Gravity Survey along the Lines of Precise Levels throughout Japan by Means of a WORDEN Gravimeter.

Part I. Shikoku District.

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1. Introduction

Since the early days of its existence, the Earthquake Research Institute has been much interested in the fact that the gravity anomalies in Japan show a very characteristic distribution in and near the areas which are active from the seismological point of view. In 1929, it was shown by C. TSUBOI (1929) that a close relationship exists between the distributions of BOUGUER gravity anomalies and of epicentres of conspicuous earthquakes in and near Japan. Since gravity anomalies are indications of abnormal underground mass distributions, the relationship found was thought to be undoubtedly an important clue for understanding reasonably the nature of mechanism of earthquake occurrence, particularly in relation to the detailed structure of the outer part of the earth.

At the time when TSUBOI's study was published, the values of BOUGUER anomalies were known at 122 land stations which are distributed rather evenly throughout Japan with an average mutual distance of about 50 km. The measurements at these stations had been made by H. NAGAOKA, S. SHINJO, R. OTANI, M. MATUYAMA and others under the auspices of the Geodetic Commission of Japan by the pendulum method. An important addition to these materials was made by M. MATUYAMA, N. KUMAGAI and others (1936, 1940) when, by means of a MEINESZ apparatus, they made gravity measurements at some 60 stations on the neighbouring seas of Japan, also under the auspices of the same Commission. Although the number of stations, nearly 200 in all, is large enough to yield results to be based on for tracing general trends of isoanomaly lines in the area concerned, it was soon felt that no further advance of the studies of the important problem stated above can be expected unless a more detailed and systematic gravity survey is carried out.

Evidently, in order to accomplish such a detailed survey effectively, the time needed for measurement at each gravity station must be reduced as much as possible. Efforts were therefore made by C. TSUBOI and others (M. KIMURA: 1933, 1934; C. TSUBOI and T. FUCHIDA: 1937) to establish a new method of gravity measurement which will fulfil such requirements. After many preliminary experiments, two sets of two-quartz pendulum apparatus with necessary accessories were finally completed, and, by means of wireless timing communications between the two, installed respectively at the base and field stations, the accurate measurement of gravity within a considerably reduced time was made possible. By using these new apparatuses, nearly 100 stations, at an interval of about 20 km on the average, were established in the Kwanto district, an area noted for its seismic activity (T. FUCHIDA: 1935). These detailed surveys disclosed several zones with steep gradient of gravity anomaly here and there in the district, which the widely-spaced older measurements had failed to detect. The locations of these steep gradients could be correlated to minor seismic areas to some extent and this fact convinced us more strongly of the importance of the gravity survey for earthquake studies.

In spite of the developments made in the techniques of measurements as stated above, still one whole day at least was required for one gravity station including the installation and transportation work. This was far from satisfactory for our purpose of the quick coverage of gravity measurements throughout Japan.

As to the theoretical side, on the other hand, C. TSUBOI (1937, 1938, 1939, 1940, 1941, 1942) has developed the FOURIER series method for interpreting gravity anomalies. This method, with reasonable and simple assumptions, has opened a possibility to calculate directly the underground mass distribution from observed gravity anomalies. The method has proved to be a very powerful weapon for attacking various gravity problems and in fact many actual problems have been successfully studied, particularly in relation to isostasy.

We thus thought the time to be ripe for us to take a further and more systematic step toward the precise investigation of the gravity distribution in Japan. In addition, two events occurred which strongly stimulated us to push forward in this line.

The first event is concerned with a strong earthquake which took place near the town of Nikkô, Tochigi Prefecture, on December 26, 1949. At that time, a gravity party from the Geological Survey of Japan, equipped with a North American gravimeter, happened to be engaged in the gravity prospecting work near the epicentre of the earthquake. No chance was lost by the party to repeat determinations of the gravity difference between the towns of Nikkô and Imaichi, both very near the epicentre. According to the report of the party (K. IIDA, M. HAYAKAWA and K. KATAYOSE: 1950), the gravity differences between the two towns were as follows:

Table I. Gravity Differences (Imaichi-Nikkô)

Date		Gravity Difference
Dec.	30—31, 1949	61.70 mgal
March	28—29, 1950	61.55
March	16—17, 1951	61.70

These data are very interesting in that they apparently suggest some change in the difference of the values of gravity according to time, although it may be due either to mere observation errors or to an eventual change in the height difference between the two towns by some 45 cm. We know that the change of this magnitude is by no means unusual in seismic areas.

The second event is concerned with the great Nankaidô earthquake of December 21, 1946. T. OKUDA (1951) of the Geographical Survey Institute, who measured the deviations of the vertical at several trigonometrical points in the meizoseismal area of this great earthquake, found that the values unmistakably differ from those of older measurements made at the same points before the earthquake. The horizontal displacements of the trigonometrical points due to the deformations of the earth's crust were notable (GEOGRAPHICAL SURVEY INSTITUTE: 1952) as were the cases of several other great earthquakes. These displacements may result in apparent changes in the deviation of the vertical at these points. But the changes in the deviation observed by OKUDA are too large to be attributed to the deformations, not to say to observational errors. The systematic distribution of the changes both in magnitude and direction with respect to the position of the epicentre of the earthquake of 1946 is also another indirect proof of their reality. If the changes are something real, the change in the direction of the vertical itself is presumably the most plausible explanation for them. The change in the deviation of the vertical is nothing but a change in the form of the geoid and the latter cannot be produced without some change in the subterranean density distribution. The change in gravity will necessarily accompany this, although the mode of change will differ according to circumstances. In fact, OKUDA calculated the change in the underground density distribution by which the observed changes in the deviation of the vertical can be accounted for and even proceeded to predict the accompanying change in the gravity distribution.

These findings, not decisive yet as they are, have attracted our interest very much. Thus, in addition to the detailed gravity survey, a new problem has confronted us, viz. whether the gravity changes with time or not. The desirability of execution of our gravity project was greatly enhanced.

Obviously, the most important point in studying these problems is how to measure gravity values with a high accuracy at a number of identifiable stations within the shortest possible time. Thus, naturally, the gravimeter has come into question.

Incidentally, Dr. G. P. WOOLLARD of University of Wisconsin, U.S.A., visited us carrying a WORDEN gravimeter in 1948, during his journey made for the world gravity measurements. This visit of Dr. WOOLLARD fortunately afforded us an opportunity to become acquainted with the working behavior of the instrument. In consequence, we became convinced of the fact that the WORDEN gravimeter is, if not the only one, among the instruments most dependable for our purpose.

The Earthquake Research Institute applied to the Government for defrayal of the expense necessary for purchasing a WORDEN gravimeter, which application was fortunately granted. In this connection, we have the pleasure of expressing our gratitude to the Government officials for their support and good understanding on this matter.

An order for this instrument was at once placed with the Houston Technical Laboratories, Houston, Texas, U.S.A. The gravimeter reached us safely in due course of time. The instrument number is 60.

2. Programme

Careful measurements by a WORDEN gravimeter can detect a small gravity difference of a few hundredths of a milligal. Several preliminary trips proved the dependability of the gravimeter to be beyond doubt.

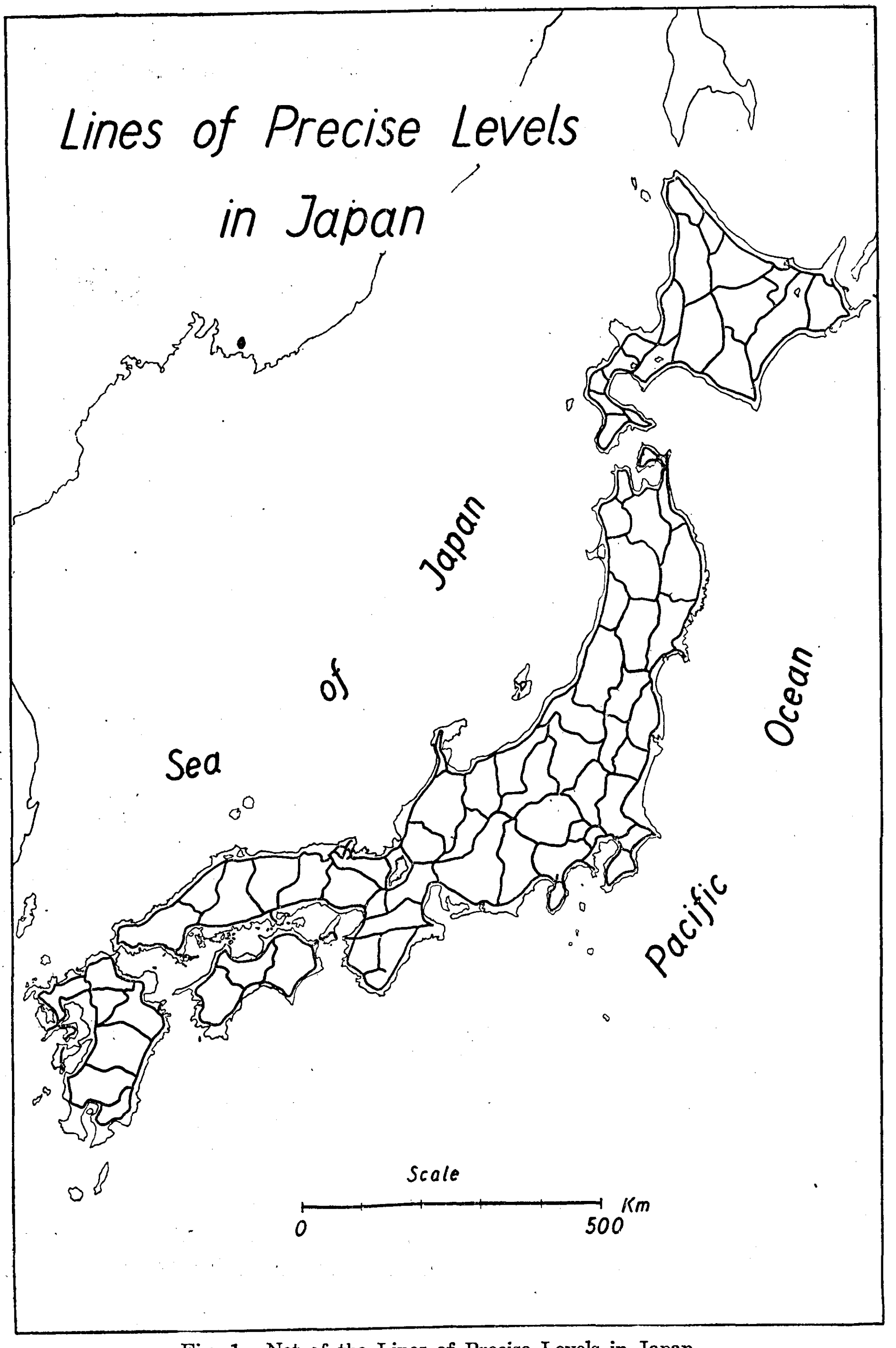

Fig. 1. Net of the Lines of Precise Levels in Japan.

We became well experienced in the use of the gravimeter and were ready to start measurements.

As is well known, in order to secure an accuracy of 0.01 mgal in the determination of gravity anomalies or in the comparison of the old and new measurements, the height of each gravity station must be known to the degree of 3 cm. To measure the height by levellings with this degree of accuracy is not a very difficult task, if the survey is confined to a small area as in the case of prospecting. But things are quite different for us, since, according to our plan, the gravity survey is to be extended to a great many points which are distributed over a wide

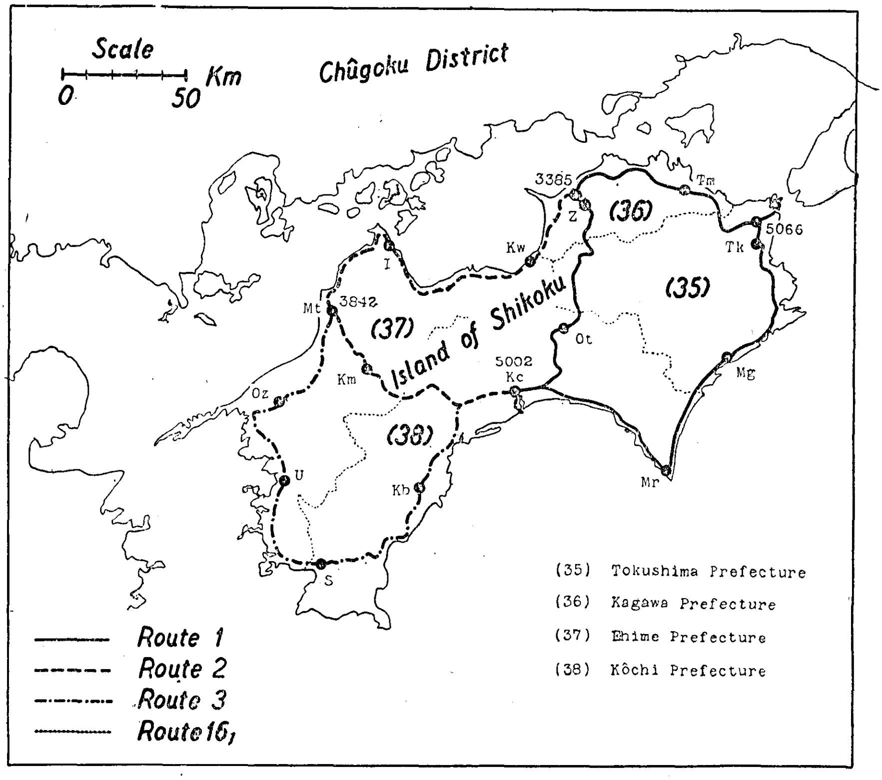

Fig. 2. Lines of Precise Levels on the Island of Shikoku with Prefecture Boundaries.

area throughout Japan. This circumstance naturally imposes a practical limit on the scope of our project. After many considerations, we have come to the conclusion that our gravity measurements shall be made along the lines of precise levels at the sites of bench marks. The net of the lines of precise levels in Japan is shown in Fig. 1. Although the net is pretty dense as such, it is unfortunately not dense enough to allow us to state that the bench marks are two-dimensionally or areally distributed. Of course an areal survey of gravity is desirable, but in that case, the work for determining the accurate heights of the stations would be prohibitively enormous.

On the lines of precise level in Japan, the bench marks are laid at every 2 km and their heights are known very accurately. The horizontal positions of the bench marks on the other hand, can be determined from maps (scale 1/50,000) pretty accurately, at least to a decimal of one minute angle. The easiness of identification of the very point of the measurement is another advantage in using the bench mark as the point of gravimeter measurement. This is particularly important for us, because, as was stated before, we have in mind the possibility of a resurvey of gravity values in order to investigate the suspected secular variations in the gravity values.

The first series of the measurements was decided to be made on the island of Shikoku. The island has an area a little less than 19,000 km^2. This island comprises four prefectures, viz., Tokushima, Kagawa, Ehime and Kôchi. The lines of precise levels on this island is roughly shown in Fig. 2.

3. The WORDEN Gravimeter

As is well known, the WORDEN gravimeter is equipped with two dials, which are called the large and small dials. One division on the large dial roughly corresponds to 4 mgal, while that on the small dial to 0.9150 mgal in our instrument. The latter figure has been supplied by the maker of the instrument and taken as reliable at least for the time being. We have very frequently measured gravity differences between Tokyo, Chiba and Mitaka by means of the gravimeter and made it certain that no appreciable change has occurred in the constant of the gravimeter. We have found out by experience that, notwithstanding the pains we have taken to set the large dial to its certain scale positions very accurately, one large dial division in terms of small dial divisions is apparently at variance. Table II will illustrate this uncertainty. Two readings in a set given in the table were made consecutively at one same place. As may be seen from the table, $\Delta SD/\Delta LD$ ranges from 4.38 to 4.54 and appears to show no systematic change according to the large dial value. Thus we believe that the gravimeter may be most wisely

Table II. Small Dial Scales and Large Dial Scales.

