

HINODE 協同観測 HOP 0128 の観測テーマ

Target of interest:

[1] Active Region

- 1a. Low Cadence (EFR:evolution, velocity)
- 1b. High Cadence I. (Sunspot Dynamics:
wave propagation)
- 1c. High Cadence II. (Flare Gas Dynamics)

[2] Chromospheric jets

Evidence of magnetic reconnections
Difference depending on place

[3] Dark Filament

Oscillation, wave propagation

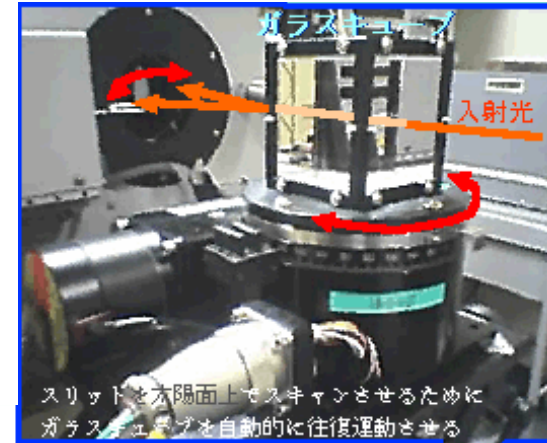
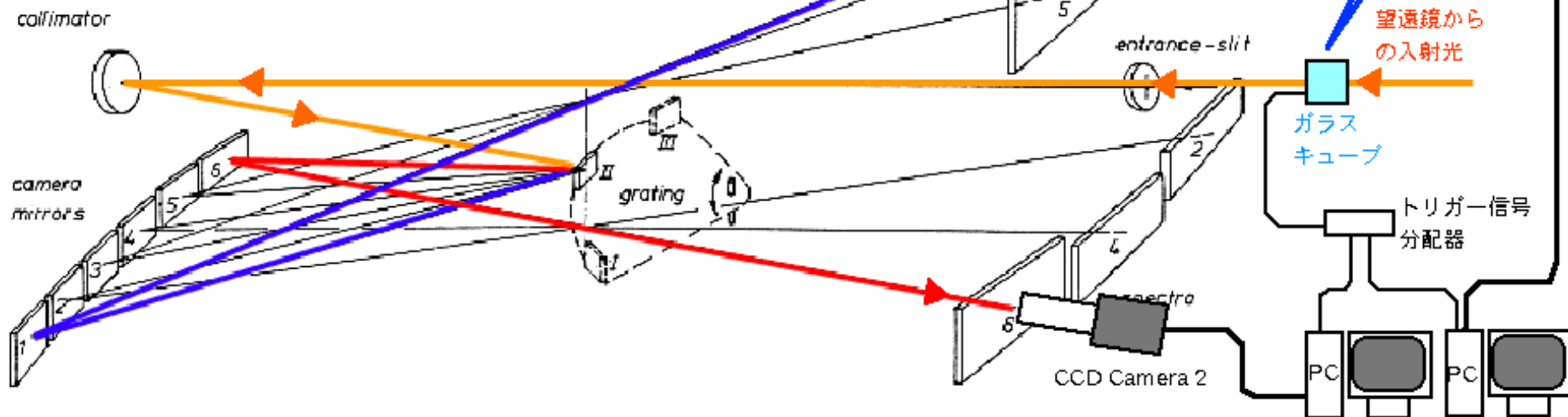
<< 2010年度 HOP0128 with DST/HS >>

- * CCD1 & CCD2 are the same.
- * Control softwares are also the same.
=> cadence & start-end timing are the same.
- * Wavelength-combination:
mainly Ca II & H-alpha

水平式分光器周辺のスペクトロヘリオグラフの構成

典型例として、太陽スペクトルの青色領域と赤色領域を同時に観測する場合の光路を、各々青線、赤線で示している。

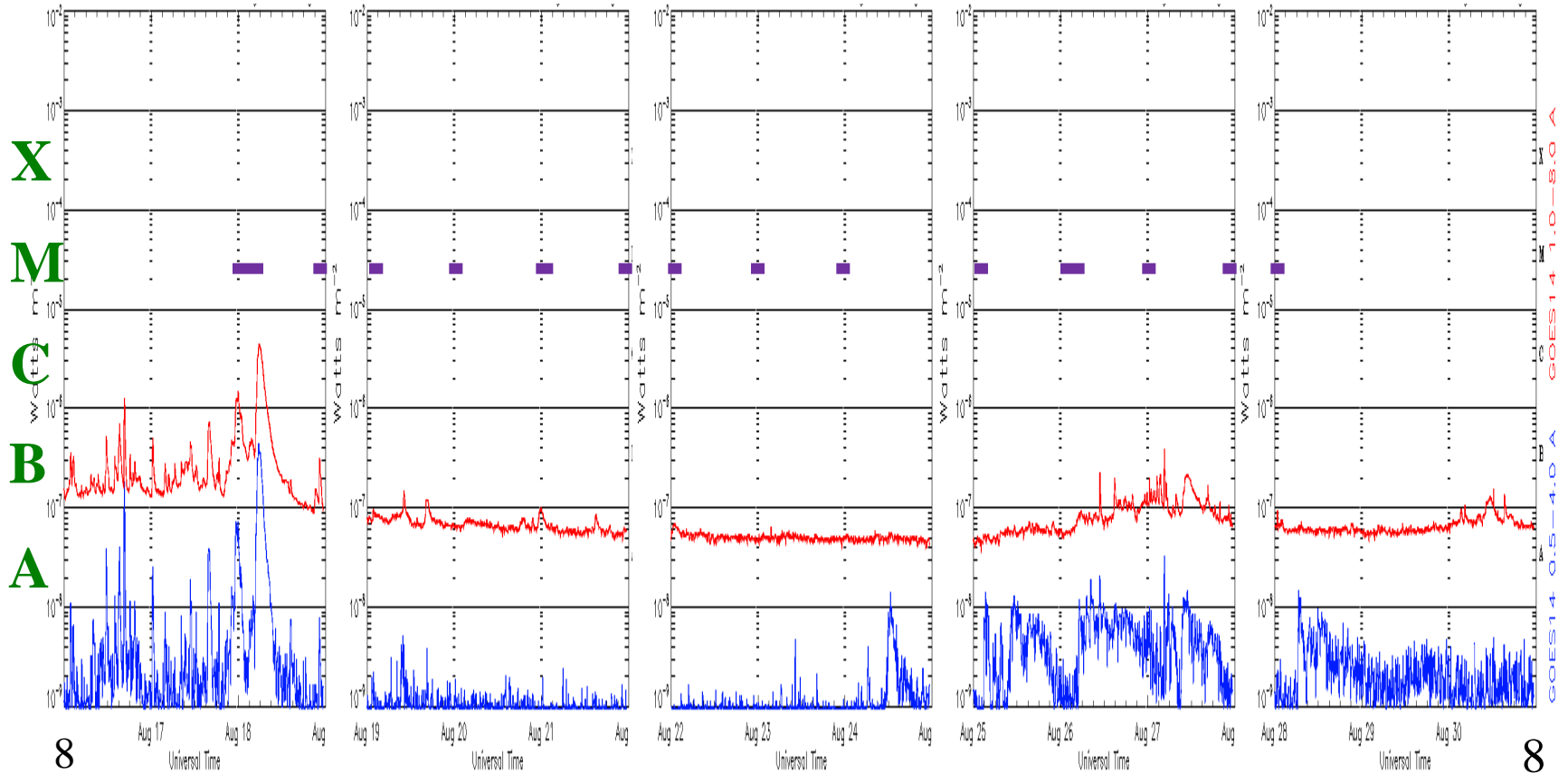
ガラスキューブからは回転開始時と終了時にトリガー信号を発生させ、それをカメラ制御PCに取り込み、スペクトルの撮影開始、停止指令のタイミングとして用いる。



