STEREO IMPACT Status

SWG March, 2014

Contributors:

Peter Schroeder, Dave Curtis, Dick Mewaldt
Tycho von Rosenvinge, Andreas Klassen,
Glenn Mason, Chris Russell, Lan Jian, Benoit
Lavraud, Ying Liu, Yan Li, Janet Luhmann

IMPACT Instrument Status Summary

IMPACT's seven instrument suite has functioned nominally since the previous SWG, with the exception of a notable MAG event described below- from which recovery was complete.

- MAG experienced a SEL on Feb 20, 2014, on STB which was recovered on Feb 25 (see following slide)
- MAG offsets slowly drifting but manageable.
- STE-D has been functioning normally.
- SWEA has been functioning nominally. The SWEA 3D distribution cadence was changed from 20s to 30s in Nov 2013 in order to reduce total telemetry in anticipation of DSN time shortages in the following months.
- SEP suite functioning nominally except for an SEPT latchup on Dec 4, 2013 (recovered) and some elective reprogramming (details below)

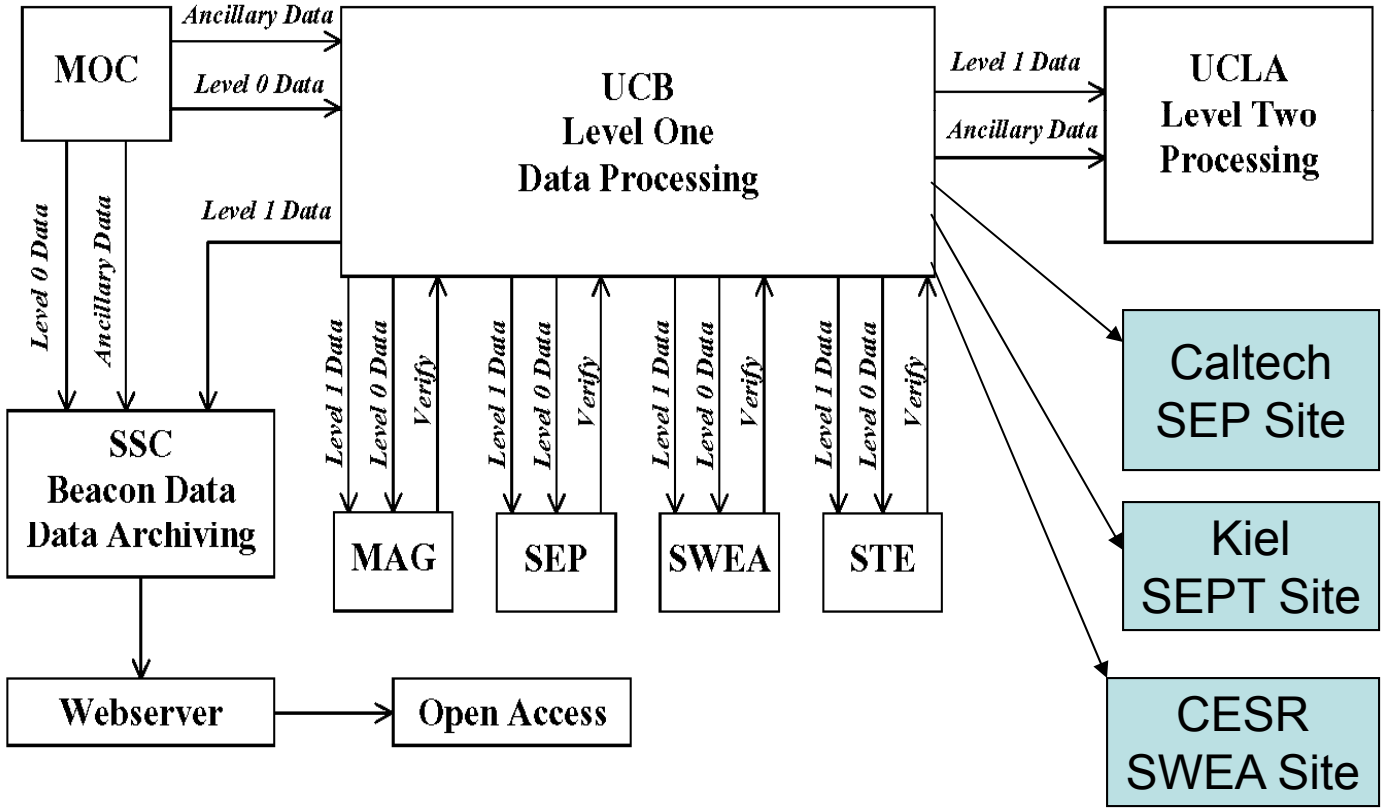
Feb 20, 2014, MAG Anomaly on STB

- On Feb 20 2014, STB MAG experienced a SEL (single event latchup), which caused the MAG instrument to shut off.
- In some respects, this appears similar to the SEU on Jan 8 2011 which caused power down of the full IMPACT and PLASTIC suites by spacecraft autonomy (due to abnormally high current in MAG).
- Although instrument and spacecraft houskeeping is too coarse to confirm this, we believe it reasonable that a SEL caused a similarly high current in MAG, and that the hardware responded by shutting down before the spacecraft autonomy rule kicked in.
- We recovered MAG through a modified IDPU power cycle procedure on Feb 25 2014. The power cycle allowed the SEP and PLASTIC suites to remain powered.
- After the power cycle, PLASTIC was inadvertently put into a silent mode, requiring an IDPU soft reset on Feb 26 2014.

IMPACT Data Report
SWG March 2014

From Peter Schroeder,
with inputs from the IMPACT Team

IMPACT Data Flow (no change)



Current IMPACT Level 1 Data Status

Instrument	1st Date (A)	1st Date (B)	Last Date
MAG	2006 Nov 2	2006 Nov 2	2014 Jan 31
SWEA	2006 Oct 28	2006 Oct 28	2014 Jan 31
STE	2006 Oct 28	2006 Oct 28	2014 Jan 31
LET	2006 Nov 14	2006 Nov 13	2014 Jan 31
SEPT	2006 Dec 12	2006 Dec 12	2014 Jan 31
SIT	2007 Mar 15	2007 Mar 15	2014 Jan 31
HET	2006 Dec 1	2006 Nov 14	2013 Sep 30

