PLASTIC Status Report

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Dublin SWG 2010

PLASTIC Instrument
Status: Nominal

- MCP are routinely tracked, and as gain changes, commanded to higher bias (both A and B).
- Microtel is ready to proceed with generating new software for the reduced telemetry modes, pending proposal.
- Current APL estimate is that the lowest s/c rate for A until 2015 is about 80 kbs.

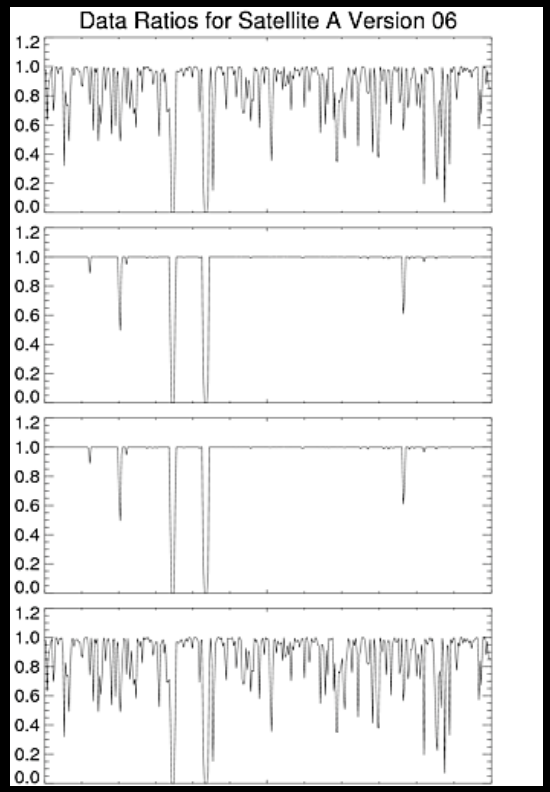
Proton Data Recovery Effort

Density

Bulk Speed

N/S Angle

Temp-
erature



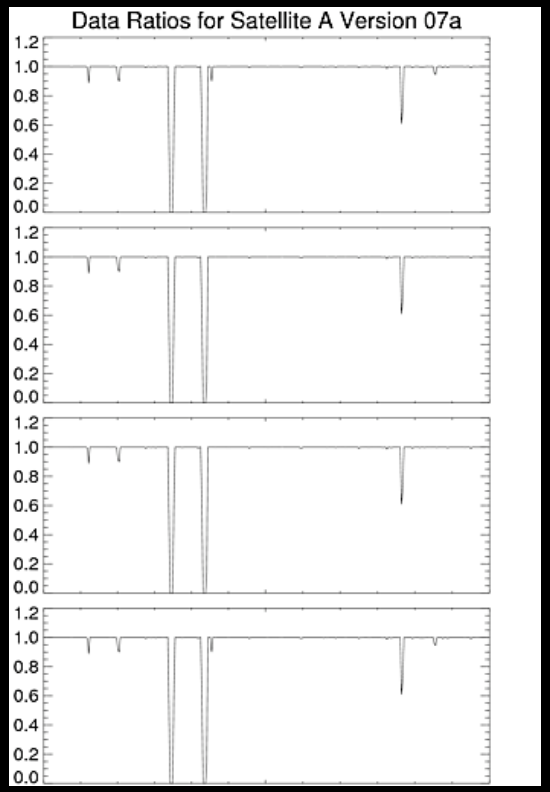
ST-A Jan - Dec 2008 v6

Density

Bulk Speed

N/S Angle

Temp-
erature



ST-A Jan - Dec 2008 v7

The automated validation procedure in processing version 6 was very strict, resulting in the loss of data that by human inspection appeared to be o.k. The revised version has less stringent standards, so there is now very little loss, typically 2% or less. The trade-off is that the human validation requires more time to manually inspect all suspected outliers.

