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中国地震台网观测报告

BULLETIN OF SEISMOLOGICAL
OBSERVATIONS OF CHINESE STATIONS

1982



国家地震局地球物理研究所编

地震出版社出版

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BULLETIN OF SEISMOLOGICAL
OBSERVATIONS OF CHINESE STATIONS

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中国 北京

国家地震局地球物理研究所

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(1982)

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序

1. 《中国地震台网观测报告》是我国地震台网对发生在全世界、特别是发生在中国和邻近地区的地震观测数据的汇编。自1979年起,本报告改用国际协调时UTC,并采用汉语拼音拼写中国地名和人名,外国地名和人名仍沿用英文。

2. 本报告测定震源参数,沿用J-B走时表^[1]。除使用报告中所列台站的数据外,还选用了一部分国内外其它地震台站的P波到时,用计算机进行修定。残差、标准偏差和标准误差分别列于计算结果和参加运算的原始数据之后。震源深度数据符号“S”,表示定位过程中选用了J-B表的表面走时。参数之后加注“*”表示选用了地方台网或国外机构的结果。

每个选定的震中都按Flinn和Engdahl等^[2,3]的分区办法给出相应的地理区。这些地区的界限沿经纬线整度划分,因而有时与国境线不符。应该强调指出,所用地震及地理区域的名称仅作位置的指引,而不包含任何政治意义。对发生在中国的地震,分别注明震中的具体地理位置。

3. 测定面波震级 M_s ,沿用北京台1965年的面波震级公式:

$$M_s = \log(A/T) + 1.66 \log \Delta + 3.50 \quad (1^\circ < \Delta < 130^\circ)$$

测定体波震级 M_B ,采用古登堡-里克特1956年的体波震级公式:

$$M_B = 1.59m - 3.97$$

式中 m 为统一震级

测定近震震级 M_L ,采用里克特的经典方法:

$$M_L = \log A + R(\Delta)$$

式中 A 是地动位移,以 μ 计,量规函数 $R(\Delta)$ 是由李善邦教授确定的。

4. 本报告还摘录了部分国内较大地震的宏观结果,分别附在各地震之后。其中给出的烈度,均按1957年谢毓寿教授所编《新的中国地震烈度表》^[4]标度评定。

5. 汇编《中国地震台网观测报告》采用了国际通用的符号^[5]。为便于使用计算机打印报告,对下列震相和P波初动方向的符号采用了NEIS的地震电报符号暂时予以替代,敬请注意。

PG	代表	$\bar{P}$ 或 P_g	SG	代表	$\bar{S}$ 或 S_g	LG	代表	L_g
PB	代表	P^*	SB	代表	S^*	PU	代表	中长周期仪器记录的+P
AP	代表	${}_pP$	XP	代表	${}_sP$	PR	代表	中长周期仪器记录的-P
			XS	代表	${}_sS$	PC	代表	短周期仪器记录的+P
APKP	代表	${}_pPKP$	XP KP	代表	${}_sPKP$	PD	代表	短周期仪器记录的-P

参 考 文 献

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[3] E. A. 福林, E. R. 恩达尔和A. R. 希尔 1974 地震和地理分区 美国地震学会报告 第64卷 第771页。

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INTRODUCTION

1. The "Bulletin of Seismological Observations Of Chinese Stations" is a summary of the observed data of earthquakes occurring in the whole world, especially in China and its neighbouring regions. Beginning from 1979, the observational times and the times of epicentral estimates are given in UTC. The names of Chinese places and persons are spelt with Chinese phonetic alphabets while foreign names are all given in English.

2. All computation of focal parameters are based on the Seismological Tables by Jeffreys and Bullen^[1]. Besides the data observed at the stations listed in this Bulletin, the P arrivals at some other stations inside and outside China are used for computer revision of the parameters. The residuals, standard deviations and standard errors are listed with the results. The focal depth "S" indicates that travel times for a surface focus are used in positioning earthquake focus. An asterisk after the focal parameters indicates that the results are adopted from local network of stations or foreign agencies.

For each adopted epicenter a geographical region corresponding to that given by Flinn and Engdahl^[2] and Flinn, Engdahl and Hill^[3] is given. The boundaries of these regions follow integral degree lines of latitude and longitude and this system of division leads, on occasion, to discrepancies with state or national frontiers. It should be noted that the names used to classify seismic and geographic regions are meant to be only a guide to their location and in no way to imply any political matter. For earthquakes occurring in China, concrete geographic positions of the epicenters are given.