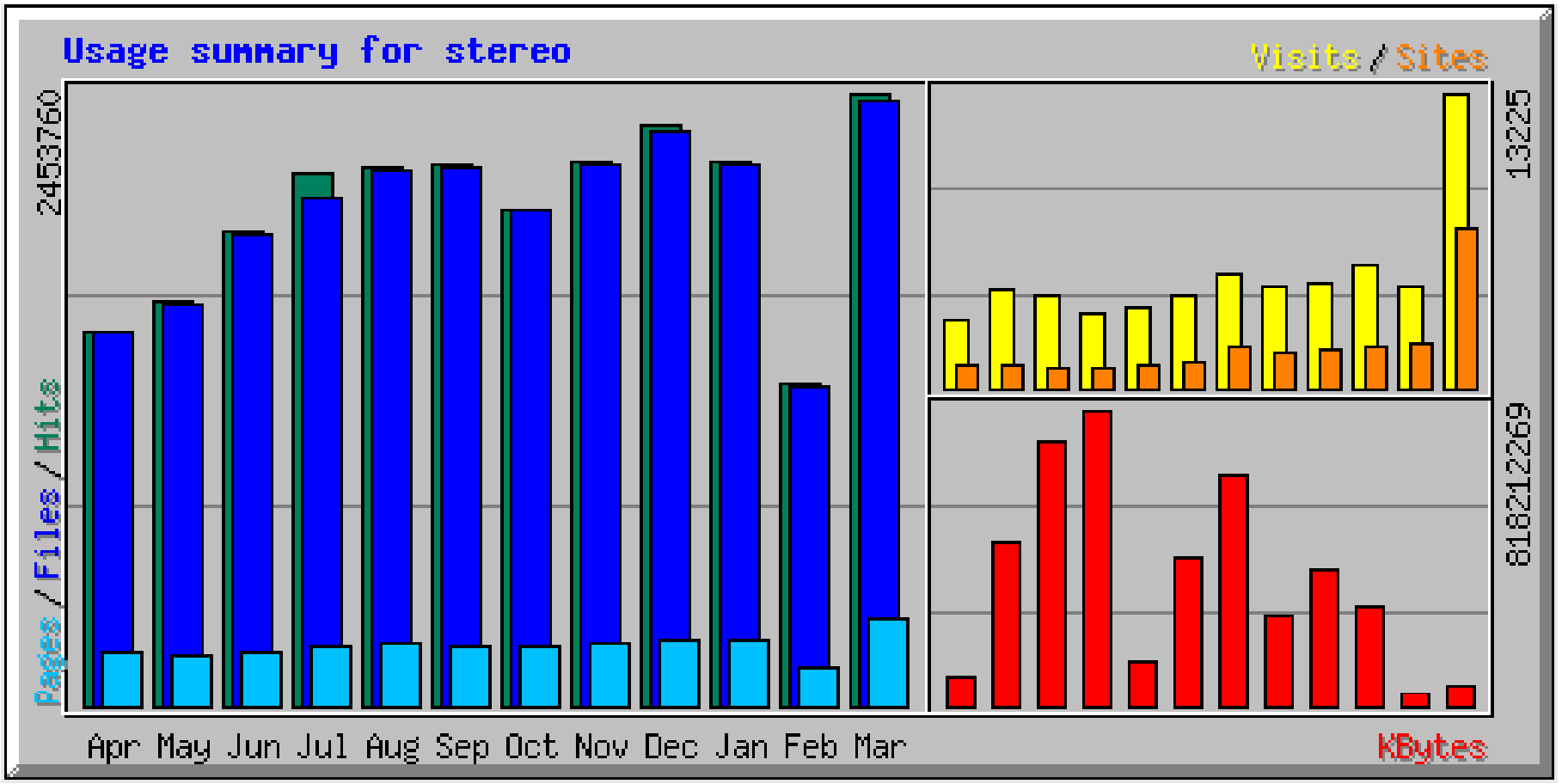
Data Processing Time

- Time delay to data appearance on the website has been nominal
  - IMPACT (and the rest of STEREO) does not receive “final” Level 0 telemetry files until 30 days after any given date.
  - Our Co-I’s generally like to validate data one month at a time. This means, for example, that they won’t begin validation of January data until the beginning of March.
  - Then it requires a couple of weeks or more to validate.

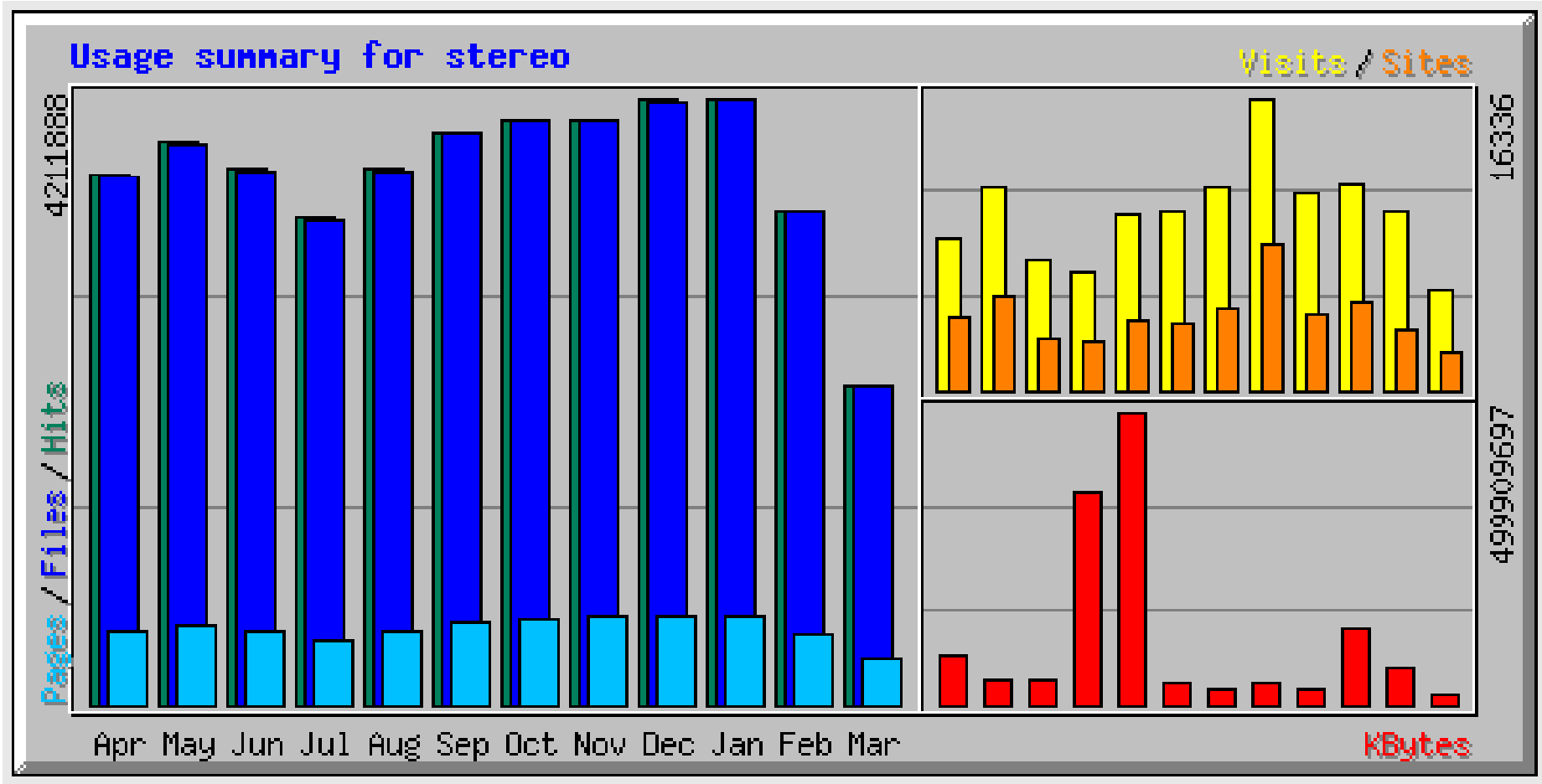
Updated IMPACT website/data access@UCB

Summary by Month										
Month	Daily Avg				Monthly Totals					
	Hits	Files	Pages	Visits	Sites	KBytes	Visits	Pages	Files	Hits
Mar 2014	130342	130128	18976	330	2038	20003068	5614	322607	2212177	2215817
Feb 2014	136433	136122	19444	393	3492	64336051	9847	486105	3403053	3410844
Jan 2014	135867	135575	19952	370	4931	130225296	11474	618538	4202838	4211888
Dec 2013	135499	135021	19764	351	4242	29356427	10888	612699	4185677	4200487
Nov 2013	135430	134917	20137	544	8050	35749198	16336	604115	4047522	4062919
Oct 2013	131085	130676	18936	360	4527	29121904	11179	587020	4050978	4063664
Sep 2013	132502	132239	19126	328	3684	35721618	9862	573788	3967199	3975073
Aug 2013	120115	119791	16423	315	4000	499909697	9788	509120	3713540	3723585
Jul 2013	108484	108195	14306	214	2792	363203525	6654	443514	3354055	3363012
Jun 2013	124164	123666	17020	243	2835	42967400	7291	510629	3709989	3724943
May 2013	125955	125244	18015	361	5218	41244765	11197	558476	3882594	3904609
Apr 2013	122781	122000	16786	282	4003	86110749	8464	503586	3660023	3683448
Totals						**1377949698**	**118594**	**6330197**	**44389645**	**44540289**

IMPACT website/data access@UCB at prior SWG



IMPACT website/data access@UCB update (indicates increased use)



SEP Suite Status

STEREO SWG

3/21/2014

STEREO HET STATUS

Tycho von Rosenvinge, March 18, 2014

Operations:

• Both HET sensors continue normal operation

Data Processing and Accessibility:

• HET data from both STA and STB are processed and available through 3/18/2014

Plans for the Conjunction:

• Once either HET is turned off it should remain off until it can be turned on and remain on

STEREO HET PROGRESS

- Extensive paper in press (Solar Physics):

">25 MeV Proton Events Observed by the High Energy Telescopes on the STEREO A and B Spacecraft and/or at the Earth During the First ~Seven Years of the STEREO Mission", Richardson, von Rosenvinge, et al.

- Contains a table of details for 209 SEP events:
  - spacecraft locations
  - intensities of ~25 MeV protons at each spacecraft
  - solar event longitude
  - CME, X-ray flare, and radio burst properties

- This table will be put on-line at the Caltech STEREO website soon.

