

2005 July 23 @ CAWSES/IAGA meeting
Toulouse, France

Report of recent activity related to theme 2

K. Shibata

Kwasan and Hida Observatories

Kyoto University

Funding Approved !

- Grant-in-Aid for **Creative Scientific Research** (学術創成研究) of the Ministry of Education, Science, Sports, Technology, and Culture of Japan
- Title: "**The Basic Study of Space Weather Prediction**"
- PI: K. Shibata (Kyoto Univ.)
- recommended by Prof. Kamide
- Term: 5 years (2005-2009)
- Number of Researchers: 11
- Budget :

450 M yen / 5 years ~ 800k dollars/year
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Purpose of this project

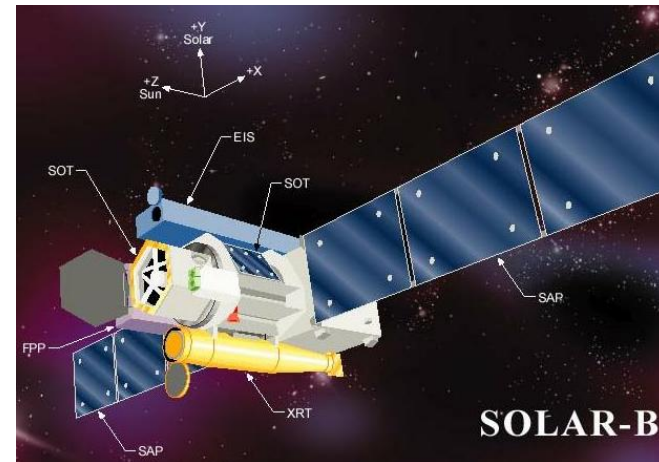
- The purpose of this project is to develop a physical model of solar-terrestrial phenomena and space storms as a basis of space weather prediction under international program CAWSES
- To encourage close and effective collaboration between solar and geophysicists

Research Plan

1. **Study of Energy Release on the Sun**
K. Shibata, S. K. Kato, S. Tsuneta, K. Kusano
Kyoto/Hida obs and Solar B
2. **Solar Wind Radio Observations and Modeling**
K. Fujiki
Nagoya/STE Lab radio obs
3. **Real Time Observations of Magnetosphere and Ionosphere and Space Weather Map Modeling**
T.Ogino, Y. Omura, T. Obara
4. **Vertual Observatory (Numerical Modeling)**
M. Hoshino, M. Fujimoto, M. Ugai

Solar-B Mission

- Solar Optical Telescope (SOT)
- X-Ray Telescope (XRT)
- EUV Imaging Spectrometer (EIS)
- **to be launched in 2006, August**
 - Mission Lifetime: > 3 years
- **Scientific objective**
 - coronal heating mechanism
 - elementary MHD processes such as magnetic reconnection



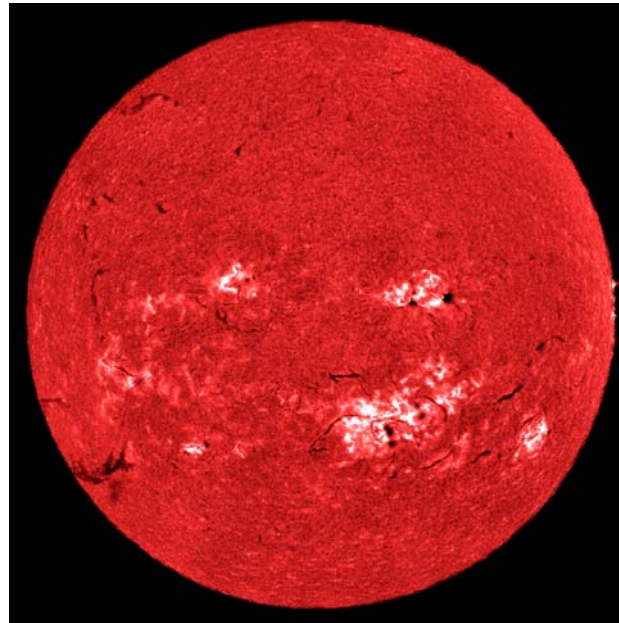
Astro-E2 (Suzaku, X-ray astronomy mission) was successfully Launched in July, 2005

SMART (Solar Magnetic Activity Research Telescope) at Hida Observatory of Kyoto University, 2003 – observing full Sun H α and vector magnetic fields every 1 minute

