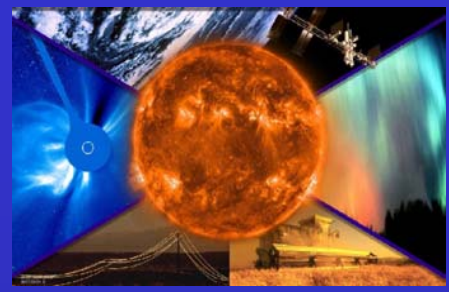


# CAWSES France

**Science: PNST, ISSI**
**Campaign Sept 2005**
**Outreach/education**
**Exhibition**

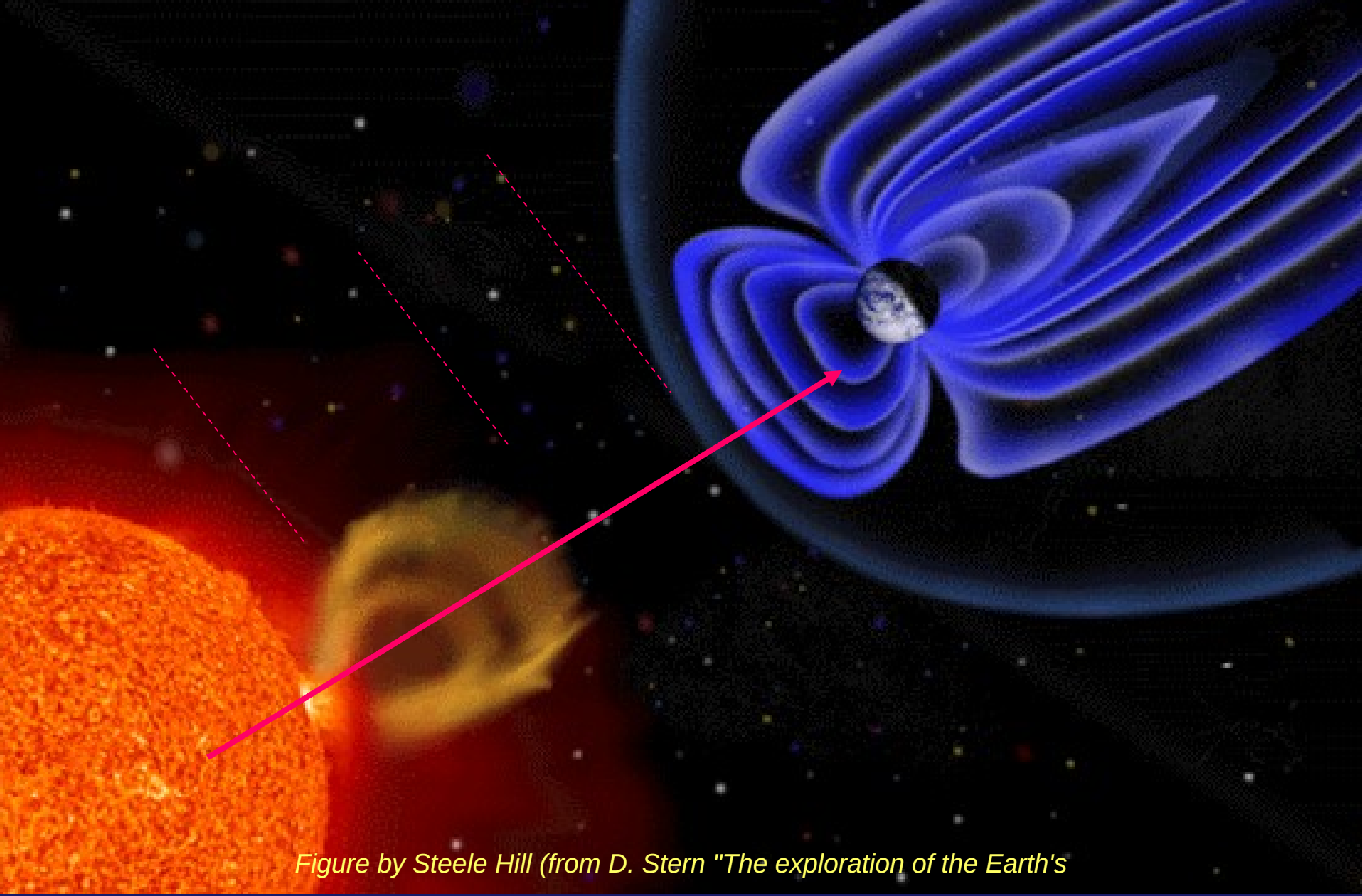


*Figure by Steele Hill (from D. Stern "The exploration of the Earth's magnetosphere")*

# Workshop PNST Soleil-Cluster-Sol
# (Sun-Cluster-ground based instruments)

**St Maur, 19 June 2006 chairman: C. Hanuise**

members

CETP/EMI : J.C. Cerisier CETP/OPN : P. Canu, N. Cornilleau-Wehrlin, D. Fontaine
DMI : J. Watermann, IAS : G. Artzner, LESIA: B. Schmieder, M. Pick, N.Vilmer
LPCE : C. Hanuise, G. Lointier, A. Marchaudon
Grenoble: C. Lathuillère, Saint Maur: M. Menvielle, F. Pitout, H. Rème,