STEREO/LET Status

Richard Mewaldt - 3/21/14

Operations:

- **Both LET Instruments continue normal operation and performance**

Data Processing and Availability:

- **Data from both LET sensors have been processed and made available through Jan. 31, 2014**

Reductions in Bit Rate:

- **Early in 2013 both LET sensors reduced their bit rates by a significant amount (see summary below)**

Plans for the Conjunction:

- **Once either LET sensor is turned off we would like it to remain off until it can be turned on and remain on**

SIT Status report

Glenn Mason JHU/APL 3/11/2014

SIT status report 3/2014

- **SEP central patches to drop empty SIT PHA packets (Feb, Mar 2013)**
- **Instrument operating status:**
  - **SIT-A and SIT-B both operating nominally**
  - **last table uploads: 4/2011 and 5/2011; no changes since then**
  - **possible degradation of MCP efficiency due to solar activity is being monitored; correction, if any, will be done in on-ground software**
- **Data processing status:**
- **most recent data to Caltech site:**
  - **ASCII files through 2014 Jan 29 (use .fin files)**
  - **browse plots through 2014 Mar 10**
  - **L1 data released through Berkeley site through Sept 2013 (released 11/15/2013)**
- **Plans for conjunction period: seek to minimize HV cyclings, and thermal excursions; prefer to be off rather than cycle instrument**

SEPT Status Report

Andreas Klassen CAU/Kiel 2014-03-11

1. Instrument issues:

On 04-Dec-2013 07:33 UT SEPT-N on STA experienced a latch-up.
Affected were the SEPT-North electron telescope and the SEPT-South ion telescope.
The instrument was restored back to nominal mode on 11-Dec-2013 at 15:55 UT.

Otherwise all telescopes are operating in normal mode.

2. Status of Data processing:

–Verified level 2 ASCII files available online through October 9, 2013:
http://www2.physik.uni-kiel.de/stereo/data/sept/level2/

–SEPT browse plots available online through March 1, 2014:
http://www2.physik.uni-kiel.de/stereo/browseplots/

3. Plans for the Conjunction period:

SEPT team suggests that their instrument can be powered on every three days to record data during the solar conjunction, presenting the opportunity to inter-calibrate the instruments (STA vs. STB). *(my note: SEPT has not participated in the recent SEP group discussions on the power cycling issues so this is a unique perspective on the matter among the SEP group).*

SEP-Suite Reductions in Bit-Rate

- During February 2013 we uploaded patches to the LET and SEP-Central flight software on both Ahead and Behind that reduces the science telemetry from the LET and SIT instruments during solar quiet times. During solar events, up to the full science telemetry allocation will still be telemetered. The new flight software filters out "livetime-stim" PHA calibration events from LET, and any empty PHA packets from SIT. These changes do not affect the science from these instruments.
- During a 40-day period starting 2013 Oct 27, these changes reduced the **TOTAL** telemetry from the SEP suite of instruments on Ahead by ~28% compared with the same period in previous years. This period is free of data gaps.
- During solar quiet times the telemetry reduction is ~46%

STEREO MAG status in 2013

- The changes of zero level over the last year are within 1 nT for all three components in both STA and STB.
- Decline in burst model data: data up to doy 009
  - STA: 5 to 25 minutes data recorded in 6 days
  - STB: 35 to 145 minutes data recorded in 9 days
- Data production:
  - At the end of the month we wait 30 days and download one month of data (to allow the files to be finalized at APL) and process the month as quickly as possible (about 2 weeks). So generally we are never more than 2.5 months behind real time.

Supplementary Data Report (from Lan Jian, UMD)

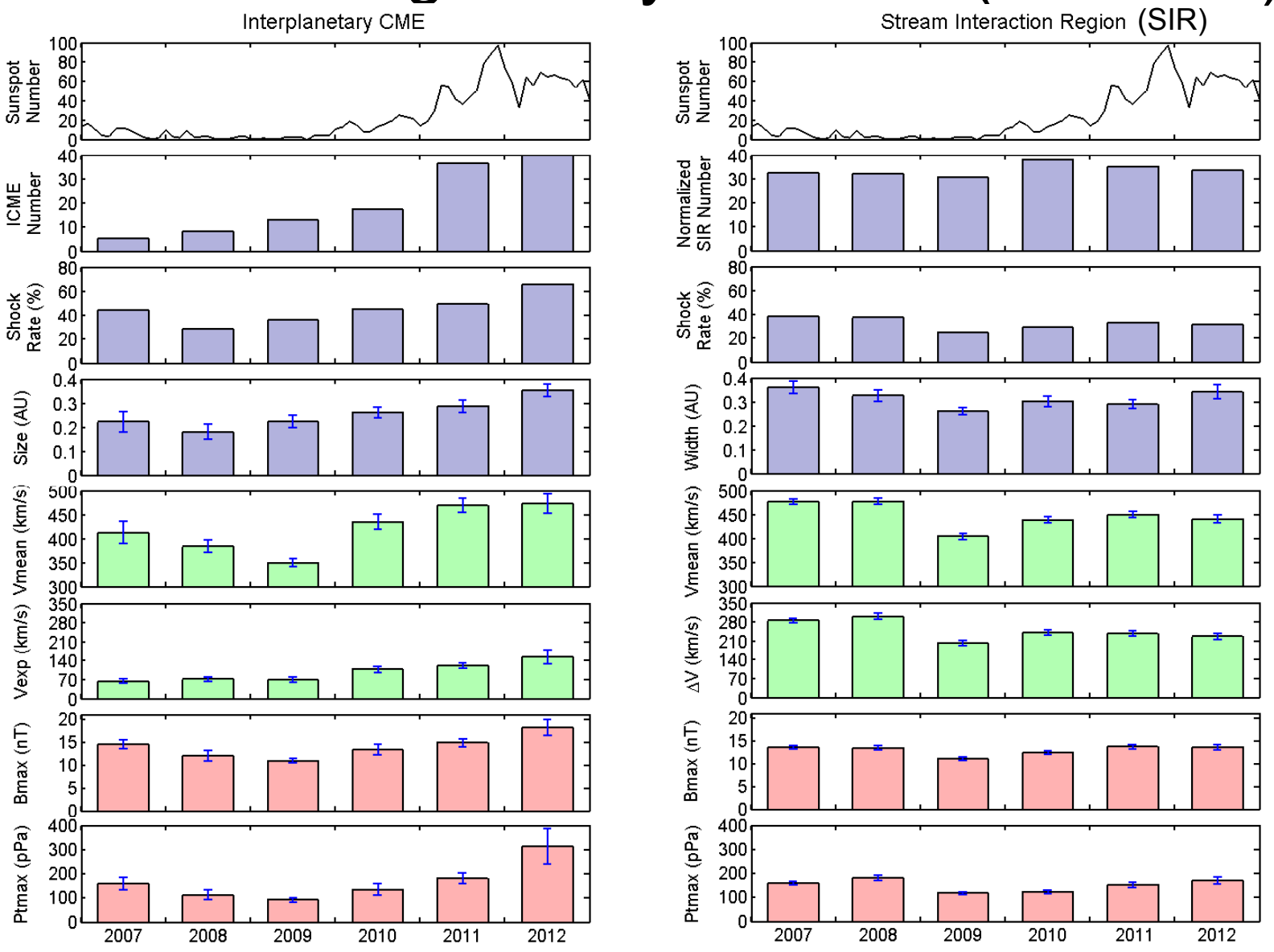
Update on Level 3 event lists at UCLA/STEREO site

- Lists of interplanetary coronal mass ejections, stream interaction regions, and interplanetary shocks are updated to 12/31/2012 for both s/c. Lan Jian has started the survey of 2013 events, will continue working on it and update it soon
- List of solar energetic particle events from HET is updated to 9/30/2013 for both s/c

