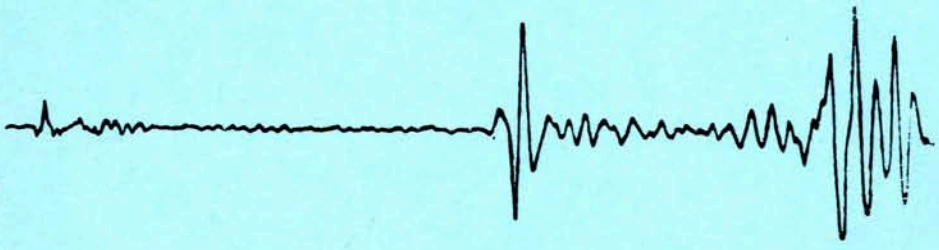
JOHN CARROLL UNIVERSITY
SEISMOLOGICAL OBSERVATORY
CLEVELAND, OHIO
USA

SEISMOLOGICAL BULLETIN



1 January 1969—31 December 1969

VATORY DIRECTOR

ARD J WALTER

In September, 1968, the Seismological Observatory moved into new quarters in the Bohannon Science Center. The coordinates of the new location are:

	Geographic	Geocentric
Latitude	41° 29' 19.5" North	41° 17.7'
Longitude	81° 31' 55.5" West	
	h = 327.9 meters	
	1075.8 feet	

Foundation: hard glacial clay

Direction Cosines

a = .1106

b = -.7431

c = .6599

JANUARY 1969

Date	Phase	Component	GMCT	Motion	Remarks
Jan. 1	iP_4	e	$23^h\ 38^m\ 18.9^s$		USCGS: 34.8°N, 92.6°W
	iP_3	e	23 38 32.0		H = $23^h\ 35^m\ 36.2^s$
	i	e	23 40 12.5		h = 12 km
	iS_4	e	23 40 23.06		Mag: 4.2
	iL	n	23 41 18.3		Phase identification using Walter-Birkenhauer Local Travel Time Table
Jan. 3	i	n	05 25 13.2		USCGS: 18.5°N, 65.1°W
	iL	e	05 25 16.6		H = $05^h\ 14^m\ 26.4^s$
					h = 113 km
					Mag: 4.7
Jan. 5	ePR_1	E	13 46 30	west	USCGS: 8.0° S, 158.9°E
	ePR_1	N	13 46 31	north	H = $13^h\ 26^m\ 39.9^s$
	eSKS	E	13 52 09		h = 47 km
	ePS	N	13 56 18		Mag: 6.4
Jan. 6	ePPS	E	16 09 48		USCGS: 10.5°S, 164.5°E
	eSR_1	E	16 14 26		H = $15^h\ 39^m\ 00.9^s$
					h = 32 km
					Mag: 6.2
Jan. 14	eP	Z	23 24 16.6		USCGS: 36.2°N, 29.2°E
	iP	e	23 24 17.5	east	H = $23^h\ 12^m\ 07.9^s$
	iP	Z	23 24 24.7	comp.	h = normal
	eP	N	23 24 26	north	Mag: 5.5
	iS	n	23 34 17.6		
	eS	E	23 34 18		
Jan. 19	iP	e	07 14 18.4	east	USCGS: 45.0°N, 143.2°E
	iP	Z	07 14 18.5	comp.	H = $07^h\ 02^m\ 04.4^s$
	iP	n	07 14 18.8	south	h = 20.4 km
	iS	e	07 24 16.6		Mag: 6.4
	eS	N	07 24 18		
	eS	E	07 24 18		
	esS	E	07 25 11		
Jan. 19	ePR_1	E	19 10 24	west	USCGS: 14.9°S, 167.2°E
	iPR_1	e	19 10 24.3	west	H = $18^h\ 50^m\ 52.1^s$
	iSKS	n	19 16 00.3		h = 112 km
	eSKS	E	19 16 00		Mag: 6.2
	eSKKS	E	19 17 12		
	eS	N	19 18 05		
	ePS	E	19 20 06		
	eSR_1	N	19 26 16		
Jan. 19	iPR_1	n	19 30 28.0	south	Aftershock of previous quake
	iPR_1	e	19 30 28.3	west	

	Date	Phase	Component	GMCT	Motion	Remarks
Jan.	20	iP	e	$14^h\ 31^m\ 10.7^s$	west	USCGS: 54.9°N, 166.0°E
		iP	Z	14 31 10.9	dil.	H = $14^h\ 20^m\ 11.5^s$
		iP	n	14 31 11.0	north	h = 23 km
						Mag: 6.1
Jan.	21	eS	N	08 17 44		USCGS: 28.7°N, 43.6°W
		eS	E	08 17 46		H = 08 05 40.1
						h = Normal
						Mag: 5.2
Jan.	23	e	E	23 11 16		USCGS: 33.9^h°N, 116.0^m°N
						H = $23^h\ 01^m\ 01.0^s$
						h = 18 km
						Mag: 4.9
Jan.	24	iPR_1	e	02 51 12.0	west	USCGS: 21.9°S, 179.6°W
		iPR_1	Z	02 51 12.8	comp.	H = $02^h\ 33^m\ 03.5^s$
		ePR_1	E	02 51 13	east	h = 595 km
		eSKS	N	02 56 11		Mag: 5.9
		eSKS	E	02 56 12		
		eSKKS	E	02 57 13		
		eS	N	02 58 01		
		esSKS	E	03 00 08		
		esSKS	N	03 00 09		
		esSKKS	E	03 00 59		
		esSKKS	N	03 01 01		
		esS	N	03 01 57		
		eSR_1	N	03 05 56		
Jan.	26	iP	Z	15 16 36.4	comp.	USCGS: 55.8°N, 162.9°E
		iP	e	15 16 38.2	east	H = $15^h\ 05^m\ 32.7^s$
		iP	n	15 16 38.4	south	h = 16 km
		eS	N	15 25 38		Mag: 5.5
		eS	E	15 25 40		
Jan.	30	iP'	e	10 48 58.1	east	USCGS: 4.8°N, 127.4°E
		iP'	n	10 49 06.8	south	H = $10^h\ 29^m\ 40.4^s$
		ePR_1	N	10 50 53	north	h = 70 km
		ePR_1	E	10 50 53	west	Mag: 5.9
		ePS_1	E	11 00 59		
		ePS	N	11 01 00		

FEBRUARY 1969

Date	Phase	Component	GMCT	Motion	Remarks
Feb. 4	iP	Z	$22^h\ 00^m\ 43.1^s$	dil.	
	iP	e	22 00 45.0	west	
	iP	n	22 00 45.1	south	
	eS	E	22 09 03.5		
Feb. 10	iP	e	23 16 24.7	west	USCGS: 23.1°S, 178.8°E
	i	Z	23 16 25.0	dil.	H = $23^h\ 02^m\ 57.5^s$
	ePR_2	N	23 23 23.1		h = 670 km
	eSKKS	N	23 27 29		Mag: 5.8
	esSKKS	N	23 31 16		
	esSKKS	E	23 31 21		
	iSR_1	e	23 36 11		
Feb. 12	iP'	Z	22 34 41.9	comp.	
	iP'	e	22 34 42.2	west	
	iP	n	22 34 43.8	north	
	ePR_1	E	22 37 37	west	
	ePR_1	N	22 37 37	north	
	eSKP	N	22 38 22		
	ePR_2	N	22 40 54		
	e	N	22 43 45		
Feb. 23	iP'	Z	00 56 24.0	dil.	USCGS: 3.1°S, 118.9°E
	iP'	n	00 56 27.2	south	H = $00^h\ 36^m\ 56.6^s$
	iSKP	n	00 59 56.1		h = 13 km
	eSKP	E	00 59 56		Mag: 6.1
	eSKP	N	00 59 57		
	ePSKS	N	01 09 18		
	ePSKS	E	01 09 19		
	eSR_1	E	01 17 18		
Feb. 25	iP	Z	07 44 41.6	dil.	USCGS: 15.2°N, 87.5°W
	iP	n	07 44 42.0	south	H = $07^h\ 39^m\ 00.6^s$
	eS	E	07 49 35		h = 15 km
	eS	N	07 49 37		Mag: 5.4
Feb. 28	eP	E	02 49 59	west	USCGS: 36°N, 10.6°W
	eP	N	02 49 59	south	H = $02^h\ 40^m\ 32.5^s$
	iP	Z	02 49 59.0	comp.	h = 22 km
	iP	n	02 49 58.8	south	Mag: 7.3
	iP	e	02 49 59.0	west	
	eS	N	02 57 28		
	eS	n	02 57 36		
Feb. 28	iP	n	03 20 35.0		Aftershock of previous
	iP	e	03 20 35.0		quake

FEBRUARY 1969 (cont'd.)

