

**Report on DELP 1988 Cruises in the Okinawa Trough**  
**Part 5. Measurement of the Three Components and**  
**Total Intensity of the Geomagnetic Field**  
**in the Okinawa Trough**

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**Abstract**

Three components and total intensity of the geomagnetic field were measured by Shipboard Three Component Magnetometer (STCM) and a proton precession magnetometer, respectively, during the DELP 1988 cruises of the R/V Dai-5 Kaiko-maru in the Okinawa Trough. Geomagnetic survey was mainly conducted in the region of the southwestern part of the trough, and detected magnetic anomalies with amplitudes exceeding 300 nT. Generally, these anomalies are associated with topographic highs in the trough. The anomalies are distributed discontinuously except the axial rift area of the trough. This anomaly pattern suggests that the back-arc spreading have occurred only within the rift area, the Yaeyama Graben, in the southwestern part of the trough.

**1. Introduction**

The Okinawa Trough is a marginal basin located behind the Ryukyu arc-trench system, extends from the northeast coast of Taiwan to the west coast of Kyusyu (Fig. 1). The width of the trough is generally about 60-100 km. The maximum depth exceeds 2300 m in the southwestern part of the trough.

In the Okinawa Trough, the geological and geophysical surveys have been carried out by many institutes. The Geological Survey of Japan has made intensive surveys to investigate into the geological history of the Ryukyu Arc system and its adjacent area including the trough in

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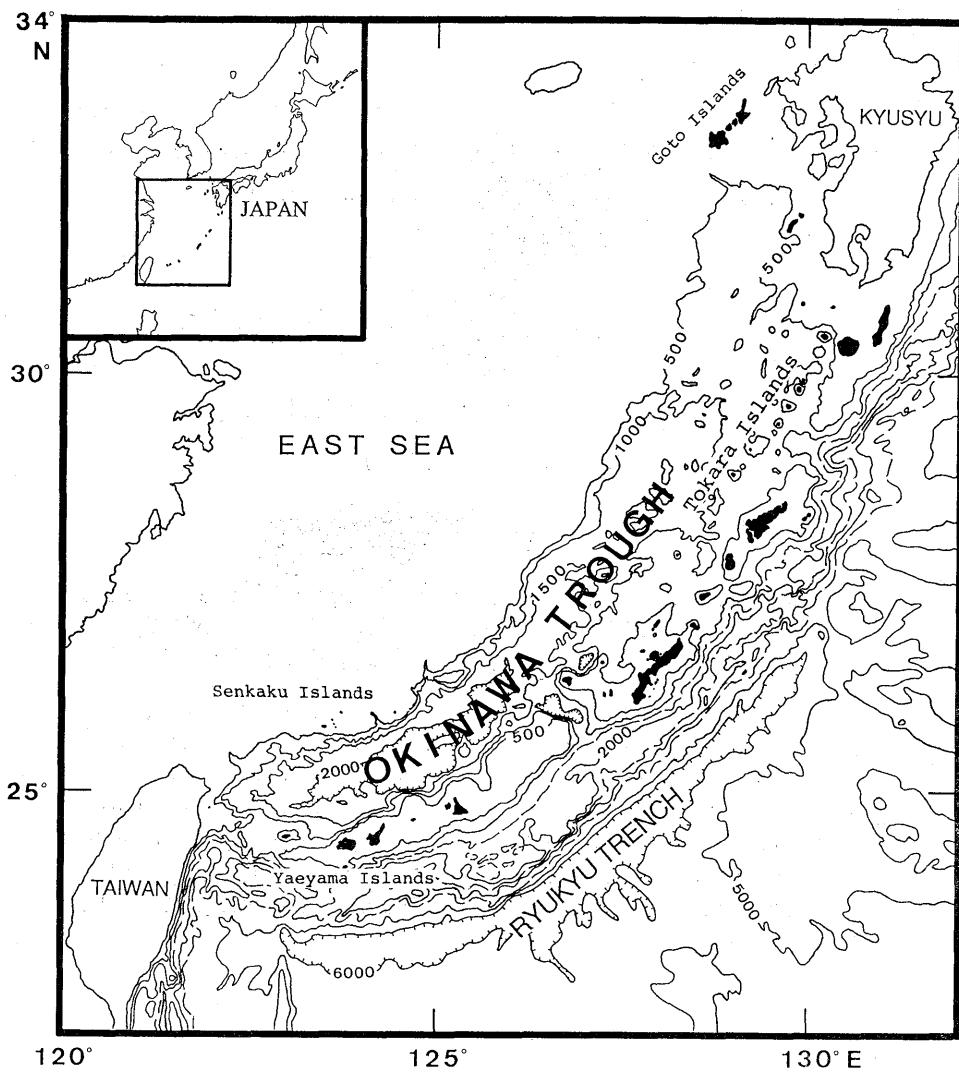


Fig. 1. Location map of the Okinawa Trough, Ryukyu Arc, and surrounding areas. Contours are in meters. Detailed bathymetric charts of the main survey areas on the 1988 DELP cruises are shown in Figures 3 and 4.

1975 (HONZA, 1976). The Hydrographic Department of Maritime Safety Agency also conducted intensive surveys along series of track lines mainly running north-south separated by about 5 or 10 nautical miles, including sea-beam mapping surveys in 1984, 1985, and 1986 (Hydrographic Department of Maritime Safety Agency, 1987; OSHIMA *et al.*, 1988). In the summer of 1984, as a part of the Japanese Development and Dynamics of Lithosphere Program (DELP), geophysical and geological research

cruises on R/V Wakashio-maru were made in the middle part of the Okinawa Trough (Japanese DELP Research Group on Back arc basins, 1986). IFREMER (Institut Francais de Recherch pour l'Exploitation de la Mer) has also made an intensive survey in the whole area of the trough in 1984 (SIBUET *et al.*, 1987).