Processing Steps

- Daily recovery of L0 and immediate processing for browse plots
- L0 data gap recovery
- Spacecraft ephemeris – needed to correct aberration
- Incorporation of MCP efficiency trends
- Manual validation

- The monthly updated products include the incorporation of spacecraft trajectory information (needed to derive components in RTN and HERTN coordinates) and monthly updates to the detector efficiency curves. Validated Level 2 solar wind proton products currently available on the UNH site as ASCII files include 1-minute (full resolution), 10-minute and hourly averages of solar wind bulk parameters.

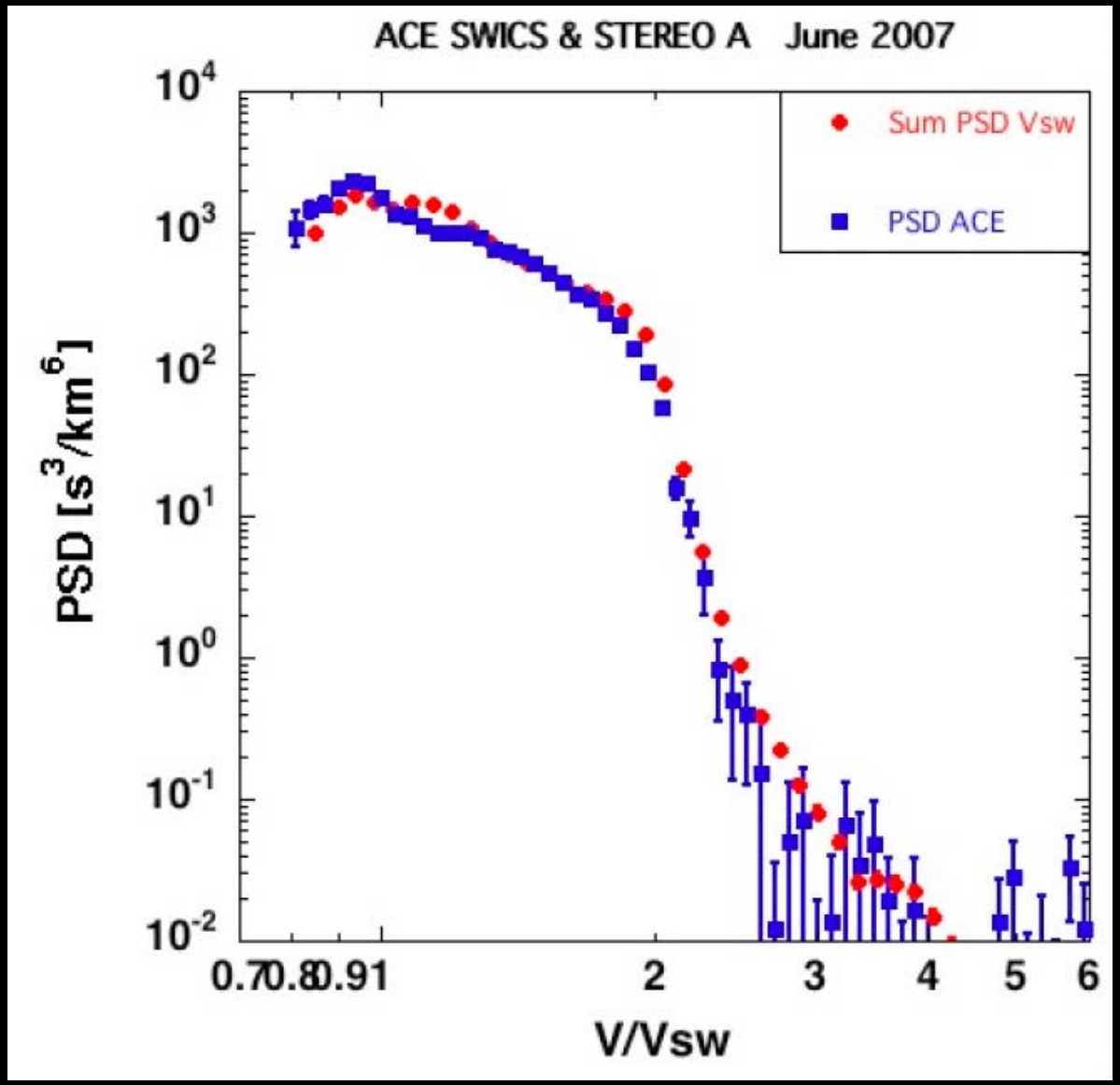
- These files contain merged spacecraft location (Carrington Rotation Number, HEE an, HEEQ, and HCI coordinates) and attitude information.