Date	Phase	Component	GMCT	Motion	Remarks
Feb. 28	iP	n	$04^h\ 35^m\ 02.2^s$		USCGS: 36.2°N, 10.5°W
	iP	e	04 35 03.0		$H = 04^h\ 25^m\ 36.9^s$
					h = normal
					Mag: 5.7

MARCH 1969

Date	Phase	Component	GMCT	Motion	Remarks
Mar. 3	iP	e	$01^h\ 11^m\ 02.6^s$	east	USCGS: 40.1°N, 27.4°E
	iP	Z	01 11 03.4	dil.	H = $00^h\ 59^m\ 10.5^s$
	iP	n	01 11 03.4	south	h = 4 km
					Mag: 5.6
Mar. 6	iM	e	17 19 07.8		USCGS: 72.2°N, 74.4°W
					H = $17^h\ 03^m\ 23.7^s$
					h = normal
					Mag: 4.6
Mar. 9	iP'	n	14 06 36.2	south	USCGS: 4.1°S, 135.5°E
	$e(SR_1)$	E	14 27 30		H = $13^h\ 47^m\ 59.4^s$
					h = 14 km
					Mag: 5.5
Mar. 10	iP	Z	08 21 09.5	comp.	USCGS: 12.3°N, 87.5°W
	iP	n	08 21 10.2		H = $08^h\ 15^m\ 08.4^s$
					h = 62 km
					Mag: 5.3
Mar. 13	iP	Z	18 50 42.0	comp.	USCGS: 63.5°N, 129.0°W
	iSR_1	n	18 58 16.7		H = $18^h\ 43^m\ 48.9^s$
					h = normal
					Mag: 4.8
Mar. 14	eP	N	08 53 02	north	USCGS: 12.9°N, 86.8°W
	iP	e	08 53 01.9	east	H = $08^h\ 47^m\ 16.3^s$
	iP	Z	08 53 01.8	comp.	h = 178 km
	iP	n	08 53 01.9	north	Mag: 5.6
	epP	N	08 53 48		
	eS	N	08 57 41		
	eS	E	08 57 41		
	esS	E	08 58 49		
Mar. 16	iP	Z	16 07 18.4	dil	USCGS: 38.5°N, 142.7°E
	iP	e	16 07 18.9	west	H = $15^h\ 54^m\ 17.2^s$
	ipP	Z	16 07 31.2	dil.	h = 40 km
	ipP	e	16 07 31.5	east	Mag: 5.4
	ipP	n	16 07 31.5		
	eS	N	16 18 10		
Mar. 18	iPR_1	e	20 39 29.0	east	USCGS: 50.1°N, 130.0°W
					H = $20^h\ 31^m\ 27.3^s$
					h = normal
					Mag: 5.0

Date	Phase	Component	GMCT	Motion	Remarks
Mar. 20	iP	Z	$08^h\ 23^m\ 32.9^s$	dil.	USCGS: 31.3°N, 114.3°W
	iP	e	08 23 34.0		H = $08^h\ 17^m\ 41.9^s$
	iP	n	08 23 34.1		h = 20 km
	iP	Z	08 23 38.4		Mag: 6.0
	eS	N	08 28 28		
Mar. 21	iP	e	03 13 33.2	east	USCGS: 31.3°N, 114.7°W
					H = $03^h\ 07^m\ 31.9^s$
					h = normal
					Mag: 4.9
Mar. 21	iP	e	03 59 46.5	west	USCGS: 31.2°N, 114.3°W
	eS	N	04 04 45		H = $03^h\ 53^m\ 42.4^s$
					h = N
					Mag: 5.3
Mar. 21	iP	e	05 02 17.0	west	USCGS: 31.2°N, 114.2°W
	eS	N	05 07 09		H = $04^h\ 56^m\ 20.3^s$
					h = N
					Mag: 5.4
Mar. 21	iP	e	06 40 11.2	west	USCGS: 31.1°N, 114.3°W
	eS	N	06 45 07		H = $06^h\ 34^m\ 22.2^s$
					h = 4 km
					Mag: 5.5
Mar. 21	iP	e	07 27 03.0	west	USCGS: 31.3°N, 114.2°W
	iPR_1	e	07 27 50.9	west	H = $07^h\ 21^m\ 11.6^s$
	eS	N	07 32 14		h = N
					Mag: 5.1
Mar. 21	iP	e	10 16 06.9	west	USCGS: 31.2°N, 114.3°W
	eS	N	10 21 03		H = $10^h\ 10^m\ 10.7^s$
					h = 5 km
					Mag: 5.4
Mar. 22	iP	e	07 31 29.8	west	USCGS: 31.4°N, 114.1°W
	e	E	07 36 19		H = $07^h\ 25^m\ 35.6^s$
	eS	N	07 36 39		h = N
					Mag: 5.1
Mar. 22	e	N	18 33 00		USCGS: 31.5°N, 114.2°W
					H = $18^h\ 23^m\ 02.1^s$
					h = 18 km
					Mag: 4.8

Date	Phase	Component	GMCT	Motion	Remarks
March 23	i(P)	e	$11^h\ 38^m\ 32.7^s$	west	USCGS: 31.4°N, 115.0°W
	eS	E	11 43 11		H = $11^h\ 32^m\ 22.4^s$
					h = N
					Mag: 4.7
March 23	iP	n	15 44 57.3	n	USCGS: 31.5°N, 114.1°W
	eS	E	15 49 55		H = $15^h\ 39^m\ 01^s$
	eS	N	15 49 56		h = 16 km
					Mag: 4.7
March 24	i	n	09 08 49.5	south	USCGS: 31.3°N, 114.2°W
	eS	E	09 13 19		H = $09^h\ 02^m\ 32.1^s$
					h = 25 km
					Mag: 4.9
March 25	iP	e	13 33 29.3	e	USCGS: 39.2°N, 28.4°E
	eS	E	13 43 28		H = $13^h\ 21^m\ 32.4^s$
					h = 23 km
					Mag: 5.6
March 27	iP'	Z	13 00 38.4	comp.	USCGS: 4.8°N, 127.5°E
	iP'	n	13 00 38.5		H = $12^h\ 41^m\ 35.9^s$
	$e(PR_1)$	N	13 03 01		h = 32 km
	$e(PR_1)$	E	13 03 02		Mag: 6.1
	ePS	N	13 12 51		
	ePPS	E	13 14 28		
	eSR_1	E	13 19 35		
March 28	eP	N	02 00 30	north	USCGS: 38.6°N, 28.4°E
	iP	Z	02 00 30.1	dil.	H = $01^h\ 48^m\ 30.4^s$
	eP	E	02 00 31	east	h = 9 km
	iP	Z	02 00 31.8	comp.	Mag: 6.0
	iP	n	02 00 32.2	south	
	iP	e	02 00 32.4	west	
	iP	e	02 00 33.5	east	
	iP	n	02 00 33.5	north	
	eS	N	02 10 27		
	eS	E	02 10 28		
March 28	iPR_1	n	15 26 21.2	north	USCGS: 31.5°N, 114.3°W
	eS	E	15 30 24		H = $15^h\ 19^m\ 40.4^s$
					h = N
					Mag: 5.0
March 29	ePR_1	E	09 34 25		USCGS: 12.0°N, 41.2°E
	e(SKS)	E	09 40 51		H = $09^h\ 15^m\ 54.1^s$
	eSKKS	N	09 41 29		h = N
					Mag: 5.8

Date	Phase	Component	GMCT	Motion	Bulletins
March 31	iP	Z	$07^h\ 28^m\ 46.1^s$	dil.	USCGS: 27.7°N, 34.0°E
	eP	E	07 28 47	east	H = $07^h\ 15^m\ 54.4^s$
	eP	N	07 28 48	north	h = N
	iP	n	07 28 47.9	north	Mag: 6.0
	eS	N	07 39 38		
	eS	E	07 39 39		
March 31	iP	Z	19 38 04.3	comp.	USCGS: 38.3°N, 134.6°E
	iP	n	19 38 04.4	south	H = $19^h\ 25^m\ 27.2^s$
	iP	e	19 38 04.6		h = 417 km
	ipP	Z	19 39 39.0	dil.	Mag: 5.9
	ipP	e	19 39 40.2	west	
	ipP	n	19 39 40.7	south	
	iSKS	e	19 47 54.9		
	iSKS	n	19 47 55.8		
	iSKS	E	19 47 55.8		
	eSKS	N	19 47 57		
	eSKKS	E	19 48 35		
	eSKKS	N	19 48 35		
	iSKKS	e	19 48 35.3		
	iSKKS	n	19 48 36.7		
	esSKKS	E	19 51 19		
	esSKKS	N	19 51 21		