<<Start and end dates>>

18-Aug-2010 (Wed) to 28-Aug-2009 (Sat)

GOES X-ray Flux



8
月
16
日

8 23:35:12 UTC

NOAA/SWPC Boulder/Updated: 2010 Aug 21 23:35:11 UTC

NOAA/SWPC Boulder/Updated: 2010 Aug 24 23:35:11 UTC

NOAA/SWPC Boulder/Updated: 2010 Aug 27 23:35:12 UTC

NOAA/SWPC Boulder/Updated: 2010 Aug 30 23:35:11 UTC

NOAA

8
月
31
日

GOES14 1.0-8.0 A
GOES14 0.5-4.0 A

観測指定領域

8月 18日

Fine

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K**
with high time-cadence.
- Raster scans of **H-alpha**
with the same cadence.

00:08-01:01 UT

01:18-02:05 UT

- H-alpha imaging** (slit
monitor) at 5 wavelengths

00:10—02:58 UT

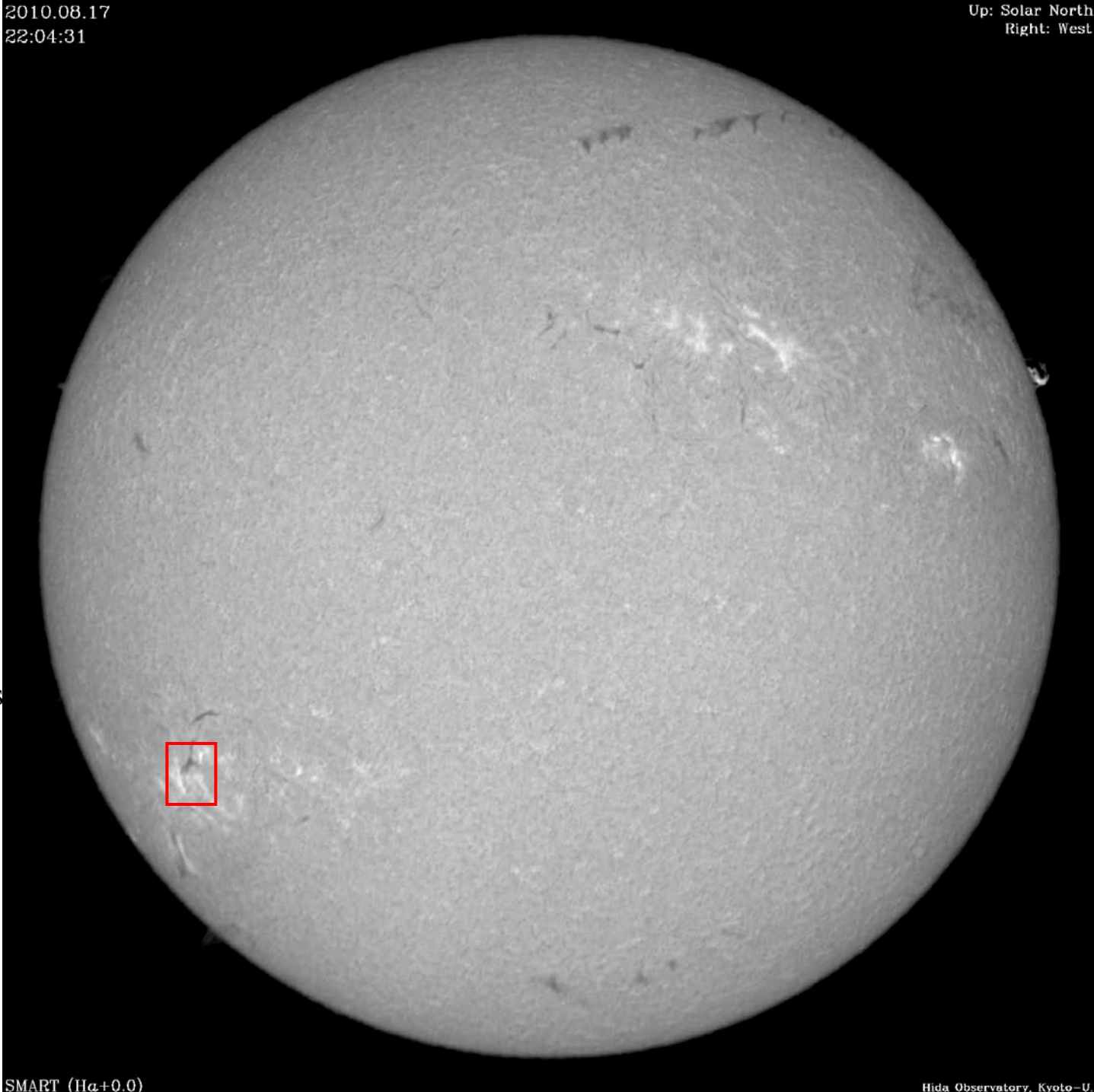
04:12—07:49 UT

Hinode:

23:39—05:59:35 UT

2010.08.17
22:04:31

Up: Solar North
Right: West



SMART ($H\alpha+0.0$)

Hida Observatory, Kyoto-U

観測指定領域

8月 19日

After cloudy, fine.

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K**
with high time-cadence.
- Raster scans of **H-alpha**
with the same cadence.

