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Correction of the Tokyo geomagnetic data in Meiji era

by

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Abstract

Before the Kakioka Magnetic Observatory commenced the activities in January 1913 in Kakioka, Ibaraki Prefecture, continuous observation of the geomagnetic field had been carried out from 1897 until 1912 in the premises of the Central Meteorological Observatory in Tokyo. Although magnetograms and observation notes that had been kept in the Central Meteorological Observatory were burned up when the city was severely damaged by the 1923 Great Kanto Earthquake, printed annual reports(yearbooks) were fortunately left in the libraries of the Kakioka Magnetic Observatory and the Japan Meteorological Agency. Recently, the Kakioka Magnetic Observatory digitized the hourly data over the whole 16 years and released them on its own homepage. While doing this, we were looking to see whether or not there might be any errors that could have occurred in transferring the data from the observation records to the annual reports or any errors that occurred during typesetting. We realized in that process that there was a large number of apparently obviously mistaken data items mixed in, when the original data were printed in the annual reports. At the first release of the digitized data, the original data as listed in the annual reports was given more importance and was released uncorrected, just as the data had been. However, we considered that obvious mistakes in these valuable geomagnetic data of the Meiji era should be corrected for easy use in various research works, and so we decided to revise them entirely this time. In principle, we restricted corrections to only errors judged to be obvious mistakes. Whether to revise each datum or not relies on a judgment made in the following way:

(1) An immediate judgment that a figure in the 100s digit of an hourly value is a typing error is acceptable when, for example, only one datum with a value in the 900s range is contained mixed in with other values in a day when all the other values are in the 600s range. In this case a judgment is made that a “6” was mistakenly changed to a “9.” The validity of this judgment was confirmed, checking that the mean value calculated using the revised value agreed with the mean value written in the annual report.

(2) In order to find mistakes in the figures, we referred to the above procedure used in (1) to confirm the validity of the revision. (Checking whether the mean value written in the annual report agrees with the mean value re-calculated using the digitized data.) If a disagreement is found in both the mean values of 24 hourly data in a day (lateral mean values) and the monthly mean values of the data at the identical time of each day (vertical mean values), it is suggested that the magnetic field value at the day and the hour where the lateral row and the vertical column cross might be mistaken. In that case, we checked whether the disagreement is resolved by changing the hourly value at the cross section. Only one figure, not two, was changed within either the 100s, or 10s, or units digits to change the values. Further, alteration of the units digit value was restricted by the criteria described in the following.

(3) When the difference in two kinds of mean values is less than about 0.3, we considered the data should not be revised. The data was not revised also even when the difference was 0.4 or 0.5, unless it was estimated that obvious mistakes were almost certainly made, judging from variations in the magnetic field on the day.

(3) When the difference in two kinds of mean values is less than about 0.3, we considered the data should not be revised. The data was not revised also even when the difference was 0.4 or 0.5, unless it was estimated that obvious mistakes were almost certainly made, judging from variations in the magnetic field on the day.

(4) In such cases that there are multiple locations in both the vertical and lateral lines where the two kinds of mean values described above are different, so that it could not be specified which column data should be revised, data were not revised (were not able to be revised) even if the difference in the mean value exceeded 0.5.

(5) Even when the above disagreements of two kinds of mean values could be resolved, the data were not revised in the following cases: when the data were unnatural from the viewpoint of the magnetic field variation trend on that day (that is, the maximum or minimum value is estimated to occur on that day at the nearest hour, but the revised value deviated greatly from those values, or that day was recorded as "calm," but the revision, if applied, would cause a large variation), or when any revision would cause a deviation from the maximum or minimum ranges on that day. We did not revise data in those cases because we judged that the hourly value itself written in the annual report was correct, but the mean value in the annual report was mistaken (mistakes during checking or reading figures at mean value calculation).

(6) When the 10s or 100s figures are lacking due to unclear printing, we inserted a reasonable figure in the spot, judging from the values before and after the hourly value. In most cases, we confirmed that this was effective to have the two kinds of mean values agree with each other.

(7) After revision, we drew a magnetic change map for each element every year to find some locations showing abnormal changes, such as a pulse wave or a rectangular wave. Investigation of this abnormal change reveals that the mean value was not calculated, because of a lack of measurements, resulting in missing mistakes in the 100s figures. Such data were corrected by estimating the correct value from magnetic field values before and after the abnormal changes.

Although the revision was limited to the hourly value data that was judged to be obviously mistaken, the number of revisions exceeded 900 locations. We show the entire list of the places revised and their contents. Besides that, we also attached the list of places where we decided not to make a revision, because it was impossible to specify the date and hour to be corrected or we judged it better not to revise them due to some reasons. For these locations, we think, there remains a possibility to find out in the future that our judgment not to revise was in fact not correct. In addition to the above-described two cases, there were many places where we just looked at the plotted magnetic change map and had a doubt if the change was actually observed. They show changes over several tens of nT in a calm day or changes over 100 nT during a few days. This is not understood as a natural change in the magnetic field, but is left uncorrected as it is, because we did not find any mistakes which were taken up to be revised in this work. We listed those places as well, hoping for progress of study in the future.

Comparison of figures drawn using the original geomagnetic hourly values with those made from the revised data indicates that this revision was effective to clean up a lot of data noise due to artificial mistakes. The H and Z components, however, have significant large drift variations at some areas. A few hints to consider the abnormal changes are noted, but clarification of the cause is left to future studies. We can take in geomagnetic variations such as magnetic storms from the figures. In fact, a total of 307 bromide analog copies of magnetic storms were inserted in the annual report. The bromide records are very valuable, but they are of such a large volume, difficult to contain in the paper, that only a list of the records is given.

Assuming that the local magnetic difference between Tokyo and Kakioka that was measured in 1916 is constant, the data were converted to Kakioka's value to plot the yearly mean values with Kakioka's data since 1924. Although the Z component is outstanding from 1909 through 1911 because of drift changes that cannot be considered natural, the data continuity of each component is rather good. In particular, it is excellent in the D component. Therefore, it is no exaggeration to say that this revision has made it possible to discuss long-term geomagnetic changes near Japan based on continuous observation data over one century. We hope that the published data will be useful in research for long-term geomagnetic changes, and annual variations of magnetic storms in Japan.

1. Introduction

The first continuous geomagnetic observation in Japan was conducted at Imai-cho Azabu in 1883 by the Geographical Bureau of the Ministry of Home Affairs on the occasion of the first International Polar Year (1882 to 1883). This observation was left to the Tokyo Meteorological Observatory of the Geographical Bureau to carry out and was continued until 1886 (100 Years of Geomagnetic Observation History, 1983.) Since that time, there was a gap in continuous observation in Japan until the Central Meteorological Observatory started in 1897 (Meiji Year 30) on the premises in Tokyo. Magnetic observations were performed on the Tokyo premises for a period of 16 years until 1912 when the site was moved to Kakioka because of deterioration of observation conditions. The Kakioka Magnetic Observatory was founded in December 1912 (Taisho Year 1) as an auxiliary facility of the Central Meteorological Observatory to take over the geomagnetic observations from January 1, 1913. Torahiko Terada and Wasaburo Ohishi were involved in the site selection (100 Years of Geomagnetic Observation History, 1983.) Although observation notes, magnetograms, and field notes in Tokyo days that had been kept in the Central Meteorological Observatory were burned up when the metropolitan city was severely damaged by the 1923 great Kanto earthquake, printed annual reports were fortunately left in the libraries. Recently, the Magnetic Observatory digitized the hourly data over the whole 16 years and released them on its own homepage for effective use of the valuable documents. While doing this, we were looking to see whether or not there might be any errors that could have occurred in transferring the data from the observation records to the annual reports or any errors that occurred during typesetting. We realized in that process that there was a large number of what could be thought obviously mistaken data items mixed in. At the first release of the digitized data, the original data as listed in the annual reports was given more importance and was released uncorrected, just as the data had been. But we considered that obvious mistakes in these valuable geomagnetic data of the Meiji era should be corrected for easy use in various research projects, and so decided to revise them entirely this time. This paper explains the basic concepts employed in the procedure of correction to show an image of improvement, comparing the original data and the revised data, with some considerations to the features of the revised data.

In addition, we note here that no typing errors while digitizing the annual reports were found during the revision.

2. Observation and data in Tokyo

A summary of geomagnetic observations in Tokyo has been reported in the preface of the annual report of the Central Meteorological Observatory (Central Meteorological Observatory, 1897), 100 Years of Weather Observation (Japan Meteorological Agency, 1975), and 100 Years of Geomagnetic Observation History (Magnetic Observatory, 1983). The following descriptions were based on the references.

2-1 Observation method

a) Locations of observation point

An observation point was located on the premises of the Central Meteorological Observatory at Kita-Hanebashi-Mon of the old donjon, at latitude 35 degrees 41' North, longitude 139 degrees 45' East, and 21 meters above sea level.

b) Structure of observation room

An absolute observation room was a one-storied structure with a roof opening at the center available for directional observation of the North Star. From a small window at the north side, a gold cross of the Nikolai Cathedral at Surugadai can be seen, filling the role of an azimuth mark.

A variometer room is located at 18 meters to the east of the absolute observation room, a house structured with a wooden cellar 3 meters deep, and covered by a double roof. Its interior is divided by a staircase into two sections, one on the east and one on the west. A self-recording variometer is installed in the east side room, and the same type variometer as that of the east side room was set in the west side room for direct reading.

c) Observation devices

The absolute observation employs a Tanaka-

date type magnetometer for D (deflection) and H (horizontal element) measurement, and a Casella-made dip circle is used for I (magnetic inclination.) The Tanakadate type magnetometer uses a material called spider's thread, which is strong and shows little stress, instead of the conventional silk yarn, to increase observation accuracy and has been remodeled to install a cancellation coil for the horizontal magnetic field. The direction of the lift magnet is adjusted by projecting light to a small mirror mounted on the magnet viewing through a small telescope, whose optical source uses a kerosene lamp. An altazimuth instrument is also installed to measure the geographical meridian (true north). These instruments are alternatively amounted on the same tripod for H and D measurements. A Casella-made dip circle is based on the same principle as a direct reading dip circle available for the direction of a free-rotating magnetic needle. A magnetic coil is used to erase and/or invert the magnetic direction of the magnetic needle (Tanakadate, 1904.)

For the observation of magnetic variation, a Mascart type variometer (France made) was employed. The meter is comprised of D, H, and Z magnetic elements, where D is a single lifting type, and H is a double lifting type with silk yarn as a lifting thread. Z is a balance type to support the magnet horizontally.

d) Observation method

Absolute observation of "H" is based on the so-called Gauss-Lamont method. The H component is calculated from the vibration measurement (to measure M*H) and the deflection measurement (to measure M/H.) At the absolute observation of "D" and "I," deflection and magnetic inclination were determined by directly reading the direction of a freely rotating magnetic needle. The number of observations was once a month from 1897 through 1901, and twice a month since 1902.

Variation observations were carried out using practically the same lifting magnet variometer that has been used until 1995 at the Magnetic Observatory. The instrument projects light from the optical source with a kerosene lamp onto the mirror installed at a variometer magnet lifting tool system or a balance magnet system whose reflected light was photo-recorded at a bromide. The scale of recording was 1.47'/mm for D, 4 to 6 nT/mm for H, and 6 to 11 nT/mm for Z.

e) Other information

—Every hour value is estimated to be an instant value on the hour. This is because the Kakioka Magnetic Observatory used an instant value from 1924 through 1929, and an hourly mean value was applied since 1930.

—Both daily and monthly mean values were calculated on Japan Standard Time (135 degrees East), and the values from 1 AM until midnight were employed for the daily mean value.

—The geomagnetic local difference between Tokyo and Kakioka was measured in 1916, and those results, which are written on the present reports of the Kakioka Magnetic Observatory, were as follows. A positive sign means that Kakioka's data is larger than Tokyo's.

H: -265 nT, Z: +481 nT, and D: -5.5' (E+)

2-2 Data

The Central Meteorological Observatory printed and issued a report composing a geomagnetic section and an atmospheric electricity section in the Meiji era as an Annual Report of the Central Meteorological Observatory of Japan Part II on a one book per year basis. However, the atmospheric electricity section was inserted in the report for the eight years from 1887 through 1904; therefore, since 1905, only the geomagnetic section was reported. The geomagnetic section has a preface introducing the environment and observation methods, a monthly table of hourly data, and bromide records of geomagnetic variation (magnetic storm), which contain the same contents as the present reports of the Kakioka Magnetic Observatory.

At Kakioka Magnetic Observatory, one copy of each year's Tokyo annual report is left, except for 1903 and 1905, which have been divided into three volumes for bookbinding and storage. In addition, they have been processed into microfilm for release through the World Data Center for Geomagnetism (Kyoto University.) Although it had been long believed that the reports from the two years of 1903 and 1905 might have been lost

during the great Kanto earthquake, they were recently found in the libraries of the Kobe Marine Observatory and Japan Meteorological Agency, which were established in the Meiji era. As a result, this time all of the data from the 16 years, including those two years, were digitized and revised successfully.

The monthly table of hourly data digitized and revised this time as shown in Annexed Figure 1 describes information for the three elements of D, H, and Z, including hourly value, daily mean value (lateral line average), hourly mean value (vertical line average), monthly mean value, daily maximum value and its appearance time, daily minimum value and its appearance time, range (difference between daily maximum and daily minimum values), and five step evaluation (C: calm, A: unquiet, S_0: small variation, S: variation, S_2: severe variation) in the geomagnetic variation in the morning and afternoon. The daily mean value is not counted if it includes only one hour of non-measured time, but is just indicated with "..." marked. The hourly mean value and whole mean value are calculated, excluding days for which the daily mean values are not counted. Four monthly tables, the D, H, and Z components in November 1899, and the H element in August 1911, among a total of 572 tables over 16 years of the three-component monthly tables, were not printed because the related data were potentially not accumulated for one month, judging from the surrounding conditions.

The hourly data were digitized by reading printed figures for manual input to personal computers. In addition to unclear typing and printed matters in those days, the deterioration of paper quality made some unclear figures difficult to read, especially until 1903.

In addition to the above-described observation methods, the sensitivities of H and Z in every month were reported in the preface. The sensitivity is estimated to have changed greatly during one month, because monthly values differ significantly from one month to the next, as indicated later. For a temperature coefficient, the measured results in 1898 were listed in the annual report in 1897. It shows that the coefficients were considerably large for both H and Z components as "<21 nT/°C" and "<30 nT/°C," respectively.

3. Basic principle on revising work

At first, the basic revising principle was established so that only errors judged to be obvious mistakes should be corrected. Whether to revise or not relies on a judgment made in the following way:

(1) An immediate judgment that a figure in the 100s digit of an hourly value is a typing error is acceptable when, for example, only one datum with a value in the 900s range is contained mixed in with the other values in a day when all the other values are in the 600s range. In this case a judgment is made that a "6" was mistakenly changed to a "9." The validity of this judgment was confirmed later, checking that the mean value calculated using the revised value agreed with the mean value written in the annual report.

(2) In order to find mistakes in the figures, we referred to the above procedure which was used in (1) to confirm the validity of the revision. (Checking whether the mean value written in the annual report agrees with the mean value re-calculated using the newly digitized data.) If disagreement is found in both the mean values of 24 hourly data in a day (lateral mean values) and the monthly mean values of the data at the identical time of each day (vertical mean values), it is suggested that the magnetic field value at the day and the hour where the lateral row and the vertical column cross might be mistaken. In that case, we checked whether the disagreement is dissolved by changing the hourly value at the cross section. Only one figure, not two, was changed within either the 100s, or 10s, or units digits to change the values. Further, alteration of the units digit value was restricted by the criteria described in the following item (3).

(3) When the difference in two kinds of mean values is less than about 0.3 (nearly 10 nT or less in hourly value), we considered the data should not be revised. The data was not revised also even when the difference was 0.4 or 0.5, unless it was estimated that obvious mistakes were almost certainly made, judging from variations in the magnetic field on the day.

(4) When there are multiple locations existing in the vertical and lateral lines where the two kinds of mean values described above are different, so that it could not be specified which column data should be revised, data were not revised (were not able to be revised) even though the difference in the mean value exceeded 0.5.

(5) Even when the above disagreements of two kinds of mean values could be resolved, the data were not revised in the following cases: when the data were unnatural from the viewpoint of the magnetic field variation trend on that day (that is, the maximum or minimum value is estimated to occur on that day at the nearest hour, but the revised value deviated greatly from those values, or that day was recorded as "calm," but the revision, if applied, would cause a large variation), or when any revision would cause a deviation from the maximum or minimum ranges on that day. We did not revise data in those cases because we judged that the hourly value itself written in the annual report was correct, but the mean value in the annual report was mistaken (mistakes during checking or reading figures at mean value calculation).

(6) The monthly mean value determined from the daily mean value written in the annual report sometimes did not agree with the monthly mean value determined from the hourly mean value. In that case, we judged that the mean value which did not agree with the mean value re-calculated based on the digitized data was wrong.

(7) When the 10s or 100s figures are lacking due to unclear printing, we inserted a reasonable figure in the spot, judging from the values before and after the hourly value or the mean value. In most cases, we confirmed that this was effective to have the two kinds of mean value agree with each other.

(8) After revision, we drew a magnetic change map for each element every year to find some locations showing abnormal changes, such as a pulse wave or a rectangular wave. Investigation of this abnormal change reveals that the mean value was not calculated, because of a lack of measurements, resulting in missing mistakes in the 100s figures, if any should have been present. Such data were corrected by estimating the correct value from magnetic field values before and after the abnormal changes.

As described earlier, the data revision in this work was limited to the hourly value data that was judged to be obviously mistaken, but the number of revisions still exceeded 900 locations. Table 1 shows a list of the corrected locations and their contents. We carefully checked and checked again to revise the data, therefore we do not believe that the revised data were mistaken, but in the future some demands might be required to check whether the revisions were really correct. In that case, it may be useful to refer to Table 1 for comparing directly with the original data. Table 2 is the list of cases for which we decided not to make a revision, according to criteria described in (4) and (5) above, namely, it was impossible to specify the date and hour where to be corrected or we judged it better not to revise them due to some reasons, though a disagreement of the mean values would apparently be resolved. To these locations, there remains a possibility to find out in the future that our judgment not to revise was in fact not correct.

As explained repeatedly, this revision was limited to correct simple mistakes, but is not intended to be a complete revision. In addition to the revised areas, there were many places where we just looked at the plotted magnetic change map and had a doubt, asking ourselves, "Will this change show what was actually observed?" We listed those places in Table 3, hoping for progress of study in future. They show changes over several tens of nT in a calm day or changes over 100 nT during a few days. In particular, the Z component in September 1912 shows a drift-like change of 450 nT a month. This is not understood as a natural change in the magnetic field, but is left uncorrected as it is, because we did not find any mistakes which were taken up to be revised in this work. In the next section, some factors that might affect observation accuracy are investigated, but clarification of the cause of the unnatural changes listed in Table 3 is left to the future.

4. Results of revision

Figure 1-1 through Figure 1-16 show

comparisons of geomagnetic hourly values plotted before and after revision for the H, D, and Z components. The figure indicates that this revision was effective to clean up a lot of data noises due to artificial mistakes. The H and Z components, however, have significant large drift variations. Expecting that causes of the drift variation will be clarified in future studies, we only note some related hints in this section. As described before, the temperature coefficient was measured in 1898 and the value is given on the annual report every year. Therefore, the data is supposed to be treated with temperature correction, even if the correction was insufficient. On the other hand, sensitivity as shown in Figure 2 and 3 varies significantly; in particular, variation in the Z component was large. At first, a comparison between monthly mean values and changes in sensitivity in the Z component for one year, 1912, suggested that the drift change was mainly caused by sensitivity variation, but it was clarified later that no relation exists between them by comparing changes of both data over 16 years. In any case, the drift changes were significant in the Z component, but not so conspicuous as in other components, which possibly resulted from a malfunction of absolute observation instruments for the Z component. However, comparison between changes in monthly mean values for the H and Z components shows a relationship between both to suggest that some variations in the Z component are potentially produced by variations in the H component. A pattern of daily changes seems to have deformed since 1902, expanding the amplitude, especially in the winter season, which might be affected by an electric current flowing on the ground from the beginning of the operation of streetcars in Tokyo.

We can take in geomagnetic variations such as magnetic storms from the revised data. Figure 4 shows changes in the H component in a year, 1897, in which triangle marks indicate locations noted in the monthly Tables as S2 (severe variation) and S (variation) on the five-step evaluation to the geomagnetic variation. A total of 307 bromide analog copies of magnetic storms were inserted in the annual report in which the geomagnetic observation data in Tokyo were printed. The bromide records are very valuable, but they are of such a large volume, difficult to contain in the paper, that only examples observed in September and October, 1897, are shown in Annexed Figure 2. A list for all of the copies is given in Table 4. Annexd Figure 3 shows typical example of the five-degree classification of geomagnetic variations adopted by the Annual Report of the central Meteorological Observatory.

As described earlier, the local magnetic difference between Tokyo and Kakioka was measured in 1916. Assuming that the local magnetic difference is constant, the data were converted to Kakioka's value to plot the yearly mean values with Kakioka's data since 1924 in Figure 5. As seen in the figure, the H, D, and Z components are connected relatively smoothly. Exceptionally, only the Z component is outstanding from 1909 through 1911; it is caused by the drift changes that can not be considered natural as explained before. The data continuity of other components is excellent, in particular in the D component; therefore, it is no exaggeration to say that this revision has made it possible to discuss long-term geomagnetic changes near Japan based on continuous observation data over one century.

5. Conclusions

From January in Meiji 30 (1897) to December in Taisho 1 (1912), geomagnetic observation was conducted on the premises of the Central Meteorological Observatory in Tokyo. Although observation notes, magnetogram, and field notes were burned up when the metropolitan city was severely damaged by the 1923 great Kanto earthquake, printed annual reports were fortunately left in the libraries. This time, we decided to fully revise these valuable data for publishing, hoping that they can be applied in many fields. Revision was limited to obvious mistakes, excluding those cases where we could not make a firm decision for revising. We attached a table in which a list of places where the data were not revised but should be re-considered is shown with some comments for further study, in addition to the entire list of places revised and the geomagnetic change map after revision. We hope that the published data will be useful in researches for long-term geomagnetic changes,

annual variations of magnetic storms, etc. in Japan.

Acknowledgement

Mr. Yoshiji Kato, a librarian of Office of Archives and Library in the Japan Meteorological Agency, and Mr. Tetsuya Uwai, chief of the Administration Section in the Kobe Marine Observatory, searched to find the Tokyo annual reports for 1903 and 1905, which had not been left in the Kakioka Magnetic Observatory. Mr. Ishii, a chief researcher and Mr. Suganuma, an engineering official in the Survey Section, assisted in making conversions to the IAGA format. We would like to express our deep appreciation for their cooperation and assistance.