## Study of big storms:

Commonly used quantitative physical storm parameter Dst

……

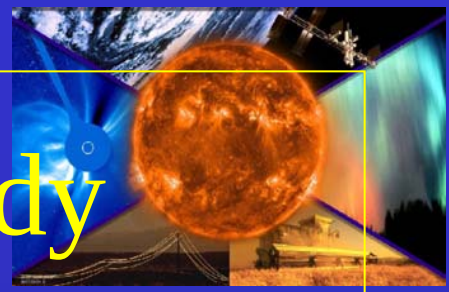
(J.Watermann)

« Storm is an interval of time when a sufficiently intense and long-lasting interplanetary convection electric field leads, through a substantial energization in the magnetosphere-ionosphere system, to an intensified ring current strong enough to exceed some key threshold of the quantifying storm time index Dst. »

*Gonzalez et al., 1994*

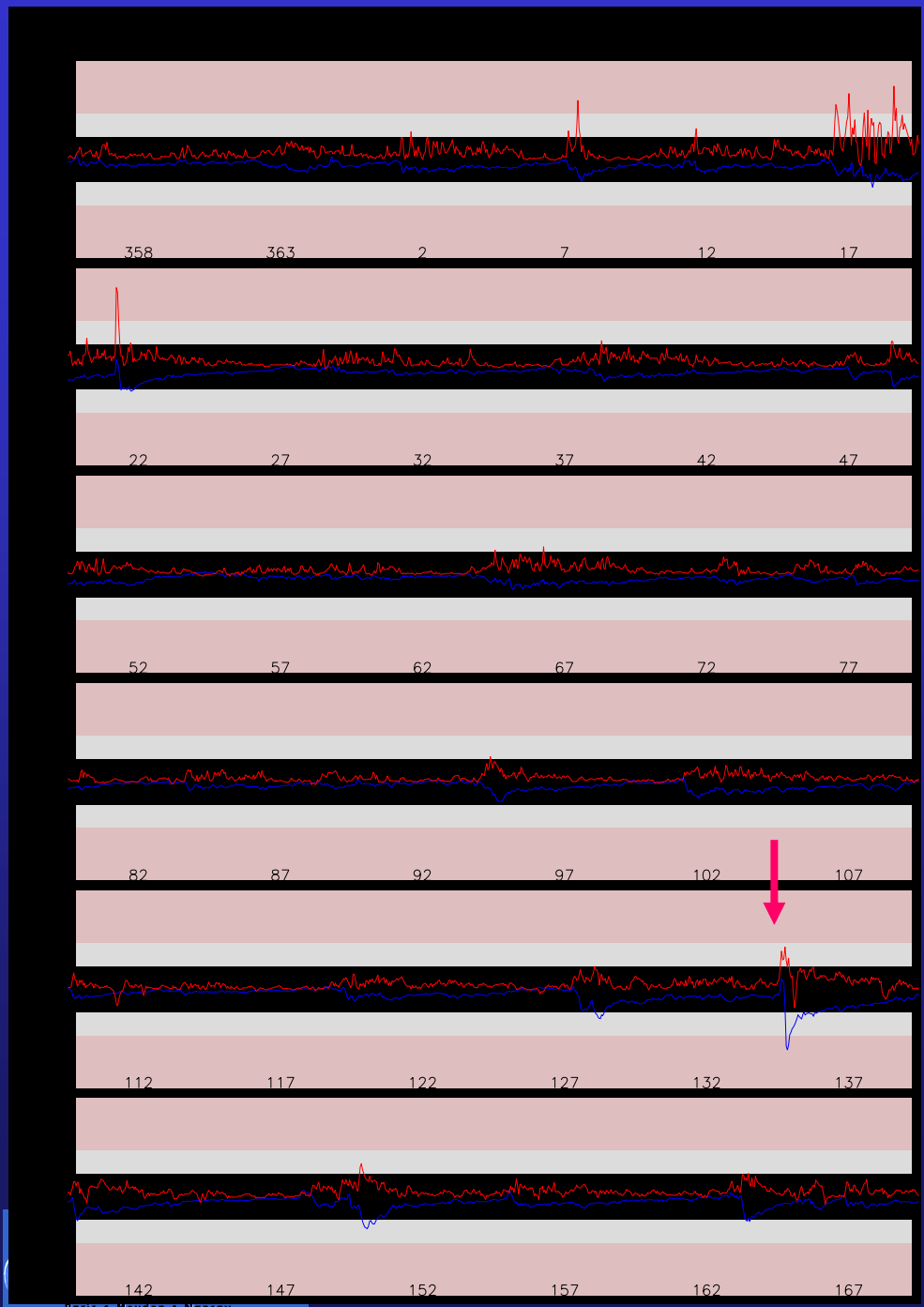
| ….. Storm strength | …… | Dst exceeds |
|---|---|---|
| ========== | | ========== |
| severe (super storm) | | -250 nT / -200 nT |
| intense (strong) | | -100 nT |
| moderate | | -50 nT |

