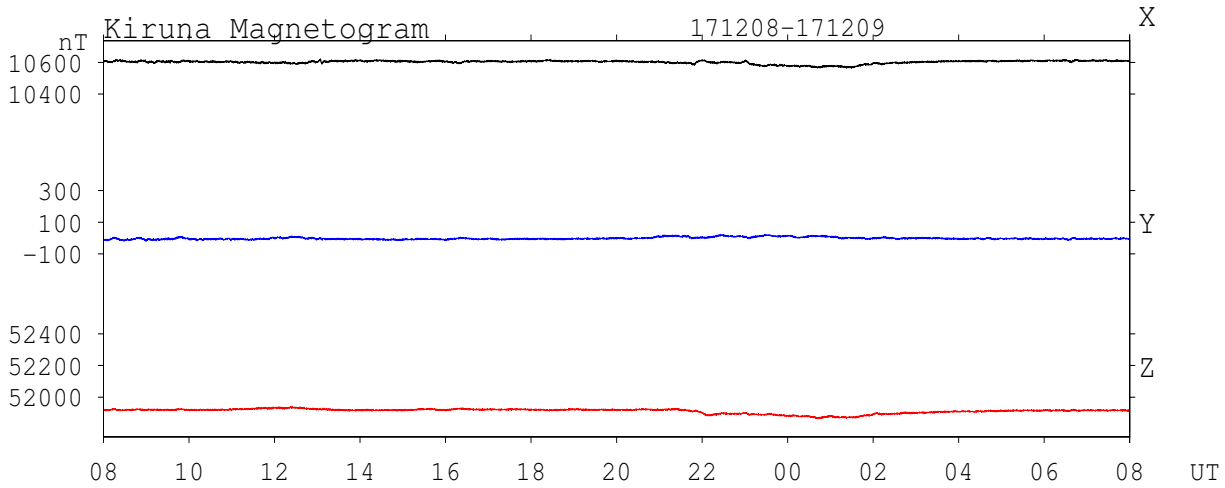

Kiruna Magnetogram
171203-171204
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

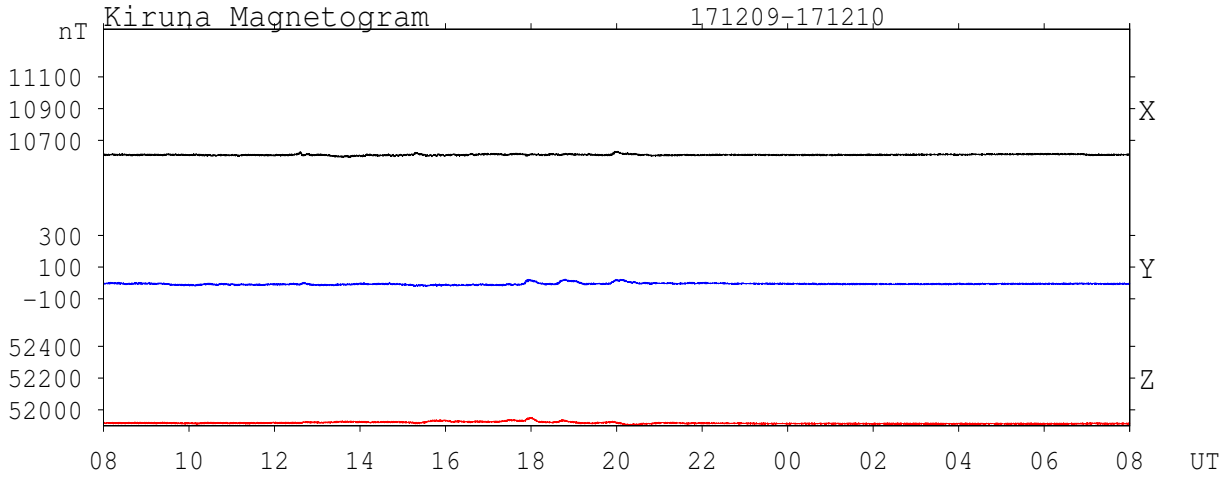

Kiruna Magnetogram
171204-171205
nT
10800
10600
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

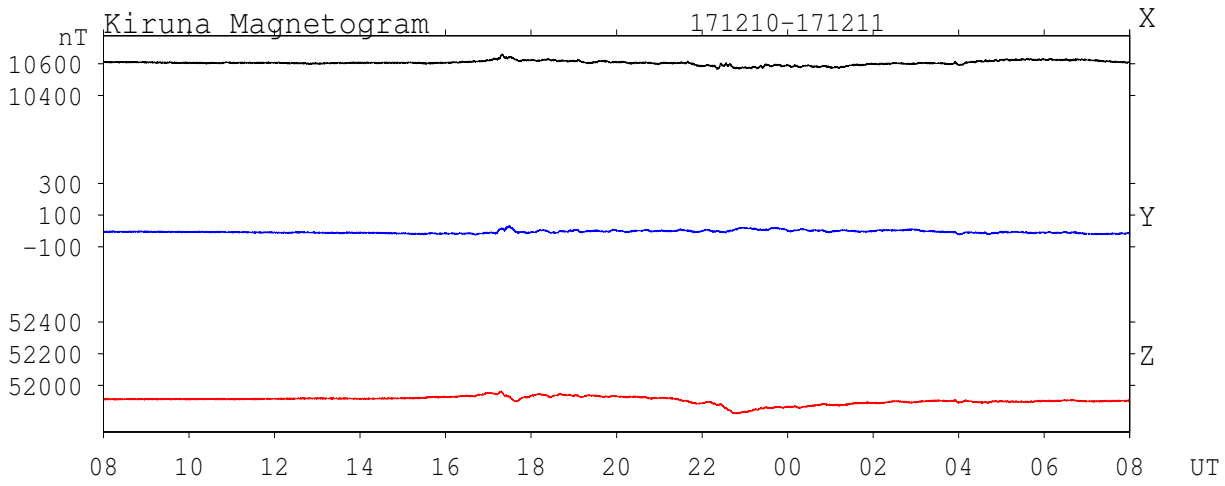

Kiruna Magnetogram
171205-171206
nT
10900
10700
300
100
-100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

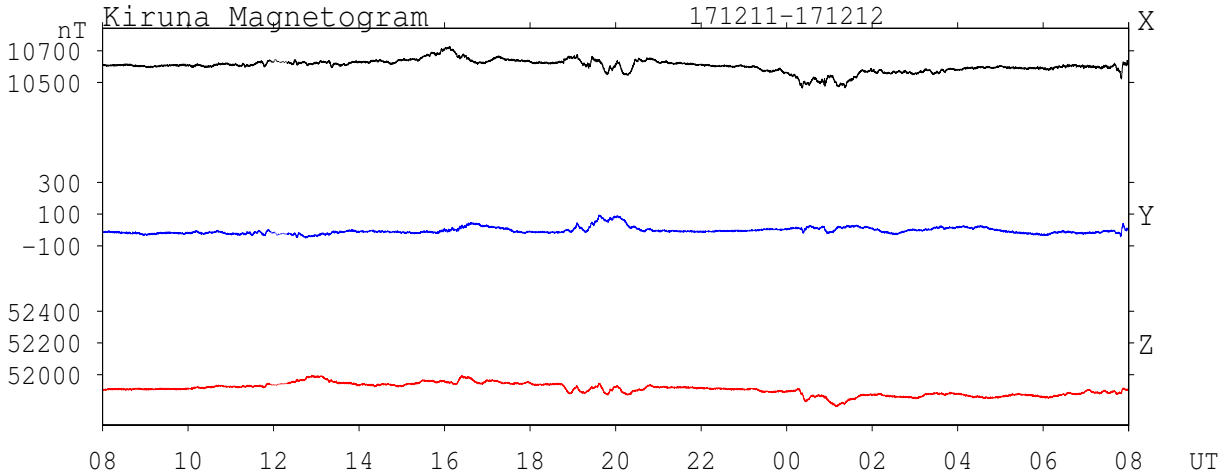

Kiruna Magnetogram
171206-171207
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

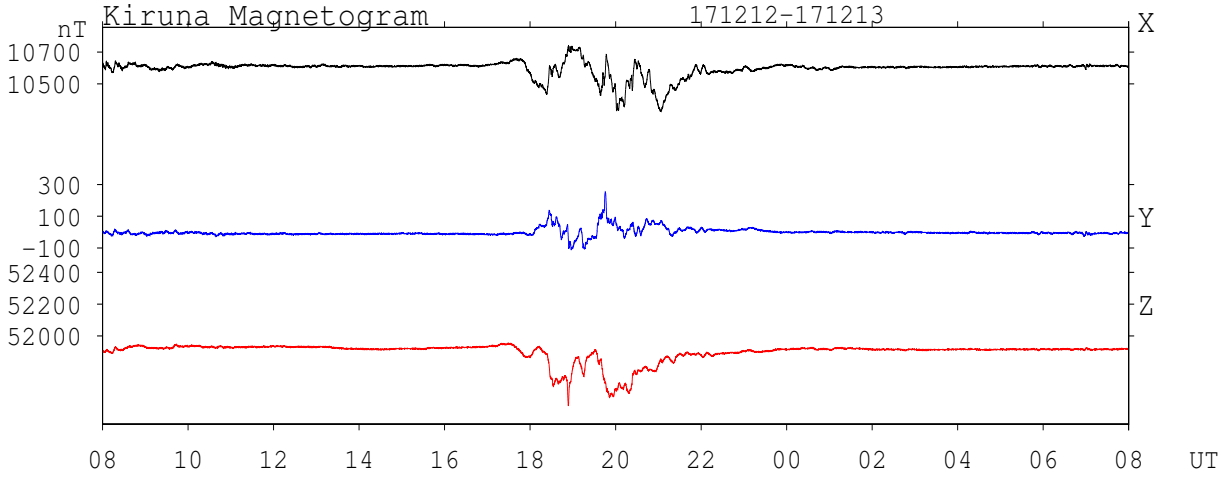

Kiruna Magnetogram
171207-171208
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

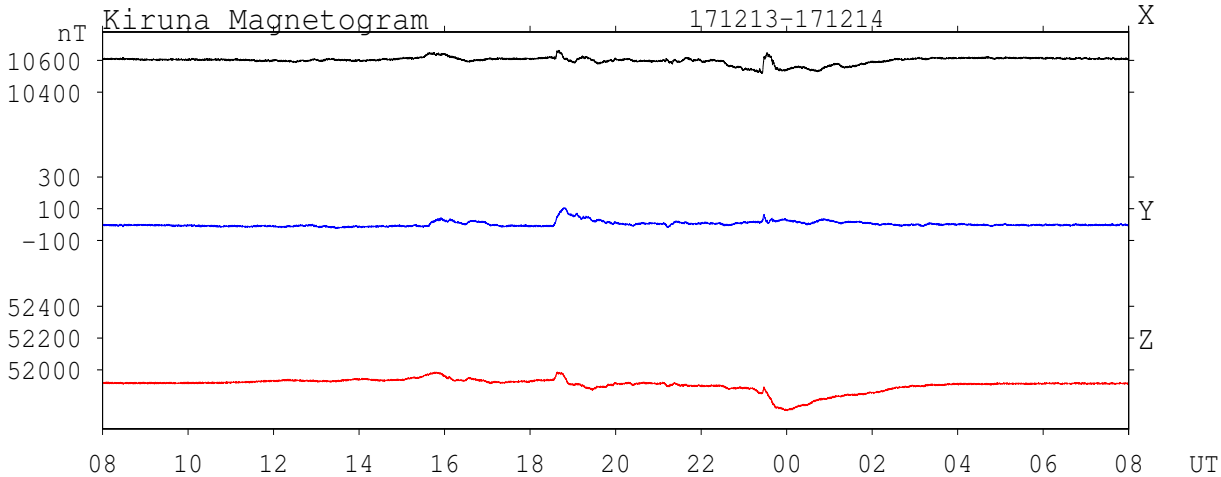

Kiruna Magnetogram
171208-171209
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

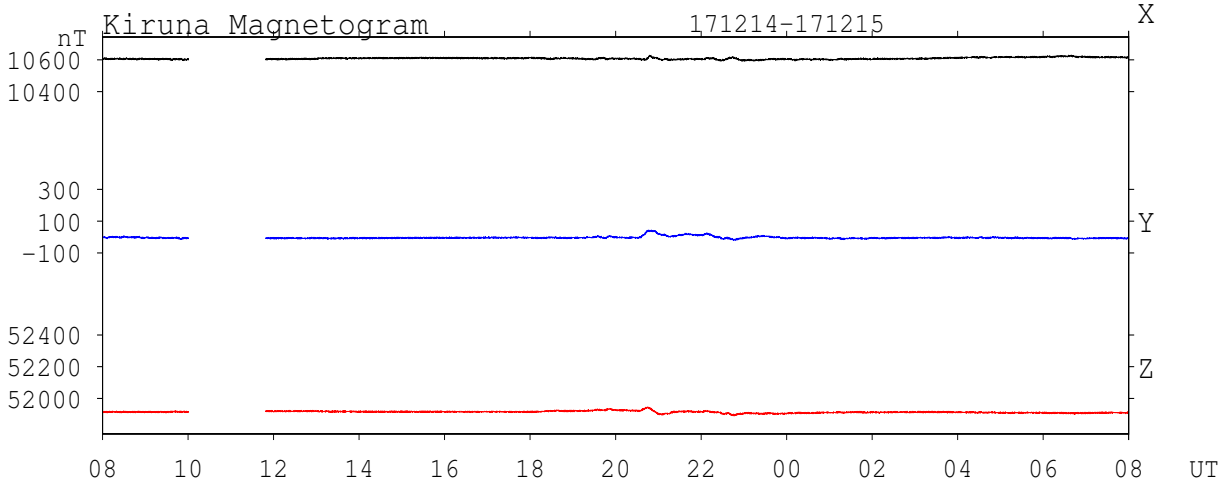

Kiruna Magnetogram
171209-171210
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