APRIL 1969

Date	Phase	Component	GMCT	Motion	Remarks
April 3	eS	E	$11^h\ 06^m\ 38^s$		USCGS: 31.6°N, 114.1°W H $10^h\ 55^m\ 53.3^s$ h = N Mag: 4.6
April 4	iP	Z	08 56 10.4	dil.	USCGS: 51.2°N, 173.7°E
	eS	E	09 05 06		H = $08^h\ 45^m\ 18.7^s$
	eS	N	09 05 07		h = N
					Mag: 5.6
April 4	iP	Z	13 05 58.1	comp.	USCGS: 1.2°N, 85.2°W
	iP	n	13 06 00.3		H = $12^h\ 58^m\ 24.1^s$
	eS	E	13 12 05		h = N
	eS	e	13 12 08		Mag: 5.3
April 4	iP	Z	16 22 16.2	comp.	USCGS: 24.4°N, 109.8°W
	iP	e	16 22 16.5		H = $16^h\ 16^m\ 17.2^s$
	iP	n	16 22 17.0		h = 31 km
	eP	E	16 22 18		Mag: 5.6
	eS	E	16 27 23		
	eS	N	16 27 24		
April 5	eSKS	N	02 43 29		USCGS: 12.2°N, 41.2°E
	ePS	E	02 46 19		H = $02^h\ 18^m\ 29.9^s$
	eSR_1	N	02 51 49		h = 17 km
					Mag: 6.2
April 5	iP	Z	23 33 46.9	comp.	USCGS: 1.2°N, 85.2°W
	eP	N	23 33 46		H = $23^h\ 26^m\ 11.5^s$
	eP	E	23 33 49		h = 31 km
	eS	N	23 39 48		Mag: 5.8
	eS	E	23 39 53		
April 13	iPR_1	e	23 54 53.8	west	USCGS: 6.1°S, 129.9°E
	iPR_1	Z	23 54 54.0	dil.	H = $23^h\ 33^m\ 15.4^s$
	$ipPR_1$	Z	23 55 33.0	comp.	h = 152 km
	$ipPR_1$	e	23 55 33.2	east	Mag: 5.9
	$ipPR_1$	n	23 55 33.3	south	
	$eSKP_1$	E	23 55 48		
	eSKP	N	23 55 50		
	iSKP	e	23 55 50.0		
	iSKP	n	23 55 50.0		
	esSKP	E	23 56 55		
	esSKP	N	23 56 56		
April 16	ePR_1	E	01 43 01		USCGS: 3.5°S, 151.0°E H = $01^h\ 22^m\ 47.5^s$ h 39 km Mag: 5.7

Date	Phase	Component	GMCT	Motion	Remarks
April 21	eP	N	$02^h\ 24^m\ 56^s$	south	USCGS: 14.1°N, 91.0°W
	iP	e	02 24 57.0	east	H = 02 19 07.1
	iP	n	02 24 57.7	north	h = 82 km
	ipP	N	02 25 14	south	Mag: 5.5
	eS	E	02 29 41		
	eS	N	02 29 41		
	esS	N	02 30 10		
April 21	ePR_1	E	07 37 19		USCGS: $32.2°N, 131.9°E$
	ePR_1	N	07 37 21		H = $07^h\ 19^m\ 27.5^s$
	eS	E	07 44 47		h = 41 km
	eSR_1	N	07 51 46		Mag: 6.1
April 22	iP	e	06 43 36.8	west	USCGS: $26.8°S, 114.1°W$
	eP	N	06 43 38	south	H = $06^h\ 31^m\ 57.5^s$
	iP	e	06 43 38.5	east	h = N
	iP	n	06 43 38.9	north	Mag: 5.6
	eS	N	06 53 11		
	eS	E	06 53 14		
	$e(SR_1)$	E	06 57 49		
April 25	iP	Z	03 41 00.2	comp.	USCGS: $7.5°N, 82.1°W$
	iP	n	03 41 00.9		H = $03^h\ 34^m\ 17.7^s$
	eS	E	03 46 30		h = 25 km
	eSR_1	N	03 48 54		Mag: 5.4
April 26	eP	N	06 10 14	north	USCGS: $30.6°N, 71.4°W$
	iP	n	06 10 14.9	south	H = $05^h\ 58^m\ 49.0^s$
	iP	Z	06 10 15.1	dil.	h = 23 km
	iP	e	06 10 15.3	west	Mag: 5.6
	eS	E	06 19 35		
	eS	N	06 19 43		
April 26	eP	N	06 14 11	south	USCGS: $30.6°N, 71.5°W$
	iP	n	06 14 12.2		H = $06^h\ 02^m\ 49.0^s$
	iP	Z	06 14 12.7		h = N
	eS	E	06 23 34		Mag: 5.9
April 28	iP	e	23 26 44.1	east	USCGS: $23.4°N, 116.4°W$
	iP	Z	23 26 44.2	comp.	H = $23^h\ 20^m\ 42.9^s$
	iPR_1	Z	23 27 31.7	dil.	h = 20 km
	eS	E	23 31 44		Mag: 5.7

MAY 1969

Date	Phase	Component	GMCT	Motion	Remarks
May 5	iP_4	e	$05^h\ 43^m\ 49.3^s$	west	Phase Identifications using Walter-Birkenhauer Tables. Felt at Jefferson, Ohio. Land slumping along Grand River.
	iP_4	Z	05 43 49.9	dil.	
	iS_4	Z	05 44 07.7		
May 7	iP	e	13 50 45.4	east	USCGS: 37° 16'58" N
	iP	n	13 50 46.0	north	116° 30'02"W
	iP	Z	13 50 46.0	dil.	H = 13 45 00.0
					h = 0
					Mag: 5.8
May 13	iP	Z	14 22 58.5	comp.	USCGS: 11.5°N, 86.4°W
	iP	n	14 21 59.4	north	$H = 14^h\ 16^m\ 52.8^s$
	eS	N	14 28 22		h = 79 km
	eSR_1	E	14 29 58		Mag: 5.6
May 13	iP'	Z	14 48 35.1	comp.	USCGS: 7.2°S, 120.9°E
	iPR_1	Z	14 51 21.5	comp.	$H = 14^h\ 30^m\ 19.6^s$
	i	n	14 52 20.5	south	h = 616 km
	iSKKS	e	14 57 38.4		Mag: 5.6
	iSKKS	n	14 57 39.6		
May 14	iP	Z	19 43 24.5	comp.	USCGS: 51.3°N, 179.9°W
	iP	e	19 43 24.7	east	$H = 19^h\ 32^m\ 54.2^s$
	iP	n	19 43 24.9	south	h = 21 km
	eP	E	19 43 25	east	Mag: 6.2
	eP	N	19 43 25	south	
	eS	E	19 51 55		
	eS	N	19 51 55		
May 15	iP	Z	20 49 41.2	comp.	USCGS: 16.8°N, 61.3°W
	iP	e	20 49 41.6		$H = 20^h\ 43^m\ 33.4^s$
	iP	n	20 49 41.9		h = 50 km
	eS	E	23 54 54		Mag: 5.7
May 18	iP	Z	08 52 08.0	dil.	USCGS: 60.3°N, 146.0°S
	eS	N	08 58 24		$H = 08^h\ 44^m\ 03.6^s$
	eS	E	08 58 26		h = 6 km
	$e(SR_1)$	N	09 01 44		Mag: 5.4
May 23	iP	Z	13 13 42.6	comp.	USCGS: 53.4°N, 160.2°W
	eS	E	13 21 10		$H = 13^h\ 04^m\ 36.6^s$
	e	N	13 21 22		h = 32 km
					Mag: 5.6
May 26	i	n	05 00 52.7	north	USCGS: 15.8°N, 94.4°W
	i	n	06 05 49.1		$H = 05^h\ 54^m\ 18.4^s$
					h = 34 km
					Mag: 5.1

Date	Phase	Component	GMCT	Motion	Remarks
May 30	ePR_1	E	16 42 27		USCGS: 32.3°S, 178.1°W
	eSKS	E	16 48 12		H = $16^h\ 22^m\ 47.8^s$
	ePS	N	16 52 13		h = N
					Mag: 5.5
May 31	eSKS	E	22 49 07		USCGS: 16.0°S, 172.9°W
	iPS	n	22 51 47.1		H = $22^h\ 24^m\ 32.0^s$
	eSR_1	N	22 57 05		h = 15 km
					Mag: 5.2

