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PAKISTAN METEOROLOGICAL SERVICE

GEOPHYSICAL INSTITUTE

QUETTA

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Vol. 6

October 1960

No. 10

CONTENTS

1.	Particulars of Stations and Instruments	...	1
2.	Major shocks	...	3
3.	Local and Minor shocks	...	21

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	Cretaceous 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
Quetta (Central Station)				
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.)

Major Shocks

Date	Station	Phase	h	m	s
		Sandwich Is and depth about 77 km			
2	✓ Qt	ePKPZ	12	13	42
		USCGS H 11 53 44			
		38.7 S 91.5 W			
		Pacific Ocean			
		Southwest of Easter Island			
		depth about 84 km			
×2	Ch	ePZ	16	39	28
	Wr	ePZ	42	20	
	Qt	ePZ			36
		USCGS H 16 32 06			
		3.1 N 127.7 E			
		Molucca Passage			
		depth about 31 km			
2	✓ Ch	ePZ	18	09	22
		ePPN*			30
		ePPPN*			37
		esPN*			49
		eSN*	10	17	
		eSSN*			29
	✓ Wr	iPZ	13	41	d
	✓ Qt	ePZ			57 d
		USCGS H 18 08 12.4			
		18.6 N 94.9 E			
		Burma			
		depth about 104 km			
×2	Qt	ePZ	20	01	29 d
		iSZNEN*			55
×2	Wr	iPZ	23	26	15



Major Shocks

Date	Station	Phase	h	m	s
		38.7 S 75.3 W			
		Near coast of Southern Chile			
		depth about 43 km			
×3	Ch	ePZ	10	21	19
		epPZ			25
		ePcPZ	22	35	
		ePPZ	23	17	
		eSN*	28	16	
	Wr	iPZ	23	37	d
	Qt	ePZ			53 d
		USCGS H 10 12 07.8			
		3.3 S 137.8 E			
		Western New Guinea			
		depth about 29 km			
×3	Lh	ePZ	17	23	05 c
	Wr	iPZ			21 c
	Qt	ePZ			37 c
		USCGS H 17 10 56.2			
		8.1 S 152.8 E			
		D'Entrecasteaux Island			
		depth about 100 km			
3	✓ Ch	ePZ	19	56	58
	✓ Lh	ePZ			59 09 c
	✓ Wr	ePZ			38 c
		ipPZ			50
	✓ Qt	ePZ			39 c
		epPZ			50
		ePPZNE	20	01	30
		eSN*			06 44

Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
	USCGS H 16 19 15.4						USCGS H 03 15 34.9				
	52.2 N 107.2 E						58.1 N 31.9 W				
	Lake Baikal region						North Atlantic Ocean				
	depth about 46 km						depth about 71 km				
6	✓Qt	ePKPZ	16	36	19 d	7	✓Ch	ePZ	15	27	09
		ePKP ₂ NE			27			ipPZ			22
	✓Wr	ePKP ₂ Z			34			esPZN*			32
	✓Lh	ePKPZ			28			ePcPZN*	28	34	
	USCGS H 15 16 37.6							ePPZN*		59	
	38.3 S 74.9 W							eSN*	34	04	
	Near coast of southern							ePSZN*		21	
	Chile						✓Lh	esSZ		27	
	depth about 53 km							ipZ	29	19	o
×6	Qt	ePZ	16	53	47		✓Wr	ePKPPKPZ	57	36	
	USCGS H 16 45 09.1							ipZ	29	40	o
	5.7 S 103.0 E							eSE	38	43	
	Off coast of Sumatra						✓Kr	ePKPPKPN	57	50	
	depth about 167 km							ePZ	29	40	
<6	Qt	ePZ	18	14	26 d			eSE	38	49	
×6	Qt	ePZ	19	03	16			Mu			Sec
6	✓Wr	ePZ	20	06	40			PZ 3.6	1.6		
	✓Qt	ePZ			47		✓Qt	Δ = 70°.2			
		ePPZE	09	21				ipZ	15	29	53 o
		eSN*	15	49				ipcPZN	30	05	
	✓Ch	ePZ	08	26				ipPZ		13	
	USCGS H 19 55 42.2							iXZ		20	
	58.2 N 31.6 W							ePPZNE	32	25	
	North Atlantic Ocean							iSNN*	39	06	
	depth about 63 km							isSN*		35	
7	✓Qt	ePZ	03	26	39			iScSEN*		55	
								e(PKPPKP)Z	57	24	



Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		Mu			Sec			isSN*			07 36
		PZ 7.3			1.7			iSSN*			56
		Δ = 72°.1						iScSN*			08 27
	USCGS H 15 18 30.8						✓Wr	ipZ			00 39 d
	7.4 S 130.7 E							iSZ			06 45
	Banda Sea						✓Qt	iXN			08 22
	depth about 45 km							ipZ			01 17 d
	Mag 6½ - 6¾ (Berk),							iXZN			02 09
	6¾-7 (Pal) 7.2 (Kr),							ipcPZ			23
	7.3 (Qt)							ipPZ			03 14
<7	Qt	ePZ	19	56	11			i!PPZNE			28
×7	Qt	ePKPZ	20	21	24			isPZ			04 19
	USCGS H 20 01 32.6							ipPPZE			39
	20.4 S 113.7 W							ipcSNE			08 12
	Easter Islands region							iXZ			18
	depth about 203 km							i!SNEN*			07 51
	Mag 5¼ - 5½ (Pal)							i!ScSNE			10 01
8	✓Wr	ePKPZ	02	10	52			iXN*			14
	✓Qt	ePKPZ			58			iSSNEN*			11 46
		ePPZEN*			13 24			Mu			Sec
		ePKSZNEN*			14 24			PZ 7.4			1.5
	USCGS H 01 51 51.2							PPZ 2.3			1.7
	16.7 N 97.9 W							Δ = 51°.3			
	Oxaca, Mexico						✓Kr	ipZ			06 01 35 d
	depth about 74 km							epPZ			03 31
	Mag 4¾ - 5 (Pal)							eSE			08 29
8	✓Ch	ipZ	05	59	26 d			Mu			Sec
		ipPN*			06 01 05			PZ 7.3			1.2
		ipPZN*			12			Δ = 54°.1			
		i(S)Z			04 20			USCGS H 05 53 01.1			
		iSN*			26						

Major Shocks

Date	Station	Phase	h	m	s
	40.0 N 129.7 E				
	Sea of Japan				
	depth about 608 km				
	Mag 6 $\frac{1}{4}$ - 6 $\frac{1}{2}$ (Berk),				
	6 $\frac{1}{2}$ - 6 $\frac{3}{4}$ (Pas),				
	6.9 (Qt), (Kr)				
$\times 8$	Qt	ePZ	06	30	33
	Wr	ePN		31	26
$\times 8$	Qt	ePZ	12	04	26 c
$\times 8$	Qt	ePZ	14	03	00 c
	USCGS H 13 54 03.3				
	42.7 N 19.6 E				
	Yugoslavia				
	depth about 24 km				
8	\checkmark Ch	ePZ	20	43	35
		eSN*		46	22
	\checkmark Kr	ePZ		46	10
	\checkmark Wr	ePZ			36
	\checkmark Qt	ePZ			40 c
		epPZ		47	04
		ePPZN			57
		ePPZE		48	21
		eXNN*		51	41
		iSN*		52	03
		esSNE			40
		eSSNE		54	20
		Mu Sec			
	PZ	0.7	1.8		
	$\Delta = 34^\circ.9$				
	H 20 39 56				

Date	Station	Phase	h	m	s
	7 N 94 E				
	Nicobar Islands				
	depth about 100 km				
	USCGS H 20 40 06.6				
	7.9 N 92.9 E				
	Nicobar Islands				
	depth about 84 km				
	Mag 6.2 (Qt)				
9	\checkmark Ch	ePZ	09	08	53
		eSN*		15	28
	\checkmark Lh	ePZ		09	53
	\checkmark Wr	iPZ			59 d
		iSZ		17	30
	\checkmark Qt	i!PZNE		10	36 d
		ipPZNE		11	17
		iPcPZN			33
		iXZ		12	16
		ePPZNN*			50
		i!SZNN*		18	40
		isSNEN*		19	44
		i!ScSNEN*		20	17
		eSSNE		22	53
		ePKPPKPZ		40	03
		Mu Sec			
	PZ	6.0	1.9		
	PN	2.7	1.7		
	PE	2.6	1.6		
	SN	14.0	3.0		
	SE	8.3	3.0		
	$\Delta = 60^\circ.4$				



Major Shocks

Date	Station	Phase	h	m	s
	\checkmark Kr	i!PZ	09	10	53 d
		eSE		19	11
		Mu Sec			
	PZ	5.0	1.7		
	$\Delta = 62^\circ.8$				
	USCGS H 09 00 42.0				
	40.8 N 141.2 E				
	Near coast of northern				
	Honshu, Japan				
	depth about 155 km				
	Mag 6 (Pal), 6 $\frac{1}{4}$ (Pas),				
	7.2 (Qt), (Kr)				
9	\checkmark Qt	ePKPZ	10	10	08
	USCGS H 09 51 19.1				
	15.1 S 174.0 W				
	Samoa Islands region				
	depth about 129 km				
$\times 9$	Qt	ePZ	13	15	37
	USCGS H 13 07 16.6				
	40.2 N 129.9 E				
	Sea of Japan				
	depth about 510 km				
$\times 9$	Qt	ePZ	15	34	05
$\times 9$	Qt	ePZ	21	48	30
$\times 10$	Wr	iPZ	21	54	34
	Qt	ePZ			39
$\times 10$	Qt	ePZ	23	48	22
$\times 11$	Qt	ePZ	18	34	56
		ePcPZ		36	30
		ePPNE			52

