

Jim



University of Minnesota Seismic Station

Minneapolis, Minnesota

SEISMOLOGICAL BULLETIN

by

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1 January 1964 -- June 1964

Station Constants



Latitude: $44^{\circ} 54' 52''$ North

Longitude: $93^{\circ} 11' 24''$ West

Elevation: 710 feet

Abbreviations

i = sudden beginning of the motion (impetus)

e = gradual beginning of the motion (emersio)

Instruments

Three component Benioff short-period seismographs,
 $T_o = 1 \text{ sec.}$, $T_g = .76 \text{ sec.}$

Three component Sprengnether long-period
seismographs,
 $T_o = 30 \text{ sec.}$, $T_g = 100 \text{ sec.}$

All times are G. C. T.

Earthquakes are not reported for which only a surface wave was recorded.

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DATE	PHASE	TIME		
		h	m	s
5 Jan 64	iP (S)	18	43	13
	<u>Central Peru</u>			
	USCGS	18	33	54.7
	8.0 S 74.5 W			
	Depth: 150 km Dist: 55.3°			
	Az: 157.3° Mag: 5.2			
5 Jan 64	ePKP	00	05	48
	eSS	00	27	18
	eLQ	00	43	06
	eLR	00	52	00
	<u>Prince Edward Island region</u>			
	USCGS	23	46	10.7
	52.3 S 28.6 E			
	Depth: 33 km Dist: 141.7°			
	Az: 122.5°			

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DATE	PHASE	TIME		
		h	m	s
6 Jan 64	eP	23	56	13
	ePP	23	58	18
	ePPP	23	59	52
	eS	00	05	05
	ePS	00	05	27
	ePPS	00	05	49
	eSS	00	09	44
	eLQ	00	12	55
	eLR	00	15	57
	<u>Southern Kamchata</u>			
	USCGS	23	45	23.4
	50.9 N 157.3 E			
	Depth: 33 km Dist: 66.8°			
	Az: 319.5° Mag: 5.6			
9 Jan 64	eP	18	43	28
	eS	18	52	51
	ePS	18	53	11
	eSS	18	58	06
	eLQ	19	02	40
	eLR	19	06	60
	<u>Kurile Islands</u>			
	USCGS	18	31	52.4
	45.5 N 150.9 E			
	Depth: 40 km Dist: 73.6°			
	Az: 318.8° Mag: 5.6			

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DATE	PHASE	TIME		
		h	m	s
10 Jan 64	eP	05	03	02
	eS	05	13	00
	eLQ	05	24	32
	eLR (NW)	05	28	16
<u>Near south coast of Hokkaido Japan</u>				
	USCGS	04	50	53.4
	42.0 N 42.6 E			
	Depth: 33 km Dist: 80.1°			
	Az: 321.3° Mag: 5.5			
12 Jan 64	eP	06	08	49
	eS	06	15	43
	eSS	06	19	00
	eLQ	06	20	30
	eLR	06	22	08
<u>Fox Islands, Aleutian Islands</u>				
	USCGS	06	00	13.2
	53.2 N 166.3 W			
	Depth: 33 km Dist: 46.7°			
	Az: 307.7° Mag: 5.5			
15 Jan 64	eP	21	49	06
	ePS	22	01	08
	ePPS	22	01	32
	eLQ	22	12	52
	eLR	22	17	26
<u>South of Honsku, Japan</u>				
	USCGS	21	36	05.0
	29.1° N 140.8° E			
	Depth: 70 km Dist: 91.4°			
	Az: 314.9° Mag: 6.4			

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DATE	PHASE	TIME		
		h	m	s
18 Jan 64	ePP	12	23	17
	eS	12	29	30
	ePS	12	32	23
	ePPS	12	33	40
	eSS	12	38	08
	eLQ	12	48	36
	eLR	12	56	02

Taiwan

USCGS 12 04 40.0

23.1 N 120.5 E

Depth: 33 km Dist: 105.7°

Az: 328.0° Mag: 6.1

20 Jan 64	eP	17	22	50
	ePP	17	27	22
	eS	17	34	52
	eLQ	17	54	54

Loyalty Islands region

USCGS 17 08 37.4

20.7 S 169.9 E

Depth: 141 km Dist: 109.1°

Az: 259.6° Mag: 6.1

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DATE	PHASE	TIME		
		h	m	s
22 Jan 64	ePP	00	18	30
	eSKS	00	24	48
	ePS	00	27	45
	ePPS	00	28	54
	eSS	00	33	39
	eLQ	00	44	04
	eLR	00	49	40
<u>New Hebrides Islands</u>				
	USCGS	23	59	43.6
	13.7 S 165.9 E			
	Depth: 33 km Dist: 107.2°			
	Az: 267.7° Mag: 6.0			
26 Jan 64	iP (SSE)	09	19	56
	iPcP	09	20	27
	iS	09	28	22
	ePS	09	28	40
	ePPS	09	29	00
	eSS	09	32	20
	eLQ	09	35	36
	eLR (SSE)	09	39	50
<u>Southern Peru</u>				
	USCGS	09	09	33.9
	16.3 S 71.7 W			
	Depth: 116 km Dist: 64.0°			
	Az: 157.0° Mag: 6.1			

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DATE	PHASE	TIME		
		h	m	s
28 Jan 64	iP (N)	14	22	31
	i	14	23	36
	iPP	14	26	29
	eSKS	14	32	46
	eS	14	34	14
	<u>Hindu Kush</u>			
	USCGS	14	09	17.1
	36.5 N 70.9 E			
	Depth: 207 km Dist: 97.7°			
	Az: 12.9° Mag: 6.1			
3 Feb 64	eP	08	48	24
	ipP	08	48	33
	eS	08	52	30
	eLR	08	54	04
	<u>Gulf of California</u>			
	USCGS	08	43	36.3
	31.5 N 114.2 W			
	Depth: 14 km Dist: 21.2°			
	Az: 238.0° Mag: 4.6			

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DATE	PHASE	TIME		
		h	m	s
5 Feb 64	eP	11	42	49
	eS	11	53	04
	ePS	11	54	07
	eSS	11	59	07
	eLQ	12	05	33
	eLR	12	09	20
	<u>Central Honshu, Japan</u>			
	USCGS	11	30	15.7
	36.5 N 141.0 E			
	Depth: 46 km Dist: 85.3°			
	Az: 319.0° Mag: 5.4			
6 Feb 64	eP (NW)	13	14	55
	ePP	13	16	25
	eS	13	21	03
	eSS	13	23	24
	eLQ	13	23	55
	eLR	13	25	30
	<u>Kodiak Island region</u>			
	USCGS	13	07	25.2
	55.7 N 155.8 W			
	Depth: 33 km Dist: 40.1°			
	Az: 308.7°			

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DATE	PHASE	TIME		
		h	m	s
12 Feb 64	eP	20	46	50
	ePKP	20	50	30
	ePP	20	51	20
	ePKS	20	54	04
	eSKS	20	57	20
	ePS	21	01	00
	ePPS	21	02	10
	eSS	21	07	09
	eLQ	21	19	40
	eLR	21	23	08

Admiralty Islands region

USCGS 20 31 53.2

3.5 S 146.6 E

Depth: 33 km Dist: 113.6°

Az: 289.8° Mag: 5.4

12 Feb 64	eSS	23	04	30
	eLR	23	18	00

Samoa Islands region

USCGS 22 33 59.2

15.3 S 174.4 W

Depth: 33 km Dist: 94.6°

Az: 253.1° Mag: 5.0

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DATE	PHASE	TIME		
		h	m	s
14 Feb 64	eP	16	44	17
	ePP	16	48	54
	eSKS	16	55	14
	ePS	16	58	23
	eSS	17	04	34
	eLQ	17	15	00
	eLR	17	20	20

New Britain

USCGS 16 29 45.0

5.1 S 151.7 E

Depth: 55 km Dist: 111.3°

Az: 284.6° Mag: 6.0

27 Feb 64	eS	11	46	21
	eLR	11	49	37

Near coast of Colima, Mexico

USCGS 11 35 32.4

18.9 N 104.0 W

Depth: 33 km Dist: 27.5°

Az: 202.7° Mag: 4.5

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DATE	PHASE	TIME		
		h	m	s
27 Feb 64	ePS	15	40	16
	ePPS	15	41	16
	eSS	15	46	13
	eLR	16	03	50
	<u>Central Burma</u>			
	USCGS	15	10	48.4
	21.7 N 94.4 E			
	Depth: 102 km Dist: 113.4°			
	Az: 352.3° Mag: 6.4			
2 March 64	iP	19	46	06
	eS	19	57	20
	ePS	19	58	21
	eSS	20	03	45
	eLQ	20	13	40
	eLR	20	17	56
	<u>Tonga Islands</u>			
	USCGS	19	32	41.7
	18.9 S 174.8 W			
	Depth 105 km Dist: 97.4°			
	Az: 250.8° Mag: 5.3			

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DATE	PHASE	TIME		
		h	m	s
6 March 64	ePP	19	16	23
	ePS	19	25	40
	ePPS	19	26	48
	eSS	19	31	51
	eLQ	19	42	31
	eLR (W)	19	47	32

New Britain region
USCGS 18 57 16.1
0.6° S 154.4° E
Depth: 74 km Dist: 109.5°
Az: 284.5° Mag: 5.8

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DATE	PHASE	TIME
		h m s

18 March 64	iP (NW)	04 47 38
	eS	04 55 55
	eScS	04 56 52
	ePPS	04 58 40
	eSS	05 00 16

Sea of Okhotsk

USCGS	04 37 26.9
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52.5 N 153.6 E

Depth: 440 km Dist: 67.3°

Az: 322.5° Mag: 5.6

19 March 64	eP	21 57 21
	eSKS	22 08 27
	eS	22 09 50
	eSS	22 14 22
	eLQ	22 21 32
	eLR	22 27 23

Samoa Islands region

USCGS	21 44 03.8
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15.1 S 172.6 W

Depth: 33 km Dist: 93.2°

Az: 252.0° Mag: 5.6

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DATE	PHASE	TIME		
		h	m	s
21 March 64	eP	15	13	53
	ePP	15	14	48
	ePPP	15	15	12
	eS	15	18	54
	eLR	15	21	40