LD	*SD*	$\Delta SD / \Delta LD$	*LD*	*SD*	$\Delta SD / \Delta LD$	*LD*	*SD*	$\Delta SD / \Delta LD$	*LD*	*SD*	$\Delta SD / \Delta LD$
430 436	5141 2470	} 4.45	402 409	6325 3211	} 4.45	418 430	6169 813	} 4.46	411 417	5883 3200	} 4.44
431 436	2987 743	} 4.49	402 410	5017 1475	} 4.43	418 423	6139 3917	} 4.44	413 417	6318 4518	} 4.50
423 436	6650 843	} 4.47	410 414	6137 4346	} 4.48	413 423	5695 1250	} 4.45	406 413	6728 3528	} 4.50
419 423	6791 5017	} 4.43	414 420	6301 3593	} 4.51	405 413	6180 2563	} 4.52	406 410	3126 1310	} 4.54
419 427	5259 1712	} 4.43	416 420	7044 5211	} 4.58	394 405	6616 1714	} 4.45	410 415	5895 3707	} 4.38
418 427	5023 998	} 4.47	406 416	6270 1757	} 4.51	390 394	6299 4509	} 4.48	410 415	2496 274	} 4.44
418 429	6775 1880	} 4.45	400 406	5637 2978	} 4.43	390 397	5191 2093	} 4.43	406 410	5685 3894	} 4.48
418 429	6473 1570	} 4.46	400 404	3327 1558	} 4.42	397 404	5794 2697	} 4.42	402 406	6098 4285	} 4.53
418 429	6491 1615	} 4.43	404 410	4341 1677	} 4.44	404 410	5507 2810	} 4.49	402 412	5603 1099	} 4.50
420 429	5624 1602	} 4.47	410 416	3699 1027	} 4.45	410 417	5773 2633	} 4.49	403 412	6024 1980	} 4.49
414 420	5952 3239	} 4.52	416 426	5347 820	} 4.53	417 420	4925 3573	} 4.51	403 410	6199 3077	} 4.46
409 414	6216 3950	} 4.53	426 430	5213 3418	} 4.49	411 420	6173 2185	} 4.43			

used by exclusively resorting to the small dial. Therefore if the gravity difference between any two successive field stations is anticipated to be too large to be covered with the large dial at the same setting, the following procedure was adopted. At the first station, two readings are taken with the large dial successively fixed at two different settings; the first setting being the same as at its preceding station and the second such as will allow the measurement at the next station possible without any change in the large dial setting.

Before showing an example of measurements which were made according to this scheme, it will be appropriate to describe small corrections applied to the gravimeter readings against the effects of the earth tides and of the height of the instrument above the bench mark at which the measurement was made.

4. Corrections for the Earth Tides and for the Heights of the Instrument above the Bench Marks

The corrections for the earth tides were calculated by the aid of the

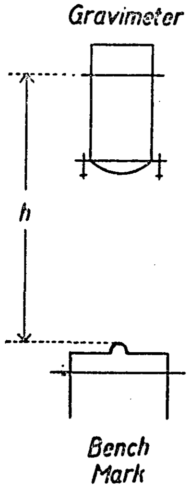

Fig. 3. Height of the Instrument above the Bench Mark.

useful table prepared by J. B. DAMREL and published by the Houston Technical Laboratories (1951). In order to know the local hour angles of the moon and the sun for which the corrections are to be calculated, the Abridged Nautical Almanac published by the Maritime Safety Agency, Japan, was resorted to.

The correction for the height of the instrument above the bench mark was also made in order to get the gravity value at the very height of the mark itself. The height of a fixed mark of the gravimeter above the bench mark was read at each measurement (Fig. 3). This varied from 27 cm to more than 1 m according to circumstances. The correction ($0.3086 \times h$) was applied in order to get the gravity value at the very height of the bench mark.

5. Actual Examples of Gravimeter Readings

Now Table III shows a part of the results of our actual measurements. This will be enough to illustrate how our measurements were made.

In the table, δT means the time interval between the measurements at two successive stations which was necessary for moving. $\sum \delta T$ is the sum of δT; the time between two consecutive readings at one station which were occasionally necessary not being included in it. $\sum \delta T$ is therefore the net total time which was spent in installations of the instrument and transportations. *LD* is the reading of the large dial, while *SD* is that of the small dial. h is the height of the instrument above the bench mark. *E. T.* is the correction for the earth tides. δg is the difference in the gravity between two successive stations and $\sum \delta g$ is the cumulative sum of δg. $\sum \delta g$ is therefore the difference in the gravity at a field station and at the station which was taken as the reference. In our present case, Zentsûji was taken as the reference station for the sake of convenience.

The procedure which is the same in principle was also used to connect the measurements made on two consecutive days. The evening reading of the first day and the morning reading of the second day at a lodging place are connected as illustrated in Table IV.

6. Flow of the Gravimeter Spring

The correction against the flow of the gravimeter spring is essen-

Table III. A Part of the Results of Actual Measurements.

Station No.	Bench Mark No.	Time 1951 IV 16	δT	$\Sigma\delta T$	LD	SD	h (cm)	0.9150 × SD (0.01 mgal)	0.3086 × h (″)	$E.T.$ (″)	Sum of Left Three (″)	δg (″)	$\Sigma\delta g$ (″)
...	....	.. ..		.. ..	...	....	..	....	..	..	....		....
			. ..									....	
112	5043	10h 57m		64h 22m	420	4035	33	3692	10	0	3702		− 4176
			0h 15m									− 372	
113	5045	11 12		64 37	〃	3619	44	3311	14	0	3325		− 4553
			2 14									1456	
114	5047	13 26		66 51	〃	5211	47	4768	15	−2	4781		− 3097
〃	〃	13 28			416	7044	〃	6445	15	−2	6458		
			0 19									−4853	
114_R		13 47		67 10	〃	1757	—	1608	—	−3	1605		− 7950
〃		13 52			406	6270	—	5737	—	−3	5734		
			0 20									−2998	
115	5051	14 12		67 30	〃	2978	45	2725	14	−3	2736		−10948
〃	〃	14 14			400	5637	〃	5158	14	−3	5169		
			0 23									−2113	
116	5052	14 37		67 53	〃	3327	50	3044	15	−3	3056		−13061
〃	〃	14 39			404	1558	〃	1426	15	−3	1438		
			0 34									2545	
117	5054	15 13		68 27	〃	4341	46	3972	14	−3	3983		−10516
〃	〃	15 15			410	1677	〃	1534	14	−3	1545		
			0 15									1855	
118	5055	15 30		68 42	〃	3699	51	3385	16	−1	3400		− 8661
〃	〃	15 32			416	1027	〃	940	16	−1	955		
			0 18									3952	
119	5057	15 50		69 00	〃	5347	48	4893	15	−1	4907		− 4709
〃	〃	15 53			426	820	〃	750	15	−1	764		
			0 15									771	
120	5059	16 08		69 15	〃	1662	48	1521	15	−1	1535		− 3938
			0 14									1540	
121	5061	16 22		69 26	〃	3351	34	3066	10	−1	3075		− 2398
			. ..									....	
...	....	.. ..		.. ..	...	....	..	....	..	..	....		....

Table IV. Connection of Measurements on Two Consecutive Days.

Station No.	Bench Mark No.	Time 1951	δT	$\Sigma\delta T$	LD	SD	h (cm)	0.9150 × SD (0.01 mgal)	0.3086 × h (″)	$E.T.$ (″)	Sum of Left Three (″)	δg (″)	$\Sigma\delta g$ (″)
...	....	.. ..		.. ..	...	....	..	....	..	..	....		....
		IV 15	. ..									....	
106	5031	14h 48m		56h 42m	410	4089	21	3741	6	1	3748		−8211
			0h 24m									432	
107	5033	15 12		57 06	〃	4549	54	4162	17	1	4180		−7779
			4 38									−627	
Ôtaguchi		19 50		61 44	〃	3866	27	3537	8	8	3553		−8406
		IV 16											
〃		8 13			〃	3913	27	3580	8	−1	3587		
			0 54									646	
107	5033	9 7		62 38	〃	4610	53	4218	16	−1	4233		−7760
			0 30									393	
108	5036	9 37		63 08	〃	5045	37	4616	11	−1	4626		−7367
			. ..									...	
...	....	.. ..		.. ..	...	....	..	....	..	..	....		....

Table V. Bulk Closing Residual for the Three Loops in Shikoku.

Loop	Closing Residuals (mgal)	Total Time (hour)	Average Rate of Flow (mgal/hour)
I	7.04	197.0	0.0357
II	6.30	150.7	0.0418
III	6.01	144.1	0.0417

tially important. As shown before in Fig. 2, the routes of our measurements in Shikoku can be regarded as consisting of three partially overlapping loops: the east loop I, the middle loop II and the west loop III. The bulk closing residuals (including both running and lodging states) for each of the loops are given in Table V. The average rate of flow has been obtained merely by dividing the residual for a loop by the time needed to complete that loop. The total flow, however, may be regarded to consist of two parts. The one is the flow during the lodging where the gravimeter is placed quietly and the other is that during transportations where the gravimeter is shaken in a car. If the bulk closing residuals given above in Table V are grouped into these two parts and the average flows are calculated separately for each, we get the values shown in Table VI.

Table VI. Rates of Flow of the Gravimeter Spring for Lodging and Running Conditions.

Loop	Lodging			Running		
	Residual (mgal)	Time (hour)	Average Rate (mgal/hour)	Residual (mgal)	Time (hour)	Average Rate (mgal/hour)
I	4.54	125.3	0.0362	2.50	71.7	0.0349
II	2.62	78.3	0.0335	3.68	72.4	0.0509
III	2.86	75.9	0.0377	3.15	68.2	0.0462

Except for the average rate of flow during running for Loop I, the average rates of flow during lodging and running are approximately constant respectively and the former is smaller than the latter. It is not yet clear, however, whether this difference is due to the difference in the mechanical conditions to which the gravimeter is subjected or to the difference in temperature of the instrument, for the temperature is generally low in the night-time when we are lodging.

7. Method of Calculations

Actual calculations of the gravity values at the bench marks have been made in the following way.

Route 1. As was shown in Fig. 2, this route starts from Zentsûji (Z) and describes a loop via Tomida (Tm), Tokushima (Tk), Mugi (Mg), Muroto (Mr), Kôchi (Kc), and Ôtaguchi (Ot) which are lodging places. The running closing residual for this loop was 2.50 mgal while the working time needed to complete this loop was 71.7 hours. The average running flow is therefore

$$R=2.50\div 71.7=0.0349 \text{ mgal/hour}.$$

The value of $dg\equiv\sum\delta g$ at each of the bench marks on this route is given a correction $R\sum\delta T$, where $\sum\delta T$ is the time needed from Zentsûji to arrive at that bench mark. In this way, the gravity values (relative to Zentsûji) at all the stations along this Route 1 have been determined.

Route 2. The route, starting from B.M. 3385 and ending at B.M. 5002 via Zentsûji (Z), Kawanoe (Kw), Imabari (I), Matsuyama (Mt), and Kume (Km), is taken as Route 2. According to the final result of measurements along Route 1, we know that

$$dg(3385)=4.70 \text{ mgal}$$

and

$$dg(5002)=-54.49 \text{ mgal}.$$

On the other hand, the results of measurements along Route 2 gave

$$dg(5002)=-51.45 \text{ mgal}$$

assuming

$$dg(3385)=4.70 \text{ mgal}.$$

There is therefore a difference

$$-51.45+54.49=3.04 \text{ mgal}$$

for the value of $dg(5002)$ as determined from the measurements along Routes 1 and 2. The time needed for the measurements from B.M. 3385 to B.M. 5002 along Route 2 was 53.9 hours, so that the average rate of flow for Route 2 is

$$R=3.04\div 53.9=0.0564 \text{ mgal/hour}.$$

As was done for the stations along Route 1, the value of measurement at each bench mark on Route 2 is given a correction $R\sum\delta T$, where $\sum\delta T$ is the working time needed to arrive at that bench mark from B.M. 3385.

Route 3. Route 3, which starts from B.M. 5002 and ends at B.M. 3842 via Kubokawa (Kb), Sukumo (S), Uwajima (U) and Ôzu (O) gave

$$dg(3842)=-77.94 \text{ mgal},$$

with $$dg(5002) = -54.49 \text{ mgal.}$$

On the other hand, the final results for Route 2 gave

$$dg(3842) = -80.18 \text{ mgal,}$$

so that the flow for Route 3 is

$$-77.94 + 80.18 = 2.24 \text{ mgal,}$$

and the time is 49.9 hours. The average rate of flow for Route 3 is therefore

$$R = 2.24 \div 49.9 = 0.0449 \text{ mgal/hour.}$$

All the values at the bench marks on this route were corrected in the same manner as described above for Route 1 and Route 2.

There are of course other methods of adjustment. For instance, the method of least squares is usually resorted to, if the routes along which the gravity values are measured have several points in common. This and other methods of reduction have been tried but in our present case, no significant difference has been shown by the difference in the methods.

Lastly it must be noticed that by the preceding processes, we have only determined the gravity differences at all the bench marks in Shikoku from the value at Zentsûji which was conveniently taken as the reference station. In order to get the gravity value at each of the stations, the value at one of the stations on the routes must be known. Now by a direct connection to Honshû (the Main Island of Japan), the value at B.M. 5066 on the first route has been found to be 979.67653. That the difference

$$g(\text{Zentsûji}) - g(5066)$$

is 14.60 mgal is already known. Thus the value at Zentsûji becomes

$$979.67653 + 14.60 = 979.69113$$

In saying that the value at B.M. 5066 is 979.67653, the value at the Tokyo Base Station has been taken exactly to be 979.80100, This value was determined in 1899 by H. NAGAOKA relative to Potsdam. Obviously NAGAOKA's determination has no sufficient accuracy to give the gravity value down to one hundredth of a milligal. It is merely for the sake of convenience that the value has been taken exactly as 979.80100.

8. Results

The bench marks at which the gravity values have been measured on this island are 276 in number. The number in each of four prefectures is given in Table VII.

Table VII. Number of Gravimeter Stations in Four Prefectures in Shikoku.

Tokushima Prefecture	55
Kagawa Prefecture	33
Ehime Prefecture	96
Kôchi Prefecture	92
Total	276

In addition, a few meteorological and tidal observatories have been visited. These are 9 in number and thus make the total 285. The measurements were made mainly in April, 1951, partly in August, 1952, and in April, 1953.

The gravity values and anomalies at the stations in Shikoku are given in Table VIII—XIV which are self-explanatory. Tables VIII—XI correspond to Routes 1, 2, 3 and 16_1 respectively, while Tables XII—XV give the results for four prefectures separately. In calculating the gravity anomalies, the free air reduction was made by the formula

$$0.308600 \times h \text{ (m)}.$$

That the coefficient 0.3086 necessarily varies according to gravity anomalies has been discussed by C. TSUBOI (1952), but no consideration for this effect has been paid here. The BOUGUER reductions were made by taking the density of the rock to be exactly 2.6700. Again, the normal gravity was calculated according to

$$\gamma = 979.03000(1 + 0.00530200 \sin^2 \varphi - 0.00000700 \sin^2 2\varphi).$$

Since the latitudes of gravity stations, which were read from maps of the scale 1/50,000, are accurate to 0.′1 at most, the normal gravity values at the stations cannot be calculated beyond 0.1 mgal. Neither the reduction nor the normal gravity having an accuracy greater than 0.1 mgal, the calculated gravity anomalies are to be regarded as correct to 0.1 mgal at most. But the gravity value at the very site of a bench mark is relatively accurate within a few hundredths of a milligal. The fact that at a certain bench mark, the gravity value as referred to that at Zentsûji was such and such at such and such a time should be kept on record. This is important especially because we have in mind the possibility of redetermination in order to attack the important problem whether there can be secular variations in gravity or not.

The lines of equal BOUGUER anomalies with 5 mgal intervals are shown in Fig. 8. The positions of the lines are accurate where they meet the lines of precise levels, but obviously no great accuracy can be claimed for their positions and trends in the intervenient parts. The followings are some of the more interesting features which are noticed in Fig. 8, although the full discussions of these and others are reserved to a future study.

