

# IP shock list obtained from WIND and ACE data

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Table 1: IP shock list Jan 1995 to Dec 2013<sup>1</sup>.

Y	M	D	UT	shock normal	$\theta_{x_n}$	$\varphi_{y_n}$	$\theta_{B_n}$	$v_s$	X	$B_z$	Ms	SAT
1994	Dec	05	2101	(-0.760, -0.600, 0.249)	139.50	157.48	67.13	378.82	1.55	3.84	1.47	W
1995	Jan	01	1936	(-0.820, -0.461, 0.322)	145.12	235.07	68.08	332.62	2.07	1.19	2.18	W
1995	Feb	26	0255	(-0.803, -0.577, 0.147)	143.45	165.70	32.16	287.50	1.45	-3.17	1.46	W
1995	Mar	04	0036	(-0.683, 0.338, 0.648)	133.06	27.55	80.13	350.72	1.95	-0.35	1.87	W
1995	Mar	23	0937	(-0.950, 0.152, -0.271)	161.87	209.30	77.89	373.36	1.90	-1.84	2.18	W
1995	Apr	17	2333	(-0.865, 0.072, 0.496)	149.92	8.26	81.68	361.93	1.62	2.74	1.30	W
1995	Jul	22	0535	(-0.641, 0.261, -0.722)	129.88	289.86	38.40	272.85	2.15	-0.54	1.27	W
1995	Jul	24	0223	(-0.813, -0.582, 0.032)	144.34	176.81	50.76	351.70	3.01	0.92	3.50	W
1995	Aug	17	0245	(-0.856, 0.447, -0.261)	148.84	329.69	54.89	406.08	2.42	0.16	1.58	W
1995	Aug	22	1256	(-0.809, 0.399, 0.432)	144.02	42.73	51.86	335.28	2.58	0.24	2.17	W
1995	Aug	24	2211	(-0.874, -0.129, -0.469)	150.88	15.33	74.46	348.23	1.58	-0.09	1.68	W
1995	Sep	14	2124	(-0.747, 0.276, 0.604)	138.36	24.58	77.59	395.06	1.43	-1.98	1.46	W
1995	Oct	17	1303	(-0.532, -0.601, -0.596)	122.12	225.24	62.33	252.13	1.26	-2.93	2.00	W
1995	Oct	18	1040	(-0.718, -0.146, -0.681)	135.87	192.10	78.57	323.59	3.44	0.81	3.53	W
1995	Oct	22	2120	(-0.693, 0.468, 0.548)	133.90	40.49	60.19	345.24	1.98	-0.14	1.31	W
1995	Nov	27	0822	(-0.869, -0.254, -0.424)	150.35	210.96	55.62	350.41	1.46	-1.05	1.79	W
1995	Dec	15	0437	(-0.885, 0.393, 0.251)	152.23	57.41	33.62	317.91	2.00	0.54	1.40	W
1995	Dec	24	0557	(-0.862, -0.352, -0.366)	149.52	43.89	64.22	419.00	2.44	-0.06	2.53	W
1996	Feb	06	1914	(-0.838, -0.192, 0.511)	146.89	200.61	62.87	343.32	1.72	1.17	1.35	W
1996	Feb	21	2214	(-0.779, -0.125, 0.615)	141.15	101.53	36.12	349.17	1.80	-0.72	1.01	W
1996	Mar	02	2031	(-0.393, -0.034, 0.919)	113.17	92.12	59.64	200.31	1.40	-0.45	1.16	W
1996	Apr	02	1007	(-0.513, 0.503, 0.696)	120.84	35.84	66.10	228.94	1.48	0.15	1.89	W
1996	Apr	03	0947	(-0.878, -0.421, 0.229)	151.38	151.48	88.29	346.95	1.50	1.03	1.44	W
1996	Apr	08	0241	(-0.465, -0.310, 0.829)	117.72	200.52	72.29	201.73	1.75	1.63	1.62	W
1996	Apr	08	1308	(-0.741, -0.314, 0.593)	137.84	117.93	79.07	314.74	1.43	0.66	2.14	W
1996	Jun	18	2235	(-0.763, -0.378, 0.524)	139.74	125.80	64.95	374.87	1.37	-2.45	0.97	W
1996	Jul	28	1214	(-0.731, 0.682, 0.015)	136.97	88.73	11.44	257.80	1.62	0.74	2.38	W
1996	Aug	12	2211	(-0.498, 0.067, -0.855)	119.88	184.46	34.83	227.51	1.62	-1.78	2.17	W
1996	Aug	16	0745	(-0.643, -0.196, -0.740)	130.05	14.87	59.55	318.34	1.68	0.70	1.38	W
1996	Nov	11	1512	(-0.971, 0.120, -0.207)	166.14	300.10	49.02	370.52	1.86	1.33	1.59	W
1996	Dec	02	1000	(-0.877, 0.399, 0.268)	151.28	56.12	38.71	304.92	1.63	3.03	2.62	W
1996	Dec	09	1850	(-0.739, -0.502, -0.450)	137.63	228.15	48.62	316.64	1.40	0.69	2.06	W
1997	Jan	05	0320	(-0.453, 0.106, 0.885)	116.95	6.81	82.03	242.81	1.64	0.94	1.70	W
1997	Jan	10	0052	(-0.872, -0.274, -0.406)	150.71	213.99	48.82	391.74	2.52	0.10	2.03	W
1997	Feb	09	1250	(-0.814, 0.574, -0.087)	144.52	351.35	59.67	565.82	2.02	-0.68	1.86	W
1997	Feb	27	1729	(-0.780, -0.411, -0.471)	141.30	221.15	60.05	491.75	1.49	0.96	1.81	W
1997	Mar	05	1254	(-0.938, -0.254, 0.235)	159.73	137.21	48.71	374.77	2.15	1.90	1.67	W
1997	Mar	15	2230	(-0.676, -0.520, 0.523)	132.49	134.84	72.58	327.97	1.33	-0.91	1.38	W
1997	Mar	20	1942	(-0.570, -0.078, 0.818)	124.74	95.44	87.06	228.73	1.73	1.07	2.13	W

1997	Mar	23	0821	(-0.473, -0.531, -0.703)	118.26	217.07	43.69	150.61	1.73	-1.21	1.01	W
1997	Apr	10	1258	(-0.623, 0.280, 0.731)	128.51	20.96	86.12	278.09	1.55	3.26	1.27	W
1997	Apr	16	1221	(-0.873, -0.395, 0.287)	150.78	144.05	83.03	373.64	1.51	-3.22	1.37	W
1997	Apr	30	1805	(-0.565, -0.229, 0.793)	124.41	106.09	63.15	261.45	1.84	-1.94	1.99	W
1997	May	01	1202	(-0.678, -0.331, 0.656)	132.70	116.75	28.66	291.70	2.03	-1.20	2.23	W
1997	May	15	0155	(-0.895, -0.407, -0.182)	153.53	65.91	86.14	438.08	2.28	-2.43	2.74	W
1997	May	20	0510	(-0.801, -0.468, -0.374)	143.20	231.35	12.96	304.04	2.51	-2.03	2.74	W
1997	May	25	1349	(-0.938, -0.088, -0.336)	159.65	194.63	84.50	351.51	1.50	1.89	1.46	W
1997	May	26	0909	(-0.593, 0.641, -0.487)	126.40	322.77	23.95	201.33	1.80	0.69	1.40	W
1997	Aug	05	0459	(-0.842, -0.431, 0.323)	147.40	143.13	71.13	367.94	1.48	1.96	1.51	W
1997	Sep	02	2237	(-0.808, -0.486, -0.334)	143.87	235.45	79.12	339.79	1.89	2.62	2.13	W
1997	Sep	03	0838	(-0.982, 0.155, -0.112)	168.97	324.18	69.60	483.60	1.43	0.85	1.13	W
1997	Oct	10	1557	(-0.919, -0.072, 0.389)	156.72	100.44	87.34	467.84	1.54	3.65	1.39	W
1997	Oct	24	1118	(-0.937, -0.326, 0.125)	159.57	158.96	66.92	489.08	2.31	-4.18	1.60	W
1997	Nov	01	0614	(-0.772, -0.366, -0.517)	140.57	35.30	74.48	320.37	1.50	1.84	1.66	W
1997	Nov	09	1003	(-0.474, 0.546, -0.691)	118.31	218.30	67.04	255.48	2.18	0.91	2.05	W
1997	Nov	09	2222	(-0.854, 0.035, 0.518)	148.70	3.84	34.62	372.64	2.00	-4.23	1.43	W
