

# 松代における地殻潮汐の観測 (続)\*

長宗留男\*\*・泉末雄\*\*

525. 622

## Observation of the Earth Tides at Matsushiro Seismological Observatory (continued)

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(Matsushiro Seismological Observatory)

In the present paper, observational data used in the previous investigation<sup>(1)</sup> are shown.

ここにはわれわれが前の調査<sup>(2)</sup>に使用した資料を掲げる。

観測場所：松代地震観測所 36°32' N, 138°12' E, 海拔 440m

傾斜方向：{E-W 成分 正傾斜 東  
{N-S 成分 正傾斜 北

感 度：各成分各期間を通じて 0.022"/1mm

Oceanic M<sub>2</sub> tide

(A) : Direct attraction of oceanic tide, (B) : Tilt due to tidal load

× 10<sup>-5</sup>

r (degr.)	W				N			
	cos2t		sin2t		cos2t		sin2t	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
0.7 - 2	3.76	10.64	2.85	8.12	20.79	58.84	2.51	7.10
2 - 3	10.28	23.54	-16.86	-38.61	27.35	62.63	-10.01	-22.92
3 - 4	3.84	7.45	-15.02	-29.14	18.51	35.91	-5.42	-10.51
4 - 5	-1.85	-3.11	-11.37	-19.10	16.91	28.41	1.82	-3.06
5 - 6	-2.09	-3.09	-9.99	-14.79	13.49	19.97	1.42	2.10
6 - 7	-2.77	-3.68	-8.69	-11.56	11.08	14.74	1.01	1.34
7 - 8	-3.37	-4.04	-8.69	-10.43	9.89	11.87	2.26	2.71
8 - 9	-4.95	-5.45	-11.77	-12.95	9.97	10.97	3.97	4.37
9 - 10	-5.05	-5.10	-4.53	-4.58	5.77	5.83	3.90	3.94
10 - 12	-10.31	-9.28	-13.19	-11.87	12.30	11.07	5.92	5.33
12 - 14	1.61	1.27	-10.75	-8.49	9.61	7.59	5.12	4.04
14 - 16	-8.49	-5.94	-9.26	-6.48	6.26	4.38	4.92	3.44
16 - 18	-6.66	-4.19	-10.24	-6.47	7.16	4.51	4.85	3.06
18 - 20	-4.93	-2.81	-7.31	-4.17	5.67	3.23	3.68	2.10
20 - 22	-5.86	-2.99	-4.89	-2.49	3.80	1.94	0.56	0.29
22 - 26	-10.07	-4.73	-8.40	-3.95	4.08	1.92	2.26	1.06
26 - 30	-12.49	-5.12	-7.01	-2.87	6.82	2.80	2.13	0.87
SETONAIKAI	-1.23	-1.59	-4.57	-7.54	1.56	2.40	2.96	4.70
Σ	-60.63	-18.22	-159.67	-187.37	191.02	289.01	30.22	9.96

\* Received Dec. 20, 1954

\*\* 松代地震観測所

(1) T. Nagamune and S. Izumi : Quart. Jour. of Seismology 20, No. 1 (1955), 7~14

(2) 長宗, 泉 : 松代における地殻潮汐の観測, 験震時報 20, No. 1 (1955), 7~14

1950. VIII 3 ~ IX 2 E ~ W

Date	1 <sup>h</sup>	3	5	7	9	11	13	15	17	19	21	23
VIII 3	0.8750	0.8775	0.8750	0.8750	0.8725	0.8700	0.8575	0.8450	0.8375	0.8350	0.8575	0.8475
4	.8500	.8500	.8500	.8350	.8500	.8500	.8500	.8450	.8375	.8250	.8450	.8375
5	.8200	.8250	.8375	.8200	.8250	.8175	.8200	.8150	.8125	.8125	.8075	.8150
6	.8050	.8000	.8000	.7875	.7850	.7750	.7800	.7875	.7850	.7700	.7625	.7575
7	.7625	.7625	.7625	.7575	.7525	.7400	.7450	.7350	.7350	.7375	.7375	.7375
8	.7375	.7400	.7350	.7300	.7250	.7250	.7250	.7200	.7125	.7125	.7100	.7075
9	.7050	.7050	.7075	.7100	.7200	.7025	.6950	.6900	.6900	.6925	.6875	.6875
10	.6875	.6850	.6825	.6750	.6875	.6875	.6800	.6700	.6650	.6625	.6700	.6700
11	.6675	.6625	.6600	.6625	.6575	.6600	.6600	.6625	.6650	.6275	.6250	.6250
12	.6250	.6250	.6200	.6175	.6125	.6250	.6250	.6200	.6000	.5975	.5875	.5875
13	.5925	.5850	.5800	.5750	.5750	.5850	.5900	.5900	.5775	.5700	.5625	.5700
14	.5700	.5700	.5650	.5550	.5625	.5625	.5675	.5675	.5550	.5400	.5250	.5350
15	.5375	.5425	.5350	.5300	.5250	.5275	.5250	.5250	.5300	.5375	.5000	.5050
16	.5000	.5000	.5000	.5000	.4925	.5000	.5025	.4975	.4850	.4775	.4700	.4725
17	.4700	.4700	.4700	.4700	.4700	.4700	.4700	.4700	.4700	.4650	.4550	.4550
18	.4500	.4500	.4550	.4550	.4500	.4500	.4500	.4450	.4450	.4450	.4450	.4475
19	.4500	.4550	.4500	.4425	.4400	.4450	.4450	.4450	.4450	.4400	.4350	.4300
20	.4275	.4250	.4250	.4225	.4125	.3975	.3900	.3950	.3875	.3950	.3875	.3875
21	.4000	.4000	.4000	.4000	.4000	.4000	.4000	.3825	.3900	.3950	.4000	.4000
22	.4200	.4000	.4000	.4000	.4100	.4100	.4150	.4125	.4175	.4175	.4100	.4200
23	.4250	.4250	.4250	.4250	.4250	.4300	.4300	.4250	.4375	.4075	.3975	.3975
24	.3950	.3875	.3850	.3800	.3750	.4100	.4125	.4000	.4000	.3950	.3875	.4000
25	.4075	.4050	.4000	.4000	.4000	.4175	.4200	.4150	.4075	.3975	.4000	.4050
26	.4125	.4150	.4025	.4000	.4000	.4150	.4250	.4225	.4100	.4000	.4000	.4075
27	.4100	.4100	.4100	.4025	.4000	.4150	.4200	.4150	.4150	.4000	.4000	.4050
28	.4075	.4100	.4100	.4050	.4000	.4050	.4100	.4150	.4100	.4050	.4000	.4025
29	.4025	.4100	.4150	.4050	.4000	.4100	.4200	.4250	.4250	.4100	.3950	.4025
30	.4250	.4250	.4175	.4075	.4000	.4150	.4050	.4000	.3950	.3850	.3750	.3750
31	.3950	.4000	.3925	.3925	.3850	.3950	.3975	.4000	.3900	.3850	.3825	.3775
IX 1	.3875	.3900	.3875	.3750	.3675	.3800	.3900	.3900	.3900	.3875	.3725	.3775
2	.3800	.3925	.3950	.3925	.3875	.3925	.3875	.3875	.3875	.3875	.3850	.3900

