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PAKISTAN METEOROLOGICAL SERVICE

GEOPHYSICAL INSTITUTE

QUETTA



# Pakistan Meteorological Service

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Particulars of Stations and Instruments

(a) Stations

Station	Symbol	Latitude	Longitude	Height (a.s.l.)	Ground
Quetta	Qt	30° 11'·3 N	66° 57'·0 E	1719 meters	Cretaeocus Limestone
Lahore	Lh	31° 33'·0 N	74° 20'·0 E	210 „	Alluvium
Karachi	Kr	24° 49'·8 N	67° 02'·2 E	30 „	Alluvium
Chittagong	Ch	22° 21'·5 N	91° 49'·0 E	15 „	Alluvium
Warsak	Wr	34° 09'·0 N	71° 25'·0 E	343 „	River Terrace

(b) Instruments

Instruments	Components	Period Seismo. & Galvo.	Damping	Max. Magnification
<u>Quetta (Central Station)</u>				
Sprengnether	Z	1·9 sec.	Critical	5,500
„	N	1·95 „	„	4,500
„	E	1·95 „	„	5,800
„	N	15·8 „	„	15,000
„	E	16·5 „	„	16,000

(Contd.)



Instruments	Components	Period		Damping	Max. Magnification
		Seismo.	& Galvo.		
Willmore	Z, N & E	{ Seismo = 1 sec. Galvo = 1/4 "		—	—
Milne-Shaw	E	12.0	sec.	20:1	250
Sprengnether Pen recorder	E	1.0	"	—	—
<b>Lahore</b> Sprengnether	Z	1.8	"	Critical	4,900
"	N	1.7	"	"	4,200
"	E	1.6	"	"	4,100
<b>Karachi</b> Sprengnether	Z	1.8	sec.	Critical	5,890
"	N	1.6	"	"	4,700
"	E	1.4	"	"	4,700
<b>Chittagong</b> Sprengnether	Z	1.7	"	Critical	5,200
"	N	1.8	"	"	5,700
"	E	1.5	"	"	3,600
"	N	7.0	"	"	6,600
Willmore	Z	{ Seismo = 1 sec. Galvo = 1/4 "		—	—
<b>Warsak</b> Sprengnether	N	2.0	sec.	Critical	4,000
Willmore (with Sprengnether galvo. & recorder)	Z	1.0	"	—	—

\* indicates long period seismographs, Sprengnether or Milne-Shaw.  
c=compression, d=dilatation, X=unidentified phase.  
Mu=Actual ground motion of the indicated phase in microns.  
Se=Period of the indicated phase in seconds.  
(Pas), (Berk), (Up), (Ki) stand for seismological observatories Pasadena (U.S.A.),  
Berkley (U.S.A.), Uppsala (Sweden) and Kiruna (Sweden) respectively.  
All times are in Greenwich Mean Time.

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
1	Lh	ePZ	04	34	06±						
	Qt	ePZ			46						
		eSNE		36	15	1	Ch	ePZ	15	49	48
	Wr	ePN			47			ePcPZ			52
		H 04 32 51						ePPZN*			53 04
		27 N 75½ E						ePPPN*			54 59
		Northern India						eSN*	16	00	14
1	Qt	ePKPZ	07	53	35			eScSN*			24
		USCGS H 07 35 21.9						ePSN*			01 09
		27.6 S 176.9 W					Wr	ePN	15	49	36
		Tonga Islands region					Lh	ePZ			44c
		depth about 500 km					Qt	ePZ			50 03
1	Ch	ePZ	09	40	46			epPNE			12
		ePcPZ			50			ePPNEN*			53 25
		ePPZ			44 02			eSKSNN*	16	00	29
		ePPPZ			46 01			eSEN*			44
		eSN*			51 12			ePSN*			01 46
	Qt	ePZ			42 32			eSSN*			06 37
		e!(SKS)N*			53 22			Mu Sec			
		USCGS H 09 28 19.5						PZ 0.2 1.5			
		16.8 S 167.6 E						Δ = 88°			
		New Hebrides Islands						USCGS H 15 37 14.4			
		depth about 63 km						56.1 N 153.7 W			
		Mag 6 (Pas)						Kodiak Island, Alaska			
1	Ch	ePZ	10	47	34			depth about 24 km			
		eSN*			57 58			Mag 6-6½ (Pas), 6.2 (Qt)			
	Qt	eSKSN*	11	00	02	1	Qt	ePZ	17	30	53
		USCGS H 10 35 01.1						iSNE			31 18
		16.5 S 167.6 E						ePN			43
		New Hebrides Islands				1	Qt	ePKPZ	18	59	58



Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
1	Qt	ePKPZ	20	20	55	2	Qt	ePKPZ	18	51	48
		USCGS H 18 41 16.2						eXZ	52	26	
		Fiji Islands						USCGS H 18 32 18.9			
		depth about 33 km						31.9 S 68.9 W			
								San Juan Province,			
								Argentina			
								depth about 25 km			
2	Qt	ePZ	07	57	18	2	Ch	iPZN*	22	14	39
2	Ch	ePZN*	13	48	15			iPcPZ			52
		ePPZN*			22			ePPPN*			19 20
		eSN*		49	52			eSN*			24 24
		eSSN*		50	09			esSN*			54
	Lh	ePZ			51			ePSN*			25 01
		eSZN			54 39		Lh	ePZ			14 49
	Wr	ePN			51 20			iSZ			24 49
		ePPN			58			eScSZ			25 07
		eSN			55 33		Qt	ePZ			15 14
	Qt	ePZ			51 53			ePPZN			18 27
		ePPNE			52 36			ePPPZE			20 24
		ePPPZ			53			eSKSZNE			25 33
		iSNN*			56 33			iSNEN*			38
		H 13 46 05						eSSN*			31 17
		29 1/4 N 98 1/4 E						Mu Sec			
		Sikang Province, China						PZ 0.3 1.3			
		USCGS H 13 46 10.0						$\Delta = 84^\circ$			
		28.7 N 98.3 E						USCGS H 22 02 48.9			
		Tibet						52.0 N 171.4 W			
		depth about 48 km						Aleutian Islands			
2	Lh	ePZ	18	48	44						

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
3	Wr	ePN	00	05	10			esPZ			56 21
		depth about 49 km						ePPPE			59 07
		Mag 5 1/4-6 (Pas), 6.3 (Qt)						epPPE			59 07
3	Qt	ePZ			28			ePPPN			47
3	Lh	ePZ	00	28	55			epPPPZ			13 01 06
		ePZ			29 37			iSNN*			04 12
		USCGS H 00 19 57.3						e!SNN*			10 28
		43.2 N 144.4 E						Mu Sec			
		Near north coast of						PZ 0.4 1.3			
		Hokkaido, Japan						$\Delta = 91^\circ$			
		depth about 14 km						USCGS H 12 41 34.9			
3	Qt	ePKPZ	06	00	38			6.1 S 154.5 E			
		USCGS H 05 41 39.9						Solomon Islands			
		20.9 S 174.4 W						depth about 457 km			
		Tonga Islands						Mag 6 1/2-6 3/4 (Pas), 6.2 (Qt)			
		depth about 61 km									
3	Ch	ePZ	07	58	46						
		USCGS H 07 46 53.5									
		19.0 S 169.1 E									
		New Hebrides Islands									
		depth about 212 km									
3	Ch	iPZN*	12	51	51						
		esPZ			54 09						
		eSN*			13 00 14						
	Lh	ePZ			12 53 26						
		eSZ			13 03 13						
	Wr	ePN			12 53 38						
		eSN			13 03 40						
	Qt	ePZ			12 53 53						
		epPZ			55 30						

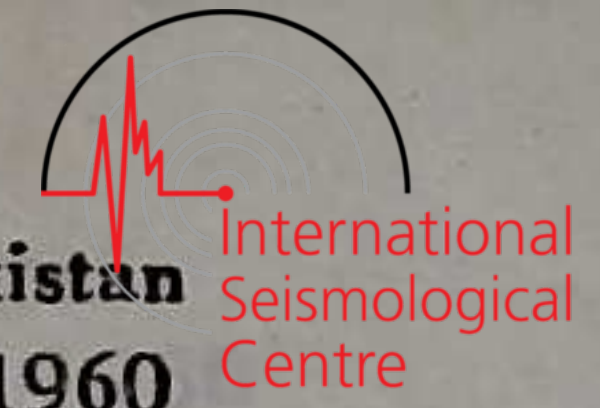






Date	Station	Phase	h	m	s
7	Wr	ePN	14	47	34
		eSN		48	38
	Qt	ePZ			23
		eSNE		50	06
H 14 46 09 Uzbekistan S.S.R.					
7	Kr	ePZ	20	05	30
		eSE			57
Qt		ePZ	06	27	
		eSNE	07	37	
H 20 04 55 Arabian Sea					
8	Qt	ePZ	08	23	11
8	Qt	ePZ	10	59	55
8	Ch	ePZ	11	14	49
		epPZ		15	03
		ePPZ		16	18
		ePPPZ			41
	Lh	ePZ	17	03	
	Wr	ePN			31
		eSN		25	18
	Kr	ePZ		17	37
		Qt	ePZ		
	epPZE			18	02
ePPZN			19	58	
epPPE			20	20	
ePPPZE			21	26	
epPPPZN				34	
eSNN*			25	56	
epSN*			26	27	

Date	Station	Phase	h	m	s
		eScSN*			27 26
		Mu Sec			
	PZ	0.2	1.3		
		$\Delta = 60^\circ$			
USCGS H 11 07 40.8 6.2 N 126.2 E Near east coast of Mindanao, Philippine Islands depth about 47 km Mag 6.1 (Qt)					
8	Ch	ePZ	14	42	00
Qt		ePZ			57
		ePcPZE			43 24
USCSG H 14 32 00.3 52.5 N 158.8 E Kamchatka depht about 29 km					
8	Ch	ePZ	17	09	54
USCGS H 17 02 43.4 5.9 N 126.3 E Near south coast of Mindanao, Philippine Islands depth about 312 km					
8	Qt	ePZ	23	23	22
USCGS H 23 12 45.4 45.4 N 149.8 E Kurile Islands depth about 94 km					