General feature of geomagnetic anomaly in the whole area of the Okinawa Trough and its adjacent area were reported by ISHIHARA and MURAKAMI (1976), MIYAZAKI *et al.* (1976), and OSHIMA *et al.* (1988). ISHIHARA and MURAKAMI (1976) and MIYAZAKI *et al.* (1976) reported that the magnetic anomalies in the Okinawa Trough are weak and negative as a whole, their amplitudes (peak to peak) are 100–300 nT, and their wave lengths vary around several tens of kilometers. OSHIMA *et al.* (1988) revealed two magnetic anomaly belts fringing both sides of the trough. One of the magnetic anomaly belt extends between Goto Islands and Senkaku Islands along the southwestern margin, Taiwan-Shinji folded zone (WAGEMAN *et al.*, 1970), of the shallow shelf of East Sea. The other magnetic anomaly belt, which is considered to be a magnetic expression of the Ryukyu volcanic belt including the recent volcanic front of the Ryukyu Arc, extends between Tokara Islands and northern vici-

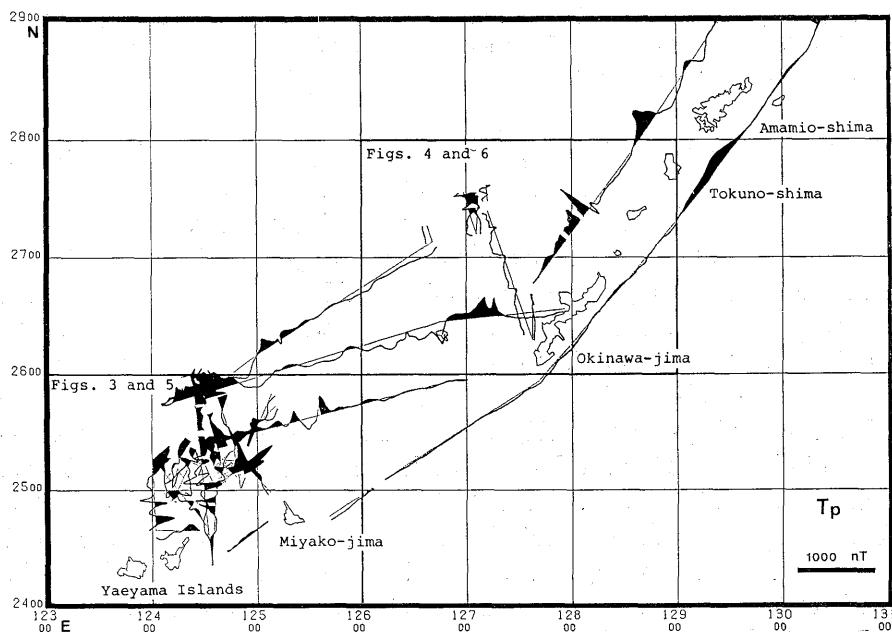


Fig. 2. Total geomagnetic anomalies along ship's tracks on the 1988 DELP cruises. Geomagnetic survey was mainly conducted in the southwestern part of the Okinawa Trough.

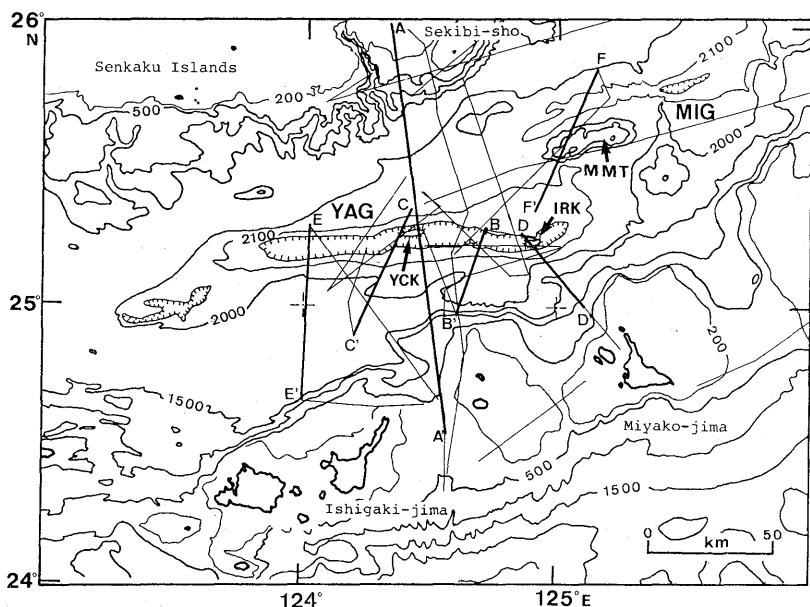


Fig. 3. Detailed bathymetric contour chart of the main survey area in the southwestern part of the Okinawa Trough on the 1988 DELP cruises, modified after Oshima et al., (1988). Contours in meters. Several lines show the ship's tracks. Solid lines, especially, show the tracks for the reference of magnetic anomaly profiles, seismic reflection profiles, and 3.5 kHz profiles that appear in other figures. IRK=Irabu Sea-Knoll. MIG=Miyako Graen. MMT=Miyako Sea-Mount. YAG=Yaeyama Graben. YCK=Yaeyama Central Sea-Knoll.

nity of the Yaeyama Islands. They also reported that the magnetic anomalies of the knolls in the graben of the trough are located adjacent to the magnetic anomalies of the Ryukyu volcanic belt.

In the middle part of the Okinawa Trough, the linear patterns of the magnetic anomalies which are attributable to normal magnetization of the small ridges, Iheya Ridge, in the graben were reported by OSHIMA *et al.* (1988). KIMURA *et al.* (1985) reported that the geomagnetic anomaly lineation, an ENE-WSW direction, of the sea-floor spreading type with an axial volcanic ridge, Iheya Ridge, exists in the middle part of the trough, and pointed out that the volcanic activity of the ridge is of recent period (about 1.8 to 0.5 Ma). KITAHARA *et al.* (1986), DAVAGNIER *et al.* (1987), and SIBUET *et al.* (1987) reported that the geomagnetic anomalies in the middle part of the trough are consistent with a series of linear dyke intrusions through the continental crust beneath the trough.

LEE *et al.* (1980) pointed out that the trend of magnetic anomaly pattern in the southwestern part of the Okinawa Trough are nearly parallel to the strike of the structural belts of the southern Ryukyu

Island Arc, and presented several offsets of the magnetic anomalies in the southern part of the trough. They concluded that these offsets were caused by fracture zones or transform faults in the basement of the trough.

On this 1988 DELP cruise, the magnetic survey was mainly conducted in the southwestern part of the Okinawa Trough (Figs. 1, 2, and 3). In the middle part of the trough (Fig. 4), the survey conducted a few lines for filling up vacant space of the DELP 1984 cruise area (KITAHARA *et al.*, 1986). The locations of the geomagnetic survey lines with detailed bathymetric chart are shown in Figures 3 and 4.

The purpose of the geomagnetic surveys on the 1988 DELP cruises is to make the following problems clear:

- (1) whether the source bodies of the geomagnetic anomalies are linearized or not in the axial part of the trough, and
- (2) whether the geomagnetic anomaly lineations suggest that the back-arc opening has been operated or not in the trough.