1952. VI 4 ~ VII 3 E ~ W

Date	0 <sup>h</sup>	1	2	3	4	5	6	7	8	9	10	11
VI 4	0.5875	0.5825	0.5750	0.5800	0.5850	0.5875	0.5900	0.5900	0.5950	0.5900	0.5875	0.5875
5	.6125	.6175	.6200	.6300	.6325	.6375	.6375	.6350	.6375	.6325	.6250	.6225
6	.6475	.6450	.6450	.6500	.6525	.6525	.6550	.6575	.6575	.6550	.6550	.6525
7	.6650	.6600	.6675	.6675	.6750	.6800	.6850	.6825	.6850	.6800	.6800	.6650
8	.6875	.6875	.6875	.6900	.6925	.7000	.7000	.7000	.7000	.7000	.7000	.6975
9	.7100	.7000	.7000	.7000	.7000	.7000	.7075	.7075	.7150	.7225	.7350	.7250
10	.7375	.7300	.7250	.7200	.7250	.7200	.7200	.7200	.7250	.7250	.7300	.7350
11	.7575	.7550	.7550	.7550	.7525	.7550	.7575	.7575	.7625	.7625	.7650	.7600
12	.7825	.7800	.7800	.7750	.7800	.7775	.7800	.7750	.7825	.7800	.7850	.7825
13	.8025	.8075	.8050	.8000	.8000	.8000	.7950	.7975	.7950	.8000	.8000	.8000
14	.8200	.8200	.8200	.8175	.8150	.8175	.8125	.8125	.8125	.8050	.8125	.8125
15	.8325	.8350	.8400	.8375	.8450	.8375	.8375	.8325	.8350	.8275	.8275	.8350
16	.8525	.8500	.8625	.8575	.8625	.8625	.8625	.8625	.8550	.8450	.8500	.8500
17	.8625	.8650	.8725	.8750	.8775	.8750	.8800	.8725	.8750	.8625	.8700	.8625
18	.8875	.8850	.8875	.8875	.8975	.8950	.9050	.8975	.9050	.8975	.9000	.9000