Date	Station	Phase	h	m	s
9	Qt	ePZ	08	40	27
		Ch		41	20
9	Wr	iPN	10	06	07
		iSN			38
Lh		iPZ			43d
		eSN		07	44
Qt		iPZ			08c
		esPNE		08	03
Kr		iSNE			29
		ePZ			08c
eSE 10 15 H 10 05 24 36 N 71.5 E Hindukush depth about 250 km USCGS H 10 05 21.9 36.4 N 71.6 E Hindukush depth about 236 km					
9	Qt	ePZ	10	54	32
9	Wr	ePN	15	16	26
		iSN			17 00
Qt		ePZ			24d
		eSNE		18	43
H 15 15 40 Hindukush					
Qt		ePZ	16	28	51
		ePPZ			31 00
		eSN*			36 35
		eSSN*			40 19

Date	Station	Phase	h	m	s
USCGS H 16 19 15.9 71.5 N 2.4 W Jan Mayen Islands region depth about 23 km					
9	Qt	ePZ	18	06	58
9	Qt	ePZ	19	46	24
9	Wr	ePN	19	57	13
		iSN			50
Qt		ePZ			58 24
		eSNE			59 56
H 19 56 24 Northern Afghanistan					
9	Qt	ePZ	20	14	08
		eSN*			21 50
		eSSN*			25 34
USCGS H 20 04 32.7 71.7 N 1.3 W Jan Mayen Islands region depth about 23 km					
10	Qt	ePZ	00	25	56
		ePPPZE			27 25
		eLN*			35.0
USCGS H 00 19 08.4 34.4 N 26.4 E Crete depth about 10 km					
10	Qt	ePZ	10	08	24
Ch	ePZ			10 12	
10	Ch	iPZ	10	50	58d
		epPZ			52 38



Date	Station	Phase	h	m	s
		ePPZ			41
		esPZ		53	45
		eSZ		55	52
		esSZ		58	49
Lh		iPZ		53	16d
		eSZN	11	00	01
Wr		ePN	10	53	39
		eSN	11	00	44
Kr		i!PZ	10	53	47
		epPZ		55	42
Qt		iPZ		53	55d
		ePcPNE		54	41
		epPZE		55	45
		ePPE		56	22
		epPPZNE		57	43
		esPPE		59	03
		eSNEN*	11	01	15
		eScSN*		02	28
		e!sSNEN*		04	37
		USCGS H	10	44	51.2
		4.0 N		122.6	E
		Celebes Sea			
		depth about		629	km
10	Ch	ePZ	15	49	05
	Lh	ePZ		51	48
	Qt	ePZ		52	15
		ePPZN		53	31
		eSN*		57	51
		eLN*	16	00.6	
		USCGS H	15	45	22.6



Date	Station	Phase	h	m	s
		6.6 N		93.8	E
		Nicobar Islands			
		depth about		29	km
11	Qt	ePZ	01	15	38
11	Qt	ePKP <sub>2</sub> E	08	15	43
		USCGS H	07	55	54.5
		38.8 S		74.8	W
		Off coast of Chile			
		depth about		25	km
11	Qt	ePE	09	55	51
11	Qt	ePE	12	12	03
12	Qt	ePZ	02	56	52c
		USCGS H	02	44	48.1
		60.8 N		151.9	W
		Southern Alaska			
		depth about		230	km
12	Ch	iPZ	12	23	49c
		epPZ		24	06
		ePPZ		25	06
		eSZ		29	10
	Lh	ePZ		25	39
	Wr	ePN			56
	Qt	iPZ		26	29c
		e!pPZNE		40	
		e!sPZNE		54	
		ePcPE		27	38
		ePPE		28	34
		epPPN		45	
		ePPPNE		29	41
		eSNEN*		33	57

Date	Station	Phase	h	m	s
		Mu		Seo	
		PZ	0.8	1.7	
		PN	0.2	1.2	
		PE	0.5	1.5	
		$\Delta = 54^\circ$			
	Kr	ePZ	12	26	39c
		epPZ			58
		Mu		Seo	
		PZ	0.6	1.2	
		$\Delta = 55^\circ$			
		USCGS H	12	17	08.1
		27.3 N		128.4	E
		Ryukyu Islands			
		depth about		48	km
		Mag $6\frac{1}{2} - 6\frac{3}{4}$ (Pas), 6.5 (Qt), (Kr)			
12	Wr	ePN	15	09	28
	Lh	ePZ		10	06
	Qt	ePZ			32
		eSNE		12	00
		H	15	08	37
		Afghanistan-Tadzhikistan			
		border			
12	Lh	ePZ	16	10	50
		epPZ		12	45
	Qt	ePZ		11	25
		eSNEN*		18	52
		esSN*		22	24
		e(SS)N*		23	07
		USCGS H	16	02	05.8

Date	Station	Phase	h	m	s
		7.0 S		117.0	E
		Java Sea			
		depth about		611	km
12	Lh	ePZ	22	45	02
	Qt	ePZ			37
		USCGS H	22	34	22.5
		5.5 S		130.5	E
		Banda Sea			
		depth about		57	km
13	Qt	ePZ	01	02	37
13	Lh	ePnZ	02	24	53
	Wr	ePnN		25	09
		eXN			48
	Qt	ePnZN			09
		e!XE			48
		eSnNE			55
		eS*NE		26	05
		eSgZE			13
		H	02	24	09
		$30\frac{3}{4}$ N		$71\frac{1}{4}$	E
		West Pakistan			
13	Ch	iPZ	03	16	42
		epPZ		18	04
		ePPZ			38
	Qt	ePZ			59
		epPZ		20	32
		esPZ		21	21
		ePPE			29
		eSNEN*		26	58
		USCGS H	03	09	09.7