1997	Nov	22	0912	(-0.965, -0.149, 0.214)	164.89	124.92	81.41	486.21	2.72	1.20	2.50	W
1997	Nov	30	0715	(-0.758, -0.453, 0.469)	139.31	134.04	63.50	310.42	1.73	-1.23	2.03	W
1997	Dec	10	0433	(-0.863, 0.008, -0.505)	149.70	270.88	83.57	384.03	2.34	1.70	2.18	W
1997	Dec	23	0109	(-0.551, 0.447, 0.705)	123.41	32.39	59.88	211.21	1.41	0.15	2.34	W
1997	Dec	30	0113	(-0.775, -0.622, -0.107)	140.83	260.24	57.48	366.07	1.97	-1.54	1.99	W
1998	Jan	06	1330	(-0.878, 0.364, 0.312)	151.36	49.41	64.35	392.03	2.66	0.62	1.99	W
1998	Jan	24	0437	(-0.730, -0.056, 0.681)	136.88	94.66	70.00	344.32	2.23	-0.94	2.40	W
1998	Jan	28	1600	(-0.601, -0.145, -0.786)	126.96	190.46	79.14	373.58	1.26	0.50	3.14	W
1998	Jan	31	1553	(-0.791, -0.142, 0.595)	142.32	103.40	74.17	411.66	1.65	-0.83	1.28	W
1998	Feb	18	0750	(-0.886, -0.388, 0.255)	152.35	146.72	78.36	438.12	1.46	-0.31	1.00	W
1998	Mar	04	1100	(-0.938, 0.162, -0.307)	159.70	297.82	64.12	465.99	1.49	-1.63	2.90	W
1998	Apr	07	1653	(-0.882, -0.077, -0.465)	151.87	189.40	41.85	364.99	2.06	-1.55	1.74	W
1998	Apr	23	1730	(-0.943, -0.103, -0.318)	160.50	197.97	47.48	378.59	2.39	-1.15	1.71	W
1998	Apr	30	0844	(-0.658, -0.649, 0.382)	131.13	149.55	50.16	323.00	3.02	0.41	6.84	W
1998	May	01	2120	(-0.844, -0.450, -0.292)	147.58	236.98	66.47	623.92	2.26	2.54	2.86	W
1998	May	03	1658	(-0.820, 0.516, -0.248)	145.07	334.34	43.30	458.52	2.18	-1.22	2.32	W
1998	May	08	0920	(-0.757, 0.413, 0.506)	139.22	39.24	29.09	604.98	1.76	1.24	2.13	A
1998	May	15	1356	(-0.909, -0.414, 0.049)	155.37	263.29	81.70	352.51	3.56	-0.68	2.02	A
1998	May	29	1503	(-0.947, 0.084, -0.310)	161.25	285.13	61.72	660.08	1.85	-3.33	1.32	A
1998	Jun	13	1857	(-0.656, 0.734, -0.176)	131.03	364.51	38.48	299.49	4.01	0.78	1.90	A
1998	Jun	25	1542	(-0.706, -0.708, 0.023)	134.89	178.13	67.74	366.75	1.65	9.87	1.00	A
1998	Jul	05	0314	(-0.893, -0.256, 0.371)	153.20	124.59	89.74	597.06	1.65	0.26	2.37	A
1998	Jul	31	0914	(-0.632, -0.147, -0.761)	129.18	190.94	86.64	374.60	1.56	-4.79	1.21	A
1998	Aug	06	0642	(-0.955, 0.249, 0.162)	162.74	56.95	83.27	436.05	2.10	-5.61	1.00	A
1998	Aug	10	0006	(-0.454, -0.183, 0.872)	116.97	191.87	54.98	324.19	2.02	0.83	2.27	A
1998	Aug	19	1840	(-0.794, -0.607, -0.033)	142.54	266.90	65.43	306.76	2.30	-3.17	2.31	W
1998	Aug	26	0640	(-0.724, 0.060, -0.687)	136.39	275.02	80.00	750.34	2.37	1.82	4.86	W
1998	Sep	24	2321	(-0.933, -0.202, -0.297)	158.97	214.21	76.51	768.07	2.64	0.56	2.77	W
1998	Oct	02	0654	(-0.865, 0.428, -0.263)	149.84	328.45	38.34	917.59	1.65	-2.01	6.06	A
1998	Oct	18	1900	(-0.718, -0.025, -0.696)	135.86	182.04	52.29	315.85	2.48	0.82	2.42	A
1998	Oct	23	1233	(-0.768, 0.344, -0.541)	140.16	302.43	76.38	513.21	2.73	-1.14	1.60	A
1998	Nov	07	0736	(-0.749, -0.464, -0.473)	138.50	224.40	77.19	431.93	1.67	0.87	1.57	A
1998	Nov	08	0420	(-0.978, 0.132, -0.161)	167.97	309.32	78.09	738.90	2.04	-9.41	1.53	A
1998	Nov	30	0417	(-0.891, -0.448, -0.068)	153.02	261.32	66.60	431.32	2.38	-3.15	2.17	A
1998	Dec	01	0254	(-0.605, -0.753, -0.259)	127.21	251.05	76.79	360.46	1.66	2.20	1.42	A
1998	Dec	26	0932	(-0.735, 0.624, -0.266)	137.31	336.88	89.42	486.35	1.58	5.27	1.05	A
1998	Dec	28	1732	(-0.823, -0.341, -0.455)	145.35	216.81	64.62	413.69	1.74	-3.89	1.63	A
1999	Jan	13	0958	(-0.868, -0.353, 0.348)	150.26	135.44	83.37	405.87	1.83	-3.20	2.20	A
1999	Jan	22	1945	(-0.825, 0.425, -0.373)	145.58	318.74	10.95	640.74	1.56	-3.94	1.16	A
1999	Feb	11	0747	(-0.967, -0.237, 0.091)	165.32	158.93	57.43	419.48	1.92	-1.77	1.47	A
1999	Feb	17	0621	(-0.968, -0.122, -0.217)	165.56	209.31	79.48	552.81	1.52	-2.42	1.43	A
1999	Feb	18	0207	(-0.997, -0.062, -0.040)	175.77	236.81	55.21	697.75	2.86	1.14	2.81	A
1999	Feb	28	2033	(-0.909, -0.058, -0.412)	155.41	187.95	86.47	421.95	1.35	-7.28	1.08	A
1999	Mar	10	0040	(-0.904, 0.053, 0.424)	154.68	7.19	74.36	483.69	1.59	-3.34	2.37	A
1999	Apr	16	1034	(-0.859, 0.378, 0.346)	149.22	47.54	36.02	455.56	1.91	0.81	1.72	A
1999	May	05	1458	(-0.763, -0.517, 0.386)	139.77	233.30	80.98	410.76	2.87	1.17	2.08	A
1999	May	18	0002	(-0.956, 0.203, -0.212)	162.94	313.70	9.47	413.02	3.24	-0.26	1.92	A
1999	Jun	26	0231	(-0.939, -0.344, 0.015)	159.87	177.51	84.42	380.68	1.76	1.60	2.04	W
1999	Jun	26	1923	(-0.823, 0.554, 0.123)	145.40	77.49	44.88	371.96	2.26	9.18	1.39	A
1999	Jul	02	0022	(-0.666, 0.497, -0.556)	131.77	311.83	21.61	470.13	2.16	-0.24	1.99	A
1999	Jul	06	1415	(-0.851, -0.165, 0.499)	148.32	108.32	65.35	454.91	1.80	2.92	1.97	A

1999 Aug 04	0114	(-0.894, -0.310, -0.325)	153.34	223.65	63.60	377.02	3.65	-0.71	1.10	A
1999 Aug 08	1744	(-0.818, -0.041, -0.574)	144.88	184.05	25.16	361.07	1.71	-3.49	0.54	A
1999 Aug 15	0937	(-0.932, -0.263, 0.250)	158.72	136.46	72.08	366.83	2.58	-3.04	1.33	A
1999 Aug 22	2248	(-0.854, -0.441, 0.275)	148.68	148.06	73.32	409.88	1.66	-7.41	1.01	A
1999 Aug 23	1129	(-0.907, -0.071, 0.414)	155.14	99.68	76.41	446.67	1.56	-4.72	1.11	A
1999 Sep 12	0320	(-0.863, -0.376, 0.337)	149.69	228.16	70.59	535.70	2.30	-1.23	2.89	A
1999 Sep 15	0717	(-0.923, 0.122, 0.365)	157.40	18.44	64.08	665.59	1.71	0.72	1.63	A
1999 Sep 15	1940	(-0.851, -0.223, 0.476)	148.30	115.07	63.64	541.93	2.26	2.90	1.62	A