1950 VIII 1 ~ VIII 31 N ~ S

Date	1 h	3	5	7	9	11	13	15	17	19	21	23
VIII 1	0.3800	0.3775	0.3775	0.3800	0.3850	0.3725	0.3575	0.3800	0.3925	0.3850	0.3850	0.3850
2	.3850	.3825	.3800	.3850	.3050	.3025	.3000	.3025	.3050	.3025	.3100	.3150
3	.3350	.3300	.3225	.3275	.3275	.3350	.3275	.3325	.3300	.3275	.3275	.3225
4	.3275	.3300	.3275	.3275	.3225	.3225	.3175	.3150	.2975	.2875	.2925	.2925
5	.2975	.2900	.2800	.2800	.2850	.2675	.2525	.2475	.2500	.2600	.2725	.2750
6	.2500	.2475	.2375	.2400	.2475	.2500	.2525	.2675	.2650	.2575	.2600	.2550
7	.2500	.2475	.2475	.2525	.2475	.2425	.2225	.2050	.2200	.2175	.2175	.2150
8	.2100	.2175	.2200	.2250	.2225	.2225	.2250	.2175	.2125	.2125	.2100	.2200
9	.2150	.2200	.2225	.2175	.2075	.1975	.1925	.1975	.1950	.1975	.1950	.1975
10	.1975	.1925	.1950	.1950	.1975	.1875	.1875	.1875	.1925	.1925	.1970	.2000
11	.2000	.2000	.1975	.2000	.2025	.1950	.1825	.1650	.1500	.2025	.2100	.2175
12	.2175	.2125	.2100	.2100	.2100	.1975	.1925	.1975	.1925	.2050	.2100	.2050
13	.2050	.2050	.2000	.2000	.1975	.1925	.1925	.1925	.1975	.2025	.2100	.2125
14	.2050	.2025	.2025	.2050	.2025	.1925	.1850	.1825	.1675	.1725	.1750	.1775
15	.1775	.1775	.1775	.1800	.1825	.1475	.1525	.1550	.1600	.1725	.1750	.1875
16	.2000	.2025	.2475	.2675	.2725	.2350	.2050	.1975	.1900	.1925	.1875	.1925
17	.1925	.1850	.1825	.1850	.1850	.1975	.1900	.1800	.1725	.1725	.1725	.1725
18	.1700	.1575	.1625	.1675	.1725	.1675	.1475	.1425	.1275	.1175	.1300	.1275
19	.1300	.1300	.1275	.1275	.1425	.1475	.1300	.1300	.1275	.1275	.1350	.1325
20	.1325	.1350	.1300	.1275	.1300	.1175	.1150	.1150	.1225	.1175	.1175	.1075
21	.1025	.1025	.1025	.0975	.0975	.0975	.0975	.1025	.1100	.1125	.1225	.1175
22	.1175	.1075	.1125	.1120	.1120	.0375	.0350	.0700	.0850	.0775	.0725	.0725
23	.0650	.0625	.0600	.0550	.0600	.0300	.0375	.0225	.0125	.0300	.0350	.0275
24	.0275	.0275	.0275	.0325	.0625	.0625	.0625	.0675	.0800	.0925	.0975	.1050
25	.1025	.0975	.0975	.0950	.0800	.0675	.0525	.0550	.0525	.0550	.0800	.0825
26	.0725	.0725	.0700	.0700	.0600	.0275	.0175	.0100	.0225	.0275	.0475	.0275
27	.0275	.0275	.0225	.0275	.0475	.0275	.0275	.0225	.0275	.0425	.0475	.0425
28	.0525	.0475	.0475	.0475	.0600	.0525	.0350	.0325	.0375	.0175	.0725	.0625
29	.0500	.0450	.0425	.0450	.0600	.0475	.0500	.0500	.0500	.0625	.0725	.0625
30	.0650	.0675	.0675	.0675	.0725	.0675	.0675	.0600	.0625	.0675	.0775	.0750
31	.0775	.0750	.0725	.0750	.0875	.0750	.0750	.0625	.0550	.0525	.0625	.0675

Date	12 h	13	14	15	16	17	18	19	20	21	22	23
VI 4	0.5850	0.5875	0.5875	0.5850	0.6075	0.6050	0.6125	0.6125	0.6150	0.6125	0.6125	0.6125
5	.6200	.6225	.6225	.6250	.6300	.6350	.6400	.6400	.6475	.6375	.6500	.6425
6	.6525	.6400	.6475	.6400	.6550	.6550	.6625	.6675	.6700	.6700	.6700	.6650
7	.6625	.6550	.6575	.6600	.6600	.6625	.6700	.6700	.6800	.6825	.6925	.6875
8	.6950	.6875	.6875	.6875	.6900	.6950	.7075	.6975	.7075	.7075	.7125	.7100
9	.7250	.7175	.7125	.7075	.7125	.7175	.7200	.7200	.7250	.7250	.7375	.7325
10	.7350	.7300	.7325	.7250	.7275	.7300	.7375	.7375	.7425	.7500	.7525	.7525
11	.7575	.7600	.7575	.7575	.7550	.7550	.7525	.7525	.7650	.7725	.7750	.7825
12	.7800	.7750	.7725	.7700	.7675	.7600	.7650	.7625	.7725	.7800	.7975	.7975
13	.8000	.8025	.8000	.7975	.8000	.7950	.7975	.7950	.8050	.8100	.8150	.8175
14	.8175	.8125	.8225	.8200	.8250	.8225	.8250	.8150	.8150	.8200	.8250	.8250
15	.8400	.8375	.8450	.8400	.8500	.8425	.8450	.8400	.8475	.8350	.8500	.8500
16	.8500	.8450	.8575	.8550	.8650	.8625	.8625	.8625	.8625	.8600	.8750	.8625
17	.8700	.8625	.8700	.8750	.8825	.8850	.8875	.8900	.8850	.8875	.8875	.8850
18	.8875	.8850	.8800	.8825	.8775	.8700	.8800	.8850	.8925	.8925	.9025	.8975