1. The BOUGUER anomaly increases considerably towards the south, that is towards the Pacific side of the island. The positive anomaly of as large as about 100 mgal is found at Muroto Point.

2. The isoanomaly contour lines have the general trends from WSW to ENE which perfectly agree with those of the tectonic structure of the island.

3. Along the Median Dislocation Line, which is a tectonic line running about the middle of island in the said direction and dividing it into the Inner and Outer Zones, the BOUGUER anomalies are relatively minimum. This belt of minimum is narrow and sharp in the eastern part but becomes wider towards the west.

4. There is an area with conspicuous negative anomalies near the city of Matsuyama (Mt). This area is likely to extend still farther towards the north across the Seto Inland Sea and reach the Chûgoku District. This distribution suggests a conspicuous depression of the earth's crust.

5. There is an area with conspicuous positive anomalies towards the north of Kagawa Prefecture. This may be taken as indicating the existence there of a dense mass beneath the ground. Geological evidences are in accord with this indication, for it is just in this area that basaltic (sanukitic) rock bodies (erosion relics) are sporadically distributed, which must have been fed from a large hidden source of basaltic magma.

9. Acknowledgements

We cannot close our present report without gratefully expressing our deep appreciations for the supports and assistances which were offered to us during this work by a number of offices, institutes, local authorities as well as individuals in various ways. The names of these are too numerous to be mentioned here. But particularly, we wish to thank Mrs. S. INOUE and Miss K. SEKI who have helped us greatly in numerical computations. A part of the expense necessary for this survey was defrayed from the Grant in Aid of Scientific Research from the Ministry of Education.

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Table VIII. Results along Route 1. (0.01 mgal)

Route 1. Zentsûji—Tomida—Tokushima—Mugi—Muroto—Kôchi—Ôtaguchi—Zentsûji

Pref.	No.	B.M.	Date 1951	Time	$\sum\delta T$	LD	SD	0.9150 × SD	h (cm)	0.3086 × h	$E.T.$	3.49 × $\sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
				h m	h m										
36	Zentsûji		IV 8	7 59	0 00	430	3485	3189	27	8	− 5	0	0	69113	2
″	1	J. 3385	″	9 07	1 08	″	3996	3656	34	10	0	4	470	69583	″
″	2	3383	″	9 25	1 26	″	5141	4704	45	14	0	5	1521	70634	″
″	″	″	″	9 32		436	2470	2260	″	″	6				″
″	3	3381	″	9 56	1 50	″	2754	2520	34	10	6	6	1776	70889	″
″	4	J. 354	″	10 17	2 11	″	2943	2693	41	13	6	8	1950	71063	″
″	5	353	″	10 34	2 28	″	3059	2799	49	15	10	9	2061	71174	″
″	6	351	″	10 58	2 52	″	2524	2309	34	10	10	10	1565	70678	″
″	7	349	″	11 24	3 18	″	2084	1907	46	14	10	12	1165	70278	″
″	8	347	″	12 05	3 59	″	3054	2794	47	15	13	14	2054	71167	″
″	9	345	″	12 32	4 26	″	4014	3673	46	14	14	15	2932	72045	″
″	10	343	″	13 57	5 51	″	3665	3353	53	16	12	21	2606	71719	″
″	11	Takamatsu W.S.*	″	14 19	6 13	″	2763	2528	58	18	12	22	1782	70895	″
″	12	341	″	14 37	6 31	″	2865	2621	37	11	8	23	1863	70976	″
″	13	339	″	15 05	6 59	″	2050	1876	52	16	8	24	1122	70235	″
″	14	337	″	15 38	7 32	″	1714	1568	53	16	2	26	806	69919	″
″	15	335	″	15 47	7 41	″	1355	1240	40	12	2	27	473	69586	″
″	16	333	″	16 11	8 05	″	1604	1468	54	17	2	28	705	69818	″
″	17	331	″	16 25	8 19	″	0743	0680	46	14	2	29	− 87	69026	″
″	″	″	″	16 40		431	2987	2733	″	″	− 3				″
″	18	330	″	16 55	8 34	″	1355	1240	41	13	− 3	30	− 1582	67531	″
″	Tomida		″	18 13		432	3432	3140	27	8	− 7				″
″	″		IV 9	8 30		″	3482	3186	″	″	− 2				″
″	16	333	″	9 27	8 05	436	1700	1556	52	16	− 2	28	705	69818	″
″	17	331	″	9 45	8 23	″	0843	0771	44	14	3	29	− 78	69035	″
″	″	″	″	9 53		423	6650	6085	″	″	3				″
″	18	330	″	10 08	8 38	″	5017	4591	45	14	3	30	− 1573	67540	″
″	″	″	″	10 13		419	6791	6214	″	″	3				″
″	19	327	″	11 20	9 45	″	1832	1676	39	12	8	34	− 6112	63001	″
35	20	326	″	11 50	10 15	″	2735	2503	43	13	12	36	− 5282	63831	″

* Weather Station Seismometer Room.

〃	21	324	〃	12 10	10 35	〃	2975	2722	45	14	12	37	−5063	64050	〃
〃	22	322	〃	12 30	10 55	〃	4705	4305	30	9	14	38	−3484	65629	3
〃	23	320	〃	12 50	11 15	〃	5259	4812	52	16	14	39	−2971	66142	〃
〃	〃	〃	〃	12 56		427	1712	1566	〃	〃	14				〃
〃	24	318	〃	14 27	12 46	〃	2640	2416	39	12	13	45	−2132	66981	〃
〃	25	316	〃	14 43	13 02	〃	2740	2507	41	13	11	45	−2042	67071	〃
〃	26	314	〃	14 56	13 15	〃	2358	2158	39	12	11	46	−2393	66720	〃
〃	27	312	〃	15 12	13 31	〃	2419	2213	46	14	11	47	−2337	66776	〃
〃	28	310	〃	15 26	13 45	〃	2873	2629	41	13	11	48	−1923	67190	〃
〃	29	308	〃	15 48	14 07	〃	3222	2948	50	15	7	49	−1607	67506	〃
〃	30	306	〃	16 20	14 39	〃	3060	2800	32	10	7	51	−1762	67351	〃
〃	31	J. 5066	〃	16 36	14 55	〃	3392	3104	46	14	2	52	−1460	67653	〃
〃	32	5068	〃	17 07	15 26	〃	2916	2668	48	15	2	54	−1897	67216	〃
〃	33	5070	〃	17 40	15 59	〃	3138	2871	40	12	−3	56	−1704	67409	〃
〃	34	5072	〃	18 22	16 41	〃	3769	3449	58	18	−3	58	−1122	67991	〃
〃	35	5074	〃	18 41	17 00	〃	3862	3534	46	14	−6	59	−1045	68068	〃
〃	Tokushima		〃	19 07	17 26	〃	3609	3302	27	8	−6	61	−1285	67828	〃
〃	〃		IV 10	8 48		〃	3624	3316	〃	〃	−4				〃
〃	36	Tokushima W.S.*	〃	9 14	17 52	〃	3326	3043	58	18	−4	62	−1549	67564	〃
〃	34	5072	〃	10 18	18 56	〃	3791	3469	54	17	0	66	−1124	67989	〃
〃	35	5074	〃	10 35	19 13	〃	3875	3546	58	18	5	67	−1042	68071	〃
〃	37	5077	〃	11 11	19 49	〃	4479	4098	41	13	5	69	− 497	68616	〃
〃	38	5079	〃	11 43	20 21	〃	3315	3033	−1	0	9	71	−1573	67540	〃
〃	39	5081	〃	12 04	20 42	〃	2404	2200	44	14	9	72	−2393	66720	〃
〃	40	5082	〃	12 15	20 53	〃	2299	2104	55	17	9	73	−2487	66626	〃
〃	41	5084	〃	12 52	21 30	〃	1737	1589	52	16	12	75	−3002	66111	〃
〃	42	5086	〃	13 12	21 50	〃	1488	1362	46	14	12	76	−3232	65881	〃
〃	43	5088	〃	13 33	22 11	〃	0988	0913	32	10	13	77	−3685	65428	〃
〃	〃	〃	〃	13 40		418	5023	4596	〃	〃	13				〃
〃	44	5090	〃	14 00	22 31	〃	5428	4967	55	17	13	78	−3308	65805	〃
〃	45	5092	〃	14 22	22 53	〃	4072	3726	51	16	13	80	−4552	64561	〃
〃	46	5095	〃	14 53	23 24	〃	5554	5082	49	15	12	82	−3200	65913	〃
〃	47	5098	〃	15 30	24 01	〃	5840	5344	34	10	9	84	−2948	66165	〃
〃	48	5100	〃	16 33	25 04	〃	5961	5454	50	15	6	88	−2840	66273	〃
〃	49	5102	〃	16 55	25 26	〃	5286	4837	48	15	6	89	−3458	65655	〃
〃	50	5104	〃	17 50	26 21	〃	4591	4201	55	17	1	92	−4100	65013	〃
〃	51	5106	〃	18 08	26 39	〃	5025	4598	53	16	1	93	−3705	65408	〃
〃	52	5108	〃	18 27	26 58	〃	6482	5931	45	14	1	94	−2375	66738	〃
〃	53	5109	〃	18 50	27 21	〃	6598	6037	48	15	−2	96	−2273	66840	〃
〃	Mugi		〃	20 00	28 31	〃	6723	6152	27	8	−5	99	−2171	66942	〃

* Weather Station Seismometer Room.

Table VIII. (Continued)

Pref.	No.	B.M.	Date 1951	Time (h m)	$\sum\delta T$ (h m)	LD	SD	$0.9150 \times SD$	h (cm)	$0.3086 \times h$	$E.T.$	$3.49 \times \sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
35	Mugi		IV 11	10 30		418	6775	6199	27	8	1				3
〃	〃		〃	10 38		429	1880	1720	〃	〃	1				〃
〃	〃		IV 12	8 40		〃	1999	1829	〃	〃	−5				〃
〃	53	5109	〃	9 00	28 51	〃	1891	1730	43	13	−5	101	−2267	66846	〃
〃	54	5110	〃	10 30	30 21	〃	2050	1876	42	13	2	106	−2119	66994	〃
〃	55	5113	〃	10 55	30 46	〃	2195	2008	51	16	2	107	−1985	67128	〃
〃	56	5115	〃	11 20	31 11	〃	1863	1705	61	19	2	109	−2287	66826	〃
〃	57	5116	〃	11 47	31 38	〃	1504	1376	46	14	6	110	−2618	66495	〃
〃	58	5119	〃	12 15	32 06	〃	1904	1742	53	16	6	112	−2252	66861	〃
38	59	5121	〃	13 41	33 32	〃	1935	1771	44	14	11	117	−2225	66888	〃
〃	60	5123	〃	14 00	33 51	〃	1902	1740	22	7	11	118	−2264	66849	〃
〃	61	5125	〃	14 25	34 16	〃	1777	1626	22	7	11	120	−2380	66733	〃
〃	62	5128	〃	14 52	34 43	〃	2123	1943	23	7	12	121	−2063	67050	〃
〃	〃	〃	〃	15 17		〃	2110	1931	〃	〃	12				〃
〃	63	5131	〃	15 40	35 06	〃	2714	2483	34	10	11	122	−1510	67603	〃
〃	64	5133	〃	16 13	35 39	〃	2395	2191	39	12	11	124	−1802	67311	〃
〃	65	5135	〃	16 35	36 01	〃	2564	2346	34	10	9	126	−1653	67460	〃
〃	66	5137	〃	16 57	36 23	〃	2635	2411	23	7	9	127	−1592	67521	〃
〃	67	5138	〃	17 10	36 36	〃	3005	2750	20	6	9	128	−1255	67858	〃
〃	68	F. 46	〃	17 30	36 56	〃	3253	2976	38	12	8	129	−1025	68088	〃
〃	69	5142	〃	18 04	37 30	〃	3220	2946	46	14	8	131	−1054	68059	〃
〃	69 R		〃	18 25	37 51	〃	1570	1437			8	132	−2579	66534	〃
〃	〃		〃	18 27		418	6473	5923			8				〃
〃	71	△	〃	18 44	38 08	〃	3792	3470	30	9	5	133	−5027	64086	〃
〃	70	Muroto W.S.*	〃	18 54	38 18	〃	3757	3438	57	18	5	134	−5051	64062	〃
〃	70 R		〃			〃	6491	5939			3				〃
〃	〃		〃			429	1615	1478			3				〃
〃	72	5144	〃	20 12	39 36	〃	3376	3089	41	13	3	138	−950	68163	〃
〃	Muroto		〃	20 38	40 02	〃	3224	2950	27	8	0	139	−1098	68015	4a
〃	〃		IV 13	8 30		〃	3272	2994	〃	〃	−4				〃
〃	73	M. 1	〃	8 52	40 24	〃	3088	2826	40	12	−4	141	−1264	67849	〃
〃	72	5144	〃	9 11	40 43	〃	3367	3081	45	14	−4	142	−1008	68105	〃
〃	74	5146	〃	9 30	41 02	〃	3024	2767	54	17	−3	143	−1319	67794	〃
〃	75	5148	〃	9 54	41 26	〃	2678	2450	49	15	−3	144	−1639	67474	〃
〃	76	5150	〃	10 15	41 47	〃	2441	2234	58	18	−3	146	−1854	67259	〃

* Weather Station Seismometer Room.

〃	77		5152	〃	10 40	42 12	〃	2035	1862	44	14	−1	147	−2229	66884	〃
〃	78		5154	〃	11 03	42 35	〃	1602	1466	53	16	−1	149	−2625	66488	〃
〃	〃		〃	〃	11 07		420	5624	5146	〃	〃	−1				〃
〃	79		5156	〃	11 27	42 55	〃	5283	4834	22	7	−1	150	−2947	66166	〃
〃	80		5158	〃	11 47	43 15	〃	4882	4467	74	23	2	151	−3296	65817	〃
〃	81		5160	〃	12 18	43 46	〃	4863	4450	33	10	2	153	−3328	65785	〃
〃	82		5162	〃	13 50	45 18	〃	4854	4441	44	14	8	158	−3332	65781	〃
〃	83		5164	〃	14 26	45 54	〃	3896	3565	28	9	7	160	−4216	64897	〃
〃	84		5166	〃	14 40	46 08	〃	4238	3878	15	5	9	161	−3906	65207	〃
〃	85		5168	〃	14 55	46 23	〃	3814	3490	33	10	9	162	−4290	64823	〃
〃	86		5172	〃	15 21	46 49	〃	3296	3016	61	19	9	163	−4756	64357	〃
〃	87		5174	〃	15 42	47 10	〃	3369	3083	42	13	10	165	−4696	64417	〃
〃	88		5176	〃	16 00	47 28	〃	2753	2519	36	11	10	166	−5263	63850	〃
〃	89		5178	〃	16 20	47 48	〃	2526	2311	90	28	10	167	−5455	63658	〃
〃	90	Kôchi	W.S.*	〃	17 19	48 47	〃	2763	2528	59	18	9	170	−5252	63861	〃
〃	91		5002	〃	17 43	49 11	〃	2552	2335	56	17	8	172	−5449	63664	〃
〃	Kôchi			〃	19 07	50 35	〃	2474	2264	27	8	5	176	−5536	63577	〃
〃	〃			IV 15	7 40		〃	2646	2421	〃	〃	−2				〃
〃	91		5002	〃	8 41	51 36	〃	2737	2504	53	16	−2	180	−5449	63664	〃
〃	92		J. 5004	〃	9 00	51 55	〃	3202	2930	37	11	−2	181	−5029	64084	〃
〃	93		5006	〃	9 17	52 12	〃	3393	3105	35	11	−2	182	−4855	64258	〃
〃	94		5008	〃	9 35	52 30	〃	3239	2964	34	10	−2	183	−4998	64115	〃
〃	〃		〃	〃	9 37		414	5952	5446	〃	〃	−2				〃
〃	95		5010	〃	10 02	52 55	〃	3950	3614	33	10	−2	184	−6831	62282	〃
〃	〃		〃	〃	10 05		409	6216	5688	〃	〃	−2				〃
〃	96		5012	〃	10 25	53 15	〃	3211	2938	24	7	−2	186	−9586	59527	〃
〃	〃		〃	〃	10 27		402	6326	5788	〃	〃	−2				〃
〃	97		5013	〃	10 40	53 28	〃	4191	3835	44	14	−2	187	−11533	57580	〃
〃	98		5015	〃	11 02	53 50	〃	4877	4462	48	15	−2	188	−10906	58207	〃
〃	99		5017	〃	11 20	54 08	〃	5010	4584	32	10	−2	189	−10790	58323	〃
〃	100		5019	〃	11 51	53 47	〃	6085	5568	26	8	−2	188	−9814	59299	〃
〃	99		5017	〃	12 12	54 08	〃	5017	4591	32	10	−2	189	−10790	58323	〃
〃	〃		〃	〃	12 14		410	1475	1350	〃	〃	−2				〃
〃	101		5021	〃	12 43	54 37	〃	4312	3945	50	15	−1	190	−8190	60923	〃
〃	102		5023	〃	13 31	55 25	〃	3679	3366	40	12	0	193	−8774	60339	〃
〃	103		5025	〃	13 50	55 44	〃	3893	3562	43	13	0	194	−8578	60535	〃
〃	104		5027	〃	14 07	56 01	〃	3264	2987	42	13	0	195	−9154	59959	〃
〃	105		5029	〃	14 37	56 31	〃	3520	3221	47	15	1	197	−8919	60194	〃
35	106		5031	〃	14 48	56 42	〃	4089	3741	21	6	1	198	−8409	60704	〃
〃	107		5033	〃	15 12	57 06	〃	4549	4162	54	17	1	199	−7978	61135	〃

* Weather Station Seismometer Room.