The magnetic and bathymetric data observed in this cruise for every ten minutes, including date, time and location of measurement, are listed

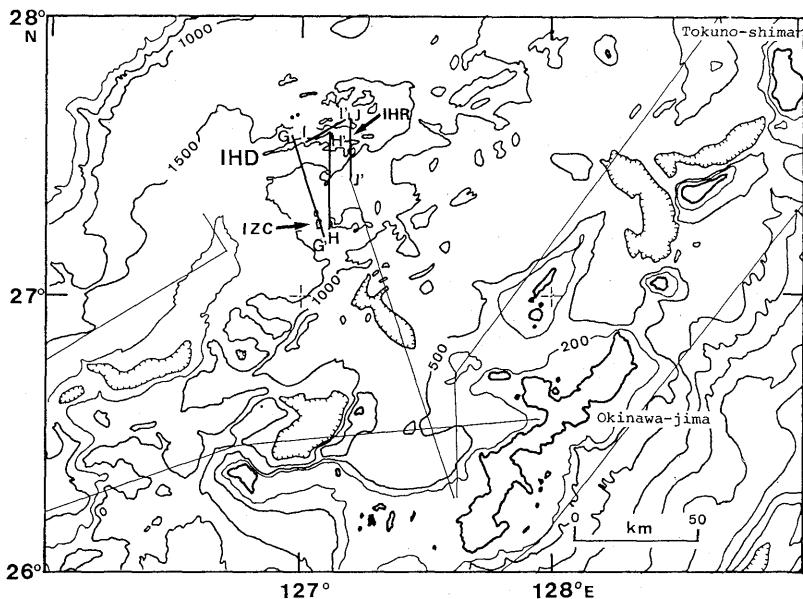


Fig. 4. Detailed bathymetric contour chart of the survey area in the middle part of the Okinawa Trough on the 1988 DELP cruises, modified after Oshima *et al.* (1988). Contours in meters. Several lines show the ship's tracks. Solid lines, especially, show the tracks for the reference of magnetic anomaly profiles and 3.5 kHz profiles that appear in the following figures. IHD=Iheya Deep. IHR=Iheya Ridge. IZC=Izena Cauldron.

in the last part of the report (Appendix 2).

## 2. Method of Measurement and Data Processing

Three components and total intensity of the geomagnetic field were measured by a Shipboard Three Component Magnetometer (STCM) which was developed by N. ISEZAKI and others of Kobe University (ISEZAKI *et al.*, 1981; ISEZAKI, 1986; MATSUBARA *et al.*, 1986) and a conventional proton precession magnetometer respectively. The three sensors of STCM, a fluxgate type magnetometer, assembled perpendicular to each other. The STCM was set up on the upper deck of the research vessel, Dai-5 Kaiko-maru, throughout the cruise.

The locations of the research vessel were mainly obtained by two satellite systems (NNSS and GPS) and occasionally by LORAN-C because all the survey area was not covered by the LORAN-C positioning system alone. The ship's heading direction and the rolling and pitching angles were measured by a gyrocompass and a vertical gyroscope, respectively. These data sampling was controlled by a microcomputer. The bathymetric data and water depth were measured by a 3.5 kHz subbottom profiler. All these observed values were provided in the form of digital data which were transferred and stored in a floppy disk every one minutes while being printed out.

The values measured by a STCM are not real three components of the geomagnetic field, because the ambient field around the magnetic sensor of STCM may have been suffered from the additional magnetic fields induced by the metallic hull of the research vessel. In order to remove the components of the induced field, we assumed that the measured three components of the magnetic field were the vector sum of the following three magnetic fields:

- (1) The geomagnetic field.
- (2) The magnetic field caused by the remanent magnetic moment of the metallic body of the vessel. The STCM sensors were fixed to the ship. This magnetic field, therefore, is constant.
- (3) The magnetic field due to the ship's magnetic moments induced by the real geomagnetic field.

Spacial distribution of the induced magnetic moment is complicated, but the strength of induced magnetic moment is generally proportional to the intensity of the real geomagnetic field. Thus, the induced field can be regarded as linear to the real geomagnetic field. The true geomagnetic field was calculated by subtracting these induced field (2 and 3) from the original field value (1). We measured the magnetic field, the ship's heading direction, and the rolling and pitching angles by spin-

ning the heading of the vessel by 360 degrees at one point where the three components of the geomagnetic field are known for obtaining the relation between the real geomagnetic field and the observed magnetic field. During this cruise the above spinning observations were carried out at six points (Appendix 1). The STCM method has been reported in more detail by Isezaki (1986).

Magnetic field values, i.e., total force and three vector components were compared to those of IGRF-85 (International Geomagnetic Reference Field determinated in 1985; IAGA DIVISION I, WG 1, 1985), and the local geomagnetic anomalies were derived by subtracting both the regional field as well as artificial biasing field. In this report, correction for daily variation has not been applied to the magnetic data.

In the following sections and figures,  $T_p$  and  $T_c$  are total geomagnetic intensities measured by a proton precession magnetometer and calculated from three components (X, Y, and Z) measured by the STCM, respectively. Here X, Y, and Z represent the northward, eastward, and vertical component of the geomagnetic field, respectively.

### 3. Results

The measurements on the 1988 DELP cruises detected magnetic anomalies with amplitude (peak to peak) exceeding 300 nT (Fig. 2). Generally, these anomalies would be associated with some small sea-knolls of the central rift zone, the Yaeyama Graben (Fig. 3), and sea-hills in the southwestern part of the trough and the central volcanic ridge, the Iheya Ridge (Fig. 4), in the middle part of the trough.

Figures 2, 5, and 6 show the data plotted as magnetic anomalies along ship's tracks. Several details of the anomalies in Figures 3 and 4 are shown in Figures 7, 8, 9 and 10 with seismic reflection profiles or 3.5 kHz profiles along the solid tracks.

General characteristics of the magnetic anomalies in the Okinawa Trough area are as follows:

(1) Amplitudes of anomalies (peak to peak) are about 200–300 nT, and their wavelength ranges from 10 to 30 km (Figs. 2, 5a, and 6a).

(2) The magnetic quiet zone, where the anomalies are less than about 50 nT, corresponds to the Ryukyu Ridge except off the eastern vicinity of Amamio-shima and Tokuno-shima (Fig. 2).

(3) Compared with the magnetic anomalies over the Ryukyu Ridge, the trough is a zone of relatively high-amplitude magnetic anomalies (Figs. 2, 5a, and 6a).

