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SOMMAIRE

SECOND PERCENTAGE OF THE POTENTIAL GRADIENT (E) AND
OF THE DENSITY CURRENT AT THE BREBEUF COLLEGE
GEOPHYSICAL OBSERVATORY

E. Gherzi, s.j.

ATMOSPHERIC ELECTRICITY "Standard Programme" for 1967

RAYONNEMENT SOLAIRE A MONTREAL
(1 JUILLET AU 31 DECEMBRE 1967)

BULLETIN SEISMOLOGIQUE
(1 JANVIER AU 30 JUIN 1967)

Observatoire de Géophysique

COLLÈGE JEAN-DE-BRÉBEUF

MONTREAL

OBSERVATOIRE DE GEOPHYSIQUE

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SEASONAL PERCENTAGE OF THE POTENTIAL GRADIENT
(E) AND OF THE DENSITY CURRENT (I) AT THE BREBEUF
COLLEGE GEOPHYSICAL OBSERVATORY.

by E. Gherzi, S. J.

As a complementary addition to the Tables of the hourly, monthly and yearly values of the potential gradient and of the current density, already published (1), we offer here to the reader the percentage of the fair weather figures during the seasons of the years 1964 and 1965.

The curves were painstakingly drawn by J-M. Brodeur, a graduating student of the University of Montreal.

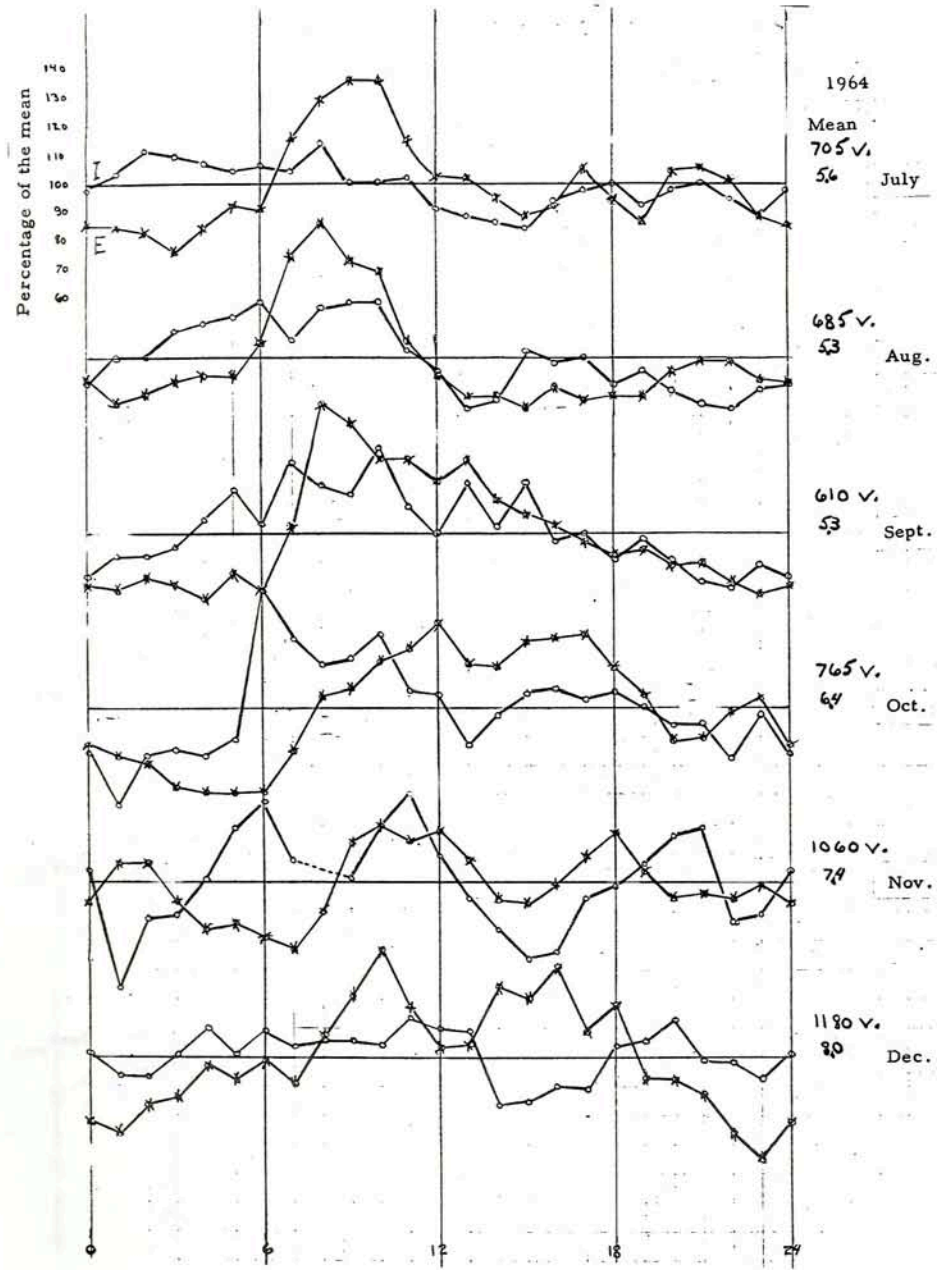
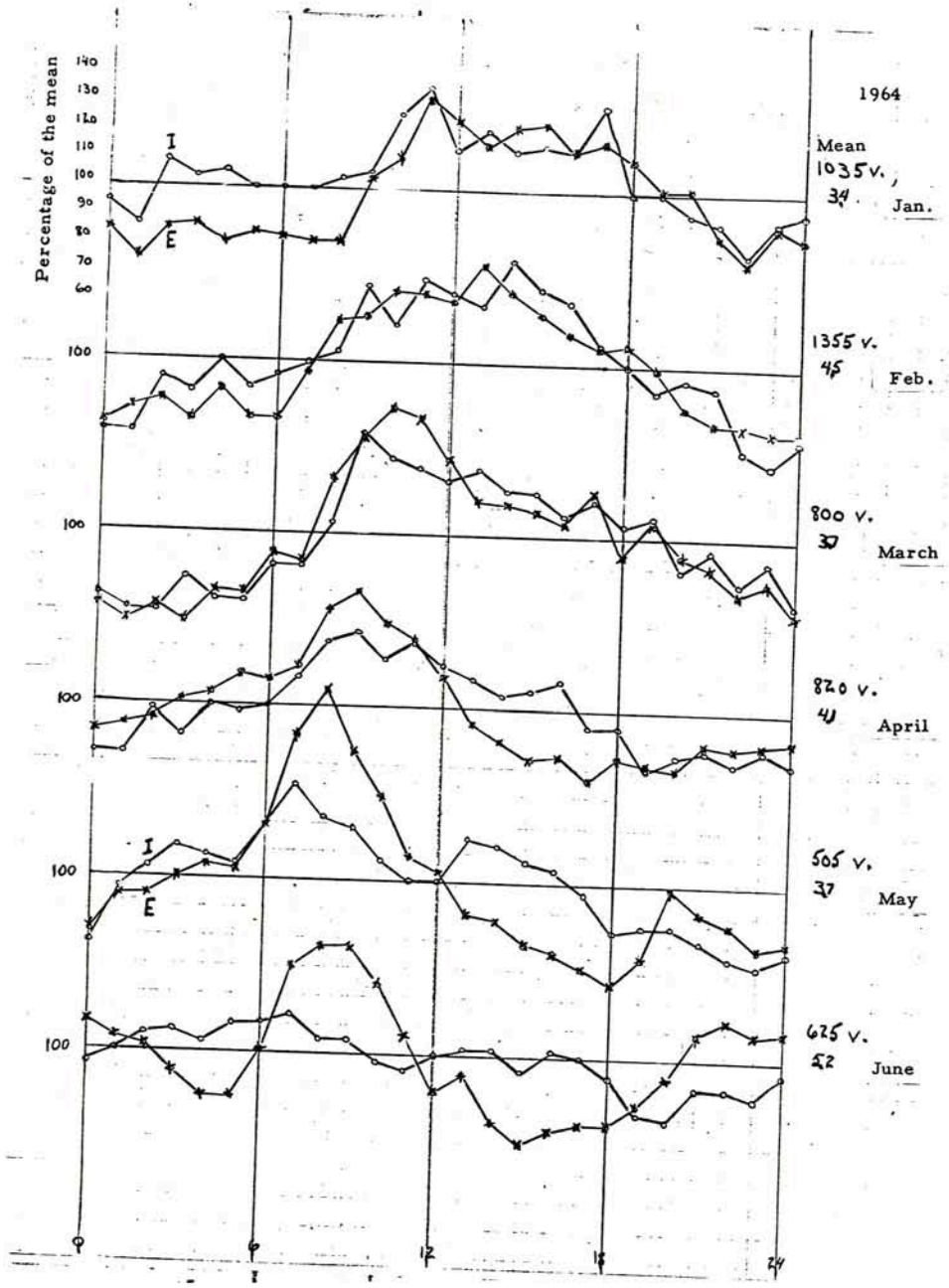
The figures of the potential gradient are absolute values as read on the recordings. Multiplying the same by the reduction factor 0.113 one gets the approximate value of this electric parameter at 1 meter above ground (grassy Ordovician limestone).

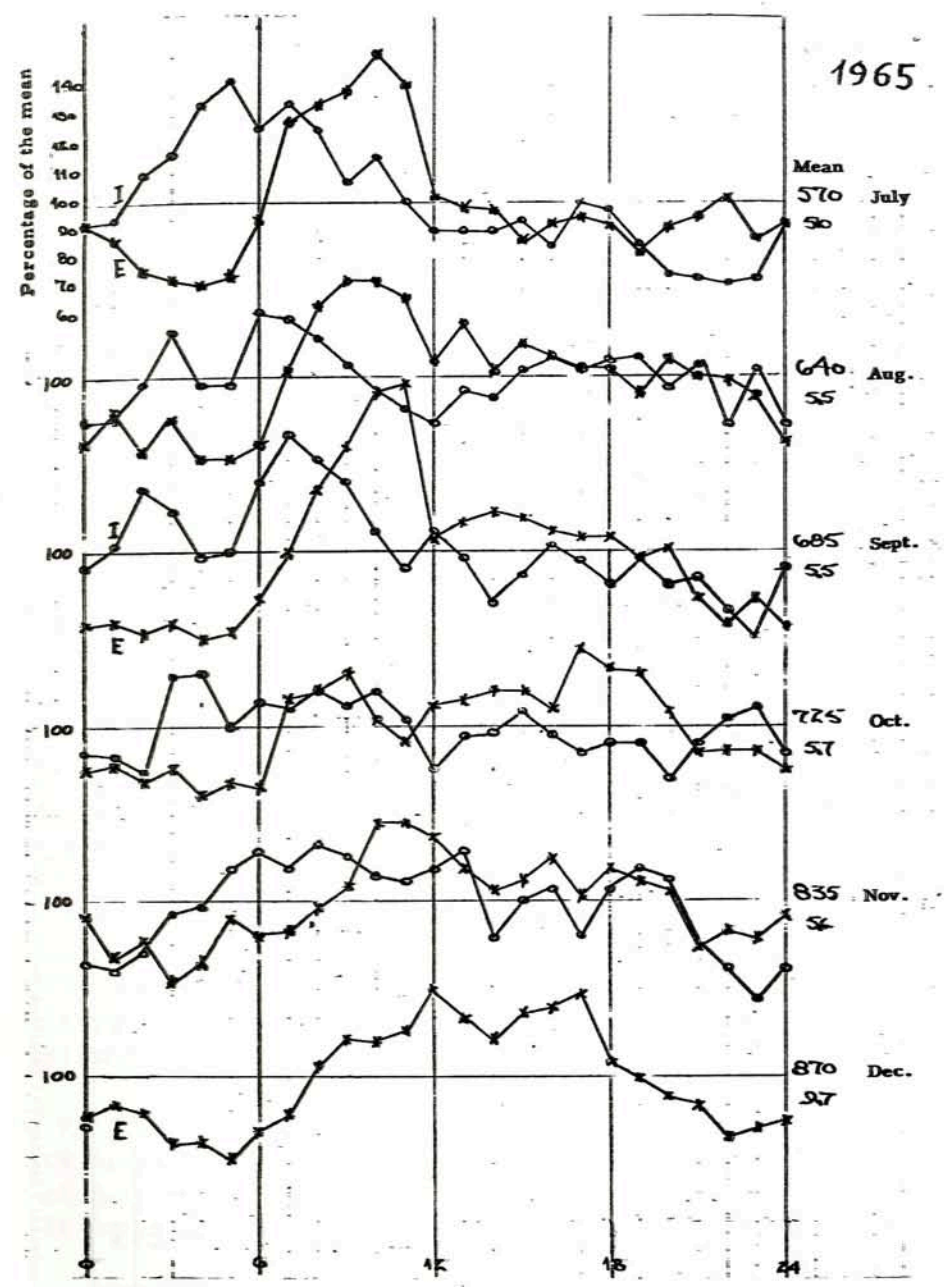
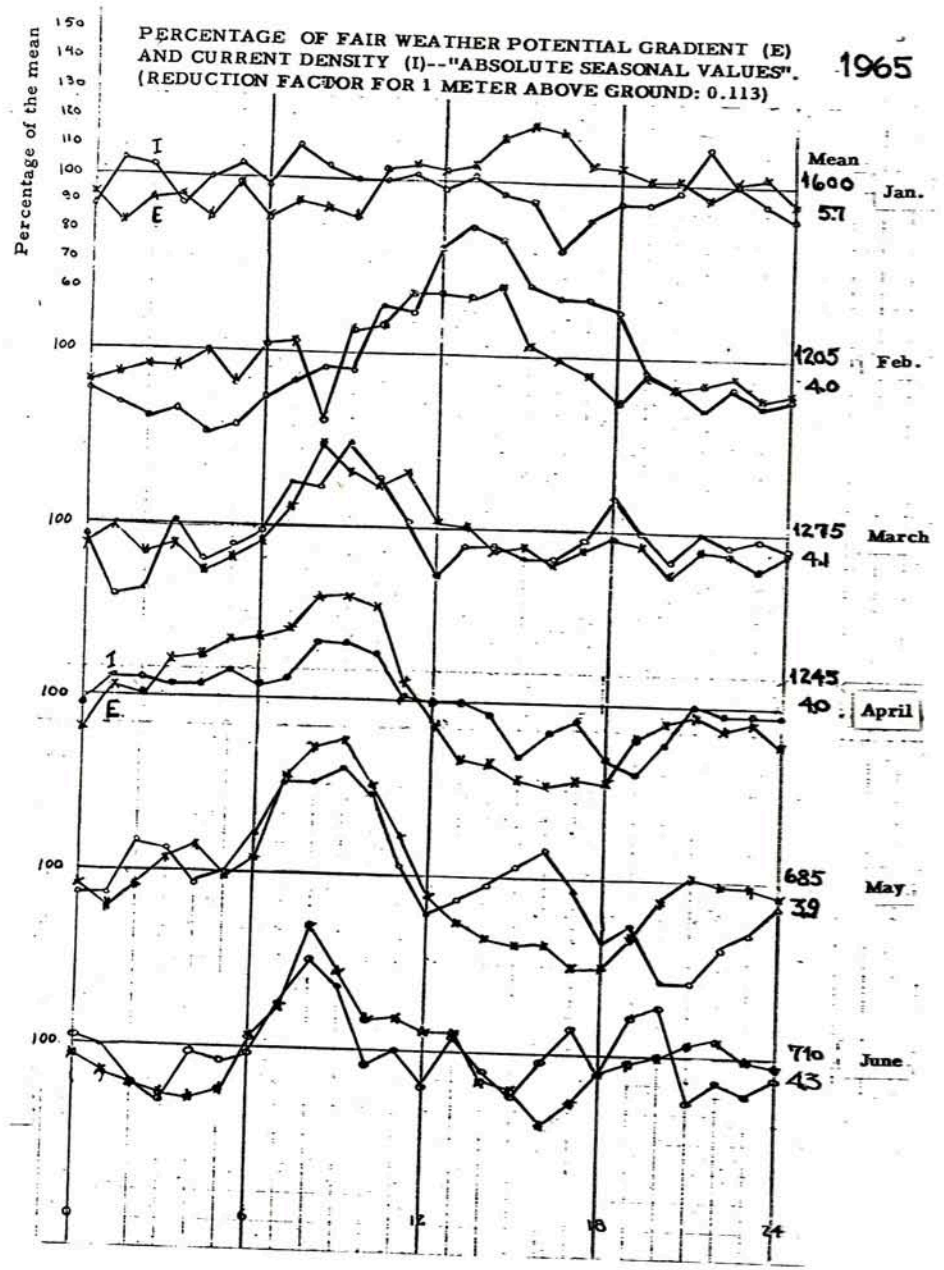
The current density is corresponding to the usually accepted formula, namely 10^{-12} A/m².

Although the percentage values of the two electric parameters show most of the time a quite parallel trend, there are many strong and unexplained cases of an apparently erratic behaviour.

Eastern Standard Time (E. S. T.)

(1) Bulletin de Géophysique, nos 16, 17, 18, 19.