Date	Station	Phase	h	m	s
		27.0 N 140.2 E			
		Bonin Islands region			
		depth about 439 km			
13	Qt	e(P)Z	12	21	31
13	Wr	ePN	19	00	46
		iSN	01	15	
	Lh	ePZ			27
		eSZ	02	27	
	Qt	ePZ	01	51	
		eSNE	03	10	
		H 19 00 10			
		36 N 71.4 E			
		Hindukush			
		depth about 200 km			
14	Ch	ePZ	00	40	20
	Lh	ePZ	42	46	
	Wr	iPZ	43	09	
	Qt	ePZ			35
		ePPZ	45	36	
		eSNEN*	50	55	
		eSSN*	54	45	
		USCGS H 00 34 25.3			
		16.9 N 122.3 E			
		Luzon, Philippine Islands			
		depth about 50 km			
14	Ch	ePZ	04	01	44
		USCGS H 03 53 32.1			
		29.9 N 137.8 E			
		South of Honshu, Japan			
		depth about 21 km			

Date	Station	Phase	h	m	s
14	Qt	ePZ	13	01	18
		e(S)NN*	03	54	
	Wr	ePN	01	35	
14	Qt	ePZ	16	12	23
		USCGS H 15 59 01.7			
		6.5 S 155.1 E			
		Solomon Islands			
		depth about 100 km			
14	Qt	ePZ	18	30	36
14	Qt	ePZ	22	45	50
14	Qt	ePKPZ	23	37	38
		USCGS H 23 18 35.1			
		20.9 S 174.1 W			
		Tonga Islands			
		depth about 25 km			
15	Ch	ePZ	03	43	52
		USCGS H 03 31 17.5			
		16.5 S 167.3 E			
		New Hebrides Islands			
		depth about 69 km			
15	Wr	ePZ	05	07	36
	Lh	ePZ			39
	Qt	ePZ	08	31	
		USCGS H 05 02 56.3			
		46.2 N 93.9 E			
		Sinkiang Province, China			
		depth about 25 km			
15	Lh	ePZ	09	15	36
	Wr	ePN	16	18	
	Qt	ePZ			59
		eSNE	19	11	
		H 09 14 08			
		30.4 N 81 E			
		Himalaya range			
15	Ch	ePZ	18	05	46
		epPZ	07	02	
		ePcPZ	09		
		ePPZ	43		
		eSN*	12	10	
		esSN*	14	13	
	Wr	cPN	07	39	
	Qt	iPZ	08	08	c
		ePPE	10	55	
		eSNEN*	16	41	
		eIXN*	18	41	
		esSSN*	23	27	
		Mu Sec			
		PZ 0.4 1.5			
		$\Delta = 70^\circ.5$			
		USCGS H 17 57 42.7			
		21.4 N 142.9 E			
		Volcano Islands region			
		depth about 361 km			
15	Qt	ePZ	18	36	02
15	Qt	ePZ	21	58	46
16	Qt	ePZ	01	21	38
16	Wr	iPZ	01	40	13 d
		eSN	41	11	
	Lh	ePZ	40	56	
		eSZ	42	26	
16	Qt	ePZ	41	04	d
		esPNE			55
		eSNE			42 43
16	Ch	ePZ			43 56
		H 01 38 57			
		38.4 N 69.2 E			
		Tadzhikistan, S. S. R.			
		depth about 220 km			
		USCGS H 01 39 03.3			
		38.5 N 68.7 E			
		Tadzhikistan, S. S. R.			
16	Wr	iPZ	23	20	54 d
		iSZ			21 20
	Lh	ePZ			36 d
		eSZN			22 31
	Qt	ePZ			21 59
		eSNE			23 14
		H 23 20 23			
		35.4 N 71.4 E			
		Hindukush			
		depth about 150 km			
17	Ch	ePZ	07	25	16
		USCGS H 07 12 48.1			
		17.4 S 167.4 E			
		New Hebrides Islands			
		depth about 23 km			
17	Ch	ePZ	08	02	35
		epPZ			47
		esPZN*			52
		ePcPZN*			03 29



Date	Station	Phase	h	m	s
		ePPZN*	04	42	
		eSN*	10	24	
		esSN*		43	
		eScSN*	12	16	
Wr		ePZ	03	06	
Qt		ePZ		43	
		epPZ		54	
		eSN*	12	30	
		ePSN*		57	
		USCGS H 07 52 50.8			
		49.3 N 155.4 E			
		Kurile Islands			
		depth about 35 km			
17	Ch	ePZ	08	15	14
		epPZN*		22	
		ePcPZN*	16	07	
		ePPZN*	17	20	
		ePPPZN*	18	42	
		iSN*	23	04	
		esSN*		23	
		eScSN*	24	57	
Wr		ePZ		46	
Qt		ePZ	16	23	
		epPZE		37	
		ePPNE	18	55	
		ePPPN	20	32	
		eSN*	25	06	
		ePSN*		46	
		e!PPSN*		58	
		USCGS H 08 05 29.5			

