

### 3. UNDERWAY GEOPHYSICS<sup>1</sup>

Dean L. Merrill<sup>2</sup> and Shipboard Scientific Party<sup>3</sup>

#### INTRODUCTION

Geophysical data were collected during Leg 112 of the Ocean Drilling Program (ODP). Of the 1083 nmi traveled during the round trip from and to Callao, Peru, geophysical data were collected for approximately 883 nmi. Bathymetry data were collected for 833 nmi; magnetic data were collected for 713 nmi; and seismic-reflection data were collected for 110 nmi. Of the 54.4 total days spent at sea, 9.6 days were spent in transit.

Shipboard geophysical instruments included two precision echo-sounders, a magnetometer, seismic-reflection profilers, and a satellite-navigation system. These instruments were maintained and operated by ODP marine technicians, in cooperation with the scientific party and the officers and crew of SEDCO-FOREX, Inc.

#### NAVIGATION DATA

Navigation data were collected on the ship's bridge by a Magnavox MX702A satellite-navigation system (SATNAV). We obtained ship's positions with this system during the entire 54.4 days at sea. We received 44 satellite fixes during the cruise.

<sup>1</sup> Suess, E., von Huene, R., et al., 1988. *Proc. ODP, Init. Repts.*, 112: College Station, TX (Ocean Drilling Program).

<sup>2</sup> Ocean Drilling Program, Texas A&M University, College Station, TX 77843.

<sup>3</sup> Erwin Suess (Co-Chief Scientist), Oregon State University, College of Oceanography, Corvallis, OR 97331; Roland von Huene (Co-Chief Scientist), U.S. Geological Survey, Branch of Pacific Marine Geology, 345 Middlefield Rd., M/S 999, Menlo Park, CA 94025; Kay-Christian Emeis (ODP Staff Scientist), Ocean Drilling Program, Texas A&M University, College Station, TX 77843; Jacques Bourgois, Département de Géotectonique, Université Pierre et Marie Curie, 4 Place Jussieu, 75230 Paris Cedex 05, France; José del C. Cruzado Castañeda, Petroleos del Peru S. A., Paseo de la Republica 3361, San Isidro, Lima, Peru; Patrick De Wever, CNRS, Laboratoire de Stratigraphie, Université Pierre et Marie Curie, 4 Place Jussieu, 75230 Paris Cedex 05, France; Geoffrey Eglinton, University of Bristol, School of Chemistry, Cantock's Close, Bristol BS8 1TS, England; Robert Garrison, University of California, Earth Sciences, Applied Sciences Building, Santa Cruz, CA 95064; Matt Greenberg, Lamont-Doherty Geological Observatory, Columbia University, Palisades, NY 10964; Elard Herrera Paz, Petroleos del Peru, S. A., Paseo de la Republica 3361, San Isidro, Lima, Peru; Phillip Hill, Atlantic Geoscience Centre, Bedford Institute of Oceanography, Box 1006, Dartmouth, Nova Scotia B2Y 4A2, Canada; Masako Ibaraki, Geoscience Institute, Faculty of Science, Shizuoka University, Shizuoka 422, Japan; Miriam Kastner, Scripps Institution of Oceanography, SVH, A-102, La Jolla, CA 92093; Alan E. S. Kemp, Department of Oceanography, The University, Southampton SO9 5NH, England; Keith Kvenvolden, U.S. Geological Survey, Branch of Pacific Marine Geology, 345 Middlefield Rd., M/S 999, Menlo Park, CA 94025; Robert Langridge, Department of Geological Sciences, Queen's University at Kingston, Ontario K7L 3A2, Canada; Nancy Lindsley-Griffin, University of Nebraska, Department of Geology, 214 Bessey Hall, Lincoln, NE 68588-0340; Janice Marsters, Department of Oceanography, Dalhousie University, Halifax, Nova Scotia B3H 4J1, Canada; Erlend Martini, Geologisch-Paläontologisches Institut der Universität Frankfurt, Senckenberg-Anlage 32-34, D-6000, Frankfurt/Main, Federal Republic of Germany; Robert McCabe, Department of Geophysics, Texas A&M University, College Station, TX 77843; Leonidas Ocola, Laboratorio Central, Instituto Geofísico del Peru, Lima, Peru; Johanna Resig, Department of Geology and Geophysics, University of Hawaii, Honolulu, HI 96822; Agapito Wilfredo Sanchez Fernandez, Instituto Geológico Minero y Metalúrgico, Pablo Bermudez 211, Lima, Peru; Hans-Joachim Schrader, College of Oceanography, Oregon State University, Corvallis, OR 97331 (currently at Department of Geology, University of Bergen, N-5000 Bergen, Norway); Todd Thornburg, College of Oceanography, Oregon State University, Corvallis, OR 97331; Gerold Wefer, Universität Bremen, Fachbereich Geowissenschaften, Postfach 330 440, D-2800 Bremen 33, Federal Republic of Germany; Makoto Yamano, Earthquake Research Institute, University of Tokyo, Bunkyo-ku, Tokyo 113, Japan.

A plot of the general navigation from Leg 112 is shown in Figure 1. Enlarged plots of the navigation in the vicinity of each site are shown in Figures 2, 3, 4, and 5. These plots were generated from satellite navigation and course- and speed-change information (Table 1). These data were compiled from the shipboard bridge log, underway geophysical log, and satellite-navigation sheets; course and speed information came from the digital seismic tape headers. The Geological Data Center at Scripps Institution of Oceanography produced this navigation compilation.

#### BATHYMETRIC DATA

Bathymetric data were obtained with both 3.5-kHz (Raytheon recorder system) and 12-kHz (EDO-248C recorder system) echo-sounders. Unfortunately, because of poor transducer location, the quality of the recorded data was poor when the ship was traveling at speeds greater than 6 kt. Consequently, we conducted site surveys that required detailed bathymetric data at speeds slower than 6 kt. A total 833 nmi of bathymetric coverage was collected during Leg 112, and a summary of these data is displayed in Figure 6.

#### MAGNETIC DATA

A Geometrics 801 proton precession magnetometer was towed between sites and alongside during the transit from Site 688 to Callao, Peru. The analog record is incomplete; however, summaries of the results are shown in Figure 6.

#### SEISMIC-REFLECTION DATA

Seismic-reflection profiles were collected over 110 nmi during Leg 112. The seismic-reflection coverage is indicated by the bar in Figure 6, and records are available from the Data Base Supervisor, Ocean Drilling Program. These data were recorded with the equipment described next.

#### Sources

The seismic sources used aboard the *JOIDES Resolution* during Leg 112 usually consisted of two 80-in.<sup>3</sup> water guns. One 80-in.<sup>3</sup> water gun was used during the collection of survey lines 1, 2, 3, and 4.

#### Streamer Hydrophones

One 100-m-long Teledyne streamer, deployed from the fantail and containing 60 active sections, was towed approximately 500 m behind the vessel. Towing depth was set by external depth depressors (birds). The hydrophone elements were combined to produce a single signal.

#### Data Recording

Seismic data were displayed in real time in analog format on two EDO-550 dry-paper recorders, using only streamers, amplifier, and two band-pass filters (Table 2).

Seismic data were also recorded using a supermicro 561 Masscomp computer, which functioned as the central unit for recording, processing, and displaying the data. Data were processed and displayed in real time on a 15-in.-wide Printronix high-resolution graphic printer (160 dots/in.). Raw data were recorded on

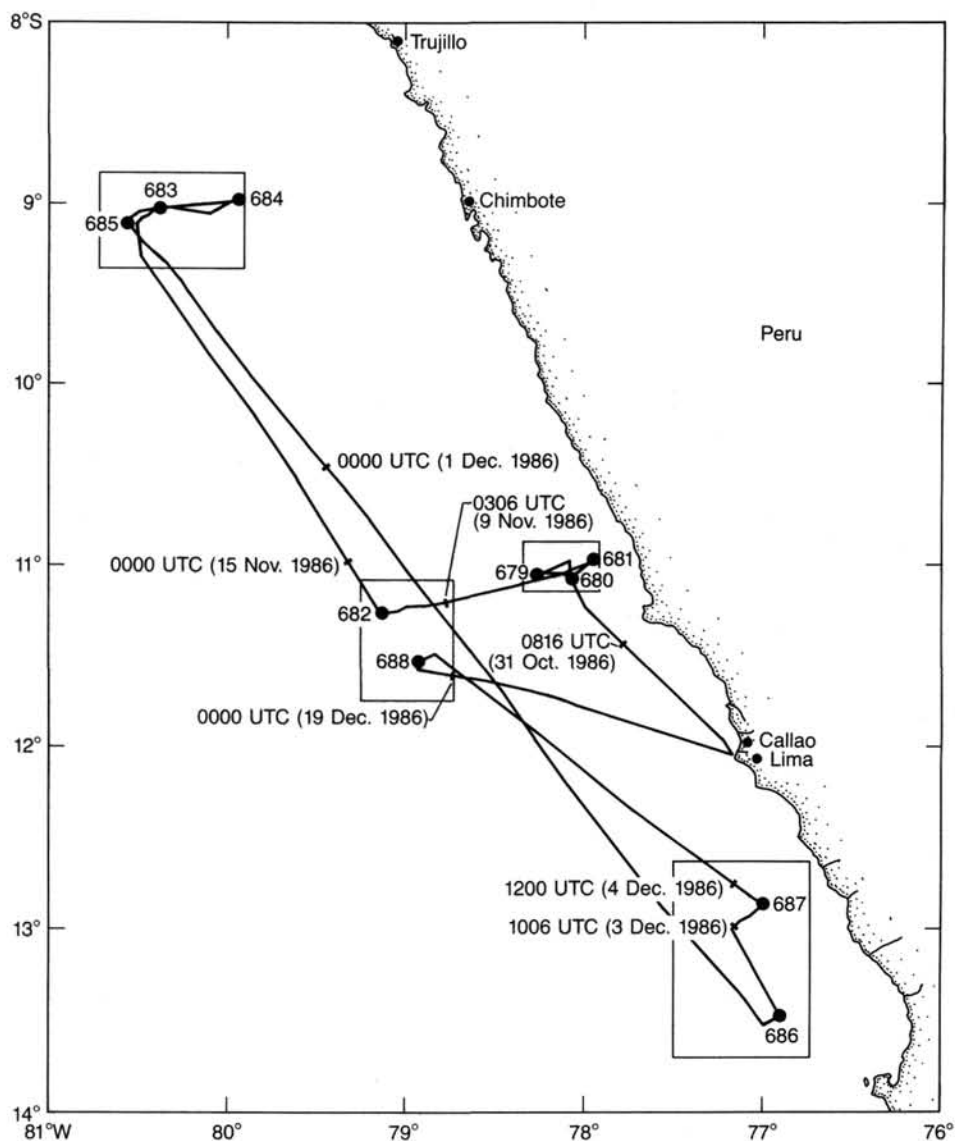


Figure 1. General navigation plot of ODP Leg 112, showing site locations generated from satellite navigation and course-speed change data given in Table 1. Enlarged navigation plots for groups of sites are shown in Figures 2, 3, 4, and 5.

Cipher tapes, using a SEG-Y format and a density of 1600 bytes/in. Seismic lines recorded with the Masscomp were reprocessed at ODP headquarters. The final data were displayed on a 22-in.-wide Versatec plotter (200 dots/in.). Table 3 gives the reprocessing parameters.

### Seismic-Reflection Lines

Nine seismic lines were collected during the cruise, as follows:

1. *Seismic line 1* was collected during the approach to Site 679, the first site visited during Leg 112. The EDO-2 record of the unprocessed analog data is shown in Figure 7 (from Julian Day 304/1152 UTC to Julian Day 304/1349 UTC). (All times are UTC, Universal Time Coordinated, formerly GMT, Greenwich Mean Time.) The data were not reprocessed; thus, no Versatec plots are available. Navigation for the approach to Site 679 is shown in Figure 2; course and speed changes are indicated on the analog record.

2. *Seismic line 2* was collected during the transit from Site 679 to Site 680. The Versatec plot of the digitally processed record is shown in Figure 8 (from Julian Day 309/0928 UTC to Julian Day 309/1215 UTC). Navigation during the approach to Site 680 is shown in Figure 2; course and speed changes are indicated on the Versatec plot.

3. *Seismic line 3* was collected during the transit from Site 680 to Site 681. The Versatec plot of the digitally processed record is shown in Figure 9 (from Julian Day 311/0331 UTC to Julian Day 311/0530 UTC). Navigation during the approach to Site 681 is shown in Figure 2; course and speed changes are indicated on the Versatec plot.

4. *Seismic line 4* was collected during the approach to Site 682. The Versatec plot of the digitally processed record is shown in Figure 10 (from Julian Day 313/0440 UTC to Julian Day 313/0542 UTC). Navigation on approach to Site 682 is shown in Figure 3; course changes are indicated on the Versatec plot.

5. *Seismic line 5* was collected during the approach to Site 683. The Versatec plot of the digitally processed record is shown in Figure 11 (from Julian Day 319/1040 UTC to Julian Day

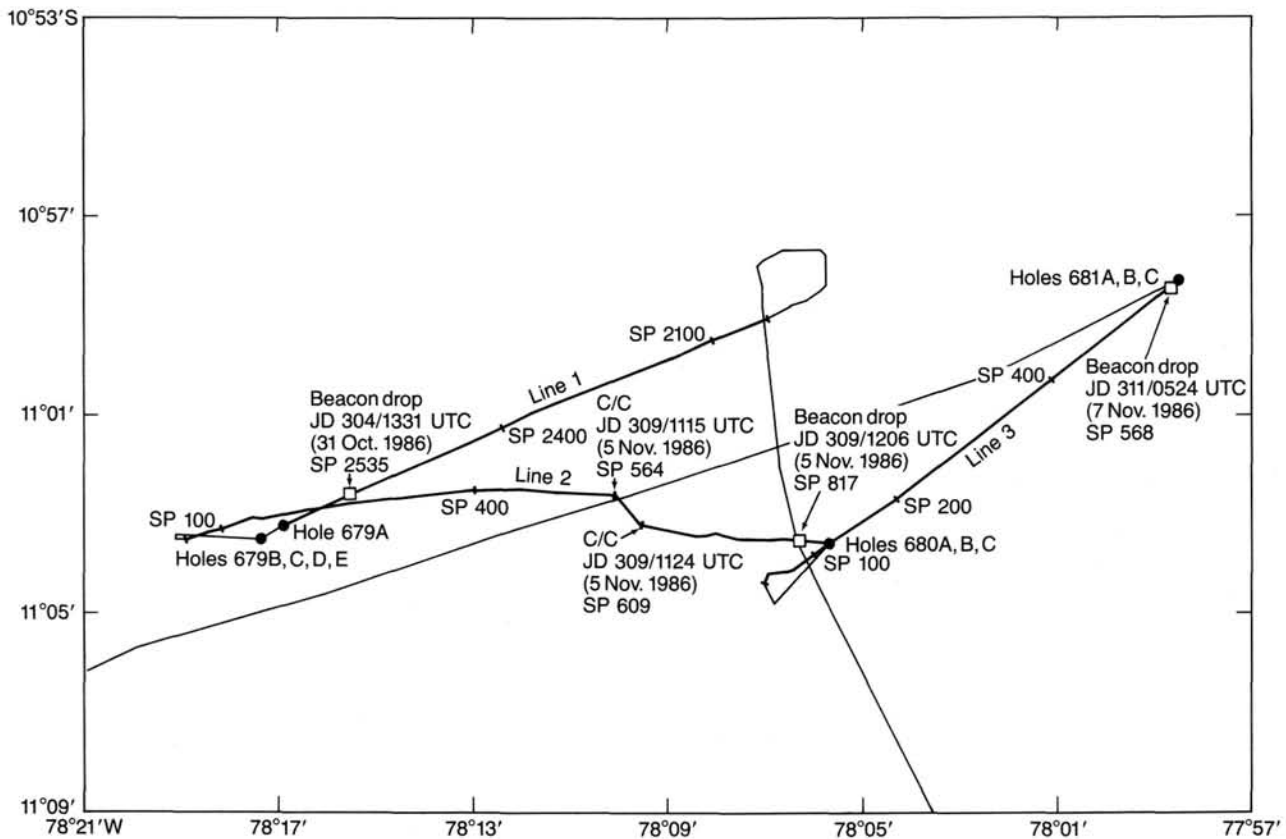


Figure 2. Enlarged navigation plot near Sites 679, 680, and 681. Location of seismic lines 1, 2, and 3 are shown by heavy lines. Course changes are marked on unprocessed analog and processed digital seismic profiles (Figs. 7, 8, and 9).

319/1233 UTC). Navigation on approach to Site 683 is shown in Figure 4; course changes are indicated on the Versatec plot.

6. No seismic data were collected for line 6 because of problems with the Masscomp computer. Site 684 was located using precision-depth-recorder plots.

7. *Seismic line 7* was collected on approach to Site 685. Because of a failure of the Masscomp computer, only analog data are available. EDO-2 plots are shown in Figure 12 (from Julian Day 326/1646 UTC to Julian Day 326/1815 UTC). Navigation on approach to Site 685 is shown in Figure 4; course changes are indicated on the EDO-2 record.