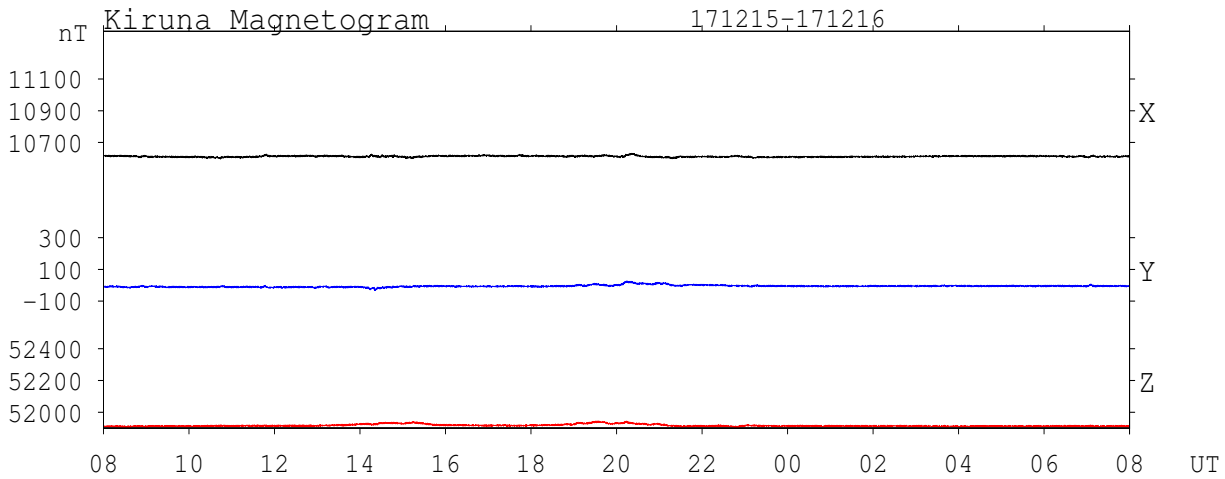

Kiruna Magnetogram
171210-171211
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

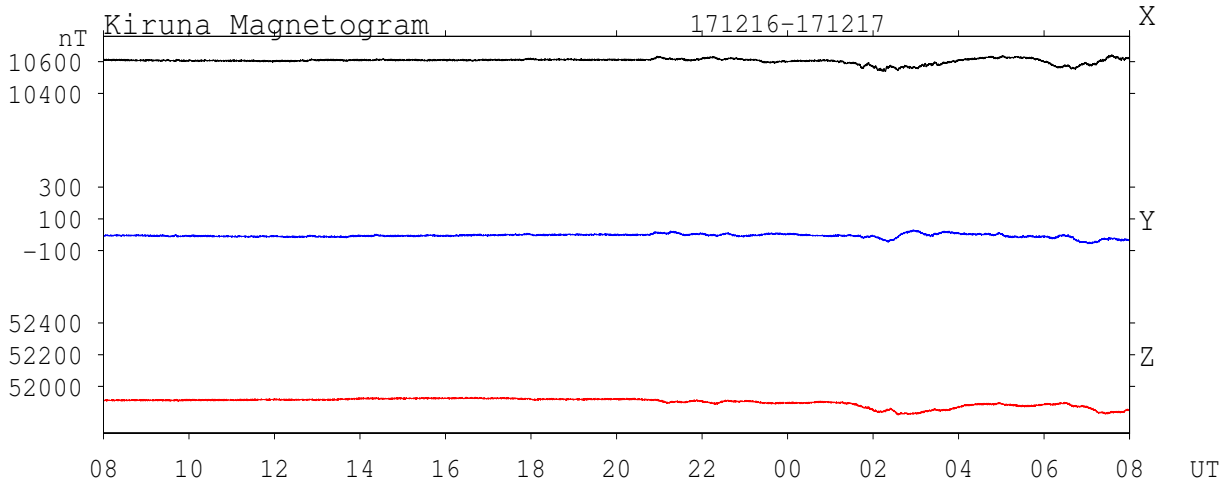

Kiruna Magnetogram
171211-171212
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

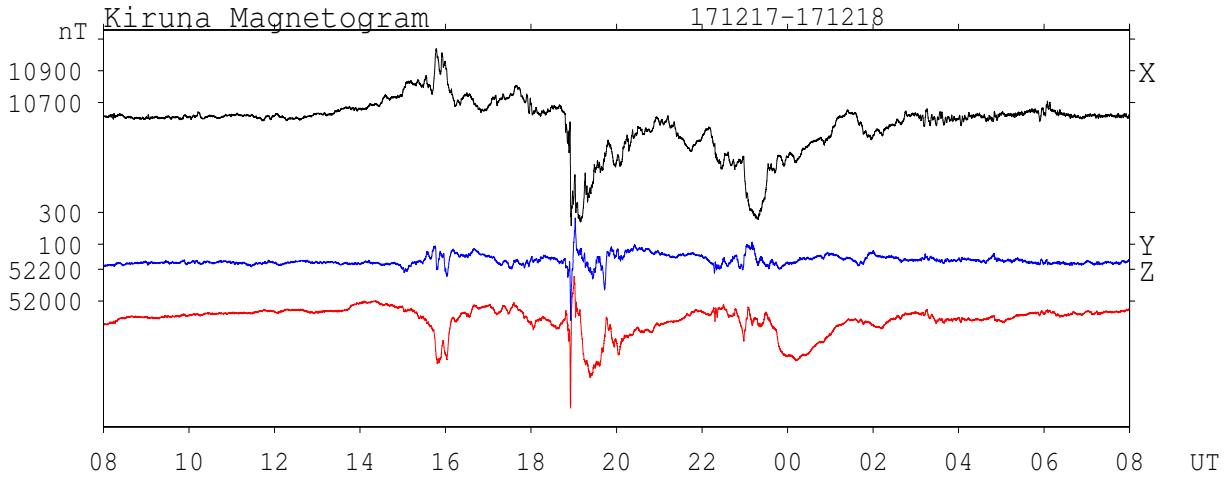

Kiruna Magnetogram
171212-171213
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

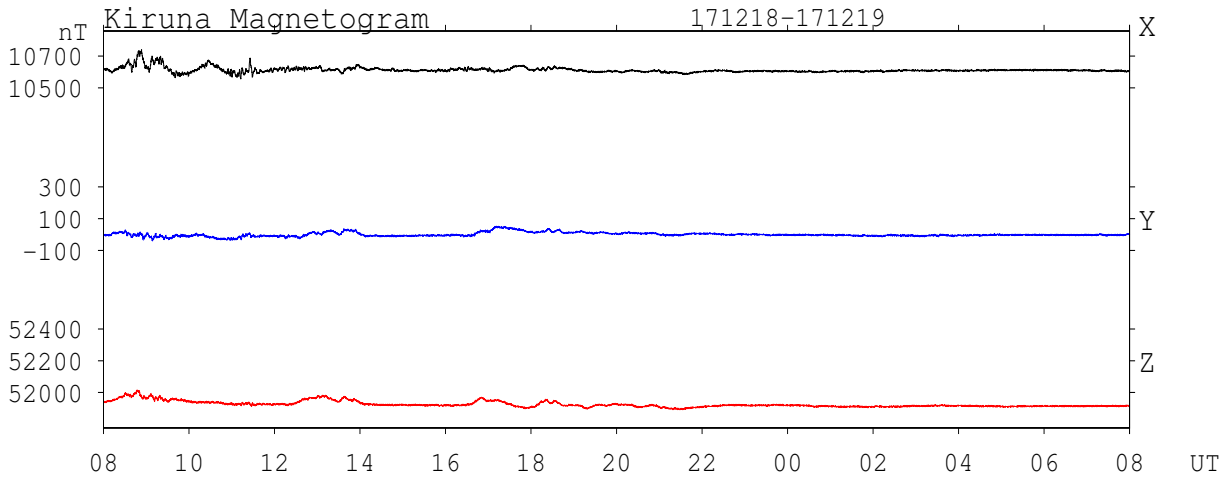

Kiruna Magnetogram
171213-171214
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

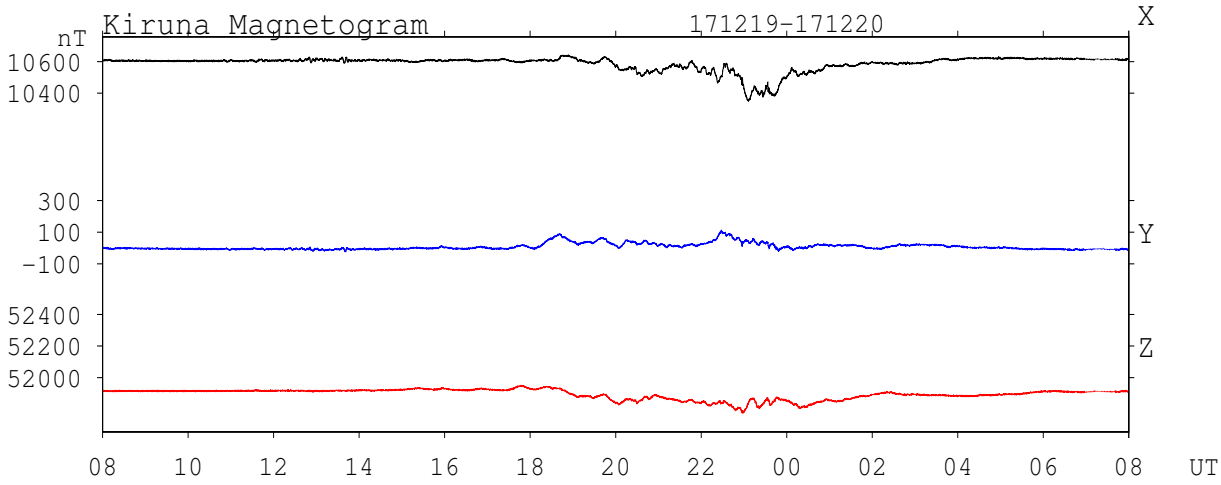

Kiruna Magnetogram
171214-171215
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

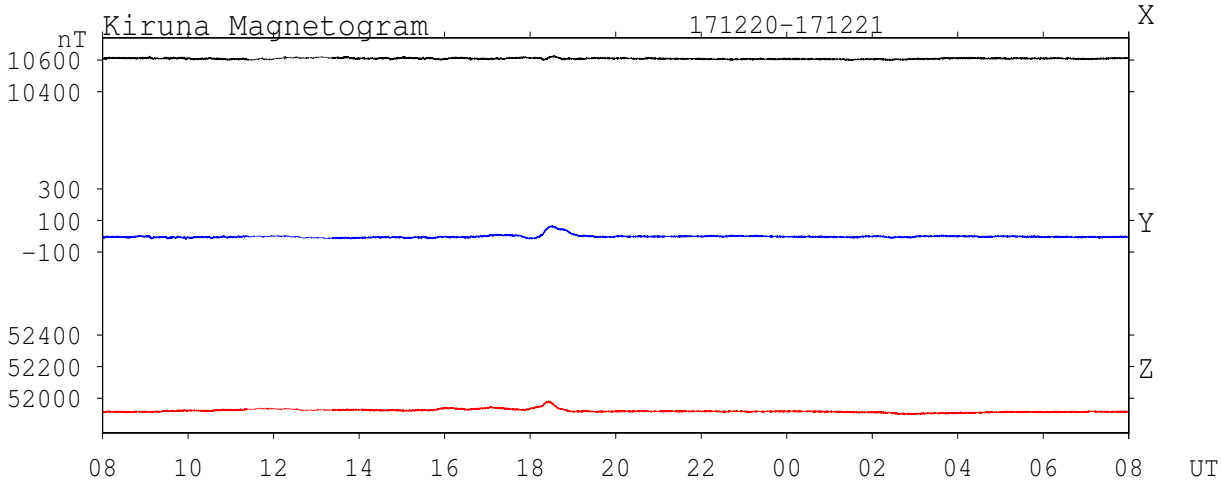

Kiruna Magnetogram
171215-171216
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

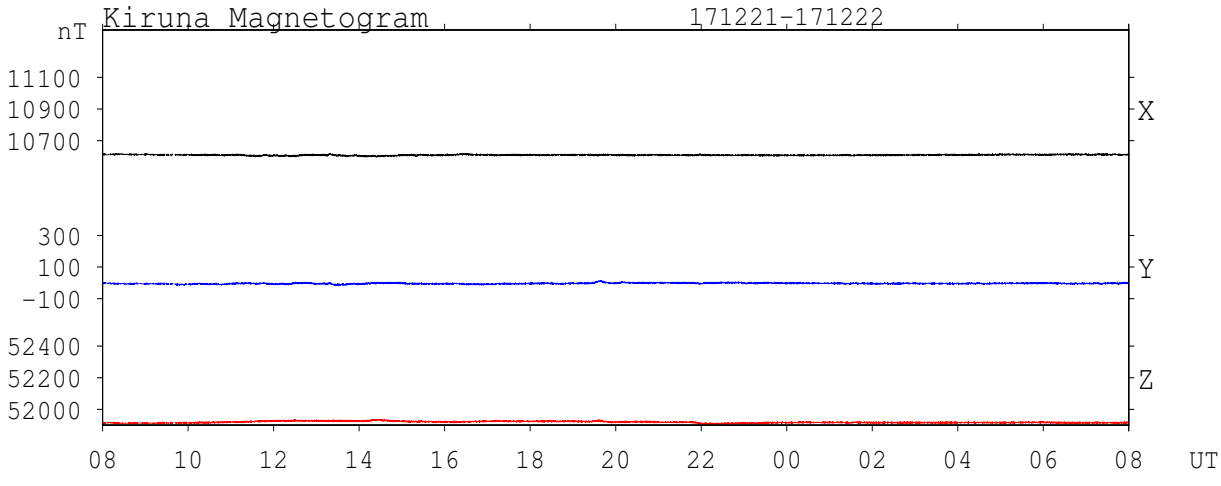

Kiruna Magnetogram
171216-171217
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

