

STEREO In Situ Data

ACE/STEREO/SOHO/Wind Joint
Meeting, Kennebunkport, ME,
June 8-11, 2010

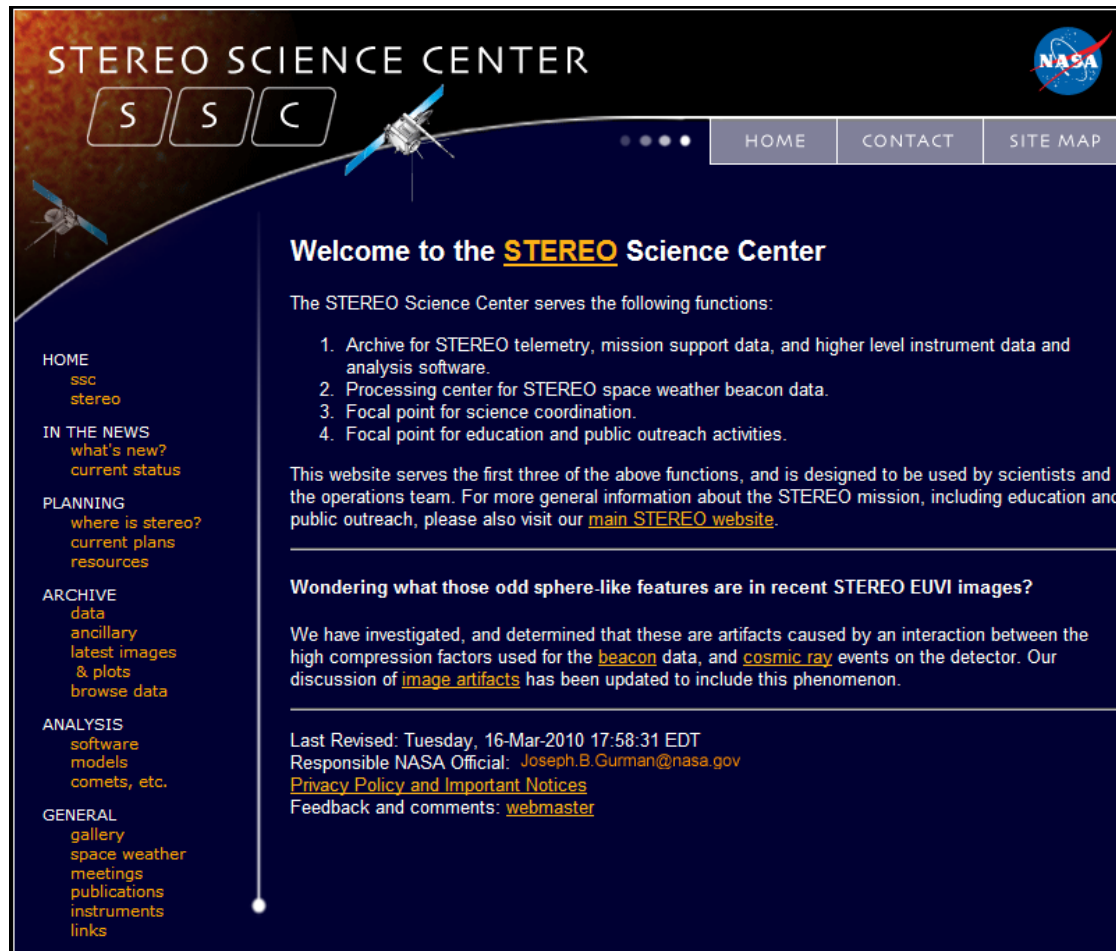
*Report compiled by Janet Luhmann,
Peter Schroeder, Lan Jian, Chris Russell*

Overview: Several Points of Entry

- STEREO Science Center archives all primary instrument and ancillary data. It also provides the real-time space weather beacon data, images and plots: <http://stereo-ssc.nascom.nasa.gov/>
- PI sites provide access to primary instrument data, some higher order data products, plots/browsers and lots of associated information about the instruments and the data sets:
 - IMPACT: <http://sprg.ssl.berkeley.edu/impact/>
 - PLASTIC: <http://stereo.sr.unh.edu/>
 - S/WAVES: <http://swaves.gsfc.nasa.gov/>
- Co-I sites provide additional tools, browsers and data in different formats (for example, ASCII):
 - UCLA: MAG data, “Level 2” (merged MAG and PLASTIC), “Level 3” (event lists): <http://www-ssc.igpp.ucla.edu/ssc/stereo/>
 - Caltech: SEP suite browsers and data: <http://www.srl.caltech.edu/STEREO/index.html>
 - Toulouse: SWEA PAD and (limited) moments data: <http://stereo.cesr.fr/>
 - Kiel: SEPT browser: <http://www2.physik.uni-kiel.de/stereo/browseplots/>
- CDAWeb serves a great deal of data and more is on the way: <http://cdaweb.gsfc.nasa.gov/>
- The Virtual Heliospheric Observatory (VHO) likewise serves some STEREO data and more is also in the pipeline: <http://vho.nasa.gov/>

STEREO Science Center:

<http://stereo-ssc.nascom.nasa.gov/>



STEREO SCIENCE CENTER

SSC

HOME CONTACT SITE MAP

Welcome to the **STEREO** Science Center

The STEREO Science Center serves the following functions:

1. Archive for STEREO telemetry, mission support data, and higher level instrument data and analysis software.
2. Processing center for STEREO space weather beacon data.
3. Focal point for science coordination.
4. Focal point for education and public outreach activities.

