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Appendix A. RIGGS IV Refraction Results

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d. Profile #2, from P and SH waves

Introduction

Appendix A1 contains lists of all the travel times read from the RIGGS IV P wave refraction seismograms. Also given are the times calculated from equation (1), using the parameters listed in Table 1, and the differences between the measured and calculated times. Travel time plots for stations O11 and O19 are included; the travel time plot for station R16 is text Figure 5.

Appendix A2 gives the calculated P wave velocities and densities versus depth, together with the distance at which each velocity was observed, and the corresponding velocity-versus-depth curves. The densities were calculated from equation (3).

In Appendix A3, travel times calculated for vertical propagation to the surface from a source at various depths are tabulated.

Appendix A4 contains the elastic parameters calculated from two sets of profiles shot at station Q13, each comprising profiles for P, SV, and SH waves. The velocities were taken from Kirchner [1978], [Kirchner and Bentley, this volume]. Graphs of Poisson's ratio versus depth also are included. The shallowest values of the elastic parameters are physically impossible (see text) and are omitted from the graphs.

Table A1a. Station 011: P Wave Travel Times

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
51	2.	4.3	4.6	-0.3
	4.	7.4	7.9	-0.5
	6.	11.4	10.5	0.9
	8.	13.0	12.6	0.4
	10.	14.7	14.4	0.3
	12.	16.3	15.9	0.4
	14.	17.6	17.3	0.3
	16.	19.0	18.6	0.4
	18.	20.1	19.9	0.2
	20.	21.4	21.1	0.3
	22.	22.8	22.2	0.6
	24.	24.1	23.3	0.8
	26.	25.6	24.4	1.2
	28.	26.7	25.4	1.3
	30.	27.6	26.4	1.1
	32.	28.4	27.5	0.9
	34.	30.2	28.5	1.7
	36.	31.0	29.5	1.5
	38.	31.9	30.4	1.5
	40.	32.8	31.4	1.4
	42.	33.7	32.3	1.4
	44.	34.3	33.2	1.1
54	16.	17.6	18.6	-1.0
	18.	19.0	19.9	-0.9
	20.	20.4	21.1	-0.7
	22.	21.6	22.2	-0.6
	24.	22.7	23.3	-0.6
	26.	24.1	24.4	-0.3
	28.	25.5	25.4	1.0
	30.	26.0	26.5	-0.5
	32.	26.9	27.5	-0.6
	34.	27.8	28.5	-0.7
	36.	28.8	29.5	-0.7
	38.	29.7	30.4	-0.7
	40.	30.6	31.4	-0.8
	42.	31.8	32.3	-0.5
	44.	32.7	33.2	-0.5
	46.	33.4	34.1	-0.7
	48.	34.1	35.0	-0.9
	50.	36.0	35.8	0.2
	52.	36.9	36.7	0.2
	54.	37.4	37.6	-0.2
	56.	38.6	38.4	0.2
	58.	39.3	39.2	0.1
	60.	40.2	40.0	0.2

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
55	56.	38.1	38.4	-0.3
	58.	38.8	39.2	-0.4
	60.	39.9	40.0	-0.1
	62.	40.6	40.8	-0.2
	64.	41.7	41.6	0.1
	66.	42.4	42.4	-0.0
	68.	43.3	43.2	0.1
	70.	43.8	43.9	-0.1
	72.	45.0	44.7	0.3
	74.	45.4	45.4	0.0
	76.	46.3	46.2	0.1
	78.	47.3	46.9	0.4
	80.	48.2	47.6	0.6
	82.	48.7	48.4	0.3
	84.	49.8	49.1	0.7
	86.	50.1	49.8	0.3
	88.	50.8	50.5	0.3
	90.	52.2	51.2	1.0
	92.	52.9	51.8	1.1
	94.	53.3	52.5	0.8
	96.	53.9	53.2	0.7
	98.	54.3	53.9	0.4
	100.	55.0	54.5	0.5
56	96.	52.6	53.2	-0.6
	98.	53.5	53.9	-0.4
	100.	54.2	54.5	-0.3
	102.	54.9	55.2	-0.3
	104.	55.9	55.8	0.1
	106.	56.6	56.5	0.1
	108.	57.3	57.1	0.2
	110.	57.7	57.8	-0.1
	112.	58.7	58.4	0.3
	114.	59.1	59.1	0.0
	116	59.7	59.7	0.0
	118.	60.8	60.3	0.5
	120.	61.2	60.9	0.3
	122.	62.4	61.6	0.8
	124.	62.6	62.2	0.4
	126.	63.1	62.8	0.3
	128.	63.5	63.4	0.1
	130.	64.9	64.0	0.9
	132.	65.3	64.6	0.7
	134.	65.8	65.2	0.6
	136.	66.4	65.8	0.6
	138.	66.8	66.4	0.4
	140.	67 0	67.0	0.0
57	136.	65.5	65.8	-0.3
	138.	66.6	66.4	0.2
	140.	66.8	67.0	-0.2

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	142.	67.7	67.6	0.1
	144.	68.5	68.2	0.3
	146.	69.1	68.8	0.3
	148.	70.0	69.4	0.6
	150.	70.4	69.9	0.5
	152.	70.6	70.5	0.1
	154.	71.1	71.1	0.0
	156.	71.5	71.7	-0.2
	158.	72.6	72.3	0.3
	160.	72.9	72.8	0.1
	162.	74.2	73.4	0.8
	164.	74.2	74.0	0.2
	166.	74.6	74.6	0.0
	168.	74.9	75.1	-0.2
	170.	76.2	75.7	0.5
	172.	76.9	76.3	0.6
	174.	77.3	76.8	0.5
	176.	77.3	77.4	0.1
	178.	78.4	78.0	0.4
	180.	78.6	78.5	0.1
58	176.	77.1	77.4	-0.3
	178.	77.5	78.0	-0.5
	180.	78.2	78.5	-0.3
	182.	78.2	79.1	-0.9
	184.	79.4	79.6	-0.2
	186.	79.8	80.2	-0.4
	188.	80.7	80.8	-0.1
	190.	80.9	81.3	-0.4
	192.	81.8	81.9	0.1
	194.	81.8	82.4	-0.6
	196.	82.4	83.0	-0.6
	198.	83.1	83.5	-0.4
	200.	83.7	84.1	-0.4
	202.	84.6	84.6	0.0
	206.	85.2	85.8	-0.6
	208.	85.7	86.3	-0.6
	210.	86.5	86.9	-0.4
	212.	87.4	87.4	0.0
	214.	87.9	88.0	-0.1
	216.	88.3	88.5	-0.2
	218.	88.7	89.0	-0.3
	220.	89.4	89.6	-0.2
59	216.	87.7	88.5	-0.8
	218.	88.5	89.0	-0.5
	220.	88.9	89.6	-0.7
	222.	89.5	90.1	-0.6
	224.	90.2	90.7	-0.5
	226.	90.8	91.2	-0.4
	228.	91.4	91.8	-0.4

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	230.	91.8	92.3	-0.5
	232.	92.2	92.9	-0.7
	234.	92.7	93.4	-0.7
	236.	93.3	94.0	-0.7
	238.	94.3	94.5	-0.2
	240.	94.5	95.0	-0.5
	242.	95.6	95.6	0.0
	244.	96.0	96.1	-0.1
	246.	96.4	96.7	-0.3
	248.	96.8	97.2	-0.4
	250.	98.3	97.8	0.5
	252.	98.3	98.3	0.0
	254.	99.0	98.8	0.2
	256.	99.4	99.4	0.0
	258.	100.1	99.9	0.2
	260.	100.5	100.5	0.0
60	256.	99.3	99.4	-0.1
	258.	100.2	99.9	0.3
	260.	100.7	100.5	0.2
	262.	101.1	101.0	0.1
	264.	101.7	101.5	0.2
	266.	102.2	102.1	0.1
	268.	102.8	102.6	0.2
	270.	103.3	103.2	0.1
	272.	103.7	103.7	0.0
	274.	104.1	104.2	-0.1
	276.	105.0	104.8	0.2
	278.	105.9	105.3	0.6
	280.	106.3	105.8	0.5
	282.	107.0	106.4	0.6
	284.	107.4	106.9	0.5
	286.	107.8	107.5	0.3
	288.	108.5	108.0	0.5
	290.	109.6	108.5	1.1
	292.	109.8	109.1	0.7
	294.	110.4	109.6	0.8
	296.	111.1	110.2	0.9
	298.	111.5	110.7	0.8
	300.	111.9	111.2	0.7
61	296.	110.0	110.2	-0.2
	298.	110.4	110.7	-0.3
	300.	111.3	111.2	0.1
	302.	111.7	111.8	-0.1
	304.	112.5	112.3	0.2
	306.	112.9	112.8	0.1
	308.	113.5	113.4	0.1
	310.	113.8	113.9	-0.1
	312.	114.6	114.4	0.2
	314.	115.0	115.0	0.0

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	316.	115.4	115.5	-0.1
	318.	116.3	116.1	0.2
	320.	116.5	116.6	-0.1
	322.	117.5	117.1	0.4
	324.	117.8	117.7	0.1
	326.	118.2	118.2	0.0
	328.	118.6	118.7	-0.1
	330.	119.7	119.3	0.4
	332.	120.1	119.8	0.3
	334.	120.5	120.3	0.2
	336.	120.9	120.9	0.0
	338.	121.4	121.4	-0.0
	340.	122.0	121.9	0.1
62	336.	120.6	120.9	-0.3
	338.	121.0	121.4	-0.4
	340.	121.7	121.9	-0.2
	342.	122.1	122.5	-0.4
	344.	122.9	123.0	-0.1
	346.	123.3	123.6	-0.3
	348.	124.4	124.1	0.3
	350.	124.4	124.6	-0.2
	352.	125.2	125.2	0.0
	354.	125.4	125.7	-0.3
	356.	126.0	126.2	-0.2
	358.	126.7	126.8	-0.1
	360.	127.3	127.3	0.0
	362.	128.1	127.8	0.3
	364.	128.3	128.4	-0.1
	366.	128.8	128.9	-0.1
	368.	129.2	129.4	-0.2
	370.	130.2	130.0	0.2
	372.	130.6	130.5	0.1
	374.	131.3	131.0	0.3
	376.	131.9	131.6	0.3
	378.	132.1	132.1	0.0
	380.	132.5	132.6	-0.1
63	376.	131.3	131.6	-0.3
	378.	132.1	132.1	0.0
	380.	132.7	132.6	0.1
	382.	133.2	133.2	0.0
	384.	134.0	133.7	0.3
	386.	134.6	134.2	0.4
	388.	135.5	134.8	0.7
	390.	135.7	135.3	0.4
	392.	136.1	135.9	0.2
	394.	136.5	136.4	0.1
	398.	138.0	137.5	0.5
	396.	137.1	136.9	0.2
	400.	138.4	138.0	0.4

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	402.	139.2	138.5	0.7
	404.	139.6	139.1	0.5
	406.	139.8	139.6	0.2
	408.	140.2	140.1	0.1
	410.	141.3	140.7	0.6
	412.	141.7	141.2	0.5
	414.	142.1	141.7	0.4
	416.	142.5	142.3	0.2
	418.	142.9	142.8	0.1
	420.	143.5	143.3	0.2

Table A1b. Station 019: P Wave Travel Times

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
95	2.	2.9	2.9	0.0
	4.	5.5	5.4	0.1
	6.	7.6	7.5	0.1
	8.	9.3	9.3	0.0
	10.	10.9	10.9	0.0
	12.	12.0	12.3	-0.3
	14.	12.6	13.7	-1.1
	16.	14.0	14.9	-0.9
	18.	15.7	16.1	-0.4
	24.	19.2	19.4	-0.2
	26.	19.8	20.5	-0.7
	28.	20.9	21.5	-0.6
	30.	22.2	22.5	-0.3
	32.	23.3	23.4	-0.1
	34.	24.2	24.4	-0.2
	36.	25.1	25.3	-0.2
	38.	26.1	26.2	-0.1
	40.	26.5	27.2	-0.7
	42.	27.8	28.1	-0.3
	44.	28.6	29.0	-0.4
	46.	29.5	29.8	-0.3
96	2.	2.0	2.9	-0.9
	4.	5.7	5.4	0.3
	6.	7.5	7.5	0.0
	8.	9.6	9.3	0.3
	10.	11.2	10.9	0.3
	12.	12.4	12.3	0.1
	14.	13.5	13.7	-0.2
	16.	14.9	14.9	0.0
	18.	16.5	16.1	0.4
	20.	17.3	17.3	0.0
	24.	19.8	19.4	0.4
	26.	20.6	20.5	0.1
	28.	21.2	21.5	-0.3
	30.	22.8	22.5	0.3
	32.	23.7	23.4	0.3
	34.	24.7	24.4	0.3
	36.	25.1	25.3	-0.2
	38.	26.7	26.2	0.5
	40.	27.1	27.2	-0.1
	42.	28.2	28.1	0.1
	44.	29.0	29.0	0.0
	46.	30.0	29.8	0.2
97	2.	3.7	2.9	0.8
	4.	6.1	5.4	0.7
	6.	7.7	7.5	0.2
	8.	9.3	9.3	0.0

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	10.	11.5	10.9	0.6
	12.	12.3	12.3	0.0
	14.	12.9	13.7	-0.8
	16.	14.5	14.9	-0.4
	18.	16.3	16.1	0.2
	20.	17.3	17.3	0.0
	24.	19.6	19.4	0.2
	26.	20.6	20.5	0.1
	28.	21.4	21.5	-0.1
	30.	22.9	22.5	0.4
	32.	23.9	23.4	0.5
	34.	24.9	24.4	0.5
	36.	25.5	25.3	0.2
	38.	26.8	26.2	0.6
	40.	27.2	27.2	0.0
	42.	28.2	28.1	-0.1
	46.	29.9	29.8	0.1
98	16.	15.2	14.9	0.3
	18.	16.3	16.1	0.2
	20.	17.3	17.3	0.0
	22.	18.8	18.4	0.4
	24.	20.2	19.4	0.8
	26.	21.2	20.5	0.7
	28.	22.2	21.5	0.7
	30.	22.7	22.5	0.2
	32.	23.9	23.4	0.5
	34.	25.1	24.4	0.7
	36.	26.1	25.3	0.8
	40.	27.8	27.2	0.6
	42.	28.4	28.1	0.3
	44.	29.2	29.0	0.2
	46.	30.4	29.8	0.6
	48.	31.0	30.7	0.3
	50.	32.0	31.6	0.4
	52.	32.7	32.4	0.3
	54.	33.5	33.2	0.3
	56.	34.1	34.1	0.0
	58.	35.1	34.9	0.2
	62.	36.7	36.5	0.2
99	56.	34.5	34.1	0.4
	58.	35.1	34.9	0.2
	70.	39.2	39.6	-0.4
	72.	40.3	40.4	-0.1
	74.	41.5	41.2	0.3
	82.	44.3	44.1	0.2
	84.	44.7	44.8	-0 1
	86.	45.7	45.6	0.1
	88.	46.3	46.3	0.0
	92.	47.8	47.7	0.1

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	94.	48.6	48 4	0.2
	96.	48.8	49.1	-0.3
	98.	49.8	49.8	0.0
	100.	50.4	50.4	0.0
	102.	51.0	51.1	0.0
100	96.	49.8	49.1	0.7
	98.	50.4	49.8	0.6
	100.	51.0	50.4	0.6
	102.	51.8	51.1	0.7
	104.	52.2	51.8	0.4
	106.	53.2	52.5	0.7
	108.	53.9	53.1	0.8
	110.	53.9	53.8	0.1
	112.	54.5	54.4	0.1
	114.	55.3	55.1	0.2
	116.	55.9	55.7	0.2
	120.	57.2	57.0	0.2
	122.	57.8	57.7	0.1
	124.	58.0	58.3	-0.3
	126.	59.3	58.9	0.4
	128.	59.5	59.6	-0.1
	130.	60.3	60.2	0.1
	132.	60.5	60.8	-0.3
	134.	61.3	61.4	-0.1
	136.	61.6	62.1	-0.5
	138.	62.6	62.7	-0.1
	140.	63.0	63.3	-0.3
	142.	63.6	63.9	-0.3
101	136.	62.7	62.1	0.6
	140.	63.7	63.3	0.4
	144.	64.7	64.5	0.2
	148.	66.0	65.7	0.3
	152.	66.8	66.9	-0.1
	156.	68.5	68.1	0.4
	160.	69.5	69.3	0.2
	164.	70.4	70.5	-0.1
	168.	71.8	71.6	0.2
	172.	72.6	72.8	-0.2
	176.	73.7	73.9	-0.2
	180.	74.8	75.1	-0.3
102	176.	74.8	73.9	0.9
	178.	75.1	74.5	0.6
	180.	75.6	75.1	0.5
	182.	76.5	75.7	0.8
	184.	76.9	76.2	0.7
	186.	77.3	76.8	0.5
	188.	77.7	77.4	0.3
	190.	77.7	77.9	-0.2