1952 VI 4 ~ VII 3 E ~ W

Date	0 <sup>h</sup>	1	2	3	4	5	6	7	8	9	10	11
VI 19	0.8950	0.8950	0.8950	0.8925	0.8925	0.8925	0.9000	0.8950	0.9050	0.8975	.8975	0.8950
20	.9125	.9050	.9100	.9050	.9125	.9075	.9175	.9175	.9250	.9250	.9250	.9150
21	.9250	.9200	.9250	.9225	.9250	.9250	.9300	.9325	.9375	.9350	.9375	.9300
22	.9450	.9375	.9450	.9375	.9450	.9375	.9475	.9475	.9500	.9475	.9500	.9475
23	.9625	.9625	.9625	.9625	.9625	.9650	.9675	.9675	.9700	.9700	.9750	.9750
24	.9675	.9700	.9700	.9675	.9700	.9650	.9675	.9725	.9700	.9775	.9775	.9850
25	.9675	.9800	.9800	.9825	.9825	.9825	.9825	.9850	.9825	.9900	.9875	.9875
26	1.0050	1.0000	1.0000	.9875	1.0000	1.0000	1.0000	.9950	1.0025	1.0000	1.0050	1.0000
27	.0175	.0175	.0250	.0250	.0250	.0250	.0250	.0250	.0250	.0250	.0250	.0250
28	.0450	.0450	.0450	.0450	.0475	.0450	.0450	.0450	.0475	.0450	.0475	.0475
29	.0625	.0675	.0725	.0675	.0625	.0625	.0650	.0650	.0625	.0625	.0650	.0625
30	.1050	.1075	.1125	.1125	.1175	.1175	.1175	.1175	.1175	.1175	.1175	.1175
VII 1	.1250	.1275	.1325	.1325	.1350	.1350	.1375	.1375	.1375	.1375	.1375	.1400
2	.1625	.1625	.1625	.1625	.1750	.1775	.1750	.1750	.1750	.1725	.1700	.1825
3	.1950	.1950	.2000	.2000	.2050	.2075	.2150	.2150	.2200	.2150	.2150	.2100

1952 VI 4 ~ VII 3 N ~ S

Date	0 <sup>h</sup>	1	2	3	4	5	6	7	8	9	10	11
VI 4	1.0250	1.0200	1.0375	1.0325	1.0450	1.0400	1.0525	1.0500	1.0600	1.0675	1.0825	1.0750
5	.0925	.0875	.1000	.1000	.1100	.1050	.1000	.1000	.1125	.1125	.1275	.1250
6	.1600	.1625	.1625	.1675	.1800	.1825	.1875	.1975	.2075	.2125	.2175	.2125
7	.2750	.2750	.2875	.2925	.3025	.3025	.3050	.3050	.3150	.3125	.3300	.3225
8	.3375	.3375	.3425	.3475	.3550	.3550	.3550	.3550	.3675	.3675	.3875	.3800
9	.3675	.3675	.3800	.3825	.3925	.3975	.4100	.4125	.4175	.4225	.4125	.3925
10	.4250	.4300	.4375	.4550	.4625	.4650	.4675	.4850	.4925	.5050	.5050	.5075
11	.5175	.5250	.5250	.5300	.5325	.5350	.5375	.5375	.5425	.5475	.5550	.5550
12	.5625	.5675	.5675	.5750	.5775	.5850	.5900	.5900	.5975	.6000	.6050	.6075
13	.6225	.6075	.6175	.6125	.6200	.6275	.6300	.6325	.6225	.6500	.6575	.6600
14	.6725	.6675	.6725	.6700	.6800	.6800	.6875	.6875	.6950	.6975	.7050	.7075
15	.7350	.7350	.7375	.7375	.7425	.7450	.7475	.7475	.7575	.7575	.7675	.7675
16	.8000	.8000	.8050	.8050	.8075	.8025	.8175	.8175	.8250	.8250	.8350	.8375
17	.8450	.8475	.8550	.8575	.8650	.8650	.8675	.8725	.8825	.8825	.8925	.8925
18	.9050	.8925	.9175	.9175	.9225	.9250	.9275	.9250	.9325	.9325	.9450	.9425
19	.9550	.9575	.9675	.9625	.9475	.9475	.9800	.9825	.9875	.9975	.9975	.9975
20	2.0175	2.0175	2.0250	2.0300	2.0350	2.0375	2.0425	2.0500	2.0550	2.0550	2.0550	2.0575
21	.0550	.0550	.0675	.0650	.0725	.0725	.0750	.0800	.0825	.0825	.0975	.0925
22	.1100	.1175	.1200	.1200	.1275	.1300	.1350	.1375	.1425	.1550	.1525	.1550
23	.1575	.1600	.1625	.1650	.1675	.1700	.1725	.1775	.1800	.1850	.1875	.1900
24	.2125	.2150	.2175	.2175	.2200	.2225	.2250	.2250	.2250	.2275	.2325	.2350
25	.2525	.2550	.2550	.2600	.2625	.2650	.2675	.2725	.2750	.2750	.2750	.2750
26	.2850	.2850	.2800	.2925	.2900	.2975	.2975	.3025	.3000	.3100	.3050	.3175
27	.3225	.3275	.3300	.3325	.3325	.3375	.3400	.3450	.3475	.3500	.3500	.3575
28	.4250	.4250	.4250	.4250	.4300	.4325	.4350	.4350	.4375	.4400	.4425	.4425
29	.4375	.4425	.4375	.4375	.4375	.4425	.4500	.4550	.4625	.4625	.4750	.4750
30	.4750	.4775	.4775	.4800	.4800	.4850	.4875	.4900	.4900	.4900	.4900	.4875
1	.5075	.5075	.5100	.5100	.5100	.5125	.5150	.5175	.5250	.5250	.5375	.5250
2	.5150	.5175	.5200	.5250	.5300	.5325	.5375	.5450	.5500	.5625	.5575	.5550
3	.5550	.5575	.5550	.5625	.5700	.5675	.5800	.5875	.5825	.5875	.5825	.5875