JUNE 1969

Date	Phase	Component	GMCT	Motion	Remarks
June 2	eS	N	$10^h\ 02^m\ 11^s$		USCGS: 59.5°N, 144.7°W
	eS	E	10 02 11		H = $09^h\ 47^m\ 59.4^s$
	eSR_1	N	10 05 22		h = N
	eSR_1	E	10 05 25		Mag: 4.7
June 3	iP	Z	04 04 22.8	comp.	USCGS: 19.1°N, 170.5°W
	iP	e	04 04 23.0	e	H = $03^h\ 58^m\ 01.5^s$
	iP	n	04 04 23.3	n	h = N
	$e(SR_1)$	E	04 11 55		Mag: 5.1
June 11	iP	n	01 06 06.0		USCGS: 59.6°N, 144.8°W
	iP	Z	01 06 06.2	comp.	H = $00^h\ 58^m\ 10.1^s$
	iP	e	01 06 06.5	east	h = 5 km
	eS	E	01 12 34		Mag: 5.3
June 12	iP	Z	15 25 34.7	comp.	USCGS: 34.4°N, 25.1°E
	iP	e	15 25 34.8	east	H = $15^h\ 13^m\ 31.1^s$
	iP	e	15 25 35.7	east	h = 25
	iP	n	15 25 35.7	north	Mag: 5.8
	ipP	e	15 25 40.3	east	
	ipP	n	15 25 40.3	south	
	ipP	Z	15 25 42.8	dil.	
	eS	E	15 35 30		
	eS	N	15 35 32		
	esS	N	15 35 44		
	esS	E	15 35 45		
June 12	i	Z	07 54 58.8	dil.	USCGS: 40.3°N, 143.7°E
	eSKKS	E	08 05 01		H = $07^h\ 41^m\ 25.1^s$
	eSKKS	N	08 05 04		h = N
					Mag: 5.1
June 13	iP	n	09 00 14.1	south	USCGS: 49.4°N, 155.5°E
	iP	Z	09 00 14.4	comp.	H = $08^h\ 48^m\ 29.5^s$
	iP	e	09 00 14.8	east	h = 64 km
	eP	E	09 00 15	east	Mag: 5.9
	eP	N	09 00 15	south	
	ipP	Z	09 00 32.4		
	eS	E	09 09 54		
	eS	N	09 09 54		
	esS	N	09 10 16		
	esS	E	09 10 26		

Date	Phase	Component	GMCT	Motion	Remarks
June 18	iP'	Z	$00^h\ 17^m\ 39.3^s$	comp.	USCGS: 52.6°S, 159.7°E
	iSKP	e	00 21 08.8		H = $23^h\ 58^m\ 10.1^s$
	eSKP	E	00 21 10		h = N
	eSKKS	E	00 27 20		Mag: 6.1
June 18	iP	Z	01 46 41.0	comp.	USCGS: 59.5°N, 145.0°W
	iP	e	01 46 42.9	east	H = $01^h\ 38^m\ 46.4^s$
	eS	E	01 52 53		h = N
					Mag: 5.2
June 18	iP	e	23 53 52.9	east	USCGS: 52.6°N, 167.9°W
	iP	Z	23 53 54.0	comp.	H = $23^h\ 44^m\ 11.2^s$
	eP	N	23 54 03		h = 18
	eS	E	00 01 39		Mag: 5.4
June 20	iP	e	02 47 05.8	west	USCGS: 53.2°N, 162.4°W
	iP	Z	02 47 05.8	dil.	H = 02 37 51.5
	iP	n	02 47 06.6	south	h = 44 km
	eP	E	02 47 06	west	Mag: 5.7
	ePR_1	E	02 49 08		
	eS	E	02 54 31		
	eS	N	02 54 31		
June 20	iP	n	03 06 22.4	north	USCGS: 20.0°N, 64.2°W
	iP	e	03 06 22.5		H = 03 00 23.5
	iP	Z	03 06 22.6	comp.	h = N
					Mag: 4.7
June 22	iP	Z	02 45 35.1	comp.	USCGS: 49.2°N, 158.5°E
	iP	e	02 45 35.3	east	H = $02^h\ 33^m\ 52.8^s$
	iP	n	02 45 35.4	south	h = N
	eS	N	02 54 55		Mag: 5.6
	eS	E	02 54 57		
June 22	iP	e	10 55 49.8	east	USCGS: 51.5°N, 179.9°W
	iP	Z	10 55 49.9	comp.	H = $10^h\ 45^m\ 24.5^s$
	iP	n	10 55 50.0	south	h = 56 km
	i(pP)	Z	10 56 44.5	dil.	Mag: 6.1
	i(pP)	n	10 56 45.5	north	
	eS	N	11 04 31		
June 23	iP	e	07 14 36.5		USCGS: 18.4°N, 104.5°W
	iP	Z	07 14 36.6		H = $07^h\ 08^m\ 27.7^s$
	iP	n	07 14 36.8		h = 36 km
	eP	E	07 14 38	east	Mag: 5.3
	e	E	07 19 34		
	eS	N	07 19 50		
	$e(SR_1)$	E	07 21 44		

JUNE 1969 (cont'd.)

Date	Phase	Component	GMCT	Motion	Remarks
June 24	eP	N	00 41 08	north	USCGS: 11.7°N, 85.7°W
	iP	Z	00 41 08.5	comp.	H = $00^h\ 35^m\ 05.5^s$
	iP	n	00 41 08.8	north	h = 100 km
	iP	e	00 41 09.3		Mag: 5.3
	eS	E	00 46 03		
	$e(SR_1)$	E	00 47 36		
June 26	iP	e	02 38 33.8	west	USCGS: 2.0°N, 90.5°W
	iP	Z	02 38 24.8	comp.	H = $02^h\ 30^m\ 58.4^s$
	iP	n	02 38 35.2	north	h = N
	eS	E	02 44 48		Mag: 5.0
	eS	N	02 44 50		
	$e(SR_1)$	N	02 47 52		
	$e(SR_1)$	E	02 47 54		
June 28	iP	n	04 40 41.5		USCGS: 12.8°N, 89.2°W
	iP	Z	04 40 42.1	comp.	H = $04^h\ 34^m\ 42.6^s$
	eP	N	04 40 43		h = 69 km
	eP	E	04 40 44		Mag: 5.2
	ePR_1	N	04 41 35		
	eS	N	04 45 33		
	eS	E	04 45 37		
June 29	iPR_1	e	10 53 36.9	east	USCGS: 30.5°S, 178.2°W
	ePS_1	N	11 03 21		H = $10^h\ 34^m\ 06.5^s$
	eSR_1	N	11 09 32		h = 43 km
					Mag: 5.6
June 29	ePR_1	E	17 31 10		USCGS: 62.8°S, 166.3°E
	ePR_1	N	17 31 11		H = $17^h\ 09^m\ 13.9^s$
	e(SKP)	E	17 32 18		h = N
	ePPS	E	17 43 10		Mag: 5.5
	$e(SR_1)$	N	17 49 37		

JULY 1969

Date	Phase	Component	GMCT	Motion	Remarks
July 3	eP	N	17 05 02	north	USCGS: 16.7°N, 98.5°W
	iP	Z	17 05 02.5	comp.	H = 16^h 59^m 06.9^s
	iP	e	17 05 02.7		h = 26 km
	iP	n	17 05 02.8		Mag: 5.2
	ipP	Z	17 05 10.5		
	e	N	17 11 06		
	e	E	17 11 06		
July 4	iP	Z	11 22 42.4	comp.	USCGS: 7.4°N, 82.7°W
	iP	n	11 22 42.5		H = 11^h 16^m 01.0^s
	eP	N	11 22 43		h = N
	eS	E	11 28 07		Mag: 5.2
	eS	N	11 28 07		
July 5	e	E	00 01 34		
	e	N	00 08 35		
July 9	eS	N	02 15 17		USCGS: 51.6°N, 174.8°E
	eS	E	02 15 17		H = 01^h 55^m 39.8^s
					h = 22 km
					Mag: 5.0
July 12	e	N	19 32 29	north	USCGS: 39.7°N, 143.5°E
	iPR_1	n	19 32 34.0	south	H = 19^h 16^m 31^s
	eSKKS	N	19 40 15		h = N
					Mag: 5.2
July 13	iP_2	Z	21 52 46.7	comp.	USCGS: 36.1°N, 32.7°W
	iP_2	e	21 52 47.9	west	H = 21^h 51^m 09.4^s
	iP_2	Z	21 52 48.1	dil.	h = 1
	iP_2	n	21 52 48.1	south	Mag: 3.5
	iP_1	e	21 52 49.9	west	Phase identifications using
	iS_4	e	21 53 36.4		Walter-Birkenhauer Tables
	iS_4	Z	21 53 36.7		
July 16	iP	Z	08 28 16.8	dil.	USCGS: 52.2°N, 159.0°E
	iP	n	08 22 16.8		H = 08^h 16^m 53.3^s
	ipP	Z	08 28 33.9	dil.	h = 69 km
	eS	E	08 37 38		Mag: 5.8
	eS	N	08 37 39		
	iS	n	08 37 38.6		
	ePS	E	08 38 06		