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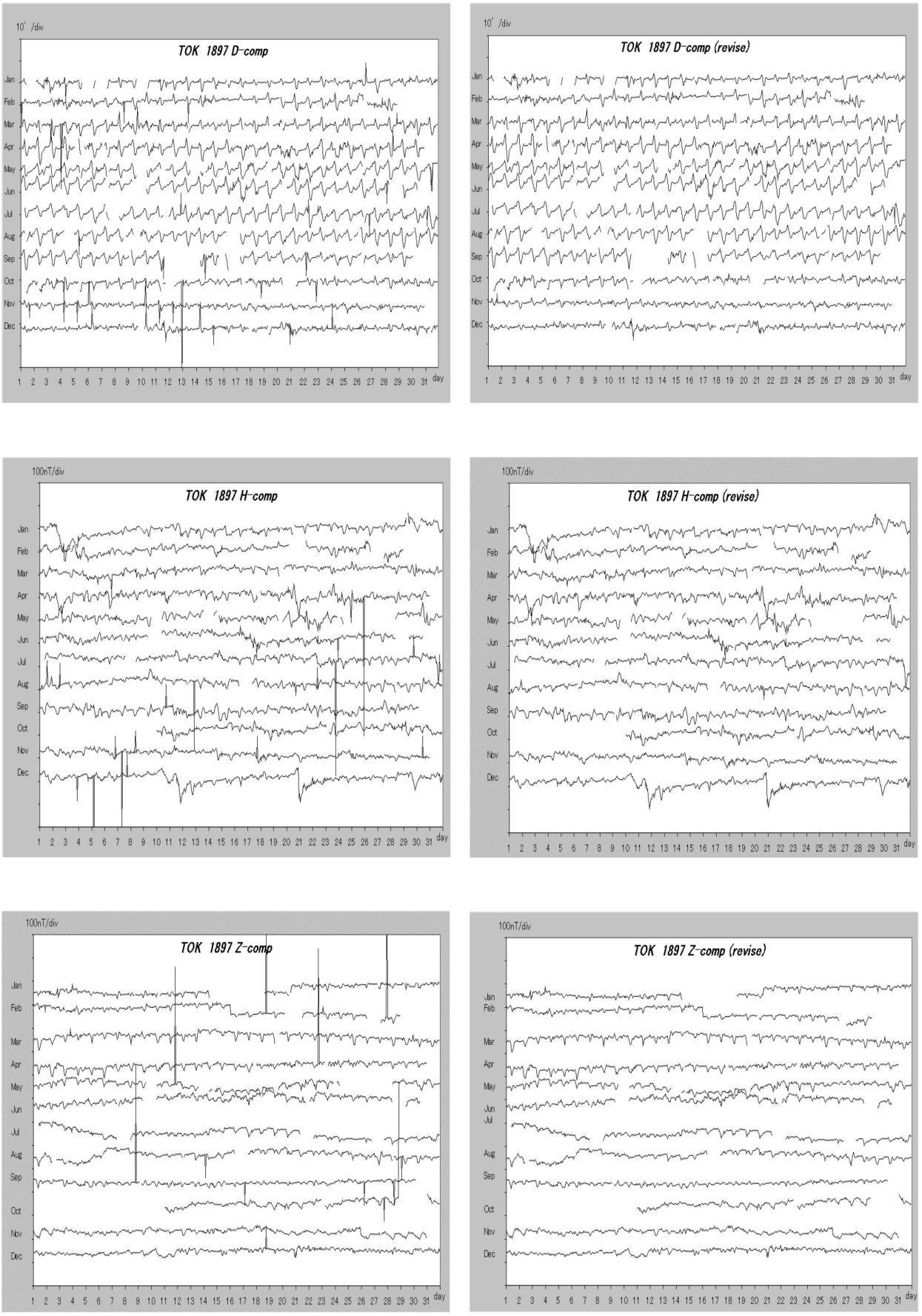


Figure 1-1 Plots of geomagnetic hourly values in 1897 in Tokyo
Each figure shows original data at the left side and revised data at the right side. Upper, middle, and lower graphs at each figure show the D, H, and Z components, respectively. The horizontal axis indicates the date, and the vertical axis shows geomagnetic values of each component. To make it easy to look at the changes, the data are shifted every month.

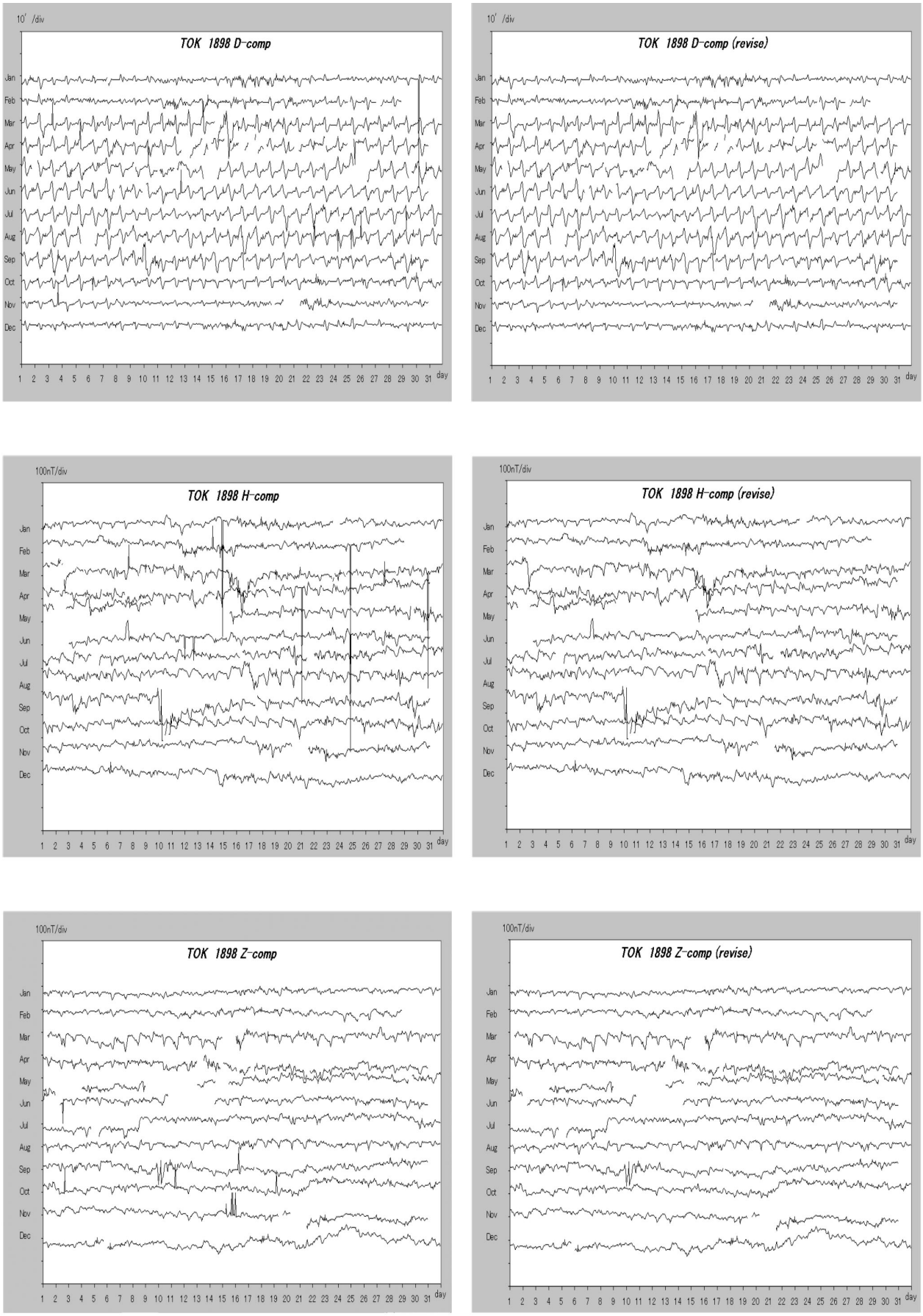


Figure 1-2 Plots of geomagnetic hourly values in 1898 (see the description of Figure 1-1)

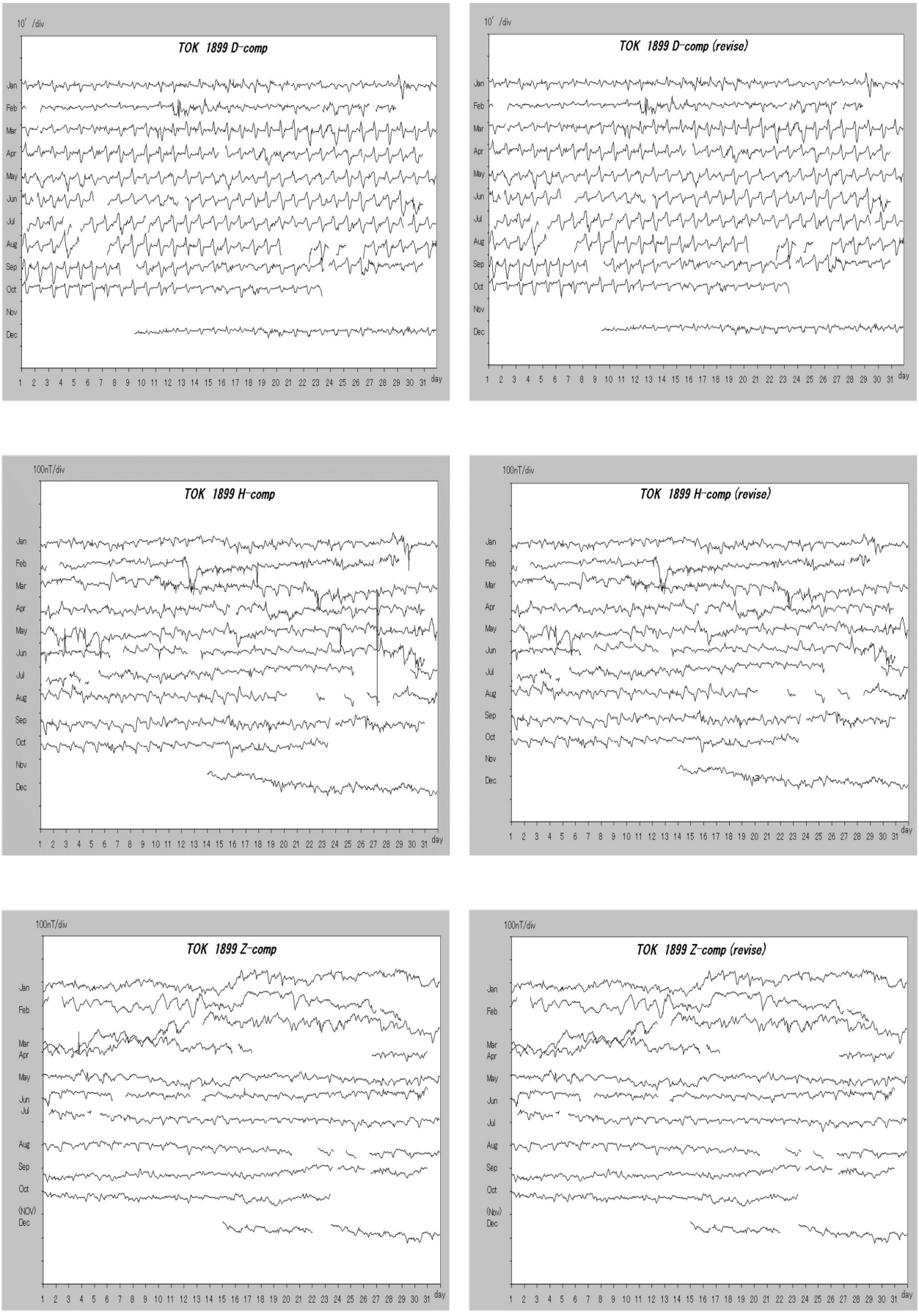


Figure 1-3 Plots of geomagnetic hourly values in 1899 (see the description of Figure 1-1)

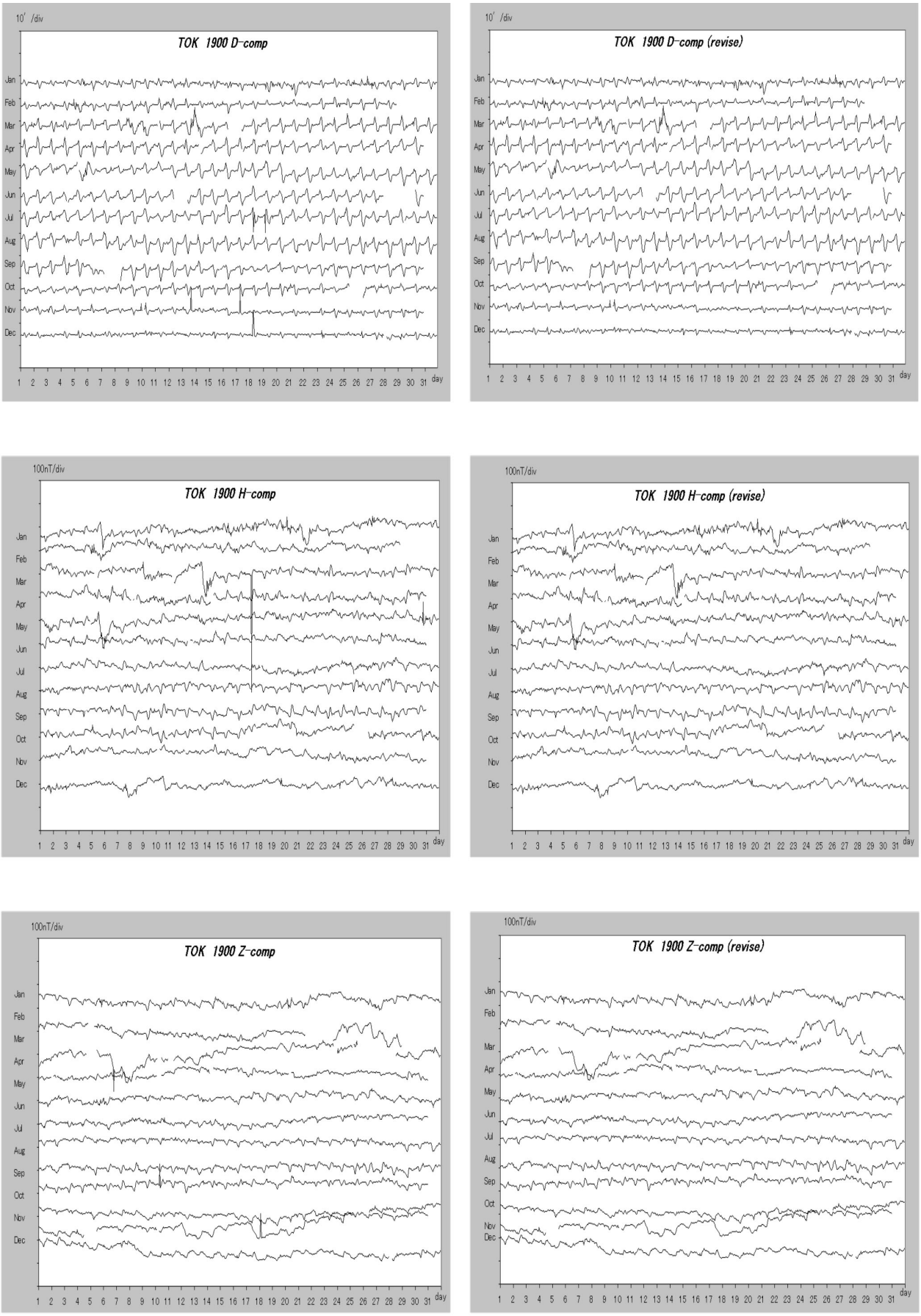


Figure 1-4 Plots of geomagnetic hourly values in 1900 (see the description of Figure 1-1)

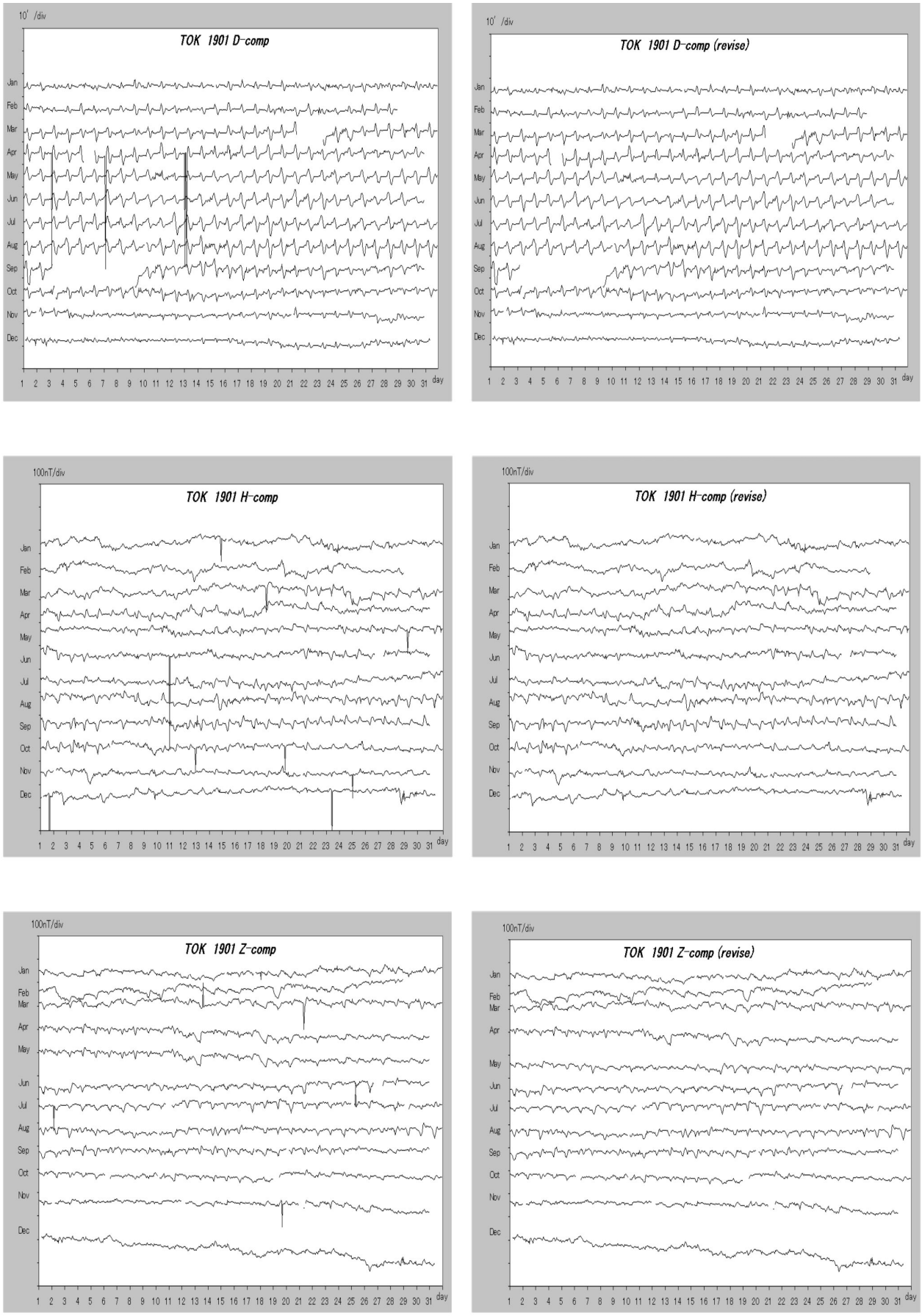


Figure 1-5 Plots of geomagnetic hourly values in 1901 (see the description of Figure 1-1)

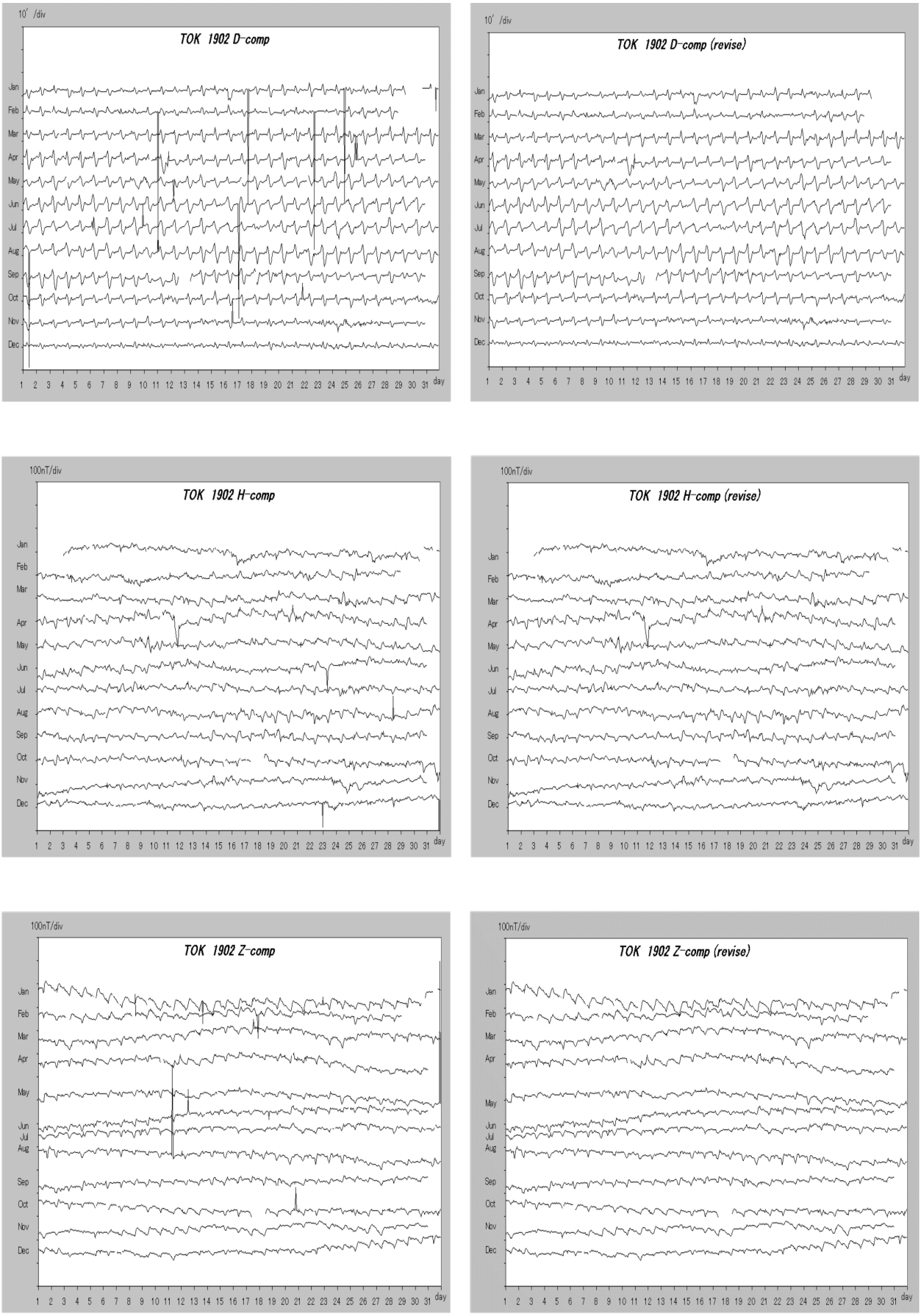


Figure 1-6 Plots of geomagnetic hourly values in 1902 (see the description of Figure 1-1)

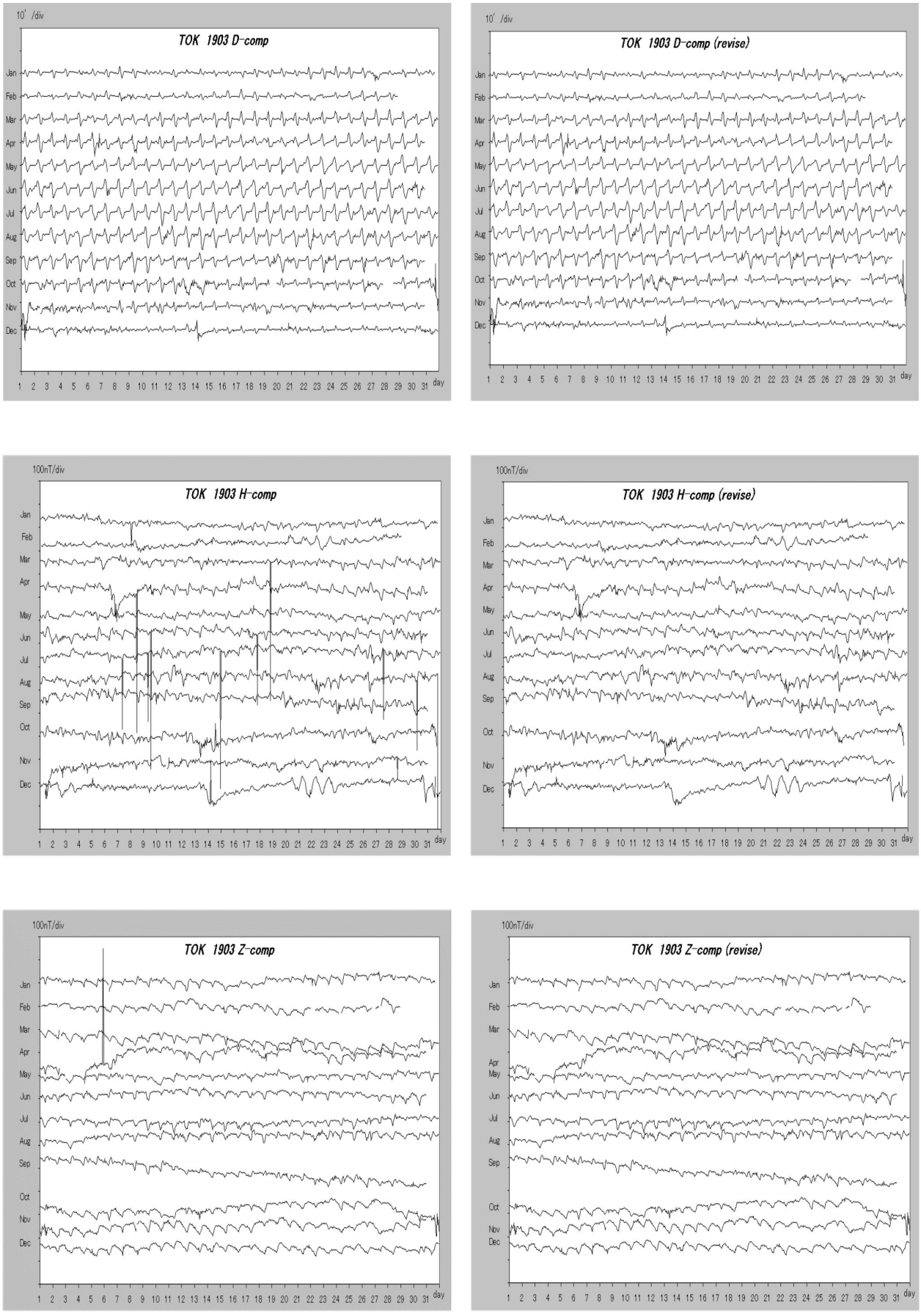


Figure 1-7 Plots of geomagnetic hourly values in 1903 (see the description of Figure 1-1)