This website serves the first three of the above functions, and is designed to be used by scientists and the operations team. For more general information about the STEREO mission, including education and public outreach, please also visit our [main STEREO website](#).

Wondering what those odd sphere-like features are in recent STEREO EUVI images?

We have investigated, and determined that these are artifacts caused by an interaction between the high compression factors used for the [beacon](#) data, and [cosmic ray](#) events on the detector. Our discussion of [image artifacts](#) has been updated to include this phenomenon.

Last Revised: Tuesday, 16-Mar-2010 17:58:31 EDT
Responsible NASA Official: Joseph.B.Gurman@nasa.gov
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Latest SECCHI beacon images

Shown here are the latest SECCHI beacon images. The STEREO space weather beacon telemetry mode is a very low rate, highly compressed data stream broadcast by the spacecraft 24 hours per day. These data are used for space weather forecasting. Because of the large compression factors used, these beacon images are of much lower quality than the actual science data.

Realtime resources:

- [latest SECCHI beacon images.](#)
- [Plots of latest in-situ and radio beacon data](#)
- [SECCHI time-elongation plots \("J-plots"\)](#)
- [What planets are currently visible?](#)
- [Comparison with helioseismology far-side data](#)
- [Latest images directory](#)

Browse resources:

- [STEREO image search tool / movie maker](#)
- Daily browse [images](#) and [plots](#)
- [Links to non-STEREO data](#)
- Other browse tools available via the [instrument data pages](#)
- [What to look for in STEREO images](#)
- See something strange? [Check here](#) first.

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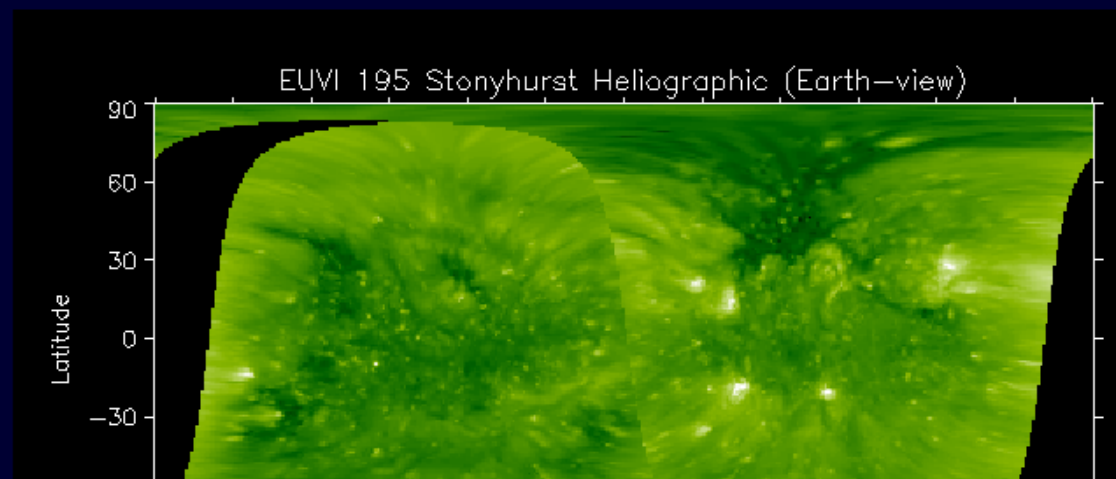
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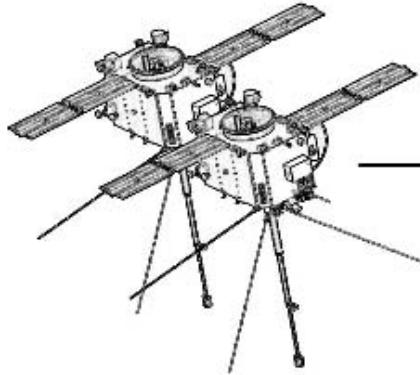
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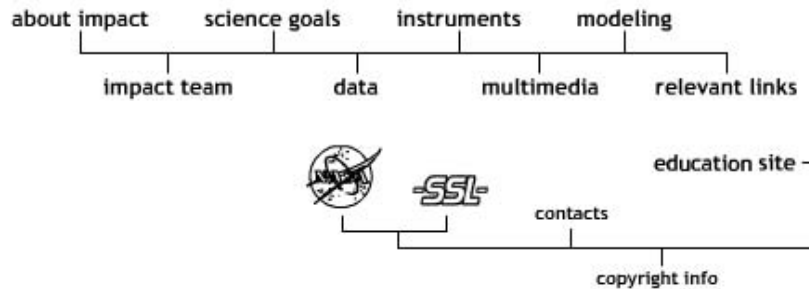


IMPACT PI Site:

<http://sprg.ssl.berkeley.edu/impact/>



stereo - impact
mission site



For the most up to date information, please visit [NASA'S STEREO Mission homepage](#).