Table VIII. (Continued)

Pref.	No.	B.M.	Date 1951	Time (h m)	$\sum\delta T$ (h m)	LD	SD	$0.9150 \times SD$	h (cm)	$0.3086 \times h$	$E.T.$	$3.49 \times \sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
38	Ôtaguchi		IV 15	19 50	61 44	410	3866	3537	27	8	8	215	−8621	60492	4a
〃	〃		IV 16	8 13		〃	3913	3580	〃	〃	−1				〃
35	107	5033	〃	9 07	62 38	〃	4610	4218	53	16	−1	218	−7978	61135	〃
〃	108	5036	〃	9 37	63 08	〃	5045	4616	37	11	−1	220	−7587	61526	〃
〃	109	5038	〃	10 02	63 33	〃	6137	5615	31	10	−1	222	−6591	62522	〃
〃	〃	〃	〃	10 04		414	4346	3977	〃	10	−1				〃
〃	110	5040	〃	10 22	63 51	〃	5435	4973	39	12	−1	223	−5594	63519	〃
〃	111	5042	〃	10 40	64 09	〃	6301	5765	43	13	0	224	−4801	64312	〃
〃	〃	〃	〃	10 44		420	3593	3288	〃	13	0				〃
〃	112	5043	〃	10 57	64 22	〃	4035	3692	33	10	0	225	−4401	64712	〃
〃	113	5045	〃	11 12	64 37	〃	3619	3311	44	14	0	225	−4778	64335	〃
〃	114	5047	〃	13 26	66 51	〃	5211	4768	47	15	−2	233	−3330	65783	〃
〃	〃	〃	〃	13 28		416	7044	6445	〃	〃	−2				〃
〃	114R		〃	13 47	67 10	〃	1757	1608			−3	234	−8184	60929	〃
〃	〃		〃	13 52		406	6270	5737			−3				〃
〃	115	5051	〃	14 12	67 30	〃	2978	2725	45	14	−3	235	−11183	57930	〃
〃	〃	〃	〃	14 14		400	5637	5158	〃	〃	−3				〃
〃	116	5052	〃	14 37	67 53	〃	3327	3044	50	15	−3	237	−13298	55815	4b
〃	〃	〃	〃	14 39		404	1558	1426	〃	〃	−3				〃
36	117	5054	〃	15 13	68 27	〃	4341	3972	46	14	−3	239	−10755	58358	〃
〃	〃	〃	〃	15 15		410	1677	1534	〃	〃	−3				〃
〃	118	5055	〃	15 30	68 42	〃	3699	3385	51	16	−1	240	−8901	60212	〃
〃	〃	〃	〃	15 32		416	1027	0940	〃	〃	−1				〃
〃	119	5057	〃	15 50	69 00	〃	5347	4893	48	15	−1	241	−4950	64163	〃
〃	〃	〃	〃	15 53		426	0820	0750	〃	〃	−1				〃
〃	120	5059	〃	16 08	69 15	〃	1662	1521	48	15	−1	242	−4180	64933	〃
〃	121	5061	〃	16 22	69 29	〃	3351	3066	34	10	−1	242	−2640	66473	〃
〃	〃	〃	〃	16 26		〃	3331	3048	〃	〃	−1				〃
〃	122	5063	〃	16 41	69 44	〃	5213	4770	44	14	1	243	− 913	68200	〃
〃	〃	〃	〃	16 45		430	3418	3127	〃	〃	1				〃
〃	123	5065	〃	16 57	69 56	〃	4683	4285	47	15	1	244	245	69358	〃
〃	1	J. 3385	〃	17 07	70 06	〃	4935	4516	29	9	1	244	470	69583	〃
〃	Zentsûji		〃	18 43	71 42	〃	4423	4047	27	8	7	250	0	69113	5

Route 1′. B.M. 295—Naruto—B.M. 295.

Pref.	No.	B.M.	Date 1953	Time	$\sum\delta T$	LD	SD	0.9150 × SD	h (cm)	0.3086 × h	$E.T.$	6.32 × $\sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
27	3655	295	IV 2	16 31 (h m)	0 00 (h m)		2863	2620	55	17	2	0	0	68579	70
35	Naruto 3656		〃	19 50	3 19		2468	2258	27	8	− 7	21	− 401	68178	〃
〃	〃 3662		IV 3	11 46			2575	2356	〃	〃	8				〃
〃	3663	300	〃	12 51	4 24		2588	2368	58	18	12	28	− 382	68197	〃
〃	3664	299	〃	13 03	4 36		2705	2475	27	8	12	29	− 286	68293	〃
〃	3665	No. 8	〃	13 39	5 12		2450	2242	67	21	13	33	− 509	68070	〃
27	3666	295	〃	17 07	8 40		3040	2782	60	19	6	55	0	68579	〃

Route 1″. Naruto—B.M. J. 5066—Naruto.

Pref.	No.	B.M.	Date 1953	Time	$\sum\delta T$	LD	SD	0.9150 × SD	h (cm)	0.3086 × h	$E.T.$	2.11 × $\sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
35	Naruto 3657		IV 3	9 50 (h m)	0 00 (h m)		2580	2361	27	8	− 1	0	0	68178	70
〃	3658	302	〃	10 43	0 53		2641	2417	65	20	4	2	71	68249	〃
〃	3659	303	〃	10 57	1 07		2486	2275	51	16	4	2	− 75	68103	〃
〃	3660	304	〃	11 10	1 20		2300	2105	67	21	4	3	− 241	67937	〃
〃	3661	J. 5066	〃	11 19	1 29		1989	1820	71	22	4	3	− 525	67653	〃
〃	Naruto 3662		〃	11 46	1 56		2575	2356	27	8	8	4	0	68178	〃

Table IX. Results along Route 2. (0.01 mgal)

Route 2. B.M. 3385—Zentsûji—Kawanoe—Imabari—Matsuyama—Kuma—B.M. 5002.

Pref.	No.	B.M.	Date 1951	Time	$\sum\delta T$	LD	SD	0.9150 × SD	h (cm)	0.3086 × h	$E.T.$	5.64 × $\sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
				h m	h m										
36	1	J. 3385	IV 16	17 07	0 00	430	4935	4516	29	9	1	0	0	69583	4b
〃	Zentsûji		〃	22 39	5 32	〃	4464	4085	27	8	2	31	− 462	69121	5
〃	〃		IV 17	11 36		〃	4509	4126	〃	〃	− 1				〃
〃	1	J. 3385	〃	12 34	6 30	〃	5030	4602	29	9	− 2	37	8	69591	〃
〃	124	3387	〃	13 07	7 03	〃	4357	3987	24	7	− 2	40	− 612	68971	〃
〃	125	3388	〃	13 22	7 18	〃	3728	3411	50	15	− 2	41	−1181	68402	〃
〃	126	3390	〃	13 38	7 34	〃	4379	4007	47	15	− 3	43	− 588	68995	〃
〃	127	3392	〃	13 56	7 52	〃	3219	2945	39	12	− 3	45	−1655	67928	〃
〃	128	3394	〃	14 14	8 10	〃	2802	2564	26	8	− 3	46	−2041	67542	〃
〃	129	3396	〃	14 34	8 30	〃	2298	2103	33	10	− 3	48	−2502	67081	〃
〃	130	3398	〃	14 50	8 46	〃	1768	1618	41	13	− 3	50	−2986	66597	〃
〃	131	3400	〃	15 09	9 05	〃	1576	1442	39	12	− 3	51	−3164	66419	〃
37	132	3403	〃	16 29	10 25	〃	1211	1108	47	15	− 2	59	−3502	66081	〃
〃	Kawanoe		〃	19 42	13 38	〃	1167	1068	27	8	7	77	−3558	66025	〃
〃	〃		IV 18	8 15		〃	1219	1115	〃	〃	3				〃
〃	132	3403	〃	8 32	13 55	〃	1284	1175	45	14	5	78	−3491	66092	〃
〃	133	3405	〃	8 59	14 22	〃	0813	0744	45	14	5	81	−3925	65658	〃
〃	〃	〃	〃	9 01		418	6169	5645	〃	〃	5				〃
〃	134	3408	〃	9 39	15 00	〃	5514	5045	54	17	6	85	−4525	65058	〃
〃	135	3410	〃	10 04	15 25	〃	4658	4262	35	11	6	87	−5316	64267	〃
〃	136	3412	〃	10 28	15 49	〃	4426	4050	43	13	6	89	−5528	64055	〃
〃	137	3413	〃	10 44	16 05	〃	3991	3652	16	5	6	91	−5936	63647	〃
〃	138	3415	〃	11 22	16 43	〃	1682	1539	39	12	6	94	−8045	61538	〃
〃	139	3417	〃	11 43	17 04	〃	3724	3407	11	3	3	96	−6191	63392	〃
〃	140	3419	〃	12 04	17 25	〃	4020	3678	49	15	3	98	−5910	63673	〃
〃	141	3421	〃	12 24	17 45	〃	3994	3655	55	17	3	100	−5933	63650	〃
〃	142	3423	〃	12 44	18 05	〃	4510	4127	34	10	0	102	−5473	64110	〃
〃	143	3425	〃	13 29	18 50	〃	4603	4212	30	9	0	106	−5393	64190	〃
〃	144	3427	〃	14 28	19 49	〃	3598	3292	14	4	− 4	112	−6328	63255	〃
〃	145	3429	〃	14 56	20 17	〃	4098	3750	35	11	− 6	114	−5867	63716	〃

〃	146		3430	〃	15 10	20 31	〃	4215	3857	49	15	−6	116	−5758	63825	〃
〃	147		3432	〃	15 28	20 49	〃	4561	4173	41	13	−6	117	−5445	64138	〃
〃	148		3434	〃	15 49	21 10	〃	4830	4419	44	14	−6	120	−5201	64382	〃
〃	149		3435	〃	16 10	21 31	〃	6139	5617	35	11	−6	121	−4007	65576	〃
〃	〃		〃	〃	16 12		423	3917	3584	35	11	−6				〃
〃	150		3437	〃	16 32	21 51	〃	5050	4621	61	19	−4	124	−2963	66620	〃
〃	151		3439	〃	16 50	22 09	〃	5255	4808	46	14	−4	125	−2782	66801	〃
〃	152		3440	〃	17 02	22 21	〃	5173	4733	64	20	−4	126	−2852	66731	〃
〃	Imabari			〃	19 32	24 51	〃	5239	4794	27	8	6	140	−2807	66776	〃
〃	〃			IV 19	8 15		〃	5289	4839	〃	〃	2				〃
〃	153		3442	〃	9 09	25 45	〃	5517	5048	49	15	6	146	−2593	66990	〃
〃	154		3444	〃	9 38	26 14	〃	6243	5712	37	11	10	148	−1931	67652	〃
〃	155		3464	〃	10 12	26 48	〃	4916	4498	45	14	10	151	−3145	66438	〃
〃	156		3466	〃	10 30	27 06	〃	4861	4448	46	14	10	153	−3197	66386	〃
〃	157		3468	〃	10 49	27 25	〃	4638	4244	96	30	10	155	−3387	66196	〃
〃	158		3470	〃	11 07	27 43	〃	3512	3213	44	14	10	156	−4435	65148	〃
〃	159		3472	〃	11 40	28 16	〃	3887	3557	42	13	8	160	−4098	65485	〃
〃	160		3474	〃	12 02	28 38	〃	2947	2697	43	13	8	161	−4959	64624	〃
〃	161		3476	〃	13 08	29 44	〃	2238	2048	45	14	4	168	−5618	63965	〃
〃	162		3478	〃	13 23	29 59	〃	1250	1144	48	15	4	169	−6522	63061	〃
〃	〃		〃	〃	13 25		413	5695	5211	〃	〃	4				〃
〃	163		3480	〃	13 39	30 13	〃	4682	4284	47	15	−1	170	−7455	62128	〃
〃	164		3482	〃	14 00	30 34	〃	3556	3254	47	15	−1	173	−8488	61095	〃
〃	165	Matsuyama	G.S.*	〃	15 08	31 42	〃	2217	2029	19	6	−5	179	−9732	59851	〃
〃	166		W.S.**	〃	16 28	33 02	〃	2069	1893	19	6	−8	186	−9878	59705	〃
〃	Matsuyama			〃	18 41	35 15	〃	3162	2893	27	8	−3	199	−8884	60699	〃
〃	〃			IV 20	9 16		〃	3220	2946	〃	〃	8				〃
〃	164		3482	〃	9 33	35 32	〃	3658	3347	45	14	11	200	−8475	61108	〃
〃	167		4733	〃	10 18	36 17	〃	3049	2790	41	13	11	205	−9038	60545	〃
〃	168		4731	〃	10 34	36 33	〃	2563	2345	49	15	11	206	−9482	60101	〃
〃	〃		〃	〃	10 36		405	6180	5655	〃	〃	11				〃
〃	169		4729	〃	10 53	36 50	〃	5557	5085	47	15	11	208	−10054	59529	〃
〃	170		4728	〃	11 09	37 06	〃	3470	3175	47	15	11	209	−11965	57618	〃
〃	171		4727	〃	11 22	37 19	〃	1714	1568	38	12	11	210	−13576	56007	6
〃	〃		〃	〃	11 25		394	6616	6054	〃	〃	11				〃
〃	172		4726	〃	11 40	37 34	〃	4509	4126	45	14	10	212	−15505	54078	〃
〃	〃		〃	〃	11 45		390	6299	5764	〃	〃	10				〃
〃	173		4724	〃	12 04	37 53	〃	2258	2066	45	14	10	214	−19205	50378	〃
〃	174		4722	〃	12 41	38 30	〃	1942	1777	49	15	9	217	−19497	50086	〃
〃	175		4720	〃	13 02	38 51	〃	4615	4223	44	14	9	219	−17054	52529	〃

* Geophysical Station of the Earthquake Research Institute. ** Weather Station Seismometer Room.