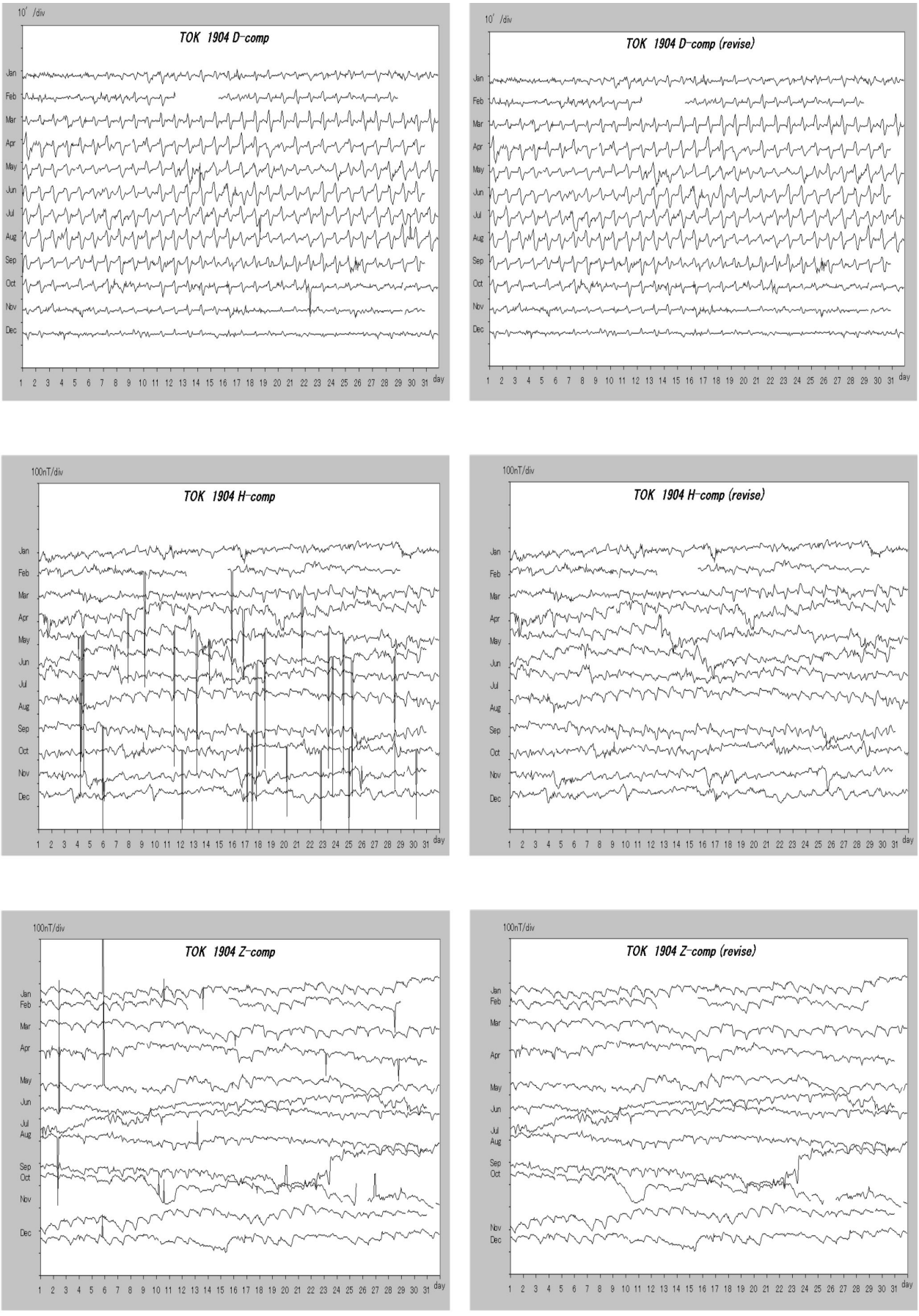


Figure 1-8 Plots of geomagnetic hourly values in 1904 (see the description of Figure 1-1)

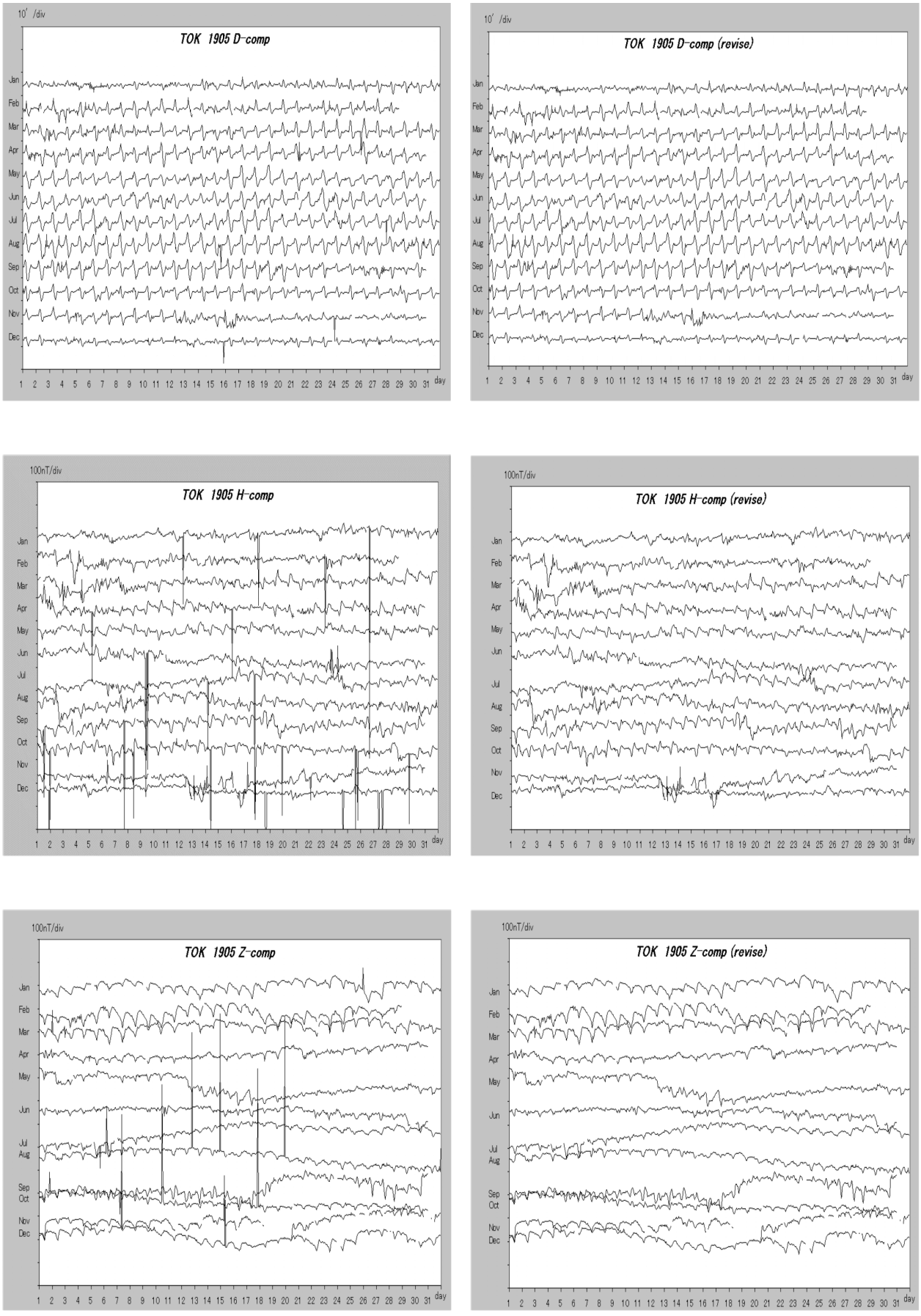


Figure 1-9 Plots of geomagnetic hourly values in 1905 (see the description of Figure 1-1)

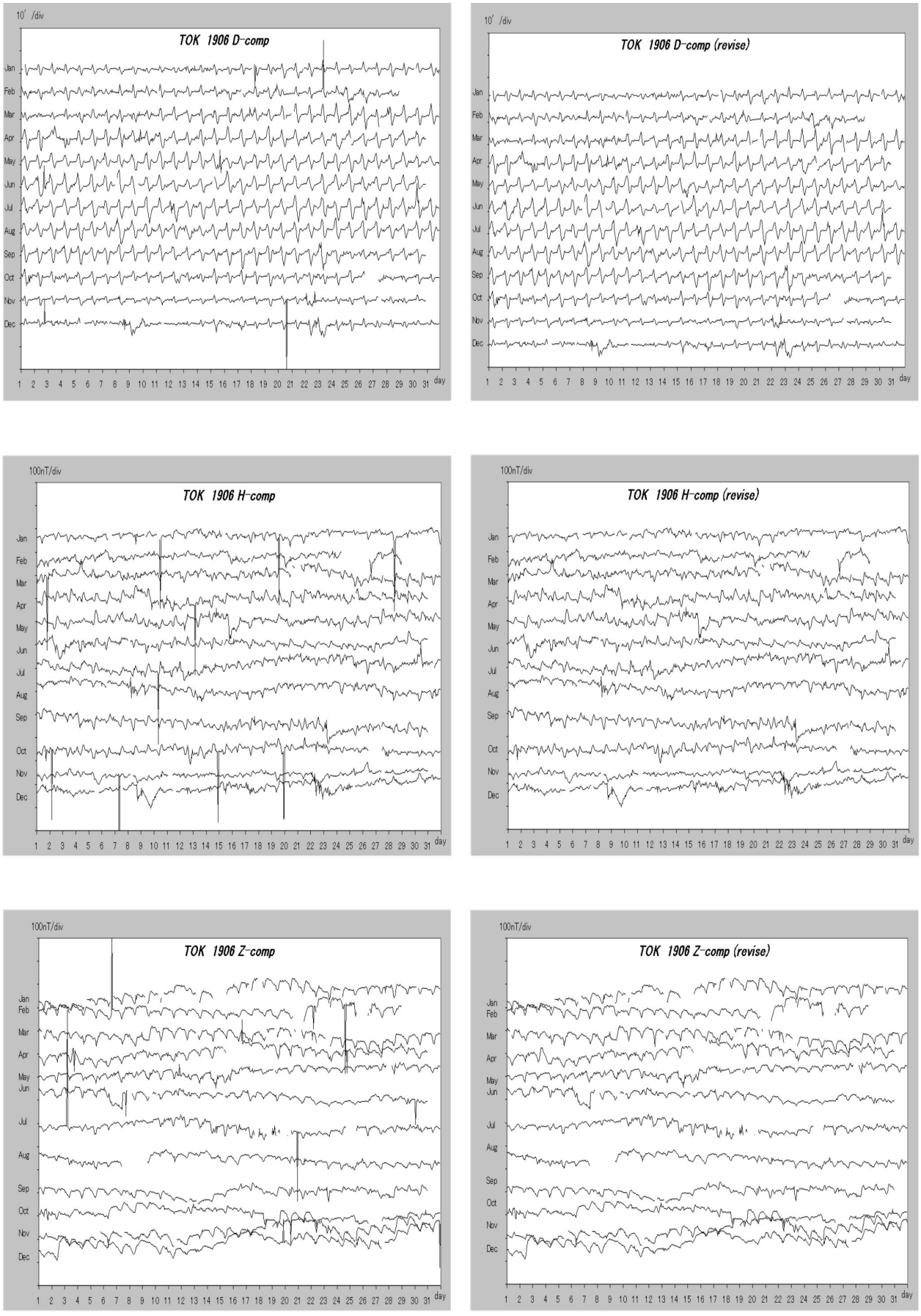


Figure 1-10 Plots of geomagnetic hourly values in 1906 (see the description of Figure 1-1)

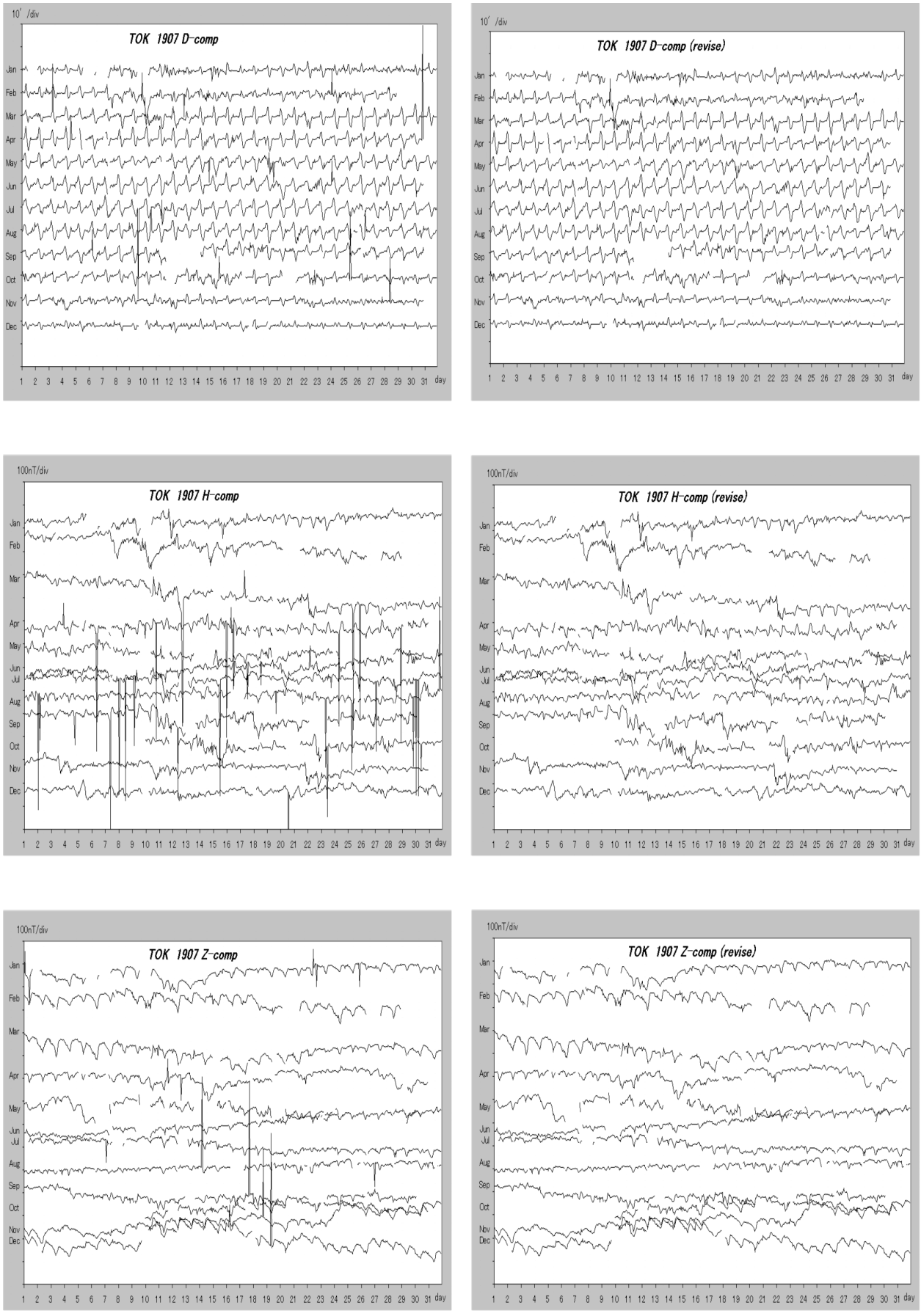


Figure 1-11 Plots of geomagnetic hourly values in 1907 (see the description of Figure 1-1)

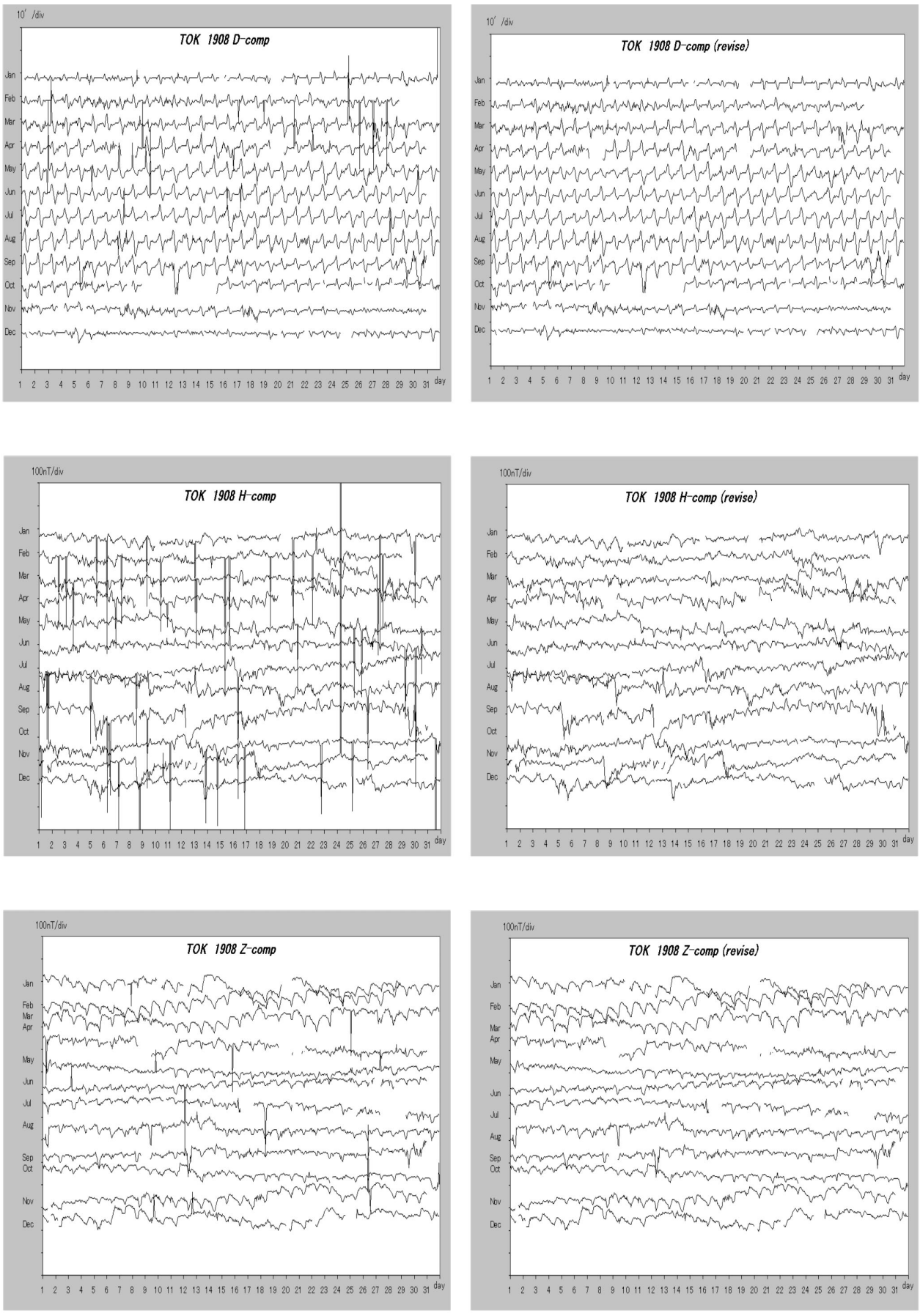


Figure 1-12 Plots of geomagnetic hourly values in 1908 (see the description of Figure 1-1)

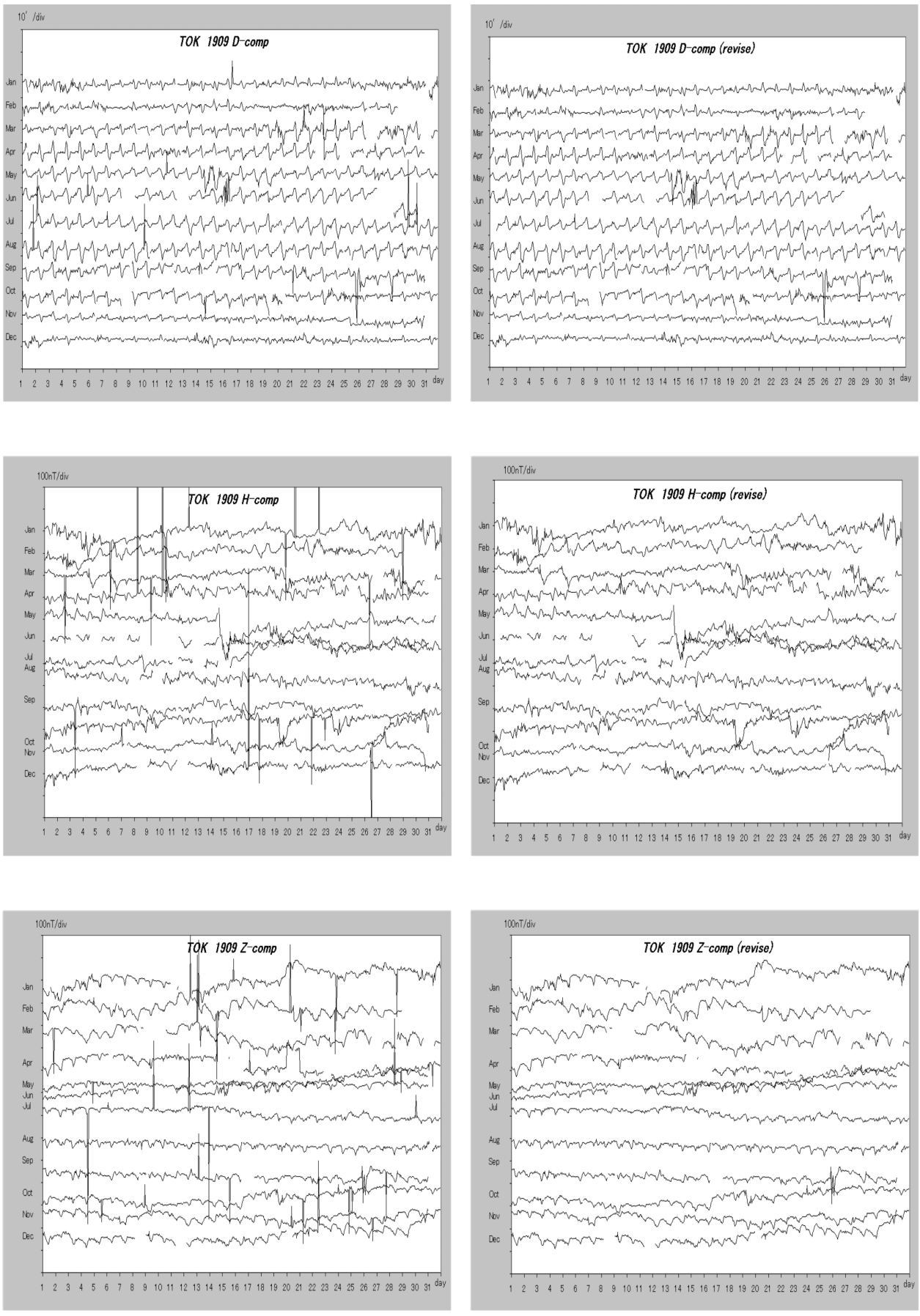


Figure 1-13 Plots of geomagnetic hourly values in 1909 (see the description of Figure 1-1)