Date	Station	Phase	h	m	s
		49.4 N 155.2 E			
		Kurile Islands			
		depth about 28 km			
		Mag 6 (Pas)			
17	Ch	ePZ	13	09	45
		USCGS H 12 58 56.4			
		6.3 S 154.4 E			
		Solomon Islands			
		depth about 134 km			
7	Qt	ePZ	16	07	35
		USCGS H 15 54 38.1			
		6.3 S 148.8 E			
		New Britain			
		depth about 79 km			
17	Qt	ePKPZ	20	15	12
		ePPZN		16	53
		USCGS H 19 56 11.1			
		20.9 S 174.5 W			
		Tonga Islands			
		depth about 28 km			
		Mag 6 (Pas)			
18	Qt	ePZ	06	52	39
		eSNEN*		53	10
	Wr	ePZ		11	
18	Ch	iPZN*	09	48	56
		epPZN*		49	18
		esPZ		34	
		ePPN*		50	50
		i!XZ		54	06
		iSN*		55	34

Date	Station	Phase	h	m	s
	Lh	ePZ	51	06	c
		Mu	Sec		
		PZ	2.5	1.8	
	Wr	iPZ	09	51	24 c
		eSN	10	00	07
	Kr	ePZ	09	51	24 c
	Qt	iPZ		36	c
		epPZE		58	
		esPE		52	11
		ePPZNE		54	06
		epPPNE		31	
		esPPZ		42	
		ePPPNE		55	49
		eSNEN*	10	00	31
		esSN*		01	12
		ePSN*		21	
		esSSN*		05	37
		Mu	Sec		
		PZ	1.6	1.8	
		$\Delta = 70^\circ$			
		USCGS H 09 40 28.3			
		6.8 S 129.2 E			
		Banda Sea			
		depth about 83 km			
		Mag 6.7 (Qt), 6.8 (Lh)			
18	Qt	ePZ	19	38	57
		USCGS H 19 26 30.9			
		51.5 N 170.1 W			
		Fox Islands			
		Aleutian Islands			

Date	Station	Phase	h	m	s
		depth about 92 km			
19	Wr	iPZ	02	33	28 d
		iSZ		34	02
	Qt	ePZ		32	
		eSNE		35	55
		H 02 32 44			
		Northern Afghanistan			
19	Ch	ePZ	03	45	18
		epPZ		36	
		esPZN*		54	
		ePPZN*		46	07
		eSN*		49	46
	Wr	ePZ		48	03
	Qt	ePZ		29	
		epPZN		55	
		ePPZNE		50	25
		epPPZ		52	
		eSN		55	33
		e!XN		41	
		USCGS H 03 39 40.9			
		15.6 N 120.0 E			
		Luzon Islands, Philippine Islands			
		depth about 97 km			
19	Ch	ePZ	04	04	40
	Qt	ePZ		07	46
		USCGS H 03 58 51.4			
		15.5 N 120.0 E			
		Near west coast of Luzon			
		Philippine Islands			



Major Shocks

Date	Station	Phase	h	m	s
		depth about 25 km			
19	Kr	ePnZ	07	51	30 d
		iPgZ		36	
	Qt	ePnZ	52	26	
		eSnZ	53	36	
	H	07 50 54			
		Arabian Sea			
19	Qt	ePKPZ	19	20	33
		epPKPZE		49	
		eXZ	22	34	
		ePPZNE		44	
		epPPZE		56	
		eSKKSN*	28	59	
		eSSN*	40	01	
	Wr	ePKPZ	20	36	
	Lh	ePKPZ		42	
	Ch	ePKPZ	21	10	
		USCGS H 19 01 25.4			
		6.9 N 77.5 W			
		Colombia-Panama border			
		depth about 66 km			
		Mag 6-6½ (Berk), 6 (Pas)			
20	Qt	ePKPZ	01	00	37
		USCGS H 00 42 22.0			
		29.8 S 177.9 W			
		Kermadec Islands			
		depth about 493 km			
20	Qt	ePKPZ	03	23	37
		USCGS H 03 04 53.0			

Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		36.9 S		177.2 E							
		Off north coast of									
		North Islands,									
		New Zealand									
20	Qt	ePKPZ	03	54	36						
		USCGS H 03 35 34.6									
		28.2 S		177.9 W							
		Kermadec Islands									
		depth about 47 km									
20	Wr	ePZ	04	10	33						
	Lh	ePZ		52							
	Qt	ePZ	11	27							
		eSNN*		16 00							
		USCGS H 04 05 56.9									
		49.9 N		88.4 E							
		U. S. S. R.									
		depth about 29 km									
21	Qt	ePKPZ	07	44	07						
		USCGS H 07 25 26.5									
		27.9 S		177.8 W							
		Kermadec Islands									
		depth about 249 km									
21	Qt	ePZ	10	02	16						
21	Qt	ePZ	10	51	06						
		epPZN 17									
		USCGS H 10 38 31.0									
		53.4 N		166.1 W							
		Fox Islands, Aleutian									
		Islands									
		depth about 38 km									
1	Ch	ePZ	16	14	00						
	Wr	ePZ		24							
	Qt	ePZ		57	d						
		epPZE		17 35							
		esPZNE		18 05							
		ePPZE		52							
		eSNEN*		23 55							
		esSNN*		25 23							
		Mu		Sec							
		PZ 0.3		1.5							
		$\Delta = 51^\circ$									
		USCGS H 16 08 14.7									
		26.5 N		124.8 E							
		East China Sea									
		depth about 207 km									
		Mag 5.6 (Qt)									
21	Qt	ePZ	23	08	33						
		ePPZE		47							
		eSN*		11 18							
		eSSN*		38							
	Wr	ePZ		09	10						
		USCGS H 23 05 08.9									
		31.9 N		50.4 E							
		Iran									
		depth about 84 km									
22	Kr	ePZ	05	46	48						
	Qt	ePZ		47	05 d						
		ePcPZE		48 24							
		ePPZ		55							
		ePPPNE		49 50							
		eSNE		54 03							
		esSEN*		18							
		eScSN*		56 48							
		eSSN*		57 37							
		Mu		Sec							
		PZ 0.6		1.5							
		$\Delta = 49^\circ$									
	Wr	ePZ		05	47 44						
	Lh	ePZ		53							
	Ch	ePZ		49	05 d						
		epPZN*		16							
		ePcPZ		33							
		ePPZ		51 35							
		ePPPZ		53 09							
		eSN*		57 55							
		esSN*		58 12							
		USCGS H 05 38 14.4									
		3.4 S		29.1 E							
		Belgian Congo									
		depth about 29 km									
		Mag 6.3 (Qt)									
22	Qt	ePZ	08	16	35						
		e(S)NEN*		17 45							
	Wr	ePZ		59							
22	Kr	ePZ		09	14 07						
	Qt	ePZ		26							
		e!pPZ		36							
		esPZNE		42							
		Mu		Sec							
		PZ 1.0		1.6							