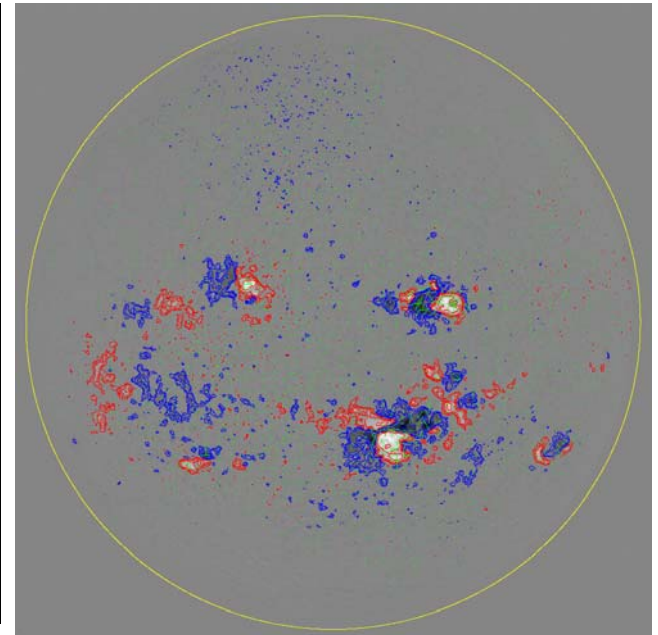
To observe energy storage and triggering
Mechanism of flares and coronal mass ejections



SMART (solar magnetic activity research telescope)



H alpha image



Vector magnetic field

H α Observations

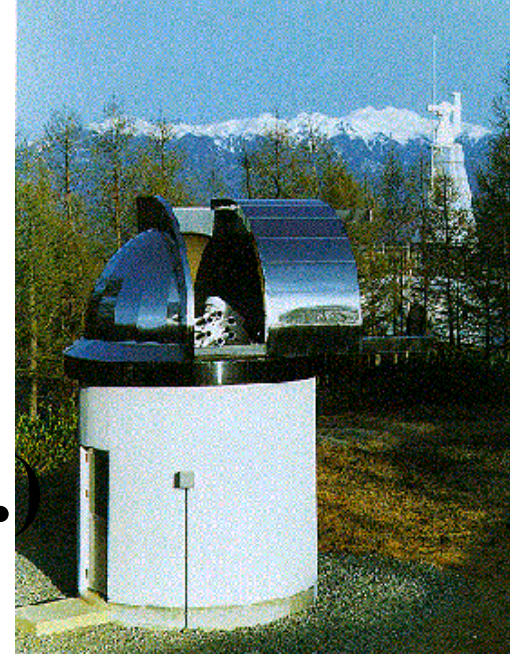
**Flare Monitoring Telescope
(FMT) (Hida Obs., Kyoto Univ.)**

**Full Sun H α 、 H α $\pm 0.8 \text{ \AA}$,
continuum image**

On video (2sec cadence) and
CD-ROM(1min)
with 4.2 arcsec pixel

Images of flares and prominence eruptions
are now open through

<http://www.kwasan.kyoto-u.ac.jp/Hida/FMT/>



64mm aperture

1997/11/04 05:40:01(UT)