(4) The largest magnetic anomaly was observed off the northwest vicinity of the Miyako-jima near the east end of the central graben, the

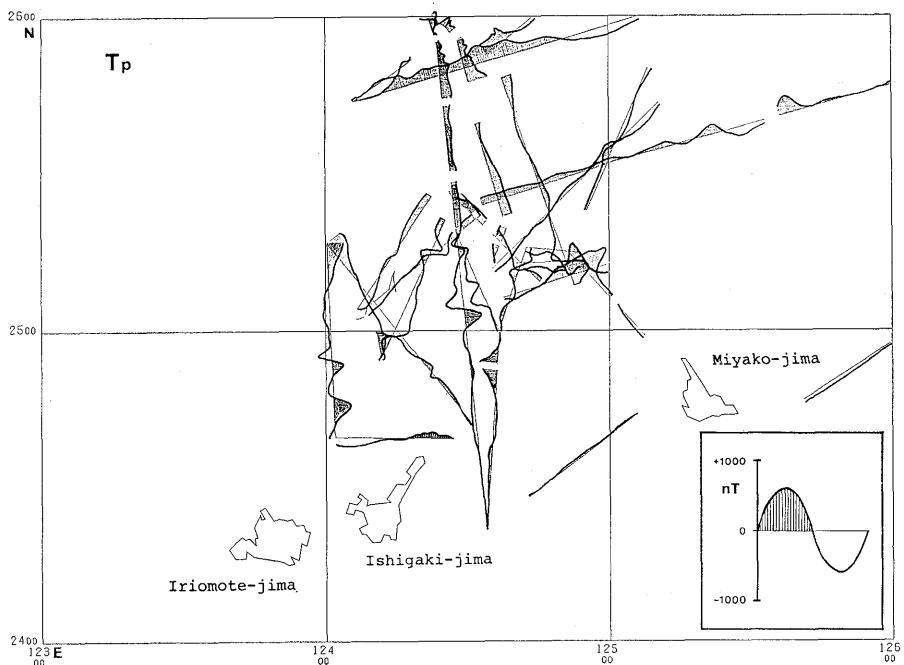


Fig. 5a.

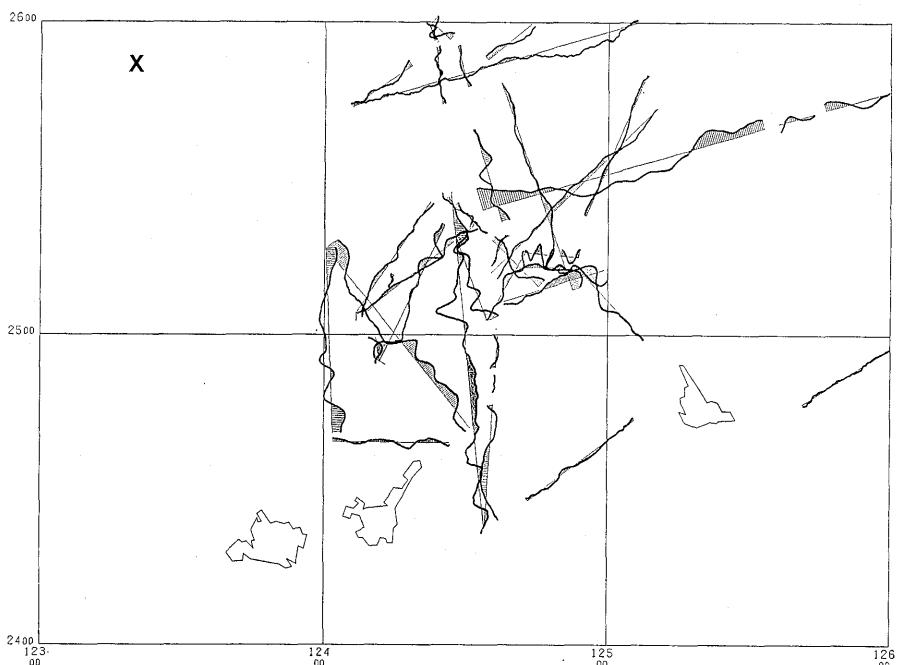


Fig. 5b.

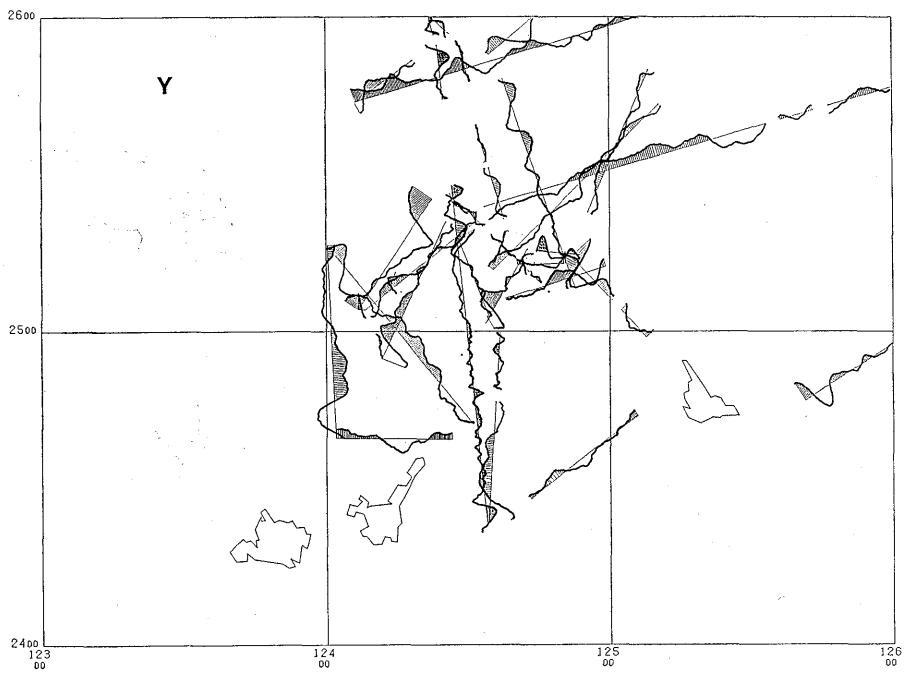


Fig. 5c.

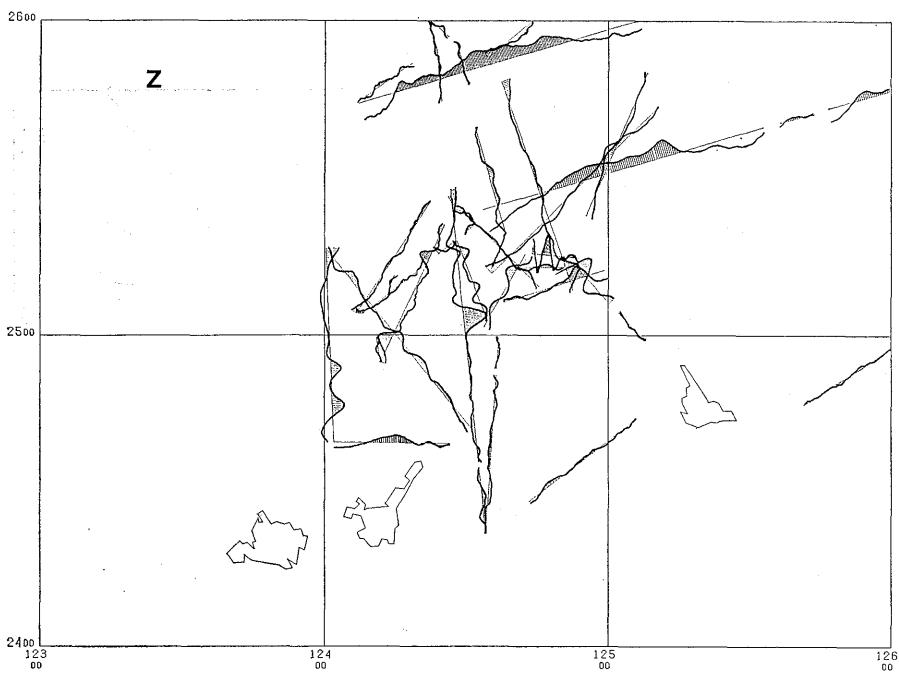


Fig. 5d.