Major Shocks

Date	Station	Phase	h	m	s
26	Qt	ePKPZ	00	51	32
	Wr	iPKP <sub>2</sub> Z			46
USCGS H 00 32 05.0 27.4 S 68.2 W Catamarca Province, Argentina depth about 25 km					
26	Ch	ePZ	01	12	12
	Wr	iPZ		14	51
	Qt	ePZ		15	23 d
26	Ch	ePZ	08	59	45
	Qt	ePZ	09	00	35
USCGS H 08 49 31.3 52.0 N 159.8 E Off southeast coast of Kamchatka					
26	Qt	ePZ	11	45	52
	USCGS H 11 36 21.7 32.4 N 131.7 E Near coast of Kyushu, Japan depth about 15 km				
26	Wr	iPZ	13	33	37 c
		iSZ		34	09
Qt	ePZ			34	
	eSZN			35	49
H 13 32 56 Hindukush					

Major Shocks

Date	Station	Phase	h	m	s
26	Ch	ePZ	15	25	10
	Lh	ePZ		23	
Qt	ePZ			53	
	epPZE		26	02	
	eSN*		36	08	
	esSNE			32	
	ePSN*		37	11	
USCGS H 15 13 25.8 51.6 N 172.2 W Fox Islands, Aleutian Islands depth about 44 km					
26	Qt	ePKPZ	17	17	28
		e!XZ			34
	epPKPZ			56	
	esPKPZ		18	05	
	iPKPZ		17	35	
	Lh	ePKPZ		43	
	epPKPZ		18	12	
USCGS H 16 58 13.9 15.9 S 72.9 W Southern Peru depth about 115 km					
27	Qt	ePKPZ	02	33	30
		ePKP <sub>2</sub> Z			38
	iPKP <sub>2</sub> Z			42	
	Lh	ePKPZ		42	
USCGS H 02 13 50.6 44.6 S 73.6 W Coast of southern Chile					
depth about 59 km					
27	Lh	ePZ	06	02	54
	Qt	ePZ		03	23 d
	epPZN			43	
USCGS H 05 51 26.9 51.5 N 177.8 E Rat Islands Aleutian Islands					
27	Lh	ePZ	07	28	31
	Wr	iPZ			50
	Qt	ePZ		29	08
	epPZ			29	
	esPNE			42	
	e (S) N*		38	20	
USCGS H 07 17 55.1 00.9 S 134.5 E Western New Guinea depth about 107 km					
27	Ch	ePZ	18	44	42
	Lh	ePZ		46	38 c
	epPZ			47	02
	Wr	iPZ		46	50 c
	Qt	ePZ		47	18 c
	epPZE			41	
	esPZE			51	
USCGS H 18 35 52.2 14.4 N 145.8 E Mariana Islands depth about 109 km					
28	Qt	ePZ	02	37	06



Major Shocks

Date	Station	Phase	h	m	s
29	Qt	ePZ	06	50	04
	Ch	ePZ		52	20
29	Ch	ePZ	11	27	08
		iXZ		28	22
		esPZN*			53
		eSZN*		33	42
	Lh	ePZ	28	48	d
		eSZ		36	46
	Wr	iPZ	28	58	
		iSZ		37	12
	Qt	ePZ	29	25	d
		ePcPZ			47
		epPZ		30	58
		ePPZN		32	08
		iSNEN*		38	03
		eScSN*			37
		esSEN*		40	46
		eSSEN*		42	52
	Kr	ePZ	29	31	±
		USCGS H	11	18	52.9
		18.9 N		144.7	E
		Mariana Islands			
		depth about			469 km
		Mag 6 (Berk),			6½-6½ (Pas)
29	Qt	ePZ	11	56	42
29	Qt	ePKPZ	19	13	37
		USCGS H	18	54	23.0
		14.9 N		90.3	W
		Guatemala			
		depth about			56 km



