

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
071°00.0'E	21°33.27'N	21°32.67'N	00:53:14	19°32.69'N	19°32.69'N	00:52:31	68.6	0.15	1.75
070°07.5'E	21°12.93'N	21°12.85'N	00:52:36	-	-	-			
070°15.0'E	21°15.91'N	21°15.68'N	00:52:47	-	-	-			
070°22.5'E	21°18.86'N	21°18.51'N	00:52:56	-	-	-			
070°30.0'E	21°21.78'N	21°21.34'N	00:53:02	-	-	-			
070°37.5'E	21°24.68'N	21°24.17'N	00:53:07	-	-	-			
070°45.0'E	21°27.56'N	21°27.00'N	00:53:10	-	-	-			
070°52.5'E	21°30.42'N	21°29.84'N	00:53:12	-	-	-	68.4	-0.15	1.75
071°00.0'E	21°33.27'N	21°32.67'N	00:53:14	19°32.69'N	19°32.69'N	00:52:31	68.4	-0.17	1.76
071°07.5'E	21°36.11'N	21°35.50'N	00:53:15	19°35.47'N	19°35.47'N	00:52:31	68.4	-0.19	1.76
071°15.0'E	21°38.94'N	21°38.32'N	00:53:15	19°38.24'N	19°38.24'N	00:52:31	68.4	-0.21	1.77
071°22.5'E	21°41.77'N	21°41.15'N	00:53:16	19°41.00'N	19°41.00'N	00:52:31	68.4	-0.23	1.78
071°30.0'E	21°44.59'N	21°43.97'N	00:53:16	19°43.76'N	19°43.76'N	00:52:31	68.4	-0.24	1.78
071°37.5'E	21°47.41'N	21°46.79'N	00:53:16	19°46.52'N	19°46.52'N	00:52:31	68.4	-0.25	1.79
071°45.0'E	21°50.22'N	21°49.60'N	00:53:17	19°49.28'N	19°49.28'N	00:52:31	68.4	-0.26	1.79
071°52.5'E	21°53.03'N	21°52.42'N	00:53:17	19°52.03'N	19°52.03'N	00:52:31	68.4	-0.27	1.79
072°00.0'E	21°55.84'N	21°55.22'N	00:53:17	19°54.78'N	19°54.78'N	00:52:32	68.4	-0.27	1.80
072°07.5'E	21°58.65'N	21°58.03'N	00:53:18	19°57.53'N	19°57.53'N	00:52:32	68.4	-0.28	1.80
072°15.0'E	22°01.45'N	22°00.83'N	00:53:18	20°00.27'N	20°00.27'N	00:52:32	68.4	-0.28	1.80
072°22.5'E	22°04.25'N	22°03.63'N	00:53:19	20°03.01'N	20°03.01'N	00:52:33	68.4	-0.28	1.80
072°30.0'E	22°07.05'N	22°06.43'N	00:53:20	20°05.75'N	20°05.75'N	00:52:33	68.4	-0.29	1.80
072°37.5'E	22°09.84'N	22°09.22'N	00:53:20	20°08.48'N	20°08.48'N	00:52:33	68.4	-0.29	1.80
072°45.0'E	22°12.63'N	22°12.00'N	00:53:21	20°11.22'N	20°11.22'N	00:52:34	68.4	-0.29	1.80
072°52.5'E	22°15.42'N	22°14.79'N	00:53:21	20°13.94'N	20°13.94'N	00:52:34	68.5	-0.29	1.80
073°00.0'E	22°18.20'N	22°17.57'N	00:53:22	20°16.67'N	20°16.67'N	00:52:35	68.5	-0.29	1.81
073°07.5'E	22°20.98'N	22°20.35'N	00:53:23	20°19.39'N	20°19.39'N	00:52:35	68.5	-0.29	1.81
073°15.0'E	22°23.75'N	22°23.12'N	00:53:24	20°22.11'N	20°22.11'N	00:52:36	68.5	-0.30	1.81
073°22.5'E	22°26.53'N	22°25.89'N	00:53:24	20°24.82'N	20°24.82'N	00:52:36	68.5	-0.30	1.81
073°30.0'E	22°29.29'N	22°28.66'N	00:53:25	20°27.53'N	20°27.53'N	00:52:37	68.5	-0.30	1.81
073°37.5'E	22°32.06'N	22°31.42'N	00:53:26	20°30.24'N	20°30.24'N	00:52:38	68.5	-0.30	1.81
073°45.0'E	22°34.82'N	22°34.18'N	00:53:27	20°32.94'N	20°32.94'N	00:52:38	68.5	-0.29	1.80
073°52.5'E	22°37.58'N	22°36.94'N	00:53:28	20°35.64'N	20°35.64'N	00:52:39	68.6	-0.28	1.80
074°00.0'E	22°40.33'N	22°39.69'N	00:53:29	20°38.34'N	20°38.34'N	00:52:40	68.6	-0.27	1.80
074°07.5'E	22°43.08'N	22°42.44'N	00:53:30	20°41.03'N	20°41.03'N	00:52:40	68.6	-0.27	1.79
074°15.0'E	22°45.83'N	22°45.19'N	00:53:31	20°43.72'N	20°43.72'N	00:52:41	68.7	-0.26	1.79
074°22.5'E	22°48.57'N	22°47.93'N	00:53:32	20°46.41'N	20°46.41'N	00:52:42	68.7	-0.26	1.79
074°30.0'E	22°51.31'N	22°50.67'N	00:53:33	20°49.09'N	20°49.09'N	00:52:43	68.7	-0.26	1.79
074°37.5'E	22°54.05'N	22°53.40'N	00:53:34	20°51.77'N	20°51.77'N	00:52:44	68.7	-0.26	1.79
074°45.0'E	22°56.78'N	22°56.13'N	00:53:35	20°54.44'N	20°54.44'N	00:52:45	68.8	-0.25	1.79
074°52.5'E	22°59.51'N	22°58.86'N	00:53:36	20°57.12'N	20°57.12'N	00:52:46	68.8	-0.25	1.79
075°00.0'E	23°02.23'N	23°01.58'N	00:53:37	20°59.78'N	20°59.78'N	00:52:47	68.8	-0.25	1.79
075°07.5'E	23°04.95'N	23°04.30'N	00:53:39	21°02.45'N	21°02.45'N	00:52:48	68.8	-0.25	1.79
075°15.0'E	23°07.67'N	23°07.01'N	00:53:40	21°05.11'N	21°05.11'N	00:52:49	68.8	-0.25	1.79
075°22.5'E	23°10.38'N	23°09.72'N	00:53:41	21°07.77'N	21°07.77'N	00:52:50	68.9	-0.25	1.79
075°30.0'E	23°13.09'N	23°12.43'N	00:53:42	21°10.42'N	21°10.42'N	00:52:51	68.9	-0.25	1.78
075°37.5'E	23°15.79'N	23°15.13'N	00:53:44	21°13.07'N	21°13.07'N	00:52:52	68.9	-0.25	1.78
075°45.0'E	23°18.49'N	23°17.83'N	00:53:45	21°16.29'N	21°13.92'N	00:52:53	68.9	-0.24	1.78
075°52.5'E	23°21.19'N	23°20.53'N	00:53:47	21°18.93'N	21°16.55'N	00:52:54	69.0	-0.24	1.78
076°00.0'E	23°23.88'N	23°23.22'N	00:53:48	21°21.57'N	21°19.17'N	00:52:56	69.0	-0.24	1.78

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**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
076°07.5'E	23°26.57'N	23°25.90'N	00:53:49	21°24.20'N	21°21.80'N	00:52:57	69.0	-0.24	1.78
076°15.0'E	23°29.26'N	23°28.59'N	00:53:51	21°26.83'N	21°24.42'N	00:52:58	69.0	-0.24	1.78
076°22.5'E	23°31.93'N	23°31.26'N	00:53:53	21°29.45'N	21°27.04'N	00:53:00	69.1	-0.24	1.78
076°30.0'E	23°34.61'N	23°33.94'N	00:53:54	21°32.08'N	21°29.65'N	00:53:01	69.1	-0.24	1.78
076°37.5'E	23°37.28'N	23°36.61'N	00:53:56	21°34.69'N	21°32.27'N	00:53:02	69.1	-0.24	1.78
076°45.0'E	23°39.95'N	23°39.27'N	00:53:57	21°37.30'N	21°34.89'N	00:53:04	69.1	-0.24	1.78
076°52.5'E	23°42.61'N	23°41.93'N	00:53:59	21°39.91'N	21°37.50'N	00:53:05	69.2	-0.24	1.78
077°00.0'E	23°45.27'N	23°44.59'N	00:54:01	21°42.51'N	21°40.10'N	00:53:07	69.2	-0.24	1.78
077°07.5'E	23°47.92'N	23°47.24'N	00:54:02	21°45.12'N	21°42.70'N	00:53:08	69.2	-0.24	1.78
077°15.0'E	23°50.57'N	23°49.89'N	00:54:04	21°47.71'N	21°45.29'N	00:53:10	69.2	-0.23	1.78
077°22.5'E	23°53.22'N	23°52.54'N	00:54:06	21°50.30'N	21°47.88'N	00:53:11	69.3	-0.23	1.78
077°30.0'E	23°55.86'N	23°55.18'N	00:54:08	21°52.89'N	21°50.47'N	00:53:13	69.3	-0.23	1.78
077°37.5'E	23°58.50'N	23°57.81'N	00:54:10	21°55.48'N	21°53.05'N	00:53:15	69.3	-0.23	1.78
077°45.0'E	24°01.13'N	24°00.44'N	00:54:11	21°58.06'N	21°55.63'N	00:53:16	69.3	-0.23	1.78
077°52.5'E	24°03.75'N	24°03.06'N	00:54:13	22°00.63'N	21°58.20'N	00:53:18	69.4	-0.23	1.78
078°00.0'E	24°06.38'N	24°05.69'N	00:54:15	22°03.21'N	22°00.77'N	00:53:20	69.4	-0.23	1.78
078°07.5'E	24°09.00'N	24°08.31'N	00:54:17	22°05.78'N	22°03.34'N	00:53:22	69.4	-0.23	1.78
078°15.0'E	24°11.61'N	24°10.92'N	00:54:19	22°08.28'N	22°05.85'N	00:53:23	69.4	-0.23	1.78
078°22.5'E	24°14.22'N	24°13.53'N	00:54:21	22°10.84'N	22°08.40'N	00:53:25	69.5	-0.23	1.78
078°30.0'E	24°16.83'N	24°16.13'N	00:54:23	22°13.45'N	22°11.00'N	00:53:27	69.5	-0.23	1.78
078°37.5'E	24°19.43'N	24°18.74'N	00:54:25	22°16.00'N	22°13.55'N	00:53:29	69.5	-0.23	1.78
078°45.0'E	24°22.03'N	24°21.34'N	00:54:28	22°18.54'N	22°16.09'N	00:53:31	69.6	-0.23	1.78
078°52.5'E	24°24.62'N	24°23.92'N	00:54:30	22°21.08'N	22°18.63'N	00:53:33	69.6	-0.23	1.78
079°00.0'E	24°27.21'N	24°26.51'N	00:54:32	22°23.62'N	22°21.17'N	00:53:35	69.6	-0.23	1.78
079°07.5'E	24°29.79'N	24°29.09'N	00:54:34	22°26.15'N	22°23.70'N	00:53:37	69.6	-0.23	1.78
079°15.0'E	24°32.37'N	24°31.66'N	00:54:36	22°28.68'N	22°26.22'N	00:53:39	69.7	-0.23	1.78
079°22.5'E	24°34.94'N	24°34.23'N	00:54:39	22°31.20'N	22°28.74'N	00:53:41	69.7	-0.23	1.78
079°30.0'E	24°37.50'N	24°36.80'N	00:54:41	22°33.72'N	22°31.26'N	00:53:44	69.7	-0.22	1.78
079°37.5'E	24°40.07'N	24°39.36'N	00:54:43	22°36.23'N	22°33.77'N	00:53:46	69.7	-0.22	1.78
079°45.0'E	24°42.62'N	24°41.92'N	00:54:46	22°38.74'N	22°36.28'N	00:53:48	69.8	-0.22	1.78
079°52.5'E	24°45.18'N	24°44.47'N	00:54:48	22°41.25'N	22°38.78'N	00:53:50	69.8	-0.22	1.78
080°00.0'E	24°47.73'N	24°47.02'N	00:54:51	22°43.75'N	22°41.28'N	00:53:52	69.8	-0.22	1.78
080°07.5'E	24°50.27'N	24°49.56'N	00:54:53	22°46.24'N	22°43.77'N	00:53:55	69.9	-0.22	1.78
080°15.0'E	24°52.81'N	24°52.10'N	00:54:56	22°48.73'N	22°46.26'N	00:53:57	69.9	-0.22	1.78
080°22.5'E	24°55.34'N	24°54.63'N	00:54:58	22°51.22'N	22°48.74'N	00:53:59	69.9	-0.22	1.77
080°30.0'E	24°57.87'N	24°57.16'N	00:55:01	22°53.70'N	22°51.23'N	00:54:02	69.9	-0.22	1.77
080°37.5'E	25°00.39'N	24°59.68'N	00:55:03	22°56.17'N	22°53.70'N	00:54:04	70.0	-0.22	1.77
080°45.0'E	25°02.91'N	25°02.20'N	00:55:06	22°58.65'N	22°56.17'N	00:54:07	70.0	-0.22	1.77
080°52.5'E	25°05.42'N	25°04.71'N	00:55:09	23°01.11'N	22°58.64'N	00:54:09	70.0	-0.22	1.77
081°00.0'E	25°07.93'N	25°07.22'N	00:55:11	23°03.57'N	23°01.10'N	00:54:12	70.1	-0.22	1.77
081°07.5'E	25°10.43'N	25°09.72'N	00:55:14	23°06.03'N	23°03.55'N	00:54:14	70.1	-0.22	1.77
081°15.0'E	25°12.93'N	25°12.22'N	00:55:17	23°08.48'N	23°06.00'N	00:54:17	70.1	-0.22	1.77
081°22.5'E	25°15.42'N	25°14.71'N	00:55:20	23°10.93'N	23°08.45'N	00:54:20	70.2	-0.22	1.77
081°30.0'E	25°17.91'N	25°17.20'N	00:55:23	23°13.37'N	23°10.89'N	00:54:22	70.2	-0.22	1.77
081°37.5'E	25°20.39'N	25°19.68'N	00:55:25	23°15.81'N	23°13.32'N	00:54:25	70.2	-0.22	1.77
081°45.0'E	25°22.87'N	25°22.16'N	00:55:28	23°18.24'N	23°15.75'N	00:54:28	70.3	-0.22	1.77
081°52.5'E	25°25.34'N	25°24.63'N	00:55:31	23°20.67'N	23°18.18'N	00:54:31	70.3	-0.22	1.77
082°00.0'E	25°27.81'N	25°27.09'N	00:55:34	23°23.09'N	23°20.60'N	00:54:33	70.3	-0.22	1.77

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TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
082°07.5'E	25°30.27'N	25°29.56'N	00:55:37	23°25.50'N	23°23.02'N	00:54:36	70.4	-0.22	1.77
082°15.0'E	25°32.72'N	25°32.01'N	00:55:40	23°27.92'N	23°25.43'N	00:54:39	70.4	-0.21	1.77
082°22.5'E	25°35.17'N	25°34.46'N	00:55:43	23°30.32'N	23°27.83'N	00:54:42	70.4	-0.21	1.77
082°30.0'E	25°37.62'N	25°36.91'N	00:55:46	23°32.72'N	23°30.23'N	00:54:45	70.5	-0.21	1.77
082°37.5'E	25°40.06'N	25°39.35'N	00:55:50	23°35.12'N	23°32.63'N	00:54:48	70.5	-0.21	1.77
082°45.0'E	25°42.49'N	25°41.78'N	00:55:53	23°37.51'N	23°35.02'N	00:54:51	70.5	-0.21	1.77
082°52.5'E	25°44.92'N	25°44.21'N	00:55:56	23°39.90'N	23°37.41'N	00:54:54	70.6	-0.21	1.77
083°00.0'E	25°47.34'N	25°46.63'N	00:55:59	23°42.28'N	23°39.79'N	00:54:57	70.6	-0.21	1.77
083°07.5'E	25°49.76'N	25°49.05'N	00:56:02	23°44.65'N	23°42.16'N	00:55:00	70.6	-0.21	1.77
083°15.0'E	25°52.17'N	25°51.46'N	00:56:06	23°47.02'N	23°44.53'N	00:55:03	70.7	-0.21	1.77
083°22.5'E	25°54.57'N	25°53.87'N	00:56:09	23°49.38'N	23°46.90'N	00:55:06	70.7	-0.21	1.77
083°30.0'E	25°56.97'N	25°56.27'N	00:56:12	23°51.74'N	23°49.25'N	00:55:10	70.7	-0.21	1.77
083°37.5'E	25°59.37'N	25°58.66'N	00:56:16	23°54.10'N	23°51.61'N	00:55:13	70.8	-0.21	1.77
083°45.0'E	26°01.76'N	26°01.05'N	00:56:19	23°56.44'N	23°53.96'N	00:55:16	70.8	-0.21	1.77
083°52.5'E	26°04.14'N	26°03.44'N	00:56:23	23°58.79'N	23°56.30'N	00:55:20	70.8	-0.21	1.77
084°00.0'E	26°06.52'N	26°05.82'N	00:56:26	24°01.12'N	23°58.64'N	00:55:23	70.9	-0.21	1.77
084°07.5'E	26°08.89'N	26°08.19'N	00:56:30	24°03.45'N	24°00.97'N	00:55:26	70.9	-0.21	1.77
084°15.0'E	26°11.25'N	26°10.55'N	00:56:33	24°05.78'N	24°03.30'N	00:55:30	71.0	-0.21	1.77
084°22.5'E	26°13.61'N	26°12.92'N	00:56:37	24°08.10'N	24°05.62'N	00:55:33	71.0	-0.21	1.77
084°30.0'E	26°15.96'N	26°15.27'N	00:56:40	24°10.42'N	24°07.93'N	00:55:37	71.0	-0.21	1.77
084°37.5'E	26°18.30'N	26°17.62'N	00:56:44	24°12.72'N	24°10.24'N	00:55:40	71.1	-0.21	1.77
084°45.0'E	26°20.63'N	26°19.97'N	00:56:48	24°15.03'N	24°12.55'N	00:55:44	71.1	-0.21	1.77
084°52.5'E	26°22.97'N	26°22.30'N	00:56:52	24°17.33'N	24°14.85'N	00:55:47	71.1	-0.21	1.77
085°00.0'E	26°25.30'N	26°24.64'N	00:56:55	24°19.62'N	24°17.14'N	00:55:51	71.2	-0.21	1.77
085°07.5'E	26°27.63'N	26°26.96'N	00:56:59	24°21.90'N	24°19.43'N	00:55:55	71.2	-0.20	1.77
085°15.0'E	26°29.94'N	26°29.28'N	00:57:03	24°24.19'N	24°21.71'N	00:55:58	71.3	-0.20	1.77
085°22.5'E	26°32.26'N	26°31.60'N	00:57:07	24°26.46'N	24°23.99'N	00:56:02	71.3	-0.20	1.77
085°30.0'E	26°34.56'N	26°33.90'N	00:57:11	24°28.73'N	24°26.26'N	00:56:06	71.3	-0.20	1.77
085°37.5'E	26°36.86'N	26°36.21'N	00:57:15	24°30.99'N	24°28.52'N	00:56:10	71.4	-0.20	1.77
085°45.0'E	26°39.15'N	26°38.50'N	00:57:18	24°33.25'N	24°30.78'N	00:56:13	71.4	-0.20	1.77
085°52.5'E	26°41.44'N	26°40.79'N	00:57:22	24°35.50'N	24°33.03'N	00:56:17	71.5	-0.20	1.77
086°00.0'E	26°43.72'N	26°43.08'N	00:57:26	24°37.75'N	24°35.28'N	00:56:21	71.5	-0.20	1.77
086°07.5'E	26°46.00'N	26°45.36'N	00:57:30	24°39.99'N	24°37.52'N	00:56:25	71.5	-0.20	1.77
086°15.0'E	26°48.27'N	26°47.63'N	00:57:35	24°42.22'N	24°39.76'N	00:56:29	71.6	-0.20	1.77
086°22.5'E	26°50.53'N	26°49.89'N	00:57:39	24°44.45'N	24°41.99'N	00:56:33	71.6	-0.20	1.77
086°30.0'E	26°52.79'N	26°52.15'N	00:57:43	24°46.67'N	24°44.21'N	00:56:37	71.7	-0.20	1.77
086°37.5'E	26°55.04'N	26°54.41'N	00:57:47	24°48.88'N	24°46.44'N	00:56:41	71.7	-0.20	1.77
086°45.0'E	26°57.28'N	26°56.65'N	00:57:51	24°51.08'N	24°48.66'N	00:56:45	71.7	-0.20	1.77
086°52.5'E	26°59.52'N	26°58.89'N	00:57:55	24°53.29'N	24°50.87'N	00:56:49	71.8	-0.20	1.77
087°00.0'E	27°01.75'N	27°01.13'N	00:58:00	24°55.48'N	24°53.07'N	00:56:54	71.8	-0.20	1.77
087°07.5'E	27°03.97'N	27°03.36'N	00:58:04	24°57.68'N	24°55.27'N	00:56:58	71.9	-0.20	1.77
087°15.0'E	27°06.19'N	27°05.58'N	00:58:08	24°59.86'N	24°57.45'N	00:57:02	71.9	-0.20	1.77
087°22.5'E	27°08.40'N	27°07.79'N	00:58:13	25°02.04'N	24°59.64'N	00:57:06	72.0	-0.20	1.77
087°30.0'E	27°10.60'N	27°10.00'N	00:58:17	25°04.21'N	25°01.81'N	00:57:11	72.0	-0.20	1.77
087°37.5'E	27°12.80'N	27°12.21'N	00:58:22	25°06.38'N	25°03.98'N	00:57:15	72.0	-0.20	1.77
087°45.0'E	27°15.00'N	27°14.40'N	00:58:26	25°08.54'N	25°06.15'N	00:57:19	72.1	-0.20	1.77
087°52.5'E	27°17.18'N	27°16.59'N	00:58:31	25°10.69'N	25°08.30'N	00:57:24	72.1	-0.19	1.77
088°00.0'E	27°19.36'N	27°18.77'N	00:58:35	25°12.84'N	25°10.45'N	00:57:28	72.2	-0.19	1.77