RAYONNEMENT SOLAIRE

1967

Date	Rayonnement total						Rayonnement diffus					
	Juillet	Août	Septembre	Octobre	Novembre	Décembre	Juillet	Août	Septembre	Octobre	Novembre	Décembre
1	588	511	442	207	81	174	188	197	(193)	164	81	52
2	361	579	490	386	30	125	269	185	180	88	30	87
3	334	366	438	324	142	29	183	279	146	128	102	28
4	636	268	412	351	53	61	(190)	171	179	87	52	60
5	587	533	384	242	194	123	(301)	M	207	135	87	70
6	613	M	486	177	237	137	(190)	M	140	160	62	71
7	659	(622)	451	307	171	105	(235)	M	187	137	103	87
8	469	384	439	52	93	17	367	M	215	52	74	17
9	178	112	290	78	77	165	171	109	225	73	76	45
10	684	240	445	47	187	167	149	M	149	47	72	41
11	653	259	495	282	38	54	(116)	M	83	125	38	53
12	411	434	474	233	43	10	168	M	97	134	39	9
13	627	449	442	94	45	125	221	M	113	89	45	72
14	626	422	464	123	213	124	M	M	99	115	56	74
15	543	581	446	112	96	76	326	M	115	108	96	74
16	253	527	421	101	217	129	(199)	199	159	91	54	72
17	661	508	409	23	48	145	M	275	215	23	48	56
18	452	341	399	82	41	60	M	245	186	82	41	58
19	560	183	(420)	124	28	29	M	174	(102)	100	28	29
20	617	113	415	265	103	151	298	104	111	112	96	37
21	M	599	211	133	194	92	M	150	178	104	100	83
22	M	312	54	153	32	148	M	204	54	106	30	45
23	387	545	108	293	20	143	283	161	105	65	19	60
24	368	560	62	270	69	114	240	M	61	82	66	83
25	(483)	(524)	312	258	130	52	205	(179)	167	102	88	49
26	544	(420)	259	138	77	164	219	(209)	128	117	45	41
27	521	376	268	117	75	123	252	263	176	89	59	85
28	172	114	191	37	150	54	162	107	170	37	108	53
29	573	498	137	108	131	98	256	151	134	107	72	79
30	614	123	198	253	164	96	164	121	159	58	58	84
31	438	272		109		49	259	174		105		49
Moyenne	503	393	349	177	106	98	230	190	148	97	64	58

Unité de mesure: 1 langley (=1 calorie-gramme par cm²) M: manquant E: une (plusieurs) heures (s) durant le jour fut (furent) estimée (s)

ATMOSPHERIC ELECTRICITY

"Standard Program" for First half of 1967

Date	Hour	Absolute Potential	One-Meter Potential	Current Density
	U. T.	Volts	Volts/m	10^{-13} A/m^2
4 January	06:00	600	68	140
11 January	12:00	-150	-17	> -100
18 January	18:00	1350	153	44
25 January	00:00	650	73	52
1 February	06:00	550	62	> 150
8 February	12:00	3000*	339	74
15 February	18:00	2100	237	30
22 February	00:00	500	56	8
1 March	06:00	700	79	> 150
8 March	12:00	2050	232	38
15 March	18:00	1650	186	66
22 March	00:00	950	107	48
5 April	06:00	800	90	20
12 April	12:00	1150	130	22
19 April	18:00	1050	119	132
26 April	00:00	1100	124	30
3 May	06:00	150	17	40
10 May	12:00	D	D	> -100
17 May	18:00	250	28	58
24 May	00:00	650	73	20
31 May	06:00	1050	119	38
7 June	12:00	450	51	42
14 June	18:00	450	51	74
21 June	00:00	1250	141	40
28 June	06:00	1050	119	52

D: electrically disturbed

M: missing

One-Meter potential = 0.113 Absolute potential

ATMOSPHERIC ELECTRICITY

"Standard Program" for Second half of 1967

Date	Hour U. T.	Absolute Potential Volts	One-Meter Potential Volts/m	Current Density 10^{-13} A/m ²
28 June	06:00	1400	158	50
5 July	12:00	550	62	56
12 July	18:00	1100	124	>150
19 July	00:00	700	79	40
26 July	06:00	400	45	>150
2 Aug.	12:00	D	D	D
9 Aug.	18:00	D	D	D
16 Aug.	00:00	900	102	34
23 Aug.	06:00	800	90	40
30 Aug.	12:00	100	11	66
6 Sept.	18:00	750	85	3
13 Sept.	00:00	900	102	M
20 Sept.	06:00	250	28	M
27 Sept.	12:00	-100	-11	>1500
4 Oct.	18:00	900	102	30
11 Oct.	00:00	50	6	>15000
18 Oct.	06:00	200	23	>15000
25 Oct.	12:00	100	11	>15000
1 Nov.	18:00	1550	175	M
5 Nov.	00:00	750	85	2600
15 Nov.	06:00	700	79	>1500
22 Nov.	12:00	400	45	>150
29 Nov.	18:00	1550	175	24
6 Dec.	00:00	1100	124	>150
13 Dec.	06:00	400	45	>150
20 Dec.	12:00	450	51	>150
27 Dec.	18:00	1150	130	>-100
3 Jan. 1968	00:00	M		>150

D: electrically disturbed

M: missing

One-Meter potential = 0.113 Absolute potential



BULLETIN SEISMOLOGIQUE

INSTRUMENTS DE LA STATION

3 séismographes Benioff de 100 kg. avec 6 galvanomètres.
 $t_o=1$ sec., $t_g=0.2$ sec. pour ZNE. Enregistreur, 60mm/min.

$t_g=6$ sec. pour Z'N'E'. Enregistreur, 30mm/min.

3 séismographes Sprengnether, type Columbia Z''N''E''.

Avant le 13 février 1964, $t_o=17$ sec., $t_g=100$ sec.

Après le 13 février 1964, $t_o=30$ sec., $t_g=100$ sec. pour Z''N''E''.

Enregistreur, 15mm/min.

Le 13 février 1964, l'amplification des Columbia a été augmentée. Cf. graphiques.

Dans notre bulletin, nous indiquons toujours sur quel séismogramme chaque phase a été lue en ajoutant après cette phase une des lettres suivantes:

ZNE pour celles données par les Benioff avec galvanomètres de 0,2 sec.

Z'N'E' pour celles données par les Benioff avec galvanomètres de 6 sec.

Z''N''E'' pour celles données par les Columbia avec galvanomètres de 100 sec.

L'heure est inscrite à chaque minute sur les séismogrammes par la Société Radio-Canada au moyen d'une ligne téléphonique avec une précision de ± 0.1 sec. à l'année. Cette Société nous fournit en même temps un courant alternatif de 60 cycles de fréquence absolument constante, pour les moteurs des enregistreurs. De plus le signal horaire de l'Observatoire du Dominion relayé par le poste local de radio CBF, à 01 00 00 p.m. s'enregistre automatiquement sur tous les séismogrammes.

Les positions géographiques des épicentres ainsi que l'heure d'origine et la profondeur sont toujours empruntées à U.S.C.G.S. pour les séismes éloignés. Pour les locaux, ces données nous sont fournies par l'Observatoire du Dominion, et cela est indiqué chaque fois. Pour sauver de l'espace, nous ne mentionnons pas U.S.C.G.S. à chaque séisme.

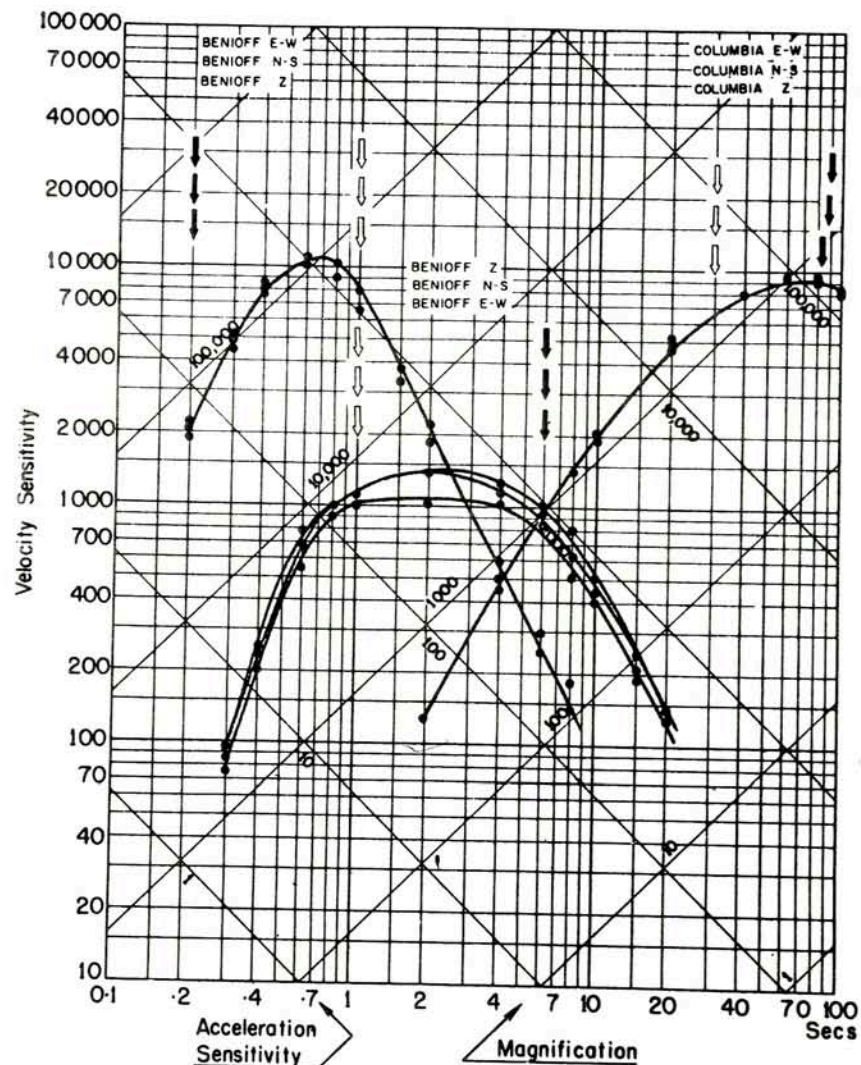
Nous indiquons aussi quelques fois, après une phase, sur la ligne suivante, la période de l'onde du sol et son amplitude en microns.

Nous tenons à exprimer publiquement notre reconnaissance à l'Observatoire du Dominion qui envoie chaque année ses techniciens refaire l'étalonnage complet de tous les séismographes et pour toute la gamme des fréquences, par la méthode de Willmore.

M. Buist, S. J.

STATION: MONTREAL

DU 1 JANVIER AU 1 JUILLET 1967



$\phi = 45^{\circ}30'09''N$ $\lambda = 73^{\circ}37'23''W$ Altitude 112M

Foundation: Ordovician Limestone (Trenton)

$T_s \uparrow$

$T_g \uparrow$

Date of Calibration: April - 1962
Feb. - 1964

BENIOFF'S

BENIOFF'S

COLUMBIA'S

S. P. - Z	Apr. 4	I. P. - Z	Apr. 4	L. P. - Z.	Feb. 13
S. P. H. - N. S.	Apr. 4	I. P. H. - N. S.	Apr. 4	L. P. H. - N. S.	Feb. 12
S. P. H. - E. W.	Apr. 5	I. P. H. - E. W.	Apr. 5	L. P. H. - E. W.	Feb. 11

1 janv. 12.4 S., 165.8 E. Santa Cruz Isl. h about 33 km. H 14 18 51.4 eZ'' 15 20	3 janv. 11.2 S., 165.5 E. Santa Cruz Isl. h about 33 km. H 05 52 51.8 ePSE'' 06 23 00
1 janv. 11.1 S., 165.2 E. Santa Cruz Isl. h about 33 km. H 21 58 57.8 ePSE'' 22 29.0	3 janv. 11.2 S., 165.4 E. Santa Cruz Isl. h about 33 km. H 11 05 15.4 eSSE'' 12 42.3
2 janv. 25.2 S., 71.0 W. Near Coast of N. Chile h about 38 km. H 06 53 17.5 iPZ 07 04 29.5 d	3 janv. 12.4 S., 166.4 E. Santa Cruz Isl. h about 33 km. H 21 23 21.8 eE'' 22 45
2 janv. 10.2 S., 28.5 E. Republic of the Congo h about 33 km. H 09 47 53.3 eE'' 10 48	4 janv. 20.3 N., 120.0 E. Philippine Isl. region h about 33 km. H 03 41 36.4 eE'' 04 33
2 janv. 12.3 S., 166.4 E. Santa Cruz Isl. h about 33 km. H 19 59 58.2 ePSE'' 20 30.1	4 janv. 38.6 N., 22.1 E. Greece h about 7 km. H 05 58 54.1 ePZ 06 09 52
3 janv. 60.9 N., 151.5 W. Kenai Peninsula, Alaska h about 92 km. H 05 28 29.3 ePZ 05 36 40	4 janv. 50.8 N., 157.1 E. Kurile Isl. h about 50 km. H 10 17 07.5 ePZ 10 28 41.5
3 janv. 10.9 S., 165.5 E. Santa Cruz Isl. h about 33 km. H 05 35 46.6 ePSE'' 06 05 54	4 janv. 10.7 N., 62.5 W. Near Coast of Venezuela h about 74 km. H 20 15 58.5 ePZ 20 22 52

5 janv. 48.1 N., 102.8 E.
Mongolia
h about 33 km.
H 00 14 40.4
iPZ 00 27 22.0 c
iS+SKSE" 38 04

5 janv. 48.4 N., 103.1 E.
Mongolia
h about 33 km.
H 00 42 13.3
iPZ 00 54 53.6 d

6 janv. 41.8 N., 143.3 E.
Hokkaido, Japan region
h about 35 km.
H 00 04 02.7
iPZ 00 16 46.1 d

7 janv. 48.8 S., 112.7 E.
Southeast Indian Rise
h about 33 km.
H 00 27 25.2
eE" 00 53

7 janv. 11.9 S., 166.1 E.
Santa Cruz Isl.
h about 33 km.
H 16 41 03.0
eE" 17 18.2

7 janv. 17.4 N., 98.8 W.
Guerrero, Mexico
h about 68 km.
H 19 24 15.3
ePZ 19 30 59

8 janv. 56.0 N., 162.9 E.
Near E. Coast of Kamchatka
h about 33 km.
H 05 02 52.1
ePZ 05 13 51

8 janv. 56.1 N., 162.9 E.
Near E. Coast of Kamchatka
h about 23 km.
H 05 06 47.7

ePZ 05 17 47

8 janv. 56.1 N., 162.8 E.
Near E. Coast of Kamchatka
h about 44 km.
H 06 43 32.3
ePZ 06 54 29

8 janv. 56.2 N., 162.7 E.
Near E. Coast of Kamchatka
h about 24 km.
H 08 31 59.7
ePZ 08 43 02.5 d

9 janv. 5.1 N., 77.6 W.
Near W. Coast of Colombia
h about 40 km.
H 18 08 23.9
iPZ 18 16 01.1 d

10 janv. 25.5 S., 70.7 W.
Near Coast of N. Chile
h about 38 km.
H 22 24 26.3
ePZ 22 35 40.5

11 janv. 0.1 S., 120.1 E.
Northern Celebes
h about 23 km.
H 05 54 00.1
eN" 06 35.4

11 janv. 34.1 N., 45.7 E.
Iran-Iraq border region
h about 34 km.
H 11 20 45.7
iPZ 11 33 13.1 d

11 janv. 5.3 N., 82.5 W.
South of Panama
h about 22 km.
H 16 08 06.1
iPZ 16 15 48.1

12 janv. 18.0 S., 70.3 W.
Near Coast of N. Chile
h about 122 km.

H 05 44 03.8
iPZ 05 54 21.1 c

13 janv. 10.6 S., 161.4 E.
Solomon Isl.
h about 32 km.
H 13 48 11.7
iP'Z 14 07 02.7 d

14 janv. 52.1 N., 175.4 E.
Rat Isl. Aleutian Isl.
h about 41 km.
H 12 04 50.7
iPZ 12 15 34.4 d

15 janv. 25.6 S., 70.7 W.
Near Coast of N. Chile
h about 5 km.
H 15 05 37.3
iPZ 15 16 56.7 d

15 janv. 55.7 N., 110.7 E.
Lake Baikal region
h about 32 km.
H 19 58 45.6
eE" 20 35

16 janv. 11.3 S., 165.7 E.
Santa Cruz Isl.
h about 33 km.
H 04 44 27.3
eN" 05 33

16 janv. 5.2 N., 77.6 W.
Near W. Coast of Colombia
h about 34 km.
H 07 22 11.1
iPZ 07 29 48.8 c

16 janv. 10.7 S., 161.3 E.
Solomon Isl.
h about 40 km.
H 11 09 08.4
eN" 12 00

16 janv. 11.2 S., 165.7 E.
Santa Cruz Isl.

h about 6 km.
H 14 26 22.9
ePSE" 14 56.5

16 janv. 10.2 N., 86.0 W.
Off Coast of Costa Rica
h about 33 km.
H 15 30 44.7
iPZ 15 37 53.9 d

17 janv. 27.4 S., 63.3 W.
Santiago Del Estero Prov.,
Argentina
h about 590 km.
H 01 07 54.3
iPZ 01 18 27.2 d
ipPZ 20 28.7

17 janv. 38.8 N., 142.1 E.
Near E. Coast of Honshu,
Japan
h about 44 km.
H 11 59 31.5
ePZ 12 12 30 c
iPZ 12 31.3 d

18 janv. 48.9 N., 154.9 E.
Kurile Isl.
h about 40 km.
H 04 20 52.9
iPZ 04 32 42.2 c

18 janv. 56.6 N., 120.8 E.
Eastern Russia
h about 11 km.
H 05 34 32.6
iPZ 05 46 30.1

18 janv. 52.5 N., 168.3 W.
Fox Isl. Aleutian Isl.
h about 37 km.
H 08 18 22.0
iPZ 08 28 12.6 c

18 janv. 42.0 N., 142.4 E.
Hokkaido, Japan region
h about 65 km.

H 08 29 03.4	eZ 09 41 50	H 08 38 51.9	H 01 20 31.7
iPZ 08 41 43.2		iPZ 08 47 22.7 d	eN'' 01 54
19 janv. 14.8 S., 178.8 W.	23 janv. 19.9 N., 109.3 W.	28 janv. 52.4 N., 169.5 W.	31 janv. 2.8 N., 84.4 W.
Fiji Isl. region	Revilla Gigedo Isl. region	Fox Isl. Aleutian Isl.	Off Coast of Central America
h about 18 km.	h about 56 km.	h about 47 km.	h about 33 km.
H 12 40 12.6	H 20 25 38.3	H 13 52 58.3	H 13 37 34.3
ePPZ'' 12 59 25	iPZ 20 33 01.8 d	iZ 14 02 54.1 c	iPZ 13 45 36.2 d
	iSN'' 39 03	iPZ 54.3 d	
19 janv. 52.4 N., 169.6 W.	24 janv. 41.4 N., 141.9 E.	28 janv. 52.4 N., 169.4 W.	1 fév. 22.0 S., 66.7 W.
Fox Isl. Aleutian Isl.	Hokkaido, Japan region	Fox Isl. Aleutian Isl.	Jujuy Province, Arg.
h about 55 km.	h about 69 km.	h about 47 km.	h about 210 km.
H 14 41 36.7	H 03 05 39.0	H 14 23 26.7	H 23 46 09.5
iPZ 14 51 30.7 d	iPZ 03 18 21.9 c	iPZ 14 33 20.7	ePZ 23 56 45
20 janv. 48.0 N., 102.9 E.	24 janv. 0.6 S., 21.0 W.	28 janv. 52.5 N., 169.4 W.	2 fév. 57.9 S., 25.7 W.
Mongolia	Central Mid-Atlantic Ridge	Fox Isl. Aleutian Isl.	South Sandwich Isl. region
h about 33 km.	h about 33 km.	h about 33 km.	h about 81 km.
H 01 57 23.1	H 09 29 12.3	H 14 30 24.2	H 06 25 49.8
iPZ 02 10 05.6 d	ePZ 09 39 58	iPZ 14 40 20.5	ePPZ'' 06 44 54
21 janv. 49.8 S., 114.8 W.	24 janv. 0.8 S., 19.9 W.	28 janv. 52.3 N., 169.3 W.	3 fév. 21.5 S., 67.1 W.
Easter Isl. Cordillera	Central Mid-Atlantic Ridge	Fox Isl. Aleutian Isl.	Chile-Bolivia border region
h about 33 km.	h about 33 km.	h about 32 km.	h about 198 km.
H 02 54 00.8	H 15 21 50.4	H 16 31 21.1	H 23 25 47.8
eSE'' 03 19.6	eE'' 15 40.8	iPZ 16 41 17.0	iPZ 23 36 19.9 d
22 janv. 6.8 N., 73.0 W.	25 janv. 36.6 N., 71.6 E.	28 janv. 52.4 N., 169.4 W.	4 fév. iPZ 05 53 18.5 d
Northern Colombia	Afghanistan-Ussr border region	Fox Isl. Aleutian Isl.	5 fév. 5.4 S., 11.4 W.
h about 158 km.	h about 281 km.	h about 50 km.	Ascension Isl. region
H 08 18 14.4	H 01 50 19.4	H 17 42 01.5	h about 19 km.
iPZ 08 25 24.7 c	iPZ 02 02 59.7 c	ePZ 17 51 53	H 18 55 45.1
22 janv. 53.5 N., 165.3 W.	26 janv. 21.4 N., 108.9 W.	28 janv. 55.0 N., 160.2 E.	eN'' 19 27
Fox Isl. Aleutian Isl.	Revilla Gigedo Isl. region	Kamchatka	6 fév. 60.1 N., 152.8 W.
h about 69 km.	h about 33 km.	h about 113 km.	Southern Alaska
H 10 30 03.0	H 06 04 33.9	H 22 28 01.2	h about 110 km.
ePZ 10 39 35	ePZ 06 11 46	iPZ 22 39 01.5 d	H 03 26 35.4
22 janv. 19.0 S., 69.1 W.	26 janv. 15.0 N., 92.8 W.	29 janv. 26.5 N., 55.2 E.	iPZ 03 34 56.5 d
Northern Chile	Mexico-Guatemala border region	Southern Iran	7 fév. 56.7 N., 157.2 W.
h about 138 km.	h about 56 km.	h about 38 km.	Alaska Peninsula
H 11 50 50.9	H 16 10 34.3	H 07 56 39.2	h about 67 km.
iPZ 12 01 13.2 d	ePZ 16 17 18.5	eN'' 08 38	H 14 53 13.9
23 janv. 6.9 N., 73.0 W.	27 janv. 9.0 S., 71.5 W.	30 janv. 41.0 N., 44.2 E.	iPZ 15 02 05.1 d
Northern Colombia	Western Brazil	Western Caucasus	8 fév. 15.2 N., 96.3 W.
h about 156 km.	h about 613 km.	h about 33 km.	Near Coast of Oaxaca, Mexico
H 09 27 48.1			
ePZ 09 34 58			

7.10 hS 10 about 46 km.
 H 19 39 14.4
 iPZ 19 46 12

9 fév. 2.9 N., 74.9 W.
 Colombia
 h about 58 km.
 H 15 24 47.2
 iPZ 15 32 38.8 c
 iSE'' 15 39 04

9 fév. 2.8 N., 74.8 W.
 Colombia
 h about 59 km.
 H 21 15 25.7
 ePZ 21 23 18

10 fév. 16.4 S., 69.6 W.
 Peru-Bolivia border region
 h about 289 km.
 H 06 51 36.9
 iPZ 07 01 24.2 c

11 fév. 51.7 N., 159.5 E.
 Off East Coast of Kamchatka
 h about 21 km.
 H 02 39 47.1
 ePZ 02 51 15.5

11 fév. 16.3 N., 98.6 W.
 Near Coast of Guerrero, Mex.
 h about 38 km.
 H 04 25 46.8
 ePZ 04 32 46

12 fév. 2.8 S., 74.4 W.
 Colombia
 h about 100 km.
 H 13 55 05.2
 ePZ 14 02 56

12 fév. 21.7 S., 70.1 W.
 Near Coast of N. Chile
 h about 18 km.
 H 14 08 12.5
 iPZ 14 19 06.2 d

13 fév. 52.5 N., 169.6 W.
 Fox Isl. Aleutian Isl.