Date	12 <sup>h</sup>	13	14	15	16	17	18	19	20	21	22	23
VI 19	0.8950	0.8900	0.8875	0.8875	0.8925	0.8925	0.9050	0.8950	0.9100	0.9050	0.9125	0.9100
20	.9150	.9075	.9075	.9000	.9075	.9075	.9175	.9125	.9250	.9250	.9325	.9250
21	.9300	.9275	.9250	.9175	.9200	.9125	.9250	.9225	.9300	.9250	.9350	.9300
22	.9500	.9375	.9375	.9300	.9375	.9375	.9400	.9425	.9475	.9500	.9575	.9575
23	.9750	.9700	.9750	.9575	.9675	.9500	.9575	.9550	.9550	.9625	.9625	.9650
24	.9825	.9750	.9825	.9625	.9750	.9600	.9625	.9575	.9625	.9575	.9625	.9700
25	.9925	.9875	.9875	.9875	.9875	.9875	.9975	.9750	.9875	.9875	.9975	1.0000
26	1.0075	1.0075	1.0075	1.0050	1.0050	1.0700	1.0025	1.0000	1.0100	1.0100	1.0125	1.0100
27	.0250	.0275	.0275	.0275	.0250	.0175	.0225	.0225	.0250	.0250	.0350	.0375
28	.0500	.0500	.0500	.0500	.0500	.0500	.0500	.0475	.0475	.0500	.0500	.0575
29	.0700	.0800	.0800	.0875	.0850	.0850	.0875	.0875	.0925	.0925	.0950	.1000
30	.1175	.1200	.1225	.1175	.1200	.1200	.1200	.1200	.1200	.1225	.1250	.1250
VII 1	.1375	.1375	.1375	.1375	.1375	.1425	.1475	.1475	.1500	.1500	.1550	.1575
2	.1850	.1825	.1825	.1825	.1825	.1875	.1925	.1925	.1975	.1975	.2000	.1950
3	.2100	.2075	.2050	.2000	.2075	.2075	.2075	.2075	.2100	.2125	.2125	.2100

Date	12 <sup>h</sup>	13	14	15	16	17	18	19	20	21	22	23
VI 4	1.0875	1.0750	1.0875	1.0875	1.1075	1.0825	1.0800	1.0750	1.0825	1.0825	1.0850	1.0875
5	.1300	.1300	.1375	.1400	.1475	.1475	.1500	.1475	.1450	.1475	.1500	.1500
6	.2250	.2300	.2300	.2400	.2600	.2650	.2675	.2700	.2700	.2675	.2675	.2700
7	.3300	.3425	.3500	.3500	.3500	.3500	.3500	.3500	.3475	.3475	.3500	.3425
8	.3875	.3825	.3925	.3925	.3925	.3850	.3925	.3650	.3500	.3500	.3500	.3550
9	.4100	.4125	.4175	.4250	.4400	.4250	.4250	.4225	.4300	.4275	.4250	.4225
10	.5125	.5125	.5225	.5225	.5250	.5250	.5250	.5250	.5300	.5300	.5250	.5175
11	.5575	.5575	.5625	.5675	.5700	.5725	.5800	.5750	.5850	.5800	.5800	.5725
12	.6100	.6100	.6175	.6300	.6375	.6425	.6425	.6425	.6450	.6450	.6475	.6300
13	.6675	.6675	.6800	.6750	.6875	.6850	.6950	.6925	.6950	.7050	.6800	.6975
14	.7100	.7200	.7200	.7200	.7225	.7250	.7250	.7225	.7225	.7225	.7300	.7275
15	.7675	.7725	.7800	.7800	.7800	.7800	.7825	.7825	.7825	.7850	.7975	.7975
16	.8500	.8500	.8525	.8525	.8550	.8475	.8550	.8575	.8550	.8500	.8475	.8425
17	.8975	.9000	.9000	.9000	.8925	.9025	.8925	.8900	.8900	.8900	.8925	.8950
18	.9475	.9500	.9600	.9550	.9725	.9675	.9675	.9625	.9625	.9575	.9550	.9550
19	.9975	.9975	2.0025	.9975	.9975	.9925	.9975	2.0000	2.0050	2.0050	2.0050	2.0100
20	2.0600	2.0550	.0650	2.0575	2.0650	2.0500	2.0550	.0475	.0475	.0475	.0475	.0525
21	.1050	.0975	.1075	.1075	.1100	.1125	.1100	.1075	.1125	.1175	.1150	.1100
22	.1575	.1700	.1675	.1725	.1675	.1700	.1675	.1600	.1550	.1550	.1550	.1550
23	.1925	.1950	.1975	.2000	.2050	.2050	.2050	.2025	.2025	.2025	.2050	.2100
24	.2375	.2425	.2475	.2500	.2525	.2525	.2525	.2525	.2550	.2575	.2575	.2550
25	.2800	.2675	.2800	.2825	.2925	.2850	.2800	.2825	.2775	.2875	.2850	.2825
26	.3125	.3225	.3200	.3275	.3250	.3250	.3250	.3250	.3250	.3225	.3200	.3225
27	.3750	.3875	.4025	.4050	.4225	.4250	.4250	.4300	.4250	.4250	.4225	.4225
28	.4400	.4425	.4425	.4475	.4500	.4500	.4475	.4500	.4500	.4475	.4400	.4375
29	.4750	.4775	.4800	.4825	.4850	.4850	.4875	.4850	.4825	.4800	.4775	.4750
30	.4850	.4850	.4825	.4850	.4875	.4925	.4950	.4975	.5000	.5025	.5025	.5025
VII 1	.5300	.5300	.5375	.5325	.5325	.5325	.5325	.5325	.5250	.5175	.5150	.5150
2	.5550	.5550	.5575	.5575	.5575	.5550	.5625	.5550	.5550	.5500	.5450	.5475
3	.5875	.5950	.5925	.5925	.5925	.5950	.5950	.5975	.6000	.6000	.6000	.6025