8. *Seismic line 8* was collected during the approach to Site 686. The Versatec plot of the digitally processed record is shown in Figure 13 (from Julian Day 335/2138 UTC to Julian Day

335/2228 UTC). Navigation on approach to Site 686 is shown in Figure 5; course changes are indicated on the Versatec plot.

9. *Seismic line 9* was collected on approach to Site 687. The Versatec plot of the digitally processed record is shown in Figure 14 (from Julian Day 337/0921 UTC to Julian Day 337/1055 UTC). Navigation on approach to Site 687 is shown in Figure 5; course changes are indicated on the Versatec plot.

10. *Seismic line 10* was collected on approach to Site 688. The Versatec plot of the digitally processed record is shown in Figure 15 (from Julian Day 338/2145 UTC to Julian Day 338/2225 UTC). Navigation during the approach to Site 688 is shown in Figure 3; course changes are indicated on the Versatec plot.

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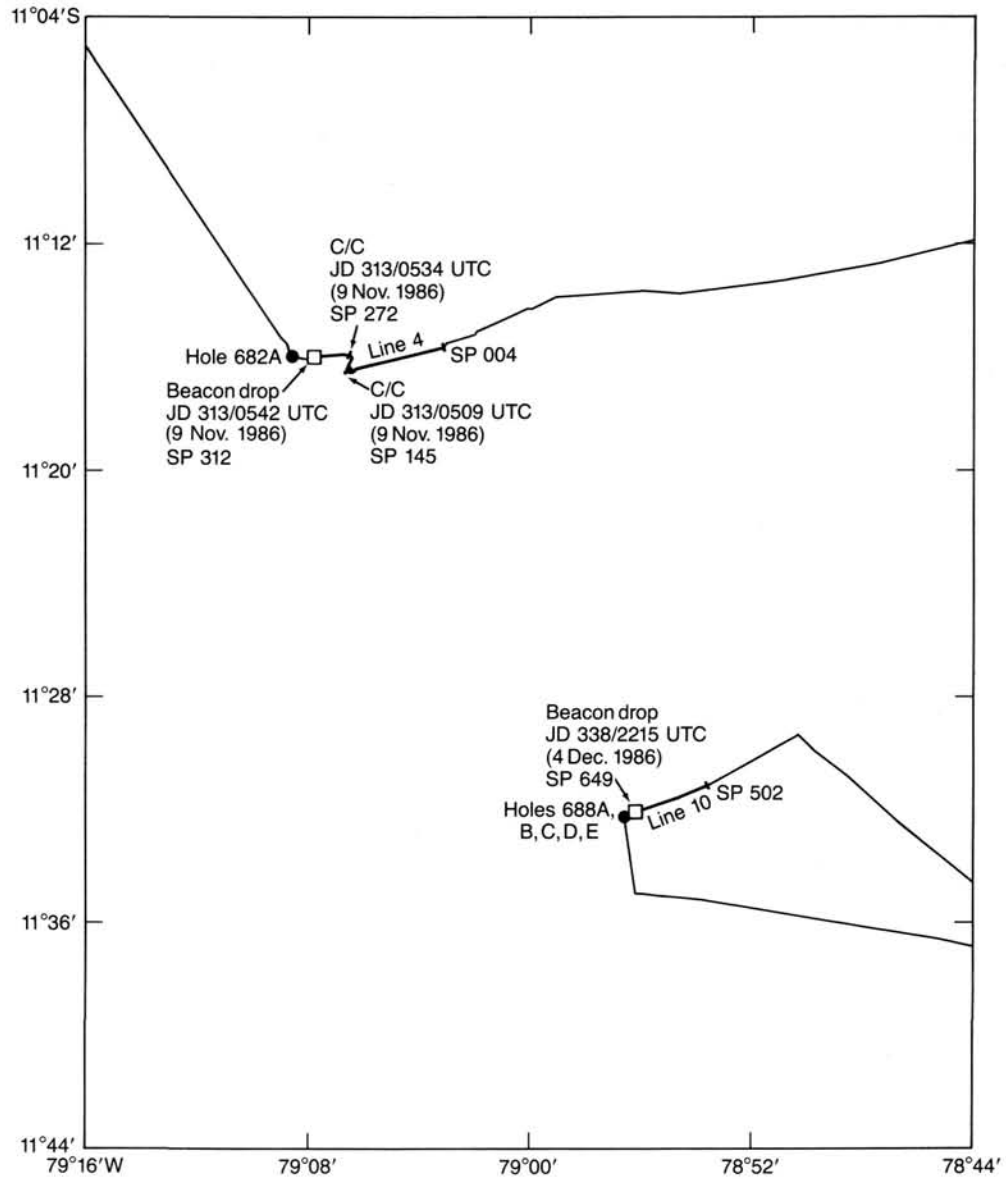


Figure 3. Enlarged navigation plot near Sites 682 and 688. Location of seismic lines 4 and 10 are shown by heavy lines. Course changes are marked on processed digital seismic profiles (Figs. 10 and 15).

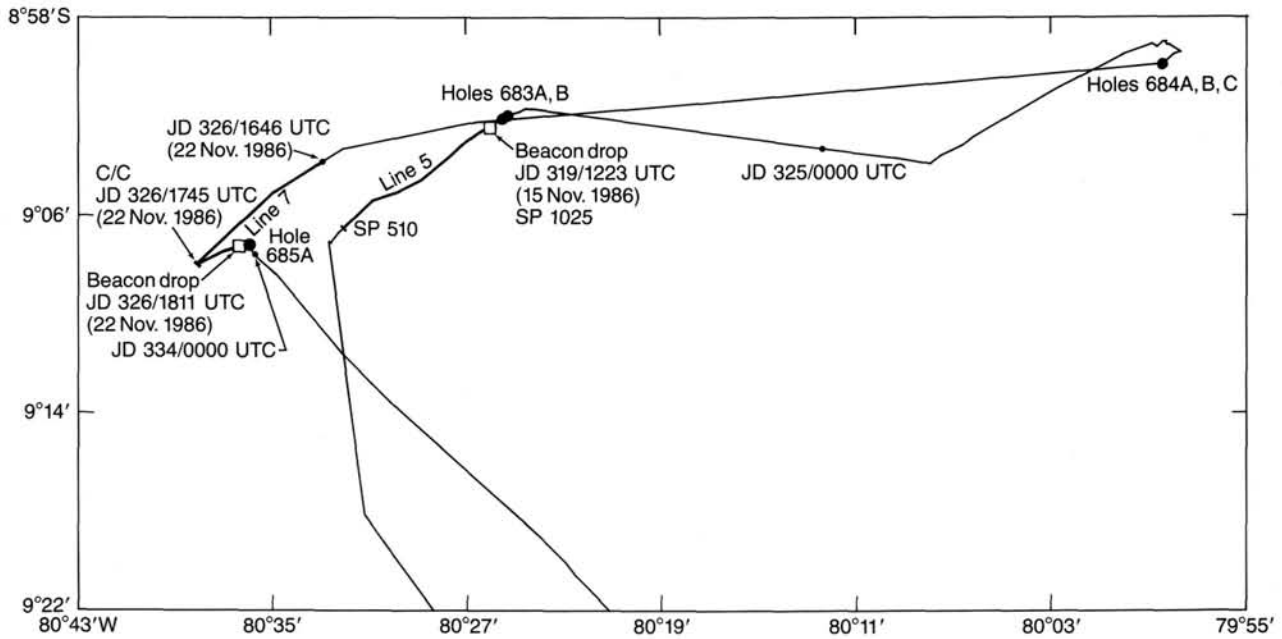


Figure 4. Enlarged navigation plot near Sites 683, 684, and 685. Location of seismic lines 5 and 7 are shown by heavy lines. Site 684 was located by 3.5- and 12-kHz precision depth recordings. No seismic data were collected for Site 684 because of a computer malfunction. Course changes are marked on unprocessed analog and processed digital seismic profiles (Figs. 11 and 12).

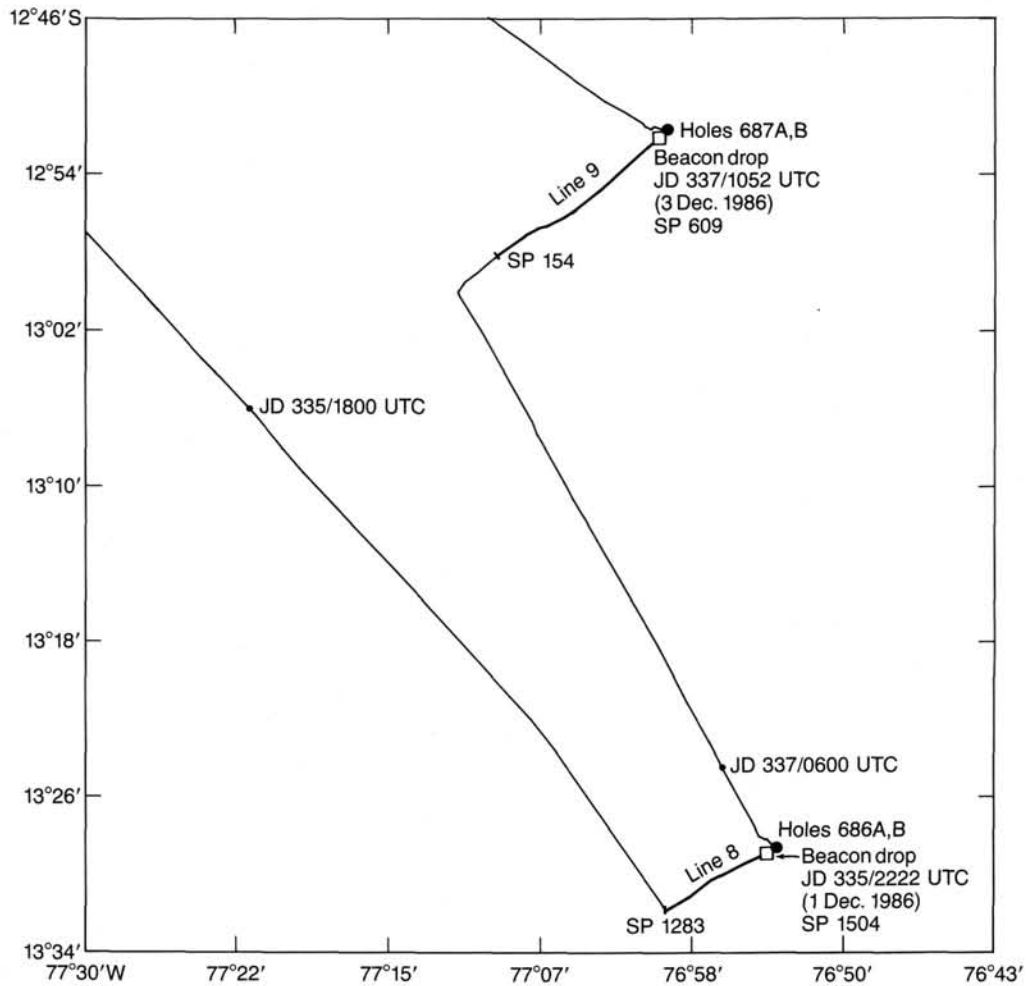


Figure 5. Enlarged navigation plot near Sites 686 and 687. Location of seismic lines 8 and 9 are shown by heavy lines. Course changes are marked on processed digital seismic profiles (Figs. 13 and 14).

**Table 1. Satellite navigation and course- and speed-change data used to generate Leg 112 trackline plots shown in Figures 1 through 5.**

Date (1986)	Time (UTC)	South		West		Distance (nmi)	Actual		Drift		Dead reckoning		Comments <sup>a</sup>
		latitude (deg)	(min)	longitude (deg)	(min)		speed (kt)	course (deg)	speed (kt)	heading (deg)	speed (kt)	course (deg)	
31 Oct	0254	11	57.83	77	13.67	0	8.5	314	3.3	321	5.2	310	SN
31	0816	11	26.1	77	47.1	45.6	9.3	314	3.3	321	6.0	310	c/cs
31	1012	11	13.6	78	0.3	63.5	13.9	333	3.3	321	10.6	337	c/cs
31	1017	11	12.6	78	0.8	64.7	12.9	333	3.3	321	9.7	337	c/cs
31	1020	11	12.0	78	1.1	65.3	14.1	332	3.3	321	10.8	336	c/cs
31	1026	11	10.8	78	1.8	66.7	14.1	333	3.3	321	10.9	337	c/cs
31	1027	11	10.6	78	1.9	67.0	14.1	333	3.3	321	10.9	337	****
31	1054	11	4.9	78	4.8	73.3	14.1	332	3.3	321	10.8	336	c/cs
31	1059	11	3.9	78	5.3	74.5	13.2	348	3.3	321	10.4	357	c/cs
31	1101	11	3.4	78	5.4	74.9	13.6	349	3.3	321	10.8	358	c/cs
31	1106	11	2.32	78	5.66	76.1	11.6	354	1.1	316	10.8	358	SN
31	1123	10	59.1	78	6.0	79.4	10.6	353	1.1	316	9.8	357	c/cs
31	1125	10	58.7	78	6.0	79.7	11.6	354	1.1	316	10.8	357	c/cs
31	1127	10	58.3	78	6.1	80.1	9.9	14	1.1	316	9.4	20	c/cs
31	1128	10	58.2	78	6.0	80.3	8.3	74	1.1	316	8.9	80	c/cs
31	1131	10	58.0	78	5.6	80.7	9.2	86	1.1	316	9.9	91	c/cs
31	1136	10	58.0	78	4.8	81.5	7.7	135	1.1	316	8.7	135	c/cs
31	1137	10	58.1	78	4.7	81.6	8.1	166	1.1	316	9.0	163	c/cs
31	1138	10	58.2	78	4.7	81.7	9.0	183	1.1	316	9.7	178	c/cs
31	1141	10	58.7	78	4.7	82.2	9.2	204	1.1	316	9.6	198	c/cs
31	1142	10	58.8	78	4.8	82.3	9.6	241	1.1	316	9.3	235	c/cs
31	1144	10	59.0	78	5.1	82.6	9.4	241	1.1	316	9.2	235	c/cs
31	1146	10	59.1	78	5.4	82.9	6.7	245	1.1	316	6.5	236	c/cs
31	1150	10	59.3	78	5.8	83.4	5.3	245	1.1	316	5.0	234	c/cs
31	1156	10	59.5	78	6.3	83.9	5.2	250	1.1	316	4.8	238	c/cs
31	1211	10	60.0	78	7.5	85.2	5.5	248	1.1	316	5.2	237	c/cs
31	1241	11	1.0	78	10.1	88.0	5.4	246	1.1	316	5.2	235	c/cs
31	1311	11	2.1	78	12.6	90.7	5.4	246	1.1	316	5.1	235	c/cs
31	1335	11	3.0	78	14.7	92.8	5.4	246	1.1	316	5.2	235	c/cs
31	1349	11	3.5	78	15.8	94.1	5.5	248	1.1	316	5.2	237	c/cs
31	1350	11	3.52	78	15.92	94.2	5.2	237	0.0	238	5.2	237	S679
31	1350	11	3.5	78	15.9	94.2	0.0	238	0.0	238	0.0	500	c/cs
5 Nov	0850	11	3.78	78	16.34	94.7	1.7	285	1.7	285	0.0	500	S679
5	0850	11	3.8	78	16.3	94.7	3.1	271	1.7	285	1.5	256	c/cs
5	0923	11	3.7	78	18.1	96.4	0.7	164	1.7	285	2.2	121	c/cs
5	0926	11	3.8	78	18.1	96.4	2.7	84	1.7	285	4.4	92	c/cs
5	0930	11	3.8	78	17.9	96.6	3.4	77	1.7	285	5.0	86	c/cs
5	0944	11	3.6	78	17.1	97.4	3.0	72	1.7	285	4.5	84	c/cs
5	0956	11	3.39	78	16.52	98.0	5.5	79	1.0	58	4.5	84	SN
5	0958	11	3.4	78	16.3	98.2	5.8	80	1.0	58	4.9	85	c/cs
5	1015	11	3.1	78	14.7	99.8	5.8	85	1.0	58	4.9	90	c/cs
5	1045	11	2.8	78	11.8	102.7	5.7	90	1.0	58	4.8	96	c/cs
5	1051	11	2.8	78	11.2	103.3	5.7	94	1.0	58	4.9	101	c/cs
5	1109	11	2.9	78	9.5	105.0	5.7	93	1.0	58	4.9	100	c/cs
5	1113	11	2.9	78	9.1	105.4	4.4	126	1.0	58	4.1	139	c/cs
5	1115	11	3.0	78	8.9	105.5	4.3	136	1.0	58	4.2	150	c/cs
5	1124	11	3.5	78	8.5	106.2	5.2	105	1.0	58	4.6	115	c/cs
5	1135	11	3.7	78	7.6	107.1	5.6	88	1.0	58	4.8	94	c/cs
5	1138	11	3.73	78	7.27	107.4	4.1	87	0.8	313	4.8	94	SN
5	1142	11	3.7	78	7.0	107.7	4.2	95	0.8	313	4.9	101	c/cs
5	1150	11	3.8	78	6.4	108.2	4.0	102	0.8	313	4.8	107	c/cs
5	1154	11	3.8	78	6.2	108.5	4.2	89	0.8	313	4.9	96	c/cs
5	1200	11	3.8	78	5.7	108.9	4.0	95	0.8	313	4.7	101	c/cs
5	1205	11	3.8	78	5.4	109.3	4.3	95	0.8	313	4.9	101	c/cs
5	1215	11	3.90	78	4.67	110.0	4.9	101	0.0	327	4.9	101	S680
5	1215	11	3.9	78	4.7	110.0	4.8	101	0.0	327	4.8	101	c/cs
5	1216	11	3.9	78	4.6	110.0	0.0	327	0.0	327	0.0	500	c/cs
7	0200	11	3.90	78	4.60	110.1	1.6	225	1.6	225	0.0	500	S680
7	0256	11	5.0	78	5.7	111.6	2.1	219	1.6	225	0.5	200	c/cs
7	0300	11	5.1	78	5.8	111.7	0.8	330	1.6	225	2.0	21	c/cs
7	0331	11	4.7	78	6.0	112.1	4.2	28	1.6	225	5.8	33	c/cs
7	0334	11	4.5	78	5.9	112.4	3.6	71	1.6	225	5.1	63	c/cs
7	0342	11	4.4	78	5.4	112.8	3.6	64	1.6	225	5.2	58	c/cs
7	0350	11	4.14	78	4.99	113.3	5.7	56	0.6	38	5.2	58	SN
7	0410	11	3.1	78	3.4	115.2	5.8	52	0.6	38	5.3	54	c/cs
7	0437	11	1.5	78	1.3	117.8	5.9	52	0.6	38	5.4	54	c/cs
7	0451	11	0.6	78	0.1	119.2	6.0	52	0.6	38	5.5	54	c/cs
7	0521	10	58.8	77	57.7	122.3	6.0	52	0.6	38	5.5	53	c/cs
7	0524	10	58.60	77	57.46	122.6	5.5	53	0.0	233	5.5	53	S681
7	0525	10	58.5	77	57.4	122.6	0.0	233	0.0	233	0.0	500	c/cs
8	2255	10	58.60	77	57.46	122.7	3.2	249	3.2	249	0.0	500	S681
8	2255	10	58.6	77	57.5	122.7	8.2	243	3.2	249	5.0	239	c/cs
8	2326	11	0.5	78	1.3	127.0	13.4	252	3.2	249	10.2	253	c/cs
8	2350	11	2.2	78	6.5	132.4	13.4	252	3.2	249	10.2	253	c/cs



