IMPACT Status and Data Updates

SWG Meudon, April 21-22, 2008

Janet Luhmann,
Peter Schroeder, and Chris Russell
for the IMPACT team

IMPACT Instrument Status

- SWEA bias voltage has been changed to reduce low energy electron contributions from unanticipated spacecraft-related secondaries (now sweeps from 8 to 2000eV instead of 1 to 2000 eV)
- SWEA/STE-D experience occasional shutdowns, two of three cases clearly associated with energetic particles. D. Curtis is investigating software to monitor such shutdowns and trigger resets.
- MAG offsets slowly drifting but manageable
- SEP instruments (SEPT, LET, SIT, HET) operating nominally

Current IMPACT-led Science Projects (partial list)

- Gosling, Eriksson et al. Solar Wind Reconnection events
- Huttunen et al. multispacecraft ICMEs, small ejecta in slow wind
- Li et al. Solar signatures of STEREO ICMEs
- Liu et al. Flux rope fits to ICMEs; Slow solar wind distortions of ICMEs
- Wang and Lin, ENAs from the heliosheath/ termination shock seen by STE; solar electron events
- Jian et al., SIR and ICME event surveys, Mirror mode in solar wind
- Russell et al., Dust Events, solar wind heating
- X. Blanco-Cano, IP shocks and foreshocks
- Odstrcil et al. MHD solar wind models, Cone models of STEREO ICMEs
- Riley et al. MHD corona/solar wind model including website
- Leske et al., CIR events
- Mewaldt et al. SEP events so far
- Cohen et al., multispacecraft SEP events
- Wiedenbeck et al., He 3 and Fe rich events
- Mueller-Mellin et al., Earth Foreshock events, CIR events, multispacecraft events
- Gomez et al. CIR events
- Bucik et al., Small SEP events
- Mason et al., CIR events, small SEP events
- Desai et al. Foreshock ion events
- Lassen et al., magnetospheric events
- Korth et al., Composition of CIR events, suprathermal seed particles
- Ruan et al., Solar Wind Reconnection events
- Sauvaud et al., magnetospheric electron observations/events
- Lauvraud, Opitz et al., Reconnection events, boundary layers, electron halo angular distributions
- Luhmann et al., Solar wind source mapping, planetary (w/VEX.MEX) ICME impacts