Date	Station	Phase	h	m	s
		eSN*		41	40
	Lh	ePZ		35	07
	USCGS H 18 26 36.6				
	16.1 S 67.1 E				
	Mascarene Islands region				
	depth about 100 km				
$\times 12$	Lh	ePZ	00	31	15
	Wr	iPZ			22 d
	Qt	ePZ			59 d
	USCGS H 00 22 02.1				
	40.9 N 140.8 E				
	Near coast of Honshu,				
	Japan				
	depth about 100 km				
$\times 12$	Qt	ePZ	10	07	54
	USCGS H 09 56 08.2				
	2.1 S 140.5 E				
	Near coast of New Guinea				
	depth about 19 km				
$\times 12$	Qt	ePZ	12	33	40
$\times 12$	Lh	ePZ	17	23	02
	Wr	ePZ			23 c
	Qt	ePZ			37 c
	USCGS H 17 12 24.7				
	6.8 S 130.1 E				
	Banda Sea				
	depth about 25 km				
$\times 12$	Wr	ePZ	18	41	50
	USCGS H 18 29 35.1				
	6.1 S 148.6 E				

Major Shocks



Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		New Britain region						ePcPZ	04	04	
		depth about 119 km						ePPZN	06	09	
13	✓Qt	ePZ	02	28	07			ePPPZ	07	46	
		ePPZ	29	29				eSNEN*	12	31	
		eSNE	33	31				esSNE		44	
	✓Wr	iPZ	28	15				ePSNE	13	01	
		USCGS H 02 21 12.7						ePPSE		07	
		45.2 N 25.8 E						eScSNE		28	
		Rumania						ePKPPKPZ	31	52	
		depth about 63 km						Mū Sec			
×13	Qt	ePZ	06	10	14			PZ 0.2 1.0			
		USCGS H 04 59 06.8						Δ = 68°·4			
		North of Crozet Islands						✓Kr ePZ	15	04	02±
		depth about 31 km						USCGS H 14 52 34.7			
13	✓Ch	ePZ	15	02	47			54.8 N 161.2 E			
		epPZN*			57			Kamchatka			
		esPZN*	03	01				depth about 35 km			
		ePcPZN*			31			Mag 6 $\frac{3}{4}$ (Pas),			
		ePPZN*	05	05				6 $\frac{1}{4}$ - 6 $\frac{1}{2}$ (Berk), 6.3 (Qt)			
		ePPPN*	06	34		×13	Qt	ePZ	16	57	09
		eSN*	11	02				USCGS H 16 45 56.2			
		esSZN*			1			20.7 N 144.8 E			
		ePSZN*			22			Mariana Islands region			
		ePPSZN*			30			depth about 25 km			
		eScSN*	12	32		×13	Ch	ePZ	18	50	43
		ePKPPKPZ	32	12			Lh	ePZ		52	29
	✓Wr	ePZ	03	00			Wr	iPZ			45d
	✓Lh	ePZ			01		Qt	ePZ			53 01d
	✓Qt	ePZ			36 c			USCGS H 18 40 30.3			
		epPZ			46			3.8 S 152.4 E			

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		New Ireland region						ePZ	01	05	03
		depth about 213 km						ePZ		08	02
×14	Ch	ePZ	01	05	03			USCGS H 00 58 05.0			
	Qt	ePZ						10.1 N 125.8 E			
		Near coast of Leyte						Philippine Islands			
		depth about 17 km						USCGS H 11 33 14.0			
×14	Qt	ePZ	01	18	33			52.1 N 166.1 W			
×14	Qt	ePZ	11	45	49			Fox Islands			
		Aleutian Islands						depth about 64 km			
×64	Wr	ePZ	12	25	04			USCGS H 12 16 30.5			
	Qt	ePZ			06			4.7 S 103.1 E			
		Near coast of Sumatra						depth about 159 km			
×14	Wr	iPZ	13	24	35			USCGS H 13 12 07.8			
	Lh	ePZ			45			59.8 N 136.4 W			
	Qt	ePZ			59			Southeastern Alaska			
	Ch	ePZ			25 05			depth about 32 km			

Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
	ePPSN*				48	✓	Qt	ePZ	07	05	d
	eSSN*		45	42				epPZ			13
✓	Wr	ePZ	31	08				ePPZ	09	46	
✓	Lh	ePZ			12 d			Mu	Sec		
✓	Qt	ePZ			37			PZ 0.4	2.0		
	iPcPZNE				40			$\Delta = 72^\circ.1$			
	epPZE				51	✓	Lh	ePZ	23	07	20
	ePPZE		34	50		✓	Ch	ePZ			08 45
	ePPPZ		36	38				USCGS H 22 55 41.7			
	iSNEN*		41	55				55.5 N 35.2 W			
	eScSNE		42	03				North Atlantic Ocean			
	isSNN*				16			depth about 40 km			
	eSSEN*		47	36				Mag 6.2 (Qt)			
	iLN*		53	9		✗	14	Qt	ePZ	23	15 01
	ePKPPKZ		57	54		✓	15	Qt	ePZ	02	05 35
	Mu	Sec						USCGS H 01 54 09.2			
	PZ 0.5	1.5						55.6 N 35.6 W			
	PPZ 0.3	2.0						North Atlantic Ocean			
	$\Delta = 83^\circ.8$							depth about 37 km			
✓	Kr	ePZ	21	31	57	✗	15	Ch	ePZ	11	36 04
	epPZ				32 07			Wr	ePZ		38 27
	eSE				42 39			Qt	ePZ		39 01
	esS				34			USCGS H 11 30 02.1			
	USCGS H 21 19 11.4							23.1 N 123.4 E			
	51.7 N 172.1 W							Off coast of Formosa			
	Fox Islands							depth about 60 km			
	Aleutian Islands										
	depth about 50 km					✗	16	Qt	ePZ	01	47 29
	Mag 6.1 (Pas), (Berk),							USCGS H 01 35 57.4			
	(Pal), (Qt)							53.0 N 172.1 E			
14	✓	Wr	ePZ	23	06 59			Near Island			



Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		Aleutian Island						Off coast of Chile			
		depth about 97 km						depth about 60 km			
✗	16	Qt	ePKPZ	09	53 50	17	✓	Wr	ePKPZ	16	04 46
		Ch	ePKPZ		54 11		✓	Qt	ePKPZ		47
		USCGS H 09 34 00.9						epPKPZ			05 12
		9.4 N 90.6 W						eXZNE			07 01
		Off coast of Nicaragua						ePKSNEN*			08 14
		depth about 25 km					✓	Ch	ePKPZ		05 28
		Mag 5 (Pal)						USCGS H 15 45 36.9			
✗	16	Ch	ePZ	18	05 24			4.8 N 78.4 W			
		USCGS H 17 53 26.6						Off coast of Colombia			
		63.0 N 151.7 W						depth about 83 km			
		Central Alaska						Mag 4.3 (Pal)			
		depth about 100 km				✗	17	Qt	ePZ	18	18 25
		Mag 5 (Pal)						USCGS H 18 05 32.7			
✗	16	Wr	ePZ	19	30 14			30.7 N 40.4 W			
		Qt	ePZ		45			Atlantic Ocean			
		USCGS H 19 20 39.6						depth about 65 km			
		52.4 N 163.4 E									
		Kurile Island				17	✓	Qt	ePZ	19	15 10 o
		depth about 324 km						USCGS H 19 02 20.9			
								31.7 N 40.7 W			
✗	17	Wr	iPZ	05	34 40 d			Atlantic Ocean			
		iSN			35 11			depth about 47 km			
		Qt	ePZ		39 d	17	✓	Qt	ePKPZ	22	34 37
		iSNE			36 56			eXZ			36 13
		H 05 33 58						ePKSNEN*			38 05
		Afghanistan						USCGS H 22 15 32.3			
✗	17	Qt	ePKPZ	13	56 32			14.6 N 92.8 W			
		USCGS H 13 36 35.5						Mexico - Guatemala			
		39.6 N 88.5 W						border			

Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		depth about 128 km Mag $5\frac{3}{4}$ - 6 (Pal)				X19	Wr	eSE ePZ	17 53 04 11 23		
X18	Qt	ePKPZ	00	18	43		Qt	ePZ			23
		USCGS H 00 00 56.7 25.3 S 178.4 E South of Fiji Islands depth about 636 km.						eSNE	15 39		
X18	Qt	ePZ	00	34	17 d	X19	Qt	H 04 06 04 Bay of Bengal ePKPZ	10 51 52		
		USCGS H 00 21 47.2 52.5 N 170.2 W Fox Islands Aleutian Islands depth about 33 km Mag $4\frac{3}{4}$ - 5 (Pal)						USCGS H 10 32 02.3 55.1 S 129.9 W South Pacific Ocean depth about 100 km			
X18	Wr	ePZ	10	29	13	X20	Wr	iPZ	03 20 41 c		
	Qt	ePZ	30	22	c		Qt	iSN	21 14		
		epPZ	44					ePZ	36		
		eSNEN*	33	06				eSZNE	22 53		
		eLN*	34	0		20	Ch	H 03 19 55 Afghanistan	11 18 01		
Kr	ePZ		31	20	c			ePcPZ	10		
Ch	ePZ		55	c				ePPZ	21 02		
		H 10 26 53 42 N 78.5 E Kirghiz, S. S. R. depth about 60 km USCGS H 10 26 52.6 42.1 N 78.3 E Kirghiz, S. S. R. depth about 75 km						eSN*	27 56		
X18	Qt	ePZ	17	16	02			eScSN*	28 27		
								ePKPPKPZ	44 57		
							Wr	ePZ	19 37		
							Qt	ePZ	53		
								eXZ	23 07		
								eSKSNEN*	30 37		
								eSSN*	39 00		
								USCGS H 11 05 58.3 11.0 S 164.9 E			



Major Shocks

Date	Station	Phase	h	m	s	Date	Station	Phase	h	m	s
		Santa Cruz Islands depth about 40 km Mag $5\frac{1}{2}$ - 6 (Pas), $6\frac{1}{4}$ (Pal)				X20	Qt	ePZ	11 35 57		
X20	Ch	ePZ	02	03	34	X20	Wr	ePZ	06 40		
							Qt	ePZ	45 c		
X21	Ch	ePZ	06	33	33			USCGS H 06 25 20.5 6.9 S 127.6 E Banda Sea depth about 134 km			
						22	Ch	ePZ	08 33 37		
								ePcPZ	51		
								ipPZ	34 04		
								ePPZN*	36 30		
								eSZN*	43 10		
								eSKSN*	30		
								eScSN*	38		
								eSN*	44 02		
								ePKPPKPZ	09 01 02		
							Wr	ePZ	08 35 17		
							Qt	ePZ	33		
								ePPZ	39 43		
								eSKSNEN*	46 00		
								iSN*	54		
								ePSN*	48 38		
								ipPSEN*	45		
								eSSN*	53 45		
								USCGS H 08 22 00.9 10.3 S 161.2 E Solomon Islands region depth about 93 km Mag 6 (Pal), $6\frac{1}{4}$ - $6\frac{1}{2}$ (Berk), $6\frac{3}{4}$ -7 (Pas)			
X22	Qt	ePZ	22	34	23			USCGS H 22 22 19.8 4.6 S 144.3 E Near coast of New Guinea depth about 170 km			
23	Qt	ePZ	06	45	15			USCGS H 06 32 24.9 31.2 N 40.7 W Atlantic Ocean depth about 61 km			
X23	Qt	ePZ	11	53	27						
X23	Qt	ePZ	18	56	41						
X23	Qt	ePZ	19	27	00 c						
	Wr	ePZ			43						
X23	Qt	ePZ	22	16	44						
X24	Qt	ePZ	04	07	12						
24	Ch	ePZ	05	24	18						
		epPZ			25 01						
		eSN*			34 27						
		USCGS H 05 12 04.4 15.0 S 167.4 E New Hebrides Islands region depth about 145 km									

Major Shocks

Date	Station	Phase	h	m	s
	✓Wr	ePKPZ	52	17	
	✓Lh	ePKPZ		28	
		epPKPZ		44	
		isPKPZ		56	
USCGS H 22 32 47.7					
22.8 S 68.0 W					
Chile-Bolivia border					
depth about 60 km					
Mag 6½ (Pas)					

Minor Shocks

Date	Phase	h	m	s	Date	Phase	h	m	s
	Quetta					eSN			39.02
1	eXZ	16	07	0	3	ePZ	03	41	10
2	ePZ	01	06	28		eSNE			28
	eSNE		07	35	3	ePZ	04	27	26
2	ePZ	04	27	57		eSN			42
	eSZNE		28	26	3	eXZ	04	36	0
2	ePZ	13	20	01	3	ePZ	05	32	05
	eSNE			28		eSNE			23
2	ePZ	20	20	29	3	eXZ	05	36	0
	eSNE			55	3	eXZ	09	45	0
2	ePZ	22	57	53	3	ePZ	10	58	00
	eSZNE		58	17		eSN			18
2	ePZ	23	40	46	3	eXZ	11	02	0
	eSZN		41	14	3	eXZ	12	45	0
3	ePZ	00	36	47	3	ePZ	13	47	50
3	eXZ	00	58	0		eSZN			48 07
3	ePZ	01	01	14	3	eXZ	14	17	0
	eSZ			34	3	ePgZ	16	14	22.4
3	eXZ	01	07	0		eSgZE			23.9
3	ePgZ	01	08	22	3	ePE	20	02	54
	eSgZ			37		eSE			03 12
3	ePZ	01	32	44	3	ePgE	21	59	39.0
	eSNE		33	03		eSgE			41.1
3	ePZ	01	52	06	3	ePE	21	40	58
	eSNE		53	01		eSE			41 16
3	ePZ	02	07	23	4	ePgZ	00	25	53
	eSN			40		eSgNE			55
3	ePZ	02	52	20	4	ePE	02	34	38
	eSENE			38		eSN			55
3	ePZ	03	38	44	4	ePgE	04	56	20