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
088°07.5'E	27°21.53'N	27°20.95'N	00:58:40	25°14.98'N	25°12.60'N	00:57:33	72.2	-0.19	1.77
088°15.0'E	27°23.70'N	27°23.12'N	00:58:44	25°17.11'N	25°14.74'N	00:57:37	72.3	-0.19	1.77
088°22.5'E	27°25.85'N	27°25.29'N	00:58:49	25°19.24'N	25°16.87'N	00:57:42	72.3	-0.19	1.76
088°30.0'E	27°28.01'N	27°27.44'N	00:58:54	25°21.36'N	25°19.00'N	00:57:46	72.4	-0.19	1.76
088°37.5'E	27°30.16'N	27°29.59'N	00:58:58	25°23.48'N	25°21.12'N	00:57:51	72.4	-0.19	1.76
088°45.0'E	27°32.30'N	27°31.74'N	00:59:03	25°25.59'N	25°23.23'N	00:57:56	72.4	-0.19	1.76
088°52.5'E	27°34.45'N	27°33.87'N	00:59:08	25°27.69'N	25°25.34'N	00:58:00	72.5	-0.19	1.76
089°00.0'E	27°36.58'N	27°36.00'N	00:59:13	25°29.79'N	25°27.44'N	00:58:05	72.5	-0.19	1.76
089°07.5'E	27°38.71'N	27°38.13'N	00:59:17	25°31.88'N	25°29.53'N	00:58:10	72.6	-0.19	1.76
089°15.0'E	27°40.83'N	27°40.25'N	00:59:22	25°33.96'N	25°31.62'N	00:58:15	72.6	-0.19	1.76
089°22.5'E	27°42.95'N	27°42.36'N	00:59:27	25°36.04'N	25°33.70'N	00:58:19	72.7	-0.19	1.76
089°30.0'E	27°45.05'N	27°44.46'N	00:59:32	25°38.10'N	25°35.78'N	00:58:24	72.7	-0.19	1.76
089°37.5'E	27°47.15'N	27°46.56'N	00:59:37	25°40.17'N	25°37.85'N	00:58:29	72.8	-0.19	1.76
089°45.0'E	27°49.25'N	27°48.65'N	00:59:42	25°42.22'N	25°39.91'N	00:58:34	72.8	-0.19	1.76
089°52.5'E	27°51.33'N	27°50.73'N	00:59:47	25°44.27'N	25°41.96'N	00:58:39	72.9	-0.19	1.76
090°00.0'E	27°53.41'N	27°52.81'N	00:59:52	25°46.32'N	25°44.01'N	00:58:44	72.9	-0.19	1.76
090°07.5'E	27°55.49'N	27°54.87'N	00:59:57	25°48.35'N	25°46.06'N	00:58:49	73.0	-0.19	1.76
090°15.0'E	27°57.55'N	27°56.94'N	01:00:03	25°50.38'N	25°48.09'N	00:58:54	73.0	-0.19	1.76
090°22.5'E	27°59.61'N	27°58.99'N	01:00:08	25°52.40'N	25°50.12'N	00:58:59	73.1	-0.19	1.76
090°30.0'E	28°01.66'N	28°01.04'N	01:00:13	25°54.42'N	25°52.14'N	00:59:04	73.1	-0.18	1.76
090°37.5'E	28°03.71'N	28°03.08'N	01:00:18	25°56.43'N	25°54.16'N	00:59:10	73.2	-0.18	1.76
090°45.0'E	28°05.74'N	28°05.12'N	01:00:23	25°58.43'N	25°56.17'N	00:59:15	73.2	-0.18	1.76
090°52.5'E	28°07.77'N	28°07.14'N	01:00:29	26°00.42'N	25°58.17'N	00:59:20	73.3	-0.18	1.76
091°00.0'E	28°09.80'N	28°09.16'N	01:00:34	26°02.41'N	26°00.16'N	00:59:25	73.3	-0.18	1.76
091°07.5'E	28°11.81'N	28°11.17'N	01:00:39	26°04.39'N	26°02.15'N	00:59:31	73.4	-0.18	1.76
091°15.0'E	28°13.82'N	28°13.18'N	01:00:45	26°06.36'N	26°04.13'N	00:59:36	73.4	-0.18	1.76
091°22.5'E	28°15.82'N	28°15.18'N	01:00:50	26°08.33'N	26°06.11'N	00:59:42	73.5	-0.18	1.76
091°30.0'E	28°17.82'N	28°17.17'N	01:00:56	26°10.29'N	26°08.07'N	00:59:47	73.5	-0.18	1.76
091°37.5'E	28°19.80'N	28°19.15'N	01:01:01	26°12.24'N	26°10.04'N	00:59:52	73.6	-0.18	1.76
091°45.0'E	28°21.78'N	28°21.13'N	01:01:07	26°14.19'N	26°11.99'N	00:59:58	73.6	-0.18	1.76
091°52.5'E	28°23.75'N	28°23.10'N	01:01:12	26°16.12'N	26°13.94'N	01:00:03	73.7	-0.18	1.76
092°00.0'E	28°25.72'N	28°25.06'N	01:01:18	26°18.05'N	26°15.88'N	01:00:09	73.7	-0.18	1.76
092°07.5'E	28°27.67'N	28°27.02'N	01:01:24	26°19.98'N	26°17.81'N	01:00:15	73.8	-0.18	1.76
092°15.0'E	28°29.62'N	28°28.97'N	01:01:29	26°21.89'N	26°19.73'N	01:00:20	73.8	-0.18	1.76
092°22.5'E	28°31.56'N	28°30.91'N	01:01:35	26°23.80'N	26°21.65'N	01:00:26	73.9	-0.18	1.76
092°30.0'E	28°33.50'N	28°32.84'N	01:01:41	26°25.70'N	26°23.56'N	01:00:32	73.9	-0.18	1.76
092°37.5'E	28°35.42'N	28°34.76'N	01:01:46	26°27.60'N	26°25.45'N	01:00:37	74.0	-0.18	1.76
092°45.0'E	28°37.34'N	28°36.68'N	01:01:52	26°29.49'N	26°27.33'N	01:00:43	74.1	-0.18	1.76
092°52.5'E	28°39.25'N	28°38.59'N	01:01:58	26°31.37'N	26°29.20'N	01:00:49	74.1	-0.18	1.76
093°00.0'E	28°41.16'N	28°40.50'N	01:02:04	26°33.24'N	26°31.05'N	01:00:55	74.2	-0.18	1.76
093°07.5'E	28°43.05'N	28°42.39'N	01:02:10	26°35.10'N	26°32.91'N	01:01:01	74.2	-0.17	1.76
093°15.0'E	28°44.94'N	28°44.28'N	01:02:16	26°36.96'N	26°34.76'N	01:01:07	74.3	-0.17	1.76
093°22.5'E	28°46.82'N	28°46.16'N	01:02:22	26°38.81'N	26°36.59'N	01:01:13	74.3	-0.17	1.76
093°30.0'E	28°48.69'N	28°48.03'N	01:02:28	26°40.65'N	26°38.43'N	01:01:19	74.4	-0.17	1.76
093°37.5'E	28°50.56'N	28°49.90'N	01:02:34	26°42.49'N	26°40.25'N	01:01:25	74.4	-0.17	1.76
093°45.0'E	28°52.42'N	28°51.75'N	01:02:40	26°44.31'N	26°42.07'N	01:01:31	74.5	-0.17	1.76
093°52.5'E	28°54.27'N	28°53.60'N	01:02:46	26°46.13'N	26°43.88'N	01:01:37	74.6	-0.17	1.76
094°00.0'E	28°56.11'N	28°55.45'N	01:02:52	26°47.95'N	26°45.68'N	01:01:43	74.6	-0.17	1.76

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
094°07.5'E	28°57.94'N	28°57.28'N	01:02:58	26°49.75'N	26°47.47'N	01:01:49	74.7	-0.17	1.76
094°15.0'E	28°59.77'N	28°59.11'N	01:03:04	26°51.55'N	26°49.26'N	01:01:55	74.7	-0.17	1.76
094°22.5'E	29°01.58'N	29°00.93'N	01:03:11	26°53.34'N	26°51.04'N	01:02:02	74.8	-0.17	1.76
094°30.0'E	29°03.39'N	29°02.74'N	01:03:17	26°55.12'N	26°52.81'N	01:02:08	74.9	-0.17	1.76
094°37.5'E	29°05.19'N	29°04.54'N	01:03:23	26°56.89'N	26°54.57'N	01:02:14	74.9	-0.17	1.76
094°45.0'E	29°06.99'N	29°06.34'N	01:03:30	26°58.66'N	26°56.33'N	01:02:21	75.0	-0.17	1.76
094°52.5'E	29°08.77'N	29°08.12'N	01:03:36	27°00.42'N	26°58.08'N	01:02:27	75.0	-0.17	1.76
095°00.0'E	29°10.55'N	29°09.90'N	01:03:42	27°02.16'N	26°59.82'N	01:02:34	75.1	-0.17	1.76
095°07.5'E	29°12.32'N	29°11.68'N	01:03:49	27°03.91'N	27°01.55'N	01:02:40	75.1	-0.17	1.76
095°15.0'E	29°14.08'N	29°13.44'N	01:03:55	27°05.64'N	27°03.28'N	01:02:46	75.2	-0.17	1.76
095°22.5'E	29°15.83'N	29°15.19'N	01:04:02	27°07.37'N	27°05.00'N	01:02:53	75.3	-0.17	1.76
095°30.0'E	29°17.58'N	29°16.94'N	01:04:08	27°09.09'N	27°06.71'N	01:03:00	75.3	-0.17	1.76
095°37.5'E	29°19.31'N	29°18.68'N	01:04:15	27°10.80'N	27°08.41'N	01:03:06	75.4	-0.16	1.76
095°45.0'E	29°21.04'N	29°20.41'N	01:04:22	27°12.50'N	27°10.10'N	01:03:13	75.5	-0.16	1.76
095°52.5'E	29°22.76'N	29°22.14'N	01:04:28	27°14.19'N	27°11.79'N	01:03:20	75.5	-0.16	1.76
096°00.0'E	29°24.47'N	29°23.85'N	01:04:35	27°15.88'N	27°13.47'N	01:03:26	75.6	-0.16	1.76
096°07.5'E	29°26.18'N	29°25.56'N	01:04:42	27°17.56'N	27°15.14'N	01:03:33	75.6	-0.16	1.76
096°15.0'E	29°27.87'N	29°27.26'N	01:04:48	27°19.23'N	27°16.80'N	01:03:40	75.7	-0.16	1.76
096°22.5'E	29°29.56'N	29°28.95'N	01:04:55	27°20.89'N	27°18.46'N	01:03:47	75.8	-0.16	1.76
096°30.0'E	29°31.24'N	29°30.63'N	01:05:02	27°22.55'N	27°20.10'N	01:03:53	75.8	-0.16	1.76
096°37.5'E	29°32.91'N	29°32.31'N	01:05:09	27°24.19'N	27°21.74'N	01:04:00	75.9	-0.16	1.76
096°45.0'E	29°34.57'N	29°33.97'N	01:05:16	27°25.83'N	27°23.37'N	01:04:07	76.0	-0.16	1.75
096°52.5'E	29°36.22'N	29°35.63'N	01:05:22	27°27.46'N	27°25.00'N	01:04:14	76.0	-0.16	1.75
097°00.0'E	29°37.87'N	29°37.28'N	01:05:29	27°29.08'N	27°26.61'N	01:04:21	76.1	-0.16	1.75
097°07.5'E	29°39.50'N	29°38.92'N	01:05:36	27°30.69'N	27°28.22'N	01:04:28	76.2	-0.16	1.75
097°15.0'E	29°41.13'N	29°40.56'N	01:05:43	27°32.30'N	27°29.82'N	01:04:35	76.2	-0.16	1.75
097°22.5'E	29°42.75'N	29°42.18'N	01:05:50	27°33.89'N	27°31.41'N	01:04:43	76.3	-0.16	1.75
097°30.0'E	29°44.36'N	29°43.80'N	01:05:57	27°35.48'N	27°32.99'N	01:04:50	76.3	-0.16	1.75
097°37.5'E	29°45.96'N	29°45.40'N	01:06:05	27°37.06'N	27°34.56'N	01:04:57	76.4	-0.16	1.75
097°45.0'E	29°47.56'N	29°47.00'N	01:06:12	27°38.63'N	27°36.13'N	01:05:04	76.5	-0.16	1.75
097°52.5'E	29°49.15'N	29°48.59'N	01:06:19	27°40.19'N	27°37.69'N	01:05:11	76.5	-0.15	1.75
098°00.0'E	29°50.73'N	29°50.18'N	01:06:26	27°41.75'N	27°39.23'N	01:05:19	76.6	-0.15	1.75
098°07.5'E	29°52.30'N	29°51.75'N	01:06:33	27°43.29'N	27°40.78'N	01:05:26	76.7	-0.15	1.75
098°15.0'E	29°53.87'N	29°53.32'N	01:06:41	27°44.83'N	27°42.31'N	01:05:33	76.7	-0.15	1.75
098°22.5'E	29°55.42'N	29°54.87'N	01:06:48	27°46.36'N	27°43.83'N	01:05:41	76.8	-0.15	1.75
098°30.0'E	29°56.97'N	29°56.42'N	01:06:55	27°47.88'N	27°45.35'N	01:05:48	76.9	-0.15	1.75
098°37.5'E	29°58.51'N	29°57.96'N	01:07:03	27°49.39'N	27°46.85'N	01:05:56	77.0	-0.15	1.75
098°45.0'E	30°00.03'N	29°59.49'N	01:07:10	27°50.89'N	27°48.35'N	01:06:03	77.0	-0.15	1.75
098°52.5'E	30°01.55'N	30°01.01'N	01:07:18	27°52.38'N	27°49.84'N	01:06:11	77.1	-0.15	1.75
099°00.0'E	30°03.06'N	30°02.53'N	01:07:25	27°53.87'N	27°51.33'N	01:06:18	77.2	-0.15	1.75
099°07.5'E	30°04.56'N	30°04.03'N	01:07:33	27°55.34'N	27°52.80'N	01:06:26	77.2	-0.15	1.75
099°15.0'E	30°06.06'N	30°05.53'N	01:07:40	27°56.81'N	27°54.26'N	01:06:34	77.3	-0.15	1.75
099°22.5'E	30°07.54'N	30°07.01'N	01:07:48	27°58.27'N	27°55.72'N	01:06:41	77.4	-0.15	1.75
099°30.0'E	30°09.01'N	30°08.49'N	01:07:55	27°59.72'N	27°57.17'N	01:06:49	77.4	-0.15	1.75
099°37.5'E	30°10.48'N	30°09.96'N	01:08:03	28°01.16'N	27°58.61'N	01:06:57	77.5	-0.15	1.75
099°45.0'E	30°11.94'N	30°11.42'N	01:08:11	28°02.59'N	28°00.04'N	01:07:05	77.6	-0.15	1.75
099°52.5'E	30°13.38'N	30°12.88'N	01:08:18	28°04.01'N	28°01.46'N	01:07:13	77.7	-0.15	1.75
100°00.0'E	30°14.82'N	30°14.32'N	01:08:26	28°05.43'N	28°02.87'N	01:07:20	77.7	-0.15	1.75

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
100°07.5'E	30°16.25'N	30°15.75'N	01:08:34	28°06.83'N	28°04.28'N	01:07:28	77.8	-0.15	1.75
100°15.0'E	30°17.67'N	30°17.18'N	01:08:42	28°08.23'N	28°05.67'N	01:07:36	77.9	-0.14	1.75
100°22.5'E	30°19.08'N	30°18.59'N	01:08:50	28°09.62'N	28°07.06'N	01:07:44	77.9	-0.14	1.75
100°30.0'E	30°20.48'N	30°20.00'N	01:08:57	28°10.99'N	28°08.44'N	01:07:52	78.0	-0.14	1.75
100°37.5'E	30°21.87'N	30°21.40'N	01:09:05	28°12.36'N	28°09.80'N	01:08:00	78.1	-0.14	1.75
100°45.0'E	30°23.25'N	30°22.79'N	01:09:13	28°13.72'N	28°11.17'N	01:08:09	78.2	-0.14	1.75
100°52.5'E	30°24.63'N	30°24.17'N	01:09:21	28°15.07'N	28°12.52'N	01:08:17	78.2	-0.14	1.75
101°00.0'E	30°26.00'N	30°25.54'N	01:09:29	28°16.42'N	28°13.86'N	01:08:25	78.3	-0.14	1.75
101°07.5'E	30°27.37'N	30°26.90'N	01:09:37	28°17.75'N	28°15.19'N	01:08:33	78.4	-0.14	1.75
101°15.0'E	30°28.72'N	30°28.25'N	01:09:45	28°19.07'N	28°16.52'N	01:08:41	78.5	-0.14	1.75
101°22.5'E	30°30.06'N	30°29.60'N	01:09:54	28°20.39'N	28°17.83'N	01:08:50	78.5	-0.14	1.75
101°30.0'E	30°31.40'N	30°30.93'N	01:10:02	28°21.69'N	28°19.14'N	01:08:58	78.6	-0.14	1.75
101°37.5'E	30°32.72'N	30°32.25'N	01:10:10	28°22.99'N	28°20.44'N	01:09:06	78.7	-0.14	1.75
101°45.0'E	30°34.04'N	30°33.57'N	01:10:18	28°24.27'N	28°21.73'N	01:09:15	78.8	-0.14	1.75
101°52.5'E	30°35.34'N	30°34.88'N	01:10:26	28°25.55'N	28°23.01'N	01:09:23	78.8	-0.14	1.75
102°00.0'E	30°36.64'N	30°36.17'N	01:10:35	28°26.81'N	28°24.28'N	01:09:32	78.9	-0.14	1.75
102°07.5'E	30°37.93'N	30°37.46'N	01:10:43	28°28.07'N	28°25.54'N	01:09:40	79.0	-0.14	1.75
102°15.0'E	30°39.20'N	30°38.74'N	01:10:51	28°29.32'N	28°26.79'N	01:09:49	79.1	-0.14	1.75
102°22.5'E	30°40.47'N	30°40.01'N	01:11:00	28°30.56'N	28°28.03'N	01:09:57	79.2	-0.14	1.75
102°30.0'E	30°41.73'N	30°41.27'N	01:11:08	28°31.79'N	28°29.27'N	01:10:06	79.2	-0.13	1.75
102°37.5'E	30°42.98'N	30°42.52'N	01:11:17	28°33.01'N	28°30.49'N	01:10:15	79.3	-0.13	1.75
102°45.0'E	30°44.22'N	30°43.76'N	01:11:25	28°34.22'N	28°31.71'N	01:10:23	79.4	-0.13	1.75
102°52.5'E	30°45.46'N	30°44.99'N	01:11:34	28°35.42'N	28°32.91'N	01:10:32	79.5	-0.13	1.75
103°00.0'E	30°46.68'N	30°46.21'N	01:11:42	28°36.61'N	28°34.11'N	01:10:41	79.5	-0.13	1.75
103°07.5'E	30°47.89'N	30°47.42'N	01:11:51	28°37.79'N	28°35.30'N	01:10:50	79.6	-0.13	1.75
103°15.0'E	30°49.09'N	30°48.63'N	01:11:59	28°38.96'N	28°36.47'N	01:10:59	79.7	-0.13	1.75
103°22.5'E	30°50.29'N	30°49.82'N	01:12:08	28°40.13'N	28°37.64'N	01:11:07	79.8	-0.13	1.75
103°30.0'E	30°51.47'N	30°51.00'N	01:12:17	28°41.28'N	28°38.80'N	01:11:16	79.9	-0.13	1.75
103°37.5'E	30°52.64'N	30°52.18'N	01:12:26	28°42.42'N	28°39.95'N	01:11:25	79.9	-0.13	1.75
103°45.0'E	30°53.80'N	30°53.34'N	01:12:34	28°43.55'N	28°41.09'N	01:11:34	80.0	-0.13	1.75
103°52.5'E	30°54.96'N	30°54.50'N	01:12:43	28°44.68'N	28°42.22'N	01:11:43	80.1	-0.13	1.75
104°00.0'E	30°56.10'N	30°55.64'N	01:12:52	28°45.79'N	28°43.35'N	01:11:52	80.2	-0.13	1.75
104°07.5'E	30°57.23'N	30°56.78'N	01:13:01	28°46.89'N	28°44.46'N	01:12:02	80.3	-0.13	1.75
104°15.0'E	30°58.35'N	30°57.90'N	01:13:10	28°47.98'N	28°45.56'N	01:12:11	80.4	-0.13	1.75
104°22.5'E	30°59.47'N	30°59.02'N	01:13:19	28°49.07'N	28°46.65'N	01:12:20	80.4	-0.13	1.75
104°30.0'E	31°00.57'N	31°00.12'N	01:13:28	28°50.14'N	28°47.74'N	01:12:29	80.5	-0.13	1.75
104°37.5'E	31°01.66'N	31°01.22'N	01:13:37	28°51.20'N	28°48.81'N	01:12:38	80.6	-0.12	1.75
104°45.0'E	31°02.74'N	31°02.30'N	01:13:46	28°52.26'N	28°49.87'N	01:12:48	80.7	-0.12	1.75
104°52.5'E	31°03.81'N	31°03.38'N	01:13:55	28°53.30'N	28°50.93'N	01:12:57	80.8	-0.12	1.75
105°00.0'E	31°04.88'N	31°04.44'N	01:14:04	28°54.33'N	28°51.97'N	01:13:07	80.9	-0.12	1.75
105°07.5'E	31°05.93'N	31°05.50'N	01:14:13	28°55.36'N	28°53.01'N	01:13:16	80.9	-0.12	1.75
105°15.0'E	31°06.97'N	31°06.54'N	01:14:22	28°56.37'N	28°54.03'N	01:13:25	81.0	-0.12	1.75
105°22.5'E	31°08.00'N	31°07.58'N	01:14:31	28°57.37'N	28°55.05'N	01:13:35	81.1	-0.12	1.75
105°30.0'E	31°09.02'N	31°08.60'N	01:14:41	28°58.36'N	28°56.05'N	01:13:44	81.2	-0.12	1.75
105°37.5'E	31°10.03'N	31°09.62'N	01:14:50	28°59.35'N	28°57.05'N	01:13:54	81.3	-0.12	1.75
105°45.0'E	31°11.03'N	31°10.63'N	01:14:59	29°00.32'N	28°58.03'N	01:14:04	81.4	-0.12	1.75
105°52.5'E	31°12.02'N	31°11.62'N	01:15:09	29°01.28'N	28°59.01'N	01:14:13	81.5	-0.12	1.75
106°00.0'E	31°13.00'N	31°12.61'N	01:15:18	29°02.23'N	28°59.97'N	01:14:23	81.5	-0.12	1.75