Current IMPACT Level 1 Data Holdings

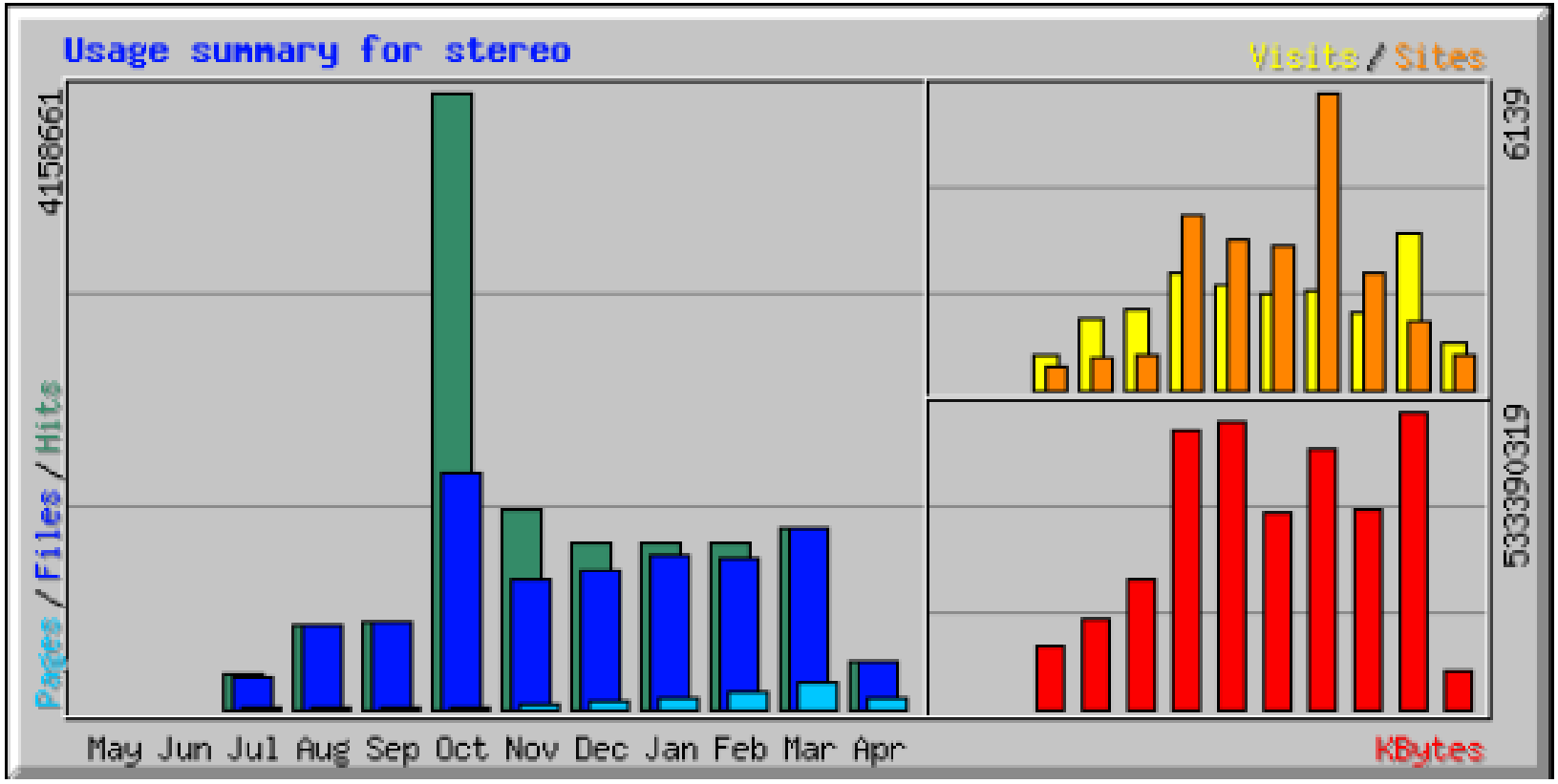
Instrument	1st Date (A)	1st Date (B)	Last Date
MAG	2006 Nov 2	2006 Nov 2	2008 Jan 31
SWEA	2006 Oct 28	2006 Oct 28	2008 Jan 31
STE	2006 Oct 28	2006 Oct 28	2008 Jan 31
LET	2006 Nov 14	2006 Nov 13	2008 Jan 31
SEPT	2006 Dec 12	2006 Dec 12	2008 Jan 31
SIT	2007 Mar 15	2007 Mar 15	2008 Jan 31
HET	15 minutes averages through 2008 Jan 31		

(note: command log now online at stereo.ssl.berkeley.edu)

IMPACT website/data access@UCB

Summary by Month										
Month	Daily Avg				Monthly Totals					
	Hits	Files	Pages	Visits	Sites	KBytes	Visits	Pages	Files	Hits
Apr 2008	51738	51334	11137	158	743	65491459	948	66825	308004	310428
Mar 2008	39610	39328	5370	103	1424	533390319	3221	166496	1219169	1227931
Feb 2008	38502	35240	3711	54	2437	357156724	1567	107625	1021972	1116581
Jan 2008	36238	33660	2536	66	6139	465474184	2058	78640	1043488	1123379
Dec 2007	35848	29801	1952	64	2995	352752109	1994	60526	923848	1111289
Nov 2007	44807	28682	951	71	3082	514061316	2158	28553	860473	1344214
Oct 2007	134150	51209	576	76	3613	500552526	2385	17861	1587497	4158661
Sep 2007	19423	19260	636	54	699	231116419	1639	19108	577806	582716
Aug 2007	18301	18114	546	46	664	158370007	1454	16941	561537	567355
Jul 2007	13290	12859	449	40	499	112226095	692	7643	218610	225933
Totals						**3290591158**	**18116**	**570218**	**8322404**	**11768487**