01:07-01:33 UT

02:16-02:33 UT

- H-alpha imaging** (slit
monitor) at 5 wavelengths

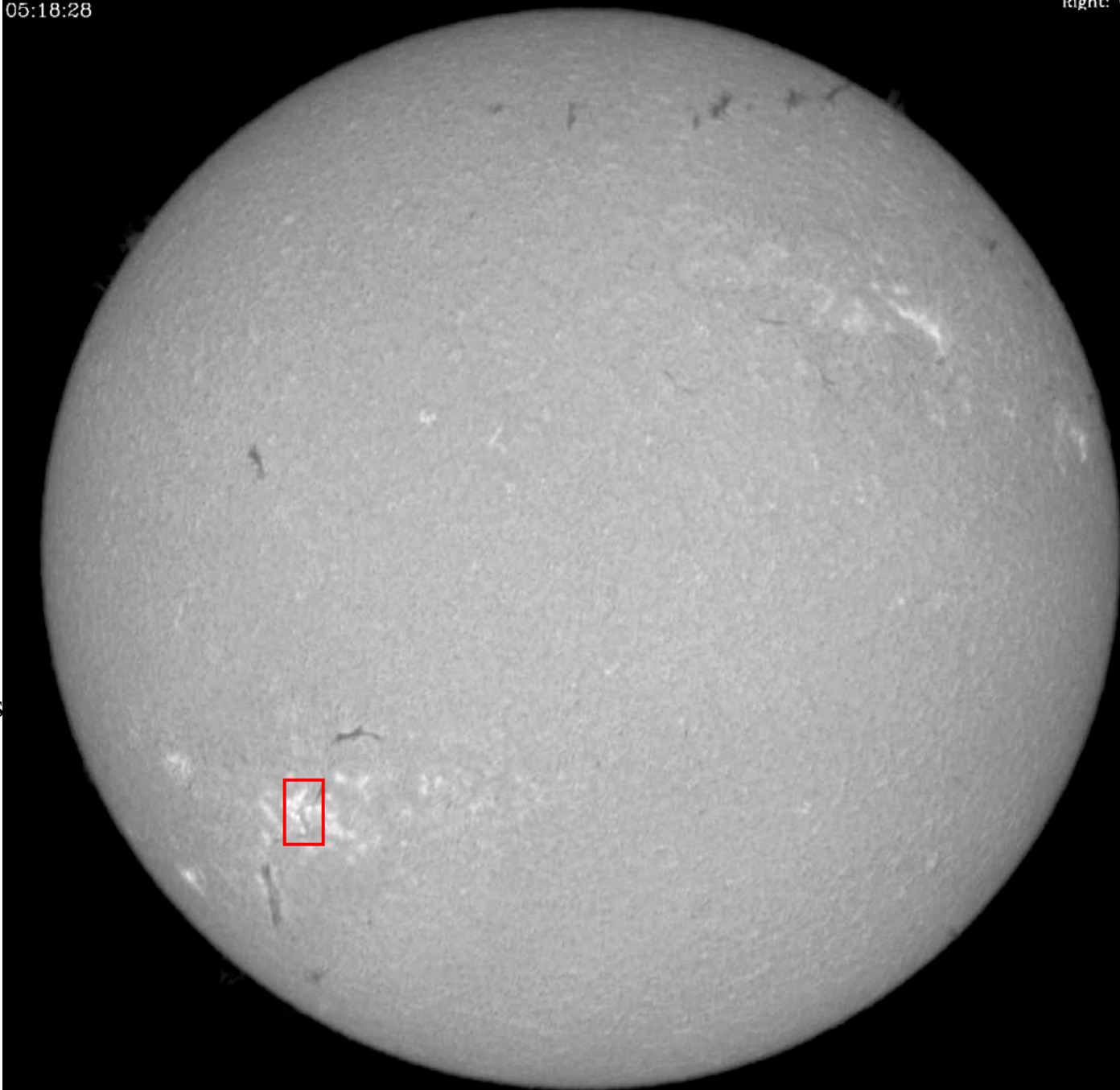
01:07—02:32 UT

Hinode:

22:40—01:00 UT

2010.08.19
05:18:28

Up: Solar North
Right: West



観測指定領域

8月 20日

After cloudy, Fine

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K** with high time-cadence.
- Raster scans of **H-alpha** with the same cadence.

01:51-02:28 UT

02:45-03:15 UT (Good)

03:27-04:04 UT

- H-alpha imaging** (slit monitor) at 5 wavelengths

01:08—04:06 UT

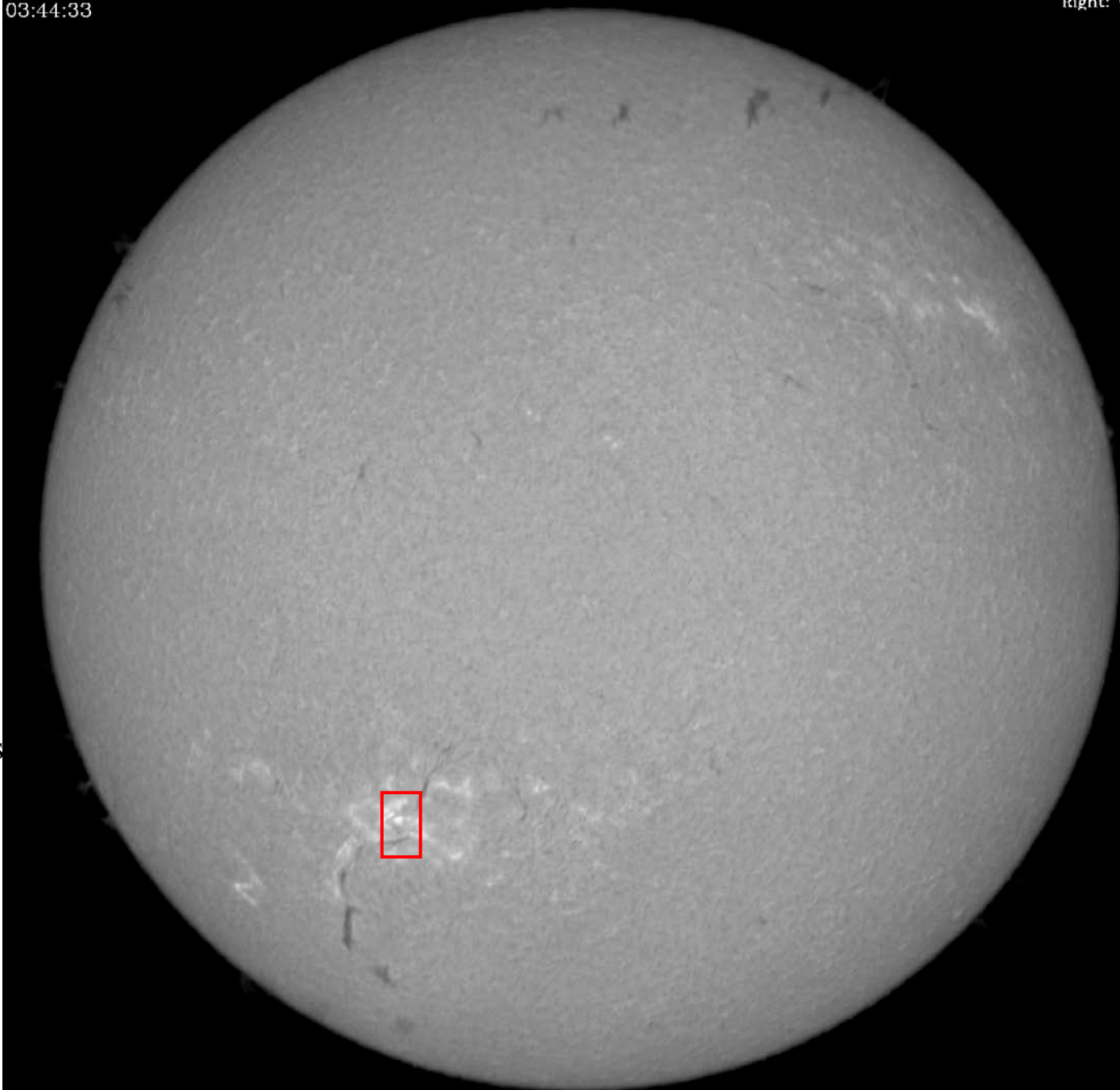
04:27—06:16 UT

Hinode:

23:10—01:54 UT

2010.08.20
03:44:33

Up: Solar North
Right: West



観測指定領域

8月 21日

Fine

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K**
with high time-cadence.
- Raster scans of **H-alpha**
with the same cadence.