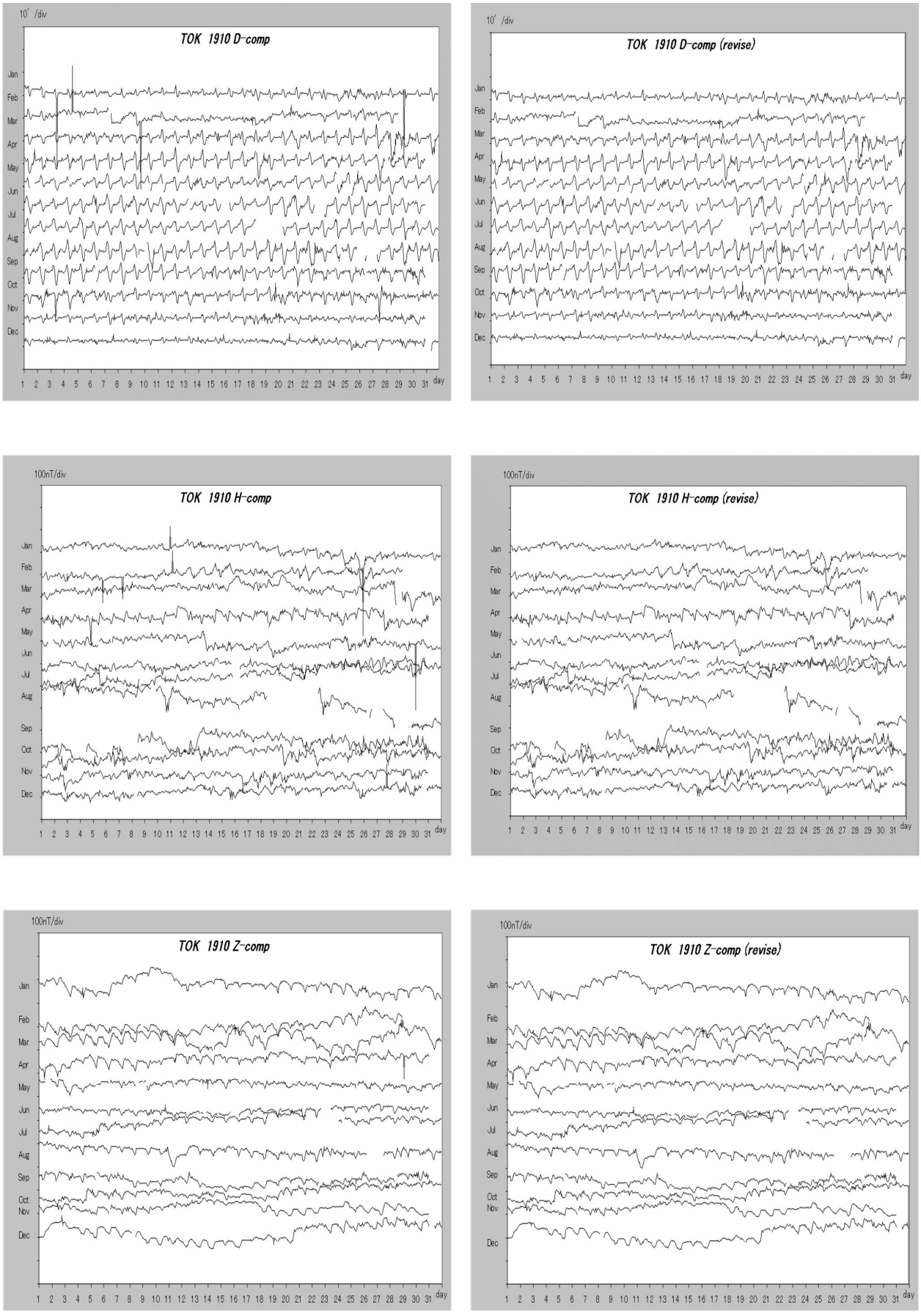


Figure 1-14 Plots of geomagnetic hourly values in 1910 (see the description of Figure 1-1)

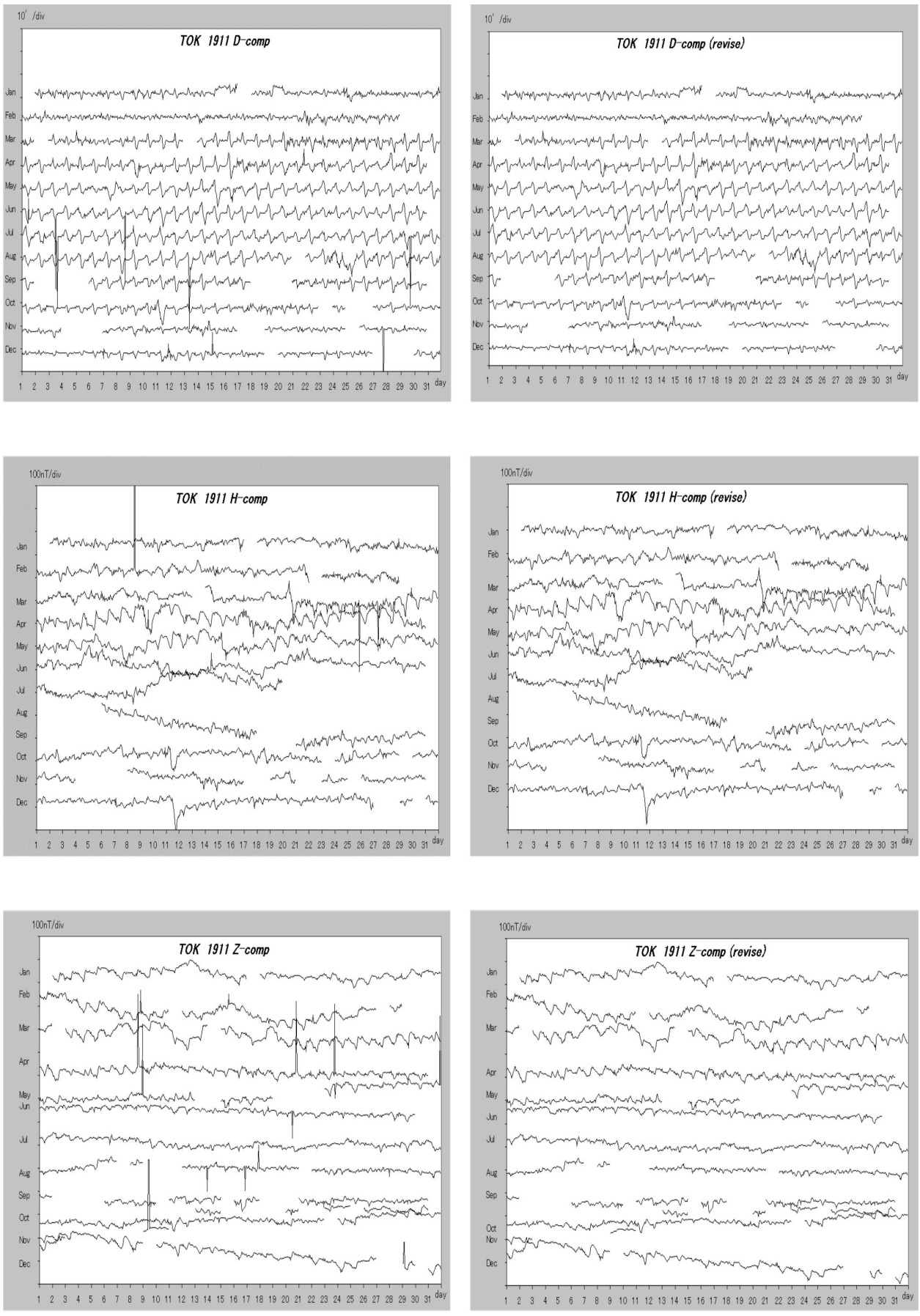


Figure 1-15 Plots of geomagnetic hourly values in 1911 (see the description of Figure 1-1)

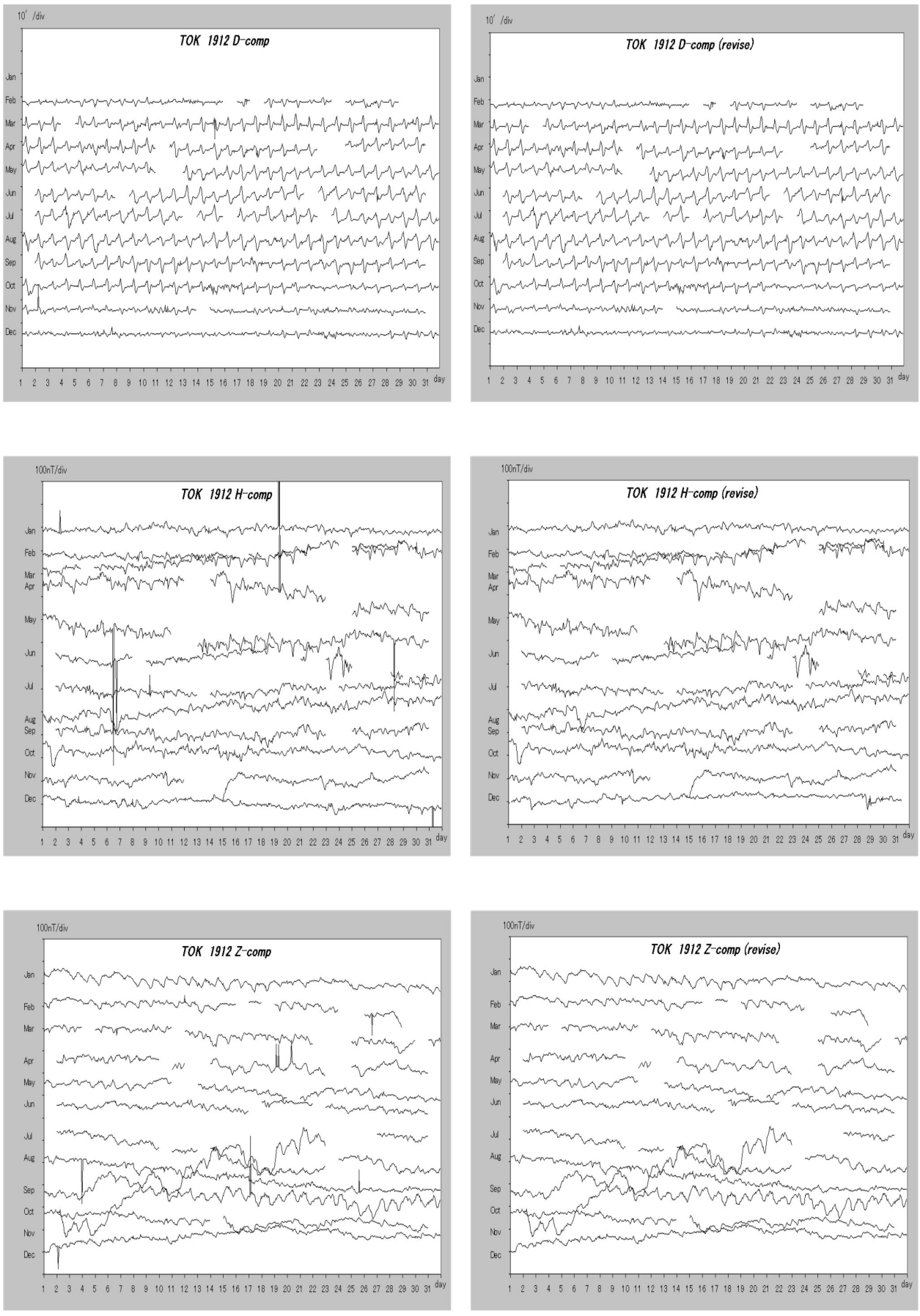


Figure 1-16 Plots of geomagnetic hourly values in 1912 (see description of Figure 1-1)

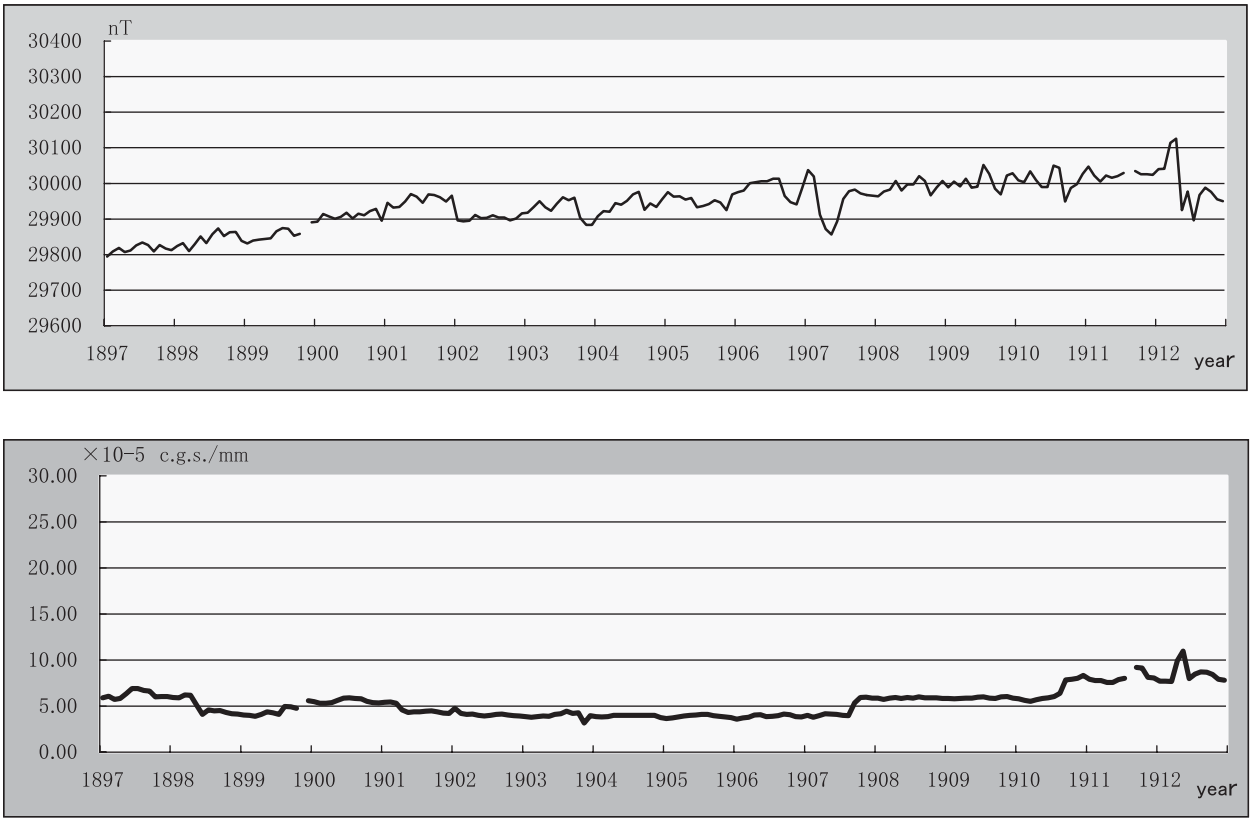


Figure 2 (a) Variations in monthly mean values (unit: nT) of the geomagnetic H component in Tokyo and (b) sensitivity each month (unit: 10^{-5} c.g.s./mm) from 1897 through 1912

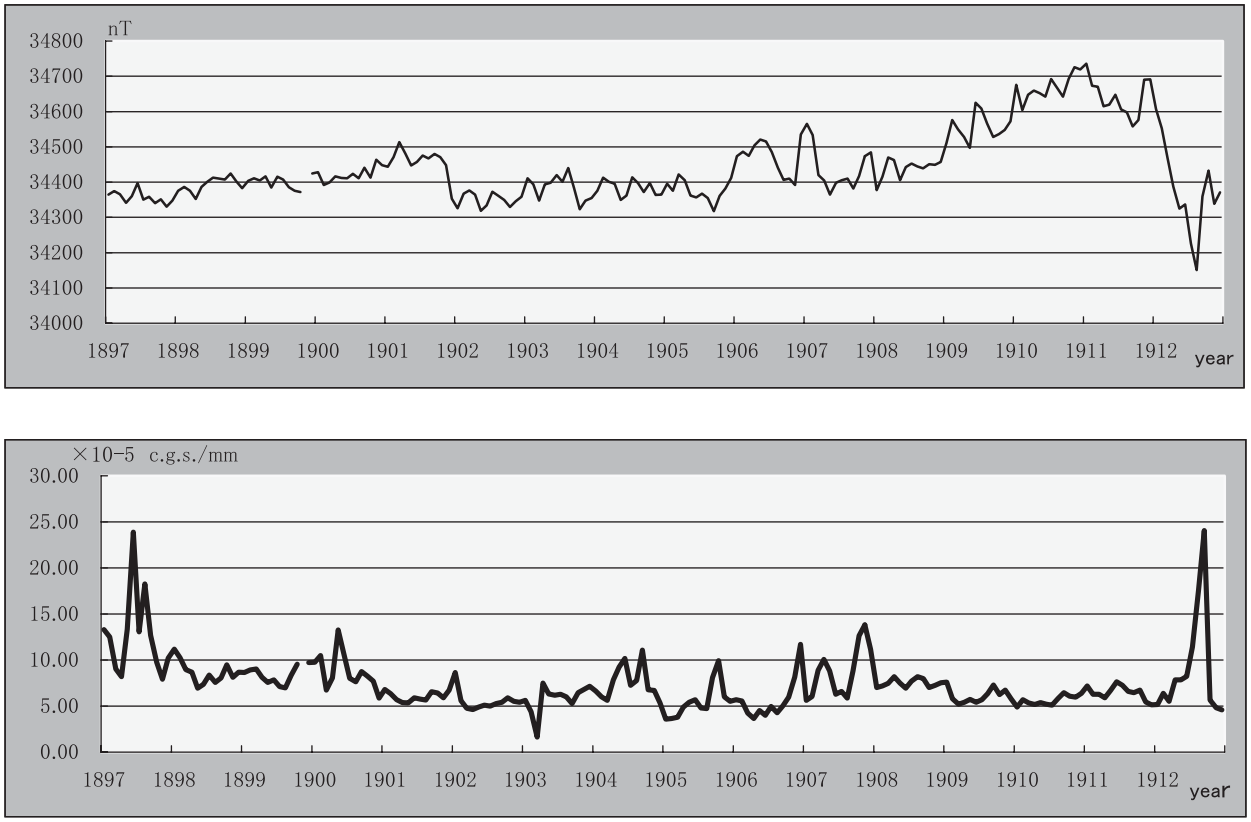


Figure 3 (a) Variations in monthly mean values (unit: nT) of geomagnetic Z component in Tokyo and (b) sensitivity each month (unit: 10^{-5} c.g.s./mm) from 1897 through 1912

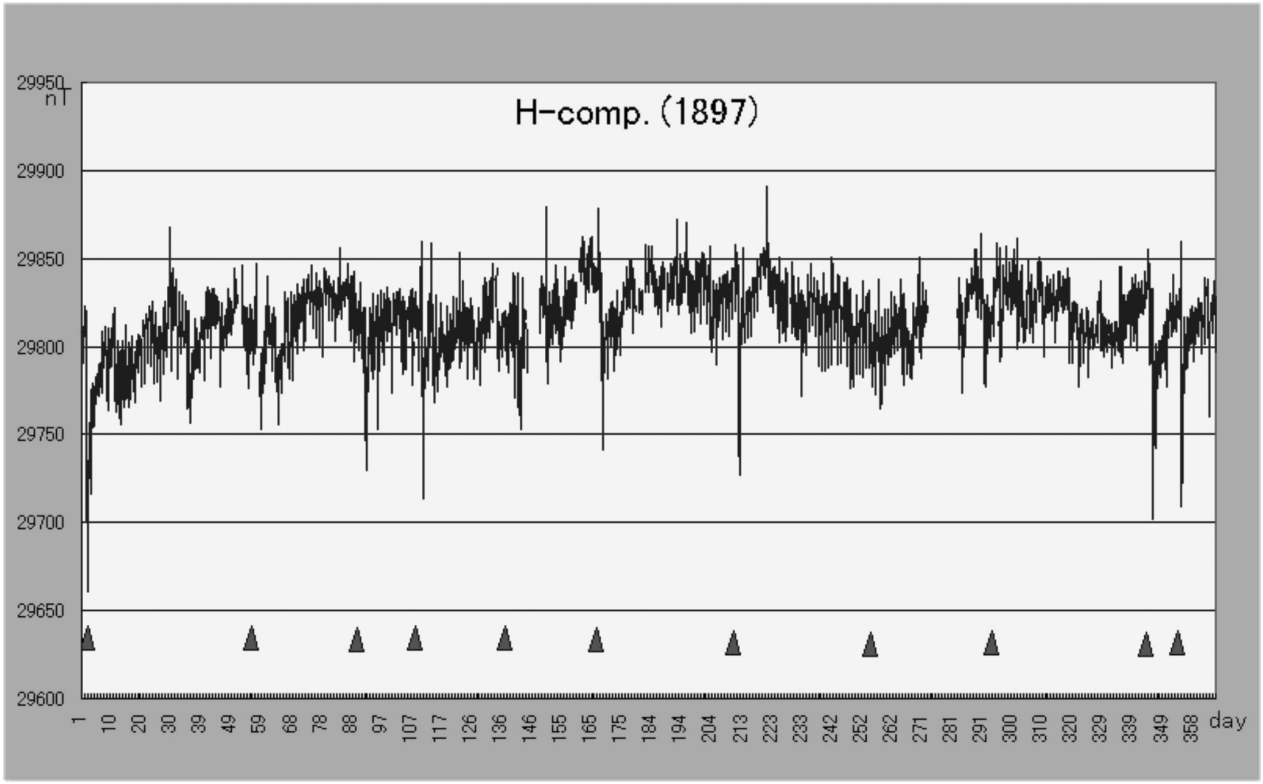


Figure 4 Hourly changes of geomagnetic H component in 1897
Horizontal axis represents dates counted from the beginning of the year and vertical axis shows values of H component (unit: nT)
A triangle mark indicates locations where severe storms (S2) or storms (S) were observed.