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
106°07.5'E	31°13.96'N	31°13.58'N	01:15:27	29°03.17'N	29°00.93'N	01:14:33	81.6	-0.12	1.75
106°15.0'E	31°14.92'N	31°14.54'N	01:15:37	29°04.10'N	29°01.88'N	01:14:42	81.7	-0.12	1.74
106°22.5'E	31°15.87'N	31°15.50'N	01:15:46	29°05.02'N	29°02.81'N	01:14:52	81.8	-0.12	1.74
106°30.0'E	31°16.80'N	31°16.44'N	01:15:56	29°05.93'N	29°03.74'N	01:15:02	81.9	-0.12	1.74
106°37.5'E	31°17.73'N	31°17.37'N	01:16:05	29°06.83'N	29°04.65'N	01:15:12	82.0	-0.12	1.74
106°45.0'E	31°18.65'N	31°18.29'N	01:16:15	29°07.72'N	29°05.56'N	01:15:22	82.1	-0.12	1.74
106°52.5'E	31°19.57'N	31°19.19'N	01:16:25	29°08.60'N	29°06.45'N	01:15:32	82.2	-0.11	1.74
107°00.0'E	31°20.48'N	31°20.09'N	01:16:34	29°09.46'N	29°07.34'N	01:15:42	82.3	-0.11	1.74
107°07.5'E	31°21.38'N	31°20.98'N	01:16:44	29°10.32'N	29°08.21'N	01:15:52	82.3	-0.11	1.74
107°15.0'E	31°22.26'N	31°21.86'N	01:16:54	29°11.17'N	29°09.08'N	01:16:02	82.4	-0.11	1.74
107°22.5'E	31°23.14'N	31°22.73'N	01:17:04	29°12.00'N	29°09.94'N	01:16:12	82.5	-0.11	1.74
107°30.0'E	31°24.01'N	31°23.58'N	01:17:13	29°12.83'N	29°10.78'N	01:16:22	82.6	-0.11	1.74
107°37.5'E	31°24.86'N	31°24.43'N	01:17:23	29°13.64'N	29°11.61'N	01:16:32	82.7	-0.11	1.74
107°45.0'E	31°25.71'N	31°25.26'N	01:17:33	29°14.44'N	29°12.44'N	01:16:43	82.8	-0.11	1.74
107°52.5'E	31°26.54'N	31°26.09'N	01:17:43	29°15.24'N	29°13.25'N	01:16:53	82.9	-0.11	1.74
108°00.0'E	31°27.36'N	31°26.90'N	01:17:53	29°16.02'N	29°14.05'N	01:17:03	83.0	-0.11	1.74
108°07.5'E	31°28.17'N	31°27.71'N	01:18:03	29°16.79'N	29°14.85'N	01:17:13	83.1	-0.11	1.74
108°15.0'E	31°28.97'N	31°28.50'N	01:18:13	29°17.55'N	29°15.63'N	01:17:24	83.2	-0.11	1.74
108°22.5'E	31°29.76'N	31°29.29'N	01:18:23	29°18.30'N	29°16.40'N	01:17:34	83.3	-0.11	1.74
108°30.0'E	31°30.54'N	31°30.06'N	01:18:33	29°19.04'N	29°17.16'N	01:17:45	83.4	-0.11	1.74
108°37.5'E	31°31.31'N	31°30.82'N	01:18:43	29°19.76'N	29°17.92'N	01:17:55	83.5	-0.11	1.74
108°45.0'E	31°32.07'N	31°31.57'N	01:18:53	29°20.48'N	29°18.66'N	01:18:06	83.5	-0.11	1.74
108°52.5'E	31°32.81'N	31°32.31'N	01:19:03	29°21.18'N	29°19.39'N	01:18:16	83.6	-0.11	1.74
109°00.0'E	31°33.55'N	31°33.04'N	01:19:14	29°21.88'N	29°20.11'N	01:18:27	83.7	-0.11	1.74
109°07.5'E	31°34.27'N	31°33.76'N	01:19:24	29°22.56'N	29°20.82'N	01:18:38	83.8	-0.10	1.74
109°15.0'E	31°34.98'N	31°34.46'N	01:19:34	29°23.23'N	29°21.51'N	01:18:48	83.9	-0.10	1.74
109°22.5'E	31°35.68'N	31°35.16'N	01:19:45	29°23.89'N	29°22.20'N	01:18:59	84.0	-0.10	1.74
109°30.0'E	31°36.37'N	31°35.85'N	01:19:55	29°24.54'N	29°22.88'N	01:19:10	84.1	-0.10	1.74
109°37.5'E	31°37.05'N	31°36.52'N	01:20:05	29°25.18'N	29°23.54'N	01:19:21	84.2	-0.10	1.74
109°45.0'E	31°37.71'N	31°37.18'N	01:20:16	29°25.81'N	29°24.20'N	01:19:31	84.3	-0.10	1.74
109°52.5'E	31°38.38'N	31°37.84'N	01:20:26	29°26.42'N	29°24.84'N	01:19:42	84.4	-0.10	1.74
110°00.0'E	31°39.03'N	31°38.48'N	01:20:37	29°27.03'N	29°25.47'N	01:19:53	84.5	-0.10	1.74
110°07.5'E	31°39.67'N	31°39.11'N	01:20:47	29°27.62'N	29°26.09'N	01:20:04	84.6	-0.10	1.74
110°15.0'E	31°40.30'N	31°39.73'N	01:20:58	29°28.20'N	29°26.70'N	01:20:15	84.7	-0.10	1.74
110°22.5'E	31°40.92'N	31°40.34'N	01:21:08	29°28.76'N	29°27.30'N	01:20:26	84.8	-0.10	1.74
110°30.0'E	31°41.52'N	31°40.94'N	01:21:19	29°29.31'N	29°27.88'N	01:20:37	84.9	-0.10	1.74
110°37.5'E	31°42.12'N	31°41.52'N	01:21:30	29°29.85'N	29°28.44'N	01:20:49	85.0	-0.10	1.74
110°45.0'E	31°42.70'N	31°42.10'N	01:21:40	29°30.39'N	29°28.98'N	01:21:00	85.1	-0.10	1.74
110°52.5'E	31°43.27'N	31°42.66'N	01:21:51	29°30.92'N	29°29.49'N	01:21:11	85.2	-0.10	1.74
111°00.0'E	31°43.83'N	31°43.21'N	01:22:02	29°31.43'N	29°30.00'N	01:21:22	85.3	-0.10	1.74
111°07.5'E	31°44.38'N	31°43.76'N	01:22:13	29°31.93'N	29°30.48'N	01:21:33	85.4	-0.10	1.74
111°15.0'E	31°44.92'N	31°44.29'N	01:22:24	29°32.42'N	29°30.96'N	01:21:45	85.5	-0.10	1.74
111°22.5'E	31°45.44'N	31°44.80'N	01:22:35	29°32.89'N	29°31.43'N	01:21:56	85.6	-0.09	1.74
111°30.0'E	31°45.96'N	31°45.31'N	01:22:46	29°33.36'N	29°31.88'N	01:22:08	85.7	-0.09	1.74
111°37.5'E	31°46.46'N	31°45.81'N	01:22:56	29°33.81'N	29°32.33'N	01:22:19	85.8	-0.09	1.74
111°45.0'E	31°46.95'N	31°46.29'N	01:23:07	29°34.26'N	29°32.76'N	01:22:30	85.9	-0.09	1.74
111°52.5'E	31°47.42'N	31°46.77'N	01:23:19	29°34.69'N	29°33.18'N	01:22:42	86.0	-0.09	1.74
112°00.0'E	31°47.89'N	31°47.23'N	01:23:30	29°35.10'N	29°33.59'N	01:22:54	86.1	-0.09	1.74

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
112°07.5'E	31°48.34'N	31°47.68'N	01:23:41	29°35.51'N	29°33.98'N	01:23:05	86.2	-0.09	1.74
112°15.0'E	31°48.78'N	31°48.12'N	01:23:52	29°35.90'N	29°34.37'N	01:23:17	86.3	-0.09	1.74
112°22.5'E	31°49.21'N	31°48.54'N	01:24:03	29°36.29'N	29°34.74'N	01:23:28	86.4	-0.09	1.74
112°30.0'E	31°49.63'N	31°48.96'N	01:24:14	29°36.66'N	29°35.10'N	01:23:40	86.5	-0.09	1.74
112°37.5'E	31°50.04'N	31°49.36'N	01:24:25	29°37.02'N	29°35.46'N	01:23:52	86.6	-0.09	1.74
112°45.0'E	31°50.43'N	31°49.76'N	01:24:37	29°37.36'N	29°35.79'N	01:24:04	86.7	-0.09	1.74
112°52.5'E	31°50.81'N	31°50.14'N	01:24:48	29°37.70'N	29°36.12'N	01:24:16	86.8	-0.09	1.74
113°00.0'E	31°51.18'N	31°50.51'N	01:24:59	29°38.02'N	29°36.44'N	01:24:27	86.9	-0.09	1.74
113°07.5'E	31°51.54'N	31°50.86'N	01:25:11	29°38.33'N	29°36.74'N	01:24:39	87.1	-0.09	1.74
113°15.0'E	31°51.88'N	31°51.21'N	01:25:22	29°38.63'N	29°37.03'N	01:24:51	87.2	-0.09	1.74
113°22.5'E	31°52.21'N	31°51.54'N	01:25:34	29°38.91'N	29°37.32'N	01:25:03	87.3	-0.09	1.74
113°30.0'E	31°52.53'N	31°51.86'N	01:25:45	29°39.18'N	29°37.58'N	01:25:15	87.4	-0.09	1.74
113°37.5'E	31°52.84'N	31°52.17'N	01:25:57	29°39.45'N	29°37.84'N	01:25:28	87.5	-0.08	1.74
113°45.0'E	31°53.13'N	31°52.47'N	01:26:08	29°39.69'N	29°38.09'N	01:25:40	87.6	-0.08	1.74
113°52.5'E	31°53.42'N	31°52.76'N	01:26:20	29°39.93'N	29°38.32'N	01:25:52	87.7	-0.08	1.74
114°00.0'E	31°53.69'N	31°53.03'N	01:26:32	29°40.15'N	29°38.54'N	01:26:04	87.8	-0.08	1.74
114°07.5'E	31°53.94'N	31°53.29'N	01:26:43	29°40.36'N	29°38.75'N	01:26:16	87.9	-0.08	1.74
114°15.0'E	31°54.19'N	31°53.54'N	01:26:55	29°40.56'N	29°38.95'N	01:26:29	88.0	-0.08	1.74
114°22.5'E	31°54.42'N	31°53.78'N	01:27:07	29°40.75'N	29°39.14'N	01:26:41	88.1	-0.08	1.74
114°30.0'E	31°54.65'N	31°54.01'N	01:27:19	29°40.92'N	29°39.31'N	01:26:53	88.2	-0.08	1.74
114°37.5'E	31°54.87'N	31°54.22'N	01:27:30	29°41.08'N	29°39.47'N	01:27:06	88.3	-0.08	1.74
114°45.0'E	31°55.08'N	31°54.42'N	01:27:42	29°41.23'N	29°39.62'N	01:27:18	88.5	-0.08	1.74
114°52.5'E	31°55.28'N	31°54.61'N	01:27:54	29°41.37'N	29°39.76'N	01:27:31	88.6	-0.08	1.74
115°00.0'E	31°55.47'N	31°54.79'N	01:28:06	29°41.49'N	29°39.89'N	01:27:43	88.7	-0.08	1.74
115°07.5'E	31°55.64'N	31°54.96'N	01:28:18	29°41.60'N	29°40.00'N	01:27:56	88.8	-0.08	1.74
115°15.0'E	31°55.80'N	31°55.11'N	01:28:30	29°41.70'N	29°40.10'N	01:28:08	88.9	-0.08	1.74
115°22.5'E	31°55.95'N	31°55.25'N	01:28:42	29°41.78'N	29°40.19'N	01:28:21	89.0	-0.08	1.74
115°30.0'E	31°56.08'N	31°55.38'N	01:28:54	29°41.85'N	29°40.27'N	01:28:34	89.1	-0.08	1.74
115°37.5'E	31°56.20'N	31°55.49'N	01:29:06	29°41.91'N	29°40.33'N	01:28:47	89.2	-0.08	1.74
115°45.0'E	31°56.31'N	31°55.60'N	01:29:19	29°41.96'N	29°40.38'N	01:28:59	89.4	-0.08	1.74
115°52.5'E	31°56.41'N	31°55.69'N	01:29:31	29°41.99'N	29°40.42'N	01:29:12	89.5	-0.08	1.74
116°00.0'E	31°56.49'N	31°55.77'N	01:29:43	29°42.01'N	29°40.45'N	01:29:25	89.6	-0.07	1.74
116°07.5'E	31°56.56'N	31°55.83'N	01:29:55	29°42.02'N	29°40.47'N	01:29:38	89.7	-0.07	1.74
116°15.0'E	31°56.62'N	31°55.89'N	01:30:08	29°42.01'N	29°40.47'N	01:29:51	89.8	-0.07	1.74
116°22.5'E	31°56.66'N	31°55.93'N	01:30:20	29°42.00'N	29°40.46'N	01:30:04	89.9	-0.07	1.74
116°30.0'E	31°56.69'N	31°55.96'N	01:30:32	29°41.97'N	29°40.44'N	01:30:17	90.0	-0.07	1.74
116°37.5'E	31°56.71'N	31°55.97'N	01:30:45	29°41.93'N	29°40.40'N	01:30:30	90.1	-0.07	1.74
116°45.0'E	31°56.71'N	31°55.97'N	01:30:57	29°41.88'N	29°40.35'N	01:30:43	90.3	-0.07	1.74
116°52.5'E	31°56.70'N	31°55.96'N	01:31:10	29°41.82'N	29°40.29'N	01:30:56	90.4	-0.07	1.74
117°00.0'E	31°56.68'N	31°55.94'N	01:31:22	29°41.74'N	29°40.22'N	01:31:10	90.5	-0.07	1.74
117°07.5'E	31°56.65'N	31°55.91'N	01:31:35	29°41.65'N	29°40.13'N	01:31:23	90.6	-0.07	1.74
117°15.0'E	31°56.60'N	31°55.86'N	01:31:48	29°41.55'N	29°40.03'N	01:31:36	90.7	-0.07	1.74
117°22.5'E	31°56.53'N	31°55.79'N	01:32:00	29°41.43'N	29°39.92'N	01:31:49	90.8	-0.07	1.74
117°30.0'E	31°56.46'N	31°55.71'N	01:32:13	29°41.30'N	29°39.79'N	01:32:03	91.0	-0.07	1.74
117°37.5'E	31°56.37'N	31°55.61'N	01:32:26	29°41.15'N	29°39.65'N	01:32:16	91.1	-0.07	1.74
117°45.0'E	31°56.26'N	31°55.51'N	01:32:38	29°40.99'N	29°39.50'N	01:32:30	91.2	-0.07	1.74
117°52.5'E	31°56.15'N	31°55.39'N	01:32:51	29°40.82'N	29°39.33'N	01:32:43	91.3	-0.07	1.74
118°00.0'E	31°56.02'N	31°55.26'N	01:33:04	29°40.64'N	29°39.16'N	01:32:57	91.4	-0.07	1.74

