Stream Interaction Regions (SIRs) from *Wind* and ACE Data during 1995 − 2009

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In order to survey the SIRs as completely as possible, we have used ACE data when the Wind data were unavailable or noisy and when Wind was near or within the magnetosphere.

The SIR include corotating interaction regions (CIRs) and tranisent stream interaction regions. The difference between a CIR and a transient SIR is only that a CIR recurs for two or more solar rotation cycles.

The SIRs are identified based on inspection of the following features: an increase of solar wind speed, a pile-up of total perpendicular pressure (Pt) with gradual decreases at both sides from the Pt peak to the edges of the interaction region, velocity deflections, an increase of proton number density, an enhancement of proton temperature, an increase of entropy, a compression of magnetic field. We require the presence of at least 5 signatures, and identify SIRs with careful consideration of the ambient solar wind.

1. Jian et al (Solar Physics, 239, 337-392, doi: 10.1007/s11207-006-0132-3, 2006) gives more details about the identification criteria and also the SIR list of 1995 – 2004.

2. The SIR list of 1995 – 2006 is an appendix of Lan Jian's 2008 PhD thesis from UCLA.

3. Jian et al. (Solar Physics, 274, 321-344, doi: 10.1007/s11207-011-9737-2, 2011) updates the results to 2009.

4. The solar cycle variation from 1995 to 2011 is published in Jian et al. (Amer. Inst. Phys. Proceedings of Solar Wind 13, 1539, 195-198, doi: 10.1063/1.4811021, 2013), where STEREO A/B is used for 1-AU observation beyond 2009.

For more information and extensive use of the survey, please contact Lan Jian at lan.jian@nasa.gov

SIR #	CIR #	Start UT [mm/dd hhmm]	End UT [mm/dd hhmm]	Discontinuity UT [mm/dd hhmm]	F/R[1] Shock	Stream Interface (SI) UT [mm/dd hhmm]	P_{tmax} [pPa]	V_{max} [km/s]	V_{min} [km/s]	ΔV^2 [km/s]	B_{max} [nT]	Comments

1995

1	1	01/01 1937	01/03 2000	01/01 1937	F	01/02 0556	173	720	320	400	16.3	Pt plateau-like and irregular
2	2	01/17 0200	01/18 2000	01/17 1918	/	01/17 2323	240	536	330	206	19	
3		01/22 0400	01/23 0200			01/22 1300	110	435	335	100	11	
4	3	01/28 1800	01/30 1100	01/30 1000	/	01/29 1520	290	747	290	457	20.5	Pt zigzag
5	4	02/10 2200	02/13 1400			02/11 0600	170	710	330	380	14	Pt irregular
6	5	02/25 2000	02/28 2000	02/26 0256	F	02/26 0325	180	640	262	378	14.6	long-time plateau after Pt peak
				02/26 0718	/							
7	6	03/09 0400	03/12 0220	03/12 0220	R	03/12 0040	210	720	410	310	17	Vp does not monotonically increase, Pt is irregular and piles up in the trailing part
8 *	7	03/25 2200	03/27 2100			03/26 1013	207	520	290	230	18.5	after an ICME[3]
9 *	8	04/06 1100	04/07 2200	04/07 2025	R	04/07 1240	580	763	300	463	28	catching up with an ICME-like structure
10	9	04/22 0200	04/25 0400			04/22 1823	130	510	300	210	13	Pt plateau-like
11	10	04/26 0800	04/27 0900			04/26 2110	250	720	420	300	17.6	
12	11	05/01 2000	05/03 0030	05/02 2357	/	05/02 0350	240	745	360	385	17	a trough of Pt, two steps
13 *	12	05/15 1700	05/16 2200			05/16 0542	300	520	310	210	25	containing an ICME
14	13	05/23 0300	05/24 0600	05/24 0440	/	05/24 0045	230	680	330	350	17	
15	14	05/29 0300	05/31 0600			05/30 0638	225	700	380	320	19.8	Pt irregular
16	15	06/09 0000	06/10 2200			06/10 0745	100	420	295	125	13	Pt irregular
17	16	06/19 0000	06/19 2000	06/19 1330	/	06/19 1230	440	740	340	400	25	Pt noisy
18	17	06/25 0600	06/26 0343	06/26 0343	R	06/25 2327	180	570	373	197	15.7	two peaks of Pt, trough
19	18	07/12 0900	07/14 0000			07/13 0200	110	326	265	61	12	
20	19	07/16 0918	07/17 0400	07/16 0918	/	07/16 2105	260	690	358	332	20	
21		07/24 0223	07/25 1000	07/24 0223	F	07/24 0923	180	510	318	192	19.4	some rotations of **B**
22	20	08/07 0905	08/09 1000	08/07 0905	/	08/07 1240	140	620	340	280	12	Pt irregular, several peaks
				08/07 1407	/							
23	21	08/13 1300	08/14 1800			08/14 0308	90	660	360	300	11.2	weak, Tp not high
24		08/24 2212	08/25 1100	08/24 2212	F	08/25 0105	220	446	318	128	14.6	
25	22	09/05 0800	09/06 0500	09/06 0230	R	09/05 1920	320	630	310	320	21	
26	23	09/10 1230	09/11 0600			09/10 1820	140	580	397	183	13.2	
27	24	10/01 2000	10/03 1200			10/02 1341	155	490	300	190	12	followed by a strong SIR

28		10/04 0000	10/04 2030	10/04 1943	/	10/04 0740	400	720	383	337	22	15-min extremely high Pt
29 *		10/18 1042	10/20 1400	10/18 1042 10/18 1900 10/19 1751	F / F	10/19 1823	410	578	300	278	29	containing an ICME
30	25	10/26 0600	10/28 0400			10/26 1700	64	388	327	61	7.5	slow and weak
31	26	10/30 0100	11/01 1800	10/30 0927	F	10/30 1322	108	640	300	340	13	Pt irregular, plateau
32		11/04 0800	11/06 0600			11/05 1430	162	610	380	230	15	
33	27	11/21 1600	11/24 0000			11/22 0720	72	367	303	64	7.2	weak, Tp not high
34	28	11/27 0300	11/29 1200			N/A	N/A	510	260	250	10	data gap for 11/27 0600 - 11/29 0000 because of Wind orbit, Pt can be estimated to be 80 pPa
35 *		12/15 0437	12/17 1800	12/15 0437 12/15 1457 12/16 0450	F / /	12/15 1425	123	440	310	130	12.5	ICME in SIR
36	29	12/24 0600	12/24 1600	12/24 0600 12/24 0845	F /	12/24 0835	470	580	330	250	27	one reverse shock at 12/25 2305
37		12/31 0000	12/31 2100			12/31 0620	110	510	330	180	11.6	Vp does not monotonically increase

1996

1	1	01/02 1400	01/03 1200			01/02 1929	90	570	370	200	11.5	little heating of plasma
2	2	01/14 1000	01/15 0000			01/14 1701	250	640	370	270	18	data gap or noisy data for 01/12 1400 - 01/14 0600 because Wind was very close to the bow shock and magnetosphere
3	3	01/19 1400	01/21 0200			01/19 2235	120	530	385	145	12	irregular Pt
4	4	01/28 1500	01/29 1200			01/28 2252	89	580	390	190	11.7	not gradual Vp increase, Vp increases significantly at the SI with Vy deflection
5	5	02/10 0120	02/11 2000	02/10 0120 02/11 0820	/ /	02/11 0525	160	630	340	290	13	

6		02/17 2030	02/19 1000			02/18 2321	92	525	365	160	9.3	a flux-rope-like structure is embedded
7	6	02/22 2355	02/26 2200	02/22 2355	F	02/24 0620	108	610	360	250	11.7	Vp does not monotonically increase, multiple Pt peaks
8		03/02 0400	03/04 2000	03/02 2032	F	03/03 0300	110	490	305	185	9.5	
9	7	03/09 0000	03/13 1600			03/11 0500	86	590	320	270	11	Pt irregular
10	8	03/20 0000	03/22 0000			03/20 2012	130	650	400	250	11	irregular Pt
11	9	04/07 2000	04/09 1700	04/08 0241	F	04/08 1339	105	500	290	210	11	
				04/08 1310	F							
12	10	04/13 1900	04/15 1000			04/14 0843	100	630	380	250	13.5	multiple enhancements of Np, Vp does not increase montonically
13	11	05/12 1500	05/16 0600			05/13 0003	119	530	325	205	11.5	Wind was close to magnetosphere, using OMNI 1-min resolution data
14	12	05/18 2000	05/21 1000			05/20 0100	66	485	310	175	9.5	no sharp Tp increase, small peaks of Pt
15 *		05/28 2200	05/30 0500			05/29 0140	200	470	340	130	16.5	following an ICME
16	13	06/05 1400	06/06 1800			06/06 0400	135	480	320	160	14.5	nice SI
17	14	06/14 1800	06/16 1200	06/16 0419	/	06/15 1345	80	425	290	135	10.3	Pt plateau, Np and Tp do not change exactly simultaneously
18		06/18 2000	06/19 1000	06/18 2236	F	06/19 0145	280	550	380	170	19	
				06/19 0157	/							
19 *	15	07/01 1220	07/04 0200	07/01 1220	/	07/02 0420	110	550	320	230	14	containing an ICME
				07/01 1417	/							
20	16	07/11 0600	07/13 1800			07/13 0000	80	440	300	140	11.5	Pt plateau, maybe a recurrence of event 11, but fast stream with not quite high speed
21	17	07/28 0800	07/31 2200	07/28 1215	F	07/31 0240	170	580	305	275	15.2	a density and Pt compression at the leading part
22	18	08/08 0000	08/10 1200			08/09 0800	80	415	330	85	9	
23	19	08/14 0000	08/15 0600			08/14 0930	90	540	360	180	10.3	
24		08/16 0200	08/17 1200	08/16 0745	F	08/16 0755	110	590	370	220	11	
25	20	08/22 1310	08/23 1800	08/22 1310	/	08/23 0425	130	532	360	172	11.8	