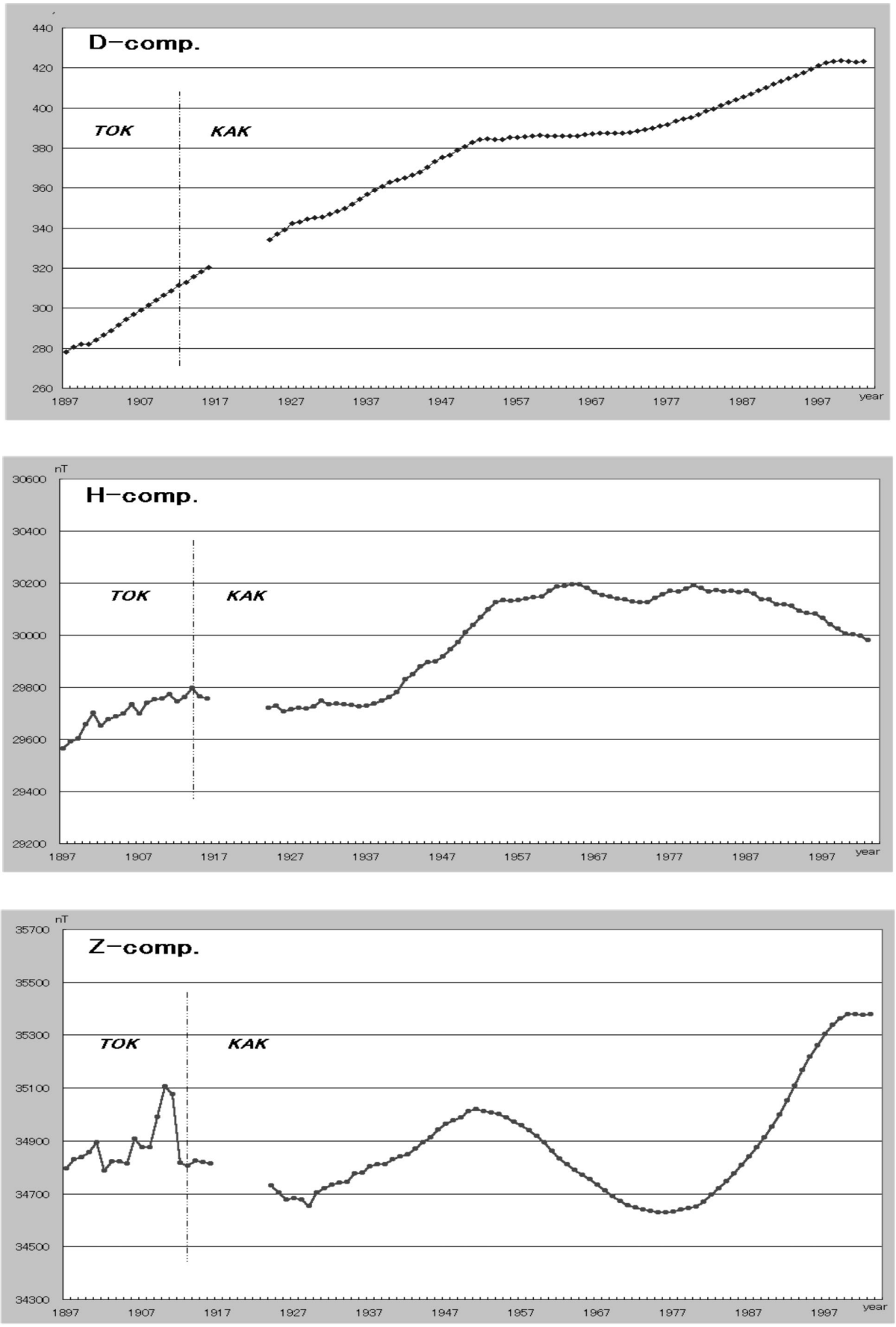
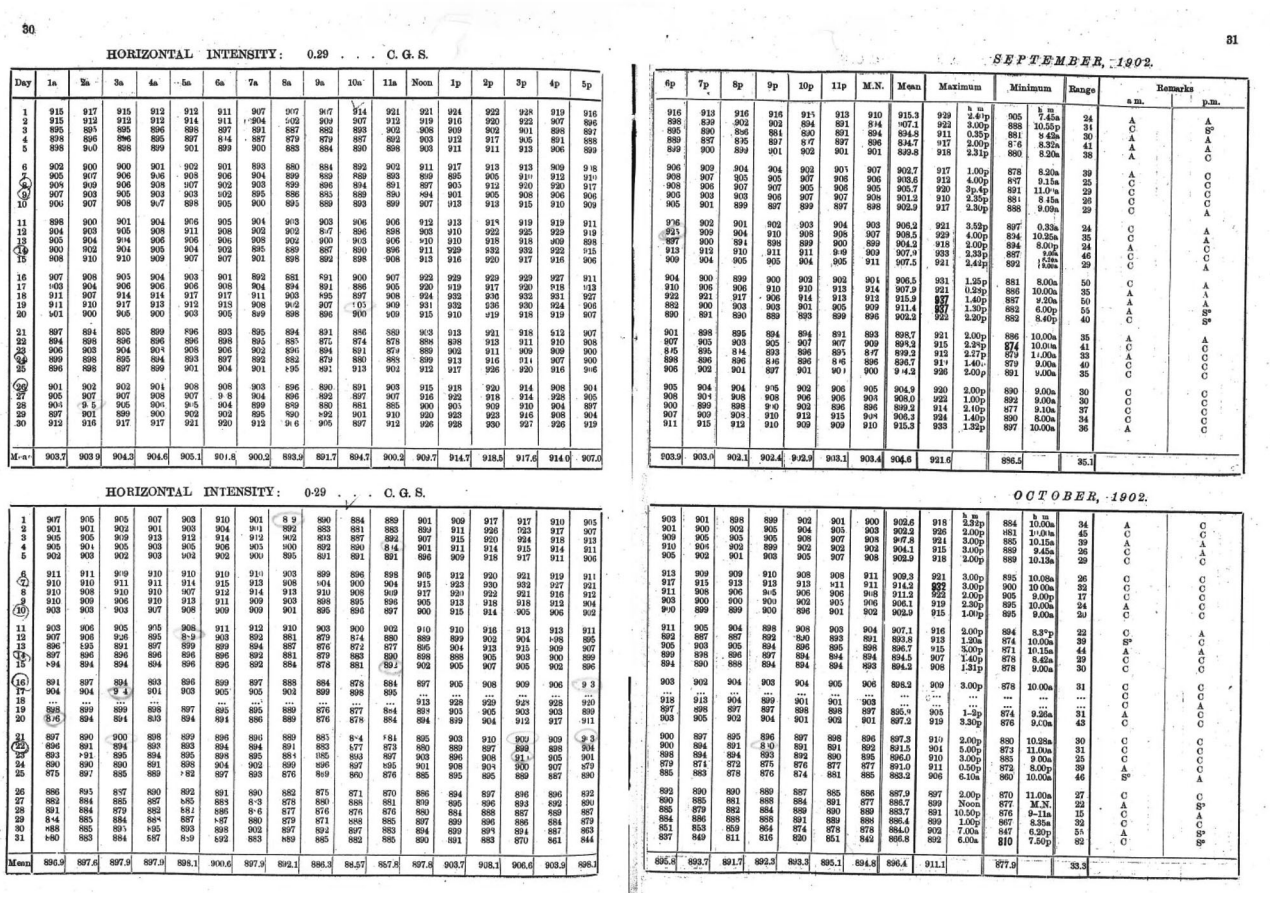


Figure 5 Long-term changes in geomagnetic components in Kakioka, adding the Tokyo data. The graphs from the top to the bottom show the monthly mean values for the D, H, and Z components, respectively. The vertical axis shows the values for each geomagnetic component (unit: nT). Tokyo's data have been corrected by the local difference between Tokyo and Kakioka. There are no data records from 1917 through 1923, because they were burned up by a fire at the great Kanto earthquake.



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HORIZONTAL INTENSITY: 0.29 . . . C. G. S.

Day	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	Noon	1p	2p	3p	4p	5p
1	915	917	915	912	912	911	907	907	907	914	921	921	924	922	928	919	916
2	915	913	913	912	914	911	[904]	902	909	907	912	919	916	920	922	907	896
3	895	895	895	896	898	897	891	887	882	893	902	908	909	902	901	898	897
4	898	896	896	895	897	894	887	879	879	887	892	903	912	917	905	891	888
5	898	900	898	899	901	899	900	888	884	890	898	903	911	911	913	906	899
6	902	900	900	901	902	901	893	880	884	892	902	911	917	913	913	909	918
7	905	907	906	906	908	906	904	899	889	889	893	899	895	905	910	912	910
(8)	908	909	906	908	907	902	903	899	896	894	891	897	905	912	920	920	917
(9)	907	903	905	903	903	902	895	886	885	888	890	894	901	905	908	906	906
10	906	907	908	907	898	905	900	895	889	893	899	897	913	913	915	910	909
11	898	900	901	904	906	905	904	903	903	906	906	912	913	918	919	919	911
12	904	903	905	908	911	908	902	902	897	896	898	903	910	922	925	929	919
13	905	904	904	906	906	906	908	902	900	903	906	910	910	918	918	909	898
(14)	900	902	904	905	904	902	895	889	887	890	896	911	929	932	932	922	915
15	908	910	910	909	907	907	901	898	892	898	906	913	916	920	917	916	906
16	907	908	905	904	903	901	892	881	891	900	907	922	929	929	929	927	911
17	903	904	906	906	906	908	904	894	891	886	905	920	919	917	920	918	913
18	911	907	914	914	917	917	911	903	895	897	908	924	932	936	932	931	927
19	911	910	917	913	913	913	908	902	907	905	909	931	932	936	930	924	906
20	901	900	905	900	903	905	899	898	896	900	909	915	910	919	918	919	907
21	897	894	895	899	896	893	895	894	891	886	889	903	913	921	918	913	907
22	894	898	896	896	896	898	895	885	875	874	878	888	898	913	911	910	908
23	906	903	904	904	908	906	902	896	894	891	879	889	902	911	909	909	900
(24)	899	898	895	894	893	897	892	882	879	880	885	899	913	916	914	907	900
25	896	898	897	899	901	904	901	[895]	891	913	902	912	917	926	920	916	906
(26)	901	902	902	904	908	908	903	896	890	891	903	915	918	920	914	908	904
27	905	907	907	908	907	[9 8]	904	896	892	897	907	916	922	918	914	928	905
28	904	[9 5]	905	906	[9-5]	904	899	889	880	881	885	900	905	909	910	904	897
29	897	901	899	900	902	902	895	890	[892]	901	910	920	923	923	916	908	904
30	912	916	917	917	921	920	912	[9 6]	905	897	912	926	928	930	927	926	919
Mean	903.7	903.9	904.3	904.6	905.1	901.8	900.2	893.9	891.7	894.7	900.2	909.7	914.7	918.5	917.6	914.0	907.0

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6p	7p	8p	9p	10p	11p	M.N.	Mean	Maximum	Minimum	Range	Remarks a.m.	Remarks p.m.
916	913	916	916	915	913	910	915.3	929	h m 2.47p	905	h m 7.45a	24	A	A
898	899	903	903	894	891	894	907.1	922	3.00p	888	10.55p	34	C	A
895	890	896	884	880	881	894	894.8	911	0.35p	881	8.43a	30	A	A
889	897	895	897	877	897	896	894.7	917	2.00p	876	8.32a	41	A	A
849	900	899	901	902	901	901	899.8	918	2.31p	880	8.20a	38	A	C
906	909	904	904	902	901	907	902.7	917	1.00p	878	8.20a	39	A	C
908	907	905	905	907	906	906	903.6	913	4.00p	887	9.15a	25	C	C
908	906	907	907	905	906	905	905.7	920	3p.4p	891	11.0°a	29	C	C
906	903	903	906	907	907	908	901.2	910	2.35p	881	8.45a	29	C	C
905	901	899	897	899	897	898	902.9	917	2.30p	888	9.09a	29	C	A
976	902	901	902	903	904	903	906.2	921	3.52p	897	0.33a	24	C	A
921	909	904	910	908	908	907	908.5	929	4.00p	894	10.25a	35	C	A
897	900	894	898	899	900	899	904.3	918	2.00p	894	8.0°p	24	A	C
913	912	910	911	911	9·9	909	907.9	933	2.33p	887	9.0a	46	C	C
909	904	905	905	904	905	911	907.5	921	2.42p	892	8.54a 9.0a	29	C	A
904	900	899	900	902	902	904	906.5	931	1.25p	881	8.0a	50	C	A
910	906	906	910	910	913	914	907.9	921	0.29p	886	10.0a	35	A	A
922	921	917	906	914	913	913	915.9	937	1.40p	897	9.20a	50	A	A
882	900	903	903	901	905	909	911.4	937	1.30p	882	6.00p	55	A	A
890	891	890	889	893	899	896	902.2	922	2.20p	882	8.40p	40	C	S°
901	898	895	894	894	891	893	898.7	921	2.0°p	886	10.0a	35	A	A
907	905	903	905	907	907	909	899.2	915	2.3°p	874	10.0a	41	C	C
895	895	894	893	896	895	897	899.2	913	2.27p	879	1.00a	33	A	C
898	896	896	896	896	896	896	896.7	914	1.40p	879	9.00a	40	C	C
906	902	901	897	901	901	900	9 4.2	926	2.0°p	891	9.00a	35	C	C
905	904	904	905	902	906	905	904.9	920	2.0°p	890	9.00a	30	C	C
908	904	908	908	906	906	904	908.0	922	1.0°p	892	9.00a	30	C	C
900	899	898	9·0	902	896	896	899.2	914	2.10p	877	9.10a	37	C	C
907	909	908	910	913	915	9·8	908.1	924	1.40p	890	8.0°a	34	C	C
911	915	912	910	909	909	910	915.3	933	1.32p	897	10.00a	36	A	C
903.9	903.0	902.1	902.4	902.9	903.1	903.4	904.6	921.6		886.5		35.1		

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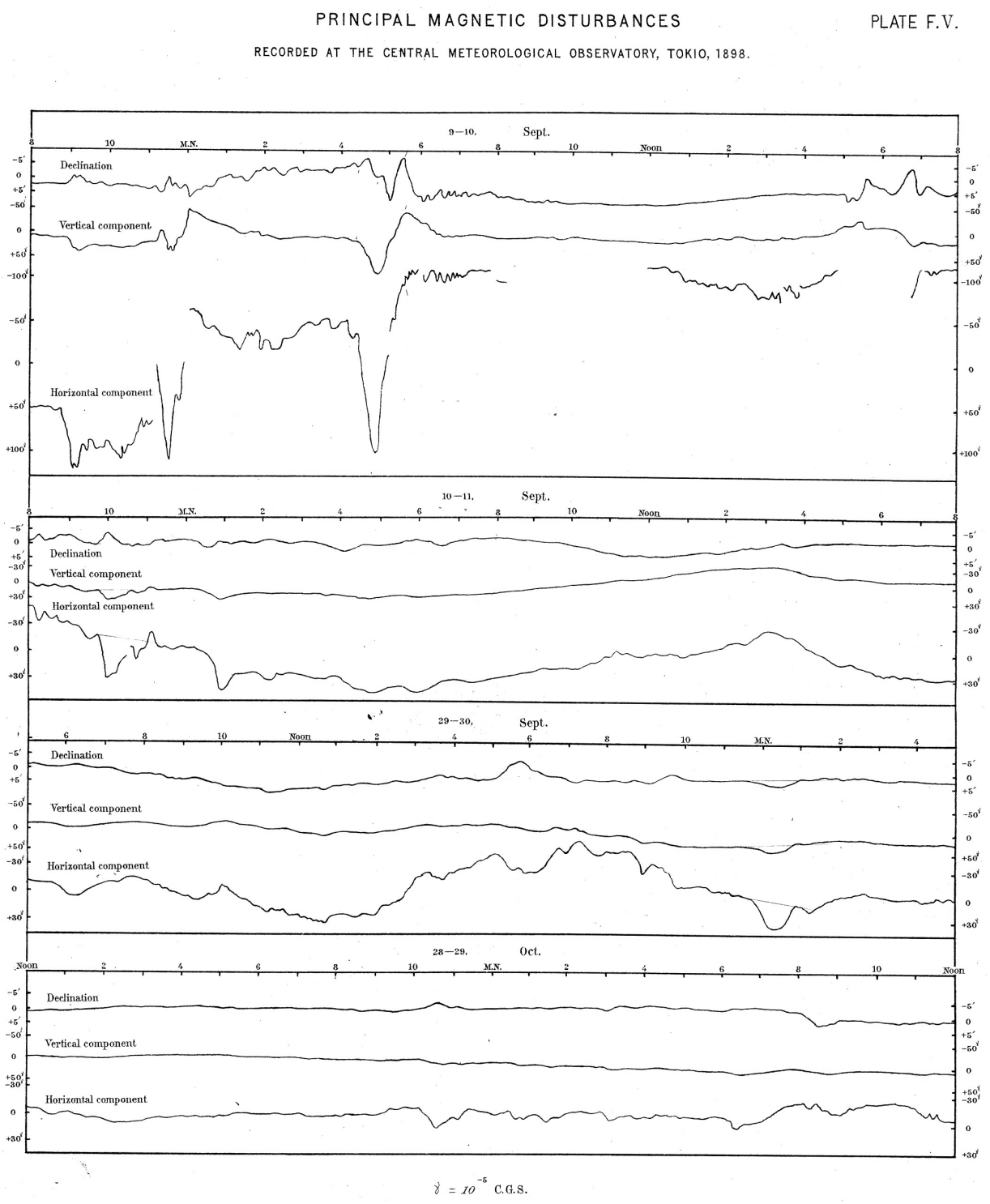
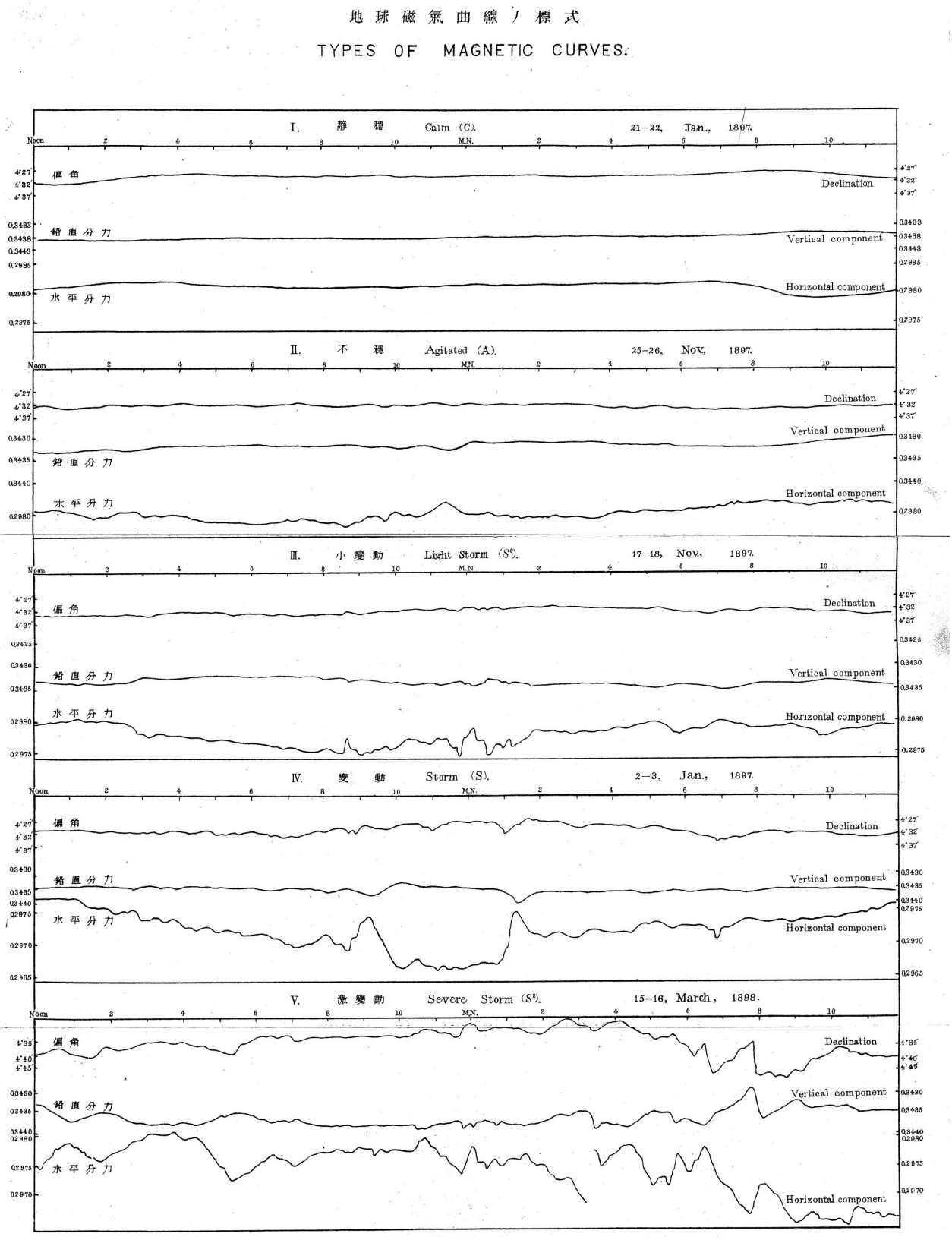
1	907	905	905	907	903	910	901	[8 9]	890	884	889	901	909	917	917	910	905	903	901	898	899	902	901	900	902.6	918	2.32p	884	10.00a	34		
2	901	901	902	901	903	904	901	892	883	881	883	892	911	926	923	917	907	901	900	902	905	904	903	903	902.2	926	2.00p	881	10.0°a	45	A	C
3	905	905	909	913	912	914	912	902	893	887	892	907	915	920	924	918	913	909	905	905	908	907	908	908	907.8	924	3.00p	885	10.15a	39	A	C
4	905	904	905	903	905	906	905	900	892	890	[8 4]	901	911	914	915	914	911	910	906	902	899	902	902	902	904.1	915	3.00p	889	9.45a	36	A	C
5	902	903	902	903	902	903	900	895	891	891	891	896	909	918	917	911	906	905	902	901	903	905	907	908	902.9	918	2.00p	889	10.13a	29	C	C
6	911	911	909	910	910	910	910	903	899	896	898	905	912	920	921	919	911	913	909	909	910	908	908	911	909.3	921	3.00p	895	10.08a	26	C	C
(7)	910	910	911	911	914	915	913	908	[4 4]	900	904	915	[9 3]	930	932	927	921	917	915	913	918	913	911	911	914.3	932	3.00p	900	10.0°a	32	C	C
8	910	908	910	910	907	912	914	913	910	908	909	917	[9 3]	922	921	916	912	909	908	906	906	906	908	906	911.2	922	2.0°p	905	9.0°p	17	C	C
9	910	909	906	910	913	911	909	903	898	895	896	905	913	918	918	913	909	907	903	900	900	900	902	905	906.1	919	2.30p	895	10.00a	24	C	C
(10)	903	903	903	907	908	909	909	901	895	893	897	900	915	914	905	906	902	[9 0]	899	899	900	898	901	902	902.9	915	1.0°p	895	9.00a	20	C	C
11	903	906	905	905	908	911	912	910	903	900	902	910	910	916	913	913	911	911	905	904	898	908	905	904	907.1	916	2.0°p	894	8.3°p	22	C	S°
12	907	906	906	905	[8 9]	903	892	881	879	874	880	889	899	903	904	[9 8]	893	891	890	893	891	893	893	893	893.8	913	1.30a	874	10.05a	39	A	C
13	896	[8 5]	891	897	899	899	894	887	876	872	877	895	904	913	915	909	907	905	903	905	904	896	895	898	896.7	915	3.00p	871	10.15a	44	A	C
14	897	896	896	896	896	896	892	881	879	883	890	898	898	905	903	900	899	899	898	896	897	894	894	894	894.5	907	1.40p	878	8.42a	29	C	C
15	[9 4]	894	894	894	896	896	892	884	878	881	[8 2]	902	905	907	905	902	898	894	894	894	893	894	894	893	894.3	908	1.31p	878	9.00a	30	C	C
(16)	891	897	894	893	896	899	897	888	884	878	884	897	905	908	909	906	[9 3]	903	902	904	903	904	905	906	906.2	909	3.00p	878	10.00a	31	C	C
17	904	904	[9 4]	901	903	905	905	902	899	898	895	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	C	C
18	...	...	...	...	...	...	...	...	...	...	...	913	928	929	928	928	920	...	...	...	...	...	...	...	...	...	...	...	...	...	C	C
19	[8 8]	899	899	898	897	895	895	889	876	877	[8 4]	[8 3]	905	905	903	903	899	897	898	898	897	895.9	905	1.2p	874	9.26a	31	C	C
20	[8 6]	894	894	893	894	891	886	889	876	878	884	894	899	904	912	917	911	897	897	897	898	897.2	919	3.30p	876	9.0°a	43	C	C
21	897	890	900	898	899	896	896	889	883	[8 4]	[8 1]	895	903	910	909	909	[9 3]	900	897	895	896	897.3	919	2.0°p	880	10.08a	39	C	C
(22)	896	891	894	893	893	894	894	891	883	877	873	880	889	897	[8 9]	898	894	891	891	892	891.5	904	5.00p	873	11.0°a	31	C	C
23	893	[9 1]	895	894	895	898	895	884	[8 5]	893	897	903	906	908	[9 1·]	905	901	897	895	896	896.0	910	3.00p	883	9.0°a	25	C	C
24	880	890	890	891	898	904	902	899	896	897	895	901	908	908	900	907	899	894	894	895	895.1	911	0.50p	872	8.0°p	39	C	C
25	875	897	885	889	[9 2]	897	893	876	869	880	876	885	895	895	889	887	880	884	882	881	883.2	906	6.10a	860	10.0°a	46	A	S°
26	886	895	897	890	892	891	890	882	875	871	870	886	894	897	896	896	892	890	890	889	887	885	886	886	887.9	897	2.00p	870	11.0°a	27	C	S°
27	882	884	885	887	885	885	[8 3]	878	880	888	881	899	895	896	893	892	890	890	885	881	888	884	891	877	888.7	899	Noon	877	M.N.	22	A	C
28	891	884	879	882	[8 1]	885	[8 6]	877	876	876	876	880	884	888	887	889	887	885	879	882	884	889	890	888	883.7	891	10.50p	876	9–11a	15	C	C
29	844	885	884	884	887	[8 7]	880	879	871	888	885	897	899	896	896	888	884	884	886	888	888	886.4	899	1.0°p	867	8.35a	32	C	C
30	888	885	895	[8 5]	893	898	902	897	892	897	883	894	899	895	894	887	863	859	864	874	878	878	884.0	902	7.0°a	847	6.20p	58	A	S°
31	880	883	884	887	889	892	883	889	885	882	885	890	891	883	870	861	844	853	849	811	816	820	851	842	866.8	892	6.0°a	810	7.50p	82	C	S°
Mean	896.9	897.8	897.9	897.9	898.1	900.6	897.9	892.1	886.3	886.57	887.8	897.8	903.7	908.1	906.6	903.9	896.1	895.8	893.7	891.7	892.3	893.3	895.1	894.8	896.4	911.1		877.9		33.3		

Annexed Figure 1 Example of the monthly table of the geomagnetic hourly value data printed in the Annual Report of the Central Meteorological Observatory



Annexed Figure 2 Example of magnetic storms whose analog records are inserted in the Annual Report of the Central Meteorological Observatory (from the top, the records for storms of September 9 to 10, September 10 to 11, September 29 to 30, and October 28 to 29, in 1897)



Annexed Figure 3 Typical example of the five-degree classification of geomagnetic variations adopted by the Annual Report of the Central Meteorological Observatory. From top to bottom Calm(C), Agitated(A), Light Storm(S_0), Storm(S), and Severe Storm(S_2) respectively.