Date	Phase	Component	GMCT	Motion	Remarks
July 18	iP	Z	$05^h\ 38^m\ 23.9^s$	dil.	USCGS: 38.3°N, 119.4°E
	iP	n	05 38 24.3	north	H = $05^h\ 24^m\ 48.0^s$
	iP	e	05 38 24.3		h = N
	iP	Z	05 38 27.3	comp.	Mag: 6.2
	eSKS	N	05 49 02		
	eSKS	E	05 49 08		
	eSKKS	N	05 49 37		
	eS	E	05 49 49		
July 19	iP	n	05 04 49.6	north	USCGS: 17.3°S, 72.5°W
	iP	Z	05 04 49.6	comp.	H = $04^h\ 54^m\ 54.1^s$
	ipP	Z	05 05 06.1	comp.	h = 54 km
	eS	E	05 12 50		Mag: 5.0
	eS	N	05 12 57		
	e	E	05 14 34		
July 20	ePR_1	e	10 57 39.3	west	USCGS: 7.2°N, 34.3°W
	eS	N	11 03 10		H = $10^h\ 46^m\ 11.7^s$
	eS	E	11 03 11		h = N
					Mag: 4.3
July 24	iP	Z	03 08 43.1	dil.	USCGS: 11.9°S, 75.1°W
	iP	n	03 08 43.1	south	H = $02^h\ 59^m\ 21.0^s$
	eS	N	03 16 10		h = 1 km
	eS	E	03 16 17		Mag: 5.6
July 25	iP	Z	06 16 50.2	dil.	USCGS: 25.6°S, 63.3°W
	iP	n	06 16 51.3	south	H = $06^h\ 06^m\ 42.4^s$
	iP	e	06 16 51.7		h = 579 km
	iS	e	06 25 07.4		Mag: 5.5
	eS	E	06 25 08		
	iS	n	06 25 07.9		
	eS	N	06 25 10		
	ePS	N	06 25 52		
	ePS	E	06 25 53		
	esS	E	06 28 41		
	esPS	E	06 29 52		
July 26	iPR_1	e	07 27 54.5	west	USCGS: 12.6°N, 87.8°W
	iPR_1	n	07 27 57.0		H = $07^h\ 21^m\ 00.2^s$
	e(S)	N	07 32 38		h = 84 km
					Mag: 4.8

Date	Phase	Component	GMCT	Motion	Remarks
July 27	iP	Z	21 29 35.5	comp.	USCGS: 59.4°N, 145.3°W
	iP	n	21 29 36.7	south	H = 21^h 21^m 40.6^s
	iP	e	21 29 37.0	east	h = N
	iP	Z	21 29 37.5	comp.	Mag: 5.3
	eS	N	21 35 59		
	eS	E	21 36 00		
July 27	iP	Z	23 55 48.5	comp.	USCGS: 20.0°N, 64.3°W
	iP	e	23 55 49.2	east	H = 23^h 49^m 50.3^s
	iS	n	00 00 22.2		h = N
					Mag: 5.0
July 29	iP	Z	00 46 41.9	comp.	USCGS: 19.9°N, 64.1°W
	iP	n	00 46 42.2		H = 00 40 42.5
	iP	e	00 46 42.3		h = 32 km
	iS	n	00 51 13.6		Mag: 5.1
	iS	e	00 51 14.5		
July 31	iP	e	10 57 53.0	west	USCGS: 27.1°N, 111.3°W
	eS	N	11 02 42		H = 10^h 52^m 01.2^s
	eS	E	11 02 44		h = 30 km
					Mag: 4.9
July 31	iP	Z	11 32 47.8	dil.	USCGS: 53.0°N, 170.1°W
	iP	e	11 32 47.8	west	H = 11^h 23^m 01.2^s
	iP	n	11 32 48.3		h = 37 km
					Mag: 5.3

AUGUST 1969

Date	Phase	Component	GMCT	Motion	Remarks
August 1	iP	n	$13^h\ 12^m\ 59.7^s$		USCGS: 18.8°N, 64.4°W
	iP	Z	13 13 00.4	dil.	H = $13^h\ 06^m\ 49.1^s$
	iP	e	13 13 01.3		h = 47 km
	iP	Z	13 13 08.8	dil.	Mag: 5.0
	iP	n	13 13 08.9	south	
	ipP	e	13 13 11.4	west	
	iS	e	13 17 38.3		
	iS	n	13 17 39.2		
August 1	iP	Z	23 56 00.3	comp.	USCGS: 45.6°N, 150.9°E
	eP	E	23 56 01	east	H = $23^h\ 43^m\ 44.9^s$
	iP	e	23 56 01.1		h = 38 km
	iP	n	23 56 01.5	south	Mag: 5.6
	ipP	Z	23 56 10.2	dil.	
	eS	E	00 06 06		
	esS	E	00 06 28		
August 4	eSR_1	E	12 33 54		USCGS: 61.9°N, 151.2°W
	eSR_1	N	12 33 56		H = $12^h\ 15^m\ 56.9^s$
					h = 27 km
					Mag: not given
August 4	iP'	Z	17 37 34.7	comp.	USCGS: 5.7°S, 125.3°E
	iPR_1	Z	17 40 23.8	dil.	H = $17^h\ 19^m\ 19.6^s$
	iPR_1	e	17 40 25.3	west	h = 521 km
	iPR_1	n	17 40 27.7	south	Mag: 6.2
	iSKP	n	17 41 18.1		
August 5	iP'	Z	02 31 28.9	comp.	USCGS: 1.3°N, 126.2°E
	ePR_1	N	02 34 46		H = $02^h\ 13^m\ 09.6^s$
	ePR_1	E	02 34 46		h = 34 km
	iPR_1	Z	02 34 48.7	comp.	Mag: 6.1
	iSKP	e	02 35 44.9		
	iSKP	n	02 35 46.4		
	eSKP	E	02 35 50		
	eSKKS	N	02 41 35		
	eSKKS	E	02 41 36		
	ePS	E	02 44 56		
	eSR_1	N	02 52 09		
August 5	iPR_1	Z	16 52 41.0	comp.	USCGS: 5.2°S, 153.8°E
	ePR_1	E	16 52 43	east	H = $16^h\ 32^m\ 25.8^s$
	eSR_1	N	17 08 49		h = 69 km
					Mag: 5.4

Date	Phase	Component	GMCT	Motion	Remarks
August 8	iP'	Z	$21^h\ 03^m\ 18.9^s$	dil.	USCGS: 6.1°S, 129.7°E
	iP'	e	21 03 23.9		H = $20^h\ 44^m\ 21^s$
	iP'	Z	21 03 24.0	comp.	h 196 km
	iP'	n	21 03 24.1	south	Mag: 5.9
	iSKP	Z	21 06 29.9		
	eSKP	E	21 06 30		
	eSKP	N	21 06 30		
	iSKP	e	21 06 30.2		
	iSKP	e	21 06 30.4		
	eSKKS	E	21 12 28		
	eSKKS	N	21 12 29		
	ePPS	N	21 17 15		
	ePPS	E	21 17 18		
	eSR_1	N	21 23 33		
August 11	iP	Z	20 05 25.9	dil.	Foreshock of Kurile earthquake. H = $21^h\ 26^m\ 37.6^s$
August 11	iP	Z	20 22 33.2	comp.	Foreshock of Kurile earthquake. H = $21^h\ 26^m\ 37.6^s$
August 11	iP	Z	20 52 43.8	dil.	Foreshock of Kurile earthquake. H = $21^h\ 26^m\ 37.6^s$
August 11	iP	Z	20 57 16.0	comp.	Foreshock of Kurile earthquake. H = $21^h\ 26^m\ 37.6^s$
August 11	iP	Z	21 39 13.8	dil.	USCGS: 43.4°N, 147.9°E H $21^h\ 26^m\ 37.6^s$ h = 43 km Mag: 5.7
August 11	eP	N	21 40 05	south	USCGS: 43.5°N, 147.4°E
	eP	E	21 40 06	east	H = $21^h\ 27^m\ 39.4^s$
	iP	Z	21 40 06.2	comp	h 28 km
	iP	n	21 40 06.5	south	Mag: 7.1
	eS	N	21 50 31		Kurile Islands main shock
	iS	e	21 50 32.2		
	eS	E	21 50 33		
August 11	iP	Z	23 15 26.5	dil.	USCGS: 43.1°N, 147.8°E
	iP	n	23 15 33.2	south	H = $23^h\ 02^m\ 53.8^s$ h = N Mag: 5.5