Date	Phase	h m s	Date	Phase	h m s
	eSgE	36		eSE	47
4	ePE	15 00 50±	6	eXE	05 54.0
	eSE	01 27	6	eXE	06 01.0
4	ePE	16 33 51	6	eXE	06 30.0
	eSE	34 09	6	ePE	06 44 44
4	eXE	18 22.0		eSE	45 06
4	eXE	18 31.0	6	eXE	07 41.0
4	eXE	21 38.0	6	eXE	16 20.0
5	ePZ	02 13 00	6	ePZE	16 25 05
5	ePZ	02 28 04		eSE	27
5	iPgZN	10 53 43 d	6	ePgZE	16 45 30
	iSgN	46		eSgE	34
5	eXZ	11 26.0	6	ePE	21 11 44
5	ePgE	14 35 48.9		eSNE	12 01
	eSgE	51.0	6	eXZ	23 02 54
5	e(P)E	15 33 09	6	ePZ	23 14 09
5	ePgE	20 14 11.5	7	iPgZ	00 37 58
	eSgN	15.8		iSgE	38 11
5	eXZ	21 04.0	7	eXZ	02 29 40
5	ePgZ	21 33 42.0	7	ePZ	11 02 37
	eSgE	46.7	7	ePZ	11 13 09
5	ePZE	21 48 49	7	ePE	14 51 24
	eSE	49 11		eSZNE	45
5	ePE	22 32 57	7	ePgZE	15 23 08
	eSE	33 15		eSgE	12
5	ePE	22 46 19	7	ePZN	19 30 39
	eSNE	45		eSE	55
5	eXZ	23 21.6	7	ePE	20 26 27
6	eXZ	00 11 53		eSE	51
6	ePE	05 35 29	8	eXNE	06 46 23

Date	Phase	h m s	Date	Phase	h m s
8	ePZE	09 49 23	11	eXZE	22 28.0
	eSEN	50	12	ePZ	00 13 59
8	ePgZE	12 42 03		eSEN	14 17
	eSgZE	13	12	eXZ	01 28.0
8	ePgZE	21 40 46.3	12	eXZ	02 06.0
	eSgNE	51.5	12	eXZ	04 23.0
9	eXE	03 13.0	12	eXZ	08 45.0
9	eXE	04 29.0	12	ePZ	10 07 54
9	eXE	16 54.0	12	ePgZ	12 45 18
9	ePgZE	17 19 39		eSgNE	
	eSgNE	50	12	eXZ	12 52 17
10	ePZ	00 35 47	12	ePZE	17 11 44
10	ePgE	07 17 47	12	e(P)Z	21 13 30
	eSgNE	59	12	ePZE	22 15 40
10	ePZ	12 21 00		eSNE	16 50
	eSNE	19	13	iPgZ	02 52 18.4
10	ePZE	19 13 34		eSgZ	31.4
	eSNE	14 02	13	ePZE	03 30 10
10	ePZE	19 28 01		eSE	35
	eSNE	19	13	eXE	03 41.0
11	ePE	05 03 08	13	ePZE	04 14 52
	eSE	27		eSNE	15 53
11	eXE	06 05.0	13	ePZ	06 10 14
11	eXZE	08 06.0	13	ePZE	16 38 31 c
	eXZ	14 43.0		eSZNE	39 02
11	eXE	16 39.0	13	ePgZ	19 46 19
	ePE	19 43 48		eSgNE	32
11	eSE	44 05	13	ePZ	22 00 05
11	ePZE	20 55 45		eSNE	27
	eSNE	56 01	14	ePZ	02 40 34