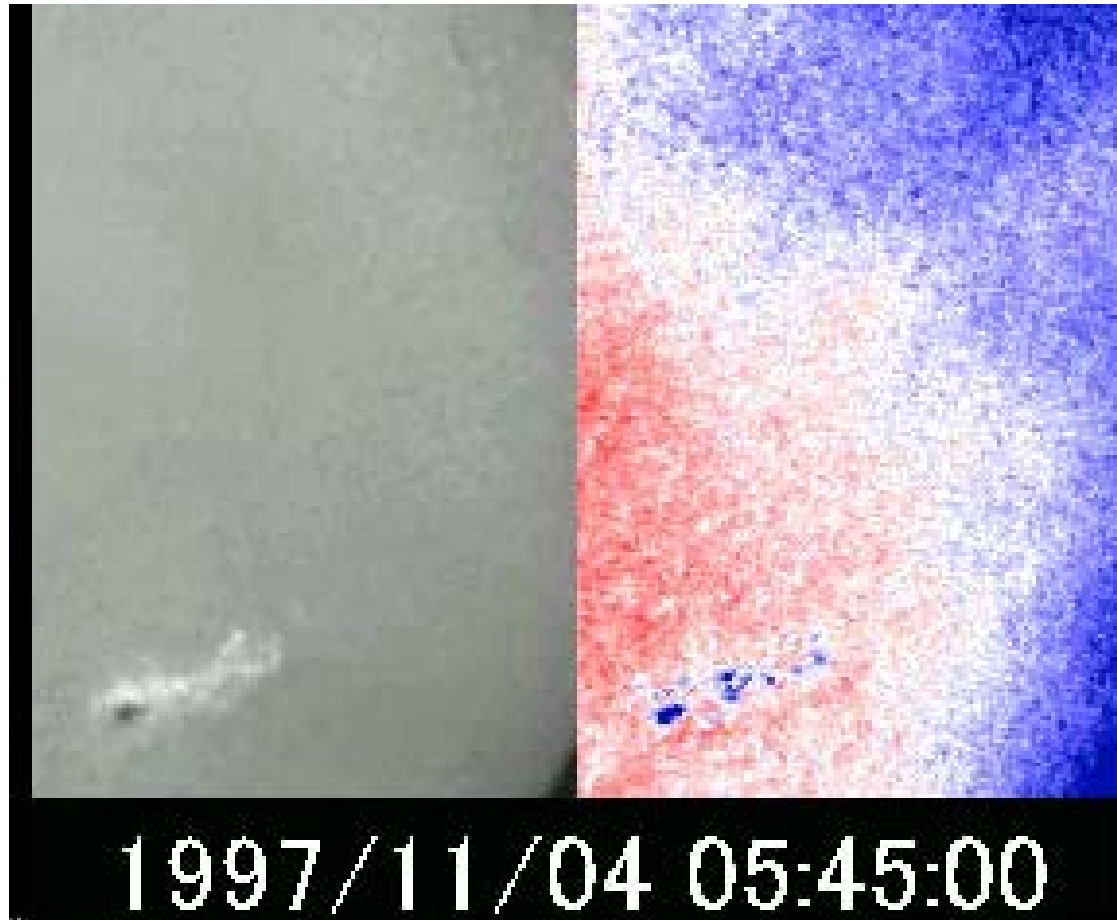


H α + 0.8 \AA

Moreton waves

flare associated waves observed
in $H\alpha$ (Moreton 1960)

chromospheric manifestation of
fast mode MHD shocks in the
corona (Uchida 1968)