Near coast of Michoacan, Mexico

USCGS 15 08 14.3
 18.7 N 103.1 W
 Depth: 83 km Dist: 27.4°
 Az: 200.8° Mag: 5.0

26 March 64	eS	13	46	06
	eSS	13	49	34
	eLQ	13	51	23
	eLR	13	52	53

1500 km SW of Galapagos Islands

USCGS 13 29 56.2
 4.4 S 104.7 W
 Depth: 33 km Dist: 50.2°
 Az: 195.0° Mag: 4.9

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DATE	PHASE	TIME
		h m s
28 March 64	iP	03 43 10
	<u>Prince William Sound, Alaska</u>	
	USCGS	03 36 12.7
	61.1° N 147.6° W	
	Depth: 20 km Dist: 35.3°	
	Az: 316.9° Mag: 8.5	

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DATE	PHASE	TIME		
		h	m	s
2 April 64	ePP	01	33	02
	eSS	01	50	11
	eLQ	02	06	00
	eLR (N)	02	11	20

Near coast of northern Sumatra

USCGS 01 11 55

5.9 N 95.7 E

Depth: 132 km Dist: 128.8^o

Az: 348.6^o Mag: 5.2

3 April 64	eP	08	45	29
	eS	08	50	56
	eSS	08	52	52
	eLR	08	53	53

Prince William Sound, Alaska

USCGS 08 38 42.8

59.6 N 144.7 W

Depth: 10 km Dist: 33.5^o

Az: 314.4^o Mag: 5.4

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DATE	PHASE	TIME		
		h	m	s
3 April 64	iP	22	40	46
	ePP	22	41	48
	eS	22	46	10
	eLR	22	50	17
<u>Prince William Sound</u>				
	USCGS	22	33	42.2
	61.6 N 147.6 W			
	Depth: 40 km Dist: 35.3°			
	Az: 317.8° Mag: 5.7			
4 April 64	eP	05	00	51
	ePP	05	01	45
	eS	05	06	28
	eSS	05	08	33
	eLR (NW)	05	10	28
<u>Prince William Sound</u>				
	USCGS	04	54	01.7
	60.3 N 146.5 W			
	Depth: 5 km Dist: 34.8°			
	Az: 315.5° Mag: 5.0			

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DATE	PHASE	TIME		
		h	m	s
4 April 64	eP	08	47	53
	ePP	08	49	23
	eS	08	53	49
	eSS	08	56	03
	eLQ	08	56	28
	eLR (NW)	08	58	38
	<u>Prince William Sound</u>			
	USCGS	08	40	29.8
	56.5 N 152.6 W			
	Depth: 15 km Dist: 38.2°			
	Az: 309.5 Mag: 5.3			
4 April 64	eP (NW)	17	53	40
	ePP	17	55	16
	eS	17	59	30
	eSS	18	01	40
	eLQ	18	02	16
	eLR	18	04	11
	<u>Prince William Sound</u>			
	USCGS	17	46	08.6
	56.3 N 154.4 W			
	Depth: 25 km Dist: 39.2°			
	Az: 309.4° Mag: 5.7			

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DATE	PHASE	TIME		
		h	m	s
4 April 64	eS	22	29	10
	eLR	22	32	20
	<u>Prince William Sound</u>			
	USCGS	22	16	54.5
	59.4 N 145.2 W			
	Depth: 10 km Dist: 34.1°			
	Az: 314.0° Mag: 5.1			
6 April 64	eP	10	49	23
	eS	10	54	57
	eLR (NW)	10	59	17
	<u>Prince William Sound</u>			
	USCGS	10	42	36.3
	59.9 N 145.6 W			
	Depth: 15 km Dist: 34.3°			
	Az: 314.9° Mag: 4.8			

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DATE	PHASE	TIME		
		h	m	s
8 April 64	eP (NW)	11	09	39
	ePP	11	12	28
	eS	11	19	04
	eSS	11	23	54
	eLQ	11	29	19
	eLR (NW)	11	33	32
<u>Kurile Islands</u>				
	USCGS	10	58	09.1
45.8 N 150.8 E				
Depth: 40 km Dist: 73.5°				
Az: 319.0° Mag: 5.5				
9 April 64	eS	04	27	11
	eLR	04	29	47
<u>El Salvador</u>				
	USCGS	04	15	23.0
13.5 N 89.9 W				
Depth: 89 km Dist: 31.43°				
Az: 173.9° Mag: 5.0				
9 April 64	eP	13	13	04
	eS	13	18	31
	eLR (NW)	13	22	06
<u>Prince William Sound</u>				
	USCGS	13	06	15.2
59.6 N 146.1 W				
Depth: 15 km Dist: 34.5°				
Az: 314.3° Mag: 5.1				

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DATE	PHASE	TIME		
		h	m	s
10 April 64	eP	21	51	34
	ePP	21	53	00
	eS	21	57	26
	eSS	22	00	00
	eLQ	22	00	12
	eLR	22	02	03

Prince William Sound

USCGS 21 44 06.7
 60.1 N 153.7 W
 Depth: 10 km Dist: 38.4°
 Az: 315.4° Mag: 5.6

14 April 64	eP	16	02	12
	eS	16	07	52
	eSS	16	09	48
	eLR	16	12	02

Prince William Sound

USCGS 15 55 10.9
 61.3 N 147.3 W
 Depth: 30 km Dist: 35.2°
 Az: 317.3° Mag: 5.4

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DATE	PHASE	TIME		
		h	m	s
15 April 64	eP	15	38	18
	ePP	15	39	45
	eS	15	44	12
	eSS	15	46	44
	eLQ	15	47	22
	eLR	15	48	55

Prince William Sound

USCGS 15 30 47.1
 56.5 N 154.4 W
 Depth: 35 km Dist: 39.2°
 Az: 309.7° Mag: 5.5

16 April 64	eP (NW)	19	34	18
	ePP	19	35	47
	eS	19	40	13
	eLQ	19	42	47
	eLR (NW)	19	44	24

Prince William Sound

USCGS 19 26 57.4
 56.4 N 152.9 W
 Depth: 30 km Dist: 38.4°
 Az: 309.3° Mag: 5.5

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DATE	PHASE	TIME		
		h	m	s
17 April 64	eP	04	56	52
	eS	05	02	50
	eLQ	05	05	29
	eLR (NW)	05	07	14
<u>Prince William Sound</u>				
USCGS		04	49	30.5
56.4 N 152.9 W				
Depth: 25 km Dist: 38.4°				
Az: 309.3° Mag: 5.3				
17 April 64	eP	09	16	24
	eS	09	22	11
	eLR (NW)	09	26	45
<u>Prince William Sound</u>				
USCGS		09	09	07.8
57.7 N 151.4 W				
Depth: 20 km Dist: 37.4				
Az: 311.3° Mag: 5.4				
18 April 64	eS	05	48	39
	eSS	05	53	38
	eLQ	05	58	48
	eLR (NW)	06	03	00
<u>Kurile Islands</u>				
USCGS		05	27	44.6
45.5 N 151.1 E				
Depth: 33 km Dist: 73.5°				
Az: 318.6° Mag: 5.3				

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DATE	PHASE	TIME		
		h	m	s
18 April 64	eP	20	15	15
	ePP	20	17	25
	eS	20	21	44
	eSS	20	23	48
	eLQ	20	24	25
	eLR	20	26	57

Prince William Sound

USCGS 20 08 19.7
56.1 N 153.7 W
Depth: 15 km Dist: 38.9°
Az: 309.0° Mag: 4.9

19 April 64	eP	14	26	51
	ePP	14	31	13
	eSKS	14	37	24
	ePS	14	40	42
	eSS	14	46	44
	eLQ	14	57	00
	eLR (SSE)	15	03	44

Near South Shetland Islands

USCGS 14 12 21.9
60.5 S 58.3 W
Depth: 33 km Dist: 108.8°
Az: 162.6° Mag: 5.4

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International
Seismological
Centre

DATE	PHASE	TIME		
		h	m	s
20 April 64	iP	12	03	35
	ipP	12	03	48
	ePP	12	04	41
	ePPP	12	05	00
	eS	12	09	08
	eLR (NW)	12	12	24
<u>Prince William Sound</u>				
USCGS		11	56	41.6
61.4 N 147.3 W				
Depth: 30 km Dist: 35.2°				
Az: 317.4° Mag: 5.7				
20 April 64	eP	16	25	17
	eS	16	30	52
	eLR (NW)	16	35	24
<u>Prince William Sound</u>				
USCGS		16	18	26.4
60.7 N 145.3 W				
Depth: 15 km Dist: 34.2°				
Az: 316.3° Mag: 4.9				
21 April 64	eP	05	08	29
	epP	05	08	42
	ePP	05	09	46
	eS	05	14	03
	eLR	05	18	29
<u>Prince William Sound</u>				
USCGS		05	01	35.7
61.5 N 147.4 W				
Depth: 40 km Dist: 35.3°				
Az: 317.6° Mag: 5.4				

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International
Seismological
Centre

DATE	PHASE	TIME		
		h	m	s
23 April 64	eP	03	48	19
	ePKP	03	51	43
	ePP	03	53	25
	ePKS	03	55	14
	eSKS	03	59	02
	ePS	04	03	17
	eSS	04	10	04
	eLQ	04	23	53
	eLR (W)	04	30	45

Aril Islands region

USCGS 03 32 50.3

5.3 S 134.0 E

Depth: 33 km Dist: 123.1°

Az: 299.4° Mag: 6.4

24 April 64	eP	03	57	46
	eS	04	03	12
	eLR (NW)	04	07	28

Prince William Sound

USCGS 03 51 05.0

59.5 N 144.5 W

Depth: 33 km Dist: 33.7

Az: 314.2° Mag: 5.2

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DATE	PHASE	TIME		
		h	m	s
24 April 64	eP	06	10	57
	ePKP	06	14	42
	ePP	06	15	44
	ePKS	06	18	18
	eSKS	06	21	26
	ePSi	06	25	20
	eSS	06	31	27
	eLQ	06	43	32
	eLR	06	49	40
<u>North-East New Guinea</u>				
USCGS		05	56	10.1
5.1 S 144.2 E				
Depth: 106 km Dist: 116.3°				
Az: 290.6° Mag: 6.3				
24 April 64	iP (SSE)	14	46	39
	ePP	14	47	27
	iS	14	51	36
	eSS	14	52	27
	eLR (SSE)	14	55	42
<u>Near coast of El Salvador</u>				
USCGS		14	40	28.3
13.3 N 88.8 W				
Depth: 158 km Dist: 31.7°				
Az: 171.9° Mag: 5.1				