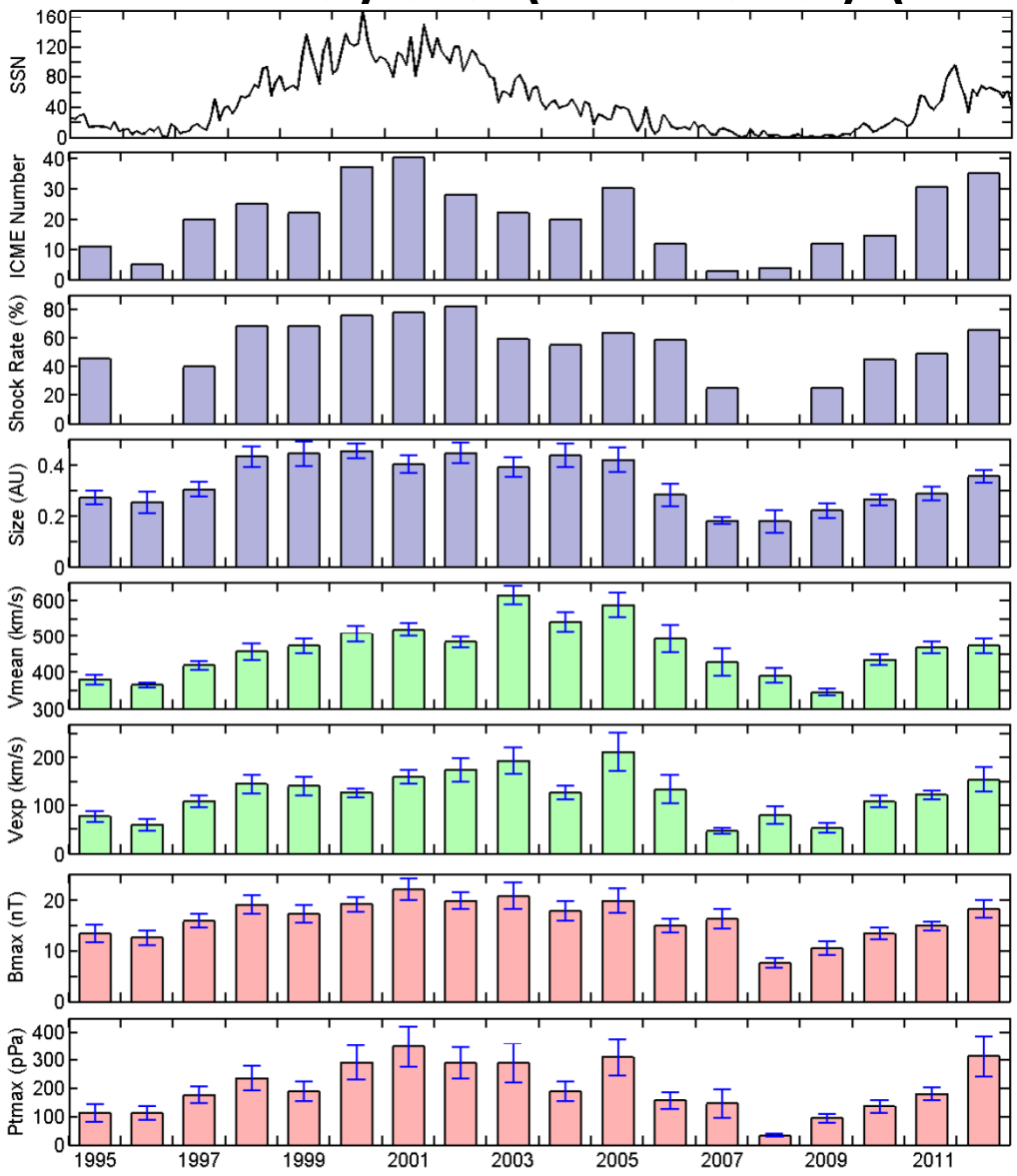
Selected IMPACT Science Updates

(all)

Statistics of STEREO In-situ Events through 2012 showing activity increase (L.K. Jian)



Comparison with ICME statistics of previous cycle (L1 data) (L.K. Jian)



In comparison with solar max 23

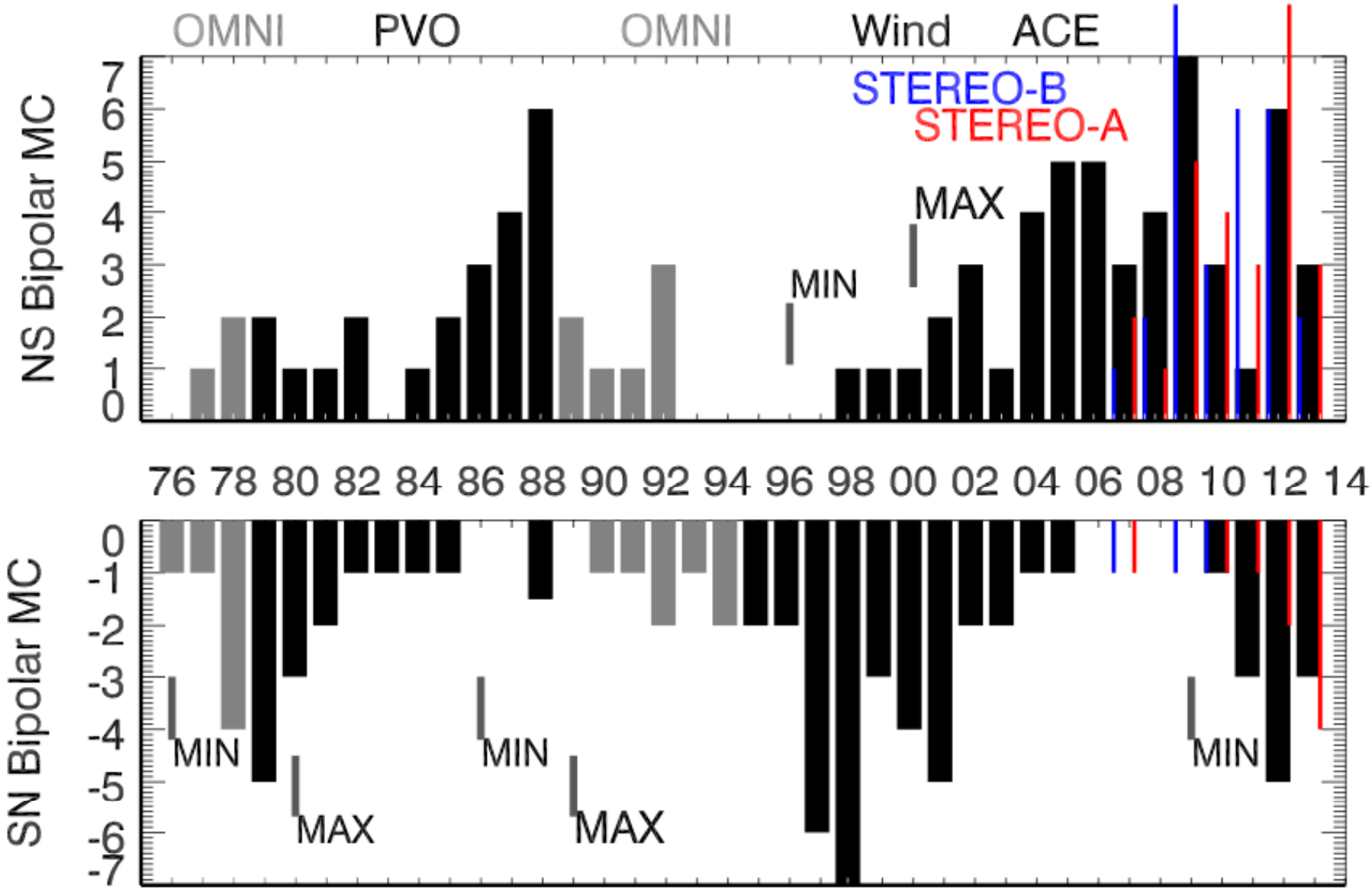
similar amount of ICMEs

lower shock rate and size

slower propagation speed

weaker maximum magnetic field

Update on Solar Cycle ICME Magnetic ‘Polarities’ (Yan Li, SSL)



Recent Nature Communications | Article

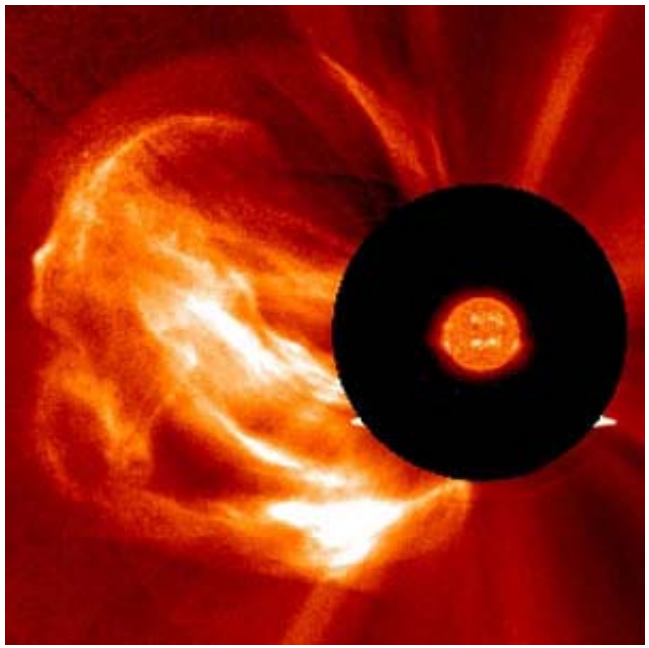
Observations of an extreme storm in interplanetary space caused by successive coronal mass ejections

..Attributes importance of the July 2012 STA event to a combination of multiple coronal eruptions from the same region, including an earlier one that cleared out the space ahead.