STEREO/ACE

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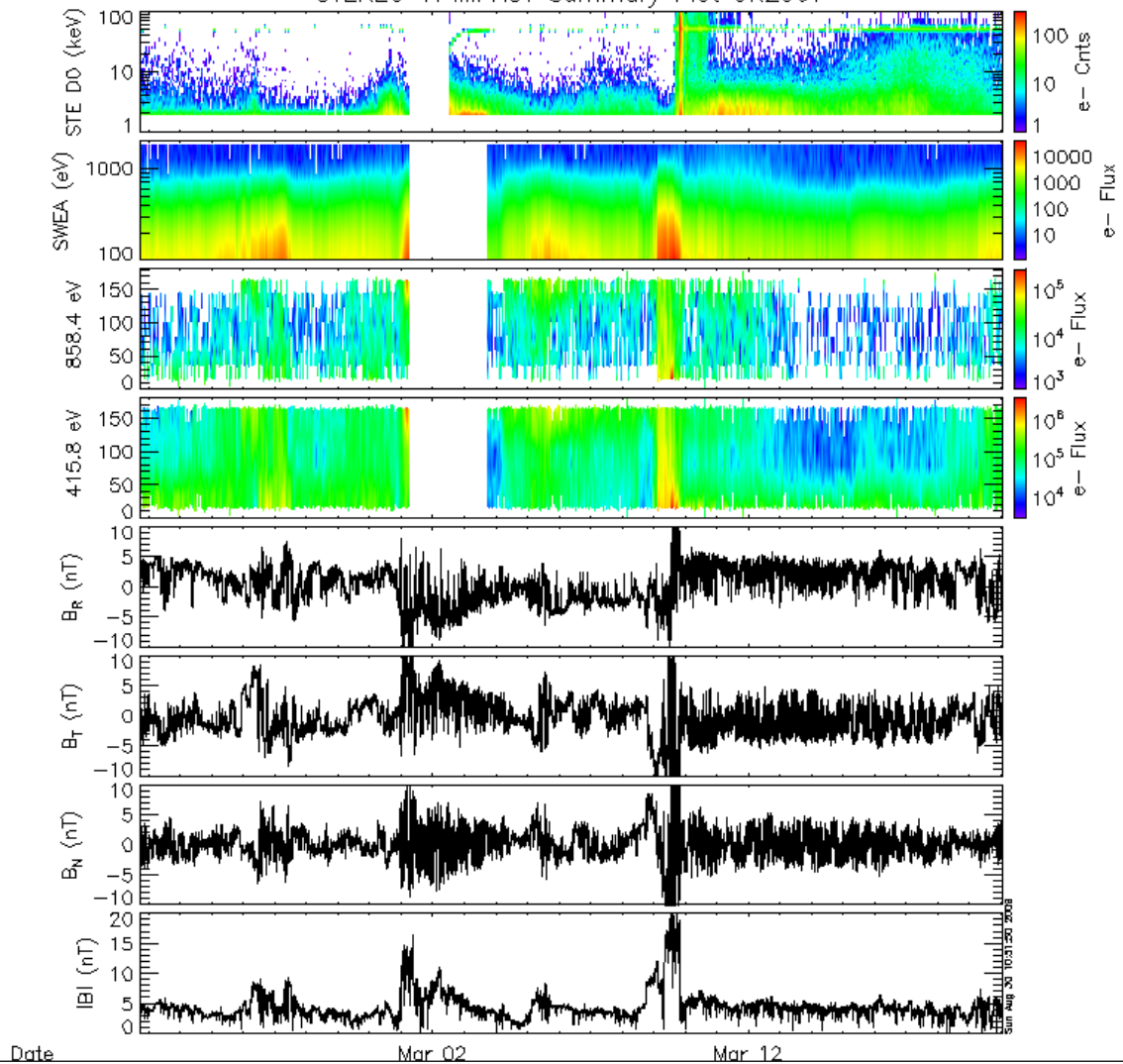
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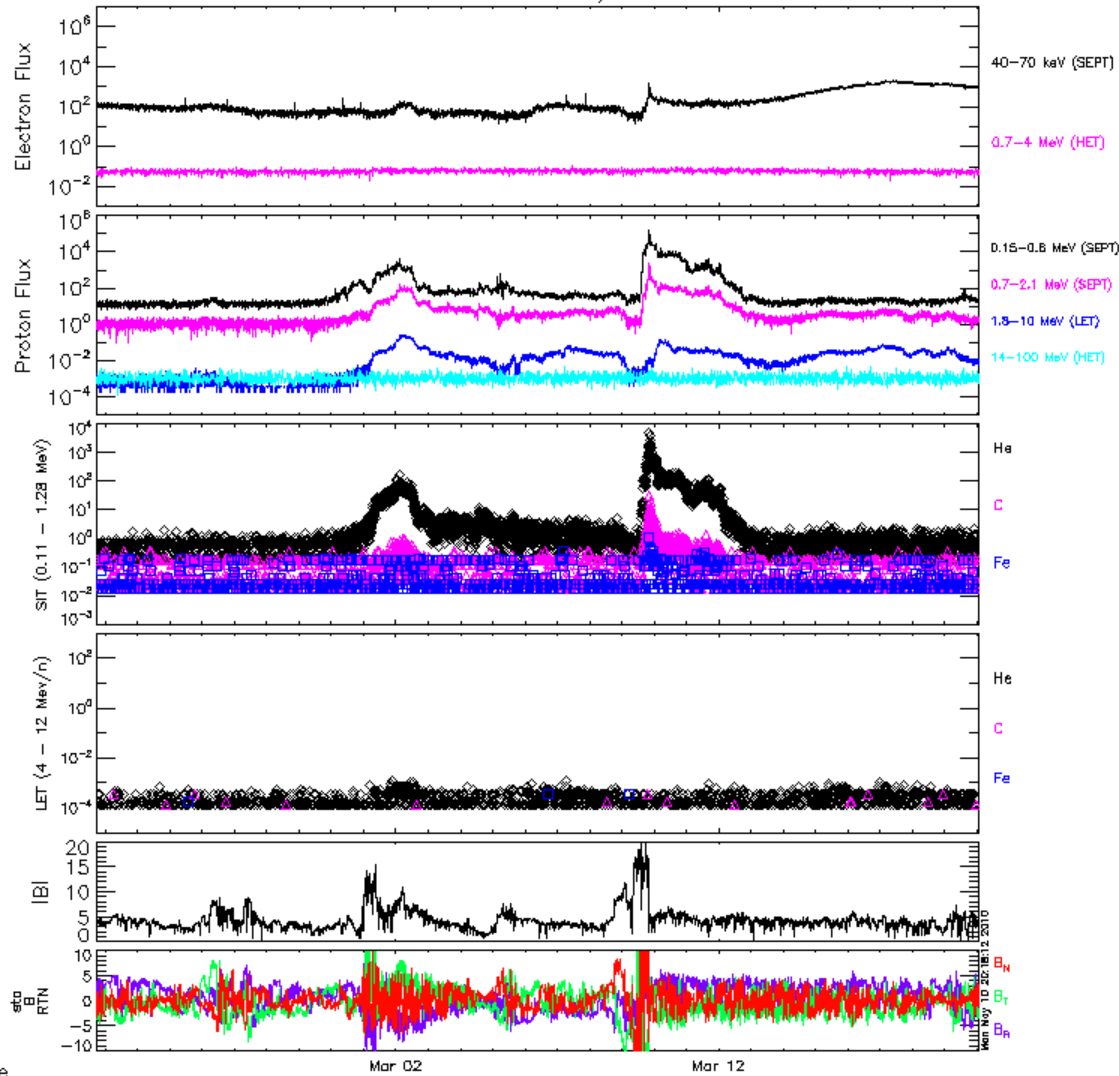
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STEREO-A IMPACT Summary Plot CR2067