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DATE	PHASE	TIME		
		h	m	s
27 April 64	eSS	07	25	24
	eLQ	07	41	05
	eLR	07	50	00
	<u>Balleny Islands region</u>			
	USCGS	06	44	25.1
	60.1 S 151.0 E			
	Depth: 33 km Dist: 139.8°			
	Az: 224.3° Mag: 5.0			
2 May 64	iP (NW)	16	22	34
	ePP	16	25	24
	ePPP	16	27	11
	eS	16	32	02
	ePPS	16	32	56
	eSS	16	36	48
	eLQ	16	42	30
	eLR (NW)	16	45	56
	<u>Kurile Islands</u>			
	USCGS	16	11	00.2
	45.5 N 150.3 E			
	Depth: 35 km Dist: 73.9°			
	Az: 319.1° Mag: 5.7			

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DATE	PHASE	TIME		
		h	m	s
5 May 64	eP	08	13	33
	eS	08	22	48
	ePS	08	23	10
	eSS	08	28	00
	eLQ	08	35	36
	eLR (NW)	08	37	23

Kurile Islands

USCGS 08 01 48.4
 45.5 N 150.1 E
 Depth: 40 km Dist: 74.0
 Az: 319.2° Mag: 4.9

6 May 64	ePP	08	29	34
	ePKS	08	32	52
	eSKS	08	35	48
	ePS	08	38	55
	ePPS	08	40	05
	eSS	08	45	02
	eLR (W)	09	00	08

Solomon Islands

USCGS 08 10 47.5
 11.1 S 162.6 E
 Depth: 40 km Dist: 107.8°
 Az: 272.0° Mag: 5.1

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DATE	PHASE	TIME		
		h	m	s
6 May 64	eP	15	33	55
	eS	15	39	28
	eSS	15	42	24
	eLR	15	45	00
	<u>Prince William Sound</u>			
	USCGS	15	26	35.5
	56.7 N 152.1 W			
	Depth: 15 km Dist: 37.9°			
	Az: 309.7° Mag: 5.4			
7 May 64	iP (NW)	20	25	13
	ePP	20	28	28
	eS	20	35	38
	ePS	22	36	33
	ePPS	22	37	04
	eSS	22	41	28
	eLQ	22	48	50
	eLR (NW)	22	52	50
	<u>Off west coast of Honshu, Japan</u>			
	USCGS	20	12	49.3
	40.5 N 139.0 E			
	Depth: 33 km Dist: 82.9°			
	Az: 322.6° Mag: 5.9			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
8 May 64	eP	16	29	24
	ePP	16	30	48
	eS	16	35	12
	eSS	16	37	47
	eLQ	16	37	48
	eLR (NW)	16	40	18

Prince William Sound

USCGS 16 21 49.8
 56.7 N 154.0 W
 Depth: 25 km Dist: 38.9°
 Az: 310.0° Mag: 5.3

8 May 64	eS	21	46	40
	eLR (NW)	21	50	14

Prince William Sound

USCGS 21 34 40.6
 60.8 N 143.6 W
 Depth: 35 km Dist: 33.4°
 Az: 316.6° Mag: 5.4

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
8 May 64	eP	23	49	32
	eS	23	56	33
	eSS	00	00	27
	eLQ	00	00	37
	eLR (NW)	00	04	32

Andreanof Islands, Aleutian Islands

USCGS 23 40 44.1
 52.2 N 169.5 W
 Depth: 20 km Dist: 48.9°
 Az: 307.4° Mag: 5.2

12 May 64	iP (NW)	18	24	11
	iPP	18	25	32
	eS	18	29	54
	eSS	18	32	30
	eLQ	18	32	38
	eLR (NW)	18	35	04

Alaska aftershock

USCGS 18 16 41.9
 56.6 N 152.4 W
 Depth: 10 km Dist: 38.1°
 Az: 309.6° Mag: 5.3

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
13 May 64	eP	05	40	08
	ePP	05	44	23
	eSKS	05	50	30
	e	05	52	04
	eSS	05	59	31
	eLQ	06	10	24
	eLR	06	16	28

Kermadec Islands region

USCGS 05 25 26.1
 32.8 S 178.3 W
 Depth: 33 km Dist: 109.2°
 Az: 232.7° Mag: 5.3

15 May 64	ePS	11	19	14
	eSS	11	25	14
	eLQ	11	36	08
	eLR	11	41	34

Bismarck Sea

USCGS 10 50 21
 3.5 S 149.1 E
 Depth: 44 km Dist: 111.9°
 Az: 287.8° Mag: 4.7

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
15 May 64	eS	19	49	15
	eLR (SW)	19	51	17
	<u>Gulf of California</u>			
	USCGS	19	40	35
	31.5 N 113.7 W			
	Depth: 33 km Dist: 20.8°			
	Az: 236.8° Mag: 4.7			
16 May 64	eP	16	21	59
	ePP	16	26	24
	eSKS	16	32	52
	e	16	34	28
	ePS	16	36	16
	eSS	16	42	20
	eLQ	16	52	44
	eLR	16	58	35
	<u>Kermadec Islands region</u>			
	USCGS	16	07	46.2
	32.8 S 178.3 W			
	Depth: 33 km Dist: 109.2°			
	Az: 242.7° Mag: 5.4			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
17 May 64	eP	00	56	51
	ePP	00	58	04
	eS	01	02	09
	eSS	01	04	05
	eLR (NW)	01	06	12
<u>Alaska aftershock</u>				
	USCGS	00	50	17.9
	59.4 N 142.7 W			
	Depth: 35 km Dist: 32.8°			
	Az: 314.1° Mag: 5.1			
17 May 64	iP (E)	19	34	28
	iPP	19	36	11
	eS	19	41	00
	eSS	19	44	08
	eLQ	19	44	50
	eLR	19	46	36
<u>North Atlantic Ocean</u>				
	USCGS	19	26	20.6
	35.2 N 35.9 W			
	Depth: 33 km Dist: 44.1°			
	Az: 82.0° Mag: 5.6			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
20 May 64	ePP	06	21	09
	ePS	06	30	15
	ePPS	06	31	49
	eSS	06	37	19
	eLQ	06	57	12
	eLR (NW)	06	55	29

Near north coast of western New Guinea
USCGS 06 01 14.8
2.7 S 139.3 E
Depth: 61 km Dist: 117.7°
Az: 296.5° Mag: 5.8

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
21 May 64	iP	15	43	25
	ePP	15	44	56
	eS	15	49	16
	eSS	15	51	50
	eLQ	15	52	00
	eLR	15	53	48

Alaska Aftershock

USCGS 15 36 01.5
 59.0 N 153.5 W
 Depth: 15 km Dist: 38.4°
 Az: 313.6° Mag: 5.3

26 May 64 iP (SE) 11 13 56

Sandwich Islands

USCGS 10 59 12.3
 56.2 S 27.8 W
 Depth: 120 km Dist: 114.7°
 Az: 146.0°

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
27 May 64	iPP	01	16	11
	eSKS	01	21	44
	ePS	01	25	41
	eSS	01	31	48
	eLQ	01	43	19
	eLR	01	50	09
	<u>Sandwich Islands</u>			
	USCGS	00	56	42.5
	56.1 S 27.6 W			
	Depth: 105 km Dist: 114.7°			
	Az: 145.8° Mag: 5.6			
29 May 64	iP	10	24	30
	ePP	10	25	39
	eS	10	30	00
	eLR	10	33	20
	<u>Alaska Aftershock</u>			
	USCGS	10	17	34.5
	60.2 N 146.3 W			
	Depth: 5 km Dist: 34.7°			
	Az: 315.4° Mag: 5.6			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
30 May 64	iP	14	43	26
	ePP	14	46	45
	eSKS	14	53	42
	eS	14	54	00
	ePS	14	54	36
	ePPS	14	55	10
	eSS	14	59	24
	eLQ	15	06	12
	eLR	15	11	07

Near east coast of Honshu, Japan

USCGS 14 30 45.3
 36.2 N 141.1 E
 Depth: 49 km Dist: 85.5°
 Az: 318.8° Mag: 5.4

31 May 64	iP (NW)	00	52	26
	iPP	00	55	15
	iPPP	00	57	12
	eS	01	02	00
	eSS	01	07	36
	eLQ	01	12	20
	eLR	01	16	28

Kurile Islands

USCGS 00 40 36.4
 43.5 N 146.8 E
 Depth: 48 km Dist: 77.1°
 Az: 319.7° Mag: 6.3

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
2 June 64	eP	16	16	08
	eS	16	21	34
	eLR (NW)	16	25	45
<u>Alaska Aftershock</u>				
	USCGS	16	09	23.5
	59.7 N 144.4 W			
	Depth: 15 km Dist: 33.7°			
	Az: 314.5° Mag: 5.1			
3 June 64	eS	14	15	50
	eLR	14	20	20
<u>Alaska Aftershock</u>				
	USCGS	14	03	42.4
	59.9 N 143.9 W			
	Depth: 20 km Dist: 33.4°			
	Az: 314.9° Mag: 5.1			
4 June 64	eP (S)	04	34	46
	eS	04	39	31
	eSS	04	40	44
	eLR (S)	04	42	13
<u>Near coast of Guerrero, Mexico</u>				
	USCGS	04	28	54.7
	17.5 N 100.8 W			
	Depth: 22 km Dist: 28.1°			
	Az: 195.6° Mag: 4.7			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
4 June 64	ePS	11	46	24
	eLQ	12	03	16
	eLR	12	08	11