Table IX. (Continued)

Pref.	No.	B.M.	Date 1951	Time	$\sum\delta T$	LD	SD	0.9150 × SD	h (cm)	0.3086 × h	$E.T.$	5.64 × $\sum\delta T$ Flow	$\sum\delta g$	g 979.	Field Note No.
37	176	4718	IV 20	h m 14 25	h m 40 14	390	5191	4750	41	13	4	227	−16541	53042	6
〃	〃	〃	〃	14 28		397	2093	1915	〃	〃	4				〃
〃	177	4716	〃	14 49	40 35	〃	2836	2595	43	13	− 2	229	−15869	53714	〃
〃	178	4714	〃	15 06	40 52	〃	3242	2966	42	13	− 2	231	−15500	54083	〃
〃	Kuma		〃	19 24	45 10	〃	2158	1975	27	8	− 7	255	−16525	53058	〃
〃	〃		IV 21	8 32		〃	2205	2018	〃	〃	8				〃
〃	178	4714	〃	9 16	45 54	〃	3328	3045	19	6	8	259	−15504	54079	〃
〃	179	4711	〃	9 45	46 23	〃	4582	4193	43	13	13	262	−14347	55236	〃
〃	180	4709	〃	10 05	46 43	〃	3976	3638	48	15	13	263	−14901	54682	〃
〃	181	4707	〃	10 24	47 02	〃	4950	4529	40	12	13	265	−14015	55568	〃
〃	182	4705	〃	10 45	47 23	〃	5794	5302	40	12	16	267	−13241	56342	〃
〃	〃	〃	〃	10 47		404	2697	2468	〃	〃	16				〃
38	183	4703	〃	11 17	47 53	〃	3462	3168	35	11	16	270	−12545	57038	〃
〃	184	4700	〃	11 40	48 16	〃	3118	2853	39	12	15	272	−12862	56721	〃
〃	185	4697	〃	12 03	48 39	〃	5507	5039	50	15	15	275	−10676	58907	〃
〃	〃	〃	〃	12 05		410	2810	2571	〃	〃	15				〃
〃	186	4694	〃	13 34	50 08	〃	4042	3698	38	12	6	283	−9569	60014	〃
〃	187	4689	〃	13 59	50 33	〃	4514	4130	52	16	6	285	−9135	60448	〃
〃	188	4687	〃	14 15	50 49	〃	5335	4882	50	15	6	287	−8386	61197	〃
〃	189	4686	〃	14 42	51 16	〃	5773	5282	40	12	− 1	289	−7998	61585	〃
〃	〃	〃	〃	14 43		417	2633	2409	〃	〃	− 1				〃
〃	190	4684	〃	15 00	51 33	〃	2094	1916	41	13	− 1	291	−8492	61091	〃
〃	191	4993	〃	15 30	52 03	〃	4210	3852	102	31	− 6	294	−6546	63037	〃
〃	192	4995	〃	15 49	52 22	〃	4380	4008	31	10	− 6	296	−6413	63170	〃
〃	193	4998	〃	16 41	53 14	〃	4707	4307	45	14	− 9	300	−6117	63466	〃
〃	194	F. 35	〃	17 02	53 35	〃	4872	4458	27	8	− 9	302	−5974	63609	〃
〃	91	5002	〃	17 19	53 52	〃	4925	4506	55	17	− 9	304	−5919	63664	〃

Table X. Results along Route 3. (0.01 mgal)

Route 3. Kôchi—B.M. 5002—Kubokawa—Sukumo—Uwajima—Ôzu—B.M. 3482

Pref.	No.	B.M.	Date 1951	Time	$\Sigma\delta T$	LD	SD	0.9150 × SD	h (cm)	0.3086 × h	$E.T.$	4.49 × $\Sigma\delta T$ Flow	$\Sigma\delta g$	g 979.	Field Note No.
				h m	h m										
38	Kôchi		IV 23	8 32	− 2 25	420	3646	3336	27	8	2	− 11	− 89	63575	6
〃	195	10882	〃	9 20	− 1 37	〃	3654	3343	41	13	2	− 7	− 81	63583	〃
〃	196	10884	〃	9 45	− 1 12	〃	4046	3702	38	12	9	− 5	282	63946	〃
〃	197	Urato Tide Gauge	〃	10 10	− 47	〃	4072	3726	57	18	9	− 4	311	63975	〃
〃	198	13	〃	10 20	− 37	〃	4142	3790	36	11	9	− 3	367	64031	〃
〃	91	5002	〃	10 57	0	〃	3731	3414	55	17	15	0	0	63664	〃
〃	199	4991	〃	12 09	1 12	〃	2185	1999	22	7	19	5	−1426	62238	〃
〃	〃	〃	〃	12 17		411	6173	5648	〃	〃	19				〃
〃	200	J. 4683	〃	12 33	1 28	〃	5167	4728	45	14	19	7	−2341	61323	〃
〃	201	4681	〃	12 58	1 53	〃	4057	3712	31	10	19	9	−3363	60301	〃
〃	202	4677	〃	13 30	2 25	〃	4720	4319	47	15	17	11	−2755	60909	〃
〃	202R		〃	13 39	2 34	〃	5883	5383			17	12	−1707	61957	〃
〃	〃		〃	13 42		417	3200	2928			17				〃
〃	203	4675	〃	13 55	2 47	〃	4390	4017	55	17	17	13	− 602	63062	〃
〃	204	4673	〃	15 30	4 22	〃	4623	4230	48	15	5	20	− 410	63254	〃
〃	205	4670	〃	16 37	5 29	〃	4457	4078	46	14	− 2	25	− 575	63089	〃
〃	206	4667	〃	17 27	6 19	〃	4518	4134	45	14	− 2	28	− 522	63142	〃
〃	〃	〃	〃	17 30		413	6318	5781	〃	〃	− 7				〃
〃	207	4664	〃	17 58	6 47	〃	3578	3274	51	16	− 7	31	−3030	60634	〃
〃	〃	〃	〃	18 02		406	6728	6156	〃	〃	− 7				〃
〃	208	4661	〃	18 26	7 11	〃	3172	2902	35	11	− 7	32	−6290	57374	〃
〃	209	4659	〃	18 42	7 27	〃	3732	3415	52	16	−10	34	−5777	57887	〃
〃	210	4657	〃	19 00	7 45	〃	3754	3435	39	12	−10	35	−5762	57902	〃
〃	211	4654	〃	19 35	8 20	〃	4238	3878	47	15	−10	37	−5318	58346	〃
〃	Kubokawa		〃	19 50	8 35	〃	4286	3922	27	8	−10	39	−5283	58381	7
〃	〃		IV 24	8 34		〃	4326	3956	〃	〃	− 2				〃
〃	211	4654	〃	9 18	9 19	〃	4280	3916	45	14	− 2	42	−5320	58344	〃
〃	212	4652	〃	9 40	9 41	〃	3126	2860	26	8	4	44	−6378	57286	〃
〃	〃	〃	〃	9 45		410	1310	1199	〃	〃	4				〃
〃	213	4650	〃	10 21	10 17	〃	5091	4658	43	13	4	46	−2916	60748	〃
〃	214	4648	〃	10 43	10 39	〃	5895	5394	126	39	11	48	−2149	61515	〃
〃	〃	〃	〃	10 47		415	3707	3392	〃	〃	11				〃
〃	215	4646	〃	11 05	10 57	〃	3970	3633	51	16	11	49	−1932	61732	〃
〃	216	4644	〃	11 20	11 12	〃	4229	3870	34	10	11	50	−1702	61962	〃
〃	217	4642	〃	11 56	11 48	〃	3879	3549	31	10	16	53	−2021	61643	〃

Table X. (Continued)

Pref.	No.	B.M.	Date 1951	Time (h m)	$\Sigma\delta T$ (h m)	LD	SD	$0.9150 \times SD$	h (cm)	$0.3086 \times h$	$E.T.$	$4.49 \times \Sigma\delta T$ Flow	$\Sigma\delta g$	g 979.	Field Note No.
38	218	4640	IV 24	12 20	12 12	415	4026	3684	43	13	16	55	−1885	61779	7
〃	219	4638	〃	12 50	12 42	〃	3540	3239	36	11	19	57	−2331	61333	〃
〃	220	4636	〃	13 13	13 05	〃	3574	3270	27	8	19	59	−2305	61359	〃
〃	221	4635	〃	14 09	14 01	〃	3324	3041	95	29	19	63	−2517	61147	〃
〃	222	4633	〃	14 36	14 28	〃	3461	3167	30	9	16	65	−2416	61248	〃
〃	223	4631	〃	16 39	16 31	〃	3129	2863	18	6	4	74	−2744	60920	〃
〃	224	4630	〃	16 50	16 42	〃	3164	2895	62	19	4	75	−2700	60964	〃
〃	225	4629	〃	17 02	16 54	〃	3005	2750	51	16	4	76	−2849	60815	〃
〃	226	4627	〃	17 20	17 12	〃	2659	2433	108	33	4	77	−3150	60514	〃
〃	227	4625	〃	17 39	17 31	〃	2740	2507	−14	−4	−2	79	−3121	60543	〃
〃	228	4623	〃	17 59	17 51	〃	2483	2272	84	26	−2	80	−3327	60337	〃
〃	229	4621	〃	18 18	18 10	〃	1398	1279	−33	−10	−2	82	−4358	59306	〃
〃	230	4619	〃	18 37	18 29	〃	2088	1911	51	16	−6	83	−3705	59959	〃
〃	Sukumo		〃	19 17	19 09	〃	2095	1917	27	8	−6	86	−3710	59954	〃
〃	〃		IV 25	7 58		〃	2149	1966	〃	〃	−9				〃
〃	230	4619	〃	8 53	20 04	〃	2149	1966	52	16	−5	90	−3702	59962	〃
〃	231	4616	〃	9 42	20 53	〃	0274	0251	38	12	0	94	−5420	58244	〃
〃	〃	〃	〃	9 49		410	2496	2284	〃	〃	0				〃
37	232	4613	〃	11 15	22 19	〃	1981	1813	34	10	6	100	−5893	57771	〃
〃	233	4610	〃	11 48	22 52	〃	3340	3056	18	6	11	103	−4652	59012	〃
〃	234	4608	〃	13 43	24 47	〃	3475	3180	36	11	18	111	−4524	59140	〃
〃	235	4606	〃	14 05	25 09	〃	3129	2863	56	17	18	113	−4837	58827	〃
〃	236	4603	〃	14 31	25 35	〃	2861	2618	47	15	18	115	−5086	58578	〃
〃	237	4598	〃	15 23	26 27	〃	3540	3239	37	11	17	119	−4474	59190	〃
〃	238	4596	〃	15 42	26 46	〃	3894	3563	45	14	14	120	−4151	59513	〃
〃	〃	〃	〃	15 46		406	5685	5202	45	14	14				〃
〃	239	4595	〃	15 58	26 58	〃	5798	5305	125	39	14	121	−4024	59640	〃
〃	240	4592	〃	16 40	27 40	〃	4828	4418	40	12	9	124	−4946	58718	〃
〃	241	4590	〃	16 55	27 55	〃	5674	5192	59	18	9	125	−4167	59497	〃
〃	242	F. 44	〃	17 15	28 15	〃	5832	5336	33	10	9	127	−4033	59631	〃
〃	243	Uwajima W.S.*	〃	17 42	28 42	〃	4932	4513	19	6	4	129	−4867	58797	〃
〃	244	〃 **	〃	17 58	28 58	〃	4976	4553	46	14	4	130	−4820	58844	〃
〃	Uwajima		〃	19 40	30 40	〃	5878	5378	27	8	−5	138	−4018	59646	〃
〃	〃		IV 26	8 08		〃	5941	5436	〃	〃	−8				〃
〃	242	F. 44	〃	8 54	31 26	〃	5919	5416	33	10	−6	141	−4037	59627	〃

*Weather Station Barometer Room. ** Weather Station Bench Mark.

″	245	4587	″	9 22	31 34	″	5855	5357	48	15	− 6	142	−4092	59572	″
″	246	4585	″	9 48	32 20	″	4627	4234	47	15	− 3	145	−5215	58449	″
″	247	4583	″	10 13	32 45	″	5742	5254	54	17	− 3	147	−4195	59469	″
″	248	4581	″	10 50	33 22	″	4285	3921	16	5	2	150	−5538	58126	″
″	″	″	″	10 53		402	6098	5580	″	″	2				″
″	249	4580	″	11 15	33 44	″	2044	1870	35	11	2	151	−9243	54421	″
″	250	4578	″	12 07	34 36	″	1743	1595	39	12	6	155	−9517	54147	″
″	251	4577	″	14 28	36 57	″	3333	3050	41	13	14	166	−8064	55600	″
″	252	4575	″	14 59	37 28	″	3594	3289	47	15	16	168	−7823	55841	″
″	253	4572	″	15 37	38 06	″	5603	5127	41	13	15	171	−5991	57673	″
″	″	″	″	15 42		412	1099	1006	″	″	″				″
″	254	4570	″	16 07	38 31	″	4963	4541	60	19	15	173	−2452	61212	″
″	255	J. 4569	″	16 44	39 08	″	5134	4698	59	18	13	176	−2301	61363	″
″	256	4567	″	17 17	39 41	″	3912	3579	52	16	13	178	−3424	60240	″
″	257	4565	″	17 51	40 15	″	1060	0970	43	13	9	181	−6043	57621	8
″	258	4563	″	18 20	40 44	″	4329	3961	34	10	8	183	−3058	60606	″
″	259	4562	″	18 41	41 05	″	4365	3994	41	13	3	185	−3029	60635	″
″	Ôzu		″	20 00	42 24	″	4313	3946	27	8	− 1	190	−3091	60573	″
″	″		IV 27	8 30		″	4371	3999	″	″	− 6				″
″	259	4562	″	9 15	43 09	″	4432	4055	41	13	− 6	194	−3034	60630	″
″	260	4561	″	9 32	43 26	″	4496	4114	61	19	− 4	195	−2968	60696	″
″	261	4558	″	9 56	43 50	″	4590	4200	36	11	− 4	197	−2892	60772	″
″	262	4557	″	10 06	44 00	″	4758	4354	35	11	− 4	198	−2739	60925	″
″	263	4555	″	10 36	44 30	″	3486	3190	43	13	− 2	200	−3901	59763	″
″	264	4552	″	11 18	45 12	″	3206	2933	39	12	− 2	203	−4162	59502	″
″	265	4550	″	11 38	45 32	″	1980	1812	32	10	2	204	−5282	58382	″
″	″	″	″	11 42		403	6024	5512	″	″	2				″
″	266	4548	″	12 05	45 55	″	5240	4795	55	17	2	206	−5994	57670	″
″	267	4547	″	12 17	46 07	″	4493	4111	40	12	2	207	−6684	56980	″
″	268	4545	″	12 37	46 27	″	2796	2558	44	14	5	209	−8234	55430	″
″	268R		″	12 57	46 47	″	6199	5672			5	210	−5135	58529	″
″	″		″	13 00		410	3077	2815			5				″
″	269	4543	″	13 16	47 03	″	4315	3948	29	9	5	211	−3994	59670	″
″	270	4541	″	13 37	47 24	″	4381	4009	81	25	9	213	−3915	59749	″
″	271	4539	″	15 12	48 59	″	4314	3947	54	17	12	220	−3989	59675	″
″	272	4538	″	15 23	49 10	″	4594	4204	23	7	12	221	−3743	59921	″
″	273	4536	″	15 42	49 29	″	5052	4623	41	13	13	222	−3318	60346	″
″	164	3482	″	16 05	49 52	″	5871	5372	48	15	13	224	−2569	61095	″

Table XI. Results along Route 16_1. (0.01 mgal)

Route 16_1. B.M. 141—Kinoe—B.M. 3447—B.M. 3454—B.M. 141.