STEREO IMPACT SEP Plots:

STEREO-A SEP Summary Plot CR2067



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STEREO B

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Where is STEREO?

PLASTIC PI Site:

<http://stereo.sr.unh.edu/>



PLASTIC
PLasma And Supra-Thermal
Ion Composition Investigation



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WELCOME TO THE STEREO PLASTIC WEBSITE...

Part of the NASA STEREO mission for providing a global view of the Sun and its effects on the Heliosphere.

The [NASA Solar Terrestrial Relations Observatory](#) (STEREO) mission uses two nearly identical spacecraft in orbit about the Sun to provide a unique and revolutionary view of the Sun-Earth system. The strategic placement of the two spacecraft allows for the first time a stereoscopic (3-D) view of the Sun and the interplanetary space environment out to the orbit of the Earth. Of particular interest to this mission is the origin, propagation and evolution of coronal mass ejections (CMEs). CMEs are the primary cause of major space weather disturbances at the Earth.

The STEREO payload combines remote imaging of the Sun and its eruptions with in-situ sampling of the particles and fields that subsequently flow past the spacecraft. The Plasma and Suprathermal Ion Composition (PLASTIC) portion of the scientific payload samples the solar wind and suprathermal particles, providing measurements of kinetic properties and composition. The [PLASTIC consortium](#) includes the University of New Hampshire, the University of Bern, the Max Planck Institute, Christian-Albrechts-University Kiel, and NASA Goddard Space Flight Center, under the overall direction of the University of New Hampshire (Dr. A.B. Galvin, PI).

STEREO STATUS:

STEREO was successfully launched at 8:52 pm on October 25, 2006 (EDT). Both spacecraft are now in heliocentric orbits. The second year of the two year mission was completed on January 21, 2009. The mission has been extended.

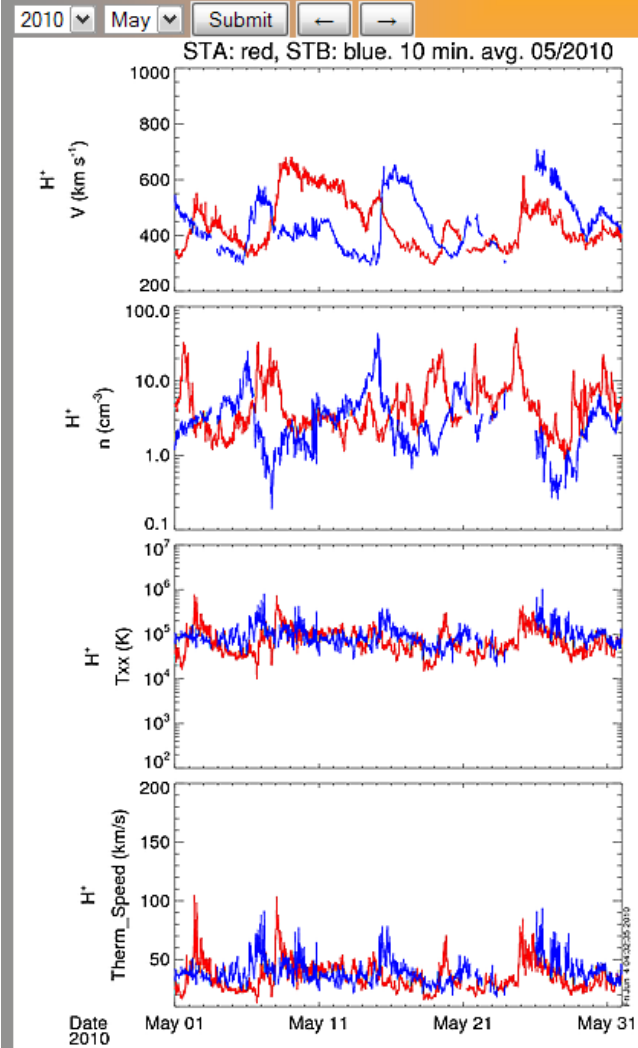
LATEST PLASTIC STATUS:

PLASTIC A and PLASTIC B are operating nominally.