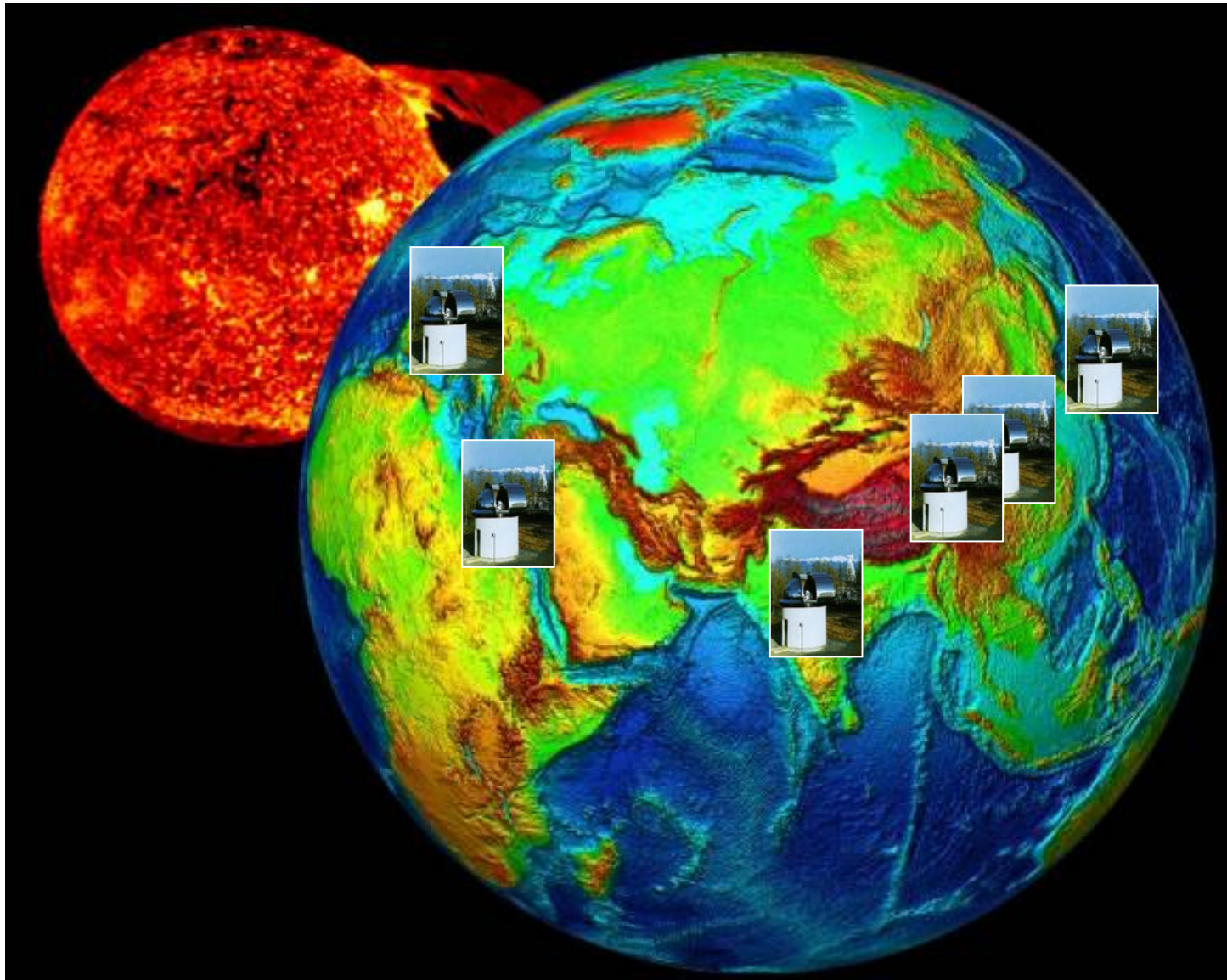
$H\alpha$ center

$H\alpha +0.8\text{\AA}, -0.8\text{\AA}$

Hida FMT
Discovered
More than
15 Moreton
Waves
In 1997-2004

(Eto et al. 2002
Narukage et al.
2002, 2004,
Okamoto et al.
2005)

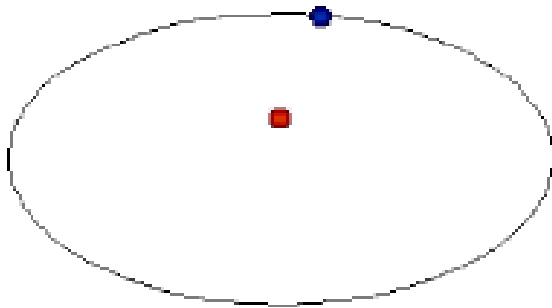
Whole Earth Observation



Solar wind observations

(Nagoya Univ., STE Lab.)