26	21	08/28 1500	08/29 1500			08/29 0140	150	620	380	240	13.6	no sharp Tp increase
27	22	09/03 1800	09/07 0000			09/04 2300	70	440	310	130	10.5	
28	23	09/09 1200	09/13 1200			09/10 0106	198.7	720	340	380	15	Wind was close to magnetosphere, so OMNI 1-min data are used, Vp does not increase montonically
29	24	09/19 0400	09/20 2200			09/19 1645	100	690	450	240	11	
30	25	09/26 1400	09/26 2200	09/26 2136	R	09/26 1830	200	685	440	245	18.6	
31	26	10/01 1800	10/03 0000			10/02 1255	180	560	330	230	17.5	
32	27	10/08 1200	10/09 1600			10/09 0500	130	540	350	190	12.5	Pt and Vp irregular
33	28	10/17 1400	10/18 0900			10/17 2238	115	615	390	225	12	
34	29	10/21 2000	10/23 0800			10/23 0000	150	700	390	310	14.5	
35	30	10/27 2000	10/28 1200			10/28 0300	150	620	370	250	14.8	
36	31	11/03 1200	11/04 1800	11/03 2300 11/04 0205	/ /	11/04 0000	123	450	320	130	12.3	
37	32	11/13 1250	11/14 1200	11/13 1250	/	11/13 2105	125	500	365	135	14.6	
38	33	11/24 0000	11/25 0600			11/24 0830	125	480	310	170	11.5	followed by long Vp increase
39	34	12/02 1005	12/04 1500			12/02 1800	190	530	280	250	18	OMNI data, several short data gaps
40	35	12/09 1600	12/10 1200	12/09 1850	/	12/09 2310	160	550	350	200	16	irregular Tp and Pt
41	36	12/14 0817	12/16 1557			12/15 1600	65	580	380	200	8.5	
42	37	12/20 0000	12/22 1800			12/21 0950	84	450	305	145	8.7	clear HCS crossing embedded, quieter in the leading part than in the trailing part

1997

1	1	01/06 1800	01/07 1600			01/07 0150	110	460	346	114	11	two peaks of Pt
2 *	2	01/10 0052	01/11 0900	01/10 0052	F	01/11 0200	500	590	375	215	24.2	ICME + SIR
3	3	01/25 1830	01/26 1730			01/26 1000	215	600	320	280	18	a trough of Pt
4		01/27 1200	01/28 1300	01/28 0854	R	01/28 0855	120	685	460	225	12	weak, near contact with previous SIR
5	4	02/05 0300	02/06 2000			02/05 2100	95	470	315	155	11.5	
6		02/08 0820	02/08 1740	02/08 1327	/	02/08 1313	233	600	380	220	16	relatively neat, short

7 *		02/17 0300	02/18 0600			02/17 1743	110	435	320	115	12.8	Vp does not increase monotonically, containing an ICME
8	5	02/20 1800	02/22 0100			02/21 0820	120	435	320	115	11	followed by another enhancement of Vp
9	6	02/27 1729	02/28 1200	02/27 1729	F	02/28 0050	165	630	440	190	16.5	Vp increases in two steps
10	7	03/05 1255	03/06 0400	03/05 1255	F	03/05 1547	130	425	320	105	11.7	short
11		03/11 2000	03/12 1600			03/12 0210	215	525	295	230	13.5	noisy plateau of Pt after the Pt peak
12	8	03/26 0200	03/27 0000			03/26 1150	77	591	420	171	8.8	weak
13		03/28 0729.4	03/30 0900	03/28 0729.4	F	03/28 1657	85	550	380	170	11	Vp noisy, Pt is asymmetric
14	9	03/31 1600	04/02 1000			04/01 0530	160	490	350	140	15.5	
15 *	10	04/10 1300	04/11 0200	04/10 1300	F	04/10 2000	260	450	310	140	19.5	
16		04/16 0800	04/17 1400	04/16 1220	F	04/16 1700	180	550	310	240	15.5	classical
17		05/01 1203	05/02 0300	05/01 1203	F	05/01 1745	170	635	330	305	16	
18	11	06/05 1800	06/07 2200	06/06 0953	/	06/06 0953	95	450	320	130	9.5	two peaks, irregular
19		06/14 1800	06/17 0000			06/15 1721	99	450	275	175	9.6	OMNI data, weak
20		06/22 0000	06/23 0600	06/22 0245	/	06/22 0337	170	430	270	160	12	Pt irregular
21	12	06/27 0200	06/27 1800			06/27 1030	110	550	360	190	12.3	neat
22	13	07/02 1930	07/04 2100			07/03 0936	72	400	275	125	8.7	Wind data gap, OMNI data used
23		07/06 2200	07/08 0100			07/07 1605	140	455	335	120	13.5	classical
24		07/09 0800	07/10 0600			07/09 2130	125	450	340	110	14	2-hr data gap, following a previous SIR
25	14	07/24 0000	07/25 0100			07/24 0550	140	480	360	120	10.7	saw-peak
26	15	07/30 2000	07/31 1600			07/31 0300	165	500	305	195	17	a small trough of Pt peak
27	16	08/09 0500	08/10 0300			08/09 0715	80	470	335	135	11	irregular Pt
28	17	08/12 1600	08/14 0100			08/13 0525	76	565	350	215	8.6	followed by another Pt peak
29	18	08/27 1200	08/28 1400			08/28 0400	110	460	300	160	14.3	irregular Pt

30 *	19	09/02 2200	09/04 0500	09/02 2238 09/03 0838	F F	09/04 0007	195	570	312	258	18	containing an ICME
31	20	09/08 0300	09/10 0600			09/08 1844	95	485	320	165	10.5	OMNI data
32	21	09/26 1500	09/28 0900			09/28 0030	95	510	330	180	11.2	weak, lasting longer before the SI
33	22	10/06 1800	10/08 1000			10/08 0030	95	430	315	115	10.7	weak
34	23	10/23 0730	10/24 0130	10/23 0810	F	10/23 1520	130	410	290	120	11.5	Vp does not monotonically increase, followed by another SIR
35	24	10/31 2300	11/01 2300	11/01 0615	F	11/01 0632	150	475	325	150	13	Pt irregular
36	25	11/17 1600	11/19 0400			11/18 0625	130	505	360	145	12.8	
37	26	11/30 0715	11/30 1400	11/30 0715	F	11/30 0750	133	460	300	160	12.3	an interpeak trough before it, short
38		12/04 0800	12/06 1400			12/04 1902	64	415	310	105	8.7	weak, noisy

1998

1		01/16 0900	01/17 1200			01/16 1804	130	380	280	100	14	classical, but not a CIR
2		01/18 0600	01/20 2000			01/19 1400	180	470	290	180	17.8	
3		01/31 1400	02/01 1500	01/31 1553	F	01/31 2345	170	480	330	150	14.5	Vp irregular, noisy, catching up with an ICME
4		02/10 1800	02/11 2300			02/11 1520	80	580	390	190	10.3	
5		02/28 0000	03/03 0000			02/28 1415	150	515	310	205	15	Pt peaks not where Tp sharply rises
6	1	03/09 2100	03/11 0400			03/10 1015	300	565	270	295	23.5	noisy, trough in the center
7	2	03/19 2000	03/22 1200			03/21 1100	160	640	310	330	16	three peaks of Pt
8 *		03/24 1000	03/27 2300			03/26 0256	100	510	350	160	13	containing a flux rope structure
9		04/03 2200	04/05 0600			04/04 1530	120	400	300	100	13	
10	3	04/15 1400	04/18 1522	04/18 1522	R	04/16 2350	100	670	320	350	13	noisy
11		04/23 1729	04/25 0000	04/23 1729 04/23 2210	F /	04/23 2133	330	470	323	147	19.2	

12	4	05/07 0800	05/08 1800	05/08 0923	F	05/08 0952	210	690	480	210	13.5	Tp increases in steps
13 *	5	05/15 1353	05/17 1800	05/15 1353	F	05/16 0310	143	640	320	320	17	two obviously different streams, containing an ICME
14	6	05/28 1400	05/30 1600	05/29 1515	F	05/29 1525	320	730	340	390	20.6	sharp interface
15		06/03 0600	06/04 0600			06/03 1127	120	520	395	125	13	3-hr data gap
16	7	06/05 0000	06/07 1200			06/06 1920	125	660	350	310	14	a trough
17 *		06/14 1400	06/16 1000			06/15 0500	90	442	312	130	12	following an ICME
18	8	06/18 1800	06/20 1200			06/19 1300	180	520	300	220	16	Pt plateau, no sharp Tp increase
19 *	9	07/04 1800	07/06 1800	07/05 0352	F	07/05 0417	200	670	400	270	14	followed by an ICME
20 *	10	07/15 1200	07/17 0024	07/17 0024	R	07/16 0457	340	640	300	340	22.5	two obviously different streams
21		07/20 2000	07/22 0000			07/21 0510	163	500	335	165	15.5	
22	11	07/22 1200	07/23 2000	07/23 1302	R	07/23 0307	240	740	360	380	16.6	
23		08/05 2000	08/08 0400	08/06 0715	F	08/06 0828	225	540	350	190	22	
24	12	08/22 0000	08/23 2200	08/22 0211	F	08/22 1445	140	580	280	300	13.5	
				08/23 1023	R							
25		09/11 0200	09/13 0800			09/12 1552	80	510	330	180	9.5	
26		09/17 1200	09/19 0800			09/18 1340	210	475	300	175	20	
27	13	10/06 1533	10/08 0000	10/06 1533	/	10/07 1630	148	600	340	260	15	ACE[4], a trough of Pt, 18-hr data gap of *Wind*
28	14	10/27 0600	10/30 0000			10/28 2100	95	630	350	280	12.5	
29	15	11/23 1000	11/24 0300			11/23 1630	150	520	310	210	16	
30		12/10 1200	12/12 1200	12/11 1934	F	12/11 2014	180	410	330	80	17.3	ACE, two peaks of Pt
31	16	12/15 1800	12/16 1100			12/16 0445	103	540	370	170	13	ACE
32	17	12/19 1200	12/21 0000			12/20 0000	80	500	340	160	11	
33	18	12/25 0200	12/26 0414	12/26 0414	R	12/25 2000	220	540	320	220	22	