IMPACT website/data access@UCB



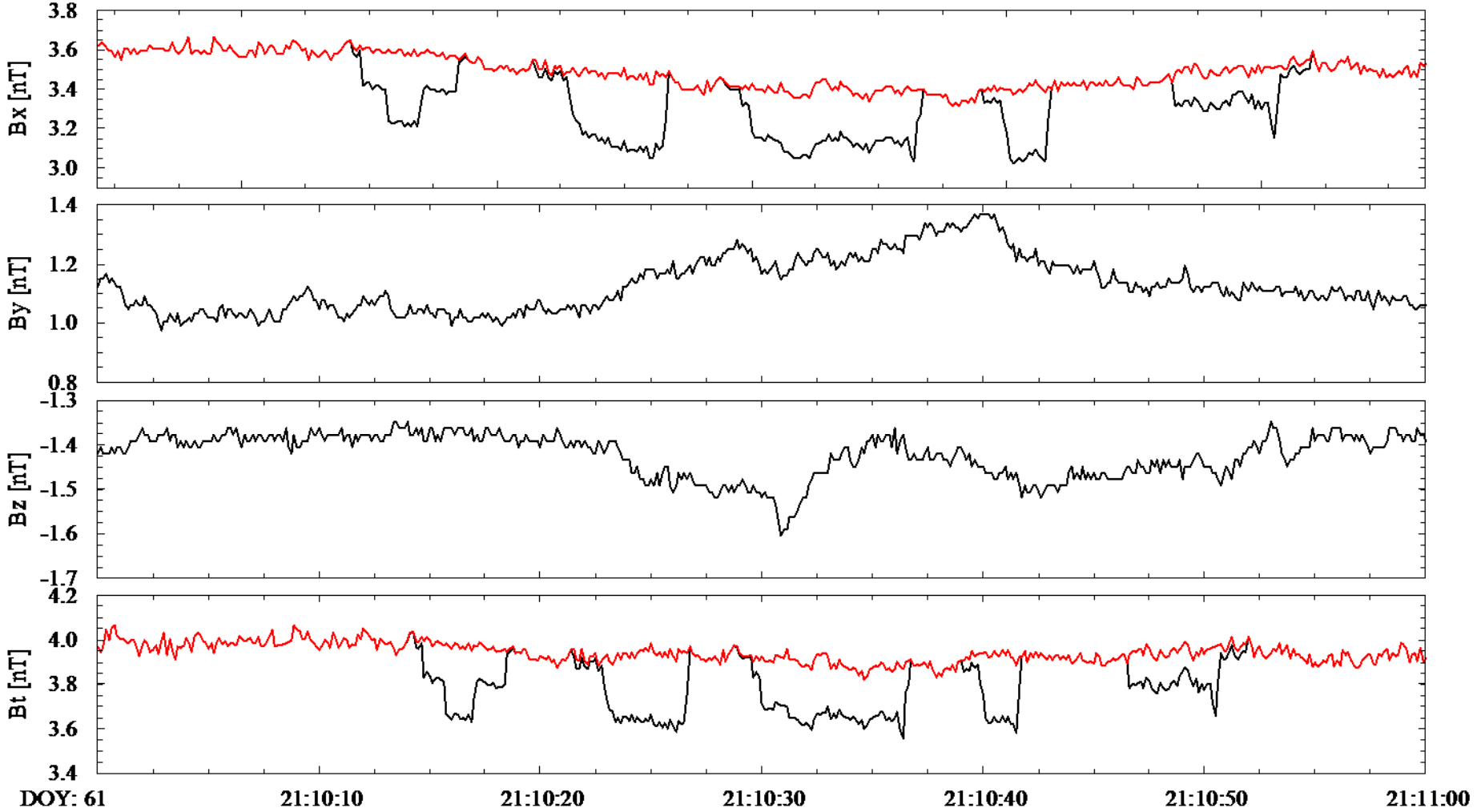
Coming soon

- HET 1 min Level 1 data in cdf
- “Level 2” merged Key Parameters (1 min) including MAG, PLASTIC Moments, SWEA and LET data in ascii
- “Level 3” Event lists (Shocks, SIRs, ICMEs…)
- Improved boom browse plots with added SWEA electron heat flux pitch angle spectrograms and burst mode intervals identified, plus SEP browse plots
- New Burst mode triggers (see Peter for more detailed information)
- CDAW-served IMPACT MAG, SWEA and LET Level 1 files (Now being tested on their data server-not public yet. This will allow CDAWWeb plotting with other non-STEREO CDAWWeb data, plus ascii downloads).