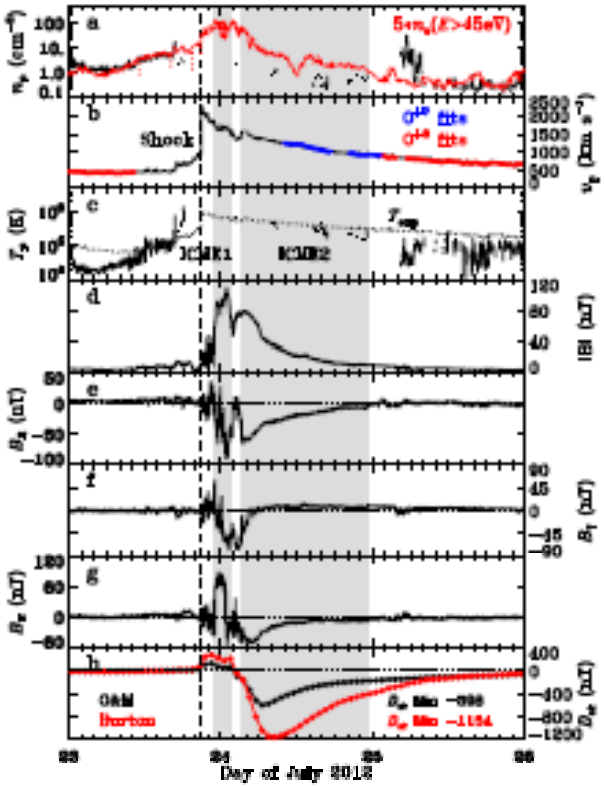
•**Ying Liu**

Other Coauthors:

•Janet G. Luhmann,
•Primož Kajdič,
•Emilia K.J. Kilpua,
•Noé Lugaz,
•Nariaki V. Nitta,
•Christian Möstl,
•Benoit Lavraud,
•Stuart D. Bale,
•Charles J. Farrugia
•& Antoinette B. Galvin

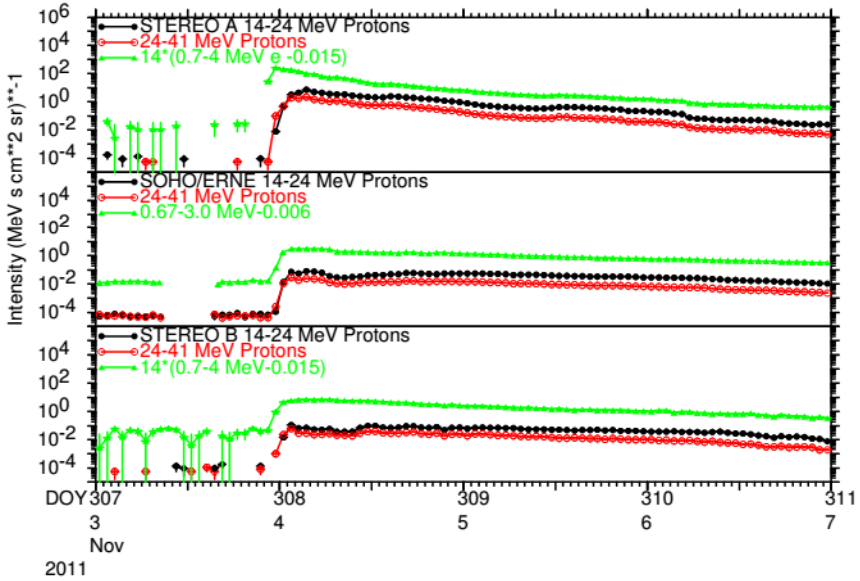


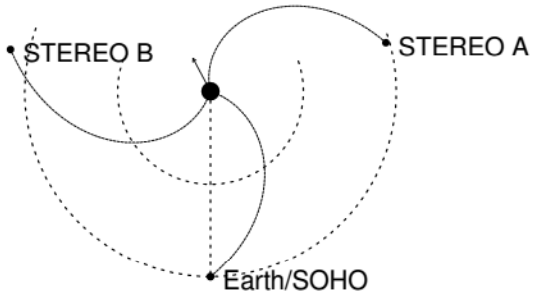
Their 'Featured Image'



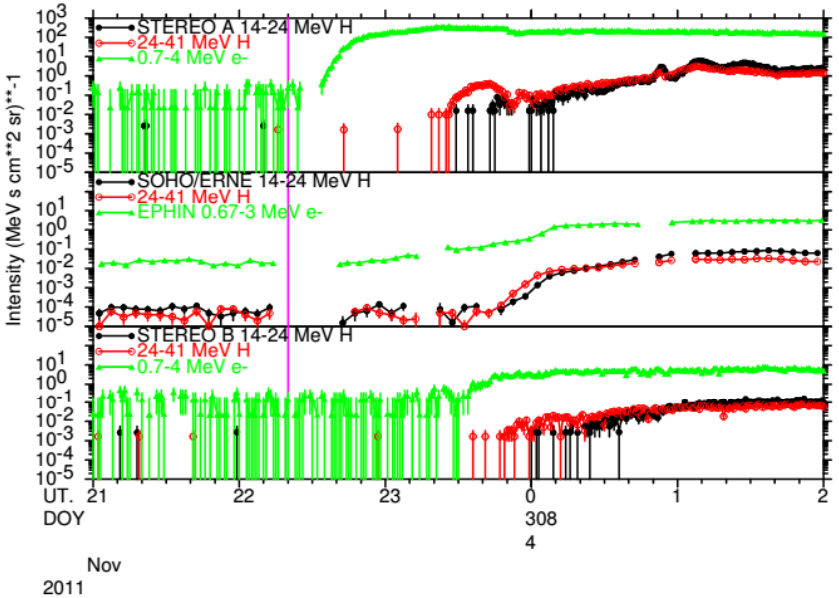
Nature Communications 5, doi:10.1038/ncomms4481, 18 March 2014

November 3, 2011: Rapid Onset at all Three Spacecraft





This unusual event shows a rapid rise at all S/C, even at Earth for which the event was at E152º. As might be expected, the intensity was largest at the best connected S/C (STEREO A). A (not particularly fast) 991 km/s halo CME was observed by LASCO.



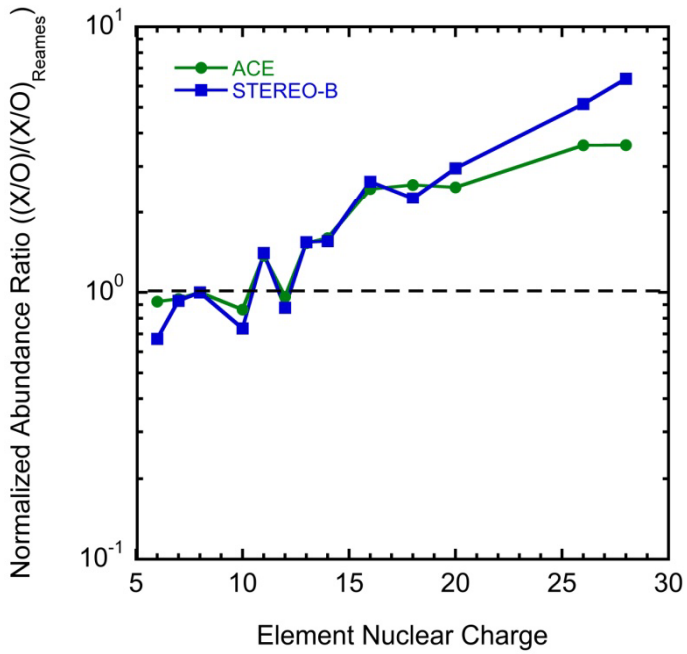
In this expanded view of event onset, the vertical purple line indicates the time of type III burst onset. 0.7-4 MeV electrons arrived at STEREO A ~13 minutes later, followed by 24-41 MeV protons ~52 minutes later. Similar energy protons were observed at the other two S/C after an additional delay of only ~25 minutes. Thus, within ~90 minutes of event onset, ~25 MeV protons were detected throughout the inner heliosphere.