1999

1	1	01/05 1800	01/07 1400			01/06 1421	170	575	310	265	17.2	
2	2	01/13 0800	01/15 0700	01/13 1000	F	01/13 2100	230	600	330	270	19.3	ACE, *Wind* data gaps
3		01/26 1600	01/30 1200			01/27 1230	77	480	325	155	9	long, weak, noisy

4	3	02/11 0749	02/12 0710	02/11 0749	F	02/11 1840	320	480	368	112	25.5	a trough of Tp, no reverse shock, ambiguous shock in *Wind* data
5		02/14 1300	02/15 1800			02/15 0125	110	678	370	308	13	Pt plateau
6	4	02/28 2144	03/02 0300	02/28 2144	F	03/01 1317	300	570	370	200	22	
7		03/03 1900	03/04 2000			03/04 0810	130	580	390	190	12.2	Neugebauer *et al.* (2004) has different view, entropy hole
8	5	03/28 1200	03/30 1948			03/29 0617	150	560	320	240	15.5	ACE
9	6	04/10 0230	04/10 2230			04/10 0630	115	600	350	250	13	a trough of Pt
10		04/20 1300	04/20 2310			04/20 1635	130	660	470	190	13	ACE
11	7	04/28 1000	04/30 1100			04/29 1500	85	650	400	250	10	
12		05/12 2200	05/13 2000			05/13 0602	190	515	380	135	19	big disturbance of Vp before the event
13	8	05/18 0032	05/18 1948	05/18 0032	F	05/18 0430	360	700	340	360	28	classical
				05/18 1948	R							
14		05/23 0030	05/23 1930			05/23 0847	75	512	380	132	9.6	a trough of Pt
15	9	05/24 0900	05/25 1030	05/25 1008	R	05/25 0426	240	605	400	205	15	
16	10	06/08 0000	06/09 0530			06/08 0746	132	660	340	320	12.2	
17		06/15 0600	06/18 0000			06/15 1211	87	410	280	130	11	Pt plateau, a small trough of Pt in the center
18 *	11	06/26 0200	06/28 1000	06/26 0232	F	06/26 1937	460	910	307	603	25	ICME + SIR
				06/26 1932	F							
19		07/14 1200	07/15 2230			07/15 0000	80	426	300	126	9.7	a small trough of Pt
20	12	07/21 1300	07/22 2200			07/22 0900	220	540	275	265	19.6	
21 *	13	07/30 0600	07/31 0000			07/30 1912	285	670	380	290	24	ACE, followed by several ICMEs
22		08/06 0500	08/06 2200			08/06 1020	112	500	322	178	12.4	
23 *		08/09 2130	08/12 0200			08/11 0156	132	435	300	135	14.5	following an ICME
24	14	08/15 1033	08/17 0216	08/15 1033	F	08/15 2054	270	680	340	340	21.6	
				08/17 0216	R							
25 *	15	08/23 0600	08/24 2000	08/23 1211	F	08/23 1721	150	538	380	158	16	Pt increases in steps, closely following an ICME
				08/23 1542	F							
26		09/07 0100	09/08 0000			09/07 0750	157	535	353	182	14.5	Neugebauer *et al.* (2004)

27	16	09/12 0358	09/13 1900	09/12 0358	F	09/12 1613	185	662	410	252	15	Vp and Pt irregular
28	17	09/26 0800	09/27 1800	09/26 1456 09/26 1851 09/26 2015	F / /	09/26 1934	280	690	340	350	18	
29	18	10/09 1600	10/11 0700			10/10 1336	300	685	380	305	17.5	
30 *	19	10/21 0221	10/22 1300	10/21 0221	F	10/22 0638	610	720	347	373	38	ICME + SIR, a trough of Pt in the center
31		10/31 0000	11/01 0900	11/01 0609	R	10/31 1010	135	473	360	113	14.3	ACE, weak
32	20	11/05 2003	11/09 0000	11/05 2003 11/08 0134	F /	11/07 1415	270	663	315	348	18	V irregular
33 *		11/21 1400	11/24 0640	11/21 1713	/	11/22 0156	200	510	350	160	16.3	Tp and Vp irregular, SIR + ICME
34	21	12/02 0600	12/05 0000			12/04 0506	240	750	330	420	21	ACE
35	22	12/23 1142	12/25 0600			12/24 0644	330	647	264	383	33	*Wind* , |**B**| abnormally high at some points, two peaks, close to Earth; data gap of ACE
36	23	12/30 1030	12/31 1900			12/31 0016	240	720	370	350	19	ACE, classical, Wind close to Earth

2000

1	1	01/10 1200	01/12 1000	01/11 1340	F	01/11 1400	310	600	320	280	22.3	ACE, SI in the center, *Wind* was in the magnetosheath
2	2	01/27 0500	01/28 0900	01/27 1357	F	01/27 1820	650	750	320	430	31	ACE, high Np, *Wind* data gap
3	3	02/05 1527	02/07 0000	02/05 1527	F	02/05 2114	320	700	372	328	19.7	classical
4	4	02/23 0400	02/24 1415	02/24 1416	R	02/24 0936	285	760	350	410	17.5	after an ICME
5		03/05 1300	03/07 0600			03/06 0655	86	470	310	160	11.3	weak, after an ICME
6		03/11 2300	03/12 2300			03/12 1130	170	462	310	152	16.2	Vp does not monotonically increase
7		03/16 1052	03/18 0000			03/17 1120	105	338	272	66	12.3	Vp is noisy and does not monotonically increase
8	5	03/22 0100	03/22 1900			03/22 1606	330	595	340	255	23	noisy

9		03/23 2200	03/24 1930			03/24 0545	54	790	490	300	9.2	noisy and plateau
10		03/31 1800	04/02 1300			04/01 1615	100	495	355	140	13	
11	6	04/15 1400	04/17 1015	04/14 1935	/	04/16 2005	240	530	270	260	17.8	
				04/16 1030	/							
				04/17 1015	R							
12 *		04/18 1600	04/20 0200			04/19 1610	90	560	395	165	12.3	ACE, ICME with SIR
13 *	7	05/01 1345	05/02 2200	05/01 1345	/	05/02 1047	113	900	420	480	16	ACE, big deflection of Vp, containing a tiny flux rope
				05/02 1047	/							
14	8	05/12 1500	05/13 2300			05/13 0342	186	610	300	310	17.3	in ICME list of Richardson and Cane, it is followed by an ICME
15		05/17 2000	05/18 1200			05/18 0000	106	640	470	170	13.2	noisy
16 *	9	05/23 1400	05/24 1400			05/24 0140	800	700	520	180	36	ACE, very strong, with ICME
17	10	05/29 0700	05/30 0300			05/29 1617	260	720	330	390	19	30-min data gap
18	11	06/14 0800	06/15 1700			06/14 2000	200	700	410	290	14.5	classical
19		07/03 1000	07/05 0000			07/04 1247	96	595	320	275	11.7	
20		07/31 1500	08/02 0200			07/31 2113	105	535	363	172	13	
21		08/23 2200	08/25 0600			08/24 0851	135	440	300	140	15.5	a peak before the event
22	12	08/27 1400	08/29 0500			08/28 1610	130	650	332	318	12	irregular Pt
23		09/11 1000	09/13 1200			09/12 1831	100	455	330	125	11.3	
24	13	09/16 1830	09/17 1100			09/16 2310	175	588	350	238	17	followed by an ICME
25	14	09/24 1200	09/25 0400			09/24 2202	110	580	380	200	13.2	
26		09/25 0600	09/26 0400			09/25 1354	83	626	460	166	10.8	closely following an SIR
27	15	10/15 1800	10/16 1200			10/16 0000	85	622	462	160	10.5	weak, after an ICME
28	16	10/22 0500	10/23 0800			10/22 2320	125	595	355	240	15.6	a trough of Pt
29	17	11/03 2000	11/05 1800	11/04 0225	F	11/04 0345	320	710	320	390	23.7	a trough of Pt
30		11/23 2200	11/25 0000			11/24 1600	140	550	300	250	14.3	
31	18	12/06 1500	12/09 0400			12/08 0835	160	680	340	340	15	noisy, BDE[5]
32 *		12/24 0800	12/26 1200	12/24 0825	/	12/25 0230	170	500	295	205	16.5	BDE

2001

1		01/02 1305	01/05 0400	01/02 1305	F	01/04 1440	130	440	270	170	14	toughs of Tp and Pt
				01/04 0114	F							
2		01/10 1609	01/11 1000	01/10 1609	F	01/10 2052	105	490	330	160	12.2	