Date	Phase	Component	GMCT	Motion	Remarks
August 12	iP'	Z	$00^h\ 12^m\ 06.0^s$	comp.	USCGS: 1.7°N, 126.5°E
	iPR$_1$	Z	00 14 27.2	dil.	H = $23^h\ 52^m\ 56.9^s$
	iPR$_1$	n	00 14 29.3	south	h = 34 km
	iSKP	n	00 15 28.9		Mag: 6.1
	iSKP	Z	00 15 29.2		
August 12	iP	Z	03 46 11.0	dil.	USCGS: 43.1°N, 147.6°E
	eS	E	03 56 35		H = $03^h\ 33^m\ 37.2^s$
	eS	N	03 56 37		h = N
					Mag: 5.5
August 12	iP	Z	05 06 09.2	dil.	USCGS: 43.3°N, 147.5°E
					H = $04^h\ 53^m\ 36.5^s$
					h = N
					Mag: 5.7
August 12	iP	Z	09 38 12.0	dil.	USCGS: 43.1°N, 147.6°E
					H = $09^h\ 25^m\ 38.7^s$
					h = N
					Mag: 5.3
August 12	iP	Z	09 46 14.6	dil.	USCGS: 43.6°N, 147.5°E
					H = $09^h\ 33^m\ 43.2^s$
					h = 34 km
					Mag: 5.6
August 12	iP	Z	11 33 50.1	comp.	USCGS: 43.9°N, 148.7°E
	eS	E	11 44 08		H = $11^h\ 21^m\ 21.6^s$
					h = 29 km
					Mag: 5.4
August 12	iP'	Z	12 40 28.0	dil.	USCGS: 1.7°N, 126.3°E
	iPR$_1$	Z	12 42 45.0	comp.	H = $12^h\ 21^m\ 19.0^s$
	iSKP	Z	12 43 48.0	dil.	h = 30 km
					Mag: 5.8
August 13	iP	Z	03 41 46.5	comp.	USCGS: 43.5°N, 147.4°E
	iP	n	03 41 46.5	south	H = $03^h\ 29^m\ 14.1^s$
					h = N
					Mag: 5.5
August 13	iP	Z	08 44 01.7	dil.	USCGS: 44.0°N, 147.7°E
	iP	n	08 44 02.7		H = $08^h\ 31^m\ 32.2^s$
					h = N
					Mag: 5.6

Date	Phase	Component	GMCT	Motion	Remarks
August 13	iP	Z	$23^h\ 09^m\ 35.4^s$	comp.	USCGS: 44.0°N, 148.1°E
	iP	e	23 09 38.8		H = $22^h\ 57^m\ 07.4^s$
	eS	E	23 19 52		h = N
	iS	e	23 19 52.1		Mag: 5.6
	eS	N	23 19 54		
August 14	iP	Z	$15^h\ 31^m\ 36.0^s$	dil.	USCGS: 44.1°N, 147.8°E
	iP	n	15 31 36.0	south	H = $15^h\ 19^m\ 34.7^s$
	eP	N	15 31 37	north	h = N
	eP	E	15 31 38	west	Mag: 4.8
	eS	E	14 41 58		
	eS	N	14 42 03		
August 15	iP	Z	04 44 33.6	dil.	USCGS: 43.0°N, 147.9°E
	iP	n	04 44 33.9	north	H = $04^h\ 32^m\ 00.4^s$
	iP	e	04 44 33.9	west	h = N
	eS	E	04 54 56		Mag: 5.6
	eS	N	04 55 04		
August 15	eSKKS	N	09 05 35		USCGS: 21.6°N, 143.0°E
	eS	E	09 06 53		H = $08^h\ 41^m\ 54.9^s$
					h = 319 km
					Mag: 6.1
August 15	e	Z	10 15 23.5	dil.	USCGS: 43.1°N, 148.3°E
	eS	E	10 25 15		H = $10^h\ 02^m\ 17.9^s$
	eS	N	10 25 18		h = N
					Mag: 4.7
August 17	eP	E	20 19 00		USCGS: 25.3°N, 109.2°W
	iP	Z	20 19 00.7	dil.	H = $20^h\ 13^m\ 08.2^s$
	iP	e	20 19 00.8		h = N
	eS	N	20 23 50		Mag: 5.7
August 18	iP	n	03 27 51.7		USCGS: 24.9°N, 109.0°W
	iP	e	03 27 52.1		H = $03^h\ 21^m\ 54^s$
	iP	Z	03 27 52.3	comp.	h = 22
	eS	N	03 32 42		Mag: 5.3
August 19	iP	n	09 02 23.5	north	USCGS: 43.8°N, 148.2°E
	iP	Z	09 02 23.6	dil.	H = $08^h\ 49^m\ 54.8^s$
	iP	e	09 02 23.7	west	h = 39 km
	eP	E	09 02 25	east	Mag: 5.7
	eP	N	09 02 27	south	
	eS	E	09 12 42		

Date	Phase	Component	GMCT	Motion	Remarks
August 20	iP	Z	08 02 00.4	comp.	USCGS: 47.9°N, 153.6°E
	iP	n	08 02 01.1	south	H = $07^h\ 50^m\ 05.5^s$
	iP	e	08 02 01.9		h = 73 km
	ipP	n	08 02 08.9	south	Mag: 5.8
	ipP	Z	08 02 09.6	comp.	
	eS	N	08 11 45		
	eS	E	08 11 46		
August 21	iP	e	14 31 56.8	west	USCGS: 23.2°N, 110.6°W
	eS	E	14 37 04		H = $14^h\ 25^m\ 51.5^s$
					h = 15 km
					Mag: 5.3
August 22	eP	N	10 10 54	south	USCGS: 23.3°N, 110.4°W
	ePR_2	E	10 12 00		H = $10^h\ 04^m\ 36.4^s$
					h = 11 km
					Mag: 5.1
August 30	iP	e	07 24 09.9	west	USCGS: 43.7°N, 147.8°E
	iP	Z	07 24 10.2	comp.	H = $07^h\ 11^m\ 39.5^s$
	iP	n	07 24 10.6	south	h = N
	eS	E	07 34 30		Mag: 5.4
August 30	iP	Z	08 40 36.9	comp.	USCGS: 43.6°N, 147.8°E
	i	Z	08 40 41.7	comp.	H = $08^h\ 28^m\ 06.5^s$
	i	e	08 40 41.9	west	h = N
	i	n	08 40 42.8	south	Mag: 5.4
	eS	E	08 50 59		
	e(PS)	N	08 52 03		

SEPTEMBER 1969

Date	Phase	Component	GMCT	Motion	Remarks
September 2	iP	Z	$03^h\ 58^m\ 04.7^s$	dil.	USCGS: 27.7°S, 66.5°N
	iP	n	03 58 05.5		H = $03^h\ 47^m\ 09.1^s$
	iP	e	03 58 05.6	east	h = 174 km
	ipP	Z	03 58 46.8	comp.	Mag: 5.5
	ipP	e	03 58 47.7	west	
	eS	N	04 07 01		
	eS	E	04 07 01		
	ePS	N	04 07 49		
September 4	eP	E	03 20 57		USCGS: 46.6°N, 153.5°E
	eP	N	03 20 57		H = $03^h\ 08^m\ 52^s$
	iP	Z	03 20 57.1	dil.	h = N
	eS	E	03 30 56		Mag: 5.4
	eS	N	03 30 57		
September 6	iP	e	13 46 00.2	east	
	iP	n	13 46 00.5	north	
September 6	eP	E	14 39 54	east	USCGS: 36.9°N, 11.9°W
	iP	e	14 39 55.6	east	H = $14^h\ 30^m\ 39.5^s$
	iP	Z	14 39 55.7	dil.	h = N
	i	Z	14 40 13.0	comp.	Mag: 5.7
	ePR_2	E	14 42 57		
	eS	E	14 47 20		
	eS	N	14 47 21		
	ePS	N	14 47 43		
September 9	eSKKS	N	05 40 14		USCGS: 35.7°N, 137.0°E
	eS	E	05 40 24		H = $05^h\ 15^m\ 37.7^s$
	ePS	N	05 41 15		h = 29 km
					Mag: 5.5
September 10	iP	e	21 04 38.1	west	USCGS: 39°24'21"N
					107°56'53"W
					Project "Rulison"
					H = $21^h\ 00^m\ 00.14^s$
					h = 0
					Mag: 5.3
September 12	eP	E	09 07 32		USCGS: 51.2°N, 179.2°W
	iP	Z	09 07 32.9	dil.	H = $08^h\ 57^m\ 07.3^s$
	eP	N	09 07 33		h = 48 km
	iP	e	09 07 33.7		Mag: 6.0
	iP	Z	09 07 34.8	comp.	
	iP	e	09 07 34.9		
	eS	E	09 16 02		
	eS	N	09 16 06		
September 16	iPR_1	n	14 32 07.0		USCGS: 15.5°N, 93.1°W
	iPR_1	e	14 32 07.5	east	H = $14^h\ 25^m\ 42.3^s$
	iPR_1	Z	14 32 07.6	comp.	h = 0
					Mag: 6.2