Table 1 (continued).

Date (1986)	Time (UTC)	South		West		Distance (nmi)	Actual		Drift		Dead reckoning		Comments <sup>a</sup>
		latitude (deg)	(min)	longitude (deg)	(min)		speed (kt)	course (deg)	speed (kt)	heading (deg)	speed (kt)	course (deg)	
9 Nov	0000	11	2.9	78	8.7	134.6	13.4	252	3.2	249	10.2	253	c/cs
9	0011	11	3.6	78	11.1	137.1	13.4	252	3.2	249	10.2	253	c/cs
9	0029	11	4.9	78	15.0	141.1	13.4	254	3.2	249	10.2	255	c/cs
9	0047	11	6.0	78	18.9	145.1	13.4	256	3.2	249	10.2	258	c/cs
9	0056	11	6.5	78	20.9	147.1	13.4	255	3.2	249	10.2	257	c/cs
9	0102	11	6.82	78	22.22	148.5	12.3	255	2.1	243	10.2	257	SN
9	0114	11	7.5	78	24.6	150.9	12.4	256	2.1	243	10.3	259	c/cs
9	0130	11	8.3	78	27.9	154.2	12.3	256	2.1	243	10.2	259	c/cs
9	0142	11	8.8	78	30.3	156.7	12.4	258	2.1	243	10.3	261	c/cs
9	0150	11	9.2	78	32.0	158.3	12.3	257	2.1	243	10.2	260	c/cs
9	0215	11	10.3	78	37.1	163.4	12.2	256	2.1	243	10.1	259	c/cs
9	0226	11	10.9	78	39.3	165.7	12.3	257	2.1	243	10.2	260	c/cs
9	0306	11	12.71	78	47.39	173.8	11.9	260	1.6	262	10.2	260	SN
9	0311	11	12.9	78	48.4	174.8	11.9	259	1.6	262	10.3	259	c/cs
9	0323	11	13.3	78	50.8	177.2	12.0	260	1.6	262	10.4	260	c/cs
9	0326	11	13.4	78	51.4	177.8	12.1	264	1.6	262	10.5	264	c/cs
9	0342	11	13.8	78	54.7	181.1	12.0	272	1.6	262	10.4	273	c/cs
9	0349	11	13.7	78	56.1	182.5	12.2	267	1.6	262	10.6	268	c/cs
9	0404	11	13.9	78	59.2	185.5	11.0	245	1.6	262	9.5	242	c/cs
9	0409	11	14.3	79	0.0	186.4	8.8	245	1.6	262	7.2	241	c/cs
9	0410	11	14.3	79	0.2	186.6	2.0	258	1.6	262	0.4	243	c/cs
9	0412	11	14.3	79	0.2	186.6	7.0	246	1.6	262	5.5	241	c/cs
9	0420	11	14.7	79	1.1	187.6	6.3	246	1.6	262	4.7	240	c/cs
9	0429	11	15.1	79	2.0	188.5	6.4	249	1.6	262	4.8	245	c/cs
9	0430	11	15.2	79	2.1	188.6	6.4	250	1.6	262	4.8	246	c/cs
9	0440	11	15.5	79	3.1	189.7	5.7	229	1.6	262	4.4	217	c/cs
9	0442	11	15.65	79	3.25	189.9	7.5	247	4.3	277	4.4	217	SN
9	0443	11	15.7	79	3.4	190.0	8.0	258	4.3	277	4.2	239	c/cs
9	0446	11	15.8	79	3.8	190.4	7.9	254	4.3	277	4.3	231	c/cs
9	0453	11	16.0	79	4.7	191.3	8.7	266	4.3	277	4.6	256	c/cs
9	0456	11	16.1	79	5.1	191.7	8.1	255	4.3	277	4.5	234	c/cs
9	0506	11	16.4	79	6.4	193.1	6.6	243	4.3	277	3.8	205	c/cs
9	0507	11	16.5	79	6.5	193.2	3.7	231	4.3	277	3.2	155	c/cs
9	0509	11	16.5	79	6.6	193.3	1.2	289	4.3	277	3.1	93	c/cs
9	0511	11	16.5	79	6.7	193.4	1.4	8	4.3	277	4.5	79	c/cs
9	0517	11	16.4	79	6.7	193.5	2.1	17	4.3	277	5.1	73	c/cs
9	0520	11	16.3	79	6.6	193.6	1.5	34	4.3	277	5.1	82	c/cs
9	0521	11	16.3	79	6.6	193.6	1.5	34	4.3	277	5.1	82	****
9	0532	11	16.0	79	6.5	193.9	2.1	210	4.3	277	4.0	127	c/cs
9	0533	11	16.1	79	6.5	194.0	0.5	4	4.3	277	4.3	91	c/cs
9	0534	11	16.0	79	6.5	194.0	4.6	336	4.3	277	4.4	33	c/cs
9	0535	11	16.0	79	6.5	194.0	7.2	304	4.3	277	3.9	334	c/cs
9	0536	11	15.9	79	6.6	194.2	8.0	272	4.3	277	3.7	265	c/cs
9	0538	11	15.9	79	6.9	194.4	9.6	261	4.3	277	5.6	249	c/cs
9	0542	11	16.0	79	7.5	195.1	9.8	261	4.3	277	5.8	249	c/cs
9	0545	11	16.1	79	8.0	195.6	4.3	277	4.3	277	0.0	500	c/cs
9	0555	11	15.99	79	8.73	196.3	0.0	90	0.0	90	0.0	500	S682
14	2200	11	15.99	79	8.73	196.3	1.4	348	1.4	348	0.0	500	S682
14	2200	11	16.0	79	8.7	196.3	1.5	337	1.4	348	0.3	275	c/cs
14	2205	11	15.9	79	8.8	196.4	2.3	336	1.4	348	1.0	318	c/cs
14	2215	11	15.5	79	8.9	196.8	3.1	321	1.4	348	2.0	303	c/cs
14	2220	11	15.3	79	9.1	197.0	14.9	327	1.4	348	13.6	325	c/cs
14	2226	11	14.1	79	9.9	198.5	8.4	328	1.4	348	7.1	324	c/cs
14	2229	11	13.7	79	10.2	198.9	10.3	326	1.4	348	9.1	323	c/cs
14	2237	11	12.6	79	10.9	200.3	11.7	325	1.4	348	10.4	322	c/cs
14	2243	11	11.6	79	11.6	201.5	12.1	326	1.4	348	10.8	323	c/cs
14	2258	11	9.1	79	13.4	204.5	12.2	327	1.4	348	10.9	324	c/cs
14	2323	11	4.9	79	16.2	209.6	12.3	328	1.4	348	11.0	325	c/cs
14	2346	11	0.9	79	18.8	214.3	12.2	327	1.4	348	11.0	324	c/cs
15	0000	10	58.5	79	20.4	217.2	12.2	327	1.4	348	11.0	324	c/cs
15	0014	10	56.1	79	22.0	220.1	12.1	328	1.4	348	10.8	325	c/cs
15	0034	10	52.7	79	24.2	224.1	12.1	328	1.4	348	10.8	326	c/cs
15	0042	10	51.3	79	25.0	225.7	12.2	328	1.4	348	10.9	326	c/cs
15	0117	10	45.3	79	28.8	232.8	12.3	328	1.4	348	11.0	325	c/cs
15	0140	10	41.3	79	31.4	237.5	12.2	328	1.4	348	10.9	326	c/cs
15	0158	10	38.2	79	33.4	241.2	12.1	329	1.4	348	10.8	327	c/cs
15	0225	10	33.5	79	36.2	246.6	12.2	330	1.4	348	10.9	328	c/cs
15	0231	10	32.4	79	36.8	247.8	12.3	330	1.4	348	11.0	328	c/cs
15	0236	10	31.53	79	37.31	248.9	13.4	325	2.5	314	11.0	328	SN
15	0314	10	24.6	79	42.2	257.3	13.4	326	2.5	314	11.0	329	c/cs
15	0331	10	21.4	79	44.3	261.1	13.4	326	2.5	314	11.0	329	c/cs
15	0337	10	20.3	79	45.1	262.5	13.4	326	2.5	314	11.0	329	c/cs
15	0427	10	11.0	79	51.4	273.6	13.4	325	2.5	314	11.0	328	c/cs
15	0428	10	10.85	79	51.53	273.8	13.4	324	2.6	305	11.0	328	SN
15	0445	10	7.8	79	53.8	277.6	13.4	324	2.6	305	11.0	328	c/cs

Table 1 (continued).

Date (1986)	Time (UTC)	South		West		Distance (nmi)	Actual		Drift		Dead reckoning		Comments <sup>a</sup>
		latitude (deg)	(min)	longitude (deg)	(min)		speed (kt)	course (deg)	speed (kt)	heading (deg)	speed (kt)	course (deg)	
15 Nov	0505	10	4.2	79	56.5	282.1	13.3	324	2.6	305	10.9	328	c/cs
15	0548	9	56.5	80	2.3	291.6	13.3	323	2.6	305	10.9	327	c/cs
15	0627	9	49.6	80	7.6	300.3	13.0	324	2.6	305	10.6	328	c/cs
15	0635	9	48.20	80	8.62	302.0	11.8	326	1.3	307	10.6	328	SN
15	0649	9	45.9	80	10.2	304.8	12.2	326	1.3	307	11.0	328	c/cs
15	0738	9	37.7	80	15.9	314.7	12.1	326	1.3	307	10.9	328	c/cs
15	0818	9	31.0	80	20.5	322.8	12.2	324	1.3	307	10.9	326	c/cs
15	0839	9	27.6	80	23.0	327.1	12.1	324	1.3	307	10.8	326	c/cs
15	0846	9	26.4	80	23.8	328.5	12.1	324	1.3	307	10.9	326	c/cs
15	0857	9	24.6	80	25.2	330.7	12.2	324	1.3	307	10.9	326	c/cs
15	0937	9	18.0	80	30.0	338.8	11.7	328	1.3	307	10.5	331	c/cs
15	0939	9	17.7	80	30.2	339.2	11.7	353	1.3	307	10.8	358	c/cs
15	0958	9	14.0	80	30.7	342.9	11.9	353	1.3	307	11.0	358	c/cs
15	1003	9	13.1	80	30.8	343.9	11.5	353	1.3	307	10.7	358	c/cs
15	1036	9	6.7	80	31.6	350.3	5.8	10	1.3	307	5.4	22	c/cs
15	1037	9	6.7	80	31.5	350.4	4.4	45	1.3	307	4.8	61	c/cs
15	1043	9	6.3	80	31.2	350.8	5.0	38	1.3	307	5.2	53	c/cs
15	1047	9	6.1	80	31.0	351.1	5.0	49	1.3	307	5.4	62	c/cs
15	1104	9	5.1	80	29.9	352.6	4.7	64	1.3	307	5.4	76	c/cs
15	1118	9	4.7	80	28.9	353.7	3.7	88	1.3	307	4.8	98	c/cs
15	1121	9	4.6	80	28.7	353.9	4.2	63	1.3	307	4.9	77	c/cs
15	1127	9	4.5	80	28.4	354.3	4.6	61	1.3	307	5.3	74	c/cs
15	1135	9	4.2	80	27.8	354.9	4.9	52	1.3	307	5.4	65	c/cs
15	1146	9	3.6	80	27.1	355.8	5.1	50	1.3	307	5.5	63	c/cs
15	1206	9	2.5	80	25.8	357.5	4.8	59	1.3	307	5.4	72	c/cs
15	1226	9	1.69	80	24.40	359.1	5.4	72	0.0	244	5.4	72	S683
15	1226	9	1.7	80	24.4	359.1	5.5	62	0.0	244	5.6	62	c/cs
15	1233	9	1.4	80	23.8	359.7	5.6	62	0.0	244	5.6	62	c/cs
15	1234	9	1.3	80	23.7	359.8	0.0	244	0.0	244	0.0	500	c/cs
20	2245	9	1.59	80	24.26	360.4	1.8	66	1.8	66	0.0	500	S683
20	2250	9	1.5	80	24.1	360.6	2.8	69	1.8	66	1.0	74	c/cs
20	2300	9	1.4	80	23.7	361.0	2.6	80	1.8	66	1.0	107	c/cs
20	2305	9	1.3	80	23.5	361.2	3.7	91	1.8	66	2.2	112	c/cs
20	2310	9	1.3	80	23.1	361.6	6.4	100	1.8	66	5.0	112	c/cs
20	2322	9	1.5	80	21.9	362.8	11.2	96	1.8	66	9.6	101	c/cs
20	2332	9	1.73	80	20.00	364.7	10.2	97	0.9	47	9.6	101	SN
20	2332	9	1.7	80	20.0	364.7	10.1	97	0.9	47	9.5	101	c/cs
20	2339	9	1.9	80	18.8	365.9	10.4	98	0.9	47	9.8	102	c/cs
21	0022	9	2.9	80	11.4	373.3	10.3	99	0.9	47	9.8	103	c/cs
21	0040	9	3.3	80	8.3	376.4	10.4	100	0.9	47	9.9	104	c/cs
21	0046	9	3.5	80	7.2	377.4	10.6	79	0.9	47	9.8	82	c/cs
21	0048	9	3.5	80	6.9	377.8	8.7	60	0.9	47	7.8	61	c/cs
21	0051	9	3.2	80	6.5	378.2	5.7	61	0.9	47	4.8	64	c/cs
21	0101	9	2.8	80	5.6	379.2	4.6	61	0.9	47	3.7	65	c/cs
21	0108	9	2.5	80	5.2	379.7	4.1	59	0.9	47	3.2	63	c/cs
21	0131	9	1.7	80	3.8	381.3	4.3	60	0.9	47	3.4	64	c/cs
21	0204	9	0.5	80	1.7	383.7	4.4	61	0.9	47	3.5	64	c/cs
21	0216	9	0.1	80	0.9	384.6	2.4	57	0.9	47	1.5	63	c/cs
21	0217	9	0.1	80	0.9	384.6	4.3	60	0.9	47	3.5	64	c/cs
21	0224	8	59.8	80	0.4	385.1	9.9	61	0.9	47	8.9	62	c/cs
21	0225	8	59.8	80	0.3	385.3	4.3	64	0.9	47	3.4	68	c/cs
21	0245	8	59.1	79	59.0	386.7	4.2	71	0.9	47	3.3	78	c/cs
21	0258	8	58.8	79	58.1	387.6	4.0	75	0.9	47	3.3	83	c/cs
21	0303	8	58.7	79	57.8	387.9	2.4	102	0.9	47	2.1	124	c/cs
21	0308	8	58.8	79	57.6	388.1	3.5	68	0.9	47	2.7	75	c/cs
21	0310	8	58.7	79	57.5	388.3	3.1	34	0.9	47	2.2	28	c/cs
21	0313	8	58.6	79	57.4	388.4	1.8	328	0.9	47	1.9	299	c/cs
21	0315	8	58.6	79	57.4	388.5	0.4	252	0.9	47	1.3	235	c/cs
21	0318	8	58.6	79	57.4	388.5	1.3	109	0.9	47	1.2	153	c/cs
21	0323	8	58.6	79	57.3	388.6	2.3	115	0.9	47	2.1	139	c/cs
21	0328	8	58.7	79	57.2	388.8	1.9	107	0.9	47	1.6	137	c/cs
21	0331	8	58.7	79	57.1	388.9	2.9	119	0.9	47	2.8	138	c/cs
21	0341	8	59.0	79	56.6	389.4	0.7	165	0.9	47	1.4	200	c/cs
21	0345	8	59.0	79	56.6	389.4	2.0	236	0.9	47	2.9	233	c/cs
21	0353	8	59.1	79	56.9	389.7	2.5	234	0.9	47	3.4	232	c/cs
21	0408	8	59.5	79	57.4	390.3	0.1	9	0.9	47	0.9	231	c/cs
21	0413	8	59.5	79	57.4	390.3	0.4	5	0.9	47	0.7	250	c/cs
21	0414	8	59.5	79	57.4	390.3	0.9	47	0.9	47	0.0	500	c/cs
21	0415	8	59.49	79	57.35	390.3	0.0	90	0.0	90	0.0	500	S684
22	1345	8	59.49	79	57.35	390.3	3.6	269	3.6	269	0.0	500	S684
22	1345	8	59.5	79	57.4	390.3	5.5	267	3.6	269	1.9	263	c/cs
22	1400	8	59.6	79	58.8	391.7	12.6	265	3.6	269	9.0	263	c/cs
22	1505	9	0.8	80	12.6	405.4	13.9	265	3.6	269	10.3	264	c/cs
22	1600	9	1.80	80	25.44	418.2	1.2	260	11.2	221	10.3	264	SN



Table 1 (continued).