Table 1 List of revised hourly value data for each geomagnetic component
Table 1-1, 1-2, and 1-3 show the D component (unit: '), H component (unit: nT), and Z component (unit: nT), respectively.

Table 1-1

	year	mon.	day	hour	comp.	orig.	rev.	diff.
1	1897	1	4	10	D	388	288	−100.0
2	1897	1	26	16	D	207	297	90.0
3	1897	2	1	4	D	390	290	−100.0
4	1897	2	8	18	D	383	283	−100.0
5	1897	2	13	12	D	383	283	−100.0
6	1897	3	3	8	D	372	272	−100.0
7	1897	3	4	2	D	585	285	−300.0
8	1897	3	4	4	D	380	280	−100.0
9	1897	3	9	18	D	207	297	90.0
10	1897	3	10	10	D	295	265	−30.0
11	1897	3	28	23	D	237	287	50.0
12	1897	4	28	16	D	219	319	100.0
13	1897	5	31	12	D	393	293	−100.0
14	1897	5	31	14	D	394	294	−100.0
15	1897	6	28	5	D	351	251	−100.0
16	1897	7	12	23	D	203	303	100.0
17	1897	7	22	10	D	233	333	100.0
18	1897	7	23	3	D	262	292	30.0
19	1897	7	26	22	D	399	299	−100.0
20	1897	8	5	10	D	386	286	−100.0
21	1897	8	10	2	D	299	279	−20.0
22	1897	8	18	11	D	321	331	10.0
23	1897	9	11	16	D	393	293	−100.0
24	1897	9	14	18	D	397	297	−100.0
25	1897	9	22	6	D	381	281	−100.0
26	1897	10	4	7	D	399	299	−100.0
27	1897	10	13	1	D	808	308	−500.0
28	1897	10	18	22	D	381	281	−100.0
29	1897	10	22	24	D	399	309	−90.0
30	1897	11	1	18	D	372	272	−100.0
31	1897	11	4	7	D	391	291	−100.0
32	1897	11	5	7	D	393	293	−100.0
33	1897	11	6	3	D	209	309	100.0
34	1897	11	6	4	D	206	306	100.0
35	1897	11	10	8	D	202	302	100.0
36	1897	11	11	9	D	397	297	−100.0
37	1897	11	12	9	D	396	296	−100.0
38	1897	11	17	5	D	312	322	10.0
39	1897	12	6	9	D	209	309	100.0
40	1897	12	9	9	D	306	296	−10.0
41	1897	12	10	9	D	203	303	100.0
42	1897	12	14	9	D	202	302	100.0
43	1897	12	15	9	D	394	294	−100.0
44	1897	12	21	1	D	394	294	−100.0
45	1897	12	24	4	D	221	321	100.0
46	1897	12	26	6	D	305	325	20.0
47	1898	1	6	11	D	3*2	322	–
48	1898	1	30	7	D	803	303	−500.0
49	1898	3	3	9	D	218	318	100.0
50	1898	3	14	11	D	214	314	100.0
51	1898	4	5	10	D	209	309	100.0
52	1898	4	10	10	D	395	295	−100.0
53	1898	4	25	14	D	398	298	−100.0
54	1898	6	12	20	D	222	322	100.0
55	1898	7	4	15	D	356	366	10.0
56	1898	7	29	9	D	391	291	−100.0
57	1898	8	22	15	D	251	351	100.0
58	1898	8	24	8	D	390	290	−100.0
59	1898	8	25	8	D	380	280	−100.0
60	1898	8	26	1	D	227	327	100.0
61	1898	11	3	19	D	231	331	100.0
62	1899	1	20	4	D	***	330	–
63	1899	1	21	3	D	32*	325	–
64	1900	7	18	9	D	394	294	−100.0
65	1900	7	19	6	D	398	298	−100.0
66	1900	8	21	15	D	384	364	−20.0
67	1900	9	1	16	D	382	362	−20.0
68	1900	9	2	13	D	380	389	9.0
69	1900	9	4	15	D	374	354	−20.0
70	1900	9	5	11	D	381	391	10.0
71	1900	9	6	14	D	377	367	−10.0
72	1900	9	6	22	D	379	369	−10.0
73	1900	11	13	18	D	241	341	100.0
74	1900	11	17	9	D	247	347	100.0
75	1900	12	18	8	D	256	356	100.0
76	1900	12	18	9	D	251	351	100.0
77	1901	1	6	2	D	356	366	10.0
78	1901	4	3	5	D	849	349	−500.0
79	1901	4	7	5	D	861	361	−500.0
80	1901	4	13	3	D	848	348	−500.0
81	1901	4	13	6	D	852	352	−500.0
82	1901	4	18	18	D	357	351	−6.0
83	1902	1	17	20	D	870	370	−500.0
84	1902	1	24	24	D	864	364	−500.0
85	1902	2	11	3	D	971	371	−600.0
86	1902	2	19	88	D	3*6	356	–
87	1902	2	22	18	D	973	373	−600.0
88	1902	4	25	18	D	281	381	100.0
89	1902	4	25	22	D	282	382	100.0
90	1902	5	4	9	D	3*5	365	–
91	1902	5	12	7	D	465	365	−100.0
92	1902	5	17	9	D	3*2	372	–
93	1902	5	22	6	D	36*	369	–
94	1902	6	17	3	D	875	375	−500.0
95	1902	7	6	7	D	387	337	−50.0
96	1902	7	9	24	D	274	374	100.0
97	1902	8	1	13	D	888	388	−500.0
98	1902	8	11	3	D	283	383	100.0
99	1902	8	11	12	D	417	411	−6.0
100	1902	8	28	19	D	383	388	5.0

Table 1-1 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
101	1902	9	18	10	D	3*9	399	–
102	1902	10	7	2	D	3*0	390	–
103	1902	10	13	3	D	3*0	390	–
104	1902	10	15	1	D	3*0	390	–
105	1902	10	16	21	D	3*0	390	–
106	1902	10	21	21	D	321	391	70.0
107	1902	10	22	1	D	396	386	−10.0
108	1902	11	16	16	D	291	391	100.0
109	1903	4	20	10	D	440	400	−40.0
110	1903	6	10	15	D	429	419	−10.0
111	1903	6	22	4	D	382	392	10.0
112	1903	9	20	21	D	413	403	−10.0
113	1903	9	25	22	D	411	421	10.0
114	1904	1	19	1	D	428	418	−10.0
115	1904	3	7	21	D	425	420	−5.0
116	1904	3	15	21	D	431	421	−10.0
117	1904	3	29	24	D	404	414	10.0
118	1904	4	5	18	D	420	426	6.0
119	1904	4	7	21	D	438	433	−5.0
120	1904	6	14	7	D	302	402	100.0
121	1904	7	18	18	D	531	431	−100.0
122	1904	8	29	22	D	335	435	100.0
123	1904	9	1	3	D	480	430	−50.0
124	1904	10	22	11	D	575	475	−100.0
125	1905	3	26	4	D	560	460	−100.0
126	1905	4	3	20	D	456	466	10.0
127	1905	4	21	14	D	406	506	100.0
128	1905	7	28	1	D	547	447	−100.0
129	1905	8	15	19	D	556	456	−100.0
130	1905	9	21	8	D	442	432	−10.0
131	1905	11	24	5	D	575	475	−100.0
132	1905	12	5	24	D	471	481	10.0
133	1905	12	15	24	D	574	474	−100.0
134	1906	1	18	9	D	555	455	−100.0
135	1906	2	23	10	D	254	454	200.0
136	1906	2	24	23	D	484	474	−10.0
137	1906	3	28	4	D	450	480	30.0
138	1906	5	15	19	D	436	536	100.0
139	1906	5	19	18	D	480	490	10.0
140	1906	6	2	19	D	405	505	100.0
141	1906	7	19	21	D	480	485	5.0
142	1906	9	20	1	D	484	488	4.0
143	1906	11	20	17	D	994	494	−500.0
144	1906	12	2	20	D	397	497	100.0
145	1907	3	3	9	D	274	474	200.0
146	1907	4	4	18	D	401	501	100.0
147	1907	4	30	22	D	6	506	500.0
148	1907	5	15	1	D	593	493	−100.0
149	1907	5	19	12	D	462	562	100.0
150	1907	5	19	20	D	593	493	−100.0
151	1907	6	18	4	D	465	495	30.0
152	1907	6	24	4	D	400	500	100.0
153	1907	6	28	3	D	509	500	−9.0
154	1907	7	9	18	D	905	505	−400.0
155	1907	7	11	12	D	471	571	100.0
156	1907	8	10	17	D	400	500	100.0
157	1907	8	12	11	D	526	512	−14.0
158	1907	8	26	16	D	415	515	100.0
159	1907	9	6	8	D	402	502	100.0
160	1907	9	9	18	D	516	506	−10.0
161	1907	10	15	19	D	419	519	100.0
162	1907	10	25	13	D	223	523	300.0
163	1907	11	12	16	D	507	517	10.0
164	1907	11	28	12	D	322	522	200.0
165	1908	1	2	24	D	521	511	−10.0
166	1908	2	17	3	D	620	520	−100.0
167	1908	2	18	24	D	620	520	−100.0
168	1908	2	26	2	D	820	520	−300.0
169	1908	2	27	2	D	823	523	−300.0
170	1908	2	28	2	D	828	528	−300.0
171	1908	2	29	2	D	820	520	−300.0
172	1908	3	3	7	D	326	526	200.0
173	1908	3	25	6	D	224	524	300.0
174	1908	4	10	1	D	328	528	200.0
175	1908	4	14	9	D	461	491	30.0
176	1908	4	16	18	D	630	530	−100.0
177	1908	4	21	6	D	328	528	200.0
178	1908	4	22	15	D	442	542	100.0
179	1908	5	2	24	D	628	528	−100.0
180	1908	5	3	2	D	223	523	300.0
181	1908	5	6	7	D	599	499	−100.0
182	1908	5	8	7	D	407	507	100.0
183	1908	5	9	7	D	407	507	100.0
184	1908	5	10	7	D	415	515	100.0
185	1908	5	11	17	D	524	534	10.0
186	1908	5	15	8	D	461	491	30.0
187	1908	5	18	12	D	590	560	−30.0
188	1908	6	8	16	D	506	546	40.0
189	1908	6	10	15	D	238	538	300.0
190	1908	6	16	7	D	594	494	−100.0
191	1908	6	17	7	D	593	493	−100.0
192	1908	6	27	17	D	523	533	10.0
193	1908	6	30	9	D	403	503	100.0
194	1908	7	8	16	D	445	545	100.0
195	1908	7	14	21	D	530	533	3.0
196	1908	7	15	24	D	530	536	6.0
197	1908	8	8	6	D	598	498	−100.0
198	1908	8	17	11	D	550	560	10.0
199	1908	8	28	8	D	404	504	100.0
200	1908	12	13	19	D	536	556	20.0

Table 1-1 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
201	1909	1	16	17	D	438	538	100.0
202	1909	3	22	1	D	430	530	100.0
203	1909	4	19	16	D	554	544	−10.0
204	1909	4	23	12	D	371	571	200.0
205	1909	5	11	20	D	437	537	100.0
206	1909	5	14	17	D	622	662	40.0
207	1909	6	5	23	D	436	536	100.0
208	1909	7	2	5	D	344	544	200.0
209	1909	7	29	19	D	274	574	300.0
210	1909	7	30	10	D	379	579	200.0
211	1909	8	1	22	D	375	575	200.0
212	1909	8	10	4	D	370	570	200.0
213	1909	9	21	5	D	666	566	−100.0
214	1909	10	14	17	D	679	579	−100.0
215	1909	11	19	19	D	573	583	10.0
216	1910	1	3	13	D	919	619	−300.0
217	1910	1	29	10	D	874	574	−300.0
218	1910	2	4	17	D	371	571	200.0
219	1910	2	9	19	D	911	611	−300.0
220	1910	10	3	11	D	692	592	−100.0
221	1910	10	27	14	D	699	599	−100.0
222	1911	4	21	22	D	528	598	70.0
223	1911	6	1	14	D	543	643	100.0
224	1911	6	3	14	D	938	638	−300.0
225	1911	6	8	17	D	914	614	−300.0
226	1911	6	23	23	D	600	606	6.0
227	1911	7	3	17	D	921	621	−300.0
228	1911	7	9	8	D	562	592	30.0
229	1911	7	29	19	D	913	613	−300.0
230	1911	7	29	22	D	611	601	−10.0
231	1911	8	13	11	D	914	614	−300.0
232	1911	11	27	19	D	912	612	−300.0
233	1911	12	15	4	D	527	627	100.0
234	1912	3	15	9	D	689	589	−100.0
235	1912	11	2	7	D	536	636	100.0

Table 1-2

	year	mon.	day	hour	comp.	orig.	rev.	diff.
1	1897	1	1	13	H	793	798	5.0
2	1897	1	3	3	H	700	709	9.0
3	1897	1	22	8	H	816	806	−10.0
4	1897	1	27	7	H	81*	810	−
5	1897	1	28	7	H	8**	812	−
6	1897	1	29	7	H	**4	854	−
7	1897	1	30	7	H	*25	825	−
8	1897	3	2	9	H	819	809	−10.0
9	1897	3	6	13	H	700	790	90.0
10	1897	3	29	23	H	844	840	−4.0
11	1897	4	24	23	H	693	793	100.0
12	1897	4	25	23	H	198	798	600.0
13	1897	6	23	23	H	721	821	100.0
14	1897	7	9	21	H	827	837	10.0
15	1897	7	19	5	H	833	838	5.0
16	1897	7	23	19	H	323	823	500.0
17	1897	7	29	19	H	938	838	−100.0
18	1897	7	31	18	H	851	751	−100.0
19	1897	8	1	14	H	926	826	−100.0
20	1897	8	2	14	H	915	815	−100.0
21	1897	8	4	20	H	821	831	10.0
22	1897	8	5	18	H	823	833	10.0
23	1897	8	12	22	H	536	836	300.0
24	1897	8	22	9	H	895	795	−100.0
25	1897	8	26	7	H	810	800	−10.0
26	1897	8	26	17	H	817	807	−10.0
27	1897	9	10	18	H	919	819	−100.0
28	1897	11	6	20	H	896	796	−100.0
29	1897	11	7	8	H	331	831	500.0
30	1897	11	8	9	H	919	819	−100.0
31	1897	11	11	9	H	855	835	−20.0
32	1897	11	17	18	H	895	795	−100.0
33	1897	11	30	11	H	898	798	−100.0
34	1897	12	3	22	H	713	813	100.0
35	1897	12	5	4	H	324	824	500.0
36	1897	12	7	18	H	920	820	−100.0
37	1898	1	14	22	H	337	837	500.0
38	1898	2	14	4	H	914	814	−100.0
39	1898	2	23	16	H	823	833	10.0
40	1898	2	24	20	H	321	821	500.0
41	1898	3	1	14	H	85*	850	−
42	1898	3	2	11	H	8*1	861	−
43	1898	3	2	15	H	83*	839	−
44	1898	3	3	15	H	83*	835	−
45	1898	3	4	5	H	89*	819	−
46	1898	3	7	16	H	932	832	−100.0
47	1898	3	8	11	H	7*1	791	−
48	1898	3	8	23	H	8*4	844	−
49	1898	3	9	3	H	84*	846	−
50	1898	3	9	10	H	8*9	809	−
51	1898	3	16	11	H	8*2	666	−
52	1898	3	23	10	H	77*	778	−
53	1898	3	23	14	H	8*2	802	−
54	1898	3	24	1	H	8*4	804	−
55	1898	3	24	6	H	8*8	808	−
56	1898	3	24	12	H	79*	796	−
57	1898	3	25	12	H	79*	798	−
58	1898	3	28	9	H	7*8	798	−
59	1898	3	30	11	H	79*	796	−
60	1898	3	30	20	H	315	815	500.0
61	1898	3	31	15	H	8*4	844	−
62	1898	3	31	16	H	8*2	842	−
63	1898	4	1	6	H	83*	839	−
64	1898	4	2	8	H	8*5	825	−
65	1898	4	3	2	H	81*	813	−
66	1898	4	4	11	H	83*	836	−
67	1898	4	5	15	H	82*	828	−
68	1898	4	7	9	H	80*	800	−
69	1898	4	8	9	H	7*5	795	−
70	1898	4	14	9	H	79*	793	−
71	1898	4	17	4	H	82*	829	−
72	1898	4	18	12	H	8*1	831	−
73	1898	4	21	2	H	349	849	500.0
74	1898	4	22	16	H	8*8	848	−
75	1898	4	27	11	H	*60	860	−
76	1898	4	28	3	H	88*	886	−
77	1898	4	29	10	H	84*	848	−
78	1898	4	30	5	H	8*2	862	−
79	1898	4	27	11	H	960	860	−100.0
80	1898	6	11	24	H	739	839	100.0
81	1898	6	12	17	H	736	836	100.0
82	1898	6	24	20	H	340	840	500.0
83	1898	8	22	16	H	89*	893	−
84	1898	9	23	7	H	877	869	−8.0
85	1898	10	8	6	H	857	867	10.0
86	1899	1	29	18	H	714	814	100.0
87	1899	2	17	22	H	740	840	100.0
88	1899	3	27	7	H	331	831	500.0
89	1899	5	24	10	H	768	868	100.0
90	1899	6	2	22	H	963	863	−100.0
91	1899	6	10	7	H	833	873	40.0
92	1899	7	17	9	H	891	861	−30.0
93	1900	3	17	10	H	394	894	500.0
94	1900	5	4	22	H	8*5	895	−
95	1900	5	30	18	H	979	879	−100.0
96	1900	7	14	5	H	90*	900	−
97	1900	7	18	4	H	9*0	900	−
98	1900	7	24	8	H	9*2	902	−
99	1900	7	25	10	H	8*8	878	−
100	1900	7	26	21	H	919	910	−9.0

Table 1-2 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
101	1900	9	3	3	H	92*	920	–
102	1900	9	4	14	H	91*	916	–
103	1900	10	10	22	H	9*5	905	–
104	1900	10	17	19	H	94*	940	–
105	1900	11	12	7	H	93*	936	–
106	1900	12	1	16	H	877	897	20.0
107	1900	12	27	13	H	916	910	−6.0
108	1901	1	14	22	H	865	965	100.0
109	1901	3	2	8	H	927	937	10.0
110	1901	3	18	10	H	846	946	100.0
111	1901	5	29	7	H	868	968	100.0
112	1901	5	31	13	H	988	978	−10.0
113	1901	6	10	23	H	554	954	400.0
114	1901	8	8	24	H	945	955	10.0
115	1901	8	9	6	H	959	949	−10.0
116	1901	9	13	2	H	998	958	−40.0
117	1901	10	12	23	H	858	958	100.0
118	1901	10	19	20	H	863	963	100.0
119	1901	11	25	1	H	843	943	100.0
120	1901	12	23	11	H	671	971	300.0
121	1902	1	14	20	H	90*	908	–
122	1902	1	15	22	H	8*5	895	–
123	1902	2	7	13	H	890	896	6.0
124	1902	2	19	6	H	909	900	−9.0
125	1902	2	26	11	H	898	893	−5.0
126	1902	3	24	5	H	875	895	20.0
127	1902	3	24	8	H	876	886	10.0
128	1902	4	4	18	H	91*	913	–
129	1902	4	18	8	H	92*	929	–
130	1902	6	12	20	H	932	922	−10.0
131	1902	6	23	8	H	801	901	100.0
132	1902	7	14	22	H	9*2	912	–
133	1902	7	24	22	H	90*	901	–
134	1902	7	29	21	H	81*	910	–
135	1902	7	30	21	H	9*2	912	–
136	1902	8	4	15	H	9*9	909	–
137	1902	8	6	7	H	8*6	896	–
138	1902	8	17	20	H	8*9	899	–
139	1902	8	29	10	H	977	877	−100.0
140	1902	9	12	18	H	925	917	−8.0
141	1902	9	19	10	H	*0*	905	–
142	1902	9	28	2	H	9*5	905	–
143	1902	10	1	8	H	8*9	899	–
144	1902	10	4	11	H	8*4	894	–
145	1902	10	12	5	H	8*9	889	–
146	1902	10	15	11	H	89*	892	–
147	1902	10	16	17	H	9*3	903	–
148	1902	10	17	3	H	9*4	904	–
149	1902	10	20	1	H	8*6	896	–
150	1902	10	21	15	H	90*	909	–
151	1902	10	21	17	H	9*3	903	–
152	1902	10	22	21	H	8*0	890	–
153	1902	10	23	15	H	91*	910	–
154	1902	11	13	22	H	894	884	–
155	1902	12	8	16	H	9*4	914	–
156	1902	12	18	12	H	900	910	10.0
157	1902	12	22	24	H	816	916	100.0
158	1902	12	23	3	H	915	925	10.0
159	1902	12	24	16	H	9*8	918	–
160	1902	12	31	23	H	636	936	300.0
161	1903	1	8	2	H	818	918	100.0
162	1903	2	2	23	H	931	921	−10.0
163	1903	2	8	23	H	903	908	5.0
164	1903	3	11	24	H	963	953	−10.0
165	1903	3	18	20	H	353	953	600.0
166	1903	3	28	21	H	969	959	−10.0
167	1903	3	31	19	H	950	953	3.0
168	1903	4	8	12	H	317	917	600.0
169	1903	5	18	13	H	943	940	−3.0
170	1903	6	9	14	H	358	958	600.0
171	1903	6	17	20	H	636	936	300.0
172	1903	7	7	9	H	632	932	300.0
173	1903	7	9	9	H	663	963	300.0
174	1903	7	14	23	H	376	976	600.0
175	1903	7	27	14	H	674	974	300.0
176	1903	8	30	10	H	639	939	300.0
177	1903	10	13	24	H	872	877	5.0
178	1903	10	14	14	H	954	854	−100.0
179	1903	10	15	22	H	874	894	20.0
180	1903	11	12	1	H	897	887	−10.0
181	1903	11	20	20	H	874	884	10.0
182	1903	11	28	16	H	814	914	100.0
183	1903	12	9	18	H	8*7	867	—
184	1903	12	14	5	H	998	798	−200.0
185	1904	2	9	5	H	417	917	500.0
186	1904	2	15	23	H	418	918	500.0
187	1904	3	21	9	H	610	910	300.0
188	1904	4	7	22	H	636	936	300.0
189	1904	4	16	20	H	651	951	300.0
190	1904	4	16	21	H	851	951	100.0
191	1904	5	4	2	H	832	932	100.0
192	1904	5	4	8	H	429	929	500.0
193	1904	5	4	12	H	348	948	600.0
194	1904	5	11	12	H	374	974	600.0
195	1904	5	13	6	H	340	940	600.0
196	1904	5	14	5	H	729	929	200.0
197	1904	5	18	12	H	364	964	600.0
198	1904	5	23	10	H	366	966	600.0
199	1904	5	24	14	H	342	942	600.0
200	1904	6	4	6	H	346	946	600.0