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	192.	78.8	78.5	0.3
	194.	79.6	79.1	0.5
	196.	80.0	79.6	0.4
	198.	80.2	80.2	0.0
	200.	80.8	80.8	0-0
	202.	81.3	81.3	0.0
	204.	81.7	81.9	-0.2
	206.	82.9	82.4	0.5
	208.	83.3	83.0	0.3
	210.	84.0	83.6	0.4
	212.	84.2	84.1	0.1
	214.	84.8	84.7	0.1
	216.	85.0	85.2	-0.2
	218.	85.8	85.8	0.0
	220.	86.0	86.3	-0.3
	222.	86.7	86.9	-0.2
103	216.	85.2	85.2	0.0
	218.	85.8	85.8	0.0
	220.	86.3	86.3	0.0
	222.	86.7	86.9	-0.2
	224.	87.1	87.4	-0.3
	226.	87.9	88.0	-0.1
	228.	88.1	88.5	-0.4
	230.	88.3	89.1	-0.8
	232.	89.0	89.6	-0.6
	234.	90.0	90.2	-0.2
	236.	90.4	90.7	-0.3
	240.	91.3	91.8	-0.5
	242.	92.1	92.4	-0.3
	244.	92.3	92.9	-0.6
	246.	93.5	93.4	0.1
	248.	94.0	94.0	0.0
	250.	94.6	94.5	0.1
	252.	94.6	95.1	-0.5
	254.	95.4	95.6	-0.2
	256.	95.6	96.2	-0.6
	258.	96.4	96.7	-0.3
	260.	96.8	97.2	-0.4
	262.	97.2	97.8	-0.6
104	256.	96.5	96.2	0.3
	258.	96.7	96.7	0.0
	260.	97.5	97.2	0.3
	262.	97.9	97.8	0.1
	264.	98.3	98.3	0.0
	266.	99.0	98.9	0.1
	268.	99.4	99.4	0.0
	270.	99.6	99.9	-0.3
	272.	100.3	100.5	-0.2
	274.	101.1	101.0	0.1

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	276.	101.8	101.6	0.2
	280.	102.7	102.6	0.1
	282.	103.1	103.2	-0.1
	284.	103.5	103.7	-0.2
	286.	104.4	104.2	0.2
	288.	104.8	104.8	0.0
	290.	105.7	105.3	0.4
	292.	105.7	105.9	-0.2
	294.	106.4	106.4	0.0
	296.	106.6	106.9	-0.3
	298.	107.0	107.5	-0.5
	300.	107.7	108.0	-0.3
	302.	108.1	108.5	-0.4
105	296.	106.7	106.9	-0.2
	298.	107.1	107.5	-0.4
	300.	107.7	108.0	-0.3
	302.	108.1	108.5	-0.4
	304.	108.8	109.1	-0.3
	306.	109.4	109.6	-0.2
	308.	109.8	110.1	-0.3
	310.	109.8	110.7	-0.9
	312.	110.4	111.2	-0.8
	314.	111.3	111.7	-0.4
	316.	111.7	112.3	-0.6
	320.	112.7	113.3	-0.6
	322.	113.1	113.9	-0.8
	324.	113.5	114.4	-0.9
	326.	114.6	114.9	-0.3
	328.	115.0	115.5	-0.5
	330.	115.6	116.0	-0.4
	332.	115.8	116.5	-0.7
	334.	116.7	117.1	-0.4
	336.	116.9	117.6	-0.7
	338.	117.5	118.1	-0.6
	340.	117.9	118.7	-0.8
	342.	118.3	119.2	-0.9
106	336.	118.1	117.6	0.5
	338.	118.5	118.1	0.4
	340.	119.2	118.7	0.5
	342.	119.6	119.2	0.4
	344.	119.8	119.7	0.1
	346.	120.4	120.2	0.2
	348.	120.8	120.8	0.0
	350.	121.4	121.3	0.1
	352.	121.9	121.8	0.1
	354.	122.5	122.4	0.1
	356.	123.1	122.9	0.2
	360.	124.2	124.0	0.2
	362.	124.8	124.5	0.3
	364.	125.0	125.0	0.0

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	366.	126.0	125.5	0.5
	368.	126.2	126.1	0.1
	370.	126.9	126.6	0.3
	372.	127.3	127.1	0.2
	374.	127.9	127.7	0.2
	376.	128.1	128.2	-0.1
	378.	128.5	128.7	-0.2
	380.	129.4	129.3	0.1
	382.	129.0	129.8	-0.8
107	376.	128.5	128.2	0.3
	378.	129.1	128.7	0.4
	380.	129.7	129.3	0.4
	382.	130.1	129.8	0.3
	384.	130.5	130.3	0.2
	386.	131.1	130.8	0.3
	388.	131.7	131.4	0.3
	390.	131.7	131.9	-0.2
	392.	132.4	132.4	0.0
	394.	133.2	133.0	0.2
	396.	133.8	133.5	0.3
	400.	134.6	134.5	0.1
	402.	135.2	135.1	0.1
	404.	135.6	135.6	0.0
	406.	136.2	136.1	0.1
	408.	136.9	136.7	0.2
	410.	137.5	137.2	0.3
	412.	137.9	137.7	0.2
	414.	138.3	138.2	0.1
	416.	138.3	138.8	-0.5
	418.	139.1	139.3	-0.2
	420.	139.7	139.8	-0.1
	422.	140.0	140.4	-0.4
93	440.	148.0	145.1	2.9
	470.	156.5	153.0	3.5
	500.	163.1	160.9	2.2
	530.	171.1	168.8	2.3
	560.	179.0	176.8	2.2
	590.	187.4	184.7	2.7
	620.	194.3	192.6	1.7
	650.	201.1	200.5	0.6
	680.	209.5	208.4	1.1
	710.	217.8	216.3	1.5

Table A1c. Station R16: P Wave Travel Times

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
21	2.	3.7	3.5	0.2
	4.	6.3	6.2	0.1
	6.	9.2	8.4	0.8
	8.	11.0	10.3	0.7
	10.	13.0	12.0	1.0
	12.	14.6	13.4	1.2
	14.	15.9	14.8	1.1
	16.	16.9	16.0	0.9
	18.	17.9	17.2	0.7
	20.	18.7	18.3	0.4
	22.	20.2	19.4	0.8
	24.	21.4	20.5	0.9
	26.	22.2	21.5	0.7
	28.	22.9	22.5	0.4
	30.	23.4	23.5	-0.1
	32.	24.4	24.5	-0.1
	34.	26.2	25.5	0.7
	36.	27.7	26.4	1.3
	38.	27.9	27.4	0.5
	40.	29.2	28.3	0.9
	42.	30.2	29.2	1.0
	44.	31.3	30.1	1.2
22	2.	3.8	3.5	0.3
	4.	6.8	6.2	0.6
	6.	8.3	8.4	-0.1
	8.	10.0	10.3	-0.3
	10.	11.8	12.0	-0.2
	12.	13.8	13.4	0.4
	14.	14.8	14.8	0.0
	16.	15.8	16.0	-0.2
	18.	16.8	17.2	-0.4
	20.	18.3	18.3	0.0
	22.	19.8	19.4	0.4
	24.	20.8	20.5	0.3
	26.	22.3	21.5	0.8
	30.	24.0	23.5	0.5
	32.	25.0	24.5	0.5
	36.	28.3	26.4	1.9
	34.	26.8	25.5	1.3
	38.	28.8	27.4	1.4
	40.	29.5	28.3	1.2
	44.	30.8	30.1	0.7
	42.	30.3	29.2	1.1
25	16.	15.6	16.0	-0.4
	18.	17.1	17.2	-0.1
	20.	18.4	18.3	0.1
	22.	19.1	19.4	-0.3

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	28.	22.9	22.5	0.4
	30.	23.4	23.5	-0.1
	32.	24.3	24.5	-0.2
	34.	25.0	25.5	-0.5
	36.	25.9	26.4	-0.5
	38.	27.1	27.4	-0.3
	40.	28.0	28.3	-0.3
	42.	29.2	29.2	0.0
	44.	29.9	30.1	-0.2
	46.	30.6	31.0	-0.4
	48.	31.5	31.9	-0.4
	50.	32.7	32.7	0.0
	52.	34.0	33.6	0.4
	54.	34.7	34.4	0.3
	56.	35.4	35.3	0.1
	58.	36.1	36.1	0.0
	60.	37.0	36.9	0.1
42	2.	3.1	3.5	-0.4
	4.	5.6	6.2	-0.6
	6.	7.3	8.4	-1.1
	8.	9.8	10.3	-0.5
	14.	14.4	14.8	-0.4
	16.	15.6	16.0	-0.4
	18.	16.7	17.2	-0.5
	20.	18.0	18.3	-0.3
	22.	19.3	19.4	-0.1
	24.	20.1	20.5	-0.4
	26.	21.2	21.5	-0.3
	28.	22.3	22.5	-0.2
	30.	22.9	23.5	-0.6
	32.	24.0	24.5	-0.5
	34.	25.2	25.5	-0.3
	36.	26.7	26.4	0.3
	38.	27.6	27.4	0.2
	40.	28.4	28.3	0.1
	42.	29.1	29.2	-0.1
	44.	30.1	30.1	0.0
26	56.	35.1	35.3	-0.2
	58.	35.9	36.1	-0.2
	60.	37.0	36.9	0.1
	62.	37.6	37.7	-0.1
	64.	38.7	38.5	0.2
	66.	39.5	39.3	0.2
	68.	40.4	40.1	0.3
	70.	41.0	40.9	0.1
	72.	41.9	41.7	0.2
	74.	42.3	42.4	-0.1
	76.	42.9	43.2	-0.3
	78.	43.8	43.9	-0.1

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	80.	44.8	44.7	0.1
	82.	45.7	45.4	0.3
	86.	46.5	46.9	-0.4
	88.	47.2	47.6	-0.4
	90.	48.2	48.3	-0.1
	92.	49.1	49.0	0.1
	98.	51.3	51.1	0.2
	100.	51.8	51.8	0.0
27	54.	34.6	34.4	-0.2
	56.	35.6	35.3	0.3
	58.	36.8	36.1	0.7
	60.	37.5	36.9	0.6
	62.	38.1	37.7	0.4
	64.	39.0	38.5	0.5
	66.	40.1	39.3	0.8
	68.	40.5	40.1	0.4
	70.	41.2	40.9	0.3
	72.	41.8	41.7	0.1
	74.	42.7	42.4	0.3
	76.	43.8	43.2	0.6
	78.	44.6	43.9	0.7
	80.	45.5	44.7	0.8
	82.	45.9	45.4	0.5
	84.	46.4	46.2	0.2
	86.	47.0	46.9	0.1
	88.	48.0	47.6	0.4
	90.	49.3	48.3	1.0
	92.	49.6	49.0	0.6
	94.	50.0	49.7	0.3
	96.	50.7	50.4	0.3
	98.	51.4	51.1	0.3
28	96.	49.9	50.4	-0.5
	98.	50.5	51.1	-0.6
	100.	51.4	51.8	-0.4
	102.	51.9	52.5	-0.6
	104.	53.0	53.2	-0.2
	106.	53.7	53.8	-0.1
	108.	54.5	54.5	0.0
	110.	55.2	55.2	0.0
	112.	55.9	55.8	0.1
	114.	56.1	56.5	-0.4
	116.	56.9	57.1	-0.2
	118.	57.7	57.8	-0.1
	120.	58.6	58.4	0.2
	122.	59.2	59.1	0.1
	124.	59.8	59.7	0.1
	126.	60.2	60.4	-0.2
	128.	61.1	61.0	0.1
	130.	62.1	61.6	0.5
	132.	63.1	62.2	0.9

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	134.	63.6	62.9	0.7
	136.	64.2	63.5	0.7
	138.	64.8	64.1	0.7
	140.	65.2	64.7	0.5
29	136.	63.0	63.5	-0.5
	138.	64.1	64.1	0.0
	140.	65.0	64.7	0.3
	142.	65.6	65.3	0.3
	144.	66.3	66.0	0.3
	146.	66.9	66.6	0.3
	148.	67.6	67.2	0.4
	150.	68.2	67.8	0.4
	152.	68.7	68.4	0.3
	154.	69.1	69.0	0.1
	156.	70.0	69.6	0.4
	158.	70.8	70.2	0.6
	160.	71.5	70.8	0.7
	162.	72.2	71.3	0.9
	164.	72.4	71.9	0.5
	166.	73.0	72.5	0.5
	168.	73.5	73.1	0.4
	170.	74.6	73.7	0.9
	172.	75.5	74.3	1.2
	174.	75.9	74.8	1.1
	176.	76.4	75.4	1.0
	178.	77.0	76.0	1.0
	180.	77.5	76.6	0.9
30	176.	74.6	75.4	-0.8
	178.	75.5	76.0	-0.5
	180.	76.1	76.6	-0.5
	182.	76.7	77.2	-0.5
	184.	77.3	77.7	-0.4
	186.	78.0	78.3	-0.3
	188.	78.7	78.9	-0.2
	190.	79.4	79.4	0.0
	192.	79.9	80.0	-0.1
	194.	80.6	80.6	0.0
	196.	81.0	81.1	-0.1
	200.	82.4	82.3	0.1
	202.	83.1	82.8	0.3
	204.	83.6	83.4	0.2
	206.	84.1	83.9	0.2
	208.	84.5	84.5	0.0
	210.	85.5	85.1	0.4
	212.	86.4	85.6	0.8
	214.	86.9	86.2	0.7
	216.	87.3	86.7	0.6
	218.	87.8	87.3	0.5
	220.	88.3	87.8	0.5

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
31	216.	87.0	86.7	0.3
	218.	87.7	87.3	0.4
	220.	88.4	87.8	0.6
	222.	88.8	88.4	0.4
	224.	89.3	88.9	0.4
	226.	90.2	89.5	0.7
	228.	90.6	90.1	0.5
	230.	91.3	90.6	0.7
	232.	91.7	91.2	0.5
	234.	91.9	91.7	0.2
	236.	92.4	92.2	0.2
	238.	93.4	92.8	0.6
	240.	93.6	93.3	0.3
	242.	94.3	93.9	0.4
	244.	94.5	94.4	0.1
	246.	95.1	95.0	0.1
	248.	95.3	95.5	-0.2
	250.	96.4	96.1	0.3
	252.	97.2	96.6	0.6
	254.	97.7	97.2	0.5
	256.	98.1	97.7	0.4
	258.	98.5	98.2	0.3
	260.	98.9	98.8	0.1
32	256.	97.1	97.7	-0.6
	258.	97.5	98.2	-0.7
	260.	98.2	98.8	-0.6
	262.	98.8	99.3	-0.5
	264.	99.4	99.9	-0.5
	266.	100.3	100.4	-0.1
	268.	100.7	100.9	-0.2
	270.	101.5	101.5	0.0
	272.	101.9	102.0	-0.1
	274.	102.1	102.6	-0.5
	276.	102.8	103.1	-0.3
	278.	103.8	103.6	0.2
	280.	104.2	104.2	0.0
	282.	104.8	104.7	0.1
	284.	105.2	105.3	-0.1
	288.	106.2	106.3	-0.1
	290.	107.2	106.9	0.3
	292.	107.8	107.4	0.4
	294.	108.3	107.9	0.4
	296.	108.9	108.5	0.4
	298.	109.3	109.0	0.3
	300.	109.9	109.5	0.4
33	296.	108.1	108.5	-0.4
	298.	108.8	109.0	-0.2
	300.	109.4	109.5	-0.1
	302.	110.1	110.1	0.0