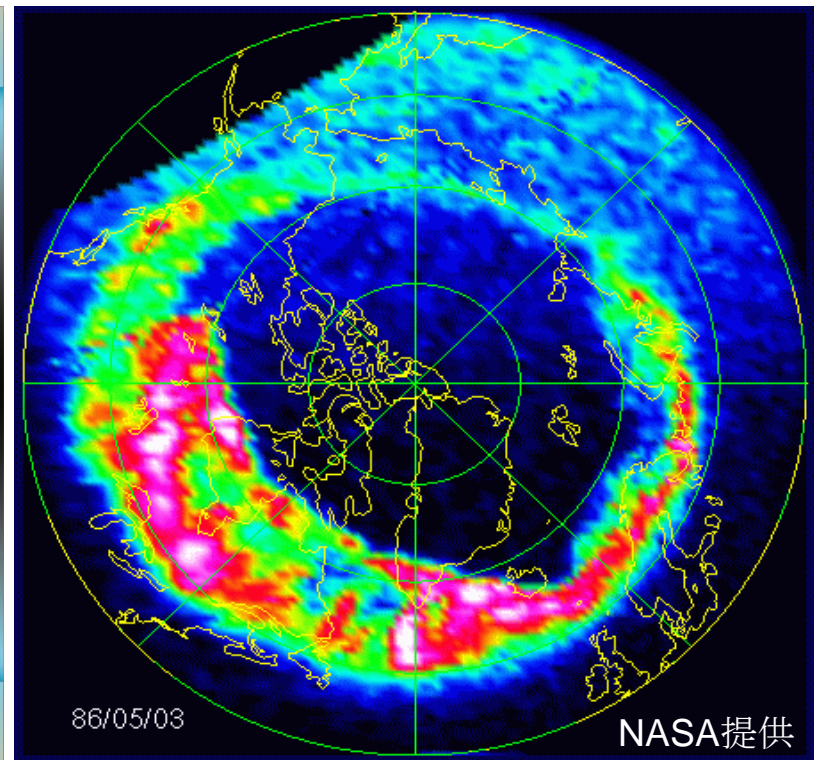
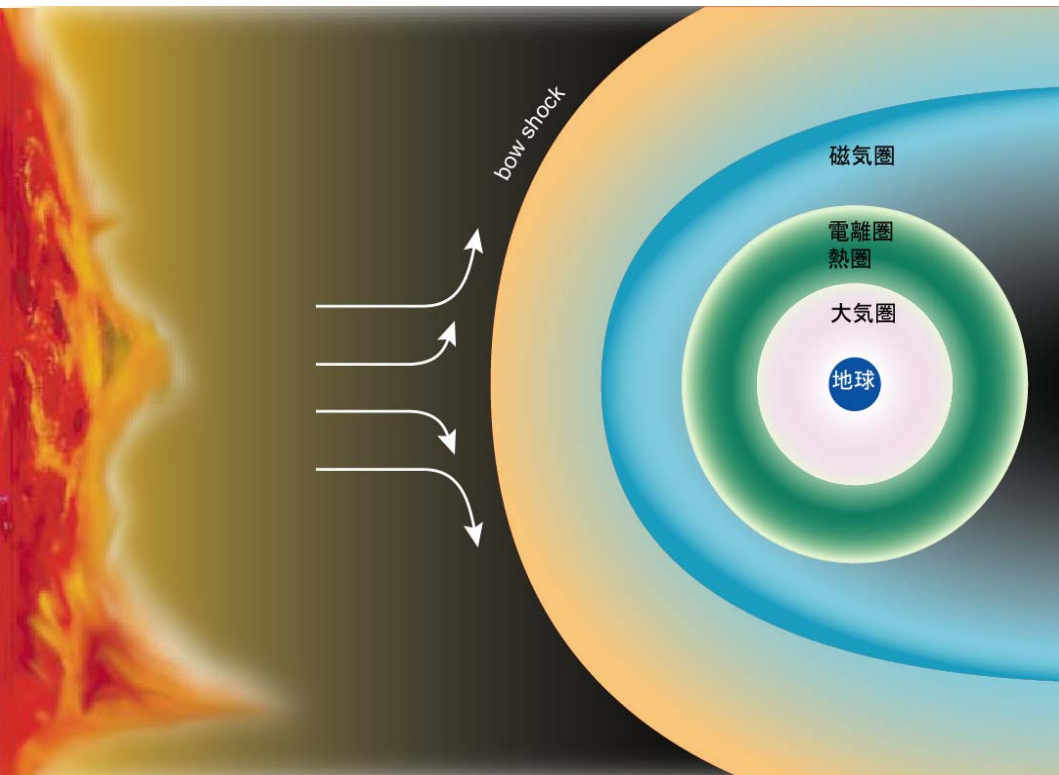
IPS observations



UHF radio telescope
(327MHz)

