

## SMM C/P 1989 Coronal Mass Ejections page 1 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jan 01	001	04:40-06:13	268	014	—	—	—	—	0	No obvious front	Narrow tongue.
Jan 01	001	07:55-09:12	~150	—	—	—	—	—	0	Too fuzzy	Fuzzy cloud near pylon shadow.
Jan 02	002	02:22~05:30	145	—	—	—	—	—	0	Too fuzzy	Cloud superposed on and south of streamer. Deflections.
Jan 02	002	19:21~22:53	297	055	Jan 02 19:21-20:30	621 <sub>1</sub> 912 <sub>2</sub> *	288†	3	9	Loop	Bright loop/cavity and loop-shaped(?) core superposed on streamer. Streamer is disrupted. Deflections. Core becomes concave-outward, 'V'-shaped from 20:30 to 22:04.
Jan 03	003	09:41~18:46	~058	—	—	—	—	—	1	—	Mound with core superposed on streamer (or fan). Could be more than one event. Deflections. Concave-outward shaped material at 18:29. Data is streaked.
Jan 04	004	~02:18~13:13	114	057	—	—	—	—	0	No obvious front	Cloud superposed on streamer.
Jan 04	004	~07:24~10:39	028 033?	025 025?	Jan 04 07:24-07:40	631 <sub>1</sub> *	034	2	7	Northern loop	Two overlapping loops/cavities: 1. Northern loop/cavity. Front trails southern loop. 2. Southern loop/cavity.
					—	—	—	—	0	Front at 07:24 only	
											DATA GAP: Jan 04 13:54 to Jan 05 15:36.
Jan 06	006	02:40-08:54 02:40-04:55	060	070	—	—	—	—	0	No clear front	Two part event: 1. Broad, fuzzy cloud superposed on streamer. Deflections.
		07:12-08:54	060	080	—	—	—	—	0	No clear front	2. Structured (prominence?) cloud superposed on streamer.
Jan 06	006	05:39-09:02	290	070	Jan 06 05:39-06:28	190 <sub>1</sub> * 422 <sub>2</sub>	290	3	7	Outer cavity	Loop/cavity and structured, inner (prominence?) loop/cavity. Inner loop is at northern edge of event. Event is superposed on fan.
					Jan 06 05:55-06:28	395 <sub>1</sub> * 528 <sub>2</sub>	306	3	9	Inner loop (prominence?)	Fan is blown out. Deflections.
Jan 06	006	~11:01-21:56	~270	—	—	—	—	—	0	No obvious front	Slow expansion of material in fan. Fan is disrupted. Deflections.

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Jan 06	006	18:08-18:41	120	060	Jan 06 18:08-18:41	799 <sub>1</sub> ★ 678 <sub>2</sub>	137†	3	6	Loop	Sharp loop/cavity at 18:08 superposed on south edge of streamer. Front gets fuzzy. Deflections.
Jan 07	007	00:22-09:00	~140	~020	—	—	—	—	0	No clear front	Blob 'N Ray. Moves synchronously with other east events from 05:03 to 06:37.
Jan 07	007	01:56-03:54	303	067	Jan 07 01:56-02:20	545 <sub>1</sub> ★ 770 <sub>2</sub>	310	3	7	Loop	Fuzzy loop/cavity and twisted, structured (prominence?) core superposed on streamer (or ray). Deflections.
					Jan 07 02:12-02:45	491 <sub>1</sub> ★ 400 <sub>2</sub>	310	3	7	Cavity (in core)	
Jan 07	007	03:29-23:46 03:29-14:24	~104	~041	Jan 07 12:51-13:24	219 <sub>1</sub> ★ 070 <sub>2</sub>	110	3	4	Mound	Two part event: 1. Fuzzy mounds (or loops/cavities). Stalls or fades by 05:03. Bright, narrow material in southern edge at 05:19. Could be part of 00:22 event. Accelerates at 12:51. Possible fuzzy loop/cavity and core at this time. Event is superposed on streamers (or rays). 2. Fuzzy, structured loop/cavity (or cloud).
		20:39-23:46			~102	~036	—	—	—	—	
Jan 07	007	05:03-09:00	~055	~030	Jan 07 05:19-05:52	633 <sub>1</sub> ★ 493 <sub>2</sub>	058	3	5	Loop	Fuzzy loop/cavity with concave-outward 'U'-shaped blob superposed on rays. Region is disrupted.
Jan 07	007	06:37~14:24	070?	056?	Jan 07 08:35-13:16	019 <sub>1</sub> ★ 043 <sub>2</sub>	065	4	3	Loop	Faint loop/cavity superposed on fan (or rays) between two ongoing events. Front fades.
					Jan 07 06:37-13:16	020 <sub>1</sub> ★ 013 <sub>2</sub>	068†	9	3	Cavity	
Jan 07	007	08:35<10:26	317	045	—	—	—	—	0	Front at 08:35 only	Loop(?)/cavity and structured, loop-shaped (prominence?) core superposed on fan.
Jan 07	007	18:13?-23:54	~250	~020	—	—	—	—	0	Too faint	Very faint cloud superposed on fan. Could have started earlier.

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Jan 07/08	007/008	22:29-02:09	058	020	Jan 07 23:02-23:46	368 <sub>1</sub> *	063	2	4	Tongue	Tongue superposed on fan.
Jan 08	008	03:10~08:16	060	030	—	—	—	—	1		Two part event: 1. Concave-outward, 'cornucopia', 'V'-shaped material with bright, structured (prominence?) material at 03:43. Event is superposed on fan. Could be part of previous event. Non-radial motion. 2. Irregularly-shaped material.
		03:10-08:16	090	037	—	—	—	—	0	No obvious front	
Jan 08	008	12:48-15:55	123	051	Jan 08 12:48-14:05	339 <sub>1</sub> * 234 <sub>2</sub>	118	4	9	Loop	Flattened loop/cavity and fuzzy core superposed on streamer and rays. Region is disrupted. Deflections.
Jan 08	008	15:55-20:03	062	028	Jan 08 16:21-17:12	435 <sub>1</sub> * 511 <sub>2</sub>	068	3	3	Cloud	Cloud containing concave-outward, 'U'-shaped front. Cloud is superposed on fan. Deflections.
Jan 08	008	17:04-20:11	240	031	—	—	—	—	0	No clear front	Fuzzy cloud superposed on fan.
Jan 08	008	20:03-22:26	074	021	—	—	—	—	0	No clear front	Narrow tongue superposed on rays.
Jan 09	009	04:41<11:39	053	047	—	—	—	—	0	No clear front	Narrow tongue superposed on rays followed by wider cloud superposed on rays at 09:14. Deflections.
Jan 09	009	13:21-15:12	343	100	Jan 09 13:21-13:38	737 <sub>1</sub> *	325	2	9	Loop	Big loop/cavity and core(?) superposed on streamers and fan. Deflections.
Jan 09/10	009/010	18:36-10:12	227	055	Jan 09 18:36-21:43	050 <sub>1</sub> * 074 <sub>2</sub>	215	3	5	Loop	Could be two events: 1. Thick loop/cavity superposed on streamer and fan. Second loop/cavity follows at 23:17. Deflections. Concave-outward material could be present from 07:13 to 10:12. 2. Faint cloud superposed on and north of part one.
		07:05-10:12	315?	—	—	—	—	—	1		
Jan 09	009	19:45-21:18	130	054	Jan 09 19:45-20:18	340 <sub>1</sub> * 352 <sub>2</sub>	128	4	4	Loop	Flattened loop/cavity superposed on fan (or streamers). Could be related to 18:36 southwest event.
Jan 10	010	00:42-03:16	134	027	Jan 10 00:50-00:58	844 <sub>1</sub> *	135	2	7	Mound	Structured mound (or tongue) superposed on fan.

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Jan 10	010	20:50-22:32	125	080	Jan 10 20:50-21:15	611 <sub>1</sub> * 467 <sub>2</sub>	140	3	7	Loop	Loop/cavity with possible core superposed on fan. Deflections.
Jan 10/11	010/011	22:16~00:22	~061	~028	—	—	—	—	0	No clear front	Narrow tongue superposed on rays. Deflections.
Jan 11	011	06:20-12:18	015?	—	—	—	—	—	0	No clear front	Possible halo. Motion in all sectors.
		09:11-12:18	020	020	—	—	—	—	0	Front at 09:11 only	Mound (or loop/cavity) north of streamer.
Jan 11	011	06:37~20:22	220	040	Jan 11 06:37-09:27	082 <sub>1</sub> * -014 <sub>2</sub>	225	5	3	Cloud	Faint cloud (or mound) superposed on streamer followed by brighter material from 08:11 until ~20:22. Cavity could be present at 08:11. Streamer is disrupted.
Jan 11	011	13:35-15:09	060	064	Jan 11 13:52-14:00	912 <sub>1</sub> *	068	2	8	Loop	Two part event, same times for both: 1. Loop/cavity and core superposed on background corona. Deflections.
			137	016	—	—	—	—	0	No obvious front	2. Tongue superposed on fan.
Jan 12	012	20:47-22:37	058	087	Jan 12 20:47-21:36	538 <sub>1</sub> * 610 <sub>2</sub>	067	4	7	Loop	Wide loop/cavity and inner loop-shaped core superposed on streamers and rays. Region is disrupted. Deflections.
Jan 13	013	05:16-07:42	206?	032?	—	—	—	—	0	Front at 05:25 only	Cloud (or loop/cavity) near pylon shadow.
Jan 13	013	10:49-12:47	124	081	Jan 13 10:49-11:38	314 <sub>1</sub> * 290 <sub>2</sub>	142†	4	5	Loop	Faint loop/cavity (or mound) with blob.
Jan 14	014	06:22~10:45	195?	062?	—	—	—	—	0	Too faint	Faint, irregular cloud spans pylon shadow. Deflections. Could extend as far east as 142°.
Jan 15	015	11:18-12:52	282	015	—	—	—	—	0	No clear front	Narrow tongue north of streamer.
Jan 15	015	16:40-17:49	310	020	—	—	—	—	0	No obvious front	Fuzzy, narrow cloud (or tongue) superposed on ray.
Jan 15	015	19:06-21:13	105	051	Jan 15 19:06-19:39	160 <sub>1</sub> * 316 <sub>2</sub>	114	3	3	Loop	Faint loop/cavity superposed on rays (or streamers). Deflections.
Jan 15	015	20:31-22:05	283	007	—	—	—	—	0	No obvious front	Narrow jet north of streamer.

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Jan 15	015	20:48-23:55	015	050	—	—	—	—	0	Front at 20:48 only	Mound (or loop/cavity) with highly structured arrow-shaped (prominence) core at 012° in 22:22 image. Event appears between streamers. Deflections.
Jan 15	015	22:13-23:47	112	087	Jan 15 22:13-22:46	316 <sub>1</sub> *	095	2	6	Loop	Faint structured, irregularly-shaped loop/cavity with faint structured (prominence?) core superposed on streamers (or rays). Deflections.
					Jan 15 22:13-22:46	347 <sub>1</sub> *	107†	2	6	Core (prominence?)	
Jan 15/16	015/016	22:55-00:03	295	070	—	—	—	—	1	Cloud	Faint cloud superposed on streamers and rays. Deflections.
Jan 16	016	09:09-12:49	055	060	Jan 16 09:09-09:42	538 <sub>1</sub> *	060	3	7	Cavity	Loop/cavity with beautiful, brighter, structured, inner (prominence) loop/cavity superposed on and between streamers. Northern leg of inner loop is highly structured. Streamers are disrupted. Big deflections.
			046	060	Jan 16 09:17-10:42	352 <sub>1</sub> *	060	3	9	Inner loop (prominence)	
Jan 16	016	09:25-11:07	245	040	Jan 16 09:25-09:50	465 <sub>1</sub> *	240	3	5	Loop	Faint, irregular loop/cavity (and core?) superposed on streamers. Deflections.
Jan 16	016	09:33-11:07	182?	065?	—	—	—	—	0	No clear front	Faint, irregular cloud partially obscured by pylon shadow. Could be wider.
Jan 17	017	03:55-07:27	~070	~050	—	—	—	—	1		Faint cloud superposed on streamers and rays.
Jan 17	017	09:17-14:42	~221	~042	—	—	—	—	0	Too faint	Faint cloud superposed on streamers and rays. South edge is obscured by pylon shadow. Deflections.
Jan 17/18	017/018	21:21-04:00	329	066	—	—	—	—	0	Too fuzzy	Could be two events: 1. Faint material superposed on streamer. Streamer expands. 2. Loop/cavity and core superposed on and north of streamer. Streamer is disrupted. Deflections.
	017/018	21:21-04:00			—	—	—	—	0	Too fuzzy	
	018	00:28-04:00	323	065	Jan 18 00:28-00:53	560 <sub>1</sub> *	327	3	8	Loop	
					Jan 18 00:28-00:53	471 <sub>1</sub> *	327	3	8	Cavity	

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Jan 18	018	07:00-11:49	240	081	Jan 18 07:00-07:52	725 <sub>1</sub> * 608 <sub>2</sub>	245	3	7	Loop	Broad loop/cavity and complex multi-structured core superposed on and between streamers. Region is partially blown out. Big deflections.
Jan 18/19	018/019	07:00~06:24	~315	—	Jan 18 08:25-09:50	117 <sub>1</sub> * 340 <sub>2</sub>	324	3	3	Cloud	Could be up to three events: 1. Cloud superposed on streamer. Could be concave-outward, 'V'-shaped. 2. Loop/cavity and inner, structured (prominence) loops/cavities superposed on and north of streamer. Inner loops are visible by 19:12. Deflections. 3. Streamer expands and blows out.
	018	07:00~11:24			—	—	—	—	—	1	
	018	18:47~20:20	318 335	063 030	—	—	—	—	1	Inner loops (prominence)	
	018/019	21:10-06:24	315	030	—	—	—	—	0	No obvious front	
Jan 18	018	11:07-12:41	095	090	—	—	—	—	0	Front at 11:07 only	Wide, irregular loop/cavity with core. South side is faint. Deflections.
Jan 19	019	01:43-04:17	~107	~086	—	—	—	—	1	Front clearly visible at 01:43 only	Loop/cavity with bright, structured cores superposed on and between streamers. Material covers east sector. Region is partially blown out. Deflections.
Jan 20	020	05:07-07:14	050	050	—	—	—	—	0	Front at 05:07 only	Multiple, concentric loops/cavities and structured core superposed on and between streamers. Region is partially blown out. Deflections.
					—	—	—	—	1	Cavity	
Jan 20	020	16:19-23:50	290	030	Jan 20 16:19-17:36	226 <sub>1</sub> * 127 <sub>2</sub>	293	4	5	Mound	Fuzzy, structured mound (or tongue) superposed on and between rays. Fades.
Jan 21	021	00:40-02:13?	307	045	—	—	—	—	0	Front at 00:40 only	Thin loop/cavity and structured (prominence?) core superposed on streamer and ray. Core fragments. Faint material ejected mid Jan 21. Region is disrupted. Deflections.
Jan 21/22	021/022	~08:12-02:30	060	030	—	—	—	—	0	No obvious front	Slow expansion and disruption of streamer.