3	1	01/21 0600	01/22 1800			01/21 2200	240	540	310	230	19.5	
4		01/28 1030	01/29 2000			01/29 0135	200	488	300	188	16.7	little heating of plasma
5	2	02/05 2000	02/07 1000			02/06 0625	225	540	315	225	16	Tp irregular
6		02/12 2100	02/14 0000	02/12 2131 02/13 0428	/ /	02/13 0532	160	630	420	210	15	Vp and Pt irregular
7		02/26 0400	02/27 1800	02/27 1222	/	02/27 0552	200	400	260	140	14	noisy, 16-hr data gap of ACE
8	3	02/28 0400	02/28 1600			02/28 0732	125	550	330	220	13.2	noisy
9 *		03/03 0900	03/06 0000	03/03 1040 03/05 2135	F R	03/05 1355	130	600	440	160	14.5	ACE, containing an ICME without BDEs (03/04 0400 ~ 03/05 0140), a trough of Pt
10		05/08 0600	05/09 2025	05/08 1109	F	05/08 1116	90	580	350	230	12.3	noisy deflections of Vp
11	4	05/12 0400	05/12 2200	05/12 1003	F	05/12 1235	200	660	380	280	19	Np compression is not obvious
12		05/13 1100	05/14 0500			05/13 2220	100	625	480	145	13	close to the previous SIR, noisy, no big deflection of Vp
13 *	5	05/22 0000	05/25 2000	05/23 0422	SR[6]	05/23 0250	178	640	295	345	17	containing an ICME-like structure in the leading part
14	6	06/01 0700	06/02 1400	06/02 1240	/	06/01 2130	242	570	306	264	22	
15	7	06/08 1200	06/10 0400			06/09 0410	110	640	360	280	12.5	a trough of Pt
16 *	8	06/18 0000	06/20 0500			06/18 1310	200	750	300	450	17	Pt irregular, containing a 13-hr ICME-like structure
17		07/13 2100	07/14 0700			07/14 0135	135	450	383	67	14	followed by another Vp increase, obvious Vp deflection
18	9	07/16 0500	07/17 0900			07/16 1520	120	625	390	235	14	no sharp SI, Vp, Np, and Tp all gradually change
19	10	07/24 0000	07/26 0000			07/25 0000	90	600	360	240	11	noisy, no big deflection of Vp
20	11	07/30 1600	07/31 2300			07/31 0400	250	625	320	305	19.5	
21		08/09 1800	08/10 1400			08/10 0210	90	480	343	137	10	
22	12	08/21 0000	08/22 1200			08/21 2245	75	660	390	270	11	no big deflection, Pt plateau

23		08/25 0600	08/27 0100			08/25 2100	110	460	342	118	12.6	troughs of Tp and Vp
24	13	09/02 1600	09/04 0400			09/03 1140	90	560	320	240	10.5	ACE, *Wind* data gap 09/09 1200 ~ 09/11 1200
25 *	14	09/14 1800	09/15 1900	09/14 2059	SR[6]	09/15 0505	100	610	400	210	11.5	ACE, ICME with SIR
26	15	09/23 0300	09/24 0700			09/23 0919	230	585	340	245	18.5	
27		10/08 0400	10/09 1600	10/08 1305	F	10/08 1445	140	485	340	145	14.6	no big deflection, several data gaps during 11/01 ~ 11/16, some data gaps at SIRs in Nov. and Dec.
28 *	16	10/11 1620	10/12 0900	10/11 1620	F	10/11 2210	480	600	360	240	28	ACE, SIR + ICME, short interval for ICME, ~ 6hr, BDE for over three days
29		12/02 0800	12/04 1800			12/03 2147	180	550	330	220	18.5	ACE, although it is associated with BDEs
30	17	12/14 2100	12/16 1212	12/16 1212	R	12/15 1647	420	570	280	290	26	irregular and noisy Pt
31		12/21 1000	12/22 0600	12/21 1410	F	12/21 1446	100	480	325	155	12.5	
32	18	12/23 2330	12/24 1300	12/23 2330	F	12/24 0630	210	590	320	270	18.8	BDEs near the forward shock, a low-latitude coronal hole close to disk center on 12/21

2002

1		01/07 0900	01/09 0100			01/08 0825	115	475	320	155	13	Pt plateau and noisy
2	1	01/10 1100	01/11 0500	01/10 1627	/	01/10 1706	400	673	390	283	22	
3		01/19 0500	01/21 1800			01/19 0907	223	523	288	235	19	a trough of Pt
4		01/24 2100	01/27 0000			01/25 1427	95	500	315	185	12.2	
5	2	02/04 1800	02/06 0600	02/06 0448	R	02/05 2303	420	715	308	407	22	
6		02/10 2000	02/12 1300			02/11 0210	60	600	410	190	9.8	ACE
7		02/16 1100	02/17 2000	02/16 1140 02/17 0332	/ F	02/17 0431	200	450	308	142	15.2	
8	3	03/03 1900	03/05 0800	03/03 2338	SR[6]	03/04 1730	320	750	340	410	22.8	following an ICME
9		03/11 1000	03/12 1500			03/11 1831	140	520	335	185	14.5	noisy
10	4	03/29 2000	03/31 1600	03/29 2215	F	03/30 0023	350	800	314	486	23.5	two steps of Vp enhancement

				03/31 1551	/							not a reverse shock due to noisy Vp
11		04/06 2100	04/07 1900			04/07 0620	70	445	320	125	9.7	entropy hole before the SI
12 *		04/10 0000	04/12 1200			04/11 0102	140	550	283	267	14.3	SIR with ICME (04/12 ~ 04/13 1530)
13		04/27 0800	04/28 0700			04/27 1850	90	540	390	150	11.8	ACE, Vp noisy deflections
14		05/05 1800	05/08 0200			05/07 1100	78	415	310	105	10.2	two peaks of Pt
15 *		05/11 1030	05/12 1400	05/11 1030	F	05/11 1122	320	550	400	150	23	ICME (05/11 1618 ~ 05/12 0100, Tp not low) + SIR
				05/12 0234	/							
16	5	05/26 1900	05/28 0200			05/27 1232	130	890	400	490	14	
17		06/01 1300	06/03 1800			06/02 2014	95	500	320	180	11.7	
18	6	06/08 0030	06/09 0000	06/08 1028	F	06/08 1128	170	440	290	150	15.5	
19		06/15 1600	06/17 0600			06/16 0533	125	428	323	105	12.5	
20	7	06/18 1000	06/19 1800			06/19 0322	210	620	350	270	16.7	
21	8	07/05 0200	07/06 1130			07/06 0858	210	563	333	230	14	Pt plateau
22	9	07/11 2300	07/12 1900			07/12 1107	235	590	380	210	16.6	a small trough of Pt
23		07/15 1900	07/16 1700			07/16 0828	112	435	330	105	10.3	
24		08/11 0245	08/11 2200			08/11 1015	85	540	390	150	9.6	ACE, apparent deflection of Vp
25	10	08/14 0800	08/17 0000			08/15 1900	90	730	420	310	11.2	ACE, very noisy *Wind* data, sharp changes at SI
26		09/03 0200	09/04 1900	09/04 1842	/	09/04 0720	230	495	330	165	19.2	noisy
27	11	09/11 0500	09/12 0500			09/11 1507	180	552	390	162	15	Vp noisy
28	12	09/16 0500	09/16 2300			09/16 1434	120	520	340	180	14.5	
29 *		09/30 0700	10/02 1200	09/30 0755	F	09/30 2100	340	535	290	245	26.5	ICME in SIR
30	13	10/07 0000	10/08 0600			10/07 1250	130	538	340	198	14.8	
31		10/14 0200	10/15 0300			10/14 1439	213	440	260	180	20	SIR + SIR
32	14	10/15 0300	10/16 0400			10/15 1918	310	600	405	195	19	noisy, following a SIR
33	15	10/23 2000	10/25 0000			10/24 1212	220	790	420	370	18	
34		11/01 0600	11/03 1200			11/02 1342	130	500	400	100	12.5	from ACE, *Wind* data gap

35	16	11/09 1600	11/11 1800	11/09 1725	F	11/11 1227	340	710	340	370	19.8	
				11/09 1827	F							
				11/13 0457	R							
36 *	17	11/20 1000	11/21 1300	11/20 1050	F	11/21 0200	850	785	350	435	41	seem to contain a flux rope
37	18	12/06 1100	12/07 1900			12/07 0908	310	630	370	260	18	
38	19	12/13 1900	12/15 1500			12/14 2110	180	615	342	273	15	
39 *		12/17 2230	12/19 2100	12/19 1852	R	12/19 0519	300	540	340	200	23	ACE, ICME + SIR
40		12/22 0700	12/23 1030	12/22 1217	/	12/22 2127	220	600	370	230	21.5	ACE, irregular Pt
41	20	12/26 1400	12/27 1500			12/26 2323	250	760	383	377	16.8	

2003

1	1	01/02 1600	01/04 0700			01/03 1715	150	660	360	300	15.3	a trough of Pt
2		01/09 1200	01/11 1200			01/10 0720	125	500	270	230	14	6-hr data gap
3	2	01/17 0000	01/20 0000			01/18 2226	180	640	320	320	17	no sharp SI
4	3	02/03 0600	02/05 0000			02/04 0537	115	710	460	250	12.6	noisy
5	4	02/12 1600	02/15 1600			02/14 0842	140	675	360	315	15.5	ACE, three peaks of Pt
6		02/19 1200	02/20 1500			02/20 0410	100	730	510	220	11	Tp irregular, troughs of Tp and Pt
7	5	02/26 1700	02/27 1335	02/26 2225	/	02/26 2205	210	605	400	205	18	noisy
				02/27 1335	R							
8		03/03 0400	03/04 1400			03/03 1930	170	610	370	240	16	
9		03/11 1100	03/11 2100			03/11 1530	95	500	380	120	12	sharp SI
10	6	03/13 1800	03/15 0000			03/14 0518	130	650	460	190	15	Np and Tp jump at different places
11		03/26 1400	03/28 0000	03/26 1640	/	03/27 0032	130	550	370	180	12	no Vp big deflection
				03/27 0032	/							
12	7	03/29 1800	03/31 0000			03/30 0049	150	650	380	270	14	two stages of Vp increase
13	8	04/07 0600	04/11 0200	04/08 0020	F	04/08 0855	250	750	370	380	18	a trough of Pt
14	9	04/13 1800	04/16 1800			04/14 1600	110	790	440	350	14	a trough of Pt
15		04/24 0800	04/25 0100			04/24 1335	90	610	430	180	11.5	noisy
16	10	05/04 1900	05/06 1200	05/04 1911	/	05/05 1840	210	750	360	390	17	
17		05/21 0700	05/22 0800			05/21 1915	120	580	400	180	14.5	irregular Tp