New Britain

USCGS 11 17 11.8

6.1 S 149.9 E

Depth: 54 km Dist: 113.2°

Az: 285.2°

5 June 64	eP	09	57	30
	eS	10	02	54
	eLR (NW)	10	06	20

Alaska Aftershock

USCGS 09 50 35.0

60.4 N 146.0 W

Depth: 15 km Dist: 34.5°

Az: 315.7° Mag: 5.2

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
10 June 64	ePKP	22	35	20
	iPP	22	36	36
	eSKS	22	42	05
	ePS	22	46	22
	ePPS	22	48	00
	eSS	22	52	54
	eLQ	23	05	58
	eLR	23	11	29

Talaud Islands region

USCGS 22 16 44.8

5.0 N 127.4 E

Depth: 146 km Dist: 118.5°

Az: 312.5° Mag: 5.5

11 June 64	ePP	17	21	40
	ePS	17	31	24
	ePPS	17	32	53
	eSS	17	37	47
	eSSS	17	42	00
	eLQ	17	49	52
	eLR	17	55	20

Near north coast of western New Guinea

USCGS 17 01 48.5

2.0 S 140.8 E

Depth: 18 km Dist: 116.2°

Az: 295.7°

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
12 June 64	ePP	11	09	56
	eSKS	11	15	32
	ePS	11	19	40
	ePPS	11	20	55
	eSS	11	26	20
	eLQ	11	38	44
	eLR	11	44	14

Near north coast of western New Guinea

USCGS 10 50 09.1

2.1 S 141.1 E

Depth: 33 km Dist: 116.1°

Az: 295.4° Mag: 5.5

13 June 64	eS	04	38	54
	eLQ	04	45	20
	eLR	04	48	50

Aleutian Islands

USCGS 04 20 53.5

53.6 N 172.1 E

Depth: 33 km Dist: 58.0°

Az: 315.5° Mag: 5.1

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
14 June 64	iP	12	28	19
	ePP	12	31	44
	eSKS	12	38	42
	eS	12	38	55
	eLQ	12	52	47
	eLR	12	56	44

Southeastern Turkey

USCGS 12 15 31.3
 38.0 N 38.5 E
 Depth: 8 km Dist: 86.7°
 Az: 36.2°

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
15 June 64	ePKP	00	24	42
	ePP	00	26	48
	ePPP	00	29	49
	ePS	00	36	47
	ePPS	00	38	33
	eSS	00	44	24
	eLR (NW)	01	07	39
<u>Northern Sumatra</u>				
	USCGS	00	05	31.1
	5.4 N 97.0 E			
	Depth: 33 km Dist: 129.1°			
	Az: 346.9° Mag: 5.5			
16 June 64	iP (NW)	04	14	13
<u>Near west coast of Honshu, Japan</u>				
	USCGS	04	01	44.3
	38.3° N 139.1° E			
	Depth: 57 km Dist: 84.7°			
	Az: 321.3° Mag: 6.1			
18 June 64	eP	18	13	12
	eS	18	22	16
	eLR	18	35	19
<u>Kurile Islands</u>				
	USCGS	18	01	47.6
	47.5 N 154.9 E			
	Depth: 33 km Dist: 70.3°			
	Az: 318.1° Mag: 5.3			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
20 June 64	iP (SSW)	17	18	08
	eS	17	22	56
	eSS	17	23	50
	eLR (SSW)	17	25	18
	<u>Near coast of Jalisco, Mexico</u>			
	USCGS	17	12	15.2
	18.5 N 105.5 W			
	Depth: 28 km Dist: 28.3°			
	Az: 205.3° Mag: 5.5			
21 June 64	iP (NW)	01	43	59
	ipP	01	44	13
	eS	01	52	50
	ePS	01	53	13
	eLQ	02	01	25
	eLR	02	05	09
	<u>Kamchatka</u>			
	USCGS	01	33	11.2
	51.0 N 157.0 E			
	Depth: 51 km Dist: 66.9°			
	Az: 319.7° Mag: 5.7			

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
22 June 64	iP	00	30	06
	ePP	00	34	09
	eSKS	00	40	20
	eS	00	40	52
	ePS	00	42	13
	ePPS	00	43	03
	eSS	00	47	12
	eLQ	00	56	10
	eLR (SW)	01	00	32

Samoa Islands

USCGS

00 16 27.4

15.7 S 172.8 W

Depth: 33 km Dist: 93.8°

Az: 251.7° Mag: 5.1

22 June 64	iP (NW)	01	38	26
	iPP	01	41	24
	ePPP	01	43	16
	eS	01	48	04
	ePPS	01	49	32
	eSS	01	52	54
	eLQ	01	58	58
	eLR (NW)	02	03	34

Kurile Islands

USCGS

01 26 37.0

43.3 N 146.1 E

Depth: 77 km Dist: 77.5°

Az: 320.0° Mag: 6.2

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
28 June 64	eP	13	06	10
	ePP	13	10	42
	e	13	18	24
	ePS	13	20	12
	ePPS	13	20	56
	eSS	13	26	00
	eLQ	13	37	08
	eLR (W)	13	42	00

New Ireland region

USCGS 12 51 34.6
1.7 S 149.6 E
Depth: 7 km Dist: 110.2°
Az: 288.7° Mag: 6.4

28 June 64	eP	17	17	57
	eS	17	26	56
	eLQ	17	34	23
	eLR	17	37	50

North Atlantic Ocean

USCGS 17 07 07.0
3.5 N 32.4 W
Depth: 33 km Dist: 67.1°
Az: 109.0° Mag: 4.6

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
28 June 64	iP	17	38	51
	eS	17	47	40
	eSS	17	52	09
	eLQ	17	55	16
	eLR	17	58	48

North Atlantic Ocean

USCGS

17 27 59.8

4.0 N 32.4 W

Depth: 33 km Dist: 66.8°

Az: 108.6° Mag: 5.3

28 June 64	eP	19	16	14
	eS	19	22	00
	eLR (NW)	19	25	56

Alaska Aftershock

USCGS

19 09 05.4

58.3 N 150.2 W

Depth: 23 km Dist: 36.7°

Az: 312.2° Mag: 5.5

Minneapolis, Minnesota 1964



DATE	PHASE	TIME		
		h	m	s
29 June 64	eP (NW)	07	28	47
	ePP	07	30	10
	eS	07	34	36
	eSS	07	37	02
	eLQ	07	38	32
	eLR (NW)	07	39	32

Southern Alaska

USCGS

07 21 32.8

62.7 N 152.0 W

Depth: 33 km Dist: 37.4°

Az: 319.5° Mag: 5.6

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME		
		h	m	s
30 June 64	eP	14	02	08
	iPKP	14	05	29
	iPP	14	07	15
	eSKS	14	12	27
	ePS	14	17	16
	ePPS	14	18	51
	eSS	14	24	14
	eLQ	14	38	18
	eLR (NW)	14	44	19

Northern Celebes

USCGS

13 46 21.6

0.8° S 122.5° E

Depth: 36 km Dist: 125.8°

Az: 315.6° Mag: 6.3

30 June 64	iP (NW)	20	19	33
	ePP	20	21	38
	eS	20	28	43
	e	20	30	24

Sea of Okhotsk

USCGS

20 08 28.5

46.6° N 144.6° E

Depth: 383 km Dist: 75.6°

Az: 323.0° Mag: 5.5

University of Minnesota Seismic Station

Minneapolis, Minnesota

SEISMOLOGICAL BULLETIN

BY

Brian J. Mitchell

and

Bruce S. Hemingway

1 July 1964 --- 31 December 1964

MAY 13 1965

Station Constants



Latitude: $44^{\circ} 54' 52''$ North

Longitude: $93^{\circ} 11' 24''$ West

Elevation: 710 feet

Abbreviations

i = sudden beginning of the motion (impetus)

e = gradual beginning of the motion (emersio)

Instruments

Three component Benioff short-period seismographs,
 $T_o = 1 \text{ sec.}$, $T_g = .76 \text{ sec.}$

Three component Sprengnether long-period
seismographs,
 $T_o = 30 \text{ sec.}$, $T_g = 100 \text{ sec.}$

All times are G. C. T.

Earthquakes are not reported for which only a surface wave was recorded.

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
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3 July 64	eSS	05 16 16
	eLR	05 18 44

Jalisco, Mexico

USCGS 05 05 33.8

19.4° N 104.3° W

Depth: 102 km Dist: 27.1°

Az: 203.6° Mag: 4.4

5 July 64	eP	03 21 24
	eS	03 26 42
	eLR (NW)	03 31 32

Alaska aftershock

USCGS 03 14 33.3

60.8° N 144.9° W

Depth: 30 km Dist: 34.0°

Az: 316.5° Mag: 4.9

Minneapolis, Minnesota, 1964



International
Seismological
Centre

DATE	PHASE	TIME h m s
5 July 64	iP(SW)	19 13 06
	eS	19 17 24
	eLR (SW)	19 18 30
	<u>Gulf of California</u>	
	USCGS	19 07 57.8
	26.2° N 110.2° W	
	Depth: 29 km Dist: 23.2°	
	Az: 222.0° Mag: 6.0	
5 July 64	iP (NW)	23 47 36
	ePP	23 50 28
	eS	23 57 12
	eSS	00 02 13
	eLQ	00 07 20
	eLR (NW)	00 12 00
	<u>Kurile Islands</u>	
	USCGS	23 36 01.5
	44.8° N 149.6° E	
	Depth: 54 km Dist: 74.8°	
	Az: 319.0° Mag: 5.5	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
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6 July 64	iP	07 27 44
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Guerrero, Mexico

USCGS

07 22 11.5

18.3° N 100.4° W

Depth: 100 km Dist: 27.2°

Az: 195.1° Mag: 6.3

7 July 64	iP	12 50 02
	eS	13 54 36
	eLR	13 56 28

Off coast of Oregon

USCGS

13 44 40

43.4° N 127.2° W

Depth: 7 km Dist: 24.4°

Az: 278.6° Mag: 5.7

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
8 July 64	ePS	08 15 43
	eSS	08 22 44
	eLQ	08 35 28
	eLR	08 41 31