Minor Shocks

Minor Shocks

Date	Phase	h m s	Date	Phase	h m s
	eSZNE	59		eSNE	50 46
14	eXZ	03 28.0	16	ePZ	19 38 34
14	eXZ	04 19.0		eSNE	52
14	eXZ	05 25.0	16	ePZ	21 12 12
14	ePZ	04 55 06		eSNE	13 41
14	ePgZ	06 45 00.7	16	eXZ	22 31.0
	eSgZN	10.4	17	ePgZ	09 12 40.
14	ePZ	08 43 41		eSgN	48.
14	ePZ	10 35 32	17	ePZ	17 41 43
	eSN	49		eSNE	42 00
14	ePZN	13 52 28	18	ePgZ	15 15 18.
	eSN	46		eSgZE	23.
14	eXZ	15 35 44	18	ePZ	15 42 39
14	eXZ	16 51 46		eSNE	43 29
14	ePZ	21 03 52	19	ePgZ	07 29 40.
	eSZN	04 09		eSgZN	43.
14	eXZ	21 43.0	19	ePZ	16 40 42
14	ePZ	21 49 55		eSNE	44
14	ePZ	22 36 03	19	ePZ	21 31 51
15	ePZ	00 33 39		eSN	33 05
15	ePZ	01 14 26	20	ePgZ	17 07 04.
	eSZN	43		eSgN	15.
15	ePZ	13 00 39	21	ePZ	10 29 10
	eSN	01 09		eSN	30 57
15	ePZ	18 35 41	22	eXZ	04 28.0
	eSNE	36 14	22	eXZ	04 51.0
15	ePZ	22 51 39	22	ePZ	13 25 57
	eSN	52 11		ePN	27 11
15	ePZ	23 53 43	22	ePZ	16 18 53
16	ePZ	18 49 30		eSNE	20 04

Date	Phase	h m s	Date	Phase	h m s
23	ePZ	12 11 20	26	ePZ	16 20 27
	eSN	50		eSNE	21 46
23	ePZ	16 52 38	27	ePZ	01 33 48
	eSN	53 16		eSN	34 20
23	ePgZ	12 30 31	28	ePZ	01 04 48
	eSgNE	45		eSNE	05 06
23	ePZ	22 55 52	29	ePZ	00 37 57
	eSN	57 01	29	eXZ	07 43 53
24	ePZ	06 29 18	29	ePZ	01 28 17
	eSN	30 07		eSN	43
24	eXZ	08 08	29	eXZ	12 44 58
24	ePZ	09 28 20	29	ePZ	13 37 32
	eSN	57	29	ePZ	15 59 45
24	ePgZ	09 35 20.2	29	e(P)Z	18 15 50
	eSgZ	33.9	29	eXZ	23 31 23
24	ePZ	09 59 40	30	ePZ	10 16 07
	eSN	10 00 10		eSNE	24
24	ePZ	16 22 35	31	ePZ	11 24 20
	eSZNE	58		eSNE	45
24	ePgZ	17 13 46	31	ePZ	13 14 26
	eSgZ	58		eSNE	46
24	ePgZ	20 54 27.0	31	ePZ	19 05 58
	eSgN	29.9		eSNE	06 26
26	eXZ	04 48.0	31	ePZ	20 35 45
26	ePgZ	06 32 33		Warsak	
	eSgN	42	1	ePN	16 33 43
26	ePgZ	07 51 14	2	iPgZ	01 05 16 d
	eSgNE	25		iSgZ	31.9
26	ePZE	14 54 11	2	ePZ	08 51 12
	eSE	34		iSZ	37

Minor Shocks

Date	Phase	h	m	s
3	ePZ	04	01	55
	iSZ		02	24
4	iPN	06	50	18 c
	eSN			51
4	ePZ	10	44	06
	iSZ			37
4	ePZ	14	55	14.6
5	iPN	11	23	50 d
	iSN		24	18
5	ePZ	12	43	04
	eSZ			37
5	ePZ	17	44	29
6	iSZ			55
6	ePZ	04	35	52
	eSZ		36	25
6	ePZ	14	16	05
	eSZ			44
6	ePZ	18	28	53
6	iPZ	18	32	48 c
	iSZ		33	15
7	ePN	15	57	50
7	ePN	20	24	38
	eSN		25	05
8	iPgZ	28	26	37d
	iSgZ			48
10	ePZ	05	26	48
10	ePZ	13	00	48
	eSZ		01	21
10	ePZ	17	02	31
11	iPZ	06	03	55