23:29-00:06 UT (soso)

00:11-00:41 UT (soso)

00:52-01:28 UT

01:32-02:09 UT (soso)

02:17-02:48 UT

- H-alpha imaging** (slit
monitor) at 5 wavelengths

23:13—03:02 UT

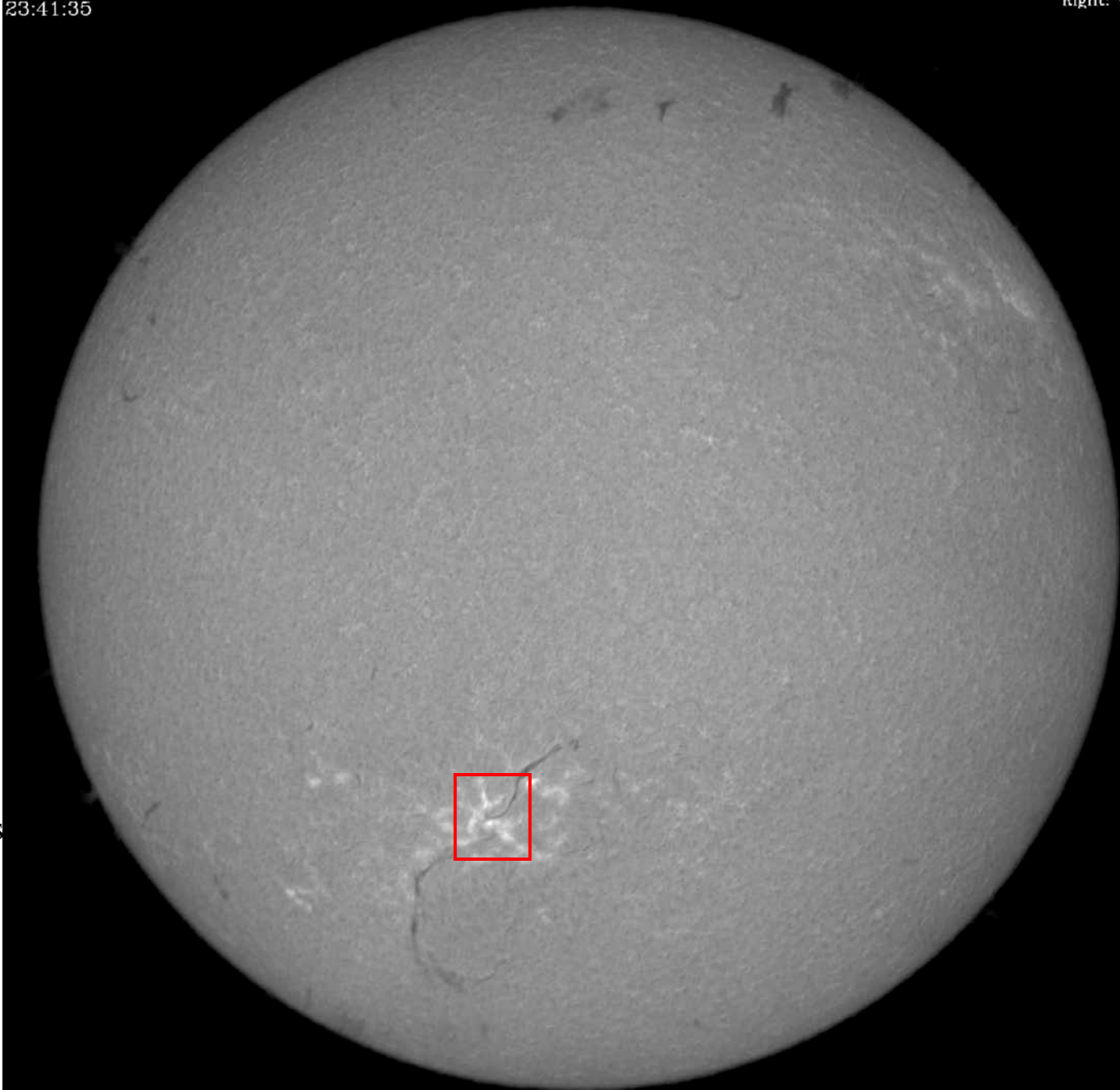
03:32—06:12 UT

Hinode:

23:40—03:00 UT

2010.08.20
23:41:35

Up: Solar North
Right: West



観測指定領域

8月 22日

Fine

Targets: **AR11100**
(Plage Jets)

-Raster scans of **Ca II K**
with high time-cadence.

-Raster scans of **H-alpha**
with the same cadence.

23:19-00:06 UT (Good)