8.10 hS 10 about 51 km.
 H 10 07 34.5
 iPZ 10 17 28.0

13 fév. 5.2 S., 75.4 W.
 Northern Peru
 h about 39 km.
 H 10 25 43.9
 iPZ 10 34 40.1 c

13 fév. 52.7 N., 34.1 W.
 North Atlantic Ocean
 h about 10 km.
 H 23 14 19.6
 iPZ 23 19 59.0 c

14 fév. 13.7 N., 96.5 E.
 Andaman Isl. region
 h about 27 km.
 H 01 36 04.7
 ePSN'' 02 06 40

15 fév. 9.0 S., 71.3 W.
 Peru-Brazil border region
 h about 597 km.
 H 16 11 11.8
 iPZ 16 19 44.1 d
 iSN' 26 37

16 fév. 16.1 N., 96.9 W.
 Oaxaca, Mexico
 h about 60 km.
 H 19 52 11.6
 iPZ 19 59 03.3 c

17 fév. 28.8 N., 43.4 W.
 North Atlantic Ridge
 h about 33 km.
 H 10 06 45.3
 eE'' 10 20

17 fév. 23.7 S., 175.2 W.
 Tonga Isl. region
 h about 19 km.
 H 10 10 51.5
 eP'Z 10 29 34

18 fév. 28.9 N., 43.4 W.
 North Atlantic Ridge

h about 33 km.
 H 00 31 48.2
 iPZ 00 37 52.5

18 fév. 5.9 S., 153.2 E.
 New Ireland region
 h about 41 km.
 H 02 39 19.4
 iP'Z 02 58 14.5 c

18 fév. 59.7 N., 75.8 W.
 Northern Quebec
 h about 33 km.
 H 10 10 54.8
 iPZ 10 14 15.1 c

19 fév. 16.2 N., 98.5 W.
 Near Coast of Guerrero, Mex.
 h about 25 km.
 H 11 46 39.8
 ePZ 11 53 41

19 fév. 9.2 S., 113.1 E.
 South of Java
 h about 12 km.
 H 22 14 35.3
 iP'Z 22 33 59.9 d

19 fév. 0.0 124.2 E.
 Molucca Sea
 h about 101 km.
 H 23 28 28.0
 eP'Z 23 47 33
 iPPZ 50 53.6

20 fév. 33.7 N., 75.3 E.
 Eastern Kashmir
 h about 24 km.
 H 15 18 39.9
 eE'' 16 10

21 fév. 19.2 N., 67.9 W.
 Mona Passage
 h about 44 km.
 H 04 16 21.1
 eZ 04 22 03

22 fév. 19.5 S., 169.0 E.
 New Hebrides Isl.

h about 87 km.
 H 18 26 46.7
 eN'' 19 18

23 fév. iPZ 18 56 33.8 d

25 fév. 0.0 129.3 E.
 Northern Celebes
 h about 70 km.
 H 11 20 47.4
 eP'Z 11 39 55

25 fév. 0.1 S., 123.9 E.
 Northern Celebes
 h about 105 km.
 H 11 38 46.0
 e(P'Z) 11 57 51

26 fév. 49.8 N., 78.1 E.
 Eastern Kazakh SSR.
 h about 0 km.
 H 03 57 57.7
 iPZ 04 10 20.2 c

27 fév. 2.9 N., 74.8 W.
 Colombia
 h about 69 km.
 H 02 06 42.5
 iPZ 02 14 34.1 c
 iZ 42.9

28 fév. 32.7 N., 141.7 E.
 South of Honshu, Japan
 h about 23 km.
 H 09 37 18.0
 eN'' 10 01.4

2 mars 0.3 S., 78.7 W.
 Ecuador
 h about 121 km.
 H 02 47 31.7
 iPZ 02 55 42.8 d

2 mars 52.4 N., 160.5 E.
 Off East Coast of Kamchatka
 h about 18 km.
 H 20 47 37.6
 e(P)Z 20 59 12

2 mars 53.8 N., 160.5 E.
Near E. Coast of Kamchatka
h about 21 km.
H 23 03 39.7
iPZ 23 14 56.9 d

4 mars 21.4 N., 121.8 E.
Taiwan region
h about 134 km.
H 05 09 24.2
eN'' 05 38.4

4 mars 18.5 S., 175.4 W.
Tonga Isl.
h about 225 km.
H 06 16 21.9
eN'' 06 42.6

4 mars 39.2 N., 24.6 E.
Aegean Sea
h about 33 km.
H 17 58 06.4
iPZ 18 09 07.3 d

5 mars iPZ 17 11 56.2

7 mars 10.9 S., 166.5 E.
Santa Cruz Isl.
h about 34 km.
H 17 22 43.3
eN'' 18 38

9 mars 10.7 S., 166.3 E.
Santa Cruz Isl.
h about 30 km.
H 03 24 18.9
eE'' 04 23

9 mars 10.7 S., 166.3 E.
Santa Cruz Isl.
h about 33 km.
H 05 52 19.2
eE'' 06 48

9 mars 10.6 S., 166.3 E.
Santa Cruz Isl.
h about 30 km.
H 06 58 35.7
eP'Z 07 17 22

9 mars 14.5 N., 91.4 W.
Guatemala
h about 106 km.
H 14 08 44.5
ePZ 14 15 42

9 mars 10.7 S., 166.3 E.
Santa Cruz Isl.
h about 59 km.
H 18 02 45.7
ePSE'' 18 32 36

9 mars 56.2 N., 34.6 W.
North Atlantic Ocean
h about 33 km.
H 20 34 48.2
ePZ 20 40 24

9 mars 56.1 N., 34.4 W.
North Atlantic Ocean
h about 33 km.
H 21 22 48.9
eE'' 21 35

10 mars 56.1 N., 34.7 W.
North Atlantic Ocean
h about 33 km.
H 01 43 55.6
eSE'' 01 54.5

10 mars 56.0 N., 34.7 W.
North Atlantic Ocean
h about 33 km.
H 11 14 38.0
ePZ 11 20 17

11 mars 10.7 S., 166.2 E.
Santa Cruz Isl.
h about 49 km.
H 08 33 27.4
eP'Z 08 52 10

11 mars 19.1 N., 95.8 W.
Vera Cruz, Mexico
h about 33 km.
H 14 44 59.2
iPZ 14 51 25.8 d

12 mars 51.1 N., 157.9 E.
Near E. Coast of Kamchatka

h about 21 km.
H 01 23 49.5
ePZ 01 35 24

12 mars 42.6 N., 143.0 E.
Hokkaido, Japan region
h about 33 km.
H 02 51 54.7
ePZ 03 04 35

12 mars 28.2 N., 111.6 W.
Gulf of California
h about 33 km.
H 21 22 19.2
eN'' 21 39

13 mars 3.0 N., 74.5 W.
Colombia
h about 90 km.
H 00 59 04.7
iPZ 01 06 54.7 d

13 mars ePZ 07 25 18

13 mars ePZ 08 32 31

13 mars 53.7 N., 165.4 W.
Fox Isl. Aleutian Isl.
h about 33 km.
H 14 44 07.2
ePZ 14 53 42

13 mars 40.1 S., 74.5 W.
Off Coast of S. Chile
h about 33 km.
H 16 06 54.3
iPZ 16 19 28.5 c

13 mars 19.7 N., 38.9 E.
Red Sea
h about 7 km.
H 19 22 15.4
ePZ 19 35 22

13 mars 24.2 S., 70.4 W.
Near Coast of N. Chile
h about 78 km.
H 20 08 25.7
ePZ 20 19 26

14 mars 28.4 N., 94.3 E.
India-China border region
h about 24 km.
H 06 58 04.6
eP'Z'' 07 16 32

14 mars 19.4 N., 38.7 E.
Red Sea
h about 33 km.
H 21 52 05.3
eN'' 22 57

15 mars eE'' 12 40

17 mars 3.6 S., 150.9 E.
New Ireland region
h about 33 km.
H 11 24 45.7
eP'Z 11 43 46.5

19 mars 6.7 S., 129.9 E.
Banda Sea
h about 60 km.
H 01 10 45.8
eP'Z 01 29 54

19 mars 45.4 N., 151.3 E.
Kurile Isl.
h about 33 km.
H 04 01 36.7
ePZ 04 13 50
iSE'' 23 56

20 mars 51.8 N., 175.2 E.
Rat Isl. Aleutian Isl.
h about 50 km.
H 10 48 07.2
ePZ 10 58 52

20 mars 45.6 N., 151.4 E.
Kurile Isl.
h about 51 km.
H 13 31 34.0
iPZ 13 43 44.9 c

20 mars 45.6 N., 151.5 E.
Kurile Isl.
h about 53 km.
H 13 40 52.8

iPZ 13 53 03.2 d 22 mars 14.8 S., 177.0 W.
 Fiji Isl. region
 h about 33 km.
 H 23 46 20.6
 eN'' 00 33
 20 mars 45.6 N., 151.5 E.
 Kurile Isl.
 h about 32 km.
 H 13 52 05.5
 iPZ 14 04 17.5 d 23 mars 17.0 S., 177.1 W.
 Fiji Isl. region
 h about 55 km.
 H 00 35 43.1
 eN'' 01 21
 20 mars 45.6 N., 151.2 E.
 Kurile Isl.
 h about 60 km.
 H 15 46 29.4
 iPZ 15 58 38.5 24 mars 6.0 S., 112.3 E.
 Java Sea
 h about 600 km.
 H 09 00 19.5
 eP'Z 09 18 37
 iZ 21 01
 20 mars 22.1 S., 170.6 E.
 Loyalty Isl. region
 h about 28 km.
 H 19 07 25.2
 iP'Z 19 26 19.5 24 mars 6.0 S., 112.3 E.
 Java Sea
 h about 600 km.
 H 11 46 13.9
 ipP'Z 12 07 16.6
 21 mars 6.8 N., 73.0 W.
 Northern Colombia
 h about 151 km.
 H 18 11 42.2
 iPZ 18 18 53.3 c 24 mars 6.7 S., 74.9 W.
 Peru-Brazil border region
 h about 149 km.
 H 15 38 49.4
 iPZ 15 47 45.0 c
 ipPZ 48 17.5
 22 mars 10.8 S., 79.0 W.
 Near Coast of Peru
 h about 26 km.
 H 05 05 17.3
 iPZ 05 15 05.8 c 25 mars 23.1 S., 66.4 W.
 Jujuy Province, Argentina
 h about 202 km.
 H 12 18 23.9
 iPZ 12 29 06.0 d
 22 mars 18.8 S., 79.1 W.
 Off Coast of Peru
 h about 27 km.
 H 05 20 16.0
 ePZ 05 30 04 25 mars 7.4 N., 79.7 W.
 South of Panama
 h about 35 km.
 H 14 29 13.6
 ePZ 14 36 37
 22 mars 5.4 S., 146.4 E.
 East New Guinea region
 h about 70 km.
 H 13 00 26.9
 eN'' 14 00 25 mars eN'' 18 50
 22 mars 56.1 S., 27.6 W.
 South Sandwich Isl. region
 h about 23 km.
 H 21 17 34.3
 eN'' 21 41.7 25 mars 45.5 N., 151.4 E.
 Kurile Isl.
 h about 41 km.

H 22 47 58.4
 ePZ 23 00 12 31 mars 51.8 N., 176.2 E.
 Rat Isl. Aleutian Isl.
 h about 48 km.
 H 09 15 29.1
 eE'' 09 42.5
 26 mars 3.0 N., 77.8 W.
 Near W. Coast of Colombia
 h about 82 km.
 H 16 30 32.0
 ePZ 16 38 22 31 mars 35.5 S., 102.7 W.
 Southern Pacific Ocean
 h about 33 km.
 H 10 29 43.5
 eE'' 10 52.7
 26 mars 10.3 S., 73.9 W.
 Peru
 h about 134 km.
 H 23 56 48.4
 iPZ 00 06 12.3 c 1 avril 45.8 N., 151.8 E.
 Kurile Isl.
 h about 40 km.
 H 05 54 19.1
 ePZ 06 06 27.5
 27 mars 8.9 S., 71.3 W.
 Western Brazil
 h about 603 km.
 H 08 26 34.5
 ePZ 08 35 05.5 d
 iPZ 05.7 c
 ipPZ 36 58.6 1 avril 46.3 N., 152.0 E.
 Kurile Isl.
 h about 40 km.
 H 05 57 09.1
 ePZ 06 09 16
 29 mars 2.4 S., 138.5 E.
 West New Guinea
 h about 38 km.
 H 10 33 38.4
 eN'' 11 27 1 avril 4.6 S., 105.8 W.
 Northern Easter Isl. Cordillera
 h about 33 km.
 H 10 41 00.2
 ePZ 10 50 47
 30 mars 11.0 S., 115.5 E.
 South of Bali Isl.
 h about 33 km.
 H 02 08 02.4
 iP'Z 02 27 38.2 d 1 avril 45.7 N., 151.8 E.
 Kurile Isl.
 h about 40 km.
 H 12 23 35.5
 ePZ 12 35 45
 30 mars 16.9 S., 176.9 W.
 Fiji Isl. region
 h about 33 km.
 H 23 04 45.8
 eSSN'' 23 39 38 1 avril 58.4 N., 154.9 W.
 Alaska Peninsula
 h about 96 km.
 H 23 21 12.2
 ePZ 23 29 47
 31 mars 52.1 N., 169.7 W.
 Fox Isl. Aleutian Isl.
 h about 28 km.
 H 02 12 17.8
 iPZ 02 22 06.1 d 2 avril 25.0 S., 175.5 W.
 South of Tonga Isl
 h about 33 km.
 H 17 27 10.6
 eE'' 18 13
 31 mars 63.1 N., 148.5 W.
 Central Alaska
 h about 83 km.

3 avril 19.9 N., 38.5 E.
Red Sea
h about 33 km.
H 07 38 28.4
ePZ 07 51 30

3 avril 20.2 S., 173.7 W.
Tonga Isl.
h about 48 km.
H 12 58 40.9
eN'' 13 25 40

4 avril 2.3 S., 138.7 E.
West New Guinea
h about 11 km.
H 00 37 26.1
eE'' 01 16

4 avril 45.5 N., 152.2 E.
Kurile Isl. region
h about 42 km.
H 03 54 26.2
eE'' 04 37.5

5 avril 20.0 N., 147.1 E.
Mariana Isl. region
h about 50 km.
H 02 34 11.1
eP'Z 02 52 40

5 avril 10.9 N., 43.4 W.
North Atlantic Ridge
h about 33 km.
H 20 41 09.3
ePSN'' 20 45 40

6 avril 19.6 N., 64.2 W.
Virgin Islands
h about 13 km.
H 03 07 05.5
eN'' 03 17.8

6 avril 34.4 N., 139.0 E.
Near S. Coast of Honshu,
Japan
h about 13 km.
H 06 17 29.3
eN'' 06 42

6 avril 34.4 N., 139.1 E.
Near S. Coast of Honshu, Jap.
h about 33 km.
H 08 49 41.3
eN'' 09 38

6 avril 6.3 S., 148.8 E.
New Britain region
h about 43 km.
H 12 01 07.5
eP'Z 12 20 06.5

6 avril 34.3 N., 139.1 E.
Near S. Coast of Honshu, Jap.
h about 15 km.
H 23 28 51.0
eN'' 00 11

8 avril 39.6 N., 82.5 W.
Ohio
h about 33 km.
H 05 40 32.3
iPZ 05 42 40

8 avril 21.9 S., 68.6 W.
Chile-Bolivia border region
h about 122 km.
H 09 30 17.8
iPZ 09 41 00.3 c
ipPZ 30.9

9 avril 4.0 S., 135.8 E.
West New Guinea region
h about 15 km.
H 00 05 07.0
eN'' 00 44

9 avril 7.2 S., 155.8 E.
Solomon Isl.
h about 40 km.
H 08 56 59.7
ePZ 09 15 52.5

9 avril 45.6 N., 151.6 E.
Kurile Isl.
h about 33 km.
H 21 52 34.0
eN'' 22 22

9 avril 17.7 S., 173.0 W.
Tonga Isl. region

h about 70 km.
H 23 57 24.9
eN'' 00 52

10 avril 7.4 S., 155.7 E.
Solomon Isl.
h about 37 km.
H 04 59 53.9
eE'' 05 47

10 avril 7.3 S., 155.8 E.
Solomon Isl.
h about 29 km.
H 15 02 42.2
eSKKSE''15 30 24

10 avril 63.6 S., 167.3 W.
South Pacific Cordillera
h about 33 km.
H 16 47 49.7
eSSE'' 17 27 48

10 avril 58.6 N., 154.3 W.
Alaska Peninsula
h about 86 km.
H 19 57 34.4
iPZ 20 06 07.3

10 avril 7.3 S., 155.9 E.
Solomon Isl.
h about 39 km.
H 21 49 19.5
eN'' 22 47

11 avril 3.3 S., 119.2 E.
Celebes
h about 21 km.
H 05 09 12.1
eN'' 06 07

11 avril 23.2 S., 68.8 W.
Northern Chile
h about 93 km.
H 10 40 21.5
iPZ 10 51 15.2 d
ipPZ 39.3

11 avril 18.8 N., 62.7 W.
Leeward Isl.
h about 49 km.
H 12 42 47.7

eSE'' 12 53 22

12 avril 56.2 N., 136.0 W.
Off Coast of Southeastern
Alaska
h about 37 km.
H 00 54 42.1
eN'' 01 14