Pref.	No.	B.M.	Date 1952	Time	$\sum\delta T$	*LD*	*SD*	0.9150 × *SD*	*h* (cm)	0.3086 × *h*	*E.T.*	11.96× $\sum\delta T$ Flow	$\sum\delta g$	*g* 979.	Field Note No.
33	2285	141	VIII 27	17 55 (h m)	0 00 (h m)		2083	1906	64	20	−4	0	0	68495	52
〃	2286	Kinoe Tide Gauge	〃	20 13	2 18		1054	0964	27	8	−6	28	− 984	67511	〃
〃	2287_2	〃	VIII 28	7 17			3526	3226	〃	〃	7				〃
37	2288	3447	〃	10 51	5 52		3470	3175	46	14	−2	71	−1081	67414	〃
〃	2289	3448	〃	11 48	6 49		4028	3686	103	32	−2	81	− 562	67933	〃
〃	2290	3449	〃	12 07	7 08		4095	3747	62	19	−2	85	− 518	67977	〃
〃	2291	3450	〃	12 24	7 25		4049	3705	47	15	−2	89	− 568	67927	〃
〃	2292	3451	〃	13 27	8 23		2814	2575	68	21	−2	102	−1705	66790	〃
〃	2293	3453	〃	13 53	8 54		4914	4496	82	25	−2	106	216	68711	〃
〃	2294	3454	〃	14 06	9 07		4904	4487	36	11	−2	109	190	68685	〃
33	2295	141	〃	16 11	11 12		4715	4314	67	21	−4	134	0	68495	〃

(35) Tokushima Prefecture.

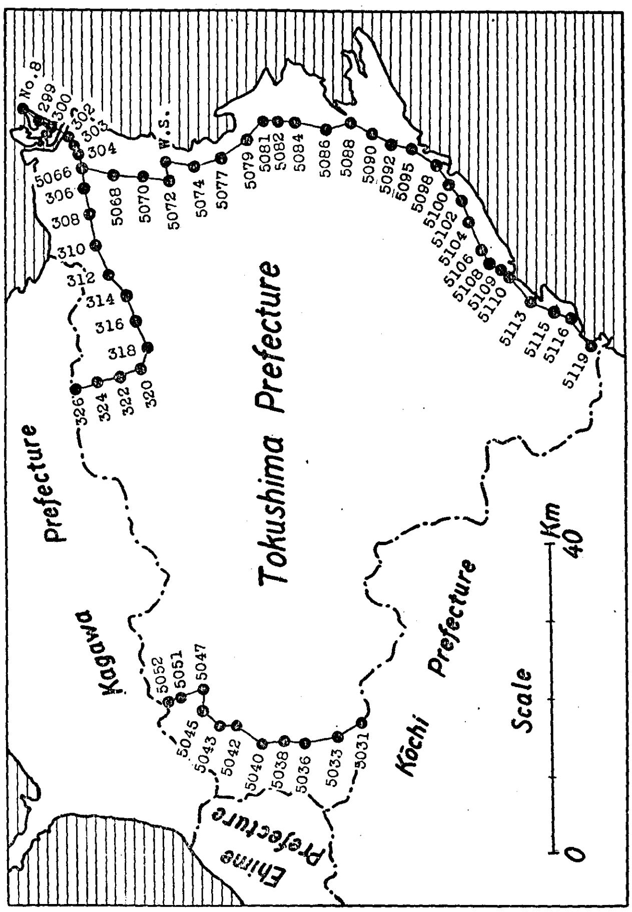

Fig. 4. Gravity Stations in Tokushima Prefecture.

Table XII. Synoptic Results for Tokushima Prefecture (I).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		34° ′	134° ′								
326	20	10.6	15.4	217.55	IV 9	63831	7055	6811	6604	45.1	20.7
324	21	08.9	15.5	169.08	〃	64050	6927	6738	6580	34.7	15.8
322	22	07.5	16.3	104.79	〃	65629	6886	6769	6561	32.5	20.8
320	23	05.8	17.1	60.87	〃	66142	6802	6734	6537	26.5	19.7
318	24	05.3	18.7	32.35	〃	66981	6798	6762	6530	26.8	23.2
316	25	06.0	21.1	31.38	〃	67071	6804	6769	6540	26.4	22.9
314	26	06.5	23.4	18.12	〃	66720	6728	6708	6547	18.1	16.1
312	27	07.8	25.1	23.07	〃	66776	6749	6723	6565	18.4	15.8
310	28	08.3	27.5	6.45	〃	67190	6739	6732	6572	16.7	16.0
308	29	09.1	29.8	9.63	〃	67506	6780	6770	6583	19.7	18.7
306	30	09.0	32.1	1.87	〃	67351	6741	6739	6582	15.9	15.7
J. 5066	31	09.5	33.6	1.79	〃	67653	6771	6769	6589	18.2	18.0
5068	32	07.5	33.3	1.46	〃	67216	6726	6725	6561	16.5	16.4
5070	33	05.3	33.3	2.97	〃	67409	6750	6747	6530	22.0	21.7
5072	34	03.5	33.0	1.15	〃	67991	6803	6801	6505	29.8	29.6
〃	〃	〃	〃	〃	IV 10	67989	6802	6801	6505	29.7	29.6
5074	35	01.7	33.1	1.47	IV 9	68068	6811	6810	6480	33.1	33.0
〃	〃	〃	〃	〃	IV 10	68071	6812	6810	6480	33.2	33.0
Tokushima W.S.*	36	03.1	34.6	1.10	〃	67564	6760	6759	6499	26.1	26.0
		33°									
5077	37	59.4	35.1	1.81	〃	68616	6867	6865	6448	41.9	41.7
5079	38	57.9	36.3	3.34	〃	67540	6764	6761	6427	33.7	33.4
5081	39	56.8	37.8	5.98	〃	66720	6691	6684	6412	27.9	27.2
5082	40	55.9	37.6	7.18	〃	66626	6685	6677	6399	28.6	27.8
5084	41	54.2	37.3	5.44	〃	66111	6628	6622	6375	25.3	24.7
5086	42	52.3	37.1	10.52	〃	65881	6621	6609	6349	27.2	26.0
5088	43	50.9	36.5	35.73	〃	65428	6653	6613	6329	32.4	28.4
5090	44	48.9	36.2	17.83	〃	65805	6636	6616	6301	33.5	31.5
5092	45	47.5	35.7	77.33	〃	64561	6695	6608	6282	41.3	32.6
5095	46	46.1	35.2	6.35	〃	65913	6611	6604	6262	34.9	34.2
5098	47	44.5	33.6	2.02	〃	66165	6623	6620	6240	38.3	38.0

* Weather Station Seismometer Room.

5100	48	43.7	32.0	1.79	〃	66273	6633	6631	6229	40.4	40.2
5102	49	43.1	30.5	29.85	〃	65655	6658	6624	6221	43.7	40.3
5104	50	42.6	28.8	72.04	〃	65013	6724	6643	6214	51.0	42.9
5106	51	41.9	26.8	52.13	〃	65408	6702	6643	6204	49.8	43.9
5108	52	40.6	25.4	4.65	〃	66738	6688	6683	6186	50.2	49.7
5109	53	39.7	25.1	9.57	〃	66840	6714	6703	6173	54.1	53.0
〃	〃	〃	〃	〃	IV 12	66846	6714	6703	6172	54.2	53.1
5110	54	39.4	24.3	2.45	〃	66994	6707	6704	6169	53.8	53.5
5113	55	37.6	22.1	1.89	〃	67128	6719	6717	6144	57.5	57.3
5115	56	36.1	21.4	3.56	〃	66826	6694	6690	6123	57.1	56.7
5116	57	35.1	21.3	25.59	〃	66495	6729	6700	6110	61.9	59.0
5119	58	33.8	18.5	3.32	〃	66861	6696	6693	6092	60.4	60.1

Synoptic Results for Tokushima Prefecture (II).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	133° ′								
5031	106	50.3	47.3	196.26	IV 15	60704	6676	6457	6321	35.5	13.6
5033	107	52.0	46.5	181.09	〃	61135	6672	6470	6345	32.7	12.5
〃	〃	〃	〃	〃	IV 16	61135	6672	6470	6345	32.7	12.5
5036	108	54.5	45.7	163.56	〃	61526	6657	6474	6379	27.8	9.5
5038	109	56.2	45.5	147.62	〃	62522	6708	6543	6403	30.5	14.0
5040	110	58.0	45.7	128.82	〃	63519	6749	6605	6428	32.1	17.7
5042	111	59.1	47.4	118.42	〃	64312	6797	6664	6444	35.3	22.0
		34°									
5043	112	00.0	47.4	111.91	〃	64712	6817	6691	6456	36.1	23.5
5045	113	01.6	48.1	142.77	〃	64335	6874	6714	6478	39.6	23.6
5047	114	01.9	50.6	82.36	〃	65783	6833	6740	6483	35.0	25.7
5051	115	03.6	49.4	434.89	〃	57930	7135	6649	6506	62.9	14.3
5052	116	04.1	49.0	543.34	〃	55815	7258	6650	6513	74.5	13.7

Synoptic Results for Tokushima Prefecture (III).

B.M.	No.	φ	λ	H (m)	Date 1953	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		34° ′	134° ′								
No. 8	3665	13.8	38.7	18.38	IV 3	68070	6864	6843	6649	21.5	19.4
299	3664	11.9	37.8	3.04	〃	68293	6839	6835	6622	21.7	21.3
300	3663	11.1	37.5	8.49	〃	68197	6846	6836	6611	23.5	22.5
302	3658	10.4	36.7	1.48	〃	68249	6830	6828	6601	22.9	22.7
303	3659	10.1	35.5	1.71	〃	68103	6816	6814	6597	21.9	21.7
304	3660	09.8	34.3	2.19	〃	67937	6801	6798	6593	20.8	20.5

(36) Kagawa Prefecture.

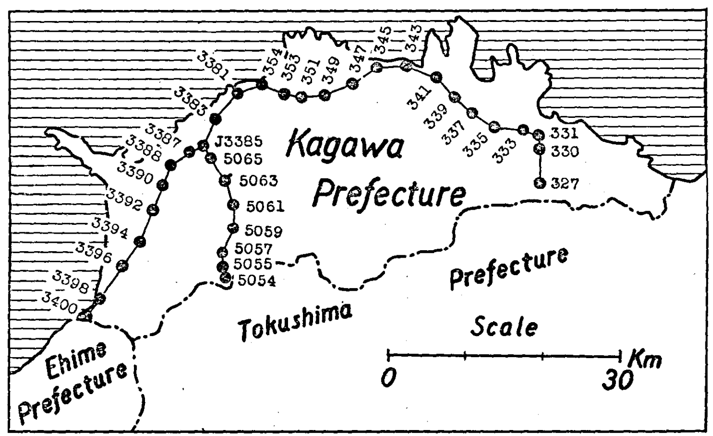

Fig. 5. Gravity Stations in Kagawa Prefecture.

Table XIII. Synoptic Results for Kagawa Prefecture (I).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		34° ′	133° ′								
3400	131	02.5	37.0	2.78	IV 17	66419	6651	6647	6491	16.0	15.6
3398	130	04.1	38.5	4.18	〃	66597	6673	6668	6513	16.0	15.5
3396	129	06.0	39.9	14.85	〃	67081	6754	6737	6540	21.4	19.7
3394	128	07.5	41.5	10.89	〃	67542	6788	6776	6561	22.7	21.5
3392	127	09.1	42.6	23.27	〃	67928	6865	6839	6583	28.2	25.6
3390	126	11.2	43.1	9.70	〃	68995	6929	6919	6613	31.6	30.6
3388	125	12.1	44.0	61.03	〃	68402	7029	6960	6625	40.4	33.5
3387	124	13.1	44.9	21.87	〃	68971	6965	6940	6639	32.6	30.1
J. 3385	1	14.8	47.2	18.50	IV 8	69583	7015	6995	6663	35.2	33.2
〃	〃	〃	〃	〃	IV 16	69583	7015	6995	6663	35.2	33.2
〃	〃	〃	〃	〃	IV 17	69591	7016	6996	6663	35.3	33.3
3383	2	16.8	47.8	4.73	IV 8	70634	7078	7073	6691	38.7	38.2
3381	3	18.9	49.2	2.89	〃	70889	7098	7095	6721	37.7	37.4
J. 354	4	18.7	51.4	1.12	〃	71063	7110	7109	6718	39.2	39.1
353	5	18.7	52.9	3.20	〃	71174	7127	7124	6718	40.9	40.6
351	6	18.0	55.0	12.65	〃	70678	7107	7093	6708	39.9	38.5
349	7	18.0	57.1	31.72	〃	70278	7126	7090	6708	41.8	38.2
347	8	18.7	59.5	13.16	〃	71167	7157	7143	6718	43.9	42.5
			134°								
345	9	20.2	01.0	3.35	〃	72045	7215	7211	6739	47.6	47.2
343	10	20.5	03.5	2.42	〃	71719	7179	7177	6743	43.6	43.4
Takamatsu W.S.*	11	19.0	03.5	9.83	〃	70895	7120	7109	6722	39.8	38.7
341	12	19.1	04.9	2.95	〃	70976	7107	7103	6723	38.4	38.0
339	13	17.5	06.4	12.06	〃	70235	7061	7047	6701	36.0	34.6
337	14	16.1	08.0	24.15	〃	69919	7066	7039	6681	38.5	35.8
335	15	15.8	10.5	36.09	〃	69586	7070	7030	6677	39.3	35.3
333	16	15.7	13.0	32.17	〃	69818	7081	7045	6676	40.5	36.9
〃	〃	〃	〃	〃	IV 9	69818	7081	7045	6676	40.5	36.9
331	17	15.0	15.1	52.33	IV 8	69026	7064	7006	6666	39.8	34.0
〃	〃	〃	〃	〃	IV 9	69035	7065	7006	6666	39.9	34.0
330	18	14.0	15.1	97.37	IV 8	67531	7054	6945	6652	40.2	29.3
〃	〃	〃	〃	〃	IV 9	67540	7055	6946	6652	40.3	29.4
327	19	11.6	15.2	284.71	〃	63001	7179	6860	6618	56.1	24.2

* Weather Station Seismometer Room.

Synoptic Results for Kagawa Prefecture (II).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		34° ′	133° ′								
5065	123	14.0	47.4	26.03	IV 16	69358	7016	6987	6652	36.4	33.5
5063	122	12.1	48.6	53.49	〃	68200	6985	6925	6625	36.0	30.0
5061	121	10.2	49.8	88.60	〃	66473	6921	6822	6599	32.2	22.3
5059	120	08.1	49.2	125.02	〃	64933	6879	6739	6569	31.0	17.0
5057	119	06.4	48.1	128.43	〃	64163	6813	6669	6545	26.8	12.4
5055	118	05.0	48.7	308.40	〃	60212	6973	6628	6526	44.7	10.2
5054	117	04.5	49.0	402.10	〃	58358	7077	6627	6519	55.8	10.8

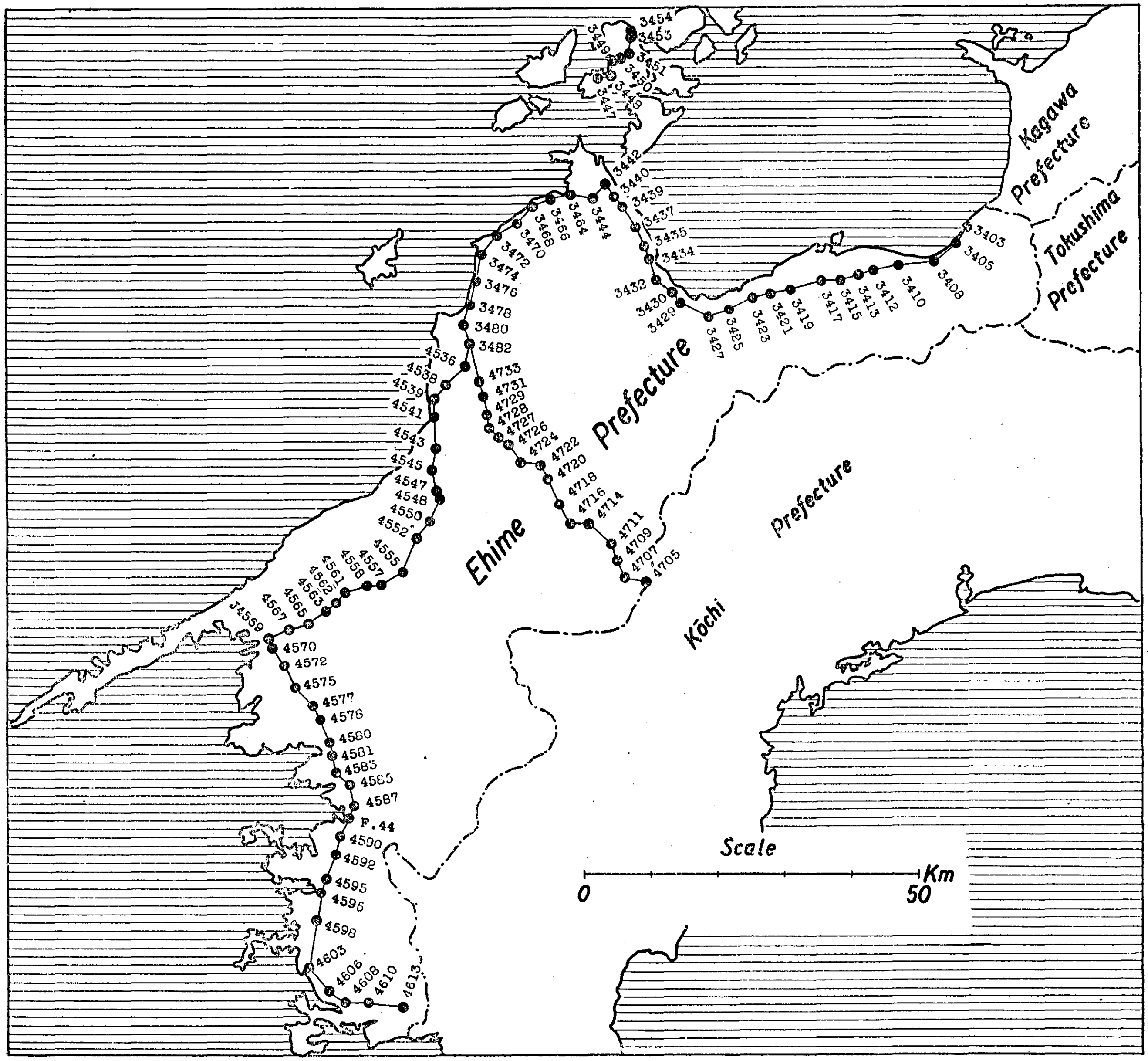

Fig. 6. Gravity Stations in Ehime Prefecture.