Date (1986)	Time (UTC)	South latitude		West longitude		Distance (nmi)	Actual		Drift		Dead reckoning		Comments <sup>a</sup>
		(deg)	(min)	(deg)	(min)		speed (kt)	course (deg)	speed (kt)	heading (deg)	speed (kt)	course (deg)	
22 Nov	1605	9	2.0	80	26.4	419.1	11.2	259	1.2	221	10.3	263	c/cs
22	1630	9	2.9	80	31.0	423.8	11.2	234	1.2	221	10.0	235	c/cs
22	1635	9	3.4	80	31.8	424.7	5.8	239	1.2	221	4.7	243	c/cs
22	1700	9	4.7	80	33.9	427.2	5.2	227	1.2	221	4.0	229	c/cs
22	1748	9	7.49	80	39.96	431.3	2.9	227	1.1	53	4.0	229	SN
22	1750	9	7.6	80	37.0	431.4	3.5	79	1.1	53	2.6	90	c/cs
22	1755	9	7.5	80	36.7	431.7	5.2	61	1.1	53	4.1	63	c/cs
22	1800	9	7.3	80	36.4	432.1	5.5	63	1.1	53	4.4	66	c/cs
22	1810	9	6.9	80	35.5	433.0	5.3	76	1.1	53	4.3	82	c/cs
22	1815	9	6.78	80	35.10	433.5	4.3	82	0.0	90	4.3	82	S685
22	1815	9	6.8	80	35.1	433.5	0.0	90	0.0	90	0.0	500	c/cs
30	1430	9	6.78	80	35.10	433.5	2.0	132	2.0	132	0.0	500	S685
30	1440	9	7.0	80	34.8	433.8	6.0	137	2.0	132	4.0	139	c/cs
30	1445	9	7.4	80	34.5	434.3	11.2	136	2.0	132	9.1	137	c/cs
30	1450	9	8.0	80	33.8	435.2	12.0	140	2.0	132	10.0	141	c/cs
30	1510	9	11.1	80	31.2	439.2	11.1	136	2.0	132	9.1	137	c/cs
30	1520	9	12.4	80	29.9	441.1	11.3	135	2.0	132	9.3	135	c/cs
30	1526	9	13.2	80	29.1	442.2	10.8	129	2.0	132	8.8	128	c/cs
30	1528	9	13.4	80	28.8	442.6	8.0	131	2.0	132	6.0	130	c/cs
30	1530	9	13.6	80	28.6	442.9	11.2	132	2.0	132	9.2	132	c/cs
30	1549	9	16.0	80	25.9	446.4	5.6	131	2.0	132	3.6	131	c/cs
30	1551	9	16.1	80	25.8	446.6	11.2	132	2.0	132	9.2	132	c/cs
30	1611	9	18.6	80	23.0	450.3	10.6	134	2.0	132	8.6	134	c/cs
30	1614	9	19.0	80	22.6	450.9	11.4	134	2.0	132	9.4	134	c/cs
30	1619	9	19.7	80	21.9	451.8	10.7	143	2.0	132	8.7	145	c/cs
30	1622	9	20.1	80	21.6	452.4	11.3	137	2.0	132	9.3	138	c/cs
30	1634	9	21.7	80	20.0	454.6	11.2	140	2.0	132	9.2	142	c/cs
30	1700	9	25.47	80	16.85	459.5	11.0	147	2.0	168	9.2	142	GPS
30	1705	9	26.2	80	16.3	460.4	11.1	147	2.0	168	9.2	143	c/cs
30	1723	9	29.0	80	14.5	463.7	11.0	149	2.0	168	9.1	145	c/cs
30	1730	9	30.13	80	13.85	465.0	10.9	145	1.7	143	9.1	145	GPS
30	1742	9	31.9	80	12.6	467.2	11.0	145	1.7	143	9.3	145	c/cs
30	1801	9	34.7	80	10.5	470.7	10.9	144	1.7	143	9.1	144	c/cs
30	1826	9	38.4	80	7.8	475.2	10.9	144	1.7	143	9.2	144	c/cs
30	1856	9	42.8	80	4.6	480.6	10.9	142	1.7	143	9.2	142	c/cs
30	1934	9	48.3	80	0.3	487.6	10.9	143	1.7	143	9.2	143	c/cs
30	2036	9	57.29	79	53.36	498.9	12.0	140	2.9	130	9.2	143	SN
30	2300	10	19.36	79	34.52	527.7	11.2	140	2.1	124	9.2	143	GPS
1 Dec	0052	10	35.2	79	20.7	548.6	11.3	140	2.1	124	9.3	144	c/cs
1	0124	10	39.9	79	16.8	554.6	11.2	141	2.1	124	9.2	145	c/cs
1	0159	10	44.93	79	12.68	561.1	11.5	144	2.3	139	9.2	145	SN
1	0213	10	47.1	79	11.1	563.8	11.4	144	2.3	139	9.1	145	c/cs
1	0249	10	52.6	79	7.0	570.6	11.3	143	2.3	139	9.1	144	c/cs
1	0306	10	55.2	79	5.0	573.8	11.0	142	2.3	139	8.8	143	c/cs
1	0311	10	55.9	79	4.4	574.7	11.3	144	2.3	139	9.1	145	c/cs
1	0322	10	57.6	79	3.2	576.8	11.1	145	2.3	139	8.8	147	c/cs
1	0332	10	59.1	79	2.1	578.6	11.4	144	2.3	139	9.2	145	c/cs
1	0339	11	0.2	79	1.3	580.0	9.5	144	2.3	139	7.2	145	c/cs
1	0341	11	0.4	79	1.1	580.3	11.2	143	2.3	139	9.0	144	c/cs
1	0345	11	1.02	79	0.65	581.0	11.2	141	2.3	128	9.0	144	SN
1	0359	11	3.0	78	59.0	583.6	11.3	142	2.3	128	9.1	145	c/cs
1	0433	11	8.1	78	54.9	590.0	11.2	142	2.3	128	9.0	145	c/cs
1	0503	11	12.5	78	51.4	595.7	11.4	142	2.3	128	9.2	145	c/cs
1	0536	11	17.4	78	47.4	601.9	11.3	141	2.3	128	9.1	144	c/cs
1	0604	11	21.5	78	44.0	607.2	11.3	142	2.3	128	9.1	145	c/cs
1	0632	11	25.63	78	40.65	612.5	11.3	142	2.3	130	9.1	145	SN
1	0727	11	33.8	78	34.1	622.9	11.4	143	2.3	130	9.2	146	c/cs
1	0811	11	40.5	78	28.9	631.3	11.4	143	2.3	130	9.1	146	c/cs
1	0814	11	40.93	78	28.56	631.9	11.3	144	2.2	137	9.1	146	SN
1	0834	11	44.0	78	26.3	635.6	11.3	146	2.2	137	9.2	148	c/cs
1	0924	11	51.8	78	20.9	645.1	11.2	146	2.2	137	9.1	148	c/cs
1	1000	11	57.38	78	17.03	651.8	11.3	146	2.3	137	9.1	148	SN
1	1003	11	57.8	78	16.7	652.4	4.2	142	2.3	137	1.9	148	c/cs
1	1005	11	58.0	78	16.6	652.5	11.3	145	2.3	137	9.0	147	c/cs
1	1036	12	2.7	78	13.2	658.4	11.2	144	2.3	137	8.9	146	c/cs
1	1103	12	6.8	78	10.2	663.4	11.1	145	2.3	137	8.8	147	c/cs
1	1140	12	12.41	78	6.20	670.2	10.6	142	2.0	120	8.8	147	SN
1	1634	12	53.4	77	33.5	722.2	11.1	136	2.0	120	9.2	140	c/cs
1	1707	12	57.9	77	29.2	728.3	11.3	137	2.0	120	9.4	141	c/cs
1	1730	13	1.06	77	26.17	732.6	11.6	138	2.3	123	9.4	141	GPS
1	1747	13	3.5	77	23.9	735.9	11.6	138	2.3	123	9.4	142	c/cs
1	1752	13	4.2	77	23.2	736.9	9.3	137	2.3	123	7.1	142	c/cs
1	1754	13	4.4	77	23.0	737.2	11.6	138	2.3	123	9.4	141	c/cs
1	1808	13	6.4	77	21.1	739.9	11.6	140	2.3	123	9.4	144	c/cs
1	1820	13	8.2	77	19.6	742.2	11.1	139	2.3	123	8.9	143	c/cs

Table 1 (continued).

Date (1986)	Time (UTC)	South latitude		West longitude		Distance (nmi)	Actual course		Drift		Dead reckoning		Comments <sup>a</sup>
		(deg)	(min)	(deg)	(min)		speed (kt)	course (deg)	speed (kt)	heading (deg)	speed (kt)	course (deg)	
1 Dec	1828	13	9.34	77	18.59	743.7	9.1	136	1.0	60	8.9	143	SN
1	1828	13	9.3	77	18.6	743.7	9.4	137	1.0	60	9.3	143	c/cs
1	1846	13	11.4	77	16.6	746.5	9.1	136	1.0	60	8.9	143	c/cs
1	1850	13	11.8	77	16.2	747.2	9.5	137	1.0	60	9.3	143	c/cs
1	1913	13	14.5	77	13.6	750.8	9.2	137	1.0	60	9.1	143	c/cs
1	1918	13	15.0	77	13.1	751.6	9.0	136	1.0	60	8.8	143	c/cs
1	1919	13	15.2	77	13.0	751.7	7.7	135	1.0	60	7.5	143	c/cs
1	1921	13	15.3	77	12.8	752.0	9.5	138	1.0	60	9.3	144	c/cs
1	1933	13	16.7	77	11.5	753.9	9.1	137	1.0	60	8.9	144	c/cs
1	1944	13	18.0	77	10.3	755.5	9.5	138	1.0	60	9.4	144	c/cs
1	1959	13	19.7	77	8.7	757.9	9.3	139	1.0	60	9.2	145	c/cs
1	2019	13	22.1	77	6.5	761.0	9.3	142	1.0	60	9.2	148	c/cs
1	2032	13	23.6	77	5.3	763.0	9.1	145	1.0	60	9.1	152	c/cs
1	2138	13	31.9	76	59.4	773.1	6.1	62	1.0	60	5.1	63	c/cs
1	2146	13	31.52	76	58.67	773.9	5.9	54	1.2	13	5.1	63	SN
1	2154	13	31.1	76	58.0	774.7	5.9	58	1.2	13	5.1	68	c/cs
1	2211	13	30.2	76	56.6	776.3	5.7	65	1.2	13	5.1	76	c/cs
1	2228	13	29.5	76	55.0	778.0	5.8	65	1.2	13	5.2	76	c/cs
1	2245	13	28.81	76	53.49	779.6	5.2	76	0.0	90	5.2	76	S686
1	2245	13	28.8	76	53.5	779.6	0.0	90	0.0	90	0.0	500	c/cs
3	0515	13	28.81	76	53.49	779.6	2.0	321	2.0	321	0.0	500	S686
3	0520	13	28.7	76	53.6	779.8	1.7	312	2.0	321	0.4	179	c/cs
3	0530	13	28.5	76	53.8	780.1	1.5	305	2.0	321	0.7	178	c/cs
3	0540	13	28.3	76	54.0	780.3	2.7	283	2.0	321	1.6	234	c/cs
3	0543	13	28.3	76	54.2	780.4	5.0	309	2.0	321	3.1	302	c/cs
3	0546	13	28.2	76	54.4	780.7	6.4	331	2.0	321	4.4	336	c/cs
3	0548	13	28.0	76	54.5	780.9	8.2	331	2.0	321	6.3	334	c/cs
3	0551	13	27.6	76	54.7	781.3	9.7	331	2.0	321	7.7	334	c/cs
3	0606	13	25.5	76	55.9	783.7	10.1	331	2.0	321	8.2	334	c/cs
3	0621	13	23.3	76	57.1	786.3	10.0	331	2.0	321	8.0	334	c/cs
3	0634	13	21.4	76	58.2	788.4	10.0	331	2.0	321	8.0	334	c/cs
3	0654	13	18.4	76	59.8	791.8	10.1	331	2.0	321	8.1	333	c/cs
3	0740	13	11.7	77	3.7	799.5	10.0	330	2.0	321	8.1	332	c/cs
3	0747	13	10.7	77	4.3	800.7	9.8	331	2.0	321	7.8	334	c/cs
3	0753	13	9.8	77	4.8	801.6	10.1	331	2.0	321	8.1	333	c/cs
3	0810	13	7.4	77	6.2	804.5	9.8	338	2.0	321	7.9	342	c/cs
3	0813	13	6.9	77	6.4	805.0	10.2	331	2.0	321	8.2	333	c/cs
3	0846	13	2.0	77	9.2	810.6	10.2	331	2.0	321	8.2	333	c/cs
3	0859	13	0.1	77	10.4	812.8	6.8	32	2.0	321	6.4	49	c/cs
3	0903	12	59.7	77	10.1	813.3	7.8	35	2.0	321	7.5	50	c/cs
3	0904	12	59.60	77	10.04	813.4	7.9	50	0.4	45	7.5	50	GPS
3	0909	12	59.2	77	9.5	814.0	6.9	50	0.4	45	6.5	50	c/cs
3	0916	12	58.7	77	8.9	814.8	7.0	50	0.4	45	6.6	50	c/cs
3	0921	12	58.3	77	8.4	815.4	6.8	53	0.4	45	6.5	53	c/cs
3	0929	12	57.7	77	7.7	816.3	6.9	56	0.4	45	6.6	57	c/cs
3	0937	12	57.2	77	6.9	817.3	6.6	64	0.4	45	6.2	65	c/cs
3	0945	12	56.8	77	6.1	818.1	5.5	66	0.4	45	5.2	67	c/cs
3	1000	12	56.3	77	4.8	819.5	5.5	59	0.4	45	5.1	60	c/cs
3	1006	12	55.98	77	4.34	820.1	7.7	51	2.8	35	5.1	60	SN
3	1010	12	55.7	77	3.9	820.6	7.8	50	2.8	35	5.1	58	c/cs
3	1037	12	53.4	77	1.2	824.1	7.9	47	2.8	35	5.2	53	c/cs
3	1055	12	51.78	76	59.43	826.4	5.1	53	0.0	233	5.2	53	S687
3	1056	12	51.7	76	59.4	826.5	5.1	53	0.0	233	5.1	53	c/cs
3	1057	12	51.7	76	59.3	826.6	0.0	233	0.0	233	0.0	500	c/cs
4	1030	12	51.78	76	59.43	826.8	1.3	286	1.3	286	0.0	500	S687
4	1100	12	51.6	77	0.0	827.4	2.4	233	1.3	286	1.9	201	c/cs
4	1104	12	51.7	77	0.2	827.6	6.6	297	1.3	286	5.4	299	c/cs
4	1107	12	51.7	77	0.5	827.9	8.7	301	1.3	286	7.5	304	c/cs
4	1109	12	51.4	77	0.7	828.2	10.5	302	1.3	286	9.3	304	c/cs
4	1114	12	50.9	77	1.5	829.0	11.3	301	1.3	286	10.0	303	c/cs
4	1121	12	50.3	77	2.6	830.4	11.4	303	1.3	286	10.2	305	c/cs
4	1125	12	49.8	77	3.3	831.1	11.9	305	1.3	286	10.7	307	c/cs
4	1130	12	49.28	77	4.13	832.1	13.5	306	2.8	301	10.7	307	GPS
4	1145	12	47.3	77	6.9	835.5	13.6	306	2.8	301	10.8	307	c/cs
4	1200	12	45.32	77	9.77	838.9	13.6	306	2.8	301	10.8	307	GPS
4	1203	12	44.9	77	10.3	839.6	13.6	307	2.8	301	10.8	308	c/cs
4	1218	12	42.9	77	13.1	843.0	13.6	307	2.8	301	10.8	308	c/cs
4	1236	12	40.5	77	16.5	847.0	13.2	306	2.8	301	10.4	308	c/cs
4	1241	12	39.8	77	17.4	848.1	13.7	307	2.8	301	10.9	308	c/cs
4	1246	12	39.1	77	18.3	849.3	13.5	307	2.8	301	10.7	308	c/cs
4	1258	12	37.5	77	20.6	852.0	13.6	307	2.8	301	10.8	308	c/cs
4	1300	12	37.26	77	20.94	852.4	14.0	306	3.3	300	10.8	308	GPS
4	1319	12	34.7	77	24.6	856.9	14.1	306	3.3	300	10.9	308	c/cs
4	1324	12	34.0	77	25.6	858.0	13.3	306	3.3	300	10.1	308	c/cs
4	1328	12	33.4	77	26.3	858.9	14.1	305	3.3	300	10.8	307	c/cs

Table 1 (continued).