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

ΔT = 65.9 s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm	Elev Fact	Scale Fact
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time	Northern Limit	Southern Limit	Universal Time			
			h m s						
			h m s						
118°07.5'E	31°55.87'N	31°55.11'N	01:33:17	29°40.44'N	29°38.97'N	01:33:10	91.6	-0.07	1.74
118°15.0'E	31°55.71'N	31°54.95'N	01:33:30	29°40.23'N	29°38.76'N	01:33:24	91.7	-0.07	1.74
118°22.5'E	31°55.54'N	31°54.78'N	01:33:43	29°40.01'N	29°38.54'N	01:33:38	91.8	-0.07	1.74
118°30.0'E	31°55.36'N	31°54.60'N	01:33:56	29°39.77'N	29°38.31'N	01:33:51	91.9	-0.07	1.74
118°37.5'E	31°55.16'N	31°54.40'N	01:34:09	29°39.51'N	29°38.07'N	01:34:05	92.0	-0.06	1.74
118°45.0'E	31°54.94'N	31°54.19'N	01:34:22	29°39.25'N	29°37.82'N	01:34:19	92.2	-0.06	1.74
118°52.5'E	31°54.72'N	31°53.96'N	01:34:35	29°38.97'N	29°37.55'N	01:34:33	92.3	-0.06	1.74
119°00.0'E	31°54.48'N	31°53.73'N	01:34:48	29°38.67'N	29°37.26'N	01:34:47	92.4	-0.06	1.74
119°07.5'E	31°54.22'N	31°53.47'N	01:35:01	29°38.36'N	29°36.96'N	01:35:01	92.5	-0.06	1.74
119°15.0'E	31°53.95'N	31°53.21'N	01:35:15	29°38.04'N	29°36.64'N	01:35:15	92.6	-0.06	1.74
119°22.5'E	31°53.67'N	31°52.93'N	01:35:28	29°37.70'N	29°36.28'N	01:35:29	92.8	-0.06	1.74
119°30.0'E	31°53.37'N	31°52.64'N	01:35:41	29°37.35'N	29°35.91'N	01:35:43	92.9	-0.06	1.74
119°37.5'E	31°53.06'N	31°52.34'N	01:35:55	29°36.99'N	29°35.52'N	01:35:57	93.0	-0.06	1.74
119°45.0'E	31°52.73'N	31°52.02'N	01:36:08	29°36.61'N	29°35.13'N	01:36:11	93.1	-0.06	1.74
119°52.5'E	31°52.39'N	31°51.69'N	01:36:21	29°36.22'N	29°34.72'N	01:36:25	93.2	-0.06	1.74
120°00.0'E	31°52.04'N	31°51.34'N	01:36:35	29°35.81'N	29°34.29'N	01:36:40	93.4	-0.06	1.74
120°07.5'E	31°51.67'N	31°50.98'N	01:36:48	29°35.39'N	29°33.85'N	01:36:54	93.5	-0.06	1.74
120°15.0'E	31°51.29'N	31°50.61'N	01:37:02	29°34.95'N	29°33.40'N	01:37:08	93.6	-0.06	1.74
120°22.5'E	31°50.89'N	31°50.22'N	01:37:15	29°34.50'N	29°32.93'N	01:37:23	93.7	-0.06	1.74
120°30.0'E	31°50.48'N	31°49.82'N	01:37:29	29°34.03'N	29°32.45'N	01:37:37	93.9	-0.06	1.74
120°37.5'E	31°50.05'N	31°49.41'N	01:37:43	29°33.55'N	29°31.95'N	01:37:51	94.0	-0.06	1.74
120°45.0'E	31°49.61'N	31°48.98'N	01:37:56	29°33.06'N	29°31.44'N	01:38:06	94.1	-0.06	1.74
120°52.5'E	31°49.16'N	31°48.54'N	01:38:10	29°32.55'N	29°30.92'N	01:38:21	94.2	-0.06	1.74
121°00.0'E	31°48.68'N	31°48.08'N	01:38:24	29°32.03'N	29°30.38'N	01:38:35	94.4	-0.06	1.74
121°07.5'E	31°48.20'N	31°47.61'N	01:38:38	29°31.49'N	29°29.83'N	01:38:50	94.5	-0.06	1.74
121°15.0'E	31°47.70'N	31°47.13'N	01:38:52	29°30.94'N	29°29.26'N	01:39:05	94.6	-0.06	1.74
121°22.5'E	31°47.19'N	31°46.63'N	01:39:05	29°30.37'N	29°28.67'N	01:39:19	94.7	-0.06	1.74
121°30.0'E	31°46.67'N	31°46.12'N	01:39:19	29°29.78'N	29°28.06'N	01:39:34	94.9	-0.05	1.74
121°37.5'E	31°46.13'N	31°45.59'N	01:39:33	29°29.19'N	29°27.44'N	01:39:49	95.0	-0.05	1.74
121°45.0'E	31°45.58'N	31°45.05'N	01:39:47	29°28.59'N	29°26.80'N	01:40:04	95.1	-0.05	1.74
121°52.5'E	31°45.01'N	31°44.50'N	01:40:01	29°27.97'N	29°26.15'N	01:40:19	95.3	-0.05	1.74
122°00.0'E	31°44.43'N	31°43.93'N	01:40:16	29°27.34'N	29°25.49'N	01:40:34	95.4	-0.05	1.74
122°07.5'E	31°43.84'N	31°43.34'N	01:40:30	29°26.69'N	29°24.81'N	01:40:49	95.5	-0.05	1.74
122°15.0'E	31°43.23'N	31°42.75'N	01:40:44	29°26.03'N	29°24.11'N	01:41:04	95.6	-0.05	1.74
122°22.5'E	31°42.60'N	31°42.14'N	01:40:58	29°25.36'N	29°23.40'N	01:41:19	95.8	-0.05	1.74
122°30.0'E	31°41.96'N	31°41.51'N	01:41:12	29°24.66'N	29°22.68'N	01:41:34	95.9	-0.05	1.74
122°37.5'E	31°41.30'N	31°40.87'N	01:41:27	29°23.96'N	29°21.94'N	01:41:49	96.0	-0.05	1.74
122°45.0'E	31°40.63'N	31°40.21'N	01:41:41	29°23.24'N	29°21.18'N	01:42:04	96.2	-0.05	1.74
122°52.5'E	31°39.95'N	31°39.55'N	01:41:55	29°22.50'N	29°20.41'N	01:42:20	96.3	-0.05	1.74
123°00.0'E	31°39.26'N	31°38.86'N	01:42:10	29°21.75'N	29°19.63'N	01:42:35	96.4	-0.05	1.74
123°07.5'E	31°38.56'N	31°38.16'N	01:42:24	29°20.98'N	29°18.83'N	01:42:50	96.6	-0.05	1.74
123°15.0'E	31°37.86'N	31°37.45'N	01:42:39	29°20.19'N	29°18.02'N	01:43:06	96.7	-0.05	1.74
123°22.5'E	31°37.14'N	31°36.72'N	01:42:53	29°19.40'N	29°17.19'N	01:43:21	96.8	-0.05	1.74
123°30.0'E	31°36.41'N	31°35.98'N	01:43:08	29°18.58'N	29°16.35'N	01:43:37	96.9	-0.05	1.74
123°37.5'E	31°35.66'N	31°35.22'N	01:43:23	29°17.76'N	29°15.49'N	01:43:52	97.1	-0.05	1.74
123°45.0'E	31°34.90'N	31°34.45'N	01:43:37	29°16.91'N	29°14.62'N	01:44:08	97.2	-0.05	1.74
123°52.5'E	31°34.13'N	31°33.65'N	01:43:52	29°16.05'N	29°13.74'N	01:44:24	97.3	-0.05	1.73
124°00.0'E	31°33.34'N	31°32.85'N	01:44:07	29°15.17'N	29°12.83'N	01:44:39	97.5	-0.05	1.73

TABLE 8 - EXTENDED VERSION

MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
 TOTAL SOLAR ECLIPSE OF 2009 JULY 22

ΔT = 65.9 s

Longitude	North Graze Zone Latitudes		Northern Limit	South Graze Zone Latitudes		Southern Limit	Path Azm °	Elev Fact	Scale Fact km/"
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
124°07.5'E	31°32.53'N	31°32.03'N	01:44:21	29°14.28'N	29°11.92'N	01:44:55	97.6	-0.05	1.73
124°15.0'E	31°31.71'N	31°31.20'N	01:44:36	29°13.37'N	29°10.99'N	01:45:11	97.7	-0.05	1.73
124°22.5'E	31°30.86'N	31°30.35'N	01:44:51	29°12.45'N	29°10.04'N	01:45:27	97.9	-0.05	1.73
124°30.0'E	31°30.01'N	31°29.49'N	01:45:06	29°11.50'N	29°09.08'N	01:45:42	98.0	-0.05	1.73
124°37.5'E	31°29.13'N	31°28.61'N	01:45:21	29°10.55'N	29°08.10'N	01:45:58	98.1	-0.05	1.73
124°45.0'E	31°28.24'N	31°27.72'N	01:45:36	29°09.57'N	29°07.11'N	01:46:14	98.3	-0.05	1.73
124°52.5'E	31°27.34'N	31°26.81'N	01:45:51	29°08.59'N	29°06.10'N	01:46:30	98.4	-0.05	1.73
125°00.0'E	31°26.42'N	31°25.89'N	01:46:06	29°07.58'N	29°05.08'N	01:46:46	98.5	-0.04	1.73
125°07.5'E	31°25.48'N	31°24.95'N	01:46:21	29°06.56'N	29°04.04'N	01:47:03	98.7	-0.04	1.73
125°15.0'E	31°24.53'N	31°24.00'N	01:46:37	29°05.52'N	29°02.99'N	01:47:19	98.8	-0.04	1.73
125°22.5'E	31°23.56'N	31°23.03'N	01:46:52	29°04.47'N	29°01.92'N	01:47:35	99.0	-0.04	1.73
125°30.0'E	31°22.57'N	31°22.05'N	01:47:07	29°03.40'N	29°00.84'N	01:47:51	99.1	-0.04	1.73
125°37.5'E	31°21.57'N	31°21.05'N	01:47:22	29°02.31'N	28°59.74'N	01:48:07	99.2	-0.04	1.73
125°45.0'E	31°20.55'N	31°20.03'N	01:47:38	29°01.21'N	28°58.62'N	01:48:24	99.4	-0.04	1.73
125°52.5'E	31°19.51'N	31°19.00'N	01:47:53	29°00.09'N	28°57.49'N	01:48:40	99.5	-0.04	1.73
126°00.0'E	31°18.46'N	31°17.95'N	01:48:08	28°58.96'N	28°56.34'N	01:48:57	99.6	-0.04	1.73
126°07.5'E	31°17.39'N	31°16.89'N	01:48:24	28°57.80'N	28°55.18'N	01:49:13	99.8	-0.04	1.73
126°15.0'E	31°16.31'N	31°15.81'N	01:48:39	28°56.63'N	28°54.00'N	01:49:30	99.9	-0.04	1.73
126°22.5'E	31°15.21'N	31°14.72'N	01:48:55	28°55.45'N	28°52.81'N	01:49:46	100.0	-0.04	1.73
126°30.0'E	31°14.09'N	31°13.61'N	01:49:11	28°54.25'N	28°51.60'N	01:50:03	100.2	-0.04	1.73
126°37.5'E	31°12.95'N	31°12.49'N	01:49:26	28°53.03'N	28°50.38'N	01:50:20	100.3	-0.04	1.73
126°45.0'E	31°11.80'N	31°11.34'N	01:49:42	28°51.79'N	28°49.13'N	01:50:36	100.5	-0.04	1.73
126°52.5'E	31°10.63'N	31°10.19'N	01:49:58	28°50.54'N	28°47.87'N	01:50:53	100.6	-0.04	1.73
127°00.0'E	31°09.45'N	31°09.01'N	01:50:13	28°49.27'N	28°46.59'N	01:51:10	100.7	-0.04	1.73
127°07.5'E	31°08.24'N	31°07.82'N	01:50:29	28°47.98'N	28°45.30'N	01:51:27	100.9	-0.04	1.73
127°15.0'E	31°07.02'N	31°06.62'N	01:50:45	28°46.68'N	28°43.98'N	01:51:44	101.0	-0.04	1.73
127°22.5'E	31°05.79'N	31°05.40'N	01:51:01	28°45.35'N	28°42.66'N	01:52:01	101.1	-0.04	1.73
127°30.0'E	31°04.53'N	31°04.16'N	01:51:17	28°44.02'N	28°41.31'N	01:52:18	101.3	-0.04	1.73
127°37.5'E	31°03.26'N	31°02.91'N	01:51:33	28°42.66'N	28°39.95'N	01:52:35	101.4	-0.04	1.73
127°45.0'E	31°01.98'N	31°01.64'N	01:51:49	28°41.29'N	28°38.57'N	01:52:52	101.6	-0.04	1.73
127°52.5'E	31°00.70'N	31°00.35'N	01:52:05	28°39.90'N	28°37.18'N	01:53:09	101.7	-0.04	1.73
128°00.0'E	30°59.41'N	30°59.05'N	01:52:21	28°38.49'N	28°35.77'N	01:53:26	101.9	-0.04	1.73
128°07.5'E	30°58.10'N	30°57.73'N	01:52:37	28°37.07'N	28°34.35'N	01:53:44	102.0	-0.04	1.73
128°15.0'E	30°56.77'N	30°56.39'N	01:52:53	28°35.62'N	28°32.90'N	01:54:01	102.1	-0.04	1.73
128°22.5'E	30°55.42'N	30°55.04'N	01:53:10	28°34.16'N	28°31.44'N	01:54:18	102.3	-0.04	1.73
128°30.0'E	30°54.06'N	30°53.67'N	01:53:26	28°32.68'N	28°29.97'N	01:54:36	102.4	-0.04	1.73
128°37.5'E	30°52.68'N	30°52.28'N	01:53:42	28°31.19'N	28°28.48'N	01:54:53	102.6	-0.04	1.73
128°45.0'E	30°51.28'N	30°50.88'N	01:53:59	28°29.68'N	28°26.97'N	01:55:11	102.7	-0.04	1.73
128°52.5'E	30°49.86'N	30°49.46'N	01:54:15	28°28.15'N	28°25.44'N	01:55:28	102.8	-0.04	1.73
129°00.0'E	30°48.43'N	30°48.03'N	01:54:32	28°26.60'N	28°23.90'N	01:55:46	103.0	-0.04	1.73
129°07.5'E	30°46.98'N	30°46.57'N	01:54:48	28°25.03'N	28°22.34'N	01:56:03	103.1	-0.04	1.73
129°15.0'E	30°45.51'N	30°45.10'N	01:55:05	28°23.45'N	28°20.76'N	01:56:21	103.3	-0.04	1.73
129°22.5'E	30°44.02'N	30°43.61'N	01:55:21	28°21.84'N	28°19.17'N	01:56:39	103.4	-0.04	1.73
129°30.0'E	30°42.51'N	30°42.10'N	01:55:38	28°20.22'N	28°17.56'N	01:56:57	103.5	-0.04	1.73
129°37.5'E	30°40.99'N	30°40.58'N	01:55:55	28°18.58'N	28°15.93'N	01:57:14	103.7	-0.04	1.73
129°45.0'E	30°39.45'N	30°39.03'N	01:56:11	28°16.93'N	28°14.29'N	01:57:32	103.8	-0.04	1.73
129°52.5'E	30°37.89'N	30°37.47'N	01:56:28	28°15.25'N	28°12.63'N	01:57:50	104.0	-0.04	1.73
130°00.0'E	30°36.31'N	30°35.90'N	01:56:45	28°13.56'N	28°10.95'N	01:58:08	104.1	-0.04	1.73

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

ΔT = 65.9 s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
130°07.5'E	30°34.71'N	30°34.30'N	01:57:02	28°11.85'N	28°09.25'N	01:58:26	104.3	-0.04	1.73
130°15.0'E	30°33.11'N	30°32.69'N	01:57:19	28°10.12'N	28°07.54'N	01:58:44	104.4	-0.04	1.73
130°22.5'E	30°31.49'N	30°31.06'N	01:57:36	28°08.37'N	28°05.81'N	01:59:03	104.6	-0.04	1.73
130°30.0'E	30°29.86'N	30°29.42'N	01:57:53	28°06.60'N	28°04.05'N	01:59:21	104.7	-0.04	1.73
130°37.5'E	30°28.21'N	30°27.75'N	01:58:10	28°04.82'N	28°02.27'N	01:59:39	104.8	-0.04	1.73
130°45.0'E	30°26.54'N	30°26.07'N	01:58:27	28°03.01'N	28°00.46'N	01:59:57	105.0	-0.04	1.73
130°52.5'E	30°24.85'N	30°24.37'N	01:58:44	28°01.19'N	27°58.63'N	02:00:16	105.1	-0.04	1.73
131°00.0'E	30°23.15'N	30°22.66'N	01:59:01	27°59.35'N	27°56.78'N	02:00:34	105.3	-0.04	1.73
131°07.5'E	30°21.42'N	30°20.92'N	01:59:19	27°57.49'N	27°54.91'N	02:00:52	105.4	-0.04	1.73
131°15.0'E	30°19.68'N	30°19.17'N	01:59:36	27°55.61'N	27°53.03'N	02:01:11	105.6	-0.04	1.73
131°22.5'E	30°17.92'N	30°17.40'N	01:59:53	27°53.71'N	27°51.12'N	02:01:30	105.7	-0.04	1.73
131°30.0'E	30°16.14'N	30°15.61'N	02:00:11	27°51.80'N	27°49.20'N	02:01:48	105.8	-0.04	1.73
131°37.5'E	30°14.34'N	30°13.81'N	02:00:28	27°49.86'N	27°47.26'N	02:02:07	106.0	-0.04	1.73
131°45.0'E	30°12.52'N	30°11.99'N	02:00:45	27°47.90'N	27°45.31'N	02:02:25	106.1	-0.04	1.73
131°52.5'E	30°10.68'N	30°10.14'N	02:01:03	27°45.93'N	27°43.33'N	02:02:44	106.3	-0.04	1.73
132°00.0'E	30°08.83'N	30°08.29'N	02:01:21	27°43.94'N	27°41.34'N	02:03:03	106.4	-0.04	1.73
132°07.5'E	30°06.95'N	30°06.41'N	02:01:38	27°41.93'N	27°39.33'N	02:03:22	106.6	-0.04	1.73
132°15.0'E	30°05.06'N	30°04.51'N	02:01:56	27°39.89'N	27°37.30'N	02:03:41	106.7	-0.04	1.73
132°22.5'E	30°03.15'N	30°02.60'N	02:02:14	27°37.84'N	27°35.25'N	02:04:00	106.9	-0.04	1.73
132°30.0'E	30°01.21'N	30°00.67'N	02:02:31	27°35.77'N	27°33.19'N	02:04:19	107.0	-0.04	1.73
132°37.5'E	29°59.26'N	29°58.72'N	02:02:49	27°33.68'N	27°31.10'N	02:04:38	107.1	-0.04	1.73
132°45.0'E	29°57.29'N	29°56.75'N	02:03:07	27°31.57'N	27°29.00'N	02:04:57	107.3	-0.04	1.73
132°52.5'E	29°55.30'N	29°54.76'N	02:03:25	27°29.45'N	27°26.88'N	02:05:16	107.4	-0.04	1.73
133°00.0'E	29°53.29'N	29°52.75'N	02:03:43	27°27.30'N	27°24.74'N	02:05:35	107.6	-0.04	1.73
133°07.5'E	29°51.26'N	29°50.73'N	02:04:01	27°25.13'N	27°22.58'N	02:05:54	107.7	-0.04	1.73
133°15.0'E	29°49.21'N	29°48.69'N	02:04:19	27°22.94'N	27°20.41'N	02:06:14	107.9	-0.04	1.73
133°22.5'E	29°47.14'N	29°46.63'N	02:04:37	27°20.73'N	27°18.21'N	02:06:33	108.0	-0.04	1.73
133°30.0'E	29°45.05'N	29°44.55'N	02:04:55	27°18.51'N	27°16.00'N	02:06:52	108.2	-0.04	1.73
133°37.5'E	29°42.94'N	29°42.45'N	02:05:13	27°16.26'N	27°13.76'N	02:07:12	108.3	-0.04	1.73
133°45.0'E	29°40.81'N	29°40.33'N	02:05:31	27°13.99'N	27°11.52'N	02:07:31	108.5	-0.04	1.73
133°52.5'E	29°38.66'N	29°38.19'N	02:05:50	27°11.71'N	27°09.26'N	02:07:51	108.6	-0.04	1.73
134°00.0'E	29°36.50'N	29°36.04'N	02:06:08	27°09.41'N	27°06.99'N	02:08:11	108.8	-0.04	1.73
134°07.5'E	29°34.31'N	29°33.86'N	02:06:26	27°07.08'N	27°04.68'N	02:08:30	108.9	-0.04	1.73
134°15.0'E	29°32.11'N	29°31.67'N	02:06:45	27°04.73'N	27°02.35'N	02:08:50	109.0	-0.04	1.73
134°22.5'E	29°29.89'N	29°29.46'N	02:07:03	27°02.37'N	27°00.00'N	02:09:10	109.2	-0.04	1.73
134°30.0'E	29°27.65'N	29°27.22'N	02:07:22	26°59.98'N	26°57.64'N	02:09:29	109.3	-0.04	1.73
134°37.5'E	29°25.43'N	29°24.98'N	02:07:40	26°57.57'N	26°55.25'N	02:09:49	109.5	-0.04	1.73
134°45.0'E	29°23.19'N	29°22.73'N	02:07:59	26°55.14'N	26°52.85'N	02:10:09	109.6	-0.04	1.73
134°52.5'E	29°20.91'N	29°20.45'N	02:08:17	26°52.69'N	26°50.43'N	02:10:29	109.8	-0.04	1.73
135°00.0'E	29°18.58'N	29°18.14'N	02:08:36	26°50.22'N	26°47.99'N	02:10:49	109.9	-0.04	1.73
135°07.5'E	29°16.24'N	29°15.81'N	02:08:55	26°47.73'N	26°45.53'N	02:11:09	110.1	-0.04	1.73
135°15.0'E	29°13.88'N	29°13.46'N	02:09:14	26°45.22'N	26°43.04'N	02:11:29	110.2	-0.04	1.73
135°22.5'E	29°11.50'N	29°11.09'N	02:09:32	26°42.69'N	26°40.54'N	02:11:49	110.4	-0.04	1.73
135°30.0'E	29°09.10'N	29°08.71'N	02:09:51	26°40.13'N	26°38.02'N	02:12:10	110.5	-0.04	1.73
135°37.5'E	29°06.67'N	29°06.30'N	02:10:10	26°37.56'N	26°35.48'N	02:12:30	110.7	-0.04	1.73
135°45.0'E	29°04.23'N	29°03.88'N	02:10:29	26°34.97'N	26°32.93'N	02:12:50	110.8	-0.04	1.73
135°52.5'E	29°01.77'N	29°01.43'N	02:10:48	26°32.35'N	26°30.34'N	02:13:10	111.0	-0.04	1.73
136°00.0'E	28°59.28'N	28°58.96'N	02:11:07	26°29.71'N	26°27.74'N	02:13:31	111.1	-0.04	1.73