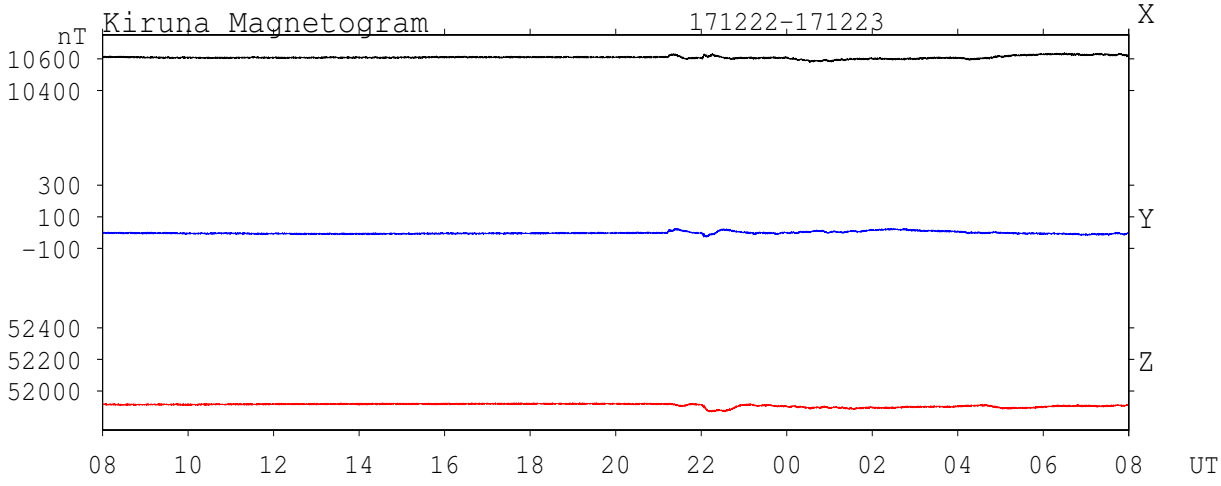

Kiruna Magnetogram
171217-171218
nT
10900
10700
300
100
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

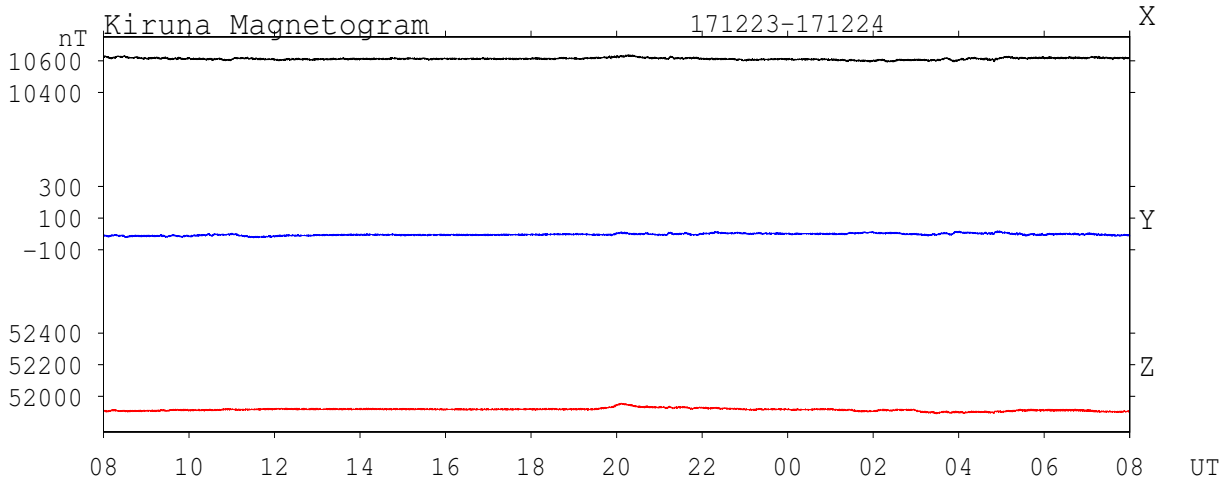

Kiruna Magnetogram
171218-171219
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

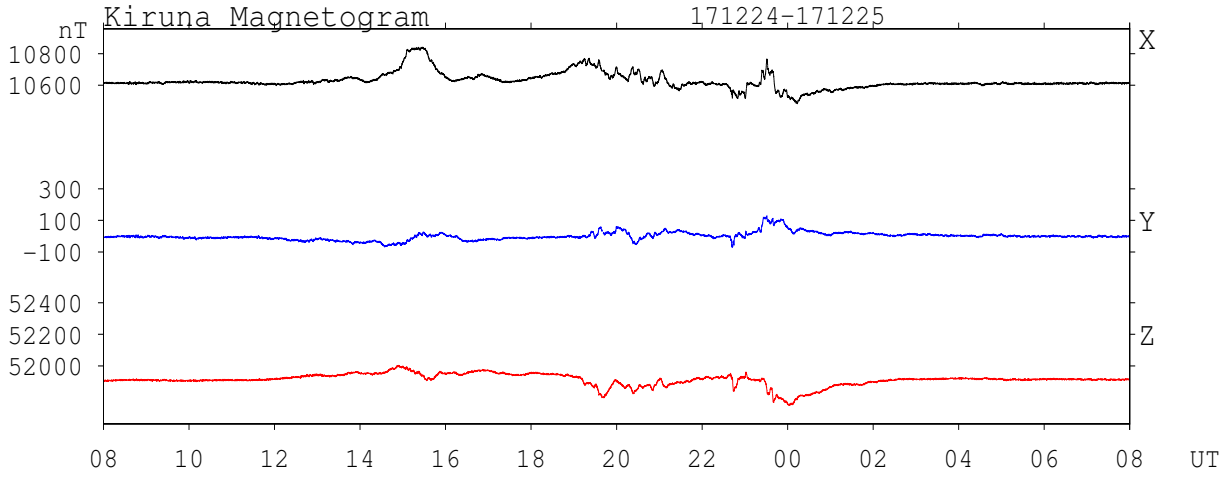

Kiruna Magnetogram
171219-171220
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

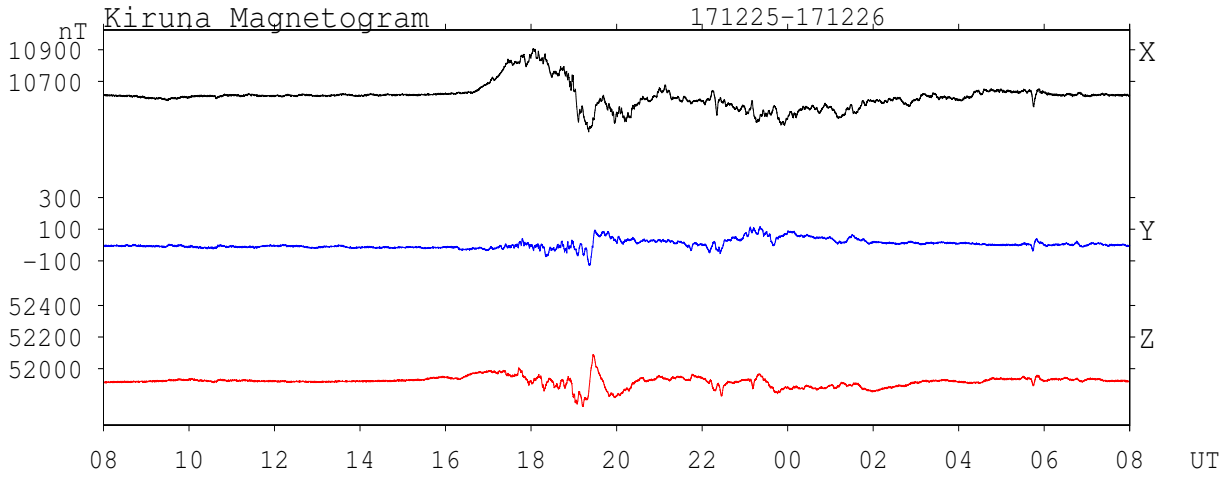

Kiruna Magnetogram
171220-171221
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

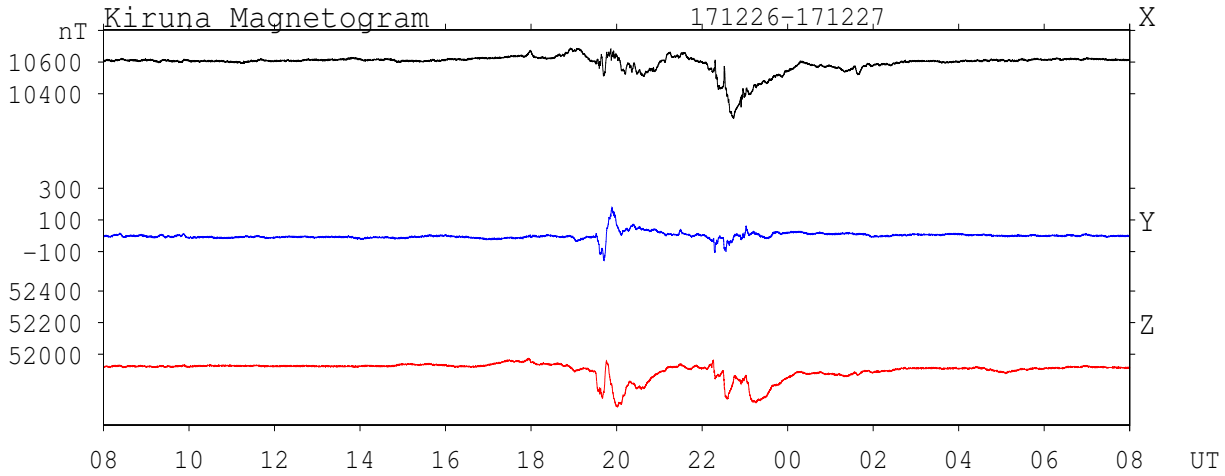

Kiruna Magnetogram
171221-171222
nT
11100
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

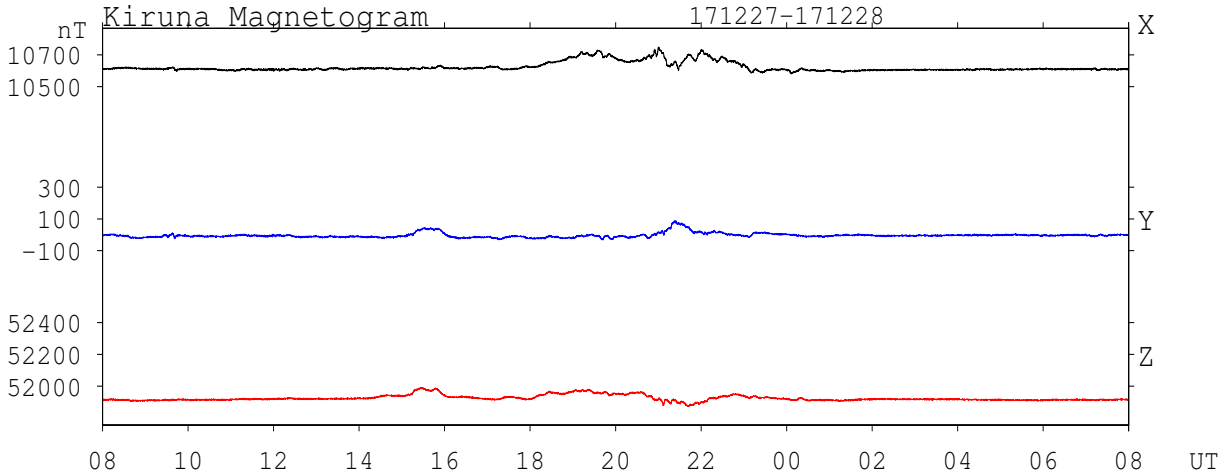

Kiruna Magnetogram
171222-171223
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

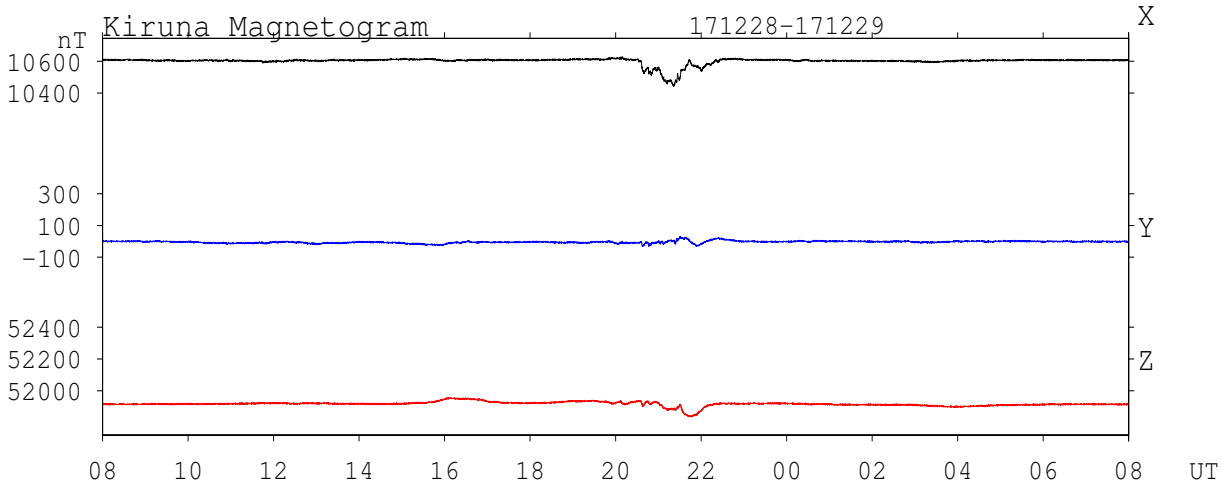

Kiruna Magnetogram
171223-171224
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

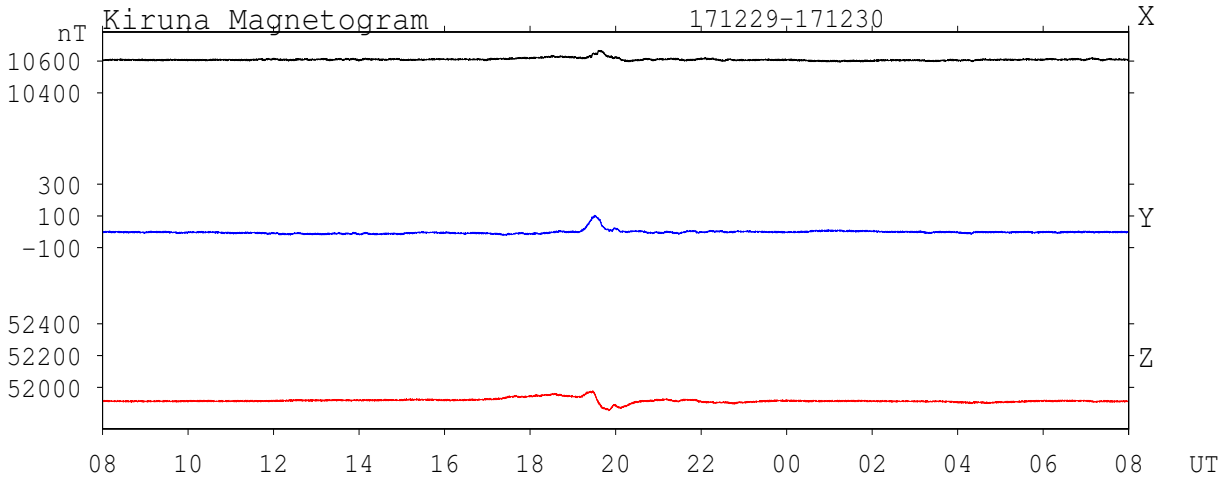

Kiruna Magnetogram
171224-171225
nT
10800
10600
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