Date (1986)	Time (UTC)	South latitude		West longitude		Distance (nmi)	Actual		Drift		Dead reckoning		Comments <sup>a</sup>
		(deg)	(min)	(deg)	(min)		speed (kt)	course (deg)	speed (kt)	heading (deg)	speed (kt)	course (deg)	
4 Dec	1344	12	31.3	77	29.5	862.7	14.1	305	3.3	300	10.8	307	c/cs
4	1356	12	29.6	77	31.8	865.5	13.5	305	3.3	300	10.3	307	c/cs
4	1359	12	29.3	77	32.4	866.2	14.2	305	3.3	300	10.9	307	c/cs
4	1400	12	29.12	77	32.57	866.4	13.8	304	3.0	292	10.9	307	GPS
4	1404	12	28.6	77	33.4	867.3	13.6	306	3.0	292	10.8	310	c/cs
4	1422	12	26.2	77	36.7	871.4	13.7	306	3.0	292	10.8	310	c/cs
4	1432	12	24.8	77	38.6	873.7	13.7	306	3.0	292	10.8	310	c/cs
4	1500	12	21.07	77	43.91	880.1	13.9	306	3.2	291	10.8	310	GPS
4	1507	12	20.1	77	45.3	881.7	13.9	306	3.2	291	10.9	310	c/cs
4	1510	12	19.7	77	45.8	882.4	13.8	308	3.2	291	10.8	313	c/cs
4	1526	12	17.5	77	48.8	886.1	13.9	309	3.2	291	10.9	314	c/cs
4	1533	12	16.4	77	50.1	887.7	13.8	310	3.2	291	10.9	315	c/cs
4	1600	12	12.46	77	55.01	894.0	13.4	311	2.7	293	10.9	315	GPS
4	1603	12	12.0	77	55.5	894.6	13.4	309	2.7	293	10.8	313	c/cs
4	1632	12	7.9	78	0.7	901.1	13.3	309	2.7	293	10.8	313	c/cs
4	1649	12	5.6	78	3.7	904.9	13.4	310	2.7	293	10.8	314	c/cs
4	1700	12	3.99	78	5.60	907.3	13.3	310	2.6	295	10.8	314	GPS
4	1712	12	2.3	78	7.7	910.0	13.4	307	2.6	295	10.9	310	c/cs
4	1720	12	1.2	78	9.1	911.8	13.4	306	2.6	295	10.9	309	c/cs
4	1728	12	0.1	78	10.6	913.6	13.2	310	2.6	295	10.8	313	c/cs
4	1743	11	58.0	78	13.2	916.9	13.3	309	2.6	295	10.8	312	c/cs
4	1800	11	55.66	78	16.20	920.6	13.4	308	2.8	290	10.8	312	GPS
4	1803	11	55.3	78	16.7	921.3	13.5	308	2.8	290	10.9	313	c/cs
4	1826	11	52.0	78	20.9	926.5	13.4	308	2.8	290	10.8	312	c/cs
4	1848	11	49.0	78	24.9	931.4	12.8	309	2.8	290	10.2	314	c/cs
4	1853	11	48.4	78	25.7	932.5	13.5	308	2.8	290	10.9	312	c/cs
4	1900	11	47.40	78	27.00	934.0	13.6	307	3.0	287	10.9	312	GPS
4	1911	11	45.9	78	29.0	936.5	13.6	306	3.0	287	10.8	311	c/cs
4	1930	11	43.38	78	32.61	940.9	12.9	308	2.2	291	10.8	311	GPS
4	1937	11	42.5	78	33.8	942.4	13.0	308	2.2	291	10.9	311	c/cs
4	1954	11	40.2	78	36.8	946.0	13.0	308	2.2	291	10.9	311	c/cs
4	2023	11	36.4	78	41.9	952.3	12.9	310	2.2	291	10.8	314	c/cs
4	2030	11	35.40	78	43.05	953.8	13.1	310	2.5	290	10.8	314	GPS
4	2046	11	33.2	78	45.8	957.3	13.0	310	2.5	290	10.7	314	c/cs
4	2051	11	32.5	78	46.7	958.4	13.1	312	2.5	290	10.8	317	c/cs
4	2058	11	31.5	78	47.8	959.9	12.8	309	2.5	290	10.5	314	c/cs
4	2100	11	31.19	78	48.15	960.4	10.9	311	0.7	258	10.5	314	GPS
4	2103	11	30.8	78	48.6	960.9	11.4	310	0.7	258	11.0	313	c/cs
4	2111	11	29.9	78	49.8	962.4	11.3	310	0.7	258	10.9	313	c/cs
4	2115	11	29.4	78	50.3	963.2	3.3	246	0.7	258	2.6	243	c/cs
4	2116	11	29.4	78	50.4	963.2	7.8	241	0.7	258	7.1	239	c/cs
4	2145	11	31.2	78	53.7	967.0	5.9	249	0.7	258	5.2	248	c/cs
4	2207	11	32.0	78	55.8	969.1	6.0	251	0.7	258	5.3	250	c/cs
4	2215	11	32.26	78	56.57	969.9	5.3	250	0.0	70	5.3	250	S688
4	2222	11	32.5	78	57.2	970.6	5.7	252	0.0	70	5.7	252	c/cs
4	2230	11	32.7	78	57.9	971.3	0.0	70	0.0	70	0.0	500	c/cs
18	1400	11	32.26	78	56.65	972.6	0.3	172	0.3	172	0.0	500	S688
18	2215	11	34.6	78	56.3	975.1	1.3	171	0.3	172	1.0	171	c/cs
18	2230	11	34.96	78	56.24	975.4	2.8	107	2.5	86	1.0	171	SN
18	2230	11	35.0	78	56.2	975.4	3.9	96	2.5	86	1.5	113	c/cs
18	2235	11	35.0	78	55.9	975.7	4.4	96	2.5	86	2.0	109	c/cs
18	2245	11	35.1	78	55.2	976.4	5.4	96	2.5	86	3.0	104	c/cs
18	2300	11	35.2	78	53.8	977.8	8.4	100	2.5	86	6.0	105	c/cs
18	2330	11	35.9	78	49.6	982.0	8.6	99	2.5	86	6.2	104	c/cs
19	0000	11	36.6	78	45.2	986.3	13.0	101	2.5	86	10.6	104	c/cs
19	0030	11	37.8	78	38.7	992.8	13.4	101	2.5	86	11.0	104	c/cs
19	0035	11	38.0	78	37.6	993.9	10.4	100	2.5	86	8.0	104	c/cs
19	0100	11	38.7	78	33.2	998.2	9.9	102	2.5	86	7.5	107	c/cs
19	0130	11	39.8	78	28.3	1003.2	13.4	103	2.5	86	11.0	107	c/cs
19	0220	11	42.31	78	17.23	1014.3	12.6	101	2.0	66	11.0	107	SN
19	0230	11	42.7	78	15.1	1016.4	11.7	101	2.0	66	10.1	108	c/cs
19	0240	11	43.10	78	13.17	1018.4	7.6	109	2.5	286	10.1	108	SN
19	0300	11	43.9	78	10.7	1020.9	7.7	110	2.5	286	10.2	109	c/cs
19	0330	11	45.2	78	7.0	1024.7	7.5	111	2.5	286	10.0	110	c/cs
19	0400	11	46.6	78	3.5	1028.5	7.8	109	2.5	286	10.3	108	c/cs
19	0430	11	47.8	77	59.7	1032.4	7.3	107	2.5	286	9.8	107	c/cs
19	1130	12	3.00	77	10.00	1083.3	7.3	107	0.0	0	9.8	107	PORT

<sup>a</sup> SN = satellite navigation; c/cs = change of course; GPS = Global Positioning System; \*\*\*\* = missing data. UTC = Universal Time Co-ordinated.

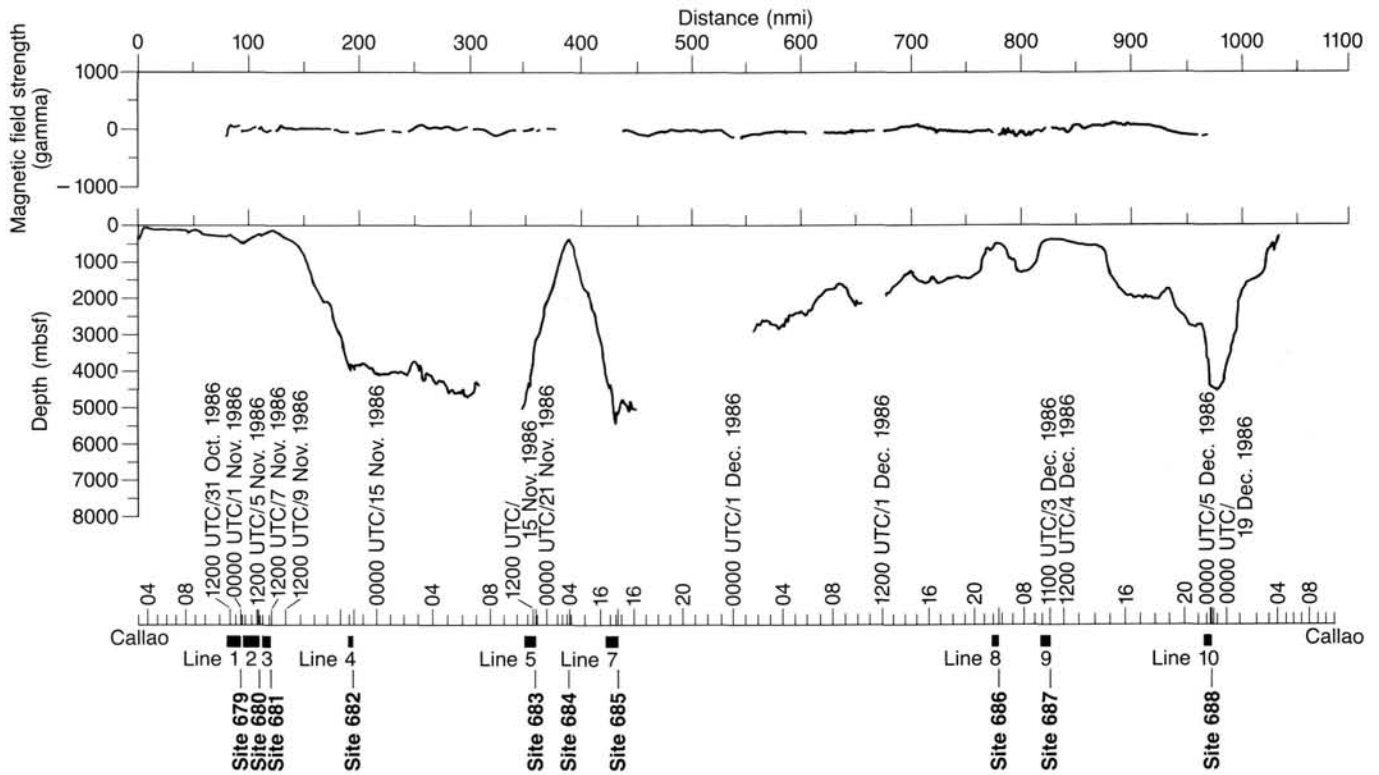


Figure 6. Records of magnetic and bathymetric profiles obtained during Leg 112. Solid bars indicate the seismic-reflection coverage.

Table 2. Seismic-data real-time recording parameters.<sup>a</sup>

	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6 <sup>b</sup>	Line 7 <sup>c</sup>	Line 8	Line 9	Line 10
Streamer:	10°59'S 78°06'S	11°04'S 78°18'W	11°05'S 78°06'W	11°15'S 79°03'W	09°06'S 80°31'W	—	09°03'S 80°32'W	13°32'S 76°59'W	12°58'S 77°08'W	11°31'S 78°54'W
End at:	Site 679	Site 680	Site 681	Site 682	Site 683	—	Site 685	Site 686	Site 687	Site 688
Source:	80-in. <sup>3</sup> water gun, Starboard	80-in. <sup>3</sup> water gun, Starboard	80-in. <sup>3</sup> water gun, Starboard	80-in. <sup>3</sup> water gun, Starboard	Two 80-in. <sup>3</sup> water guns	—	Two 80-in. <sup>3</sup> water guns	Two 80-in. <sup>3</sup> water guns	Two 80-in. <sup>3</sup> water guns	Two 80-in. <sup>3</sup> water guns
Streamer:	Port	Port	Port	Port	Port	—	Port	Port	Port	Port
EDO-1:										
High cut:	250 Hz	250 Hz	250 Hz	250 Hz	250 Hz	—	—	250 Hz	250 Hz	250 Hz
Low cut:	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz	—	—	20 Hz	20 Hz	20 Hz
Gain:										
Amp:	70 dB	70 dB	70 dB	70 dB	80 dB	—	—	70 dB	70 dB	70 dB
EDO-2:										
High cut:	250 Hz	250 Hz	250 Hz	250 Hz	250 Hz	—	—	250 Hz	250 Hz	250 Hz
Low cut:	20 Hz	20 Hz	20 Hz	20 Hz	20 Hz	—	—	20 Hz	20 Hz	20 Hz
Gain:										
Amp:	70 dB	70 dB	70 dB	70 dB	80 dB	—	—	70 dB	70 dB	70 dB

<sup>a</sup> Unprocessed analog EDO-2 seismic data from lines 1 and 7 are shown in Figures 7 and 12, respectively.

<sup>b</sup> Masscomp computer failed; no seismic data collected.

<sup>c</sup> Masscomp computer down; no digital seismic data collected.

**Table 3. Seismic-data processing and reprocessing parameters.<sup>a</sup>**

	Line 1	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10
Data window:	—	0000 to 4800 ms	250 to 5000 ms	4800 to 7000 ms	3600 to 8000 ms	—	—	300 to 5000 ms	0000 to 4400 ms	4000 to 8000 ms
AGC:										
Response time:	—	400 ms	400 ms	400 ms	400 ms	—	—	400 ms	400 ms	400 ms
Start time:	—	400 ms	250 ms	4800 ms	3800 ms	—	—	400 ms	350 ms	4300 ms
Gain:	—	100%	100%	100%	100%	—	—	100%	100%	100%
Zero-phase,										
Band-pass filter:										
High cut:	—	140 Hz	140 Hz	140 Hz	140 Hz	—	—	140 Hz	140 Hz	140 Hz
Low cut:	—	25 Hz	25 Hz	25 Hz	30 Hz	—	—	25 Hz	25 Hz	25 Hz
Predictive deconvolution:										
Prediction dist.:	—	30 ms	20 ms	30 ms	35 ms	—	—	20 ms	30 ms	25 ms
Filter length:	—	275 ms	350 ms	250 ms	325 ms	—	—	280 ms	200 ms	250 ms
White noise:	—	1%	1%	1%	1%	—	—	1%	1%	1%
Design start time:	—	400 ms	250 ms	4800 ms	3600 ms	—	—	400 ms	350 ms	4300 ms
Design stop time:	—	4200 ms	4500 ms	7000 ms	8000 ms	—	—	4500 ms	4200 ms	7600 ms

<sup>a</sup> Processed digital seismic data plotted on the Versatec plotter for lines 2, 3, 4, 5, 8, 9, and 10 are shown in Figures 8, 9, 10, 11, 13, 14, and 15, respectively.