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Jan 21/22	021/022	21:41~04:12	295	040	Jan 21 21:58-23:31	283 <sub>1</sub> 479 <sub>2</sub> *	300	4	5	Flat loop	Flattened loop/cavity (or mound) superposed on streamers. Second loop/cavity (or mound) at 01:13. Deflections.
Jan 22	022	11:52-15:00	~038	~043	Jan 22 13:26-13:42	562 <sub>1</sub> *	045	2	5	Mound	Faint mound (or cloud) superposed on and north of streamer. Deflections. Could be wider.
											DATA GAP: Jan 23 05:44 to Jan 24 22:58.
Jan 25	025	03:47-05:54	307	045	Jan 25 03:47-03:55	561 <sub>1</sub> *	310	2	9	Loop	Thick loop/cavity superposed on and south of streamer and rays. Deflections.
Jan 25	025	06:03-09:10	122?	025?	—	—	—	—	0	No obvious front	Cloud (or blob) in streamer.
Jan 25/26	025/026	16:41~07:00	127	055	Jan 25 16:57-20:05	055 <sub>1</sub> *	130	8	5	Cavity	Cavity and core rise slowly in streamer. Loop becomes visible around cavity.
Jan 26	026	03:03-06:44	314	032	Jan 26 03:28-03:53	375 <sub>1</sub> *	313	2	3	Cloud	Cloud superposed on and south of streamer.
Jan 26	026	14:06~15:40	268	—	—	—	—	—	0	No obvious front	Faint blob (or cloud) between streamers.
Jan 26	026	14:23-15:32	150?	050?	Jan 26 14:31-14:48	351 <sub>1</sub> *	142	2	5	Loop	Faint loop(?)/cavity superposed on streamer.
Jan 26	026	19:20-20:54	~270	—	—	—	—	—	0	No obvious front	Faint, narrow jet. Data is streaked.
Jan 27	027	16:37-18:11	260	040	Jan 27 16:37-17:10	738 <sub>1</sub> *	260	2	3	Mound	Faint, structured mound in streaked data. Deflections.
Jan 28	028	03:24-05:31	310	060	Jan 28 03:24-03:41	382 <sub>1</sub> *	315	3	4	Loop (not leading edge)	Bright, irregular loop/cavity and complex loop-shaped core superposed on streamer. Remnants ejected late in event. Core is concave-outward, 'V'-shaped by 04:06. Streamer is partially blown out. Deflections.
			305	030	Jan 28 03:24-03:49	436 <sub>1</sub> *	315	4	7	Inner cavity (in core)	
Jan 28	028	08:38-10:28	142	035	—	—	—	—	0	No obvious front	Faint cloud superposed on streamer.
Jan 28	028	13:27-15:00	~325	—	—	—	—	—	0	Front at 13:27 only	Faint loop/cavity superposed on fan (or streamer).
Jan 28/29	028/029	22:15-01:30	315	050	Jan 28 22:15-22:48	649 <sub>1</sub> *	315	3	9	Outer loop	Two part event: 1. Multiple, concentric loops/cavities with core superposed on streamer and fan. 2. Faint mound (or cloud) north of fan.
		22:15-01:22			638 <sub>1</sub> *	315					
		22:23-01:30	~018	~065	—		—	—	—	0	

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Jan 29	029	00:30-02:48	~130	—	—	—	—	—	0	Too fuzzy	Cloud superposed on streamers. Cloud is concave-outward, 'V'-shaped.
Jan 29	029	04:21-17:06	040	048	Jan 29 06:28-08:02	142 <sub>1</sub> *	030	2	5	Cavity	Two piece event: 1. Loop/cavity (and core?) superposed on rays. 2. Fuzzy loop/cavity and core north of fan. Deflections.
		08:02-17:06	000	040	Jan 29 09:18-10:52	174 <sub>1</sub> *	002	2	3	Fuzzy cavity	
Jan 30	030	02:11~03:44	304	062	Jan 30 02:11-02:27	1055 <sub>1</sub> *	310	2	9	Outer loop	Dimpled loop/cavity with beautiful, structured, knotty, inner (prominence) loop/cavity superposed on rays and streamer. Deflections. Region is disrupted.
			305	040	Jan 30 02:11-02:27	787 <sub>1</sub> *	305	2	9	Inner loop (prominence)	
Jan 30	030	02:52~05:18	103	045	—	—	—	—	0	Too fuzzy	Structured mound superposed on streamer. Deflections.
Jan 30	030	05:51~22:41	027	022	—	—	—	—	0	No clear front	Tongue superposed on narrow streamer. Streamer is disrupted. Deflections.
Jan 30	030	12:05-16:10?	222	032	—	—	—	—	1		Fuzzy mound superposed on and south of streamer.
Jan 31	031	04:38~09:35	065	130	Jan 31 04:38-06:12	338 <sub>1</sub> *	045	3	7	Outer loop	Could be two concentric, proximate loops/cavities centered on ray. Deflections.
					Jan 31 04:47-05:04	356 <sub>1</sub> *	020	3	7	Inner loop	
Jan 31	031	11:34~20:30	059	043	—	—	—	—	1		Structured cloud. Could be related to previous event. Deflections.
Feb 01	032	04:01-06:08	032	014	—	—	—	—	1		Narrow, structured tongue superposed on ray. Ray is disrupted.
											DATA GAP: Feb 01 07:58 to 16:31.
Feb 01	032	16:39?~18:54	315	035	—	—	—	—	0	No obvious front	Faint loop/cavity superposed on streamer. Data is streaked.
											DATA GAP: Feb 01 23:02 to Feb 03 15:17.
Feb 03	034	<15:17-16:06	~315	—	—	—	—	—	0	Missed front	Bright, irregular material over west limb. Missed front in data gap.

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					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Feb 03/04	034/035	15:33?-08:42?	051	049	—	—	—	—	1	Cloud	Irregularly-shaped cloud in streaked data.
Feb 04	035	10:15~23:00	042	095	Feb 04 10:15-10:40	842 <sub>1</sub> *	052	2	5	Loop	Could be two events in streaked data: 1. Big, bright loop/cavity and complex, structured core superposed on streamers (or fan). Region is blown out. Big deflections. 2. Thin loop/cavity. Best seen in north images.
		11:49~23:00			Feb 04 11:49-16:29	027 <sub>1</sub> * 021 <sub>2</sub>	062	4	3	Cavity	
Feb 05	036	11:20~14:27	~069	~022	—	—	—	—	0	No obvious front	Faint cloud superposed on rays. Could be wider. Data is streaked.
Feb 06	037	16:56-18:29	030	050	—	—	—	—	0	Front at 16:56 only	Structured mound (or loop/cavity) with structured core superposed on rays. Deflections.
Feb 07	038	01:00-13:28	235	026	—	—	—	—	0	No obvious front	Could be two events: 1. Tongue superposed on streamers. Motion prior to event. 2. Fuzzy loop/cavity(?) superposed on streamers. Deflections. Region is disrupted.
		01:00~03:59	~230	—	—	—	—	0	No obvious front		
Feb 08	039	09:02-12:17	235	040	Feb 08 09:02-11:17	128 <sub>1</sub> * 016 <sub>2</sub>	234†	4	3	Cavity	Fuzzy, structured loop(?)/cavity superposed on fan (or streamers). Region is disrupted. Deflections.
Feb 08/09	039/040	21:30~02:27	015	100	—	—	—	—	0	Missed front	Big loop/cavity and structured, loop-shaped core centered on streamer. Big deflections. Region is disrupted.
Feb 08/09	039/040	23:36-01:10	223	032	—	—	—	—	0	Front in one image only	Loop/cavity superposed between streamers. Deflections.
Feb 09	040	04:34-07:41	235	040	—	—	—	—	0	No obvious front	Faint, structured cloud superposed on streamers.
Feb 09	040	14:55-19:35	~020	~160	Feb 09 16:28-18:01	124 <sub>1</sub> *	000	2	3	Loop	Wide, fuzzy, faint loop/cavity. Best seen in 18:01 image. Halo?

† Position of feature was measured along a non-radial line.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Feb 10	041	06:54-10:01	228	019	—	—	—	—	0	Missed front	Irregularly-shaped, highly structured, twisted ropes of (prominence?) material superposed on and south of streamer. Could have missed the front between 05:29 and 06:54 images.
Feb 10	041	12:35-15:42	103	054	Feb 10 12:35-13:08	742 <sub>1</sub> 1611 <sub>2</sub> *	108†	3	9	Loop	Thin loop/cavity with core and blob between streamers. Blob is in northern leg of event. Loop is 'light-bulb'-shaped. Deflections.
Feb 11	042	02:45-23:33	~050	—	—	—	—	—	0	No obvious front	Two part event in streaked data: 1. Fuzzy cloud with blob superposed on streamers. 2. Bright, narrow jet.
		02:45-09:15								—	
Feb 11	042	21:51-23:33	~057	—	—	—	—	—	0	No obvious front	
Feb 11	042	13:55-17:02	~210	~020	Feb 11 13:55-15:29	074 <sub>1</sub> *	208	2	3	Cloud	Fuzzy cloud south of streamer.
Feb 12	043	14:18~23:47	106	067	Feb 12 15:08-16:00	089 <sub>1</sub> *	110	2	3	Cavity	Faint, fuzzy loop/cavity and complex, structured (loop-shaped?) core superposed on and between streamers. Deflections. Data is streaked.
Feb 12/13	043/044	20:57-05:10	150?	119?	Feb 12 20:57-21:22	784 <sub>1</sub> *	140	3	6	Loop	Wide loop/cavity and diffuse core. Streaked data. Deflections. Could extend as far north as 055°.
Feb 13	044	16:54-20:01	056	038	Feb 13 16:54-18:28	291 <sub>1</sub> *	055	4	7	Cavity	Loop/cavity and core superposed on and north of streamer. Streamer is partially blown out. Deflections. Data is streaked.
Feb 14	045	03:57~16:24	322	090	Feb 14 10:27-11:44	144 <sub>1</sub> *	325	2	3	Northern cavity	Slow brightening and expansion of material in streamer. Irregular cloud appears at 08:54. Broad loop/cavity with complex core is visible at 10:27 with smaller, embedded loop/cavity and core at southern edge. Streamer is blown out. Big deflections. Data is streaked.
					Feb 14 11:52-13:01	186 <sub>1</sub> *	295	3	4	Southern cavity	
Feb 14	045	05:47~12:01	~103	~015	—	—	—	—	1	Cavity	Small, faint cavity superposed on rays in streaked data.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Feb 14/15	045/046	11:36~10:06	055	033	Feb 14 11:36-14:43	077 <sub>1</sub> * 059 <sub>2</sub>	060	4	7	Cavity	Loop/cavity and brighter, structured inner (prominence) loop/cavity superposed on streamers. Region is partially blown out. Big deflections. Additional fuzzy cloud follows from 00:37 until ~10:06. Data is streaked.
					Feb 14 13:09-15:16	028 <sub>1</sub> * 020 <sub>2</sub>	060	4	9	Inner loop (prominence)	
Feb 15	046	18:37-20:10	~305	—	—	—	—	—	0	No clear front	Jet (or narrow tongue). Could be wider.
Feb 16	047	11:53~22:47	092	020	—	—	—	—	0	No obvious front	Two part event: 1. Faint, irregularly-shaped cloud superposed on rays in streaked data. 2. Faint, narrow cloud. Possible concave-outward, 'U'-shaped material in 18:40 image.
		11:53~15:00	~135	—	—	—	—	—	0	No clear front	
Feb 17	048	14:22-19:02	105	050	Feb 17 14:22-15:55	236 <sub>1</sub> *	110	2	7	Loop	Multiple(?), concentric loops/cavities and core superposed on streamer. 'Light-bulb' shape at 15:55. Streamer is blown out. Deflections.
					Feb 17 14:22-15:55	236 <sub>1</sub> *	110	2	7	Cavity	
Feb 17/18	048/049	~21:08-08:11	~147	~039	—	—	—	—	0	Mound	Streamers expand slowly and develop a mound-shaped front. Highly structured, bright, knotty (prominence) material follows from 02:49 to 07:38. Knotty material extends as far north at ~100 degrees at 3.0R <sub>☉</sub> . Streamers are blown out. Big deflections.
					Feb 18 02:49-04:47	059 <sub>1</sub> * 079 <sub>2</sub>	130	4	7	Inner material (prominence)	
Feb 18	049	04:47~06:38	260	039	Feb 18 04:47-05:04	562 <sub>1</sub> *	248	2	6	Loop	Bright loop/cavity superposed on and north of streamer. Southern leg is structured (prominence?) in 06:58 image. Deflections.
Feb 19	050	02:03~16:03	267	023	Feb 19 02:03-02:44	315 <sub>1</sub> * 359 <sub>2</sub>	260	4	7	Cavity	Loop/cavity and core (or mound). Deflections. Faint material late in event.
Feb 19	050	05:10-11:48	041	051	—	—	—	—	0	Front at 05:10 only	Faint loop/cavity with core and blob superposed on rays. Region is disrupted. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Feb 20	051	02:05-05:21	~235	—	—	—	—	—	0	Front at 02:05 only	Faint cloud superposed on streamer.
Feb 20/22	051/053	15:48~04:45	~045	~035	—	—	—	—	0	Front at 15:48 only.	Multiple part event: 1. Structured cloud superposed on rays (or streamers). 2. Narrow tongue of material in ray from Feb 20 23:35 until Feb 21 01:09. More motion and brightening until Feb 22 ~04:45.
	051/053	23:35~04:45	~047	~013	—	—	—	—	—		
Feb 21	052	10:05-12:19	256	020	—	—	—	—	1	Blob	Narrow blob (or cloud) in streamer. Data is streaked.
Feb 22	053	11:07~14:14	251	035	—	—	—	—	0	Front at 11:07 only	Fuzzy, complex cloud superposed on streamer. Deflections.
Feb 23	054	06:13~07:47	043	016	—	—	—	—	0	Missed front	Structured fan (or tongue) along ray. Deflections. Could have missed the front.
Feb 23	054	09:36~12:02	149	033	—	—	—	—	0	No obvious front	Structured fan superposed on streamer.
Feb 24	055	09:41~13:29	234	081	Feb 24 11:31-12:04	223 <sub>1</sub> * 243 <sub>2</sub>	255	4	7	Inner cavity (northern edge)	Fuzzy, complex loop/cavity with twisted, complex core and inner cavity superposed on streamers. Streamers are blown out. Big deflections. Data is streaked.
Feb 25	056	05:11~21:36	138	051	—	—	—	—	1	Loop	Could be two events: 1. Loop/cavity in streamer. Streamer is disrupted. Data is streaked. 2. Bright tongue in streamer. Streamer is blown out by end of day. Equatorial streamer brightens.
		05:11~07:28	135	010	—	—	—	—	0	No obvious front	
Feb 26	057	all day	304	032	—	—	—	—	1	Cavity	Motion in rays. Cavity with core rises slowly from ~04:06 until end of day. Data is streaked.
Feb 26	057	16:50~19:57	200	060	—	—	—	—	1	Cloud	Faint cloud spans pylon shadow. Data is streaked.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments		
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual				
Feb 26/27	057/058	18:07-00:20	020	047	—	—	—	—	0	Front at 18:07 only	Two part event: 1. Loop/cavity (or mound) with structured, knotty, complex (prominence) blobs superposed on fan (or streamers). Deflections. 2. Mound (or cloud). Deflections.		
		18:07-00:20			—	—	—	—	0	Blobs at 19:40 only			
		22:47-00:20			—	—	—	—	0	Front at 22:47 only			
Feb 28	059	16:31~21:11	~168	~045	Feb 28 16:31-18:05	228 <sub>1</sub> * 289 <sub>2</sub>	150	4	5	Loop	Fuzzy loop/cavity in streaked images superposed on and south of streamer. Moves non-radially (equatorward). Possible concave-outward, 'U'-shaped material from 18:38 to 21:11.		
Feb 28	059	18:46~21:03	293	065	Feb 28 18:46-19:55	513 <sub>1</sub> * 235 <sub>2</sub>	295	3	3	Loop	Flattened loop/cavity superposed on fan at 18:46. Could be multiple, concentric loops/cavities with core by 19:30. Data is streaked.		
Mar 01	060	05:32?-22:39	280	—	—	—	—	—	0	No obvious front	Could be three events. 1. Faint (wide?) cloud superposed on streamers and rays. Deflections. Streaked data. 2. Structured cloud (or mound). Deflections. Region is disrupted. 3. Blob (or cloud) in fan.		
		05:32?-07:57		—	—	—	—	1	Cloud				
		14:10-17:17		275	030	—	—	—	1	Blob			
Mar 02	061	04:27-05:00	290	040	Mar 02 04:27-05:00	562 <sub>1</sub> *	300	2	5	Northern cloud	Two adjacent clouds (or blobs) superposed on rays and streamers. Northern cloud is faster.		
Mar 02	061	09:32-16:37	280	014	—	—	—	—	1		Two piece event: 1. Blob (or cloud) in fan. 2. Mound (or cloud) with cavity. Deflections.		
		09:32~10:48			290	035	Mar 02 12:38-13:30	512 <sub>1</sub> *	290	2		5	Mound
		12:38-16:37			—	—	—	—	—	3		3	Cavity
Mar 02/04	061/063 061/062 062/063	22:59~23:46	105	040	—	—	—	—	0	No obvious front	Could be more than one event: 1. Irregular cloud superposed on streamers. 2. Slow expansion and disruption of streamer.		
		22:59-02:05			—	—	—	—	1	Streamer			
		early~23:46			074	028	—	—	—	—		1	Streamer

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 03	062	08:10-14:24	274	048	Mar 03 08:10-08:36	357 <sub>1</sub> * 401 <sub>2</sub>	270	4	5	Mound	Bright, complex mound (or loop/cavity) with structured (prominence?) core superposed on streamers and rays. Deflections. Region is blown out.
					Mar 03 08:36-09:00	149 <sub>1</sub> *	261	2	5	Core (prominence?)	
Mar 05	064	01:03-05:18?	327?	065?	Mar 05 01:27-03:01	140 <sub>1</sub> * 153 <sub>2</sub>	325	5	6	Cavity	Very faint loop/cavity (or mound) superposed on streamers and ray. Deflections. Could be wider.
Mar 05	064	10:14?-12:21?	270	030	Mar 05 10:14-10:39	547 <sub>1</sub> * 349 <sub>2</sub>	266	3	5	Mound	Faint mound (or cloud) superposed on streamer (or rays). Deflections.
Mar 05	064	21:33-23:06	089	020	—	—	—	—	0	Front at 21:33 only	Jet (or fan). Deflections.
Mar 06	065	14:15-15:49	~034	~137	—	—	—	—	0	Front at 14:15 only	Bright loop/cavity and core superposed on streamers (or fan). Region is blown out. Big deflections. Faint material (ejected?) in this region from 09:51 to 12:41.
Mar 07	066	06:07-23:29	108	035	—	—	—	—	0	Front at 06:07 only	Could be three events: 1. Loop/cavity and concave-outward, 'V'-shaped core superposed on north edge of streamer. Region is disrupted. Big deflections. 2. Small, flattened cloud (or blob). 3. Faint, narrow tongue (or wisp).
		06:07-09:22			—	—	—	—	0	Front at 13:28 only	
		13:28-14:01 22:40-23:29			087 090	— 026	— —	— —	— —	0 0	
Mar 07	066	14:09<21:15	~325	—	—	—	—	—	0	Front at 14:09 only	Mound seen in partial image at 14:09. Data gap follows.
DATA GAP: Mar 07 14:09 to 21:07.											
Mar 08/09	067/068	01:55-01:15	239?	070?	—	—	—	—	0	No clear front	Could be more than one event: 1. Very faint cloud superposed on and north of streamer. 2. Faint structured cloud centered on streamer. Deflections.
	067	01:55-03:28			—	—	—	—	0	No clear front	
	067/068	12:48-01:15	213	094	—	—	—	—	0	No clear front	