*http://fiji.sr.unh.edu/

- Available ascii/excel Files
  - Level 2 Proton Data (A, B) through 01/2010
  - Daily Suprathermal He+ Relative Fluxes (A) through 2008
  - Alphas bulk parameters (β version)
  - Carbon 5+/4+ Ratio
  - Oxygen bulk parameters
  - Oxygen 7+/6+ Ratio
  - Iron <Q>

*The computer is named fiji because of a certain former UNH graduate student's wish to live and work someplace warm.

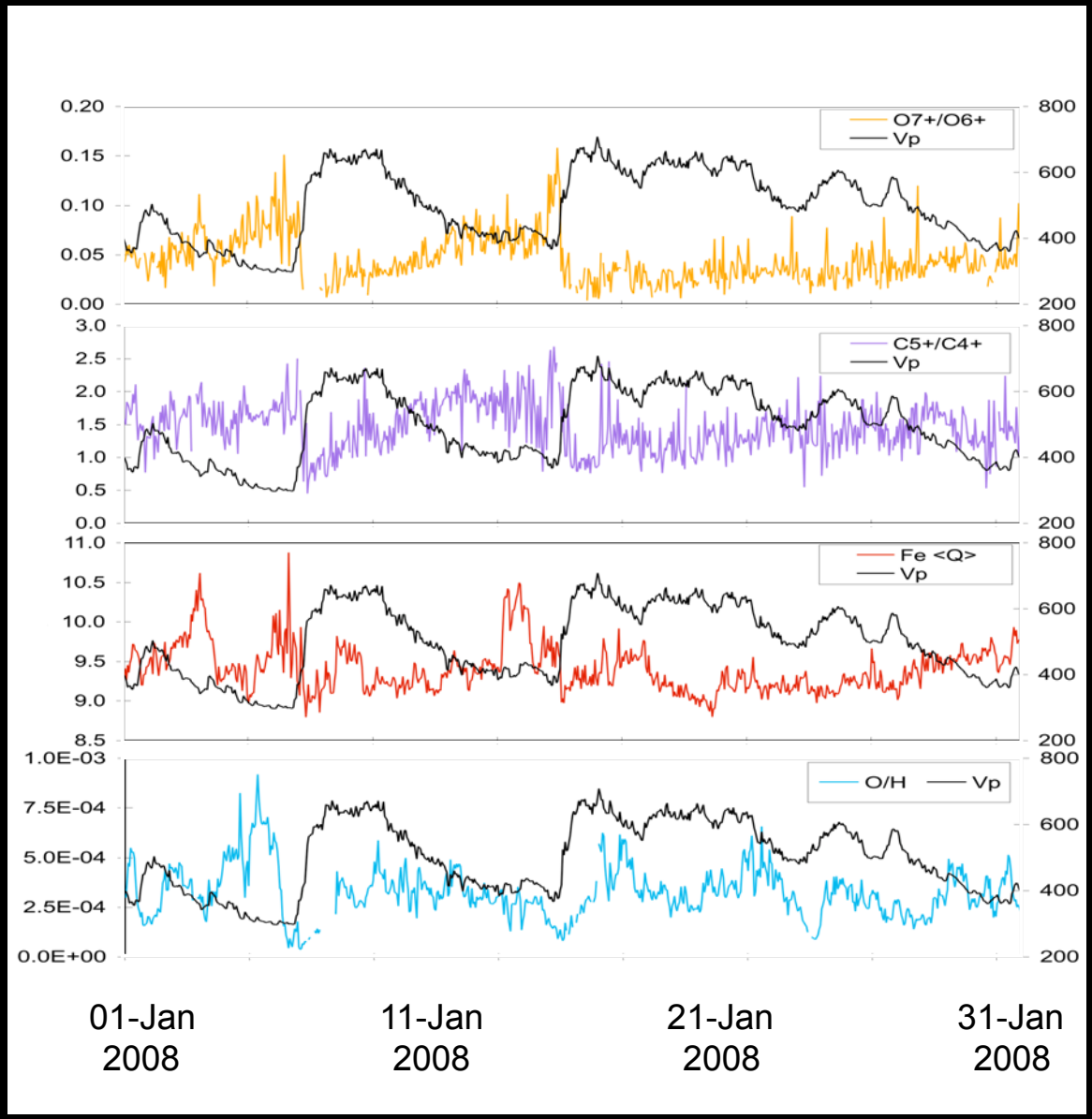
Pickup He+



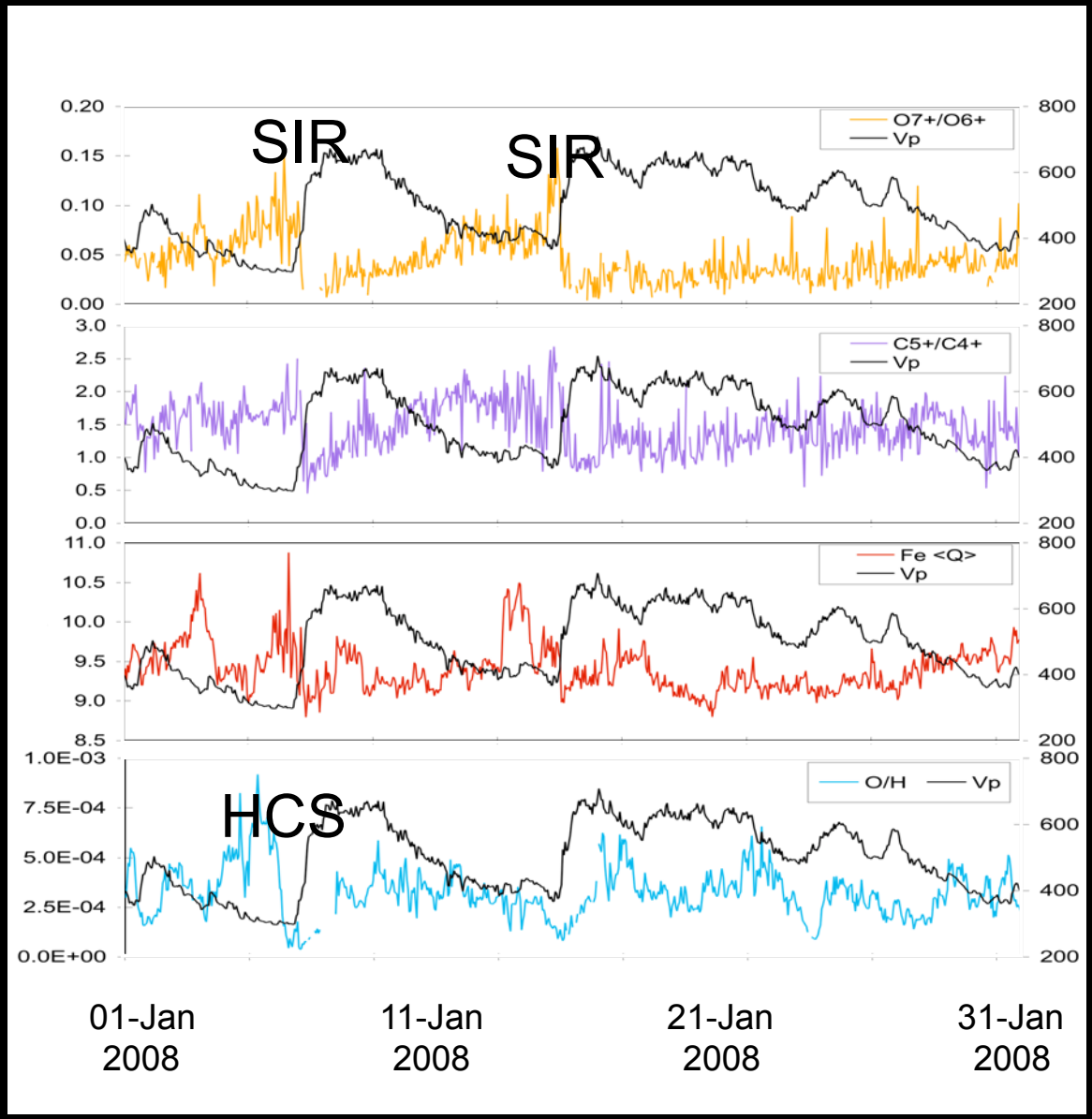
STEREO-A/ PLASTIC cross calibration with ACE/SWICS