00:11-00:48 UT

00:56-01:33 UT

-**H-alpha imaging** (slit
monitor) at 5 wavelengths

23:05—01:42 UT

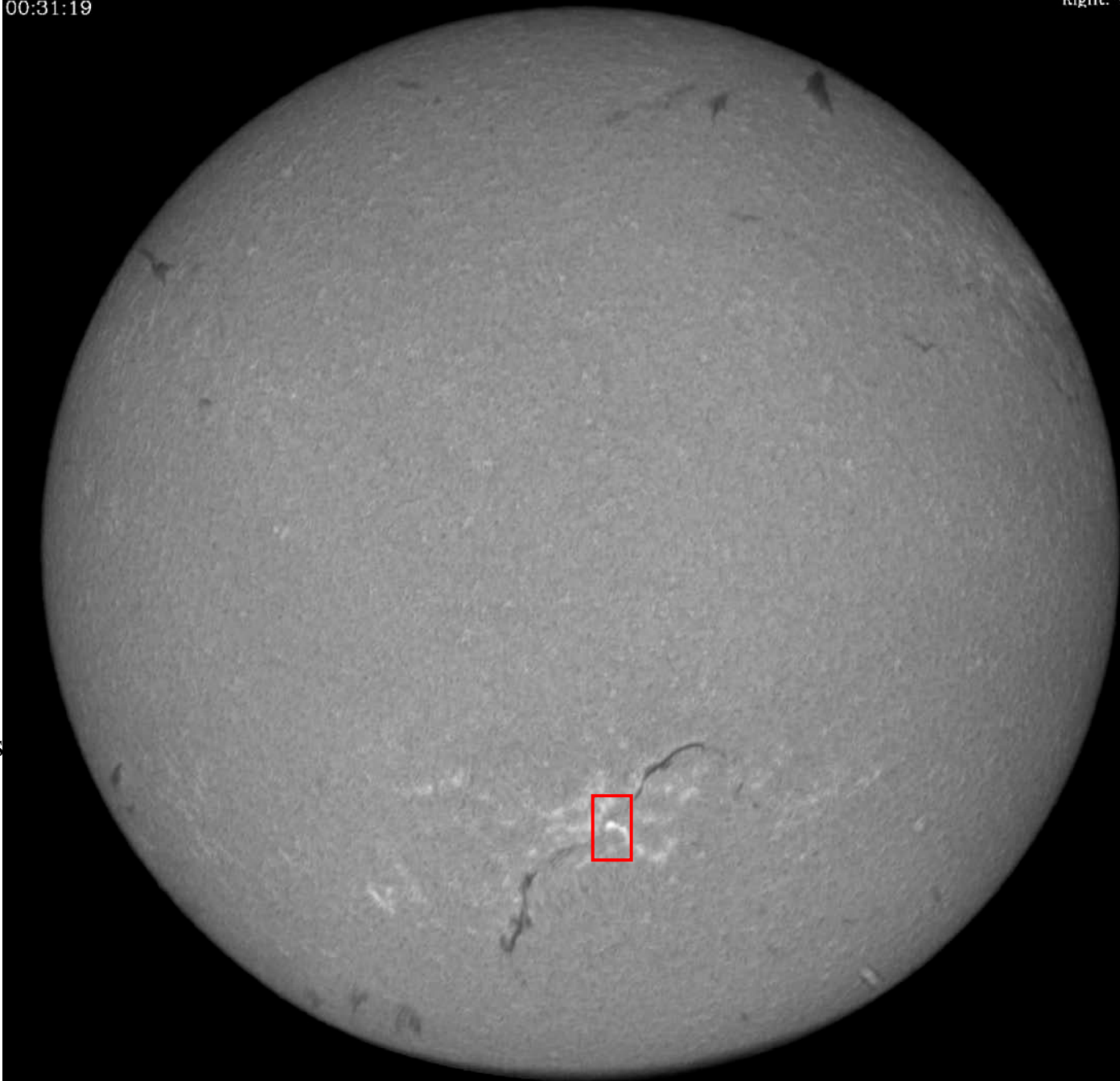
01:58—06:38 UT

Hinode:

22:50—01:21 UT

2010.08.22
00:31:19

Up: Solar North
Right: West



SMART ($H\alpha+0.0$)

Hida Observatory, Kyoto-U

観測指定領域

8月 23日

After fine, cloudy

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K**
with high time-cadence.
- Raster scans of **H-alpha**
with the same cadence.

23:38-00:18 UT

00:23-01:00 UT

01:08-01:47 UT

01:51-02:23 UT

- H-alpha imaging** (slit
monitor) at 5 wavelengths

23:20—02:43 UT

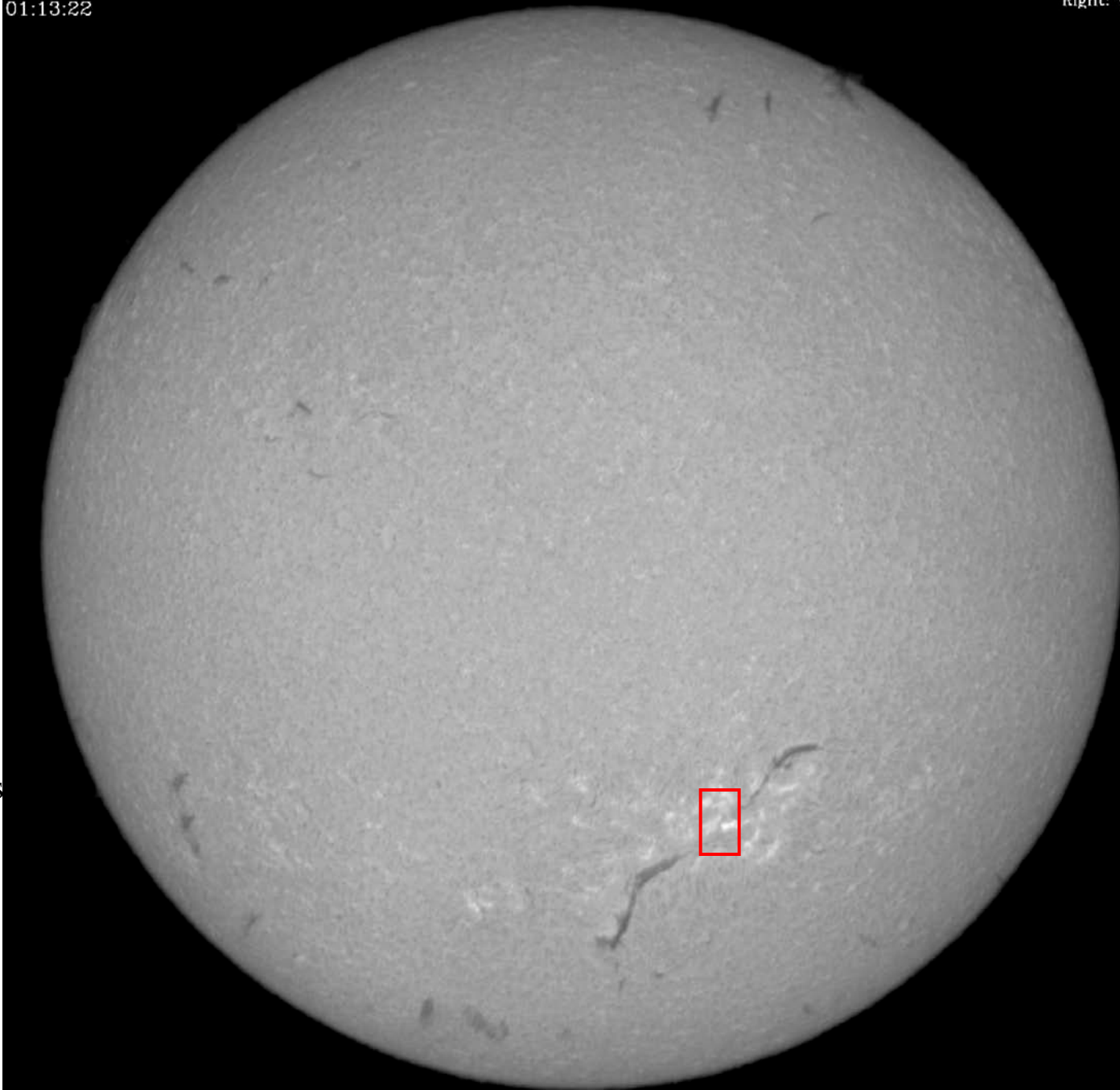
04:54—08:35 UT (DF)

Hinode:

23:25—02:00 UT

2010.08.23
01:13:22

Up: Solar North
Right: West



観測指定領域

8月 24日

Fine and occasionally
cloudy.