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 08	067	03:34-05:27	050	024	—	—	—	—	0	Front at 03:34 only	Small mound(?) at north edge of streamer.
Mar 08/10	067/069	08:34~03:34	052	025	Mar 08/09 13:05-03:05	007 <sub>1</sub> * 007 <sub>2</sub>	052	7	3	Outer cavity	Could be more than one event: 1. Cavity rises slowly in streamer. Loop becomes visible around cavity. Inner loop(?)/cavity and core appear under first cavity Mar 08 ~22:25. Streamer is blown out. Deflections. 2. Blob 'N Ray. 3. Very faint cloud (or blob). 4. Flattened, filled tongue at south edge of streamer.
					Mar 09 01:32-15:32	011 <sub>1</sub> * 007 <sub>2</sub>	045†	9	4	Inner loop	
					Mar 09 15:32-18:39	040 <sub>1</sub> * 059 <sub>2</sub>	043	3	4	Inner cavity	
	067	15:47-17:20	080	—	Mar 08 15:47-16:36	216 <sub>1</sub> * 253 <sub>2</sub>	079	5	4	Blob	
	067	19:10-19:27	092	022	—	—	—	—	0	No obvious front	
	068	02:57-04:14	077	014	Mar 09 02:57-03:14	1370 <sub>1</sub> * 1297 <sub>2</sub>	080	3	7	Tongue	
Mar 09	068	06:21-11:17	142	025	—	—	—	—	1	Tongue	Tongue of material along streamer. Front elongates. Streamer is disrupted.
Mar 09	068	14:07-18:11	112	046	Mar 09 14:07-15:07	444 <sub>1</sub> * 307 <sub>2</sub>	125†	4	4	Loop	Two part event: 1. Loop/cavity and core superposed on streamer. Deflections. 2. Narrow, structured tongue.
		14:07~16:57									
		15:40-18:14									
Mar 09/10	068/069	23:27~00:52	067	025	—	—	—	—	0	Front at 23:27 only	Faint mound superposed on fan (or streamer).
Mar 10	069	02:42-12:03	160	050	—	—	—	—	1	—	Faint structured mound superposed on and south of streamer.
Mar 10/11	069/070	18:24-01:46	068	064	Mar 10 18:24-19:33	416 <sub>1</sub> * 357 <sub>2</sub>	075	3	5	Mound	Mound superposed on streamer. Irregularly-shaped by 19:08. Brighter, structured knots of (prominence?) material from 19:57 to 23:04. Deflections.
			070	027	Mar 10 19:57-22:39	076 <sub>1</sub> * 074 <sub>2</sub>	065†	7	7	Inner material (prominence?)	
Mar 10	069	19:24-20:58	~006	~058	—	—	—	—	0	Front at 19:24 only	Nice, bright loop/cavity at north edge of streamer. Could be wider. Deflections.

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					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 11	070	03:44~06:35	107	039	—	—	—	—	0	Front at 04:28 only	Faint, fuzzy loop/cavity superposed on fan. Corona brightens from 063° to 134°.
Mar 11	070	16:55-19:18	144	038	Mar 11 16:55-17:44	395 <sub>1</sub> * 343 <sub>2</sub>	150	4	5	Material (prominence?)	Irregular cloud with twisted, complex, structured (prominence?) material superposed on rays (or streamers.)
Mar 11	070	18:36-21:51	~320	~180	Mar 11 18:36-19:09	343 <sub>1</sub> * 499 <sub>2</sub>	340	3	4	Cloud	Very faint, very wide cloud (or mound) covers entire west and most of north sector. Brightest over north pole. Possible halo.
Mar 12	071	06:03-07:36	284	019	—	—	—	—	0	Missed front	Irregularly-shaped cloud. Could have missed front.
Mar 12	071	11:51-14:58	064	025	—	—	—	—	0	No obvious front	Faint cloud.
Mar 13	072	00:43-03:50	308	028	—	—	—	—	0	No obvious front	Fuzzy cloud superposed on fan.
Mar 13	072	14:02-16:00	~250	—	—	—	—	—	0	No obvious front	Cloud superposed on streamer. Cloud is concave-outward, 'V'-shaped.
DATA GAP: Mar 13 22:05 to Mar 14 02:28.											
Mar 14/15	073/074	15:03-02:04	062	009	—	—	—	—	0	No obvious front	Two part event: 1. Fuzzy jet north of streamer. 2. Structured cloud. Deflections.
		15:03-18:26			—	—	—	—			
Mar 15	074	02:21~08:01	189?	166?	—	—	—	—	0	No obvious front	Faint loop/cavity (or wisp) superposed on streamer. Brightest from 220°-260°.
Mar 15/16	074/075	05:36~07:55	339	060	—	—	—	—	0	No clear front	Could be two events: 1. Faint cloud (or mound) superposed on and between streamers. 2. Fuzzy cloud superposed on streamers. Deflections.
		05:36-07:01			—	—	—	—			
Mar 16	075	02:49~13:42	156	088	Mar 16 02:49-03:14	328 <sub>1</sub> *	150	2	3	Loop	Faint, thin loop/cavity with possible core superposed on fan in 02:49 image. Gone by 05:48. Blob 'N Ray from 09:44 to ~13:42.
Mar 17	076	05:07-07:22	125	024	Mar 17 05:07-05:32	327 <sub>1</sub> * 255 <sub>2</sub>	130	3	4	Mound	Narrow mound at north edge of streamer.

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					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 17	076	09:55-13:02	132	051	—	—	—	—	0	Front at 09:55 only	Structured cloud superposed on streamer. Wider at greater heights. Streamer is partially blown out. Deflections.
Mar 17	076	17:50~20:40	~308	~033	Mar 17 17:50-18:23	698 <sub>1</sub> * 874 <sub>2</sub>	307	3	7	Loop	Structured, irregular loop/cavity in narrow streamer. Could be wider. Streamer is blown out. Deflections.
Mar 17	076	20:48-23:55	133	067	—	—	—	—	0	Front at 22:21 only	Structured loop/cavity(?) with possible core superposed on streamers (or fan). Deflections. Region is disrupted.
Mar 18	077	02:53-06:49	230	062	Mar 18 02:53-03:43	583 <sub>1</sub> 740 <sub>2</sub> *	247	4	9	Loop	Loop/cavity with highly structured, inner (prominence) loop/cavity in streamer. Streamer is blown out. Deflections.
					Mar 18 03:10-03:34	514 <sub>1</sub> *	229	2	5	Inner loop (prominence)	
Mar 18	077	17:01-21:41	117	038	—	—	—	—	0	Front at 18:34 only	Loop/cavity and core superposed on streamer or fan. Deflections. Region is disrupted.
Mar 18/19	077/078	18:26-04:27	283	061	Mar 18 19:59-20:32	333 <sub>1</sub> * 368 <sub>2</sub>	290	3	7	Loop	Big loop/cavity and amorphous core superposed on streamer. Big deflections. Streamer is blown out.
					Mar 18 19:59-20:32	439 <sub>1</sub> * 262 <sub>2</sub>	290	3	7	Cavity	
Mar 19	078	13:30-15:03	~045	—	—	—	—	—	0	Front at 13:30 only	Cloud superposed on streamer (or fan). Deflections.
Mar 19	078	16:12-21:08	250	057	Mar 19 16:12-16:53	302 <sub>1</sub> * 369 <sub>2</sub>	250	4	7	Loop	Loop/cavity with structured (prominence?) core and concave-outward, 'U'-shaped blob at ~265° from 18:18 to ~21:08. Event is superposed on fan.
					Mar 19 16:12-16:53	335 <sub>1</sub> * 431 <sub>2</sub>	250	4	9	Cavity	
Mar 19	078	19:26-21:00	111	033	—	—	—	—	0	Front at 19:26 only	Multiple, structured loops/cavities and complex core north of streamer. Deflections.
											DATA GAP: Mar 19 23:06 to Mar 20 17:00.

Speed<sub>1</sub> ⇒ Speed was determined from a constant velocity fit to the number of points indicated.

Speed<sub>2</sub> ⇒ Speed was determined from a constant acceleration fit to the number of points indicated evaluated at the time of the last measurement (in Trajectory Times column).

\* Preferred fit to the data. This quantity is included in the speed histograms.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 20	079	20:14-23:54	116	068	—	—	—	—	0	Front at 21:48 only	Broad, structured, complex cloud superposed on and north of streamers. Brightest at north and south edges. Region is disrupted. Deflections.
Mar 20/21	079/080	23:54-01:27	177	048	—	—	—	—	0	Front at 23:54 only	Faint loop/cavity on and south of streamer. Deflections.
Mar 21	080	09:05-22:58	025	041	—	—	—	—	0	No obvious front	Could be up to three events: 1. Faint cloud superposed on rays (or streamers). Deflections. 2. Loop/cavity(?) superposed on polar fan. Deflections. Region is disrupted. 3. Cloud superposed on fan. Deflections. Region is disrupted.
		09:05-15:12	019	052	—	—	—	—	0	Front at 16:45 only	
		16:45-18:19	014	052	—	—	—	—	0	No obvious front	
Mar 22	081	01:48-05:20	~105	~080	Mar 22 01:48-03:22	075 <sub>1</sub> ★	100	2	3	Cloud	Broad, very faint cloud extending over large fraction of east limb. Wisp (or loop-like) structure at southern edge.
Mar 22	081	16:29-23:25	073	008	—	—	—	—	0	No obvious front	Jet at 16:29 followed by second jet at 21:52 in same location.
Mar 23	082	10:18-13:24	075	013	—	—	—	—	0	No obvious front	Fan of material ejected between existing structures.
Mar 23/24	082/083	19:45-01:58	305?	110?	Mar 23 19:45-19:54	1400 <sub>1</sub> ★	320	2	7	Mound	Possible halo. Event could be wider. Mound with adjacent loop/cavity at northern edge from 19:45 to 19:54. Event is superposed on streamer. Streamer is disrupted. Material ejected all over west limb by 21:10. Brightening over all limbs. Deflections.
			315?	042?							
Mar 24	083	all day	116	082	—	—	—	—	1	Loop	Slow expansion of loop/cavity (or mound). Front evolves and fades. Deflections.

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## SMM C/P 1989 Coronal Mass Ejections page 19 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 24/25	083/084	21:10~06:29	273	075	—	—	—	—	0	Mound at 22:10 only	Flat-topped mound with fuzzy internal loop/cavity and core at southern edge. Event is superposed on faint streamer. Deflections.
					Mar 24/25 22:10-00:16	139 <sub>1</sub> * 192 <sub>2</sub>	262	3	3	Loop	
Mar 25	084	16:40~19:47	287	050	Mar 25 16:40-17:22	441 <sub>1</sub> * 520 <sub>2</sub>	280	3	5	Mound	Faint, flat-topped mound (or loop/cavity) superposed on streamer.
Mar 26	085	12:52-23:45	282?	057?	Mar 26 13:33-14:25	492 <sub>1</sub> *	265	2	3	Cloud	Structured cloud with possible concave-outward shaped cavity at southern edge from 14:50 to ~16:40. Loop/cavity (or mound), appears at 14:50 containing highly structured, loop-shaped (prominence) core. Southernmost edge of (prominence) core evolves into bright hook shape. Event is superposed on streamer. Streamer is disrupted. Deflections.
					Mar 26 14:50-17:32	219 <sub>1</sub> * 239 <sub>2</sub>	285	5	7	Core (prominence)	
					Mar 26 15:58-19:30	136 <sub>1</sub> 098 <sub>2</sub> *	269†	8	6	Hook in core (prominence)	
Mar 26	085	19:13-23:53	043	020	—	—	—	—	0	No obvious front	Jet (or fan) between streamers.
Mar 27	086	16:46-23:40	278	037	Mar 27 17:10-17:27	422 <sub>1</sub> *	267	2	3	Southern edge of mound	Two fuzzy blowouts: 1. Fuzzy mound (or cloud) superposed on rays in streaked data. 2. Faint cloud in streaked data.
		16:46-20:17									
		20:09-23:40									
Mar 28	087	02:05-10:32	~278	—	—	—	—	—	1	Cloud	Could be two events: 1. Fuzzy cloud superposed on streamer. 2. Loop/cavity and bright, structured (prominence?) core south of streamer. Deflections. Loop/cavity is gone by 05:53. Additional material ejected from 08:59 to 10:32 in same location.
		02:05-05:53									
		04:20-10:32									
Mar 28/29	087/088	03:38<18:43	~036	~037	—	—	—	—	0	No obvious front	Slow expansion of cloud superposed on fuzzy fan. Ends during data gap. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Mar 28/30	087/089	~07:26~13:13	101	060	—	—	—	—	1	Loop	Loop/cavity (with core?) expands slowly in streamer. Streamer blows out during data gap from Mar 28 20:51 to Mar 29 18:35. Deflections. Additional material, including possible 'V'-shaped, concave-outward structure at southern edge, ejected from Mar 29 ~22:14 to Mar 30 ~13:13.
Mar 28	087	11:24-22:32	281	046	Mar 28 11:24-12:05	305 <sub>1</sub> * 213 <sub>2</sub>	275	3	7	Cavity	Flat-topped loop/cavity with core superposed on streamer (or fan). Region is disrupted. Deflections. Loop is out of the field of view by 14:30. Additional material (mound?) ejected from ~16:11 until 22:32. DATA GAP: Mar 28 22:32 to Mar 29 18:27.
Mar 30	089	08:58~17:44	300?	111?	Mar 30 08:58-09:07	560 <sub>1</sub> *	337	2	9	Northern edge of loop	Thin loop/cavity with amorphous core superposed on streamers. Gone by 09:58. Deflections. Very faint material ejected until ~17:44. DATA GAP: Apr 01 06:18 to 19:28.
Apr 01	091	19:36?-22:42	322	045	—	—	—	—	0	No obvious front	Fuzzy cloud superposed on fan. Deflections.
Apr 02	092	~08:27~23:58	050?	—	—	—	—	—	0	No obvious front	Very faint, cloud superposed on streamer.
Apr 02/03	092/093	09:59?~04:46	342	—	—	—	—	—	0	No clear front	Bright jet at northern edge of streamer (or fan). Possible concave-outward, 'U'-shaped material from ~12:41 until 14:31. Material could be falling sunward from 17:21 to 17:37 on Apr 02 and again on Apr 03 from 03:13 to 04:46 at 327°.
					—	—	—	—	1	'U'-shaped material	
Apr 03/04	093/094	23:25~03:56	250	041	—	—	—	—	0	No clear front	Fuzzy cloud superposed on streamer. Deflections.
Apr 04	094	~12:50-23:42	305	007	—	—	—	—	0	No obvious fronts	Narrow fans (or jets) at 12:50, 17:30 and 23:42. Data is streaked.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Apr 05	095	14:14-23:25	224	035	—	—	—	—	0	No obvious front	Cloud superposed on streamer. Streamer is disrupted. Data is streaked.
Apr 06	096	08:44-10:17	343	019	—	—	—	—	0	No clear front	Small, fuzzy cloud superposed on streamer. Deflections.
Apr 07	097	00:07-01:57	098	011	—	—	—	—	0	No obvious front	Fuzzy fan (or cloud).
Apr 07	097	00:15-23:08	263	026	—	—	—	—	1	Loop	Could be three events: 1. Loop/cavity rises slowly in streamer. Best seen in early south images. Evolves and fades. Deflections. 2. Jet brightens then expands and fades. 3. Fan ejected just north of streamer in part one. Deflections. Data is streaked.
		00:15~15:30									
		00:23~03:05 20:01-23:08									
Apr 07	097	13:41-15:47	093	025	Apr 07 13:41-14:06	773 <sub>1</sub> ★	090	2	5	Mound	Fuzzy mound in streaked data. Deflections.
Apr 08	098	08:18-13:14	055?	078?	Apr 08 08:27-08:43	730 <sub>1</sub> ★ 940 <sub>2</sub>	060	3	9	Loop	Loop/cavity and beautiful, highly structured, complex, inner (prominence) loop/cavity. Kink or sharp bend in southern leg of loop. Event is south of streamer. Deflections. Data is streaked.
			054?	033?	Apr 08 08:27-08:43	264 <sub>1</sub> ★ 293 <sub>2</sub>	054†	3	5	Inner loop (prominence)	
Apr 08/09	098/099	23:50-01:31	310	025	Apr 08/09 23:50-00:31	337 <sub>1</sub> ★	305	2	2	Fan	Narrow fan. Data is streaked.
Apr 09	099	01:23-03:21	115	061	—	—	—	—	0	Missed front	Very faint, structured cloud. Data is streaked. Deflections. Could have missed the front.
Apr 10/11	100/101	18:17-16:00?	115	029	Apr 10 18:17-19:58	073 <sub>1</sub> 184 <sub>2</sub> ★	117	4	3	Cavity	Could be two events. Data is streaked. 1. Thick loop/cavity with amorphous core. Big deflections. 2. Wide, concave-outward, 'U'-shaped material at ~19:58. Moves outward until ~09:48. Faint cavity visible in southeast from ~19:41 until ~19:58. Deflections.
		18:17~22:20									

† Position of feature was measured along a non-radial line.

