SWG 19: Pasadena

PLASTIC Status Report

Toni Galvin

M. Popecki, K. Simunac, B. Klecker
L. Kistler, L. Ellis, C. Farrugia, E. Moebius, Y. Liu
M. Lee, J. Barry, P. Bochsler, P. Wurz, L. Blush
R. Wimmer-Schweingruber, A. Opitz, L. Berger
Solar Minimum:

Yesterday the Groundhog saw his shadow, confirming Chris StCyr’s report:

Six more months of Solar Minimum!

Figure received from Alex Young
Personnel Changes

- Katherine Singer is now working at Hamilton Sunstrand (ISS Air Quality Control)

- Yong Liu, New Post Doc at UNH – working on generation of Oxygen Parameters (Public Domain)

- Peter Bochsler, Visiting Scientist at UNH

- Submission of three candidates to NASA Project for Data Phase Co-Investigators: K. Simunac (UNH), A. Opitz (CESR), and L. Berger (CUA, Kiel)
Instrument Activities - 2008

A

• 2/7/08 - DPU FSW load 3.2.7
• 4/14/08 High voltages reset; instrument was restarted.
• 5/11/08 Instrument stalled and entered anomalous hv mode due to delivery timing of some memory register commands
  
  Two previously unknown problems; both needed to create the hangup:
  
  – Leap-year error in the POC s/w (since corrected by UCB, thanks!)
  +
  – Variation in S/C from MOC-POC ICD about handling time-tag commands

B

3/3/08 - DPU FSW load 3.2.7
11/19/08 MCP HV increase - 20V
11/21/08 Raised DPU-side S-ch switch threshold
11/26/08 MCP HV increase - 20V
In addition to these published papers cited in the bibliography, multiple papers have been submitted to Solar Physics, covering a variety of topics.

Others are in progress for the SOHO-STEREO Workshop.
STEREO Investigations


Applications of Grad-Shafranov Reconstruction Techniques on Magnetic Clouds Observed by Stereo and Wind and Comparison to Solar Source

Interstellar Pickup Ion Observations by STEREO: Focus Cone Variations with Solar Wind Streams

High Resolution Minor Ion Composition and Kinetic Properties at Solar Wind Interfaces -- Solar Source Back Mapping

Suprathermal Ions in Compression Regions and in Upstream Events
Is the Current Solar Cycle Minimum Weaker than Previous Cycles?

STEREO - Wind - Helios Observations of the Solar Wind QI

The solar wind quasi-invariant (QI) is the ratio of the solar magnetic wind magnetic energy density to the plasma kinetic energy density, that is, the inverse square of the Alfven Mach number.

QI complements other indices and has implications on the Sun-Solar System connection during an entire solar activity phase.

On average, the QI(2007) is less than that observed during the previous two minima, indicating weaker solar activity. This also implies weaker MHD effects in solar wind flow around planetary magnetospheres which, in turn, alters the flow’s interaction with them.

Reference:
Temporal Evolution of the Solar Wind during the Recent Solar Minimum:

Observations and Consequences for Space Weather Modeling

The heliocentric orbits of the two STEREO satellites provide a unique opportunity to study the cross-correlation of solar wind parameters\(^1,2\), and, during these solar minimum conditions, the evolution of stream interfaces\(^3\) near 1 AU over time scales of hours to a few days, that is, much less than the period of a Carrington rotation.

Presentation this SWG by Kristin Simuanc

References:

Multi-spacecraft STEREO and Wind observations allowed us to model two magnetic clouds (MCs) with increased accuracy. The model was a Grad-Shafranov Reconstruction where data from two spacecraft were ingested to optimize the magnetic field maps. The MCs were observed in May 2007 when the STEREO spacecraft were about 9° apart.

For one MC it was possible to compare the magnetic flux content with that inferred from the corresponding two-ribbon flare on the Sun. **For the first time it was shown that most of the magnetic flux of the MC, now better constrained because of the available multi-spacecraft observations, is created during the eruption on the Sun.**

References:
STEREO Investigations (in progress)

Interstellar Pickup Ion Observations by STEREO: Focus Cone Variations with Solar Wind Streams

Pickup helium ions provides diagnostics for Local Interstellar Cloud parameters, such as the LIC flow velocity vector and temperature. However, pickup ion distributions are highly variable and are known to be affected by the interplanetary magnetic field, solar wind density, ionization rates & probably several unknown causes. For deduction of LIC parameters, mitigation is sought with better information to distinguish temporal vs spatial differences. STEREO A/B provide two traversals of the focusing cone per year.

STEREO RESULTS:

Presentation this SWG by Berndt Klecker

References:
1. B. Klecker et al., AGU 2008, SWG 2009
Data available through SSC web-site:

All Level 1 CDF: Housekeeping, monitor rates, and all science data, including proton onboard moments. Does not include heavy ion efficiencies. (These files are used in analysis programs SPLAT and PHA_PLAY.)

Level 2 CDF 1-minute cadence data for the 1D-Maxwellian derived proton bulk parameters. March 2007 through Nov. 2008. These files lag by about 30 days because they require the *.fin Level 0 files.

Data: epoch, epoch_1kev, error codes, caution codes, s/c attitude flag, proton density, proton bulk speed, kinetic temperature, thermal velocity, n_s_flow_angle, carrington_rotation, spcrft_lon_carr, heliospheric_dist, spcrft_lon_hee, spcrft_lat_hee, spcrft_lon_heeq, spcrft_lat_heeq, spcrft_lon_hci, spcrft_lat_hci. New STA processing this week, to incorporate E_W flow angle, and velocity components (RTN, HERTN).
Data available through PLASTIC web-site


Automatically Generated Plots:
- Level 2 Proton Moments (1D Max) Bulk Vel, Density, Temperature, and Thermal_vel through present
- On-Board Moments: Bulk Vel, Density, Temperature, Vel. Standard Deviation through present
- Solar Wind Stack Plots through 10/2008
- He+ Survey Plots through present
- Spacecraft roll, pitch, and yaw through present
- Movie: Solar Wind Fe Charge States at CIR

Coming this week: STA Proton Velocity Components
Upcoming Meetings

• STEREO SWG for Fall
• SOHO CELIAS / PLASTIC

STEREO Team meeting April 7-9 2009, to be held in Concord NH at the STEREO EPO Partner McAuliffe-Sheppard Discovery Center

• If interested in attending, please contact
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