Fig. 5. Geomagnetic anomalies projected perpendicularly to the track lines in the southwestern part of the Okinawa Trough. Figures 5a, 5b, 5c, and 5d show total geomagnetic anomalies ( $T_p$ ), X, Y and Z component geomagnetic anomalies respectively.

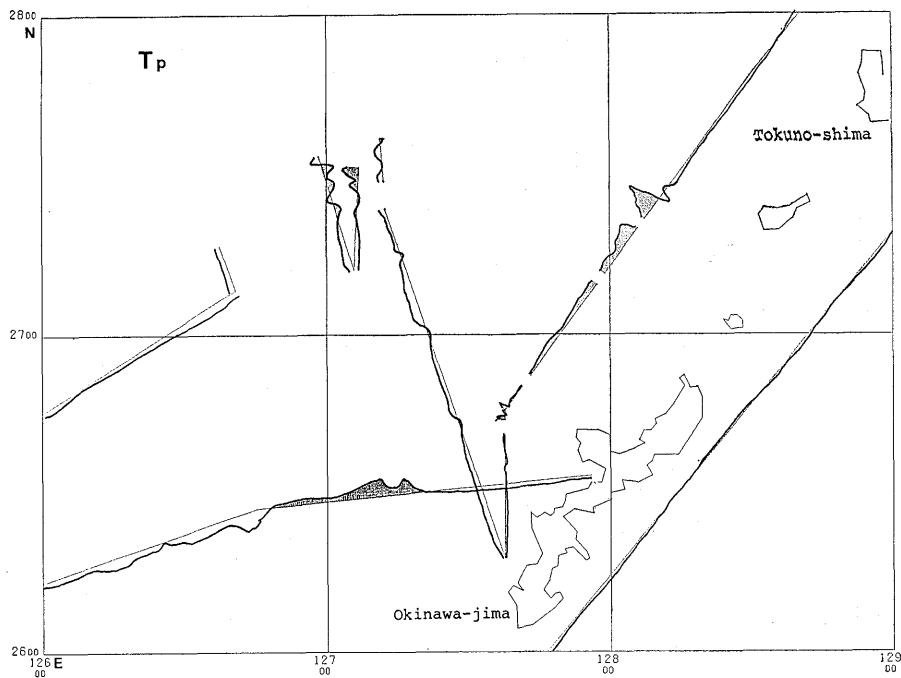


Fig. 6a.

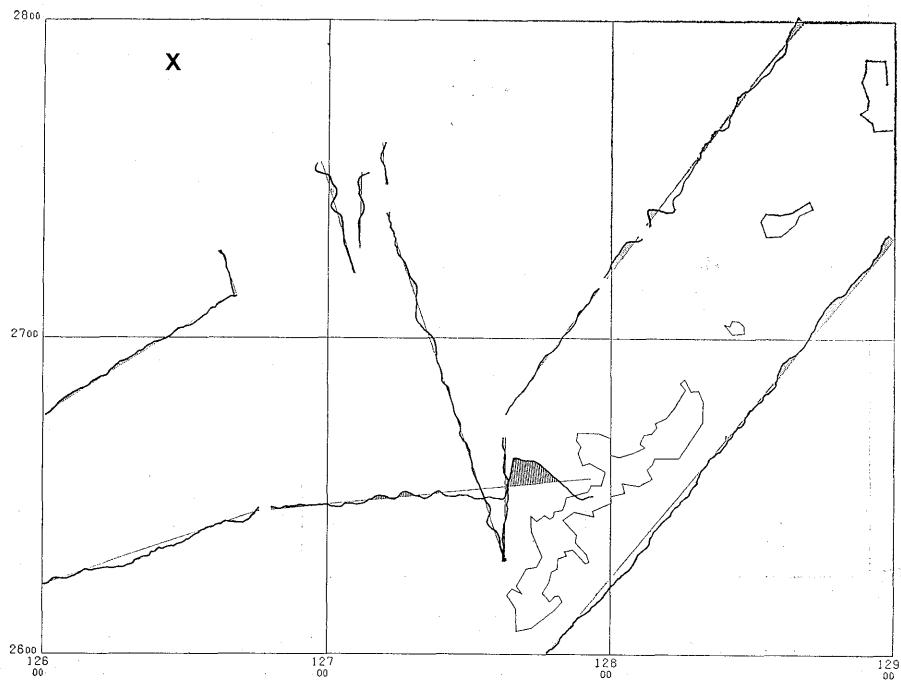


Fig. 6b.

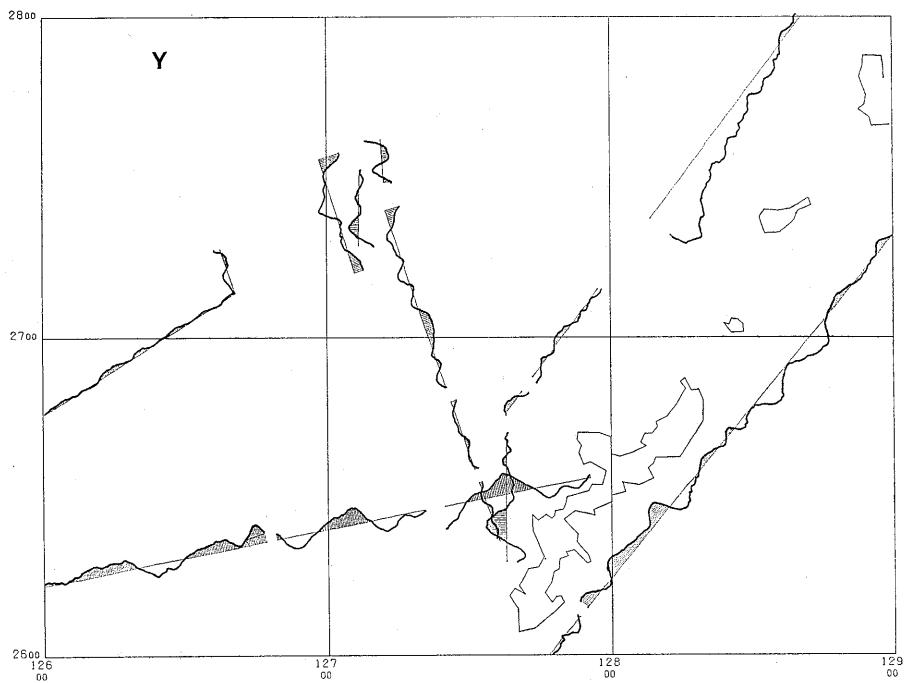


Fig. 6c.