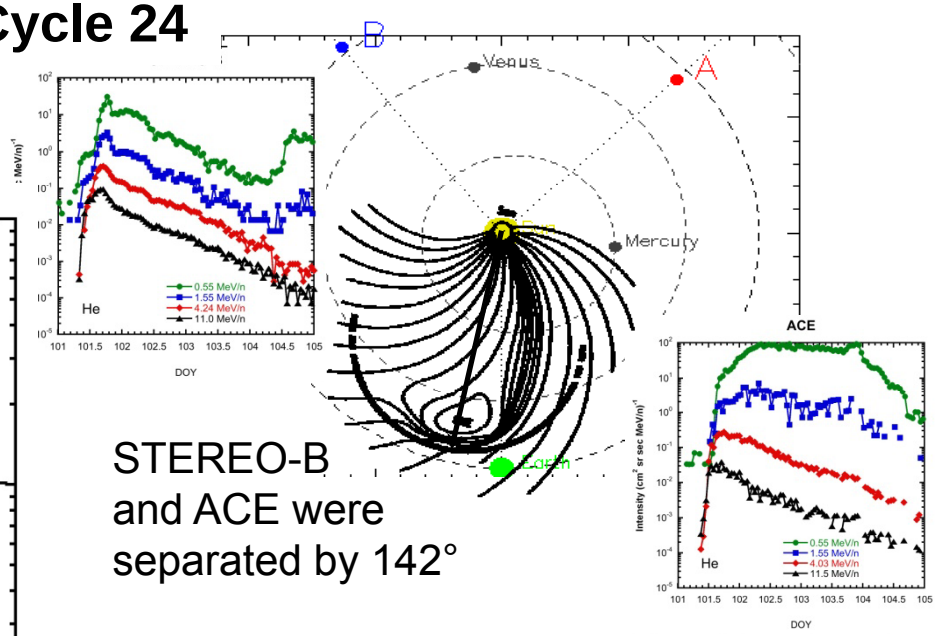
The First Large Fe-rich SEP Event of Cycle 24

Heavy ions from the 11 April 2013 SEP event were observed by STEREO-B and ACE

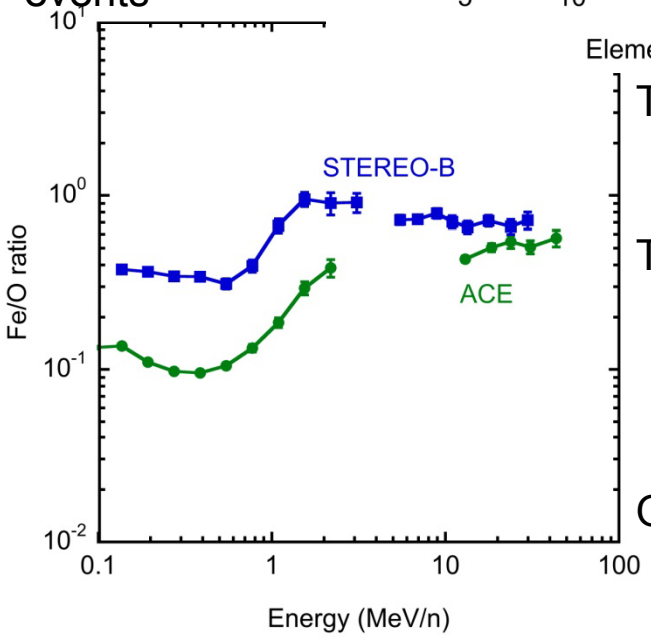
Both spacecraft observed SEP composition enriched in Fe and other heavy ions

The enrichment in Fe is energy dependent, similar to cycle 23 Fe-rich events

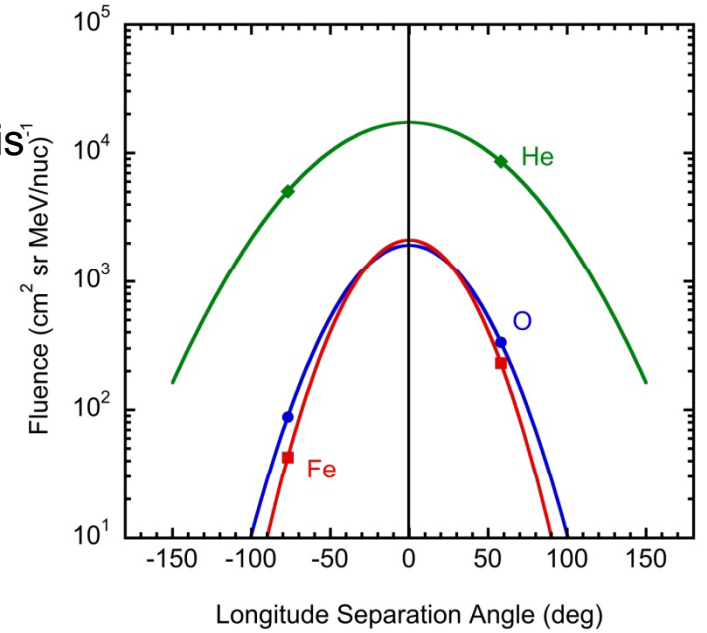




STEREO-B and ACE were separated by 142°



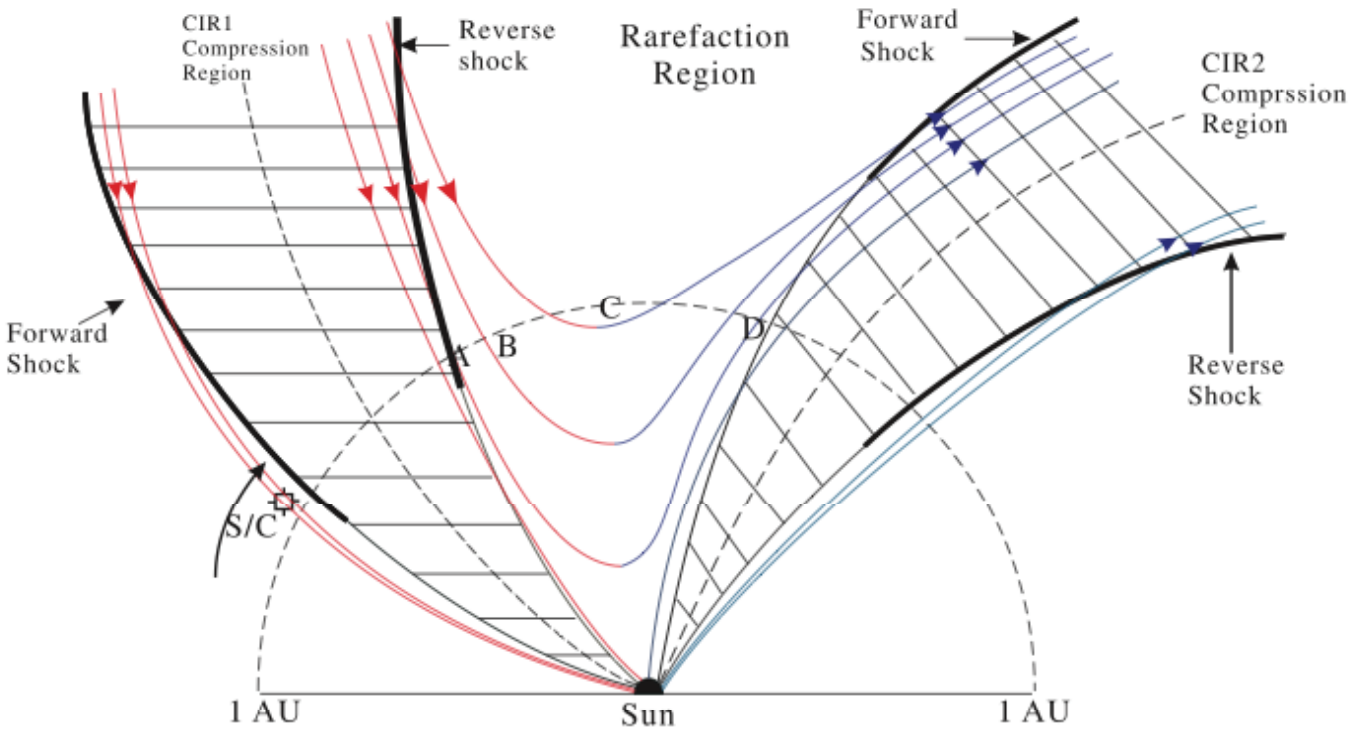
σ_{He} = 49° σ_O = 38° σ_{Fe} = 31°



The He longitude distribution is wider than O which is wider than Fe

This suggests Fe/O ~1 for positions magnetically connected to the flare site, consistent with a direct flare contribution