# Multi wavelength study



- Source of CMEs, AR or filament eruption
- CME (LASCO), EIT (depression, dimming)
- Radio images and spectra (Nançay)
- Study of the magnetic cloud (Wind and Ace)
- Magnetosphere compression (Cluster)
- Signatures in the thermosphere (Super DARN)

# Different periods




| year / day of year | date | Dst | PCN |
|---|---|---|---|
| 2003 / 149-150 | *May event* | -144 | 8.8 |
| 2003 / 153 | Jun 02 | -91 | 4.8 |
| 2003 / 169-170 | Jun 17-18 | -141 | 5.5 |
| 2003 / 193 | Jul 12 | -105 | 5.6 |
| 2003 / 197 | Jul 16 | -90 | 5.4 |
| 2003 / 230 | Aug 18 | -148 | 5.1 |
| 2003 / 302-326 | *Halloween* | -422 | 15.7 |
| 2004 / 22 | Jan 22 | -149 | 8.3 |
| 2004 / 42-43 | Feb 11-12 | -109 | 5.0 |
| 2004 / 94-95 | Apr 04-05 | -112 | 5.2 |
| 2004 / 199 | Jul 17 | -80 | 4.6 |
| 2004 / 204-210 | Jul 22-28 | -181 | 7.6 |
| 2004 / 243-244 | Aug 30-31 | -126 | 3.9 |
| 2004 / 312-317 | Nov 07-12 | -373 | 17.0 |
| 2005 / 8 | Jan 08 | -96 | 12.8 |
| 2005 / 17-22 | Jan 17-22 | -121 | 17.2 |
| 2005 / 95 | Apr 05 | -85 | 4.4 |
| 2005 / 128 | May 08 | -127 | 5.0 |
| 2005 / 135 | May 15 | -263 | 9.2 |
| 2005 / 150 | May 30 | -138 | 7.2 |
| 2005 / 164 | June 13 | -106 | 5.1 |