Notice the good agreement!

Studying Interfaces



Studying Interfaces



Solar Wind in the Quiet time

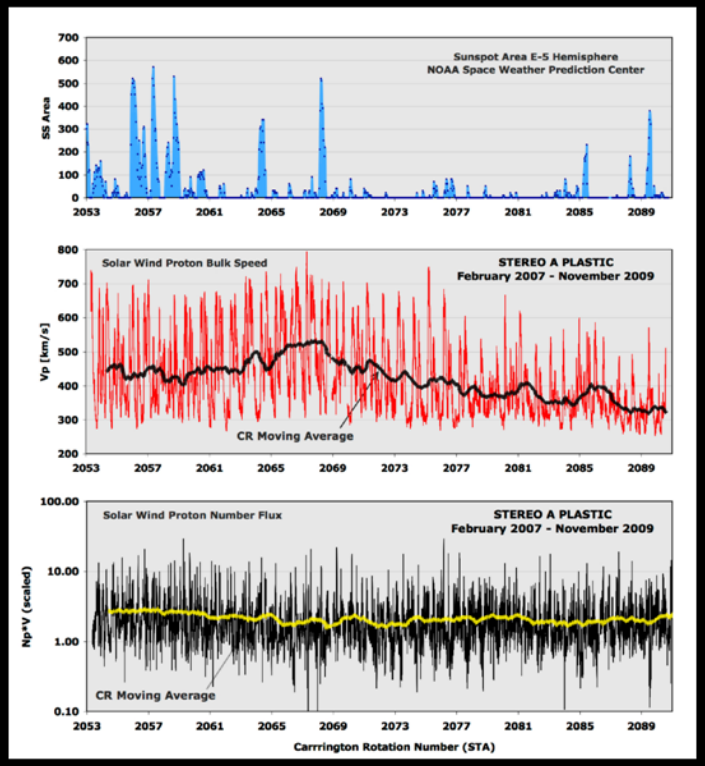
Solar wind iron average charge states observed by STEREO PLASTIC compared against solar wind speeds.