Minor Shocks

Date	Phase	h	m	s	Date	Phase	h	m	s
17	ePZ	08	53	28		iSN			36
	iSZ			52	23	ePZ	22	02	10
17	ePZ	18	42	40	23	iPZ	22	54	54 d
17	ePZ	23	34	33		iSZ			55 24
18	ePZ	16	05	27	24	ePZ	00	42	32
	eSZ		06	01		iSZ			43 08
18	ePZ	17	14	48	24	iPZ	05	29	48 d
18	ePZ	23	09	05		iSZ			30 19
19	ePZ	12	02	53	24	ePZ	09	22	29
	iSZ		03	26		iSN			41
19	ePZ	19	13	00	24	ePZ	10	00	22
19	iPZ	21	30	57	24	ePZ	15	21	25
	iSZ		31	19		eSZ			22 11
20	ePZ	08	53	28	24	ePZ	12	21	35
	iSZ			57	24	iPZ	20	09	32 c
20	ePZ	09	13	00	25	ePZ	04	24	49
	iSZ			28	25	ePZ	14	50	56
20	ePZ	19	15	52	25	ePZ	19	33	48
	eSZ		16	37	26	ePZ	04	47	13
21	iPZ	06	36	05 d		iSZ			48 10
21	ePZ	10	28	11	26	ePZ	19	32	04
	iSZ		29	14		iSZ			34
21	iPZ	15	31	23 d	27	ePZ	05	01	29
	iSZ			58		iSZ			02 04
22	ePZ	04	16	28	27	iPZ	12	15	01
	iSZ		17	08		iSZ			39
22	ePZ	12	15	33	28	ePZ	00	39	22
	iPZ		13	24 57 d		eSZ			40 52
22	iSN		25	14	28	ePZ	10	51	54
22	iPZ	16	18	04 c	28	ePZ	11	44	18

Minor Shocks

Date	Phase	h m s	Date	Phase	h m s
	iSZ	43	6	eXZ	20 06 11
28	ePZ	12 57 35	7	eXZ	15 57 36
28	ePZ	13 26 55	7	eXZ	20 25 23
	iSZ	27 23	9	ePZ	16 32 37
28	ePZ	13 57 03		eSZ	33 07
28	ePZ	16 25 12	9	ePZ	20 01 16
	iSZ	43	9	eXZ	21 41 51
28	iPZ	20 16 33	10	ePZ	17 02 02
	iSZ	17 09	10	eXZ	23 47 34
29	ePZ	06 25 11	12	eXZ	01 28 57
	iSZ	51	15	eXZ	13 01 36
29	iPZ	15 57 34	15	ePZ	22 50 26
30	iPZ	04 42 49 d		iSZ	44
	iSZ	43 20	16	ePZ	18 50 20
30	ePZ	06 55 23	17	ePZ	05 35 18
	iSZ	50		eSZ	36 14
30	ePZ	08 27 56	17	ePZ	17 43 13
	eSZ	28 29	17	eXZ	22 34 38
30	ePZ	13 44 13	18	eXZ	00 33 33
	iSZ	46	18	ePZ	10 29 19
31	ePZ	01 07 03	18	e(P)Z	17 15 06
	eSZ	35	19	eXZ	04 13 50
31	ePZ	05 08 36	19	ePZ	21 31 45
	iSZ	09 13	20	ePZ	03 21 21
31	iPZ	23 01 48 d		eSZ	22 25
	iSZ	02 14	28	eXZ	04 28 40
31	ePZ	23 56 45	29	eXZ	21 56 14
	Lahore		30	ePZ	11 34 03
2	ePZ	18 11 46	30	ePZ	12 34 21
3	eXZ	05 31 31			



Minor Shocks

Date	Phase	h m s	Date	Phase	h m s
	Karachi		17	eXZ	19 17 30
2	eXZ	18 13 53	19	eXZ	04 12 29
7	eXE	11 02 30	20	eXZ	17 32 16
7	ePZ	23 54 00	23	eXZ	18 54 46
8	eXZ	20 46 11	24	ePZ	05 51 50
13	eXZ	15 04 02	25	eXZ	18 41 12
15	ePZ	13 02 19	26	eXZ	20 03 19
18	eXZ	15 42 06	27	ePZ	14 52 31
24	eXZ	06 28 42	28	eXZ	03 10 17
24	eXZ	10 01 33	28	ePZ	07 57 46
26	ePZ	16 19 31	29	eXN	01 34 42
	eSE	20 22			
28	eXZ	04 29 11			
29	eXE	12 44 18			
	Chittagong				
2	eXZ	02 48 00			
4	eXN	10 02 59			
6	ePZ	16 25 14			
6	eXN	16 55 54			
11	eXZ	18 37 53			
12	eXZ	00 33 25			
12	eXN	12 35 39			
12	ePZ	17 20 37			
14	eXZ	11 45 20			
14	eXZ	12 23 11			
14	ePZ	14 51 21			
14	ePZ	16 47 46			
14	ePZ	21 39 45			
15	ePZ	02 07 00			
16	eXZ	21 42 15			