**PNST** **Sept 2005**

# II. "The stages of Sun-Earth connection"

## Proposal to ISSI, International Teams Programme

**The participation of the groups in the various tasks are described below:**

**1. Solar observations (pre-corona, flares and CMEs): EIT and LASCO.**

***Brigitte Schmieder and Pascal Démoulin*** **(Observatory of Paris)**

***Cristina Mandrini and Sergio Dasso*** **(Instituto de Física del Espacio)**

***Hebe Cremades*** **(Max Planck)**

**2. In-situ (interplanetary) observations:**

**Magnetic field and solar wind plasma: *Consuelo Cid*, *Yolanda Cerrato and Elena Saiz* (Universidad de Alcalá)**

**3. Energetic particles: *Blai Sanahuja and Angels A***

**Ground based observations (geomagnetic indices):**

***Michel Menvielle*** **(Centre d'Etudes des Enviromer**

***Chantal Lathuillere*** **(Laboratoire de Planétologie d**

**4 Theoretical models:**

***Consuelo Cid, Yolanda. Cerrato and Elena Saiz*** **(U**

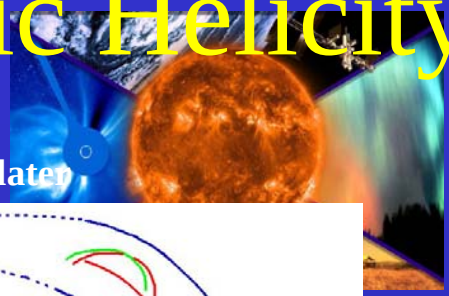
***Stefaan Poedts*** **(K.U.Leuven)**

***Sergio Dasso*** **(Intituto de Física del Espacio)**

***Luciano Rodríguez*** **(Max Planck)**

**Worshops: October 2005, May 2006 October 23-27 2006**

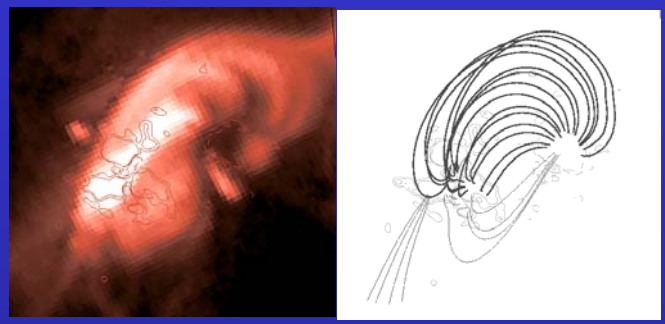
# Conservation of the magnetic Helicity

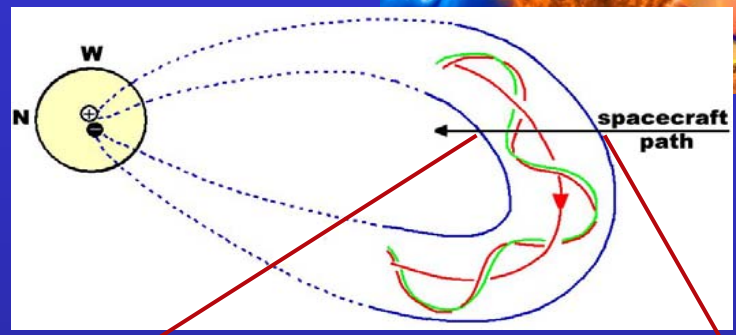


**AR 7912, 14 Oct. 1995**

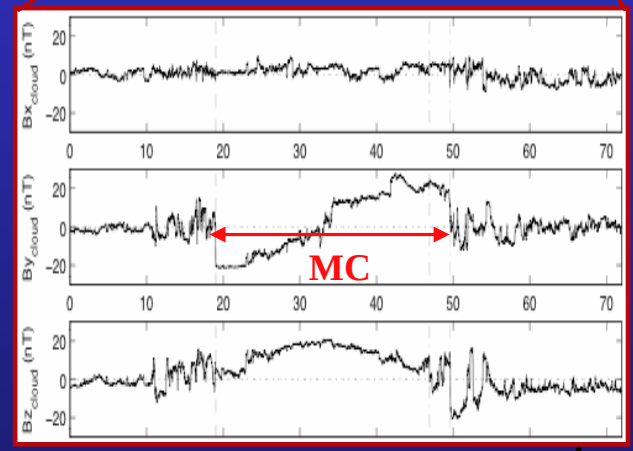
**4 days later**

**before CME**






**after CME**




Remote sensing but global

Magnetograms + coronal loops + extrapolation