12 avril 3.1 S., 148.1 E.
Bismarck Sea
h about 54 km.
H 02 00 15.9
eN'' 03 06

12 avril 19.3 N., 63.6 W.
Leeward Isl.
h about 38 km.
H 04 40 53.0
eSE'' 04 51 20

12 avril 5.3 N., 96.5 E.
Northern Sumatra
h about 55 km.
H 04 51 40.2
eP'Z 05 10 44.5

12 avril 12.2 N., 88.1 W.
Off Coast of Central America
h about 49 km.
H 04 56 26.8
iPZ 05 03 19.7

12 avril 1.5 S., 155.8 E.
Solomon Isl.
h about 49 km.
H 13 46 05.0
eE'' 14 33

13 avril 52.1 N., 157.6 E.
Kamchatka
h about 50 km.
H 18 40 07.7
iPZ 18 51 34.5 c

13 avril 18.5 N., 100.2 W.
Guerrero, Mexico
h about 86 km.
H 19 59 51.5
iPZ 20 06 35.3

14 avril 7.6 S., 128.0 E.
Banda Sea
h about 97 km.
H 04 34 21.2
eN'' 05 01

14 avril 17.5 N., 100.2 W.
Guerrero, Mexico
h about 62 km.
H 05 18 35.8
iPZ 05 25 29.8 c

14 avril 25.6 N., 109.5 W.
Gulf of California
h about 33 km.
H 10 04 17.3
ePZ 10 11 13.5

15 avril ePZ 16 11 53

16 avril 46.4 N., 153.3 E.
Kurile Isl.
h about 24 km.
H 10 10 06.7
ePZ 10 22 12

18 avril 11.7 N., 89.2 W.
Near Coast of Nicaragua
h about 113 km.
H 08 29 17.1
iPZ 08 36 06

19 avril 18.8 N., 69.6 W.
Dominican Republic region
h about 103 km.
H 21 57 05.1
iPZ 22 02 38.5 c

20 avril 5.5 S., 129.7 E.
Banda Sea
h about 163 km.
H 00 01 24.9
eP'Z 00 20 26
iZ 23 38.1

21 avril 5.4 S., 126.9 E.
Banda Sea
h about 33 km.
H 08 14 25.0
eN'' 08 37.5

22 avril 5.6 S., 126.8 E.
Banda Sea
h about 33 km.
H 08 37 25.5
eP'Z 08 55 32

22 avril 8.3 N., 82.8 W.
Panama Costa Rica border
region
h about 40 km.
H 14 43 21.4
ePZ 14 50 38

23 avril 36.3 N., 2.4 E.
Algeria
h about 33 km.
H 09 30 22.0
iPZ 09 40 00.8 c

23 avril 8.1 N., 83.3 W.
Costa Rica
h about 40 km.
H 22 25 27.4
e(P)Z 22 32 45

25 avril 32.9 S., 69.0 W.
Mendoza Province, Argentina
h about 39 km.
H 10 36 14.3
ePN 10 48 11

26 avril 30.9 N., 114.3 W.
Gulf of California
h about 33 km.
H 07 18 18.4
eE'' 07 36.5

26 avril 16.5 S., 175.6 E.
Fiji Isl. region
h about 116 km.
H 21 46 41.2
eE'' 22 41

27 avril 1.8 S., 138.7 E.
Near N. Coast of West
New Guinea
h about 33 km.
H 08 09 47.9
eN'' 08 48

29 avril 51.2 N., 130.4 W.
Queen Charlotte Isl. region
h about 6 km.
H 00 04 41.8
iPZ 00 12 59.5

29 avril 51.4 N., 178.3 W.
Andreanof Isl. Aleutian Isl.
h about 50 km.
H 03 55 20.8
ePZ 04 06 47.5

30 avril iPZ 07 35 03.0 d
30 avril 8.5 S., 74.9 W.
Peru-Brazil border region
h about 137 km.
H 08 39 07.8
iPZ 08 48 17.9 d

30 avril 59.9 N., 153.9 W.
Southern Alaska
h about 146 km.
H 11 11 45.1
ePZ 11 20 41.5

30 avril 14.3 N., 91.3 W.
Guatemala
h about 16 km.
H 16 28 15.1
ePZ 16 35 07

30 avril 1.8 S., 138.7 E.
Near N. Coast of West
New Guinea
h about 33 km.
H 16 59 00.6
eP'Z 17 18 06

1 mai 39.7 N., 21.3 E.
Greece
h about 15 km.
H 07 09 00.5
iPZ 07 19 49.5 d

4 mai 55.7 S., 27.9 W.
South Sandwich Isl. region
h about 33 km.
H 08 17 32.1
eP'Z 08 36 18

4 mai 19.7 S., 176.2 W.
Fiji Isl. region
h about 33 km.
H 10 18 58.0
eN'' 11 05

4 mai 30.6 N., 114.3 W.
Gulf of California
h about 28 km.
H 22 34 49.7
ePZ 22 41 41

5 mai 59.3 N., 151.4 W.
Kenai Peninsula, Alaska
h about 57 km.
H 15 07 49.5
eN'' 15 27 30

5 mai 8.0 S., 107.2 E.
Java
h about 33 km.
H 17 38 05.3
eN'' 18 47

6 mai 55.6 S., 26.3 W.
South Sandwich Isl. region
h about 33 km.
H 08 31 15.8
eN'' 09 31.5

6 mai 15.1 N., 92.4 W.
Mexico-Guatemala border
region
h about 121 km.
H 12 39 44.2
ePZ 12 46 41

6 mai 19.3 N., 70.0 W.
Dominican Republic region
h about 39 km.
H 14 00 41.4
ePZ 14 06 15

6 mai 6.9 N., 77.5 W.
Near W. Coast of Colombia
h about 33 km.
H 19 39 23.9
ePZ 19 46 47

7 mai 52.2 N., 171.9 W.

Fox Isl. Aleutian Isl.	Chile-Bolivia border region	h	about 41 km.	Southern California
h	h	H	11 22 31.6	h
H	H	iPZ	11 35 12.3	h
ePZ	iPZ			H
	ipPZ			eN''
7 mai 37.0 N., 115.0 W.		19 mai 13.2 N., 89.5 W.		21 mai 1.0 S., 101.5 E.
Southern Nevada	13 mai 56.5 N., 152.6 W.	El Salvador		Southern Sumatra
h	Kodiak Isl. region	h	about 83 km.	h
H	h	H	07 52 03.1	h
eN''	H	iPZ	07 58 48.0 c	H
	ePZ	ipPZ	59 05.4	iPZ
8 mai 13.0 N., 80.2 W.		20 mai 19.8 N., 146.0 E.		22 mai 20.3 N., 65.9 W.
Off Coast of Central America	14 mai 20.6 S., 68.9 W.	Mariana Isl. region		North Atlantic Ocean
h	Chile-Bolivia border region	h	about 42 km.	h
H	h	H	02 51 09.4	H
ePZ	H	eN''	03 40	ePZ
	iPZ			
9 mai 44.2 N., 149.0 E.	ipPZ	20 mai 16.1 N., 75.2 W.		22 mai 15.0 N., 94.6 W.
Kurile Isl.	15 mai 34.6 N., 26.7 E.	Off Coast of Peru		Near Coast of Oaxaca, Mex.
h	Crete	h	about 16 km.	h
H	h	H	06 33 40.8	H
ePZ	H	ePZ	06 43 57	eN''
	ePZ			
9 mai 56.6 N., 152.6 W.		20 mai 13.3 N., 90.4 W.		23 mai 44.6 N., 150.5 E.
Kodiak Isl. region	15 mai 10.3 S., 74.6 W.	Near Coast of Guatemala		Kurile Isl. region
h	Peru	h	about 108 km.	h
H	h	H	07 48 52.0	H
eE''	H	ePZ	07 55 38	ePZ
	iPZ			
9 mai 56.6 N., 152.3 W.		20 mai 23.3 S., 69.3 W.		23 mai iPZ 14 06 34.9
Kodiak Isl. region	16 mai 13.5 N., 90.6 W.	Northern Chile		23 mai 13.4 N., 90.7 W.
h	Near Coast of Guatemala	h	about 98 km.	Near Coast of Guatemala
H	h	H	12 52 06.6	h
ePZ	H	iPZ	13 03 01.0 c	H
	ePZ			eN''
9 mai 5.2 N., 127.5 E.		20 mai 59.2 S., 65.7 W.		27 mai 51.9 N., 176.1 E.
Philippine Isl. region	16 mai 60.8 N., 143.7 W.	Drake Passage		Rat Isl. Aleutian Isl.
h	Southern Alaska	h	about 33 km.	h
H	h	H	13 02 09.3	h
iP'Z	H	eE''	13 46	H
	eN''			iPZ
10 mai iPZ 16 01 07.7		20 mai iPZ 15 06 33.9 d		
11 mai 6.8 N., 73.1 W.	17 mai 41.9 N., 144.6 E.	21 mai 27.9 N., 111.3 W.		28 mai 52.1 N., 175.0 E.
Northern Colombia	Hokkaido, Japan region	Gulf of California		Rat Isl. Aleutian Isl.
h	h	h	about 33 km.	h
H	H	H	07 18 12.8	H
iPZ	eE''	ePZ	07 25 00.5	ePZ
ipPZ				
11 mai 20.3 S., 65.5 W.	18 mai 41.9 N., 144.7 E.	21 mai 33.5 N., 116.6 W.		
	Hokkaido, Japan region			

29 mai 43.3 N., 145.7 E.
 Hokkaido, Japan region
 h about 88 km.
 H 21 01 44.3
 iPZ 21 14 10.5

30 mai 24.2 N., 108.7 W.
 Gulf of California
 h about 33 km.
 H 14 27 37.4
 ePZ 14 34 32

31 mai 12.5 N., 60.3 W.
 Windward Isl.
 h about 60 km.
 H 11 38 39.0
 iPZ 11 45 26.9 d

1 juin 53.7 N., 165.6 W.
 Fox Isl. Aleutian Isl.
 h about 60 km.
 H 03 36 19.0
 iPZ 03 45 53.1 c

1 juin 53.9 N., 160.6 E.
 Near E. Coast of Kamchatka
 h about 28 km.
 H 10 16 09.4
 ePZ 10 27 24

1 juin 44.5 N., 149.0 E.
 Kurile Isl.
 h about 58 km.
 H 11 03 52.4
 ePZ 11 16 11.5

1 juin 6.8 S., 155.0 E.
 Solomon Isl.
 h about 31 km.
 H 20 47 45.6
 eP'Z 21 06 40

2 juin 0.9 N., 28.4 W.
 Central Mid-Atlantic Ridge
 h about 33 km.
 H 06 31 28.4
 ePZ 06 40 33

3 juin 10.8 S., 79.0 W.
 Near Coast of Peru
 h about 33 km.
 H 01 21 20.2
 eN'' 01 48.4

h about 33 km.
 H 06 11 07.8
 ePZ 06 20 47

3 juin 58.4 N., 151.2 W.
 Kodiak Isl. region
 h about 32 km.
 H 09 08 56.4
 ePZ 09 17 24

3 juin 8.5 S., 74.4 W.
 Peru-Brazil border region
 h about 152 km.
 H 13 08 06.8
 iPZ 13 17 15.8

4 juin 51.4 N., 159.3 E.
 Off E. Coast of Kamchatka
 h about 9 km.
 H 05 26 44.6
 ePZ 05 38 24

4 juin 51.5 N., 159.3 E.
 Off E. Coast of Kamchatka
 h about 12 km.
 H 06 23 38.4
 ePZ 06 35 10

4 juin 51.5 N., 159.2 E.
 Off E. Coast of Kamchatka
 h about 33 km.
 H 06 34 26.3
 ePZ 06 45 54

4 juin 33.6 N., 90.9 W.
 Mississippi
 h about 33 km.
 H 16 14 13.6
 ePZ 16 18 16.5

4 juin 15.5 S., 75.7 W.
 Near Coast of Peru
 h about 38 km.
 H 18 28 39.6
 ePZ 18 38 48

5 juin 21.3 S., 174.5 W.
 Tonga Isl.
 h about 33 km.
 H 01 21 20.2
 eN'' 01 48.4

7 juin 17.1 N., 99.9 W.
 Guerrero, Mexico
 h about 47 km.
 H 07 06 33.2
 ePZ 07 13 30

8 juin 21.4 S., 170.3 E.
 Loyalty Isl. region
 h about 90 km.
 H 13 22 13.7
 eE'' 13 59.2

10 juin 41.3 S., 73.6 W.
 Near Coast of S. Chile
 h about 37 km.
 H 05 26 44.4
 ePZ 05 39 24

10 juin 16.4 N., 46.6 W.
 North Atlantic Ridge
 h about 33 km.
 H 18 04 39.6
 ePZ 18 11 47

11 juin iP_nZ 01 50 05.6 c
 iS_nZ 27.1

11 juin 10.8 S., 115.1 E.
 South of Bali Isl.
 h about 46 km.
 H 15 21 06.5
 iP'Z 15 40 40.9

12 juin 16.6 N., 46.6 W.
 North Atlantic Ridge
 h about 33 km.
 H 00 05 06.5
 eZ 00 12 12
 iPZ 13.6 d

12 juin 38.2 N., 22.7 E.
 Greece
 h about 33 km.
 H 02 51 05.5
 ePZ 03 02 04

12 juin 44.9 S., 35.7 E.
 Prince Edward Isl. region
 h about 36 km.
 H 05 21 10.6
 eZ 05 40 29

12 juin 47.4 N., 154.3 E.
 Kurile Isl.
 h about 56 km.
 H 23 22 45.3
 ePZ 23 34 40.5

13 juin 42.9 N., 78.2 W.
 New York
 h about 5 km.
 H 19 08 54.4
 iP_nZ 19 10 00.2

14 juin 14.9 S., 73.4 W.
 Peru
 h about 99 km.
 H 03 14 17.5
 ePZ 03 24 16

14 juin 15.2 S., 173.6 W.
 Tonga Isl.
 h about 11 km.
 H 05 06 16.3
 eE'' 05 04

14 juin 47.5 N., 154.4 E.
 Kurile Isl.
 h about 55 km.
 H 08 05 58.6
 ePZ 08 17 54

14 juin 47.5 N., 154.5 E.
 Kurile Isl.
 h about 53 km.
 H 08 13 02.2
 iPZ 08 24 57.8 d

16 juin 55.7 S., 146.8 E.
 West of Macquarie Isl.
 h about 27 km.
 H 05 44 02.2
 iP'Z 06 04 02.0 d

16 juin 55.6 S., 147.3 E.
 West of Macquarie Isl.
 h about 33 km.
 H 06 03 16.6
 eP'Z 06 23 13

16 juin 15.0 S., 75.6 W.
 Near Coast of Peru
 h about 22 km.
 H 10 01 34.7

iPZ 10 11 43.0 d

16 juin 8.8 N., 77.6 W.
Panama-Colombia border region
h about 78 km.
H 20 23 00.3
iPZ 20 30 02.7

16 juin 9.0 N., 77.3 W.
Near N. Coast of Colombia
h about 14 km.
H 21 19 44.0
iPZ 21 26 53.4 c

17 juin 4.5 S., 104.7 W.
Northern Easter Isl. Cordillera
h about 33 km.
H 00 56 29.4
ePZ 01 06 15

17 juin 58.3 S., 26.6 W.
South Sandwich Isl. region
h about 140 km.
H 05 00 11.8
eP'Z 05 18 29
eZ 29 28

17 juin 14.1 N., 90.0 W.
Guatemala
h about 103 km.
H 17 43 55.2
iPZ 17 50 34.0 d

18 juin 6.9 N., 73.0 W.
Northern Colombia
h about 151 km.
H 02 26 05.0
ePZ 02 33 15.5

19 juin 52.7 N., 166.9 W.
Fox Isl. Aleutian Isl.
h about 33 km.
H 17 07 45.4
iPZ 17 17 30.6 c
iSE'' 25 27

20 juin 52.8 N., 167.1 W.
Fox Isl. Aleutian Isl.
h about 31 km.
H 05 25 22.4
iPZ 05 35 08.0 d

20 juin 52.8 N., 167.1 W.
Fox Isl. Aleutian Isl.
h about 11 km.
H 07 38 44.9
iPZ 07 48 33.8 c

21 juin 2.2 S., 77.6 W.
Peru-Ecuador border region
h about 49 km.
H 06 49 56.6
iPZ 06 58 33.6 c

21 juin 64.8 N., 147.4 W.
Central Alaska
h about 17 km.
H 18 04 49.5
iPZ 18 12 52.7 c

21 juin 64.8 N., 147.4 W.
Central Alaska
h about 17 km.
H 18 13 02.9
iPZ 18 21 06

21 juin 64.8 N., 147.4 W.
Central Alaska
h about 17 km.
H 18 24 45.7
iPZ 18 32 48.1

21 juin 25.2 S., 70.5 W.
Near Coast of N. Chile
h about 23 km.
H 20 09 28.4
iPZ 20 20 42.9 d

22 juin 51.7 N., 176.8 W.
Andreanof Isl. Aleutian Isl.
h about 54 km.
H 15 36 38.9
eN'' 16 07.5

22 juin 1.3 S., 149.8 E.
New Ireland region
h about 34 km.
H 19 08 33.5
eN'' 20 05

23 juin 15.0 S., 172.3 W.
Samoa Isl. region
h about 33 km.
H 00 25 29.8
eN'' 01 10

23 juin 5.8 S., 130.5 E.
Banda Sea
h about 85 km.
H 05 05 04.8
eP'Z 05 24 17
iZ 27 36.7

23 juin 64.8 N., 147.5 W.
Central Alaska
h about 9 km.
H 11 54 33.5
ePZ 12 02 36

23 juin 19.2 S., 167.7 E.
New Hebrides Isl. region
h about 37 km.
H 21 30 11.5
eP'Z 21 49 05.5

24 juin 14.3 N., 92.6 W.
Near Coast of Chiapas, Mex.
h about 91 km.
H 07 51 46.5
ePZ 07 58 31

24 juin 15.5 S., 74.0 W.
Near Coast of Peru
h about 90 km.
H 18 07 28.5
ePZ 18 17 31

24 juin 12.5 N., 141.6 E.
South of Mariana Isl.
h about 18 km.
H 21 00 23.9
eN'' 21 29.5

25 juin 12.4 N., 141.8 E.
South of Mariana Isl.
h about 42 km.
H 23 18 04.3
eN'' 23 47

26 juin 18.4 N., 105.2 W.

Off Coast of Jalisco, Mexico
h about 45 km.
H 02 22 34.8
iPZ 02 29 48.0 c

27 juin 51.3 N., 180.0
Andreanof Isl, Aleutian Isl.
h about 26 km.
H 20 32 59.3
eN'' 21 03

27 juin 46.4 S., 96.0 E.
Southeast Indian Rise
h about 33 km.
H 21 37 48.1
eN'' 22 25

28 juin 46.0 N., 151.5 E.
Kurile Isl.
h about 33 km.
H 01 10 03.9
iPZ 01 22 13.9 d

28 juin 47.0 S., 165.8 E.
Off W. Coast of S. Isl., N.Z.
h about 37 km.
H 14 34 04.5
eN'' 15 33

29 juin 5.2 N., 82.7 W.
South of Panama
h about 33 km.
H 02 52 50.1
ePZ 03 00 32

29 juin 15.8 S., 172.4 W.
Samoa Isl. region
h about 14 km.
H 09 25 47.4
eZ'' 10 21

29 juin 7.2 S., 128.6 E.
Banda Sea
h about 121 km.
H 16 36 15.7
iP'Z 16 55 21.3 d

29 juin 21.5 S., 68.6 W.
Chile-Bolivia border region
h about 122 km.

H	18	45	34.4
iPZ	18	56	14.5 d

30 juin 52.0 N., 175.3 E.