1999 Sep 22	1144	(-0.878, 0.142, 0.457)	151.40	17.25	65.98	451.02	3.19	1.04	1.56	A
1999 Sep 26	1426	(-0.904, -0.404, -0.142)	154.65	250.58	86.15	435.68	1.50	-1.41	1.02	A
1999 Oct 21	0137	(-0.895, 0.087, 0.438)	153.47	11.22	48.84	444.82	3.00	3.35	1.66	A
1999 Oct 28	1125	(-0.918, -0.364, 0.155)	156.70	156.98	50.80	444.15	1.72	3.55	1.45	A
1999 Nov 05	2003	(-0.752, -0.054, -0.657)	138.78	184.67	83.32	362.57	1.51	-1.19	1.50	W
1999 Nov 13	1213	(-0.921, 0.347, 0.177)	157.07	62.93	87.60	464.98	2.07	-5.43	1.14	A
1999 Nov 19	2357	(-0.614, 0.040, 0.788)	127.89	2.89	46.37	365.40	1.35	-4.70	1.35	A
1999 Dec 11	1200	(-0.593, -0.015, -0.805)	126.40	181.05	41.76	444.03	1.39	-2.00	3.09	A
1999 Dec 12	1513	(-0.840, -0.161, -0.518)	147.11	197.30	51.64	549.37	2.05	-1.33	1.93	A
1999 Dec 26	2126	(-0.918, -0.225, 0.326)	156.68	124.65	34.75	418.09	1.86	-0.21	0.64	A
2000 Jan 11	1338	(-0.748, -0.491, -0.446)	138.44	227.73	89.99	479.59	1.49	-1.10	1.30	A
2000 Jan 22	0021	(-0.425, 0.008, -0.905)	115.14	180.52	39.48	245.14	1.91	-2.08	1.72	A
2000 Jan 27	1355	(-0.872, -0.188, 0.451)	150.73	112.67	59.37	381.20	2.11	6.69	1.22	A
2000 Jan 30	1844	(-0.930, 0.321, 0.179)	158.43	60.77	39.20	773.58	1.32	-2.45	2.57	A
2000 Feb 05	1448	(-0.971, 0.050, -0.235)	166.08	282.08	57.25	404.20	1.94	-0.36	0.76	A
2000 Feb 11	0211	(-0.894, -0.299, -0.022)	153.42	85.77	31.47	509.62	2.48	-0.10	1.79	A
2000 Feb 11	2318	(-0.851, -0.370, 0.373)	148.33	134.79	84.96	606.57	3.70	-0.75	2.89	A
2000 Feb 14	0700	(-0.996, -0.057, 0.075)	174.62	127.36	75.39	676.95	1.71	-0.11	1.01	A
2000 Feb 20	2044	(-0.571, -0.012, -0.821)	124.85	180.85	83.85	279.70	5.04	-2.25	1.02	A
2000 Apr 06	1632	(-0.972, -0.076, -0.224)	166.34	198.73	69.91	843.84	1.68	1.50	7.52	W
2000 Apr 24	0850	(-0.816, 0.456, -0.355)	144.71	322.08	88.95	536.97	1.57	-0.34	1.29	A
2000 May 17	2140	(-0.358, -0.551, 0.754)	110.95	126.15	62.19	375.08	1.29	1.18	1.64	A
2000 May 23	2342	(-0.999, 0.032, 0.044)	176.90	36.03	84.46	685.04	1.69	1.50	1.03	W
2000 Jun 03	0804	(-0.906, -0.379, 0.190)	154.93	153.37	81.43	436.31	1.40	-1.74	1.39	A
2000 Jun 04	1422	(-0.982, 0.148, -0.118)	169.08	321.60	49.75	672.29	1.71	3.80	3.14	A
2000 Jun 08	0840	(-0.985, 0.000, -0.173)	170.06	270.04	54.10	867.05	3.44	3.40	3.53	A
2000 Jun 11	0716	(-0.963, 0.061, 0.261)	164.44	13.12	39.46	597.02	1.43	-1.17	1.88	A
2000 Jun 23	1226	(-0.785, 0.153, -0.600)	140.11	1.48	75.02	563.79	2.62	-1.59	2.60	A
2000 Jul 10	0556	(-0.848, 0.526, -0.067)	147.97	262.71	67.55	488.56	2.01	-3.08	1.51	A
2000 Jul 11	1121	(-0.725, -0.014, 0.689)	136.46	91.16	67.05	382.58	1.66	0.72	1.52	A
2000 Jul 13	0916	(-0.713, -0.418, -0.563)	135.45	216.59	69.06	570.25	1.85	2.84	1.47	A
2000 Jul 19	1447	(-0.616, 0.644, 0.454)	128.03	54.82	11.42	371.08	2.99	-1.18	1.54	A
2000 Jul 26	1754	(-0.514, 0.837, 0.189)	120.93	77.24	46.83	223.58	1.91	-3.99	1.01	A
2000 Jul 28	0543	(-0.983, 0.181, -0.037)	169.36	348.38	76.02	472.11	3.84	-6.09	1.34	A
2000 Jul 28	0909	(-0.766, -0.302, 0.568)	139.99	118.03	66.73	452.45	1.74	9.07	1.29	A
2000 Aug 10	0407	(-0.942, -0.286, -0.177)	160.34	238.21	57.13	416.84	2.93	-0.98	0.81	A
2000 Aug 11	1809	(-0.736, 0.098, -0.670)	137.36	278.33	60.90	572.77	2.14	-2.08	1.48	A
2000 Aug 14	2136	(-0.613, 0.572, -0.544)	127.84	316.41	44.83	413.38	2.37	-2.17	2.24	A
2000 Sep 04	1110	(-0.539, 0.659, -0.524)	122.65	321.49	36.93	316.52	2.10	0.81	1.60	A
2000 Sep 06	1612	(-0.643, -0.343, 0.685)	130.03	116.62	59.93	359.19	2.83	5.78	1.37	A
2000 Sep 15	0358	(-0.742, 0.348, 0.573)	137.90	31.27	73.15	446.73	1.05	-1.09	5.67	A
2000 Sep 17	1657	(-0.729, 0.663, 0.171)	136.81	75.52	39.24	981.96	1.45	4.02	3.45	A
2000 Sep 30	1037	(-0.942, 0.246, 0.229)	160.39	47.09	87.89	440.00	1.47	-6.69	1.01	A
2000 Oct 03	0007	(-0.831, -0.506, -0.232)	146.19	245.39	64.65	415.73	2.18	-1.64	1.41	A
2000 Oct 04	1336	(-0.991, 0.109, 0.074)	172.40	55.89	82.98	479.41	1.45	-8.32	1.16	A
2000 Oct 05	0239	(-0.956, -0.143, 0.257)	162.89	119.03	77.29	535.72	2.24	-7.30	2.52	A
2000 Oct 12	2233	(-0.957, -0.130, 0.260)	163.12	116.67	72.13	517.61	2.48	3.23	2.55	W
2000 Oct 28	0648	(-0.913, 0.398, 0.095)	155.86	76.53	30.52	577.71	1.10	0.20	5.13	W
2000 Oct 28	0907	(-0.913, 0.243, 0.328)	155.88	36.50	49.37	429.77	3.64	1.11	1.45	A
2000 Oct 31	1630	(-0.833, -0.267, 0.485)	146.37	118.87	43.16	442.77	3.19	-0.92	2.47	A
2000 Nov 04	0133	(-0.703, -0.272, 0.658)	134.65	112.45	89.72	354.16	3.60	3.87	1.26	A
2000 Nov 06	0945	(-0.981, 0.059, -0.186)	168.76	287.66	61.42	671.25	2.53	-1.27	2.23	A
2000 Nov 10	0619	(-0.961, -0.030, 0.275)	163.94	96.22	73.54	893.20	3.34	3.13	2.05	A
2000 Nov 11	0400	(-0.874, -0.015, 0.487)	150.87	91.82	40.38	843.57	2.29	1.14	1.51	A
2000 Nov 26	0500	(-0.831, -0.078, 0.551)	146.17	98.03	53.41	411.02	1.83	-1.63	1.69	A
2000 Nov 26	1123	(-0.906, -0.423, 0.003)	154.95	179.60	75.87	597.89	2.60	4.81	2.43	A
2000 Nov 28	0455	(-0.852, 0.180, -0.492)	148.43	290.13	70.97	570.05	1.73	-2.91	1.91	A
2000 Nov 29	0305	(-0.822, 0.564, -0.078)	145.28	352.13	87.94	531.77	1.73	-7.73	1.06	A
2000 Dec 03	0318	(-0.957, 0.154, -0.248)	163.04	301.80	65.81	495.10	1.40	3.63	1.24	A