TABLE 8 - EXTENDED VERSION**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22** $\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
136°07.5'E	28°56.77'N	28°56.48'N	02:11:26	26°27.06'N	26°25.12'N	02:13:51	111.2	-0.04	1.73
136°15.0'E	28°54.24'N	28°53.97'N	02:11:46	26°24.38'N	26°22.48'N	02:14:12	111.4	-0.04	1.73
136°22.5'E	28°51.69'N	28°51.45'N	02:12:05	26°21.68'N	26°19.82'N	02:14:32	111.5	-0.04	1.73
136°30.0'E	28°49.14'N	28°48.90'N	02:12:24	26°18.96'N	26°17.14'N	02:14:53	111.7	-0.04	1.73
136°37.5'E	28°46.60'N	28°46.34'N	02:12:43	26°16.22'N	26°14.44'N	02:15:14	111.8	-0.04	1.73
136°45.0'E	28°44.05'N	28°43.75'N	02:13:03	26°13.46'N	26°11.71'N	02:15:34	112.0	-0.04	1.73
136°52.5'E	28°41.47'N	28°41.15'N	02:13:22	26°10.67'N	26°08.97'N	02:15:55	112.1	-0.04	1.73
137°00.0'E	28°38.87'N	28°38.52'N	02:13:42	26°07.87'N	26°06.21'N	02:16:16	112.2	-0.04	1.73
137°07.5'E	28°36.26'N	28°35.88'N	02:14:01	26°05.04'N	26°03.43'N	02:16:37	112.4	-0.04	1.73
137°15.0'E	28°33.62'N	28°33.21'N	02:14:21	26°02.19'N	26°00.63'N	02:16:58	112.5	-0.04	1.73
137°22.5'E	28°30.95'N	28°30.52'N	02:14:40	25°59.32'N	25°57.81'N	02:17:18	112.7	-0.04	1.73
137°30.0'E	28°28.27'N	28°27.82'N	02:15:00	25°56.43'N	25°54.97'N	02:17:39	112.8	-0.04	1.73
137°37.5'E	28°25.57'N	28°25.09'N	02:15:19	25°53.52'N	25°52.10'N	02:18:01	113.0	-0.04	1.73
137°45.0'E	28°22.84'N	28°22.34'N	02:15:39	25°50.58'N	25°49.22'N	02:18:22	113.1	-0.04	1.73
137°52.5'E	28°20.09'N	28°19.57'N	02:15:59	25°47.63'N	25°46.32'N	02:18:43	113.3	-0.04	1.73
138°00.0'E	28°17.32'N	28°16.78'N	02:16:19	25°44.65'N	25°43.40'N	02:19:04	113.4	-0.04	1.73
138°07.5'E	28°14.53'N	28°13.97'N	02:16:39	25°41.65'N	25°40.45'N	02:19:25	113.6	-0.04	1.73
138°15.0'E	28°11.72'N	28°11.14'N	02:16:59	25°38.63'N	25°37.49'N	02:19:46	113.7	-0.04	1.73
138°22.5'E	28°08.88'N	28°08.29'N	02:17:19	25°35.59'N	25°34.50'N	02:20:08	113.8	-0.05	1.73
138°30.0'E	28°06.03'N	28°05.42'N	02:17:39	25°32.52'N	25°31.50'N	02:20:29	114.0	-0.05	1.73
138°37.5'E	28°03.15'N	28°02.53'N	02:17:59	25°29.43'N	25°28.45'N	02:20:51	114.1	-0.05	1.73
138°45.0'E	28°00.25'N	27°59.61'N	02:18:19	25°26.33'N	25°25.33'N	02:21:12	114.3	-0.05	1.73
138°52.5'E	27°57.33'N	27°56.68'N	02:18:39	25°23.20'N	25°22.17'N	02:21:34	114.4	-0.05	1.73
139°00.0'E	27°54.38'N	27°53.72'N	02:18:59	25°20.04'N	25°18.99'N	02:21:55	114.6	-0.05	1.73
139°07.5'E	27°51.42'N	27°50.75'N	02:19:19	25°16.87'N	25°15.80'N	02:22:17	114.7	-0.05	1.74
139°15.0'E	27°48.43'N	27°47.75'N	02:19:40	25°13.67'N	25°12.58'N	02:22:38	114.8	-0.05	1.74
139°22.5'E	27°45.42'N	27°44.73'N	02:20:00	25°10.45'N	25°09.34'N	02:23:00	115.0	-0.05	1.74
139°30.0'E	27°42.39'N	27°41.69'N	02:20:20	25°07.21'N	25°06.09'N	02:23:22	115.1	-0.05	1.74
139°37.5'E	27°39.33'N	27°38.63'N	02:20:41	25°03.95'N	25°02.81'N	02:23:44	115.3	-0.05	1.74
139°45.0'E	27°36.25'N	27°35.55'N	02:21:01	25°00.66'N	24°59.50'N	02:24:05	115.4	-0.05	1.74
139°52.5'E	27°33.15'N	27°32.44'N	02:21:22	24°57.36'N	24°56.18'N	02:24:27	115.5	-0.05	1.74
140°00.0'E	27°30.03'N	27°29.32'N	02:21:42	24°54.03'N	24°52.84'N	02:24:49	115.7	-0.05	1.74
140°07.5'E	27°26.89'N	27°26.17'N	02:22:03	24°50.67'N	24°49.48'N	02:25:11	115.8	-0.05	1.74
140°15.0'E	27°23.72'N	27°23.00'N	02:22:24	24°47.30'N	24°46.09'N	02:25:33	116.0	-0.05	1.74
140°22.5'E	27°20.53'N	27°19.81'N	02:22:44	24°43.90'N	24°42.68'N	02:25:55	116.1	-0.05	1.74
140°30.0'E	27°17.32'N	27°16.60'N	02:23:05	24°40.48'N	24°39.26'N	02:26:17	116.3	-0.05	1.74
140°37.5'E	27°14.08'N	27°13.37'N	02:23:26	24°37.04'N	24°35.81'N	02:26:40	116.4	-0.05	1.74
140°45.0'E	27°10.83'N	27°10.11'N	02:23:47	24°33.58'N	24°32.34'N	02:27:02	116.5	-0.05	1.74
140°52.5'E	27°07.55'N	27°06.84'N	02:24:08	24°30.09'N	24°28.85'N	02:27:24	116.7	-0.05	1.74
141°00.0'E	27°04.25'N	27°03.54'N	02:24:29	24°26.58'N	24°25.33'N	02:27:46	116.8	-0.05	1.74
141°07.5'E	27°00.92'N	27°00.22'N	02:24:50	24°23.05'N	24°21.80'N	02:28:09	116.9	-0.06	1.74
141°15.0'E	26°57.57'N	26°56.88'N	02:25:11	24°19.50'N	24°18.24'N	02:28:31	117.1	-0.06	1.74
141°22.5'E	26°54.20'N	26°53.52'N	02:25:32	24°15.92'N	24°14.66'N	02:28:53	117.2	-0.06	1.74
141°30.0'E	26°50.81'N	26°50.13'N	02:25:53	24°12.32'N	24°11.07'N	02:29:16	117.4	-0.06	1.74
141°37.5'E	26°47.39'N	26°46.73'N	02:26:14	24°08.70'N	24°07.45'N	02:29:38	117.5	-0.06	1.74
141°45.0'E	26°43.95'N	26°43.30'N	02:26:35	24°05.05'N	24°03.80'N	02:30:01	117.6	-0.06	1.74
141°52.5'E	26°40.49'N	26°39.84'N	02:26:57	24°01.39'N	24°00.14'N	02:30:24	117.8	-0.06	1.74
142°00.0'E	26°37.00'N	26°36.36'N	02:27:18	23°57.71'N	23°56.46'N	02:30:46	117.9	-0.06	1.74

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

ΔT = 65.9 s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
142°07.5'E	26°33.50'N	26°32.86'N	02:27:39	23°54.04'N	23°52.75'N	02:31:09	118.0	-0.06	1.74
142°15.0'E	26°29.96'N	26°29.34'N	02:28:01	23°50.34'N	23°49.03'N	02:31:32	118.2	-0.06	1.74
142°22.5'E	26°26.41'N	26°25.80'N	02:28:22	23°46.60'N	23°45.28'N	02:31:54	118.3	-0.06	1.74
142°30.0'E	26°22.84'N	26°22.23'N	02:28:44	23°42.83'N	23°41.51'N	02:32:17	118.5	-0.06	1.74
142°37.5'E	26°19.25'N	26°18.64'N	02:29:05	23°39.04'N	23°37.72'N	02:32:40	118.6	-0.06	1.74
142°45.0'E	26°15.64'N	26°15.03'N	02:29:27	23°35.23'N	23°33.89'N	02:33:03	118.7	-0.06	1.74
142°52.5'E	26°12.01'N	26°11.40'N	02:29:48	23°31.40'N	23°30.04'N	02:33:26	118.8	-0.06	1.74
143°00.0'E	26°08.35'N	26°07.75'N	02:30:10	23°27.54'N	23°26.16'N	02:33:49	119.0	-0.06	1.74
143°07.5'E	26°04.67'N	26°04.07'N	02:30:32	23°23.66'N	23°22.25'N	02:34:12	119.1	-0.06	1.74
143°15.0'E	26°00.96'N	26°00.37'N	02:30:53	23°19.76'N	23°18.33'N	02:34:35	119.2	-0.07	1.74
143°22.5'E	25°57.21'N	25°56.64'N	02:31:15	23°15.84'N	23°14.39'N	02:34:58	119.4	-0.07	1.74
143°30.0'E	25°53.46'N	25°52.89'N	02:31:37	23°11.89'N	23°10.42'N	02:35:21	119.5	-0.07	1.74
143°37.5'E	25°49.68'N	25°49.12'N	02:31:59	23°07.92'N	23°06.43'N	02:35:44	119.6	-0.07	1.74
143°45.0'E	25°45.88'N	25°45.34'N	02:32:21	23°03.93'N	23°02.43'N	02:36:07	119.8	-0.07	1.74
143°52.5'E	25°42.06'N	25°41.53'N	02:32:43	22°59.91'N	22°58.39'N	02:36:31	119.9	-0.07	1.74
144°00.0'E	25°38.22'N	25°37.70'N	02:33:05	22°55.88'N	22°54.34'N	02:36:54	120.0	-0.07	1.74
144°07.5'E	25°34.35'N	25°33.84'N	02:33:27	22°51.82'N	22°50.27'N	02:37:17	120.1	-0.07	1.74
144°15.0'E	25°30.46'N	25°29.97'N	02:33:49	22°47.73'N	22°46.17'N	02:37:40	120.3	-0.07	1.74
144°22.5'E	25°26.55'N	25°26.07'N	02:34:11	22°43.63'N	22°42.05'N	02:38:04	120.4	-0.07	1.74
144°30.0'E	25°22.61'N	25°22.15'N	02:34:33	22°39.50'N	22°37.91'N	02:38:27	120.5	-0.07	1.74
144°37.5'E	25°18.65'N	25°18.21'N	02:34:55	22°35.35'N	22°33.75'N	02:38:51	120.6	-0.07	1.74
144°45.0'E	25°14.67'N	25°14.24'N	02:35:17	22°31.18'N	22°29.56'N	02:39:14	120.8	-0.07	1.74
144°52.5'E	25°10.66'N	25°10.26'N	02:35:40	22°26.98'N	22°25.36'N	02:39:38	120.9	-0.08	1.74
145°00.0'E	25°06.63'N	25°06.25'N	02:36:02	22°22.76'N	22°21.13'N	02:40:01	121.0	-0.08	1.74
145°07.5'E	25°02.58'N	25°02.21'N	02:36:24	22°18.52'N	22°16.88'N	02:40:25	121.1	-0.08	1.74
145°15.0'E	24°58.50'N	24°58.16'N	02:36:47	22°14.26'N	22°12.61'N	02:40:48	121.3	-0.08	1.74
145°22.5'E	24°54.40'N	24°54.08'N	02:37:09	22°09.98'N	22°08.31'N	02:41:12	121.4	-0.08	1.74
145°30.0'E	24°50.27'N	24°49.99'N	02:37:32	22°05.67'N	22°04.00'N	02:41:35	121.5	-0.08	1.74
145°37.5'E	24°46.16'N	24°45.87'N	02:37:54	22°01.34'N	21°59.66'N	02:41:59	121.6	-0.08	1.74
145°45.0'E	24°42.06'N	24°41.72'N	02:38:17	21°56.99'N	21°55.31'N	02:42:23	121.8	-0.08	1.74
145°52.5'E	24°37.92'N	24°37.56'N	02:38:39	21°52.61'N	21°50.93'N	02:42:47	121.9	-0.08	1.74
146°00.0'E	24°33.76'N	24°33.37'N	02:39:02	21°48.22'N	21°46.53'N	02:43:10	122.0	-0.08	1.74
146°07.5'E	24°29.57'N	24°29.16'N	02:39:24	21°43.80'N	21°42.11'N	02:43:34	122.1	-0.08	1.74
146°15.0'E	24°25.37'N	24°24.93'N	02:39:47	21°39.36'N	21°37.67'N	02:43:58	122.2	-0.08	1.74
146°22.5'E	24°21.13'N	24°20.67'N	02:40:10	21°34.90'N	21°33.21'N	02:44:22	122.3	-0.09	1.74
146°30.0'E	24°16.88'N	24°16.40'N	02:40:33	21°30.42'N	21°28.72'N	02:44:46	122.5	-0.09	1.74
146°37.5'E	24°12.61'N	24°12.10'N	02:40:55	21°25.91'N	21°24.21'N	02:45:09	122.6	-0.09	1.74
146°45.0'E	24°08.30'N	24°07.78'N	02:41:18	21°21.38'N	21°19.69'N	02:45:33	122.7	-0.09	1.74
146°52.5'E	24°03.98'N	24°03.44'N	02:41:41	21°16.83'N	21°15.14'N	02:45:57	122.8	-0.09	1.74
147°00.0'E	23°59.64'N	23°59.07'N	02:42:04	21°12.26'N	21°10.57'N	02:46:21	122.9	-0.09	1.74
147°07.5'E	23°55.27'N	23°54.69'N	02:42:27	21°07.67'N	21°05.98'N	02:46:45	123.0	-0.09	1.74
147°15.0'E	23°50.88'N	23°50.28'N	02:42:50	21°03.05'N	21°01.37'N	02:47:09	123.2	-0.09	1.74
147°22.5'E	23°46.47'N	23°45.85'N	02:43:13	20°58.42'N	20°56.73'N	02:47:33	123.3	-0.09	1.74
147°30.0'E	23°42.03'N	23°41.40'N	02:43:36	20°53.76'N	20°52.07'N	02:47:57	123.4	-0.09	1.74
147°37.5'E	23°37.57'N	23°36.92'N	02:43:59	20°49.08'N	20°47.37'N	02:48:21	123.5	-0.09	1.74
147°45.0'E	23°33.09'N	23°32.43'N	02:44:22	20°44.38'N	20°42.66'N	02:48:45	123.6	-0.10	1.74
147°52.5'E	23°28.59'N	23°27.91'N	02:44:45	20°39.66'N	20°37.93'N	02:49:10	123.7	-0.10	1.74
148°00.0'E	23°24.06'N	23°23.37'N	02:45:08	20°34.92'N	20°33.18'N	02:49:34	123.8	-0.10	1.74

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

ΔT = 65.9 s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm	Elev Fact	Scale Fact km/"
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
148°07.5'E	23°19.51'N	23°18.81'N	02:45:31	20°30.15'N	20°28.40'N	02:49:58	123.9	-0.10	1.74
148°15.0'E	23°14.94'N	23°14.23'N	02:45:54	20°25.37'N	20°23.61'N	02:50:22	124.0	-0.10	1.74
148°22.5'E	23°10.35'N	23°09.62'N	02:46:17	20°20.56'N	20°18.80'N	02:50:46	124.1	-0.10	1.74
148°30.0'E	23°05.73'N	23°05.00'N	02:46:40	20°15.74'N	20°13.97'N	02:51:10	124.2	-0.10	1.74
148°37.5'E	23°01.09'N	23°00.35'N	02:47:04	20°10.89'N	20°09.11'N	02:51:35	124.3	-0.10	1.74
148°45.0'E	22°56.43'N	22°55.68'N	02:47:27	20°06.02'N	20°04.24'N	02:51:59	124.4	-0.10	1.74
148°52.5'E	22°51.75'N	22°50.99'N	02:47:50	20°01.13'N	19°59.35'N	02:52:23	124.5	-0.10	1.74
149°00.0'E	22°47.04'N	22°46.28'N	02:48:14	19°56.23'N	19°54.44'N	02:52:47	124.6	-0.11	1.74
149°07.5'E	22°42.32'N	22°41.55'N	02:48:37	19°51.30'N	19°49.50'N	02:53:11	124.7	-0.11	1.74
149°15.0'E	22°37.57'N	22°36.80'N	02:49:00	19°46.35'N	19°44.55'N	02:53:36	124.8	-0.11	1.74
149°22.5'E	22°32.80'N	22°32.02'N	02:49:24	19°41.37'N	19°39.58'N	02:54:00	124.9	-0.11	1.74
149°30.0'E	22°28.01'N	22°27.23'N	02:49:47	19°36.36'N	19°34.58'N	02:54:24	125.0	-0.11	1.74
149°37.5'E	22°23.19'N	22°22.41'N	02:50:10	19°31.35'N	19°29.57'N	02:54:48	125.1	-0.11	1.74
149°45.0'E	22°18.36'N	22°17.58'N	02:50:34	19°26.32'N	19°24.53'N	02:55:13	125.2	-0.11	1.74
149°52.5'E	22°13.50'N	22°12.72'N	02:50:57	19°21.27'N	19°19.46'N	02:55:37	125.3	-0.11	1.74
150°00.0'E	22°08.63'N	22°07.84'N	02:51:21	19°16.21'N	19°14.37'N	02:56:01	125.4	-0.11	1.74
150°07.5'E	22°03.73'N	22°02.94'N	02:51:44	19°11.12'N	19°09.27'N	02:56:26	125.5	-0.11	1.74
150°15.0'E	21°58.81'N	21°58.02'N	02:52:08	19°06.01'N	19°04.15'N	02:56:50	125.6	-0.12	1.74
150°22.5'E	21°53.87'N	21°53.08'N	02:52:31	19°00.89'N	18°59.00'N	02:57:14	125.7	-0.12	1.74
150°30.0'E	21°48.90'N	21°48.12'N	02:52:55	18°55.75'N	18°53.85'N	02:57:39	125.8	-0.12	1.75
150°37.5'E	21°43.92'N	21°43.14'N	02:53:18	18°50.59'N	18°48.67'N	02:58:03	125.9	-0.12	1.75
150°45.0'E	21°38.92'N	21°38.14'N	02:53:42	18°45.40'N	18°43.47'N	02:58:27	126.0	-0.12	1.75
150°52.5'E	21°33.92'N	21°33.13'N	02:54:05	18°40.20'N	18°38.26'N	02:58:51	126.0	-0.12	1.75
151°00.0'E	21°28.89'N	21°28.10'N	02:54:29	18°34.99'N	18°33.03'N	02:59:16	126.1	-0.12	1.75
151°07.5'E	21°23.83'N	21°23.04'N	02:54:53	18°29.75'N	18°27.78'N	02:59:40	126.2	-0.12	1.75
151°15.0'E	21°18.74'N	21°17.96'N	02:55:16	18°24.50'N	18°22.51'N	03:00:04	126.3	-0.12	1.75
151°22.5'E	21°13.63'N	21°12.86'N	02:55:40	18°19.22'N	18°17.23'N	03:00:29	126.4	-0.13	1.75
151°30.0'E	21°08.51'N	21°07.74'N	02:56:03	18°13.93'N	18°11.93'N	03:00:53	126.5	-0.13	1.75
151°37.5'E	21°03.37'N	21°02.61'N	02:56:27	18°08.63'N	18°06.61'N	03:01:17	126.6	-0.13	1.75
151°45.0'E	20°58.20'N	20°57.45'N	02:56:51	18°03.30'N	18°01.28'N	03:01:42	126.6	-0.13	1.75
151°52.5'E	20°53.02'N	20°52.27'N	02:57:14	17°57.96'N	17°55.93'N	03:02:06	126.7	-0.13	1.75
152°00.0'E	20°47.82'N	20°47.08'N	02:57:38	17°52.60'N	17°50.56'N	03:02:30	126.8	-0.13	1.75
152°07.5'E	20°42.59'N	20°41.86'N	02:58:02	17°47.23'N	17°45.17'N	03:02:54	126.9	-0.13	1.75
152°15.0'E	20°37.35'N	20°36.63'N	02:58:25	17°41.83'N	17°39.77'N	03:03:19	126.9	-0.13	1.75
152°22.5'E	20°32.09'N	20°31.38'N	02:58:49	17°36.43'N	17°34.35'N	03:03:43	127.0	-0.13	1.75
152°30.0'E	20°26.81'N	20°26.11'N	02:59:13	17°31.00'N	17°28.92'N	03:04:07	127.1	-0.14	1.75
152°37.5'E	20°21.52'N	20°20.82'N	02:59:36	17°25.56'N	17°23.47'N	03:04:31	127.2	-0.14	1.75
152°45.0'E	20°16.20'N	20°15.51'N	03:00:00	17°20.10'N	17°18.01'N	03:04:55	127.2	-0.14	1.75
152°52.5'E	20°10.86'N	20°10.19'N	03:00:24	17°14.63'N	17°12.53'N	03:05:20	127.3	-0.14	1.75
153°00.0'E	20°05.51'N	20°04.85'N	03:00:48	17°09.14'N	17°07.03'N	03:05:44	127.4	-0.14	1.75
153°07.5'E	20°00.14'N	19°59.49'N	03:01:11	17°03.63'N	17°01.52'N	03:06:08	127.5	-0.14	1.75
153°15.0'E	19°54.75'N	19°54.11'N	03:01:35	16°58.11'N	16°56.00'N	03:06:32	127.5	-0.14	1.75
153°22.5'E	19°49.35'N	19°48.72'N	03:01:59	16°52.58'N	16°50.46'N	03:06:56	127.6	-0.14	1.75
153°30.0'E	19°43.93'N	19°43.30'N	03:02:22	16°47.03'N	16°44.90'N	03:07:20	127.7	-0.15	1.75
153°37.5'E	19°38.50'N	19°37.87'N	03:02:46	16°41.46'N	16°39.33'N	03:07:44	127.7	-0.15	1.75
153°45.0'E	19°33.05'N	19°32.43'N	03:03:10	16°35.88'N	16°33.75'N	03:08:08	127.8	-0.15	1.75
153°52.5'E	19°27.58'N	19°26.96'N	03:03:33	16°30.29'N	16°28.15'N	03:08:32	127.9	-0.15	1.75
154°00.0'E	19°22.10'N	19°21.48'N	03:03:57	16°24.68'N	16°22.54'N	03:08:56	127.9	-0.15	1.75