Table 1-2 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
201	1904	6	17	21	H	323	923	600.0
202	1904	6	23	18	H	349	949	600.0
203	1904	6	25	6	H	346	946	600.0
204	1904	6	28	13	H	375	975	600.0
205	1904	9	5	23	H	348	948	600.0
206	1904	9	17	3	H	321	921	600.0
207	1904	9	17	13	H	324	924	600.0
208	1904	10	12	3	H	344	944	600.0
209	1904	10	13	11	H	923	927	4.0
210	1904	10	20	5	H	658	958	300.0
211	1904	10	22	20	H	340	940	600.0
212	1904	10	24	24	H	349	949	600.0
213	1904	10	30	5	H	645	945	300.0
214	1904	11	6	2	H	822	922	100.0
215	1904	11	25	24	H	974	874	−100.0
216	1905	1	6	19	H	960	940	−20.0
217	1905	1	12	7	H	674	974	300.0
218	1905	1	18	3	H	666	966	300.0
219	1905	2	23	7	H	678	978	300.0
220	1905	3	4	11	H	979	879	−100.0
221	1905	4	5	6	H	640	940	300.0
222	1905	4	16	2	H	656	956	300.0
223	1905	6	9	10	H	341	941	600.0
224	1905	6	9	13	H	460	960	500.0
225	1905	6	23	17	H	976	876	−100.0
226	1905	6	23	19	H	974	874	−100.0
227	1905	6	23	20	H	959	859	−100.0
228	1905	6	24	6	H	992	892	−100.0
229	1905	7	14	5	H	645	945	300.0
230	1905	7	15	4	H	958	938	−20.0
231	1905	7	17	20	H	370	970	600.0
232	1905	9	1	13	H	639	939	300.0
233	1905	9	7	18	H	371	971	600.0
234	1905	10	1	24	H	643	943	300.0
235	1905	10	8	11	H	647	947	300.0
236	1905	10	11	19	H	993	963	−30.0
237	1905	10	14	10	H	338	938	600.0
238	1905	10	17	21	H	642	942	300.0
239	1905	10	19	23	H	660	960	300.0
240	1905	10	25	15	H	554	954	400.0
241	1905	10	25	19	H	640	940	300.0
242	1905	10	29	19	H	625	925	300.0
243	1905	11	6	11	H	999	899	−100.0
244	1905	11	17	7	H	990	890	−100.0
245	1905	11	22	4	H	828	928	100.0
246	1905	11	28	7	H	967	947	−20.0
247	1905	11	29	2	H	956	959	3.0
248	1905	11	30	19	H	944	964	20.0
249	1905	12	1	22	H	472	972	500.0
250	1905	12	17	16	H	661	961	300.0
251	1905	12	17	17	H	651	951	300.0
252	1905	12	24	16	H	671	971	300.0
253	1905	12	27	10	H	658	958	300.0
254	1905	12	27	17	H	667	967	300.0
255	1906	1	8	15	H	935	985	50.0
256	1906	1	10	12	H	659	959	300.0
257	1906	1	19	14	H	673	973	300.0
258	1906	1	28	11	H	647	947	300.0
259	1906	3	1	20	H	677	977	300.0
260	1906	3	15	14	H	1002	1012	10.0
261	1906	4	13	4	H	673	973	300.0
262	1906	4	29	5	H	1005	1015	10.0
263	1906	5	12	9	H	960	980	20.0
264	1906	7	10	8	H	673	973	300.0
265	1906	10	2	4	H	649	949	300.0
266	1906	10	14	22	H	637	937	300.0
267	1906	10	19	23	H	647	947	300.0
268	1906	10	19	24	H	655	955	300.0
269	1906	11	7	8	H	442	942	500.0
270	1907	3	12	18	H	346	846	500.0
271	1907	3	12	19	H	372	872	500.0
272	1907	3	17	9	H	1017	917	−100.0
273	1907	3	25	10	H	332	832	500.0
274	1907	3	25	22	H	371	871	500.0
275	1907	4	3	23	H	976	876	−100.0
276	1907	4	6	10	H	338	838	500.0
277	1907	4	9	24	H	826	886	60.0
278	1907	4	10	20	H	389	889	500.0
279	1907	4	15	21	H	868	898	30.0
280	1907	4	16	1	H	397	897	500.0
281	1907	4	16	9	H	959	859	−100.0
282	1907	4	16	13	H	605	905	300.0
283	1907	4	24	9	H	446	846	400.0
284	1907	4	28	23	H	374	874	500.0
285	1907	5	26	13	H	367	867	500.0
286	1907	6	8	2	H	350	850	500.0
287	1907	6	14	15	H	890	896	6.0
288	1907	6	16	14	H	819	919	100.0
289	1907	6	17	14	H	824	924	100.0
290	1907	6	18	14	H	822	922	100.0
291	1907	6	22	5	H	991	901	−90.0
292	1907	7	8	13	H	423	923	500.0
293	1907	7	9	5	H	660	960	300.0
294	1907	7	9	9	H	986	946	−40.0
295	1907	7	15	13	H	444	944	500.0
296	1907	7	17	17	H	863	963	100.0
297	1907	7	27	3	H	637	937	300.0
298	1907	7	30	2	H	449	949	500.0
299	1907	7	30	6	H	446	946	500.0
300	1907	8	2	2	H	484	984	500.0

Table 1-2 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
301	1907	8	2	5	H	787	987	200.0
302	1907	8	19	17	H	900	990	90.0
303	1907	8	23	9	H	667	967	300.0
304	1907	8	29	21	H	671	971	300.0
305	1907	8	31	20	H	1403	1003	−400.0
306	1907	9	2	1	H	1008	1000	−8.0
307	1907	9	4	19	H	865	985	120.0
308	1907	9	7	10	H	378	978	600.0
309	1907	9	10	9	H	963	983	20.0
310	1907	9	12	10	H	637	937	300.0
311	1907	10	3	12	H	780	980	200.0
312	1907	10	23	12	H	653	953	300.0
313	1907	10	30	11	H	855	955	100.0
314	1907	12	5	11	H	1000	1010	10.0
315	1907	12	20	15	H	366	966	600.0
316	1908	1	5	11	H	668	968	300.0
317	1908	1	6	6	H	461	961	500.0
318	1908	1	9	8	H	668	968	300.0
319	1908	1	13	1	H	643	943	300.0
320	1908	1	20	15	H	568	968	400.0
321	1908	1	27	8	H	478	978	500.0
322	1908	1	30	1	H	661	961	300.0
323	1908	2	2	13	H	678	978	300.0
324	1908	2	3	3	H	676	976	300.0
325	1908	2	7	9	H	693	993	300.0
326	1908	2	10	10	H	659	959	300.0
327	1908	2	14	8	H	933	983	50.0
328	1908	2	15	9	H	378	978	600.0
329	1908	2	15	17	H	677	977	300.0
330	1908	2	18	21	H	679	979	300.0
331	1908	2	22	3	H	685	985	300.0
332	1908	2	22	10	H	1105	1005	−100.0
333	1908	2	27	13	H	676	976	300.0
334	1908	3	3	16	H	674	974	300.0
335	1908	3	13	4	H	686	986	300.0
336	1908	3	27	4	H	657	957	300.0
337	1908	4	3	5	H	1043	1013	−30.0
338	1908	4	6	23	H	787	987	200.0
339	1908	4	10	22	H	876	976	100.0
340	1908	5	19	23	H	688	988	300.0
341	1908	5	25	8	H	672	972	300.0
342	1908	5	25	22	H	675	975	300.0
343	1908	5	30	12	H	776	976	200.0
344	1908	6	15	17	H	1088	988	−100.0
345	1908	6	29	7	H	683	983	300.0
346	1908	6	30	2	H	386	986	600.0
347	1908	7	1	15	H	692	992	300.0
348	1908	7	1	18	H	673	973	300.0
349	1908	7	4	24	H	672	972	300.0
350	1908	7	8	13	H	672	972	300.0
351	1908	7	14	17	H	983	993	10.0
352	1908	7	16	9	H	436	936	500.0
353	1908	8	9	10	H	1088	988	−100.0
354	1908	8	9	11	H	1036	936	−100.0
355	1908	8	26	9	H	663	963	300.0
356	1908	8	26	16	H	993	983	−10.0
357	1908	8	31	16	H	1004	1040	36.0
358	1908	9	6	7	H	575	975	400.0
359	1908	9	6	12	H	650	950	300.0
360	1908	9	9	9	H	680	980	300.0
361	1908	10	1	5	H	653	953	300.0
362	1908	10	11	3	H	471	971	500.0
363	1908	10	13	21	H	630	930	300.0
364	1908	10	14	19	H	618	918	300.0
365	1908	10	16	21	H	567	967	400.0
366	1908	10	22	19	H	669	969	300.0
367	1908	10	25	5	H	681	981	300.0
368	1908	10	25	14	H	996	990	−6.0
369	1908	10	31	15	H	103	1003	900.0
370	1908	11	7	4	H	693	993	300.0
371	1908	11	24	7	H	4029	1029	−3000.0
372	1908	12	5	21	H	994	964	−30.0
373	1908	12	8	19	H	389	989	600.0
374	1908	12	10	14	H	1131	1031	−100.0
375	1908	12	31	13	H	1005	1015	10.0
376	1909	1	5	6	H	968	963	−5.0
377	1909	1	6	4	H	647	947	300.0
378	1909	1	10	12	H	680	980	300.0
379	1909	1	12	7	H	1201	1021	−180.0
380	1909	1	19	20	H	688	988	300.0
381	1909	1	20	14	H	1974	974	−1000.0
382	1909	1	22	11	H	10000	1000	−9000.0
383	1909	1	28	24	H	688	988	300.0
384	1909	3	2	15	H	693	993	300.0
385	1909	3	9	8	H	682	982	300.0
386	1909	3	29	9	H	672	972	300.0
387	1909	4	8	7	H	2020	1020	−1000.0
388	1909	4	10	6	H	2012	10012	8000.0
389	1909	9	3	10	H	682	982	300.0
390	1909	9	26	13	H	345	845	500.0
391	1909	10	17	19	H	686	986	300.0
392	1909	10	21	21	H	681	981	300.0
393	1909	10	22	22	H	878	978	100.0
394	1909	11	7	1	H	1124	1024	−100.0
395	1909	11	14	2	H	1132	1032	−100.0
396	1909	12	16	23	H	1929	1029	−900.0
397	1909	12	17	21	H	1035	1025	−10.0
398	1910	1	10	24	H	1117	1017	−100.0
399	1910	1	25	23	H	625	925	300.0
400	1910	2	5	18	H	874	974	100.0

Table 1-2 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
401	1910	2	7	7	H	890	990	100.0
402	1910	2	11	4	H	1106	1006	−100.0
403	1910	3	13	23	H	1055	1035	−20.0
404	1910	4	4	20	H	878	978	100.0
405	1910	5	30	2	H	691	991	300.0
406	1910	6	5	12	H	997	977	−20.0
407	1910	6	19	16	H	990	996	6.0
408	1910	6	29	9	H	1005	1025	20.0
409	1910	7	23	16	H	1078	1098	20.0
410	1910	12	27	19	H	1147	1047	−100.0
411	1911	2	8	14	H	1939	1039	−900.0
412	1911	3	25	22	H	689	989	300.0
413	1911	3	27	9	H	779	979	200.0
414	1911	4	9	15	H	1058	958	−100.0
415	1911	6	8	21	H	1003	1008	5.0
416	1911	6	14	12	H	1072	1012	−60.0
417	1911	10	27	23	H	1014	1040	26.0
418	1912	1	2	9	H	1122	1022	−100.0
419	1912	1	19	8	H	1652	1052	−600.0
420	1912	2	2	20	H	1027	1037	10.0
421	1912	2	3	13	H	1030	1040	10.0
422	1912	2	22	24	H	1079	1089	10.0
423	1912	4	18	10	H	1616	1106	−510.0
424	1912	5	6	12	H	369	969	600.0
425	1912	5	28	7	H	603	903	300.0
426	1912	6	6	18	H	670	970	300.0
427	1912	6	17	13	H	1016	1006	−10.0
428	1912	7	9	8	H	960	860	−100.0
429	1912	12	31	7	H	640	940	300.0

Table 1-3

	year	mon.	day	hour	comp.	orig.	rev.	diff.
1	1897	2	1	22	Z	368	398	30.0
2	1897	2	3	8	Z	390	380	−10.0
3	1897	2	18	18	Z	864	364	−500.0
4	1897	2	20	12	Z	253	353	100.0
5	1897	2	23	2	Z	392	362	−30.0
6	1897	2	27	23	Z	844	344	−500.0
7	1897	3	3	20	Z	399	369	−30.0
8	1897	4	22	18	Z	841	341	−500.0
9	1897	5	11	20	Z	861	361	−500.0
10	1897	7	3	23	Z	355	375	20.0
11	1897	8	14	3	Z	261	361	100.0
12	1897	8	15	3	Z	369	359	−10.0
13	1897	8	29	2	Z	253	353	100.0
14	1897	9	8	20	Z	840	340	−500.0
15	1897	9	14	17	Z	338	328	−10.0
16	1897	9	17	3	Z	242	342	100.0
17	1897	9	20	13	Z	347	337	−10.0
18	1897	9	26	6	Z	244	344	100.0
19	1897	9	28	12	Z	253	353	100.0
20	1897	10	27	18	Z	276	376	100.0
21	1897	10	28	21	Z	875	375	−500.0
22	1897	11	12	24	Z	342	332	−10.0
23	1897	11	21	18	Z	339	329	−10.0
24	1897	12	18	18	Z	457	357	−100.0
25	1898	6	2	14	Z	303	393	90.0
26	1898	9	16	6	Z	495	395	−100.0
27	1898	10	2	17	Z	498	398	−100.0
28	1898	10	11	8	Z	522	422	−100.0
29	1898	10	19	5	Z	495	395	−100.0
30	1898	11	13	24	Z	336	326	−10.0
31	1898	11	3	20	Z	414	424	10.0
32	1898	11	15	7	Z	448	408	−40.0
33	1898	11	15	17	Z	497	397	−100.0
34	1898	11	15	19	Z	498	398	−100.0
35	1898	11	15	24	Z	497	397	−100.0
36	1898	12	11	12	Z	355	365	10.0
37	1899	4	3	19	Z	488	388	−100.0
38	1899	4	30	7	Z	385	395	10.0
39	1899	4	30	18	Z	376	386	10.0
40	1899	6	16	18	Z	444	414	−30.0
41	1899	7	6	6	Z	4*6	426	−
42	1899	7	7	6	Z	4*2	422	−
43	1900	3	6	19	Z	240	340	100.0
44	1900	3	17	16	Z	437	427	−10.0
45	1900	4	26	24	Z	424	421	−3.0
46	1900	6	7	7	Z	409	406	−3.0
47	1900	6	10	17	Z	426	406	−20.0
48	1900	8	22	9	Z	40*	408	−
49	1900	9	10	8	Z	527	427	−100.0
50	1900	10	11	19	Z	409	419	10.0
51	1900	10	23	14	Z	401	411	10.0
52	1900	11	18	3	Z	512	412	−100.0
53	1901	1	18	2	Z	414	444	30.0
54	1901	1	20	8	Z	420	428	8.0
55	1901	3	13	15	Z	598	498	−100.0
56	1901	3	21	9	Z	398	498	100.0
57	1901	5	21	4	Z	450	440	−10.0
58	1901	7	2	4	Z	367	467	100.0
59	1901	7	25	8	Z	571	471	−100.0
60	1901	11	19	17	Z	353	453	100.0
61	1902	1	6	18	Z	3*8	348	−
62	1902	1	13	16	Z	229	329	100.0
63	1902	1	16	13	Z	338	328	−10.0
64	1902	1	22	22	Z	343	313	−30.0
65	1902	2	8	11	Z	456	356	−100.0
66	1902	2	17	22	Z	266	366	100.0
67	1902	3	17	14	Z	449	409	−40.0
68	1902	4	20	14	Z	*98	398	−
69	1902	5	2	21	Z	326	320	−6.0
70	1902	5	14	20	Z	33*	334	−
71	1902	5	18	3	Z	32*	326	−
72	1902	5	19	20	Z	338	328	−10.0
73	1902	5	21	22	Z	314	324	10.0
74	1902	5	31	22	Z	898	298	−600.0
75	1902	6	5	22	Z	3*3	303	−
76	1902	6	12	13	Z	447	347	−100.0
77	1902	6	13	21	Z	3*5	345	−
78	1902	6	16	18	Z	35*	350	−
79	1902	6	18	18	Z	3*8	348	−
80	1902	6	24	23	Z	3*3	363	−
81	1902	6	27	18	Z	3*0	360	−
82	1902	6	29	20	Z	36*	360	−
83	1902	7	23	15	Z	38*	380	−
84	1902	7	23	20	Z	3*2	382	−
85	1902	7	30	21	Z	3*9	379	−
86	1902	7	31	13	Z	3*3	383	−
87	1902	8	11	8	Z	752	352	−400.0
88	1902	8	12	20	Z	382	362	−20.0
89	1902	8	24	1	Z	369	359	−10.0
90	1902	9	12	14	Z	3*0	360	−
91	1902	9	19	10	Z	3*0	330	−
92	1902	10	3	23	Z	3*7	357	−
93	1902	10	7	2	Z	34*	3*2	−
94	1902	10	7	3	Z	3*2	342	−
95	1902	10	20	20	Z	426	326	−100.0
96	1902	10	22	6	Z	3*0	320	−
97	1902	10	27	19	Z	3*3	323	−
98	1903	1	28	17	Z	4*7	427	—
99	1903	4	5	22	Z	848	348	−500.0
100	1903	5	22	15	Z	4*7	407	—

Table 1-3 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
101	1903	5	25	13	Z	4*9	409	—
102	1903	10	6	22	Z	327	320	−7.0
103	1903	10	22	20	Z	356	350	−6.0
104	1904	1	5	21	Z	857	357	−500.0
105	1904	1	13	15	Z	287	387	100.0
106	1904	2	10	14	Z	523	423	−100.0
107	1904	2	28	12	Z	284	384	100.0
108	1904	3	16	3	Z	324	374	50.0
109	1904	4	23	4	Z	291	391	100.0
110	1904	4	28	19	Z	266	366	100.0
111	1904	5	5	22	Z	849	349	−500.0
112	1904	6	2	11	Z	915	315	−600.0
113	1904	7	1	5	Z	311	361	50.0
114	1904	8	2	9	Z	112	412	300.0
115	1904	8	13	5	Z	489	389	−100.0
116	1904	8	23	14	Z	394	399	5.0
117	1904	9	20	1	Z	392	292	−100.0
118	1904	9	20	2	Z	392	292	−100.0
119	1904	9	20	3	Z	392	292	−100.0
120	1904	10	10	5	Z	454	354	−100.0
121	1904	10	10	14	Z	427	327	−100.0
122	1904	10	17	20	Z	367	397	30.0
123	1904	10	25	12	Z	412	欠測	−
124	1904	10	25	17	Z	422	欠測	−
125	1904	10	26	22	Z	451	351	−100.0
126	1904	10	26	23	Z	452	352	−100.0
127	1904	10	26	24	Z	455	355	−100.0
128	1904	11	9	11	Z	330	339	9.0
129	1904	12	5	20	Z	472	372	−100.0
130	1905	1	25	24	Z	477	377	−100.0
131	1905	1	26	17	Z	7	1007	1000.0
132	1905	3	2	1	Z	493	393	−100.0
133	1905	4	4	21	Z	373	393	20.0
134	1905	4	18	10	Z	374	394	20.0
135	1905	4	26	13	Z	415	418	3.0
136	1905	5	25	1	Z	346	340	−6.0
137	1905	6	10	16	Z	335	365	30.0
138	1905	7	5	17	Z	208	298	90.0
139	1905	8	6	5	Z	574	374	−200.0
140	1905	8	12	19	Z	897	397	−500.0
141	1905	8	14	23	Z	979	379	−600.0
142	1905	8	19	23	Z	962	362	−600.0
143	1905	8	31	24	Z	397	297	−100.0
144	1905	10	1	20	Z	492	392	−100.0
145	1905	10	7	6	Z	310	410	100.0
146	1905	10	10	12	Z	870	370	−500.0
147	1905	10	13	18	Z	356	359	3.0
148	1905	10	17	21	Z	940	340	−600.0
149	1905	10	23	15	Z	351	357	6.0
150	1905	10	27	6	Z	340	346	6.0
151	1905	11	7	9	Z	840	340	−500.0
152	1905	11	15	7	Z	575	375	−200.0
153	1905	12	15	9	Z	569	369	−200.0
154	1906	1	27	18	Z	464	494	30.0
155	1906	2	6	16	Z	979	479	−500.0
156	1906	2	24	16	Z	217	517	300.0
157	1906	3	12	11	Z	459	429	−30.0
158	1906	4	3	18	Z	424	524	100.0
159	1906	4	24	19	Z	418	518	100.0
160	1906	5	11	21	Z	555	505	−50.0
161	1906	6	7	18	Z	432	532	100.0
162	1906	6	30	2	Z	395	495	100.0
163	1906	7	3	5	Z	989	489	−500.0
164	1906	7	14	18	Z	460	490	30.0
163	1906	11	19	21	Z	487	387	−100.0
166	1906	12	20	11	Z	474	574	100.0
167	1906	12	31	23	Z	379	579	200.0
168	1907	1	25	22	Z	502	602	100.0
169	1907	2	10	5	Z	476	576	100.0
170	1907	2	21	9	Z	405	505	100.0
171	1907	3	2	17	Z	456	466	10.0
172	1907	3	5	16	Z	455	445	−10.0
173	1907	4	11	17	Z	486	386	−100.0
174	1907	4	12	17	Z	305	405	100.0
175	1907	5	20	11	Z	400	406	6.0
176	1907	7	7	4	Z	332	432	100.0
177	1907	8	14	6	Z	808	408	−400.0
178	1907	8	27	1	Z	328	428	100.0
179	1907	9	9	16	Z	383	373	−10.0
180	1907	9	17	18	Z	888	388	−500.0
181	1907	10	18	23	Z	458	448	−10.0
182	1907	11	18	19	Z	793	493	−300.0
183	1907	12	2	17	Z	492	482	−10.0
184	1907	12	16	7	Z	645	545	−100.0
185	1907	12	19	9	Z	960	460	−500.0
186	1908	1	7	22	Z	294	394	100.0
187	1908	3	25	2	Z	303	503	200.0
188	1908	4	1	7	Z	294	494	200.0
189	1908	4	15	20	Z	264	464	200.0
190	1908	4	30	15	Z	422	442	20.0
191	1908	5	6	5	Z	404	424	20.0
192	1908	5	9	20	Z	497	397	−100.0
193	1908	5	27	9	Z	497	407	−90.0
194	1908	6	1	5	Z	438	433	−5.0
195	1908	6	3	6	Z	525	425	−100.0
196	1908	6	12	3	Z	131	431	300.0
197	1908	7	18	10	Z	227	427	200.0
198	1908	10	30	9	Z	432	435	3.0
199	1908	10	31	23	Z	497	397	−100.0
200	1908	11	26	10	Z	767	467	−300.0