Molucca Passage

USCGS	07 45 48.6
3.2° N 128.4° E	
Depth: 50 km Dist: 119.5°	
Az: 310.4° Mag: 5.5	

8 July 64	eP	12 11 02
	e	12 12 04
	iPKP	12 14 22
	iPP	12 16 13
	eSKS	12 21 08

Banda Sea

USCGS	11 55 39
5.5° S 129.8° E	
Depth: 165 km Dist: 125.8°	
Az: 303.2° Mag: 6.5	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
9 July 64	eP	11 35 52
	eSKS	11 46 30
	eS	11 47 32
	ePS	11 49 05
	eSS	11 54 27
	eLQ	12 03 45
	eLR	12 08 52

Tonga Islands

USCGS 11 22 05.4
23.3° S 175.7° W
Depth: 43 km Dist: 101.0°
Az: 248.2° Mag: 5.7

9 July 64	iP (WSW)	16 53 54
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New Hebrides Islands

USCGS 16 39 49.3
15.5° S 167.6° E
Depth: 121 km Dist: 107.3°
Az: 265.2° Mag: 6.6

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
11 July 64	eS	09 56 52
	eSS	09 58 50
	eLR (NW)	10 00 40

Alaska aftershock

USCGS	09 44 18.7
59.7° N 146.1° W	
Depth: 33 km Dist: 34.5°	
Az: 314.5° Mag: 5.3	

11 July 64	iP (NW)	20 32 27
	eS	20 38 00
	eLR	20 41 28

Alaska aftershock

USCGS	20 25 40.3
59.7° N 146.2° W	
Depth: 40 km Dist: 34.6°	
Az: 314.5° Mag: 5.6	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

13 July 64	eP	12 00 08
	eS	12 04 32
	eLR	12 05 52

Near coast of Oregon

USCGS 11 54 50.7
42.5° N 126.7° W
Depth: 33 km Dist: 24.3°
Az: 276.2° Mag: 5.6

17 July 64	iP	02 46 19
	eS	02 56 10

Southern Greece

USCGS 02 34 26.9
38.2° N 23.7° E
Depth: 150 km Dist: 79.6°
Az: 45.6° Mag: 5.4

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
18 July 64	eS	23 47 50
	eLR (NW)	23 51 25

Alaska aftershock

USCGS	23 36 21.0
60.0° N 143.4° W	
Depth: 33 km Dist: 33.2°	
Az: 315.1° Mag: 4.9	

20 July 64	eP	18 55 35
	eSS	19 00 24
	eLR	19 03 33

Reville Gagedo Islands region

USCGS	18 49 43.5
19.8° N 109.0° W	
Depth: 33 km Dist: 28.3°	
Az: 212.8° Mag: 5.1	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

21 July 64	ePP	01 16 12
	eS	01 20 02
	eLQ	01 20 36
	eLR	01 22 00

Off coast of Jalisco, Mexico

USCGS 01 09 25.8
19.8° N 108.8° W
Depth: 31 km Dist: 28.2°
Az: 212.4° Mag: 4.9

21 July 64	iP	07 08 21
	eLR	07 17 32

Near coast of El Salvador

USCGS 07 01 59.3
13.1° N 88.4° W
Depth: 68 km Dist: 32.0°
Az: 171.2° Mag: 4.7

Minneapolis, Minnesota, 1964



International
Seismological
Centre

DATE	PHASE	TIME h m s
22 July 64	eS	10 42 53
	eLR	10 44 26
	<u>Gulf of California</u>	
	USCGS	10 34 11.9
	31.7° N 114.1° W	
	Depth: 33 km Dist: 21.0°	
	Az: 238.2° Mag: 4.6	
24 July 64	iP (NW)	07 02 09
	eS	07 11 22
	eLQ	07 21 12
	eLR (NW)	07 26 00
	<u>Kurile Islands</u>	
	USCGS	06 50 52.8
	46.9° N 153.9° E	
	Depth: 33 km Dist: 71.2°	
	Az: 318.1° Mag: 5.9	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

24 July 64	iP	08 23 57
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Kurile Islands

USCGS

08 12 40.0

47.2° N 153.8° E

Depth: 33 km Dist: 71.0°

Az: 318.4° Mag: 5.9

24 July 64	iP (NW)	17 14 10
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ePS

17 23 24

eSS

17 27 52

eLQ

17 31 42

eLR

17 36 20

Kurile Islands

USCGS

17 02 49.2

47.1° N 153.6° E

Depth: 33 km Dist: 71.2°

Az: 318.5° Mag: 5.8

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
25 July 64	iP (SE)	19 42 48
	ePP	19 45 40
	ePPP	19 47 28
	eS	19 52 24
	ePS	19 53 00
	eSS	19 57 10
	eLQ	20 02 56
	eLR	20 07 00

Northern Chile

USCGS 19 31 07.0
27.9° S 70.9° W
Depth: 26 km Dist: 75.3°
Az: 159.7 Mag: 6.1

28 July 64	iPKP	18 59 44
	eSS	19 21 54
	eLQ	19 37 14
	eLR	19 41 38

About 1000 km. southwest of Tasmania

USCGS 18 40 04.3
51.2° S 139.0° E
Depth: 33 km Dist: 145.2°
Az: 240.5° Mag: 5.3

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

30 July 64	iP (SE)	05 22 44
	iPP	05 24 18
	eS	05 28 20
	eLR	05 32 04

Near west coast of Costa Rica

USCGS 05 16 03.3

11.1° N 86.2° W

Depth: 42 km Dist: 34.2°

Az: 167.7° Mag: 5.7

31 July 64	eP	06 06 56
	ePP	06 11 42
	ePS	06 21 22
	eSS	06 27 18
	eLQ	06 38 52
	eLR (SW)	06 45 52

New Britain

USCGS 05 52 18.8

6.1° S 149.4° E

Depth: 63 km Dist: 113.6°

Az: 285.6 Mag: 5.9

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
2 Aug 64	iP	08 43 25
	iPP	08 44 52
	eS	08 49 02
	eSS	08 51 24
	eLQ	08 52 02
	eLR (NW)	08 53 27
<u>Alaska aftershock</u>		
USCGS		08 36 16.9
56.2° N 149.9° W		
Depth: 31 km Dist: 36.7°		
Az: 308.6° Mag: 5.4		
3 Aug 64	eP (SE)	01 54 51
	eS	01 59 45
	eSS	02 01 30
	eLR	02 02 39
<u>Dominican Republic region</u>		
USCGS		01 48 23.3
19.8° N 70.7° W		
Depth: 7 km Dist: 31.2°		
Az: 136.0° Mag: 5.2		

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
4 Aug 64	iP	17 35 47
	eS	17 45 06
	ePS	17 45 38
	eSS	17 49 49
	eLQ	17 55 36
	eLR	17 58 45

Kurile Islands

USCGS 17 24 29.2
 46.5° N 151.1° E
 Depth: 101 km Dist: 72.8°
 Az: 319.3° Mag: 5.9

5 Aug 64	eS	11 24 40
	ePS	11 25 31
	eSS	11 30 20

Off coast of central Chile

USCGS 11 01 16.5
 39.0° S 74.5° W
 Depth: 26 km Dist: 85.2°
 Az: 165.5° Mag: 5.1

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
5 Aug 64	eP	11 21 00
	eSKS	11 31 19
	eSKS	11 32 05
	ePS	11 33 52
	eLQ	11 50 37
<u>South of Kermadec Islands</u>		
	USCGS	11 06 02.6
	32.1° S 179.8° E	
	Depth: 235 km Dist: 109.9°	
	Az: 244.4° Mag: 5.8	
5 Aug 64	iP (SSE)	22 35 56
	ePP	22 39 20
	eSKS	22 46 32
	eSS	22 52 36
	eLQ	22 59 12
	eLR	23 04 48
<u>Off coast of southern Chile</u>		
	USCGS	22 23 13.0
	41.1° S 74.9° W	
	Depth: 33 km Dist: 87.2°	
	Az: 166.3° Mag: 6.1	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
6 Aug 64	iP	10 51 43
	eSS	10 56 16
	eLR	10 57 28

Off coast of Oregon

USCGS 10 46 28.9
43.4[°] N 126.7[°] W
Depth: 33 km Dist: 24.0[°]
Az: 278.3[°] Mag: 5.3

6 Aug 64	eP	18 32 14
	eS	18 38 00
	eLQ	18 40 50
	eLR (NW)	18 43 00

Alaska aftershock

USCGS 18 24 50.5
56.9[°] N 152.1[°] W
Depth: 39 km Dist: 37.9[°]
Az: 310.0[°] Mag: 5.6

Minneapolis, Minnesota, 1964



International
Seismological
Centre

DATE PHASE

TIME
h m s

8 Aug 64	iP	15 51 37
	eS	15 57 46
	eLR	16 01 27

Off west coast of Nicaragua

USCGS 15 45 10.9

12.5° N 87.8° W

Depth: 63 km Dist: 32.6°

Az: 170.2° Mag: 5.8

10 Aug 64	eP	01 16 50
	eS	01 22 10
	eSS	01 24 16
	eLR	01 25 53

Mona Passage

USCGS 01 10 12.4

19.1° N 67.3° W

Depth: 33 km Dist: 33.6°

Az: 131.7° Mag: 5.5

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

13 Aug 64	eP	00 45 02
	epP	00 46 28
	eSKS	00 55 04
	ePS	00 58 21

Solomon Islands

USCGS 00 31 14.1
5.4° S 154.3° E
Depth: 383 km Dist: 109.7°
Az: 282.4° Mag: 6.0

14 Aug 64	eS	21 46 08
	eSS	21 49 57
	eLQ	21 53 09
	eLR	21 56 00

Central Mid-Atlantic Ridge

USCGS 21 27 41.6
7.4° N 36.8° W
Depth: 33 km Dist: 61.3°
Az: 109.7° Mag: 4.8

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
17 Aug 64	eP	15 24 04
	ePP	15 26 04
	eS	15 31 17
	eLQ	15 36 23
	eLR	15 38 28
<u>Norwegian Sea</u>		
USCGS		15 15 18.9
72.2° N 1.7° E		
Depth: 33 km Dist: 49.4°		
Az: 23.8° Mag: 5.4		
18 Aug 64	iP (SSE)	04 56 32
	ePP	04 59 31
	ePPP	05 01 17
	eS	05 05 50
	eSS	05 11 07
	eLQ	05 15 49
<u>Off coast of northern Chile</u>		
USCGS		04 44 58.0
26.4° S 71.5° W		
Depth: 8 km Dist: 73.2°		
Az: 150.0°		