TABLE 8 - EXTENDED VERSION

MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
 TOTAL SOLAR ECLIPSE OF 2009 JULY 22

$\Delta T = 65.9$ s

Longitude	North Graze Zone Latitudes		Northern Limit	South Graze Zone Latitudes		Southern Limit	Path Azm	Elev Fact	Scale Fact
	Northern Limit	Southern Limit	Universal Time	Northern Limit	Southern Limit	Universal Time			
			h m s			h m s	°		km/"
154°07.5'E	19°16.60'N	19°15.99'N	03:04:21	16°19.06'N	16°16.92'N	03:09:20	128.0	-0.15	1.75
154°15.0'E	19°11.08'N	19°10.48'N	03:04:44	16°13.42'N	16°11.28'N	03:09:44	128.0	-0.15	1.75
154°22.5'E	19°05.55'N	19°04.95'N	03:05:08	16°07.77'N	16°05.63'N	03:10:08	128.1	-0.15	1.75
154°30.0'E	19°00.00'N	18°59.40'N	03:05:31	16°02.11'N	15°59.96'N	03:10:32	128.1	-0.15	1.75
154°37.5'E	18°54.44'N	18°53.84'N	03:05:55	15°56.43'N	15°54.29'N	03:10:56	128.2	-0.16	1.75
154°45.0'E	18°48.85'N	18°48.27'N	03:06:19	15°50.75'N	15°48.60'N	03:11:20	128.3	-0.16	1.75
154°52.5'E	18°43.26'N	18°42.68'N	03:06:42	15°45.05'N	15°42.89'N	03:11:43	128.3	-0.16	1.75
155°00.0'E	18°37.66'N	18°37.07'N	03:07:06	15°39.33'N	15°37.18'N	03:12:07	128.4	-0.16	1.75
155°07.5'E	18°32.04'N	18°31.45'N	03:07:29	15°33.60'N	15°31.45'N	03:12:31	128.4	-0.16	1.76
155°15.0'E	18°26.41'N	18°25.81'N	03:07:53	15°27.87'N	15°25.71'N	03:12:55	128.5	-0.16	1.76
155°22.5'E	18°20.76'N	18°20.16'N	03:08:16	15°22.12'N	15°19.96'N	03:13:18	128.5	-0.16	1.76
155°30.0'E	18°15.09'N	18°14.50'N	03:08:40	15°16.36'N	15°14.20'N	03:13:42	128.6	-0.16	1.76
155°37.5'E	18°09.42'N	18°08.82'N	03:09:03	15°10.58'N	15°08.43'N	03:14:06	128.6	-0.17	1.76
155°45.0'E	18°03.72'N	18°03.12'N	03:09:27	15°04.80'N	15°02.64'N	03:14:29	128.7	-0.17	1.76
155°52.5'E	17°58.02'N	17°57.42'N	03:09:50	14°59.00'N	14°56.85'N	03:14:53	128.7	-0.17	1.76
156°00.0'E	17°52.30'N	17°51.70'N	03:10:14	14°53.20'N	14°51.04'N	03:15:16	128.7	-0.17	1.76
156°07.5'E	17°46.56'N	17°45.96'N	03:10:37	14°47.38'N	14°45.23'N	03:15:40	128.8	-0.17	1.76
156°15.0'E	17°40.81'N	17°40.22'N	03:11:00	14°41.56'N	14°39.40'N	03:16:03	128.8	-0.17	1.76
156°22.5'E	17°35.05'N	17°34.46'N	03:11:24	14°35.72'N	14°33.57'N	03:16:26	128.9	-0.17	1.76
156°30.0'E	17°29.28'N	17°28.68'N	03:11:47	14°29.87'N	14°27.72'N	03:16:50	128.9	-0.17	1.76
156°37.5'E	17°23.49'N	17°22.90'N	03:12:10	14°24.02'N	14°21.87'N	03:17:13	129.0	-0.17	1.76
156°45.0'E	17°17.69'N	17°17.10'N	03:12:34	14°18.15'N	14°16.00'N	03:17:36	129.0	-0.18	1.76
156°52.5'E	17°11.88'N	17°11.29'N	03:12:57	14°12.24'N	14°10.12'N	03:17:59	129.0	-0.18	1.76
157°00.0'E	17°06.06'N	17°05.47'N	03:13:20	14°06.34'N	14°04.23'N	03:18:22	129.1	-0.18	1.76
157°07.5'E	17°00.22'N	16°59.63'N	03:13:43	14°00.46'N	13°58.34'N	03:18:45	129.1	-0.18	1.76
157°15.0'E	16°54.38'N	16°53.79'N	03:14:06	13°54.56'N	13°52.45'N	03:19:08	129.1	-0.18	1.76
157°22.5'E	16°48.52'N	16°47.93'N	03:14:29	13°48.65'N	13°46.54'N	03:19:31	129.2	-0.18	1.76
157°30.0'E	16°42.65'N	16°42.06'N	03:14:52	13°42.74'N	13°40.62'N	03:19:54	129.2	-0.18	1.76
157°37.5'E	16°36.77'N	16°36.18'N	03:15:16	13°36.81'N	13°34.70'N	03:20:17	129.2	-0.18	1.76
157°45.0'E	16°30.88'N	16°30.29'N	03:15:39	13°30.88'N	13°28.77'N	03:20:40	129.3	-0.19	1.76
157°52.5'E	16°24.98'N	16°24.39'N	03:16:02	13°24.94'N	13°22.84'N	03:21:03	129.3	-0.19	1.76
158°00.0'E	16°19.07'N	16°18.48'N	03:16:24	13°19.00'N	13°16.89'N	03:21:26	129.3	-0.19	1.76
158°07.5'E	16°13.15'N	16°12.57'N	03:16:47	13°13.05'N	13°10.94'N	03:21:48	129.3	-0.19	1.76
158°15.0'E	16°07.22'N	16°06.63'N	03:17:10	13°07.09'N	13°04.98'N	03:22:11	129.4	-0.19	1.76
158°22.5'E	16°01.28'N	16°00.70'N	03:17:33	13°01.12'N	12°59.02'N	03:22:33	129.4	-0.19	1.76
158°30.0'E	15°55.32'N	15°54.79'N	03:17:56	12°55.15'N	12°53.05'N	03:22:56	129.4	-0.19	1.76
158°37.5'E	15°49.36'N	15°48.85'N	03:18:19	12°49.18'N	12°47.07'N	03:23:18	129.4	-0.19	1.77
158°45.0'E	15°43.40'N	15°42.87'N	03:18:41	12°43.20'N	12°41.09'N	03:23:41	129.5	-0.19	1.77
158°52.5'E	15°37.42'N	15°36.90'N	03:19:04	12°37.21'N	12°35.11'N	03:24:03	129.5	-0.20	1.77
159°00.0'E	15°31.44'N	15°30.92'N	03:19:26	12°31.22'N	12°29.12'N	03:24:25	129.5	-0.20	1.77
159°07.5'E	15°25.44'N	15°24.93'N	03:19:49	12°25.22'N	12°23.12'N	03:24:48	129.5	-0.20	1.77
159°15.0'E	15°19.44'N	15°18.93'N	03:20:12	12°19.22'N	12°17.12'N	03:25:10	129.5	-0.20	1.77
159°22.5'E	15°13.44'N	15°12.92'N	03:20:34	12°13.21'N	12°11.12'N	03:25:32	129.5	-0.20	1.77
159°30.0'E	15°07.42'N	15°06.91'N	03:20:56	12°07.20'N	12°05.11'N	03:25:54	129.5	-0.20	1.77
159°37.5'E	15°01.40'N	15°00.89'N	03:21:19	12°01.19'N	11°59.09'N	03:26:16	129.6	-0.20	1.77
159°45.0'E	14°55.37'N	14°54.86'N	03:21:41	11°55.17'N	11°53.08'N	03:26:38	129.6	-0.20	1.77
159°52.5'E	14°49.34'N	14°48.83'N	03:22:03	11°49.15'N	11°47.06'N	03:26:59	129.6	-0.20	1.77
160°00.0'E	14°43.29'N	14°42.79'N	03:22:26	11°43.13'N	11°41.03'N	03:27:21	129.6	-0.21	1.77

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T =$ 65.9 s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
160°07.5'E	14°37.25'N	14°36.74'N	03:22:48	11°37.10'N	11°35.01'N	03:27:43	129.6	-0.21	1.77
160°15.0'E	14°31.19'N	14°30.69'N	03:23:10	11°31.07'N	11°28.98'N	03:28:05	129.6	-0.21	1.77
160°22.5'E	14°25.13'N	14°24.63'N	03:23:32	11°25.04'N	11°22.94'N	03:28:26	129.6	-0.21	1.77
160°30.0'E	14°19.07'N	14°18.56'N	03:23:54	11°19.01'N	11°16.91'N	03:28:48	129.6	-0.21	1.77
160°37.5'E	14°13.00'N	14°12.49'N	03:24:16	11°12.97'N	11°10.87'N	03:29:09	129.6	-0.21	1.77
160°45.0'E	14°06.92'N	14°06.42'N	03:24:38	11°06.93'N	11°04.84'N	03:29:30	129.6	-0.21	1.77
160°52.5'E	14°00.84'N	14°00.34'N	03:25:00	11°00.89'N	10°58.80'N	03:29:52	129.6	-0.21	1.77
161°00.0'E	13°54.76'N	13°54.26'N	03:25:21	10°54.85'N	10°52.75'N	03:30:13	129.6	-0.21	1.77
161°07.5'E	13°48.67'N	13°48.17'N	03:25:43	10°48.81'N	10°46.71'N	03:30:34	129.6	-0.21	1.77
161°15.0'E	13°42.58'N	13°42.08'N	03:26:05	10°42.76'N	10°40.67'N	03:30:55	129.6	-0.22	1.77
161°22.5'E	13°36.48'N	13°35.98'N	03:26:26	10°36.72'N	10°34.62'N	03:31:16	129.6	-0.22	1.77
161°30.0'E	13°30.38'N	13°29.88'N	03:26:48	10°30.68'N	10°28.58'N	03:31:37	129.6	-0.22	1.77
161°37.5'E	13°24.28'N	13°23.78'N	03:27:09	10°24.63'N	10°22.54'N	03:31:58	129.6	-0.22	1.77
161°45.0'E	13°18.17'N	13°17.67'N	03:27:31	10°18.59'N	10°16.49'N	03:32:18	129.6	-0.22	1.77
161°52.5'E	13°12.06'N	13°11.56'N	03:27:52	10°12.54'N	10°10.45'N	03:32:39	129.6	-0.22	1.78
162°00.0'E	13°05.95'N	13°05.45'N	03:28:13	10°06.50'N	10°04.40'N	03:33:00	129.6	-0.22	1.78
162°07.5'E	12°59.83'N	12°59.34'N	03:28:34	10°00.46'N	09°58.36'N	03:33:20	129.6	-0.22	1.78
162°15.0'E	12°53.72'N	12°53.22'N	03:28:56	09°54.41'N	09°52.31'N	03:33:41	129.6	-0.22	1.78
162°22.5'E	12°47.60'N	12°47.11'N	03:29:17	09°48.37'N	09°46.27'N	03:34:01	129.6	-0.23	1.78
162°30.0'E	12°41.48'N	12°40.99'N	03:29:38	09°42.34'N	09°40.23'N	03:34:21	129.6	-0.23	1.78
162°37.5'E	12°35.36'N	12°34.87'N	03:29:59	09°36.30'N	09°34.19'N	03:34:42	129.6	-0.23	1.78
162°45.0'E	12°29.24'N	12°28.74'N	03:30:20	09°30.26'N	09°28.16'N	03:35:02	129.6	-0.23	1.78
162°52.5'E	12°23.11'N	12°22.62'N	03:30:40	09°24.22'N	09°22.12'N	03:35:22	129.6	-0.23	1.78
163°00.0'E	12°16.99'N	12°16.50'N	03:31:01	09°18.19'N	09°16.09'N	03:35:42	129.5	-0.23	1.78
163°07.5'E	12°10.87'N	12°10.37'N	03:31:22	09°12.16'N	09°10.05'N	03:36:02	129.5	-0.23	1.78
163°15.0'E	12°04.74'N	12°04.25'N	03:31:42	09°06.13'N	09°04.02'N	03:36:21	129.5	-0.23	1.78
163°22.5'E	11°58.62'N	11°58.12'N	03:32:03	09°00.11'N	08°58.00'N	03:36:41	129.5	-0.23	1.78
163°30.0'E	11°52.49'N	11°52.00'N	03:32:23	08°54.09'N	08°51.98'N	03:37:01	129.5	-0.23	1.78
163°37.5'E	11°46.37'N	11°45.87'N	03:32:44	08°48.07'N	08°45.95'N	03:37:20	129.5	-0.23	1.78
163°45.0'E	11°40.25'N	11°39.75'N	03:33:04	08°42.05'N	08°39.94'N	03:37:40	129.4	-0.24	1.78
163°52.5'E	11°34.12'N	11°33.62'N	03:33:24	08°36.04'N	08°33.92'N	03:37:59	129.4	-0.24	1.78
164°00.0'E	11°28.00'N	11°27.50'N	03:33:44	08°30.03'N	08°27.91'N	03:38:19	129.4	-0.24	1.78
164°07.5'E	11°21.88'N	11°21.38'N	03:34:04	08°24.02'N	08°21.91'N	03:38:38	129.4	-0.24	1.78
164°15.0'E	11°15.76'N	11°15.26'N	03:34:24	08°18.02'N	08°15.90'N	03:38:57	129.4	-0.24	1.78
164°22.5'E	11°09.65'N	11°09.14'N	03:34:44	08°12.03'N	08°09.91'N	03:39:16	129.3	-0.24	1.78
164°30.0'E	11°03.53'N	11°03.03'N	03:35:04	08°06.03'N	08°03.91'N	03:39:35	129.3	-0.24	1.78
164°37.5'E	10°57.42'N	10°56.91'N	03:35:24	08°00.04'N	07°57.92'N	03:39:54	129.3	-0.24	1.78
164°45.0'E	10°51.31'N	10°50.80'N	03:35:44	07°54.06'N	07°51.94'N	03:40:13	129.3	-0.24	1.78
164°52.5'E	10°45.20'N	10°44.69'N	03:36:03	07°48.08'N	07°45.96'N	03:40:31	129.2	-0.24	1.78
165°00.0'E	10°39.09'N	10°38.58'N	03:36:23	07°42.11'N	07°39.98'N	03:40:50	129.2	-0.24	1.78
165°07.5'E	10°32.99'N	10°32.48'N	03:36:42	07°36.14'N	07°34.01'N	03:41:09	129.2	-0.25	1.78
165°15.0'E	10°26.89'N	10°26.38'N	03:37:02	07°30.18'N	07°28.05'N	03:41:27	129.2	-0.25	1.78
165°22.5'E	10°20.79'N	10°20.28'N	03:37:21	07°24.21'N	07°22.09'N	03:41:45	129.1	-0.25	1.79
165°30.0'E	10°14.70'N	10°14.19'N	03:37:40	07°18.26'N	07°16.14'N	03:42:04	129.1	-0.25	1.79
165°37.5'E	10°08.61'N	10°08.10'N	03:37:59	07°12.32'N	07°10.19'N	03:42:22	129.1	-0.25	1.79
165°45.0'E	10°02.52'N	10°02.01'N	03:38:18	07°06.38'N	07°04.25'N	03:42:40	129.0	-0.25	1.79
165°52.5'E	09°56.44'N	09°55.93'N	03:38:37	07°00.44'N	06°58.32'N	03:42:58	129.0	-0.25	1.79
166°00.0'E	09°50.36'N	09°49.85'N	03:38:56	06°54.52'N	06°52.39'N	03:43:16	129.0	-0.25	1.79

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
166°07.5'E	09°44.29'N	09°43.77'N	03:39:15	06°48.60'N	06°46.47'N	03:43:34	128.9	-0.25	1.79
166°15.0'E	09°38.22'N	09°37.70'N	03:39:34	06°42.68'N	06°40.55'N	03:43:51	128.9	-0.25	1.79
166°22.5'E	09°32.16'N	09°31.64'N	03:39:53	06°36.78'N	06°34.65'N	03:44:09	128.9	-0.25	1.79
166°30.0'E	09°26.10'N	09°25.58'N	03:40:11	06°30.88'N	06°28.75'N	03:44:27	128.8	-0.25	1.79
166°37.5'E	09°20.04'N	09°19.52'N	03:40:30	06°24.99'N	06°22.85'N	03:44:44	128.8	-0.25	1.79
166°45.0'E	09°14.00'N	09°13.47'N	03:40:48	06°19.10'N	06°16.97'N	03:45:02	128.8	-0.26	1.79
166°52.5'E	09°07.95'N	09°07.42'N	03:41:06	06°13.22'N	06°11.09'N	03:45:19	128.7	-0.26	1.79
167°00.0'E	09°01.91'N	09°01.40'N	03:41:25	06°07.35'N	06°05.22'N	03:45:36	128.7	-0.26	1.79
167°07.5'E	08°55.87'N	08°55.39'N	03:41:43	06°01.49'N	05°59.36'N	03:45:53	128.6	-0.26	1.79
167°15.0'E	08°49.84'N	08°49.37'N	03:42:01	05°55.64'N	05°53.50'N	03:46:10	128.6	-0.26	1.79
167°22.5'E	08°43.82'N	08°43.34'N	03:42:19	05°49.79'N	05°47.65'N	03:46:27	128.6	-0.26	1.79
167°30.0'E	08°37.81'N	08°37.33'N	03:42:37	05°43.95'N	05°41.81'N	03:46:44	128.5	-0.26	1.79
167°37.5'E	08°31.80'N	08°31.32'N	03:42:54	05°38.12'N	05°35.98'N	03:47:01	128.5	-0.26	1.79
167°45.0'E	08°25.81'N	08°25.32'N	03:43:12	05°32.30'N	05°30.16'N	03:47:18	128.4	-0.26	1.79
167°52.5'E	08°19.81'N	08°19.32'N	03:43:30	05°26.49'N	05°24.35'N	03:47:34	128.4	-0.26	1.79
168°00.0'E	08°13.83'N	08°13.34'N	03:43:47	05°20.68'N	05°18.54'N	03:47:51	128.4	-0.26	1.79
168°07.5'E	08°07.85'N	08°07.36'N	03:44:05	05°14.88'N	05°12.74'N	03:48:07	128.3	-0.26	1.79
168°15.0'E	08°01.88'N	08°01.38'N	03:44:22	05°09.10'N	05°06.96'N	03:48:23	128.3	-0.26	1.79
168°22.5'E	07°55.91'N	07°55.42'N	03:44:39	05°03.32'N	05°01.18'N	03:48:40	128.2	-0.26	1.79
168°30.0'E	07°49.95'N	07°49.46'N	03:44:57	04°57.55'N	04°55.41'N	03:48:56	128.2	-0.26	1.79
168°37.5'E	07°44.00'N	07°43.51'N	03:45:14	04°51.79'N	04°49.65'N	03:49:12	128.1	-0.27	1.79
168°45.0'E	07°38.06'N	07°37.56'N	03:45:31	04°46.04'N	04°43.90'N	03:49:28	128.1	-0.27	1.79
168°52.5'E	07°32.13'N	07°31.63'N	03:45:48	04°40.30'N	04°38.16'N	03:49:44	128.0	-0.27	1.79
169°00.0'E	07°26.20'N	07°25.70'N	03:46:04	04°34.57'N	04°32.43'N	03:49:59	128.0	-0.27	1.79
169°07.5'E	07°20.29'N	07°19.78'N	03:46:21	04°28.85'N	04°26.71'N	03:50:15	127.9	-0.27	1.79
169°15.0'E	07°14.38'N	07°13.87'N	03:46:38	04°23.13'N	04°21.00'N	03:50:31	127.9	-0.27	1.79
169°22.5'E	07°08.48'N	07°07.97'N	03:46:54	04°17.43'N	04°15.30'N	03:50:46	127.8	-0.27	1.79
169°30.0'E	07°02.58'N	07°02.07'N	03:47:11	04°11.74'N	04°09.60'N	03:51:02	127.8	-0.27	1.80
169°37.5'E	06°56.70'N	06°56.19'N	03:47:27	04°06.05'N	04°03.92'N	03:51:17	127.7	-0.27	1.80
169°45.0'E	06°50.82'N	06°50.31'N	03:47:44	04°00.38'N	03°58.25'N	03:51:32	127.7	-0.27	1.80
169°52.5'E	06°44.96'N	06°44.45'N	03:48:00	03°54.72'N	03°52.59'N	03:51:47	127.6	-0.27	1.80
170°00.0'E	06°39.10'N	06°38.59'N	03:48:16	03°49.06'N	03°46.94'N	03:52:02	127.6	-0.27	1.80
170°07.5'E	06°33.25'N	06°32.74'N	03:48:32	03°43.42'N	03°41.30'N	03:52:17	127.5	-0.27	1.80
170°15.0'E	06°27.42'N	06°26.90'N	03:48:48	03°37.79'N	03°35.67'N	03:52:32	127.5	-0.27	1.80
170°22.5'E	06°21.59'N	06°21.07'N	03:49:04	03°32.17'N	03°30.05'N	03:52:47	127.4	-0.27	1.80
170°30.0'E	06°15.76'N	06°15.25'N	03:49:20	03°26.56'N	03°24.44'N	03:53:02	127.4	-0.27	1.80
170°37.5'E	06°09.95'N	06°09.44'N	03:49:35	03°20.96'N	03°18.85'N	03:53:16	127.3	-0.27	1.80
170°45.0'E	06°04.15'N	06°03.64'N	03:49:51	03°15.37'N	03°13.26'N	03:53:31	127.3	-0.27	1.80
170°52.5'E	05°58.36'N	05°57.85'N	03:50:06	03°09.79'N	03°07.69'N	03:53:45	127.2	-0.27	1.80
171°00.0'E	05°52.58'N	05°52.07'N	03:50:22	03°04.22'N	03°02.12'N	03:53:59	127.2	-0.28	1.80
171°07.5'E	05°46.81'N	05°46.30'N	03:50:37	02°58.67'N	02°56.57'N	03:54:14	127.1	-0.28	1.80
171°15.0'E	05°41.05'N	05°40.53'N	03:50:52	02°53.12'N	02°51.03'N	03:54:28	127.0	-0.28	1.80
171°22.5'E	05°35.30'N	05°34.78'N	03:51:08	02°47.59'N	02°45.50'N	03:54:42	127.0	-0.28	1.80
171°30.0'E	05°29.56'N	05°29.04'N	03:51:23	02°42.06'N	02°39.98'N	03:54:56	126.9	-0.28	1.80
171°37.5'E	05°23.82'N	05°23.31'N	03:51:38	02°36.55'N	02°34.47'N	03:55:10	126.9	-0.28	1.80
171°45.0'E	05°18.11'N	05°17.59'N	03:51:52	02°31.05'N	02°28.97'N	03:55:24	126.8	-0.28	1.80
171°52.5'E	05°12.40'N	05°11.88'N	03:52:07	02°25.56'N	02°23.49'N	03:55:37	126.8	-0.28	1.80
172°00.0'E	05°06.70'N	05°06.19'N	03:52:22	02°20.08'N	02°18.02'N	03:55:51	126.7	-0.28	1.80