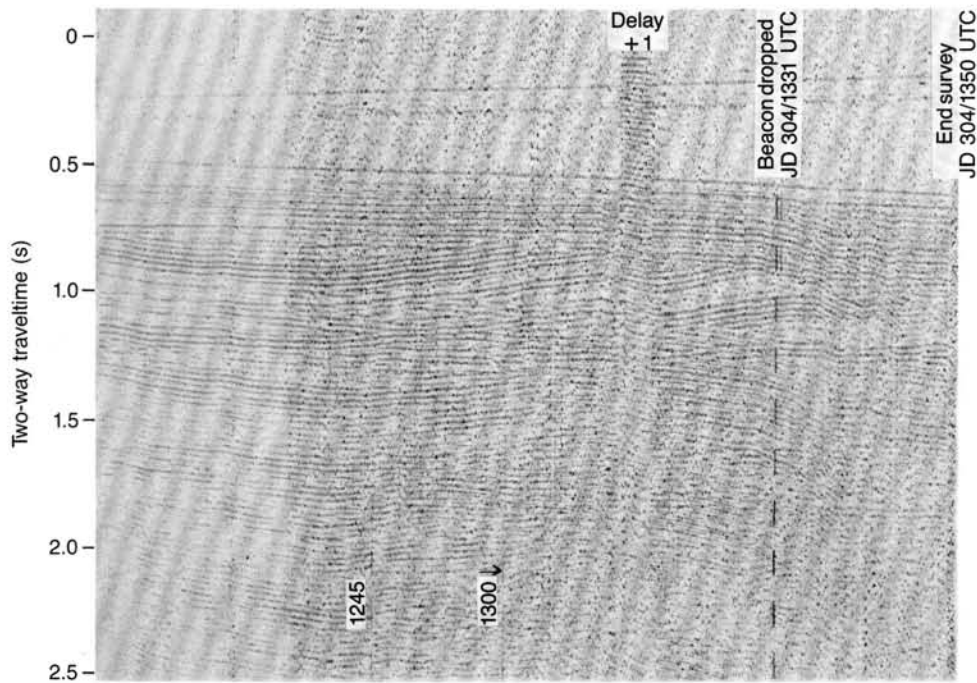


Figure 7. Unprocessed analog seismic data collected from survey line 1 during transit to Site 679 and recorded on the EDO-2 recorder. Trackline navigation is shown in Figure 2.



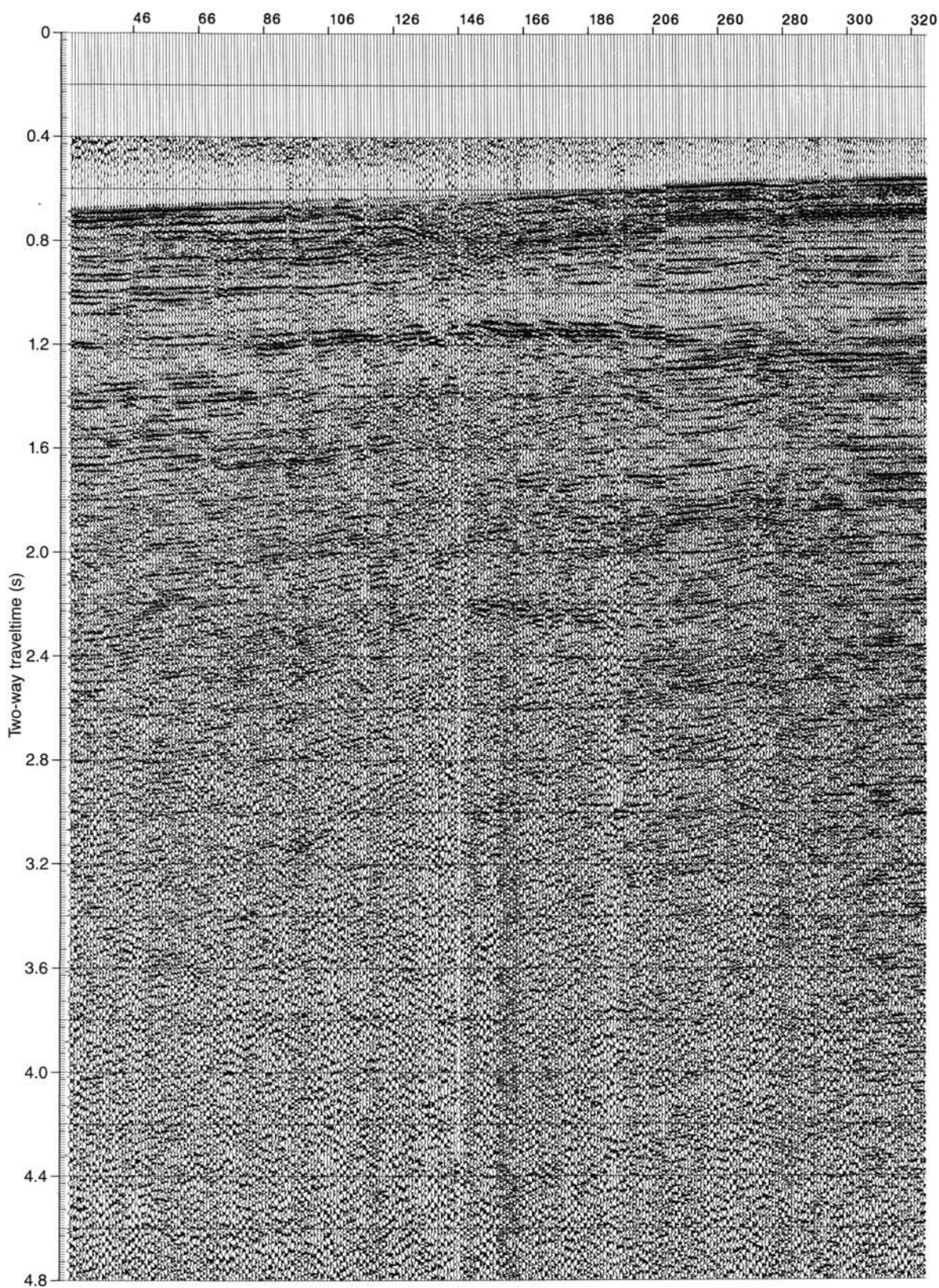


Figure 8. Processed digital seismic data collected from survey line 2, en route to Site 680. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 2.



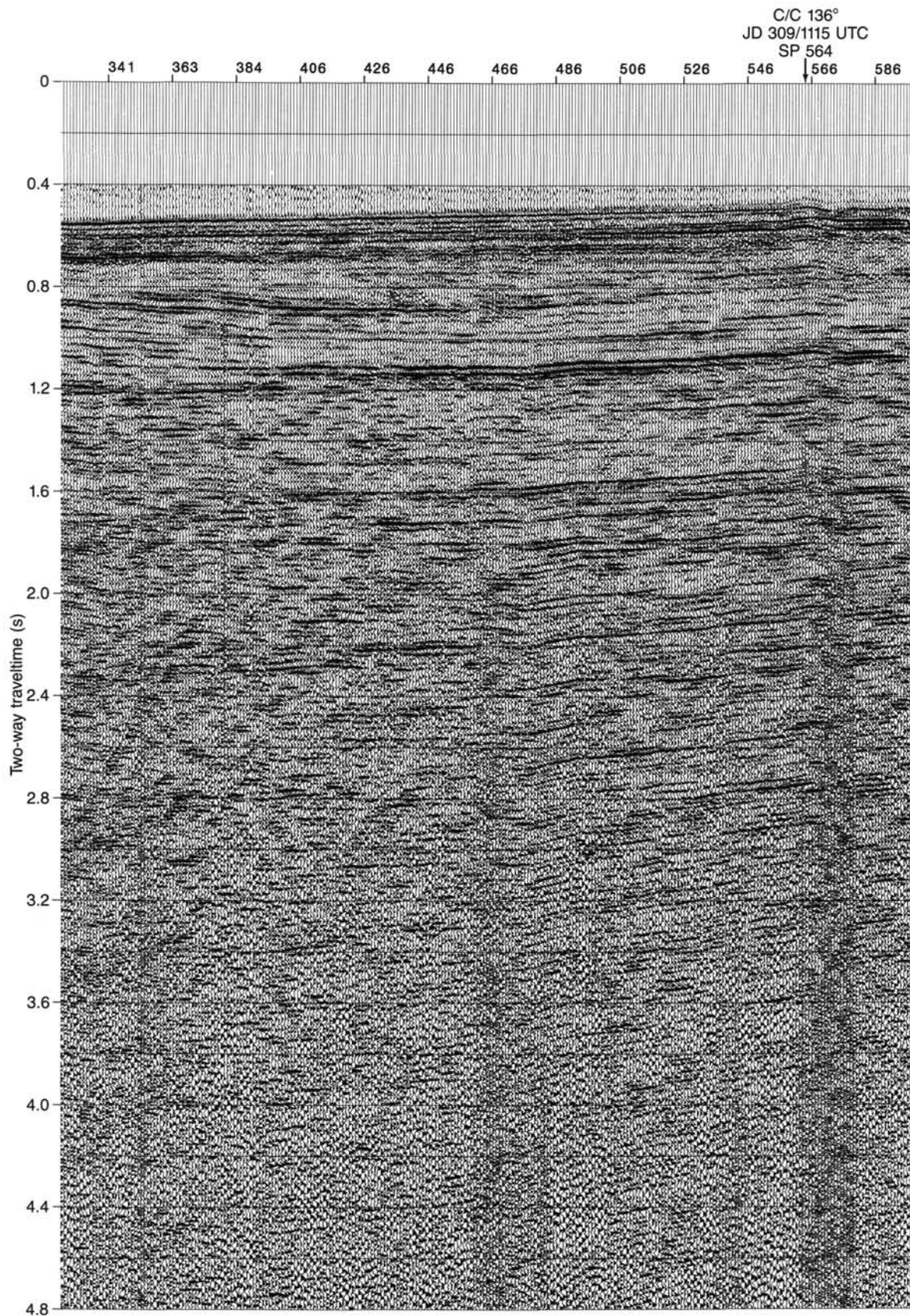


Figure 8. (continued).

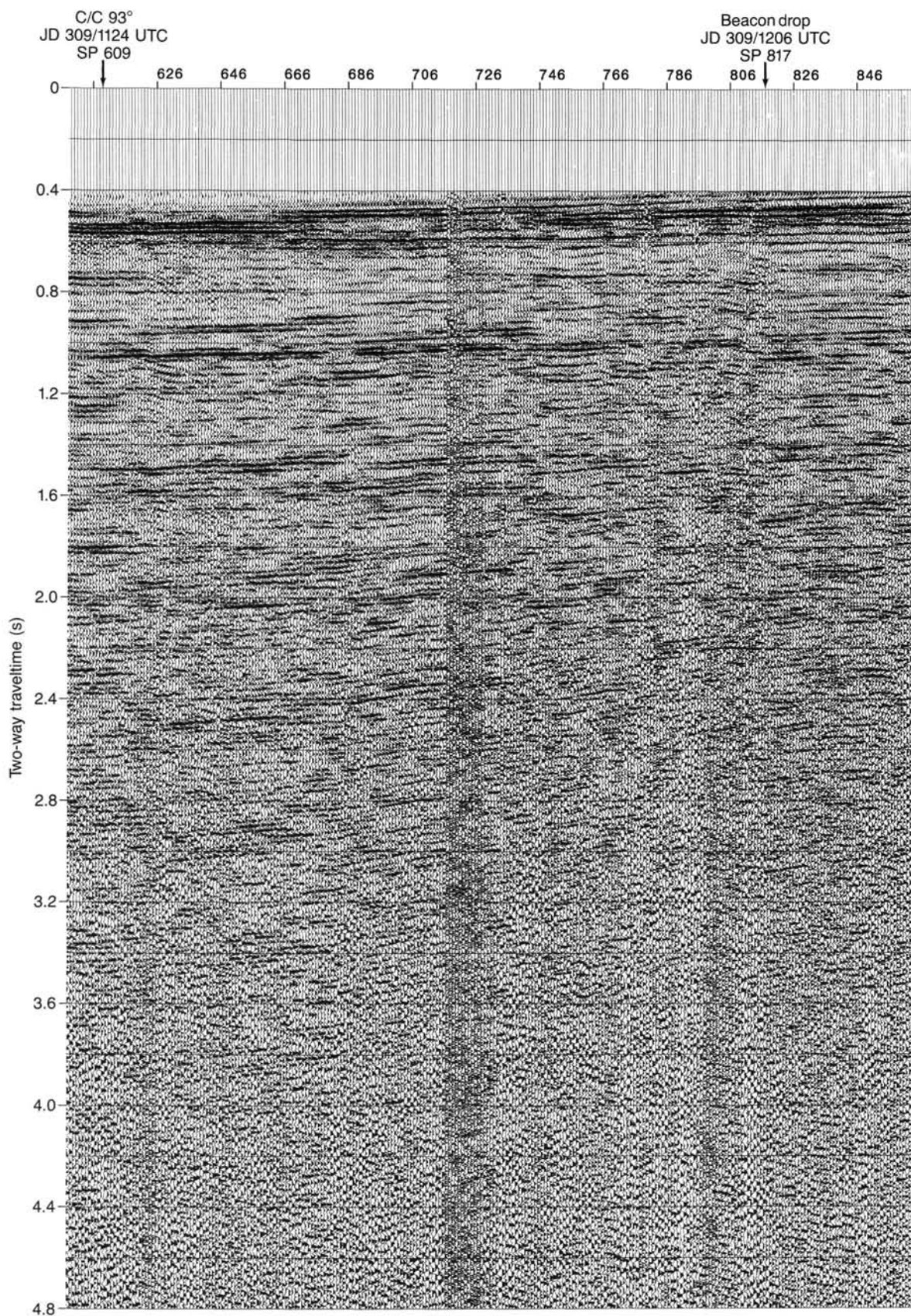


Figure 8. (continued).



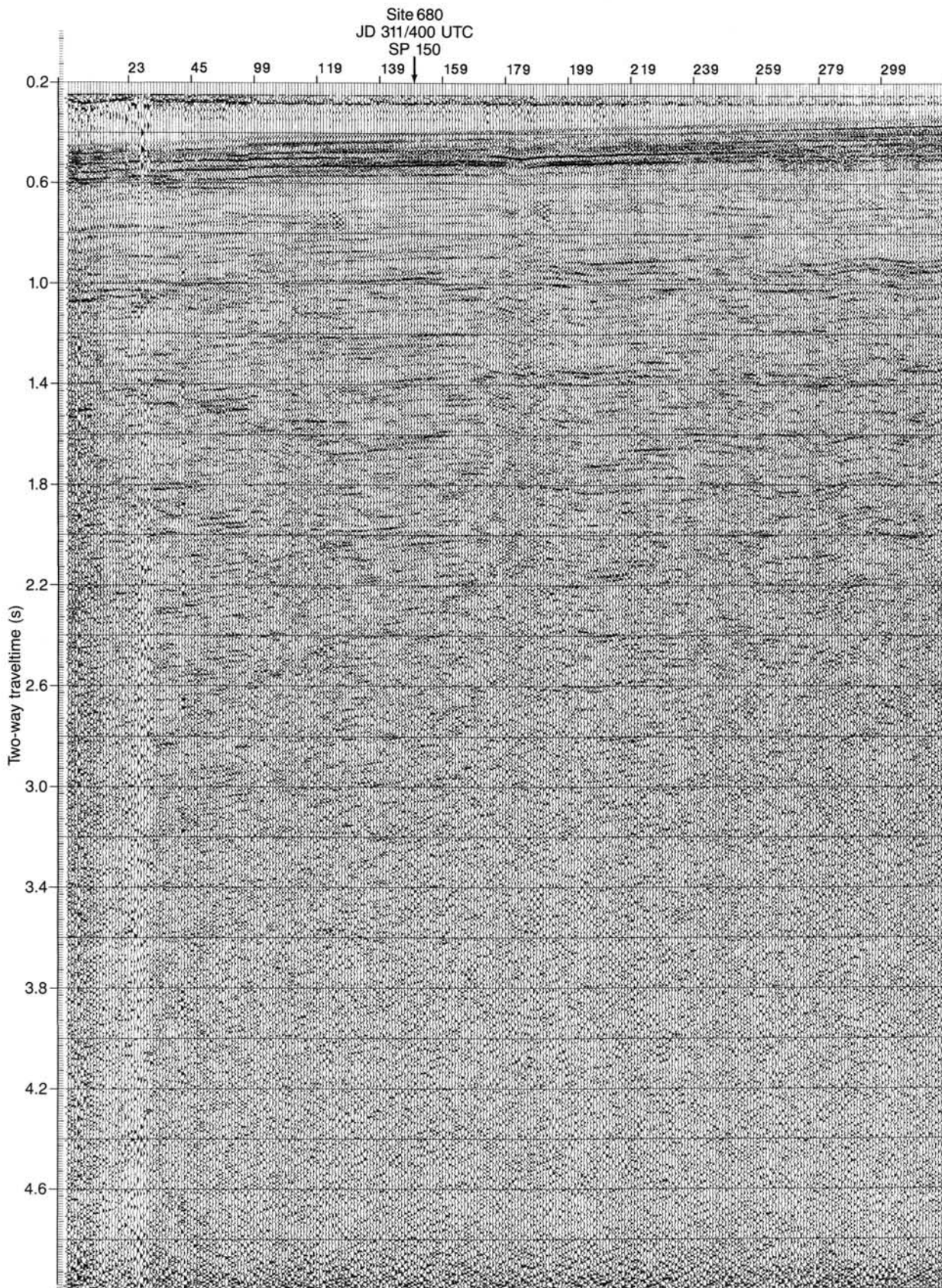


Figure 9. Processed digital seismic data collected from line 3, en route to Site 681. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 2.