PLASTIC Proton Moments Monthly AB Comparison

Bulk Velocity, Density, and Temperature derived from a 1D Maxwellian fit of 1-minute PLASTIC data.



S/WAVES PI Site:

<http://swaves.gsfc.nasa.gov/>

 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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WAVES Experiment on the STEREO Mission



STEREO/WAVES.
Science Objectives

Type III Radio Bursts

Type II Radio Bursts

The STEREO/WAVES experiment will

- Track and probe CME-driven shocks from the corona to 1 AU.
- Map the 3D structure of CME-driven shocks and their electron beams.
- Probe the density and IMF structure of the heliosphere before and after CMEs.
- Understand the radio emission process and geometry of radio bursts.
- Measure electron density and temperature of filament material in clouds.

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NASA Official: Robert MacDowall
Curator: Roger Hess

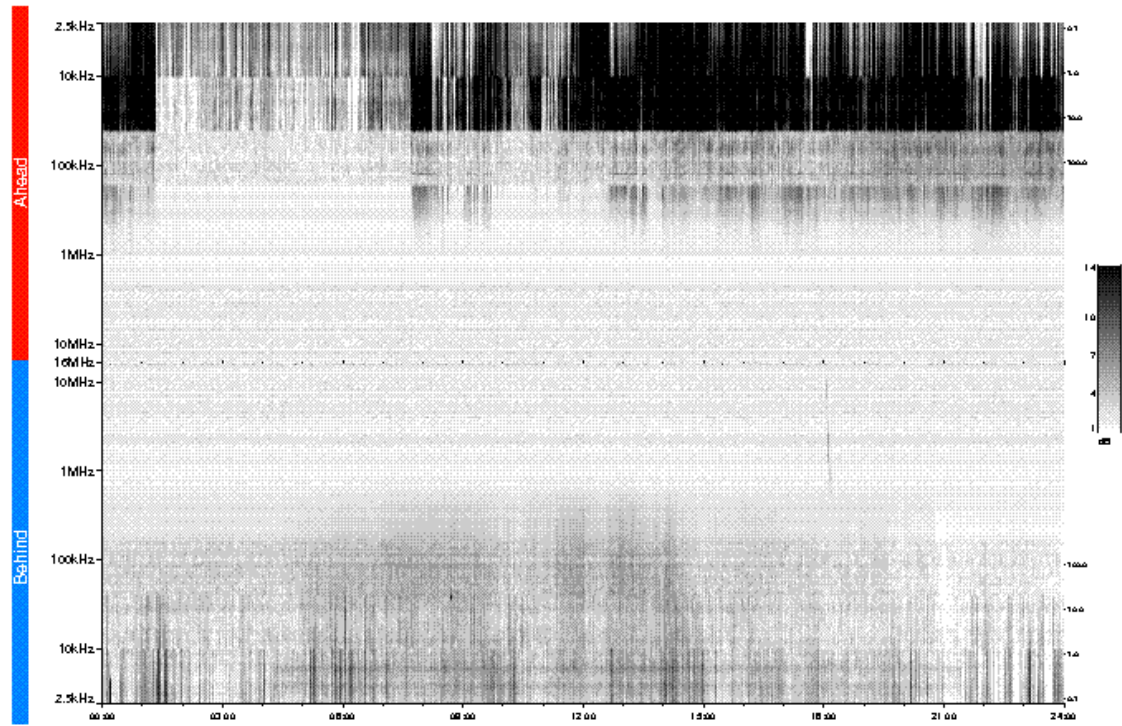
Date:

STEREO / WAVES Daily Summary Plot - grayscale for 2010-06-02 (153)

File: swaves_summary_20100602_g

STEREO/WAVES Daily Summary - 02-Jun-2010 (DOY 153)

Ahead source file = swaves_ahead_2010_153_1_02.plt
Ahead PSE Angle = 333.3



Behind PSE Angle = 333.3
Behind source file = swaves_behind_2010_153_1_02.plt

Time (UTC)

swaves_summary_20100602_g.png on 2010-06-02 10:20:00 AM EDT

STEREO/IMPACT Server at UCLA

<http://www-ssc.igpp.ucla.edu/ssc/stereo/>

- **L1 Magnetometer Data** (1 Hz, 8 Hz, 32 Hz)
 - Earth orbit in GSM (Nov 7, 2006 – Oct 31, 2008)
 - Heliocentric orbit in RTN or spacecraft coordinates (Nov 7, 2006 – Mar 31, 2010)
 - Correlative: Wind/ACE mag data in RTN (1m, 1s)
 - Plots and ASCII data
- **L2 Merged Magnetometer and PLASTIC Plasma Data** (1 hour, 10 min, 1 min)
 - STA (Feb 15, 2007 – Feb 28, 2010)
 - STB (Mar 1, 2007 – Feb 28, 2010)
 - Parameters: V_p , N_p , T_p , entropy, beta, total pressure, B_r , B_t , B_n , B , cone angle, clock angle, B_r/B , B_t/B , B_n/B , spacecraft location
 - Plots and ASCII data
- **L3 Event Lists** (ICMEs, CIRs, Shocks)
 - Updated to Oct 31, 2009
 - ICME parameters: start and stop time, maxima of total pressure, magnetic field, and solar wind speed, declining speed, group, and comments
 - SIR parameters: start and stop time, interface time, maxima of total pressure, magnetic field, proton number density, minimum and maximum solar wind speed
 - Shock parameters (using 8-Hz data): time, field ratio, shock normal angle, beta, Mach number, availability of 32-Hz data, forward/reverse shock

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The Stereo Mission



STEREO Data

UCLA provides plots and ascii files of Level 1 to Level 3 data.