Date	Phase	h	m	s	Date	Phase	h	m	s
	Quetta								
1	ePZ	03	21	35	4	ePgZ	12	43	14
	eSE		22	00		eSgZN			27
1	eXZ	04	46.0		4	ePZ	13	15	36
1	eXE	10	46.0		4	ePZ	19	45	21
1	eXZ	10	52	46	5	ePZ	09	05	54
1	ePgZ	16	17	32		eSNE			07 13
	eSgN			45	5	ePZ	09	31	35
1	ePZ	16	46	43		eSNE			32 01
	eSN		47	23	5	ePZ	12	25	27
1	ePZ	21	37	39	5	ePgZ	18	25	21 d
	eSE		38	34		eSgEN			37
1	ePZ	22	09	52	5	ePZ	18	59	42
	eSEN		10	18		eSNE			19 01 00
1	ePZ	23	20	23	5	ePZ	20	10	52
	eSEN			47		e(S)E			12 30
2	ePZ	05	09	30	6	ePZ	04	44	28
	eSNE		11	29		eSNE			50
2	ePE	07	29	30	6	eXZ	15	04	25
	eSE			55	6	eXZ	16	09	22
2	ePZ	12	15	34		ePZ	15	51	00
	iSNE			59	6	eSN			32
3	eXZE	07	49	52	6	eXZ	16	09	22
3	eXZ	09	15	37	6	ePZ	17	03	07
4	ePZ	00	42	31		eSNE			04 11
	eSN			58	7	ePgZ	04	31	30
4	ePZ	08	09	37		eSgNE			42
4	ePZ	09	22	11	7	ePgE	12	12	48
	eSE			32		eSgE			13 02
	eSN			36	7	ePZ	13	19	54
4	ePZ	10	20	07		eSNE			20 36



Date	Phase	h	m	s	Date	Phase	h	m	s	Date	Phase	h	m	s	Date	Phase	h	m	s
7	ePZ	13	26	03	13	ePZ	16	07	05	19	ePZ	22	29	59.5		eSNE			33
	eSNE			46		eSNE			08 24		eSEN			30 27	25	ePZ			01 37 53
7	ePgZ	23	58	38 d	14	ePZ	02	54	39	20	ePZ	15	23	38	25	ePgZ			15 30 38
	iSgNE			52		eSNE			55 50		eSN			24 51		eSgNE			48
8	ePZ	02	03	33	14	eXE	05	17	30	20	ePgZ	17	07	10		ePgZ			16 16 41.2
	eSE			04 12	14	ePZ	17	30	08		eSgZNE			20	25	eSgNE			52.8
8	ePZ	20	22	59	15	ePZ	07	23	41	20	ePZ	19	33	39	26	ePZ			20 59 31.6
9	ePZ	14	29	11		eSN			24 07		eSNE			35 00		eSNE			39.5
10	ePZ	03	49	07	15	ePZ	09	16	59	20	ePZ	19	41	08	27	eXZ			09 24 37
	eSNE			50 48	15	ePZ	13	14	11	21	ePZ	01	39	02	27	eXZ			10 17 39
10	ePZ	07	08	17	16	ePgZ	02	14	55		iSNE			23	27	eXZ			12 20 39
	eSNE			39		eSgZ			56	21	ePZ	08	07	34	27	ePZ			15 16 55
10	ePZE	11	56	30	16	ePgZ	06	39	52		eSZNE			09 00	27	eSN			17 45
	eSNE			57 35		eSgZ			54	21	ePZ	19	49	51	28	ePZ			10 01 10
10	ePZE	16	05	34	16	ePZN	20	25	34		eSN			50 01		eSN			37
11	ePE	05	25	32		eSN			58	22	ePZ	06	36	27	28	eXZ			20 36 14
	eSE			55	17	ePgZ	12	04	19		iSNE			51	28	ePZ			05 47 17
11	ePE	15	28	23		eSgN			26	23	ePZ	02	38	13	29	eSNE			42
	eSE			29 53	18	ePZ	01	05	37		eSNE			39	29	ePZ			12 21 41
12	ePgZ	02	31	07		eSE			06 06	23	ePZ	15	54	27					
	eSgN			16	18	eXZ	16	37	31	23	ePZ	18	07	20					
12	ePgZ	02	55	56	18	ePZ	16	39	12	23	ePZ	20	36	21					
	eSgE			56 07		eSN			52	23	eSN			47	1	ePN			09 16 41
12	ePZ	03	37	32	18	ePgZ	18	30	27	23	ePZ	20	53	07		eSN			17 18
	eSE			38 14		eSgN			29	23	eSgE			17	2	ePN			14 39 45
12	eXZ	14	43	02	18	ePZ	22	43	54		ePZ	00	49	04		eSN			40 15
12	ePgZ	21	05	52		eSZN			44 14	24	ePZ			40	2	ePN			22 14 06
	eSgNE			06 01	18	eXZ	23	22	32	24	eSE	12	30	46	3	ePN			06 46 43
13	ePgNE	09	17	39.9	18	ePgZ	23	36	26		ePZ			31 12		eSN			47 29
	eSgE			43.0		eSgNE			42	24	ePZ	16	50	08	3	ePN			07 32 39