Targets: **AR11100**
(**Plage Jets**)

-Raster scans of **Ca II K**
with high time-cadence.

-Raster scans of **H-alpha**
with the same cadence.

00:45-00:59 UT

01:31-01:41 UT

-**H-alpha imaging** (slit
monitor) at 5 wavelengths

00:40—02:58 UT

03:40—06:48 UT

Hinode:

22:30—01:00 UT

2010.08.24
00:55:09

Up: Solar North
Right: West



観測指定領域

8月 25日

Thin cloud

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K**
with high time-cadence.
- Raster scans of **H-alpha**
with the same cadence.

00:30-02:04 UT

- H-alpha imaging** (slit
monitor) at 5 wavelengths

00:17—02:45 UT

Hinode:

00:00—02:30 UT

2010.08.25
00:23:15

Up: Solar North
Right: West



観測指定領域

8月 26日

Fine

Targets: **AR11100**
(Plage Jets)

- Raster scans of **Ca II K**
with high time-cadence.
- Raster scans of **H-alpha**
with the same cadence.

23:26-00:03 UT

00:07-01:25 UT

01:32-02:14 UT

02:23-03:01 UT

- H-alpha imaging** (slit
monitor) at 5 wavelengths

23:17—03:35 UT

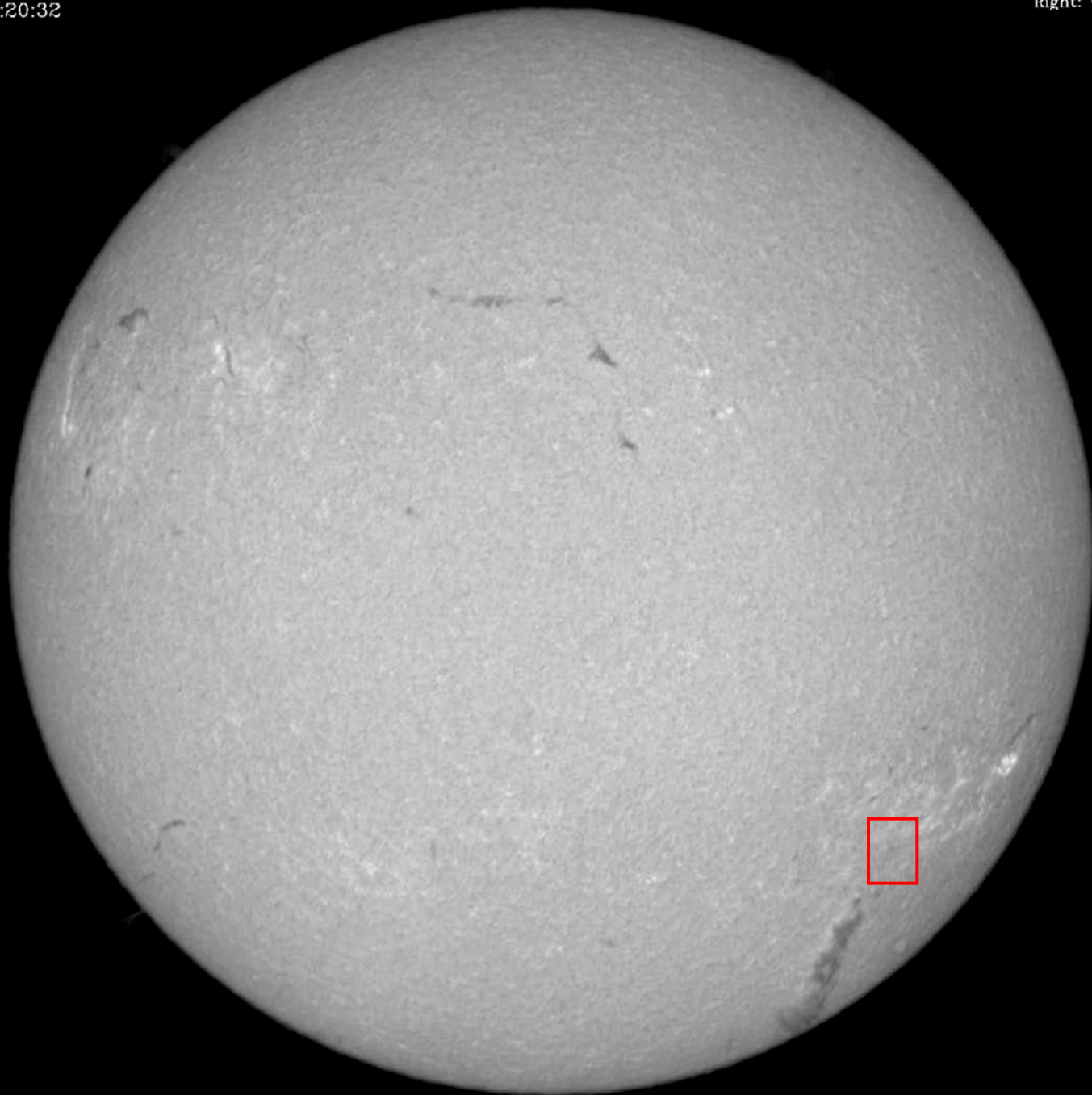
06:28—08:24 UT (DF)

Hinode:

00:04—06:01 UT

2010.08.26
00:20:32

Up: Solar North
Right: West



SMART ($H\alpha+0.0$)

Hida Observatory, Kyoto-U

観測指定領域

8月 27日

Fine

Targets: **Dark filament**
near the west limb

-Raster scans of **Ca II K**
with high time-cadence.
-Raster scans of **H-alpha**
with the same cadence.

23:43-00:20 UT

00:27-01:04 UT

01:08-01:46 UT

-**H-alpha imaging** (slit
monitor) at 5 wavelengths

23:38—02:59 UT

03:51—08:46 UT

Hinode:

23:04—01:29 UT

2010.08.27
00:15:40

Up: Solar North
Right: West



観測指定領域

8月 28日

Fine

Targets: **Limb spicule on the south-west Limb (dark filament disappeared)**

-Raster scans of **Ca II K** with high time-cadence.

-Raster scans of **H-alpha** with the same cadence.