Magnetosphere, ionosphere, thermosphere: scale coupling

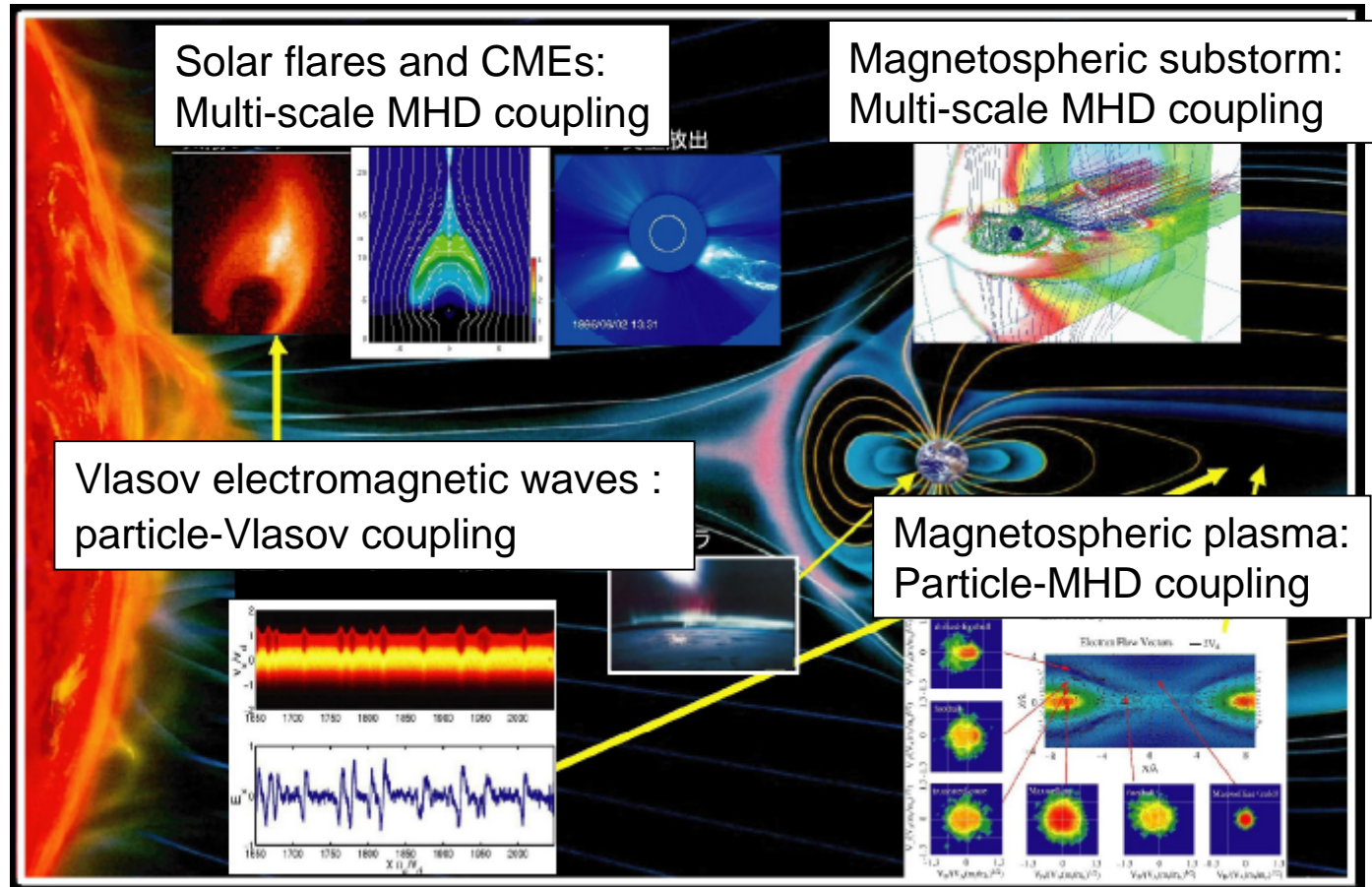
Real time observations and **space weather map modeling**



Vertual Observatory

(Numerical Modeling of Space Weather based on real observational data)

based on the collaboration between solar physicists, space plasma physicists, and geophysicists



Working groups of theme 2 (space weather)

- Coordinated Data Analysis Working Group
 - Chair: [Nat Gopalswamy \(USA\)](#)
- Space Weather Applications Working Group (Prediction and User Groups)
 - Chair: [R. Schwenn \(Germany\)](#)
[=>Bothmer \(Germany\)?](#)
- Modeling, Simulations, and Data Assimilation Working Group
 - Chair: [S. T. Wu \(USA\)](#).
- Continuous H alpha Observations Working Group
 - Chair: [H. Kurokawa \(Japan\)](#)

Working group

– Continuous H alpha Observations Working Group

- Chair: [H. Kurokawa \(Japan\)](#),

Possible Members : [H. Wang \(USA\)](#),
[B. Schmieder \(France\)](#), [H. Zhang \(China\)](#), etc.