18		05/27 0000	05/28 1500			05/27 2100	110	770	450	320	12.5	
19	11	06/01 0000	06/03 0600			06/01 2326	125	900	580	320	12	quite noisy
20		06/14 0800	06/15 0400	06/14 2240	/	06/14 2115	200	600	450	150	18	irregular Vp
21 *		06/18 0442	06/19 0400	06/18 0442	F	06/18 1018	180	650	450	200	19	after an ICME, one stream quiet, the other one noisy
22	12	06/26 0600	06/27 1300			06/26 1335	175	750	500	250	17	
23		07/03 0900	07/04 1200			07/03 2208	130	820	460	360	12	
24 *	13	07/11 0000	07/12 2000	07/12 0847	/	07/11 1632	170	680	340	340	17	a flux rope in the first part
25	14	07/26 0600	07/27 0700	07/26 1940	/	07/26 2155	650	800	340	460	35	
				07/27 0512	/							
26		07/28 0600	07/29 0800			07/28 1255	100	820	550	270	12	closely following a CIR
27 *		08/05 1800	08/06 1600			08/06 0046	120	550	410	140	13.5	closely following an ICME
28	15	08/07 0800	08/08 1000			08/08 0425	130	800	460	340	14	noisy, two stages of Vp increase
29	16	08/20 1000	08/22 0700			08/21 0840	170	770	435	335	16.2	ACE, Pt zigzag
30		08/29 0700	08/30 0200			08/29 2030	100	640	430	210	12.5	
31		08/31 2200	09/02 1200			09/01 0441	115	570	392	178	13.7	ACE, two stages of Vp increase
32	17	09/03 1400	09/04 2300			09/04 0800	75	700	470	230	11.2	ACE, no obvious SI
33	18	09/08 1300	09/10 0400			09/09 1855	250	670	375	295	16	irregular Pt
34	19	09/15 1900	09/17 1900	09/15 1945	/	09/16 2017	280	780	350	430	23	classical, but no sharp Tp increase
35	20	10/01 1200	10/03 1800			10/01 2300	150	500	280	220	18.5	Vp and Tp increase irregularly, Vp deflects greatly
36		10/05 1230	10/06 0900			10/05 2312	140	470	360	110	14.2	closely followed by another SIR
37	21	10/06 0900	10/07 0100			10/06 2030	140	650	380	270	14	irregular increases of Vp and Tp
38	22	10/14 0700	10/15 0900			10/14 1852	285	750	430	320	20	ACE, data gap (10/28 1300 ~ 10/31 0100)
39		11/08 0400	11/09 1900			11/08 1515	140	600	407	193	14	ACE
40	23	11/10 0900	11/11 2100			11/10 2325	160	780	450	330	16.5	ACE

41		11/29 2230	11/30 1900	11/30 0246	/	11/30 0404	190	500	382	118	17	ACE, no sharp SI, parameters gradually change
42		12/04 1800	12/06 0500			12/05 0443	220	560	340	220	18.5	ACE, no sharp Tp increase
43	24	12/07 1000	12/10 1200	12/07 1342	F	12/07 1408	150	800	400	400	15	ACE, Vp big deflection
44	25	12/20 0000	12/22 0000			12/20 1225	270	640	308	332	22	ACE, no sharp SI
45		12/26 1800	12/29 0600	12/27 0911	/	12/27 0912	115	580	370	210	13.5	ACE, sharp SI

2004

1	1	01/02 1500	01/03 2000			01/03 0231	140	640	425	215	14.7	ACE, gradual transition between two streams
2		01/06 1926	01/07 1600	01/06 1926	F	01/06 2214	160	780	580	200	18	ACE, Vp is noisy
3	2	01/15 0000	01/17 0000			01/15 1445	85	660	420	240	12.7	ACE
4	3	01/29 2025	01/30 1700			01/30 0818	163	700	410	290	17	ACE
5		01/31 0200	01/31 1845			01/31 0730	68	660	420	240	10.2	ACE, weak, Pt plateau, no sharp SI, closely following another SIR
6		02/05 0600	02/06 1200			02/05 2300	54	620	460	160	8.5	ACE, weak
7	4	02/11 0130	02/12 1400			02/12 0230	230	700	350	350	21.3	ACE, classical
8	5	02/26 1930	02/29 2000			02/27 2016	160	750	300	450	17.8	ACE, *Wind* was in magnetosphere
9	6	03/09 1030	03/10 1400	03/10 0741	/	03/09 2050	200	780	400	380	18	
10	7	03/25 0800	03/27 2200			03/25 2150	125	900	350	550	14.8	
11 *	8	04/05 0800	04/07 0000			04/05 2102	200	633	370	263	19.3	ICME + SIR, nice rope
12	9	04/22 0300	04/25 2000			04/23 1117	120	560	370	280	13.5	ACE
13		04/28 0000	04/29 0400			04/28 1630	63	600	410	190	9.8	ACE, no sharp SI
14		05/03 1900	05/04 0700			05/04 0133	75	435	332	103	9	
15	10	05/05 0200	05/06 0400			05/05 1817	130	645	400	245	13	ACE, two stages of Vp enhancement
16	11	05/19 1100	05/22 2300			05/20 1045	140	580	300	280	15.3	two peaks of Pt
17	12	05/28 0000	05/31 1000			05/30 2245	95	550	420	130	11	a trough of Pt

18 *	13	06/13 0000	06/15 2000			06/15 0935	130	560	320	240	13	containing an ICME-like structure
19	14	06/27 2200	06/29 1000			06/29 0406	200	620	320	300	17.5	
20	15	07/10 0200	07/12 0500	07/12 0455	/	07/12 0125	170	600	285	315	16	no sharp SI, wave has not been compressed into shock at the discontinuity
21		07/16 0300	07/17 1200			07/17 0030	160	575	370	205	18	disturbances of Tp
22		07/19 0800	07/20 1600			07/19 1515	52	570	360	210	8.8	ACE, weak
23		08/06 1400	08/07 2200			08/07 0918	160	475	330	145	15	followed by another SIR
24	16	08/09 1500	08/10 2100			08/10 0337	110	570	350	220	14	
25		08/25 0400	08/27 1600			08/26 1820	75	475	310	165	10	
26 *	17	08/31 0100	09/01 0800			08/31 0735	90	540	390	150	11.5	closely after an ICME
27		09/04 1800	09/07 0600			09/05 1500	86	470	300	170	13	7-hr data gap
28		09/27 0100	09/29 0700			09/28 0500	75	420	322	98	9.5	no big increase of Tp
29		10/07 2200	10/09 0700			10/08 1722	95	393	280	113	10	weak
30	18	10/12 2130	10/14 1300			10/13 1236	120	550	380	170	12	Tp irregular
31		10/18 0800	10/21 1600			10/20 1016	110	460	293	167	11.5	
32	19	10/23 2000	10/25 1700			10/25 0451	130	520	340	180	11	no big increase of Tp
33		10/29 0500	10/31 1800			10/29 2127	100	480	297	183	10.3	
34		11/02 1400	11/05 0300			11/03 2332	100	470	332	138	10	Tp irregular
35	20	11/19 1200	11/21 0100	11/21 0042	R	11/19 1730	200	640	340	300	18.2	two stages of interaction, a trough of Pt
36	21	11/28 1000	11/30 1500			11/29 0057	200	710	360	350	17.8	
37	22	12/15 1400	12/17 2100			12/17 0109	150	680	340	340	11.5	a trough of Pt
38		12/21 0300	12/21 1200			12/21 0720	165	490	350	140	17.2	closely followed by another SIR
39		12/21 2200	12/22 1800			12/22 0542	165	550	385	165	14.2	
40		12/24 1800	12/27 2200			12/25 1110	120	560	350	210	13.6	

2005

1	1	01/01 1007	01/02 1300			01/01 2100	180	800	440	360	18	ACE, 5-min separation between Np sudden decrease and Tp rapid increase, so no SI
2	2	01/11 1228	01/12 1700	01/11 1957	/	01/12 0400	280	700	400	300	20	ACE, nice Vy deflection
3		01/14 1200	01/15 1400			01/15 0036	95	700	520	180	9.5	ACE, no sharp variations of Np and Tp
4	3	01/28 2021	01/30 0400			01/29 1450	210	600	360	240	18	Vp irregular, no sharp discontinuity
5	4	02/06 1400	02/08 0921			02/07 0943	175	760	360	400	19	HPS around 02/06 0430 UT, before the SIR, no shocks at the end, the fast stream lasted 3 days
6	5	03/04 2235	03/07 1820	03/07 1820	R	03/06 0825	230	700	380	320	17	Vy, Vz deflections
7		03/13 0107	03/15 0528			03/14 1030	140	425	320	105	13	small ΔV
8 *	6	03/23 1900	03/25 1704	03/25 1704	R	03/25 1148	220	710	300	410	17	after an ICME
9	7	04/03 0032	04/05 0255	04/03 0032	F	04/04 0543	200	660	310	350	16	Pt irregular, small in the front part, fast stream was noisy; Pmax at 04/05 0217 UT, but mostly due to r. s.
				04/05 0255	R							
10		04/11 0000	04/14 0000			04/11 1855	175	650	320	330	18	not a shock at the end; Vp deflection: W to E, S to N; sector boundary at 1600 UT on 04/11
11	8	04/19 2006	04/20 1600	04/19 2006	/	04/20 0317	200	580	330	250	15	clear separation at SD, a small Pt pileup before the SIR
12	9	04/29 1509	05/01 0736	04/29 1509	F	04/29 1827	160	700	380	320	16	Pt asymmetric, long tail after the SD; Vp deflection: W to E, S to N
				05/01 0736	R							
13	10	05/28 0323	05/29 0636	05/28 0323	F	05/28 0648	160	460	280	180	13.2	asymmetric Pt, much longer duration after SI, followed by an ICME
14	11	06/04 0300	06/05 1400			06/04 1311	180	660	370	290	16.2	very gradual Vp increase