1953 VII 10 ~ VIII 7 N ~ S

Date	0 <sup>h</sup>	1	2	3	4	5	6	7	8	9	10	11
VII 10	0.0100	0.0125	0.0175	0.0225	0.0300	0.0350	0.0350	0.0400	0.0425	0.0450	0.0450	0.0475
11	.0250	.0250	.0250	.0250	.0300	.0275	.0275	.0375	.0425	.0625	.0550	.0575
12	.0625	.0675	.0700	.0700	.0700	.0675	.0675	.0675	.0700	.0750	.0750	.0800
13	.1075	.1150	.1325	.1250	.1250	.1250	.1250	.1250	.1250	.1250	.1525	.1375
14	.1375	.1375	.1550	.1625	.1625	.1650	.1600	.1625	.1625	.1600	.1700	.1650
15	.1675	.1725	.1750	.1875	.1950	.1900	.1875	.1875	.1875	.1875	.1850	.1900
16	.1650	.1625	.1650	.1700	.1725	.1750	.1800	.1825	.1825	.1850	.1875	.1850
17	.1950	.1750	.1775	.1775	.1775	.1750	.1750	.1800	.1800	.1825	.1825	.1825
18	.1925	.1900	.2000	.2000	.2025	.2025	.2025	.2025	.2050	.2050	.2125	.2050
19	.2200	.2200	.2275	.2275	.2275	.2275	.2275	.2300	.2325	.2325	.2300	.2325
20	.2375	.2375	.2425	.2425	.2475	.2475	.2500	.2500	.2550	.2550	.2600	.2525
21	.2450	.2450	.2475	.2500	.2525	.2500	.2500	.2500	.2550	.2575	.2600	.2575
22	.2300	.2325	.2375	.2375	.2375	.2350	.2350	.2350	.2400	.2400	.2450	.2375
23	.2400	.2450	.2500	.2500	.2575	.2575	.2625	.2625	.2650	.2700	.2750	.2750
24	.2850	.2875	.2900	.2900	.2925	.2925	.2950	.2975	.3000	.3000	.3000	.3025
25	.2825	.2825	.2875	.2900	.2900	.2900	.2925	.2950	.2975	.3000	.3025	.3025
26	.2900	.2950	.3000	.3050	.3050	.3050	.3075	.3100	.3125	.3150	.3150	.3200
27	.3075	.3125	.3125	.3125	.3125	.3125	.3150	.3175	.3200	.3250	.3300	.3300
28	.3150	.3175	.3225	.3250	.3275	.3275	.3275	.3275	.3325	.3325	.3350	.3350
29	.3500	.3500	.3500	.3500	.3550	.3575	.3575	.3575	.3575	.3575	.3725	.3500
30	.3500	.3500	.3525	.3525	.3525	.3525	.3550	.3550	.3600	.3600	.3625	.3625
VIII 31	.3650	.3675	.3675	.3700	.3750	.3750	.3850	.3850	.3875	.3900	.3950	.3875
1	.3900	.3925	.3950	.3950	.3975	.4000	.4000	.4075	.4100	.4125	.4125	.4150
2	.4325	.4350	.4375	.4400	.4400	.4450	.4450	.4475	.4500	.4575	.4550	.4500
3	.4650	.4750	.4725	.4725	.4725	.4700	.4675	.4700	.4725	.4725	.4750	.4750
4	.4825	.4850	.4875	.4900	.4900	.4900	.4900	.4900	.4900	.4900	.4900	.4925
5	.5000	.5000	.5025	.5050	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000
6	.5325	.5350	.5375	.5400	.5425	.5450	.5475	.5500	.5500	.5625	.5600	.5450
7	.5500	.5550	.5550	.5575	.5575	.5600	.5625	.5650	.5650	.5650	.5650	.5625

1953 VII 10 ~ VIII 7 E ~ W

Date	0 <sup>h</sup>	1	2	3	4	5	6	7	8	9	10	11
VII 10	1.1325	1.1325	1.1325	1.1325	1.1325	1.1375	1.1400	1.1450	1.1500	1.1475	1.1450	1.1375
11	.1700	.1625	.1700	.1700	.1725	.1750	.1750	.1725	.1700	.1700	.1750	.1700
12	.1750	.1800	.1825	.1850	.1875	.1950	.2000	.2025	.2075	.2075	.2075	.2025
13	.2000	.1925	.1950	.2000	.2075	.2100	.2125	.2125	.2125	.2125	.2125	.2125
14	.2175	.2075	.2100	.2100	.2175	.2200	.2250	.2250	.2325	.2325	.2325	.2325
15	.2375	.2350	.2325	.2325	.2375	.2400	.2500	.2500	.2575	.2500	.2600	.2550
16	.2700	.2700	.2675	.2700	.2625	.2625	.2625	.2675	.2700	.2725	.2725	.2725
17	.2925	.2950	.2925	.2925	.2925	.2900	.2900	.2900	.2900	.2925	.2975	.2950
18	.3100	.3075	.3075	.3075	.3075	.3075	.3100	.3050	.3025	.3050	.3075	.3100
19	.3125	.3125	.3125	.3150	.3175	.3175	.3175	.3175	.3175	.3175	.3175	.3200
20	.3325	.3325	.3325	.3325	.3325	.3300	.3300	.3275	.3250	.3250	.3250	.3275
21	.3450	.3425	.3425	.3425	.3425	.3425	.3425	.3400	.3375	.3375	.3375	.3350
22	.3500	.3625	.3625	.3650	.3650	.3675	.3675	—	—	—	—	—
23	.3800	.3825	.3850	.3875	.3875	.3875	.3825	.3800	.3775	.3750	.3750	.3750
24	.3875	.3950	.4000	.4025	.4050	.4025	.4025	.3975	.3950	.3900	.3875	.3875