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	304.	110.8	110.6	0.2
	306.	111.4	111.2	0.2
	308.	112.3	111.7	0.6
	312.	112.7	112.8	-0.1
	314.	113.3	113.3	0.0
	316.	113.7	113.8	-0.1
	318.	114.9	114.4	0.5
	320.	115.3	114.9	0.4
	322.	115.9	115.4	0.5
	324.	116.3	116.0	0.3
	326.	116.7	116.5	0.2
	328.	117.1	117.0	0.1
	330.	118.2	117.6	0.6
	332.	119.2	118.1	1.1
	334.	119.6	118.6	1.0
	336.	119.8	119.2	0.6
	338.	120.4	119.7	0.7
	340.	120.8	120.2	0.6
39	336.	118.4	119.2	-0.8
	338.	119.1	119.7	-0.6
	340.	119.7	120.2	-0.5
	342.	120.1	120.7	-0.6
	344.	120.7	121.3	-0.6
	346.	121.6	121.8	-0.2
	348.	122.2	122.3	-0.1
	350.	122.6	122.9	-0.3
	352.	123.2	123.4	-0.2
	354.	123.7	123.9	-0.2
	356.	124.1	124.5	-0.4
	358.	124.9	125.0	-0.1
	360.	125.5	125.5	0.0
	362.	125.9	126.1	-0.2
	364.	126.3	126.6	-0.3
	366.	126.7	127.1	-0.4
	368.	127.4	127.6	-0.2
	370.	128.2	128.2	0.0
	372.	129.0	128.7	0.3
	374.	129.4	129.2	0.2
	376.	130.0	129.8	0.2
	378.	130.4	130.3	0.1
	380.	130.6	130.8	-0.2
40	376.	129.0	129.8	-0.8
	378.	129.6	130.3	-0.7
	380.	130.2	130.8	-0.6
	382.	130.8	131.4	-0.6
	384.	131.4	131.9	-0.5
	386.	132.2	132.4	-0.2
	388.	132.6	132.9	-0.3
	390.	133.2	133.5	-0.3
	392.	133.4	134.0	-0.6

Record Number	Distance (m)	Measured Travel Time (ms)	Calculated Travel Time (ms)	Travel Time Difference (ms)
	394.	133.8	134.5	-0.7
	396.	134.2	135.1	-0.9
	398.	135.4	135.6	-0.2
	400.	135.8	136.1	-0.3
	402.	136.7	136.7	0.0
	404.	136.9	137.2	-0.3
	406.	137.5	137.7	-0.2
	408.	137.7	138.2	-0.5
	410.	139.0	138.8	0.2
	412.	139.6	139.3	0.3
	414.	140.0	139.8	0.2
	416.	140.6	140.4	0.2
	418.	140.8	140.9	-0.1
	420.	141.3	141.4	-0.1
41	666.	206.0	206.3	-0.3
	668.	206.5	206.9	-0.4
	670.	207.1	207.4	-0.3
	672.	207.7	207.9	-0.2
	674.	208.3	208.4	-0.1
	676.	208.7	209.0	-0.3
	678.	209.8	209.5	0.3
	680.	210.0	210.0	0.0
	682.	210.4	210.5	-0.1
	684.	211.0	211.1	-0.1
	686.	211.5	211.6	-0.1
	688.	212.3	212.1	0.2
	690.	213.1	212.7	0.4
	692.	213.5	213.2	0.3
	694.	214.0	213.7	0.3
	696.	214.4	214.2	0.2
	698.	214.8	214.8	0.0
	700.	215.4	215.3	0.1
	702.	216.5	215.8	0.7
	704.	216.9	216.3	0.6
	706.	217.5	216.9	0.6
	708.	218.1	217.4	0.7
	710.	218.3	217.9	0.4

Table A2a.
Station 011: P Wave Velocities and Densities

Distance m	Velocity $m\ s^{-1}$	Depth m	Density $Mg\ m^{-3}$
4.	680	0.9	0.362
6.	861	1.7	0.378
8.	1042	2.4	0.395
10.	1208	3.2	0.412
12.	1351	3.9	0.427
14.	1471	4.6	0.441
16.	1569	5.2	0.452
18.	1649	5.8	0.462
20.	1715	6.3	0.471
22.	1772	6.7	0.478
24.	1822	7.2	0.485
26.	1868	7.7	0.491
28.	1910	8.1	0.497
30.	1951	8.6	0.503
32.	1990	9.0	0.509
34.	2027	9.5	0.514
36.	2064	10.0	0.520
38.	2101	10.5	0.526
40.	2137	11.0	0.531
42.	2173	11.5	0.537
44.	2208	12.0	0.543
46.	2243	12.5	0.548
48.	2278	13.1	0.554
50.	2312	13.6	0.560
55.	2397	14.9	0.575
60.	2479	16.3	0.590
65.	2559	17.7	0.605
70.	2636	19.1	0.620
75.	2710	20.5	0.635
80.	2781	22.0	0.650
85.	2848	23.3	0.664
90.	2913	24.7	0.679
95.	2974	26.1	0.693
100.	3031	27.4	0.706
105.	3085	28.7	0.719
110.	3136	30.0	0.732
115.	3184	31.2	0.744
120.	3229	32.4	0.755
125.	3270	33.5	0.766
130.	3309	34.7	0.776
135.	3345	35.8	0.785
140.	3378	36.8	0.794
145.	3409	37.8	0.802
150.	3437	38.8	0.810
155.	3464	39.7	0.817
160.	3488	40.7	0.823
165.	3510	41.5	0.829
170.	3530	42.4	0.835
175.	3549	43.2	0.840

Distance m	Velocity $m\ s^{-1}$	Depth m	Density $Mg\ m^{-3}$
180.	3566	43.9	0.845
185.	3582	44.7	0.849
190.	3597	45.4	0.853
195.	3610	46.0	0.856
200.	3622	46.7	0.860
230.	3675	49.9	0.874
260.	3706	52.4	0.881
290.	3723	54.3	0.886
320.	3733	55.8	0.888
350.	3738	56.9	0.890
380.	3741	57.7	0.890
410.	3743	58.3	0.891

Table A2b.
Station 019: P Wave Velocities and Densities

Distance m	Velocity m s^{-1}	Depth m	Density Mg m^{-3}
0.	561	0.0	0.353
4.	888	0.7	0.381
6.	1023	1.3	0.394
8.	1173	1.9	0.403
10.	1305	2.5	0.422
12.	1426	3.2	0.436
14.	1533	3.8	0.448
16.	1628	4.4	0.460
18.	1710	5.0	0.470
20.	1781	5.5	0.480
22.	1843	6.0	0.488
24.	1898	6.5	0.496
26.	1946	6.9	0.503
28.	1990	7.4	0.509
30.	2030	7.8	0.515
32.	2067	8.3	0.521
34.	2102	8.7	0.526
36.	2136	9.1	0.531
38.	2168	9.6	0.536
40.	2199	10.0	0.541
42.	2229	10.5	0.546
44.	2258	10.9	0.551
46.	2287	11.4	0.556
48.	2315	11.8	0.561
50.	2343	12.3	0.566
55.	2412	13.4	0.578
60.	2479	14.7	0.590
65.	2543	15.9	0.602
70.	2607	17.2	0.614
75.	2668	18.5	0.626
80.	2727	19.7	0.639
85.	2785	21.0	0.651
90.	2840	22.3	0.663
95.	2893	23.6	0.674
100.	2945	24.9	0.686
105.	2994	26.2	0.697
110.	3041	27.4	0.709
115.	3086	28.7	0.719
120.	3128	29.9	0.730
125.	3170	31.1	0.740
130.	3208	32.3	0.750
135.	3245	33.4	0.759
140.	3280	34.5	0.768
145.	3313	35.7	0.777
150.	3344	36.7	0.785
155.	3373	37.8	0.793
160.	3401	38.8	0.800
165.	3427	39.8	0.807
170.	3452	40.8	0.814

Distance m	Velocity m s^{-1}	Depth m	Density Mg m^{-3}
175.	3475	41.8	0.820
180.	3496	42.7	0.826
185.	3517	43.6	0.831
190.	3536	44.5	0.836
195.	3554	45.3	0.841
200.	3570	46.1	0.846
230.	3649	50.4	0.867
260.	3702	54.0	0.880
290.	3735	56.9	0.889
320.	3757	59.3	0.894
350.	3771	61.2	0.898
380.	3780	62.7	0.900
410.	3785	63.9	0.901
440.	3789	64.9	0.902
470.	3791	65.7	0.902
500.	3793	66.3	0.903
530.	3793	66.8	0.903
560.	3794	67.2	0.903
590.	3794	67.5	0.903
620.	3795	67.7	0.903
650.	3795	67.9	0.903
680.	3795	68.1	0.903
710.	3795	68.2	0.903
740.	3795	68.3	0.903
770.	3795	68.4	0.903
800.	3795	68.4	0.903
830.	3795	68.5	0.903
860.	3795	68.5	0.903
890.	3795	68.6	0.903
920.	3795	68.6	0.903
950.	3795	68.6	0.903
980.	3795	68.6	0.903
1010.	3795	68.6	0.903

Table A2c.
Station R16: P Wave Velocities and Densities

Distance m	Velocity $m\ s^{-1}$	Depth m	Density $Mg\ m^{-3}$
0.	500	0.0	0.348
4.	800	0.8	0.373
6.	973	1.4	0.388
8.	1134	2.1	0.404
10.	1294	2.8	0.420
12.	1418	3.5	0.435
14.	1533	4.1	0.448
16.	1634	4.7	0.460
18.	1711	5.3	0.470
20.	1780	5.8	0.479
22.	1838	6.3	0.487
24.	1888	6.7	0.494
26.	1923	7.2	0.501
28.	1973	7.6	0.506
30.	2010	8.0	0.512
32.	2044	8.4	0.517
34.	2077	8.9	0.522
36.	2109	9.3	0.527
38.	2140	9.7	0.532
40.	2170	10.2	0.537
42.	2199	10.6	0.541
44.	2223	11.1	0.546
46.	2257	11.5	0.551
48.	2285	12.0	0.556
50.	2314	12.5	0.560
55.	2383	13.6	0.572
60.	2451	14.9	0.585
65.	2517	16.2	0.597
70.	2581	17.5	0.609
75.	2644	18.8	0.622
80.	2705	20.1	0.634
85.	2763	21.4	0.646
90.	2830	22.7	0.658
95.	2875	24.0	0.670
100.	2937	25.3	0.682
105.	2978	26.6	0.694
110.	3026	27.9	0.705
115.	3072	29.1	0.716
120.	3116	30.4	0.727
125.	3158	31.6	0.737
130.	3198	32.8	0.747
135.	3235	34.0	0.757
140.	3271	35.1	0.766
145.	3305	36.3	0.774
150.	3336	37.4	0.783
155.	3367	38.4	0.791
160.	3395	39.5	0.798
165.	3421	40.5	0.805
170.	3446	41.5	0.812

Distance m	Velocity $m\ s^{-1}$	Depth m	Density $Mg\ m^{-3}$
175.	3470	42.4	0.818
180.	3492	43.4	0.824
185.	3513	44.3	0.830
190.	3532	45.2	0.835
195.	3550	46.0	0.840
200.	3567	46.8	0.845
230.	3647	51.1	0.866
260.	3700	54.7	0.880
290.	3733	57.7	0.888
320.	3755	60.0	0.894
350.	3769	61.9	0.897
380.	3777	63.4	0.899
410.	3783	64.6	0.900
440.	3786	65.6	0.901
470.	3789	66.3	0.902
500.	3790	66.9	0.902
530.	3791	67.4	0.902
560.	3791	67.8	0.902
590.	3792	68.1	0.902
620.	3792	68.3	0.902
650.	3792	68.5	0.902
680.	3792	68.6	0.902
710.	3792	68.8	0.902
740.	3792	68.9	0.902
770.	3792	68.9	0.902
800.	3792	69.0	0.902
830.	3792	69.0	0.902
860.	3792	69.1	0.902
890.	3792	69.1	0.902
920.	3792	69.1	0.902
950.	3792	69.1	0.902
980.	3792	69.2	0.902
1010.	3792	69.2	0.902

Table A3. P Wave Vertical Travel Times

Station 011		Station 019		Station R16	
Depth m	Vertical Travel Time ms	Depth m	Vertical Travel Time ms	Depth m	Vertical Travel Time ms
1.7	1.0	1.3	0.6	1.4	0.7
2.4	1.8	1.9	1.2	2.1	1.3
3.2	2.5	2.5	1.6	2.8	1.9
3.9	3.0	3.2	2.2	3.5	2.4
4.6	3.5	3.8	2.6	4.2	2.9
5.2	3.9	4.4	2.9	4.7	3.2
5.8	4.3	5.0	3.3	5.3	3.6
6.3	4.6	5.5	3.6	5.8	3.8
6.7	4.8	6.0	3.9	6.3	4.1
7.2	5.1	6.5	4.1	6.7	4.3
7.6	5.3	6.9	4.3	7.2	4.6
8.1	5.6	7.4	4.6	7.6	4.8
8.5	5.8	7.8	4.8	8.0	5.0
9.0	6.0	8.3	5.0	8.4	5.2
9.5	6.3	8.7	5.2	8.8	5.4
9.9	6.5	9.1	5.4	9.2	5.6
10.4	6.7	9.5	5.6	9.7	5.8
10.9	6.9	10.0	5.8	10.1	6.0
11.4	7.2	10.4	6.0	10.5	6.2
11.9	7.4	10.9	6.2	11.0	6.4
12.4	7.6	11.3	6.4	11.4	6.6
13.0	7.9	11.8	6.6	11.9	6.8
13.5	8.1	12.2	6.8	12.3	7.0
14.8	8.7	13.4	7.3	13.5	7.5
16.2	9.2	14.6	7.8	14.7	8.0
17.6	9.8	15.8	8.3	16.0	8.5
19.0	10.3	17.1	8.8	17.2	9.0
20.4	10.8	18.3	9.2	18.5	9.5
21.8	11.4	19.6	9.7	19.8	9.9
23.2	11.9	20.9	10.2	21.1	10.4
24.5	12.3	22.2	10.6	22.4	10.9
25.9	12.8	23.5	11.1	23.7	11.3
27.2	13.2	24.7	11.5	25.0	11.8
28.5	13.6	26.0	11.9	26.3	12.2
29.8	14.1	27.2	12.3	27.6	12.7
31.0	14.4	28.5	12.8	28.8	13.1
32.2	14.8	29.7	13.1	30.1	13.5
33.4	15.2	30.9	13.5	31.3	13.9
34.5	15.5	32.1	13.9	32.5	14.3
35.6	15.9	33.2	14.2	33.7	14.6
36.7	16.2	34.4	14.6	34.8	15.0
37.7	16.5	35.5	15.0	35.9	15.3
38.7	16.8	36.6	15.3	37.0	15.6
39.6	17.0	37.6	15.6	38.1	16.0
40.5	17.3	38.7	15.9	39.2	16.3
41.4	17.6	39.7	16.2	40.2	16.6
42.3	17.8	40.6	16.5	41.2	16.9
43.1	18.0	41.6	16.8	42.2	17.2

Station C11		Station O19		Station R16	
Depth m	Vertical Travel Time ms	Depth m	Vertical Travel Time ms	Depth m	Vertical Travel Time ms
43.9	18.3	42.5	17.0	43.1	17.4
44.6	18.5	43.4	17.3	44.0	17.7
45.3	18.7	44.3	17.5	44.9	17.9
46.0	18.9	45.2	17.8	45.8	18.2
46.7	19.0	46.0	18.0	46.6	18.4
50.0	20.0	50.3	19.2	51.0	19.7
52.6	20.7	54.0	20.2	54.8	20.7
54.6	21.2	57.0	21.0	57.8	21.5
56.1	21.6	59.4	21.7	60.3	22.2
57.2	21.9	61.4	22.2	62.3	22.7
58.0	22.1	62.9	22.6	63.8	23.1
58.7	22.3	64.2	22.9	65.1	23.4
59.2	22.4	65.2	23.2	66.1	23.7
60.6	22.8	66.0	23.4	67.0	23.9
100.0	33.2	66.7	23.6	67.6	24.1
400.0	112.5	67.2	23.7	68.1	24.2
		67.6	23.8	68.6	24.4
		69.2	24.2	70.1	24.8
		100.0	32.3	100.0	32.6
		400.0	111.6	400.0	111.9

Table A4a. Station Q13: Calculated Elastic Parameters: Profile #1, P and SV Waves