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
172°07.5'E	05°01.01'N	05°00.50'N	03:52:37	02°14.62'N	02°12.56'N	03:56:05	126.6	-0.28	1.80
172°15.0'E	04°55.33'N	04°54.82'N	03:52:51	02°09.16'N	02°07.11'N	03:56:18	126.6	-0.28	1.80
172°22.5'E	04°49.66'N	04°49.16'N	03:53:06	02°03.72'N	02°01.67'N	03:56:31	126.5	-0.28	1.80
172°30.0'E	04°44.01'N	04°43.50'N	03:53:20	01°58.29'N	01°56.24'N	03:56:45	126.5	-0.28	1.80
172°37.5'E	04°38.37'N	04°37.86'N	03:53:34	01°52.87'N	01°50.83'N	03:56:58	126.4	-0.28	1.80
172°45.0'E	04°32.74'N	04°32.23'N	03:53:48	01°47.46'N	01°45.43'N	03:57:11	126.4	-0.28	1.80
172°52.5'E	04°27.13'N	04°26.61'N	03:54:02	01°42.07'N	01°40.04'N	03:57:24	126.3	-0.28	1.80
173°00.0'E	04°21.52'N	04°21.00'N	03:54:16	01°36.68'N	01°34.66'N	03:57:37	126.2	-0.28	1.80
173°07.5'E	04°15.93'N	04°15.40'N	03:54:30	01°31.31'N	01°29.30'N	03:57:50	126.2	-0.28	1.80
173°15.0'E	04°10.35'N	04°09.81'N	03:54:44	01°25.95'N	01°23.94'N	03:58:02	126.1	-0.28	1.80
173°22.5'E	04°04.79'N	04°04.24'N	03:54:58	01°20.60'N	01°18.60'N	03:58:15	126.1	-0.28	1.80
173°30.0'E	03°59.23'N	03°58.68'N	03:55:12	01°15.26'N	01°13.27'N	03:58:28	126.0	-0.28	1.80
173°37.5'E	03°53.69'N	03°53.12'N	03:55:25	01°09.94'N	01°07.96'N	03:58:40	125.9	-0.28	1.80
173°45.0'E	03°48.16'N	03°47.58'N	03:55:39	01°04.63'N	01°02.66'N	03:58:53	125.9	-0.28	1.80
173°52.5'E	03°42.64'N	03°42.06'N	03:55:52	00°59.33'N	00°57.36'N	03:59:05	125.8	-0.28	1.80
174°00.0'E	03°37.14'N	03°36.54'N	03:56:05	00°54.04'N	00°52.09'N	03:59:17	125.7	-0.28	1.80
174°07.5'E	03°31.64'N	03°31.04'N	03:56:19	00°48.76'N	00°46.82'N	03:59:29	125.7	-0.28	1.80
174°15.0'E	03°26.15'N	03°25.54'N	03:56:32	00°43.50'N	00°41.56'N	03:59:42	125.6	-0.28	1.80
174°22.5'E	03°20.68'N	03°20.06'N	03:56:45	00°38.25'N	00°36.32'N	03:59:54	125.6	-0.28	1.80
174°30.0'E	03°15.22'N	03°14.60'N	03:56:58	00°33.01'N	00°31.09'N	04:00:05	125.5	-0.29	1.80
174°37.5'E	03°09.78'N	03°09.14'N	03:57:11	00°27.79'N	00°25.88'N	04:00:17	125.4	-0.29	1.80
174°45.0'E	03°04.34'N	03°03.70'N	03:57:23	00°22.57'N	00°20.68'N	04:00:29	125.4	-0.29	1.80
174°52.5'E	02°58.92'N	02°58.27'N	03:57:36	00°17.37'N	00°15.48'N	04:00:41	125.3	-0.29	1.80
175°00.0'E	02°53.50'N	02°52.85'N	03:57:49	00°12.18'N	00°10.31'N	04:00:52	125.2	-0.29	1.80
175°07.5'E	02°48.10'N	02°47.44'N	03:58:01	00°07.00'N	00°05.14'N	04:01:04	125.2	-0.29	1.80
175°15.0'E	02°42.72'N	02°42.04'N	03:58:14	00°01.84'N	00°00.01'S	04:01:15	125.1	-0.29	1.80
175°22.5'E	02°37.34'N	02°36.66'N	03:58:26	00°03.31'S	00°05.15'S	04:01:27	125.0	-0.29	1.80
175°30.0'E	02°31.98'N	02°31.29'N	03:58:38	00°08.45'S	00°10.28'S	04:01:38	125.0	-0.29	1.80
175°37.5'E	02°26.63'N	02°25.94'N	03:58:51	00°13.57'S	00°15.39'S	04:01:49	124.9	-0.29	1.80
175°45.0'E	02°21.29'N	02°20.59'N	03:59:03	00°18.69'S	00°20.49'S	04:02:00	124.8	-0.29	1.80
175°52.5'E	02°15.97'N	02°15.26'N	03:59:15	00°23.79'S	00°25.59'S	04:02:11	124.8	-0.29	1.80
176°00.0'E	02°10.65'N	02°09.94'N	03:59:27	00°28.88'S	00°30.68'S	04:02:22	124.7	-0.29	1.80
176°07.5'E	02°05.35'N	02°04.63'N	03:59:38	00°33.95'S	00°35.75'S	04:02:33	124.6	-0.29	1.80
176°15.0'E	02°00.06'N	01°59.34'N	03:59:50	00°39.02'S	00°40.82'S	04:02:44	124.6	-0.29	1.80
176°22.5'E	01°54.79'N	01°54.06'N	04:00:02	00°44.07'S	00°45.87'S	04:02:54	124.5	-0.29	1.80
176°30.0'E	01°49.52'N	01°48.79'N	04:00:14	00°49.10'S	00°50.90'S	04:03:05	124.4	-0.29	1.80
176°37.5'E	01°44.27'N	01°43.54'N	04:00:25	00°54.13'S	00°55.92'S	04:03:15	124.4	-0.29	1.80
176°45.0'E	01°39.03'N	01°38.29'N	04:00:37	00°59.14'S	01°00.93'S	04:03:26	124.3	-0.29	1.80
176°52.5'E	01°33.81'N	01°33.06'N	04:00:48	01°04.14'S	01°05.93'S	04:03:36	124.2	-0.29	1.80
177°00.0'E	01°28.59'N	01°27.84'N	04:00:59	01°09.13'S	01°10.92'S	04:03:47	124.2	-0.29	1.80
177°07.5'E	01°23.39'N	01°22.64'N	04:01:10	01°14.10'S	01°15.89'S	04:03:57	124.1	-0.29	1.80
177°15.0'E	01°18.20'N	01°17.45'N	04:01:22	01°19.06'S	01°20.85'S	04:04:07	124.0	-0.29	1.80
177°22.5'E	01°13.03'N	01°12.27'N	04:01:33	01°24.01'S	01°25.79'S	04:04:17	124.0	-0.29	1.80
177°30.0'E	01°07.87'N	01°07.10'N	04:01:44	01°28.94'S	01°30.72'S	04:04:27	123.9	-0.29	1.80
177°37.5'E	01°02.72'N	01°01.95'N	04:01:54	01°33.87'S	01°35.65'S	04:04:37	123.8	-0.29	1.80
177°45.0'E	00°57.58'N	00°56.81'N	04:02:05	01°38.79'S	01°40.55'S	04:04:47	123.8	-0.29	1.80
177°52.5'E	00°52.46'N	00°51.69'N	04:02:16	01°43.70'S	01°45.44'S	04:04:57	123.7	-0.29	1.80
178°00.0'E	00°47.34'N	00°46.57'N	04:02:27	01°48.60'S	01°50.32'S	04:05:06	123.6	-0.29	1.80

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
178°07.5'E	00°42.25'N	00°41.47'N	04:02:37	01°53.47'S	01°55.20'S	04:05:16	123.6	-0.29	1.80
178°15.0'E	00°37.16'N	00°36.38'N	04:02:48	01°58.32'S	02°00.06'S	04:05:25	123.5	-0.29	1.80
178°22.5'E	00°32.09'N	00°31.31'N	04:02:58	02°03.17'S	02°04.91'S	04:05:35	123.4	-0.29	1.80
178°30.0'E	00°27.03'N	00°26.25'N	04:03:08	02°08.00'S	02°09.75'S	04:05:44	123.4	-0.29	1.80
178°37.5'E	00°21.98'N	00°21.20'N	04:03:19	02°12.82'S	02°14.58'S	04:05:53	123.3	-0.29	1.80
178°45.0'E	00°16.94'N	00°16.16'N	04:03:29	02°17.63'S	02°19.39'S	04:06:03	123.2	-0.29	1.80
178°52.5'E	00°11.92'N	00°11.14'N	04:03:39	02°22.43'S	02°24.19'S	04:06:12	123.2	-0.29	1.80
179°00.0'E	00°06.91'N	00°06.13'N	04:03:49	02°27.21'S	02°28.98'S	04:06:21	123.1	-0.29	1.80
179°07.5'E	00°01.92'N	00°01.13'N	04:03:59	02°31.98'S	02°33.75'S	04:06:30	123.0	-0.29	1.80
179°15.0'E	00°03.07'S	00°03.85'S	04:04:09	02°36.73'S	02°38.51'S	04:06:39	122.9	-0.29	1.80
179°22.5'E	00°08.04'S	00°08.82'S	04:04:18	02°41.48'S	02°43.26'S	04:06:48	122.9	-0.29	1.80
179°30.0'E	00°13.00'S	00°13.78'S	04:04:28	02°46.21'S	02°47.99'S	04:06:57	122.8	-0.29	1.80
179°37.5'E	00°17.94'S	00°18.72'S	04:04:38	02°50.92'S	02°52.72'S	04:07:05	122.7	-0.29	1.80
179°45.0'E	00°22.87'S	00°23.64'S	04:04:47	02°55.63'S	02°57.42'S	04:07:14	122.7	-0.29	1.80
179°52.5'E	00°27.79'S	00°28.53'S	04:04:57	03°00.32'S	03°02.12'S	04:07:23	122.6	-0.29	1.80
180°00.0'E	00°32.70'S	00°33.42'S	04:05:06	03°05.00'S	03°06.80'S	04:07:31	122.5	-0.29	1.80
179°52.5'W	00°37.59'S	00°38.32'S	04:05:16	03°09.67'S	03°11.47'S	04:07:39	122.5	-0.29	1.80
179°45.0'W	00°42.47'S	00°43.20'S	04:05:25	03°14.32'S	03°16.13'S	04:07:48	122.4	-0.29	1.80
179°37.5'W	00°47.34'S	00°48.06'S	04:05:34	03°18.96'S	03°20.77'S	04:07:56	122.3	-0.29	1.80
179°30.0'W	00°52.19'S	00°52.92'S	04:05:43	03°23.59'S	03°25.40'S	04:08:04	122.3	-0.29	1.80
179°22.5'W	00°57.04'S	00°57.75'S	04:05:52	03°28.21'S	03°30.02'S	04:08:13	122.2	-0.29	1.80
179°15.0'W	01°01.86'S	01°02.58'S	04:06:01	03°32.81'S	03°34.63'S	04:08:21	122.1	-0.29	1.80
179°07.5'W	01°06.68'S	01°07.39'S	04:06:10	03°37.40'S	03°39.22'S	04:08:29	122.0	-0.29	1.80
179°00.0'W	01°11.48'S	01°12.19'S	04:06:19	03°41.98'S	03°43.80'S	04:08:37	122.0	-0.29	1.80
178°52.5'W	01°16.27'S	01°16.98'S	04:06:28	03°46.55'S	03°48.36'S	04:08:44	121.9	-0.29	1.80
178°45.0'W	01°21.05'S	01°21.75'S	04:06:36	03°51.10'S	03°52.91'S	04:08:52	121.8	-0.29	1.80
178°37.5'W	01°25.81'S	01°26.51'S	04:06:45	03°55.64'S	03°57.45'S	04:09:00	121.8	-0.29	1.80
178°30.0'W	01°30.57'S	01°31.26'S	04:06:53	04°00.17'S	04°01.98'S	04:09:08	121.7	-0.29	1.80
178°22.5'W	01°35.31'S	01°35.99'S	04:07:02	04°04.68'S	04°06.50'S	04:09:15	121.6	-0.29	1.80
178°15.0'W	01°40.03'S	01°40.71'S	04:07:10	04°09.18'S	04°11.00'S	04:09:23	121.6	-0.29	1.80
178°07.5'W	01°44.75'S	01°45.42'S	04:07:19	04°13.67'S	04°15.48'S	04:09:30	121.5	-0.29	1.80
178°00.0'W	01°49.45'S	01°50.12'S	04:07:27	04°18.15'S	04°19.96'S	04:09:38	121.4	-0.29	1.80
177°52.5'W	01°54.13'S	01°54.80'S	04:07:35	04°22.61'S	04°24.42'S	04:09:45	121.4	-0.29	1.80
177°45.0'W	01°58.81'S	01°59.47'S	04:07:43	04°27.06'S	04°28.87'S	04:09:52	121.3	-0.29	1.80
177°37.5'W	02°03.47'S	02°04.12'S	04:07:51	04°31.50'S	04°33.31'S	04:10:00	121.2	-0.29	1.80
177°30.0'W	02°08.12'S	02°08.77'S	04:07:59	04°35.93'S	04°37.73'S	04:10:07	121.1	-0.29	1.80
177°22.5'W	02°12.76'S	02°13.40'S	04:08:07	04°40.34'S	04°42.14'S	04:10:14	121.1	-0.29	1.80
177°15.0'W	02°17.38'S	02°18.02'S	04:08:15	04°44.74'S	04°46.54'S	04:10:21	121.0	-0.29	1.80
177°07.5'W	02°21.99'S	02°22.62'S	04:08:22	04°49.13'S	04°50.93'S	04:10:28	120.9	-0.29	1.80
177°00.0'W	02°26.59'S	02°27.21'S	04:08:30	04°53.51'S	04°55.30'S	04:10:35	120.9	-0.29	1.80
176°52.5'W	02°31.18'S	02°31.79'S	04:08:38	04°57.87'S	04°59.66'S	04:10:41	120.8	-0.29	1.80
176°45.0'W	02°35.75'S	02°36.36'S	04:08:45	05°02.22'S	05°04.01'S	04:10:48	120.7	-0.29	1.80
176°37.5'W	02°40.31'S	02°40.91'S	04:08:53	05°06.56'S	05°08.34'S	04:10:55	120.7	-0.29	1.80
176°30.0'W	02°44.86'S	02°45.45'S	04:09:00	05°10.89'S	05°12.66'S	04:11:02	120.6	-0.29	1.80
176°22.5'W	02°49.39'S	02°49.97'S	04:09:08	05°15.20'S	05°16.97'S	04:11:08	120.5	-0.29	1.80
176°15.0'W	02°53.91'S	02°54.49'S	04:09:15	05°19.51'S	05°21.27'S	04:11:15	120.4	-0.29	1.80
176°07.5'W	02°58.42'S	02°58.99'S	04:09:22	05°23.80'S	05°25.55'S	04:11:21	120.4	-0.29	1.80
176°00.0'W	03°02.92'S	03°03.48'S	04:09:29	05°28.07'S	05°29.83'S	04:11:27	120.3	-0.29	1.80