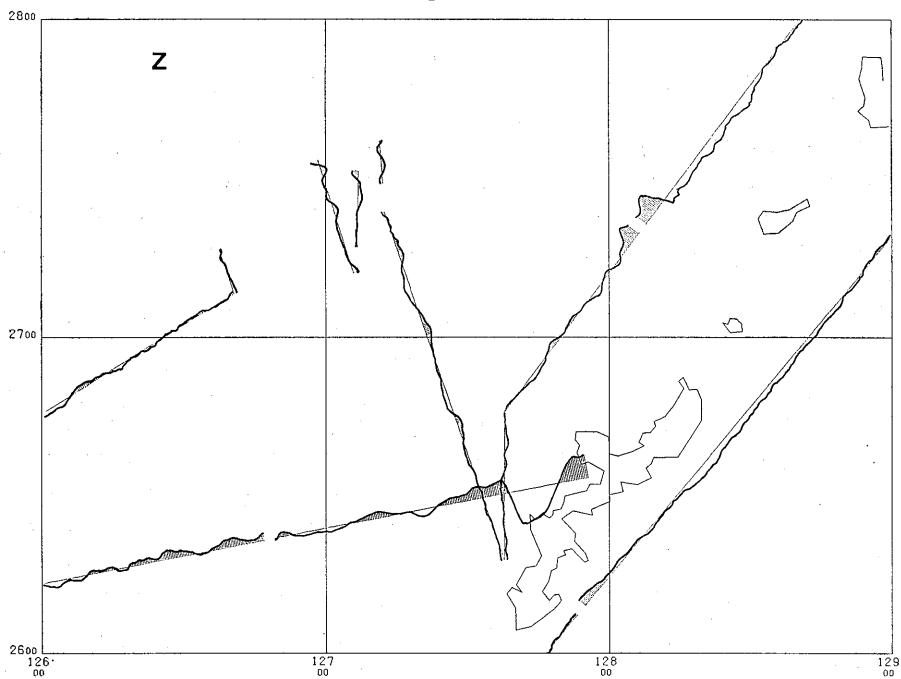


Fig. 6d.

Fig. 6. Geomagnetic anomalies projected perpendicularly to the track lines in the middle part of the Okinawa Trough. Figures 6a, 6b, 6c and 6d show total geomagnetic anomalies ( $T_p$ ), X, Y and Z component geomagnetic anomalies respectively.

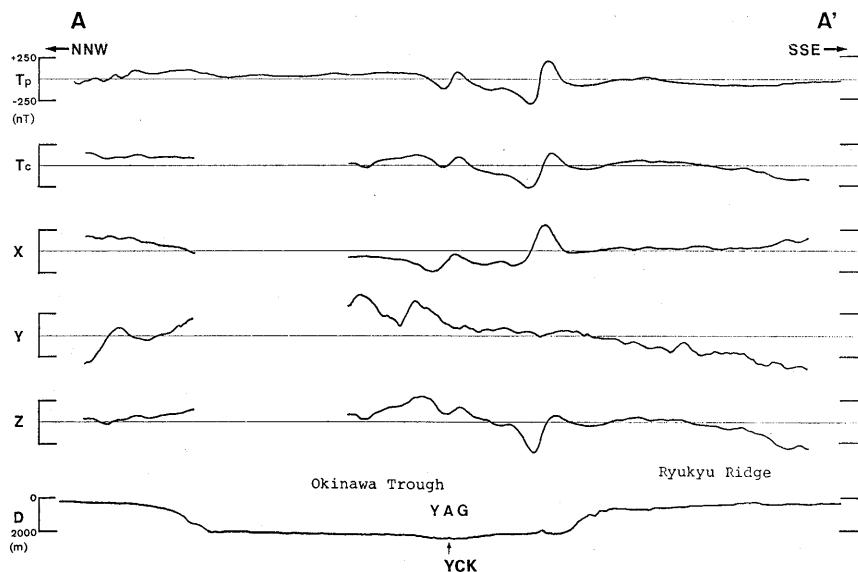


Fig. 7. Geomagnetic anomaly profiles ( $T_p$ ,  $T_c$ , X, Y, Z) and water depth (D) across the southwestern part of the Okinawa Trough. Locality of the profiles is shown in Figure 3. YAG=Yaeyama Graben. YCK=Yaeyama Central Sea-Knoll.

Yaeyama Graben, in the southwestern part of the Okinawa Trough (Figs. 5a and 9a).

(5) A positive anomaly area is observed on the edge of the East China Shelf around the Sekibi-sho (Figs. 2, 3, and 5a).

(6) Generally, positive anomaly dominates in the northern half of the southwestern part of the trough and negative anomaly in the southern half.

Figure 7 (Line A-A', Fig. 3) shows profiles of the N-S magnetic anomalies ( $T_p$ ,  $T_c$ , X, Y and Z) and water depth (D) across the trough. These profiles show that the magnetic anomalies are associated with a sea-knoll, i.e. the Yaeyama Central Sea-Knoll in the Yaeyama Graben, and a sea-hill. These profiles also suggest that the above sea-knoll/-hill consist of volcanics and are magnetized in normal polarity. To the left or north in the figure, positive anomaly is located between the edge of the shelf and the axis of the graben. To the right or south, low-amplitude and short-wavelength anomaly corresponds to the Ryukyu Ridge.

Line B-B' (Fig. 8a), across the eastern part of the Yaeyama Graben, suggests that the source bodies of geomagnetic anomalies are localized around the axial part of the graben under sediment layer of the trough. Seismic reflection profile also suggests that the small intrusive volcanic bodies exist under sediment layer.

Figure 8b (Line C-C') shows also magnetic profiles and a seismic profile across the Yaeyama Graben near the line A-A' (Fig. 7). Three topographic highs of the acoustic basement are observed in the seismic profile. And magnetic anomaly profiles suggest that the first and the third topographic highs, from south to north in the figure, are magnetized body causing the geomagnetic anomalies, but that the second peak is not or weakly magnetized body which may be a subsided piece of the Ryukyu Ridge.