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
1	1	670	500	-0.128	0.16	0.09	-0.02	0.004
2	1	880	590	0.092	0.29	0.13	0.03	0.12
3	1	1090	680	0.181	0.44	0.18	0.11	0.23
4	1	1150	755	0.121	0.52	0.23	0.07	0.23
5	1	1420	840	0.231	0.75	0.31	0.26	0.47
6	1	1565	910	0.245	0.93	0.37	0.36	0.61
7	1	1700	980	0.251	1.12	0.45	0.45	0.75
8	1	1820	1050	0.251	1.33	0.53	0.54	0.89
9	1	1920	1100	0.256	1.51	0.60	0.63	1.03
10	1	2010	1155	0.254	1.71	0.68	0.70	1.16
11	1	2115	1205	0.260	1.93	0.77	0.83	1.34
12	1	2195	1250	0.260	2.13	0.84	0.91	1.48
13	1	2260	1290	0.258	2.31	0.92	0.98	1.59
14	1	2340	1330	0.261	2.52	1.00	1.09	1.76
15	1	2405	1370	0.260	2.72	1.08	1.17	1.89
16	1	2470	1405	0.261	2.93	1.16	1.27	2.04
17	1	2540	1430	0.268	3.12	1.23	1.42	2.24
18	1	2595	1460	0.268	3.30	1.30	1.51	2.38
19	1	2650	1485	0.271	3.49	1.37	1.62	2.54
20	1	2700	1508	0.273	3.66	1.44	1.73	2.69
21	1	2745	1525	0.277	3.81	1.49	1.85	2.85
22	1	2795	1550	0.278	4.00	1.57	1.96	3.00
23	1	2840	1565	0.282	4.16	1.62	2.10	3.18
24	1	2890	1580	0.287	4.32	1.68	2.26	3.38
25	1	2930	1597	0.289	4.48	1.74	2.38	3.54
26	1	2975	1610	0.293	4.65	1.80	2.54	3.73
27	1	3020	1627	0.296	4.82	1.86	2.68	3.93
28	1	3060	1640	0.299	4.98	1.92	2.84	4.11
29	1	3100	1653	0.301	5.13	1.97	2.99	4.30
30	1	3140	1670	0.303	5.32	2.04	3.13	4.50

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
31	1	3180	1685	0.305	5.51	2.11	3.29	4.70
32	1	3220	1695	0.308	5.66	2.16	3.48	4.92
33	1	3250	1705	0.310	5.79	2.21	3.61	5.08
34	1	3290	1715	0.313	5.96	2.27	3.81	5.32
35	1	3330	1728	0.316	6.14	2.33	4.00	5.55
36	1	3355	1740	0.316	6.28	2.39	4.10	5.69
37	1	3385	1755	0.316	6.45	2.45	4.22	5.85
38	1	3415	1768	0.317	6.62	2.51	4.35	6.03
39	1	3440	1780	0.317	6.76	2.57	4.45	6.16
40	1	3465	1790	0.318	6.90	2.62	4.57	6.32
41	5	3530	1820	0.319	7.29	2.76	4.87	6.71
42	5	3650	1870	0.322	8.01	3.03	5.48	7.50
43	5	3715	1920	0.318	8.58	3.26	5.68	7.85
44	5	3760	1960	0.313	9.02	3.43	5.77	8.06
45	5	3775	1985	0.309	9.26	3.54	5.72	8.08
46	5	3780	1995	0.307	9.35	3.58	5.69	8.07
47	-	3780	1995	0.307	9.35	3.58	5.69	8.07

Table A4b. Station Q13: Calculated Elastic Parameters: Profile #1, P and SH Waves

Layer Number	Thickness (m)	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
1	1	510	-0.189	0.15	0.09	-0.03	0.04
2	1	580	0.116	0.28	0.13	0.04	0.12
3	1	650	0.224	0.41	0.17	0.14	0.25
4	1	710	0.192	0.49	0.20	0.13	0.26
5	1	776	0.287	0.67	0.26	0.35	0.53
6	1	825	0.308	0.80	0.31	0.49	0.70
7	1	895	0.308	0.98	0.37	0.60	0.85
8	1	940	0.318	1.12	0.43	0.75	1.03
9	1	980	0.324	1.26	0.48	0.88	1.19
10	1	1030	0.322	1.43	0.54	0.98	1.34
11	1	1070	0.328	1.60	0.60	1.15	1.55
12	1	1110	0.328	1.76	0.67	1.27	1.71
13	1	1150	0.325	1.93	0.73	1.35	1.84
14	1	1195	0.324	2.13	0.81	1.47	2.01
15	1	1240	0.319	2.33	0.89	1.56	2.15
16	1	1275	0.318	2.52	0.96	1.67	2.31
17	1	1315	0.317	2.73	1.03	1.79	2.49
18	1	1350	0.314	2.92	1.11	1.88	2.62
19	1	1380	0.314	3.11	1.18	1.99	2.78
20	1	1415	0.311	3.31	1.26	2.07	2.92
21	1	1445	0.308	3.50	1.34	2.15	3.05
22	1	1475	0.307	3.70	1.41	2.25	3.20
23	1	1500	0.307	3.89	1.48	2.36	3.35
24	1	1520	0.309	4.07	1.55	2.51	3.54
25	1	1545	0.307	4.25	1.62	2.59	3.68

Layer Number	Thickness (m)	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
26	1	1565	0.309	4.44	1.69	2.73	3.87
27	1	1585	0.310	4.62	1.76	2.87	4.05
28	1	1605	0.310	4.81	1.83	3.00	4.22
29	1	1620	0.312	4.97	1.89	3.14	4.41
30	1	1640	0.312	5.16	1.96	3.27	4.59
31	5	1685	0.316	5.68	2.15	3.71	5.15
32	5	1750	0.322	6.50	2.45	4.44	6.08
33	5	1810	0.322	7.22	2.73	4.92	6.74
34	5	1855	0.326	7.90	2.97	5.57	7.56
35	5	1890	0.325	8.36	3.15	5.87	7.98
36	5	1925	0.322	8.76	3.31	6.01	8.22
37	5	1945	0.319	8.96	3.39	6.00	8.26
38	5	1965	0.315	9.12	3.47	5.90	8.21
39		1965	0.315	9.12	3.47	5.90	8.21

Table A4c. Station Q13: Calculated Elastic Parameters: Profile #2, P and SV Waves

Layer Number	Thickness (m)	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
1	1	501	-5.97	-0.87	0.09	-0.08	-0.02
2	1	598	0.010	0.27	0.13	0.003	0.09
3	1	685	0.174	0.44	0.19	0.10	0.22
4	1	760	0.199	0.57	0.24	0.16	0.32
5	1	837	0.243	0.74	0.30	0.28	0.48
6	1	800	0.268	0.91	0.36	0.41	0.65
7	1	950	0.282	1.09	0.43	0.55	0.84
8	1	1003	0.293	1.27	0.49	0.70	1.02
9	1	1054	0.294	1.44	0.56	0.80	1.16
10	1	1100	0.296	1.62	0.63	0.91	1.32
11	1	1137	0.301	1.78	0.69	1.03	1.49
12	1	1179	0.300	1.95	0.75	1.12	1.63
13	1	1215	0.300	2.12	0.82	1.23	1.77
14	1	1247	0.302	2.28	0.88	1.33	1.92
15	1	1275	0.306	2.44	0.94	1.47	2.10
16	1	1309	0.305	2.62	1.00	1.57	2.24
17	1	1335	0.308	2.79	1.06	1.71	2.43
18	1	1360	0.311	2.96	1.13	1.85	2.61
19	1	1388	0.311	3.14	1.20	1.97	2.77
20	1	1413	0.313	3.33	1.26	2.12	2.97
21	1	1438	0.314	3.50	1.33	2.24	3.13
22	1	1464	0.315	3.70	1.40	2.38	3.32
23	1	1487	0.315	3.87	1.47	2.50	3.48
24	1	1510	0.317	4.08	1.55	2.69	3.73
25	1	1530	0.320	4.28	1.62	2.88	3.97

Layer Number	Thickness (m)	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
26	1	1550	0.321	4.46	1.69	3.03	4.16
27	1	1570	0.321	4.64	1.75	3.16	4.33
28	1	1590	0.320	4.80	1.82	3.23	4.44
29	1	1609	0.321	5.00	1.89	3.39	4.66
30	1	1638	0.322	5.19	1.96	3.54	4.85
31	5	1680	0.324	5.76	2.17	3.99	5.44
32	5	1755	0.325	6.63	2.50	4.66	6.33
33	5	1820	0.326	7.44	2.80	5.25	7.12
34	5	1865	0.327	8.07	3.04	5.76	7.79
35	5	1900	0.327	8.55	3.22	6.11	8.25
36	5	1920	0.327	8.82	3.32	6.30	8.52
37	5	1930	0.325	8.90	3.35	6.23	8.47
38	5	1930	0.326	8.91	3.35	6.30	8.54
39		1930	0.326	8.91	3.35	6.30	8.54

Table A4d. Station Q13: Calculated Elastic Parameters: Profile #2, P and SH Waves

Layer Number	Thickness (m)	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
1	1	380	-0.073	0.09	0.05	-0.01	0.03
2	1	470	0.280	0.21	0.08	0.11	0.16
3	1	572	0.310	0.34	0.13	0.21	0.30
4	1	650	0.311	0.46	0.18	0.29	0.40
5	1	735	0.317	0.62	0.24	0.41	0.56
6	1	815	0.319	0.80	0.30	0.53	0.73
7	1	900	0.313	1.00	0.38	0.64	0.89
8	1	980	0.306	1.22	0.47	0.74	1.05
9	1	1057	0.292	1.45	0.56	0.79	1.16
10	1	1125	0.283	1.67	0.65	0.85	1.28
11	1	1180	0.279	1.88	0.74	0.93	1.42
12	1	1244	0.267	2.12	0.84	0.96	1.51
13	1	1295	0.260	2.34	0.93	1.00	1.62
14	1	1340	0.256	2.54	1.01	1.06	1.74
15	1	1385	0.253	2.77	1.10	1.13	1.87
16	1	1420	0.253	2.97	1.18	1.21	2.00
17	1	1447	0.258	3.16	1.25	1.34	2.18
18	1	1470	0.264	3.34	1.32	1.47	2.35
19	1	1490	0.269	3.51	1.38	1.60	2.53
20	1	1510	0.275	3.69	1.44	1.76	2.73
21	1	1528	0.279	3.85	1.50	1.90	2.90
22	1	1544	0.285	4.02	1.56	2.07	3.11
23	1	1560	0.288	4.18	1.62	2.20	3.29
24	1	1575	0.295	4.36	1.68	2.42	3.54
25	1	1589	0.300	4.55	1.74	2.63	3.80

Layer Number	Thickness (m)	V_s m s^{-1}	Poisson's Ratio	Young's Modulus Gigapascals	Rigidity Gigapascals	Lame's Modulus Gigapascals	Bulk Modulus Gigapascals
26	1	1604	0.304	4.72	1.81	2.79	4.00
27	1	1616	0.307	4.86	1.86	2.95	4.19
28	1	1630	0.307	5.00	1.91	3.04	4.32
29	1	1643	0.311	5.17	1.97	3.23	4.55
30	1	1653	0.314	5.32	2.02	3.42	4.77
31	5	1690	0.321	5.81	2.20	3.94	5.40
32	5	1740	0.329	6.54	2.46	4.75	6.39
33	5	1795	0.332	7.27	2.73	5.40	7.22
34	5	1845	0.332	7.93	2.97	5.89	7.87
35	5	1890	0.330	8.48	3.18	6.17	8.30
36	5	1935	0.324	8.94	3.37	6.20	8.45
37	5	1975	0.314	9.24	3.51	5.91	8.26
38	5	2015	0.304	9.57	3.67	5.71	8.15
39	5	2035	0.299	9.72	3.74	5.56	8.06

Appendix A. Figure Captions

Fig. A1a. Short-refraction travel time curve, station O11, P waves.

Fig. A1b. Short-refraction travel time curve, station O19, P waves.

Fig. A2a. P wave velocity vs. depth, station O11.

Fig. A2b. P wave velocity vs. depth, station O19.

Fig. A2c. P wave velocity vs. depth, station R16.

Fig. A4a. Poisson's ratio vs. depth, station Q13, from SV waves on profile 1.

Fig. A4b. Poisson's ratio vs. depth, station Q13, from SH waves on profile 1.

Fig. A4c. Poisson's ratio vs. depth, station Q13, from SV waves on profile 2.

Fig. A4d. Poisson's ratio vs. depth, station Q13, from SH waves on profile 2.

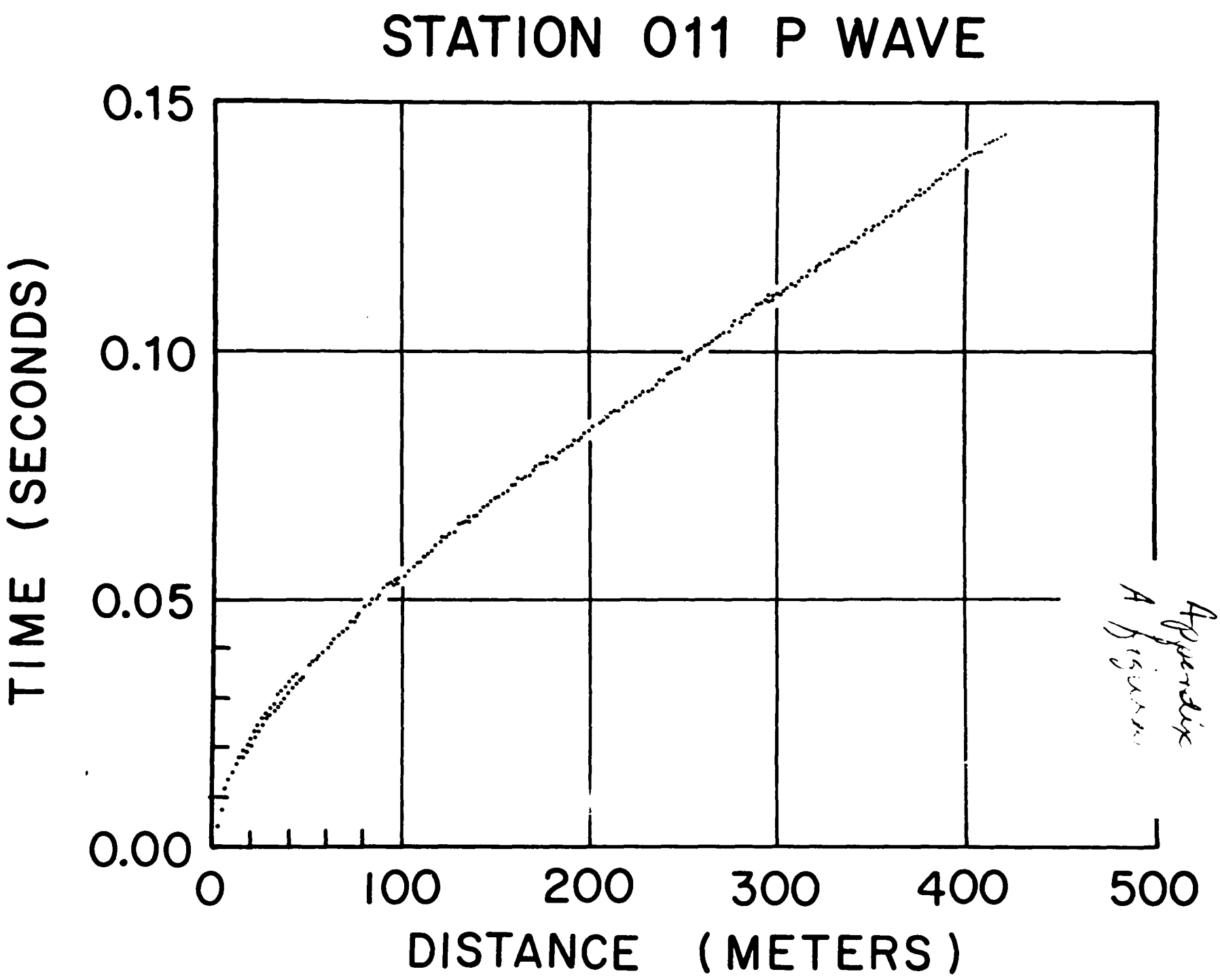

STATION 011 P WAVE
0.15
0.10
0.05
0.00
TIME (SECONDS)
0
100
200
300
400
500
DISTANCE (METERS)