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## SMM C/P 1989 Coronal Mass Ejections page 22 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Apr 10/11	100/101	20:58-09:56	003	090	—	—	—	—	1	Loop	Wide, (multiple?) complex loop/cavity with structured core superposed on streamer and fan. Fan is blown out. Big deflections. Data is streaked. Swelling began Apr 09.
Apr 12/13	102/103	early~10:02	286	106	Apr 12/13 22:29-07:48	077 <sub>2</sub> *	310	5	3	Outer loop	Very slow expansion of cavity on and north of streamer. Fuzzy loop(?) becomes visible around cavity late Apr 12. Inner loop/cavity appear by Apr 13 05:23. Outer and inner loops expand laterally and accelerate outward from Apr 13 05:23 until end of event. Big deflections. Region is blown out. Data is badly streaked.
Apr 12	102	12:19-14:44	157	050	Apr 12 12:19-13:44	200 <sub>1</sub> *	163	3	3	Cavity	Mound with cavity superposed on rays in streaked data. Possible concave-outward material from 13:27 until 13:44. Deflections.
Apr 14	104	~01:25>13:49	090	057	—	—	—	—	0	No clear front	Slow, broad, faint cloud. Ends in data gap. Data is streaked.
Apr 14	104	08:37-10:49	261	029	Apr 14 08:54-09:02	689 <sub>1</sub> *	268	2	7	Tongue	Structured, tongue (or loop/cavity) in streamer. Visible in polaroid filter sequence only.
DATA GAP: Apr 14 13:57 to Apr 15 18:43.											
Apr 17	107	all day	001	066	—	—	—	—	0	No obvious front	Slow expansion of streamer (or fan). Deflections. Region is disrupted.
Apr 18	108	06:13-09:27	> 134	> 056	Apr 18 07:13-07:37	536 <sub>1</sub> *	150	4	6	Loop	Irregular, structured, dimpled (multiple?) loop/cavity and possible core superposed on and south of streamer. Deflections.
DATA GAP: Apr 18 21:35 to Apr 20 15:02.											
Apr 21	111	02:01-20:38	290	028	—	—	—	—	1		Two piece event: 1. Fuzzy cloud superposed on ray in very streaked data. Deflections. 2. Narrow jet (or fan) south of cloud in part one. Very streaked data.
		02:01~10:20	265	—	—	—	—	—	0	No obvious front	

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
Apr 22	112	01:17-12:00?	314?	076?	Apr 22 01:17-01:25	420 <sub>1</sub> *	335	2	5	First inner loop	Wide loop/cavity with two smaller, inner loops/cavities at northern edge in 01:17 image. Data is very streaked. Streamer at site of inner loops is disrupted. Deflections. Motion (ejection?) of material until mid-day.
Apr 23	113	03:55-06:36	102	045	—	—	—	—	0	Front at 03:55 only	Mound superposed on streamer. Deflections. Data is streaked.
Apr 23	113	08:51-12:48	143	044	Apr 23 09:42-10:16	477 <sub>1</sub> * 623 <sub>2</sub>	140†	5	9	Back edge of 'question-mark' core (prominence)	Thick loop/cavity with highly structured, 'question-mark' shaped (prominence) core. Event is superposed on streamer. Region is partially blown out. Deflections. Data is streaked.
Apr 23/24	113/114	16:03-08:07	274	057	Apr 23 16:03-18:09	277 <sub>1</sub> * 334 <sub>2</sub>	280	4	6	Loop	Loop/cavity with amorphous core superposed on streamer and rays. Data is streaked. Region is disrupted. Deflections.
Apr 24/26	114/116	17:00-06:37	243	032	—	—	—	—	1	Cloud (late in event)	Slow expansion of streamer. Cavity visible early Apr 25. Cavity accelerates early Apr 26.
			234	017	—	—	—	—	0	Cavity	Fuzzy cloud is ejected Apr 26 from 02:49 until ~06:37. Region is disrupted. Deflections. Cavity width measured at 3.0R <sub>⊙</sub> . Data is streaked.
Apr 24	114	21:47-23:28	128	—	—	—	—	—	0	No clear front	Blob 'N Ray. Data is streaked.
											DATA GAP: Apr 26 15:46 to Apr 27 13:12.
Apr 28	118	02:52<12:26	030	—	—	—	—	—	0	No obvious front	Narrow fan in 02:52 image only. Data gap follows.
											DATA GAP: Apr 28 03:17 to 12:10
Apr 28/29	118/119	23:26-22:57									Could be more than one event. Data is streaked.
	118/119	23:26-00:59	112	081	Apr 28 23:26-23:35	412 <sub>1</sub> *	125	2	7	Loop	1. Loop/cavity and core superposed on and south of streamer. Deflections.
	119	21:16-22:57	092	—	—	—	—	—	0	No obvious front	2. Blob superposed on streamer.

† Position of feature was measured along a non-radial line.

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## SMM C/P 1989 Coronal Mass Ejections page 24 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Apr 30	120	09:07~16:00	248	050	—	—	—	—	0	Loop at 09:07 only	Loop/cavity and possible core superposed on streamer. Data is streaked.
											DATA GAP: May 02 02:05 to 13:47.
May 02	122	20:07-21:49	~237	~045	—	—	—	—	0	No clear front	Cloud superposed on and north of streamer in very streaked data. Deflections.
May 02/03	122/123	21:32-02:11?	305 315	018 027	—	—	—	—	0	No obvious front	Narrow fan with small cavity. Data is streaked.
					—	—	—	—	1	Cavity	
May 03	123	04:00-05:50	028	044	—	—	—	—	1	Loop	Faint loop/cavity superposed on streamers (or fan). Data is streaked.
May 03	123	04:17-08:56	~090	~019	—	—	—	—	0	No obvious front	Cloud superposed on streamer. Streamer is disrupted. Data is streaked.
May 03/04	123/124	21:03-00:09	248	065	—	—	—	—	0	No clear front	Structured cloud superposed on and north of streamer. Data is very streaked.
May 06	126	14:06-17:11	251	047	May 06 15:22-15:39	573 <sub>1</sub> * 405 <sub>2</sub>	233	3	3	Southern edge of outer cavity	Multiple, concentric loops/cavities superposed on and north of streamer. Deflections. Region is disrupted. Data is streaked.
					May 06 15:22-15:39	278 <sub>1</sub> * 272 <sub>2</sub>	233	3	4	Inner cavity	
May 06/07	126/127	21:50~10:13	~194	~088	May 06 22:07-23:23	251 <sub>1</sub> *	168	2	3	Cavity	Wide loop/cavity and inner, structured (prominence) loop/cavity all superposed on and south of streamer. Spans pylon shadow. Poor data quality. Deflections.
May 07/08	127/128	23:02~05:14	260	027	—	—	—	—	1	Clouds	Two clouds superposed on streamer in badly streaked data. First cloud ejected from 23:02~01:26. Deflections. Second cloud ejected from 03:32 until ~05:14.
May 08	128	11:17~19:01	145	043	—	—	—	—	0	No obvious front	Cloud expands and disrupts streamer in badly streaked data.
											DATA GAP: May 09 06:00 to 13:03.

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## SMM C/P 1989 Coronal Mass Ejections page 25 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
May 09	129	16:25-21:13	249	030	May 09 16:25-18:24	049 <sub>1</sub> ★	250	2	5	Cavity	Loop/cavity and possible core superposed on streamer. Streamer is disrupted. Deflections.
May 10	130	all day	068	086	—	—	—	—	0	No clear front	Broad faint cloud on and north of streamer. Region is disrupted. Deflections. Data is very streaked.
											DATA GAP: May 10 01:51 to 10:44.
May 10	130	10:44~15:56	248	044	May 10 10:44-11:25	376 <sub>1</sub> 474 <sub>2</sub> ★	250	4	7	Loop	Loop/cavity and core superposed on fan (or streamer). Region is partially blown out. Deflections. Data is streaked.
					May 10 11:00-12:25	242 <sub>1</sub> ★ 065 <sub>2</sub>	250	4	7	Cavity	
May 13	133	16:09-19:47	267	046	May 13 16:42-17:41	443 <sub>1</sub> ★ 552 <sub>2</sub>	260	3	5	Outer cavity	Bright loop/cavity in streamer in 16:58 image. Multiple(?), dimpled loops/cavities with core by 17:41. Streamer is blown out. Deflections. Data is streaked.
May 15	135	02:21-10:38	150	061	May 15 02:21-04:36	101 <sub>1</sub> ★ 178 <sub>2</sub>	147	4	3	Loop	Faint loop(?)/cavity with loop-shaped core superposed on streamer.
May 15	135	09:57-19:40	~271	~010	—	—	—	—	0	No clear front	Could be three events in streaked data: 1. Blob 'N Ray. 2. Another Blob 'N Ray. 3. Blob (or wave) 'N Ray. All blobs appear to be concave-outward, 'U'-shaped.
		09:57-11:55	~270	~010	May 15 13:03-13:53	433 <sub>1</sub> ★ 457 <sub>2</sub>	267	3	4	Blob	
		13:03-14:36	~270	~010	—	—	—	—	0	No clear front	
May 15	135	16:42-17:50	134?	093?	May 15 16:42-16:50	1198 <sub>1</sub> ★	160	2	4	Outer loop	Broad loop/cavity with brighter, embedded, structured (prominence?) loop/cavity. Loop/cavity is superposed on and south of streamer. Southern edge is obscured by pylon shadow. Could extend as far south as 235°. Streamer is disrupted. Data is streaked.
					May 15 16:42-16:50	775 <sub>1</sub> ★	160	2	4	Outer cavity	

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
May 16	136	03:08-04:32	070	013	May 16 03:08-03:16	521 <sub>1</sub> *	070	2	7	Loop (prominence?)	Small, structured (prominence?) loop/cavity south of streamer. Data is streaked. Deflections.
May 16/17	136/137	17:37-05:36?	242	048	—	—	—	—	1		Mound (with cavity?) superposed on streamer in streaked data. Possible concave-outward, 'U'-shaped material at northern edge of event. Deflections. Region is disrupted.
											DATA GAP: May 17 05:36 to May 18 04:33.
May 18	138	06:39-16:04?	097?	050?	—	—	—	—	0	No obvious front	Very faint cloud superposed on streamers.
May 19	139	17:44-19:41	< 289	> 070	May 19 17:44-18:09	210 <sub>1</sub> *	305	2	5	Loop	Loop/cavity superposed on fan. Missing data south of 254°. Deflections.
May 19	139	19:25-20:58	097	—	—	—	—	—	0	No obvious front	Cloud superposed on streamer.
May 20	140	09:46-10:54	~122	~083	—	—	—	—	0	Front at 09:46 only	Probable loop/cavity superposed on and between streamers. Visible in 09:46 image only. Region is disrupted. Big deflections.
May 20	140	11:02-16:14	292	085	May 20 11:11-11:35	726 <sub>1</sub> *	270	2	7	Loop	Structured loop/cavity superposed on streamer. (Prominence?) Blobs (or jets) at 255° and 270° superposed on rays. Deflections.
					May 20 11:19-11:35	923 <sub>1</sub> *	260†	2	4	Back of blob (prominence?)	
May 20/21	140/141	~17:39~13:13	103	020	—	—	—	—	0	No clear front	Slow expansion of cloud around streamer.
May 21	141	07:43-10:32	~228	~023	—	—	—	—	0	Front at 07:43 only	Cloud superposed on rays (or streamers). Deflections. Could extend as far south as 152°.
May 22	142	06:56-11:35	~209	~058	May 22 06:56-08:04	320 <sub>1</sub> *	210	3	7	Loop	Loop/cavity with structured, inner (prominence) loop/cavity superposed on and south of streamer. Southern edge obscured by pylon shadow. Additional structured, knotty material follows inner loop from 07:39 to ~11:10. Deflections. Some streaking in data.
					May 22 06:56-08:04	473 <sub>2</sub>					
						279 <sub>1</sub> *	210	4	9		
						314 <sub>2</sub>					

† Position of feature was measured along a non-radial line.

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Speed<sub>2</sub> ⇒ Speed was determined from a constant acceleration fit to the number of points indicated evaluated at the time of the last measurement (in Trajectory Times column).

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
May 22	142	17:21-23:58	291	023	—	—	—	—	0	Front at 17:21 only	Could be two events. Data is streaked. 1. Small cloud superposed on faint streamer. 2. Mound superposed on and south of streamer. Images are streaked and contain data dropouts.
		17:21-18:54			—	—	—	1			
May 23	143	09:58-12:04	~225	~017	—	—	—	—	0	No clear front	Structured, knotty (prominence) material south of streamer. Edge of front could be visible in west sector images. Event is obscured by pylon shadow. Data is streaked. Deflections.
May 23	143	15:01-16:34	~264	~037	—	—	—	—	0	No clear front	Faint loop/cavity (or mound) between streamers in streaked data. Bright blob seen at south edge in 15:26 image. Deflections.
May 24	144	09:52-14:39	240	038	May 24 09:52-10:43	407 <sub>1</sub> *	240	2	4	First loop	Could be two events. Data is streaked. 1. Bright loop/cavity superposed on streamer. 2. Bright, sharper, structured loop/cavity superposed on streamer. Concave-outward, 'U'-shaped material at 13:49. Streamer is disrupted. Deflections throughout event.
		09:52~11:08			—	—	—	—	—	—	
May 24/25	144/145	19:17~06:50	284	097	May 24 19:17-21:58	054 <sub>1</sub> *	305	5	4	First loop	Faint, fuzzy loop/cavity superposed on faint streamer at 19:17. Structured, complex loop/cavity(?) with structured core blows out south of first loop at 21:58. Region is disrupted. Deflections. Data is streaked.
					May 24 20:50-21:58	098 <sub>1</sub> *	305	3	4	First cavity	
May 25	145	13:43-21:18	064	057	May 25 13:43-15:07	200 <sub>1</sub> *	070	3	4	First loop	Loop/cavity with amorphous core superposed on and north of streamer. Second loop/cavity embedded in core at 16:40. Data is streaked. Deflections.
					May 25 16:15-16:40	094 <sub>1</sub> *	086	2	4	Cavity in core	