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(37) Ehime Prefecture.

Table XIV. Synoptic Results for Ehime Prefecture (I).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
4613	232	32° ′ 57.4	132° ′ 39.0	93.58	IV 25	57771	6066	5961	5589	47.7	37.2
4610	233	57.7	35.9	22.53	〃	59012	5971	5946	5594	37.7	35.2
4608	234	〃	33.6	4.47	〃	59140	5928	5923	5594	33.4	32.9
4606	235	58.5	32.0	14.23	〃	58827	5927	5911	5604	32.3	30.7
4603	236	33° 00.6	29.9	19.15	〃	58578	5917	5896	5633	28.4	26.3
4598	237	04.9	30.5	20.95	〃	59190	5984	5960	5692	29.2	26.8
4596	238	06.9	31.4	2.35	〃	59513	5959	5956	5720	23.9	23.6
4595	239	07.9	31.7	6.05	〃	59640	5983	5976	5734	24.9	24.2
4592	240	10.0	33.3	51.97	〃	58718	6032	5974	5763	26.9	21.1
4590	241	11.7	33.0	11.01	〃	59497	5984	5971	5786	19.8	18.5
F. 44	242	12.9	34.1	10.15	〃	59631	5994	5983	5803	19.1	18.0
〃	〃	〃	〃	〃	IV 26	59627	5994	5983	5803	19.1	18.0
Uwajima W.S.*	243	13.5	33.5	43.46	IV 25	58797	6014	5965	5811	20.3	15.4
〃 **	244	〃	〃	42.00	〃	58844	6015	5968	5811	20.4	15.7
4587	245	14.3	34.4	12.50	IV 26	59572	5996	5982	5822	17.4	16.0
4585	246	15.8	33.8	61.01	〃	58449	6033	5965	5843	19.0	12.2
4583	247	16.6	32.6	1.60	〃	59469	5952	5950	5854	9.8	9.6
4581	248	18.5	32.4	65.99	〃	58126	6016	5942	5880	13.6	6.2
4580	249	19.3	32.1	240.91	〃	54421	6186	5916	5891	29.5	2.5
4578	250	21.0	31.4	279.58	〃	54147	6278	5965	5914	36.4	5.1
4577	251	21.6	31.0	212.90	〃	55600	6217	5979	5923	29.4	5.6
4575	252	23.0	29.5	218.89	〃	55841	6260	6015	5942	31.8	7.3
4572	253	24.8	27.8	143.53	〃	57673	6210	6050	5967	24.3	8.3
4570	254	26.4	26.5	15.50	〃	61212	6169	6152	5989	18.0	16.3
J. 4569	255	27.3	25.7	2.76	〃	61363	6145	6142	6002	14.3	14.0
4567	256	28.1	28.1	35.87	〃	60240	6135	6095	6013	12.2	8.2
4565	257	28.6	29.9	183.06	〃	57621	6327	6122	6020	30.7	10.2
4563	258	29.7	31.8	20.06	〃	60606	6123	6100	6035	8.8	6.5
4562	259	30.3	32.7	15.09	〃	60635	6110	6093	6043	6.7	5.0
〃	〃	〃	〃	〃	IV 27	60630	6110	6093	6043	6.7	5.0

* Weather Station Barometer Room. ** Weather Station Bench Mark.

Table XIV. (I) (Continued)

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	132° ′								
4561	260	31.1	33.1	12.25	IV 27	60696	6107	6094	6054	5.3	4.0
4558	261	32.0	36.4	16.01	〃	60772	6127	6109	6067	6.0	4.2
4557	262	31.8	37.6	37.90	〃	60925	6210	6167	6064	14.6	10.3
4555	263	33.2	39.3	71.23	〃	59763	6196	6116	6083	11.3	3.3
4552	264	35.6	33.8	107.80	〃	59502	6283	6162	6117	16.6	4.5
4550	265	37.9	42.0	164.21	〃	58382	6345	6161	6149	19.6	1.2
4548	266	38.5	42.8	173.93	〃	57670	6304	6109	6157	14.7	− 4.8
4547	267	39.6	42.3	235.02	〃	56980	6423	6160	6172	25.1	− 1.2
4545	268	41·1	42.7	329.46	〃	55430	6560	6191	6193	36.7	− 0.2
4543	269	43.0	42.5	66.19	〃	59670	6171	6097	6219	− 4.8	−12.2
4541	270	45.0	41.9	2.51	〃	59749	5983	5980	6247	−26.4	−26.7
4539	271	47.3	42.4	1.38	〃	59675	5972	5970	6279	−30.7	−30.9
4538	272	48.0	43.2	4.16	〃	59921	6005	6000	6289	−28.4	−28.9
4536	273	48.9	45.5	14.55	〃	60346	6080	6063	6301	−22.1	−23.8
Matsuyama W.S.*	166	50.4	47.0	32.92	IV 19	59705	6072	6035	6322	−25.0	−28.7
3482	164	51.3	45.7	21.61	〃	61095	6176	6152	6335	−15.9	−18.3
〃	〃	〃	〃	〃	IV 20	61108	6178	6153	6335	−15.7	−18.2
〃	〃	〃	〃	〃	IV 27	61095	6176	6152	6335	−15.9	−18.3
3480	163	53.3	45.1	7.01	IV 19	62128	6234	6227	6363	−12.9	−13.6
3478	162	55.8	45.6	4.64	〃	63061	6320	6315	6398	− 7.8	− 8.3
3476	161	57.9	46.5	3.10	〃	63965	6406	6403	6427	− 2.1	− 2.4
3474	160	59.1	46.9	4.70	〃	64624	6477	6472	6444	3.3	2.8
		34°									
3472	159	00.6	48.5	2.82	〃	65485	6557	6554	6465	9.2	8.9
3470	158	01.3	50.2	31.26	〃	65148	6611	6576	6474	13.7	10.2
3468	157	02.6	51.6	1.83	〃	66196	6625	6623	6492	13.3	13.1
3466	156	03.4	53.7	2.91	〃	66386	6648	6644	6504	14.4	14.0
3464	155	03.8	56.0	2.21	〃	66438	6651	6648	6509	14.2	13.9
3444	154	07.1	57.4	3.50	〃	67652	6776	6772	6555	22.1	21.7
3442	153	05.1	59.3	6.84	〃	66990	6720	6712	6527	19.3	18.5
			133°								
3440	152	03.4	00.1	3.80	IV 18	66731	6685	6681	6504	18.1	17.7

* Weather Station Seismometer Room.

3439	151	02.7	01.2	2.97	〃	66801	6689	6686	6494	19.5	19.2
3437	150	01.1	02.5	2.60	〃	66620	6670	6667	6472	19.8	19.5
		33°									
3435	149	59.2	03.3	14.64	〃	65576	6603	6586	6449	15.4	13.7
3434	148	58.3	03.2	48.73	〃	64382	6589	6534	6432	15.7	10.2
3432	147	56.4	04.1	10.23	〃	64138	6445	6434	6406	3.9	2.8
3430	146	55.5	05.8	1.69	〃	63825	6388	6386	6393	− 0.5	− 0.7
3429	145	54.8	06.5	2.82	〃	63716	6380	6377	6384	− 0.4	− 0.7
3427	144	53.4	07.9	25.49	〃	63255	6404	6376	6364	4.0	1.2
3425	143	53.6	10.3	5.08	〃	64190	6435	6429	6367	6.8	6.2
3423	142	54.8	12.4	2.71	〃	64110	6419	6416	6384	3.5	3.2
3421	141	55.1	14.9	47.66	〃	63650	6512	6459	6388	12.4	7.1
3419	140	55.6	17.4	44.43	〃	63673	6504	6455	6395	10.9	6.0
3417	139	56.1	19.9	61.63	〃	63392	6529	6460	6402	12.7	5.8
3415	138	56.0	22.3	159.93	〃	61538	6647	6468	6400	24.7	6.8
3413	137	56.9	24.4	52.10	〃	63647	6526	6467	6413	11.3	5.4
3412	136	57.3	25.6	33.31	〃	64055	6508	6471	6419	8.9	5.2
3410	135	57.6	28.1	30.55	〃	64267	6521	6487	6423	9.8	6.4
3408	134	57.8	30.6	8.42	〃	65058	6532	6522	6425	10.7	9.7
3405	133	59.2	33.6	8.56	〃	65658	6592	6583	6445	14.7	13.8
		34°									
3403	132	00.7.	34.5	2.91	IV 17	66081	6617	6614	6466	15.1	14.8
〃	〃	〃	〃	〃	IV 18	66092	6618	6615	6466	15.2	14.9

Synoptic Results for Ehime Prefecture (II).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	132° ′								
4733	167	48.6	46.8	23.68	IV 20	60545	6128	6101	6297	−16.9	−19.6
4731	168	46.5	47.7	38.90	〃	60101	6130	6087	6268	−13.8	−18.1
4729	169	44.6	47.9	121.07	〃	59529	6327	6191	6242	8.5	− 5.1
4728	170	44.2	48.5	230.57	〃	57618	6473	6215	6236	23.7	− 2.1
4727	171	43.8	49.2	326.85	〃	56007	6609	6244	6230	37.9	1.4
4726	172	43.2	49.7	430.11	〃	54078	6735	6254	6222	51.3	3.2
4724	173	42.1	50.9	609.07	〃	50378	6917	6236	6207	71.0	2.9
4722	174	42.0	52.8	649.95	〃	50086	7014	6287	6205	80.9	8.2
4720	175	40.2	53.5	518.39	〃	52529	6853	6273	6180	67.3	9.3
4718	176	38.4	54.6	471.05	〃	53042	6758	6231	6155	60.3	7.6

Table XIV. (II) (Continued)

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	132° ′								
4716	177	37.0	55.4	425.17	IV 20	53714	6684	6208	6136	54.8	7.2
4714	178	36.9	57.7	396.03	〃	54083	6630	6187	6135	49.5	5.2
〃	〃	〃	〃	〃	IV 21	54079	6630	6187	6135	49.5	5.2
4711	179	35.4	59.7	350.01	〃	55236	6604	6212	6114	49.0	9.8
			133°								
4709	180	33.8	00.4	317.10	〃	54682	6447	6092	6092	35.5	0.0
4707	181	32.4	00.9	263.00	〃	55568	6368	6074	6072	29.6	0.2
4705	182	32.4	03.0	243.81	〃	56342	6387	6114	6072	31.5	4.2

Synoptic Results for Ehime Prefecture (III).

B.M.	No.	φ	λ	H (m)	Date 1952	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		34° ′	132° ′								
3447	2288	12.9	58.6	24.71	VIII 28	67414	6818	6790	6636	18.2	15.4
3448	2289	13.2	59.6	2.19	〃	67933	6800	6798	6641	15.9	15.7
3449	2290	14.1	59.9	1.60	〃	67977	6803	6801	6653	15.0	14.8
			133°								
3450	2291	14.7	00.4	6.59	〃	67927	6813	6806	6662	15.1	14.4
3451	2292	15.1	01.5	76.36	〃	66790	6915	6829	6667	24.8	16.2
3453	2293	16.9	02.2	3.21	〃	68711	6880	6877	6693	18.7	18.4
3454	2294	17.5	01.5	3.12	〃	68685	6878	6875	6701	17.7	17.4

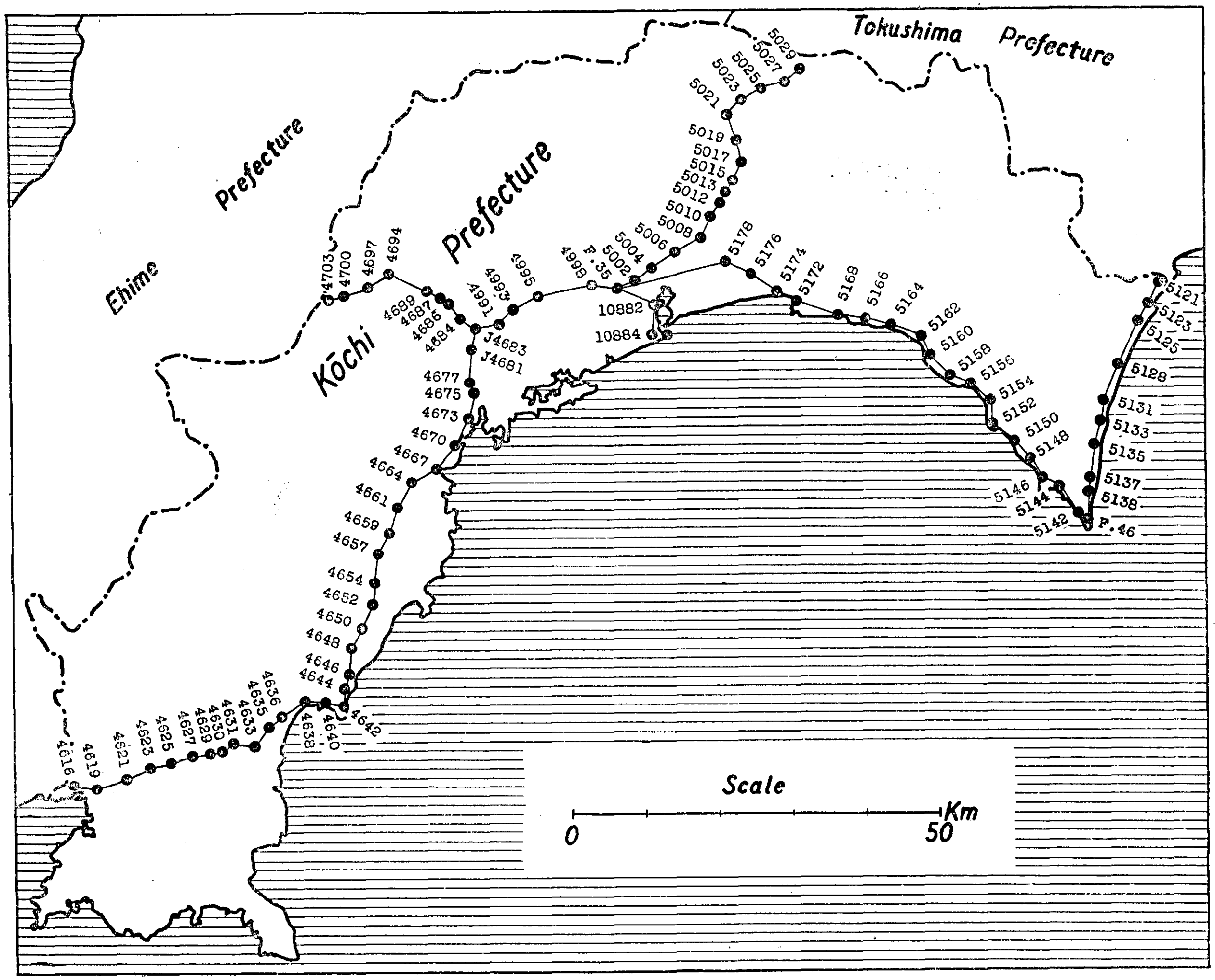

Fig. 7. Gravity Stations in Kôchi Prefecture.