Figures 9a-9c show the magnetic anomaly profiles, water depth, and 3.5 kHz profiles. Figure 9a crosses the region from the north foot of the Ryukyu Ridge off the northwest of the Miyako-jima to the eastern edge of the Yaeyama Graben (Fig. 3). Magnetic profiles in the figure show the largest amplitude during the survey. This geomagnetic anomaly correlates with the topography of the Irabu Sea-Knoll (Fig. 3). The Irabu Sea-Knoll is situated at the east end of the Yaeyama Graben where the junction of the extensive volcanic chain of the Ryukyu Arc and the Yaeyama Graben are crossing.

On Line E-E' (Fig. 9b), two knolls with magnetic anomalies are recognized in the southern half of the trough floor. In the axial part of the trough, western end area of the Yaeyama Graben (Fig. 3), however, geomagnetic anomaly and small sea-knoll like a Yaeyama Central Sea-Knoll (Fig. 3) are not recognized.

Line F-F' (Fig. 9c) extends NE from north of the Yaeyama Graben to the west end of the Miyako Graben and crosses the western part of the Miyako Sea-Mount (Fig. 3). Magnetic anomaly profiles in Figure 9c show that the small anomaly correlates with the Miyako Sea-Mount. In the area of the Miyako Graben there shows the magnetic quiet zone.

Figures 10a-10d show the magnetic anomaly profiles ( $T_p$ , X, Y, Z), water depth (D), and 3.5 kHz profiles across the Iheya Ridge in the middle part of the Okinawa Trough. Line G-G' (Fig. 10a) extends in a N-S direction across from the Iheya Ridge to the Izena Cauldron (Fig. 4). At the Izena Gauldron, we did not detect significant geomagnetic anomalies.

The vector of the magnetic anomalies has no component parallel to the geomagnetic lineation, in the case of an infinitely long body of magnetic anomaly. Then we can know whether the source body is lineated or not and also in which direction it is lineated from three component magnetic anomalies. The directions of the lineations are calculated from the observed three component magnetic data by the method of least square fits for the data sets about 20 km in length in individual calculation reference. The standard deviation of the direction is used to determine whether the magnetic source is linear or not.

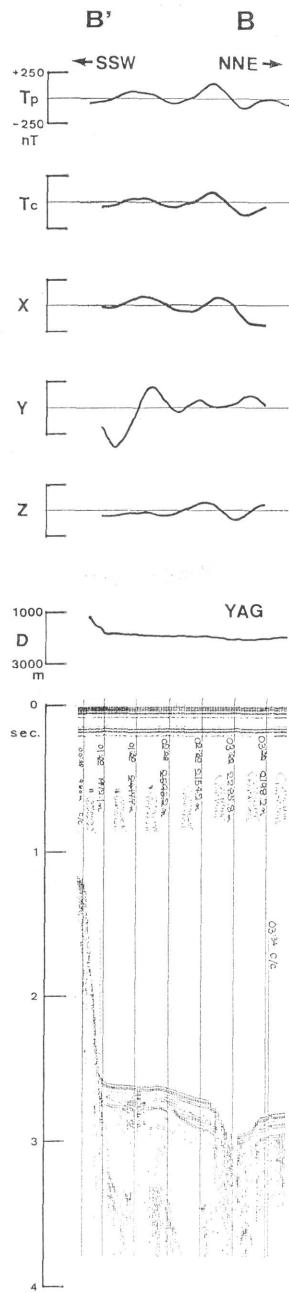


Fig. 8a.

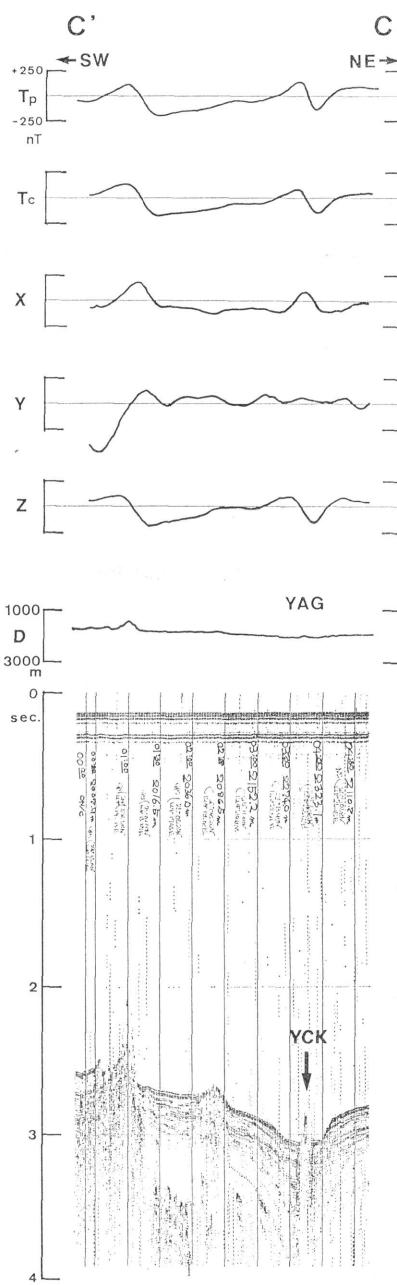


Fig. 8b.

Fig. 8. Geomagnetic anomaly profiles ( $T_p$ ,  $T_c$ , X, Y, Z), water depth (D), and seismic reflection profile across the southwestern part of the Okinawa Trough. Locality of the profiles is shown in Figure 3. YAG=Yaeyama Graben. YCK=Yaeyama Central Sea-Knoll.

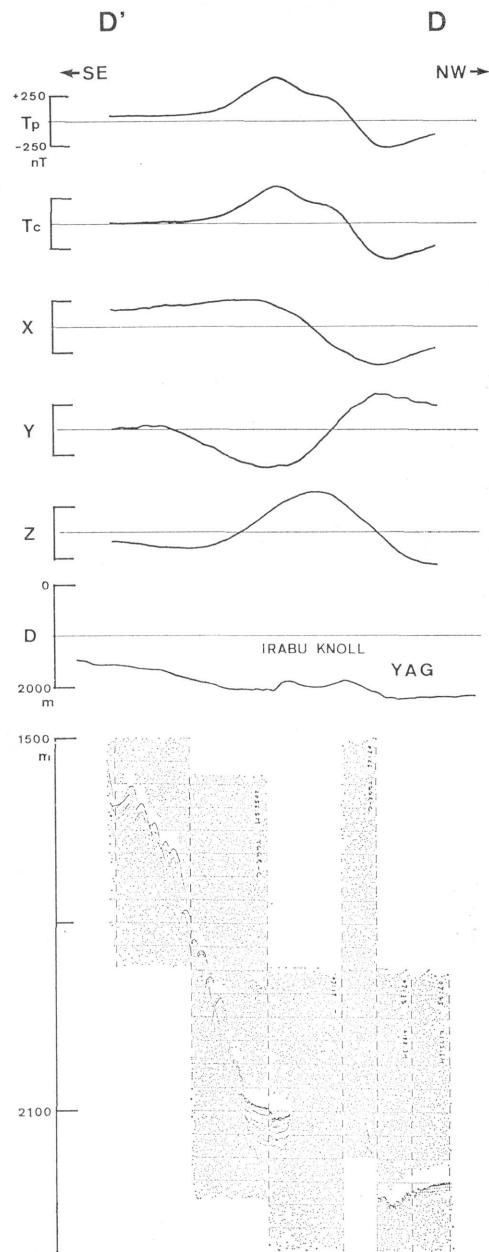


Fig. 9a.