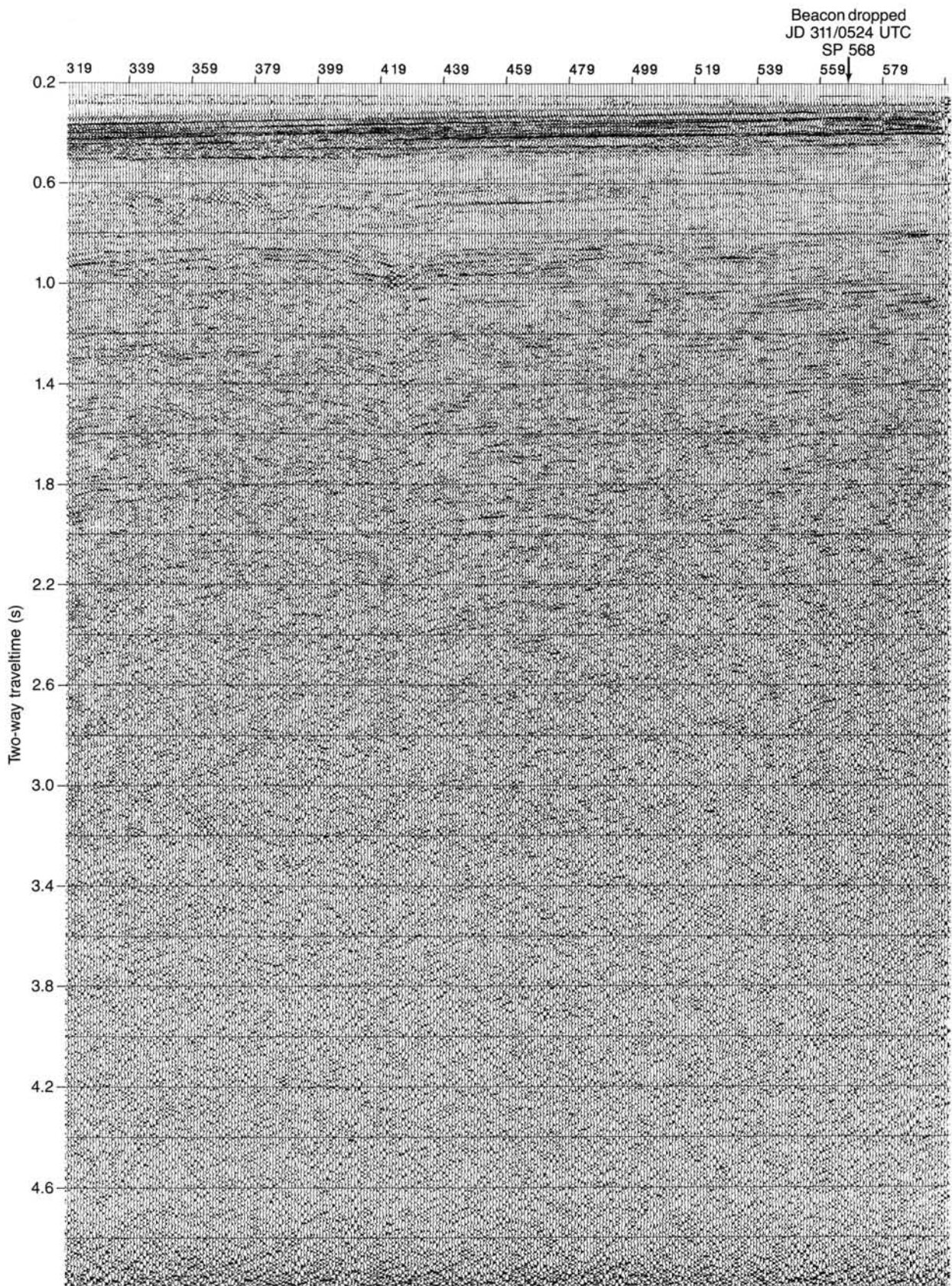


Figure 9. (continued).



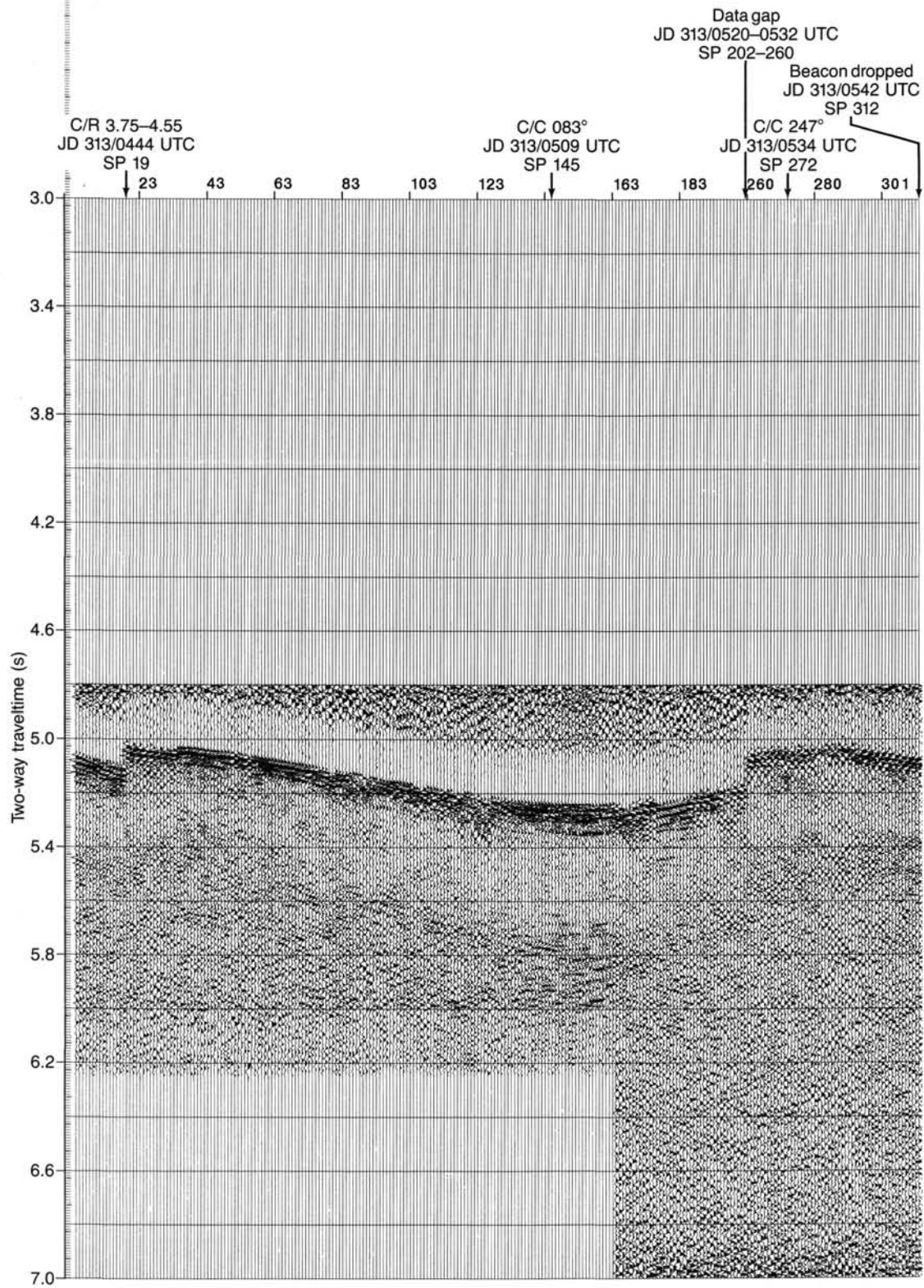


Figure 10. Processed digital seismic data collected on line 4, en route to Site 682. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 3.

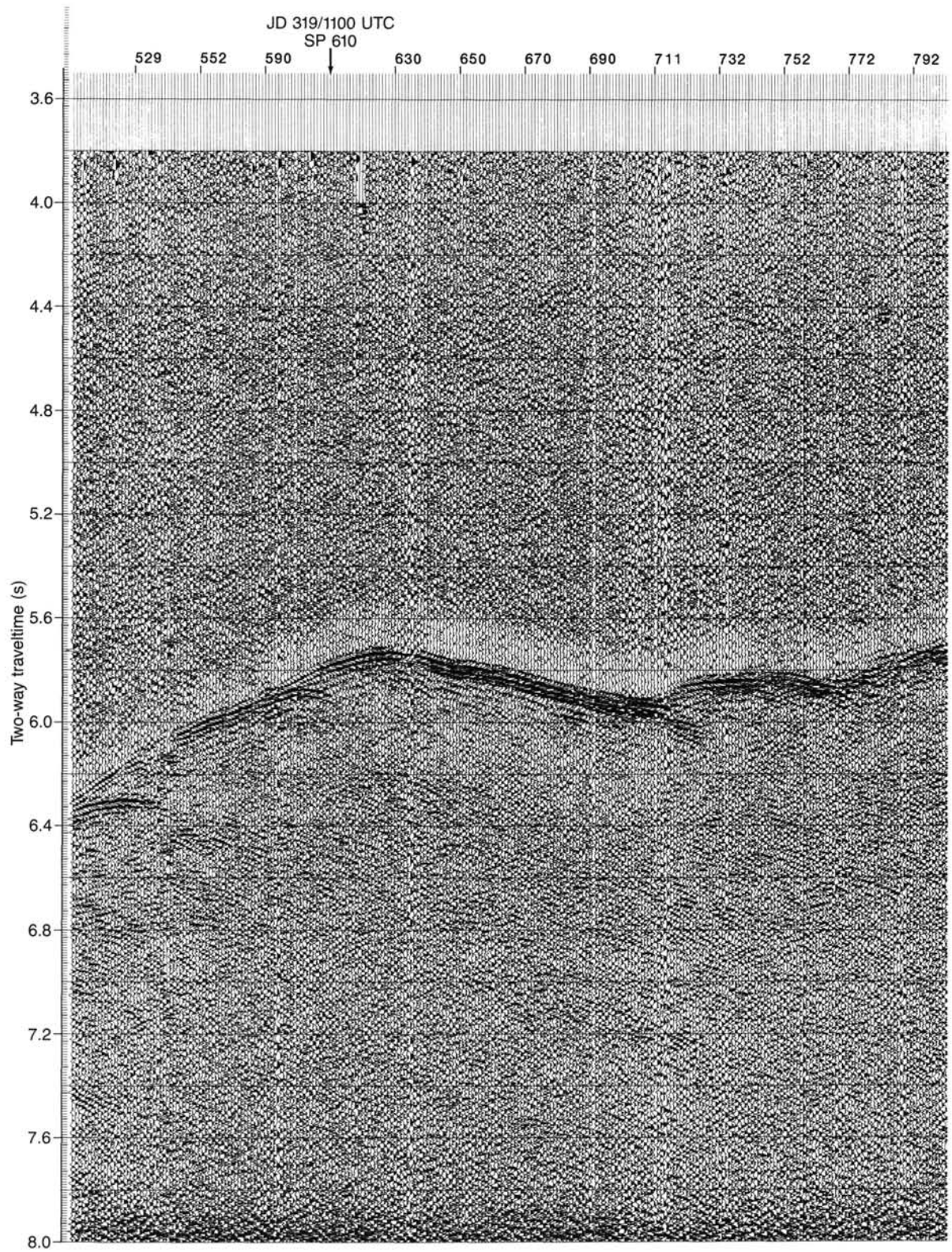


Figure 11. Processed digital seismic data collected on line 5, en route to Site 683. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 4.



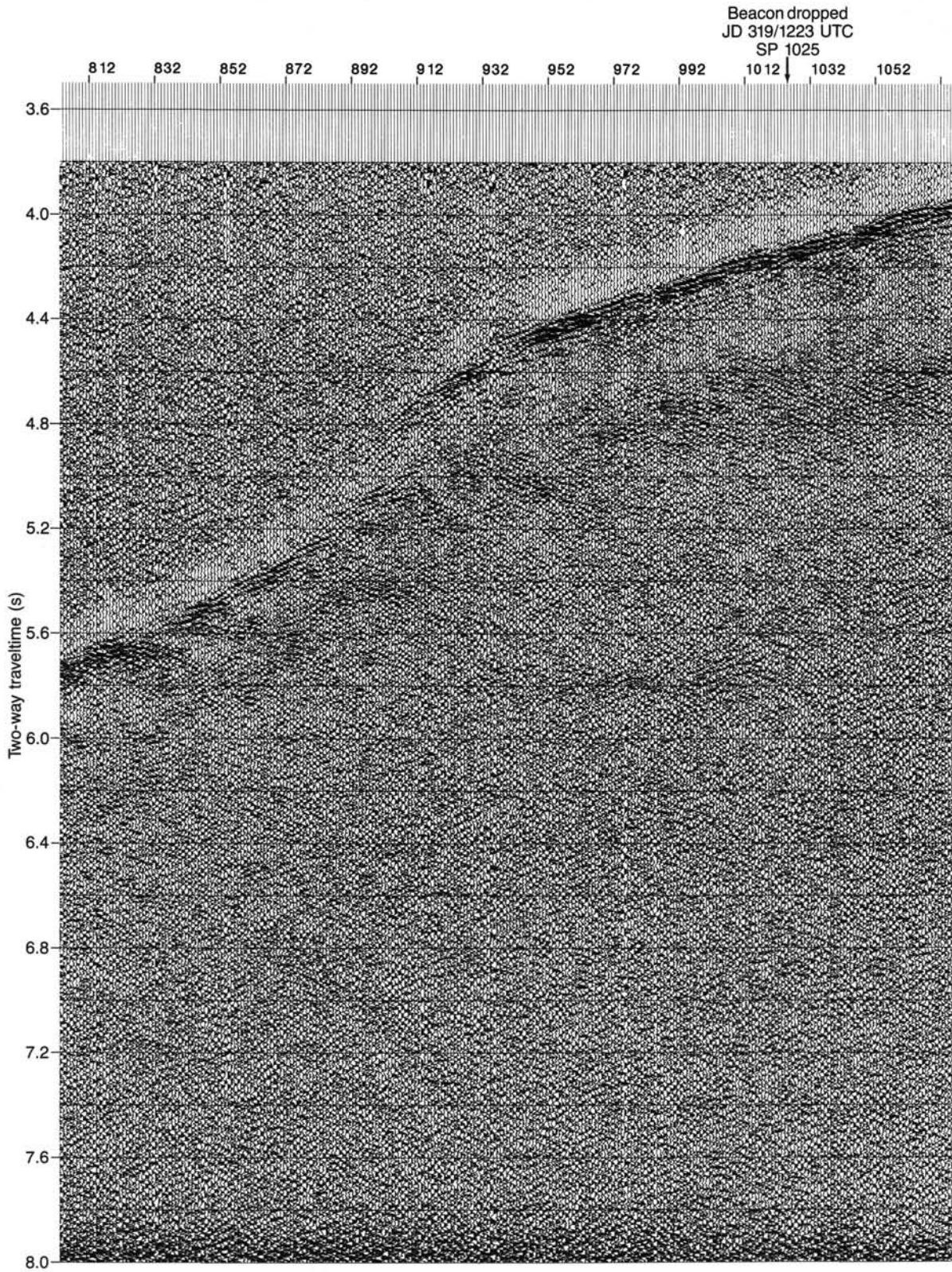


Figure 11. (continued).