- Purpose: To bring representative of solar observatories together worldwide to construct a new CAWSES data analysis tool – continuous H alpha observations

(global high resolution H α network
+ Hida FMT + more)



GLOBAL HIGH-RESOLUTION H α NETWORK



SUN ONLINE
RECENT MOVIES
DAILY MOVIES
SOLAR ACTIVITY

LATEST IMAGES
HOURLY DATA
ARCHIVE






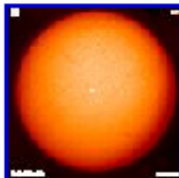
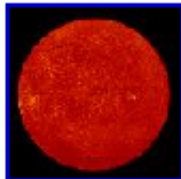
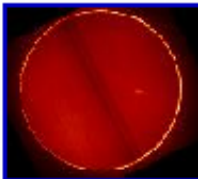
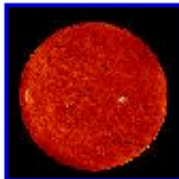
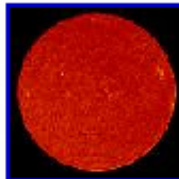

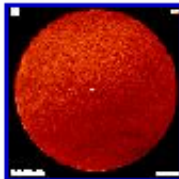
NEWS

NETWORK
SCIENCE
SITES
INSTRUMENTS
OBSERVATIONS
PUBLICATIONS
PEOPLE

LINKS

LATEST IMAGES FROM THE GLOBAL H-ALPHA NETWORK

Follow this link for all latest images in the archive

Big Bear Solar Observatory	Observatoire de Paris, Meudon	Kanzelhöhe Solar Observatory	Catania Astrophysical Observatory	Yunnan Astronomical Observatory	Huairou Solar Observatory
					
21:53:48 UT, Apr 04, 2005	14:16:37 UT, Apr 04, 2005	06:03:13 UT, Apr 04, 2005	06:50:06 UT, Mar 30, 2005	01:36:45 UT, Mar 30, 2005	08:08:35 UT, Apr 02, 2005
					
21:53:48 UT, Apr 04, 2005	14:26:02 UT, Apr 04, 2005	06:03:13 UT, Apr 04, 2005	06:50:06 UT, Mar 30, 2005	01:36:45 UT, Mar 30, 2005	08:08:35 UT, Apr 02, 2005

Upper Panel: Original data. Lower Panel: Contrast enhanced images.
Please click on the images to view the 2K x 2K versions.

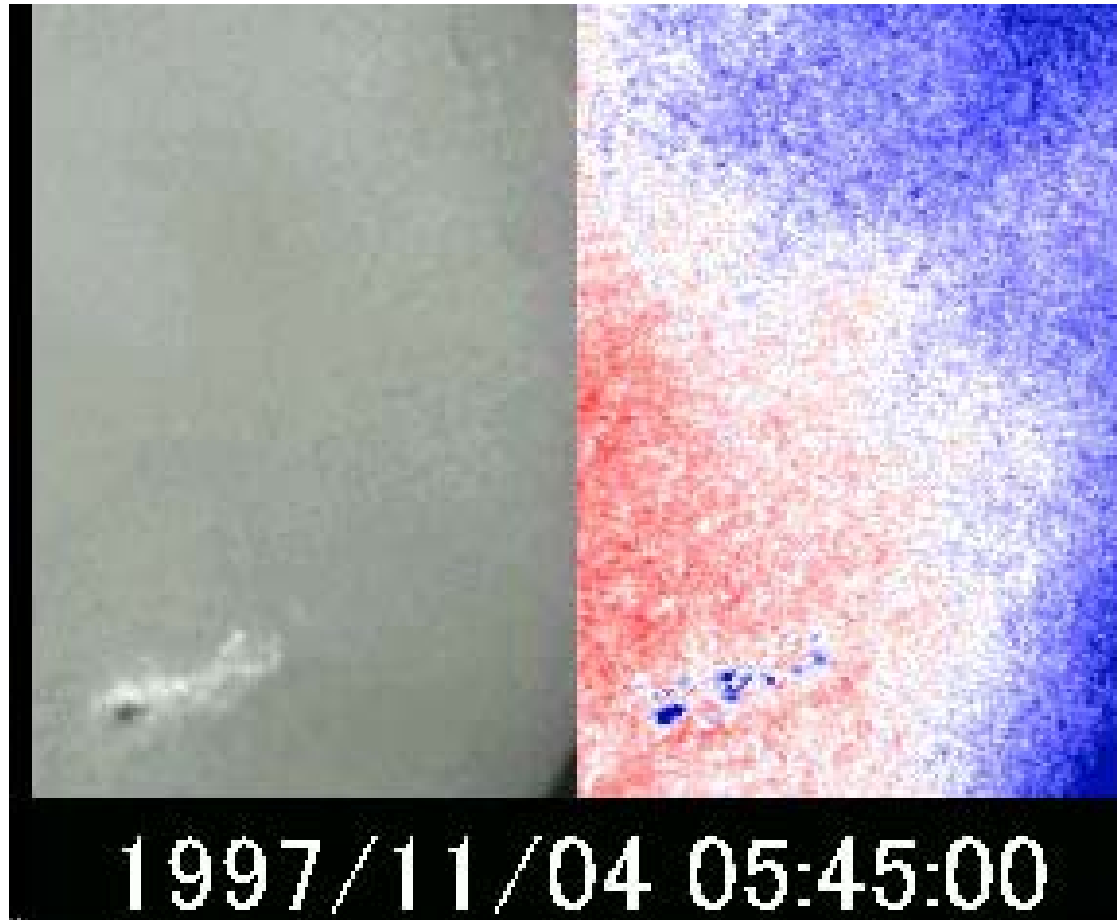
<http://www.bbso.njit.edu/Research/Halpha/>