SEPTEMBER 1969

Date	Phase	Component	GMCT	Motion	Remarks
September 16	iP	Z	$14^h\ 35^m\ 43.6^s$	comp.	USCGS: 37°18'50.93" North
	iP	e	14 35 44.8	east	116°27'38.47" West
	iP	Z	14 35 45.1	dil.	Nevada Test Site "Jorum"
	eS	N	14 40 45		H = $14^h\ 30^m\ 00.38^s$
	eS	E	14 40 47		h = 3800 ft. = 1.2 km
					Mag: mb 6-1/4 - 6-1/2
September 20	eP	E	05 15 51		USCGS: 58.3°N, 32.2°W
	eP	N	05 15 51		H = $05^h\ 08^m\ 57.6^s$
	iP	n	05 15 51.5		h = N
	iP	Z	05 15 52.7	comp.	Mag: 5.6
	ePR_1	N	05 16 57		
	ePR_1	E	05 16 57		
	ePR_2	N	05 17 17		
	ePR_2	E	05 17 18		
	eS	N	05 21 31		
September 20	eP	E	15 34 41	west	USCGS: 1.8°N, 101.0°W
	iP	e	15 34 41.5		H = $15^h\ 26^m\ 41.5^s$
	iP	Z	15 34 41.8	comp.	h = **N**
	iPR_1	Z	15 36 31.5	comp.	Mag: 5.5
	iPR_1	n	15 36 31.9	north	
	eS	E	15 41 09		
	eS	N	15 41 18		
	eSR_1	N	15 44 37		
	eSR_1	E	15 44 42		
September 23	iP	Z	01 33 39.2	dil.	USCGS: 27.3°S, 113.4°W
	iP	n	01 33 39.9	south	H = $01^h\ 22^m\ 03.3^s$
	eS	E	01 43 19		h = N
					Mag: 5.3
September 23	iP	Z	22 43 43.5	dil.	USCGS: 18.7°N, 107.1°W
	iP	e	22 43 43.7	west	H = $22^h\ 37^m\ 22.6^s$
	iP	n	22 43 43.8	south	h = N
	eS	N	22 49 10		Mag: 4.9
	eS	E	22 49 11		
September 24	iP	Z	04 05 49.9	dil.	USCGS: 52.5°N, 31.8°W
	iP	n	04 05 49.9	north	H = 03 58 56.5
	iP	e	04 05 49.9	east	h = N
	eS	N	04 11 20		Mag: 5.2

SEPTEMBER 1969 (cont'd.)

Date	Phase	Component	GMCT	Motion	Remarks
September 24	iP	Z	$18^h\ 10^m\ 57.3^s$	dil.	USCGS: 15.2°N, 45.8°W
	iP	e	18 10 57.5	east	$H = 18^h\ 03^m\ 19.0^s$
	iP	n	18 10 58.1		h = N
	iPR_1	Z	18 12 19.0	dil.	Mag: 5.8
	eS	N	18 16 59		
	eS	E	18 17 02		

OCTOBER 1969

Date	Phase	Component	GMCT	Motion	Remarks
October 1	iP	Z	$05^h\ 15^m\ 08.5^s$	dil.	USCGS: 11.9°S, 75.1°W
	iP	e	05 15 08.6		H = $05^h\ 05^m\ 43.2^s$
	iP	n	05 15 08.9		h = 4 km
	eS	E	05 22 39		Mag: 5.9
	eS	N	05 22 44		
	eSR_1	E	05 26 38		
October 1	iP	Z	17 18 34.1	dil.	USCGS: 0.8°N, 85.0°W
	iP	n	17 18 34.7		H = $17^h\ 10^m\ 56.5^s$
	iP	Z	17 18 36.1	dil.	h = N
	iP	n	17 18 37.0		Mag: 5.5
	ePR_2	N	17 20 17	south	
	eS	E	17 24 32		
	eS	N	17 24 34		
October 2	iP	Z	22 16 31.8	comp.	USCGS: 51°25'01.6"N,
	iP	e	22 16 31.9	east	179° 10'56.3"E.
	iP	n	22 16 32.1	south	H = $22^h\ 06^m\ 00.0^s$
	e(S)	E	22 24 45		h = 1 km
					Mag: 6.5
October 8	iP	Z	14 35 45.2	comp.	USCGS: 37°15'24"N,
	iP	e	14 35 45.2	east	116°26'27"W
					H = $14^h\ 30^m\ 00.0^s$
					h = 0
					Mag: 5.5
					Nevada Test Site "Pipkin"
October 10	iP	e	00 09 05.6		USCGS: 46.2°N, 75.1°W
	iP	Z	00 09 07.8	comp.	H = $00^h\ 07^m\ 06.8^s$
	iS	Z	00 10 11.6		h = 21
	iS	Z	00 10 26.6		Mag: 3.9
October 13	iP'	Z	07 14 15.8	dil.	USCGS: 18.9°S, 169.3°E
	ipP'	Z	07 15 29.6	dil.	H = $06^h\ 56^m\ 01.6^s$
	eSKP	N	07 16 26		h = 246 km
	isSKP	e	07 17 57.1		Mag: 5.9
	eSKS	N	07 20 45		
	eSKS	E	07 20 46		
	eSKKS	E	07 22 03		
	eS	E	07 22 40		
	eS	N	07 22 49		
	ePS	E	07 25 03		

Date	Phase	Component	GMCT	Motion	Remarks
October 14	iP	Z	07h 10m 24.8s	comp.	USCGS: 73.4°N, 54.8°E
	iP	Z	07 10 27.3	comp.	H = $07^h\ 00^m\ 06.2^s$
	iP	n	07 10 27.3	south	h = 0
					Mag: 6.1
October 15	iPR_1	e	04 02 05.7	west	USCGS: 19.3°N, 65.4°W
	iPR_1	Z	04 02 05.9	comp.	H = $03^h\ 56^m\ 06.6^s$
	iPR_1	n	04 02 06.4		h = 50 km
					Mag: 4.8
October 17	iP'	Z	01 43 59.4	comp.	USCGS: 23.1°N, 94.7°E
	ipP'	Z	01 44 19.4	comp.	H = $01^h\ 25^m\ 12.4^s$
	eSKS	e	01 50 14		h = 134 km
	eSKKS	e	01 51 25		Mag: 6.0
October 18	iP	Z	08 54 48.0	dil.	USCGS: 52.5°N, 173.5°E
	eS	N	09 03 50		H = $08^h\ 44^m\ 00.0^s$
					h = 24 km
					Mag: 5.6
October 20	iP	Z	13 17 58.1	dil.	USCGS: 10.8°N, 72.5°W
	iP	n	13 17 58.3	south	H = $13^h\ 11^m\ 37.0^s$
	iP	e	13 17 58.9		h = 40 km
	eS	E	13 23 08		Mag: 5.7
October 20	iP	e	15 26 09.9	east	USCGS: 17.3°N, 95.2°W
	iP	Z	15 26 09.9	comp.	H = $15^h\ 20^m\ 36.5^s$
	iP	n	15 26 10.0		h = 87 km
	iPR_1	Z	15 26 46.0	dil.	Mag: 5.4
	iPR_2	Z	15 26 58.4	comp.	
	eS	N	15 30 39		
	eS	E	15 30 40		
	esS	N	15 31 27		
	esS	E	15 31 33		
October 21	iP	Z	21 04 12.1	comp.	USCGS: 51.3°N, 179.2°W
	iP	e	21 04 12.2	east	H = $20^h\ 53^m\ 47.5^s$
	iP	n	21 04 12.2		h = 48 km
					Mag: 5.9
October 22	eP	E	22 57 58	east	USCGS: 34.8°N, 121.3°W
	iP	e	22 57 59.3		H = $22^h\ 51^m\ 23.5^s$
	eS	E	23 33 16		h = 15
					Mag: 5.9

Date	Phase	Component	GMCT	Motion	Remarks
October 24	iP	Z	$08^h\ 35^m\ 32.7^s$	comp.	USCGS: 33.3°N, 119.2°W
	iP	e	08 35 32.8		H = $08^h\ 29^m\ 12.1^s$
	eS	E	08 40 36		h = 10
	eS	N	08 40 38		Mag: 5.1
October 26	ePR$_1$	N	06 56 04	south	USCGS: 16.2°S, 174.0°W
	epPR$_1$	E	06 56 31	west	H = $06^h\ 38^m\ 03.4^s$
	eSKS	E	07 02 19		h = 127 km
	eSKS	N	07 02 19		Mag: 5.8
	eSKKS	E	07 03 00		
	eS	N	07 03 26		
October 26	iP	n	15 47 48.7	south	USCGS: 44.9°N, 17.3°E
	iP	Z	15 47 50.3	comp.	H = $15^h\ 36^m\ 51.8^s$
	eS	N	15 56 42		h = N
	eS	E	15 56 44		Mag: 5.3
October 26	iP'	Z	21 58 29.1	dil.	USCGS: 53.4°S, 23.5°E
	eSKP	N	22 02 12		H = $21^h\ 39^m\ 20.8^s$
	eSKP	E	22 02 12		h = N
					Mag: 5.9
October 27	eP	N	08 21 46		USCGS: 44.9°N, 17.2°E
	iP	Z	08 21 57.6	dil.	H = $08^h\ 10^m\ 58.3^s$
	eS	E	08 30 52		h = N
	eS	N	08 30 57		Mag: 5.3
October 29	iP	Z	22 07 34.1	dil.	USCGS: 37° 08' 35.9"N
	iP	e	22 07 35.4	east	116°03'49.8"W
					H = $22^h\ 01^m\ 51.4^s$
					h = 0
					Mag: 5.7
					W. Nevada Test Site "Calabash
October 31	eP	E	11 43 29	east	USCGS: 51.3°N, 179.0°W
	eP	N	11 43 29	south	H = $11^h\ 33^m\ 04.8^s$
	iP	Z	11 43 29.3	comp.	h = 49 km
	iP	e	11 43 29.6	east	Mag: 6.0
	i	n	11 43 30.8		
	e	E	11 44 53		
	eS	E	11 51 56		
	eS	N	11 52 00		
	esS	N	11 53 18		