2000 Dec 22	1939	(-0.791, 0.512, -0.335)	142.29	326.82	86.79	280.08	1.59	0.45	2.10	W

2001	Jan	04	0114	(-0.941, 0.017, -0.338)	160.23	272.89	65.97	487.60	1.34	-2.21	2.63	W
2001	Jan	10	1519	(-0.873, -0.478, 0.093)	150.84	168.96	63.07	357.73	2.67	-2.97	1.01	A
2001	Jan	13	0140	(-0.442, -0.257, 0.859)	116.26	106.63	40.96	287.06	4.97	4.35	1.02	A
2001	Jan	17	1530	(-0.875, -0.282, -0.395)	150.99	215.53	43.48	410.24	1.98	1.09	2.49	A
2001	Jan	23	1004	(-0.811, -0.573, 0.120)	144.18	168.16	43.97	469.75	4.42	0.97	2.38	A
2001	Jan	31	0722	(-0.724, 0.661, 0.200)	136.35	73.18	49.03	393.24	3.62	-1.66	1.55	A
2001	Feb	12	2045	(-0.830, -0.312, -0.462)	146.09	214.06	57.11	442.80	1.57	-4.52	1.61	A
2001	Mar	03	1040	(-0.953, 0.304, 0.021)	162.28	86.11	60.81	558.94	1.80	-2.14	1.98	A
2001	Mar	19	1133	(-0.933, -0.300, 0.198)	158.97	146.57	73.67	435.54	1.66	1.81	2.08	W
2001	Mar	27	0108	(-0.654, -0.071, -0.753)	130.86	185.38	37.05	354.67	4.35	-1.69	3.35	A
2001	Mar	27	1714	(-0.727, -0.584, -0.361)	136.62	238.29	82.11	509.77	2.03	-0.74	1.76	A
2001	Mar	31	0022	(-0.908, -0.274, -0.318)	155.20	220.78	59.66	615.70	2.95	-3.54	5.46	A
2001	Apr	04	1423	(-0.865, 0.319, 0.388)	149.88	39.39	6.88	797.15	1.89	1.67	6.67	A
2001	Apr	07	1658	(-0.942, -0.324, -0.084)	160.43	255.55	11.06	640.69	2.20	0.24	4.16	A
2001	Apr	08	1030	(-0.936, -0.347, -0.064)	159.36	259.55	73.91	752.66	2.71	-3.20	3.79	A
2001	Apr	11	1409	(-0.897, -0.336, 0.288)	153.73	139.36	7.07	686.63	2.28	-1.38	3.11	W
2001	Apr	11	1527	(-0.921, -0.188, 0.341)	159.76	191.26	37.07	754.04	1.82	-4.05	2.47	A
2001	Apr	13	0703	(-0.918, 0.205, 0.339)	156.64	31.20	8.02	797.91	1.55	-0.94	2.25	A
2001	Apr	18	0005	(-0.943, -0.113, 0.312)	160.59	109.93	86.22	534.76	3.46	-1.34	2.60	A
2001	Apr	21	1504	(-0.883, 0.468, 0.044)	151.99	84.61	31.47	372.48	2.23	1.19	2.27	A
2001	Apr	28	0500	(-0.686, 0.615, 0.389)	133.33	57.70	31.86	691.82	1.86	2.41	4.20	W
2001	May	08	0930	(-0.613, -0.656, 0.441)	127.78	146.06	83.88	307.50	1.79	-3.31	0.84	A
2001	May	12	0922	(-0.675, -0.348, -0.650)	132.48	208.16	83.21	497.63	1.29	-7.37	1.00	A
2001	May	27	1416	(-0.960, -0.150, 0.236)	163.78	122.43	80.91	624.44	2.20	-0.55	2.15	A
2001	Jun	07	0851	(-0.773, -0.589, -0.237)	140.60	248.04	72.78	425.86	1.73	-1.45	1.18	A
2001	Aug	03	0624	(-0.977, 0.127, 0.170)	167.77	36.79	39.61	462.99	3.65	-4.21	2.09	A
2001	Aug	05	1155	(-0.850, -0.210, 0.484)	148.20	113.43	88.22	563.95	1.26	-3.69	1.63	A
2001	Aug	12	1048	(-0.579, 0.088, 0.810)	125.41	6.17	10.00	286.19	4.81	2.55	2.03	A
2001	Aug	17	1014	(-0.991, 0.105, -0.084)	172.24	321.30	81.61	492.28	4.57	2.60	2.28	A
2001	Aug	27	1918	(-0.745, -0.211, 0.632)	138.20	108.49	70.72	536.43	2.72	-2.72	2.67	A
2001	Aug	30	1329	(-0.902, -0.177, 0.393)	154.47	114.32	51.74	537.33	1.60	-3.66	1.85	A
2001	Sep	14	0116	(-0.794, -0.523, 0.309)	142.59	149.44	89.90	395.59	2.75	3.60	1.53	A
2001	Sep	29	0905	(-0.912, 0.314, 0.263)	155.82	49.98	23.90	696.55	2.25	-1.12	2.70	A
2001	Sep	30	1845	(-0.969, -0.239, 0.069)	165.59	163.88	80.74	780.87	1.38	-3.37	4.98	A
2001	Oct	11	1619	(-0.997, -0.079, -0.015)	175.39	259.20	62.02	562.77	3.32	0.55	2.21	A
2001	Oct	14	1707	(-0.746, -0.653, -0.129)	138.29	258.86	63.87	362.46	1.64	-3.61	0.68	A
2001	Oct	21	1612	(-0.993, 0.120, 0.005)	173.13	87.77	78.94	623.69	2.87	-4.82	2.83	A
2001	Oct	25	0802	(-0.844, -0.285, 0.454)	147.58	122.16	47.52	458.80	3.46	0.20	4.91	A
2001	Oct	28	0242	(-0.961, 0.179, 0.209)	164.01	40.61	61.57	551.73	3.05	-3.53	1.89	A
2001	Oct	31	1252	(-0.763, -0.426, -0.486)	139.77	221.24	50.55	415.74	2.40	-0.83	2.49	A
2001	Nov	19	1735	(-0.946, -0.172, -0.276)	161.01	211.97	66.55	627.39	2.13	0.38	2.11	A
2001	Nov	30	1726	(-0.854, 0.241, 0.461)	148.66	27.64	62.40	333.59	1.75	0.06	0.95	A
2001	Dec	21	1410	(-0.930, -0.077, 0.360)	158.39	102.06	59.23	585.75	1.27	3.20	2.03	W
2001	Dec	23	2218	(-0.918, -0.047, 0.394)	156.64	96.84	75.59	352.59	3.30	-0.37	1.61	A
2001	Dec	29	0445	(-0.979, -0.009, 0.202)	168.35	182.69	55.31	479.25	3.43	4.62	2.86	A
2001	Dec	30	1930	(-0.992, -0.067, 0.104)	172.89	122.83	76.13	649.61	2.53	6.91	1.75	A
2002	Jan	10	1544	(-0.998, 0.048, -0.029)	176.80	329.30	71.05	695.18	1.96	-2.65	1.72	A
2002	Jan	31	2037	(-0.812, -0.035, 0.069)	144.29	207.11	86.31	590.60	1.19	-0.15	5.90	A
2002	Feb	17	0208	(-0.558, -0.355, 0.750)	123.95	115.35	60.57	270.06	3.48	1.84	1.56	A
2002	Mar	18	1236	(-0.818, -0.208, -0.536)	144.87	201.23	58.15	422.60	3.45	0.94	3.07	A
2002	Mar	20	1304	(-0.851, 0.197, 0.487)	148.72	22.03	50.44	466.32	1.84	-0.43	1.50	A
2002	Mar	22	0321	(-0.567, 0.823, 0.003)	124.57	89.82	32.58	437.45	1.21	2.50	2.83	A
2002	Mar	23	1052	(-0.840, 0.234, 0.489)	147.16	25.51	48.04	451.99	3.38	1.54	1.88	A
2002	Mar	25	0057	(-0.839, 0.433, 0.327)	147.08	52.92	57.18	495.93	2.04	8.55	0.41	A
2002	Apr	17	1028	(-0.901, 0.091, 0.423)	154.33	12.19	81.88	457.86	4.27	-6.87	2.04	A
2002	Apr	19	0801	(-0.956, -0.291, -0.024)	163.02	265.28	78.68	728.63	2.26	2.28	1.33	A
2002	Apr	23	0414	(-0.957, 0.275, -0.089)	163.18	342.11	51.02	695.79	2.67	-1.23	3.57	A
2002	May	10	1029	(-0.883, -0.311, 0.351)	152.04	221.51	67.70	409.89	2.45	0.39	1.60	A