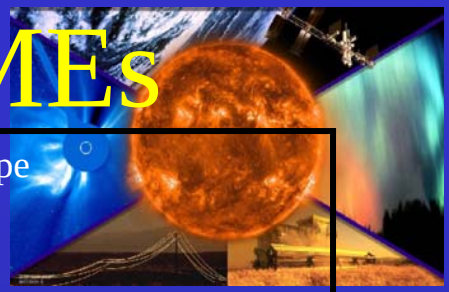
-> $\Delta H_{corona}$

Insitu but local

Insitu measurements of the 3 components of B + flux rope model

-> $H_{Magnetic\ Cloud}$

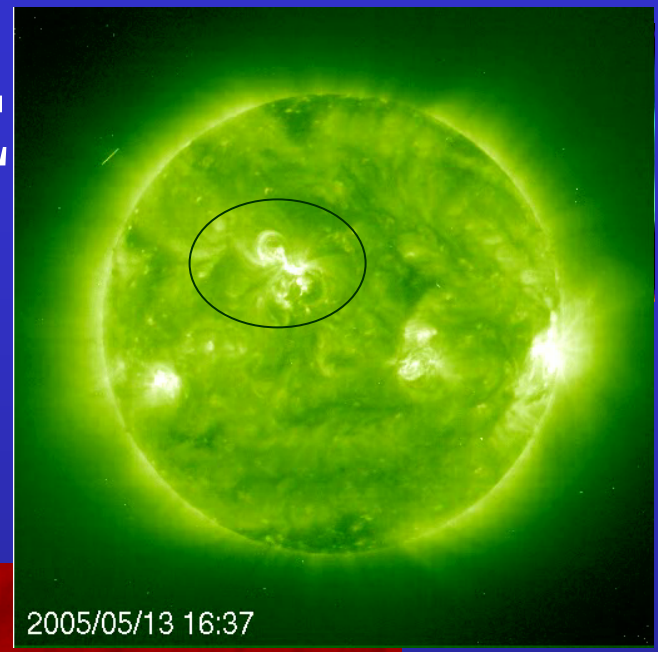
# Possible associated CMEs

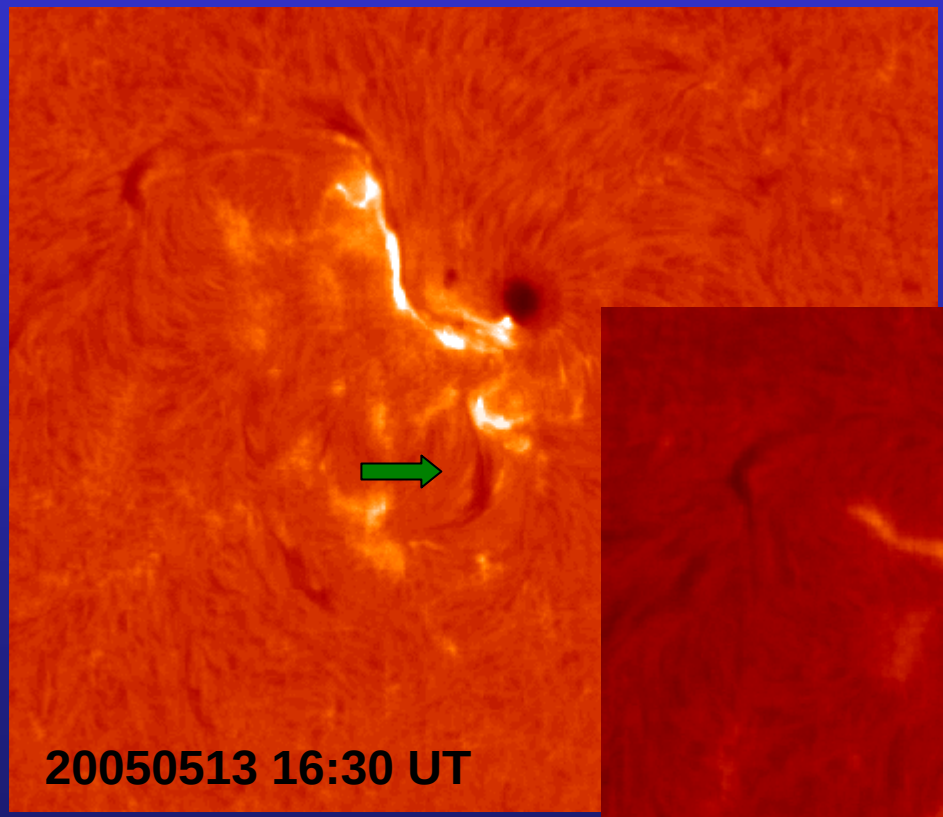


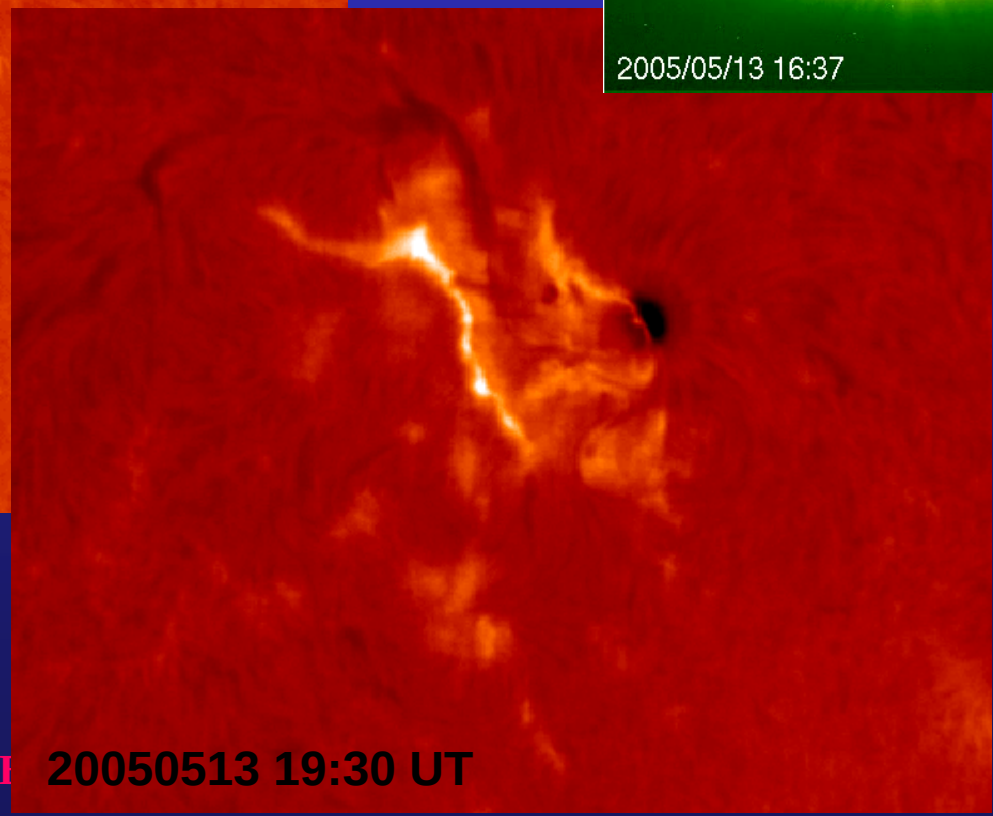
| IP Date | CME Date | Time in C2 | Proj. speed | Symmetry type |
|---|---|---|---|---|
| 2000 Apr 04-06 | 2000 Apr 04 | 16:32 | 1188 km/s | Outline assymetry to SW |
| 2000 Jun 06-08 | 2000 Jun 02 | 15:54 | 1119 km/s | Brightness assym. to NE |
| 2000 Sep 12-15 | 2000 Sep 12 | 11:54 | 1550 km/s | Brightness assym. to S |
| 2001 Mar 28-31 | 2001 Mar 28<br>2001 Mar 29 | 12:50<br>10:26 | 519 km/s<br>942 km/s | Brightness assym. to S<br>Brightness assym. |
| 2001 Nov 21-24 | 2001 Nov 21<br>2001 Nov 22<br>2001 Nov 22 | 14:06<br>20:58<br>23:30 | 518 km/s<br>1443 km/s<br>1437 km/s | Outline assym. to SW<br>Outline assym. to SW<br>Brightness assym to W |
| 2005 Jan 04-07 | 2005 Jan 04<br>2005 Jan 05<br>2005 Jan 05 | 12:54<br>06:30<br>15:30 | 460 km/s<br>261 km/s<br>735 km/s | Symmetry<br>Outline assym to NE<br>Brightness assym to SE |
| 2005 Jan 13-17 | 2005 Jan 15<br>2005 Jan 17 | 23:06<br>9:30 | 2861 km/s<br>2094 km/s | Brightness assym. to NW<br>Brightness assym. to NW |
| 2005 Jan 19-22 | 2005 Jan 19<br>2005 Jan 20 | 8:29<br>6:54 | 2020 km/s<br>882 km/s | Brightness assym. to NW<br>Brightness assym. to NW |
| 2005 May 13-14 | **2005 May 13** | **17:22** | **1689 km/s** | **Brightness assym. to E** |