Figure A1a

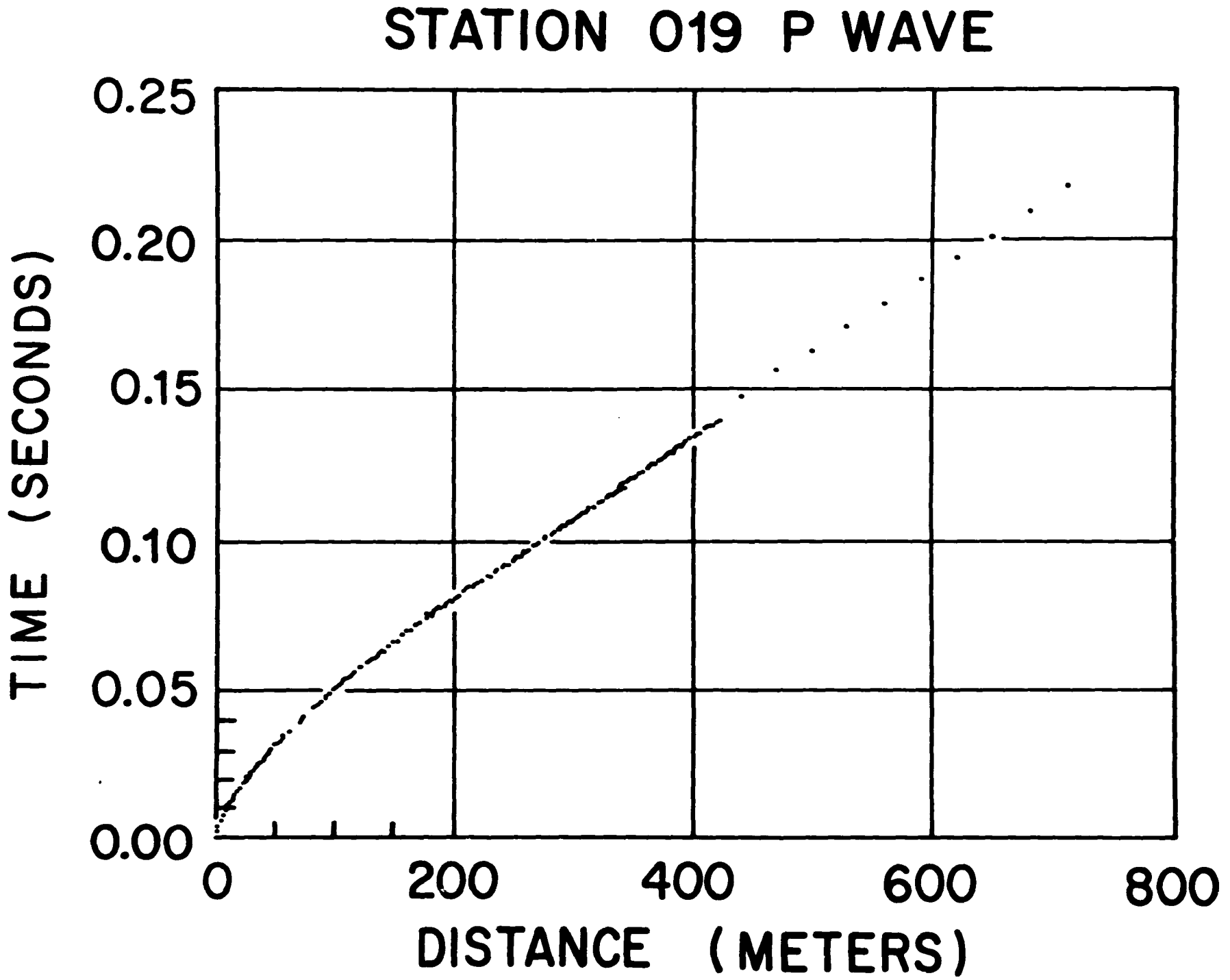

STATION 019 P WAVE
0.25
0.20
0.15
0.10
0.05
0.00
TIME (SECONDS)
0
200
400
600
800
DISTANCE (METERS)

Figure A1b

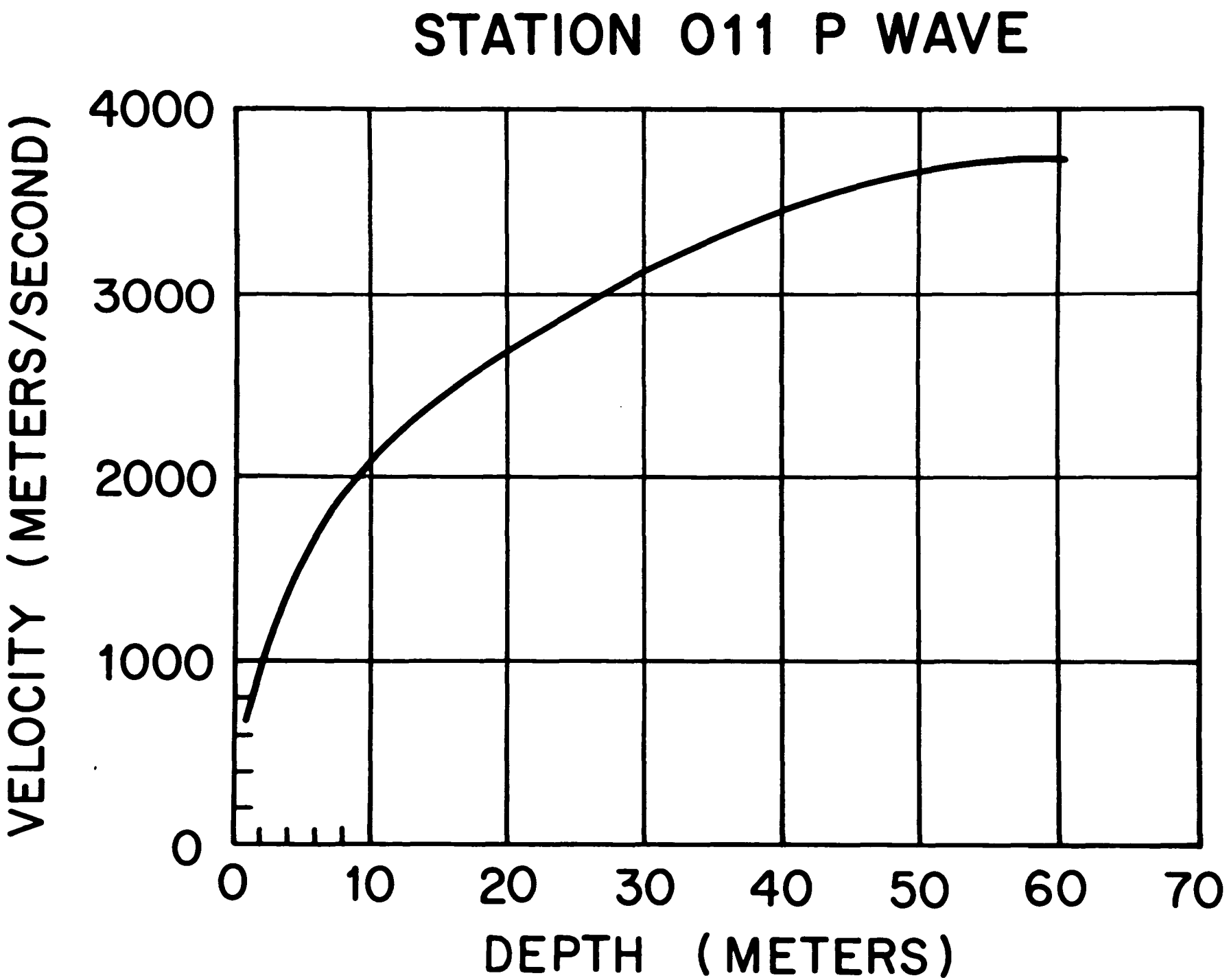

STATION 011 P WAVE
VELOCITY (METERS/SECOND)
4000
3000
2000
1000
0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A2a

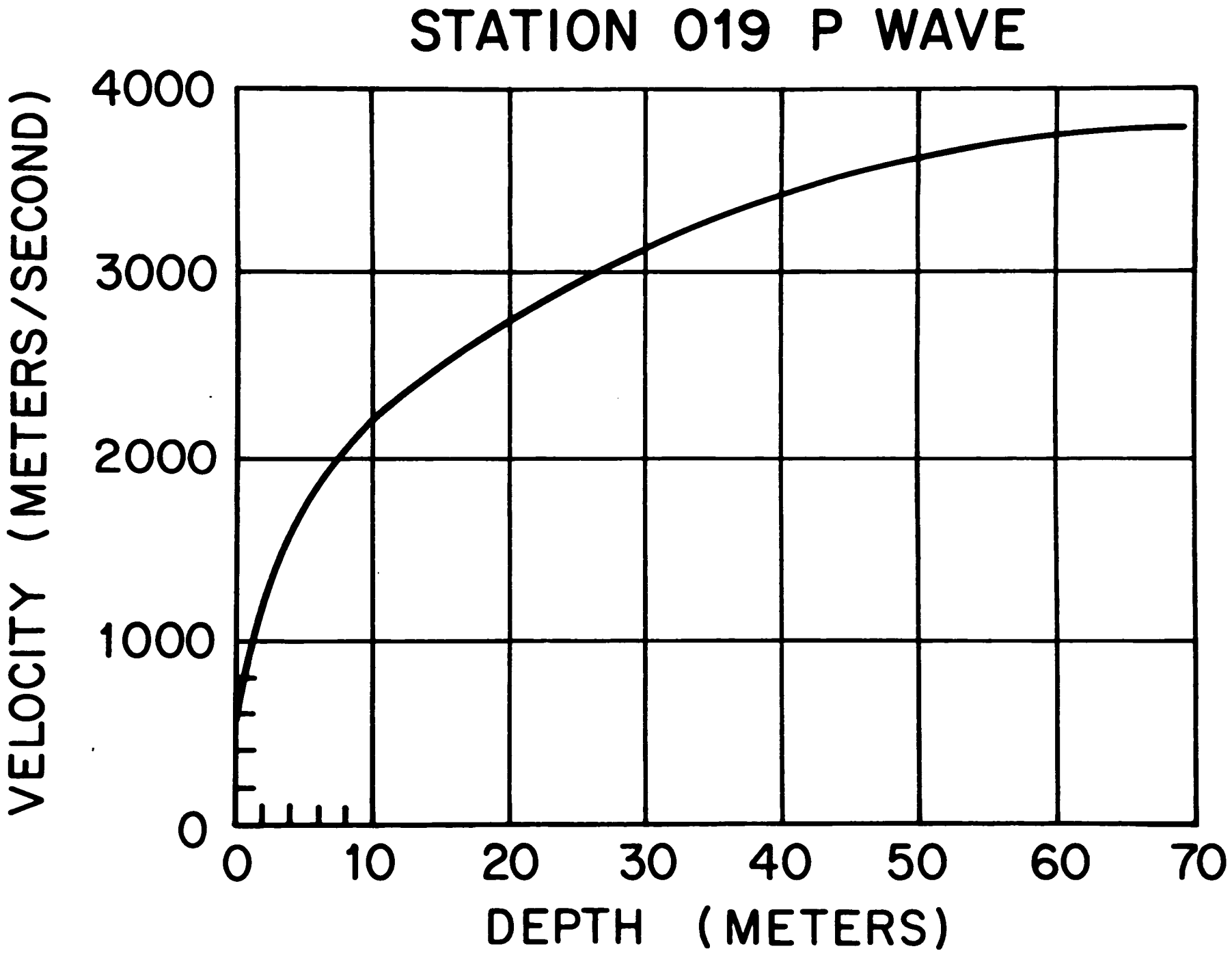

STATION 019 P WAVE
VELOCITY (METERS/SECOND)
4000
3000
2000
1000
0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A2b

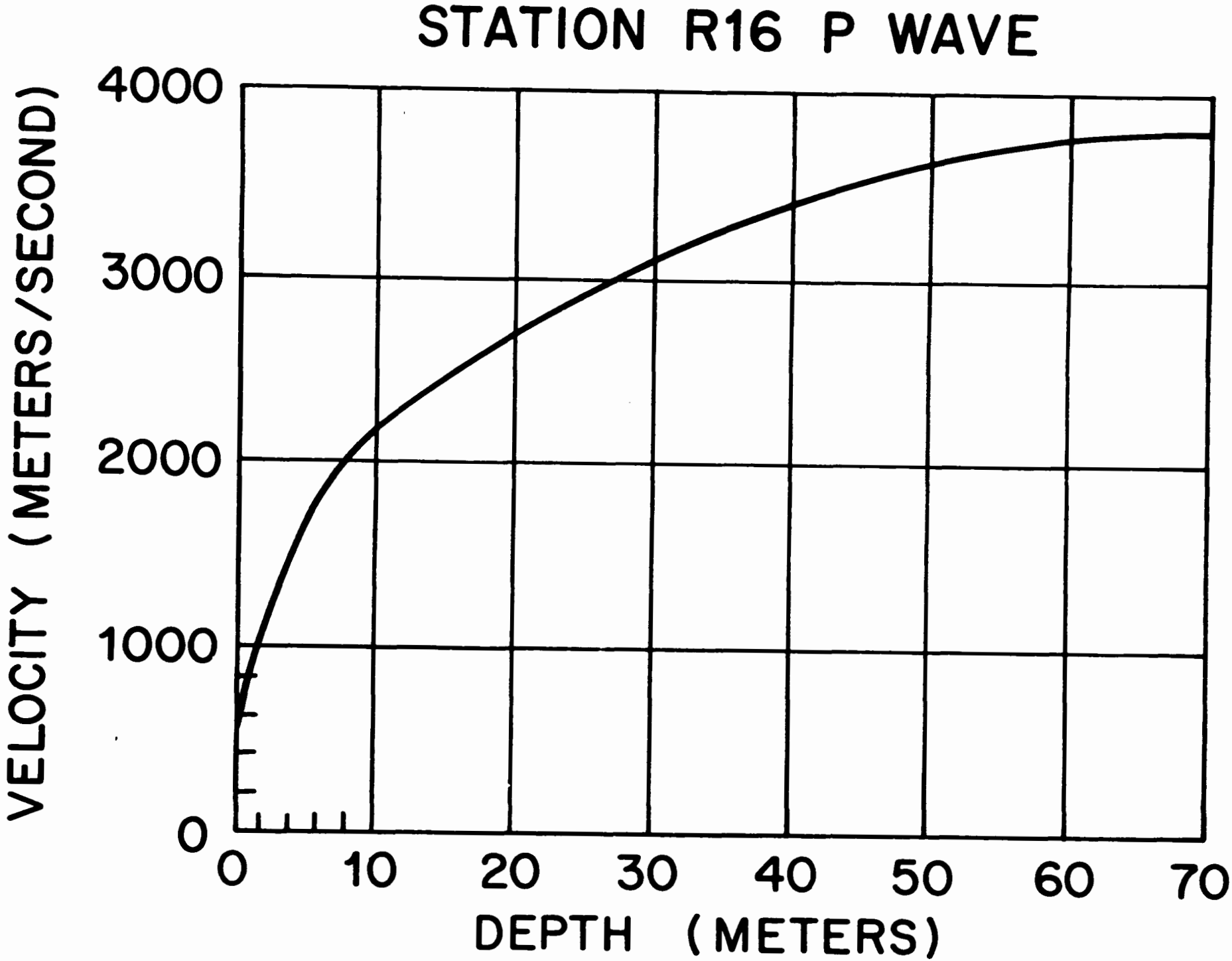

STATION R16 P WAVE
VELOCITY (METERS/SECOND)
4000
3000
2000
1000
0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A2c

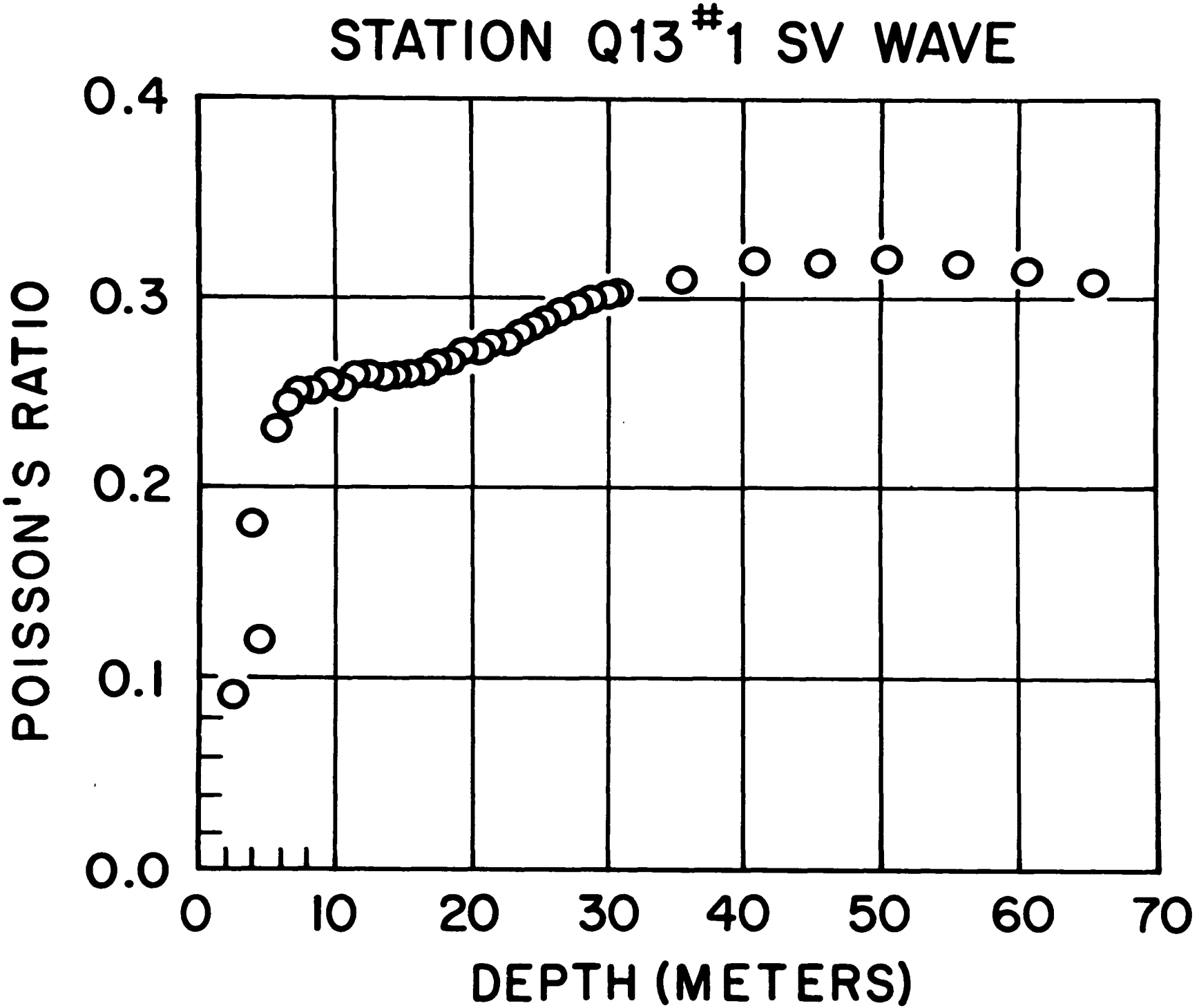

STATION Q13 #1 SV WAVE
POISSON'S RATIO
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A4a