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## SMM C/P 1989 Coronal Mass Ejections page 28 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
May 26	146	00:08-03:38	238	046	May 26 00:08-01:24	298 <sub>1</sub> 497 <sub>2</sub> *	240	4	7	Outer cavity	Multiple loops/cavities superposed on fan (or rays). Region is disrupted. Embedded cavity and concave-outward material from ~01:24 to ~02:57. Data is streaked. Deflections.
May 26	146	~14:03-16:02	212?	115?	—	—	—	—	1	Cloud	Wide(?) cloud. Could span pylon shadow. Deflections. Data is streaked.
May 28	148	04:53-06:34	~078	~020	—	—	—	—	0	No clear front	Small loop(?)/cavity north of streamer. Data is streaked.
May 28	148	12:37-17:31	267	032	May 28 12:37-13:45	291 <sub>1</sub> * 394 <sub>2</sub>	271†	3	3	Cloud	Faint cloud (or mound) superposed on and north of ray. Deflections. Data is streaked.
May 28	148	18:56-23:34	093	024	—	—	—	—	0	Front at 20:29 only	Thin loop(?)/cavity in streamer. Streamer is blown out. Deflections. Data is streaked.
May 31	151	00:47~07:23	200?	—	—	—	—	—	0	No clear front	Cloud partially obscured by pylon shadow. Data is streaked. Deflections.
											DATA GAP: May 31 15:07 to 22:09.
Jun 01	152	01:48-20:05?	132	028	—	—	—	—	0	No clear front	Material superposed on streamer. Material is ejected throughout day.
Jun 01	152	~08:00-18:57	~323	—	—	—	—	—	0	No obvious front	Diffuse cloud with concave-outward shaped base superposed on streamer. Appears to detach from streamer. Region is disrupted. Mound and rays are left behind.
					—	—	—	—	1	Concave-upward base	
Jun 01/02	152/153	21:38-04:05	170?	045?	Jun 01/02 21:38-02:16	052 <sub>1</sub> 081 <sub>2</sub> *	162	4	3	Loop	Faint loop/cavity (or mound) south of streamer. Simultaneous ejection of material in adjacent streamer.
Jun 02	153	05:39-13:22	107	065	—	—	—	—	0	Front at 05:39 only	Irregular, outer, dimpled loop/cavity with complex core containing thick, inner loop/cavity between streamers. Big deflections. Loop is gone by 06:38. Material continues to be ejected in region until ~13:22.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jun 02	153	07:19~23:55	246?	067?	—	—	—	—	1	Cloud	Slow expansion of structured cloud in streamer. Data gap occurs during event. Streamer is disrupted. Deflections. Could extend as far south as 175°.
											DATA GAP: Jun 02 15:03 to 22:06.
Jun 03/04	154/155	13:50-05:34	133	028	—	—	—	—	0	Front at 13:50 only	Loop/cavity superposed on rays. Gone by 15:22. Deflections. Material is ejected in region until ~05:34 on Jun 04.
Jun 03/04	154/155	23:31-23:34	257	046	—	—	—	—	1	Cloud	Four part event: 1. Cloud superposed on streamer. 2. Cavity with structured core. Core has concave-outward, 'V'-shape. 3. Concave-outward, 'U'-shaped material in 17:23 image at north edge of event. 4. Fuzzy material ejected until ~23:34. Region is partially blown out.
	155	23:31~01:55			—	—	—	—	1	Cavity	
	155	~03:28~16:15			—	—	—	—	0	Front at 17:23 only	
	155	17:23-17:43			—	—	—	—	0	No clear front	
	155	~20:28-23:34			—	—	—	—	0	No clear front	
Jun 04	155	08:06~10:20	~323	~013	—	—	—	—	1	Cavity	Narrow fan with cavity and internal structure appears and blows out.
Jun 04	155	07:07-12:53	030	057	—	—	—	—	1	Cavity	Loop/cavity superposed on streamer. Deflections.
Jun 04	155	11:20~15:58	024	041	—	—	—	—	0	Front at 11:20 only	Loop/cavity with structured, narrow, inner (prominence) loop/cavity superposed on streamer immediately following previous event. Deflections continue. Streamer is blown out.
			019	011	Jun 04 11:20-12:53	231 <sub>1</sub> *	020	2	9	Inner loop (prominence)	
Jun 05	156	18:32-21:54	315	—	—	—	—	—	1		Faint loop/cavity (or mound) in streaked data.
											DATA GAP: Jun 06 23:46 to Jun 12 14:22.
Jun 13	164	10:11-20:59	024	038	—	—	—	—	0	No clear front	Slow expansion of material superposed on streamer. Deflections. Data is streaked.
Jun 14	165	15:24-18:29	303	024	—	—	—	—	0	Too faint	Mound (or loop/cavity) superposed on fan (or streamers). Data is streaked.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jun 14	165	15:40-20:18	250	037	—	—	—	—	0	Front at 17:13 only	Faint loop/cavity superposed on and north of streamer (or fan) in 17:13 image. Motion in region at 15:40. Deflections. Data is streaked.
Jun 15	166	09:56-12:10	293	051	—	—	—	—	0	No obvious front	Material expands around streamer. Data is streaked.
											DATA GAP: Jun 15 12:10 to 22:17.
Jun 15/16	166/167	<22:17-07:33?	280	029	—	—	—	—	0	No clear front	Cloud on south side of streamer. Could be related to previous event. Deflections.
Jun 16	167	05:10~19:53	~252	—	—	—	—	—	1	Cloud	Small loop/cavity at north edge of streamer followed by a concave-outward shaped cloud from ~06:42 to ~12:11. Deflections.
Jun 16	167	17:21-20:26	107	029	—	—	—	—	0	Front at 17:21 only	Small, bright loop/cavity superposed on streamer (or rays).
Jun 17	168	01:12-04:18	290	020	—	—	—	—	0	Front at 02:03 only	Bright mound (or cloud) superposed on streamer. Deflections.
Jun 17	168	09:47~13:17	272	036	Jun 17 09:47-10:28	456 <sub>1</sub> * 402 <sub>2</sub>	270	3	7	Loop	Irregular loop/cavity and structured core. Deflections.
					Jun 17 09:47-10:28	314 <sub>1</sub> 431 <sub>2</sub> *	270	4	9	Core	
Jun 17	168	14:25-17:30?	296	033	Jun 17 14:25-15:57	394 <sub>1</sub> 565 <sub>2</sub> *	300	4	7	Loop	Loop/cavity with core superposed on fan (or rays). Deflections.
Jun 17	168	16:22~19:44	291	076	—	—	—	—	1		Broad, structured cloud south of previous event.
Jun 18	169	05:00-10:45	268	013	Jun 18 05:00-06:33	239 <sub>1</sub> *	263	2	5	Tongue	Two part event: 1. Elongated tongue. 2. Faint cloud. Deflections.
		05:00-09:38								09:13-10:45	
Jun 18	169	13:34~23:15	292	023	—	—	—	—	1	Cloud	Faint, narrow cloud. Part of next event?
Jun 18	169	15:07-15:32	259?	092?	Jun 18 15:07-15:24	944 <sub>1</sub> * 1228 <sub>2</sub>	234	3	5	Loop	Loop/cavity and core superposed on rays (or streamers). Only southern part of loop/cavity is visible in rolled images. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jun 18/21	169/172	18:45-20:59?	103	061	—	—	—	—	0	No obvious front	Continual ejection of faint material superposed on east limb structures. Brighter, sharper material ejected in equatorial streamer from ~18:36 on Jun 20 until midday Jun 21. Material is concave-outward shaped. Streamer is blown out. Deflections. Data is streaked.
Jun 19	170	08:06-13:09	266	044	Jun 19 09:38-11:11	228 <sub>1</sub> * 310 <sub>2</sub>	272	4	4	Loop	Faint loop/cavity with brighter, flattened, structured core superposed on streamer. Streamer is disrupted. Deflections. Data is streaked.
					Jun 19 11:11-11:52	392 <sub>1</sub> * 440 <sub>2</sub>	272	3	4	Core	
Jun 20	171	11:53-15:06?	330	048	Jun 20 11:53-12:34	223 <sub>1</sub> * 324 <sub>2</sub>	335	4	7	Outer loop	Loop/cavity with multiple loops/cavities in core all superposed on south edge of streamer. Could extend further south. Data is streaked.
Jun 20	171	15:23-21:33?	293	026	Jun 20 15:23-15:39	246 <sub>1</sub> *	295	2	7	Loop	Loop/cavity (or mound) with brighter, structured, mound-shaped (prominence) core superposed on rays. Part of (prominence) core falls sunward by 18:00. Data is very streaked.
					Jun 20 15:23-17:13	172 <sub>1</sub> * 019 <sub>2</sub>	292 <sup>†</sup>	3	7	Core (prominence) (before falling)	
Jun 20/21	171/172	22:41-00:14	274	041	Jun 20 22:41-23:22	579 <sub>1</sub> * 553 <sub>2</sub>	275	3	4	Cavity	Structured (multiple?) loop/cavity with amorphous core at south edge of streamer. Streamer is partially blown out. Big deflections. Data is streaked.
Jun 21	172	00:39-02:28	276	040	Jun 21 00:39-00:55	281 <sub>1</sub> *	275	2	3	Loop	Faint loop/cavity at south edge of streamer. Data is streaked.
Jun 21	172	09:30-11:02	261	039	Jun 21 09:30-09:54	319 <sub>1</sub> * 470 <sub>2</sub>	255	3	2	Cloud	Faint cloud. Data is very streaked.
Jun 23	174	03:18~11:01	~148	~025	—	—	—	—	0	No obvious front	Structured material superposed on fan (or streamer). Data is streaked.

<sup>†</sup> Position of feature was measured along a non-radial line.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
Jun 23	174	14:31-17:36	~223	~040	Jun 23 14:47-16:20	233 <sub>1</sub> 458 <sub>2</sub> *	240	4	2	Northern edge of loop	Loop/cavity and core in streamer (or fan). 'Light-bulb' shaped in 16:04 image. Southern edge obscured by pylon shadow. Region is blown out. Deflections. Data is streaked.
Jun 23	174	17:36~20:08	281	082	Jun 23 17:36-18:36	467 <sub>1</sub> *	264	3	4	Loop	Wide, faint loop/cavity superposed on streamer. Data is streaked.
Jun 25	176	18:34-20:40	~055	~070	—	—	—	—	1	Cloud	Broad cloud superposed on streamer. Data is streaked.
Jun 26	177	21:05-22:13	300?	080?	—	—	—	—	0	Too faint	Very faint cloud superposed on streamer.
Jun 28	179	12:56-16:35	082	051	Jun 28 12:56-13:29	576 <sub>1</sub> *	078	3	7	Loop	Loop/cavity superposed on south edge of streamer. Deflections.
Jun 29	180	03:31-04:56	340	034	—	—	—	—	0	No obvious front	Faint cloud superposed on faint streamer.
Jun 29	180	10:33~14:11	~080	—	—	—	—	—	0	No obvious front	Could be two events: 1. Jet (or wisp) superposed on rays (or fan). 2. Fuzzy cloud superposed on fan. Could extend as far south as 160°.
		10:33~14:11 12:39-14:11	~108	—	—	—	—	—	0	No obvious front	
Jun 29	180	10:50~15:27	300	035	Jun 29 10:50-11:57	216 <sub>1</sub> *	300	3	6	Loop	Thick loop/cavity superposed on faint fan. Fan is disrupted.
Jun 29	180	21:29-22:03	332	051	Jun 29 21:29-21:38	1373 <sub>1</sub> *	323	2	7	Outer cavity	Multiple, concentric, structured loops/cavities superposed on rays. Inner loop could contain prominence material. Deflections.
Jun 30	181	06:29-10:24	104	046	Jun 30 06:29-06:54	518 <sub>1</sub> *	105	3	4	Outer loop	Concentric loops/cavities and core superposed between streamers. Big deflections. Region is disrupted. Data is streaked.
					Jun 30 06:37-06:54	576 <sub>1</sub> *	105	3	4	Second loop	
Jul 03	184	13:22-18:08	105?	050?	—	—	—	—	0	No obvious front	Cloud superposed on and between streamers. Data is very streaked.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jul 04	185	09:52-15:45	023	052	Jul 04 11:07-12:40	263 <sub>1</sub> *	025	2	6	Outer loop	Thick loop/cavity with thick, structured inner loop/cavity in streamer. Streamer is blown out. Deflections.
											DATA GAPS: Jul 06 14:35 to Jul 07 15:59. Jul 07 18:21 to 20:36.
Jul 07	188	21:01-23:41	270?	027?	Jul 07 21:09-21:26	246 <sub>1</sub> *	265	2	5	Loop	Loop/cavity and core superposed on and south of streamers. Best seen in 21:09 image. Core is concave-outward shaped at 23:41.
Jul 09	190	01:54-03:27	289	021	—	—	—	—	0	No clear front	Faint cloud superposed on streamer.
Jul 09/10	190/191	18:52-01:02	282	052	Jul 09 18:52-21:57	180 <sub>1</sub> *	290	4	3	Outer loop	Concentric, complex loops/cavities and core in streamer. Streamer is disrupted.
					—	—	—	—	1	Inner loop	
Jul 09/10	190/191	22:13<09:01	~162	~035	—	—	—	—	0	No obvious front	Faint cloud superposed on and south of streamer.
Jul 11	192	00:43-05:21	068	035	—	—	—	—	0	Missed front	Loop(?)/cavity and core between streamers. Deflections. Probably missed the front.
Jul 12	193	20:00~23:05	310	043	—	—	—	—	1	Loop	Faint loop/cavity superposed on rays. Deflections.
Jul 13	194	01:29~06:48	307	039	Jul 13 01:29-02:10	392 <sub>1</sub> *	315	4	5	Loop	Faint loop/cavity superposed on rays. Region is disrupted. Deflections.
Jul 13	194	03:26~17:27	160	024	Jul 13 03:26-05:08	072 <sub>1</sub> *	154	3	7	Core (prominence?)	Cavity and structured (prominence?) core in streamer. Core contains concave-outward, 'U'-shaped material from 06:06 to ~08:21. Streamer is blown out.
											DATA GAPS: Jul 13 20:31 to 22:04. Jul 16 09:45 to 14:39.
Jul 17/18	198/199	22:44~02:14	098	050	—	—	—	—	1	Loop	Faint loop/cavity(?) with complex, flattened core at north edge of fan. Faint material could have been ejected earlier. Deflections.
											DATA GAP: Jul 18 09:31 to 15:33.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jul 18	199	15:41-18:46	041	021	—	—	—	—	0	Front at 15:41 only	Highly structured, knotty (prominence) material between streamers. We could have missed coronal front between 08:24 and 15:41 images.
Jul 19	200	~04:09-23:54?	301	034	—	—	—	—	1	Mound	Mound with cavity and structured core rises slowly in faint rays. Region is disrupted. Deflections.
Jul 19/20	200/201	06:57-03:24	070	039	—	—	—	—	0	Front at 22:55 only	Slow expansion of material around streamer. Second, brighter, structured, helmet-shaped material superposed on streamer in 22:55 image only. Deflections.
Jul 20	201	11:22-15:18	262	044	Jul 20 11:22-12:38	385 <sub>1</sub> * 437 <sub>2</sub>	265	3	5	Mound	Structured mound (or cloud) superposed on streamer. Deflections.
Jul 20	201	12:22~20:29	071	038	—	—	—	—	1	Cloud	Cloud superposed on streamer.
Jul 21	202	02:38-14:41	~106	~032	—	—	—	—	0	No clear front	Fuzzy cloud around streamer. Streamer is disrupted. Deflections. Motion as far north as 073°.
Jul 22	203	06:23-09:36	123	033	—	—	—	—	1	Cloud	Fuzzy cloud with embedded structured loop/cavity superposed on streamer. Streamer is disrupted. Deflections.
											DATA GAPS: Jul 22 12:40 to 15:04. Jul 23 06:28 to 12:37.
Jul 23	204	~14:26>23:49	212	025	—	—	—	—	0	No obvious front	Faint cloud partially obscured by pylon shadow.
											DATA GAPS: Jul 23 20:44 to 23:44. Jul 23 23:49 to Jul 24 11:43.
Jul 24/25	205/206	~22:30<12:22	278	065	Jul 25 00:02-07:44	012 <sub>1</sub> * -005 <sub>2</sub>	280	4	7	Cavity	Slow rising mound with cavity superposed on and north of streamer. Region is blown out following data gap between 08:09 and 12:22 images. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Jul 25	206	01:43-04:40	035	016	Jul 25 01:43-03:24	115 <sub>1</sub> ★	040	2	3	Mound	Mound (or cloud) superposed on rays between streamers. Moves outward and equatorward. Deflections.
Jul 25	206	08:18~12:30	045	031	—	—	—	—	0	Front at 08:18 only	Mound (or loop/cavity) on rays between streamers. Data gap follows immediately after start of event. Region is disrupted. Deflections.
											DATA GAP: Jul 25 08:26 to 12:22.
Jul 26	207	14:32~17:37	287	048	Jul 26 14:32-15:14	465 <sub>1</sub> ★ 452 <sub>2</sub>	285	3	8	Outer loop	Complex multiple(?) loops(?)/cavities and structured core superposed on faint rays and streamers. Region is disrupted. Deflections.
					Jul 26 16:05-16:46	642 <sub>1</sub> ★ 799 <sub>2</sub>	290	3	8	Second cavity	
Jul 27	208	01:19<10:33	307 287	019 027	—	—	—	—	0	Too faint	Jet (or fan) along rays followed by faint cloud with embedded, complex, structured (prominence) loops/cavities at 03:33. Loops are located just south of jet. Deflections.
					Jul 27 03:33-05:06	299 <sub>1</sub> ★	280	2	5	Outer loop (prominence)	
Jul 27	208	18:15~20:12	285	045	Jul 27 18:15-18:56	477 <sub>1</sub> ★ 502 <sub>2</sub>	285	3	7	Loop	Fuzzy, structured loop/cavity superposed on rays. Deflections.
Jul 27/28	208/209	23:17~01:57	292	028	Jul 27/28 23:17-00:25	323 <sub>1</sub> ★ 053 <sub>2</sub>	300	3	3	Mound	Structured mound (or loop/cavity and core) superposed on rays. Deflections.
Jul 28	209	06:34<11:11	294	052	—	—	—	—	1	Loop	Faint, complex loop/cavity superposed on and between streamers in polaroid filter sequence. Ends in data gap. Deflections.
											DATA GAP: Jul 28 07:16 to 11:11.
Jul 28	209	11:36-12:44	284	032	Jul 28 11:36-11:53	702 <sub>1</sub> ★	285	2	6	Loop	Fuzzy, structured loop/cavity(?) between streamers. Deflections.
											DATA GAP: Jul 29 04:32 to 17:59.
Jul 29	210	19:39-23:17	~162	—	Jul 29 19:39-20:12	489 <sub>1</sub> ★ 375 <sub>2</sub>	162	5	3	Cloud	Faint cloud between streamers. Southern edge is obscured by pylon shadow.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
											DATA GAP: Jul 30 00:33 to 03:13.
Jul 30	211	03:46-06:59	310	021	—	—	—	—	1	Cloud	Cloud superposed on and south of streamer. Deflections.
Jul 30	211	10:04~14:24	316	033	—	—	—	—	1	Loop	Thin loop/cavity(?) with amorphous core superposed on and south of streamer.
Jul 30	211	16:05?-19:10	~106	~048	—	—	—	—	0	No obvious front	Fuzzy cloud superposed on streamer (or fan).
Jul 30	211	16:14?~20:09	322	047	—	—	—	—	1	Core	Broad, faint loop/cavity with diffuse core superposed on and south of streamer. Deflections.
											DATA GAPS: Jul 31 01:27 to 07:37. Jul 31 07:37 to 10:00.
Jul 31	212	07:37-10:30	111	034	—	—	—	—	0	Front at 07:37 only	Loop/cavity (and core?) between streamers in partial image at 07:37. Deflections.
Jul 31	212	14:37~16:09	332	043	—	—	—	—	1		Faint cloud superposed on and south of streamer.
Jul 31	212	16:26<19:31	239	038	—	—	—	—	0	Front at 16:23 only	Faint mound (or thick loop/cavity) superposed on fan. Deflections.
Jul 31/Aug 01	212/213	19:22-11:11	~105	~042	Jul 31 19:22-19:47	445 <sub>1</sub> *	092	2	6	Northern edge of mound	1. Structured mound (or loop/cavity and core) superposed on and between streamers. Deflections. Region is disrupted.
	212/213	19:22-05:02									
	213	06:00~11:08	135	024	—	—	—	—	0	No obvious front	2. Faint cloud superposed on streamer.
											DATA GAP: Aug 01 06:42 to 09:05.
Aug 01/02	213/214	22:56-01:10	240	040	Aug 01 23:21-23:38	417 <sub>1</sub> *	235	2	5	Mound	Faint mound superposed on fan. Deflections.
Aug 02	214	11:48-14:52	119?	043?	—	—	—	—	0	No obvious front	Very faint cloud(s?) superposed on fan (or streamers). Deflections.
Aug 02	214	16:00-21:02	116	083	Aug 02 16:00-16:25	515 <sub>1</sub> *	088	2	7	Northern edge of outer loop	Broad, thin outer loop/cavity with thick, inner loop/cavity superposed on existing rays and streamers. Region is disrupted. Big deflections. Wisp, or deflected pre-existing structure, is bent around southern edge of front.
					Aug 02 16:00-16:25	468 <sub>1</sub> *	088	2	7	Northern edge of inner loop	