Or quasi-perp shocks on the flanks of the CME could cause the high Fe/O ratios at STB &ACE



SIT Science nugget:

An unusual event in CR 2060 showed 2 CIRs separated by less than 5 days where the maximum intensities of the energetic particles was not at the CIR passages, but rather in the period between the CIRs. Anisotropies observed during this period as well as IMF data suggest that this was caused by a U-shaped large scale topology that connected the reverse shock of the first CIR to the forward shock of the 2nd CIR, creating a region where particle acceleration led to higher intensities. This U-shaped region may have been formed by reconnection in the upper corona. (Wu et al., ApJ, 781, 17, 2014)

STEREO HET – Some Findings

- Between December, 2009 and December, 2012, 36% of events were seen at only 1 spacecraft, 34% were seen at 2 spacecraft, and 17% were seen at 3 spacecraft
- Even moderate events are sometimes visible at widely-spread solar longitudes
- Electron and proton transport processes are highly coupled
- There are occasional challenging events in which ~25 MeV protons fill the inner heliosphere remarkably rapidly
- SEP events, when divided according to North and South hemisphere, show signs of a periodicity of ~ 150 days

ACE/STEREO/Wind In Situ Science Workshop
April 2 - 3, 2014
Caltech, Pasadena CA
Spitzer Science Center

An ACE/STEREO/Wind In Situ Science Workshop will be held April 2 - 3, 2014 at Caltech's Spitzer Science Center in Pasadena, CA.
The Workshop will allow members of the ACE, STEREO and Wind science teams (and selected other invitees) to make science presentations, discuss possible joint projects, and address other programmatic issues.

Meeting Organizers

This meeting is being organized by
Richard Mewaldt - Caltech *rmewaldt@srl.caltech.edu*
Janet Luhmann - UC Berkeley *jgluhman@ssl.berkeley.edu*
Adam Szabo - GSFC *adam.szabo-1@nasa.gov*
Lynn Wilson - GSFC *lynn.b.wilsoniii@gmail.com*

STEREO IMPACT Team-Publications (1) 2013-14

L.K. Jian, C.T. Russell, J.G. Luhmann, D. Curtis, P. Schroeder, Burst Mode Trigger of STEREO In Situ Measurements, *Amer. Inst. Phys*. *Proceedings of Solar Wind 13*, *1539*, 195-198, doi: 10.1063/1.4811021, 2013.

L.K. Jian, C.T. Russell, J.G. Luhmann, A.B. Galvin, K.D.C. Simunac, Solar Wind Observations at STEREO: 2007 – 2011, *Amer. Inst. Phys*. *Proceedings of Solar Wind 13*, *1539*, 191-194, doi: 10.1063/1.4811020, 2013.

A.B. Galvin, K.D.C. Simunac, **L.K. Jian**, C.F. Farrugia, M.A. Popecki, Solar Wind Ion Observations: Comparison from the Depths of Solar Minimum to the Rising of the Cycle, *Amer. Inst. Phys*. *Proceedings of Solar Wind 13*, *1539*, 15-18, doi: 10.1063/1.4810978, 2013.

O. Enriquez-Rivera, X. Blanco-Cano, C.T. Russell, **L.K. Jian**, J.G. Luhmann, K.D.C. Simunac, A.B. Galvin, Mirror-Mode Storms inside Stream Interaction Regions and in the Ambient Solar Wind: A Kinetic Study, *J. Geophys. Res*., *118*, 17-18, doi: 10.1029/2012JA018233, 2013.

X. Blanco-Cano, P. Kajdič, E. Aguilar-Rodríguez, C.T. Russell, **L.K. Jian**, J.G. Luhmann, STEREO Interplanetary Shocks and Foreshocks, *Amer. Inst. Phys*. *Proceedings of Solar Wind 13*, *1539*, 131-134, doi: 10.1063/1.4811005, 2013.

T. Nieves-Chinchilla, A. Vourlidas, G. Stenborg, N.P. Savani, A. Koval, A. Szabo, **L.K. Jian**, Inner Heliospheric Evolution of a “Stealth” CME Derived from Multi-view Imaging and Multipoint In-situ Observations: I. Propagation to 1 AU, *The Astrophys. J*., 779, 55, doi: 10.1088/0004-637X/779/1/55, 2013.

STEREO IMPACT-Team Publications (2) 2013-14

P. Kajdič, X. Blanco-Cano, A. Opitz, J.-A. Sauvaud, E. Aguilar-Rodriguez, C.T. Russell, J.G. Luhmann, **L.K. Jian**, A.P. Rouillard, B. Lavraud, Electron Distributions Upstream and Downstream of ICME Driven IP Shocks, *Amer. Inst. Phys*. *Proceedings of Solar Wind 13*, *1539*, 203-206, doi: 10.1063/1.4811023, 2013.

D.F. Webb, C. Möstl, B.V. Jackson, M.M. Bisi, T.A. Howard, T. Mulligan, E.A. Jensen, **L.K. Jian**, J.A. Davies, C.A. de Koning, Y. Liu, M. Temmer, J.M. Clover, C.J. Farrugia, R.A. Harrison, N. Nitta, D. Odstrcil, S.J. Tappin, H.-S. Yu, Heliospheric Imaging of 3D Density Structures During the Multiple Coronal Mass Ejections of Late July to Early August 2010, *Solar Phys*., *285*, 317-348, doi: 10.1007/s11207-013-0260-5, 2013.

J.A. Barry, A.B. Galvin, M. Popecki, B. Klecker, H. Kucharek, K. Simunac, C.J. Farrugia, J.G. Luhmann, **L.K. Jian**, Analysis of Suprathermal Proton Events Observed by STEREO/PLASTIC Focusing on the Observation of Bow Shock/Magnetospheric Events, *Amer. Inst. Phys*. *Proceedings of Solar Wind 13*, *1539*, 382-385, doi: 10.1063/1.4811065, 2013.

L.K. Jian, H.Y. Wei, C.T. Russell, J.G. Luhmann, B. Klecker, N. Omidi, P. Isenberg, M.L. Goldstein, A. Figueroa-Viñas, X. Blanco-Cano, Electromagnetic Waves near the Proton Cyclotron Frequency: STEREO Observations, *The Astrophys. J*., submitted, 2013.

Y. C.-M. Liu, J. Huang, C. Wang, B. Klecker, A.B. Galvin, K.D.C. Simunac, M.A. Popecki, L. Kistler, C. Farrugia, M.A. Lee, H. Kucharek, A. Opitz, J.G. Luhmann, **L. Jian**, A Statistical Analysis of Heliospheric Plasma Sheet, Heliospheric Current Sheet and Sector Boundary Observed in situ by STEREO, *J. Geophys. Res*., in press, 2014.

STEREO IMPACT-Team Publications (3) 2013-14

Cohen, C. M. S., G. M. Mason, R. A. Mewaldt, and T. T. von Rosenvinge, “Solar Energetic Particle Characteristics and their dependence on longitude in solar cycle 24”, in *Solar Wind 13*, G. P. Zank, et al. eds, AIP Conference Proceedings #1539 (Melville, NY), 151-154 (2013).

Cohen, C. M. S., M. E. Wiedenbeck, G. M. Mason, R. Gomez-Herrero, D. K. Haggerty, N. V. Nitta, Furthering Our Understanding of Wide Longitude 3He-rich SEP Events, *Proc. of 33rd ICRC*, 2013.

Leske, R.A., Cohen, C.M.S., Dotson, B., Mewaldt, R.A., Cummings, A.C., Labrador, A.W., Stone, E.C., Wiedenbeck, M.E., Christian, E.R., and von Rosenvinge, T.T., "A Survey of Anisotropic Energetic Particle Flows Observed by STEREO", in *Solar Wind 13*, edited by G.P. Zank et al. (American Institute of Physics), AIP Conf. Proc. #1539, 227-230 (2013).

Leske, R.A., Cohen, C.M.S., Mewaldt, R.A., Cummings, A.C., Labrador, A.W., Stone, E.C., Wiedenbeck, M.E., Christian, E.R., and von Rosenvinge, T.T., "Solar Energetic Particle Anisotropies Observed by STEREO/LET", *Proc. 33rd Internat. Cosmic Ray Conf.* (Rio de Janeiro), paper 0583 (2013).