3. The surface wave magnitude M_s is determined, as usual, with the surface wave magnitude formula (1965) of Beijing Station (BJI)

$$M_s = \log(A/T) + 1.66 \log \Delta + 3.50 \quad (1^\circ < \Delta < 130^\circ)$$

The body wave magnitude M_b is determined with the Gutenberg-Richter formula (1965)

$$M_b = 1.59m - 3.97$$

where m is the unified magnitude.

The local magnitude M_L is determined with the Richter formula (1935)

$$M_L = \log A + R(\Delta)$$

where A is, amplitude of ground motion in μ and $R(\Delta)$ is as determined by Prof. S. P. Lee.

4. In this Bulletin are also included macroseismic phenomena of part of the major earthquakes occurring in China. The intensities listed are evaluated according to the "New Chinese Seismic Intensity Scale" of 1957 given by Prof. Xie

Yushou. [4]

5. The Bulletin is compiled with internationally adopted symbols^[5]. For the convenience of typing out the Bulletin on a computer, the following phases and initial motion symbol of p are represented by the telegraphic symbols used by US National Earthquake Information Service, namely:

P G	represents	$\bar{P}$	or	Pg
P B	represents	P*		
S B	represents	S*		
A P	represents	pP		
A P X P	represents	pPKP		
S G	represents	$\bar{S}$	or	Sg
X P	represents	sP		
X S	represents	sS		
X P K P	represents	sPKP		
L G	represents	Lg		

P U represents + P of the broadband or Long-period record.

P R represents - P of the broadband or Long-period record.

P C represents + P of the short-period record.

P D represents - P of the short-period record.

References

- [1] Jeffreys, H. and Bullen, K. E. , 1940, Seismological Tables, British Association, London, (Reprinted, with additions, 1967).
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一九八二年地震观测资料
汇编工作人员

Compiling personnel of the observed seismological
data in 1982

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LIST OF THE SEISMOLOGICAL STATIONS

Station Name	Code	Geographical Coordinates φ_N			Coordinates λ_E			Altitude h_m	Foundation	Instruments
Baotou (Paotow)	BTO (PT)	40°	35'	54"	110°	01'	06"	1120	Granite- Gneiss	S K, 64
Beijing (Peking)	BJI (PK)	40	02	25	116	10	30	43	Gravel bed	S K, 62, 513
Changchun	CN2	43	48	05	125	26	54	230	Slate	S K, 64, 513
Chengdu (Chengt'u)	CD2 (CU)	30	54	36	103	45	28	628	Conglome- rate	S K 513
Gaotai (Kaotai)	GTA	39	24	38	99	48	52	1341	Granite	S K, 62, DD-1
Guangzhou (Canton)	GZH (CT)	23	05	13	113	20	38	11	Sandstone	S K, DD-1, 513
Guiyang	GYA (HS)	26	27	31	106	39	50	1162	Dolomite	S K, DD-1
Hohhot (Huhehot)	HHC	40	50	58	111	33	49	1169	Rhyolite	S K, DD-1
Kashi (Kashi)	KSH (KS)	39	27	19	75	58	48	1286	Alluvial clay	S K
Kunming	KMI (KM)	25	07	24	102	44	24	1945	Basalt	S K, DD-1
Lanzhou (Lanchow)	LZH (LC)	36	05	12	103	50	40	1560	Lehm	S K, 64, 513
Lhasa	LSA (LS)	29	42	00	91	09	00	3789	Granite	S K
Mudan Jiang (Mutan River)	MDJ	44	36	59	129	35	31	250	Granite	S K, DD-1, 513
Nanjing	NJ2	32	03	06	118	51	16	45	Silicarenite	S K, DD-1, 513
Quanzhou	QZH (CCW)	24	56	35	118	35	30	21	Granite	S K, 64
Sheshan (Sose)	SSE (ZS)	31	05	44	121	11	12	10	Andesite	S K, DD-1
Taian	TIA (TA)	36	12	41	117	07	28	300	Amphibole- Granite	S K, 64, 513
Taiyuan	TIY	37	42	47	112	26	03	850	Limestone	S K, DD-1, 64
Urumqi (Urumchi)	WMQ (UM)	43	49	16	87	41	42	970	Sandstone	S K, 62
Wuhan (Wuchang)	WHN (WC)	30	32	37	114	21	01	26	Silicarenite	S K, DD-1
Xian (Sian)	XAN (SA)	34	02	22	108	55	17	630	Granite	S K, DD-1, 513

* The Code CD2 for Chengdu has been used since 1. Oct 1980 instead of CDU, because of the shift of the station.