Level 1 Magnetometer Data

Three time resolutions of STEREO data are available.
32 Hz burst mode - not continuous - least priority for telemetry.
8 Hz normal highest rate data.
1 Hz overlapped 2-second averages.
These data are available in spacecraft coordinates and in RTN coordinates for all of the mission to date.
Use [heliocentric_level1_magnetic_field](#)
During 2006 the data are also available in GSM coordinates.
Use [earth_orbit_phase_magnetic_field](#)

Level 2 Measurements of the IMPACT Instrument Suite

Data from the magnetometer and the PLASTIC plasma analyzed are available at 1m, 10m, and 1 hr resolution in RTN coordinates. Use [level2_plasma_and_magnetic_field](#)
Level 2 data and plots from HET, LET, and SIT are available at

UCLA-IGPP Stereo Mission - Mozilla Firefox

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http://www-ssc.igpp.ucla.edu/ssc/stereo/

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at 1m, 10m, and 1 hr resolution in RTN coordinates. Use [level2 plasma and magnetic field](#)

Level 2 data and plots from HET, LET, and SIT are available at <http://www.srl.caltech.edu/STEREO/index.html>

Level 2 data plots from SEPT are available at <http://www2.physik.uni-kiel.de/stereo/browseplots/>

Level 3. Event lists

These are available at http://www-ssc.igpp.ucla.edu/forms/stereo/stereo_level_3.html

The IMPACT Investigation

The IMPACT (In-situ Measurements of Particles and CME Transients) investigation targets the major STEREO science goals of 3D corona and solar wind structure, CME origins and interplanetary (ICME) evolution, Solar-terrestrial coupling, Solar Energetic Particle acceleration, and the solar magnetic flux cycle. IMPACT's strategy uses comprehensive in-situ measurements to complement the STEREO images, together with models to tie the in-situ measurements and images together.

Our international teaming approach has enabled the IMPACT investigation to include both plasma electron and energetic particle instruments determine the bulk parameters of the solar wind electrons and the flux and energy distribution of energetic particles from solar wind energies up to many MeV, including elemental abundance. The combined instrument package is capable not only of determining the strength and orientation of the magnetic field within ICMEs and the ambient solar wind at two different locations, but also determines whether the local field is rooted at the Sun at one or both ends or is disconnected from the Sun entirely. Suprathermal electron and ion detectors included in the IMPACT package add the capability to determine whether the local magnetic connections to the Sun include flaring active regions. The SEP instruments provide directional information important for both remote-sensing shock location and shape, and determining SEP maximum fluxes in cases where there is considerable anisotropy not in the direction of the nominal Parker Spiral as occurs during passage of ICMEs. In addition, a coordination with the Bougeret WAVES investigation links in the radio remote sensing observations that herald oncoming major events, enhances STEREO science return by enabling coupled in-situ measurements by the antennas and plasma/field instruments.

Go to STEREO Beacon Data: http://stereo-ssc.nascom.nasa.gov/beacon/beacon_insitu.shtml

Done

SEP Suite Site:

<http://www.srl.caltech.edu/STEREO/index.html>



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[MAG Data \(UCLA\)](#)

Unvalidated Data

(password access)

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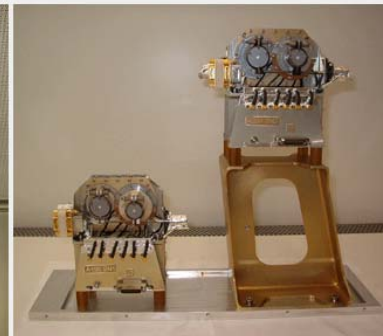
The SEP Instrument Suite on STEREO



SIT



HET and LET, on SEP-Central



SEPT-E and SEPT-NS

The Solar Terrestrial Relations Observatory (STEREO) will employ two nearly identical observatories in orbit about the Sun (one moving ahead of the Earth one moving behind) to provide the first-ever 3-D images of coronal mass ejections (CMEs). These stereo images will be supplemented by multi-point in situ measurements of solar wind and CME plasma and the energetic particles accelerated in association with solar eruptions, and by multipoint observations of bursts occurring in these events.

The Solar Energetic Particle (SEP) instrument suite provides four solar energetic particle instruments for the IMPACT (In-Situ Measurements of Particles and CME Transients) investigation on STEREO. IMPACT provides measurements of solar wind and suprathermal electrons, interplanetary magnetic fields, and energetic particles. The SEP suite is composed of the following elements:

- High Energy Telescope (HET)
- Low Energy Telescope (LET)
- Solar Electron Proton Telescope (SEPT)
- Suprathermal Ion Telescope (SIT)
- SEP-Central - the central command/control and data acquisition unit for the suite

Other related STEREO web sites:

- [STEREO Home Page at GSFC](#)
- [STEREO on NASA Portal](#)
- [STEREO - IMPACT Home Page](#)
- [STEREO Science Center](#)



LET Public Level 1 Time-Series Plots for March 2010

[SEP Suite Home](#)

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Unvalidated Data

(password access)