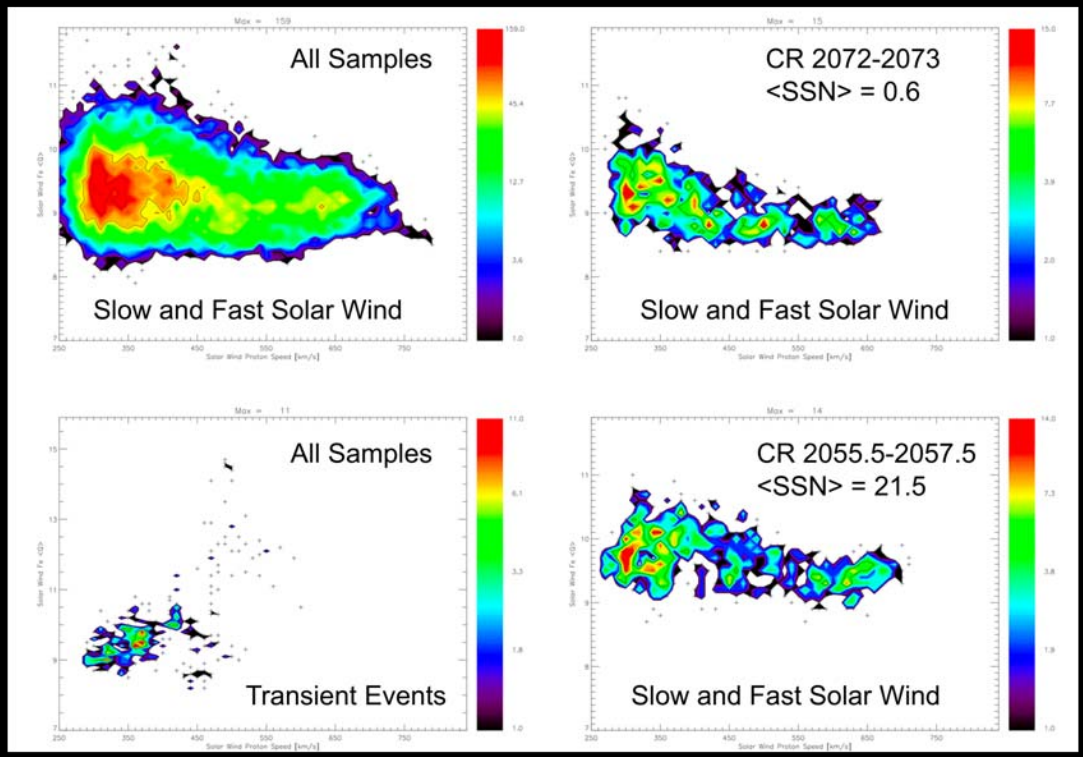
Top: Non-transient solar wind samples.

Bottom: Transient event samples. Transient time periods are identified from the events listed by Kilpua et al. (2009a,b,c) and Jian (2009).

Left fast and slow period during lowest sunspot compared to fast and slow during “high” ssn.

From Galvin, Solar Wind Observations from the STEREO Perspective (2007-2009), submitted, 2010





Recent Publications List (1 of 2)

- Bochsler, P., et al., Diagnostics of Corotating Interaction Regions with the kinetic properties of iron ions as determined with STEREO/PLASTIC, Ann. Geophys., 28, 491-497, online, 2010.
- Lavraud, B., et al., Statistics of counter-streaming solar wind suprathermal electrons at solar minimum: STEREO observations, Ann. Geophys., 28, 233–246, 2010.
- Drews, C., et al., Heavy pick up ions at 1 AU, Geophys. Res. Lett., 27, submitted, 2010.
- Baker, D., et al., Signatures of interchange reconnection: STEREO, ACE and Hinode observations combined, Ann. Geophys., 27, 3883–3897, online, 2009
- Bisi, M.M., et al., Low Resolution STELab IPS 3D Reconstructions of the Whole Heliosphere Interval and Comparison with in-Ecliptic Solar Wind Measurements from STEREO and Wind Instrumentation, Solar Physics, 256, 210-217, online, 2009.
- Daoudi H., et al., The STEREO / PLASTIC Response to Solar Wind Ions (Flight Measurements and Models), Astrophysics and Space Sciences Transactions, 5, 1-13, online, 2009.
- Dresing, N. et al., Multi-spacecraft observations of CIR-associated ion increases during the Ulysses 2007 ecliptic crossing, Solar Physics 256, 409-425, doi 10.1007/s11207-009-9356-3, online, 2009.
- Eriksson, S., et al., Asymmetric shear-flow effects on magnetic field configuration within oppositely directed solar wind reconnection exhausts, J. Geophys. Res., 114, A07103, doi:10.1029/2008JA013990, 2009.
- Foullon, C., et al., The Apparent Layered Structure of the Heliospheric Current Sheet: Multi-Spacecraft Observations, Solar Physics, DOI 10.1007/s11207-009-9452-4, online, 2009.
- Galvin, A.B., et al., Solar Wind Trends and Signatures: STEREO PLASTIC Observations Approaching Solar Minimum, Ann. Geophys., 27, 3909-3922, online, 2009.
- Gomez-Herrero, R., et al., Recurrent CIR-accelerated ions observed by STEREO SEPT, J. Geophys. Res., 114, A05101, doi:10.1029/2008JA013755, 2009.
- Jian, Lan K., et al., Multi-spacecraft observations: Stream interactions and associated structures, Solar Physics, doi:10.1007/s11207-009-9445-3, online, 2009.
- Jian, Lan K., et al., Ion Cyclotron Waves in the Solar Wind Observed by STEREO near 1 AU, ApJ, 701, L105-L109, doi: 10.1088/0004-637X/701/2/L105, 2009
- Kilpua, E.K.J., et al, Small solar wind transients and their connection to the large-scale coronal structure, Solar Physics, 256, 327-344, doi: 10.1007/s11207-009-9366-l, online, 2009.