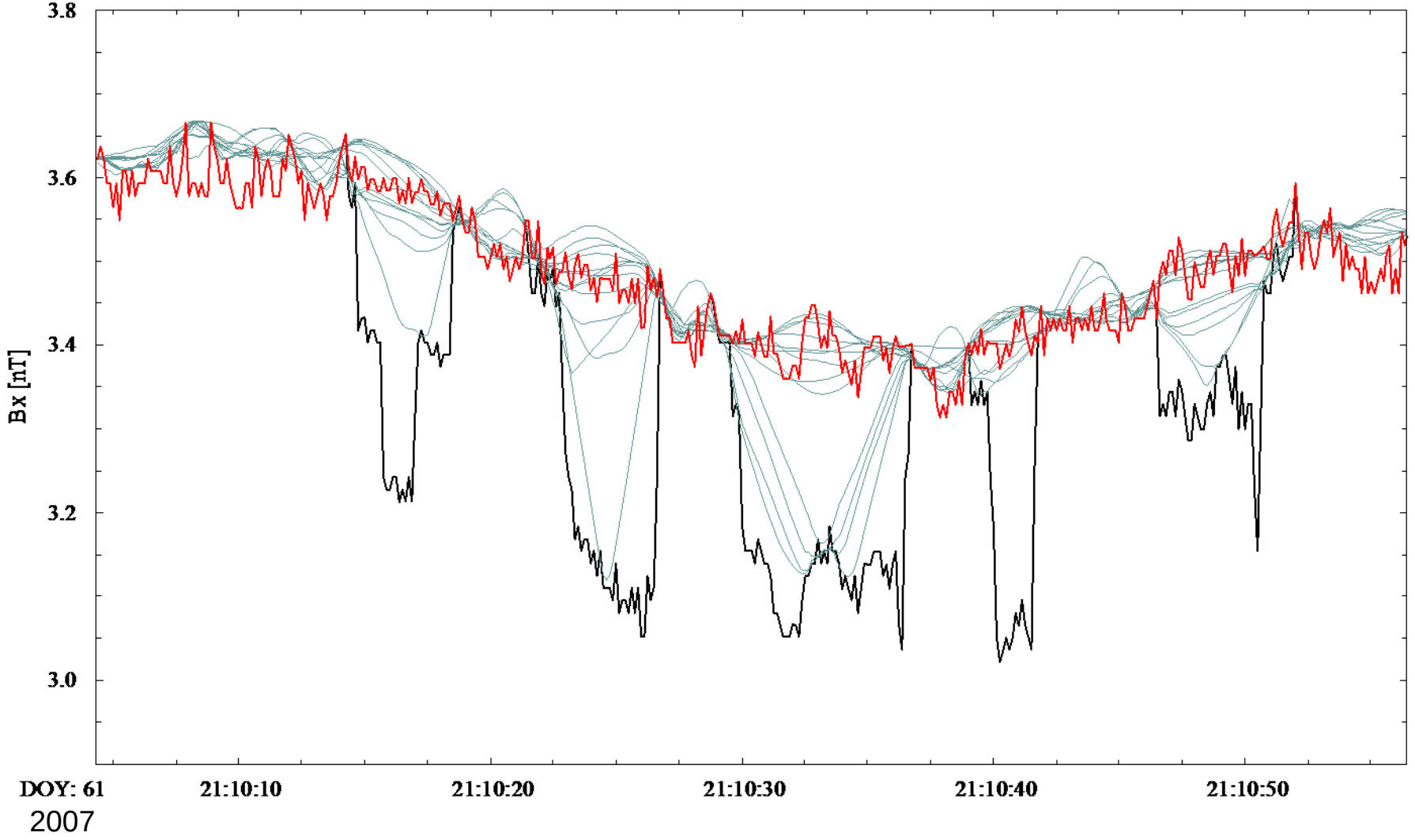
Magnetometer Data Updates

- In-flight Calibration
  - Compared STEREO A and B against Earth's field and renormalized gain and orthogonality of sensors
  - Determined offset in least sensitive gain state
  - Added flag to output files indicating gain state
- Stepping Correction (with H.K. Leinweber)
  - Developed a correction algorithm for STEREO A sensor 1 that exhibited quasi-random stepping behavior (magnetic domain stepping or ADC error or ?)
  - Coded and installed correction algorithm in production code
  - Added flag indicating when correction algorithm is used

Example of interferences and corrected STEREO A data.



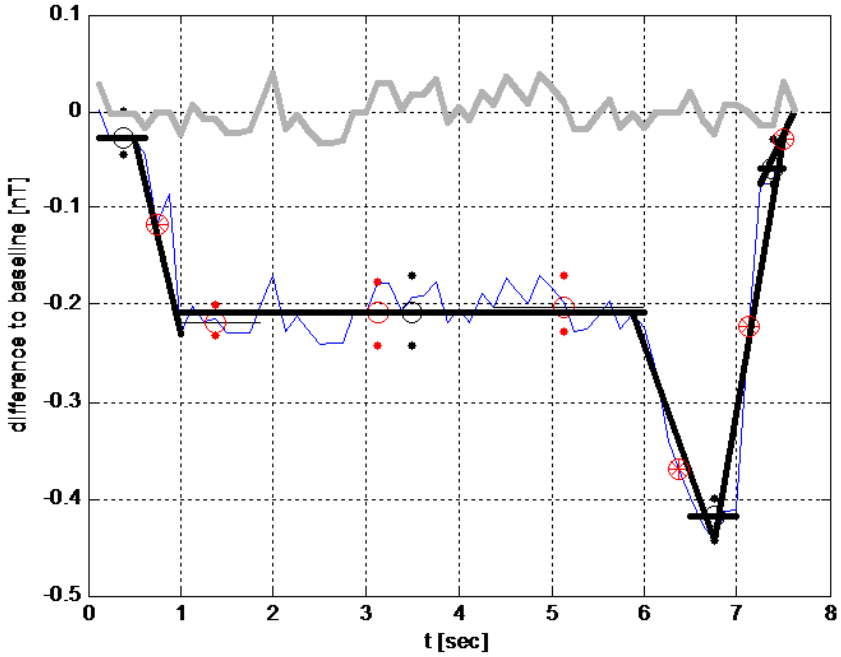
We use 13 different base lines.