15 *		06/16 0809	06/16 2308	06/16 0809	F	06/16 0845	210	700	460	240	21	closely following an ICME; **B** was not quiet in the fast stream; the Pt mimiced an ICME
16	12	06/22 1128	06/25 0152			06/23 0843	308	565	300	265	22	Vp continued increasing in the fast stream after the SIR; some BDE intervals
17	13	06/30 1640	07/02 0630	07/01 1303	F	07/01 1637	220	670	350	320	17	longer interval before SI
18	14	07/19 1510	07/22 0200	07/21 0642	R	07/21 0517	170	635	360	275	13	BDE occurred partically, Pt irregular
19	15	07/26 0000	07/29 1335	07/29 1335	R	07/27 2045	170	620	300	320	16	Pt irregular and concave, not a shock at 07/27 1840
20	16	08/04 0000	08/07 0625			08/06 1510	80	740	380	360	11	longer interval before SI
21 *		08/13 0150	08/13 1910	08/13 0150	F	08/13 0900	340	570	365	205	27	interacted with a leading ICME
22	17	08/15 0500	08/17 0004			08/16 0300	130	720	360	360	12.5	non-smooth variations
23 *		08/21 0800	08/22 0453			08/21 1505	180	535	360	175	12.5	coincided with sector boundary; a non-well-organized flux rope in the fast stream; Vp: W to E, N to S
24 *	18	08/23 1927	08/24 2039	08/23 1927	F	08/24 1203	2000	770	410	360	56	interacted with an ICME, noisy plasma data, extremely high Pmax due to large Tp, but it is the under-estimate from Wind data; ACE data gap around Pmax
				08/24 0535	F							
				08/24 2039	R							
25	19	08/30 1805	09/01 0400	08/30 1805	F	08/31 1100	250	500	350	150	19	Vp irregular
26	20	09/30 0653	10/01 1400	09/30 0653	F	09/30 1349	103	550	380	170	11.6	Vp deflection: W to E, N to S
27	21	10/07 0200	10/08 0634	10/08 0634	R	10/08 0146	500	680	330	350	24	long interval before Pmax, rapid Vp increase at 10/08 0300, maybe a sharp interface is forming
28	22	10/21 0850	10/22 1052			10/21 2336	210	400	296	104	15	small Vp deflection

29	23	10/24 1333	10/26 0100	10/24 2224	F	10/25 0305	180	455	310	145	11.5	Pt irregular
30	24	11/02 1210	11/03 0550			11/02 1835	220	650	370	280	16	classical
31	25	11/18 0600	11/20 0714			11/19 1300	125	445	280	165	12.5	Pt irregular, not monotonic Vp increase
32	26	11/21 1628	11/25 1250			11/24 0550	64	500	310	190	11.4	Pt plateau, noisy in some intervals, not monotonic Vp increase
33	27	11/29 1300	11/30 1100			11/29 2351	185	660	380	280	17	clear plasma shear, a half-day high Np region at sector boundary before the SIR
34	28	12/08 1302	12/12 0033	12/12 0033	R	12/10 0310	175	570	260	310	15.5	Pt irregular
35	29	12/19 0445	12/20 1800			12/19 2105	155	600	320	280	15	DG before it
36	30	12/27 0211	12/28 0039			12/27 1848	340	660	330	330	21	quiet **B** with large rotations at the leading part

2006

1	1	01/15 0600	01/17 0301			01/15 2102	140	460	333	127	12.5	classical
2	2	01/22 2147	01/23 2135			01/23 0858	180	640	360	280	16	
3		01/25 0900	01/26 2102	01/26 2102	R	01/26 1832	130	625	385	240	12	Pt asymmetric
4	3	02/10 0830	02/12 1400			02/11 0909	100	500	290	210	11.7	
5		02/13 1200	02/16 2100			02/15 0800	74	583	300	283	11	Pt non-smooth declining
6	4	02/18 0000	02/22 1515			02/20 0850	125	715	341	374	12	gradual transition at 02/20 10:00; Np and S hole as well as B increase during 03:52 - 07:25 on 02/19
7	5	03/05 1630	03/07 0800			03/06 1712	130	420	300	120	14.5	Vp deflection: westward to eastward, southward to northward
8	6	03/08 0000	03/11 2000			03/10 0405	136	570	328	242	12	following a weak SIR, ***B*** deflections in the leading part, discontinuity but not shock at 23:18 on 3/9; another discontinuity at 02:23 on 3/9

9 *		03/14 1730	03/15 1243			03/15 0627	145	535	340	195	17	a discontinuity at 10:49 on 3/14; a forming reverse shock at 12:43 on 3/15
10	7	03/17 1400	03/20 1100			03/18 2340	150	740	380	360	13	DG in the leading part
11	8	04/03 1600	04/06 0500			04/05 1450	175	465	280	285	16.3	asymmetric Pt profile, Vp: W to E, S to N
12	9	04/08 1921	04/09 2233	04/09 2233	R	04/09 1800	270	660	320	340	19	asymmetric Pt profile, discontinuities at 19:21 and 23:30 on 4/8, Vp deflections was same as the former SIR
13	10	04/21 0800	04/23 0000			04/22 0754	130	620	340	280	13	an interpeak trough in Pt profile
14		04/28 0019	04/29 0100	04/28 0019	F	04/28 0635	140	445	320	125	14	BDE, S increased sharply at the SI; somehow, relatively quiet B during 04/29 02:25 - 05/01 00:00
15	11	05/06 0700	05/07 0641	05/07 0641	R	05/06 1924	300	620	350	270	17.5	a very gradual Vp increase before the SIR
16	12	05/09 2200	05/12 0700			05/11 1145	105	693	360	333	10.5	weak
17	13	05/17 0500	05/18 1930			05/18 1037	180	550	320	230	17	asymmetric Pt profile
18	14	05/30 0600	06/02 2000			05/30 1655	120	600	300	300	11	an interpeak trough in Pt profile
19	15	06/05 2216	06/07 0936			06/06 1003	200	680	320	360	16	relatively quiet and rotating ***B*** during 6/6 12:00-22:00
20 *	16	06/14 0300	06/16 0000			06/15 0520	120	640	340	300	11.5	during 6/14 09:21-15:00, Np dip, S and B humps; in the front part of the ICME, B was relatively quiet and rotated like an ICME; BDE
21	17	06/27 0000	06/29 1400			06/29 0023	150	620	260	360	14.7	an interpeak trough in Pt profile
22	18	07/03 2152	07/05 0830			07/05 0023	220	660	300	360	20.5	
23 *	19	07/11 0527	07/12 1445			07/11 1415	150	540	340	200	16	closely following an ICME; fast stream had obviously more fluctuations than slow stream; BDE

24		07/14 0200	07/15 0300			07/14 1221	80	480	385	95	11	
25	20	07/27 1254	07/28 1102	07/28 1102	R	07/28 0012	285	640	340	300	17	DG at the leading edge, which might be a forward shock
26	21	07/30 1540	07/31 2200			07/31 1040	190	610	380	230	16	
27	22	08/06 2348	08/07 1950	08/07 1950	R	08/07 0630	310	580	330	250	21	Vp deflection: westward to eastward, northward to southward
28	23	08/26 2000	08/28 0700			08/27 1925	300	700	320	380	21	noisy and some short DGs, Vp deflection: W to E, N to S
29	24	09/03 2336	09/04 2045	09/03 2336	F	09/04 0216	155	640	430	210	16	asymmetric Pt profile, longer interval after SI
30	25	09/15 1800	09/19 0200			09/17 1440	77	660	310	350	11.2	
31	26	09/23 1216	09/24 0605	09/24 0605	R	09/24 0015	450	600	325	275	20.6	ACE, strong B, big Vp deflection to south
32 *	27	09/30 0210	10/01 0851	10/01 0851	R	09/30 1427	190	560	280	280	18.5	ACE, including an ICME
33	28	10/07 0720	10/07 1955	10/07 1955	R	10/07 1355	150	520	310	210	15	ACE, partial plasma DG except Vp in the leading part
34	29	10/12 0630	10/14 1100			10/13 0830	100	560	320	240	12	ACE, partial plasma DG except Vp in the leading part
35	30	10/19 2340	10/21 0015			10/20 1825	220	580	320	260	19	Vp deflection: N to S
36	31	10/27 0129	10/29 1200			10/28 1605	107	580	300	280	13.2	Vp and Pt irregular
37	32	11/03 0936	11/04 2020	11/03 0936	F	11/04 0120	105	440	335	105	10.6	Vp did not gradual increase
38	33	11/09 1153	11/10 1003	11/10 1003	R	11/10 0200	270	600	320	280	20	
39	34	11/23 0230	11/24 0900			11/23 0705	160	640	340	300	14	ACE, short, a Np drop and B hump during 11/13 07:10 - 07:42
40	35	12/05 0822	12/07 0812			12/06 1635	170	650	300	350	13	no clear SI
41	36	12/18 0915	12/21 1400			12/18 1600	90	750	410	340	12	Pt plateau