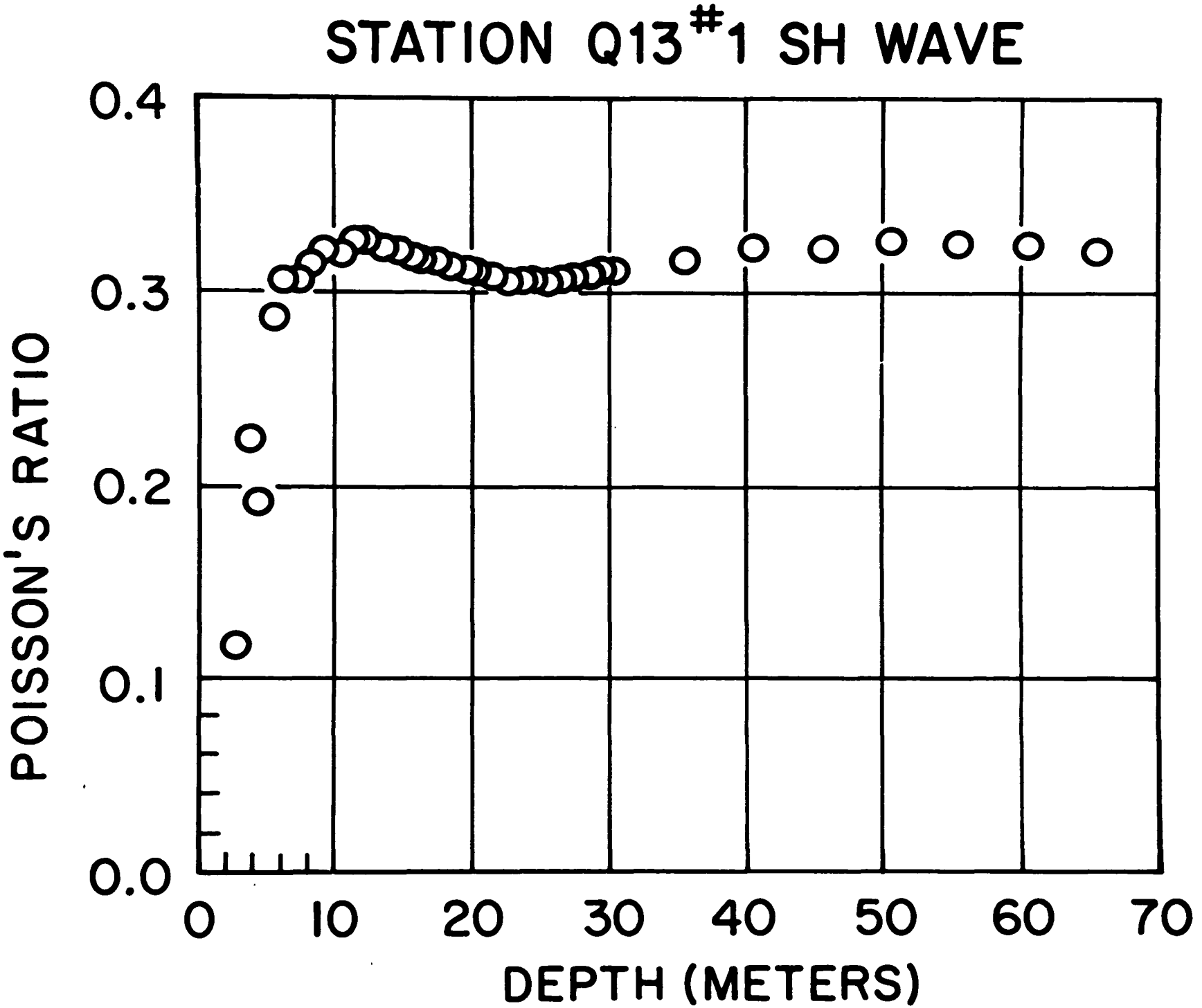

STATION Q13#1 SH WAVE
POISSON'S RATIO
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A4b

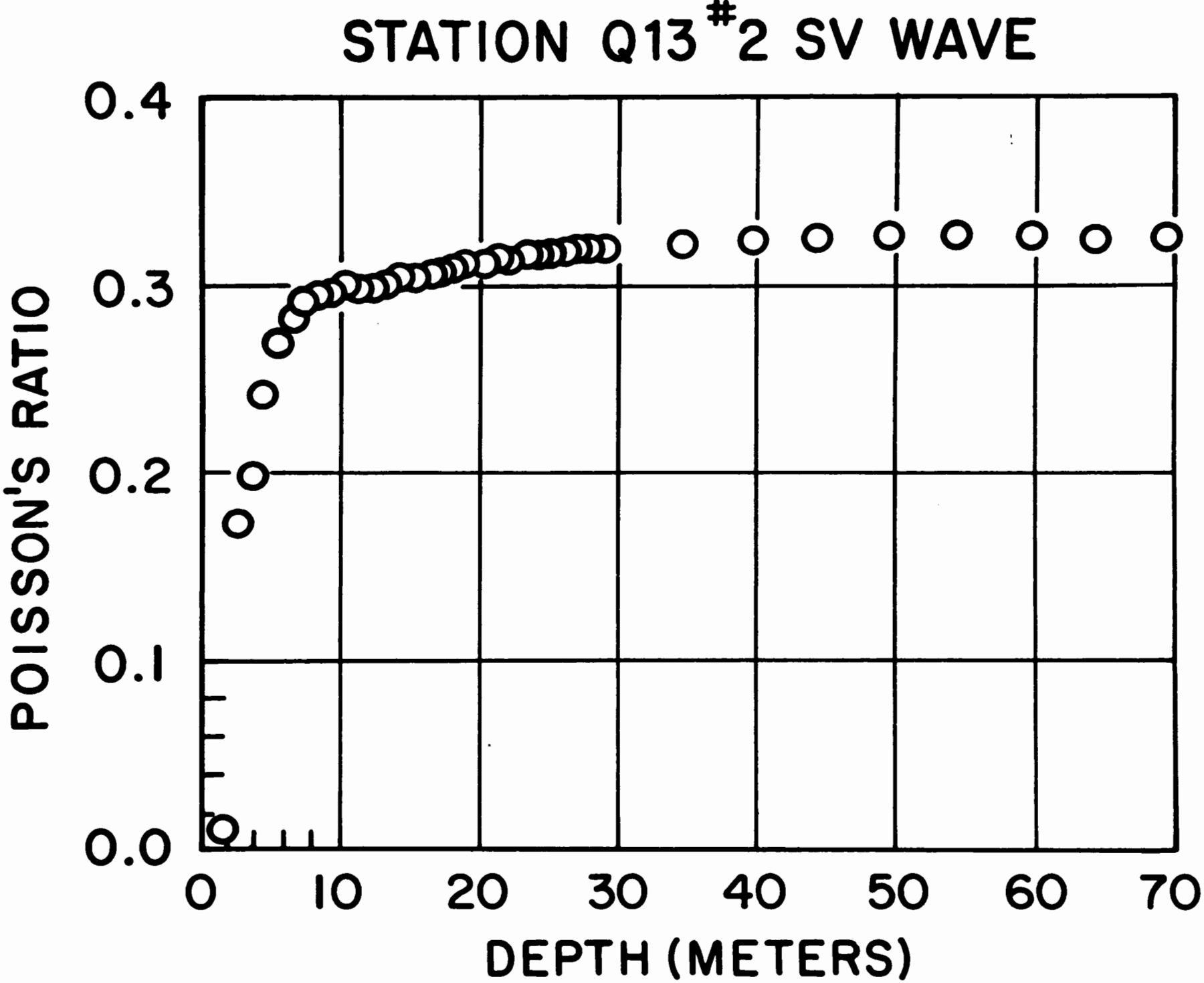

STATION Q13 #2 SV WAVE
POISSON'S RATIO
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A4c

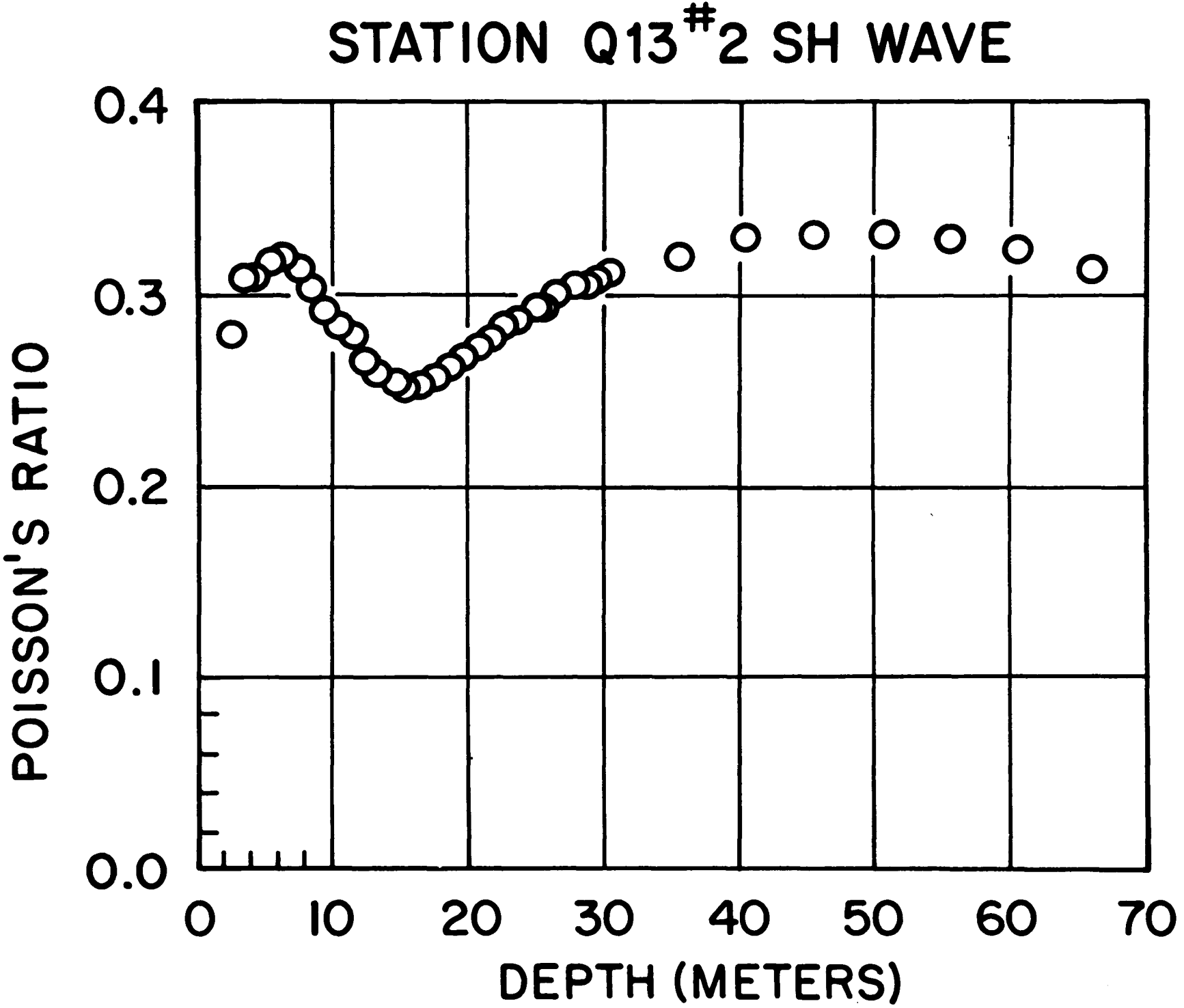

STATION Q13#2 SH WAVE
POISSON'S RATIO
0.4
0.3
0.2
0.1
0.0
0
10
20
30
40
50
60
70
DEPTH (METERS)

Figure A4d

Appendix B. Reflection Results

Table

TABLE B1. Radar Reflection Times, t_r, and Ice Thicknesses, h_i(radar)

Station	t_r μs	h_i(radar) m	Station	t_r μs	h_i(radar) m	Station	t_r μs	h_i(radar) m
Q13	3.8	328	O15	4.41	379	R14	3.79	327
C-16	4.13	356	O19*	5.5	471	R15	3.84	331
			P7	4.0	345	R16	4.1	353
H13	8.9	758	P8	4.8	412	R17	3.7	320
I14	4.6	395	P9	4.70	404	R18	2.5	218
I15	3.45	298						
J9DC	4.93	423	P10	4.15	357	S14	2.43	212
J12	4.45	387	P11	4.45	383	S15	2.8	244
			P12	3.94	340	S16	3.8	328
J13	4.45	383	P13	4.32	372	S17	2.9	252
J14	4.77	410	P14	3.69	319	T15	3.06	266
J15	3.9	336						
J16	7.4	631	P15	3.96	341	T17	1.82	161
K12	4.75	408	P16	2.7	235			
			P17	4.85	416			
K14	4.15	357	P18	4.8	412			
K15	4.28	368	P19	5.35	459			
K16	4.75	408						
K17	2.36	207	Q7	3.9	336			
KL7	5.54	475	Q8	4.4	379			
			Q9	4.00	345			
L15	3.80	328	Q10	3.9	336			
L16	4.2	362	Q11	4.04	365			
L17	3.55	307						
L18	4.55	391	Q12	3.96	341			
L19	3.62	313	Q14	3.77	325			
			Q15	3.85	332			
M12	4.0	345	Q16	4.6	395			
M14	4.0+	345	Q17	4.2	362			
M15	3.55	307						
N11	4.95	425	Q18	5.95	509			
N12	4.3	370	R10	3.50	303			
			R11	3.39	293			
N19	6.5	556	R12	3.65	315			
O11	4.4	379	R13	3.49	302			
O12	4.30	370						
O13	4.44	382						
O14	4.00	345						

*Station occupied twice. Seismic and radar reflections not at the same spot.
+From airborne sounding.