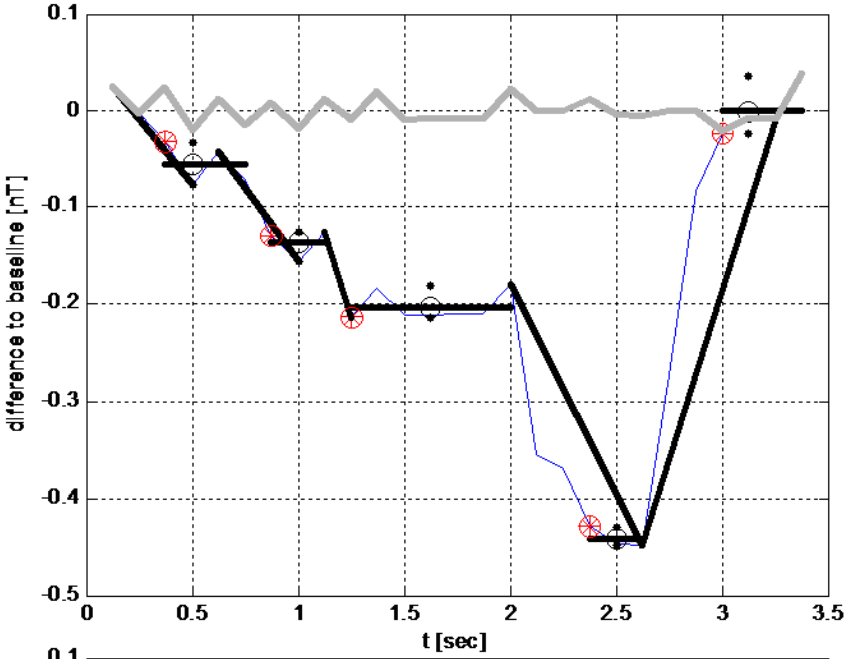


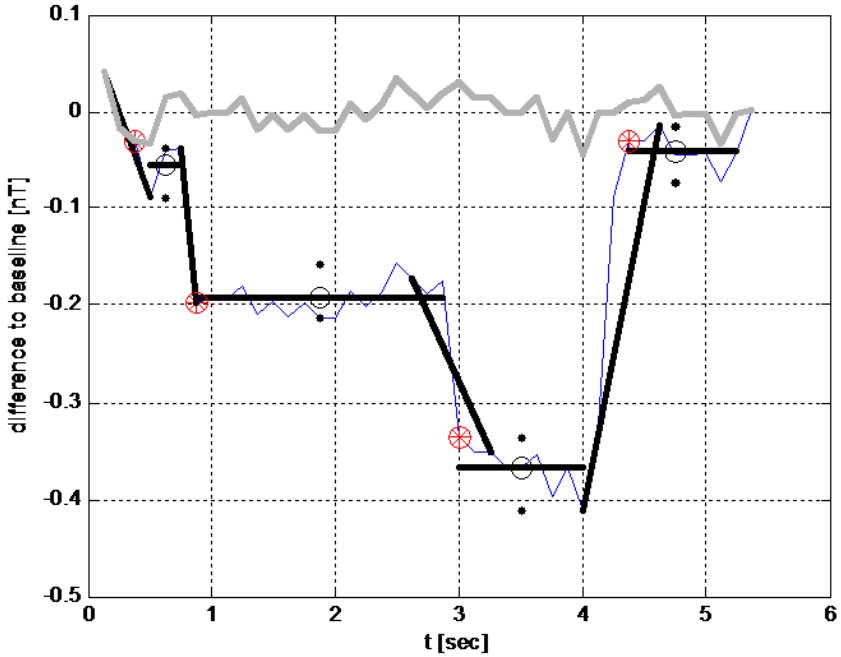
Algorithm

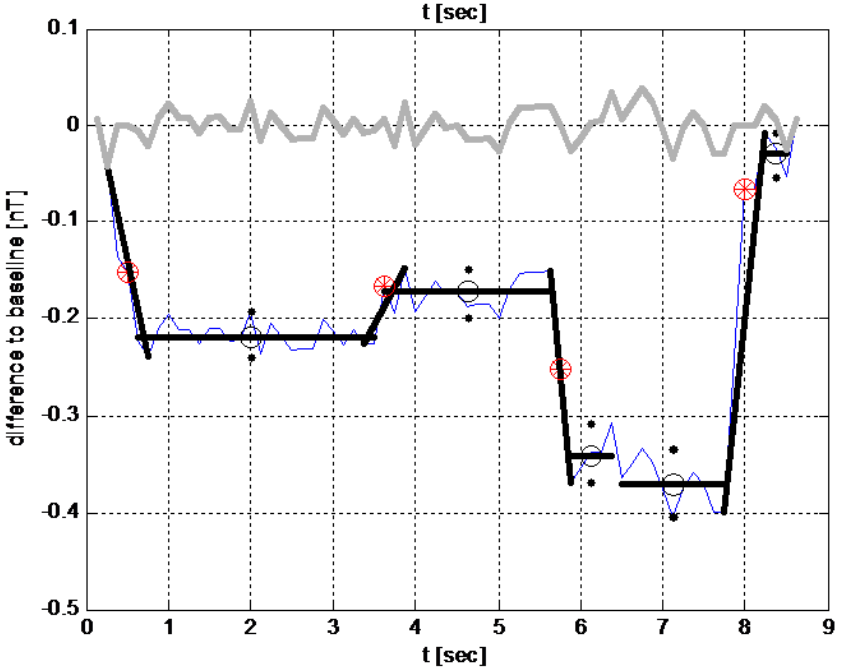
- Detects and removes Interferences that are 0.2 nT to 0.8 nT lower than baselines and less than 16 sec long.
- Starts with fastest baseline and works towards slowest baseline.
- The actual detection is done using a large set of criteria so that natural shapes of the field are preserved as much as possible