2007

1	1	2006 12/31 1000	2007 01/03 0829	01/03 0829	/	01/02 0138	190	680	300	380	15	ACE DG, fuzzy plasma data, V and Tp variations at 01/03 0830 are not very clear although the suprathermal electron flux changes sharply

2	2	01/08 0000	01/12 1200			01/11 0530	76	520	320	200	8.5	ACE DG, fuzzy plasma data, Np and Pt increases at 01/09 0500 are related to heliospheric plasma sheet
3	3	01/15 0710	01/15 1700			01/15 1407	145	620	330	290	15	after an ICME, Vy deflection
4	4	01/28 1400	01/29 1913.5	01/29 1913.5	R	01/29 1100	280	640	330	310	22	nice Vy deflection
5	5	02/04 1800	02/09 0200			02/06 1800	54	470	320	150	8.5	fast wind is not fast, weak and long
6	6	02/12 0900	02/14 1100	02/12 0900	F	02/12 1936	210	750	316	434	16.8	02/12 0921 not a shock because B does not increase sharply, a trough of Pt in the SIR
7	7	02/25 1200	02/28 1200			02/27 0703	130	680	300	380	15.5	two pile-ups of Np and Pt, two increases of Tp, the first Np enhancement is related to HPS
8	8	03/04 1200	03/07 2000			03/06 1110	86	640	360	280	11	some plasma DG before the leading part
9	9	03/11 0550	03/14 0423			03/12 1207	123	750	290	460	9.3	first Np increase is related to the HCS, at 03/12 1240, Np and Tp change sharply but V decreases, so it is not a SD
10	10	03/22 0000	03/26 0800			03/25 0010	120	520	260	260	12	long, Vp does not increase monotonically, very big Vy and Vz deflections during 03/21 - 03/22
11	11	03/31 1600	04/02 1057			04/01 0025	130	600	330	270	14	clear SD, although V does not increases sharply at the SD
12	12	04/08 2030	04/09 1330			04/08 2337	246	500	290	210	20	clear Vp deflection, two odd regions of opposite Np and Tp variations, while V is slow and B is quiet
13		04/16 2000	04/18 0100			04/17 0946	78	392	310	82	11	Vp is slow, Vp deflection

14	13	04/22 0037	04/23 0912			04/23 0144	210	520	290	230	15	Pt profile irregular
15	14	04/27 0400	04/28 1500			04/27 1750	115	660	403	257	11	Vp does not increase monotonically and Tp decreases not sharply around 4/28 1056.5
16	15	05/07 0702.75	05/08 0229.5	05/07 0702.75 05/08 0229.5	F /	05/07 1200.5	256	640	322	318	22	fairly large Np increase for 3.5 hours at the leading part, Tp decreases gradually at the trailing edge
17	16	05/17 2000	05/19 0600			05/18 1226	250	660	308	352	21	nice Vp deflection, nice SD
18	17	05/31 1200	06/05 0200			06/02 0030	100	520	305	215	12.6	long, Vp does not increase monotonically
19	18	06/12 1800	06/15 0600			06/14 1005	115	640	280	360	12	big V increase
20	19	06/21 0200	06/23 1400			06/21 0910	110	590	370	220	12.3	Pt irregular with a trough
21	20	06/29 1302	06/30 1100			06/29 1837	150	550	350	200	13	not monotonical V increase, clear V deflection, clear separation of slow and fast wind
22	21	07/03 0600	07/04 2200			07/04 0140	115	640	340	300	11	Vy deflection
23	22	07/10 1616	07/11 1600			07/11 0058	265	560	300	260	18	big DG over 12 hours
24	23	07/19 0327	07/21 0400	07/20 0459	F	07/20 1138	190	580	310	270	14	nice Vp deflection, nice SD
25	24	07/26 0800	07/27 0410	07/27 0410	R	07/26 1510	235	490	290	200	16	using 3-second data, we identify there is no f.s. or SD
26	25	07/28 1700	07/30 0300			07/29 0225	165	640	350	290	17	clear Vz deflection
27	26	08/06 0530	08/07 0741			08/06 2212	205	700	300	400	18	clear V deflection. The leading edge is a forming forward shock, with the signatures of shock, except that the B enhancement at the 'shock' only lasts 3 min before B decreases
28	27	08/10 0700	08/11 0258			08/10 1322	150	590	340	250	15	clear differences of fast and slow solar wind streams

29	28	08/14 1700	08/15 0900			08/14 2248	86	475	330	145	8.5	short, V does not increase monotonically and gradually, not a nice SIR
30	29	08/26 0700	08/27 0500			08/26 2100	230	600	340	260	21	another Np and Pt pile-ups before the SIR
31	30	08/30 1800	09/03 0600			09/02 0101	85	680	360	320	11	long, no clear SD
32	31	09/06 0900	09/07 0800			09/06 2201	70	565	410	155	9.5	slow wind is not slow
33	32	09/14 1343	09/15 0500			09/14 1830	170	448	270	178	16.6	fast wind is not very fast
34	33	09/20 0923	09/22 0700	09/20 0923	F	09/20 1304	165	605	320	285	13	Pt maximizes in the leading part, a trough in Pt profile
35	34	09/27 1054	09/29 0400	09/27 1054	F	09/27 1616	140	650	400	250	8.8	ACE, because Wind data gap at the leading part, Pt irregular with two peaks. HCS crossing is embedded within the SIR and near the SI
36	35	10/02 1700	10/04 0400			10/03 0427.5	52	610	400	210	8.2	weak, Vp deflection
37	36	10/11 0300	10/14 0000			10/12 0612	74	360	260	100	9	fast wind is not fast, a HCS ahead
38	37	10/17 0900	10/20 0300			10/18 1954	135	690	320	370	14	nice SIR
39	38	10/25 1042.7	10/25 1914.5	10/25 1042.7	F	10/25 1350	220	640	420	220	21.2	short
				10/25 1914.5	R							
40	39	10/29 1300	10/30 0500			10/29 2018	70	605	432	173	10	weak, slow wind is not very slow
41	40	11/07 2200	11/10 1900			11/09 1618	88	450	270	180	11	not smooth V increase
42	41	11/12 0600	11/13 2144.4			11/13 0207	142	640	340	300	15	not nice B increase at 11/12 2128.5, so it is not f.s.
43	42	12/10 0000	12/11 1000			12/10 1918	195	660	330	330	16	nice SIR
44	43	12/17 0153.4	12/17 2330	12/17 0153.4	F	12/17 0529	256	620	400	220	19	clear Vp deflection
45	44	12/25 1900	12/28 0800			12/27 1628	70	480	320	160	9.5	a trough in Pt profile, fast wind is not very fast

2008

1	1	01/04 1339	01/06 0543	01/04 1339	F	01/05 0624	235	690	300	390	18	nice SIR, sharp Np and Tp variations at 01/04 2349 are due to HCS, clear

				01/06 0543	R							at 01/04 2349 are due to HCS, clear Np compression for 2 hours
2	2	01/12 0530	01/15 1000			01/13 1520	74	740	420	320	9.5	big Vp deflection
3	3	01/24 0800	01/25 1000			01/25 0506	80	580	390	190	10	small fast stream
4	4	01/31 1042.5	02/01 2230			01/31 1754	170	640	320	320	14	Pt profile has a long declining part
5	5	02/09 1430	02/11 1100			02/10 0522	175	760	380	380	18	nice Pt profile
6	6	02/27 1300	03/01 0855			02/28 1025	98	830	337	493	10	12-hour data gap
7	7	03/08 0400	03/09 1300			03/09 0935	260	620	320	300	17	a trough in Pt profile
8	8	03/25 0000	03/28 1000			03/26 0918	113	700	400	300	10.5	20-hour DG in the leading part
9	9	04/04 0200	04/05 0500			04/04 1759	130	650	400	250	12.5	15-hour DG after the event
10		04/15 1600	04/16 2300			04/16 1132	130	615	350	265	12	variations of Np and Tp do not change quickly enough
11	10	04/22 1100	04/23 1900			04/23 0552	165	670	325	345	15	the leading part is longer, 4/24 1025 is not r.s.
12	11	04/30 1502	05/06 0800	04/30 1502	F	05/03 1230	95	660	380	280	10	Pt profile is irregular, with three pile-ups, Vp does not increase monotonically
13	12	05/17 1800	05/22 0000			05/21 0015	78	640	300	340	9.5	a clear Np increase around 05/19 0800 related to HCS
14	13	05/28 0117.5	05/28 1430	05/28 0117.5	F	05/28 0327	140	560	330	230	13	Vp continues to increase, a few small Pt pile-ups after the SIR
15	14	06/06 0142	06/08 0800			06/07 0925	86	530	345	185	10	weak, non-smooth parameter variations
16	15	06/14 1100	06/15 0230			06/14 2106	400	630	300	330	17	clear Vp deflection, plasma DG over 4 hours
17	16	06/24 1910.5	06/26 2350	06/24 1910.5	F	06/25 1704	150	660	340	320	16	not only one Np compression
18	17	07/04 0400	07/07 0000			07/05 1853	63	440	305	135	9.5	weak
19	18	07/11 0000	07/12 1020	07/12 1020	R	07/12 0042	140	580	320	260	16.5	Pt irregular
20	19	07/22 0633	07/23 1936	07/22 0633	F	07/22 2045	110	680	380	300	12	the trailing edge at 07/23 1936 is not a r.s., because the V and Np change gradually, and V does not increase