Rat Isl. Aleutian Isl.

h	about 62 km.		
H	19	29	59.5
ePZ	19	40	41.5

1 juil. 0.8 S., 98.7 E.

Southern Sumatra

h	about 26 km.		
H	07	28	57.6
eN"	08	01.2	

1 juil. iP_nZ 14 09 56.0

1 juil. iP_nZ 15 56 47.0

1 juil. iP_nZ 16 06 26.0

1 juil. iP_nZ 16 12 07.9

M. Buist, S. J.

2 FEB 1969

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BULLETIN SEISMOLOGIQUE

(1 JUILLET 1967 AU 31 DECEMBRE 1967)

Observatoire de Géophysique

COLLÈGE JEAN-DE-BRÉBEUF

MONTREAL

OBSERVATOIRE DE GÉOPHYSIQUE

COLLÈGE JEAN-DE-BRÉBEUF

3200 Chemin Ste-Catherine

Montréal 26, Canada.

Directeur: M. Buist, S.J.

Directeur des Recherches: E. Gherzi, S.J.

NOTE ON THE CURRENT DENSITY AND THE POTENTIAL GRADIENT
AT NIGHT HOURS WITH FAIR WEATHER CONDITIONS (no clouds,
light wind or calm) AT BREBEUF COLLEGE, MONTREAL.

by E. Gherzi, S. J.

The variations of the air-earth current and of the potential gradient, happen most of the time during day-light hours, when moderate and strong convections are caused by the sun's activity, by the turbulence raised by industrial air pollution or by local storms.

Nevertheless, even during periods of the so-called "fair weather", some moderate convections do still form when the sun is over the horizon.

At the Brébeuf College, we have chosen for our research, 3 central hours of the night, namely: 00.00, 01.00 and 02.00 hours E. S. T., when a temperature equilibrium should exist and the exchange layer remains steady at a same height.

The synoptic conditions of the atmosphere at those 3 hours, were found in the Daily Weather Maps issued by the Washington Weather Bureau, for 01h local E. S. T. The meteorological values of the temperature, of the humidity, of the wind (speed and direction) and of the clouds percentage (0-8) given in the synoptic message, were checked with those of the local surface weather, obtained at the Dorval Airfield of Montreal.

We compiled two TABLES: one for the year of 1964 and the other for the year of 1965; these years being those of the International research period of the "quiet sun" (IQSY).

In each Table, we give for each month of the year, the mean values of the air-earth current and those of the electric potential gradient, recorded at the 3 hours already mentioned, around midnight.

The air-earth current figures are underlined only for avoiding confusion with those belonging to the electric gradient. Moreover, we added the corresponding mean values of both electric parameters during the same months, obtained also in "fair weather conditions" with 24 observations per day. The differences between the two "General Means" are also shown in the last column of the two Tables.

Before attempting any discussion of the data, we have to remind the reader that in order to avoid recording small variations of the electric gradient, we had decreased the sensitivity of the electrometer, so much so, that the smallest voltage value readable was that of about 20 volts. We must note also that the width of the recorded ink line covers about a 10 volts value. The figures of the air-earth density current are more exact as fractions of the reference value $10^{-12}/m^2$.

Allowing for these instrumental handicaps, which should apply equally at random positively or negatively to all figures, the Tables show striking similarities. Although the winter months are somewhat discordant, during 8 months, the monthly electric values obtained during the three central night hours, are very close to the monthly means with 24 hours observations. It looks as if some meteorological elements did not have a great influence on the behaviour and the trend of the two electric parameters. At night, the temperature is often much lower than during days with sunshine (fair weather conditions) and the relative humidity is much higher. Also the action, in summer, of thundery atmospherics arrived from distant stations and which are stronger at night than in daylight hours, does not appear to have affected unequally the values of the recordings.

How to explain the striking, although not perfect, similarity of the two Tables? Longer yearly series should be at hand.

Did the technique used give the values of the "global electric conditions" prevailing all year long at our station? A similar comparison of the central night hours figures with those of the 24 hours series, made in other places, could perhaps show if our impression of having obtained the "global electric field" for the Brébeuf College station, is correct or by how much it is wrong.

Of course, as stated, some months (winter season) show a real discrepancy which might not be due only to the 10 to 20 volts reading uncertainty of our records. Nevertheless, such a difference of the two Tables is not very great and cannot be compared with the differences existing between successive months in the 24 hours observations series, all year long. (1)

REFERENCES

- (1) GHERZI, E. 1967. - "Atmospheric Electricity at Brébeuf College Geophysical Observatory in Montreal, Canada." pp. 239-265 "Pure and Applied Geophysics" Birkhäuser Verlag, Basel. Vol. 67, 1967/II.

FAIR WEATHER (no clouds, light wind or calm) AIR-EARTH CURRENT DENSITY ($10^{-12}A/m^2$) AND ELECTRIC GRADIENT (Volts/m $\times 10^{-1}$)

		1964					
		Hourly Means E. S. T.			Night hrs. Night hrs. Means	24 hrs. Means	Differences
		00h	01h	02h			
January	I	3.0	3.7	3.5	3.4	3.4	$0.0 \times 10^{-12}A/m^2$
	E	89.3	101.7	102.8	98.3	117.0	+18.7 Volts/m
February		3.4	4.2	4.0	3.9	4.5	+0.6
		127.7	133.3	120.9	127.7	153.1	+25.4
March		2.7	2.7	3.1	2.8	3.7	+0.9
		62.1	67.8	62.1	64.4	91.0	+26.6
April		3.4	4.0	3.7	3.7	4.1	+0.4
		87.0	89.3	94.9	90.4	92.7	+2.3
May		3.6	3.8	4.1	3.7	3.7	0.0
		55.4	55.4	57.6	55.4	57.1	+1.7
June		5.2	5.5	5.6	5.4	5.2	-0.2
		73.4	72.3	65.5	70.1	70.6	+0.5
July		5.8	6.2	6.1	6.1	5.6	-0.5
		68.9	66.7	61.0	65.5	79.7	+14.2
August		5.3	5.3	5.8	5.5	5.3	-0.2
		65.5	67.8	71.2	67.8	77.4	+9.6
September		4.9	4.9	5.1	5.0	5.3	+0.3
		55.4	58.8	56.5	56.5	68.9	+12.4
October		4.3	5.3	5.5	5.0	6.4	+1.4
		72.3	70.1	63.3	68.9	86.4	+17.5
November		4.7	6.5	6.6	6.0	7.4	+1.4
		129.9	128.8	113.0	124.3	119.0	-5.3
December		7.5	7.5	8.1	7.7	8.0	+0.3
		98.3	110.7	114.1	107.3	133.3	+26.0
					Mean	Mean	Mean
					83.0V/m	95.6V/m	+12.6V/m

FAIR WEATHER (no clouds, light wind or calm)
 AIR-EARTH CURRENT DENSITY (10^{-12}A/m^2)
 AND ELECTRIC GRADIENT (Volts/m $\times 10^{-1}$)

1965

	Hourly Means E. S. T.			Night hrs.	24 hrs.	Differences
	00h	01h	02h	Means	Means	
January	6.1	5.9	5.2	5.7	5.7	0.0×10^{-12}
	151.4	166.1	176.3	164.6	180.8	+16.2 Volts/m
February	3.3	3.1	3.2	3.2	4.0	+0.8
	125.4	129.9	128.8	128.1	136.1	+8.0
March	3.1	3.2	4.2	3.5	4.1	+0.6
	144.6	129.9	135.6	136.7	144.0	+7.3
April	4.3	4.3	4.2	4.3	4.0	+0.3
	145.8	142.4	159.3	149.2	140.7	-8.5
May	3.6	4.3	4.2	4.1	3.9	-0.2
	67.8	74.6	81.4	74.6	77.4	+2.8
June	4.3	3.8	3.5	3.9	4.3	+0.4
	72.3	70.1	66.7	70.1	80.2	+10.1
July	4.7	3.5	5.9	5.4	5.0	-0.4
	57.6	49.7	47.5	52.0	64.4	+12.4
August	4.7	5.1	6.4	5.4	5.5	+0.1
	64.4	53.1	62.2	59.9	72.3	+12.4
September	5.6	6.7	6.2	6.2	5.5	-0.7
	59.9	55.4	58.8	57.6	77.4	+19.8
October	5.1	4.8	6.7	5.5	5.7	+0.2
	72.3	66.7	71.2	70.1	81.9	+11.8
November	4.3	4.6	5.4	4.8	5.6	+0.8
	75.7	82.5	67.8	75.7	94.4	+18.7
December	12.6	12.2	12.5	12.4	?	?
	88.1	85.9	75.7	83.6	98.3	+14.7
				Mean	Mean	Mean
				93.6V/m	104.0V/m	+10.4V/m

ATMOSPHERIC ELECTRICITY

"Standard Program" for first half of 1968

Date	Time (GMT)	Absolute Potential (Volts)	One-meter Potential (Volts/m)	Current Density 10^{-13}A/m^2
3 Jan	00:00	M	M	90
10 Jan	06:00	1350	152	54
17 Jan	12:00	1600	181	74
24 Jan	18:00	1900	215	74
31 Jan	00:00	600	68	100
7 Feb	06:00	2000	226	90
14 Feb	12:00	600	68	>150
21 Feb	18:00	>3000	>339	D
28 Feb	00:00	1000	113	22
6 March	06:00	1750	198	-12
13 March	12:00	D	D	D
20 March	18:00	800	90	>150
27 March	00:00	900	102	126
3 April	06:00	650	73	8
10 April	12:00	1200	136	>150
17 April	18:00	1000	113	12
24 April	00:00	750	85	62
1 May	06:00	50	6	86
8 May	12:00	1550	175	38
15 May	18:00	950	107	28
22 May	00:00	550	62	6
29 May	06:00	1250	141	18
5 June	12:00	1350	152	>150
12 June	18:00	650	73	>150
19 June	00:00	500	56	20
26 June	06:00	800	90	>150

D: electrically disturbed. M: missing.

One-meter potential = 0.113 Absolute potential.

RAYONNEMENT SOLAIRE

1968

DATE	Rayonnement total						Rayonnement diffus					
	Janvier	Février	Mars	Avril	Mai	Juin	Janvier	Février	Mars	Avril	Mai	Juin
1	173	204	155	363	383	614	47	108	145	177	295	272
2	112	96	324	492	582	212	90	87	135	130	240	194
3	67	74	263	481	573	618	67	73	185	120	199	223
4	57	208	338	108	420	568	57	90	115	92	276	238
5	170	129	(343)	(415)	470	423	50	124	(111)	170	310	289
6	104	114	M	546	676	254	93	113	M	112	119	245
7	146	261	369	536	M	175	99	59	121	112	M	175
8	182	259	259	313	M	480	52	87	138	204	251	356
9	151	233	309	(165)	M	162	93	106	139	(144)	249	155
10	173	170	46	559	M	574	54	137	44	90	233	304
11	173	170	400	528	622	365	58	151	93	124	200	352
12	189	208	195	521	293	424	45	149	180	123	283	320
13	170	236	159	398	618	181	62	143	158	258	143	164
14	122	163	455	474	681	703	115	160	98	186	259	160
15	M	297	282	319	579	455	M	96	232	187	311	308
16	196	316	84	582	495	454	47	72	83	84	303	340
17	132	274	194	590	118	661	103	105	M	98	109	245
18	48	209	368	587	197	535	48	163	M	88	191	205
19	18	301	403	523	203	163	18	M	107	175	196	138
20	145	332	76	566	140	194	64	(77)	76	123	128	182
21	142	315	62	533	444	594	65	M	62	157	305	236
22	82	140	40	352	608	51	82	(87)	39	308	223	51
23	25	346	27	507	710	442	25	(72)	27	176	(174)	308
24	214	354	176	180	557	137	55	(64)	M	145	(193)	135
25	212	357	499	444	591	283	68	67	96	217	M	252
26	99	355	433	124	715	649	99	162	192	121	M	218
27	171	284	234	176	720	150	72	173	191	162	M	148
28	67	213	254	617	698	84	67	186	209	168	(165)	82
29	14	211	294	625	369	352	14		187	149	253	266
30	69		407	306	589	587	69		141	241	308	194
31	201		353		186		116		213		176	
Moyenne	127	235	260	431	491	385	66	113	130	155	223	225

Unité de mesure: 1 langley (= 1 calorie-gramme par cm²) M: manquant.

REPRODUCTIONS D'ENREGISTREMENTS DE SEISMES
OBTENUS AVEC UN INTENSIFICATEUR DE LUMIERE.

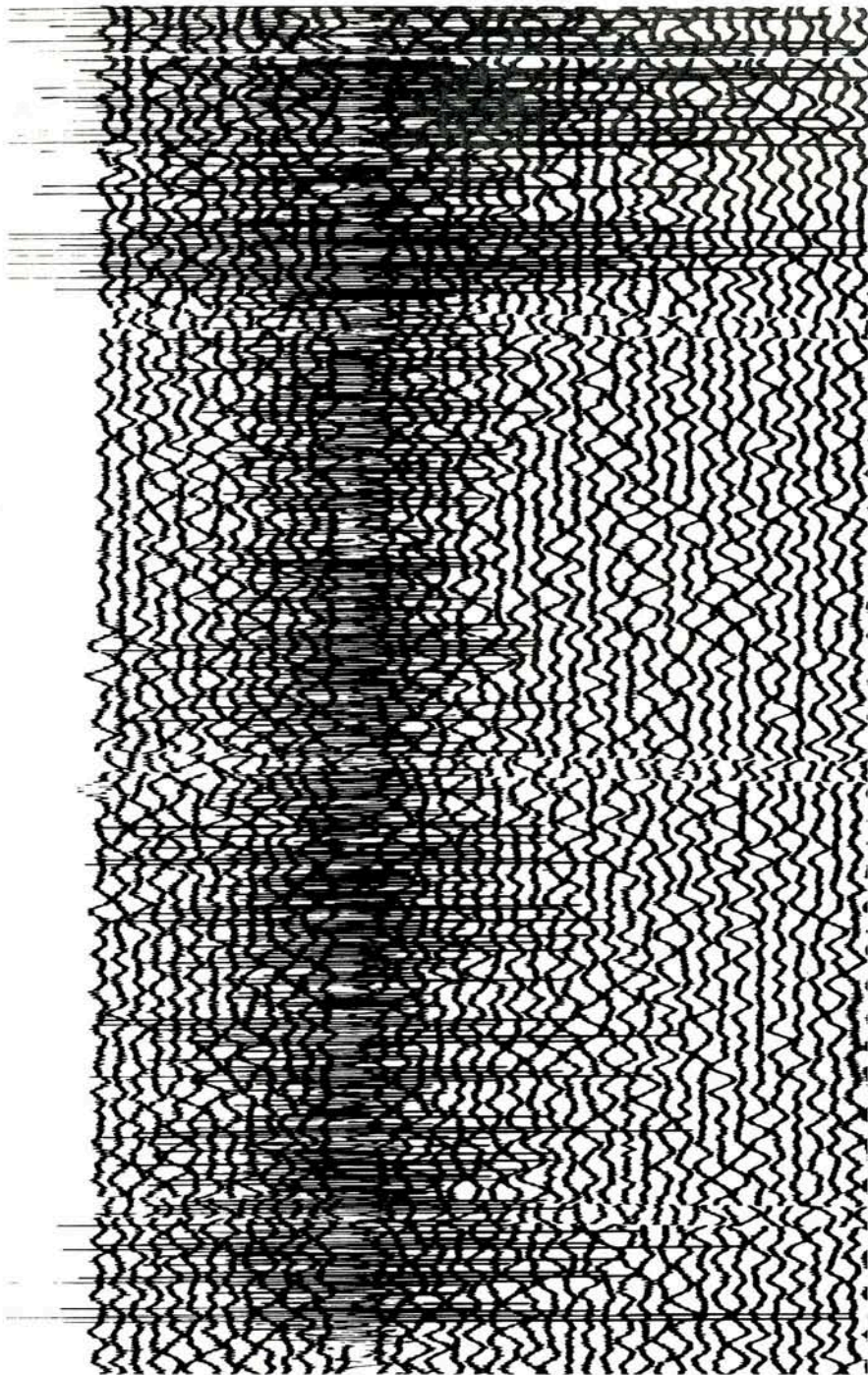
Depuis septembre 1966 la station sismologique du Collège Brébeuf utilise un intensificateur automatique de lumière sur l'enregistreur photographique du sismographe vertical courte période. Le but de cet intensificateur est de produire un tracé également noir quelle que soit la vitesse du spot lumineux sur le papier photographique. On sait que le tracé disparaît lorsque le tremblement de terre est intense et que le spot lumineux se promène avec une vitesse trop grande pour impressionner le papier photographique.

Une description de ce système ainsi que les valeurs des pièces électroniques qui le composent ont déjà été publiées par L. Bourgeois, S. J. and M. Buist, S. J. (1967), mais nous avons cru que quelques personnes seraient peut-être intéressées à voir les résultats que nous obtenons avec cet intensificateur de lumière tels qu'illustrés dans les fig. I et II.

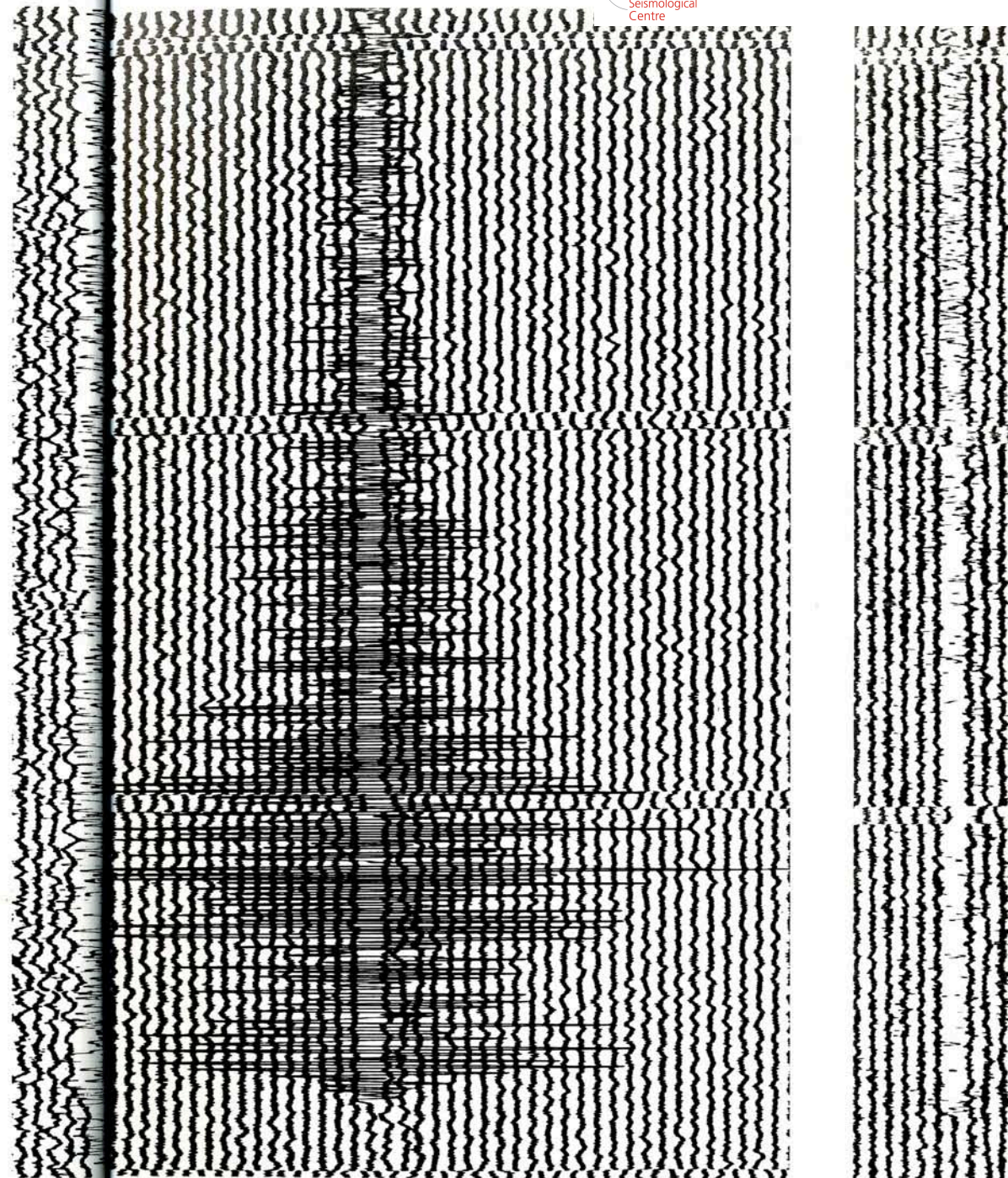
Références

Bourgeois, S. J. et M. Buist, S. J. (1967). An Automatic Spot Brightness Control for Photographic Recorders, Bull. Seism. Soc. Am. 57, 817-820.