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## SMM C/P 1989 Coronal Mass Ejections page 37 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Aug 02/03	214/215	23:42-04:44?	106	026	—	—	—	—	0	Front at 00:06 only	Faint cloud superposed on rays. Deflections.
Aug 03	215	01:47-04:52	347	059	Aug 03 02:38-03:19	219 <sub>1</sub> * 329 <sub>2</sub>	340	3	7	Outer loop	Thick loop/cavity with thick, (multiple?) structured, inner loop/cavity superposed on and south of streamer. Deflections.
			338	027	Aug 03 02:38-04:10	254 <sub>1</sub> 397 <sub>2</sub> *	335	4	7	Inner loop	
DATA GAP: Aug 03 04:52 to Aug 04 22:21.											
Aug 04/05	216/217	<23:48>13:39	126	052	Aug 05 04:26-09:03	120 <sub>2</sub> *	125	3	6	First cavity	Cavity in streamer, visible after data gap in 23:48 image. Cavity rises slowly. Loop becomes visible around cavity. Structured core with loop(?)/cavity appear at 10:35. Streamer blows out. Deflections. Starts and ends in data gap.
					Aug 05 10:18-11:50	050 <sub>1</sub> * 026 <sub>2</sub>	138	3	6	Cavity (in core)	
Aug 05	217	11:42>13:39	071	042	Aug 05 11:42-13:14	212 <sub>1</sub> * 087 <sub>2</sub>	062	3	5	Loop	Loop/cavity and core between streamers. Deflections. Ends in data gap.
DATA GAP: Aug 05 14:39 to Aug 06 18:21.											
Aug 06	218	<18:29-21:59	116	062	—	—	—	—	1	Loop	Multiple loop/cavity with complex core. Core contains bright, structured (prominence?) material. Loop edge is visible at 18:29. Loop front is visible at 18:54. Data gap follows. Deflections.
Aug 07	219	00:47-07:22	146?	040?	Aug 07 05:07-05:24	210 <sub>1</sub> * 207 <sub>2</sub>	135	3	3	Loop	Structured, complex, irregular cloud with faint, embedded loops(?)/cavities and possible concave-outward, 'U'-shaped material. Edge obscured by pylon shadow. Deflections.
Aug 07	219	00:55-06:40	273	067	Aug 07 01:12-02:44	176 <sub>1</sub> * 163 <sub>2</sub>	285	3	5	Mound	Faint mound superposed on streamer. Deflections.
Aug 07	219	07:13-08:45	114	077	—	—	—	—	0	Front at 07:22 only	Broad, complex loop/cavity with structured core superposed on and between streamers. Region is disrupted. Deflections.
DATA GAPS: Aug 08 03:13 to 04:46. Aug 08 14:59 to 16:56.											

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## SMM C/P 1989 Coronal Mass Ejections page 38 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
Aug 08/09	220/221	23:30-03:25	082	051	Aug 08/09 23:30-00:54	285 <sub>1</sub> * 319 <sub>2</sub>	086	4	7	Cavity	Structured loop/cavity superposed on fan (or streamers). Deflections.
											DATA GAPS: Aug 09 23:34 to Aug 10 13:08.
Aug 11	223	09:34-10:41	~235	—	—	—	—	—	0	No obvious front	Faint cloud between streamers.
Aug 12	224	11:27-23:54	065	054	Aug 12 12:00-12:59	276 <sub>1</sub> *	067	2	3	Cloud	Two part event. Swelling began Aug 11. 1. Fuzzy cloud (or mound) superposed on faint fan. 2. Structured loop/cavity (and core?) superposed on faint fan (or streamer). Deflections. Region is disrupted.
		12:59-14:32	072	046	Aug 12 12:59-13:32	450 <sub>1</sub> * 126 <sub>2</sub>	067	3	7	Loop	
Aug 12	224	14:40~16:45	267?	085?	—	—	—	—	0	Front at 14:48 only	Broad, faint, structured cloud. Deflections. Could be wider.
Aug 12/13	224/225	17:53~01:59	264?	062?	Aug 12 18:01-19:25	304 <sub>1</sub> * 256 <sub>2</sub>	265	4	7	Loop	Complex (multiple?) loop/cavity with structured core centered on streamer and fan. Loop has flattened front in 19:25 image. Loop is gone after 19:25. Region is partially blown out. Deflections. Irregular material continues to be ejected until ~01:59 the next day. Event could extend as far north as 320°.
Aug 14	226	01:03-01:46	256	046	—	—	—	—	0	Front at 01:03 only	Fast, bright, structured, (multiple?) thin loop/cavity with fainter, adjacent loop/cavity to the south. Top of bright loop is at ~2.5R <sub>☉</sub> . Event is in 01:03 image only. Big deflections.
Aug 14	226	08:29~12:49	060	038	Aug 14 08:29-10:01	126 <sub>1</sub> *	050	2	5	Loop	Fuzzy loop/cavity with structured core between streamers. Deflections.
Aug 14	226	15:53-20:30	~013	~026	—	—	—	—	0	No obvious front	Small cloud in streamer. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Comments	
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		Feature
Aug 15	227	01:24~06:17	242?	095?	Aug 15 02:23-02:48	748 <sub>1</sub> ★	276	2	9	Outer loop	Wide, complex, structured, multiple loops/cavities with complex, multiple, structured inner loop/cavity and structured core superposed on rays. Region is blown out. Big deflections. Could extend as far south as 175°.
					Aug 15 02:23-02:48	589 <sub>1</sub> ★	254	2	6	Blob in core	
Aug 16	228	01:28~05:22	257	055	—	—	—	—	0	Front at 01:28 only	Wide, complex, structured, multiple loops/cavities with complex, structured, twisted core superposed on faint structures. Bright, structured, narrow loop/cavity (prominence?) from 01:52<05:14. Region is disrupted. Big deflections. Slow brightening and swelling of material for ~16 hours prior to event.
			265	010	Aug 16 02:17-03:42	056 <sub>1</sub> ★	267†	2	7	Inner loop (prominence?)	
Aug 16	228	20:20-21:27	~249	~090	Aug 16 20:20-20:45	432 <sub>1</sub> ★ 632 <sub>2</sub>	210	3	5	Southernmost edge of loop	Very faint loop/cavity span pylon shadow in rolled south images from 20:20 to 20:45. Best seen in subtractions. Southernmost edge is brightest and dimpled (or concave-outward).
Aug 16	228	21:27-23:00	~307	—	—	—	—	—	0	No obvious front	Bright jet superposed on fan. Could be part of previous event.
Aug 17	229	00:57~04:26	261	044	—	—	—	—	0	Outer loop	Two concentric, bright loops/cavities at south edge of fan in 00:57 image. Complex, multi-featured, structured core visible from 01:05 to 01:22. Fan is disrupted. Big deflections.
			262	016	Aug 17 00:57-01:05	210 <sub>1</sub> ★	260	2	7	Inner loop	
Aug 17	229	10:19~11:43	309?	053?	Aug 17 10:19-10:27	561 <sub>1</sub> ★	330	2	5	Loop	Faint loop/cavity superposed on streamers and rays. Deflections. Could be much wider.
Aug 17	229	18:59~22:54	255	070	—	—	—	—	0	Front at 18:59 only	Structured loop/cavity and brighter, highly structured, complex, 'harpoon'-shaped, inner (prominence) core between streamer and fan. Fan to the south is disrupted. Big deflections.
					Aug 17 18:59-19:24	1288 <sub>1</sub> ★	263	2	7	Harpoon-shape in core (prominence)	

† Position of feature was measured along a non-radial line.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Aug 18	230	~04:47-18:35	085	030	—	—	—	—	0	No obvious front	Cloud expands slowly around streamer. Deflections.
Aug 18	230	06:27-08:08	281	108	Aug 18 06:27-06:35	560 <sub>1</sub> *	252	2	5	Core	Complex, structured mound (or cloud) with bright core(?) at southern edge. Deflections.
Aug 18	230	16:46-18:19	200	080	—	—	—	—	0	Front at 16:46 only	Loop/cavity with brighter, structured inner (prominence) loop/cavity span pylon shadow. Deflections.
			193	042	—	—	—	—	1	Inner loop (prominence)	
Aug 18/19	230/231	18:02~05:30	267	040	Aug 18 18:02-18:27	445 <sub>1</sub> * 412 <sub>2</sub>	270	3	7	Loop	Two part event: 1. Loop/cavity superposed on and south of streamer. Deflections. Ends in data gap. 2. Faint, concentric loops/cavities (with faint core?) visible after data gap superposed on and south of streamer. Deflections.
	230/231	18:02>18:27									
	231	<01:43~05:30									
DATA GAP: Aug 18 18:43 to Aug 19 00:52.											
Aug 19	231	12:37~23:48	028?	079?	—	—	—	—	0	No obvious front	Broad, faint cloud superposed on streamers. Second small cloud ejected from 20:18 until ~23:48 in same location. Deflections.
Aug 19	231	15:50-19:11?	261?	062?	—	—	—	—	1	Outer loop	Multiple loops/cavities with bright, complex, structured (prominence?) core superposed on rays. Could extend as far north as 325°. Big deflections. Slight brightening in region in 14:18 image.
Aug 20	232	02:52-04:33	240	040	—	—	—	—	0	Missed front	Broad, structured cloud with structured, embedded, arc-shaped (prominence) material at southern edge. Deflections. Probably missed front.
					—	—	—	—	0	Arc at 02:52 only	
Aug 21	233	05:08~09:45	291	046	Aug 21 06:40-07:31	481 <sub>1</sub> *	295	2	7	Loop	Flattened loop/cavity and core superposed on streamer. 'Light-bulb' shaped late in event. Deflections.
					Aug 21 06:40-07:48	459 <sub>1</sub> * 453 <sub>2</sub>	290	4	9	Cavity	

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Comments	
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		Feature
Aug 21/22	233/234	19:48~04:11	294	055	—	—	—	—	1	Loop	Faint loop(?)/cavity with structured, loop-shaped (prominence?) core superposed on streamer. Possible concave-outward, 'U'-shaped material from 03:29 to 04:11. Streamer is disrupted. Deflections.
					Aug 22 00:25-02:22	184 <sub>1</sub> ★ 207 <sub>2</sub>	292	5	5	Cavity in core (late in event)	
Aug 22	234	all day	~251	~028	—	—	—	—	0	No obvious front	Slow expansion of cloud (with core and cavity?) in streamer. Streamer is disrupted.
Aug 22	234	02:05-03:54?	???	???	—	—	—	—	0	No obvious front	Small, bright mound in east at 02:05. Broad faint cloud covers east, south and west sectors. Halo?
Aug 22	234	10:11-11:43	117?	055?	—	—	—	—	0	Front at 10:11 only	Two faint, concentric loops/cavities with possible core between streamers. Deflections.
Aug 22/23	234/235	17:27-22:37	~350	—	—	—	—	—	0	No obvious front	Slow expansion of faint cloud around streamer. Deflections. Streamer is disrupted.
Aug 22/24	234/236	23:44-23:46	269	019	Aug 22/23 23:44-02:32	088 <sub>1</sub> 016 <sub>2</sub> ★	266†	3	4	Cloud	Could be more than one event: 1. Fuzzy, faint cloud (or loop/cavity) at north edge of streamer in south images. 2. Mound superposed on streamer. Material continues to expand and blowout around streamer until end of Aug 24. Cavity(?) visible Aug 24 at ~00:27 until end of day. Trailing material is concave-outward, 'V'-shaped from ~03:48 until end of day. Region is disrupted. Deflections.
	234/235	23:44-03:05									
	235/236	15:14-23:46	292	027	Aug 23 15:14-16:22	231 <sub>1</sub> ★ 001 <sub>2</sub>	295	3	3	Mound	
Aug 23	235	09:14-13:51	085	070	—	—	—	—	0	Front at 09:14 only	Bright loop/cavity at south edge of streamer. Deflections. Streamer is disrupted.
Aug 24	236	01:51-02:08	137	020	Aug 24 01:51-02:08	422 <sub>1</sub> ★	143	2	4	Loop	Faint, narrow (multiple?) loop/cavity and possible core between streamers. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Aug 25	237	11:55~14:58	103	037	—	—	—	—	0	Loop at 11:55 only	Could be two events (or one wide event): 1. Loop/cavity in streamer. Streamer is blown out. Deflections. Slow swelling of streamer visible for ~6 hours prior to event. 2. Faint cloud with embedded material (or loop/cavity) between streamers.
		11:55~14:58									
		11:55~14:58	~149	—	—	—	—	1	Cloud		
Aug 25	237	17:29>18:10	319	018	Aug 25 17:29-18:10	165 <sub>1</sub> * 239 <sub>2</sub>	318	3	4	Tongue	Tongue expands. Visible in rolled south images. Faint material could be ejected north of this region. Ends during data gap.
Aug 25	237	17:45-17:53	206	022	—	—	—	—	0	Front at 17:45 only	Concave-outward, 'U'-shaped material in 17:45 image only. Additional material could be present in the southeast in this image only. Data gap follows.
DATA GAP: Aug 25 18:07 to Aug 26 18:41.											
Aug 26/27	238/239	23:20~05:29	322	035	Aug 27 00:11-00:52	389 <sub>1</sub> * 514 <sub>2</sub>	320	4	5	Mound	Structured mound (or loop/cavity) with embedded loop/cavity(?) superposed on rays. Deflections.
					Aug 27 00:19-00:52	387 <sub>1</sub> * 175 <sub>2</sub>	320	3	5	Embedded loop	
Aug 27	239	04:55-05:21	~090	—	Aug 27 04:55-05:21	312 <sub>1</sub> * 346 <sub>2</sub>	092†	4	5	Material (prominence?)	Irregular cloud with structured (prominence?) material at north edge. Deflections.
Aug 27	239	09:57-13:01	097	075	—	—	—	—	0	Front at 09:57 only	Faint, wide cloud. Deflections.
Aug 27/28	239/240	22:13-10:30	113	040	Aug 27/28 22:13-05:54	040 <sub>1</sub> * 065 <sub>2</sub>	110	4	3	Loop	Loop/cavity with brighter, structured core superposed on streamer. Deflections. Brightening in region prior to event (~7 hours).
Aug 28	240	~05:21~19:18	258?	195?	—	—	—	—	0	No obvious front	Extremely wide cloud covers south and west sectors. Motion in north and east. Halo?
Aug 28	240	11:46~13:34	135	039	Aug 28 11:46-12:02	211 <sub>1</sub> *	122	2	3	Loop	Faint loop/cavity between streamers.

† Position of feature was measured along a non-radial line.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Aug 28/29	240/241	13:34>00:19	102	040	—	—	—	—	1	Cloud	Cloud around streamer with two tongues of material at south edge. First tongue is visible from 13:34 until 18:11. Second tongue follows from 19:43 until end of day.
											DATA GAP: Aug 29 00:27 to Aug 30 00:19.
Aug 30	242	<00:19~08:08	089	028	—	—	—	—	0	Missed front	Faint cloud superposed on streamer. Could have missed the front.
Aug 30	242	<00:28~05:04	292	015	Aug 30 00:28-02:00	202 <sub>1</sub> ★	300	2	6	Bottom of goal-post shaped cavity	Cloud(?) containing embedded cavity with well-defined base. Cavity is concave-outward, goal-post shaped. Event is superposed on fan. Region is disrupted. Deflections.
Aug 30	242	03:24~05:37	149	012	Aug 30 03:24-04:05	643 <sub>1</sub> ★ 739 <sub>2</sub>	151	4	5	Tongue	Structured tongue superposed on ray.
											DATA GAPS: Aug 30 08:16 to 21:49. Aug 31 03:06 to 17:45.
Aug 31	243	<17:45-20:49	125 126	058 021	Aug 31 17:45-18:10 Aug 31 17:45-18:27	469 <sub>1</sub> ★ 448 <sub>1</sub> ★ 515 <sub>2</sub>	117 134†	2 4	5 5	Outer loop Inner loop	Dimpled loop/cavity with complex core including inner loop/cavity and adjacent blobs all superposed on pre-existing bright ray. Deflections. Region is disrupted.
Sep 01	244	05:03-06:27	~122	~041	—	—	—	—	1	Outer loop	Multiple loops/cavities and core (or highly structured, complex cloud) superposed on streamer. Streamer is blown out. Deflections. Could extend as far north as 060°. Data is streaked.
											DATA GAPS: Sep 01 08:16 to 17:04. Sep 02 07:18 to 18:53.
Sep 03	246	~02:58-06:11	076	062	— Sep 03 04:05-04:47	— 266 <sub>1</sub> ★ 283 <sub>2</sub>	— 072	— 3	0 7	Outer loop Inner loop	Fuzzy outer loop/cavity with sharp, flattened, inner loop/cavity (or mound) and possible core superposed on streamer. Streamer is disrupted. Deflections. Data is streaked.