仪器常数

Constants of Seismographs

台站代号 station Code	仪器型号 type of Instruments	分 向 Comp.	T_1	T_2	D_1	D_2	σ^2	V_0	r_1	R_v mm/min	记 录 方 式 Recorder Type
BTO	SK	N-S	12.5	1.2	0.45	4.9	0.109	2.07×10^3		30	照 像 纸
		E-W	12.5	1.2	0.45	5.1	0.092	1.70×10^3			
		U-D	12.5	1.2	0.63	5.1	0.383	1.16×10^3			Photo paper
	64 (473)	N-S	1.5		0.5			5.64×10^4		120	熏 烟 纸
		E-W	1.5		0.5			5.85×10^4			
		U-D	1.5		0.5			3.71×10^4			Smoked paper
BJI	SK	N-S	12.5	1.1	0.45	5.4	0.092	1.82×10^3		30	照 像 纸
		E-W	12.5	1.1	0.45	5.4	0.083	1.64×10^3			
		U-D	12.6	1.1	0.59	5.5	0.288	0.87×10^3			Photo paper
	62	N-S	1.5	0.4	0.7	1.5		3.30×10^4		60	照 像 纸
		E-W	1.5	0.4	0.7	1.5	0.058	3.21×10^4			
		U-D	1.5	0.4	0.7	1.5		3.93×10^4			Photo paper
CN2	SK	N-S	12.5	1.2	0.45	5.0	0.081	1.48×10^3		30	照 像 纸
		E-W	12.5	1.2	0.45	5.0	0.085	1.73×10^3			
		U-D	12.5	1.2	0.60	5.0	0.338	1.30×10^3			Photo paper
	64 (473)	N-S	1.5		0.45			17.05×10^4		120	熏 烟 纸
		E-W	1.5		0.45			17.35×10^4			
		U-D	1.5		0.45			5.28×10^4			Smoked paper
	DD-1	N-S	1.0		0.45			11.40×10^4		120	墨 水 笔
		E-W	1.0		0.45			10.10×10^4			
		U-D	1.0		0.45			2.34×10^4			Pen and ink
CD2	SK	N-S	12.5	1.2	0.45	5.0	0.040	1.47×10^3		30	照 像 纸
		E-W	12.5	1.2	0.45	5.0	0.041	1.47×10^3			
		U-D	12.5	1.2	0.55	5.0	0.169	1.01×10^3			Photo paper
	DD-1	N-S	1.0		0.45			9.06×10^4		120	墨 水 笔
		E-W	1.0		0.45			6.92×10^4			
		U-D	1.0		0.45			7.83×10^4			Pen and ink
GTA	SK	N-S	12.5	1.2	0.45	5.0	0.07	1.94×10^3		30	照 像 纸
		E-W	12.5	1.2	0.45	5.0	0.08	1.77×10^3			
		U-D	12.5	1.2	0.70	5.0	0.32	1.51×10^3			Photo paper
	62	N-S	1.0	0.58	0.6	1.5	0.25	2.67×10^5		120	照 像 纸
		E-W	1.0	0.58	0.6	1.5	0.25	2.58×10^5			
		U-D	1.0	0.48	0.6	1.5	0.25	1.52×10^5			Photo paper
GZH	SK	N-S	12.5	1.2	0.45	5.0	0.075	1.54×10^3		30	照 像 纸
		E-W	12.5	1.2	0.45	5.0	0.068	1.39×10^3			
		U-D	12.5	1.2	0.56	5.0	0.299	0.99×10^3			Photo paper
	DD-1	N-S	1.0		0.45			$*3.59 \times 10^4$		120	墨 水 笔
		E-W	1.0		0.45			$*4.44 \times 10^4$			
		U-D	1.0		0.45			$*2.77 \times 10^4$			Pen and ink
	513	N-S	5.0		0.33			5.0×10		30	熏 烟 纸
		E-W	5.0		0.35			4.8×10			Smoked paper