Date	Phase	h	m	s	Date	Phase	h	m	s	Date	Phase	h	m	s	Date	Phase	h	m	s				
	eSN		33	08		iSZ			31	19	ePZ	07	53	01		iSZ			16	16			
3	ePN	07	47	25	14	iPZ	04	36	34		eSZ			37	26	ePZ			09	08	28		
	eSN		48	00		iSZ			37	19	iPgZ	14	22	49 d		iSZ					09	00	
3	ePN	16	33	05	14	ePZ	13	01	35		iSgZ			51	27	iPZ			07	28	50 c		
5	ePN	09	04	55	14	ePZ	19	57	41	20	ePZ	06	19	39	27	ePZ			10	16	55		
5	ePN	18	58	51		eSZ			59		eSZ			20	10	iSZ					17	11	
	eSN		59	28	14	ePZ	21	18	49	20	iPgZ	09	21	16 d	27	ePZ			12	19	52		
5	ePN	20	09	46		eSZ			19	23	iSgZ			26		iSZ					20	52	
	iSN		10	29	15	ePZ	01	21	53	20	ePZ	15	22	45	27	iPgN			12	08	03 d		
6	ePN	05	58	37	15	ePZ	01	37	36		iSZ			23	20	iSgN						05	
	eSN		59	03		eSN			38	44	iPZ	19	32	38	27	iPgN			13	08	09 d		
6	ePN	15	24	52	15	ePN	07	54	39	20	iSZ			33	11	iSgN						11	
	eSN		25	29	15	ePN	12	58	25	21	ePN	08	06	35	27	iPZ			15	34	42 c		
	ePN	02	03	38	15	ePZ	23	15	51		iSZ			07	04	iSZ						35	54
8	eSN		04	20		eSZ			16	30	iPZ	11	39	46	29	ePZ			00	38	06		
8	ePN	11	17	31	16	iPZ	12	32	56 d	23	iPZ	07	17	01		iSZ							31
8	ePN	20	23	07		iSZ			33	27	iSZ			30	29	ePZ			16	42	14		
	eSN		46		17	ePZ	01	25	53	23	ePZ	11	28	41		eSZ							43
10	ePN	14	28	48		eSN			26	19	eSZ			29	12	ePZ			16	17	15		
	eSN		29	17	17	ePgZ	05	47	51	23	iPZ	12	53	39 c	30	iSZ							49
10	ePN	15	52	18		iSgZ			48	07	eSZ			54	12	ePZ			18	21	13		
11	ePgN	12	12	37	17	ePZ	19	49	25	23	ePZ	15	35	48	30	iSZ							50
	eSgN		48		17	ePZ	22	46	29	23	ePZ	21	12	12		iSZ							
11	ePN	15	27	18		iSZ			59		eSZ			51									
	eSN		57		18	ePZ	06	53	11	23	iPZ	23	36	29 c									
12	ePN	10	52	12	18	ePZ	14	38	12		iSZ			58	3	eXZ			16	00	46		
	eSN		37		18	iPZ	23	20	19 d	24	ePZ	04	38	34	4	eSN			00	04	21		
12	ePN	12	05	53		iSZ			49		iSZ			39	05	ePZ			15	34	01 c		
13	ePZ	12	11	58	19	ePgZ	01	10	30	25	ePZ	08	33	35	7	eXZ			14	49	19		
13	iPZ	16	06	01 d		eSgZ			39	25	iPZ	10	15	05	8	eXZ			23	22	23		

Lahore



Date	Phase	h	m	s	Date	Phase	h	m	s	Date	Phase	h	m	s	Date	Phase	h	m	s
9	eXZ	15	17	57		eSgE				35	22					eXZ	22	49	38
13	ePZ	16	07	21							26					eXZ	11	43	52
	eSZ			41		Chittagong					26					eXN	17	20	53
14	e(P)Z	16	11	51	1	eXN	12	20	30		27					eXZ	07	27	11
15	e(P)Z	18	36	45	2	eXN	18	56	50		29					eXZ	00	41	19
23	eXZ	16	38	52	3	eXN	00	28	49		30					eXN	06	57	01
24	eXZ	18	37	44	4	eXN	05	38	13		30					eXN	15	07	26
24	eXZ	21	29	10	4	eXZ	13	07	01										
26	eXZ	00	52	00	4	ePZ	17	17	42										
26	eXZ	01	14	20	5	ePZ	01	31	27										
27	ePZ	12	19	18	6	eXZ	12	45	51										
	iSZ			57	6	ePZ	16	37	13										
28	eXZ	20	12	55	7	eXZ	01	31	05										
28	eXZ	22	12	37	9	eXZ	16	41	17										
29	ePZ	14	40	48	10	eXZ	00	29	58										
29	ePZ	22	01	05	12	eXZ	16	13	30										
30	e(P)Z	18	10	55	12	iPZ	23	24	32										
	<b>Karachi</b>				13	ePZ	05	06	13										
11	eXZ	03	38	50	14	eXZ	16	09	57										
	eSE			58	15	eXZ	05	11	18										
12	eXE	03	44	51	15	ePZ	07	46	53										
	eSE			57	16	eXN	14	18	08										
17	eXZ	08	17	15	16	eXZ	21	45	42										
20	ePZ	08	15	16	18	eXZ	19	41	21										
	iSE			33	19	eXN	01	51	56										
22	ePZ	03	19	04	20	eXN	07	02	01										
	eSE			21	20	eXZ	10	40	03										
29	eXZ	06	50	05	21	ePZ	05	05	58										
29	ePgZ	08	28	25	21	eXZ	16	07	38										