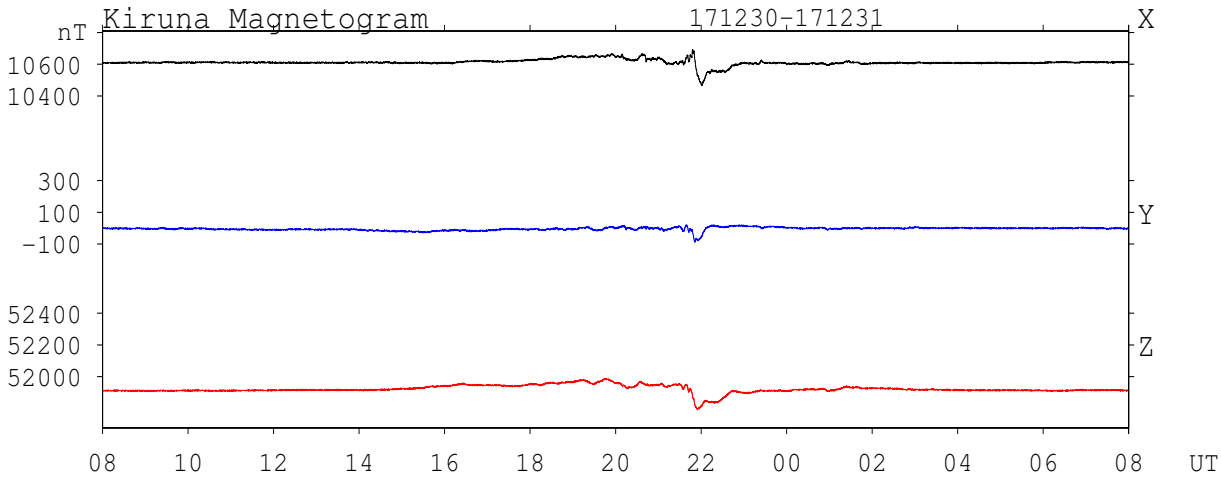

Kiruna Magnetogram
171225-171226
nT
10900
10700
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

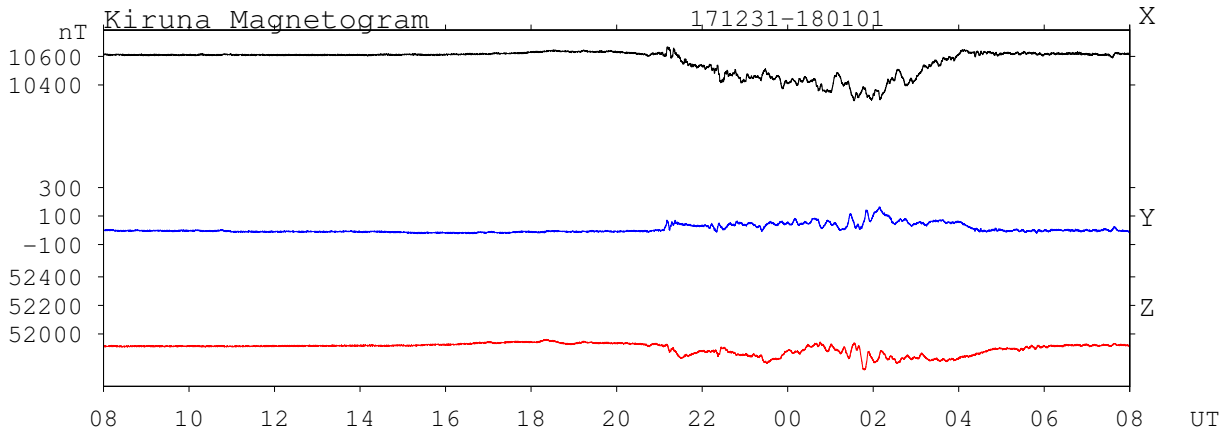

Kiruna Magnetogram
171226-171227
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT


Kiruna Magnetogram
171227-171228
nT
10700
10500
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT


Kiruna Magnetogram
171228-171229
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT


Kiruna Magnetogram
171229-171230
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT


Kiruna Magnetogram
171230-171231
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08 10 12 14 16 18 20 22 00 02 04 06 08 UT

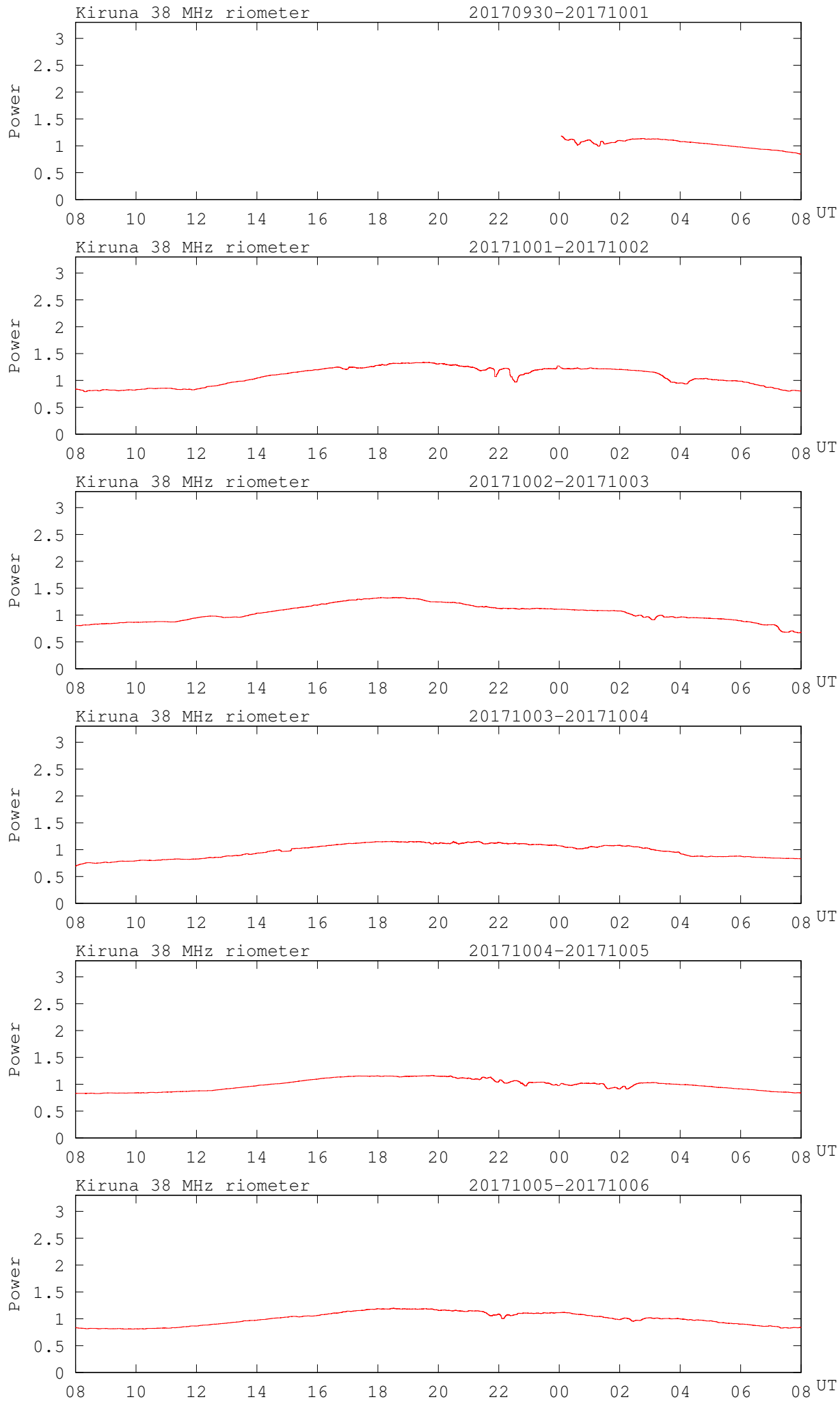

Kiruna Magnetogram
171231-180101
nT
10600
10400
300
100
-100
52400
52200
52000
X
Y
Z
08
10
12
14
16
18
20
22
00
02
04
06
08
UT