# 2005 May 13-14

# one source region, one CME

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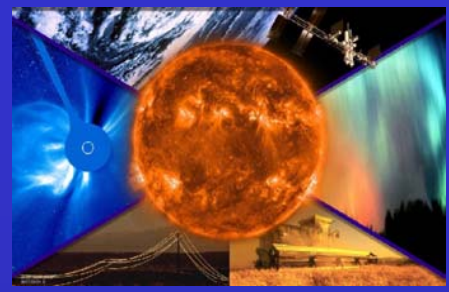
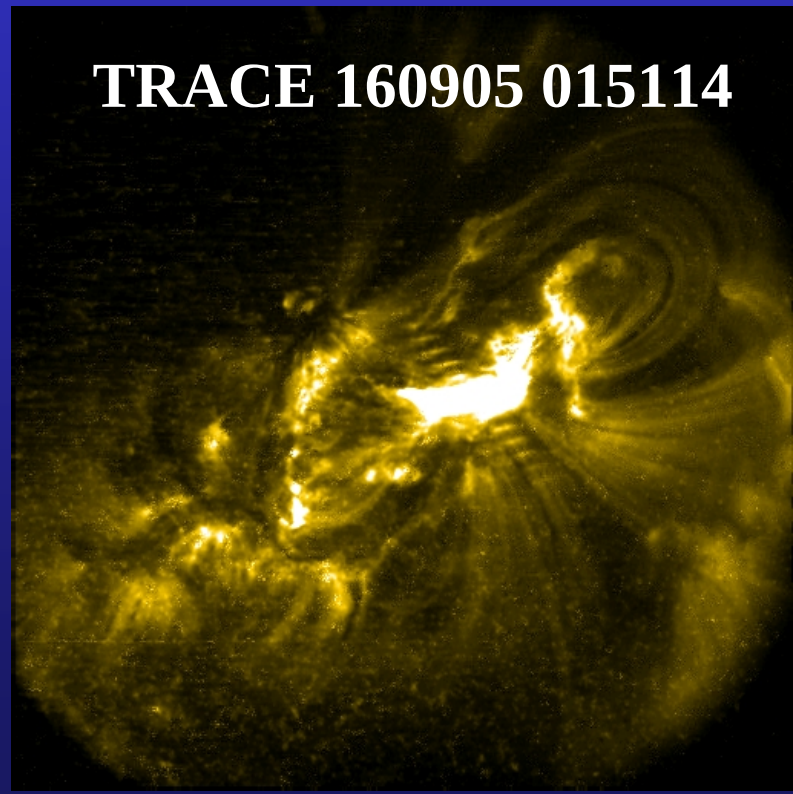
# Themes 2 and 3 Joint Activities



- (Janet Kozyra et al.)
- 30 day campaign in September 2005
  All 8 worldwide ISR radars operate on best effort basis
  Extend observations sun-to-Earth to look at solar drivers and geospace responses




**38 Flares, 12 X , 26 M**

# JOP 178 / 2005 Campaign

http://bass2000.bagn.obs-mip.fr/jop178/index.html


**Th. Roudier (P.I.) (1) , S. Rondi (1) , J.M. Malherbe (2) , P. Mein (2) , B. Schmieder (2), V.Bommier (2) , N. Mein (2) , J. Moity (2), Ch. Coutard (2), G. Molodij (2), N. Meunier (1), M. Rieutord (1), R. Tkaczuk (1), G. Aulanier (2), Berlicki (2) , E. Pariat (2) , K. Bocchialini (3), G. Pouget (3) , J. Solomon (3), P. Suetterlin (4), M. Svanda (5), Tziotziou (4), Steve Keil (6) , K.S. Balasubramaiam (6), Y. Deng (7) , J Staiger (8), P. Rudawy (9) D. Pallamraju (10), R. Kitai (10), M. Svanda (11)**

**Presented by Pr. K. SHIBATA (**Hida and Kwasan observatories ,Japan)

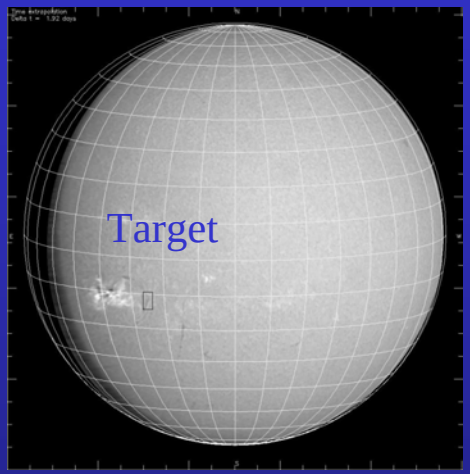
(1) Observatoire Midi Pyrénées.
(2) Observatoire de Paris, Meudon, France A.
(3) Institut d'Astrophysique Spatiale France
(4) Universiteit Utrecht, Utrecht, Netherlands
(5) Astronomical Institute Ondrejov Czech Republic K and the Global High Resolution H-alpha Network
(6) Sacramento Peak Observatory (USA)
(7) Yuanyong Huairou Solar Observing Station (China)
(8) KIS-Freiburg- VTT (Germany)
(9) Wroclaw Observatory
(10) Hida and Kwasan observatories (Japan)
(11)Astronomical Institute Ondrejov Czech Republic