续表

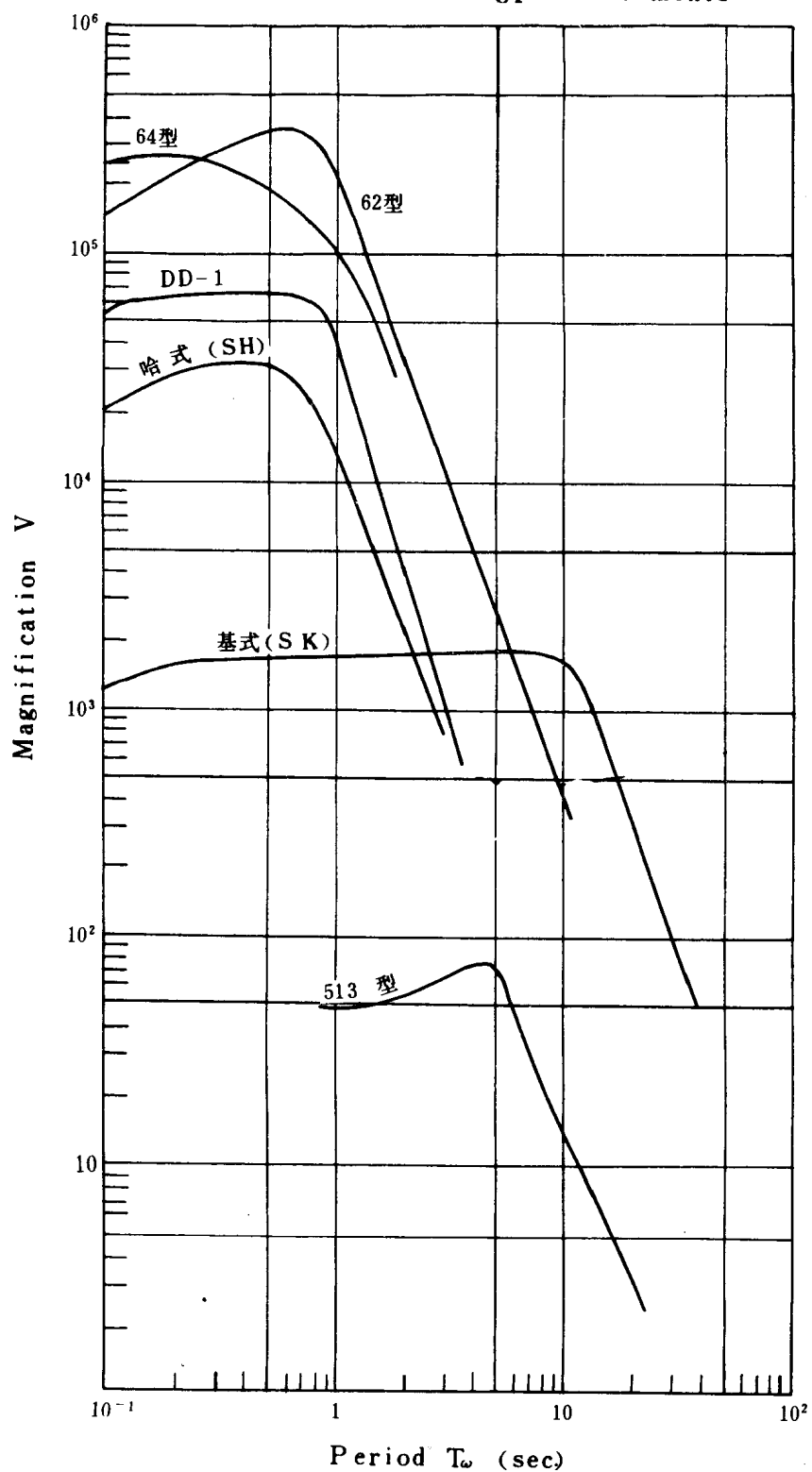
台站代号 station Code	仪器型号 type of Instruments	分 向 Comp	T ₁	T ₂	D ₁	D ₂	σ^2	V ₀	r ₁	R ₁ mm/min	记 录 方 式 Recorder Type
GYA	SK	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.45	5.1 5.0 4.9	0.090 0.071 0.299	1.49×10^3 1.45×10^3 0.77×10^3		30	照 像 纸 Photo paper
	DD-1	N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			$*7.90 \times 10^4$ $*7.23 \times 10^4$ $*5.82 \times 10^4$		120	墨 水 笔 Pen and ink
HHC	SK	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.60	5.1 5.1 5.3	0.1 0.1 0.3	2.54×10^3 2.72×10^3 1.23×10^3		30	照 像 纸 Photo paper
	DD-1	N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			$*1.52 \times 10^5$ $*1.47 \times 10^5$ $*0.61 \times 10^4$		120	墨 水 笔 Pen and ink
KSH	SK	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.54	5.0 5.0 5.0	0.039 0.032 0.249	1.12×10^3 0.68×10^3 0.83×10^3		30	照 像 纸 Photo paper
KMI	SK	N-S E-W U-D	12.5 12.5 12.5	1.1 1.1 1.1	0.45 0.45 0.60	5.5 5.5 5.5	0.092 0.080 0.322	1.47×10^3 1.40×10^3 0.90×10^3		30	照 像 纸 Photo paper
	62	N-S E-W U-D	3.0 3.0 2.0	0.1 0.1 0.1	0.6 0.6 0.6	5.0 5.0 5.0	0.042 0.046 0.046	2.00×10^4 2.00×10^4 2.01×10^4		60	照 像 纸 Photo paper