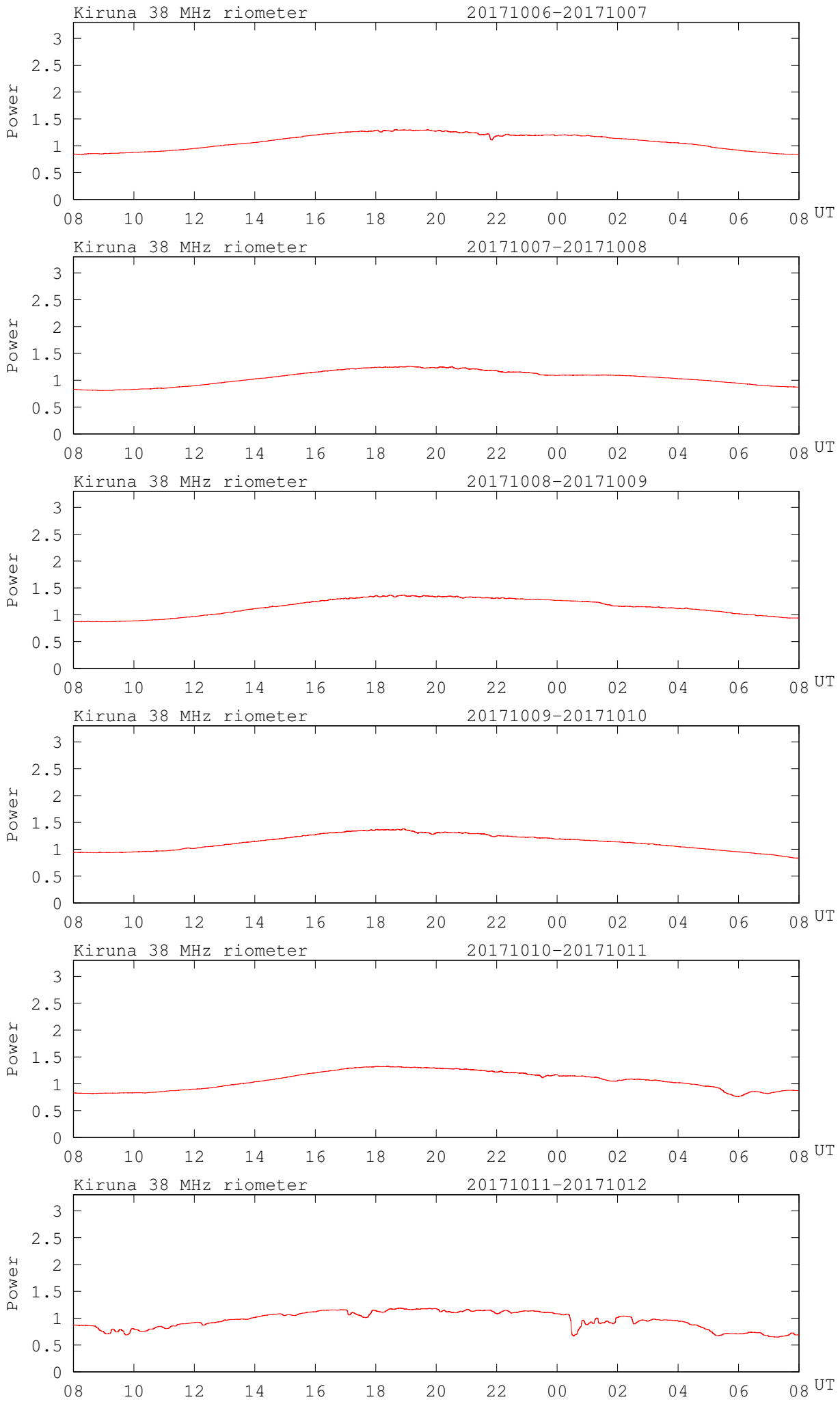
KIRUNA VERTICAL RIOMETER

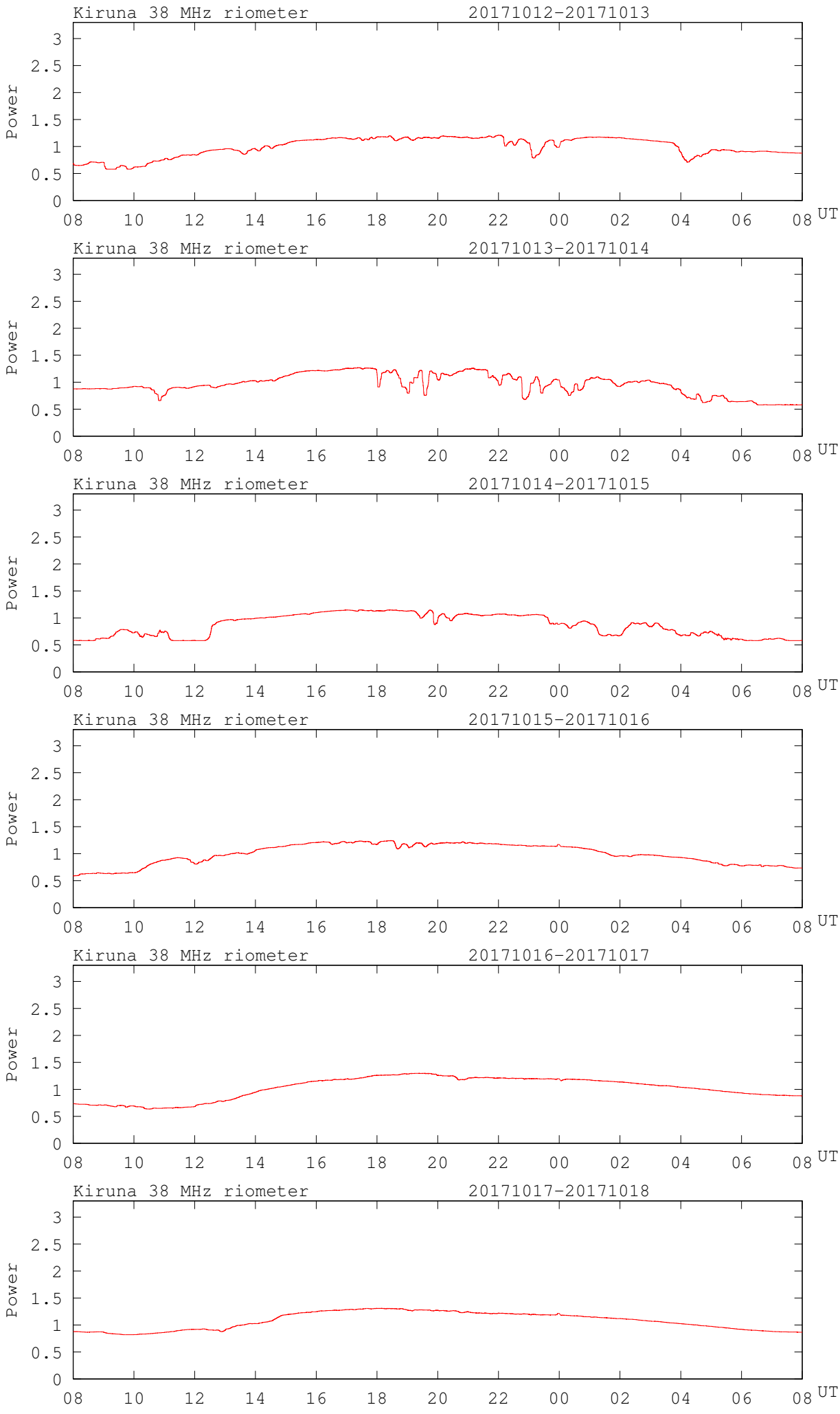
October - December 2017

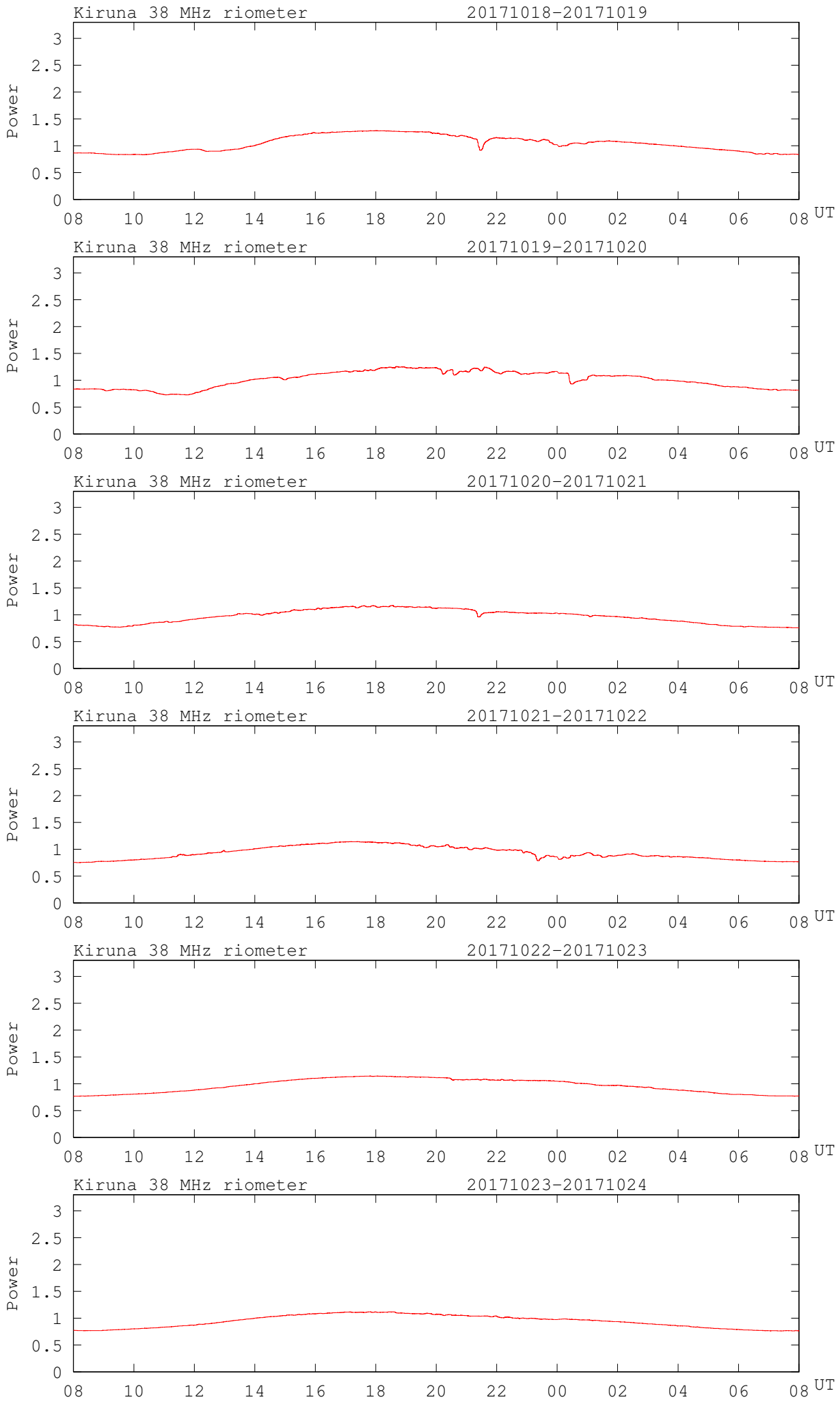
http://www.irf.se/~rio

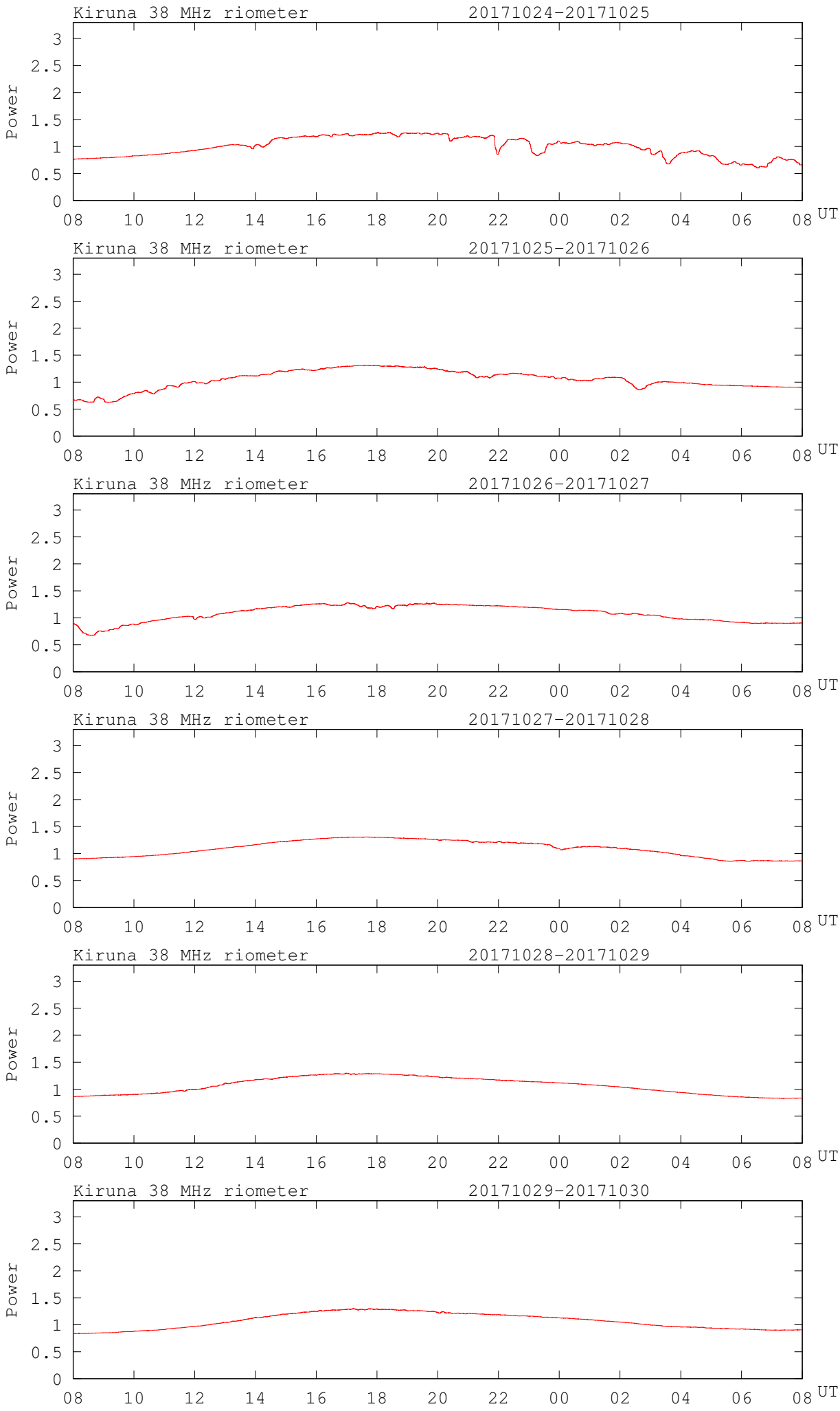
Note: Fast oscillations, for example 20171114, are due to power interference.

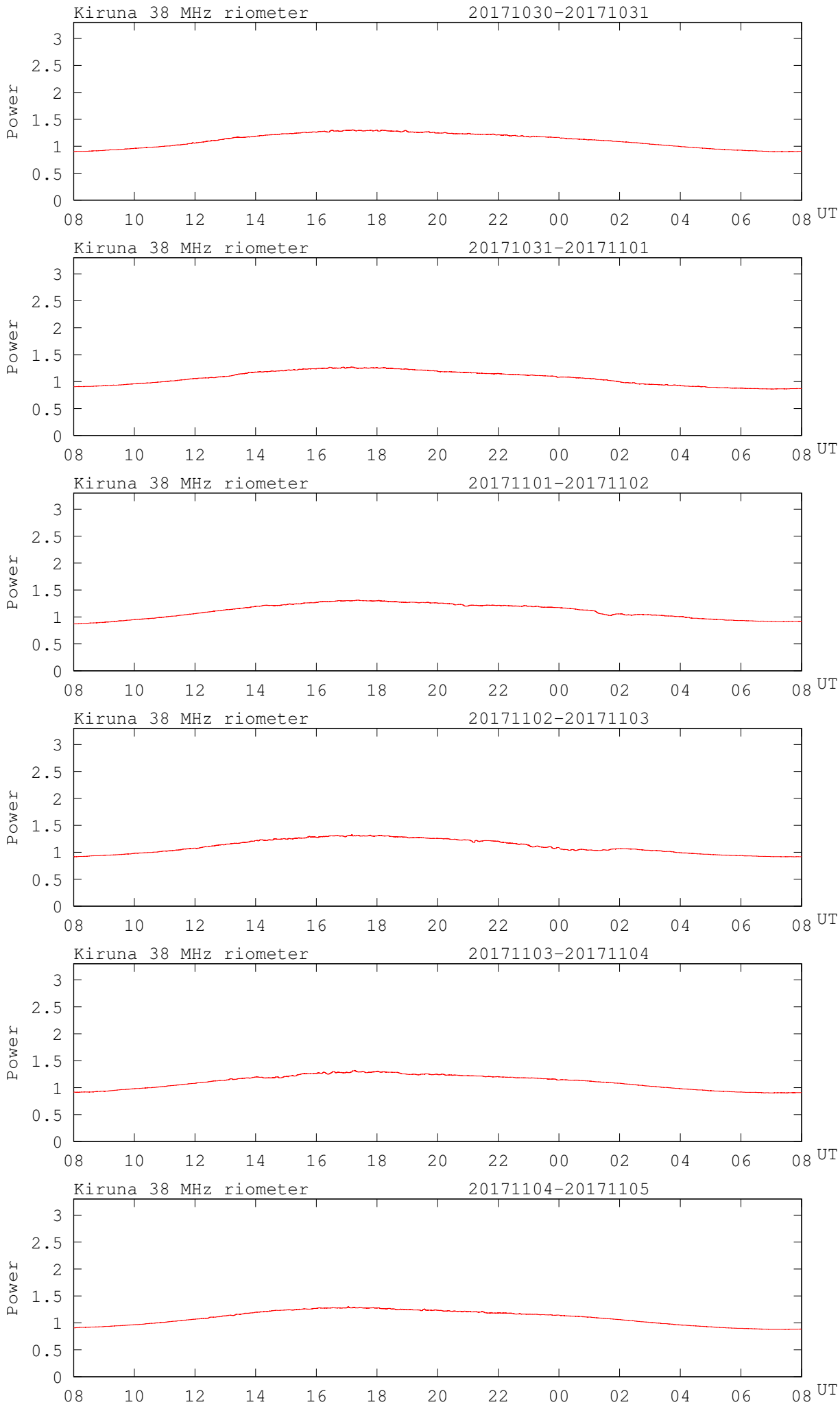

Kiruna 38 MHz riometer 20170930-20171001
Kiruna 38 MHz riometer 20171001-20171002
Kiruna 38 MHz riometer 20171002-20171003
Kiruna 38 MHz riometer 20171003-20171004
Kiruna 38 MHz riometer 20171004-20171005
Kiruna 38 MHz riometer 20171005-20171006
Power
0 0.5 1 1.5 2 2.5 3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT

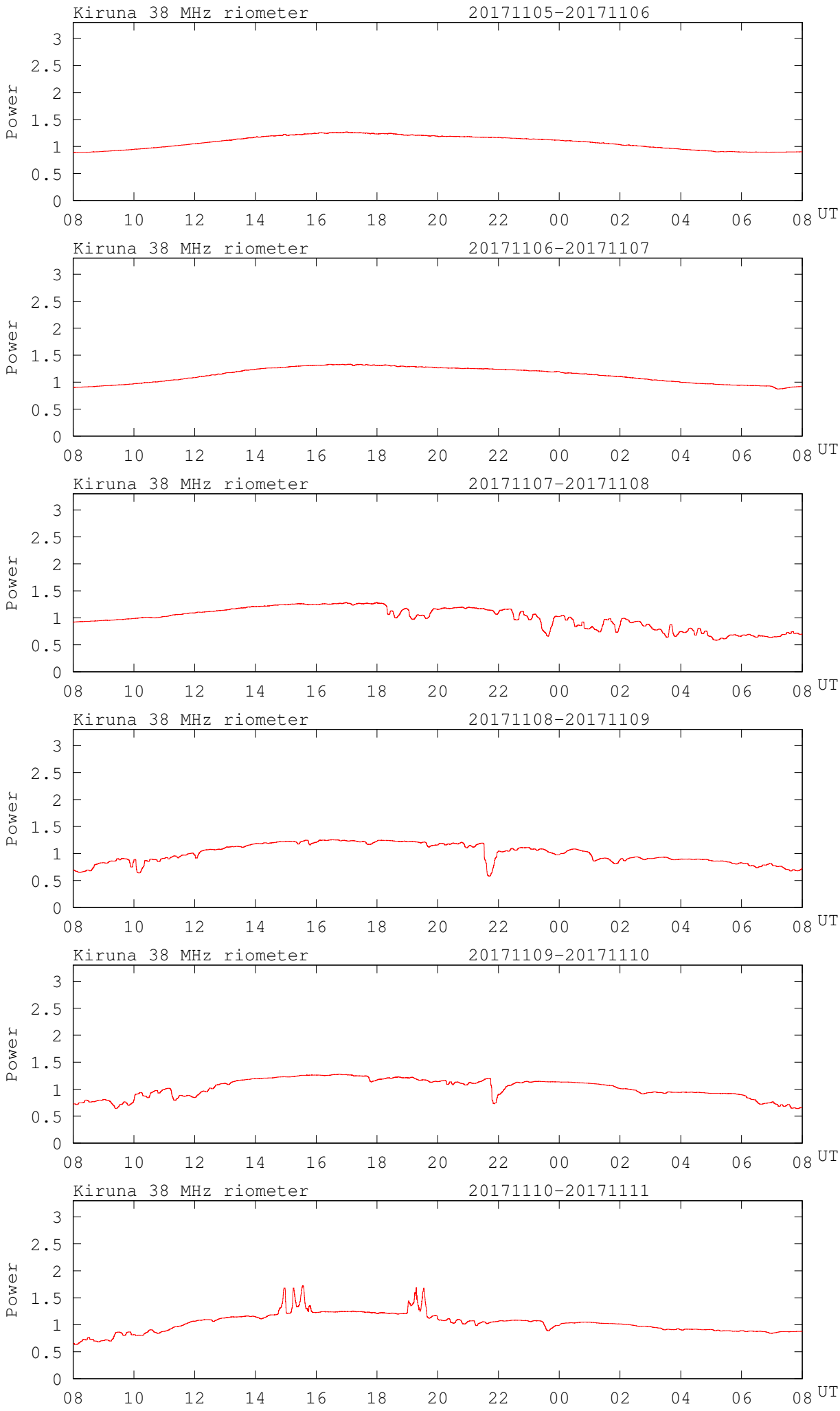

Kiruna 38 MHz riometer 20171006-20171007
Kiruna 38 MHz riometer 20171007-20171008
Kiruna 38 MHz riometer 20171008-20171009
Kiruna 38 MHz riometer 20171009-20171010
Kiruna 38 MHz riometer 20171010-20171011
Kiruna 38 MHz riometer 20171011-20171012
Power
0
0.5
1
1.5
2
2.5
3
08
10
12
14
16
18
20
22
00
02
04
06
08
UT

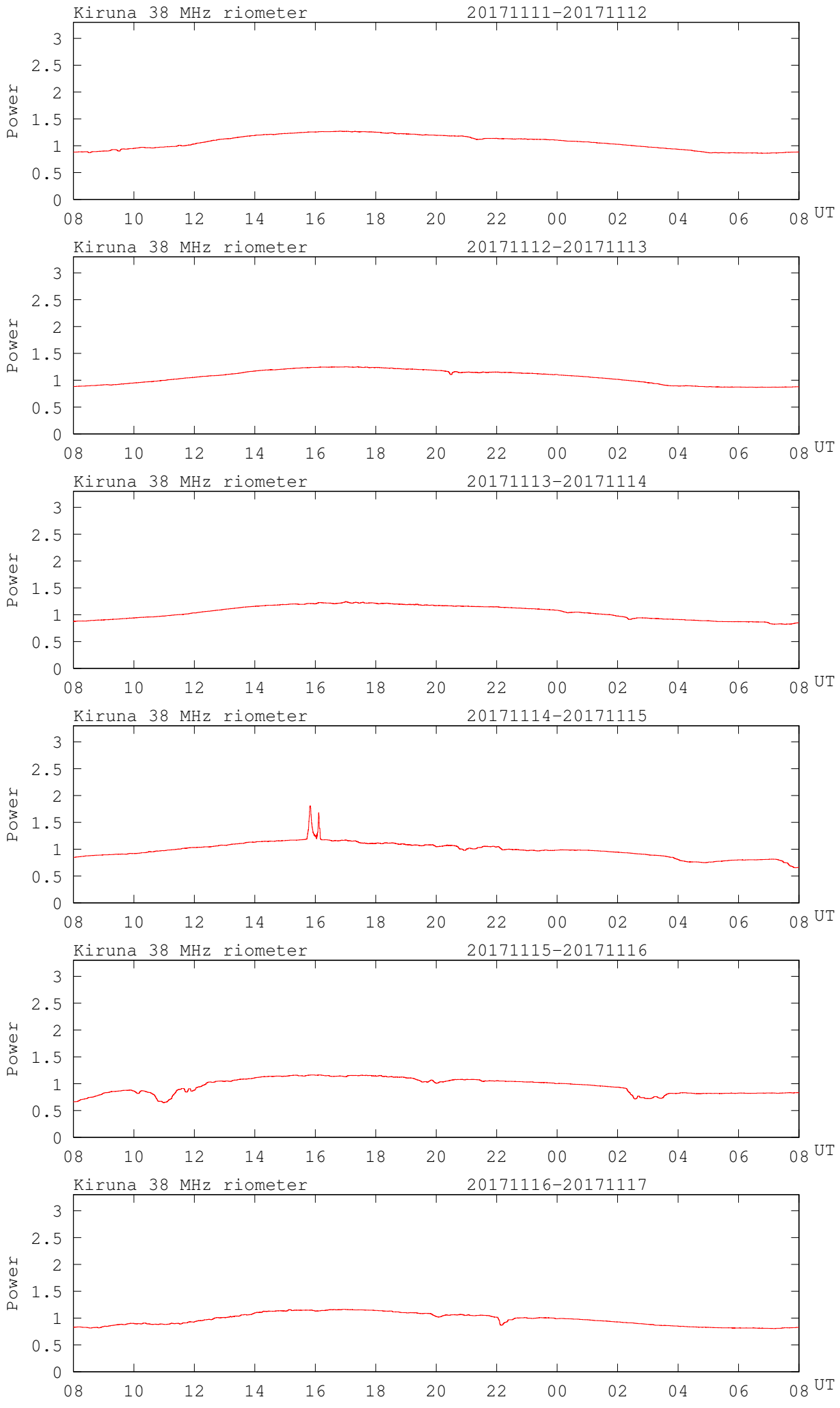

Kiruna 38 MHz riometer 20171012-20171013
Kiruna 38 MHz riometer 20171013-20171014
Kiruna 38 MHz riometer 20171014-20171015
Kiruna 38 MHz riometer 20171015-20171016
Kiruna 38 MHz riometer 20171016-20171017
Kiruna 38 MHz riometer 20171017-20171018
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT

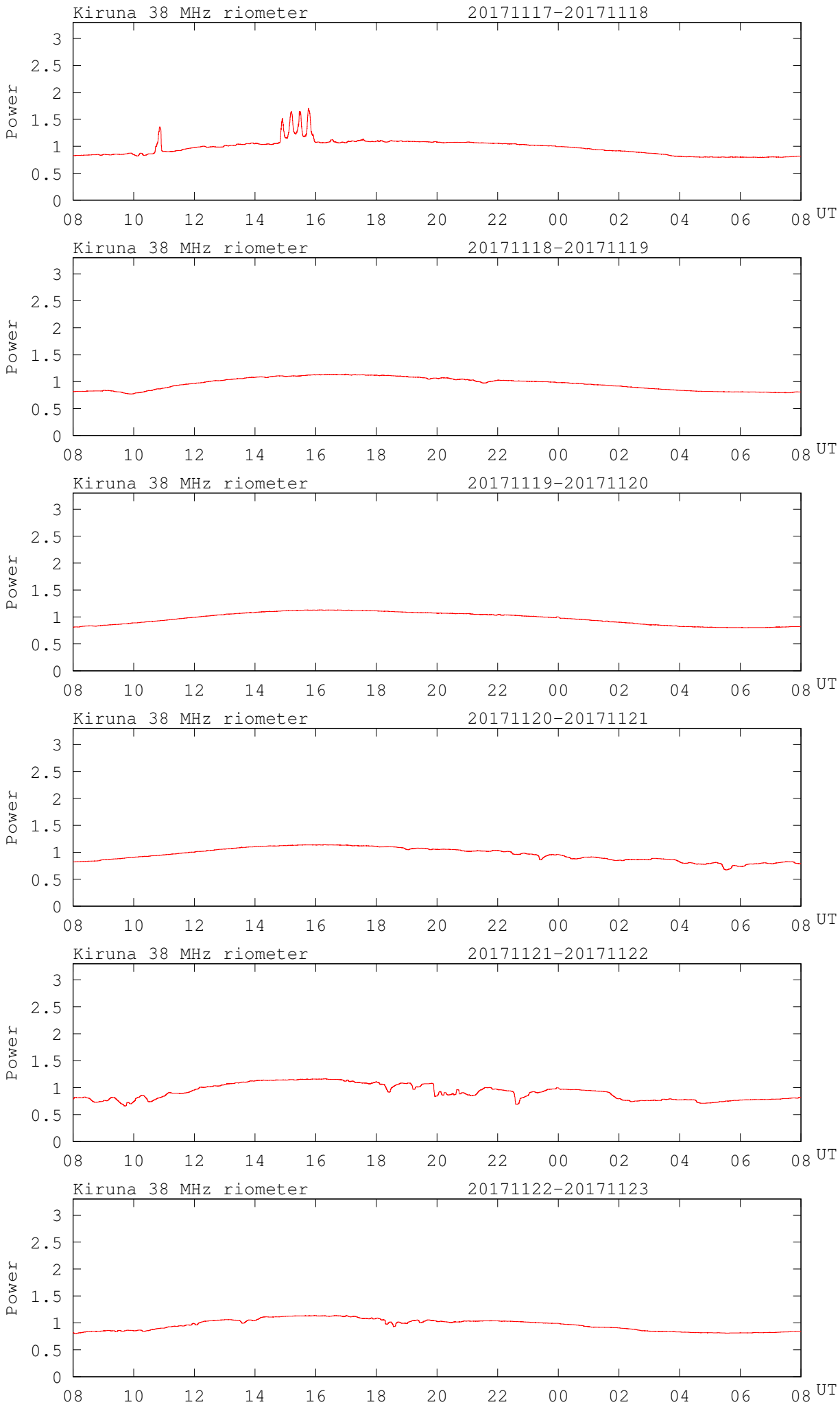

Kiruna 38 MHz riometer 20171018-20171019
Kiruna 38 MHz riometer 20171019-20171020
Kiruna 38 MHz riometer 20171020-20171021
Kiruna 38 MHz riometer 20171021-20171022
Kiruna 38 MHz riometer 20171022-20171023
Kiruna 38 MHz riometer 20171023-20171024
Power
0
0.5
1
1.5
2
2.5
3
08
10
12
14
16
18
20
22
00
02
04
06
08
UT

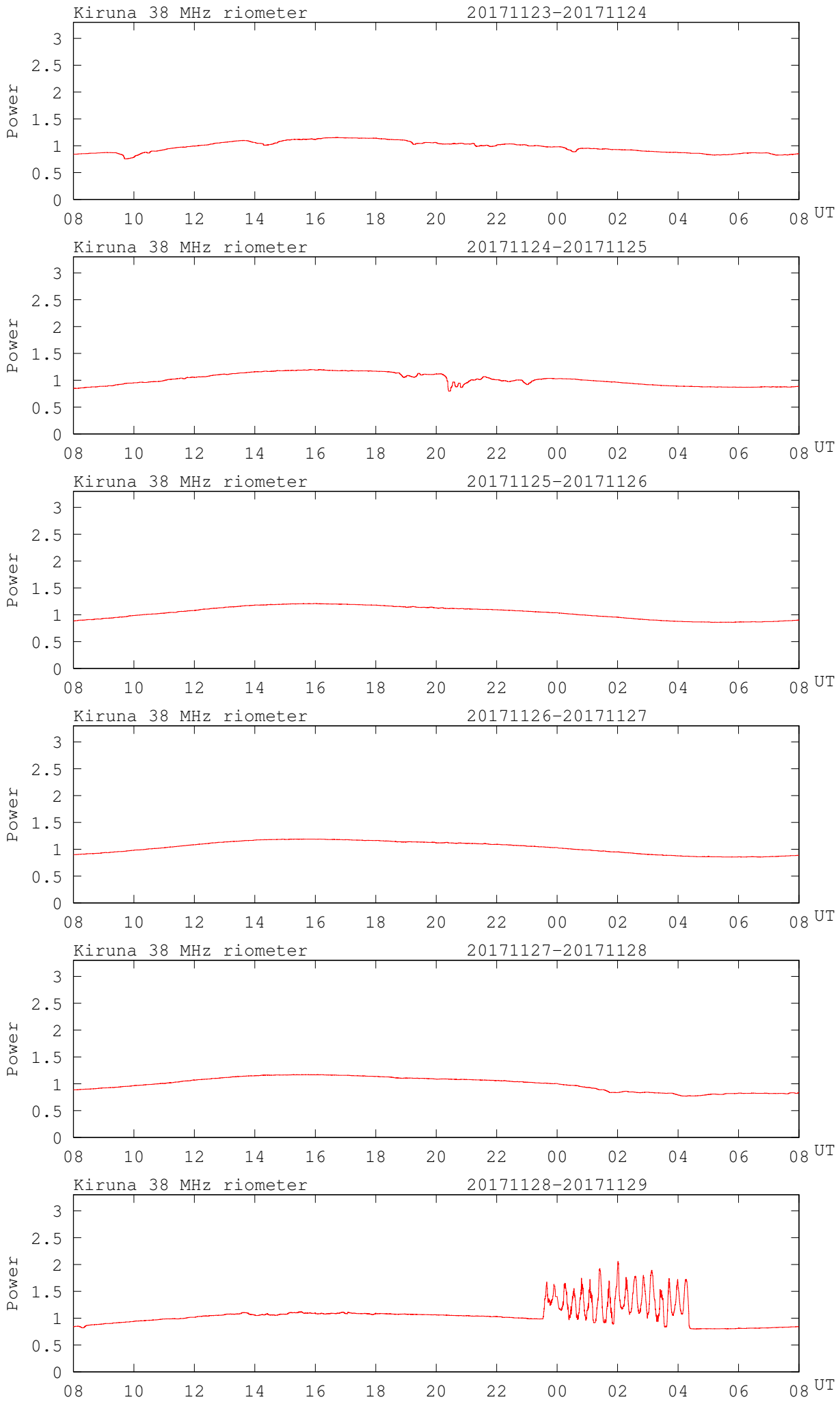

Kiruna 38 MHz riometer 20171024-20171025
Kiruna 38 MHz riometer 20171025-20171026
Kiruna 38 MHz riometer 20171026-20171027
Kiruna 38 MHz riometer 20171027-20171028
Kiruna 38 MHz riometer 20171028-20171029
Kiruna 38 MHz riometer 20171029-20171030
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT

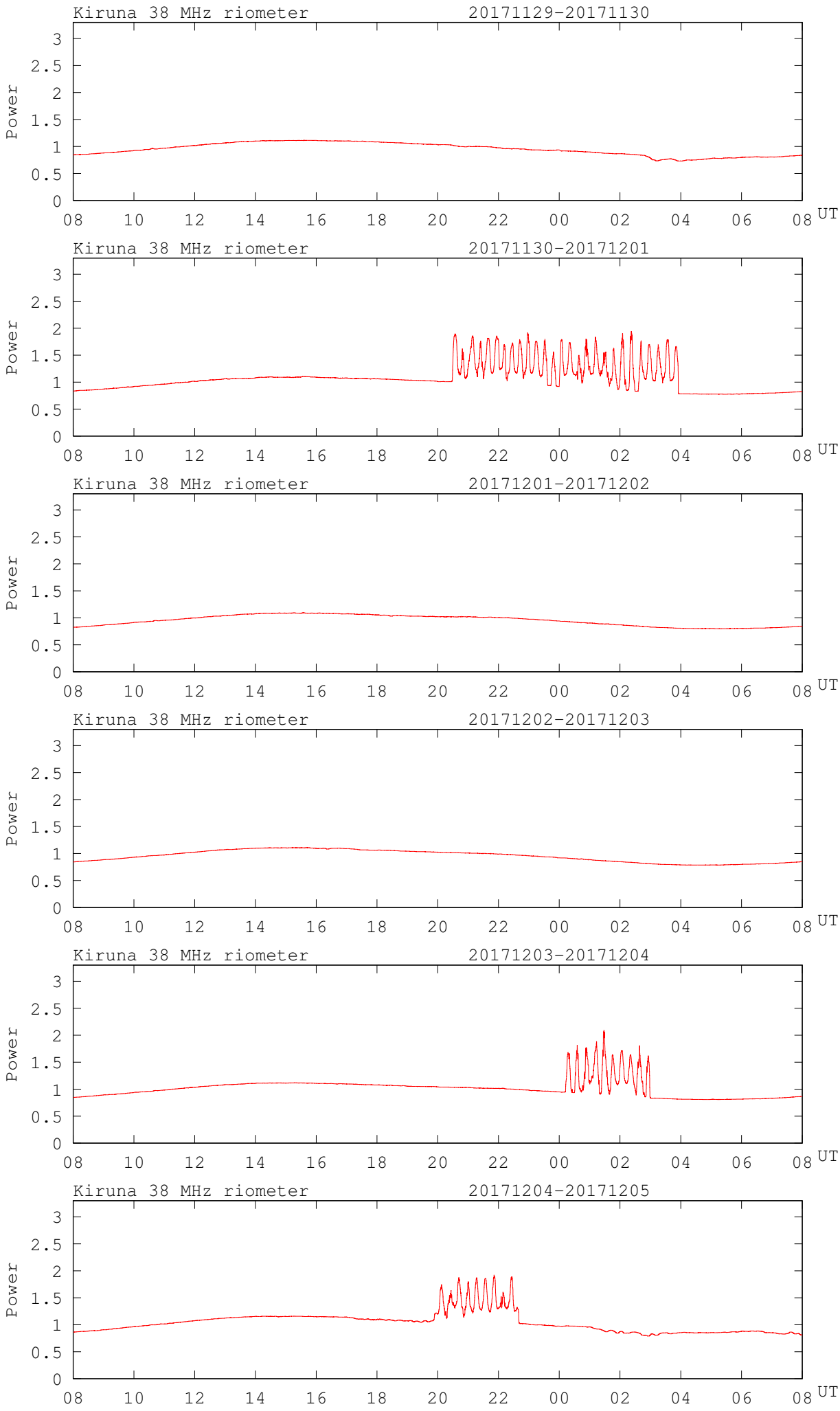

Kiruna 38 MHz riometer 20171030-20171031
Kiruna 38 MHz riometer 20171031-20171101
Kiruna 38 MHz riometer 20171101-20171102
Kiruna 38 MHz riometer 20171102-20171103
Kiruna 38 MHz riometer 20171103-20171104
Kiruna 38 MHz riometer 20171104-20171105
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT

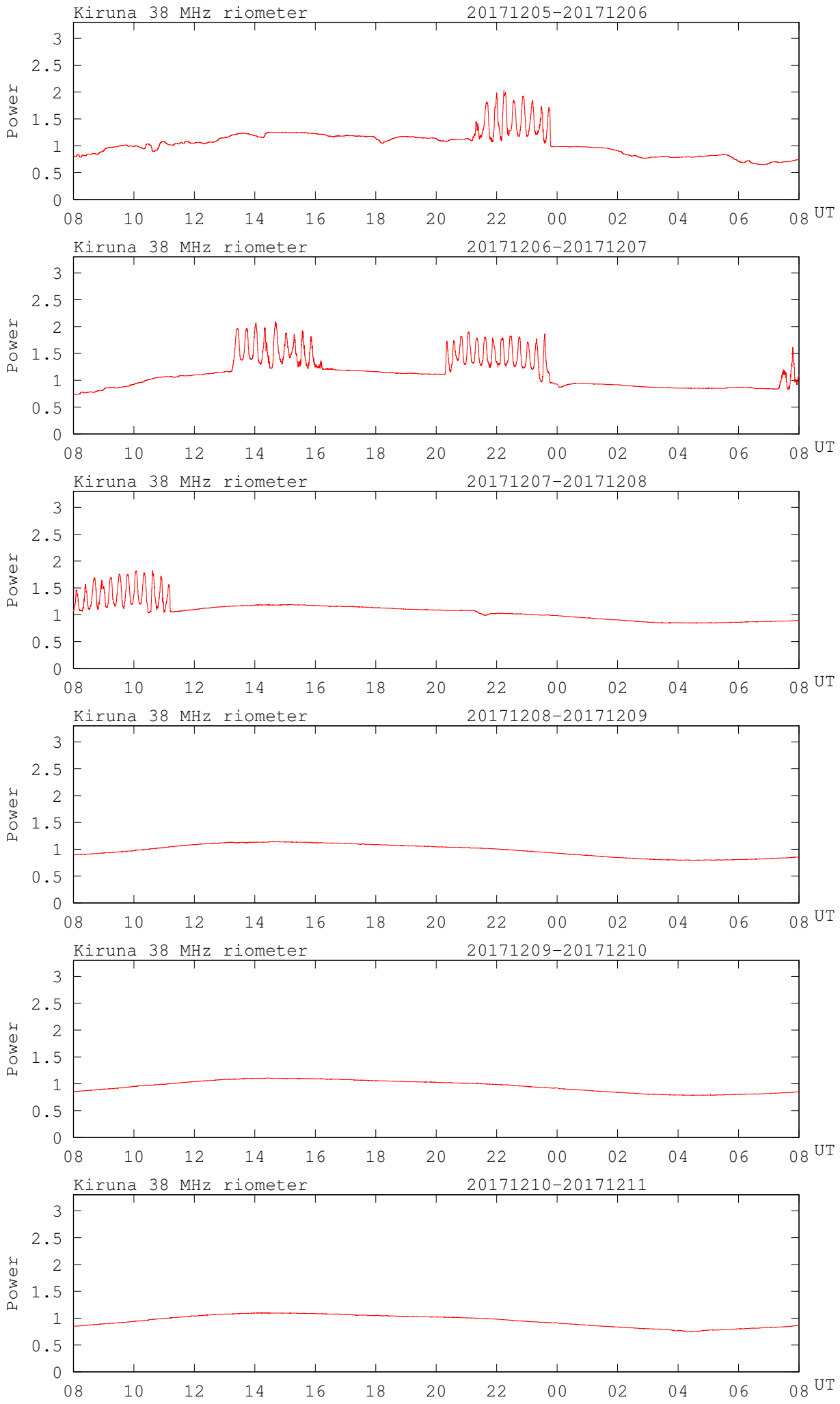

Kiruna 38 MHz riometer 20171105-20171106
Kiruna 38 MHz riometer 20171106-20171107
Kiruna 38 MHz riometer 20171107-20171108
Kiruna 38 MHz riometer 20171108-20171109
Kiruna 38 MHz riometer 20171109-20171110
Kiruna 38 MHz riometer 20171110-20171111
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT

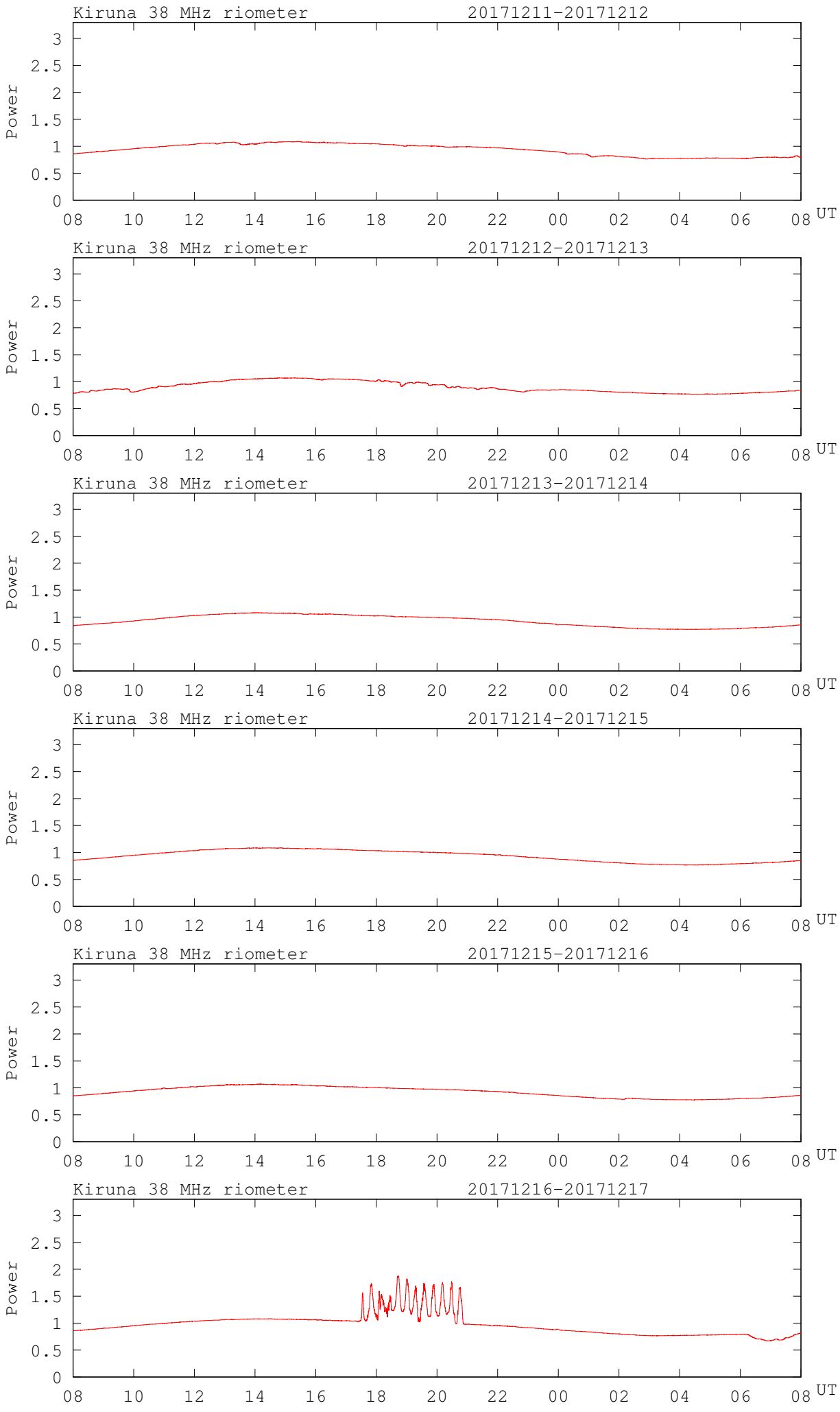

Kiruna 38 MHz riometer 20171111-20171112
Kiruna 38 MHz riometer 20171112-20171113
Kiruna 38 MHz riometer 20171113-20171114
Kiruna 38 MHz riometer 20171114-20171115
Kiruna 38 MHz riometer 20171115-20171116
Kiruna 38 MHz riometer 20171116-20171117
Power
0
0.5
1
1.5
2
2.5
3
08
10
12
14
16
18
20
22
00
02
04
06
08
UT