**NEXT campaign Aug. 25- Oct 03 2006**

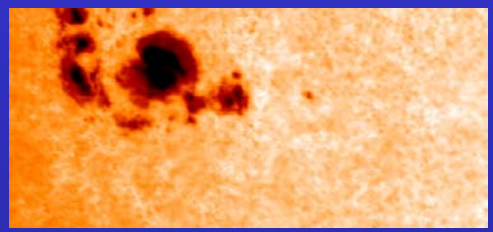
# September 11,

NOAA808 (40 degrees East, 10 degrees South)

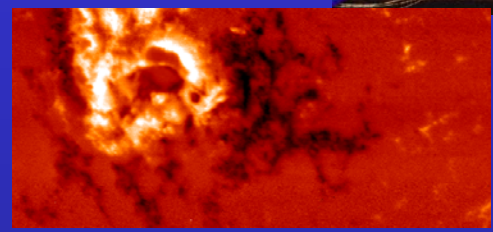
CATANIA Observatory



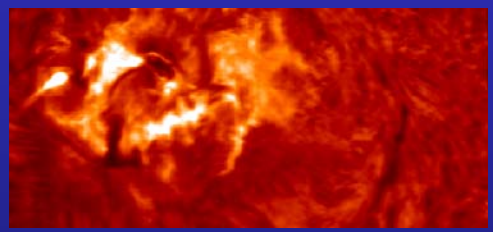

THEMIS/MSDP: simultaneaous observation at 12:00 UT
Field of view 360 arcsec by 160 arcsec