N.B. Nous désirons exprimer notre reconnaissance à National Semiconductors Ltd. de St. Laurent P.Q., pour la collaboration qu'ils nous ont apportée dans la fabrication des cellules photoélectriques.



Séisme du Centre des Etats-Unis: 9 novembre 1968.
Z enregistré avec l'intensificateur automatique de la lumière.
N-S sans l'intensificateur.



Séisme du Chili: 21 décembre 1967.
Z enregistré avec l'intensificateur automatique de la lumière.
N-S sans l'intensificateur.

INSTRUMENTS DE LA STATION

3 sismographes Benioff de 100 kg. avec 6 galvanomètres.
 $t_0=1$ sec., $t_g=0.2$ sec. pour ZNE. Enregistreur, 60mm/min.
 $t_g=6$ sec. pour Z'N'E'. Enregistreur, 30mm/min.
 3 sismographes Sprengnether, type Columbia Z''N''E''.
 Avant le 13 février 1964, $t_0=17$ sec., $t_g=100$ sec.
 Après le 13 février 1964, $t_0=30$ sec., $t_g=100$ sec. pour Z''N''E''.
 Enregistreur, 15mm/min.

Le 13 février 1964, l'amplification des Columbia a été augmentée. Cf. graphiques.

Dans notre bulletin, nous indiquons toujours sur quel sismogramme chaque phase a été lue en ajoutant après cette phase une des lettres suivantes:

ZNE pour celles données par les Benioff avec galvanomètres de 0.2 sec.
 Z'N'E' pour celles données par les Benioff avec galvanomètres de 6 sec.
 Z''N''E'' pour celles données par les Columbia avec galvanomètres de 100 sec.

L'heure est inscrite à chaque minute sur les sismogrammes par la Société Radio-Canada au moyen d'une ligne téléphonique avec une précision de ± 0.1 sec. à l'année. Cette Société nous fournit en même temps un courant alternatif de 60 cycles de fréquence absolument constante, pour les moteurs des enregistreurs. De plus le signal horaire de l'Observatoire du Dominion relayé par le poste local de radio CBF, à 01 00 00 p.m. s'enregistre automatiquement sur tous les sismogrammes.

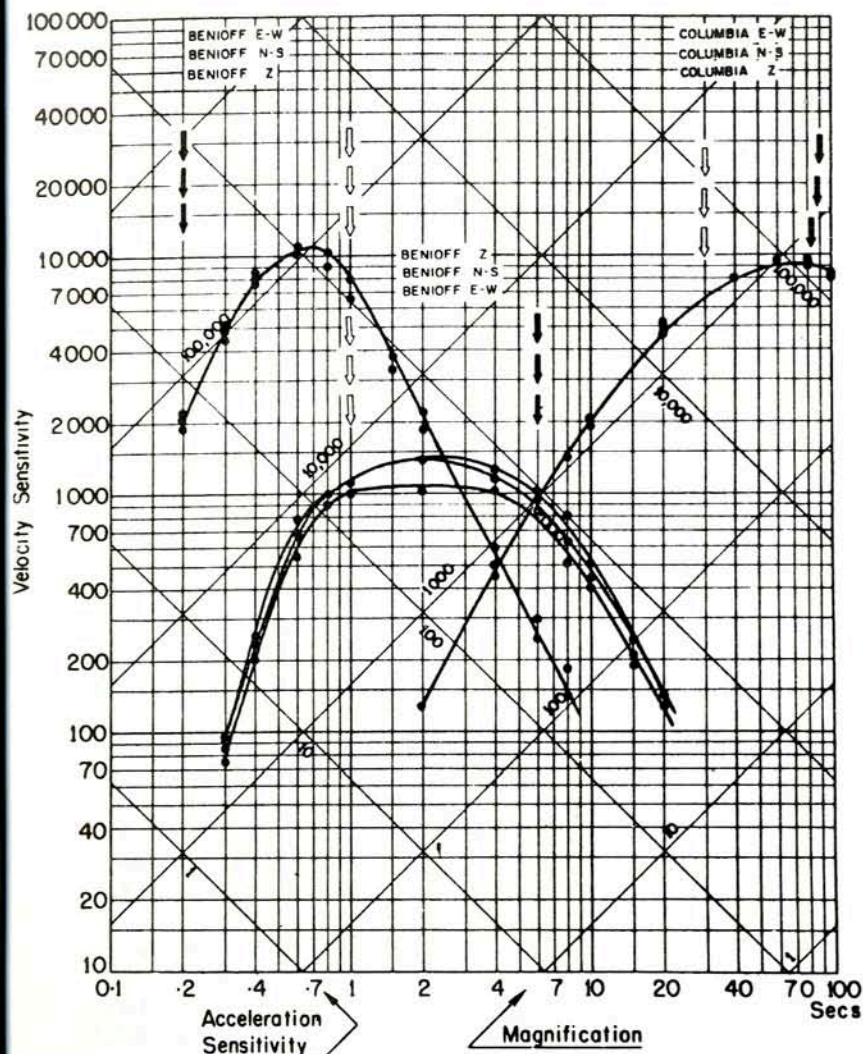
Les positions géographiques des épicentres ainsi que l'heure d'origine et la profondeur sont toujours empruntées à U.S.C.G.S. pour les séismes éloignés. Pour les locaux, ces données nous sont fournies par l'Observatoire du Dominion, et cela est indiqué chaque fois. Pour sauver de l'espace, nous ne mentionnons pas U.S.C.G.S. à chaque séisme.

Nous indiquons aussi quelques fois, après une phase, sur la ligne suivante, la période de l'onde du sol et son amplitude en microns.

Nous tenons à exprimer publiquement notre reconnaissance à l'Observatoire du Dominion qui envoie chaque année ses techniciens refaire l'étalonnage complet de tous les sismographes et pour toute la gamme des fréquences, par la méthode de Willmore.

M. Buist, S.J.

STATION: MONTREAL



$\phi = 45^{\circ}30'09''N$ $\lambda = 73^{\circ}37'23''W$ Altitude 112M

Foundation: Ordovician Limestone (Trenton)

$T_s \uparrow$

$T_g \uparrow$

Date of Calibration: April - 1962
 Feb. - 1964

BENIOFF'S		BENIOFF'S		COLUMBIA'S	
S.P. - Z	Apr. 4	I.P. - Z	Apr. 4	L.P. - Z.	Feb. 13
S.P.H. - N.S.	Apr. 4	I.P.H. - N.S.	Apr. 4	L.P.H. - N.S.	Feb. 12
S.P.H. - E.W.	Apr. 5	I.P.H. - E.W.	Apr. 5	L.P.H. - E.W.	Feb. 11

DU 1 JUILLET 1967 AU 1 JANVIER 1968

1 juil. 54.4 N., 158.0 W. Near Coast of Nicaragua
 South of Alaska h about 38 km.
 h about 33 km. H 07 39 20.4
 H 23 10 07.2 iPZ 07 46 16.0 d
 iPZ 23 19 12.6 d

2 juil. 54.5 N., 158.0 W. Near Coast of Central Chile
 South of Alaska h about 28 km.
 h about 33 km. H 14 16 51.6
 H 02 36 19.8 ePZ 14 29 17
 ePZ 02 45 24.5

2 juil. 8.7 N., 93.8 E. Hokkaido, Japan region
 Nicobar Isl. region h about 160 km.
 h about 33 km. H 23 42 13.7
 H 07 03 52.9 iPZ 23 54 36.7 c
 eP'Z 07 22 54

2 juil. 54.7 N., 157.7 W. South of Alaska
 South of Alaska h about 33 km.
 h about 32 km. H 04 03 06.8
 H 10 09 13.2 iPZ 04 12 11.0 c
 iPZ 10 18 16.6 c

3 juil. 54.6 N., 157.7 W. Central Alaska
 South of Alaska h about 59 km.
 h about 33 km. H 05 06 13.4
 H 06 54 43.4 ePZ 05 14 14
 ePZ 07 03 47.5 iPZ 07 03 47.5

3 juil. 22.8 S., 69.0 W. Northern Chile
 Northern Chile h about 97 km.
 h about 14 km. H 12 43 56.6
 H 12 43 56.6 H 13 42 22.5
 iPZ 12 54 47.6 ePZ 13 52 14.8
 ipPZ 55 12.1

3 juil. 8.5 S., 74.4 W. Leeward Islands
 Peru-Brazil border region h about 57 km.
 h about 92 km. H 18 32 15.1
 H 23 58 14.2 H 18 38 05
 iPZ 00 07 30.3 c ePZ 18 38 05
 ipPZ 08 04.5

4 juil. 11.8 N., 87.3 W. Central Mid-Atlantic Ridge
 h about 33 km.

H 19 19 48.4
 ePZ 19 28 29

8 juil. 15.4 S., 167.5 E. New Hebrides Isl.
 h about 137 km.
 h about 9 km. H 00 58 54.7
 H 00 58 54.7 iP'Z 01 17 31.0 d
 iP'Z 01 17 31.0 d

8 juil. 16.3 S., 166.8 E. New Hebrides Isl.
 h about 9 km.
 h about 119 km. H 06 22 52.8
 H 06 22 52.8 eP'Z 06 41 49
 eP'Z 06 41 49

10 juil. 4.8 N., 127.1 E. Talaud Islands
 h about 118 km.
 h about 119 km. H 19 18 14.7
 H 19 18 14.7 eN'' 19 56
 eN'' 19 56

11 juil. 20.9 S., 68.8 W. Chile-Bolivia border region
 h about 119 km.
 h about 119 km. H 14 52 58.1
 H 14 52 58.1 iPZ 15 03 34.0
 iPZ 15 03 34.0

12 juil. 54.9 N., 161.1 W. Alaska Peninsula
 h about 33 km.
 h about 33 km. H 10 32 01.6
 H 10 32 01.6 ePZ 10 41 17
 ePZ 10 41 17

12 juil. 5.6 N., 82.6 W. South of Panama
 h about 33 km.
 h about 33 km. H 21 00 20.9
 H 21 00 20.9 ePZ 21 07 57
 ePZ 21 07 57

13 juil. 35.5 N., 0.1 W. Algeria
 h about 13 km.
 h about 13 km. H 02 10 20.0
 H 02 10 20.0 iPZ 02 19 53.0 d
 iPZ 02 19 53.0 d

13 juil. 15.2 S., 74.9 W. Near Coast of Peru
 h about 74 km.
 h about 74 km. H 14 20 38.7
 H 14 20 38.7 ePZ 14 30 42
 ePZ 14 30 42

13 juil. 1.5 S., 77.4 W.

h about 199 km.
 H 21 01 35.7
 ePZ 21 09 48

14 juil. 17.6 S., 72.3 W. Near Coast of Peru
 h about 37 km.
 h about 37 km. H 03 19 26.8
 H 03 19 26.8 iPZ 03 29 50.0 d
 iPZ 03 29 50.0 d

14 juil. 6.4 S., 77.4 W. Northern Peru
 h about 146 km.
 h about 146 km. H 10 08 45.5
 H 10 08 45.5 iPZ 10 17 39.6 d
 iPZ 10 17 39.6 d

15 juil. 51.5 N., 176.8 E. Rat Isl. Aleutian Isl.
 h about 32 km.
 h about 32 km. H 08 14 59.3
 H 08 14 59.3 eN'' 08 47
 eN'' 08 47

15 juil. 24.2 N., 108.9 W. Gulf of California
 h about 33 km.
 h about 33 km. H 11 55 36.9
 H 11 55 36.9 eN'' 12 17
 eN'' 12 17

16 juil. 0.8 S., 132.6 E. West New Guinea region
 h about 33 km.
 h about 33 km. H 13 34 29.9
 H 13 34 29.9 eP'Z 13 53 36
 eP'Z 13 53 36

17 juil. 51.1 N., 169.3 W. Fox Isl. Aleutian Isl.
 h about 33 km.
 h about 33 km. H 11 28 13.4
 H 11 28 13.4 ePZ 11 38 13
 ePZ 11 38 13

19 juil. 21.3 S., 66.6 W. Southern Bolivia
 h about 234 km.
 h about 234 km. H 09 11 04.5
 H 09 11 04.5 iPZ 09 21 31.8 c
 iPZ 09 21 31.8 c

21 juil. 37.5 N., 90.4 W. Eastern Missouri
 h about 35 km.
 h about 35 km. H 09 14 48.9
 H 09 14 48.9 eZ 09 18 14
 eZ 09 18 14
 iPZ 15.6 d

22 juil. 33.5 S., 179.0 W.
 South of Kermadec Isl.
 h about 39 km.
 H 03 58 02.4
 eP'Z 04 17 04

22 juil. 31.6 S., 69.5 W.
 San Juan Province, Arg.
 h about 111 km.
 H 13 47 54.0
 iPZ 13 59 34.8

22 juil. 40.7 N., 30.8 E.
 Turkey
 h about 4 km.
 H 16 56 53.3
 iPZ 17 08 13.2 c

22 juil. 40.6 N., 30.7 E.
 Turkey
 h about 26 km.
 H 17 48 06.0
 iPZ 17 59 22.8 c

22 juil. 40.6 N., 30.7 E.
 Turkey
 h about 33 km.
 H 23 41 59.5
 ePZ 23 53 15

23 juil. 15.7 S., 167.1 E.
 New Hebrides Isl.
 h about 33 km.
 H 03 08 43.7
 eN'' 03 59

23 juil. 56.2 S., 158.3 E.
 Macquarie Isl. region
 h about 33 km.
 H 13 48 05.8
 eP'Z 14 07 47

24 juil. 11.3 S., 79.5 W.
 Off Coast of Peru
 h about 33 km.
 H 04 45 23.2
 ePZ 04 55 05.5

24 juil. 8.3 S., 121.3 E.
 Flores Isl. region
 h about 197 km.

H 07 39 31.7
 eP'Z 07 58 32

24 juil. 13.5 S., 76.3 W.
 Near Coast of Peru
 h about 60 km.
 H 10 13 56.4
 iPZ 10 23 50.5 d

26 juil. 22.0 S., 170.1 E.
 Loyalty Isl. region
 h about 30 km.
 H 08 14 56.3
 eE'' 08 48

26 juil. 39.5 N., 40.4 E.
 Turkey
 h about 33 km.
 H 18 53 01.3
 ePZ 19 04 54

27 juil. 19.9 N., 109.4 W.
 Revilla Gigedo Isl. region
 h about 31 km.
 H 00 00 47.9
 iPZ 00 08 13.0

27 juil. 64.0 N., 20.7 W.
 Iceland
 h about 33 km.
 H 05 17 54.0
 eN'' 05 32

27 juil. 35.1 S., 54.0 E.
 South Indian Ocean
 h about 33 km.
 H 11 35 33.8
 eN'' 12 41

28 juil. 16.1 N., 96.6 W.
 Oaxaca, Mexico
 h about 56 km.
 H 03 46 29.8
 iPZ 03 53 19.2 c

29 juil. 6.8 N., 73.0 W.
 Northern Colombia
 h about 161 km.
 H 10 24 24.6
 iPZ 10 31 33.8 d
 iSE'' 37 19

29 juil. 10.6 N., 67.3 W.
 Near Coast of Venezuela
 h about 10 km.
 H 23 59 58.7
 iPZ 00 06 56.6

30 juil. 40.7 N., 30.4 E.
 Turkey
 h about 16 km.
 H 01 31 01.7
 ePZ 01 42 18

30 juil. 56.2 S., 146.9 E.
 West of Macquarie Isl.
 h about 33 km.
 H 10 49 32.8
 eN'' 11 33

30 juil. 5.3 S., 153.6 E.
 New Ireland region
 h about 50 km.
 H 13 35 14.4
 eP'Z 13 54 07.5

31 juil. 60.0 S., 159.1 E.
 Macquarie Isl. region
 h about 33 km.
 H 22 48 35.6
 eP'Z 23 08 10

1 août 13.0 S., 76.8 W.
 Near Coast of Peru
 h about 66 km.
 H 01 13 42.6
 ePZ 01 23 32
 iPZ 33.1 c

1 août 60.0 S., 159.2 E.
 South of New Zealand
 h about 33 km.
 H 09 05 49.3
 eP'Z 09 25 23

2 août 44.6 N., 146.4 E.
 Kurile Islands
 h about 149 km.
 H 00 44 41.4
 ePZ 00 56 54

2 août 71.2 N., 8.0 W.
 Jan Mayen Isl. region
 h about 33 km.