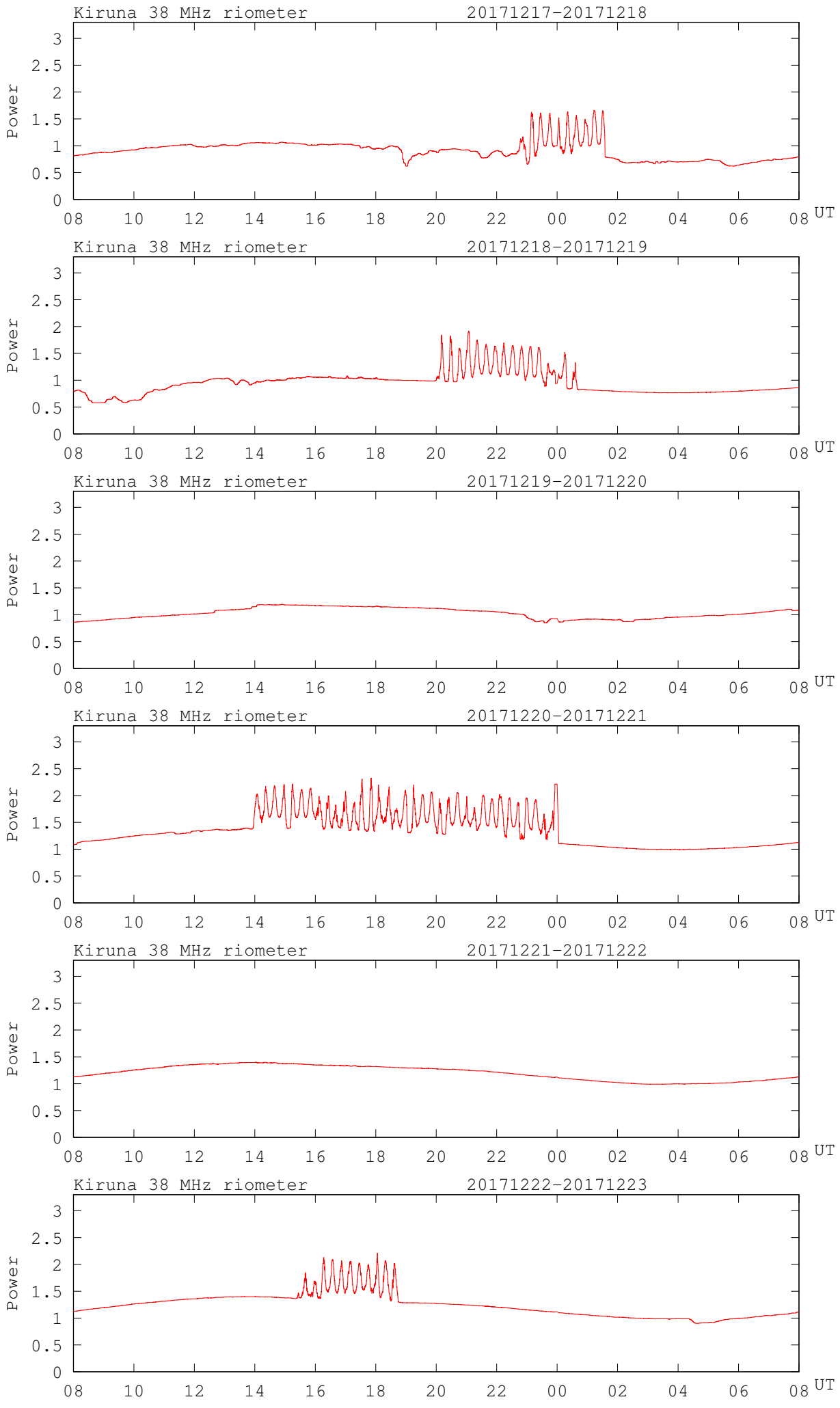

Kiruna 38 MHz riometer 20171117-20171118
Kiruna 38 MHz riometer 20171118-20171119
Kiruna 38 MHz riometer 20171119-20171120
Kiruna 38 MHz riometer 20171120-20171121
Kiruna 38 MHz riometer 20171121-20171122
Kiruna 38 MHz riometer 20171122-20171123
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT

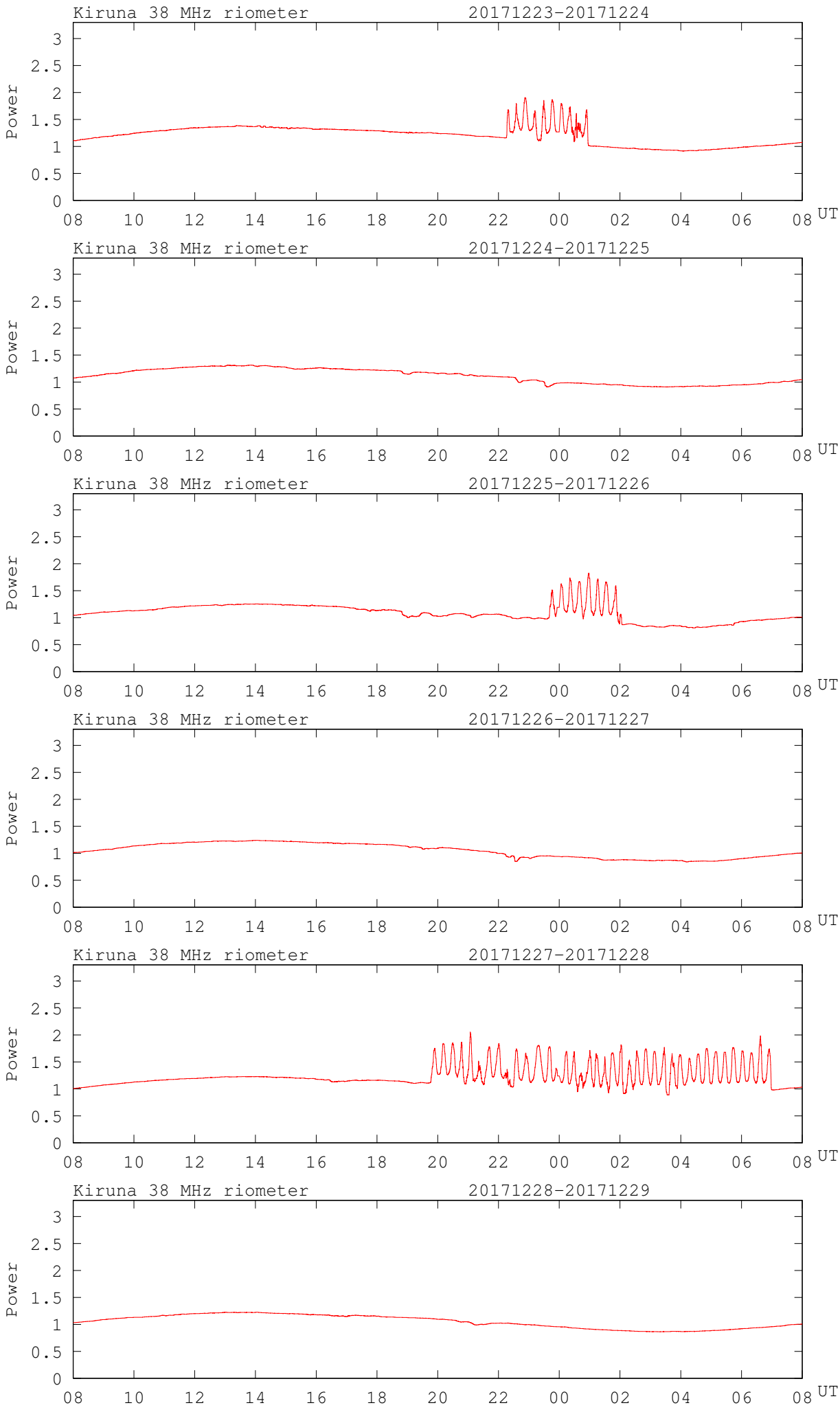

Kiruna 38 MHz riometer 20171123-20171124
Kiruna 38 MHz riometer 20171124-20171125
Kiruna 38 MHz riometer 20171125-20171126
Kiruna 38 MHz riometer 20171126-20171127
Kiruna 38 MHz riometer 20171127-20171128
Kiruna 38 MHz riometer 20171128-20171129
Power
0
0.5
1
1.5
2
2.5
3
08
10
12
14
16
18
20
22
00
02
04
06
08
UT

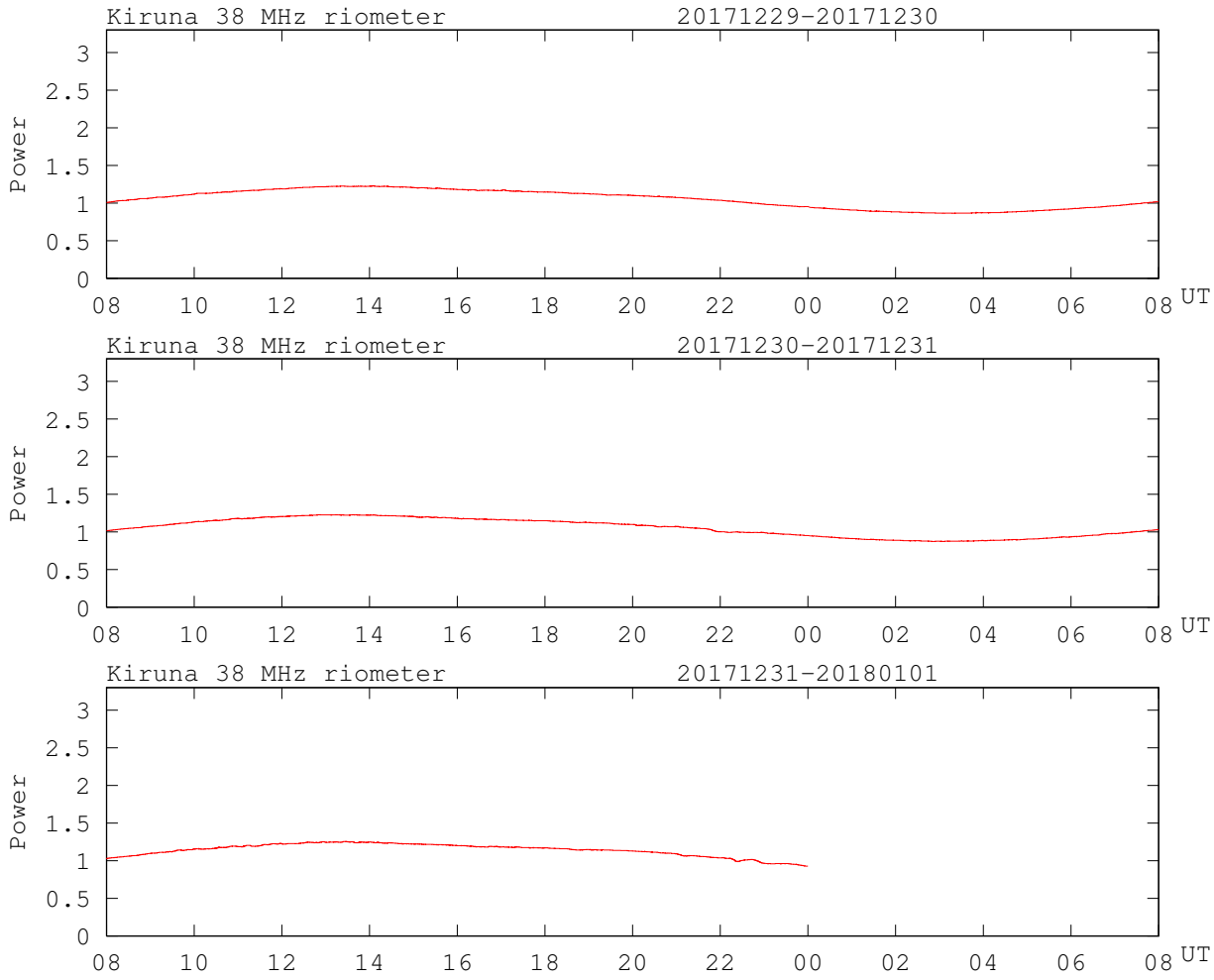

Kiruna 38 MHz riometer 20171129-20171130
Kiruna 38 MHz riometer 20171130-20171201
Kiruna 38 MHz riometer 20171201-20171202
Kiruna 38 MHz riometer 20171202-20171203
Kiruna 38 MHz riometer 20171203-20171204
Kiruna 38 MHz riometer 20171204-20171205
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT


Kiruna 38 MHz riometer 20171205-20171206
Kiruna 38 MHz riometer 20171206-20171207
Kiruna 38 MHz riometer 20171207-20171208
Kiruna 38 MHz riometer 20171208-20171209
Kiruna 38 MHz riometer 20171209-20171210
Kiruna 38 MHz riometer 20171210-20171211
Power
0 0.5 1 1.5 2 2.5 3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT


Kiruna 38 MHz riometer 20171211-20171212
Kiruna 38 MHz riometer 20171212-20171213
Kiruna 38 MHz riometer 20171213-20171214
Kiruna 38 MHz riometer 20171214-20171215
Kiruna 38 MHz riometer 20171215-20171216
Kiruna 38 MHz riometer 20171216-20171217
Power
0
0.5
1
1.5
2
2.5
3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT


Kiruna 38 MHz riometer 20171217-20171218
Kiruna 38 MHz riometer 20171218-20171219
Kiruna 38 MHz riometer 20171219-20171220
Kiruna 38 MHz riometer 20171220-20171221
Kiruna 38 MHz riometer 20171221-20171222
Kiruna 38 MHz riometer 20171222-20171223
Power
0
0.5
1
1.5
2
2.5
3
08
10
12
14
16
18
20
22
00
02
04
06
08
UT


Kiruna 38 MHz riometer 20171223-20171224
Kiruna 38 MHz riometer 20171224-20171225
Kiruna 38 MHz riometer 20171225-20171226
Kiruna 38 MHz riometer 20171226-20171227
Kiruna 38 MHz riometer 20171227-20171228
Kiruna 38 MHz riometer 20171228-20171229
Power
0 0.5 1 1.5 2 2.5 3
08 10 12 14 16 18 20 22 00 02 04 06 08
UT


Kiruna 38 MHz riometer
20171229-20171230
Power
UT
Kiruna 38 MHz riometer
20171230-20171231
Power
UT
Kiruna 38 MHz riometer
20171231-20180101
Power
UT

Institutet för rymdfysik

Swedish Institute of Space Physics

Swedish Institute of Space Physics
Box 812, SE- 981 28 Kiruna, SWEDEN
tel. +46-980-790 00, fax +46-980-790 50, e-post: irf@irf.se

www.irf.se