TABLE B2. Seismic Data used for Calculating Ice Thicknesses and Water Layer Thicknesses

Station	Shot Distance m	Reflections Type	Time s	Type	Time s	h_i(seismic) m	h_w m
Q13	125	I_1W_2	1.423	I_1W_1	0.806	336	445
C-16	155	I_1W_2	1.368	I_1W_1	0.789	356	425
I12	130	I_1W_2	0.726	I_1W_1	0.551	681	126
I13	210	I_2W_1	0.989	I_1W_1	0.743	460	353
	210	I_1W_2	1.248	I_1W_1	0.743	433	364
J9DC	0	I_1W_2	0.908	I_1W_1	0.570	414	244
J12	240	I_2W_1	0.676	I_1W_1	0.473	389	187
K13	80	I_1W_2	0.932	I_1W_1	0.575	395	257
L12	80	I_2W_1	0.844	I_1W_1	0.628	395	296
L13	50	I_2W_1	0.599	I_1W_1	0.384	391	122
L14	240	I_2W_1	0.724	I_1W_1	0.526	380	229
M13	80	I_2W_1	0.681	I_1W_1	0.480	368	200
M16	330	I_2W_1	0.869	I_1W_1	0.674	393	330
M17	388	I_1W_2	1.241	I_1W_1	0.727	388	371
M18	80	I_1W_2	1.588	I_1W_1	0.888	342	505
M19	80	I_1W_2	1.922	I_1W_1	1.037	292	631
N12	120	I_1W_2	1.087	I_1W_1	0.649	371	315
		I_2W_2	1.303	I_2W_1	1.866	371	315
N13	240	I_1W_2	0.938	I_1W_1	0.571	371	265
N14	150	I_1W_2	1.446	I_1W_1	0.822	360	450
	140	I_2W_1	1.030	I_1W_1	0.821	387	438
N15	240	I_1W_2	1.361	I_1W_1	0.781	366	418
N16	70	I_2W_1	0.770	I_1W_1	0.590	328	296
N17	330	I_2W_1	0.944	I_1W_1	0.733	419	362
N18	150	I_1W_2	1.595	I_1W_1	0.906	395	497
O16	210	I_2W_1	0.749	I_1W_1	0.540	395	233
O17	150	I_1W_2	1.220	I_1W_1	0.717	389	363
O18	140	I_1W_2	1.765	I_1W_1	1.015	482	541
O19*	140	I_1W_2	1.588	I_1W_1	0.904	400	493
P9	105	I_1W_2	0.852	I_1W_1	0.540	403	225
P19	30	I_1W_1	0.398	I_1	0.249	447	108
	30	I_2W_1	0.655	I_1W_1	0.399	446	108
Q16	240	I_1W_2	1.828	I_1W_1	1.021	384	582
R10	45	I_1W_2	0.691	I_1W_1	0.430	304	188
R11	75	I_1W_2	1.054	I_1W_1	0.607	285	322
R12	135	I_1W_2	1.220	I_1W_1	0.700	310	375
	45	I_2W_2	1.400	I_2W_1	0.883	312	372
R16	60	I_1W_2	1.717	I_1W_1	0.953	342	551
R17	30	I_1W_2	1.811	I_1W_1	0.992	302	590
S16	180	I_1W_2	1.734	I_1W_1	0.958	306	559
S17	180	I_1W_2	2.049	I_1W_1	1.095	225	688

*Station occupied twice. Seismic and radar reflections not at the same spot.

TABLE B3. Additional Data used for Calculating Water Layer Thicknesses

Station	h_i(radar) m	I_1W_1 s	h_w m	Station	h_i(radar) m	I_1W_1 s	h_w m
H13	758	1.110	502	P13	372	0.772	405
I14	395	0.753	383	P14	319	0.824	463
I15	298	0.987	588	P15	341	0.515	232
J13	383	0.630	298	P16	235	0.627	353
J14	410	0.750	375	P17	416	0.767	385
J15	336	0.934	535	P18	412	1.339	797
J16	631	0.595	175	Q7	336	0.545	181
K12	408	0.408	129	Q8	379	0.583	223
K14	357	0.720	373	Q9	345	0.586	281
K15	368	0.956	539	Q10	336	0.402	153
K16	408	0.881	470	Q11	365	0.582	270
K17	207	0.819	500	Q12	341	0.671	344
KL7	475	0.679	250	Q14	325	0.755	411
L15	328	0.737	396	Q15	332	0.467	201
L16	362	0.817	441	Q17	362	1.108	651
L17	307	0.698	376	R13	302	0.892	519
L18	391	1.032	585	R14	327	0.673	351
L19	313	0.435	184	R15	331	0.884	501
M12	345	0.704	364	R18	218	0.634	363
M14	345	0.693	359	S14	212	0.870	537
M15	307	0.776	432	S15	244	0.981	604
N11	425	0.471	168	T15	266	0.866	513
N19	556	0.565	185	T17S	155*	1.120	739
O11	379	0.505	210				
O12	370	0.616	293				
O13	382	0.714	360				
O14	345	0.831	458				
O15	379	0.670	329				
P11	383	0.551	241				
P12	340	0.620	308				

*Extrapolated from T17 using regional ice-thickness gradient.

Table

C1. Station Q13. Standard 39-layer models, based on two refraction profiles by Kirchner [1978], [Kirchner and Bentley, this volume].

a. Velocities and densities for model SV1, using profile #1 SV waves.
b. Velocities and densities for model SH1, using profile #1 SH waves.
c. Velocities and densities for model SV2, using profile #2 SV waves.
d. Velocities and densities for model SH2, using profile #2 SH waves.
e. Rayleigh wave phase and group velocities.
f. Love wave phase and group velocities.

C2. Station Q13. Models for different numbers of layers, all based on profile #1 SV waves [Kirchner, 1978; Kirchner and Bentley, this volume].

a. Velocities and densities for 15-layer model.
b. Velocities and densities for 47-layer model.
c. Velocities and densities for 70-layer model.
d. Rayleigh wave phase and group velocities, for models with different numbers of layers.

The modeled dispersion curves for the 15-layer model and the standard 39-layer are compared in Figures C2-1 and C2-2.

C3. Station Q13. Models with different shear wave velocities based on assumed values of Poisson's ratio and P wave velocities from profile #1 of Kirchner [1978], [Kirchner and Bentley, this volume].

a. Velocities and Poisson's ratios.
b. Rayleigh wave phase and group velocities.

C4. Station C-16. 39-layer model using data from a short refraction profile by Kirchner [1978], [Kirchner and Bentley, this volume].

a. Velocities and densities.
b. Rayleigh wave phase and group velocities.

Figures

C2. Station Q13
a. Rayleigh wave group-velocity dispersion curve
b. Rayleigh wave phase-velocity dispersion curve

Table C1a. Velocities and Densities for Model SV1, Using Profile #1 SV Waves.

Layer Number	Thickness (m)	V_p $m\ s^{-1}$	V_s $m\ s^{-1}$	Density $Mg\ m^{-3}$
1	1.0	670	500	0.361
2	1.0	880	590	0.379
3	1.0	1090	680	0.399
4	1.0	1150	755	0.405
5	1.0	1420	840	0.434
6	1.0	1565	910	0.451
7	1.0	1700	980	0.468
8	1.0	1820	1050	0.484
9	1.0	1920	1100	0.498
10	1.0	2010	1155	0.511
11	1.0	2115	1205	0.527
12	1.0	2195	1250	0.540
13	1.0	2260	1290	0.551
14	1.0	2340	1330	0.564
15	1.0	2405	1370	0.576
16	1.0	2470	1405	0.588
17	1.0	2540	1430	0.601
18	1.0	2595	1460	0.611
19	1.0	2650	1485	0.622
20	1.0	2700	1510	0.632
21	1.0	2745	1525	0.642
22	1.0	2795	1550	0.652
23	1.0	2840	1565	0.662
24	1.0	2890	1580	0.673
25	1.0	2930	1595	0.682
26	1.0	2975	1610	0.693
27	1.0	3020	1627	0.703
28	1.0	3060	1640	0.713
29	1.0	3100	1655	0.722
30	1.0	3140	1670	0.732
31	5.0	3250	1705	0.760
32	5.0	3415	1760	0.803
33	5.0	3530	1820	0.834
34	5.0	3650	1870	0.866
35	5.0	3715	1920	0.883
36	5.0	3760	1960	0.894
37	5.0	3775	1985	0.898
38	5.0	3780	1995	0.899
39	∞	3780	1995	0.899

Table C1b. Velocities and Densities for Model SH1, Using Profile #1 SH Waves.

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Density Mg m^{-3}
1	1.0	670	510	0.361
2	1.0	880	580	0.379
3	1.0	1090	650	0.399
4	1.0	1150	710	0.405
5	1.0	1420	776	0.434
6	1.0	1565	825	0.451
7	1.0	1700	895	0.468
8	1.0	1820	940	0.484
9	1.0	1920	980	0.498
10	1.0	2010	1030	0.511
11	1.0	2115	1070	0.527
12	1.0	2195	1110	0.540
13	1.0	2260	1150	0.551
14	1.0	2340	1195	0.564
15	1.0	2405	1240	0.576
16	1.0	2470	1275	0.588
17	1.0	2540	1315	0.601
18	1.0	2595	1350	0.611
19	1.0	2650	1380	0.622
20	1.0	2700	1415	0.632
21	1.0	2745	1445	0.642
22	1.0	2795	1475	0.652
23	1.0	2840	1510	0.662
24	1.0	2890	1520	0.673
25	1.0	2930	1545	0.682
26	1.0	2975	1565	0.693
27	1.0	3020	1585	0.703
28	1.0	3060	1605	0.713
29	1.0	3100	1620	0.722
30	1.0	3140	1640	0.732
31	5.0	3250	1685	0.760
32	5.0	3415	1750	0.803
33	5.0	3530	1810	0.834
34	5.0	3650	1855	0.866
35	5.0	3715	1890	0.883
36	5.0	3760	1925	0.894
37	5.0	3775	1945	0.898
38	5.0	3780	1965	0.899
39	∞	3780	1965	0.899

Table C1c. Velocities and Densities for Model SV2, Using Profile #2 SV Waves.

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Density Mg m^{-3}
1	1.0	520	501	0.349
2	1.0	850	598	0.377
3	1.0	1090	685	0.400
4	1.0	1240	760	0.415
5	1.0	1420	827	0.435
6	1.0	1580	890	0.454
7	1.0	1725	950	0.472
8	1.0	1855	1003	0.490
9	1.0	1950	1064	0.503
10	1.0	2045	1100	0.517
11	1.0	2130	1137	0.530
12	1.0	2205	1179	0.542
13	1.0	2275	1215	0.554
14	1.0	2340	1247	0.565
15	1.0	2410	1275	0.577
16	1.0	2470	1309	0.588
17	1.0	2535	1335	0.600
18	1.0	2595	1360	0.612
19	1.0	2650	1388	0.623
20	1.0	2710	1413	0.635
21	1.0	2760	1438	0.645
22	1.0	2815	1464	0.657
23	1.0	2860	1487	0.667
24	1.0	2920	1510	0.680
25	1.0	2975	1530	0.693
26	1.0	3020	1550	0.704
27	1.0	3060	1570	0.713
28	1.0	3090	1590	0.720
29	1.0	3135	1609	0.731
30	1.0	3175	1628	0.741
31	5.0	3290	1680	0.771
32	5.0	3450	1755	0.813
33	5.0	3580	1820	0.848
34	5.0	3680	1865	0.875
35	5.0	3750	1900	0.893
36	5.0	3790	1920	0.902
37	5.0	3790	1980	0.902
38	5.0	3800	1980	0.902
39	∞	3800	1980	0.902

Table C1d. Velocities and Densities for Model SH2, Using Profile #2 SH Waves.

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Density Mg m^{-3}
1	1.0	520	380	0.349
2	1.0	850	470	0.377
3	1.0	1090	572	0.400
4	1.0	1240	650	0.415
5	1.0	1420	735	0.435
6	1.0	1580	815	0.454
7	1.0	1725	900	0.472
8	1.0	1855	980	0.490
9	1.0	1950	1057	0.503
10	1.0	2045	1125	0.517
11	1.0	2130	1180	0.530
12	1.0	2205	1244	0.542
13	1.0	2275	1295	0.554
14	1.0	2340	1340	0.565
15	1.0	2410	1385	0.577
16	1.0	2470	1420	0.588
17	1.0	2535	1447	0.600
18	1.0	2595	1470	0.612
19	1.0	2650	1490	0.623
20	1.0	2710	1510	0.635
21	1.0	2760	1528	0.645
22	1.0	2815	1544	0.657
23	1.0	2860	1560	0.667
24	1.0	2920	1575	0.680
25	1.0	2975	1589	0.693
26	1.0	3020	1604	0.704
27	1.0	3060	1616	0.713
28	1.0	3090	1630	0.720
29	1.0	3135	1643	0.731
30	1.0	3175	1653	0.741
31	5.0	3290	1690	0.771
32	5.0	3450	1740	0.813
33	5.0	3580	1795	0.848
34	5.0	3680	1845	0.875
35	5.0	3750	1890	0.893
36	5.0	3790	1935	0.902
37	5.0	3790	1975	0.902
38	5.0	3800	2015	0.904
39	∞	3800	2035	0.904

Table C1e. Rayleigh Wave Phase and Group Velocities.

Frequency Hz	Model SV1 Phase Velocity $m\ s^{-1}$	Model SV1 Group Velocity $m\ s^{-1}$	Model SV2 Phase Velocity $m\ s^{-1}$	Model SV2 Group Velocity $m\ s^{-1}$
First mode:				
70	569	374		
60	616	378		
50	692	391		
45	748	407	493	131
40	822	435	640	218
35	919	483	790	322
30	1042	562	953	441
25	1195	684	1141	584
20	1377	863	1359	804
15	1570	1173	1555	1193
10	1705	1533	1668	1527
5	1781	1724	1732	1681
0.01	1852	1852	1798	1797
Second mode:				
70	1044	665	1023	622
60	1128	689	1107	667
50	1253	728	1227	726
45	1340	759	1305	767
40	1453	805	1401	818
35	1598	875	1522	885
30	1782	971	1678	973
25			1874	1133

Table C1f. Love Wave Phase and Group Velocities.

Frequency Hz	Model SV1 Phase Velocity $m\ s^{-1}$	Model SV1 Group Velocity $m\ s^{-1}$	Model SV2 Phase Velocity $m\ s^{-1}$	Model SV2 Group Velocity $m\ s^{-1}$
First mode:				
70	647	515	498	371
60	673	520	527	375
50	712	527	570	380
45	739	534	602	385
40	774	542	646	391
35	821	554	707	402
30	886	573	801	423
25	983	604	949	472
20	1135	667	1179	606
15	1383	826	1472	899
10	1700	1262	1763	1352

Table C2a. Velocities and Densities for 15-layer Model.

Layer Number	Thickness (m)	V_p $m\ s^{-1}$	V_s $m\ s^{-1}$	Density $Mg\ m^{-3}$
1	5.0	1100	690	0.401
2	5.0	1820	1050	0.485
3	5.0	2260	1290	0.551
4	5.0	2600	1460	0.613
5	5.0	2840	1565	0.663
6	5.0	3060	1640	0.713
7	5.0	3250	1705	0.760
8	5.0	3415	1760	0.803
9	5.0	3530	1820	0.834
10	5.0	3650	1870	0.866
11	5.0	3715	1920	0.883
12	5.0	3760	1960	0.894
13	5.0	3775	1985	0.898
14	5.0	3780	1995	0.899
15		3780	1995	0.899

Table C2b. Velocities and Densities for 47-layer Model.

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Density Mg m^{-3}
1	1.0	670	500	0.361
2	1.0	880	590	0.379
3	1.0	1090	680	0.399
4	1.0	1150	755	0.405
5	1.0	1420	840	0.434
6	1.0	1565	910	0.451
7	1.0	1700	980	0.468
8	1.0	1820	1050	0.484
9	1.0	1920	1100	0.498
10	1.0	2010	1155	0.511
11	1.0	2115	1205	0.527
12	1.0	2195	1250	0.540
13	1.0	2260	1290	0.551
14	1.0	2340	1330	0.564
15	1.0	2405	1370	0.576
16	1.0	2470	1405	0.588
17	1.0	2540	1430	0.601
18	1.0	2595	1460	0.611
19	1.0	2650	1485	0.622
20	1.0	2700	1508	0.632
21	1.0	2745	1525	0.642
22	1.0	2795	1550	0.652
23	1.0	2840	1565	0.662
24	1.0	2890	1580	0.673
25	1.0	2930	1597	0.682
26	1.0	2975	1610	0.693
27	1.0	3020	1627	0.703
28	1.0	3060	1640	0.713
29	1.0	3100	1653	0.722
30	1.0	3140	1670	0.732
31	1.0	3180	1685	0.743
32	1.0	3220	1695	0.753
33	1.0	3250	1705	0.760
34	1.0	3290	1715	0.771
35	1.0	3330	1728	0.781
36	1.0	3355	1740	0.788
37	1.0	3365	1755	0.796
38	1.0	3415	1768	0.804
39	1.0	3440	1780	0.810
40	1.0	3465	1790	0.817
41	5.0	3530	1820	0.834
42	5.0	3650	1870	0.866
43	5.0	3715	1920	0.883
44	5.0	3760	1960	0.894
45	5.0	3775	1985	0.898
46	5.0	3780	1995	0.899
47	∞	3780	1995	0.899

Table C2c. Velocities and Densities for 70-layer Model.