2002	May	11	0924	(-0.936, -0.039, 0.349)	159.46	96.36	23.96	446.63	2.32	-3.58	1.82	A
2002	May	18	1918	(-0.886, -0.411, 0.215)	152.37	152.34	83.68	515.29	2.92	0.13	3.85	A
2002	May	20	0300	(-0.811, -0.577, -0.093)	144.22	260.83	74.19	592.35	1.77	4.61	2.14	A
2002	May	21	2100	(-0.834, -0.550, -0.054)	146.48	264.36	84.00	445.37	1.30	2.83	4.75	A
2002	May	23	1014	(-0.847, -0.062, -0.528)	147.87	186.69	81.30	970.90	1.40	4.29	4.99	A
2002	May	30	0131	(-0.591, 0.387, -0.707)	126.21	208.72	64.66	458.44	1.72	1.71	2.07	A
2002	Jul	17	1524	(-0.583, -0.799, -0.150)	125.66	259.37	35.42	405.44	2.90	1.12	3.04	A
2002	Jul	19	0931	(-0.583, -0.437, -0.685)	125.66	212.54	55.51	440.62	2.78	-1.05	2.05	A
2002	Jul	19	1441	(-0.381, -0.666, -0.641)	112.43	226.13	84.95	503.46	1.62	1.83	2.07	A
2002	Jul	22	0450	(-0.792, -0.157, 0.590)	142.37	104.87	60.63	531.02	1.48	0.58	2.29	A

2002 Jul 25	1250	(-0.744, -0.659, 0.112)	138.05	170.33	88.19	545.12	1.07	0.39	1.66	A
2002 Jul 29	1239	(-0.826, -0.289, 0.484)	145.66	120.84	63.30	526.72	2.00	0.80	3.54	A
2002 Aug 01	0422	(-0.849, 0.449, 0.279)	148.07	58.16	25.11	446.25	2.83	-1.20	1.06	A
2002 Aug 01	2217	(-0.923, 0.230, -0.309)	157.35	306.76	85.39	463.65	1.77	5.86	1.07	A
2002 Aug 18	1809	(-0.902, 0.421, -0.101)	154.37	346.56	43.85	564.13	4.18	0.06	3.73	A
2002 Aug 26	1113	(-0.911, 0.412, -0.011)	155.69	358.50	25.81	604.76	1.07	-1.97	3.80	A
2002 Sep 07	1608	(-0.931, -0.363, -0.039)	158.61	263.80	85.93	624.12	2.92	-7.83	2.40	A
2002 Oct 02	2212	(-0.936, -0.245, -0.251)	159.46	224.28	84.09	519.61	2.23	-1.23	1.85	A
2002 Nov 09	1754	(-0.965, 0.145, -0.216)	164.89	303.87	73.63	441.45	1.75	4.12	1.90	A
2002 Nov 11	1154	(-0.505, -0.729, -0.462)	120.33	237.68	79.36	391.09	1.24	3.32	1.28	A
2002 Nov 16	2305	(-0.857, 0.514, -0.029)	149.00	356.79	22.63	492.52	1.45	-2.17	2.06	A
2002 Nov 20	1018	(-0.762, 0.413, 0.498)	139.68	39.62	7.18	385.08	1.70	-3.54	1.61	A
2002 Nov 26	2108	(-0.917, -0.360, 0.173)	156.45	154.27	70.43	614.74	2.47	1.31	2.39	A
2002 Dec 22	1213	(-0.966, -0.141, -0.215)	165.08	213.29	62.76	583.12	1.23	6.76	1.01	A
2002 Dec 24	1313	(-0.954, -0.281, 0.110)	162.46	158.64	34.93	574.25	1.57	-0.65	1.44	A
2003 Jan 01	2059	(-0.739, 0.673, -0.029)	137.66	357.55	57.47	494.94	1.20	-3.29	2.85	A
2003 Feb 17	2300	(-0.568, 0.344, 0.748)	124.63	24.70	47.96	521.92	1.37	-0.45	2.22	A
2002 Mar 20	0419	(-0.828, 0.537, 0.161)	145.90	73.36	61.55	795.35	1.59	3.73	1.24	A
2002 Mar 26	1650	(-0.601, -0.565, -0.566)	126.94	224.94	62.07	329.70	1.59	3.44	1.61	A
2003 Apr 08	0014	(-0.874, 0.193, 0.446)	150.90	23.38	47.17	362.79	2.59	2.08	2.73	A
2003 Apr 28	1833	(-0.961, -0.273, -0.047)	163.90	260.26	50.19	517.21	1.64	3.33	0.76	A
2003 May 09	0454	(-0.848, 0.491, 0.198)	148.04	67.98	59.53	818.51	2.83	0.69	1.34	A
2003 May 29	1150	(-0.973, -0.113, 0.201)	166.64	119.36	52.92	724.94	1.82	-1.50	2.71	A
2003 May 29	1829	(-0.970, 0.045, 0.241)	165.82	10.67	84.95	929.94	1.70	-11.47	1.89	A
2003 May 30	1550	(-0.901, -0.307, 0.307)	154.25	135.02	86.47	805.76	1.82	9.88	1.53	A
2003 Jun 18	0427	(-0.918, -0.376, 0.122)	156.69	162.01	77.02	575.40	1.55	-5.58	1.17	A
2003 Jun 20	0754	(-0.795, -0.030, 0.606)	142.66	92.84	26.84	572.28	2.23	0.09	2.37	A
2003 Jul 06	1222	(-0.556, 0.505, -0.660)	123.79	307.40	73.09	467.57	1.70	2.19	1.58	A
2003 Aug 17	1339	(-0.985, -0.089, 0.150)	169.97	120.79	63.98	722.01	1.31	5.38	4.21	A
2003 Oct 24	1447	(-0.996, 0.061, 0.069)	174.71	41.82	51.14	660.47	3.34	-6.51	2.51	A
2003 Oct 26	0818	(-0.701, -0.671, 0.240)	134.49	160.31	13.35	350.67	1.62	-0.84	2.20	A
2003 Oct 26	1830	(-0.928, -0.273, -0.253)	158.12	227.19	79.57	656.47	1.51	-2.08	1.30	A
2003 Oct 28	0130	(-0.682, -0.726, 0.089)	133.01	172.99	65.47	689.68	1.33	-0.59	1.80	A
2003 Nov 04	0600	(-0.963, 0.270, 0.002)	164.36	89.55	25.80	858.00	2.92	0.26	3.92	A
2003 Nov 06	1919	(-0.664, 0.746, -0.048)	131.64	356.33	51.23	520.59	3.20	-3.43	2.88	A
2003 Nov 15	0518	(-0.859, -0.340, 0.384)	149.15	131.46	73.45	742.64	2.26	1.35	2.11	A
2003 Nov 20	0727	(-0.973, 0.121, -0.196)	166.69	301.65	50.96	671.93	3.31	-2.81	2.87	A
2003 Nov 22	1000	(-0.640, 0.199, 0.742)	129.80	15.05	72.73	490.43	1.70	2.27	1.11	A
2003 Nov 30	0245	(-0.884, -0.050, 0.464)	152.18	96.11	67.90	505.41	1.35	-0.57	1.75	A
2003 Dec 07	1341	(-0.634, -0.426, 0.645)	129.37	123.40	69.82	422.98	2.37	-1.30	1.55	A
2004 Jan 06	1925	(-0.794, -0.543, 0.274)	142.56	153.27	86.04	616.44	1.87	1.32	1.00	A
2004 Jan 22	0103	(-0.982, 0.045, 0.182)	169.20	13.99	79.62	731.63	3.18	-1.45	3.36	A
2004 Jan 23	1420	(-0.806, -0.493, -0.327)	143.71	236.42	72.03	533.27	2.13	-2.87	1.06	A
2004 Apr 03	0854	(-0.712, -0.634, 0.301)	135.42	154.64	47.46	340.13	1.89	-0.85	1.06	A
2004 Apr 09	0148	(-0.877, -0.338, -0.342)	151.24	224.64	87.60	508.39	2.04	-4.33	1.48	A
2004 Apr 10	1924	(-0.855, 0.012, 0.518)	148.76	1.37	84.79	547.13	2.02	-1.26	4.32	A
2004 Apr 12	0424	(-0.838, -0.087, 0.539)	146.93	99.14	80.06	451.36	2.01	-1.31	1.41	A
2004 Apr 12	1734	(-0.677, 0.004, 0.736)	132.59	0.35	34.98	430.83	2.55	0.19	2.73	A
2004 Apr 24	0807	(-0.885, -0.203, -0.419)	152.25	205.81	73.26	526.06	1.51	2.00	1.95	A