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## SMM C/P 1989 Coronal Mass Ejections page 44 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
											DATA GAPS: Sep 03 09:15 to 13:18. Sep 04 05:20 to 12:35. Sep 05 23:53 to Sep 06 21:05.
Sep 07	250	07:49-10:02	~315	~010	—	—	—	—	1	Jet	Fuzzy jet (or ray).
Sep 07/08	250/251	16:02~02:31	077?	055?	—	—	—	—	0	Too fuzzy	Fuzzy irregular cloud in streamer. Cavity appears at 23:43. Streamer is blown out. Deflections.
Sep 07/08	250/251	21:54~05:59	288?	065?	Sep 07 21:54-22:19	374 <sub>1</sub> * 303 <sub>2</sub>	267	3	6	Mound	Faint mound (or loop/cavity) superposed on streamer. Deflections.
Sep 08/10	251/253	04:02~17:39	062	025	—	—	—	—	1	Loop	Could be more than one event: 1. Loop/cavity (or mound) superposed on streamer. Streamer is disrupted. Deflections. 2. Faint mound (or loop/cavity) superposed on rays (or streamer). 3. Faint cloud superposed on streamer (or rays). 4. Blob 'N Ray with faint cloud superposed on streamer (or rays). Deflections.
	251	04:02-07:32			—	—	—	—	0	Too faint	
	251	19:14-23:50	050	020	—	—	—	0	Too faint		
	252 253	08:04?~11:31 11:31~17:39	095? 060	020? 035	—	—	—	0	Too fuzzy		
Sep 08	251	22:26-23:58	270	020	—	—	—	—	0	No obvious front	Faint, narrow cloud.
Sep 09	252	19:54~23:23	282	033	—	—	—	—	0	No clear front	Structured cloud (or irregular loop/cavity) superposed on rays and streamers. Deflections.
Sep 10	253	~07:54-23:30	~227	~035	—	—	—	—	0	No clear front	Faint cloud superposed on streamers. Could extend as far north as 260°.
Sep 10	253	21:50-23:47	078	045	Sep 10 21:50-22:15	234 <sub>1</sub> *	078	2	5	Inner loop	Fuzzy outer loop/cavity with sharper, concentric, inner loop/cavity superposed on fan (or streamers). Deflections.
Sep 10/11	253/254	22:23~16:47	~315	~050	—	—	—	—	1	Northern edge	Very faint, slow-moving cloud(s?).
											DATA GAP: Sep 11 04:31 to 08:25.
Sep 11/12	254/255	10:31-01:50	082	045	—	—	—	—	0	No clear front	Fuzzy cloud superposed on rays (or streamers). Deflections.

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\* Preferred fit to the data. This quantity is included in the speed histograms.

## SMM C/P 1989 Coronal Mass Ejections page 45 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
Sep 11	254	14:50~17:54	~227	~025	Sep 11 14:50-16:22	151 <sub>1</sub> ★	220	2	3	Mound	Fuzzy mound superposed on streamer. Brightening as far south as ~160°.
											DATA GAP: Sep 12 01:59 to 13:33.
Sep 12	255	18:25~20:14	142?	024?	Sep 12 18:25-18:42	281 <sub>1</sub> ★	147	2	5	Mound	Fuzzy mound superposed on streamer. Could extend as far north as 122°. Deflections.
Sep 14	257	10:08-13:12	073? 074?	070? 038?	—	—	—	—	0	Front at 10:08 only	Loop/cavity with highly structured, complex, inner (prominence) loops/cavities. Edge of outer loop could extend south of equator in 10:33 east image. Deflections.
					Sep 14 10:08-10:33	478 <sub>1</sub> ★	064†	2	7	Inner loop (prominence)	
											DATA GAP: Sep 14 21:24 to Sep 15 02:51.
Sep 15	258	~02:51~07:27	302	051	—	—	—	—	0	No obvious front	Fuzzy (multiple?) loop/cavity and core in streamer. Becomes 'light-bulb' shaped. Big deflections. Streamer is partially blown out. Motion (swelling?) of material in streamer prior to event on Sep 14.
					Sep 15 02:51-06:36	175 <sub>1</sub> 254 <sub>2</sub> ★	300	4	5	Cavity	
Sep 15	258	06:36~09:40	251	050	—	—	—	—	0	Front at 06:36 only	Complex loop/cavity and bright, structured, complex, loop-shaped (prominence) core south of streamer. Deflections. Core is brightest at 263°.
					Sep 15 06:36-07:52	529 <sub>1</sub> ★ 649 <sub>2</sub>	271†	5	9	Core (prominence)	
Sep 15	258	13:47-15:36	163	035	Sep 15 13:47-14:04	211 <sub>1</sub> ★	155	2	5	Loop	Faint loop/cavity superposed on fan. Deflections.
Sep 16	259	11:30-16:06	066?	078?	—	—	—	—	0	No obvious front	Faint cloud superposed on and around streamer. Deflections. Could be wider.
Sep 16	259	12:29-23:28	252?	039?	—	—	—	—	0	No clear front	Faint, fuzzy cloud around streamer.
Sep 16	259	15:33~17:29	279	035	—	—	—	—	0	Too faint	Faint mound between streamers. Deflections.
Sep 18	261	10:49-15:41	325	050	Sep 18 10:49-12:37	486 <sub>2</sub> ★	320	6	9	Loop	Complex (multiple?) loop/cavity with structured core superposed on faint streamer (or fan). Region is blown out. Big deflections.
					Sep 18 11:56-12:37	420 <sub>1</sub> ★ 516 <sub>2</sub>	323†	4	7	Blob in core	

† Position of feature was measured along a non-radial line.

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★ Preferred fit to the data. This quantity is included in the speed histograms.

## SMM C/P 1989 Coronal Mass Ejections page 46 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments	
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual			
Sep 18/19	261/262	21:15-06:18	285	055	Sep 18 21:32-22:39	271 <sub>1</sub> *	301	3	5	Outer northern cavity	Could be two events: 1. Adjacent, multiple, complex (arcade?) loops/cavities and cores superposed on streamer. Streamer is disrupted. Deflections. 2. Irregular material with possible fainter loop/cavity and core. Region is blown out.	
		21:15~01:00				297 <sub>2</sub>						
		~00:52-05:28	275	040	Sep 18 21:32-23:04	413 <sub>1</sub> *	285	4	5	Outer southern cavity		
—	—				—	—						0
Sep 19	262	14:14-15:45	191	060	Sep 19 14:14-14:30	386 <sub>1</sub> *	163 <sup>†</sup>	2	6	Eastern edge of loop (prominence)		Complex, highly structured (prominence) loop/cavity spans pylon shadow. Edges are superposed on streamers. Deflections. Could have missed coronal front between 12:42 and 14:14 images. Width was measured at 3.0R <sub>☉</sub> .
Sep 20	263	06:47~10:15	298	018	Sep 20 06:47-07:04	348 <sub>1</sub> *	298	3	9	Mound		Mound (or loop/cavity) with bright, structured (prominence?) core at south edge of streamer.
						479 <sub>2</sub>						
											DATA GAP: Sep 21 04:46 to 14:55.	
Sep 22	265	17:12-20:16	143?	044?	Sep 22 17:12-19:01	237 <sub>1</sub> *	145	4	6	Loop	Thin, faint loop/cavity and core between streamers. Deflections. Could extend as far south as 195°.	
						315 <sub>2</sub>						
											DATA GAP: Sep 22 20:33 to Sep 23 17:24.	
Sep 23	266	17:58-21:01	125	010	—	—	—	—	0	No obvious front	Faint jet (or fan).	
Sep 23/24	266/267	20:36~22:32	~357	~055	—	—	—	—	0	No obvious front	Slow expansion of cloud around streamer. Deflections. Streamer is disrupted.	
Sep 25	268	00:25-03:04	313?	090?	Sep 25 00:25-00:41	913 <sub>1</sub> *	310	2	7	Northern loop	Two overlapping, irregular loops/cavities superposed on and around fan. Very faint material could be ejected as far south as 230°. Deflections.	
					Sep 25 00:25-00:41	948 <sub>1</sub> *				310		2
												DATA GAP: Sep 25 09:52 to 13:54.
Sep 25	268	18:46?-21:41	217	045	—	—	—	—	0	Front at 20:10 only		Faint loop/cavity superposed on and south of streamer. Spans pylon shadow. Streamer is partially blown out. Deflections.

<sup>†</sup> Position of feature was measured along a non-radial line.

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\* Preferred fit to the data. This quantity is included in the speed histograms.

## SMM C/P 1989 Coronal Mass Ejections page 47 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Sep 26	269	~02:00-23:33	297	047	—	—	—	—	0	No clear front	Slow, faint cloud superposed on fan and streamers. Deflections.
Sep 26	269	09:55~23:58	190	070	—	—	—	—	1	Loop	Slow, fuzzy loop/cavity spans pylon shadow. Superposed on streamer(?). Structured, inner (prominence?) loop follows at 22:26. Deflections.
Sep 27	270	05:32-06:05	080	040	Sep 27 05:32-05:57	367 <sub>1</sub> * 378 <sub>2</sub>	075	4	5	Loop	Faint loop/cavity (or mound) between streamers.
Sep 27	270	16:22<20:57	040	060	—	—	—	—	0	Front at 16:22 only	Structured mound on and between streamers.
Sep 27	270	18:10~20:49	258	056	—	—	—	—	0	Missed front	Cloud superposed on streamers and rays. Deflections. Could have missed the front.
Sep 27	270	20:49-23:52	258	070	Sep 27 20:49-22:21	339 <sub>1</sub> 441 <sub>2</sub> *	274†	4	6	Loop	Complex (multiple?) loop/cavity with structured core superposed on streamer. Loop top flattens as it moves outward. Core could be concave-outward, 'V'-shaped. Deflections. Region is disrupted.
Sep 28	271	00:01-04:28	052	045	—	—	—	—	0	Front at 00:01 only	Multiple loops/cavities and complex, loop-shaped core superposed on streamer. Streamer is disrupted. Deflections.
											DATA GAP: Sep 28 18:54 to Sep 29 00:37.
Sep 29	272	~02:00~23:26	060	050	—	—	—	—	1	Cavity	Slow loop/cavity(?) and core(?) superposed on streamers (or fan). Fades. Region is mostly blown out. Deflections.
			058	012	Sep 29 18:51-20:47	099 <sub>1</sub> * 119 <sub>2</sub>	054†	4	5	Core (late in event)	
Sep 29	272	07:08-11:27	284?	018?	—	—	—	—	0	Missed front	Structured (prominence?) cloud superposed on streamers and fan. Deflections. Could have missed the front. Could extend as far south as 240°.
Sep 29	272	11:27-12:34	262	077	Sep 29 11:27-11:43	1828 <sub>1</sub> *	255	2	7	Loop	Bright, complex, structured (multiple?) loop/cavity with structured core superposed on faint streamer (or fan). Region is blown out. Big deflections.

† Position of feature was measured along a non-radial line.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Comments	
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		Feature
											DATA GAP: Sep 29 14:48 to 17:44.
Oct 01	274	10:27~12:40	~250	060?	Oct 01 10:27-11:08	544 <sub>1</sub> * 464 <sub>2</sub>	250	3	6	Outer loop	Outer loop/cavity with complex (multiple?) inner loop/cavity and core between streamers. Deflections. Possible concave-outward, 'U'-shaped material in core.
					Oct 01 10:44-11:08	422 <sub>1</sub> * 421 <sub>2</sub>	250	3	6	Core	
Oct 01	274	19:54~22:41	250?	060?	—	—	—	—	0	Front at 20:02 only	Structured(?) loop/cavity and core between and superposed on streamers. Could extend as far north as 310°. Deflections.
											DATA GAPS throughout Oct 02 totaling ~10 hours.
Oct 03	276	08:26~10:14	227?	075?	Oct 03 08:26-08:34	1603 <sub>1</sub> *	213	2	7	Loop (prominence?)	Very fast, structured, knotty (prominence?) loop/cavity. Could extend as far south as 120° and as far north as 320°. Deflections. Could have missed coronal front between 07:11 and 08:26 images.
Oct 03	276	11:21-14:25	279	048	—	—	—	—	1	Cloud	Fuzzy cloud superposed on streamer.
Oct 03	276	14:33<20:40	032	025	—	—	—	—	0	Front at 14:33 only	Faint loop/cavity (or mound) superposed on and north of streamer. Data gap follows. Deflections.
											DATA GAP: Oct 03 14:41 to 20:31.
Oct 04	277	04:43-07:55	080	014	Oct 04 04:43-05:41	479 <sub>1</sub> *	085	2	3	Loop	Small loop/cavity(?) superposed on fan. Deflections.
Oct 04	277	06:23-07:38	276	044	—	—	—	—	0	Front at 06:23 only	Fuzzy, faint loop/cavity (or mound) superposed on and south of streamer. Deflections.
Oct 05	278	17:06~23:29	132	025	—	—	—	—	1	Cloud	Faint cloud superposed on streamer.
Oct 05	278	17:14-21:24	289	042	Oct 05 17:14-17:31	352 <sub>1</sub> *	295	2	9	Outer loop	Loop/cavity and beautiful, coiled, highly-structured, inner (prominence) loops/cavities superposed on streamer. Streamer is disrupted. Deflections.
					Oct 05 17:14-18:21	1007 <sub>2</sub> *	290†	3	9	Outer cavity	
					Oct 05 17:31-18:21	543 <sub>1</sub> *	291†	2	9	Inner loop (prominence)	

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## SMM C/P 1989 Coronal Mass Ejections page 49 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
Oct 05/06	278/279	~22:56~18:43	275	043	Oct 06 02:40-08:23	096 <sub>2</sub> *	272	6	5	Cavity	Cavity appears and rises slowly in streamer. Core appears beneath cavity at 00:28. Loop becomes visible around cavity at ~03:31. Loop/cavity are blown out by ~11:09. Irregularly-shaped material is ejected until ~18:43. Narrow concave-outward, 'U'-shaped material ejected from ~17:12 to 18:43. Streamer is blown out. Deflections.
Oct 06	279	09:46-10:03	164?	087?	—	—	—	—	0	Missed front	Broad, structured material near southern pole covers most of south sector. Visible in rolled north images. Missed the front between 08:48 and 09:46 images. Deflections.
Oct 06/08	279/281	~21:55~22:45	005	046	—	—	—	—	0	No obvious front	Slow lateral and outward expansion of adjacent streamers. Region is blown out. Deflections.
											DATA GAP: Oct 07 13:27 to 19:09.
Oct 07	280	19:25-22:45	~122	~045	Oct 07 19:25-19:42	141 <sub>1</sub> *	120	2	3	Cavity	Loop/cavity and possible core superposed on fan. Deflections. Could extend as far north as 090°.
Oct 08	281	01:23-04:43	042	047	Oct 08 01:23-01:48	351 <sub>1</sub> *	042	2	9	Outer loop	Outer loop/cavity with complex inner loop/cavity and structured (prominence?) core between streamers. Deflections.
Oct 08	281	01:31-04:51	132	021	—	—	—	—	0	First cavity	Cavity in fan at 01:31. Thin loop/cavity with complex, structured loop-shaped (prominence) core follows first cavity at 03:11. Deflections. Region is disrupted.
			147	032	Oct 08 03:11-03:19	634 <sub>1</sub> *	145	2	9	Second cavity	
			146	012	Oct 08 03:11-03:19	775 <sub>1</sub> *	145	2	9	Core (prominence)	
											DATA GAP: Oct 09 06:04 to 18:34.
Oct 09/10	282/283	21:37~07:03	059	018	Oct 09/10 21:37-01:05	036 <sub>1</sub> * 047 <sub>2</sub>	062	6	4	Cavity	Cavity with core in streamer. Loop becomes visible around cavity. Streamer is disrupted. Data is streaked.