NOVEMBER 1969

Date	Phase	Component	GMCT	Motion	Remarks
November 1	eP	E	$11^h\ 14^m\ 22^s$		USCGS: 23.1°N, 107.9°W
	iP	Z	11 14 22.5	dil.	H = $11^h\ 08^m\ 20.9^s$
	ePR_1	E	11 15 01		h = N
	eS	N	11 19 15		Mag: 5.6
	eS	E	11 19 23		
November 5	iP	Z	18 00 36.3	comp.	USCGS: 34.8°N, 121.2°W
	iP	e	18 00 36.8		H = $17^h\ 54^m\ 13.6^s$
	eS	E	18 05 58		h = N
					Mag: 5.8
November 6	iP	n	20 30 42.1	south	USCGS: 51.5°N, 178.9°W
	iP	Z	20 30 42.3	comp.	H = $20^h\ 20^m\ 18.5^s$
	iP	Z	20 30 43.1	comp.	h = 36 km
	iP	e	20 30 43.4	east	Mag: 5.5
November 7	iPS	n	13 45 09.2	north	USCGS: 26.7°N, 53.3°E
	iPS	Z	13 45 09.8	dil.	H = $13^h\ 18^m\ 44.4^s$
	iPS	e	13 45 09.8	west	h = N
					Mag: 4.6
November 7	i	e	13 54 34.9	east	
November 7	iPR_1	n	18 52 11.0	south	USCGS: 27.9°N, 60.1°E
	eSKS	E	18 58 23		H = $18^h\ 33^m\ 59.9^s$
	eSKS	N	18 58 24		h = 35 km
	eSKKS	N	18 59 30		Mag: 6.1
	ePS	N	19 01 06		
	ePS	N	19 01 06		
November 13	iP	Z	08 02 35.5	comp.	USCGS: 27.8°S, 71.6°W
	iP	n	08 02 35.8		H = $07^h\ 51^m\ 29.5^s$
	eS	E	08 11 40		h = N
	e(PS)	E	08 12 35		Mag: 5.8
November 20	iP	e	01 01 13.9	west	USCGS: 37.4°N, 81.0°W
	iP	n	01 01 14.4		H = $01^h\ 00^m\ 09.0^s$
	iP	Z	01 01 14.4	comp.	h = 3 km
	iP	Z	01 01 20.7	comp.	Mag: 4.3
	eS	N	01 02 16		
November 20	iP	n	14 17 48.3	north	
	iP	e	14 17 48.4	east	

NOVEMBER 1969

Date	Phase	Component	GMCT	Motion	Remarks
November 21	iPR$_1$	n	02^h 27^m 38.8^s	north	USCGS: 2.1°N, 94.6°E
	iSKP	n	02 28 42.0	south	H = 02^h 05^m 35.3^s
	eSKS	N	02 31 26		h = 20 km
	eSKKS	N	02 34 30		Mag: 6.4
	ePPS	N	02 39 48		
	eSR$_1$	E	02 45 23		
November 22	iP	Z	23 20 28.8	comp.	USCGS: 57.8°N, 163.5°E
	iP	n	23 20 29.3	south	H = 23^h 09^m 37.2^s
	iP	Z	23 20 29.7	dil.	h = N
	iP	e	23 20 29.8	west	Mag: 6.3
	eP	E	23 20 30	west	
	eP	N	23 20 30	north	
	eS	E	23 29 22		
November 24	iP	Z	21 19 33.6	comp.	USCGS: 60.6°N, 58.8°W
	iP	Z	21 19 35.9	comp.	H = 21^h 14^m 13.7^s
	iS	n	21 23 32.6		h = N
	iS	Z	21 23 33.6		Mag: 5.0
November 24	iP	Z	23 00 32.4	dil.	USCGS: 56.2°N, 153.6°W
	iP	n	23 00 32.4	north	H = 22^h 51^m 50.1^s
	eS	E	23 07 15		h = N
					Mag: 5.5

DECEMBER 1969

Date	Phase	Component	GMCT	Motion	Remarks
December 1	iP	e	$22^h\ 20^m\ 05.7^s$	west	USCGS: 16.7°N, 60.8°W
	iPR_1	e	22 20 55.4		H = $22^h\ 13^m\ 53.4^s$
	eS	E	22 25 07		h = 41 km
					Mag: 5.6
December 6	iP	Z	07 15 43.7	comp.	USCGS: 43.8°N, 54.8°E
	iP	n	07 15 43.8	south	H = $07^h\ 02^m\ 57.4^s$
	iP	e	07 15 44.2		h = 0
					Mag: 5.8
December 3	i	e	07 20 29.4	east	Local
December 3	i	e	10 22 48.0	west	
December 14	iP'	Z	03 01 16.6	dil.	USCGS: 2.0°N, 126.9°E
	iSKP	e	03 04 30.9		H = $02^h\ 42^m\ 09.4^s$
	iSKP	Z	03 04 31.4		h = 42 km
					Mag: 6.0
December 17	iP	e	15 05 43.0		USCGS: 37° 05' 01.6" N
	iP	Z	15 05 43.8	comp.	116° 00' 05.6" W
					H = $15^h\ 00^m\ 00.0^s$
					h = 0
					Mag: 5.5
					Nevada Test Site "Grape A"
December 18	iP	e	13 43 59.9	east	USCGS: 46.3°N, 142.5°E
	iP	Z	13 44 00.1	comp.	H = $13^h\ 32^m\ 05.2^s$
	iP	n	13 44 01.3	south	h = 344 km
	eP	E	13 44 02	east	Mag: 5.9
	eP	N	13 44 02	north	
	eS	E	13 53 52		
	eS	N	13 53 53		
December 25	iP	Z	21 38 57.3	comp.	USCGS: 15.8°N, 59.7°W
	iP	n	21 38 57.3	north	H = $21^h\ 32^m\ 27.3^s$
	iP	e	21 38 57.3	west	h = 7 km
	eP	E	21 39 00	east	Mag: 6.4
	eP	N	21 39 00	south	
	ipP	e	21 39 05.6	east	
	ipP	n	21 39 05.7	north	
	isP	n	21 39 12.7	north	
	isP	e	21 39 15.0	west	
	$e(PR_1)$	E	21 39 34	east	
	eS	E	21 44 12		
	eS	N	21 44 14		
	$i(SR_1)$	n	21 45 20.6		

Date	Phase	Component	GMCT	Motion	Remarks
December 25	iP	Z	$22^h\ 37^m\ 28.0^s$	comp.	USCGS: 16.1°N, 59.8°W
	iP	e	22 37 28.5		H = $22^h\ 31^m\ 02.3^s$
	iP	n	22 37 28.8		h = 8 km
	ipP	Z	22 37 44.5	dil.	Mag: 6.0
	eS	e	22 42 43		
December 26	iP	Z	00 11 37.1	comp.	USCGS: 16.0°N, 59.7°W
					H = $00^h\ 11^m\ 14.4^s$
					h = N
					Mag: 5.1
December 29	iP	Z	00 58 11.6	comp.	USCGS: 16.2°N, 59.7°W
	iP	e	00 58 12.1	west	H = $00^h\ 51^m\ 47.2^s$
	i	n	00 58 13.8	north	h = 17 km
					Mag: 5.6
December 29	iP	Z	14 02 00.5	comp.	USCGS: 16.1°N, 59.7°W
	iP	e	14 02 00.7	west	H = $13^h\ 55^m\ 38.0^s$
	iP	n	14 02 00.7	north	h = N
					Mag: 5.4
December 29	iP	Z	14 19 53.5	comp.	USCGS: 16.2°N, 59.7°W
					H = $14^h\ 13^m\ 29.6^s$
					h = 20 km
					Mag: 5.2
December 31	eS	E	19 27 54		USCGS: 28.5°N, 129.1°E
	ePS	N	19 29 18		H = $19^h\ 01^m\ 56.1^s$
	ePPS	E	19 29 53		h = 44 km
					Mag: 5.9