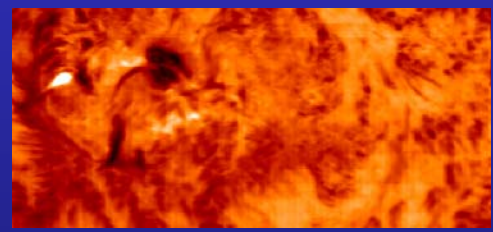
Intensity D1 a 24 nm to line center



Stokes V in D1 at 24 nm to line center

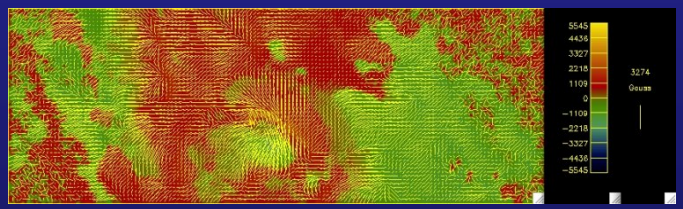


Intensity Halpha at 25 nm to line center

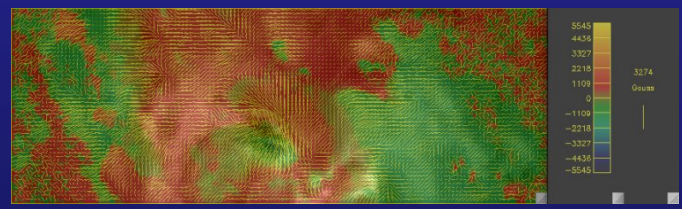


Intensity Halpha at 50 nm to line center

THEMIS/MTR: 14h44-17h59 UT



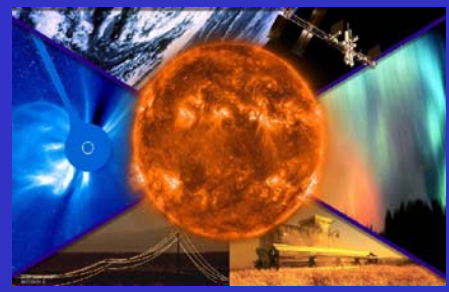

Magnetic field

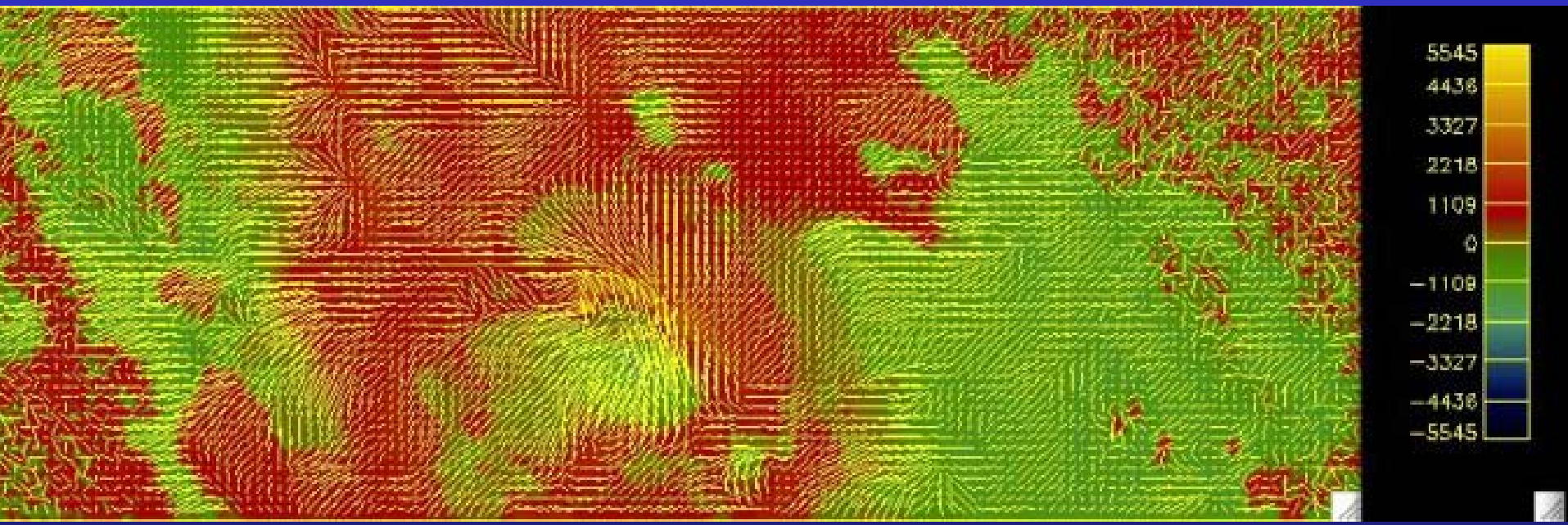



compound of both: H_aplha and magnetic field map

# THEMIS vector magnetic field

(Rondi , Roudier, Bommier, Schmieder et al. 2006, A &A , submitted)






the magnetic field vector is given in line-of-sight coordinates:
- color scale for the longitudinal magnetic field
- yellow dashes (without arrow: the ambiguity is not solved) for the transverse magnetic field

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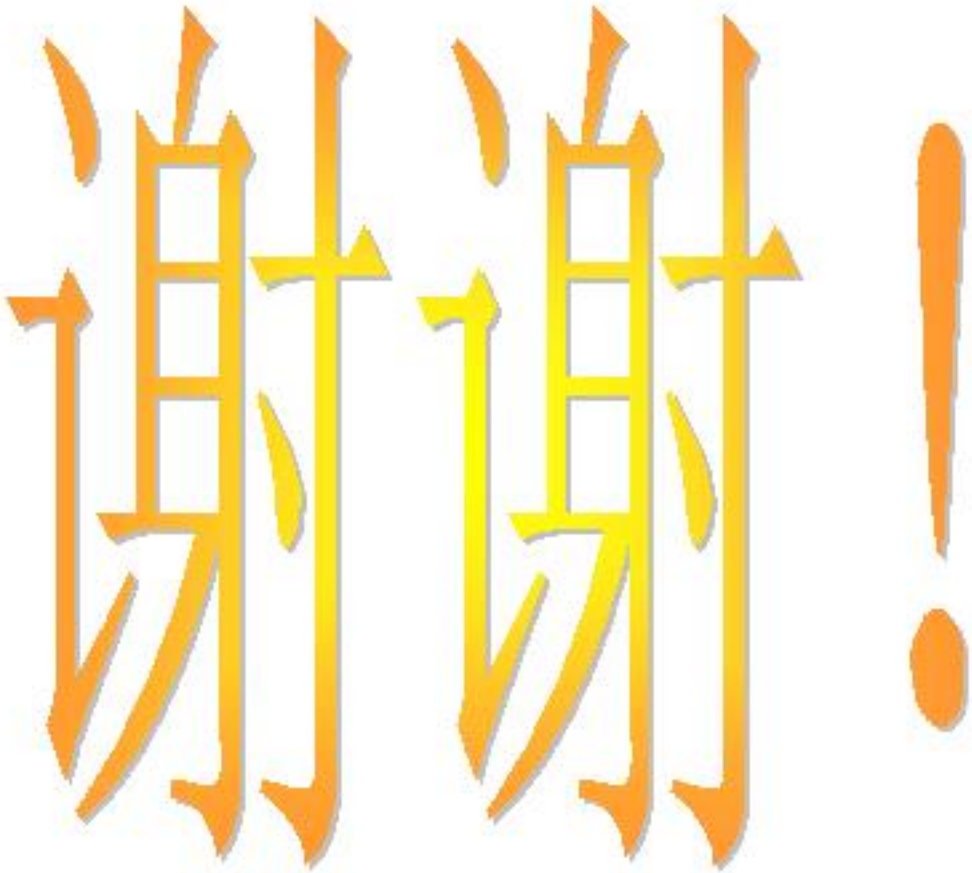
B.Schmieder PNST Sept 2005


谢谢！