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

20 Aug 64	eS	04 11 08
	eSS	04 14 16
	eLQ	04 15 25
	eLR	04 17 37

Iceland

USCGS

03 56 29.2

63.9° N 20.5° W

Depth: 33 km Dist: 44.6°

Az: 37.8° Mag: 4.8

20 Aug 64	iP	08 45 24
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Windward Islands

USCGS

08 37 47.1

14.9° N 60.4° W

Depth: 65 km Dist: 40.8°

Az: 126.7° Mag: 5.5

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
22 Aug 64	iP (SW)	03 08 10
	eS	03 12 08
	eLR	03 13 14
	<u>Gulf of California</u>	
	USCGS	03 03 20.7
	31.5° N 114.3° W	
	Depth: 15 km Dist: 21.2°	
	Az: 238.1° Mag: 5.3	
23 Aug 64	eP	15 38 51
	ePKP	15 42 24
	ePP	15 43 23
	eSKS	15 49 39
	ePS	15 53 04
	ePPS	15 54 14
	eSS	15 59 24
	eLQ	16 10 00
	eLR (W)	16 16 41
	<u>New Britain region</u>	
	USCGS	15 24 05.3
	6.1° S 149.4° E	
	Depth: 63 km Dist: 113.6°	
	Az: 285.6° Mag: 4.9	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
24 Aug 64	iP (NW)	22 04 02
	eS	22 09 47
	eLR	22 15 24
	<u>Gulf of Alaska</u>	
	USCGS	21 56 54.2
	58.4° N 150.3° W	
	Depth: 22 km Dist: 36.7°	
	Az: 312.3° Mag: 5.8	
25 Aug 64	iP (N)	13 56 47
	iPP	13 58 50
	eS	14 04 30
	eSS	14 08 00
	eLQ	14 08 58
	eLR (N)	14 12 24
	<u>East of Severnaya Zembya</u>	
	USCGS	13 47 20.6
	78.2° N 126.6° E	
	Depth: 50 km Dist: 54.8°	
	Az: 350.7° Mag: 6.1	

Minneapolis, Minnesota, 1964



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DATE	PHASE	TIME
		h m s
26 Aug 64	eP	03 26 27
	ePP	03 28 08
	ePcS	03 32 30
	eS	03 32 43
	eSS	03 35 38
	eLQ	03 36 12
	eLR (WNW)	03 38 16
<u>North Atlantic Ridge</u>		
USCGS		03 18 44.1
52.1°N 30.1°W		
Depth: 33 km Dist: 41.2°		
Az: 56.6° Mag: 5.4		
27 Aug 64	eS	19 54 50
	eLQ	20 08 29
	eLR	20 11 20
<u>Eastern Mediterranean Sea</u>		
USCGS		19 31 56.9
35.5°N 28.7°E		
Depth: 33 km Dist: 84.2°		
Az: 44.1° Mag: 4.7		

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME		
		h	m	s
3 Sept 64	iP (WNW)	05	36	39
	eSS	05	41	22
	eLR (WNW)	05	43	18
<u>Vancouver Island region</u>				
	USCGS	05	31	15.0
	50.5° N 129.5° W			
	Depth: 29 km Dist: 24.9°			
	Az: 296.0° Mag: 5.0			
3 Sept 64	iP	21	19	54
	ePP	21	20	30
	eS	21	23	48
	eSS	21	24	37
	eLR	21	25	37
<u>Gulf of California</u>				
	USCGS	21	14	43
	24.6° N 108.6° W			
	Depth: 33 km Dist: 23.8°			
	Az: 216.8° Mag: 5.3			

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
4 Sept 64	iP (ESE)	03 38 47
	ePP	03 40 51
	eS	03 47 06
	eSS	03 51 08
	eLQ	03 53 50
	eLR (ESE)	03 57 14

Central Mid-Atlantic ridge

USCGS 03 28 33.1
7.6° N 36.9° W
Depth: 22 km Dist: 61.1°
Az: 109.6° Mag: 5.4

4 Sept 64	iP	09 47 39
	eS	09 55 29
	eSS	09 59 56

Northern Chile

USCGS 09 36 58.7
18.3° S 69.0° W
Depth: 101 km Dist: 66.7°
Az: 154.9° Mag: 5.4

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
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5 Sept 64	eP	03 08 16
	eSKS	03 19 09
	ePS	03 22 20
	eSS	03 28 15
	eLQ	03 39 19
	eLR	03 44 00

Solomon Islands

USCGS 02 53 50.6
 5.8° S 154.0° E
 Depth: 69 km Dist: 110.2°
 Az: 282.3° Mag: 6.4

5 Sept 64	eP	12 38 56
	eS	12 48 22
	ePS	12 48 48
	ePPS	12 49 08
	eSS	12 53 14
	eLQ	12 58 20
	eLR	13 01 32

Central Mid-Atlantic Ridge

USCGS 12 27 22.2
 0.6° N 25.9° W
 Depth: 33 km Dist: 73.6°
 Az: 106.0° Mag: 4.7

Minneapolis, Minnesota, 1964



DATE PHASE

TIME
h m s

7 Sept 64	ePS	11 56 05
	eSS	12 02 10
	eLQ	12 15 27
	eLR (NE)	12 19 42

Arabian Sea

USCGS

11 27 15

15.7° N 53.3° E

Depth: 33 km Dist: 112.4°

Az: 35.1° Mag: 4.6

11 Sept 64 iP (ESE)

04 35 03

Jujuy Province, Argentina

USCGS

04 23 56.0

23.9° S 66.6° W

Depth: 195 km Dist: 72.7°

Az: 154.6° Mag: 5.3

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
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12 Sept 64	iPP	13 02 52
	eSKS	13 08 30
	ePS	13 12 24
	eSS	13 19 35
	eLQ	13 31 49
	eLR	13 36 31

Near north coast of New Guinea

USCGS 12 43 19.0
 4.4° S 144.0° E
 Depth: 120 km Dist: 116.0°
 Az: 291.3° Mag: 6.3

12 Sept 64	eP	22 23 02
	iPKP	22 26 07
	iPP	22 28 18
	ePS	22 38 29
	ePPS	22 40 13
	eSS	22 45 27
	eLQ	23 01 00
	eLR (SW)	23 07 33

Auckland Islands region

USCGS 22 07 03.2
 49.1° S 164.2° E
 Depth: 33 km Dist: 129.2°
 Az: 235.9° Mag: 6.9

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
14 Sept 64	iP (S)	13 39 35
	eS	13 44 29
	eLQ	13 46 22
	eLR (S)	13 47 56

Near coast of Chiapas, Mexico

USCGS 13 33 33.7

15.0° N 93.2° W

Depth: 64 km Dist: 29.8°

Az: 180.0° Mag: 4.9

Minneapolis, Minnesota, 1964'



DATE	PHASE	TIME		
		h	m	s
15 Sept 64	iPKP	15	48	33
	ePP	15	50	24
	eSKS	15	55	32
	e	15	57	47
	ePS	16	00	56
	ePPS	16	02	34
	eSS	16	07	33
	eLQ	16	23	04
	eLR	16	29	00

Nicobar Islands region

USCGS 15 29 32.2
 8.9° N 93.1° E
 Depth: 37 km Dist: 126.1°
 Az: 352.3° Mag: 6.2

16 Sept 64	iP	01	57	33
	ipP	01	57	45
	ePP	01	58	42
	eS	02	02	58
	eLR (NW)	02	07	33

Gulf of Alaska

USCGS 01 50 33.9
 60.0° N 147.1° W
 Depth: 29 km Dist: 35.0°
 Az: 315.0° Mag: 5.5

Minneapolis, Minnesota, 1964



DATE PHASE

TIME
h m s

17 Sept 64	iP	15 10 00
	iPP	15 11 50
	eS	15 16 29
	eLQ	15 20 55
	eLR (E)	15 21 46

North Atlantic Ridge

USCGS

15 02 00.9

44.5° N 31.3° W

Depth: 5.6 Dist: 43.0°

Az: 67.7° Mag: 5.6

18 Sept 64	eP	13 21 08
	ePP	13 22 52
	eS	13 28 02
	eSS	13 31 05
	eLQ	13 32 15
	eLR (ENE)	13 33 51

Azores Islands

USCGS

13 12 42.3

39.8° N 29.7° W

Depth: 20 km Dist: 46.1°

Az: 73.0° Mag: 5.5

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
19 Sept 64	iP (S)	05 14 18
	iPP	05 15 14
	eS	05 19 15
	eLR (S)	05 22 20

Near coast of Oaxaca, Mexico

USCGS 05 08 15.1
15.3° N 94.0° W
Depth: 42 km Dist: 29.5°
Az: 181.6° Mag: 5.3

23 Sept 64	iP	05 08 03
	eS	05 14 40
	eSS	05 18 11
	eLQ	05 18 57
	eLR (NW)	05 20 40

Unimak Island region

USCGS 04 59 47.4
53.6° N 163.9° W
Depth: 29 km Dist: 45.2°
Az: 307.5° Mag: 5.5

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
24 Sept 64	iP (W)	14 05 01
	eS	14 09 31
	eLR	14 11 29
	<u>Off coast of Oregon</u>	
	USCGS	13 59 36.8
	43.5° N 127.5° W	
	Depth: 14 km Dist: 24.5°	
	Az: 278.9°	
25 Sept 64	eP	15 52 12
	eS	16 00 00
	eLQ	16 06 37
	eLR	16 09 16
	<u>Rat Islands, Aleutian Islands</u>	
	USCGS	15 42 17.9
	50.3° N 176.6° E	
	Depth: 30 km Dist: 57.4°	
	Az: 310.5° Mag: 5.5	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