LZH	SK	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.59	5.1 5.0 5.0	0.078 0.077 0.359	1.44×10^4 1.55×10^4 1.02×10^4		30	照 像 纸 Photo paper
	64	N-S E-W U-D	2.5 2.5 2.5	0.1 0.1 0.1	0.5 0.5 0.5	6.0 6.0 6.0	0.25 0.25 0.25	2.27×10^4 2.27×10^4 2.65×10^4		60	照 像 纸 Photo paper
	513	N-S E-W	5.0 5.0		0.32 0.36			4.1×10 4.6×10	0.15 0.17	30	熏 烟 纸 Smoked paper
LSA	SK	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.56	4.9 4.8 5.1	0.084 0.090 0.238	1.54×10^3 1.74×10^3 0.77×10^3		30	照 像 纸 Photo paper
MDJ	SK	N-S E-W U-D	12.6 12.6 12.6	1.2 1.2 1.2	0.45 0.45 0.55	4.7 5.0 5.0	0.27 0.23 0.20	2.42×10^3 2.00×10^3 0.85×10^3		130	照 像 纸 Photo paper
	DD-1	N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			$*5.13 \times 10^4$ $*4.90 \times 10^4$ $*4.80 \times 10^4$		120	墨 水 笔 Pen and ink
NJ2	SK	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.60	5.0 5.0 5.0	0.081 0.092 0.268	2.02×10^3 1.50×10^3 1.26×10^3		130	照 像 纸 Photo paper
	DD-1	N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			3.39×10^4 3.73×10^4 6.16×10^4		120	墨 水 笔 Pen and ink
	763	N-S E-W U-D	15.0 15.0 15.0	96.5 102 97.3	1.0 1.0 1.0	1.0 1.0 1.0	0.190 0.190 0.193	1.53×10^3 1.46×10^3 1.40×10^3		15	照 像 纸 Photo paper
	513	N-S E-W	4.8 5.0		0.36 0.36			7.3×10 4.6×10	0.25 0.28	30	熏 烟 纸 Smoked paper