2004 Apr 26	1516	(-0.987, -0.050, -0.152)	170.77	198.21	9.60	557.00	1.93	-0.93	1.61	A
2004 May 10	2157	(-0.803, 0.207, 0.559)	143.41	20.32	48.09	360.17	1.72	-0.60	1.01	A
2004 Jul 16	2105	(-0.996, -0.075, -0.042)	175.07	240.99	84.48	471.14	2.07	-3.77	1.20	A
2004 Jul 22	0953	(-0.752, -0.617, -0.231)	138.79	249.45	32.96	433.59	3.39	-1.31	2.30	A
2004 Jul 24	0532	(-0.812, -0.334, -0.478)	144.34	214.93	23.58	545.23	2.27	-0.65	3.70	W
2004 Jul 26	2226	(-0.953, -0.184, 0.239)	162.46	127.58	55.50	1039.60	2.66	0.65	5.30	A
2004 Jul 30	2030	(-0.824, 0.413, -0.388)	145.48	316.78	47.69	532.13	2.33	-1.05	2.11	A
2004 Aug 01	0146	(-0.850, 0.032, -0.525)	148.26	273.53	20.68	482.84	1.82	-1.10	1.72	A
2004 Aug 29	0916	(-0.986, 0.120, -0.116)	170.42	316.05	41.23	472.31	2.03	2.05	1.57	A
2004 Sep 22	0552	(-0.703, 0.511, 0.496)	134.64	45.85	25.80	409.58	2.29	3.01	1.31	A
2004 Oct 27	1117	(-0.995, 0.093, -0.023)	174.53	346.22	44.82	441.27	1.55	2.14	1.35	A
2004 Nov 07	0959	(-0.625, -0.756, -0.196)	128.65	255.48	62.21	386.22	2.83	2.21	3.50	A
2004 Nov 07	1752	(-0.840, -0.542, 0.017)	147.15	178.16	80.85	649.06	1.93	18.55	1.62	A
2004 Nov 09	0913	(-0.716, 0.414, -0.562)	135.76	306.41	24.59	803.59	3.20	-0.85	4.11	A
2004 Nov 09	1820	(-0.990, 0.061, -0.126)	171.93	295.85	8.33	855.60	2.30	-1.95	3.67	A
2004 Nov 11	1643	(-0.653, -0.085, -0.753)	130.73	186.46	67.80	501.37	2.29	1.37	2.18	A
2004 Dec 11	1255	(-0.850, 0.515, -0.111)	148.20	347.85	38.11	543.38	2.21	-0.88	3.85	A
2004 Dec 29	1234	(-0.862, -0.440, 0.253)	149.53	150.09	32.20	412.42	1.71	-1.79	1.01	A
2005 Jan 01	1006	(-0.778, -0.390, 0.493)	141.07	128.38	63.62	464.04	1.50	0.87	1.63	A

2005	Jan	07	0840	(-0.655, -0.052, 0.754)	130.92	93.93	21.14	414.78	1.47	2.31	1.41	A
2005	Jan	17	0715	(-0.889, 0.288, 0.356)	152.76	38.93	31.43	656.70	2.10	1.16	3.18	A
2005	Jan	17	1042	(-0.646, -0.239, 0.725)	130.24	108.27	83.41	648.15	1.52	-5.74	1.01	A
2005	Jan	21	1649	(-0.992, -0.091, -0.090)	172.63	225.34	89.01	1099.99	2.14	-0.81	4.40	A
2005	Feb	17	2204	(-0.947, 0.320, 0.042)	161.17	82.50	84.72	425.31	1.70	4.39	1.01	A
2005	Apr	29	1503	(-0.616, -0.626, 0.478)	128.04	142.67	86.30	357.76	1.21	-2.70	3.11	A
2005	May	06	1204	(-0.951, -0.280, -0.134)	161.90	244.50	50.28	402.54	2.14	1.90	1.36	A
2005	May	07	1819	(-0.944, -0.301, 0.134)	160.76	155.93	61.11	435.20	1.74	-5.59	1.01	A
2005	May	20	0315	(-0.865, 0.495, -0.086)	149.83	350.11	69.17	488.33	1.27	-0.92	3.22	A
2005	May	29	0903	(-0.416, -0.710, -0.568)	114.57	231.37	54.79	271.64	1.53	9.56	1.12	A
2005	Jun	12	0652	(-0.697, -0.188, -0.692)	134.19	195.24	71.99	303.90	2.69	-1.78	1.80	A
2005	Jun	14	1754	(-0.804, -0.093, 0.588)	143.50	98.95	48.12	550.92	1.85	-0.06	3.34	A
2005	Jun	16	0810	(-0.892, -0.203, 0.403)	153.18	116.76	79.75	1005.18	1.13	6.68	4.31	A
2005	Jul	10	0248	(-0.948, 0.170, 0.268)	161.48	32.45	85.73	490.27	1.73	-6.03	1.49	A
2005	Jul	16	0151	(-0.799, -0.600, -0.036)	143.05	266.57	84.44	485.74	1.09	-3.25	3.01	A
2005	Jul	16	1616	(-0.894, -0.232, 0.383)	153.42	121.18	11.17	401.73	1.53	-0.28	1.03	A
2005	Jul	17	0053	(-0.499, 0.799, -0.335)	119.94	337.26	72.07	413.74	1.41	3.78	2.55	A
2005	Aug	01	0606	(-0.693, -0.023, -0.721)	133.83	181.79	87.43	475.84	1.92	1.27	1.01	A
2005	Aug	23	1938	(-0.860, 0.464, 0.214)	149.27	65.28	65.20	645.94	1.23	2.78	3.40	A
2005	Aug	24	0538	(-0.901, 0.150, 0.408)	154.26	20.18	65.36	574.18	2.33	6.17	1.75	A
2005	Aug	25	1308	(-0.732, 0.438, 0.522)	137.03	40.02	7.52	599.85	2.29	-1.97	1.84	A
2005	Sep	02	1340	(-0.961, -0.247, 0.125)	163.96	153.17	84.64	611.29	1.92	2.78	2.10	A
2005	Sep	09	1317	(-0.894, -0.090, 0.438)	153.41	101.59	47.70	455.69	4.84	-2.16	3.46	A
2005	Sep	12	0604	(-0.986, -0.117, -0.118)	170.44	224.93	24.08	1095.13	1.69	-2.66	1.72	A
2005	Sep	15	0830	(-0.832, -0.456, 0.316)	146.35	145.28	30.23	771.69	1.61	-1.18	6.79	A
2005	Dec	30	2346	(-0.852, 0.448, -0.272)	148.38	328.77	87.60	543.33	1.70	-1.25	1.06	A
2006	Jan	01	1331	(-0.648, 0.140, 0.749)	130.36	10.61	79.31	439.05	1.72	6.76	1.10	A
2006	Apr	08	2316	(-0.741, -0.669, 0.059)	137.81	174.96	74.58	332.40	1.42	-5.94	1.03	A
2006	Apr	13	1113	(-0.955, -0.297, 0.018)	162.72	176.44	56.05	486.59	1.94	-1.39	1.23	A
2006	Jul	09	2040	(-0.770, 0.638, -0.028)	140.34	357.45	64.58	409.06	2.64	-0.18	2.65	W
2006	Aug	15	1625	(-0.498, -0.032, -0.867)	119.85	182.11	88.36	211.96	1.65	2.00	1.60	W
2006	Aug	17	0633	(-0.907, -0.415, -0.071)	155.09	260.32	69.24	359.10	1.67	1.59	3.11	W
2006	Aug	18	1551	(-0.998, 0.021, 0.065)	176.09	18.10	63.72	761.97	1.12	3.64	5.01	A
2006	Aug	19	1051	(-0.873, 0.342, 0.348)	150.78	44.50	39.93	484.17	1.88	1.26	1.38	A
2006	Aug	21	1556	(-0.698, 0.716, -0.018)	134.28	358.54	33.25	456.48	1.25	0.25	1.90	A
2006	Sep	09	2329	(-0.905, 0.021, 0.424)	154.87	2.79	25.09	458.24	1.93	0.63	2.58	A
2006	Oct	27	0129	(-0.559, 0.129, 0.819)	123.96	8.95	85.73	255.83	1.40	-0.09	2.04	W
2006	Nov	03	0937	(-0.967, -0.110, -0.231)	165.16	205.45	84.46	395.01	1.46	1.08	1.40	W
2006	Dec	14	1353	(-0.891, -0.331, 0.310)	153.04	136.91	29.13	967.19	2.08	-1.85	5.15	A
2006	Dec	16	1753	(-0.486, 0.871, 0.068)	119.10	85.56	72.07	399.28	4.16	1.10	1.52	A