27 Sept 64	iP	15 58 18
	eS	16 04 04
	eSS	16 06 27
	eLR (NW)	16 08 20

Kodiak Island region

USCGS 15 50 54.7
56.6° N 152.0° W
Depth: 27 km Dist: 37.8°
Az: 309.5° Mag: 5.4

29 Sept 64	iP	14 13 51
	eS	14 25 18
	ePS	14 26 54
	eSS	14 31 56
	eLQ	14 41 22
	eLR (SW)	14 46 20

Tonga Islands

USCGS 14 00 14.9
20.4° S 174.4° W
Depth: 29 km Dist: 98.2°
Az: 249.5° Mag: 5.7

Minneapolis, Minnesota, 1964



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DATE TIME PHASE

PHASE

TIME

s m h

h m s

1 Oct 54 12 54 21 iP

iP

11 06 04

40 40 01 eSS

eS

11 10 36

75 00 01 eLR (W)

eS

11 13 05

05 80 01

(W) LR

Off coast of Oregon

USCGS

11 00 48.3

43.5° N 126.9° W

Depth: 33 km Dist: 24.1°

Az: 278.7°

1 Oct 64 14 13 51 iP (W)

iP

12 35 25

18 55 18 eSS

eS

12 40 00

42 55 14 eLR

eS

12 41 31

55 18 41

eS

55 14 41

Washington-Oregon border region

05 40 44 USCGS

12 31 24.6

45.7° N 122.8° W

Depth: 33 km Dist: 20.8°

Az: 282.7°

Minneapolis, Minnesota, 1964



DAT#	PHASE	TIME		
		h	m	s
2 Oct 64	iP	01	10	02
	ePP	01	12	48
	eS	01	19	56
	eLQ	01	29	29
	eLR	01	32	39

Sakhalin Island

USCGS 00 58 39.2

51.9° N 142.9° E

Depth: 33 km Dist: 72.1°

Az: 327.3° Mag: 5.7

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
2 Oct 64	eSKS	13 26 56
	ePS	13 28 28
	ePPS	13 29 40
	eSS	13 34 40
	eSSS	13 38 41
	eLQ	13 44 53
	eLR	13 49 42

Solomon Islands

USCGS 13 00 39.7
 10.5° S 162.4° E
 Depth: 68 km Dist: 107.5°
 Az: 272.6° Mag: 6.0

3 Oct 64	eS	13 52 16
	eLR	13 55 42

Southern Alaska

USCGS 13 39 39.9
 61.4° N 147.1° W
 Depth: 48 km Dist: 35.1°
 Az: 317.4° Mag: 5.2

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
6 Oct 64	eS	07 40 23
	eSS	07 45 39
	eLQ	07 51 49
	eLR (S)	07 56 00

Southern Pacific Ocean

USCGS 07 17 57.1
36.2° S 100.9° W
Depth: 33 km Dist: 81.0°
Az: 186.3° Mag: 5.5

6 Oct 64	eP	14 43 32
	ePP	14 46 14
	eS	14 59 08
	eLQ	15 04 56
	eLR	15 08 26

Turkey

USCGS 14 31 19.2
40.3° N 28.2° E
Depth: 10 km Dist: 80.2°
Az: 41.5° Mag: 6.0

Minneapolis, Minnesota, 1964



DATE PHASE

TIME

h m s

9 Oct 64

eSKS

21 58 00

eSS

22 04 51

eLQ

22 13 28

eLR

22 18 12

Samoa Islands region

USCGS

21 34 09.2

16.2° S 171.9° W

Depth: 33 km Dist: 93.5°

Az: 250.7° Mag: 5.8

10 Oct 64

iP

20 13 27

eS

20 18 57

eSS

20 20 56

eLR (NW)

20 23 12

Southern Alaska

USCGS

20 06.39.8

60.5° N 145.4° W

Depth: 31 km Dist: 34.2°

Az: 315.9° Mag: 5.4

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
11 Oct 64	iP (W)	10 16 47
	<u>Hawaii region</u>	
	USCGS	10 06 44.9
	19.1° N 156.6° W	
	Depth: 33 km Dist: 58.7°	
	Az: 262.0° Mag: 5.3	
11 Oct 64	iP	14 29 53
	<u>Near coast of Peru</u>	
	USCGS	14 19 11.5
	17.9° S 71.5° W	
	Depth: 35 km Dist: 65.6°	
	Az: 157.3° Mag: 5.2	
11 Oct 64	ePKP	21 34 08
	ePP	21 36 00
	eSKS	21 41 18
	e	21 42 56
	ePS	21 46 04
	eSS	21 52 52
	eLQ	22 07 16
	eLR	22 14 00
	<u>Northern Celebes</u>	
	USCGS	21 15 03.9
	0.6° S 121.7° E	
	Depth: 33 km Dist: 126.2°	
	Az: 314.9° Mag: 6.3	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
12 Oct 64	eP (S)	22 07 30
	eS	22 17 28
	eSS	22 22 44
	eLQ	22 29 10
	eLR	22 33 29
	<u>Easter Island region</u>	
	USCGS	21 55 33.2
	31.3° S 110.8° W	
	Depth: 25 km Dist: 77.5°	
	Az: 195.4° Mag: 6.0	
14 Oct 64	eP	03 18 17
	ePP	03 21 47
	eSKS	03 28 16
	eS	03 28 24
	eLQ	03 41 00
	eLR	03 46 54
	<u>Off east coast of Honshu, Japan</u>	
	USCGS	03 04 59.6
	33.4° N 141.8° E	
	Depth: 33 km Dist: 87.5°	
	Az: 316.7° Mag: 5.6	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
15 Oct 64	eP	20 38 30
	eS	20 48 04
	eSS	20 53 08
	eLQ	20 58 23
	eLR	21 01 55

Kurile Islands

USCGS 20 26 53.5
 44.7° N 149.8° E
 Depth: 49 km Dist: 74.8°
 Az: 318.8° Mag: 5.2

16 Oct 64	iP	07 11 16
	eS	07 20 54
	eLQ	07 33 20
	eLR	07 36 00

Kurile Islands

USCGS 06 59 38.6
 44.3° N 149.5° E
 Depth: 33 km Dist: 75.2°
 Az: 318.7° Mag: 5.5

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s
18 Oct 64	eP	12 47 28
	iPKP	12 50 32
	iPP	12 52 56
	iPPP	12 55 45
	eSKS	12 58 32
	ePS	13 02 48
	eSS	13 09 40
<u>Banda Sea</u>		
	USCGS	12 32 24.1
	7.0° S 124.0° E	
	Depth: 574 km Dist: 130.3°	
	Az: 308.1° Mag: 5.8	
21 Oct 64	eP (W)	07 41 35
	eLR (W)	07 45 20
<u>Hebgen Lake region</u>		
	USCGS	07 38 31.0
	44.8° N 111.6° W	
	Depth: 33 km Dist: 13.1°	
	Az: 276.0° Mag: 5.8	

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME
		h m s

21 Oct 64	eP	23 23 35
	ePP	23 28 00
	ePPP	23 30 16
	eSKS	23 34 20
	ePS	23 37 12
	ePPS	23 38 12
	eLQ	23 54 15
	eLR	23 59 20

India-China border region

USCGS 23 09 18.8
 28.1° N 93.8° E
 Depth: 37 km Dist: 107.1°
 Az: 353.5° Mag: 5.9

23 Oct 64	iP (SE)	02 03 33
	ipP	02 03 44
	iPP	02 05 12
	iPPP	02 05 36
	ePcS	02 09 33
	eS	02 09 44
	eSS	02 12 28
	eLQ	02 13 04
	eLR	02 14 59

North Atlantic Ocean

USCGS 01 56 03.2
 19.8° N 56.0° W
 Depth: 31 km Dist: 39.7°
 Az: 116.9° Mag: 6.4

Minneapolis, Minnesota, 1964



DATE	PHASE	TIME h m s
1 Nov 64	ePS	13 56 11
	eSS	13 03 05
	eLQ	13 16 20
	eLR	13 22 37

North of Halmahera

USCGS	12 26 06.2
3.1° N 128.1° E	
Depth: 65 km Dist: 119.7°	
Az: 310.7° Mag: 6.3	

2 Nov 64	iP	06 59 49
	eS	07 07 44
	eSS	07 10 51
	eLQ	07 12 46
	eLR	07 14 43

Northern Peru

USCGS	06 50 58.2
4.1° S 76.9° W	
Depth: 91 km Dist: 50.9°	
Az: 158.9° Mag: 6.0	

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DATE	PHASE	TIME
		h m s

6 Nov 64	iP	10 05 01
	eS	10 14 40
	ePPS	10 15 16
	eSS	10 19 32
	eLQ	10 24 43
	eLR (NW)	10 28 38

Kurile Islands

USCGS 09 53 22.4
 44.4° N 149.0° E
 Depth: 60 km Dist: 75.4°
 Az: 319.1° Mag: 5.7

8 Nov 64	iPP	03 05 20
	ePKS	03 06 22
	eSKS	03 10 16
	ePS	03 15 24
	ePPS	03 17 10
	eSS	03 22 42
	eLQ	03 38 00
	eLR (W)	03 45 51

Auckland Islands region

USCGS 02 43 57
 49.0° S 163.7° E
 Depth: 33 km Dist: 129.5°
 Az: 236.2° Mag: 6.5

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DATE	PHASE	TIME h m s
9 Nov 64	iP	05 03 12
	<u>Banda Sea</u>	
	USCGS	04 44 19.9
	7.2° S 128.2° E	
	Depth: 129 km Dist: 128.1°	
	Az: 303.6° Mag: 5.3	
11 Nov 64	iP	08 08 10
	eS	08 14 00
	eLR (NW)	08 17 48
	<u>Gulf of Alaska</u>	
	USCGS	08 01 26.1
	59.4° N 144.6° W	
	Depth: 10 km Dist: 33.8°	
	Az: 314.0° Mag: 5.2	
13 Nov 64	iP (S)	08 08 58
	eLR (S)	08 18 09
	<u>Off coast of Central America</u>	
	USCGS	08 02 38.5
	13.0° N 88.6° W	
	Depth: 86 km Dist: 32.0°	
	Az: 171.6° Mag: 4.9	