Table 1-3 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
201	1908	11	26	14	Z	383	483	100.0
202	1908	12	9	17	Z	559	459	−100.0
203	1908	12	12	17	Z	568	468	−100.0
204	1909	1	10	7	Z	490	496	6.0
205	1909	1	15	21	Z	596	496	−100.0
206	1909	1	17	5	Z	498	488	−10.0
207	1909	1	23	22	Z	319	519	200.0
208	1909	1	28	14	Z	339	539	200.0
209	1909	2	12	12	Z	927	627	−300.0
210	1909	2	13	4	Z	880	580	−300.0
211	1909	2	14	14	Z	260	560	300.0
212	1909	2	20	7	Z	857	557	−300.0
213	1909	2	21	3	Z	471	571	100.0
214	1909	2	23	19	Z	373	573	200.0
215	1909	3	1	21	Z	386	586	200.0
216	1909	3	13	1	Z	913	613	−300.0
217	1909	3	13	7	Z	507	607	100.0
218	1909	3	23	8	Z	546	526	−20.0
219	1909	4	17	3	Z	592	492	−100.0
220	1909	4	20	1	Z	611	511	−100.0
221	1909	4	20	2	Z	613	513	−100.0
222	1909	4	20	3	Z	612	512	−100.0
223	1909	4	20	4	Z	613	513	−100.0
224	1909	4	20	5	Z	612	512	−100.0
225	1909	4	20	6	Z	611	511	−100.0
226	1909	4	20	7	Z	607	507	−100.0
227	1909	4	20	8	Z	599	499	−100.0
228	1909	4	20	9	Z	592	492	−100.0
229	1909	4	20	16	Z	592	492	−100.0
230	1909	4	20	17	Z	589	489	−100.0
231	1909	4	20	18	Z	586	486	−100.0
232	1909	4	20	19	Z	590	490	−100.0
233	1909	4	20	20	Z	597	497	−100.0
234	1909	4	20	21	Z	589	489	−100.0
235	1909	4	20	22	Z	599	499	−100.0
236	1909	4	20	23	Z	597	497	−100.0
237	1909	4	20	24	Z	598	498	−100.0
238	1909	4	28	22	Z	401	501	100.0
239	1909	5	4	22	Z	402	502	100.0
240	1909	5	31	2	Z	552	582	30.0
241	1909	5	31	9	Z	477	577	100.0
242	1909	6	7	9	Z	595	495	−100.0
243	1909	6	19	17	Z	624	634	10.0
244	1909	6	28	10	Z	929	629	−300.0
245	1909	7	4	13	Z	116	616	500.0
246	1909	7	6	3	Z	657	627	−30.0
247	1909	7	9	16	Z	931	631	−300.0
248	1909	7	12	10	Z	917	617	−300.0
249	1909	7	13	23	Z	138	638	500.0
250	1909	7	20	14	Z	589	579	−10.0
251	1909	7	30	2	Z	688	588	−100.0
252	1909	8	8	17	Z	548	578	30.0
253	1909	9	13	4	Z	717	517	−200.0
254	1909	9	15	14	Z	320	520	200.0
255	1909	9	27	7	Z	541	551	10.0
256	1909	9	27	18	Z	348	548	200.0
257	1909	10	5	15	Z	425	525	100.0
258	1909	10	8	23	Z	592	492	−100.0
259	1909	10	21	7	Z	329	529	200.0
260	1909	10	24	21	Z	374	574	200.0
261	1909	10	25	3	Z	468	568	100.0
262	1909	11	20	9	Z	596	496	−100.0
263	1909	11	26	17	Z	442	542	100.0
264	1909	12	21	17	Z	564	594	30.0
265	1909	12	22	12	Z	896	596	−300.0
266	1910	4	29	2	Z	578	678	100.0
267	1910	5	13	24	Z	633	683	50.0
268	1910	6	19	9	Z	618	616	−2.0
269	1910	12	2	19	Z	793	763	−30.0
270	1910	12	19	2	Z	668	698	30.0
271	1911	1	11	11	Z	742	748	6.0
272	1911	1	13	4	Z	771	777	6.0
273	1911	2	8	20	Z	768	668	−100.0
274	1911	2	15	15	Z	750	705	−45.0
275	1911	4	8	15	Z	950	650	−300.0
276	1911	4	20	20	Z	921	621	−300.0
277	1911	4	23	18	Z	908	608	−300.0
278	1911	5	8	23	Z	913	613	−300.0
279	1911	5	23	20	Z	600	660	60.0
280	1911	5	31	22	Z	957	657	−300.0
281	1911	6	5	6	Z	642	662	20.0
282	1911	6	20	13	Z	531	631	100.0
283	1911	8	13	23	Z	502	602	100.0
284	1911	8	16	21	Z	503	603	100.0
285	1911	8	17	22	Z	699	599	−100.0
286	1911	8	27	24	Z	563	593	30.0
287	1911	10	14	21	Z	565	585	20.0
288	1911	11	9	10	Z	935	635	−300.0
289	1911	11	9	11	Z	936	636	−300.0
290	1911	11	26	6	Z	714	718	4.0
291	1911	12	29	3	Z	731	631	−100.0
292	1911	12	29	4	Z	731	631	−100.0
293	1912	2	5	21	Z	569	559	−10.0
294	1912	2	11	24	Z	598	568	−30.0
295	1912	2	26	15	Z	418	518	100.0
296	1912	3	6	17	Z	468	498	30.0
297	1912	4	19	4	Z	479	379	−100.0
298	1912	4	19	8	Z	478	378	−100.0
299	1912	4	20	8	Z	498	398	−100.0
300	1912	8	17	3	Z	418	148	−270.0

Table 1-3 continued

	year	mon.	day	hour	comp.	orig.	rev.	diff.
301	1912	9	13	16	Z	387	377	−10.0
302	1912	10	3	23	Z	316	516	200.0
303	1912	10	25	15	Z	466	366	−100.0
304	1912	12	2	3	Z	224	324	100.0

Table 2 List of geomagnetic hourly data that were questionable but not revised in this revision work. Reasons why the data were not corrected or were not able to be corrected are presented in "Remarks." Colm "Type" in the Table shows the five-degree classification of geomagnetic variations. (see Annexed Figure 3.)

	year	month	day	hour	comp.	Original value	Revised value	Information noted in the annual report			Remarks
								Maximum	Minimum	Type	
1	1897	4	17	12	D	331	231	361	284	So	*1
2	1897	7	31	5	D	354	254	371	261	S	*1
3	1897	10	5	1	D	309	299	352	305	C	*1
4	1900	10	9	12	D	376	476	380	328	C	*1
5	1903	8	31	21	D	418	413	455	387	C	*3
6	1904	12	5	12	D	452	442	473	443	C	*1
7	1905	2	3	20	D	516	416	522	413	So	*2
8	1905	6	19	15	D	483	473	493	429	C	*1
9	1905	7	19	8	D	393	493	501	391	C	*2
10	1905	12	12	9	D	455	445	487	453	C	*2
11	1909	5	15	17	D	547	447	633	440	So	*5
12	1909	9	28	14	D	701	628	706	566	C	*2
13	1911	6	29	7	D	563	553	658	563	C	*2
14	1897	4	25	1	H	829	839	829	775	A	*2
15	1900	12	21	21	H	882	892	898	880	A	*2
16	1901	9	17	1	H	975	985	984	942	A	*1
17	1902	11	12	1	H	903	883	915	894	A	*1
18	1903	7	4	21	H	964	954	964	939	C	*3
19	1903	7	13	21	H	980	988	993	949	A	*3
20	1907	4	28	6	H	846	886	879	826	A	*1
21	1908	11	15	11	H	977	997	1013	977	A	*2
22	1909	1	17	2	H	999	979	1014	989	C	*1
23	1910	2	12	19	H	986	976	1034	980	C	*1
24	1911	11	13	16	H	1004	1104	1054	978	A	*1
25	1900	10	3	4	Z	430	420	431	412	C	*4
26	1900	10	7	21	Z	412	417	428	404	C	*3
27	1902	8	6	18	Z	380	350	392	362	C	*1
28	1905	12	16	16	Z	384	389	387	351	C	*4
29	1906	12	2	18	Z	498	488	507	408	C	*4
30	1906	12	9	2	Z	516	510	544	506	C	*4
31	1907	5	19	11	Z	410	419	418	398	A	*1
32	1909	1	10	7	Z	490	496	499	467	C	*4
33	1909	6	7	9	Z	595	495	618	593	C	*1
34	1910	2	19	12	Z	582	682	617	559	C	*1
35	1911	12	20	6	Z	620	720	617	559	C	*1

*1 Any revision would cause a deviation from the maximum or minimum range on that day.

*2 The maximum or minimum value is estimated to occur on that day at the nearest hour, but the revised value deviated greatly from those values.

*3 There are multiple locations existing in the vertical and lateral lines where the two kinds of mean values described above are different.

*4 If revised the data were unnatural form the viewpoint of the magnetic field variation trend.

*5 We judged that the mean value printed in the annual report was wrong.

Table 3 Time and corresponding geomagnetic component for which change in the values do not seem natural.

	year	month	day	Component
1	1897	8	27	Z
2	1900	5	8	Z
3	1901	2	19	Z
4	1901	4	13	Z
5	1901	4	18	Z
6	1904	4	16	Z
7	1904	10	9–11	Z
8	1904	10	23	Z
9	1905	5	2	Z
10	1905	5	12	Z
11	1905	9	30	Z
12	1906	6	6–7	Z
13	1909	1	20	Z
14	1909	9	28	D
15	1910	2	7	D
16	1910	2	9	D
17	1910	10	13	H
18	1910	8	11	Z
19	1911	1	15	D
20	1911	1	19	D
21	1911	3	11–13	Z
22	1911	3	18	Z
23	1912	10	1–31	Z

Table 4 List of geomagnetic storms whose analog data are inserted in the Annual Report of the Central Meteorological Observatory

No.	year	month	day	hour	–	month	day	hour
1	1897	1	2	12	–	1	3	12
2	1897	1	3	12	–	1	4	12
3	1897	4	2	12	–	4	3	12
4	1897	4	20	12	–	4	21	12
5	1897	5	21	10	–	5	22	10
6	1897	6	17	10	–	6	18	10
7	1897	7	31	9	–	8	1	9
8	1897	12	20	12	–	12	21	12
9	1898	3	15	12	–	3	16	12
10	1898	3	16	12	–	3	17	12
11	1898	5	4	8	–	5	5	8
12	1898	9	3	1	–	9	4	1
13	1898	9	9	20	–	9	10	20
14	1898	9	11	20	–	9	12	20
15	1898	9	29	5	–	9	30	5
16	1898	10	28	12	–	10	29	12
17	1898	10	29	12	–	10	30	12
18	1898	10	30	12	–	10	31	12
19	1898	11	21	14	–	11	22	14
20	1898	11	22	14	–	11	23	14
21	1899	1	29	3	–	1	30	3
22	1899	2	12	5	–	2	13	5
23	1899	2	13	5	–	2	14	5
24	1899	2	14	5	–	2	15	5
25	1899	2	23	21	–	2	24	21
26	1899	3	10	12	–	3	11	12
27	1899	3	22	12	–	3	23	12
28	1899	3	23	12	–	3	24	12
29	1899	4	18	12	–	4	19	12
30	1899	4	19	12	–	4	20	12
31	1899	4	20	12	–	4	21	12
32	1899	5	3	12	–	5	4	12
33	1899	5	4	12	–	5	5	12
34	1899	5	5	12	–	5	6	12
35	1899	6	27	4	–	6	28	4
36	1899	6	28	4	–	6	29	4
37	1899	6	29	4	–	6	30	4
38	1899	6	30	4	–	7	1	4
39	1900	1	5	10	–	1	6	10
40	1900	1	12	12	–	1	13	12
41	1900	1	14	12	–	1	15	12
42	1900	1	15	12	–	1	16	12
43	1900	1	19	12	–	1	20	12
44	1900	1	20	12	–	1	21	12
45	1900	1	26	12	–	1	27	12
46	1900	2	4	12	–	2	5	12
47	1900	2	24	5	–	2	25	5
48	1900	3	8	12	–	3	9	12
49	1900	3	9	12	–	3	10	12
50	1900	3	12	12	–	3	13	12
51	1900	3	13	12	–	3	14	12
52	1900	4	9	7	–	4	10	7
53	1900	5	5	12	–	5	6	12
54	1901	1	23	1	–	1	24	1
55	1901	2	22	19	–	2	23	19
56	1901	3	24	20	–	3	25	20
57	1901	5	10	17	–	5	11	17
58	1901	5	23	21	–	5	24	21
59	1901	5	31	17	–	6	1	17
60	1901	7	11	21	–	7	12	21
61	1901	8	14	12	–	8	15	12
62	1901	8	15	12	–	8	16	12
63	1901	9	10	12	–	9	11	12
64	1901	10	25	12	–	10	26	12
65	1901	11	4	4	–	11	5	4
66	1901	11	19	12	–	11	20	12
67	1901	12	2	3	–	12	3	3
68	1901	12	28	12	–	12	29	12
69	1902	1	26	12	–	1	27	12
70	1902	3	11	12	–	3	12	12
71	1902	3	12	12	–	3	13	12
72	1902	3	24	12	–	3	25	12
73	1902	4	8	12	–	4	9	12
74	1902	4	11	12	–	4	12	12
75	1902	4	20	12	–	4	21	12
76	1902	5	9	12	–	5	10	12
77	1902	7	8	12	–	7	9	12
78	1902	7	24	12	–	7	25	12
79	1902	8	21	12	–	8	22	12
80	1902	9	20	12	–	9	21	12
81	1902	10	11	12	–	10	12	12
82	1902	11	24	6	–	11	25	6
83	1902	12	23	12	–	12	24	12
84	1903	1	26	12	–	1	27	12
85	1903	2	8	12	–	2	9	12
86	1903	3	5	6	–	3	6	6
87	1903	3	8	12	–	3	9	12
88	1903	3	12	12	–	3	13	12
89	1903	3	13	12	–	3	14	12
90	1903	3	30	12	–	3	31	12
91	1903	4	6	12	–	4	7	12
92	1903	4	9	1	–	4	10	1
93	1903	4	18	12	–	4	19	12
94	1903	6	1	12	–	6	2	12
95	1903	6	2	12	–	6	3	12
96	1903	6	28	12	–	6	29	12
97	1903	6	29	12	–	6	30	12
98	1903	7	19	12	–	7	20	12
99	1903	7	26	12	–	7	27	12
100	1903	7	27	21	–	7	28	21

Table 4 continued

No.	year	month	day	hour	–	month	day	hour
101	1903	8	4	15	–	8	5	15
102	1903	8	11	7	–	8	12	7
103	1903	8	22	12	–	8	23	12
104	1903	8	26	7	–	8	27	7
105	1903	9	19	12	–	9	20	12
106	1903	9	23	12	–	9	24	12
107	1903	9	29	5	–	9	30	5
108	1903	10	2	1	–	10	3	1
109	1903	10	12	12	–	10	13	12
110	1903	10	13	12	–	10	14	12
111	1903	10	31	12	–	11	1	12
112	1903	11	1	12	–	11	2	12
113	1903	11	10	12	–	11	11	12
114	1903	12	13	12	–	12	14	12
115	1903	12	20	21	–	12	21	21
116	1903	12	30	12	–	12	31	12
117	1903	12	31	12	–	1	1	12
118	1904	1	10	1	–	1	11	1
119	1904	1	11	1	–	1	12	1
120	1904	1	16	12	–	1	17	12
121	1904	1	28	18	–	1	29	18
122	1904	1	30	18	–	1	31	18
123	1904	2	16	22	–	2	17	22
124	1904	3	4	24	–	3	5	24
125	1904	3	11	12	–	3	12	12
126	1904	4	1	6	–	4	2	6
127	1904	4	2	6	–	4	3	6
128	1904	4	18	12	–	4	19	12
129	1904	4	19	12	–	4	20	12
130	1904	5	12	12	–	5	13	12
131	1904	5	13	12	–	5	14	12
132	1904	5	27	22	–	5	28	22
133	1904	6	7	12	–	6	8	12
134	1904	6	15	20	–	6	16	20
135	1904	7	6	16	–	7	7	16
136	1904	7	14	12	–	7	15	12
137	1904	8	3	21	–	8	4	21
138	1904	9	25	3	–	9	26	3
139	1904	10	7	6	–	10	8	6
140	1904	10	8	6	–	10	9	6
141	1904	11	2	19	–	11	3	19
142	1904	11	16	6	–	11	17	6
143	1904	11	17	12	–	11	18	12
144	1904	11	25	12	–	11	26	12
145	1904	12	16	12	–	12	17	12
146	1905	1	5	12	–	1	6	12
147	1905	1	17	12	–	1	18	12
148	1905	1	31	12	–	2	1	12
149	1905	2	3	9	–	2	4	9
150	1905	2	4	9	–	2	5	9

No.	year	month	day	hour	–	month	day	hour
151	1905	2	5	9	–	2	6	9
152	1905	3	2	12	–	3	3	12
153	1905	3	5	12	–	3	6	12
154	1905	3	7	12	–	3	8	12
155	1905	4	1	7	–	4	2	7
156	1905	4	2	7	–	4	3	7
157	1905	7	6	5	–	7	7	5
158	1905	7	23	12	–	7	24	12
159	1905	7	24	12	–	7	25	12
160	1905	8	2	3	–	8	3	3
161	1905	8	3	3	–	8	4	3
162	1905	8	7	12	–	8	8	12
163	1905	8	30	12	–	8	31	12
164	1905	9	3	12	–	9	4	12
165	1905	9	4	12	–	9	5	12
166	1905	9	18	12	–	9	19	12
167	1905	9	19	12	–	9	20	12
168	1905	9	27	12	–	9	28	12
169	1905	10	28	7	–	10	29	7
170	1905	11	12	12	–	11	13	12
171	1905	11	13	12	–	11	14	12
172	1905	11	15	12	–	11	16	12
173	1905	11	16	12	–	11	17	12
174	1905	11	17	12	–	11	18	12
175	1905	12	4	12	–	12	5	12
176	1906	1	31	18	–	2	1	18
177	1906	2	6	5	–	2	7	5
178	1906	2	7	5	–	2	8	5
179	1906	2	15	12	–	2	16	12
180	1906	2	19	6	–	2	20	6
181	1906	2	26	12	–	2	27	12
182	1906	2	28	4	–	3	1	4
183	1906	3	4	7	–	3	5	7
184	1906	3	5	7	–	3	6	7
185	1906	3	6	7	–	3	7	7
186	1906	3	25	1	–	3	26	1
187	1906	4	2	24	–	4	3	24
188	1906	4	28	21	–	4	29	21
189	1906	5	14	4	–	5	15	4
190	1906	5	15	4	–	5	16	4
191	1906	6	1	17	–	6	2	17
192	1906	6	2	17	–	6	3	17
193	1906	6	10	10	–	6	11	10
194	1906	7	11	10	–	7	12	10
195	1906	7	30	3	–	7	31	3
196	1906	9	22	12	–	9	23	12
197	1906	9	30	20	–	10	1	20
198	1906	10	27	12	–	10	28	12
199	1906	11	21	22	–	11	22	22
200	1906	12	8	12	–	12	9	12

Table 4 continued

No.	year	month	day	hour	–	month	day	hour
201	1906	12	16	24	–	12	17	24
202	1906	12	22	5	–	12	23	5
203	1906	12	23	5	–	12	24	5
204	1907	1	11	16	–	1	12	16
205	1907	1	14	3	–	1	15	3
206	1907	1	15	3	–	1	16	3
207	1907	2	7	12	–	2	8	12
208	1907	2	8	12	–	2	9	12
209	1907	2	9	12	–	2	10	12
210	1907	2	10	12	–	2	11	12
211	1907	3	10	12	–	3	11	12
212	1907	3	11	12	–	3	12	12
213	1907	3	12	12	–	3	13	12
214	1907	3	21	21	–	3	22	21
215	1907	4	16	12	–	4	17	12
216	1907	6	19	12	–	6	20	12
217	1907	6	22	12	–	6	23	12
218	1907	7	10	22	–	7	11	22
219	1907	7	28	7	–	7	29	7
220	1907	8	1	12	–	8	2	12
221	1907	8	2	12	–	8	3	12
222	1907	9	10	10	–	9	11	10
223	1907	9	16	8	–	9	17	8
224	1907	9	17	8	–	9	18	8
225	1907	9	18	8	–	9	19	8
226	1907	10	13	15	–	10	14	15
227	1907	10	14	15	–	10	15	15
228	1907	10	15	15	–	10	16	15
229	1907	10	22	14	–	10	23	14
230	1907	11	21	18	–	11	22	18
231	1907	11	22	18	–	11	23	18
232	1908	1	29	8	–	1	30	8
233	1908	2	11	16	–	2	12	16
234	1908	3	2	2	–	3	3	2
235	1908	3	26	14	–	3	27	14
236	1908	3	27	14	–	3	28	14
237	1908	3	28	14	–	3	29	14
238	1908	5	26	3	–	5	27	3
239	1908	6	3	19	–	6	4	19
240	1908	7	15	21	–	7	16	21
241	1908	8	8	16	–	8	9	16
242	1908	8	12	12	–	8	13	12
243	1908	8	19	7	–	8	20	7
244	1908	9	4	24	–	9	5	24
245	1908	9	11	23	–	9	12	23
246	1908	9	28	12	–	9	29	12
247	1908	9	29	12	–	9	30	12
248	1908	9	30	12	–	10	1	12
249	1908	10	5	12	–	10	6	12
250	1908	10	31	12	–	11	1	12

No.	year	month	day	hour	–	month	day	hour
251	1908	11	8	2	–	11	9	2
252	1908	11	17	12	–	11	18	12
253	1908	12	4	17	–	12	5	17
254	1909	1	1	19	–	1	2	19
255	1909	1	2	19	–	1	3	19
256	1909	1	3	19	–	1	4	19
257	1909	1	29	22	–	1	30	22
258	1909	1	30	22	–	1	31	22
259	1909	2	2	10	–	2	3	10
260	1909	3	19	12	–	3	20	12
261	1909	3	27	22	–	3	28	22
262	1909	3	28	22	–	3	29	22
263	1909	5	14	12	–	5	15	12
264	1909	5	15	12	–	5	16	12
265	1909	5	18	12	–	5	19	12
266	1909	9	25	17	–	9	26	17
267	1909	9	30	12	–	10	1	12
268	1909	11	30	12	–	12	1	12
269	1909	12	1	12	–	12	2	12
270	1910	1	24	21	–	1	25	21
271	1910	1	25	21	–	1	26	21
272	1910	3	28	2	–	3	29	2
273	1910	4	27	12	–	4	28	12
274	1910	8	22	12	–	8	23	12
275	1910	9	29	17	–	9	30	17
276	1911	1	16	4	–	1	17	4
277	1911	1	24	15	–	1	25	15
278	1911	2	1	12	–	2	2	12
279	1911	2	2	12	–	2	3	12
280	1911	2	21	12	–	2	22	12
281	1911	2	22	12	–	2	23	12
282	1911	2	27	12	–	2	28	12
283	1911	3	5	4	–	3	6	4
284	1911	3	20	9	–	3	21	9
285	1911	3	21	9	–	3	22	9
286	1911	3	27	12	–	3	28	12
287	1911	4	8	19	–	4	9	19
288	1911	4	9	19	–	4	10	19
289	1911	4	16	6	–	4	17	6
290	1911	4	17	6	–	4	18	6
291	1911	4	18	6	–	4	19	6
292	1911	5	7	12	–	5	8	12
293	1911	5	15	1	–	5	16	1
294	1911	6	5	24	–	6	6	24
295	1911	8	23	17	–	8	24	17
296	1911	9	20	12	–	9	21	12
297	1911	11	13	12	–	11	14	12
298	1911	11	14	12	–	11	15	12
299	1911	12	11	7	–	12	12	7
300	1912	4	14	24	–	4	15	24

Table 4 continued

No.	year	month	day	hour	–	month	day	hour
301	1912	5	12	24	–	5	13	24
302	1912	6	23	24	–	6	24	24
303	1912	7	4	11	–	7	5	11
304	1912	8	5	24	–	8	6	24
305	1912	9	17	22	–	9	18	22
306	1912	10	14	24	–	10	15	24
307	1912	12	7	2	–	12	8	2