2006	Dec	18	0921	(-0.950, 0.195, 0.243)	161.86	38.67	61.18	445.68	1.79	-1.20	1.55	A
2007	Feb	12	0912	(-0.922, -0.384, 0.046)	157.26	173.15	87.38	373.63	1.85	0.51	1.39	A
2007	May	07	0702	(-0.838, -0.529, 0.135)	146.88	165.65	81.45	328.68	2.04	-2.02	2.40	W
2007	Jul	20	0327	(-0.559, -0.766, 0.318)	124.01	157.47	80.41	252.60	1.70	-0.15	1.65	W
2007	Aug	22	0434	(-0.979, -0.191, -0.075)	168.19	248.61	80.32	356.83	1.57	0.69	1.63	W
2007	Sep	20	0923	(-0.581, -0.637, 0.507)	125.51	141.51	89.27	296.98	1.60	2.80	1.92	W
2007	Sep	27	1053	(-0.961, 0.065, 0.270)	163.87	13.58	46.62	416.37	2.71	1.52	1.22	A
2007	Oct	25	1040	(-0.884, -0.224, 0.409)	152.18	118.71	60.94	425.00	2.65	-0.90	3.21	W
2007	Nov	12	2127	(-0.377, -0.483, 0.790)	112.15	121.41	42.56	261.63	1.40	-1.11	1.43	A
2007	Nov	18	2121	(-0.437, -0.807, 0.398)	115.88	153.78	82.39	248.05	1.96	-0.44	1.01	W
2007	Nov	19	1722	(-0.965, 0.051, 0.258)	164.75	11.26	34.88	454.85	1.72	1.43	1.75	W
2007	Dec	17	0204	(-0.713, -0.694, 0.103)	135.44	171.57	55.69	352.73	1.80	2.70	2.33	A
2008	Jan	12	1134	(-0.857, -0.382, -0.345)	149.02	227.90	21.79	505.72	1.04	-0.41	5.25	A
2008	Apr	23	0224	(-0.849, -0.296, 0.437)	148.14	124.17	88.12	433.11	1.23	2.71	1.08	A
2008	Apr	30	1502	(-0.810, 0.586, -0.027)	144.11	357.36	14.75	352.62	1.57	-0.33	1.73	W
2008	May	28	0117	(-0.890, -0.148, -0.431)	152.86	198.92	86.83	383.50	2.13	-2.84	2.03	W
2008	Jun	24	1910	(-0.712, -0.478, 0.514)	135.39	132.90	76.37	297.01	1.60	0.66	1.42	W
2008	Jul	22	0610	(-0.452, -0.335, 0.826)	116.89	112.10	84.15	240.06	1.17	-2.31	2.03	A
2008	Aug	08	2251	(-0.688, -0.560, -0.462)	133.48	230.48	61.77	349.66	1.65	4.55	0.83	A
2008	Sep	14	1813	(-0.781, -0.528, 0.334)	141.33	147.74	78.43	313.84	1.46	-1.17	1.57	W
2008	Nov	24	2229	(-0.880, -0.256, -0.400)	151.66	212.67	79.92	325.45	2.45	1.84	2.42	W
2009	Jan	14	0018	(-0.747, -0.510, 0.426)	138.34	140.18	49.06	312.75	1.53	0.46	1.63	W
2009	Feb	03	1921	(-0.985, 0.087, 0.147)	170.19	30.70	68.94	386.48	1.99	-0.81	1.31	W
2009	Feb	10	1209	(-0.635, -0.186, 0.749)	129.44	193.95	73.37	238.14	1.50	-1.18	2.53	W
2009	Mar	03	0504	(-0.878, -0.310, 0.366)	151.36	130.24	85.90	329.51	1.94	0.37	2.21	W
2009	Apr	23	2341	(-0.824, -0.510, 0.249)	145.44	153.99	69.09	362.40	1.95	1.03	2.11	W
2009	May	28	0404	(-0.926, -0.080, -0.369)	157.83	192.24	60.16	361.93	3.00	-0.49	3.71	W
2009	Jun	24	0952	(-0.943, -0.228, -0.243)	160.52	223.16	84.62	345.40	1.74	1.86	2.04	W

2009 Jun 24	1429	(-0.938, 0.031, -0.346)	159.65	275.09	62.33	377.94	1.67	0.03	2.05	W
2009 Jun 27	1104	(-0.938, -0.015, -0.348)	159.64	182.42	89.85	413.61	1.56	2.10	1.18	W
2009 Aug 30	0033	(-0.942, -0.307, -0.136)	160.39	246.06	55.12	394.66	1.76	1.12	1.78	W
2009 Sep 03	1458	(-0.999, 0.054, 0.002)	176.92	87.35	27.58	420.56	1.89	0.31	3.65	W
2009 Oct 04	0317	(-0.671, 0.617, -0.411)	132.14	326.33	22.32	252.72	2.23	1.30	2.41	W
2009 Oct 10	2250	(-0.690, -0.661, -0.295)	133.65	65.91	81.11	271.23	1.63	-0.99	2.80	W
2009 Oct 21	2315	(-0.781, 0.125, 0.612)	141.37	11.58	79.56	288.14	1.95	-1.51	2.04	W
2009 Dec 05	0526	(-0.913, -0.238, -0.332)	155.88	215.56	40.37	265.63	2.38	0.34	2.93	W
2010 Jan 11	0838	(-0.530, -0.668, -0.522)	121.98	232.00	35.24	257.17	1.61	-1.33	1.00	W
2010 Jan 30	0128	(-0.627, -0.682, 0.376)	128.81	151.12	53.77	313.30	1.31	-3.93	1.45	W
2010 Feb 10	2357	(-0.957, -0.011, 0.289)	163.17	92.19	60.39	412.03	2.13	1.82	2.83	W
2010 Feb 15	1739	(-0.791, -0.569, 0.228)	142.24	158.17	51.91	356.14	1.54	-3.57	1.76	W
2010 Mar 24	1204	(-0.738, 0.621, 0.264)	137.60	66.98	35.42	273.30	1.39	-1.55	1.20	W
2010 Apr 05	0754	(-0.987, -0.133, 0.093)	170.66	145.02	28.34	782.26	2.84	-0.12	2.16	A
2010 Apr 11	1220	(-0.903, -0.105, -0.416)	154.60	194.17	79.59	470.32	2.17	1.13	1.86	W
2010 Aug 03	1705	(-0.911, -0.108, 0.397)	155.69	105.16	71.83	555.74	2.18	-0.94	4.01	W
2010 Dec 19	2035	(-0.988, -0.134, 0.076)	171.11	150.43	18.18	398.86	2.41	0.13	1.18	W
2011 Feb 14	1506	(-0.908, -0.304, 0.287)	155.29	136.60	64.02	402.54	3.01	-1.28	3.71	W
2011 Feb 18	0049	(-0.792, 0.121, 0.598)	142.37	11.47	83.92	417.65	3.03	1.24	3.37	W
2011 Feb 20	1141	(-0.863, 0.004, 0.505)	149.64	0.44	72.04	499.53	1.49	-1.03	1.24	W
2011 Apr 18	0546	(-0.856, -0.044, 0.516)	148.83	94.93	23.35	359.16	2.60	0.93	3.40	W
2011 Jun 04	2006	(-0.817, -0.561, -0.130)	144.82	256.93	70.03	464.49	2.67	2.74	3.33	W
2011 Jul 06	0212	(-0.579, 0.237, 0.780)	125.38	16.87	88.72	315.34	1.54	-0.31	1.87	A
2011 Jul 11	0827	(-0.829, -0.298, 0.473)	146.00	122.19	85.89	564.57	2.05	0.33	2.48	W
2011 Aug 05	1732	(-0.951, -0.224, -0.215)	161.92	226.23	82.33	514.81	2.28	-0.65	2.09	W
2011 Sep 17	0257	(-0.938, -0.232, 0.259)	159.65	131.86	85.66	508.92	2.21	-2.16	2.52	W
2011 Sep 25	1046	(-0.530, -0.464, -0.710)	121.97	213.18	77.04	307.18	2.15	2.00	1.94	W
2011 Sep 26	1144	(-0.975, 0.179, -0.130)	167.23	324.11	51.43	517.37	2.50	-4.43	2.34	W
2011 Oct 05	0646	(-0.897, -0.176, 0.405)	153.79	113.47	80.60	483.19	1.64	2.49	2.37	W
2011 Oct 30	0840	(-0.832, -0.493, 0.254)	146.35	152.74	42.12	291.80	2.36	-0.45	2.32	W
2011 Nov 04	2027	(-0.760, 0.064, -0.646)	139.48	275.69	63.00	886.47	1.06	-2.79	7.09	W