22:55-00:10 UT

00:22-01:30 UT

-**H-alpha imaging** (slit monitor) at 5 wavelengths

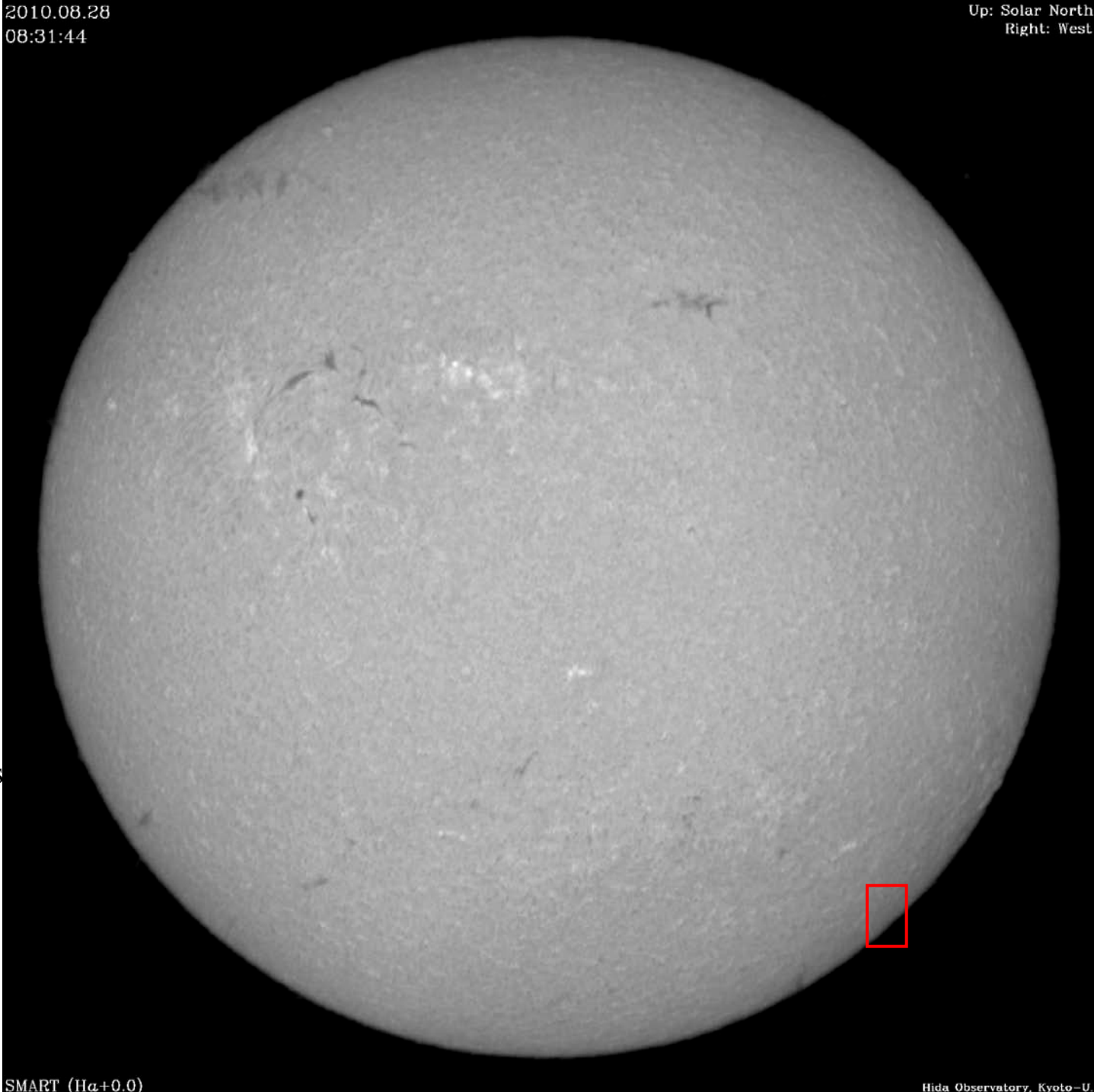
22:43—01:43 UT

Hinode:

23:04—00:59 UT

2010.08.28
08:31:44






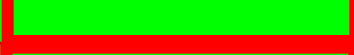

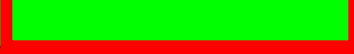

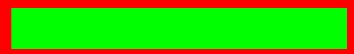

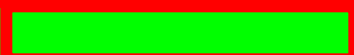
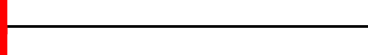
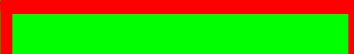


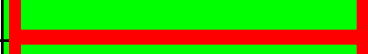
Up: Solar North
Right: West




SMART ($H\alpha+0.0$)

Hida Observatory, Kyoto-U

HOP0128 期間中の観測対象まとめ

	Active Region EFR	Active Region Sunspot	Active Region Flare	Chromospheric Jets	Dark Filament, Prominence
Aug. 16					
Aug. 17					
Aug. 18					
Aug. 19					
Aug. 20					
Aug. 21					
Aug. 22					
Aug. 23					
Aug. 24					
Aug. 25					
Aug. 26					
Aug. 27					
Aug. 28					
Aug. 29					

 : Hida/DST Spectroheliograph (CaII+ H α) + H α Imaging

 : H α Imaging

 : Hinode Observation

2010/Aug/18

- Target NOAA11100
- α 型活動域
- AR filamentがあり、そのうちの一部がブルーシフトを示していた。また、その近傍でEB様のK輝線輪郭を示した部分があった。
- Aug/18 22:13 STEREO B 195 Åムービーでモーション波/EIT波あり。伝播速さ357km/s。SoftX B3.0 enhancement?

2010/Aug/22

- 通常観測後、NOAA11100の南側フィラメントのActivityをCaIIK & H α SPHで2.5時間Trackした。
- 共同観測時のScan 2で、CaIIKヘリオグラムとH α ヘリオグラムの比較をすると、1) H α ドップラーではフィラメントのスレッド構造、Streaming Flowが顕著に見えるが、CaIIKではフィラメントを覆う大きな構造として見え、流れがよく見えない。

2010/Aug/27

- 11100南側のフィラメント
 - 9：00UTまでDSTでイメージ取得
 - Counter Streaming Motions (2枚のSheetsのCounter Motion?)
 - STEREO A Moviesをみると、9：35UT頃 FilamentがSlow Eruption を起こした模様である。
 - この時、GOESでは、B2.0のEnhancementであった。
 - SDOをみると事後、Bright Closed Loop構造が見えた。

[1] Title of the proposed observation:

Coordinated Observations between Hida Observatory & Hinode Satellite

[2] Short statement describing the observation, and scientific justification:

Chromospheric active phenomena, reconnections, coronal heating process and sunspot evolution that are all related with the solar magnetic field have become more clear by recent MHD simulations and high-resolution observations with the HINODE satellite.

We intend to quantitatively verify the present models of such phenomena by simultaneous and high-cadence observations of diversified observation from the photosphere to the corona with the HINODE satellite and spectrum observation at the Hida Obs.

For example, Hinode has found many and various chromospheric jets (Ca jets). We must verify whether the mechanisms of such jets are all magnetic reconnection (ubiquitous reconnection ?), and investigate the amount of contribution of such jets to the coronal heating process. Therefore, we will measure the 3D distributions & evolutions of the velocity field (bidirectional flow, reconnection flow, shock wave), temperature, density and magnetic field configuration around various type of jets.