Date	12 <sup>h</sup>	13	14	15	16	17	18	19	20	21	22	23
	//	//	//	//	//	//	//	//	//	//	//	//
VII 10	0.0500	0.0525	0.0550	0.0550	0.0525	0.0475	0.0400	0.0375	0.0375	0.0375	0.0250	0.0300
11	.0625	.0625	.0600	.0550	.0625	.0600	.0500	.0675	.0400	.0375	.0325	.0425
12	.0875	.0875	.0875	.0925	.0900	.0825	.0750	.0675	.0700	.0825	.0925	.1000
13	.1375	.1375	.1500	.1525	.1500	.1500	.1475	.1425	.1375	.1375	.1325	.1325
14	.1725	.1700	.1675	.1625	.1625	.1650	.1575	.1600	.1550	.1550	.1700	.1675
15	.1900	.1875	.1900	.1925	.1850	.1850	.1825	.1800	.1750	.1700	.1625	.1625
16	.1875	.1875	.1875	.1875	.1900	.1900	.1875	.1875	.1825	.1825	.1750	.1750
17	.1850	.1900	.1950	.1950	.1950	.1950	.1975	.1925	.1925	.1900	.1900	.1900
18	.2025	.2075	.2100	.2100	.2150	.2125	.2075	.2050	.2000	.2000	.2050	.2150
19	.2375	.2325	.2325	.2325	.2350	.2350	.2375	.2375	.2375	.2350	.2325	.2375
20	.2525	.2550	.2575	.2625	.2575	.2575	.2550	.2500	.2500	.2475	.2450	.2425
21	.2575	.2550	.2550	.2550	.2500	.2475	.2425	.2375	.2350	.2325	.2250	.2250
22	.2325	.2350	.2375	.2375	.2375	.2375	.2375	.2375	.2375	.2375	.2375	.2400
23	.2750	.2750	.2775	.2775	.2775	.2775	.2775	.2775	.2780	.2780	.2780	.2780
24	.3050	.3050	.3075	.3075	.3050	.3000	.2950	.2950	.2900	.2850	.2775	.2800
25	.3050	.3100	.3125	.3125	.3075	.3075	.3000	.3000	.2975	.2950	.2875	.2850
26	.3225	.3225	.3250	.3275	.3300	.3250	.3250	.3250	.3175	.3175	.3075	.3075
27	.3300	.3300	.3325	.3325	.3325	.3300	.3275	.3250	.3175	.3125	.3125	.3150
28	.3400	.3400	.3500	.3500	.3525	.3500	.3500	.3500	.3500	.3475	.3475	.3475
29	.3550	.3550	.3575	.3575	.3600	.3550	.3500	.3500	.3500	.3375	.3475	.3475
30	.3650	.3650	.3675	.3700	.3700	.3675	.3625	.3625	.3600	.3600	.3625	.3650
VIII 1	.3875	.3900	.3900	.3950	.3950	.3975	.3950	.3925	.3900	.3900	.3875	.3875
2	.4175	.4200	.4225	.4250	.4250	.4300	.4300	.4350	.4325	.4300	.4300	.4300
3	.4550	.4525	.4500	.4475	.4450	.4475	.4500	.4550	.4550	.4625	.4625	.4625
4	.4750	.4750	.4750	.4750	.4750	.4750	.4750	.4750	.4750	.4750	.4775	.4800
5	.4925	.4925	.4900	.4750	.4850	.4975	.4950	.4975	.4950	.5000	.5000	.5025
6	.5025	.5025	.5000	.5100	.5000	.4950	.5075	.5100	.5000	.5150	.5225	.5275
7	.5450	.5400	.5300	.5050	.5100	.5150	.5200	.5250	.5250	.5300	.5350	.5425
8	.5725	.5750	.5700	.5625	.5625	.5625	.5625	.5600	.5575	.5500	.5600	.5600