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Year

2007

2008

2009

2010

Month

Jan

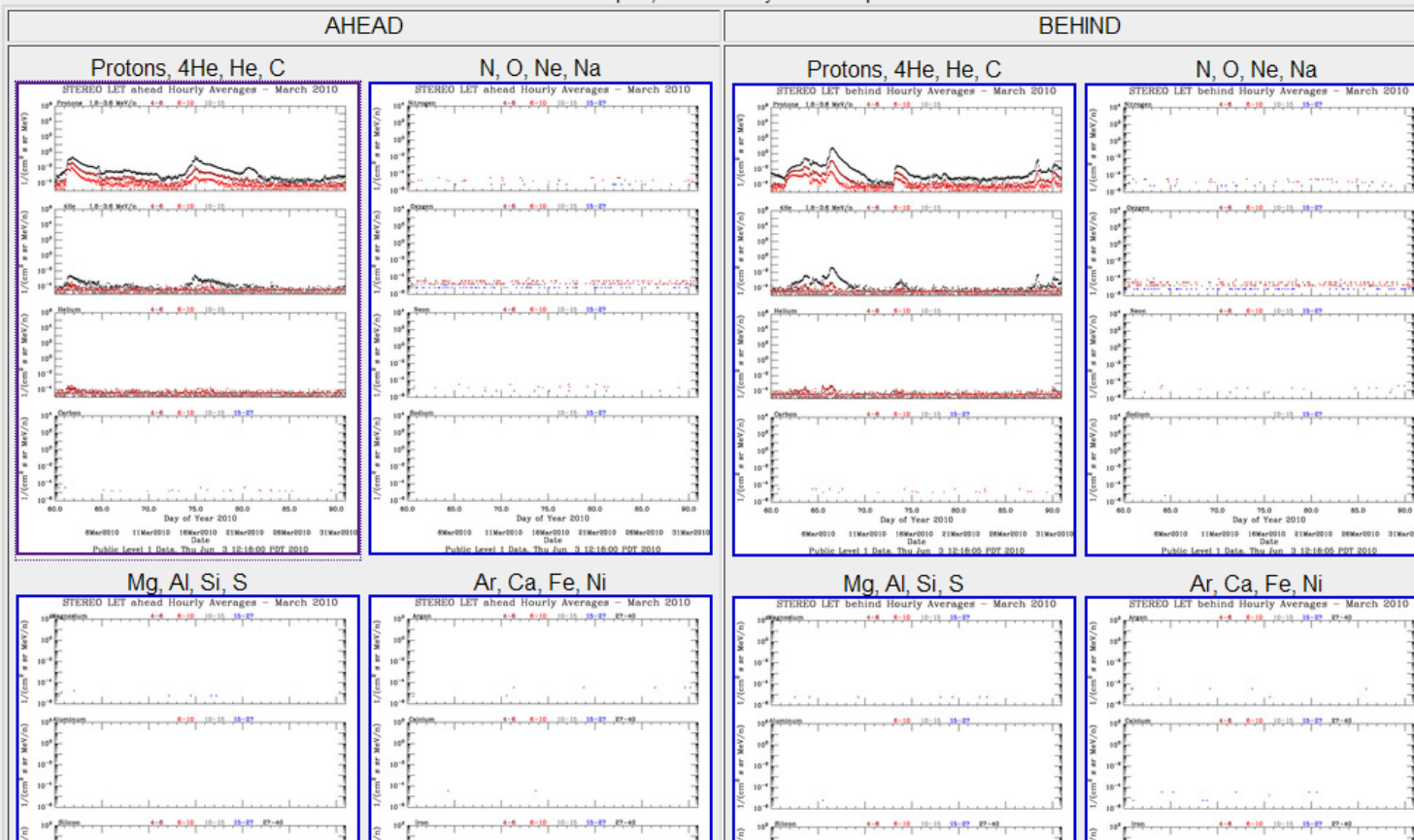
Feb

Mar

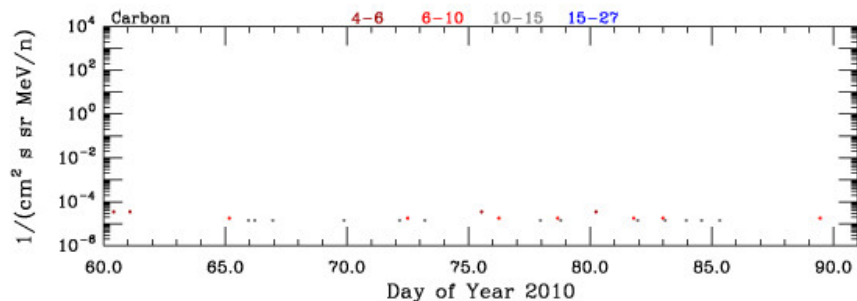
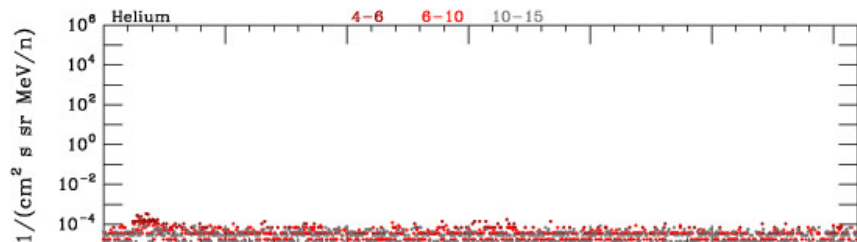
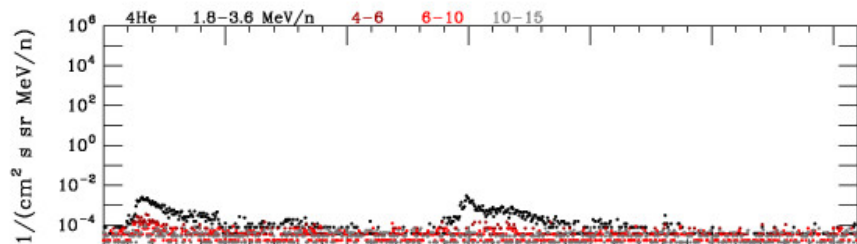
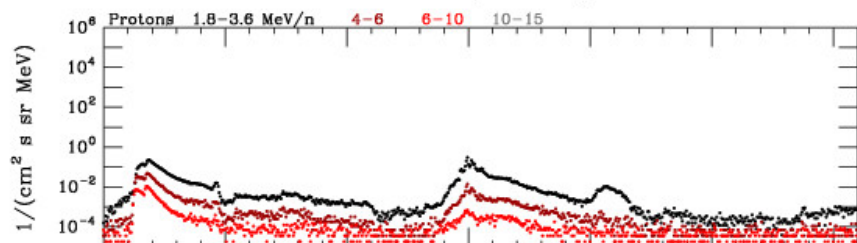
Apr