Layer Number	Thickness (m)	V_p m s^{-1}	V_s m s^{-1}	Density Mg m^{-3}
1	0.5	600	460	0.356
2	0.5	740	520	0.367
3	0.5	840	565	0.376
4	0.5	940	615	0.385
5	0.5	1040	665	0.395
6	0.5	1130	705	0.404
7	0.5	1210	740	0.412
8	0.5	1290	780	0.420
9	0.5	1370	820	0.429
10	0.5	1450	855	0.438
11	0.5	1520	885	0.447
12	0.5	1590	920	0.455
13	0.5	1670	955	0.465
14	0.5	1730	995	0.473
15	0.5	1790	1025	0.481
16	0.5	1850	1055	0.489
17	0.5	1900	1085	0.496
18	0.5	1950	1115	0.503
19	0.5	2010	1140	0.512
20	0.5	2050	1165	0.518
21	0.5	2090	1180	0.524
22	0.5	2130	1215	0.530
23	0.5	2170	1240	0.537
24	0.5	2210	1261	0.543
25	0.5	2230	1285	0.546
26	0.5	2290	1310	0.556
27	0.5	2320	1325	0.561
28	0.5	2360	1345	0.568
29	0.5	2390	1360	0.574
30	0.5	2420	1375	0.579
31	0.5	2450	1395	0.585
32	0.5	2490	1415	0.592
33	0.5	2520	1425	0.598
34	0.5	2550	1440	0.603
35	0.5	2570	1455	0.607
36	0.5	2600	1465	0.613
37	0.5	2630	1475	0.619
38	0.5	2650	1490	0.623
39	0.5	2680	1500	0.629
40	0.5	2710	1510	0.635
41	0.5	2730	1520	0.639
42	0.5	2760	1530	0.645
43	0.5	2780	1540	0.650
44	0.5	2810	1550	0.656
45	0.5	2830	1555	0.660
46	0.5	2850	1565	0.665
47	0.5	2880	1575	0.671
48	0.5	2900	1580	0.676
49	0.5	2920	1590	0.680

Layer Number	Thickness (m)	V_p $m\ s^{-1}$	V_s $m\ s^{-1}$	Density $Mg\ m^{-3}$
50	0.5	2940	1600	0.685
51	0.5	2970	1605	0.692
52	0.5	2990	1615	0.696
53	0.5	3010	1620	0.701
54	0.5	3030	1630	0.706
55	0.5	3050	1635	0.711
56	0.5	3070	1645	0.715
57	0.5	3090	1650	0.720
58	0.5	3110	1660	0.725
59	0.5	3130	1665	0.730
60	0.5	3150	1675	0.735
61	0.5	3170	1685	0.740
62	5.0	3250	1705	0.760
63	5.0	3415	1760	0.803
64	5.0	3530	1820	0.834
65	5.0	3650	1870	0.866
66	5.0	3715	1920	0.883
67	5.0	3760	1960	0.894
68	5.0	3775	1985	0.898
69	5.0	3780	1995	0.899
70	∞	3780	1995	0.899

Table C2d. Rayleigh Wave Phase and Group Velocities For Models with Different Numbers of Layers.

Frequency Hz	15 Layers Phase Velocity $m\ s^{-1}$	15 Layers Group Velocity $m\ s^{-1}$	39 Layers Phase Velocity $m\ s^{-1}$	39 Layers Group Velocity $m\ s^{-1}$	47 Layers Phase Velocity $m\ s^{-1}$	47 Layers Group Velocity $m\ s^{-1}$	70 Layers Phase Velocity $m\ s^{-1}$	70 Layers Group Velocity $m\ s^{-1}$
First Mode:								
70	679	510	569	374	569	374	570	362
60	718	485	616	378	616	378	621	372
50	788	478	692	391	692	391	702	390
40	909	524	822	435	822	435	838	441
30	1101	649	1042	562	1042	562	1058	581
20	1396	907	1377	863	1378	862	1380	876
10	1707	1538	1705	1533	1705	1534	1704	1531
0.01	1852	1852	1852	1852	1852	1852	1852	1852
Second Mode:								
70	1115	787	1044	665			1049	668
60	1180	797	1128	689			1132	696
50	1281	809	1253	728			1254	735
40	1455	844	1453	805			1451	808
30	1766	978	1782	971			1778	972
25							1978	1683

Table C3a. Model S Wave velocities and Poisson's ratios.

		Observed		Model A		Model B		Model C	
Layer	v_p' m s^{-1}	v_s' m s^{-1}	L	v_s' m s^{-1}	L	v_s' m s^{-1}	L	v_s' m s^{-1}	L
1	520	501	-5.9	334	0.15	268	0.32	308	0.23
2	850	598	0.010	536	0.17	437	0.32	497	0.24
3	1090	685	0.174	674	0.19	561	0.32	629	0.25
4	1240	760	0.199	751	0.21	638	0.32	706	0.26
5	1420	827	0.243	820	0.25	731	0.32	797	0.27
6	1580	890	0.268	887	0.27	813	0.32	873	0.28
7	1725	950	0.282	954	0.28	888	0.32		
8	1855	1003	0.293			954	0.32		
9	1950	1054	0.294			1003	0.32		
10	2045	1100	0.296	As		1052	0.32	As	
11	2130	1137	0.301	Observed		1096	0.32	Observed	
12	2205	1179	0.300			1134	0.32		
13	2275	1215	0.300			1170	0.32		
14	2340	1247	0.302			1204	0.32		
15	2410	1275	0.306			1240	0.32		

Table C3b. Rayleigh Wave Phase and Group Velocities.

Frequency Hz	Model A Phase Velocity $m\ s^{-1}$	Model A Group Velocity $m\ s^{-1}$	Model B Phase Velocity $m\ s^{-1}$	Model B Group Velocity $m\ s^{-1}$	Model C Phase Velocity $m\ s^{-1}$	Model C Group Velocity $m\ s^{-1}$
First mode:						
70	519	306	470	242	511	288
60	573	327	533	274	570	312
50	653	354	623	311	657	344
45	711	339	685	339	717	371
40	785	406	761	379	793	410
35	880	454	857	431	887	464
30	1004	525	982	499	1007	534
25	1167	631	1147	604	1165	634
20	1369	829	1355	803	1366	825
15	1557	1202	1549	1181	1556	197
10	1668	1529	1665	1520	1668	1527
5	1732	1681	1730	1678	1732	1681
0.01	1798	1797	1798	1797	1798	1797
Second mode:						
70	898	478	641	355	796	421
60	1007	540	725	380	901	468
50	1150	625	855	425	1050	538
45	1242	679	948	462	1149	589
40	1352	746	1067	516	1269	657
35	1486	829	1220	594	1418	746
30	1653	932	1420	703	1602	862
25	1863	1079	1683	858	1834	1004

Table C4a. Velocities and Densities.

Layer Number	Thickness (m)	V_p $m\ s^{-1}$	V_s $m\ s^{-1}$	Density $Mg\ m^{-3}$
1	1.0	696	525	0.364
2	1.0	990	620	0.382
3	1.0	1070	705	0.398
4	1.0	1300	770	0.422
5	1.0	1485	850	0.442
6	1.0	1660	905	0.464
7	1.0	1800	975	0.482
8	1.0	1950	1030	0.503
9	1.0	2080	1080	0.522
10	1.0	2170	1130	0.537
11	1.0	2245	1170	0.554
12	1.0	2360	1210	0.568
13	1.0	2430	1255	0.581
14	1.0	2495	1290	0.593
15	1.0	2550	1325	0.603
16	1.0	2605	1355	0.614
17	1.0	2660	1380	0.625
18	1.0	2710	1405	0.635
19	1.0	2750	1430	0.643
20	1.0	2790	1455	0.652
21	1.0	2830	1470	0.660
22	1.0	2875	1490	0.670
23	1.0	2930	1510	0.683
24	1.0	2960	1525	0.690
25	1.0	3005	1545	0.700
26	1.0	3030	1568	0.706
27	1.0	3060	1580	0.713
28	1.0	3085	1595	0.719
29	1.0	3118	1610	0.725
30	1.0	3140	1625	0.733
31	5.0	3225	1665	0.754
32	5.0	3355	1725	0.788
33	5.0	3465	1785	0.817
34	5.0	3560	1840	0.843
35	5.0	3635	1885	0.863
36	5.0	3700	1930	0.880
37	5.0	3750	1950	0.893
38	5.0	3780	1950	0.899
39	∞	3810	1950	0.906

Table C4b. Rayleigh Wave Phase and Group Velocities.

Frequency Hz	Phase Velocity $m\ s^{-1}$	Group Velocity $m\ s^{-1}$
First mode:		
100	158	407
50	717	397
25	1236	741
17	1513	1099
12.5	1635	1386
10	1685	1535
7	1731	1662
5	1749	1701
Second mode:		
50	1297	778
33	1656	956
26	1894	1260

Appendix C. Figure Captions

Fig. C2a. Rayleigh wave group-velocity dispersion at station Q13. Dots are observed points; solid line is a curve calculated from a 39-layer model; dashed line was calculated from a 15-layer model.

Fig. C2b. Rayleigh wave phase-velocity dispersion at station Q13. Dots and lines as in Figure B2-1.

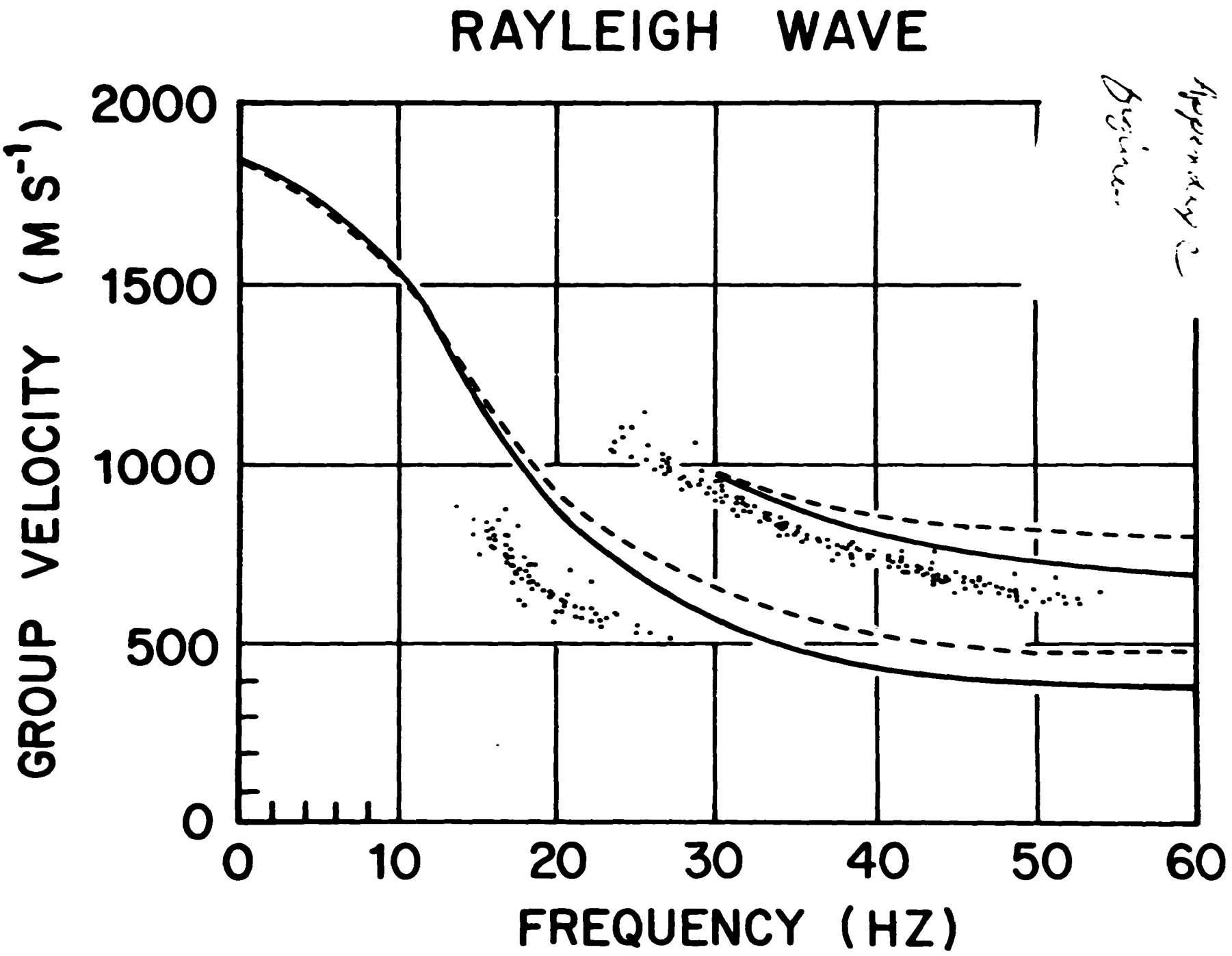
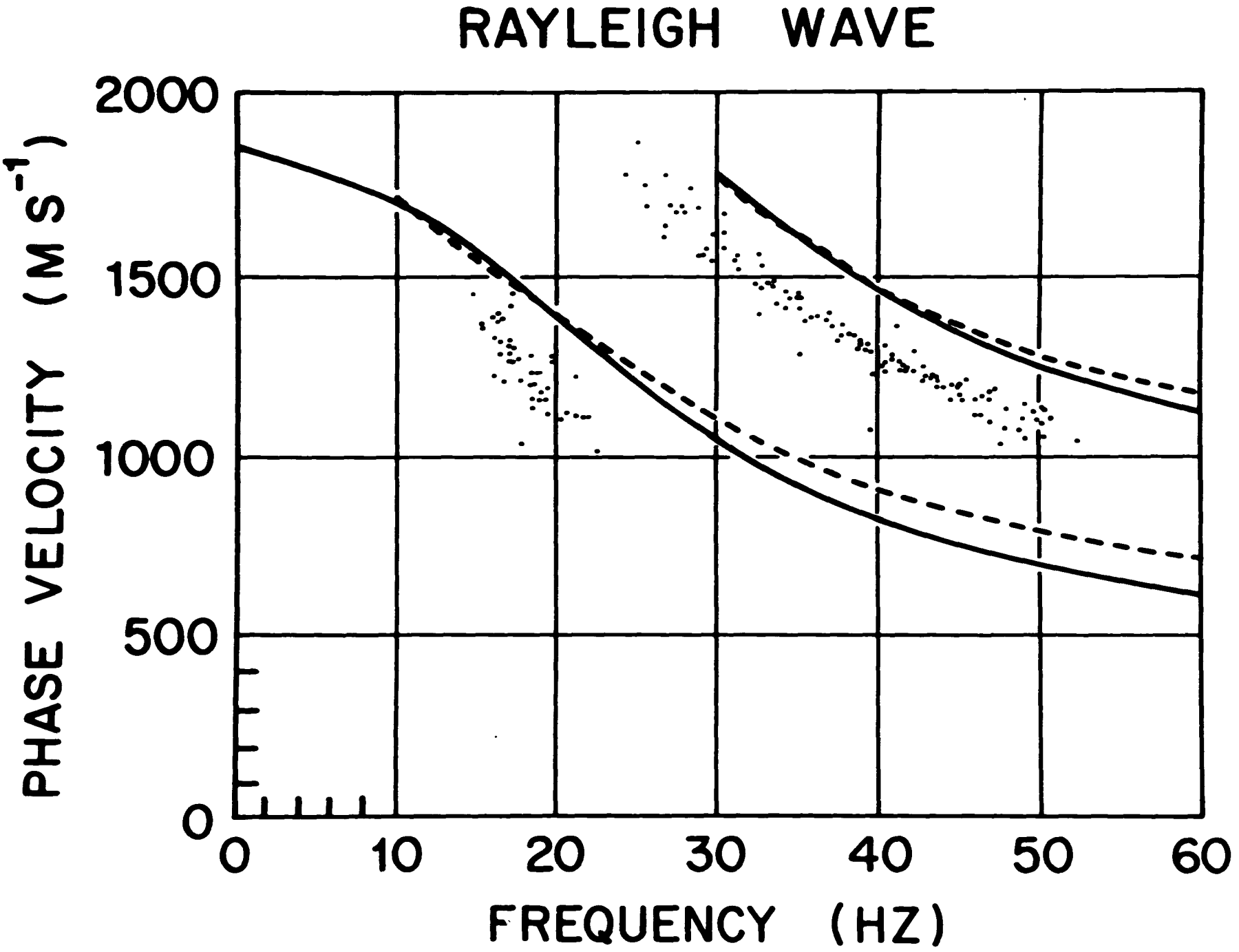

RAYLEIGH WAVE
GROUP VELOCITY (M S-1)
2000
1500
1000
500
0
0
10
20
30
40
50
60
FREQUENCY (HZ)

Figure 62a


RAYLEIGH WAVE
PHASE VELOCITY (M S^{-1})
2000
1500
1000
500
0
0
10
20
30
40
50
60
FREQUENCY (HZ)