(38) **Kôchi Prefecture.**

Table XV. Synoptic Results for Kôchi Prefecture (I).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	134° ′								
5121	59	32.5	17.7	2.50	IV 12	66888	6697	6694	6074	62.3	62.0
5123	60	31.2	17.2	6.14	〃	66849	6704	6697	6055	64.9	64.2
5125	61	29.7	16.2	17.59	〃	66733	6728	6708	6035	69.3	67.3
5128	62	26.5	14.3	7.84	〃	67050	6729	6720	5990	73.9	73.0
5131	63	23.8	12.8	8.66	〃	67603	6787	6777	5953	83.4	82.4
5133	64	22.1	12.5	7.45	〃	67311	6754	6746	5930	82.4	81.6
5135	65	20.1	12.1	6.76	〃	67460	6767	6759	5902	86·5	85.7
5137	66	18.1	11.5	7.87	〃	67521	6776	6768	5874	90.2	89.4
5138	67	17.0	11.3	6.50	〃	67858	6806	6799	5859	94.7	94.0
F. 46	68	14.8	11.0	8.37	〃	68088	6835	6825	5829	100.6	99.6
5142	69	15.8	10.2	10.77	〃	68059	6839	6827	5843	99.6	98.4
Muroto W.S.*	70	15.0	10.9	176.44	〃	64062	6951	6753	5832	111.9	92.1
△	71	14.9	10.9	184.90	〃	64086	6979	6772	5830	114.9	94.2
5144	72	17.4	08.8	6.36	〃	68163	6836	6829	5865	97.1	96.4
〃	〃	〃	〃	〃	IV 13	68105	6830	6823	5865	96.5	95.8
M. 1	73	17.4	09.9	15.85	〃	67849	6834	6816	5865	96.9	95.1
5146	74	17.9	06.8	6.99	〃	67794	6801	6793	5872	92.9	92.1
5148	75	19.8	06.0	6.85	〃	67474	6769	6761	5898	87.1	86.3
5150	76	21.2	04.2	94.9	〃	67259	6755	6745	5917	83.8	82.8
5152	77	22.1	02.4	7.57	〃	66884	6712	6703	5930	78.2	77.3
5154	78	24.0	02.2	7.60	〃	66488	6672	6664	5956	71.6	70.8
5156	79	25.5	01.0	5.89	〃	66166	6635	6628	5977	65.8	65.1
			133°								
5158	80	26.1	59.0	8.76	〃	65817	6609	6599	5985	62.4	61.4
5160	81	26.5	57.0	8.17	〃	65785	6604	6595	5990	61.4	60.5
5162	82	29.0	56.4	4.31	〃	65781	6591	6587	6025	56.6	56.2
5164	83	29.9	54.2	9.22	〃	64897	6518	6508	6037	48.1	47.1
5166	84	30.2	51.6	7.78	〃	65207	6545	6536	6042	50.3	49.4
5168	85	31.1	49.4	9.48	〃	64823	6512	6501	6054	45.8	44.7
5172	86	31.6	45.7	25.58	〃	64357	6515	6486	6061	45.4	42.5
5174	87	32.3	43.6	7.61	〃	64417	6465	6457	6071	39.4	38.6

* Weather Station Seismometer Room.

Table XV. (I) (Continued)

B.M.	No.	φ	λ	H (m)	Date 1951		g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	133° ′									
5176	88	33.5	41.8	18.59	IV	13	63850	6442	6422	6087	35.5	33.5
5178	89	34.2	39.3	12.95		〃	63658	6406	6391	6097	30.9	29.4
Kôchi W.S.*	90	33.8	33.0	1.90		〃	63861	6392	6390	6092	30.0	29.8
5002	91	33.3	32.0	2.13		〃	63664	6373	6371	6085	28.8	28.6
〃	〃	〃	〃	〃	IV	15	〃	〃	〃	〃	〃	〃
〃	〃	〃	〃	〃	IV	21	〃	〃	〃	〃	〃	〃
〃	〃	〃	〃	〃	IV	23	〃	〃	〃	〃	〃	〃
F. 35	194	33.2	30.0	9.23	IV	21	63609	6389	6379	6083	30.6	29.6
4998	193	32.9	27.1	14.31		〃	63466	6391	6375	6079	31.2	29.6
4995	192	32.2	23.5	19.70		〃	63170	6378	6356	6069	30.9	28.7
4993	191	31.6	21.2	18.82		〃	63037	6362	6341	6061	30.1	28.0
4991	199	30.3	19.7	35.92	IV	23	62238	6335	6294	6043	29.2	25.1
J. 4683	200	29.8	17.6	80.39		〃	61323	6380	6290	6036	34.4	25.4
J. 4681	201	27.9	17.1	115.71		〃	60301	6387	6258	6010	37.7	24.8
4677	202	26.2	17.4	85.16		〃	60909	6354	6258	5986	36.8	27.2
4675	203	24.8	17.9	6.47		〃	63062	6326	6319	5967	35.9	35.2
4673	204	23.2	17.4	4.92		〃	63254	6341	6335	5945	39.6	39.0
4670	205	21.7	15.5	4.07		〃	63089	6322	6317	5924	39.8	39.3
4667	206	20.0	13.7	3.37		〃	63142	6325	6321	5901	42.4	42.0
4664	207	18.8	12.1	113.47		〃	60634	6414	6287	5884	53.0	40.3
4661	208	17.8	10.7	274.85		〃	57374	6586	6278	5870	71.6	40.8
4659	209	16.1	10.2	244.85		〃	57887	6544	6270	5847	69.7	42.3
4657	210	14.0	09.3	237.69		〃	57902	6524	6258	5818	70.6	44.0
4654	211	12.2	08.6	210.36		〃	58346	6484	6248	5793	69.1	45.5
〃	〃	〃	〃	〃	IV	24	58344	6484	6248	5793	69.1	45.5
4652	212	10.2	08.3	258.69		〃	57286	6527	6237	5765	76.2	47.2
4650	213	08.6	07.9	74.57		〃	60748	6305	6222	5743	56.2	47.9
4648	214	07.0	07.3	29.92		〃	61515	6244	6210	5721	52.3	48.9
4646	215	05.9	06.2	12.78		〃	61732	6213	6198	5706	50.7	49.2
4644	216	04.3	06.6	5.28		〃	61962	6213	6207	5684	52.9	52.3
4642	217	03.0	06.1	16.16		〃	61643	6214	6196	5666	54.8	53.0
4640	218	01.7	05.0	9.44		〃	61779	6207	6196	5648	55.9	54.8
4638	219	02.0	02.6	13.44		〃	61333	6176	6161	5652	52.4	50.9
4636	220	00.9	02.0	4.53		〃	61359	6150	6145	5637	51.3	50.8
			132°									
4635	221	00.2	58.9	8.37		〃	61147	6141	6131	5628	51.3	50.3

* Weather Station Seismometer Room.

4633	222	32° 58.9	58.0	2.80	〃	61248	6133	6130	5610	52.3	52.0
4631	223	59.2	56.1	11.64	〃	60920	6128	6115	5614	51.4	50.1
4630	224	58.6	55.2	5.36	〃	60964	6113	6107	5606	50.7	50.1
4629	225	58.5	54.1	5.92	〃	60815	6100	6093	5604	49.6	48.9
4627	226	〃	52.2	9.15	〃	60514	6080	6069	5604	47.6	46·5
4625	227	57.7	50.5	6.07	〃	60543	6073	6066	5594	47.9	47.2
4623	228	57.5	48.3	8.73	〃	60337	6061	6051	5590	47.1	46.1
4621	229	56.7	46.2	47.87	〃	59306	6078	6025	5580	49.8	44.5
4619	230	56.1	44.0	2.71	〃	59959	6004	6001	5571	43.3	43.0
〃	〃	〃	〃	〃	IV 25	59962	6005	6002	5571	43.4	43.1
4616	231	56.3	41.1	78.43	〃	58244	6066	5979	5574	49.2	40.5

Synoptic Results for Kôchi Prefecture (II).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
J. 5004	92	33° ′ 34.6	133° ′ 34.1	1.17	IV 15	64084	6412	6411	6103	30.9	30.8
5006	93	35.6	36.1	18.78	〃	64258	6484	6463	6117	36.7	34.6
5008	94	36.1	38.1	18.45	〃	64115	6468	6448	6123	34.5	32.5
5010	95	37.6	38.6	120.59	〃	62282	6600	6465	6144	45.6	32.1
5012	96	38.7	39.7	278.14	〃	59527	6811	6500	6160	65.1	34.0
5013	97	39.3	40.0	383.37	〃	57580	6941	6512	6168	77.3	34.4
5015	98	40.5	41.1	345.36	〃	58207	6887	6500	6185	70.2	31.5
5017	99	41.7	41.6	329.30	〃	58323	6849	6480	6201	64.8	27.9
5019	100	43.7	41.1	319.01	〃	59299	6914	6557	6229	68.5	32.8
5021	101	45.3	40.1	251.56	〃	60923	6869	6587	6251	61.8	33.6
5023	102	46.4	41.6	228.81	〃	60339	6740	6484	6267	47.3	21.7
5025	103	46.9	43.2	222.43	〃	60535	6740	6491	6274	46.6	21.7
5027	104	47.4	45.2	249.18	〃	59959	6765	6486	6281	48.4	20.5
5029	105	48.6	46.5	214.78	〃	60194	6682	6442	6297	38.5	14.5

Synoptic Results for Kôchi Prefecture (III).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgai)	$\Delta g_0''$ (mgal)
		33° ′	133° ′								
4684	190	30.7	16.4	94.23	IV 21	61091	6400	6295	6049	35.1	24.6
4686	189	31.8	15.3	64.04	〃	61585	6356	6284	6064	29.2	22.0
4687	188	32.2	14.6	74.88	〃	61197	6351	6267	6069	28.2	19.8
4689	187	33.1	13.1	97.61	〃	60448	6346	6237	6082	26.4	15.5
4694	186	34.3	10.2	106.95	〃	60014	6331	6212	6098	23.3	11.4
4697	185	33.4	08.0	130.44	〃	58907	6293	6147	6086	20.7	6.1
4700	184	32.5	06.5	249.80	〃	56721	6443	6164	6074	36.9	9.0
4703	183	32.2	04.8	193.05	〃	57038	6300	6084	6069	23.1	1.5

Synoptic Results for Kôchi Prefecture (IV).

B.M.	No.	φ	λ	H (m)	Date 1951	g 979.	g_0 979.	g_0'' 979.	γ_0 979.	Δg_0 (mgal)	$\Delta g_0''$ (mgal)
		33° ′	133° ′								
10882	195	31.5	33.5	1.66	IV 23	63583	6363	6362	6060	30.3	30.2
10884	196	29.7	33.1	1.28	〃	63946	6399	6397	6035	36.4	36.2
Urato Tide Gauge	197	29.7	34.2	2.69	〃	63975	6406	6403	6035	37.1	36.8
13	198	29.8	34.2	2.32	〃	64031	6410	6408	6036	37.4	37.2

ウォルドン重力計による日本全国の重力測定

第一報　四国地方

坪井忠二・実川　顕・田島広一・岡田　惇

日本における重力のブーゲー異常の分布は，地震の震央の分布と密接な関係をもっている．重力異常は，地下構造の異常によって生ずるものであるから，上記の関係は，つまり，地震発生と地下構造の異常との間に密接な関係のあることを示している．従って，地震発生の機構を考えていく上には，重力異常の分布が，大切な基礎的資料の一つとなる．これは，地震研究所として，ぜひ遂行しなければならぬ研究の題目である．これが，この仕事を始めた第一の理由である．

之に加えて，日光地震 (1949)，南海地震 (1946) のときに，重力分布や，鉛直線偏倚の分布が時と共に変化したらしいという報告がある．この報告の眞僞はともかくとして，重力に経年変化があるか否かということは大問題である．これを研究するためには，日本全国におけるたくさんの点で重力を測っておいて，しばらくたってから再測しなければならない．その第一の礎石として，ともかく全国のくわしい重力測定を完了しておかなければならない．これが，この仕事を始めた第二の理由である．

このような目的をもった測定には，重力計を使うのが最も都合がよい．幸なことに，当局の諒解によって，地震研究所は，ウォルドン重力計を輸入することができた．我々は，この重力計によって，全国の重力測定に着手したのである．

測点の高さの精度と，再測のときの同定の容易さとを考えて，重力測定は，地理調査所の水準点において行うこととした．但し大体において，一つおきの水準点で測定することとした．日本全国には，水準点が約 10000 あるから，我々の測定は，およそ 5000 点で行うことになる．

この第１報は四国において得られた結果をまとめたものである．

ウォルドン重力計には，大ダイアルと小ダイアルとがついているが，我々は小ダイアルのみを使うことにした．

地球潮汐に対する補正，水準点上の重力計の高さに対する補正等は，普通の方法によって計算した．

四国における水準線は，第２図に示した通りである．これを第１，第２，第３ルートにわけ，それぞれについて，閉塞差を求め，時間に比例してそれを各点に分配した．

各点における重力が求められた後，高さの補正とブーゲー補正とを加えた．高さの補正を計算するには，$(0.308600\times h)$ の式を使った．又，ブーゲー補正を計算するには，岩石の密度を，2.6700 とした．又標準重力は，

$$\gamma_0=979.03000(1+0.530200\sin^2\varphi-0.00000700\sin^2 2\varphi)$$

によって計算した．水準点の緯度は，せいぜい 0.′1 までしか解らないから，標準重力は，せいぜい 0.1 mgal までしか解らない．従って，重力の高度異常も，ブーゲー異常も，0.1 mgal までしか解らない．但し重力の値自身は，相対的には，0.02 mgal 程度の正しさがあると思われる．

測定の結果は，第 VIII 表一第 XI 表（ルート別）第 XII 表一第 XV 表（県別）に示してある．但し東京の基点における重力を 979.80100 ととってある，ブーゲー異常の分布は，第８図に示してある．

第８図から解る主なことがらは，次のとおりである．

1) ブーゲー異常は，南方，すなわち太平洋方面に行くにつれて大きくなる．+100 mgal という大きな値が，室戸岬において見出される．
2) 等異常線は，WSW—ENE に走る．これは四国の地質構造の走向と完全に一致する．
3) 中央構造線に沿って，ブーゲー異常は極小である．この極小帯は，東方で幅が狭くて勾配が急であるが，西方で広くゆるやかになる．
4) 松山の近くに，著るしい負の異常がある．この負の地域は，瀬戸内海をよこぎって，中国地方に届くらしい．これは，地殼の著るしい陥落を示している．
5) 香川県の北方に，著るしい正の異常がある．これは地下に，密度の大きい物質があることを示している．恐らくこれは，讃岐玄武岩を供給した本源に相当するのであろう．