Mewaldt, R. A., C. M. S. Cohen, G. M. Mason, T. T. von Rosenvinge, R. A. Leske, J. G. Luhmann, D. Odstricil, and A. Vourlidas, “Solar Energetic Particle Events and their Variability from the Sun and Beyond”, in *Solar Wind 13*, G. P. Zank, et al. eds, AIP Conference Proceedings #1539 (Melville, NY), 116-121, (2013).

Mewaldt, R. A., C. M. S. Cohen, G. M. Mason, T. T. von Rosenvinge, R. A. Leske, J. G. Luhmann, “A 360° View of Solar Energetic Particle Events, Including One Extreme Event”, *Proc. 33rd Internat. Cosmic Ray Conf.* (Rio de Janeiro), paper 1186 (2013).

Russell, C. T., R. A. Mewaldt, J. G. Luhmann, G. M. Mason, T. T. von Rosenvinge, C. M. S. Cohen, R. A. Leske, R. Gomez-Herrero, A. Klassen, A. B. Galvin, and K. D. C. Simunac, “The Very Unusual Interplanetary Coronal Mass Ejection of July 23, 2012: A Blast Wave Mediated by Solar Energetic Particles”, *Astrophys. J., 770:38,* doi:10.1088/0004-637X/770/1/38, June 2013.

STEREO IMPACT-Team Publications (4)
2013-14

Wiedenbeck, M. E., and G. M. Mason, The Solar Cycle Variation of 3He from Solar Energetic Particle Events", *Proc. 33rd Internat. Cosmic Ray Conf.* (Rio de Janeiro), paper 971 (2013).

Wiedenbeck, M. E. , G. M. Mason , C. M. S. Cohen, N. V. Nitta, R. G´omez-Herrero, and D. K Haggerty, "Observations of Solar Energetic Particles from 3He-rich Events over a Wide Range of Heliographic Longitude", *The Astrophysical Journal,* 762:54 (9pp), 2013.

Cohen, C. M. S., G. M. Mason, R. A. Mewaldt, and M. E. Wiedenbeck, "The Longitudinal Dependence of Heavy Ion Composition in the 11 April 2013 SEP Event", submitted to *The Astrophysical Journal,* 2014.

Cohen, C.M.S., R.A. Mewaldt, G.M. Mason, The Charge-to-Mass Dependence of SEP Fluences Over Wide Longitudes, in *Outstanding Problems in Heliophysics: From Coronal Heating to the Edge of the Heliosphere,* Proc. of 12th Annual Internat. Astrophysics Conf., edited by Q. Hu and G.P. Zank, (Astronomical Society of the Pacific), ASP Conf. Proc. #484, 118-123 (2014). in press 2014.

Leske, R.A., Cummings, A.C., Cohen, C.M.S., Mewaldt, R.A., Labrador, A.W., Stone, E.C., Wiedenbeck, M.E., Christian, E.R., and von Rosenvinge, T.T., "Observations of Loss-Cone Pitch Angle Distributions of Solar Energetic Particles", in *Outstanding Problems in Heliophysics: From Coronal Heating to the Edge of the Heliosphere,* Proc. of 12th Annual Internat. Astrophysics Conf., edited by Q. Hu and G.P. Zank, (Astronomical Society of the Pacific), ASP Conf. Proc. #484, 118-123 (2014).

Papaioannou, A., O. E. Malandraki, N. Dresing, B. Heber, K.-L. Klein, R. Vainio, T. Rodrigues-Gasen, A. Klassen, A. Nindos, D. Heynderickx, R. A. Mewaldt, R. Gomez-Herrero, N. Vilmer, A. Kouloumvakos, K. Tsiotsiou, and G. Tsiropoula, "SEPServer Catalogues of Solar Energetic Particle events at 1 AU based on STEREO recordings: 2007-2012", *Astronomy and Astrophysics,* in press, (2014).

Richardson, I. G., T. T. von Rosenvinge, H. V. Cane, E. R. Christian, C. M. S. Cohen, A. W. Labrador, R. A. Leske, R. A. Mewaldt, M. E. Wiedenbeck, and E. C. Stone, ">25 MeV Proton Events Observed by the High Energy Telescopes on the STEREO A and B Spacecraft and/or at the Earth During the First Seven Years of the STEREO Mission", submitted to *Solar Physics,* 2014.

Wu. Z., Y. Chen, G. Li, L. L. Zhao, R. W. Ebert, M. I. Desai, G. M. Mason, B. Lavraud, L. Zhao, Y C. -M Liu, F. Guo, C. L. Tang, E. Landi, and J. Sauvaud, "Observations of Energetic Particles Between a Pair of Corotating Interaction Regions", *Astrophys. J., 781:17*, doi: 10.1088/0004-637X/781/1/17, Jan., 2014

STEREO IMPACT-Team Publications (5) 2013-14

Vainio, R., E. Valtonen, B. Heber, etal., The first SEPServer event catalogue 68-MeV solar˜ proton events observed at 1 AU in 1996-2010. Journal of Space Weather and Space Climate, 3(26):A260000, Mar. 2013.

Dresing, N. C. Cohen, R. Gomez-Herrero, B. Heber, A. Klassen, R. Leske, G. Mason, R. Mewaldt, and T. von Rosenvinge, Approaching solar maximum 24 with STEREO Multi-point observations of solar energetic particle events,In ICRC 2013, Rio de Janeiro, Brazil, 2013.

Dresing, N.R. Gomez-Herrero, A. Klassen, B. Heber, O. Malandraki, W. Droge, andY. Karatavykh, A statistical analysis of wide-spread SEP events observed with STEREO and close to Earth spacecraft, In ICRC 2013, Rio de Janeiro, Brazil, 2013.

Heber,B., N. Dresing, W. Droge, R. Gomez-Herrero, K. Herbst, Y. Kartavykh, A. Klassen, J. Labrenz, and O. Malandraki, The first ground level event of solar cycle 24 and its longitudinal distribution in the inner heliosphere,Iin ICRC 2013, Rio de Janeiro, Brazil, Mar. 2013

Wang,,L. R.P. Lin, C. Salem, M. Pulupa, D. Larson, P. Yoon, J. Luhmann, Quiet-time solar wind superhalo electrons at solar minimum, SOLAR WIND 13: Proceedings of the Thirteenth International Solar Wind Conference. AIP Conference Proceedings, Volume 1539, pp. 299-302 (2013)

Luhmann, J. G.; Ellenburg, M.; Riley, P.; Odstrcil, D.; Petrie, G.; Kilpua, E.; Jian, L. K.; Russell, C. T.; Simunac, K.; Galvin, A. B.., Large scale solar wind structure: Non-dipolar features and consequences, SOLAR WIND 13: Proceedings of the Thirteenth International Solar Wind Conference. AIP Conference Proceedings, Volume 1539, pp. 110-115 (2013)

STEREO IMPACT-Team Publications (6) 2013-14

Zhang, Y., et al., Simulated (STEREO) Views of the Solar Wind Disturbances Following the Coronal Mass Ejections of 1 August 2010, 2014, *Solar Phys.*, 289, 319

Cheng, X., et al., Tracking the Evolution of A Coherent Magnetic Flux Rope Continuously from the Inner to the Outer Corona, 2014, *Astrophys. J.*, 780, 28

Davies, J. A., et al., Establishing a stereoscopic technique for determining the kinematic properties of solar wind transients based on a generalized self-similarly expanding circular geometry, 2013, *Astrophys. J.*, 777, 167

Webb, D. F., et al., Heliospheric Imaging of 3D Density Structures During the Multiple Coronal Mass Ejections of Late July to Early August 2010, 2013, *Solar Phys.*, 285, 317

Cheng, X., et al., Investigating Two Successive Flux Rope Eruptions in a Solar Active Region, 2013, *Astrophys. J. Lett.*, 769, L25

Liu, Y. D., Luhmann, J. G., Lugaz, N., Möstl, C., Davies, J. A., Bale, S. D., and Lin, R. P., On Sun-to-Earth Propagation of Coronal Mass Ejections, 2013, *Astrophys. J.*, 769, 45Liu, Y. D. *et al*. "Observations of an Extreme Storm in Interplanetary Space Caused by Successive Coronal Mass Ejections, Nature Commun, . http://dx.doi.org/10.1038/ncomms4481 (2014)

Li, Y., J.G. Luhmann, B.K. Lynch, E. Kilpua, Magnetic Clouds in the STEREO Era, in press, J. Geophys. Res. (2014)