21	20	08/08 2324.5	08/10 0351	08/10 0351	R	08/09 0533	243	680	340	340	22	strong, leading edge at 08/08 2324.5 is not f.s. because V does not increase
22	21	08/17 1530	08/19 0030			08/18 1037	110	680	345	335	12	Np and Pt increases one day ahead are due to HCS
23	22	09/02 2354	09/04 2000			09/03 0600	144	600	325	275	16	Pt plateau
24	23	09/14 1813	09/15 1230	09/14 1813	F	09/14 2116	200	580	320	260	16	strong, a f.s. at 09/13 0400
25	24	09/30 1132.3	10/02 1800	09/30 1132.3	F	10/01 1351	98	700	340	360	10.5	a little long, Pt profile irregular, Np compression is not strong
26	25	10/11 0330	10/11 1926	10/11 1926	R	10/11 0735	170	540	300	240	17	large B deflection before the SI, data gap at ACE for the leading half part
27	26	10/18 0400	10/21 0500			10/19 2118	65	420	268	152	9	followed by another Vp increase and small Pt pile-up
28		10/24 2000	10/26 1900			10/26 0400	63	400	290	110	9	weak, the faster stream is not very fast, following a big SIR in 2 days
29	27	10/28 0524	10/29 1800	10/28 0524	F	10/28 1852	132	740	360	380	14.6	clear V deflection
30	28	11/06 1000	11/08 1300	11/07 2356	R	11/07 1202	130	570	281	289	12.5	Pt profile is a little irregular
31	29	11/15 1330	11/16 0900	11/16 0447	R	11/15 2041	122	530	310	220	14.5	a stable magnetic configuration of Parker spiral before the SIR
32	30	11/24 2229	11/25 1008	11/24 2229 11/25 1008	F R	11/25 0734	350	550	315	135	22	nice except several data spikes
33	31	12/02 1800	12/04 1119.5	12/03 0817	F	12/03 1200	80	510	290	220	9.8	clear V deflection, no sharp traditonally defined SI, Np and Tp changed gradually
34	32	12/05 1100	12/06 2100			12/06 0015	105	560	400	160	11.5	
35	33	12/10 0100	12/12 0200			12/11 0300	58	430	330	100	7.5	Vp does not monotonically increase
36	34	12/22 0300	12/23 2100			12/22 1555	108	570	300	270	12	Vp does not monotonically increase
37	35	12/29 2300	12/31 1900			12/31 0119	185	530	290	240	16	data gap for the leading half part, for both Wind and ACE

2009

1	1	01/02 0230	01/04 0000			01/03 1022	58	570	375	195	7.8	after a SIR
2	2	01/08 0000	01/10 2200			01/08 1445	53	400	288	112	7.3	not smooth Vp increase, two peaks of Np, Pt, and Pdyn
3 *	3	01/18 1900	01/19 1800			01/18 2347	90	485	350	135	12.8	~ 12 hour Vp decrease, low Tp and quiet B for 01/19 0200 - 0510, probably a small flux rope
4 *	4	01/25 2119	01/29 1600	01/25 2119	F	01/26 0638	110	415	320	95	11	clear Vp deflection, sharp field direction changes, strong and quiet field on 01/26 is an ICME
5	5	02/13 2130	02/14 1442	02/14 1442	R	02/14 0521	210	560	300	260	18.2	clear Vp deflection near SI, B deflection before SI
6	6	02/18 1725	02/24 1200			02/21 1642	70	480	300	180	5.8	some data gaps, non-montonical increase of Vp
7	7	02/26 1400	02/27 2030			02/27 0945	80	700	373	327	10	6-hour data gap
8	8	03/07 1000	03/08 2200			03/08 0736	86	450	304	146	12	Vp does not montonically increase, a sharp increase of Pt, traditionally defined SI at 03/08 0607, but Np increased afterward
9	9	03/12 1300	03/13 1200			03/12 2302	190	560	330	230	17.8	hybrid event, Vp does not increase monotonically
10	10	03/20 0000	03/22 1200			03/21 0525	84	450	290	160	11	Pt pile-up at the center
11	11	03/23 1400	03/25 1400	03/23 1728	/	03/24 0110	48	510	340	170	7.8	after a SIR, Vp does not gradually increase
12	12	04/04 0000	04/06 0600			04/05 0336	45	420	270	150	6.5	changes at SD are not sharp
13	13	04/08 1100	04/09 2000			04/09 0140	80	490	300	190	10	clear Vp deflection
14	14	04/15 1900	04/18 1700			04/16 1455	86	540	300	240	12	not monotonical Vp increase
15	15	04/23 2342.5	04/24 2200	04/23 2342.5	F	04/24 0623	66	460	350	110	8.6	Vp does not monotonically increase

16	16	05/05 0000	05/10 0000			05/06 1530	47	530	326	204	8	long and weak
17	17	05/15 2306	05/16 1300			05/16 0500	44	395	315	80	7.6	Vp is slow and does not increase monotonically
18	18	05/20 1300	05/21 0800			05/20 1934	59	355	280	75	8.5	Tp continues to increase
19	19	05/28 0405	05/28 2219	05/28 0405	F	05/28 0805	120	457	340	117	13	contain field rotations from 05/28 1100 to end, no BDE, STA saw CME 5/22 0007
20	20	06/24 1429.7	06/24 2230	06/24 1429.7	F	06/24 1746	260	510	330	180	18	
21		06/28 1100	06/29 1400			06/28 2007	107	550	350	200	9.2	following an ICME
22	21	07/09 1704	07/10 1700	07/09 1704	F	07/10 0211	100	478	330	148	12	Vp does not increase monotonically
23		07/13 0813	07/14 0154			07/13 1830	115	525	343	182	12.5	
24	22	07/21 2000	07/22 1030.5	07/22 1030.5	R	07/22 0435	200	420	290	130	18	after a region of B rotations
25 *	23	08/05 0444	08/06 1916			08/06 0225	133	526	350	176	13.5	an ICME embedded
26	24	08/16 2200	08/20 1845			08/19 0953	105	530	265	265	12	first Np and Pt pile-up, and the velocity deflection are due to HCS; ACE plasma DG
27		08/30 0016.33	08/30 2125	08/30 0016.33	F	08/30 1418.5	85	480	350	130	12.8	ACE, 6-hour quiet B embedded in the center
28	25	09/03 1457	09/04 1700	09/03 1457	F	09/03 1950	65	500	330	170	9.5	Np and Tp change at 09/03 2030 - 2100, not within 10 min, so not sharp SI; B is very variable
29	26	09/12 2000	09/16 0500			09/13 1616	88	480	285	195	9.6	Vp does not monotonically increase; Np and Tp change gradually at the transition region; a half-day prominent Pt pile-up region
30	27	09/20 0900	09/21 2000			09/21 0004	84	470	300	170	9.5	
31		10/04 0317.67	10/05 0300	10/04 0317.67	F	10/04 0923	130	430	310	120	11.2	2 Pt pile-ups before this one are not SIRs because the changes of individual parameters do not meet SIR criteria

32	28	10/10 2250	10/11 2218	10/10 2250	F	10/11 0516	220	470	266	204	14.5	clear velocity deflection
33	29	10/15 0224	10/16 1200			10/15 1046	70	440	300	140	9.6	Pt peak is not strong
34 *		10/21 2315.17	10/23 1800	10/21 2315.17	F	10/22 1300	93	400	275	125	11.5	although SOHO and STEREO saw possible CME candidate and there is BDE, but other signatures of ICMEs do not meet. The strong f.s. may be due to the CME when it was closer to the Sun
35	30	10/24 1227	10/25 0800			10/24 1650	110	475	360	115	10.5	following the fast wind of a previous SIR, but field and plasma features suggest it is a separate event
36	31	11/07 1600	11/09 1600	11/09 0706.5	R	11/08 0850	88	450	250	200	11.5	nice velocity deflection
37	32	11/20 0700	11/22 0055			11/21 0520	80	570	350	220	11.3	several Pt pile-ups ahead with no Vp increase
38		11/24 0005	11/25 1400			11/24 1343	80	465	325	140	9	following a previous SIR
39	33	12/05 0526	12/06 1807	12/05 0526	F	12/05 1957	105	430	240	190	11	sharp f.s., no CME candidate, big Vy deflection
40	34	12/16 0200	12/19 0600			12/17 1512	67	450	280	170	7.8	3 pile-ups of Pt
41		12/23 0348	12/24 0930			12/23 1305	47	455	330	125	6.7	long slow-wind region, Vp does not increase gradually
42	35	12/25 0600	12/26 1000			12/25 1748	76	405	290	115	10	Vp does not increase monotonically

* Hybrid case consisting of more than one event.

[1] F/R Shock: forward/reverse shock. "/" means neither a forward shock nor a reverse shock

[2] ΔV: change in solar wind velocity magnitude during one event.

[3] ICME: interplanetary coronal mass ejection.

[4] ACE: from ACE data.

[5] BDE: bidirectional solar wind electron strahls.

[6] SR: slow reverse shock, from Justin Kasper's shock list of *Wind* (*http://space.mit.edu/home/jck/shockdb/shockdb.html*).

Record:

1. Revised on May 30, 2010. Change: update to the end of 2009.

2. Revised on July 20, 2010. Change: based on high resolution data and close investigation, add comments on why the leading edge of 2007-08-06 SIR is not a shock.

3. Revised on Oct 25, 2010. Change: update the events for 1995 - 1997 and 2008 - 2009 following the study for Jian et al. (2011); the Wind data gaps during 1995 - 1997 are filled up with OMNI data (1-min available).

4. Reference information is updated on 18 Nov 2014.

5. Update Lan Jian's affiliation on 18 February 2021.