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## SMM C/P 1989 Coronal Mass Ejections page 50 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
											DATA GAP: Oct 11 12:10 to 16:28.
Oct 11/12	284/285	~19:47~01:53	114	036	Oct 11 22:34-22:50	105 <sub>1</sub> *	112	2	3	Loop	Motion and expansion of rays. Flattened(?) loop/cavity superposed on rays follows at 22:34. Best seen at 22:50. Deflections.
											DATA GAPS: Oct 12 03:33 to 07:26. Oct 12 10:46 to 15:04.
Oct 12	285	15:37~20:11	113	050	—	—	—	—	0	Front at 15:37 only	Fuzzy loop/cavity (or mound) superposed on streamer and rays.
Oct 12/13	285/286	~20:11~06:43	115	060	Oct 12/13 20:11-05:20	085 <sub>2</sub> *	120	7	6	Cavity	Slowly rising cavity with thick fuzzy loop/cavity superposed on streamer(s?). Loop front sharpens as it moves outward. Complex, structured, loop-shaped core appears by 05:20. Region is blown out. Big deflections.
Oct 14/15	287/288	10:14~01:02	130	020	—	—	—	—	1	First cavity	Slow outward expansion of irregular cavity in streamer. Front evolves. Bright, dimpled, wider loop/cavity and core appear at 23:31 in same location as irregular cavity. Region is blown out. Big deflections.
		23:31-01:02	130	050	Oct 14/15 23:31-00:04	572 <sub>1</sub> 866 <sub>2</sub> *	132	3	9	Second cavity	
Oct 14/15	287/288	11:28~21:06	235	060	—	—	—	—	0	No clear front	Slow expansion of complex material in wide streamer. Concave-outward, 'U'-shaped material visible from 18:48 to 19:21 on Oct 14. 'Light-bulb' shaped loop/cavity and core appear in streamer on Oct 15 at 13:05. Streamer is blown out.
					—	—	—	—	1	Cavity (late in event)	
											DATA GAP: Oct 14 13:16 to 17:17.
Oct 15	288	all day	~294	~027	—	—	—	—	0	No clear front	Slow expansion of structured cloud superposed on streamer. Streamer is disrupted.
Oct 15	288	04:13~06:59	056	024	—	—	—	—	1	Mound	Faint, helmet-shaped mound (or loop/cavity) between streamers. Deflections.

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## SMM C/P 1989 Coronal Mass Ejections page 51 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
											DATA GAPS: Oct 15 08:39 to 10:10. Oct 15 11:33 to 13:05. Oct 15 16:49 to 20:41. Oct 16 04:27 to 07:21.
Oct 16	289	08:52<23:24	217	024	—	—	—	—	1	Loop	Small loop/cavity superposed on streamer (or fan). Data gap occurs during event.
Oct 16	289	09:26<14:58	079	049	—	—	—	—	0	Front at 09:26 only	Complex (multiple?) loop/cavity at north edge of streamer. Multiple data gaps occur throughout event.
											DATA GAPS: Oct 16 09:34 to 14:58. Oct 16 15:55 to 22:34. Oct 16 23:32 to Oct 19 16:03.
Oct 19/20	292/293	~19:06~15:18	280	051	—	—	—	—	1	Cloud	Slow expansion of structured cloud around small streamer. Multiple loops/cavities and core appear at 09:30 and blowout through streamer. Streamer is disrupted. Deflections.
											DATA GAP: Oct 19 21:02 to Oct 20 03:16.
Oct 20	293	15:09-16:41	203?	097?	Oct 20 15:09-15:34	610 <sub>1</sub> * 572 <sub>2</sub>	234	3	5	Loop	Loop/cavity superposed on faint rays and fan. Partially obscured by pylon shadow. Deflections.
Oct 20	293	20:58~23:11	270	040	Oct 20 20:58-21:39	395 <sub>1</sub> * 324 <sub>2</sub>	263	3	7	Loop	Complex, flattened loop/cavity and structured core superposed on faint streamer (or rays). Deflections.
Oct 21	294	02:05-11:13	105	029	—	—	—	—	0	Front at 02:05 only	Mound superposed on adjacent, overlapping streamers. Some swelling and brightening of region for ~12 hours prior to event.
											DATA GAP: Oct 21 06:06 to 09:08.
Oct 21	294	~10:56~20:04	210	027	—	—	—	—	0	No obvious fronts	Two, irregular clouds superposed on ray. First cloud visible from 10:56 until 12:27. Second cloud seen from 15:30 until ~20:04.

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## SMM C/P 1989 Coronal Mass Ejections page 52 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
											DATA GAP: Oct 21 20:20 to Oct 22 09:29.
Oct 22	295	~11:25~23:09 14:27-15:42	324? 315	038? 020	—	—	—	—	0	No clear front	Faint, structured cloud with embedded concave-outward, 'U'-shaped material. Deflections.
					Oct 22 14:27-15:42	074 <sub>1</sub> ★ 090 <sub>2</sub>	312†	4	3	'U'-shaped material	
Oct 23	296	01:22~12:01	~280	~040	—	—	—	—	1	Cloud	Faint, structured, complex cloud superposed on faint fan. Faint, narrow material ejected from ~11:19 until 12:01. Region is disrupted. Deflections. Could extend further south.
											DATA GAPS: Oct 23 04:16 to 09:48 Oct 23 15:04 to 19:21
Oct 24	297	04:20~19:23	042?	025?	—	—	—	—	0	No obvious front	Structured mound (or cloud) around streamer.
											DATA GAP: Oct 24 06:08 to 10:08.
Oct 24	297	11:39~13:27	237	043	Oct 24 11:39-12:04	231 <sub>1</sub> ★ 306 <sub>2</sub>	241	3	5	Loop	Fuzzy, faint loop/cavity with fuzzy core superposed on faint fan (or streamers). Deflections.
Oct 24	297	18:00>19:56	256	108	Oct 24 18:00-18:25	1453 <sub>1</sub> 1956 <sub>2</sub> ★	245	3	9	Loop	Bright, complex, wide, outer loop/cavity with inner, 'light-bulb' shaped loop/cavity and structured, complex (prominence?) core superposed on faint fan (or streamers). Big deflections. Region is blown out.
											DATA GAP: Oct 24 19:56 to Oct 25 15:23.
Oct 26/27	299/300	~20:22~06:35	045	034	—	—	—	—	0	No obvious front	Structured cloud around streamer. Best seen in 20:22 image.
Oct 26/27	299/300	23:33~03:25	259	064	Oct 26/27 23:33-00:23	675 <sub>1</sub> ★	263	2	6	Loop	Loop/cavity in 23:33 image. Broad, complex loop/cavity (or two overlapping loops) with core containing twisted, structured (prominence) ropes in 00:23 image. Event is superposed on rays (or streamers). Deflections.

† Position of feature was measured along a non-radial line.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Oct 27	300	~03:58-14:35?	129	051	Oct 27 05:13-07:00	100 <sub>1</sub> * 071 <sub>2</sub>	131	4	3	Loop	(Multiple?) loop/cavity with core in streamer. Streamer is disrupted. Slight swelling and brightening of streamer prior to event. Deflections.
Oct 27	300	20:31~23:50	263	035	Oct 27 20:31-21:38	433 <sub>1</sub> * 365 <sub>2</sub>	270	3	3	Mound	Mound superposed on rays. Deflections.
Oct 28	301	05:21~07:17	090?	070?	Oct 28 05:29-05:46	633 <sub>1</sub> *	124	2	3	Southernmost edge of loop	Big, faint, structured loop/cavity. Could extend as far south as 140°.
Oct 28	301	05:29~08:15	250	100	Oct 28 05:29-06:44	353 <sub>1</sub> 122 <sub>2</sub> *	252	4	4	Loop	Wide, complex (multiple?) loop/cavity with possible core. Deflections.
Oct 28/29	301/302	~08:48<12:07	134	043	Oct 28 08:48-20:56	018 <sub>1</sub> * 023 <sub>2</sub>	130	15	7	Cavity	Slow rising loop/cavity in streamer with (multiple?) complex, inner, loop-shaped core. Streamer expands. Blows out during data gap from Oct 28 20:56 to Oct 29 11:50.
											DATA GAP: Oct 28 10:28 to 13:05.
Oct 28	301	13:13-20:40	230	020	—	—	—	—	1		Thin loop/cavity with core superposed on and north of streamer. Deflections.
											DATA GAPS: Oct 28 23:25 to Oct 29 07:33. Oct 29 14:52 to Oct 30 04:14. Oct 30 07:58 to Oct 30 12:06.
Oct 30	303	<12:06~16:22	230	040	Oct 30 12:14-15:16	164 <sub>1</sub> 255 <sub>2</sub> *	240	7	4	Cloud	Faint cloud followed by faint loop/cavity(?) and core.
Oct 31	304	16:46-18:41	089	073	Oct 31 16:46-17:10	539 <sub>1</sub> *	072	2	7	Loop (northern edge)	Complex, multiple, pentagonal loops/cavities with core on and between streamers. Region is partially blown out. Deflections.
					Oct 31 16:54-17:10	702 <sub>1</sub> *	114	2	7	Loop (southern edge)	
Oct 31	304	21:27~22:58	152?	035?	—	—	—	—	0	Missed front?	Cloud superposed on streamer. Southern edge near pylon shadow. Deflections.

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## SMM C/P 1989 Coronal Mass Ejections page 54 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Nov 01	305	09:17~12:44	260	050	Nov 01 09:17-10:48	251 <sub>1</sub> 365 <sub>2</sub> *	245	4	6	Loop	Broad, complex (multiple?) loop/cavity with wide, structured, complex core superposed on and south of streamer. Region is disrupted. Deflections.
			252	030	Nov 01 09:59-11:30	302 <sub>1</sub> 416 <sub>2</sub> *	257	4	6	Core	
Nov 01	305	17:25-18:56	072?	042?	—	—	—	—	0	No clear front	Faint cloud superposed on rays. Deflections.
Nov 01/03	305/307	~19:54~02:11	285	061	Nov 01/02 19:54-11:20	018 <sub>1</sub> * 017 <sub>2</sub>	285	6	3	Cloud	Very slow rising cloud expands on and north of streamer. Region is partially blown out. Deflections. Cavity appears at south edge of streamer at 01:57 on Nov 02. Moves out until early Nov 03 then stalls or fades.
Nov 02	306	05:33~17:39	077	047	—	—	—	—	0	No clear front	Could be two events: 1. Structured cloud superposed on rays. Deflections. 2. Structured knots of (prominence) material superposed on rays.
		05:33-06:30?									
		13:07-17:39	078	010	—	—	—	—	1	Knots (prominence)	
Nov 03	307	~02:36-22:25	080	050	—	—	—	—	0	No obvious fronts	Could be two events: 1. Irregularly-shaped material along rays (or streamers). Deflections. 2. Blobs 'N Ray. Deflections. Region is disrupted.
		02:36-08:48									
		16:22-22:25	102	015							
DATA GAP: Nov 04 04:29 to 09:59.											
Nov 04	308	13:17-14:48	122	053	Nov 04 13:17-13:33	1053 <sub>1</sub> *	119	2	5	Outer loop	Complex, structured, faint loop/cavity with multiple, interior loops/cavities and core between streamers. Deflections.
Nov 04/05	308/309	23:52~01:23	182	080	—	—	—	—	0	Front at 23:52 only	Mound spans pylon shadow.
Nov 05	309	05:39-07:52	077	030	Nov 05 05:39-06:04	304 <sub>1</sub> * 265 <sub>2</sub>	083	3	5	Loop	Irregular, flat-topped loop/cavity superposed on streamer.
Nov 05	309	10:45-15:17	102?	026?	—	—	—	—	1	Mound	Faint mound superposed on and south of streamer. Could extend as far north as 067°. Fades. Deflections.

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Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Nov 05/06	309/310	21:03-00:21	108?	025?	—	—	—	—	1	Cloud	Faint cloud between streamers.
Nov 06	310	09:34~23:59	317	052	—	—	—	—	1	Cloud	Faint, structured cloud. Remnants ejected along ray at 300° late in event.
Nov 06	310	13:58~15:28	108?	030?	—	—	—	—	1	Cloud	Faint cloud superposed on and south of streamer. Deflections. Corona brightens from 080° to 134°.
Nov 07	311	08:15>15:14	069	057	Nov 07 08:15-09:37	057 <sub>1</sub> *	060	2	3	Mound	Two part event: 1. Mound superposed on and north of streamer. Deflections. Streamer is disrupted. 2. Structured (prominence?) loop/cavity around streamer. Streamer is disrupted.
		15:06>15:14			077	035					
DATA GAP: Nov 07 15:22 to Nov 08 06:12.											
Nov 08/09	312/313	12:23~06:48	050	035	Nov 08 12:23-12:48	094 <sub>1</sub> *	054	2	4	Cavity	Thick loop/cavity and structured core between streamers. Core evolves. Deflections.
Nov 08	312	19:48~22:58	314?	055?	—	—	—	—	0	Missed front	Structured loop/cavity superposed on and south of streamer. Region is disrupted. Deflections. Missed top of loop between 18:59 and 19:48 images. Could extend as far south as 275°.
Nov 09	313	20:31~22:01	089	023	—	—	—	—	0	No obvious front	Cloud superposed on fan (or streamers).
Nov 09/10	313/314	20:39~05:43	297?	035?	—	—	—	—	0	Too faint	Very faint, irregularly-shaped cloud superposed on and south of streamer. Material seen as far south as 240°.
Nov 10	314	14:04-15:59	228?	057?	—	—	—	—	0	Front at 14:04 only	Faint loop/cavity (or mound) superposed on streamer. Could extend further south.
Nov 10	314	16:16~18:36	310	044	Nov 10 17:13-17:46	492 <sub>1</sub> *	308	3	6	Loop	Loop/cavity (or mound) superposed on streamers.
						351 <sub>2</sub>					

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## SMM C/P 1989 Coronal Mass Ejections page 56 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics					Feature	Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual		
Nov 10/11	314/315	17:05~02:08	244	064	Nov 10 17:05-19:17	129 <sub>1</sub> * 169 <sub>2</sub>	244	7	6	First loop	Faint (multiple?) loop/cavity with core and inner loop/cavity superposed on and north of streamer.
					Nov 10 18:36-19:17	113 <sub>1</sub> * 159 <sub>2</sub>	244	3	5	Core	
					Nov 10 21:37-23:32	166 <sub>1</sub> * 049 <sub>2</sub>	244	3	3	Inner loop	
Nov 11	315	00:54~04:12	232	043	—	—	—	—	0	No clear front	DATA GAP: Nov 10 19:17 to 21:37. Material ejected around streamer. Streamer is disrupted.
Nov 11/12	315/316	19:00~13:05	234	037	Nov 11/12 19:00-02:32	027 <sub>1</sub> * 019 <sub>2</sub>	233†	5	7	Cavity	Loop/cavity and core blows out slowly in streamer. Gone by Nov 12 ~ 13:05. Streamer is disrupted. Region fades until early Nov 14.
Nov 12	316	07:28-11:18	259	030	Nov 12 07:28-08:34	264 <sub>1</sub> * 282 <sub>2</sub>	247	4	5	Loop	Loop/cavity at north edge of streamer.
Nov 13	317	01:25~09:06	047	035	—	—	—	—	1	Loop	Fuzzy loop/cavity and structured core superposed on streamer. Partially obscured by artifacts. Streamer is disrupted. Deflections. DATA GAP: Nov 13 16:11 to 22:04.
Nov 13/14	317/318	22:29~01:30	077	047	—	—	—	—	0	No obvious front	Cloud expands around streamer. Deflections.
Nov 14	318	11:53~14:29	277	022	Nov 14 11:53-12:10	281 <sub>1</sub> *	275	2	4	Mound	Small mound around streamer (or ray).
Nov 14	318	14:46<19:33	117	038	—	—	—	—	0	Front at 14:46 only	Mound superposed on and north of streamer. Deflections. Ends during data gap. DATA GAPS: Nov 14 14:54 to 19:25. Nov 14 20:30 to Nov 15 04:02.
Nov 14/15	318/319	11:29~11:33	~220	~020	—	—	—	—	0	No obvious front	Could be two events: 1. Tongue superposed on streamer. Streamer is disrupted. 2. Faint, structured cloud superposed on streamer (or fan). Began during data gap. Deflections.
	318	11:29-14:46									
	319	<04:02~11:33									

† Position of feature was measured along a non-radial line.

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## SMM C/P 1989 Coronal Mass Ejections page 57 of 57

Date	DOY	Time [UT]	Cent PA [deg]	Width [deg]	Kinematics						Comments
					Trajectory Times [UT]	Speed [km/s]	Speed PA	#Data Pts	Qual	Feature	
Nov 15	319	<04:26~16:36	120	020	Nov 15 04:26-12:06	037 <sub>1</sub> 071 <sub>2</sub> *	118	6	5	Cavity	Loop/cavity superposed on fan (or streamers). Began during data gap. Amorphous core visible from 12:06 until ~16:36. Region is disrupted. Deflections.
Nov 15	319	06:14~11:33	273 266	050 020	— Nov 15 07:44-08:57	— 386 <sub>1</sub> * 378 <sub>2</sub>	— 265	— 5	0 5	No clear front Loop (prominence)	Structured mound (or cloud) with core and structured (prominence) loop/cavity and knots of material superposed on streamer. Streamer is disrupted.
Nov 15	319	20:34-22:04	255? ~251	070? ~016	Nov 15 20:58-21:15	668 <sub>1</sub> *	250	2	5	Arc	Blobs with arc-shaped material. Could be end of long southwest event that began Nov 11. Event is superposed on streamers and rays.
Nov 16	320	10:05-10:30	~175	~038	Nov 16 10:05-10:13	491 <sub>1</sub> *	190	2	7	Knots (prominence?)	Structured cloud (or tongue) with knots of (prominence?) material at westernmost edge. Visible in rolled north images. Could have missed cloud front between 09:17 and 10:05. Deflections. Poor data coverage.
Nov 16	320	13:47-14:59	~278	~040	—	—	—	—	1		Loop/cavity and core (or mound) superposed on streamer (or ray). Brighter at south edge. Deflections. Could extend as far south as 246°.
											DATA ENDS at 11:52 on November 17, 1989.

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