Gas dynamics in flare kernels will differ between compact flares and two-ribbon flares. Especially the directions of initial gas flows will be different between the two due to the the difference of energy release heights in the atmosphere, which leads to the asymmetric emission profiles of the chromospheric lines.

On the other hand, Hinode has also found wave-like phenomena in prominences. By adding chromospheric spectral informations, we intend to verify whether such phenomena in the prominences or dark filaments correspond to Alfvén waves or fast-mode kink waves, from the point of view of the coronal heating and prominence-seismology.

Moreover, we try to observe wave propagation from the photosphere to corona around sunspot region and investigate relationship between spatial distribution of coronal heating rate and spatial difference of characteristics of oscillation.

To this end, Hida observatory will provide highly complementary data sets to Hinode, i.e., DST will take full spectral line profiles of CaII H,K or H-alpha with a very high time cadence of 1 to 10 sec and a moderately high spatial resolution of 1 arcsec or better (see section [8]: appendix). SMART telescope will also take full disk H-alpha Dopplergram with a spatial resolution of 1 arcsec.

The concrete list of our targets are described in section [6].

[3] Point of contact. Name and email address:

<<Hida Obs.>>

Satoru UeNo e-mail: ueno[at]kwasan.kyoto-u.ac.jp

Kiyoshi Ichimoto e-mail: ichimoto[at]kwasan.kyoto-u.ac.jp

<<Hinode Team>>

Yoshinori Suematsu e-mail: suematsu[at]solar.mtk.nao.ac.jp

[4] Time period of proposed observations, if required:

<<Start and end dates>>

16-Aug-2010 (Mon) to 28-Aug-2010 (Sun)

The seeing and weather condition around Hida Obs. in this season is the best.

<<Minimum number of observation days>>

Everyday is the best. If it is impossible, 10 days

<<Continuity of observations>>

Continuity of 24 hours is not required.

We desire continuous observations for several hours in everyday
(see section [5]).

[5] Time window in day, if required:

<<Mimumum duration>>

Desirable duration is about 5 hours per one day
(22:00 - 03:00 UT).

Mimumum duration is 1 hours pending on the target.

The best time-period: 23:00 - 01:00 UT (AM in Japanese time)

<<Allowability of short interruptions>>

It is preferable that there are no interruptions except for moments
for changing targets.

[6] Target of interest:

1. Active Region

1a. Low Cadence (EFR)

1b. High Cadence (Sunspot Dynamics)

1c. High Cadence (Flare Gas Dynamics)

2. Chromospheric jets

3. Dark Filament

[7] Required Hinode instruments, and priority of observables:

<<Request to SOT>>

1. Active Region

1a. Low Cadence (EFR)

BFI (CaII H) 112" x 112" /600sec 432Mb/hr/30

BFI (G-band) 112" x 112" /600sec 646Mb/hr/30

NFI (NaI or 5250A IVDG) 82"x 82" /60 sec 306Mb/hr/3

SP (fast map) 82"x 82" (15min) once/hr

1b. High Cadence (Sunspot Dynamics)

BFI (CaII H) 56"x112" /20sec 432Mb/hr/2

BFI (G-band) 56"x112" /20sec 646Mb/hr/2

NFI (NaI or 5250A IVDG) 82"x 82" /20 sec 306Mb/hr

SP (fast map) 82"x 82" (15min) once/hr

2. Chromospheric jets

BFI (CaII H) 56"x112" /20sec 432Mb/hr/2

BFI (G-band) 56"x112" /20sec 646Mb/hr/2

NFI (NaI IVDG or 5250A IQUV) 82"x 82" /20 sec 306Mb/hr

3. Dark Filament

BFI (G-band) 110"x110", 2x2, /30sec 432Mb/hr/1.5

NFI (H-alpha 3 wl) 164"x 164", 2x2, /30 sec 306Mb/hr*2

SP (fast map) 164"x 164" (30min) once/hr

<<Request to EIS>>

1. Active Region

1a. Low Cadence (EFR)

- SK_AR1_50x320c: 50x320" /180sec, exp=5sec
- CAM_ARTB_RHESSI_b_2: 40x120" /200sec, exp=10sec
- TR_BRIGHT_LO: 20x144" /300sec, exp=30sec

1b. High Cadence (Sunspot Dynamics)

- SK_AR2_12x200p: 12x200" /~20sec, exp=1.5sec
- DRW_Alf_01_2: 12x152" /60sec, exp=10sec
- SK_AR2_50x240p: 50x240" /106sec, exp=2sec
- CAM_ARTB_RHESSI_b_2: 40x120" /200sec, exp=10sec

2. Chromospheric Jets

- DRW_Alf_01_2: 12x152" /60sec, exp=10sec
- SK_AR2_50x240p: 50x240" /106sec, exp=2sec
- CAM_ARTB_RHESSI_b_2: 40x120" /200sec, exp=10sec

3. Dark Filaments

- SK_AR1_50x320c: 50x320" /180sec, exp=5sec
- TR_BRIGHT_LO: 20x144" /300sec, exp=30sec

<<Request to XRT>>

512"x512"/30sec 75Mb(?) /hr

[8] Appendix: Observations with DST at Hida Obs.

1. Active Regions

1a. EFR

- * H-alpha 5 wavelength filtergraph:
Wavelength: -0.8, -0.5, 0.0, +0.5, +0.8 A
Time cadence: 15 sec
- * Ca-line spectro-heliograph:
Scan width: about 120 arcsec
Time cadence: about 15 sec
- * H-alpha spectro-heliograph:
Scan width: about 120 arcsec
Time cadence: about 15 sec

1b. Sunspot Dynamics

- * H-alpha 5 wavelength filtergraph:
Wavelength: -0.8, -0.5, 0.0, +0.5, +0.8 A
Time cadence: 15 sec
- * Ca-line spectro-heliograph:
Scan width: about 80 arcsec / 50 arcsec
Time cadence: about 10 sec / 6 sec
- * H-alpha spectro-heliograph:
Scan width: about 80 arcsec / 50 arcsec
Time cadence: about 10 sec / 6 sec

2. Chromospheric Jets

- * H-alpha 5 wavelength filtergraph:
Wavelength: -0.8, -0.5, 0.0, +0.5, +0.8 A
Time cadence: 15 sec
- * Ca-line spectro-heliograph:
Scan width: about 100 arcsec / 50 arcsec
Time cadence: about 12 sec / 6 sec
- * H-alpha spectro-heliograph:
Scan width: about 100 arcsec / 50 arcsec
Time cadence: about 12 sec / 6 sec

3. Dark Filaments

- * H-alpha 5 wavelength filtergraph:
Wavelength: -0.8, -0.5, 0.0, +0.5, +0.8 A
Time cadence: 15 sec
- * Ca-line spectro-heliograph:
Scan width: about 120 arcsec / slit-fixed
Time cadence: about 15 sec / 10 Hz
- * H-alpha spectro-heliograph:
Scan width: about 120 arcsec / slit-fixed
Time cadence: about 15 sec / 10 Hz