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For a full-size plot, click on any half-size plot below



STEREO LET ahead Hourly Averages – March 2010

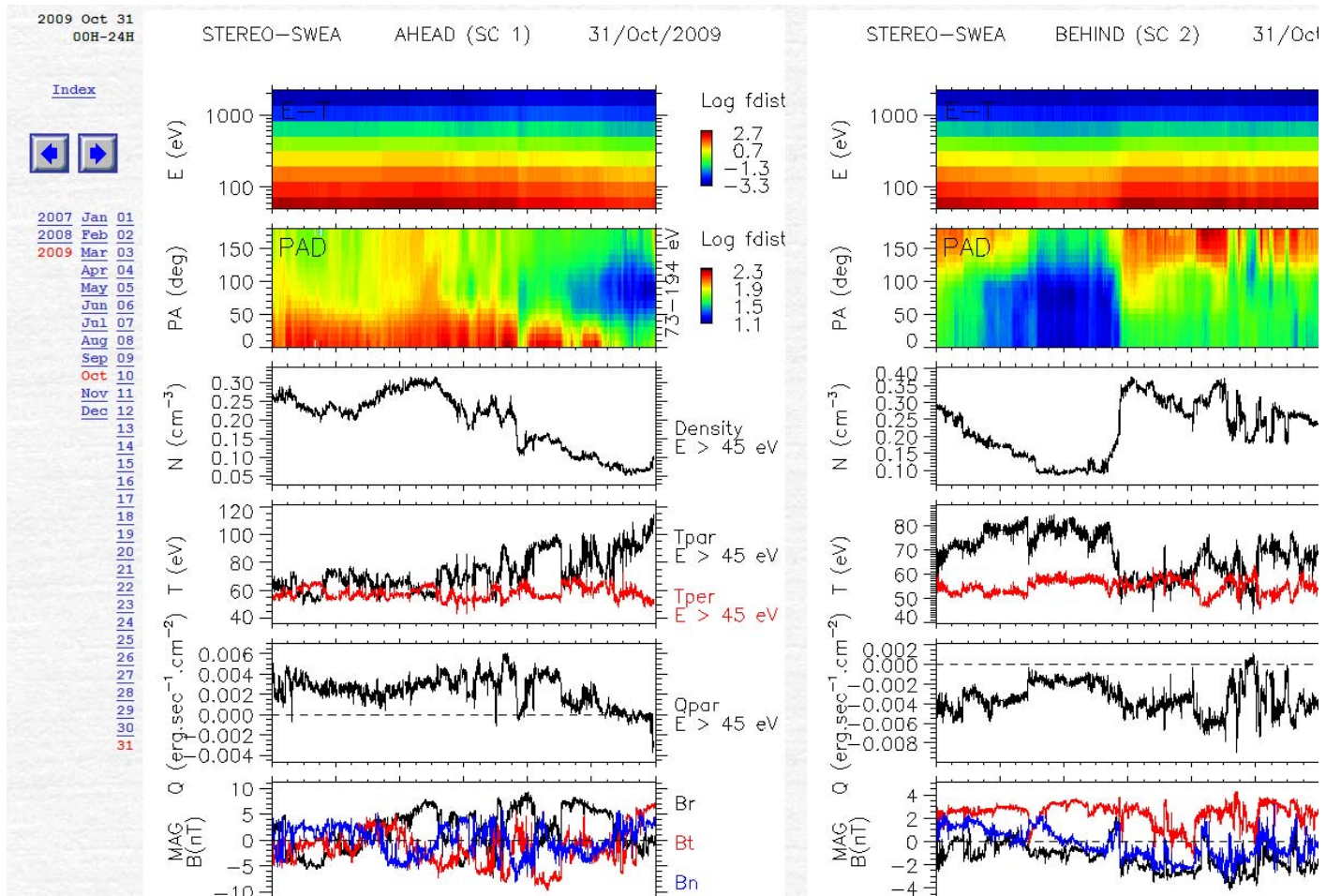


6Mar2010 11Mar2010 16Mar2010 21Mar2010 26Mar2010 31Mar2010
Date

Public Level 1 Data. Thu Jun 3 12:18:00 PDT 2010

Toulouse/SWEA:

<http://stereo.cesr.fr/>



Kiel/SEPT:

<http://www2.physik.uni-kiel.de/stereo/browseplots/>