续表

台站代号 station Code	仪器型号 type of Instruments	分 向 Comp	T ₁	T ₂	D ₁	D ₂	σ^2	V ₀	r ₁	R _v mm/min	记 录 方 式 Recorder Type
NJ2	S W	N-S E-W	1.40 1.40		0.337 0.262			1.62×10^3 1.10×10^3		30	熏 烟 纸 Smoked paper
QZH	S K	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.45	5.0 4.9 5.0	0.089 0.078 0.085	1.92×10^3 1.63×10^3 1.19×10^3		30	照 像 纸 Photo paper
		N-S E-W U-D	1.5 1.5 1.5		0.45 0.45 0.45			$*2.06 \times 10^4$ $*2.73 \times 10^4$ $*1.75 \times 10^4$		120	熏 烟 纸 Smoked paper
		N-S E-W	5.0 5.0		0.33 0.37			6.6×10 5.8×10			熏 烟 纸 Smoked paper
	763	N-S E-W U-D	15.0 15.0 15.0	100.0 100.0 100.0	1.0 1.0 1.0	1.0 1.0 1.0	0.024 0.031 0.025	1.50×10^3 1.50×10^3 1.50×10^3		15	照 像 纸 Photo paper
SSE	S K	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.55	5.1 5.0 5.1	0.074 0.081 0.230	2.06×10^3 2.06×10^3 0.90×10^3		30	照 像 纸 Photo paper
		N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			$*7.57 \times 10^4$ $*5.43 \times 10^4$ $*5.20 \times 10^4$		120	墨 水 笔 Pen and ink
	763	N-S E-W U-D	15.0 15.0 15.0	98.6 102.6 96.8	1.0 1.0 1.0	1.0 1.0 1.0	0.25 0.25 0.25	2.36×10^3 2.14×10^3 2.05×10^3		15	照 像 纸 Photo paper
TIA	S K	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.52	5.0 5.0 5.0	0.084 0.103 0.219	1.44×10^3 1.72×10^3 0.78×10^3		30	照 像 纸 Photo paper
		N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			$*1.47 \times 10^5$ $*1.42 \times 10^5$ $*0.98 \times 10^5$		120	墨 水 笔 Pen and ink
		N-S E-W U-D	1.5 1.5 1.5		0.45 0.45 0.45			$*3.90 \times 10^4$ $*5.40 \times 10^4$ $*4.60 \times 10^4$		120	熏 烟 纸 Smoked paper
	513	N-S E-W	5.0 5.0		0.33 0.33			9.9×10 9.5×10		30	熏 烟 纸 Smoked paper
TIY	S K	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.59	5.1 5.0 5.0	0.092 0.088 0.322	1.77×10^3 1.79×10^3 0.84×10^3		30	照 像 纸 Photo paper
WMQ	S K	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.61	5.0 5.0 5.0	0.100 0.088 0.349	1.73×10^3 1.63×10^3 1.03×10^3		30	照 像 纸 Photo paper
		N-S E-W U-D	2.0 2.0 2.0	0.5 0.5 0.5	0.5 0.5 0.5	1.5 1.6 1.6	0.052 0.054 0.080	6.80×10^4 6.10×10^4 6.80×10^4		60	照 像 纸 Photo paper
		N-S E-W U-D	2.0 2.0 2.0	0.5 0.5 0.5	0.5 0.5 0.5	1.5 1.6 1.6	0.052 0.054 0.080	6.80×10^4 6.10×10^4 6.80×10^4		60	照 像 纸 Photo paper
WHN	S K	N-S E-W U-D	12.5 12.5 12.6	1.2 1.2 1.2	0.45 0.45 0.56	4.9 5.0 5.0	0.088 0.087 0.305	1.71×10^3 1.57×10^3 1.01×10^3		30	照 像 纸 Photo paper
		N-S E-W U-D	1.0 1.0 1.0	0.1 0.1 0.1	0.45 0.45 0.45	0.7 0.7 0.7		$*2.09 \times 10^4$ $*1.88 \times 10^4$ $*2.95 \times 10^4$		120	墨 水 笔 Pen and ink
		N-S E-W U-D	1.0 1.0 1.0	0.1 0.1 0.1	0.45 0.45 0.45	0.7 0.7 0.7		$*2.09 \times 10^4$ $*1.88 \times 10^4$ $*2.95 \times 10^4$		120	墨 水 笔 Pen and ink
XAN	S K	N-S E-W U-D	12.5 12.5 12.5	1.2 1.2 1.2	0.45 0.45 0.62	5.0 5.0 5.0	0.091 0.094 0.353	2.32×10^3 2.33×10^3 1.40×10^3		30	照 像 纸 Photo paper
		N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			1.00×10^5 9.80×10^4 7.95×10^4		120	墨 水 笔 Pan and ink
		N-S E-W U-D	1.0 1.0 1.0		0.45 0.45 0.45			1.00×10^5 9.80×10^4 7.95×10^4		120	墨 水 笔 Pan and ink

62: type 62 seismograph with galvanometer recording
 64: type 64 seismograph with galvanometer recording or with electronic amplifier and pen recorder
 SK: type SK (Kirnos) seismograph with galvanometer recording
 DD 1: type DD-1 seismograph with electronic amplifier and pen recorder
 T₁: Pendulum period in sec.
 T₂: Galvanometer period in sec.
 D₁: Damping coefficient of pendulum
 D₂: Damping coefficient of galvanometer
 σ^2 : Coupling coefficient
 r₁: Amplitude of friction
 V₀: Static magnification. An asterisk indicates magnification at T₁.
 R_v: Paper speed in mm/min

仪器放大倍率曲线
Magnification Curves of Instruments



1982 年 地 震 目 录

The Catalogue of Earthquakes in 1982