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/"
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
175°52.5'W	03°07.40'S	03°07.95'S	04:09:36	05°32.34'S	05°34.08'S	04:11:34	120.2	-0.29	1.80
175°45.0'W	03°11.88'S	03°12.41'S	04:09:43	05°36.59'S	05°38.33'S	04:11:40	120.2	-0.29	1.80
175°37.5'W	03°16.34'S	03°16.86'S	04:09:50	05°40.83'S	05°42.56'S	04:11:46	120.1	-0.29	1.80
175°30.0'W	03°20.78'S	03°21.30'S	04:09:57	05°45.06'S	05°46.79'S	04:11:52	120.0	-0.29	1.80
175°22.5'W	03°25.22'S	03°25.72'S	04:10:04	05°49.28'S	05°51.00'S	04:11:58	120.0	-0.29	1.80
175°15.0'W	03°29.64'S	03°30.14'S	04:10:11	05°53.48'S	05°55.19'S	04:12:05	119.9	-0.28	1.80
175°07.5'W	03°34.05'S	03°34.53'S	04:10:18	05°57.67'S	05°59.38'S	04:12:10	119.8	-0.28	1.80
175°00.0'W	03°38.45'S	03°38.92'S	04:10:24	06°01.85'S	06°03.55'S	04:12:16	119.8	-0.28	1.80
174°52.5'W	03°42.83'S	03°43.29'S	04:10:31	06°06.02'S	06°07.71'S	04:12:22	119.7	-0.28	1.80
174°45.0'W	03°47.20'S	03°47.65'S	04:10:37	06°10.17'S	06°11.85'S	04:12:28	119.6	-0.28	1.80
174°37.5'W	03°51.56'S	03°52.00'S	04:10:44	06°14.32'S	06°15.99'S	04:12:34	119.6	-0.28	1.80
174°30.0'W	03°55.91'S	03°56.34'S	04:10:50	06°18.45'S	06°20.11'S	04:12:39	119.5	-0.28	1.80
174°22.5'W	04°00.24'S	04°00.66'S	04:10:56	06°22.57'S	06°24.22'S	04:12:45	119.4	-0.28	1.80
174°15.0'W	04°04.57'S	04°04.97'S	04:11:03	06°26.67'S	06°28.32'S	04:12:51	119.3	-0.28	1.80
174°07.5'W	04°08.88'S	04°09.27'S	04:11:09	06°30.77'S	06°32.40'S	04:12:56	119.3	-0.28	1.80
174°00.0'W	04°13.17'S	04°13.55'S	04:11:15	06°34.85'S	06°36.48'S	04:13:01	119.2	-0.28	1.80
173°52.5'W	04°17.46'S	04°17.83'S	04:11:21	06°38.92'S	06°40.54'S	04:13:07	119.1	-0.28	1.80
173°45.0'W	04°21.73'S	04°22.09'S	04:11:27	06°42.98'S	06°44.59'S	04:13:12	119.1	-0.28	1.80
173°37.5'W	04°25.99'S	04°26.33'S	04:11:33	06°47.03'S	06°48.62'S	04:13:17	119.0	-0.28	1.80
173°30.0'W	04°30.24'S	04°30.57'S	04:11:39	06°51.06'S	06°52.65'S	04:13:23	118.9	-0.28	1.80
173°22.5'W	04°34.48'S	04°34.79'S	04:11:45	06°55.09'S	06°56.66'S	04:13:28	118.9	-0.28	1.80
173°15.0'W	04°38.70'S	04°39.00'S	04:11:51	06°59.10'S	07°00.66'S	04:13:33	118.8	-0.28	1.80
173°07.5'W	04°42.91'S	04°43.20'S	04:11:56	07°03.10'S	07°04.65'S	04:13:38	118.7	-0.28	1.80
173°00.0'W	04°47.11'S	04°47.38'S	04:12:02	07°07.09'S	07°08.62'S	04:13:43	118.7	-0.28	1.80
172°52.5'W	04°51.30'S	04°51.56'S	04:12:08	07°11.07'S	07°12.59'S	04:13:48	118.6	-0.28	1.80
172°45.0'W	04°55.48'S	04°55.72'S	04:12:13	07°15.03'S	07°16.54'S	04:13:53	118.5	-0.28	1.80
172°37.5'W	04°59.64'S	04°59.86'S	04:12:19	07°18.98'S	07°20.48'S	04:13:58	118.5	-0.28	1.80
172°30.0'W	05°03.78'S	05°04.00'S	04:12:24	07°22.92'S	07°24.41'S	04:14:02	118.4	-0.28	1.80
172°22.5'W	05°07.91'S	05°08.13'S	04:12:29	07°26.85'S	07°28.33'S	04:14:07	118.3	-0.28	1.80
172°15.0'W	05°12.02'S	05°12.24'S	04:12:35	07°30.77'S	07°32.23'S	04:14:12	118.3	-0.28	1.80
172°07.5'W	05°16.12'S	05°16.34'S	04:12:40	07°34.68'S	07°36.12'S	04:14:16	118.2	-0.28	1.80
172°00.0'W	05°20.21'S	05°20.42'S	04:12:45	07°38.57'S	07°40.01'S	04:14:21	118.1	-0.28	1.80
171°52.5'W	05°24.28'S	05°24.50'S	04:12:50	07°42.46'S	07°43.88'S	04:14:25	118.0	-0.28	1.80
171°45.0'W	05°28.34'S	05°28.56'S	04:12:55	07°46.33'S	07°47.74'S	04:14:30	118.0	-0.28	1.80
171°37.5'W	05°32.40'S	05°32.61'S	04:13:00	07°50.19'S	07°51.58'S	04:14:34	117.9	-0.28	1.80
171°30.0'W	05°36.44'S	05°36.65'S	04:13:05	07°54.04'S	07°55.42'S	04:14:39	117.8	-0.28	1.80
171°22.5'W	05°40.46'S	05°40.68'S	04:13:10	07°57.87'S	07°59.25'S	04:14:43	117.8	-0.28	1.80
171°15.0'W	05°44.46'S	05°44.69'S	04:13:15	08°01.69'S	08°03.08'S	04:14:47	117.7	-0.28	1.80
171°07.5'W	05°48.45'S	05°48.70'S	04:13:20	08°05.50'S	08°06.89'S	04:14:51	117.6	-0.28	1.80
171°00.0'W	05°52.43'S	05°52.69'S	04:13:25	08°09.30'S	08°10.69'S	04:14:55	117.6	-0.28	1.80
170°52.5'W	05°56.40'S	05°56.67'S	04:13:29	08°13.08'S	08°14.48'S	04:14:59	117.5	-0.28	1.80
170°45.0'W	06°00.36'S	06°00.63'S	04:13:34	08°16.86'S	08°18.26'S	04:15:03	117.4	-0.28	1.80
170°37.5'W	06°04.31'S	06°04.59'S	04:13:39	08°20.62'S	08°22.02'S	04:15:07	117.4	-0.28	1.80
170°30.0'W	06°08.24'S	06°08.53'S	04:13:43	08°24.38'S	08°25.77'S	04:15:11	117.3	-0.28	1.80
170°22.5'W	06°12.16'S	06°12.46'S	04:13:48	08°28.12'S	08°29.52'S	04:15:15	117.2	-0.28	1.80
170°15.0'W	06°16.06'S	06°16.38'S	04:13:52	08°31.85'S	08°33.25'S	04:15:19	117.2	-0.28	1.80
170°07.5'W	06°19.96'S	06°20.29'S	04:13:56	08°35.57'S	08°36.97'S	04:15:23	117.1	-0.28	1.80
170°00.0'W	06°23.84'S	06°24.19'S	04:14:01	08°39.27'S	08°40.67'S	04:15:27	117.0	-0.28	1.80

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
169°52.5'W	06°27.71'S	06°28.07'S	04:14:05	08°42.97'S	08°44.37'S	04:15:30	117.0	-0.28	1.80
169°45.0'W	06°31.57'S	06°31.94'S	04:14:09	08°46.66'S	08°48.05'S	04:15:34	116.9	-0.28	1.80
169°37.5'W	06°35.42'S	06°35.80'S	04:14:13	08°50.33'S	08°51.73'S	04:15:38	116.8	-0.27	1.80
169°30.0'W	06°39.26'S	06°39.65'S	04:14:18	08°53.99'S	08°55.39'S	04:15:41	116.8	-0.27	1.80
169°22.5'W	06°43.09'S	06°43.49'S	04:14:22	08°57.65'S	08°59.04'S	04:15:45	116.7	-0.27	1.80
169°15.0'W	06°46.90'S	06°47.32'S	04:14:26	09°01.29'S	09°02.68'S	04:15:48	116.6	-0.27	1.80
169°07.5'W	06°50.70'S	06°51.13'S	04:14:30	09°04.92'S	09°06.31'S	04:15:51	116.6	-0.27	1.80
169°00.0'W	06°54.50'S	06°54.93'S	04:14:33	09°08.54'S	09°09.93'S	04:15:55	116.5	-0.27	1.80
168°52.5'W	06°58.28'S	06°58.73'S	04:14:37	09°12.15'S	09°13.53'S	04:15:58	116.4	-0.27	1.80
168°45.0'W	07°02.05'S	07°02.50'S	04:14:41	09°15.74'S	09°17.13'S	04:16:01	116.4	-0.27	1.80
168°37.5'W	07°05.80'S	07°06.27'S	04:14:45	09°19.33'S	09°20.71'S	04:16:05	116.3	-0.27	1.80
168°30.0'W	07°09.55'S	07°10.03'S	04:14:49	09°22.91'S	09°24.28'S	04:16:08	116.2	-0.27	1.80
168°22.5'W	07°13.29'S	07°13.77'S	04:14:52	09°26.47'S	09°27.84'S	04:16:11	116.2	-0.27	1.80
168°15.0'W	07°17.01'S	07°17.51'S	04:14:56	09°30.02'S	09°31.39'S	04:16:14	116.1	-0.27	1.80
168°07.5'W	07°20.73'S	07°21.23'S	04:14:59	09°33.57'S	09°34.93'S	04:16:17	116.0	-0.27	1.80
168°00.0'W	07°24.43'S	07°24.94'S	04:15:03	09°37.10'S	09°38.46'S	04:16:20	116.0	-0.27	1.80
167°52.5'W	07°28.12'S	07°28.64'S	04:15:06	09°40.62'S	09°41.98'S	04:16:23	115.9	-0.27	1.80
167°45.0'W	07°31.80'S	07°32.33'S	04:15:10	09°44.13'S	09°45.49'S	04:16:26	115.9	-0.27	1.80
167°37.5'W	07°35.47'S	07°36.01'S	04:15:13	09°47.63'S	09°48.98'S	04:16:29	115.8	-0.27	1.80
167°30.0'W	07°39.13'S	07°39.68'S	04:15:17	09°51.12'S	09°52.46'S	04:16:31	115.7	-0.27	1.80
167°22.5'W	07°42.78'S	07°43.33'S	04:15:20	09°54.60'S	09°55.94'S	04:16:34	115.7	-0.27	1.80
167°15.0'W	07°46.41'S	07°46.98'S	04:15:23	09°58.07'S	09°59.40'S	04:16:37	115.6	-0.27	1.80
167°07.5'W	07°50.04'S	07°50.61'S	04:15:26	10°01.53'S	10°02.85'S	04:16:39	115.5	-0.27	1.80
167°00.0'W	07°53.65'S	07°54.23'S	04:15:29	10°04.98'S	10°06.29'S	04:16:42	115.5	-0.27	1.80
166°52.5'W	07°57.26'S	07°57.84'S	04:15:32	10°08.41'S	10°09.72'S	04:16:45	115.4	-0.27	1.80
166°45.0'W	08°00.85'S	08°01.44'S	04:15:35	10°11.84'S	10°13.14'S	04:16:47	115.3	-0.27	1.79
166°37.5'W	08°04.43'S	08°05.03'S	04:15:38	10°15.26'S	10°16.55'S	04:16:50	115.3	-0.27	1.79
166°30.0'W	08°08.01'S	08°08.61'S	04:15:41	10°18.66'S	10°19.95'S	04:16:52	115.2	-0.27	1.79
166°22.5'W	08°11.57'S	08°12.17'S	04:15:44	10°22.06'S	10°23.33'S	04:16:55	115.1	-0.27	1.79
166°15.0'W	08°15.12'S	08°15.73'S	04:15:47	10°25.44'S	10°26.71'S	04:16:57	115.1	-0.27	1.79
166°07.5'W	08°18.66'S	08°19.27'S	04:15:50	10°28.82'S	10°30.07'S	04:16:59	115.0	-0.27	1.79
166°00.0'W	08°22.18'S	08°22.81'S	04:15:53	10°32.18'S	10°33.43'S	04:17:01	114.9	-0.27	1.79
165°52.5'W	08°25.70'S	08°26.33'S	04:15:55	10°35.54'S	10°36.77'S	04:17:04	114.9	-0.27	1.79
165°45.0'W	08°29.21'S	08°29.84'S	04:15:58	10°38.88'S	10°40.11'S	04:17:06	114.8	-0.27	1.79
165°37.5'W	08°32.71'S	08°33.34'S	04:16:01	10°42.21'S	10°43.43'S	04:17:08	114.8	-0.27	1.79
165°30.0'W	08°36.19'S	08°36.83'S	04:16:03	10°45.54'S	10°46.74'S	04:17:10	114.7	-0.27	1.79
165°22.5'W	08°39.67'S	08°40.31'S	04:16:06	10°48.85'S	10°50.04'S	04:17:12	114.6	-0.27	1.79
165°15.0'W	08°43.13'S	08°43.78'S	04:16:08	10°52.15'S	10°53.35'S	04:17:14	114.6	-0.27	1.79
165°07.5'W	08°46.59'S	08°47.24'S	04:16:11	10°55.45'S	10°56.64'S	04:17:16	114.5	-0.27	1.79
165°00.0'W	08°50.03'S	08°50.69'S	04:16:13	10°58.73'S	10°59.92'S	04:17:18	114.4	-0.27	1.79
164°52.5'W	08°53.47'S	08°54.13'S	04:16:16	11°02.00'S	11°03.19'S	04:17:20	114.4	-0.27	1.79
164°45.0'W	08°56.89'S	08°57.55'S	04:16:18	11°05.26'S	11°06.45'S	04:17:22	114.3	-0.27	1.79
164°37.5'W	09°00.30'S	09°00.97'S	04:16:20	11°08.52'S	11°09.71'S	04:17:24	114.2	-0.26	1.79
164°30.0'W	09°03.71'S	09°04.37'S	04:16:22	11°11.76'S	11°12.95'S	04:17:26	114.2	-0.26	1.79
164°22.5'W	09°07.10'S	09°07.77'S	04:16:25	11°14.99'S	11°16.17'S	04:17:27	114.1	-0.26	1.79
164°15.0'W	09°10.48'S	09°11.15'S	04:16:27	11°18.21'S	11°19.39'S	04:17:29	114.1	-0.26	1.79
164°07.5'W	09°13.85'S	09°14.53'S	04:16:29	11°21.42'S	11°22.60'S	04:17:31	114.0	-0.26	1.79
164°00.0'W	09°17.21'S	09°17.89'S	04:16:31	11°24.63'S	11°25.80'S	04:17:32	113.9	-0.26	1.79
163°52.5'W	09°20.56'S	09°21.25'S	04:16:33	11°27.82'S	11°28.98'S	04:17:34	113.9	-0.26	1.79
163°45.0'W	09°23.90'S	09°24.59'S	04:16:35	11°31.00'S	11°32.15'S	04:17:35	113.8	-0.26	1.79
163°37.5'W	09°27.23'S	09°27.92'S	04:16:37	11°34.17'S	11°35.31'S	04:17:37	113.7	-0.26	1.79

TABLE 8 - EXTENDED VERSION

**MAPPING COORDINATES FOR THE ZONES OF GRAZING ECLIPSE
TOTAL SOLAR ECLIPSE OF 2009 JULY 22**

$\Delta T = 65.9$ s

Longitude	North Graze Zone		Northern	South Graze Zone		Southern	Path Azm °	Elev Fact	Scale Fact km/''
	Latitudes		Limit	Latitudes		Limit			
	Northern Limit	Southern Limit	Universal Time h m s	Northern Limit	Southern Limit	Universal Time h m s			
163°30.0'W	09°30.56'S	09°31.25'S	04:16:39	11°37.33'S	11°38.51'S	04:17:38	113.7	-0.26	1.79
163°22.5'W	09°33.87'S	09°34.56'S	04:16:41	11°40.49'S	11°41.72'S	04:17:40	113.6	-0.26	1.79
163°15.0'W	09°37.17'S	09°37.86'S	04:16:42	11°43.63'S	11°44.91'S	04:17:41	113.5	-0.26	1.79
163°07.5'W	09°40.46'S	09°41.15'S	04:16:44	11°46.77'S	11°48.11'S	04:17:43	113.5	-0.26	1.79
163°00.0'W	09°43.74'S	09°44.44'S	04:16:46	11°49.90'S	11°51.31'S	04:17:44	113.4	-0.26	1.79
162°52.5'W	09°47.00'S	09°47.71'S	04:16:48	11°53.02'S	11°54.55'S	04:17:45	113.4	-0.26	1.79
162°45.0'W	09°50.26'S	09°50.97'S	04:16:49	11°55.92'S	11°55.91'S	04:17:46	113.3	-0.26	1.79
162°37.5'W	09°53.51'S	09°54.22'S	04:16:51	11°59.11'S	11°59.11'S	04:17:47	113.2	-0.26	1.79
162°30.0'W	09°56.75'S	09°57.46'S	04:16:52	12°02.10'S	12°02.10'S	04:17:49	113.2	-0.26	1.79
162°22.5'W	09°59.98'S	10°00.69'S	04:16:54	12°05.18'S	12°05.18'S	04:17:50	113.1	-0.26	1.79
162°15.0'W	10°03.20'S	10°03.91'S	04:16:55	12°08.25'S	12°08.25'S	04:17:51	113.0	-0.26	1.79
162°07.5'W	10°06.41'S	10°07.12'S	04:16:57	12°11.30'S	12°11.30'S	04:17:52	113.0	-0.25	1.79
162°00.0'W	10°09.61'S	10°10.32'S	04:16:58	12°14.35'S	12°14.35'S	04:17:53	112.9	-0.25	1.79
161°52.5'W	10°12.80'S	10°13.52'S	04:17:00	12°17.39'S	12°17.39'S	04:17:54	112.8	-0.25	1.79
161°45.0'W	10°15.98'S	10°16.70'S	04:17:01	12°20.42'S	12°20.42'S	04:17:55	112.8	-0.25	1.79
161°37.5'W	10°19.15'S	10°19.87'S	04:17:02	12°23.44'S	12°23.44'S	04:17:56	112.7	-0.25	1.79
161°30.0'W	10°22.32'S	10°23.03'S	04:17:04	12°26.45'S	12°26.45'S	04:17:57	112.6	-0.24	1.78
161°22.5'W	10°25.47'S	10°26.18'S	04:17:05	12°29.45'S	12°29.45'S	04:17:58	112.5	-0.24	1.78
161°15.0'W	10°28.61'S	10°29.32'S	04:17:06	12°32.44'S	12°32.44'S	04:17:58	112.5	-0.23	1.78
161°07.5'W	10°31.74'S	10°32.45'S	04:17:07	12°35.42'S	12°35.42'S	04:17:59	112.4	-0.23	1.78
161°00.0'W	10°34.86'S	10°35.57'S	04:17:08	12°38.39'S	12°38.39'S	04:18:00	112.3	-0.22	1.77
160°52.5'W	10°37.97'S	10°38.68'S	04:17:09	12°41.35'S	12°41.35'S	04:18:01	112.2	-0.20	1.77
160°45.0'W	10°41.07'S	10°41.78'S	04:17:10	12°44.31'S	12°44.31'S	04:18:01	111.9	-0.14	1.75
160°37.5'W	10°44.16'S	10°44.87'S	04:17:11	12°47.25'S	12°47.25'S	04:18:02	111.9	-0.15	1.75
160°30.0'W	10°47.24'S	10°47.95'S	04:17:12	12°50.19'S	12°50.19'S	04:18:03	111.9	-0.16	1.76
160°22.5'W	10°50.31'S	10°51.02'S	04:17:13	12°53.11'S	12°53.11'S	04:18:03	111.9	-0.17	1.76
160°15.0'W	10°53.38'S	10°54.09'S	04:17:14	12°56.03'S	12°56.03'S	04:18:04	111.9	-0.18	1.76
160°07.5'W	10°56.43'S	10°57.14'S	04:17:15	12°58.94'S	12°58.94'S	04:18:04	111.8	-0.20	1.77
160°00.0'W	10°59.48'S	11°00.18'S	04:17:16	13°01.83'S	13°01.83'S	04:18:05	111.8	-0.21	1.77
159°52.5'W	11°02.51'S	11°03.22'S	04:17:17	13°04.72'S	13°04.72'S	04:18:05	111.8	-0.23	1.78
159°45.0'W	11°05.53'S	11°06.24'S	04:17:17	13°07.61'S	13°07.61'S	04:18:05	111.8	-0.24	1.78
159°37.5'W	11°08.55'S	11°09.25'S	04:17:18	13°10.49'S	13°10.49'S	04:18:06	111.8	-0.27	1.79
159°30.0'W	11°11.55'S	11°12.26'S	04:17:19	13°13.35'S	13°13.35'S	04:18:06	111.8	-0.29	1.80
159°22.5'W	11°14.55'S	11°15.25'S	04:17:19	13°16.20'S	13°16.20'S	04:18:06	111.7	-0.32	1.82
159°15.0'W	11°17.54'S	11°18.24'S	04:17:20	13°19.05'S	13°19.05'S	04:18:07	111.7	-0.35	1.84
159°07.5'W	11°20.51'S	11°21.21'S	04:17:21	13°21.88'S	13°21.88'S	04:18:07	111.7	-0.39	1.86
159°00.0'W	11°23.48'S	11°24.18'S	04:17:21	13°24.71'S	13°24.71'S	04:18:07	111.7	-0.44	1.90
158°52.5'W	11°26.43'S	11°27.13'S	04:17:22	13°27.52'S	13°27.52'S	04:18:07	111.7	-0.50	1.94
158°45.0'W	11°29.38'S	11°30.08'S	04:17:22	13°30.32'S	13°30.32'S	04:18:07	111.7	-0.58	2.00
158°37.5'W	11°32.31'S	11°33.02'S	04:17:22	13°33.11'S	13°33.11'S	04:18:07	111.7	-0.67	2.09
158°30.0'W	11°35.24'S	11°35.95'S	04:17:22	13°35.88'S	13°35.88'S	04:18:08	111.7	-0.80	2.22
158°22.5'W	11°38.16'S	11°38.87'S	04:17:23	13°38.65'S	13°38.65'S	04:18:08	111.7	-0.98	2.42
158°15.0'W	11°41.08'S	11°41.79'S	04:17:23	13°41.42'S	13°41.42'S	04:18:08	111.7	-1.24	2.76
158°07.5'W	11°44.01'S	11°44.70'S	04:17:24	13°44.20'S	13°44.20'S	04:18:08	111.6	-1.64	3.34
158°00.0'W	11°46.94'S	11°47.61'S	04:17:25	-	-	-	111.6	-2.41	4.52
157°52.5'W	11°49.88'S	11°50.52'S	04:17:28	-	-	-	111.6	-3.82	6.84
157°45.0'W	11°52.85'S	11°53.43'S	04:17:32	-	-	-	-	-	-
157°37.5'W	11°55.84'S	11°56.34'S	04:17:37	-	-	-	-	-	-
157°30.0'W	11°58.89'S	11°59.25'S	04:17:45	-	-	-	-	-	-
157°22.5'W	12°01.99'S	12°02.18'S	04:17:56	-	-	-	-	-	-