H 11 06 38.7
 ePZ 11 14 12

2 août 71.2 N., 8.5 W.
 Jan Mayen Isl. region
 h about 33 km.
 H 14 06 17.8
 ePZ 14 13 49

2 août 22.3 S., 68.7 W.
 Northern Chile
 h about 107 km.
 H 22 41 12.2
 ePZ 22 51 59

3 août 2.4 N., 74.7 W.
 Colombia
 h about 40 km.
 H 08 28 44.9
 ePZ 08 36 40

3 août 13.5 S., 74.8 W.
 Peru
 h about 116 km.
 H 12 40 21.1
 iPZ 12 50 08.3
 ipPZ 37.5

3 août 53.0 N., 166.7 W.
 Fox Isl. Aleutian Isl.
 h about 29 km.
 H 21 37 26.7
 eE'' 21 55

3 août 53.8 N., 170.0 W.
 Fox Isl. Aleutian Isl.
 h about 194 km.
 H 23 17 08.4
 iPZ 23 26 43.3 d

7 août 58.7 N., 154.6 W.
 Alaska Peninsula
 h about 37 km.
 H 11 14 42.7
 ePZ 11 23 21

8 août 8.7 N., 102.8 W.
 Off Coast of Mexico
 h about 34 km.
 H 14 36 04.2
 eSN'' 14 51 02

9 août 8.5 S., 73.8 W. Baja, California
 Peru-Brazil border region h about 33 km.
 h about 46 km. H 08 02 08.4
 H 07 14 08.1 ePZ 08 09 13
 iPZ 07 23 27.5c

9 août 54.6 N., 159.9 E. South of Africa
 Near East Coast of h about 33 km.
 Kamchatka H 16 33 04.0
 h about 116 km. eN'' 17 03
 H 09 28 36.9
 ePZ 09 39 16

9 août 39.9 N., 104.7 W. Southern Honshu, Japan
 Colorado h about 357 km.
 h about 5 km. H 20 06 50.6
 H 13 25 06.2 iPZ 20 19 36.0 d
 ePZ 13 30 20.5

10 août 45.4 N., 150.3 E. Pyrénées
 Kurile Islands h about 15 km.
 h about 37 km. H 22 07 47.5
 H 11 21 22.3 ePZ 22 16 47
 iPZ 11 33 36.8 c

11 août 11.8 N., 85.9 W. New Britain region
 Nicaragua h about 29 km.
 h about 21 km. H 22 15 09.6
 H 12 26 18.3 eP'Z 22 34 03.5
 ePZ 12 33 15

12 août 38.5 N., 141.9 E. Ascension Isl. region
 Near Coast of Honshu, h about 28 km.
 Japan region H 23 44 11.1
 h about 53 km. ePZ 23 55 54
 H 04 30 38.5
 iPZ 04 42 34.4 d

12 août 24.7 S., 177.5 W. South of Fiji Isl.
 h about 134 km.
 H 09 39 44.3
 eP'Z 09 58 12

12 août 14.9 S., 166.7 E. Northern Colombia
 New Hebrides Isl. h about 39 km.
 h about 23 km. H 03 23 52.3
 H 12 30 56.1 ePZ 03 29 35.5
 eP'Z 09 58 12

13 août 31.1 N., 116.4 W. Northern Colombia
 h about 164 km.
 H 04 06 55.8
 ePZ 04 14 06

13 août 50.9 S., 29.1 E. South of Africa
 h about 33 km.
 H 16 33 04.0
 eN'' 17 03

13 août 35.3 N., 135.3 E. Southern Honshu, Japan
 h about 357 km.
 H 20 06 50.6
 iPZ 20 19 36.0 d

13 août 43.2 N., 0.5 W. Pyrénées
 h about 15 km.
 H 22 07 47.5
 ePZ 22 16 47

13 août 4.4 S., 152.5 E. New Britain region
 h about 29 km.
 H 22 15 09.6
 eP'Z 22 34 03.5

13 août 7.0 S., 12.6 W. Ascension Isl. region
 h about 28 km.
 H 23 44 11.1
 ePZ 23 55 54

15 août 19.2 N., 68.5 W. North Atlantic Ocean
 h about 39 km.
 H 03 23 52.3
 ePZ 03 29 35.5

15 août 6.8 N., 72.9 W. Northern Colombia
 h about 164 km.
 H 04 06 55.8
 ePZ 04 14 06

16 août 31.1 N., 93.7 E. Tibet
 h about 33 km.
 H 09 21 02.3
 eN'' 10 19

16 août iPZ 16 03 00.2

16 août 0.9 N., 98.9 E. Northern Sumatra
 h about 26 km.
 H 19 18 57.6
 eN'' 20 21

17 août 0.8 S., 21.1 W. Central Mid-Atlantic Ridge
 h about 40 km.
 H 12 49 08.9
 eN'' 12 16

17 août 59.4 N., 151.4 W. Kenai Peninsula, Alaska
 h about 55 km.
 H 22 42 09.3
 iPZ 22 50 37.7
 ipPZ 44.2

17 août 22.8 S., 68.9 W. Northern Chile
 h about 90 km.
 H 23 20 02.7
 ePZ 23 30 55
 ipPZ 31 19.5

18 août 61.5 N., 151.0 W. Southern Alaska
 h about 19 km.
 H 05 50 29.0
 ePZ 05 58 50

19 août 6.9 N., 73.0 W. Northern Colombia
 h about 150 km.
 H 07 03 07.9
 iPZ 07 10 19.0 d

19 août 40.8 N., 143.5 E. Off East Coast of Honshu, Japan
 h about 45 km.
 H 12 14 21.7
 ePZ 12 27 08

19 août 10.4 N., 126.0 E. Philippine Isl. region
 h about 58 km.
 H 15 28 08.5

19 août 12.4 S., 166.6 E. Santa Cruz Isl.
 h about 86 km.
 H 15 41 53.3
 eP'Z 16 00 32.5

20 août 58.1 N., 156.5 W. Alaska Peninsula
 h about 127 km.
 H 00 07 46.0
 ePZ 00 16 24

20 août 45.3 N., 80.1 E. Kazakh Sinkiang border reg.
 h about 33 km.
 H 02 02 05.2
 ePZ 02 14 46

20 août 55.8 N., 164.2 E. Komandorsky Isl. region
 h about 46 km.
 H 07 25 29.9
 iPZ 07 36 24.5 d

20 août 25.2 S., 69.0 W. Northern Chile
 h about 109 km.
 H 15 03 36.2
 iPZ 15 14 40.3 d
 ipPZ 15 07.2

20 août 8.8 S., 108.3 W. Northern Easter Isl. Cordillera
 h about 33 km.
 H 19 58 22.1
 ePZ 20 08 44

21 août 3.6 N., 95.8 E. Off West Coast of Northern Sumatra
 h about 33 km.
 H 07 33 00.6
 eP'Z 07 52 10

22 août 11.0 S., 78.2 W. Off Coast of Peru
 h about 53 km.
 H 07 42 44.7

ePZ 07 52 21.5

22 août 19.7 S., 70.7 W.
Near Coast of Northern Chile
h about 46 km.
H 08 55 54.6
iPZ 09 06 31.2 c

22 août 12.5 S., 76.8 W.
Near Coast of Peru
h about 57 km.
H 09 59 34.5
iPZ 10 09 21.9 c

22 août 60.8 S., 24.6 W.
South Sandwich Isl. region
h about 33 km.
H 13 02 06.8
ePZ" 13 16 50
iPPZ 21 35

23 août 19.7 S., 71.0 W.
Off Coast of Northern Chile
h about 29 km.
H 00 09 26.0
iPZ 00 20 03.4 d

23 août 19.6 S., 71.1 W.
Off Coast of Northern Chile
h about 37 km.
H 02 40 23.3
iPZ 02 51 00.7

23 août 4.3 S., 81.5 W.
Near Coast of Northern Peru
h about 33 km.
H 09 21 59.4
iPZ 09 30 52.5 d

24 août 43.5 N., 147.5 E.
Kurile Islands
h about 70 km.
H 03 21 17.6
iPZ 03 33 41.9 c

24 août 14.9 S., 166.9 E.
New Hebrides Isl.
h about 23 km.
H 10 32 52.6
eP'Z 10 51 44

24 août ePZ 18 03 02

26 août 12.2 N., 140.7 E.
West Caroline Isl.
h about 33 km.
H 00 36 42.1
eP'Z 00 55 22

26 août 55.3 N., 160.6 W.
Alaska Peninsula
h about 65 km.
H 21 44 59.2
ePZ 21 54 20

27 août 12.3 N., 86.2 W.
Nicaragua
h about 183 km.
H 13 08 55.9
iPZ 13 15 32.6 c
ipPZ 16 13.0
iSE" 20 53

27 août 50.2 N., 130.0 W.
Vancouver Isl. region
h about 24 km.
H 13 34 52.6
ePZ 13 42 04

28 août 10.0 S., 71.2 W.
Peru-Brazil border region
h about 609 km.
H 00 56 51.0
iPZ 01 05 29.2 d

28 août 50.4 N., 129.9 W.
Vancouver Isl. region
h about 33 km.
H 15 25 51.8
iPZ 15 33 01.2 d

29 août ePZ 07 47 04

29 août 3.3 S., 141.5 E.
New Guinea
h about 41 km.
H 10 50 09.4
eZ" 11 54

30 août 31.7 N., 100.2 E.
Szechwan Province, China
h about 3 km.
H 04 22 01.5
e(P)Z 04 36 08

30 août 45.4 N., 151.5 E.
Kurile Islands
h about 33 km.
H 13 33 26.4
ePZ 13 45 38

31 août 10.3 S., 78.1 W.
Near Coast of Peru
h about 62 km.
H 14 06 36.5
ePZ 14 16 09

1 sep. 6.9 N., 73.0 W.
Northern Colombia
h about 151 km.
H 02 49 18.3
iPZ 02 56 29.4 d

1 sep. 44.9 N., 147.0 E.
Kurile Islands
h about 134 km.
H 22 42 01.8
iPZ 22 54 14.1 d

3 sep. 60.5 N., 151.6 W.
Kenai Peninsula, Alaska
h about 79 km.
H 11 30 51.7
iPZ 11 39 10.2 c

3 sep. 10.6 S., 79.8 W.
Off Coast of Peru
h about 38 km.
H 21 07 30.8
iPZ 21 17 07.2 c

4 sep. 9.2 S., 77.3 W.
Peru
h about 33 km.
H 16 06 08.7
iPZ 16 15 45.3 c

4 sep. 54.8 N., 159.1 E.
Near East Coast of Kamchatka
h about 182 km.
H 19 30 13.7
iPZ 19 41 10.0 c

4 sep. 28.3 S., 63.1 W.
Santiago Del Estero Province,
Argentina

6 sep. 52.6 N., 168.5 W.
Fox Isl. Aleutian Isl.
h about 33 km.
H 17 24 40.1
ePZ 17 34 31.5

7 sep. 31.3 N., 114.4 W.
Gulf of California
h about 11 km.
H 01 59 58.1
ePZ 02 06 48

7 sep. 2.7 N., 124.3 E.
Celebes Sea
h about 274 km.
H 07 12 36.6
iPZ 07 31 13.9 c
ipPZ 34 08.9

8 sep. 23.4 S., 70.7 W.
Near Coast of Northern Chile
h about 33 km.
H 08 59 09.3
iPZ 09 11 01.0 d

8 sep. 12.2 N., 140.8 E.
West Caroline Isl.
h about 27 km.
H 22 37 39.5
eZ 22 58 12

9 sep. 27.7 S., 63.1 W.
Santiago Del Estero Prov. Arg.
h about 578 km.
H 10 06 44.1
iPZ 10 17 19.6 d
ipPZ 19 19.5

9 sep. 12.3 N., 140.7 E.
West Caroline Isl.
h about 33 km.
H 14 43 57.7
eZ" 15 03 36

9 sep. 54.8 S., 136.0 W.
South Pacific Cordillera
h about 33 km.

H 16 52 01.3	14 sep. 1.6 N., 84.9 W.	h about 33 km.	h about 17 km.
ePPZ" 17 11 31	Off Coast of Ecuador	H 16 49 02.3	H 10 30 53.4
	h about 40 km.	eN" 17 07.4	eP'Z 10 50 19
11 sep. 21.4 S., 173.8 E.	H 14 16 06.0		
New Hebrides Isl.	eSN" 14 31 00		
h about 32 km.			
H 01 22 43.7	14 sep. 23.5 S., 70.2 W.	18 sep. 31.3 N., 114.3 W.	21 sep. 31.2 N., 115.9 W.
eZ" 02 21	Near Coast of Northern Chile	Gulf of California	Baja, California
	h about 38 km.	h about 33 km.	h about 33 km.
11 sep. 21.4 S., 169.7 E.	H 20 32 39.3	H 06 55 32.0	H 00 01 54.1
Loyalty Isl. region	iPZ 20 43 39.9 d	eN" 07 14 04	ePZ 00 08 58
h about 11 km.			
H 04 37 16.4	15 sep. 35.6 N., 140.4 E.	18 sep. 5.9 S., 146.6 E.	22 sep. 0.7 S., 20.1 W.
eZ" 05 37	Near East Coast of Honshu, Japan	East New Guinea region	Central Mid-Atlantic Ridge
	h about 59 km.	h about 39 km.	h about 33 km.
11 sep. 36.4 N., 2.8 E.	H 00 28 39.8	H 15 33 06.5	H 08 08 04.3
Algeria	ePZ 00 41 51	eP'Z 15 52 08	iPZ 08 18 45.2 c
h about 33 km.			
H 07 00 28.7	15 sep. 31.6 S., 69.4 W.	19 sep. 43.0 N., 145.2 E.	22 sep. 44.5 N., 149.4 E.
iPZ 07 10 09.5	San Juan Province, Arg.	Hokkaido, Japan region	Kurile Islands
	h about 118 km.	h about 84 km.	h about 60 km.
12 sep. 22.8 S., 10.5 W.	H 17 52 02.3	H 10 56 08.6	H 10 17 59.9
South Atlantic Ridge	iPZ 18 03 43.5 d	iPZ 11 08 37.0 c	iPZ 10 30 18.0 c
h about 33 km.		ipPZ 09 02.7	
H 00 23 27.7	16 sep. 52.0 N., 176.4 W.	iSE" 18 53	23 sep. iPnZ 16 28 40.5
eZ" 01 04	Andreanof Isl. Aleutian Isl.		iSnZ 16 29 08.9
	h about 65 km.	19 sep. 57.8 S., 23.4 W.	25 sep. 15.9 S., 75.2 W.
12 sep. 44.6 N., 149.8 E.	H 08 31 58.4	South Sandwich Isl. region	Near Coast of Peru
Kurile Islands	ePZ 08 42 14	h about 33 km.	h about 10 km.
h about 25 km.		H 12 45 35.3	H 04 03 50.1
H 02 43 33.1	16 sep. 5.3 N., 82.4 W.	eP'Z 13 04 45	iPZ 04 14 03.1 d
ePZ 02 55 54	South of Panama		
	h about 33 km.	19 sep. 36.3 S., 52.2 E.	25 sep. 17.7 N., 61.6 W.
12 sep. 19.7 S., 69.9 W.	H 18 24 47.9	Atlantic Indian Rise	Leeward Islands
Northern Chile	ePZ 18 32 27.5	h about 33 km.	h about 48 km.
h about 125 km.		H 19 28 45.2	H 08 51 49.4
H 10 16 49.2	17 sep. From: Dominion Observ.	eZ" 20 13	iZ 08 58 00.0
iPZ 10 27 16.0 c	50° 40' N., 74° 30' W.		
ipPZ 44.1	H 01 19 40	20 sep. 8.0 S., 74.5 W.	26 sep. 46.9 N., 150.6 E.
	ePn 01 21 10.3	Peru-Brazil border region	Kurile Islands
12 sep. 5.5 S., 151.7 E.	eSn 58	h about 145 km.	h about 136 km.
New Britain region	△ 575 km.	H 09 33 54.1	H 06 47 11.6
h about 50 km.		iPZ 09 42 59.3 d	ePZ 06 59 07
H 21 49 47.6	17 sep. 17.2 N., 94.1 W.	ipPZ 43 33.6	
eZ" 22 10 22	Chiapas, Mexico		
	h about 45 km.	20 sep. 49.8 S., 163.4 E.	26 sep. 33.6 S., 70.5 W.
13 sep. 52.7 N., 172.5 E.	H 07 56 22.7	Auckland Isl. region	Chile-Argentina border region
Near Isl. Aleutian Isl.	iPZ 08 02 55.1 d	h about 30 km.	h about 84 km.
h about 34 km.		H 09 39 15.2	H 11 11 23.7
H 18 41 15.4	17 sep. 31.2 N., 114.4 W.	eP'Z 09 58 40	iPZ 11 23 18.1 d
iPZ 18 52 05.4 d	Gulf of California		
		20 sep. 49.8 S., 163.4 E.	26 sep. 30.0 S., 71.5 W.
		Auckland Isl. region	Near Coast of Central Chile

h about 55 km. H 22 26 42.8
 H 16 11 23.9 ePZ 22 37 51
 iPZ 16 23 01.9 d
 27 sep. iPZ 17 06 33.1
 28 sep. 52.2 N., 171.0 W. Fiji Islands region
 Fox Isl. Aleutian Isl. h about 604 km.
 h about 48 km. H 00 12 52.8
 H 03 00 30.5 iP'Z 00 30 26.5 c
 iPZ 03 10 30.6 d
 28 sep. 6.6 S., 153.4 E. New Britain region
 New Britain region h about 27 km.
 h about 44 km. H 14 54 08.4
 H 04 56 56.3 eP'Z 15 13 07
 iP'Z 05 15 51.0 d
 28 sep. 59.5 N., 147.1 W. Near Coast of Nicaragua
 Gulf of Alaska h about 39 km.
 h about 28 km. H 15 59 43.4
 H 15 44 55.7 iPZ 16 06 39.2 d
 eSN'' 15 59 42
 29 sep. 12.3 N., 91.2 W. Costa Rica
 Off Coast of Central America h about 21 km.
 h about 33 km. H 18 16 03.2
 H 05 18 49.6 iPZ 18 23 06.0 d
 ePZ 05 25 50
 29 sep. 16.2 N., 98.4 W. Off Coast of Costa Rica
 Near Coast of Guerrero, Mex. h about 33 km.
 h about 35 km. H 19 22 39.2
 H 15 40 46.9 iPZ 19 29 42.2 d
 iPZ 15 47 45.5
 30 sep. 49.1 N., 66.2 W. Near Isl. Aleutian Isl.
 Gaspe Peninsula h about 21 km.
 h about 33 km. H 19 50 25.9
 H 22 39 52.7 ePZ 20 01 15
 iP_nZ 22 41 24.5
 1 oct. 2.3 S., 79.9 W. Honduras
 Near Coast of Ecuador h about 33 km.
 h about 68 km. H 00 12 12.6
 H 12 22 46.1 ePZ 00 18 27
 iPZ 12 31 18.0 d
 1 oct. 25.6 S., 68.7 W. Off Coast of Costa Rica
 Chile-Argentina border region h about 33 km.
 h about 100 km. H 06 02 16.4
 H 06 09 19.2 c
 iPZ 06 09 19.2 c
 4 oct. 14.1 N., 92.5 W.

Near Coast of Chiapas, Mex. h about 41 km.
 H 09 00 06.5
 ePZ 09 06 57.5
 4 oct. 38.5 N., 112.1 W. Utah
 h about 18 km.
 H 10 20 14.0
 ePZ 10 26 13
 4 oct. 5.7 S., 153.9 E. New Ireland region
 h about 52 km.
 H 17 21 20.7
 ePZ 17 36 48
 eP'Z 40 12.5
 iPPZ'' 41 55
 5 oct. 14.5 S., 75.4 W. Near Coast of Peru
 h about 100 km.
 H 09 41 31.4
 iPZ 09 51 28.0 c
 ipPZ 44.5
 5 oct. 45.4 N., 150.7 E. Kurile Islands
 h about 33 km.
 H 15 55 02.8
 iPZ 16 07 17.1 d
 7 oct. 29.6 S., 71.1 W. Near Coast of Central Chile
 h about 42 km.
 H 01 14 04.1
 iPZ 01 25 41.3 d
 7 oct. 49.2 N., 156.3 E. Kurile Islands
 h about 33 km.
 H 08 28 01.2
 iPZ 08 39 47.1 d
 7 oct. 49.2 N., 156.3 E. Kurile Islands
 h about 33 km.
 H 09 06 52.3
 e(P)Z 09 18 38
 8 oct. 9.5 S., 148.8 E.
 East New Guinea region
 h about 17 km.
 H 15 59 34.4
 eP'Z 16 18 23
 9 oct. 19.4 N., 46.2 W. North Atlantic Ridge
 h about 33 km.
 H 08 27 05.4
 ePZ 08 33 54
 9 oct. 54.1 N., 155.1 E. Kamchatka
 h about 393 km.
 H 14 10 57.4
 iPZ 14 21 43.3 d
 9 oct. 21.1 S., 179.3 W. Fiji Isl. region
 h about 654 km.
 H 17 21 49.5
 ePZ'' 17 35 38
 iP'Z 39 18.3 c
 iPPZ'' 40 31
 iSN'' 47 27
 10 oct. 5.6 S., 153.9 E. New Ireland region
 h about 67 km.
 H 05 15 13.3
 eZ'' 06 18
 10 oct. 18.1 S., 171.8 E. Hew Hebrides Isl. region
 h about 63 km.
 H 06 26 46.3
 eZ'' 07 23
 11 oct. 10.3 S., 71.2 W. Peru-Brazil border region
 h about 585 km.
 H 20 28 10.2
 iPZ 20 36 52.3 d
 12 oct. 52.2 N., 152.5 E. Northwest of Kurile Isl.
 h about 476 km.
 H 12 53 46.9
 iPZ 13 04 38.3 d
 12 oct. 7.1 S., 129.8 E.