2011 Nov 11	0301	(-0.993, -0.016, -0.118)	173.13	187.75	22.04	489.30	1.36	2.05	2.83	W
2011 Nov 28	2100	(-0.737, 0.608, -0.294)	137.48	334.17	64.43	499.74	2.05	-0.01	2.94	W
2011 Dec 18	1758	(-0.935, -0.324, 0.145)	159.22	155.86	73.03	318.67	1.63	-0.36	3.03	W
2011 Dec 28	1016	(-0.875, -0.480, 0.062)	151.03	172.70	80.24	282.61	1.57	0.41	1.70	W
2012 Jan 02	0112	(-0.638, -0.119, 0.761)	129.66	98.90	66.26	300.60	1.67	1.78	1.65	W
2012 Jan 21	0402	(-0.850, 0.526, 0.037)	148.19	85.93	82.03	329.18	1.58	-3.15	1.41	W
2012 Jan 22	0533	(-0.939, -0.292, -0.181)	159.90	238.29	86.08	445.90	2.00	11.15	1.98	W
2012 Jan 24	1440	(-0.881, -0.264, -0.393)	151.74	213.95	53.82	739.80	2.58	3.56	3.62	W
2012 Jan 30	1543	(-0.953, -0.298, 0.056)	162.38	169.36	35.03	370.47	3.05	0.73	1.25	W
2012 Mar 07	0328	(-0.879, -0.452, 0.154)	151.47	161.22	85.06	478.57	1.84	-3.24	1.78	W
2012 Mar 12	0841	(-0.895, -0.369, -0.252)	153.47	235.61	87.43	582.35	3.85	-3.96	2.35	A
2012 Apr 19	1713	(-0.936, 0.351, -0.012)	159.42	358.04	80.96	387.94	1.35	0.17	1.76	W
2012 May 20	0120	(-0.897, 0.387, 0.213)	153.76	61.17	15.28	445.26	1.85	-1.02	2.61	W
2012 May 21	1831	(-0.986, -0.013, -0.168)	170.29	184.59	60.88	413.57	2.69	1.05	2.55	W
2012 Jun 16	0903	(-0.977, 0.122, 0.175)	167.68	34.94	19.61	462.29	2.33	0.08	4.03	W
2012 Jun 16	1934	(-0.646, -0.109, 0.756)	130.22	98.19	27.09	345.52	1.77	2.35	1.61	W
2012 Jul 14	1739	(-0.971, 0.103, -0.217)	166.09	295.31	39.77	656.02	2.55	-2.57	3.57	W
2012 Sep 03	1121	(-0.961, -0.040, -0.272)	164.01	188.37	52.91	438.31	3.02	-0.18	2.34	W
2012 Sep 04	2202	(-0.893, -0.260, 0.367)	153.26	125.25	56.52	484.70	1.89	-1.04	1.03	W
2012 Sep 30	1014	(-0.403, -0.528, -0.747)	113.77	215.24	81.81	146.89	1.77	1.50	1.44	W
2012 Sep 30	2218	(-0.832, 0.550, 0.079)	146.28	81.86	63.55	424.31	2.10	-4.57	2.70	W
2012 Oct 08	0412	(-0.902, -0.396, -0.174)	154.36	246.26	82.74	446.71	1.87	-6.38	1.73	W
2012 Oct 31	1428	(-0.992, 0.111, 0.053)	172.95	64.59	83.01	396.25	2.11	-2.15	2.62	W
2012 Nov 12	2212	(-0.883, -0.460, -0.094)	151.96	258.43	76.87	390.34	2.19	-5.61	2.04	W
2012 Nov 23	2051	(-0.692, 0.405, -0.597)	133.79	304.14	76.21	364.90	2.41	-2.90	2.54	W
2012 Nov 26	0432	(-0.982, 0.082, 0.172)	169.04	25.46	46.97	608.88	1.84	1.99	2.90	W
2012 Dec 14	1851	(-0.550, -0.018, 0.835)	123.34	91.26	76.72	232.11	2.07	-0.47	1.09	A
2013 Jan 17	0023	(-0.875, -0.052, 0.482)	150.99	96.10	72.17	398.72	1.36	2.82	1.19	W
2013 Jan 19	1646	(-0.610, 0.787, 0.093)	127.62	83.29	14.22	345.80	2.94	1.79	1.77	A
2013 Feb 05	1246	(-0.665, -0.291, 0.688)	131.71	112.94	77.26	339.73	1.33	-0.27	1.87	W
2013 Feb 13	0047	(-0.378, 0.041, -0.925)	112.24	272.57	32.37	211.64	1.69	-0.62	1.36	W
2013 Feb 16	1121	(-0.986, 0.075, 0.150)	170.34	26.44	72.02	441.67	2.18	-0.93	1.79	W
2013 Mar 15	0433	(-0.699, -0.258, -0.667)	134.33	201.13	3.33	414.90	1.76	-2.79	2.88	W
2013 Mar 17	0521	(-0.992, -0.121, 0.027)	172.88	167.44	30.77	766.40	2.14	-1.11	5.60	W
2013 Apr 13	2213	(-0.710, 0.073, 0.701)	135.20	5.98	60.47	452.86	2.64	-0.29	3.14	W
2013 Apr 23	0329	(-0.944, -0.294, 0.153)	160.66	152.46	52.69	301.26	1.50	0.87	1.80	W
2013 Apr 30	0852	(-0.951, -0.077, 0.298)	162.08	104.41	72.02	436.06	1.63	-0.00	1.58	W

2013 May 18	0019	(-0.986, 0.131, -0.100)	170.48	322.60	70.67	494.98	1.67	-1.95	1.09	W
2013 May 19	2131	(-0.718, -0.420, -0.555)	135.92	217.14	49.16	423.79	2.14	-0.55	2.28	W
2013 May 24	1726	(-0.796, 0.476, -0.373)	142.79	321.89	57.48	561.01	2.80	-1.68	3.39	W
2013 May 25	0921	(-0.707, -0.674, -0.216)	134.96	252.21	73.44	555.22	2.16	0.87	2.27	W
2013 May 31	1511	(-0.883, 0.406, -0.237)	151.95	329.79	79.76	405.14	1.85	1.08	2.24	W
2013 Jun 10	0252	(-0.947, -0.057, 0.317)	161.21	100.13	84.28	374.50	1.74	-3.32	1.02	W
2013 Jun 19	2214	(-0.887, -0.174, -0.427)	152.54	202.18	73.59	315.28	1.48	-4.32	1.11	W
2013 Jun 27	1351	(-0.852, 0.503, 0.148)	148.38	73.65	69.98	450.27	2.64	-0.47	2.22	W
2013 Jul 09	2011	(-0.918, -0.181, -0.352)	156.70	207.26	69.84	514.70	1.41	7.79	1.89	W
2013 Jul 12	1643	(-0.650, -0.073, -0.757)	130.52	185.49	77.16	473.08	1.64	1.34	2.36	W
2013 Jul 18	1255	(-0.891, 0.078, -0.447)	153.04	279.95	76.30	550.51	1.39	-1.26	2.15	W
2013 Sep 02	0156	(-0.901, 0.098, -0.424)	154.24	282.99	84.50	553.19	1.59	0.23	1.72	W
2013 Oct 02	0115	(-1.000, -0.010, 0.009)	179.22	140.08	39.24	689.99	2.55	-1.76	4.62	W
2013 Oct 29	0933	(-0.846, -0.532, 0.043)	147.73	175.40	56.33	385.93	1.57	-4.78	1.58	W
2013 Dec 13	1232	(-0.830, -0.558, -0.013)	146.09	268.62	53.47	310.57	2.43	0.46	2.50	W

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<sup>1</sup>In sequence, the columns indicate: YY, year; DD, day; UT, universal time;  $n_x$ , x component of shock normal;  $n_y$ , y component of shock normal;  $n_z$ , z component of shock normal;  $\theta_{x_n}$ , shock impact angle;  $\varphi_{y_n}$ , clock angle;  $\theta_{B_n}$ , obliquity, angle between the upstream magnetic field vector and shock normal;  $v_s$ , shock speed, in km/s; X, compression ratio;  $B_z$ , z component of IMF prior to 1.5h before shock impact, Ms, fast magnetosonic Mach number; and S, spacecraft, (A)CE and (W)IND.