Date	12 <sup>h</sup>	13	14	15	16	17	18	19	20	21	22	23
	//	//	//	//	//	//	//	//	//	//	//	//
VII 10	1.1375	1.1350	1.1375	1.1400	1.1425	1.1500	1.1625	1.1650	1.1700	1.1700	1.1700	1.1575
11	.1700	.1675	.1675	.1625	.1650	.1750	.1875	.1900	.1925	.1950	.1750	.1625
12	.2000	.1950	.1950	.1875	.2050	.2050	.2125	.2075	.2000	.2000	.2000	.2000
13	.2100	.1975	.2025	.2050	.2100	.2125	.2150	.2150	.2250	.2250	.2250	.2200
14	.2325	.2325	.2325	.2325	.2325	.2325	.2450	.2450	.2450	.2475	.2500	.2425
15	.2575	.2500	.2500	.2400	.2375	.2500	.2500	.2550	.2575	.2675	.2700	.2700
16	.2725	.2725	.2725	.2750	.2750	.2750	.2750	.2825	.2875	.2950	.2975	.2950
17	.2950	.2950	.2950	.2950	.2950	.2950	.2975	.3025	.3075	.3075	.3075	.3100
18	.3125	.3125	.3125	.3125	.3125	.3150	.3175	.3150	.3125	.3125	.3150	.3175
19	.3200	.3225	.3250	.3225	.3250	.3250	.3275	.3275	.3300	.3325	.3325	.3325
20	.3300	.3300	.3325	.3325	.3325	.3375	.3350	.3400	.3425	.3425	.3425	.3450
21	.3350	.3425	.3450	.3475	.3500	.3500	.3525	.3525	.3525	.3525	.3525	.3525
22	.3675	.3675	.3675	.3700	.3725	.3750	.3750	.3775	.3775	.3775	.3775	.3775
23	.3750	.3750	.3775	.3775	.3800	.3825	.3850	.3875	.3875	.3875	.3875	.3875
24	.3875	.3975	.4000	.4075	.4125	.4175	.4200	.4200	.4200	.4200	.4200	.4200

1953 VII 10 ~ VIII 7 E ~ W

Date	0 <sup>h</sup>	1	2	3	4	5	6	7	8	9	10	11
VII 25	1.4225	1.4250	1.4275	1.4325	1.4375	1.4375	1.4375	1.4350	1.4350	1.4300	1.4250	1.4475
26	.4375	.4400	.4425	.4475	.4500	.4500	.4500	.4500	.4500	.4375	.4375	.4375
27	.4600	.4600	.4600	.4625	.4725	.4725	.4750	.4750	.4750	.4700	.4625	.4625
28	.4775	.4775	.4775	.4800	.4825	.4875	.4925	.4950	.4925	.4875	.4850	.4825
29	.4975	.4975	.4950	.4975	.5000	.5050	.5075	.5050	.5125	.5125	.5175	.5125
30	.5200	.5150	.5125	.5125	.5125	.5150	.5150	.5200	.5250	.5275	.5300	.5275
31	.5375	.5375	.5375	.5375	.5350	.5325	.5325	.5325	.5350	.5350	.5350	.5375
VIII 1	.5550	.5575	.5550	.5525	.5500	.5475	.5475	.5450	.5500	.5525	.5550	.5550
2	.5700	.5725	.5750	.5725	.5725	.5700	.5675	.5625	.5625	.5650	.5675	.5700
3	.5800	.5825	.5850	.5875	.5900	.5900	.5900	.5875	.5875	.5875	.5875	.5875
4	.6000	.6025	.6025	.6050	.6075	.6100	.6100	.6075	.6075	.6075	.6075	.6025
5	.6200	.6225	.6225	.6250	.6325	.6325	.6325	.6300	.6250	.6375	.6425	.6375
6	.6350	.6375	.6375	.6375	.6375	.6425	.6450	.6450	.6450	.6425	.6375	.6500
7	.6800	.6625	.6625	.6625	.6550	.6650	.6650	.6675	.6700	.6625	.6625	.6625

1953 VII 10 ~ VIII 7 E ~ W

Date	12 <sup>h</sup>	13	14	15	16	17	18	19	20	21	22	23
VII 25	1.4250	1.4275	1.4325	1.4375	1.4450	1.4475	1.4500	1.4525	1.4550	1.4475	1.4375	1.4375
26	.4325	.4325	.4325	.4450	.4425	.4550	.4575	.4625	.4675	.4625	.4625	.4625
27	.4625	.4575	.4625	.4675	.4750	.4775	.4800	.4800	.4800	.4800	.4800	.4775
28	.4800	.4800	.4800	.4825	.4850	.4875	.4950	.4950	.4975	.4975	.4975	.4975
29	.5000	.5075	.5025	.5000	.5000	.5000	.5075	.5075	.5175	.5175	.5200	.5200
30	.5250	.5225	.5200	.5225	.5250	.5275	.5275	.5300	.5325	.5350	.5375	.5375
31	.5375	.5375	.5375	.5375	.5350	.5375	.5375	.5400	.5425	.5450	.5500	.5525
VIII 1	.5550	.5525	.5500	.5375	.5500	.5500	.5525	.5550	.5575	.5625	.5650	.5675
2	.5725	.5725	.5750	.5750	.5750	.5750	.5775	.5775	.5775	.5775	.5750	.5775
3	.5875	.5900	.5900	.5925	.5925	.5950	.5975	.5975	.5975	.5975	.6000	.6000
4	.6000	.6050	.6100	.6200	.6200	.6275	.6225	.6225	.6225	.6200	.6150	.6175
5	.6325	.6300	.6350	.6375	.6375	.6400	.6425	.6425	.6425	.6400	.6375	.6350
6	.6625	.6650	.6675	.6675	.6875	.6725	.6725	.6800	.6825	.6825	.6800	.6750
7	.6600	.6600	.6600	.6600	.6575	.6625	.6625	.6675	.6700	.6750	.6750	.6775