Recent Publications List (2 of 2)

- Kilpua, E.K.J., et al, Multispacecraft observations of magnetic clouds and their solar origins between 19 and 23 May 2007, Solar Physics, 254, 325-344, doi 10.1007/s11207-008-9300-y, 248, No. 2, 325-344, online, 2009.
- Kilpua, E. K. J., et al., STEREO observations of interplanetary coronal mass ejections and prominence deflection during solar minimum period, Ann. Geophys., 27, 4491-4503, 2009.
- Leitner, M., et al, The solar wind Quasi-Invariant observed by STEREO A and B at solar minimum 2007, and comparison with two other minima, Solar Physics, 259, 381, doi: 10.1007/s11207-009-9412-z, online, 2009.
- Louarn, P., et al, On the Temporal Variability of the ``Strahl'' and Its Relationship with Solar Wind Characteristics: STEREO SWEA Observations, Solar Physics, doi: 10.1007/s11207-009-9402-1, 2009.
- Luhmann, J.G., et al., Solar wind sources in the late declining phase of cycle 23: Effects of the weak solar polar filed on high speed streams, Solar Physics, 256, 285-305, doi 10.1007/s11207-009-9354-5, online, 2009.
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- Moestl, C., et al., Multi-spacecraft recovery of a magnetic cloud and its origin from magnetic reconnection on the Sun, J. Geophys. Res.,114, A04102, doi:10.1029/2008JA013657, 2009.
- Moestl, C., et al., Optimized Grad-Shafranov reconstruction of a small magnetic cloud using STEREO-WIND observations, Solar Physics, 256, 427-441, doi 10.1007/s11207-009-9360-7, online, 2009.
- Moestl, C., et al., Linking remote imagery of a coronal mass ejection to its in situ signatures at 1 AU, Astrophysical Journal Letters, 705, L180-L185, online, 2009.
- Opitz A., et al., Temporal evolution of the solar wind bulk velocity at solar minimum by cross-correlating the STEREO A and B measurements, Solar Physics, 256, 365-377, doi 10.1007/s11207-008-9304-7, online, 2009.
- Rouillard, A.P., et al., A multispacecraft analysis of small-scale transient entrained by solar wind streams, Solar Physics, 256, No. 1-2, 307-326, DOI 10.1007/s11207-009-9329-6, online, 2009.
- Simunac, K.D.C., et al., In situ observations of solar wind stream interface evolution, Solar Physics, 10.1007/s11207-009-9393-y, online, 2009.
- Simunac, K.D.C., et al., In situ observations from STEREO/PLASTIC: a test for L5 space weather monitors, Ann. Geophys., 27, 3805-3809, online, 2009.

More on Solar Wind Trends

- Next: Mark Popecki will be giving a short overview