Banda Sea	H	01 51 26.6
h	about 45 km.	eZ'' 02 06.0
H	18 31 37.1	
iP'Z	18 50 48.2	
14 oct. 17.3 N., 60.8 W.		
Leeward Islands	h	about 0 km.
h	about 29 km.	H 05 03 58.0
H	03 31 04.5	ePZ 05 16 20.5
iPZ	03 37 14.0 d	
15 oct. 11.9 N., 86.0 W.		
Near Coast of Nicaragua	h	about 33 km.
h	about 162 km.	H 09 40 41.2
H	08 00 50.3	eZ'' 10 02
iPZ	08 07 31.0 c	
iSE''	12 53	
15 oct. 52.1 N., 169.5 W.		
Fox Isl. Aleutian Isl.	h	about 33 km.
h	about 32 km.	H 14 53 25.2
H	17 38 43.1	eZ'' 15 15
iPZ	17 48 40.0 c	
15 oct. 17.8 N., 100.7 W.		
Guerrero, Mexico	h	about 33 km.
h	about 83 km.	H 21 05 22.5
H	18 35 55.0	eZ'' 22 12
ePZ	18 43 55	
15 oct. 1.8 S., 126.3 E.		
Molucca Sea	h	about 33 km.
h	about 51 km.	H 01 11 44.8
H	23 36 49.0	iPZ 01 19 43.1
eZ''	00 01	
16 oct. 49.3 N., 129.1 W.		
Vancouver Isl. region	h	about 92 km.
h	about 33 km.	H 06 38 55.3
H	13 27 35.6	ePZ 06 49 40.5
ePZ	13 34 45	
16 oct. 17.3 S., 66.6 E.		
Mascarene Isl. region	h	about 26 km.
h	about 18 km.	H 22 06 23.5
H	20 16 56.1	eP'Z 22 25 23
eZ''	21 24	
17 oct. 16.9 N., 61.0 W.		
Leeward Islands	h	about 12 km.
h	about 51 km.	H 01 02 43.8
H		eZ'' 01 31

21 oct. 27.7 S., 71.8 W.		
Near Coast of Northern Chile	h	about 13 km.
h	about 13 km.	H 02 35 12.3
H	02 35 12.3	iPZ 02 46 42.5 c
iPZ	02 46 42.5 c	
21 oct. 73.4 N., 54.8 E.		
Novaya Zemlya	h	about 0 km.
h	about 0 km.	H 04 59 58.1
H	04 59 58.1	iPZ 05 09 41.2 c
iPZ	05 09 41.2 c	
22 oct. 22.3 S., 65.7 W.		
Jujuy Province, Argentina	h	about 259 km.
h	about 259 km.	H 00 52 10.9
H	00 52 10.9	iPZ 01 02 42.9 c
iPZ	01 02 42.9 c	ipPZ 03 45.4
22 oct. 31.0 N., 41.4 W.		
North Atlantic Ridge	h	about 33 km.
h	about 33 km.	H 18 48 44.5
H	18 48 44.5	eZ'' 19 02
eZ''	19 02	
23 oct. 43.4 N., 146.9 E.		
Kurile Islands	h	about 33 km.
h	about 33 km.	H 02 53 30.7
H	02 53 30.7	iPZ 03 06 01.3 d
iPZ	03 06 01.3 d	
24 oct. 31.3 S., 179.7 W.		
Kermadec Islands	h	about 250 km.
h	about 250 km.	H 03 13 26.5
H	03 13 26.5	eP'Z 03 31 51
eP'Z	03 31 51	
24 oct. 2.4 S., 79.0 W.		
Near Coast of Ecuador	h	about 123 km.
h	about 123 km.	H 15 17 54.0
H	15 17 54.0	iPZ 15 26 21.2
iPZ	15 26 21.2	
25 oct. 24.5 N., 122.2 E.		
Taiwan region	h	about 65 km.
h	about 65 km.	H 00 59 22.6
H	00 59 22.6	ePZ 01 13 44
ePZ	01 13 44	
25 oct. 6.8 N., 73.0 W.		
Northern Colombia	h	about 0 km.
h	about 0 km.	H 06 03 57.9
H	06 03 57.9	iPZ 06 16 20.3 d
iPZ	06 16 20.3 d	

31 oct. 37.8 N., 14.6 E.
Sicily
h about 33 km.
H 21 08 07.2
eZ'' 21 39

1 nov. 48.2 N., 154.4 E.
Kurile Islands
h about 47 km.
H 16 09 16.7
ePZ 16 21 10

1 nov. 48.3 N., 154.4 E.
Kurile Islands
h about 40 km.
H 16 30 57.1
iPZ 16 42 50.6 d

1 nov. 4.8 S., 135.7 E.
West New Guinea region
h about 14 km.
H 18 56 54.8
eZ'' 19 55

2 nov. 28.8 S., 69.5 W.
Chile-Argentina border reg.
h about 79 km.
H 03 32 24.7
iPZ 03 43 53.7 c

3 nov. 7.6 S., 81.4 W.
Off Coast of Northern Peru
h about 14 km.
H 08 15 34.4
iPZ 08 24 54.6 c

4 nov. 4.1 N., 77.1 W.
Near West Coast of Colombia
h about 74 km.
H 02 43 56.6
ePZ 02 51 38

4 nov. 17.8 S., 179.0 W.
Fiji Islands region
h about 573 km.
H 10 17 14.7
iP'Z 10 34 49.0

4 nov. 37.4 N., 141.6 E.
Near East Coast of Honshu, Japan
h about 68 km.

H 13 26 47.7
ePZ 13 39 51

4 nov. 2.8 S., 77.7 W.
Peru-Ecuador border region
h about 99 km.
H 16 26 48.2
iPZ 16 35 20.8 d

5 nov. 3.2 N., 74.7 W.
Colombia
h about 39 km.
H 14 23 53.8
ePN 14 31 47

7 nov. 14.9 S., 173.0 W.
Samoa Islands region
h about 43 km.
H 03 49 17.4
eN'' 03 57

8 nov. 16.8 N., 85.9 W.
Caribbean Sea
h about 28 km.
H 03 10 53.3
iPZ 03 17 05.5 d

8 nov. 5.3 S., 134.0 E.
Aroe Islands region
h about 33 km.
H 06 07 21.4
eP'Z 06 26 37

8 nov. 20.0 S., 70.3 W.
Near Coast of Northern Chile
h about 60 km.
H 10 47 45.3
iPZ 10 58 21.9 c
ipPZ 34.5

8 nov. 51.1 N., 178.5 E.
Rat Isl. Aleutian Isl.
h about 29 km.
H 17 09 27.1
ePE'' 17 28 54

9 nov. 7.2 S., 123.6 E.
Banda Sea
h about 560 km.
H 02 18 45.5
eP'Z 02 37 01.5 d

10 nov. 45.1 N., 28.1 W.
North Atlantic Ridge
h about 33 km.
H 04 40 15.0
ePZ 04 46 38

10 nov. 62.3 N., 151.4 W.
Central Alaska
h about 90 km.
H 18 29 57.3
iPZ 18 38 09.6 d

11 nov. 6.0 S., 71.4 E.
Chagos Archipelago region
h about 37 km.
H 11 55 55.6
eN'' 12 35

12 nov. 17.2 S., 172.0 W.
Tonga Islands region
h about 34 km.
H 10 36 52.0
eE'' 11 01.6

12 nov. 22.8 S., 170.7 E.
Loyalty Islands region
h about 26 km.
H 17 24 31.9
eN'' 18 13.7

13 nov. 10.4 N., 85.7 W.
Costa Rica
h about 18 km.
H 16 05 46.5
ePZ 16 12 54

14 nov. 5.4 S., 147.1 E.
East New Guinea region
h about 201 km.
H 05 28 36.9
iP'Z 05 47 17.0 d

15 nov. 2.0 S., 81.0 W.
Near Coast of Ecuador
h about 33 km.
H 18 37 31.0
iPZ 18 46 04.9 d

15 nov. 28.7 S., 71.2 W.
Near Coast of Central Chile
h about 15 km.

17 nov. 28.5 N., 43.8 W.
North Atlantic Ridge
h about 33 km.
H 04 58 56.8
ePPZ 05 05 42

17 nov. 24.5 S., 68.5 W.
Chile-Argentina border region
h about 119 km.
H 07 49 03.1
ePZ 08 00 08
ipPZ 30.3

18 nov. 13.4 N., 89.1 W.
El Salvador
h about 78 km.
H 12 16 55.4
iPZ 12 23 40.5 d

19 nov. 36.4 N., 141.1 E.
Near East Coast of Honshu, Japan
h about 41 km.
H 12 06 59.5
iPZ 12 20 08.9 d

20 nov. 51.2 N., 151.3 E.
Sea of Okhotsk
h about 426 km.
H 10 15 43.0
ePZ 10 26 46

21 nov. 72.7 N., 8.5 E.
Norwegian Sea
h about 33 km.
H 17 02 25.0
iPZ 17 10 37.6 d

21 nov. 48.2 N., 27.8 W.
North Atlantic Ridge
h about 33 km.
H 21 50 24.3
eE'' 22 05

22 nov. 22.7 S., 170.9 E.
Loyalty Islands region
h about 42 km.
H 15 19 26.8
eZ'' 15 51.6

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ePZ 21 43 27.5 c
iPZ 28.0 d

23 nov. 14.5 N., 52.1 E.
 Eastern Gulf of Aden
 h about 3 km.
 H 08 35 49.5
 ePPZ" 08 54 04

23 nov. 80.2 N., 1.0 W.
 North of Svalbard
 h about 10 km.
 H 13 42 01.6
 iPZ 13 49 58.7 c

26 nov. 28.6 N., 130.0 E.
 Ryukyu Islands
 h about 33 km.
 H 00 08 09.8
 eE" 00 55

26 nov. 56.6 N., 152.2 W.
 Kodiak Islands region
 h about 28 km.
 H 08 11 06.3
 ePZ 08 19 44

27 nov. 60.3 N., 140.8 W.
 Southeastern Alaska
 h about 16 km.
 H 04 27 02.4
 eE" 04 46

27 nov. 40.0 N., 104.7 W.
 Colorado
 h about 5 km.
 H 05 09 22.7
 i(P)Z 05 14 37.2

28 nov. 32.1 N., 130.8 E.
 Kyushu, Japan
 h about 125 km.
 H 02 36 54.1
 ePZ 02 50 20

28 nov. 18.4 N., 62.4 W.
 Leeward Islands
 h about 45 km.
 H 03 21 31.4
 ePZ 03 27 05

28 nov. 56.6 N., 152.1 W.
 Kodiak Islands region
 h about 14 km.

H 20 19 36.8
 eN" 20 46

29 nov. 18.4 N., 62.4 W.
 Leeward Islands
 h about 58 km.
 H 01 23 34.5
 e(P)Z 01 29 28

30 nov. 41.5 N., 20.5 E.
 Albania
 h about 29 km.
 H 07 23 51.5
 ePZ 07 34 27.5

30 nov. 8.1 S., 80.2 W.
 Off Coast of Northern Peru
 h about 45 km.
 H 18 05 19.2
 ePZ 18 14 36

1 déc. 49.5 N., 154.4 E.
 Kurile Islands
 h about 136 km.
 H 13 57 02.4
 iPZ 14 08 38.5

2 déc. 24.1 N., 108.6 W.
 Gulf of California
 h about 33 km.
 H 00 31 18.9
 ePZ 00 38 13

2 déc. 37.8 N., 115.2 E.
 Northeastern China
 h about 13 km.
 H 20 05 52.4
 ePZ 20 18 11

4 déc. 62.4 N., 151.8 W.
 Central Alaska
 h about 96 km.
 H 08 19 08.5
 iPZ 08 27 20.5

4 déc. 51.6 N., 173.5 W.
 Andreanof Isl. Aleutian Isl.
 h about 50 km.
 H 22 18 41.0
 iPZ 22 28 52.0

Andreanof Isl. Aleutian Isl.
 h about 36 km.
 H 09 05 13.1
 iPZ 09 15 25.4 d

5 déc. 30.8 N., 114.1 W.
 Gulf of California
 h about 33 km.
 H 11 09 37.4
 e(P)Z 11 16 28

5 déc. 30.8 N., 114.0 W.
 Gulf of California
 h about 33 km.
 H 18 35 37.6
 eE" 18 48

6 déc. 12.5 N., 87.2 W.
 Near Coast of Nicaragua
 h about 87 km.
 H 02 53 06.9
 ePZ 02 59 53 d
 iPZ 53.3 c
 ipPZ 03 00 11.5

9 déc. 5.5 S., 151.6 E.
 New Britain region
 h about 59 km.
 H 06 43 25.9
 eN" 07 03

9 déc. 17.1 S., 70.7 W.
 Near Coast of Peru
 h about 76 km.
 H 09 25 39.8
 iPZ 09 35 55.8 c

9 déc. 10.9 S., 164.2 E.
 Santa Cruz Isl. region
 h about 33 km.
 H 10 50 46.6
 eN" 11 47.5

10 déc. 40.5 N., 124.6 W.
 Near Coast of Northern Calif.
 h about 5 km.
 H 12 06 50.3
 iPZ 12 14 03

10 déc. 36.7 N., 107.2 W.
 New Mexico

10 déc. 17.7 N., 73.9 E.
 India
 h about 33 km.
 H 22 51 24.3
 eE" 23 18.4

11 déc. 20.6 S., 174.3 W.
 Tonga Islands
 h about 33 km.
 H 19 40 53.3
 eZ" 20 43

11 déc. 13.6 N., 51.6 E.
 Eastern Gulf of Aden
 h about 33 km.
 H 22 30 18.3
 eE" 23 03.5

12 déc. 22.7 S., 171.1 E.
 Loyalty Islands region
 h about 39 km.
 H 08 06 16.7
 eN" 08 58

13 déc. 47.6 N., 152.6 E.
 Kurile Islands
 h about 124 km.
 H 10 38 23.4
 iPZ 10 50 13.4 d

13 déc. 19.1 S., 168.7 E.
 New Hebrides Islands
 h about 51 km.
 H 19 07 14.4
 eE" 19 44.8

14 déc. 24.0 S., 69.3 W.
 Northern Chile
 h about 53 km.
 H 03 20 47.8
 iPZ 03 31 51.2 c

14 déc. 54.6 N., 160.4 E.
 Near East Coast of Kamchatka
 h about 33 km.
 H 18 25 16.6
 ePZ 18 36 26

16 déc. 2.9 S., 77.0 W.
Peru-Ecuador border region
h about 121 km.
H 03 19 13.4
iPZ 03 27 44.0 d

16 déc. 51.2 N., 157.7 E.
Near East Coast of Kamchatka
h about 24 km.
H 20 53 58.3
iPZ 21 05 32.2

18 déc. 37.0 N., 121.8 W.
Central California
h about 11 km.
H 17 24 31.9
e(P)Z 17 31 41

19 déc. 28.5 S., 71.0 W.
Near Coast of Central Chile
h about 18 km.
H 08 42 20.7
ePZ 08 53 56

19 déc. 5.6 N., 78.1 W.
South of Panama
h about 33 km.
H 22 01 39.8
iPZ 22 09 14.6 c

20 déc. 11.8 N., 93.0 E.
Andaman Isl. region
h about 61 km.
H 11 34 25.9
eE'' 12 23

21 déc. 21.8 S., 70.0 W.
Near Coast of Northern Chile
h about 33 km.
H 02 25 21.6
iPZ 02 36 13.7 c

21 déc. 18.0 S., 69.3 W.
Northern Chile
h about 158 km.
H 05 17 54.2 c
ePZ 05 28 06.7 d

21 déc. 16.4 S., 72.6 W.
Near Coast of Peru
h about 99 km.
H 07 50 34.8

iPZ 08 00 44.0 c
ipPZ 01 02.6

21 déc. 7.0 N., 72.1 W.
Northern Colombia
h about 33 km.
H 11 37 22.5
iPZ 11 44 43.3 d

21 déc. 31.7 S., 179.1 W.
Kermadec Islands
h about 23 km.
H 17 45 54.4
eN'' 18 37

22 déc. 29.9 S., 177.4 W.
Kermadec Isl. region
h about 22 km.
H 23 08 58.0
eN'' 00 06

23 déc. 9.9 S., 74.7 W.
Peru
h about 126 km.
H 02 40 08.3
iPZ 02 49 29.8 c

23 déc. 5.2 S., 151.8 E.
New Britain region
h about 61 km.
H 13 23 15.0
iP'Z 13 42 07.3 d

24 déc. 71.9 N., 0.9 W.
Jan Mayen Isl. region
h about 33 km.
H 04 22 01.2
eE'' 04 41

24 déc. 54.5 N., 142.5 E.
Sakhalin Island
h about 33 km.
H 08 34 13.5
eE'' 09 09

24 déc. 17.4 N., 61.1 W.
Leeward Islands
h about 24 km.
H 20 03 10.9
iPZ 20 09 19.2 d

24 déc. 17.4 N., 61.3 W.

Leeward Islands
h about 20 km.
H 21 32 31.3
iPZ 21 38 39.6 d

25 déc. 5.3 S., 153.7 E.
New Ireland region
h about 64 km.
H 01 23 33.6
iP'Z 01 42 23.1 c

25 déc. 21.5 S., 70.4 W.
Near Coast of Northern Chile
h about 53 km.
H 10 41 31.6
iPZ 10 52 19.1 d

26 déc. 44.5 N., 129.7 W.
Off Coast of Oregon
h about 33 km.
H 09 29 38.5
ePZ 09 37 05

26 déc. 10.7 S., 73.9 W.
Peru
h about 120 km.
H 23 46 24.6
iPZ 23 55 53.2 d

27 déc. 21.2 S., 68.3 W.
Chile-Bolivia border region
h about 135 km.
H 09 17 55.7
iPZ 09 28 32.6 d

27 déc. 21.3 S., 68.4 W.
Chile-Bolivia border region
h about 115 km.
H 09 54 02.3
iPZ 10 04 42.3 d

27 déc. 22.5 S., 68.8 W.
Northern Chile
h about 110 km.
H 10 48 44.5
ePZ 10 59 33

27 déc. 22.3 S., 174.8 W.
Tonga Islands region
h about 33 km.
H 16 22 48.5
eZ 16 42 03

28 déc. Off Coast of Oregon
h about 33 km.
H 06 26 15.8
iPZ 06 33 37.0 d

28 déc. 44.2 N., 129.0 W.
Off Coast of Oregon
h about 33 km.
H 07 01 36.8
ePZ 07 08 59.5

28 déc. 6.9 N., 72.8 W.
Northern Colombia
h about 196 km.
H 17 33 39.8
iPZ 17 40 45.0 d

28 déc. 44.2 N., 128.9 W.
Off Coast of Oregon
h about 33 km.
H 22 11 33.9
ePZ 22 18 56

29 déc. 22.8 S., 175.3 W.
Tonga Islands region
h about 30 km.
H 20 29 32.2
eE'' 21 05.2

30 déc. 25.7 S., 70.3 W.
Near Coast of Northern Chile
h about 44 km.
H 02 14 20.2
iPZ 02 25 35.4 d

30 déc. 44.7 N., 12.2 E.
Northern Italy
h about 33 km.
H 04 19 21.2
eN'' 04 44

31 déc. 51.9 N., 171.8 W.
Fox Isl. Aleutian Isl.
h about 40 km.
H 02 29 41.2
ePZ 02 39 46.5

31 déc. 7.1 S., 154.8 E.
Solomon Islands
h about 19 km.
H 15 05 32.3
eE'' 15 43.5