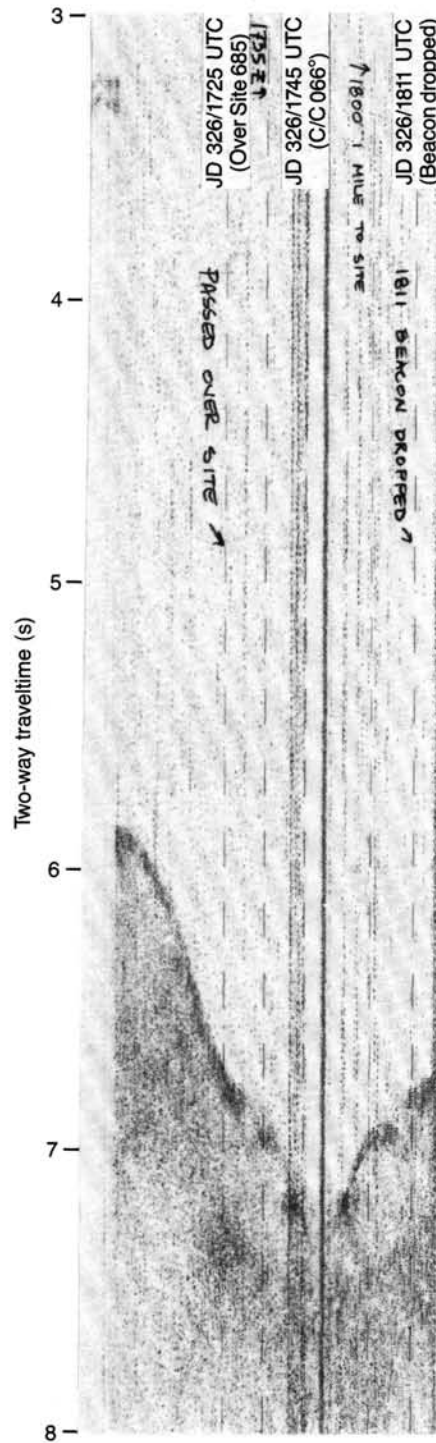


Figure 12. Unprocessed analog seismic data collected on line 7, en route to Site 684 and recorded on the EDO-2 recorder. Trackline navigation is shown in Figure 4.

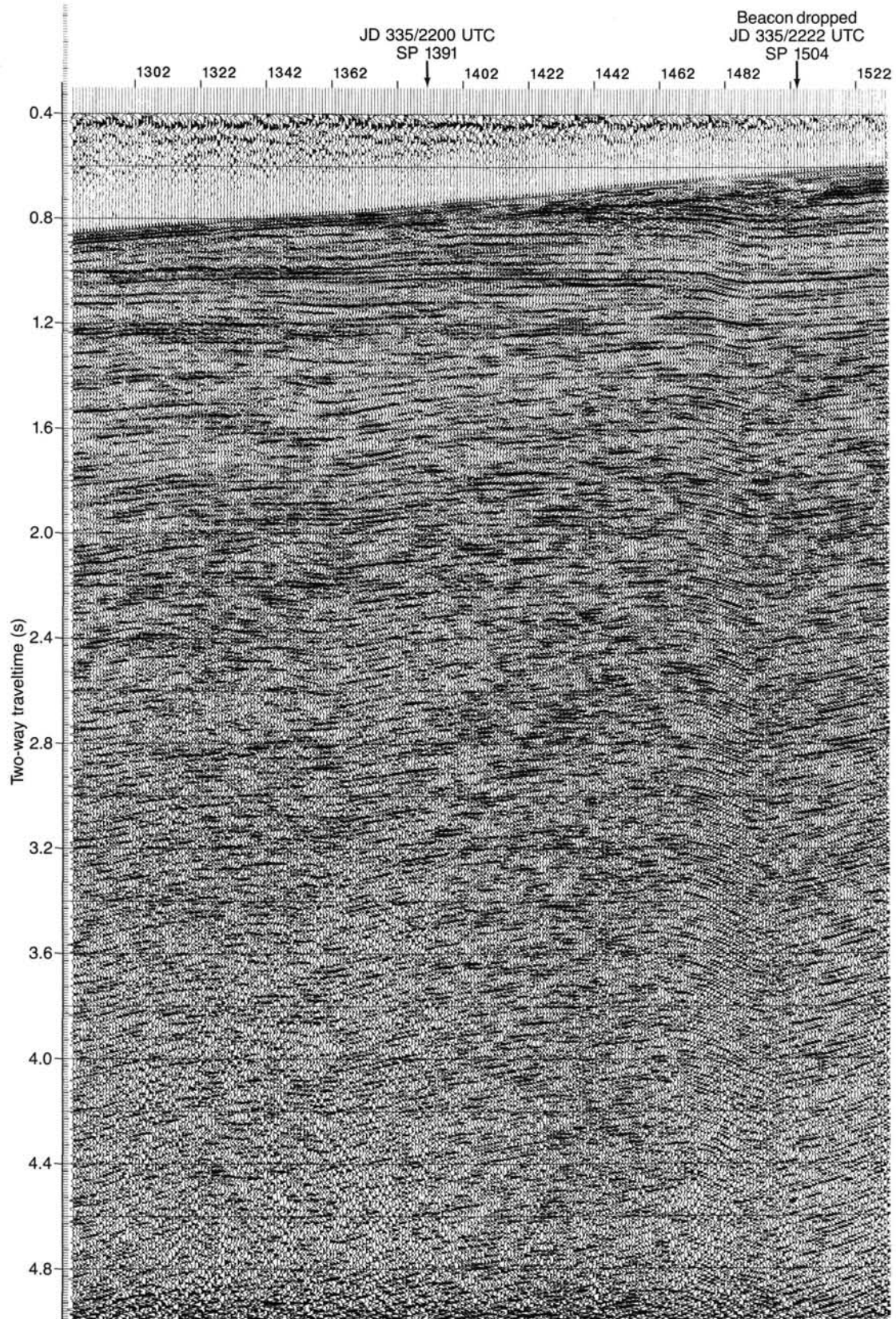


Figure 13. Processed digital seismic data collected on line 8, en route to Site 686. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 5.



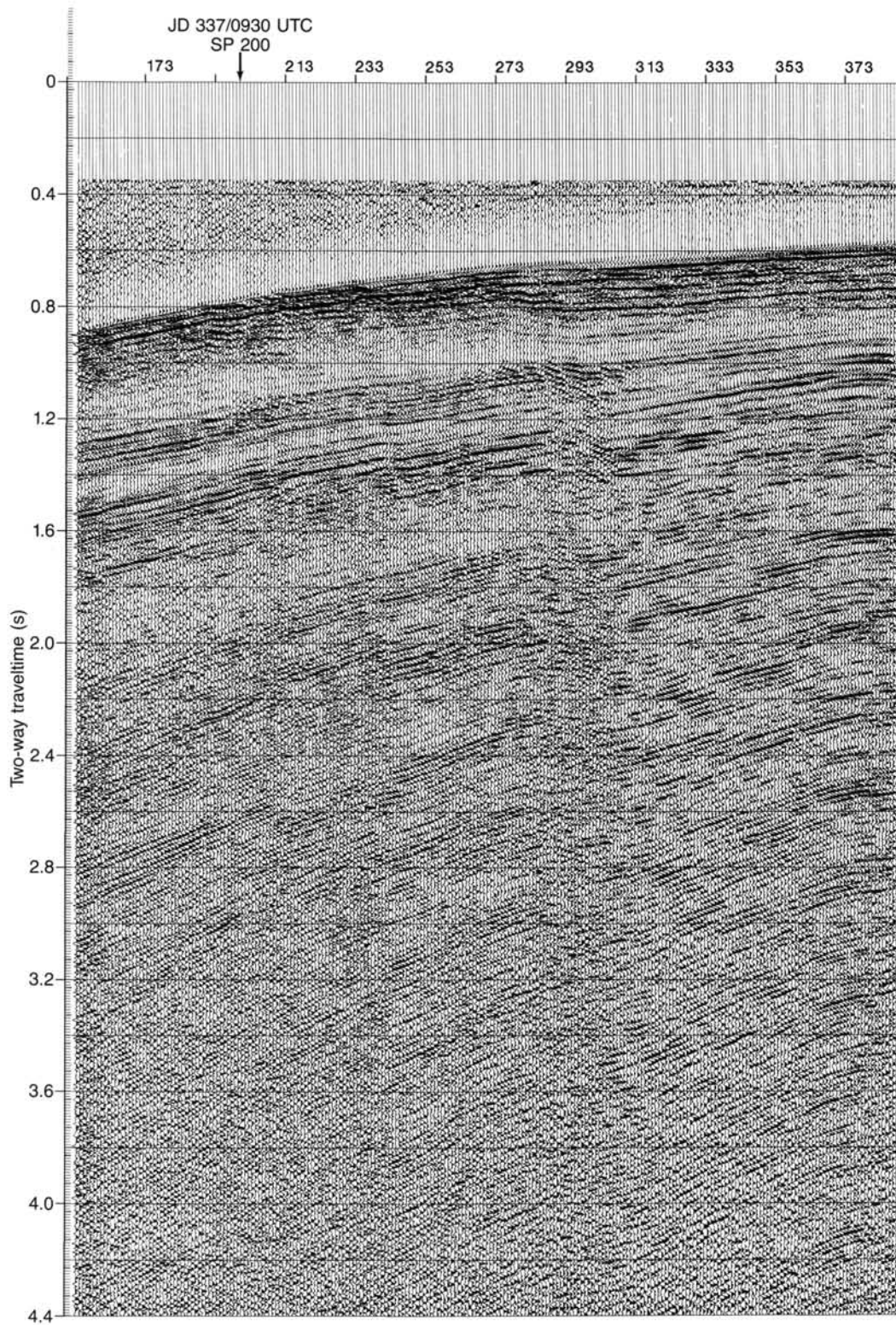


Figure 14. Processed digital seismic data collected on line 9, en route to Site 687. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 5.

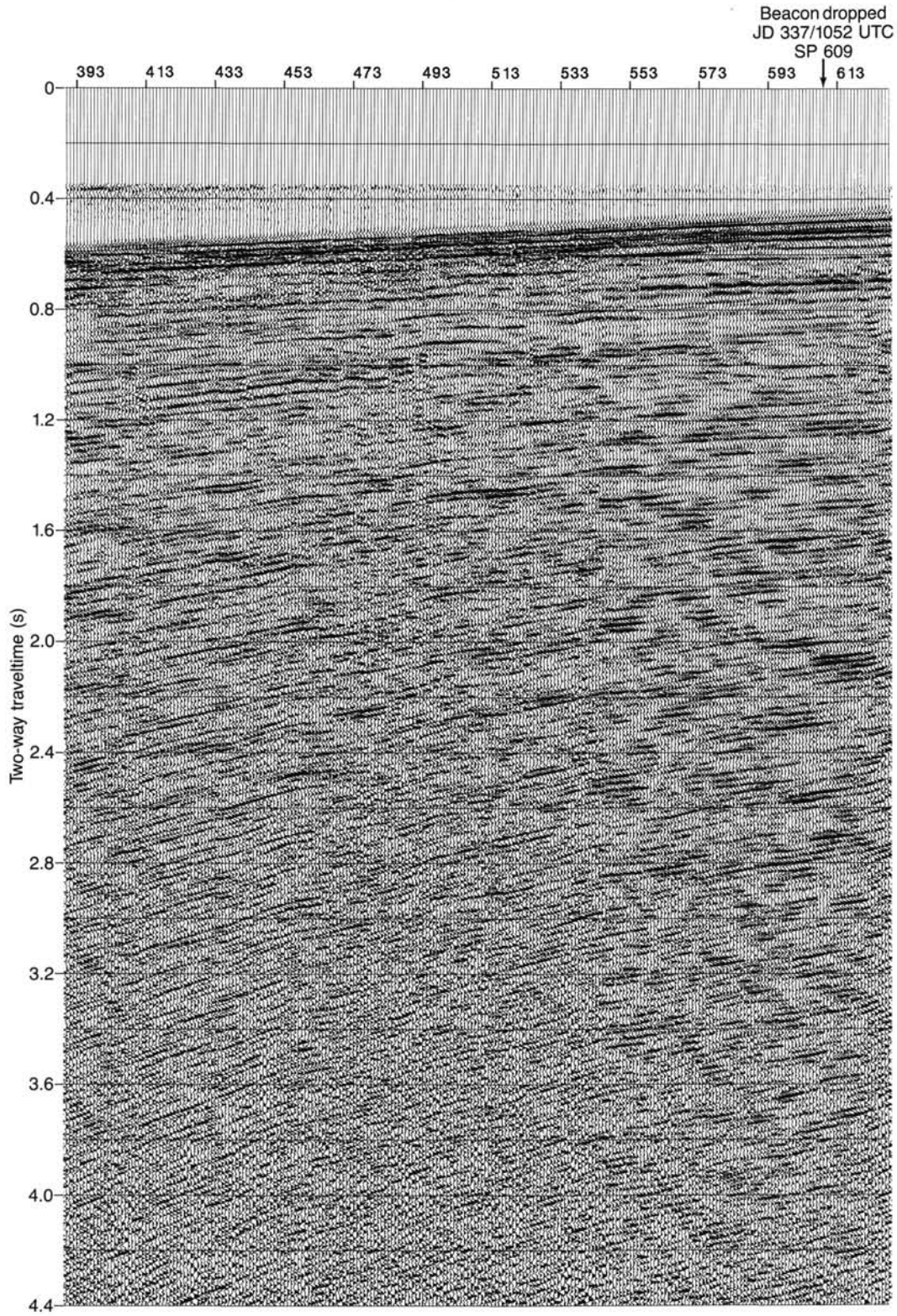


Figure 14 (continued).

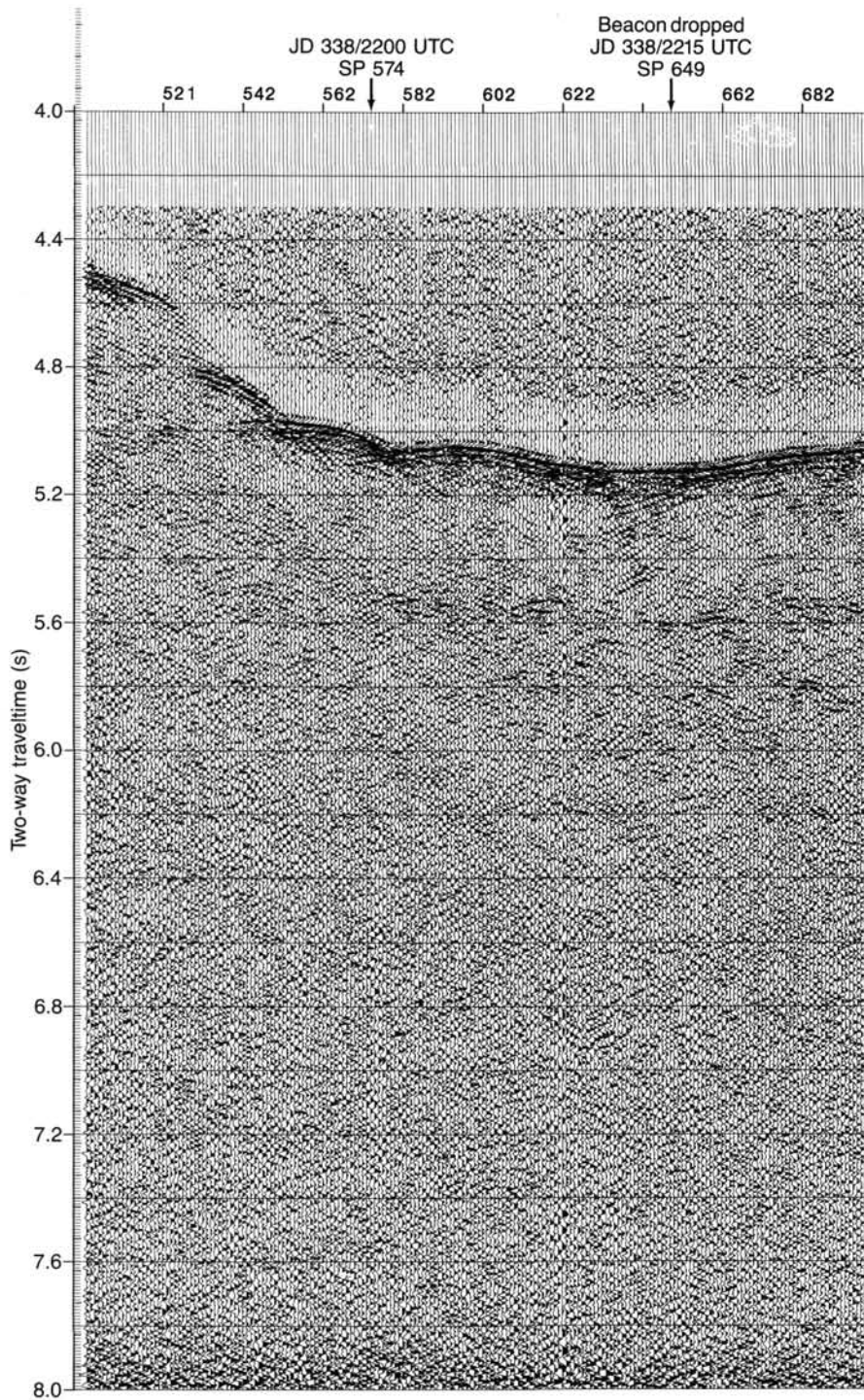


Figure 15. Processed digital seismic data collected on line 10, en route to Site 688. The profile was plotted on the Versatec plotter. Trackline navigation is shown in Figure 3.