Levels and Slopes

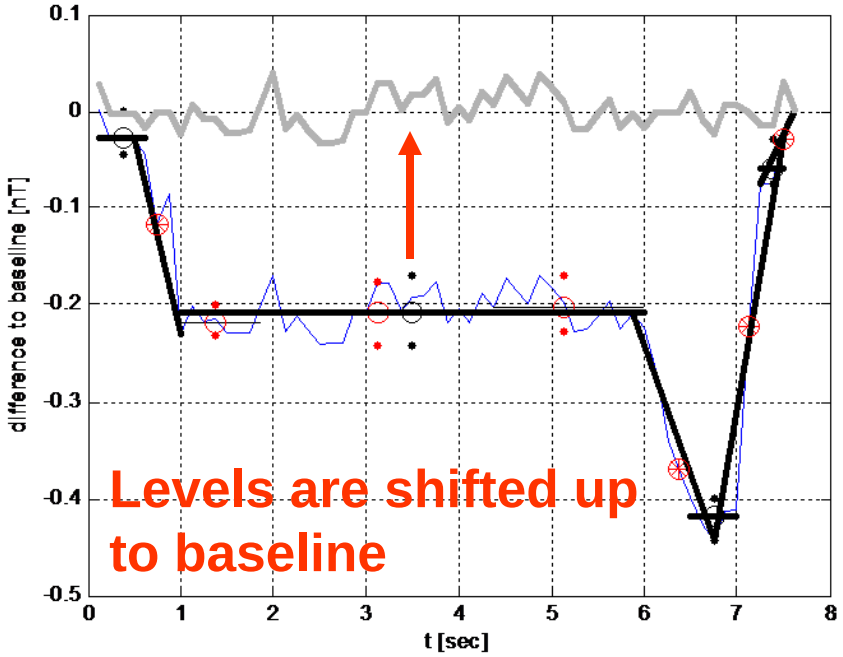


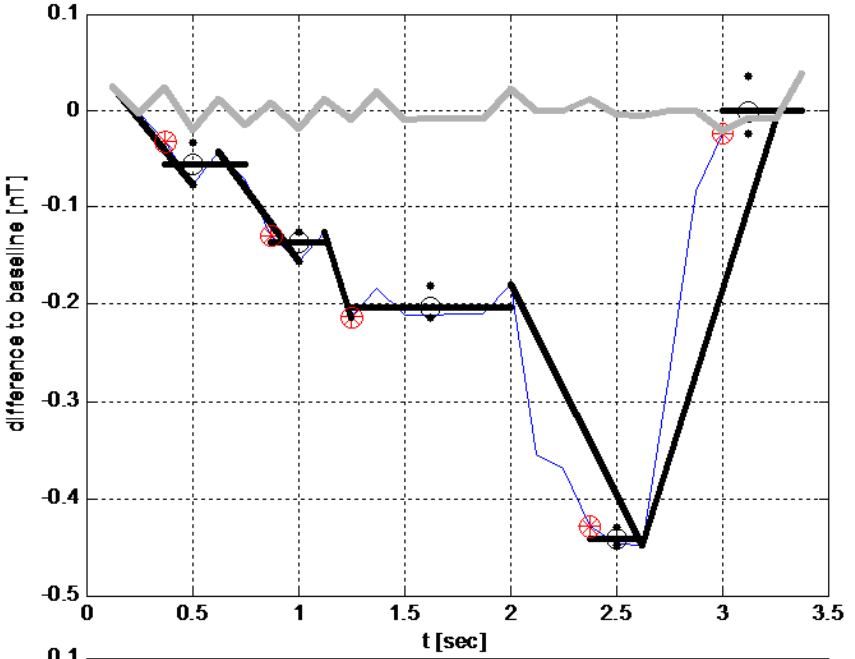


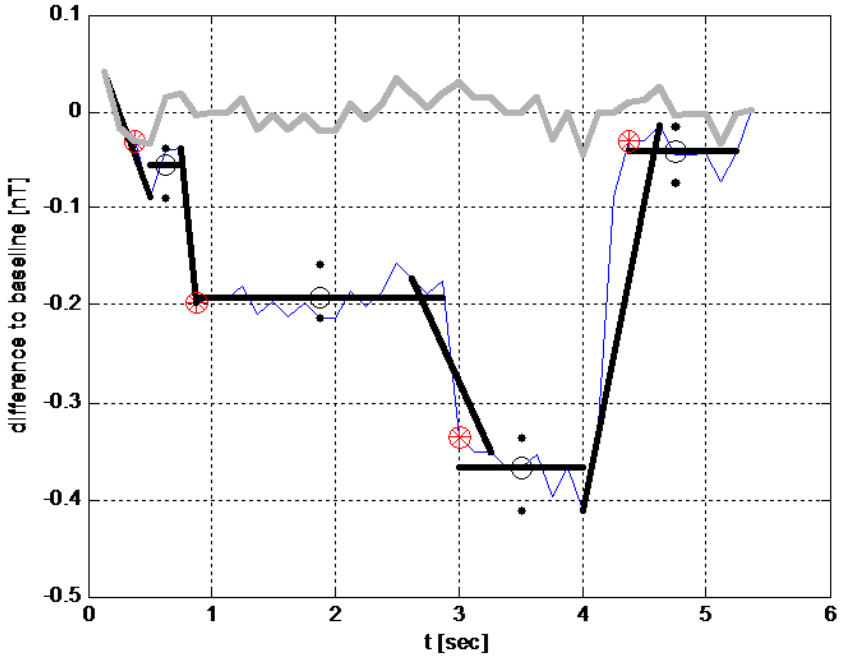


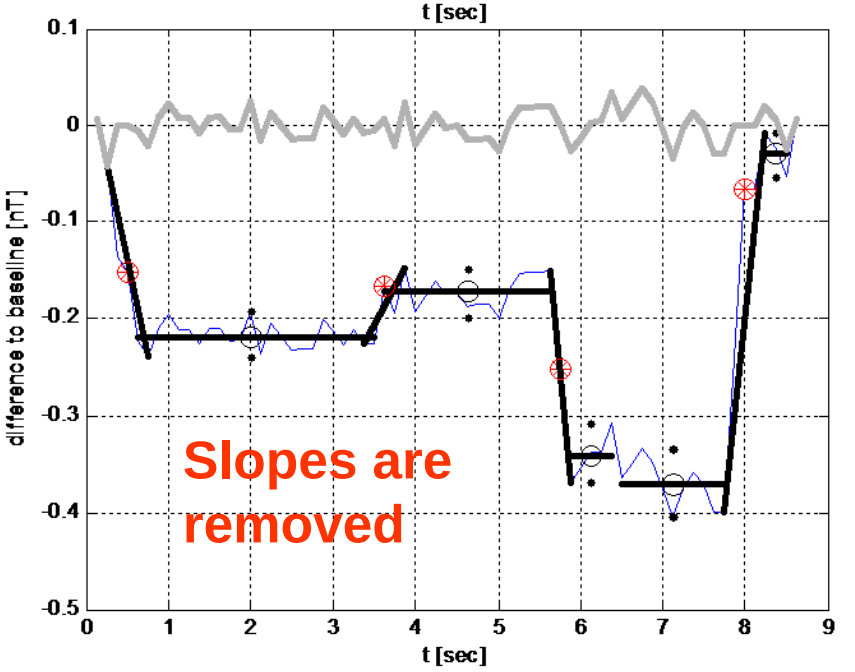


Levels and Slopes

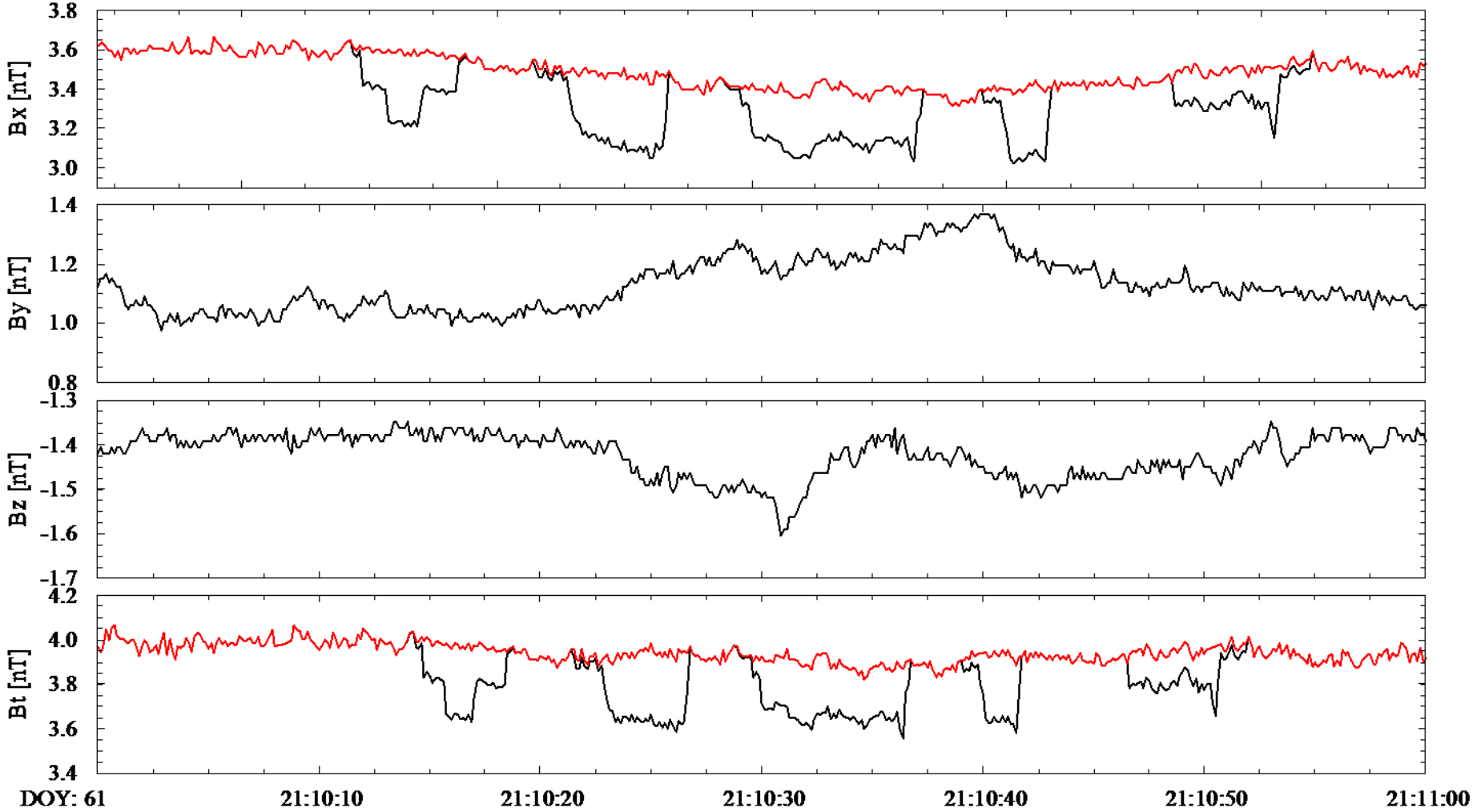








Example of interferences and corrected STEREO A data.



Recent Progress, continued

- Reprocessing
  - New production code finalized and tested on both STEREO A and B data
  - All STEREO A and B data rerun from launch to March 31, 2008
  - We consider these data definitive and final
  - These are the archival data set
- Website
  - Working on all reported bugs
  - New data should now be available on website (through March)
  - Faster web server being installed