H alpha off band observations are important !

Moreton waves = flare associated waves observed in H α (Moreton 1960)

chromospheric manifestation of fast mode MHD shocks in the corona (Uchida 1968)

To detect Moreton waves (Shocks) And filament Eruption (CMEs)



H α center

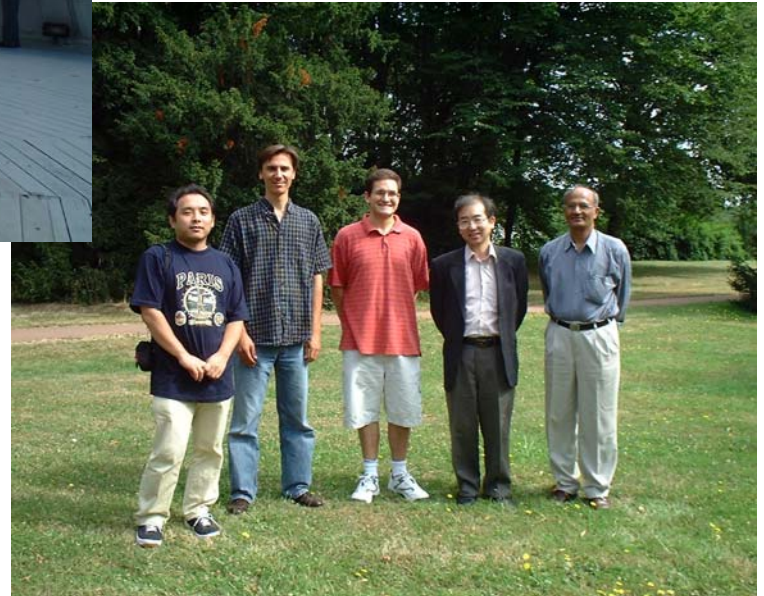
H α +0.8A,-0.8A

Hida FMT Discovered More than 15 Moreton Waves In 1997-2004

(Eto et al. 2002 Narukage et al. 2002, 2004, Okamoto et al. 2005)

Start to collaborate with observatories ...

- Paris Observatory @ Meudon on July 21



Summary of Near Future Plans in the context of CAWSES program

- Japanese domestic CAWSES meeting on Sep 12-13, 2005 at Nagoya Univ.
- Solar B will be launched in 2006 August
(Solar B science meeting on Nov. 8-11, 2005, in Kyoto)
- Hida/SMART regular observation will start in 2005 July and data will be open to the world
- International H alpha observation network will be extended in 2005 (Including H alpha off band observations and more observatories)
- Cooperative analysis of superstorm events of 6-10 November 2004 and Jan 2005
=> workshop in 2006 March in Alaska ????

Plan of workshop (preliminary)

- 2005 data analysis workshop 30—50
(2006 March ??? @ Alaska Fairbanks ???)
- 2006 numerical modeling 30—50
(2006 July, @Earth simulator center ???)
- 2007 CAWSES international meeting >100
(2007 July @ Kyoto ???)
- 2008 space weather summer school 50—100
(2008 July @ Nagoya???)
- 2009 summary workshop ?

To encourage more and more collaboration
between solar- and geo- physicists