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DATE	PHASE	TIME
		h m s
14 Nov 64	iP (SSW)	12 58 40
	eS	13 03 26
	eLR (SSW)	13 06 26

Off coast of Jalisco, Mexico

USCGS 12 52 46.3
18.2° N 105.5° W
Depth: 33 km Dist: 28.6°
Az: 205.1° Mag: 5.3

17 Nov 64	eP	08 30 18
	ePP	08 34 44
	eSKS	08 41 12
	ePS	08 44 31
	eSS	08 50 30
	eLQ	09 01 15
	eLR	09 07 00

New Britain region

USCGS 08 15 39.3
5.7° S 150.7° E
Depth: 45 km Dist: 112.4°
Az: 284.9° Mag: 6.7

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17 Nov 64	eS	16 28 26
	eSS	16 29 26
	eLR (S)	16 31 42

El Salvador

USCGS

16 17 03.0

13.2° N 89.6° W

Depth: 54 km Dist: 31.8°

Az: 173.4° Mag: 4.5

18 Nov 64	eP	14 49 56
	ePP	14 54 25
	ePS	15 04 04
	ePPS	15 05 18
	eSS	15 10 22
	e	15 11 02
	eLQ	15 21 07
	eLR	15 28 33

New Britain region

USCGS

14 34.54.5

6.0° S 148.2° E

Depth: 49 km Dist: 114.3°

Az: 286.7° Mag: 6.1

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DATE	PHASE	TIME
		h m s
19 Nov 64	eP (W)	23 50 04
	ePP	23 54 20
	eSKS	00 00 46
	ePS	00 04 20
	eSS	03 10 14
	eLQ	03 21 00
	eLR (W)	03 27 25

New Britain region

USCGS 23 35 06.0
 6.0° S 150.8° E
 Depth: 3 km Dist: 112.5°
 Az: 284.6° Mag: 6.0

20 Nov 64	iP	23 44 59
	eLQ	00 06 41
	eLR	00 10 40

Kurile Islands

USCGS 23 33 08.9
 44.6° N 149.7° E
 Depth: 33 km Dist: 74.9°
 Az: 318.8° Mag: 5.6

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DATE	PHASE	TIME h m s
24 Nov 64	iPKP	11 00 45
	iPP	11 04 08
	<u>Java</u>	
	USCGS	10 41 33.5
	6.8° S 107.4° E	
	Depth: 125 km Dist: 138.0°	
	Az: 328.5° Mag: 6.0	
24 Nov 64	eP	12 55 43
	e	12 57 55
	ePP	13 00 24
	eSKS	13 06 16
	ePS	13 09 52
	eSS	13 16 00
	eLQ	13 28 00
	eLR	13 34 40
	<u>Luzon, Philippine Islands</u>	
	USCGS	12 40 51.4
	13.1° N 124.7° E	
	Depth: 5 km Dist: 112.8°	
	Az: 319.5° Mag: 6.1	

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DATE	PHASE	TIME
		h m s
28 Nov 64	iP (SE)	16 50 15
	<u>Western Brazil</u>	
	USCGS	16 41 33.4
	7.7° S 71.2° W	
	Depth: 626 km Dist: 56.0°	
	Az: 153.4° Mag: 5.4	
28 Nov 64	iP (SE)	16 57 14
	iPcP	16 58 10
	<u>Western Brazil</u>	
	USCGS	16 49 30.3
	8.0° S 71.4° W	
	Depth: 655 km Dist: 56.2°	
	Az: 153.7° Mag: 5.6	
30 Nov 64	ePP	12 48 50
	ePS	12 59 00
	ePPS	13 00 32
	eSS	13 05 56
	eLQ	13 11 12
	eLR	13 17 00
	<u>Nicobar Islands region</u>	
	USCGS	12 27 38.6
	6.8° N 94.8° E	
	Depth: 33 km Dist: 128.0°	
	Az: 349.9° Mag: 5.7	

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DATE	PHASE	TIME
		h m s
2 Dec 64	eS	08 35 04
	eSS	08 38 08
	eLQ	08 38 47
	eLR (E)	08 40 24
<u>North Atlantic Ridge</u>		
USCGS		08 20 45.6
30.6° N 42.0° W		
Depth: 33 km Dist: 42.2		
Az: 91.7° Mag: 5.2		
3 Dec 64	iPKP	04 09 36
	iPKP2	04 09 48
	eSS	04 32 48
	eLQ	04 52 41
	eLR	05 00 40
<u>Mid-Indian Ridge</u>		
USCGS		03 50 01.2
15.0° S 66.8° E		
Depth: 46 km Dist: 145.7°		
Az: 35.9° Mag: 6.1		

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DATE	PHASE	TIME h m s
4 Dec 64	eS	02 07 55
	eSS	02 10 31
	eLQ	02 10 48
	eLR (S)	02 12 39

Off coast of Mexico

USCGS 01 54 49.3
7.8° N 102.7° W
Depth: 33 km Dist: 37.9°
Az: 195.5 Mag: 4.9

4 Dec 64	ePS	16 18 00
	eSS	16 23 52
	eLQ	16 34 45
	eLR	16 41 46

New Britain region

USCGS 15 48 43.4
6.4° S 150.7° E
Depth: 19 km Dist: 112.9°
Az: 284.4° Mag: 5.2

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DATE PHASE

TIME
h m s

7 Dec 64	ePP	09 18 08
	ePS	09 27 26
	eLQ	09 45 20
	eLR	09 49 48

New Britain region

USCGS	08 58 43.8
5.4° S 151.3° E	
Depth: 54 km Dist: 111.7°	
Az: 284.7° Mag: 5.8	

7 Dec 64	iP	19 00 14
	ePP	19 01 52
	eS	19 06 20
	eSS	19 08 45
	eLQ	19 09 10
	eLQ	19 11 16

South of Panama

USCGS	18 52 47.6
6.7° N 82.2° W	
Depth: 30 km Dist: 39.3°	
Az: 162.6° Mag: 5.2	

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DATE	PHASE	TIME
		h m s

9 Dec 64	iP	13 46 36
	ipP	13 48 37
	iS	13 55 36
	i	13 59 13

Santiago del Estero Province, Argentina

USCGS 13 35 42.4
27.5° S 63.2° W
Depth: 586 km Dist: 77.1°
Az: 152.9° Mag: 5.9

10 Dec 64	eP	15 23 28
	ePP	12 26 46
	e	15 31 11
	e	15 32 53
	eS	15 34 08
	ePS	15 34 44
	eLQ	15 47 00
	eLR (NW)	15 50 19

Eastern Sea of Japan

USCGS 15 11 05.5
40.4° N 138.9° E
Depth: 33 km Dist: 83.1°
Az: 322.6° Mag: 6.0

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DATE PHASE

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13 Dec 64	iP (NW)	00 41 26
	i	00 41 30
	eS	00 47 52
	eSS	00 51 13
	eLQ	00 52 22
	eLR	00 54 41

Alaska

USCGS

00 33 24.7

64.9° N 165.7° W

Depth: 15 km Dist: 43.3°

Az: 323.6° Mag: 5.4

14 Dec 64	ePP	02 19 50
	eSS	02 36 34
	eLR	02 57 11

South Atlantic Ridge

USCGS

01 59 05.6

54.3° S 2.4° W

Depth: 33 km Dist: 125.2°

Az: 134.2°

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DATE	PHASE	TIME
		h m s

15 Dec 64	eS	03 50 36
	eLR (SW)	03 52 51

Off coast of Jalisco, Mexico

USCGS 03 40 16.5

20.8° N 106.6° W

Depth: 33 km Dist: 26.5°

Az: 209.1° Mag: 5.1

15 Dec 64	iP (S)	12 19 25
	ipP	12 19 43
	ePP	12 20 47
	eS	12 24 10
	eLR (S)	12 27 28

Guatemala

USCGS 12 13 25.8

14.7° N 91.7° W

Depth: 118 km Dist: 30.1°

Az: 177.1° Mag: 5.4

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DATE	PHASE	TIME h m s
22 Dec 64	iP(SW	20 59 44
	eS	21 03 45
	eSS	21 04 26
	eLR (SW)	21 05 40

Off west coast of Baja California

USCGS 20 54 35.3
31.9° N 117.1° W
Depth: 14 km Dist: 22.7°
Az: 243.3° Mag: 6.3

25 Dec 64	iP (S)	16 35 44
	eSS	16 40 52
	eLR (S)	16 43 20

Near coast of Guerrero, Mexico

USCGS 16 30 01.9
18.0° N 101.2° W
Depth: 81 km Dist: 27.7°
Az: 196.6° Mag: 4.8

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DATE	PHASE	TIME
		h m s
26 Dec 64	eP	08 22 30
	eS	08 27 20
	eLR	08 29 50

Near coast of Guerrero, Mexico

USCGS 08 16 28.9
16.7° N 99.6° W
Depth: 33 km Dist: 28.6°
Az: 192.9° Mag: 5.4

26 Dec 64	iP (NW)	14 41 05
	ePP	14 43 36
	eS	14 49 44
	ePS	14 50 41

Kamchatka

USCGS 14 30 29.1
51.8° N 156.8° E
Depth: 136 km Dist: 66.4°
Az: 320.5° Mag: 5.7

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DATE PHASE

TIME
h m s

28 Dec 64	eSKS	16 39 47
	iS	16 40 08
	e	16 44 02

South of Fiji Islands

USCGS 16 16 11.0

22.1° S 179.6° W

Depth: 611 km Dist: 102.8°

Az: 251.7° Mag: 6.2

30 Dec 64	ePS	10 15 20
	eSS	10 22 00
	eLQ	10 23 24
	eLR	10 26 29

Northern Easter Island Cordillera

USCGS 09 58 01

8.7° S 109.3° W

Depth: 33 km Dist: 55.3°

Az: 199.5° Mag: 4.6