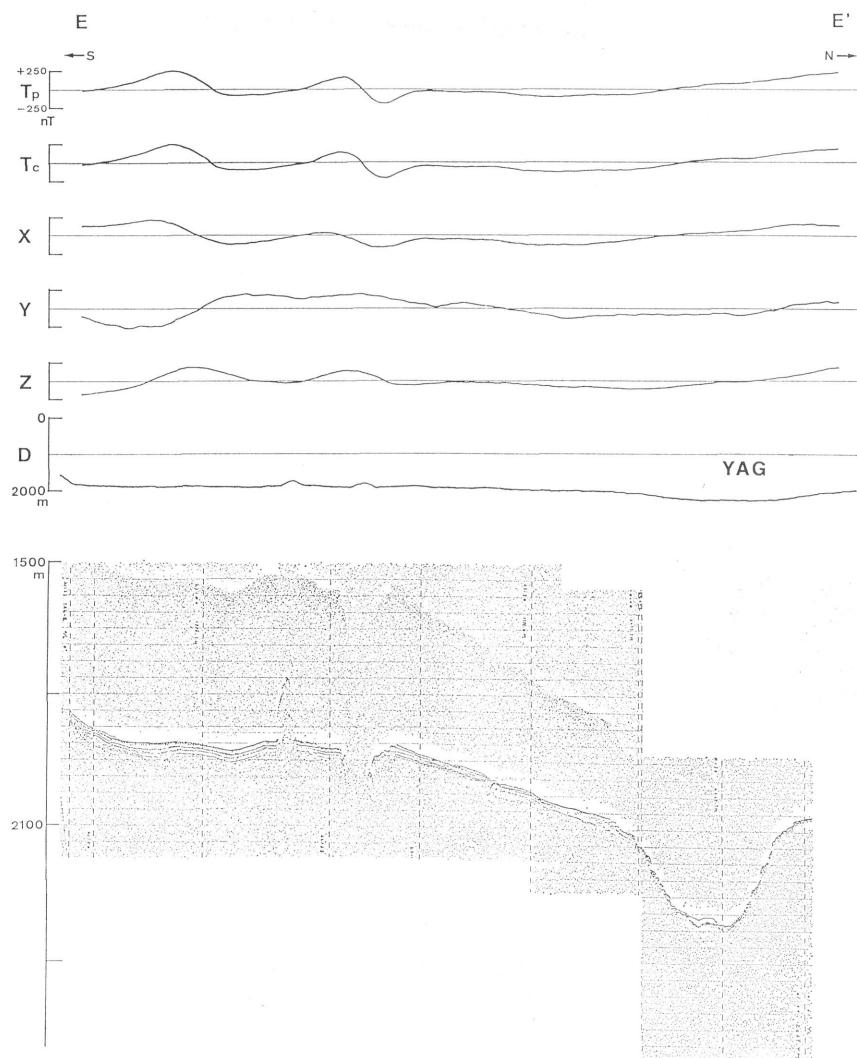


Fig. 9b.

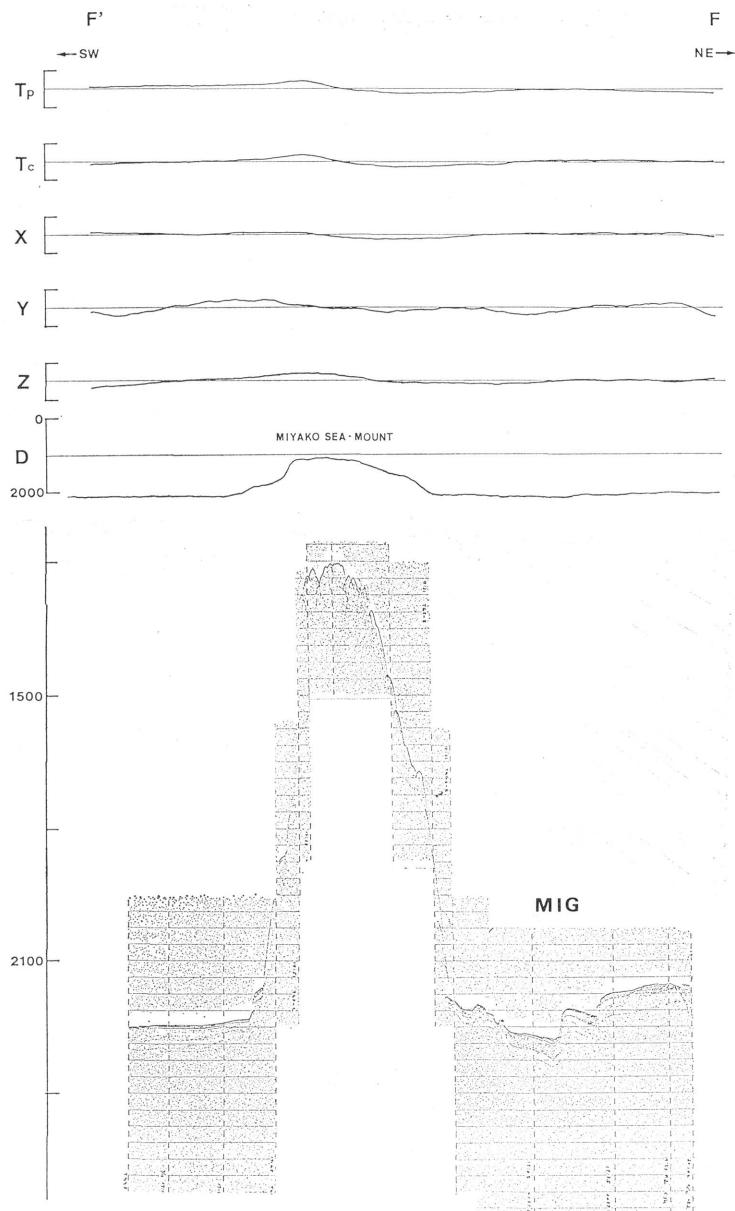


Fig. 9c.

Fig. 9. Geomagnetic naomaly profiles ( $T_p$ ,  $T_c$ , X, Y, Z), water depth (D), and 3.5 kHz profile across the southwestern part of the Okinawa Trough. Locality of the profiles is shown in Figure 3. YAG=Yaeyama Graben. MIG=Miyako Graben.

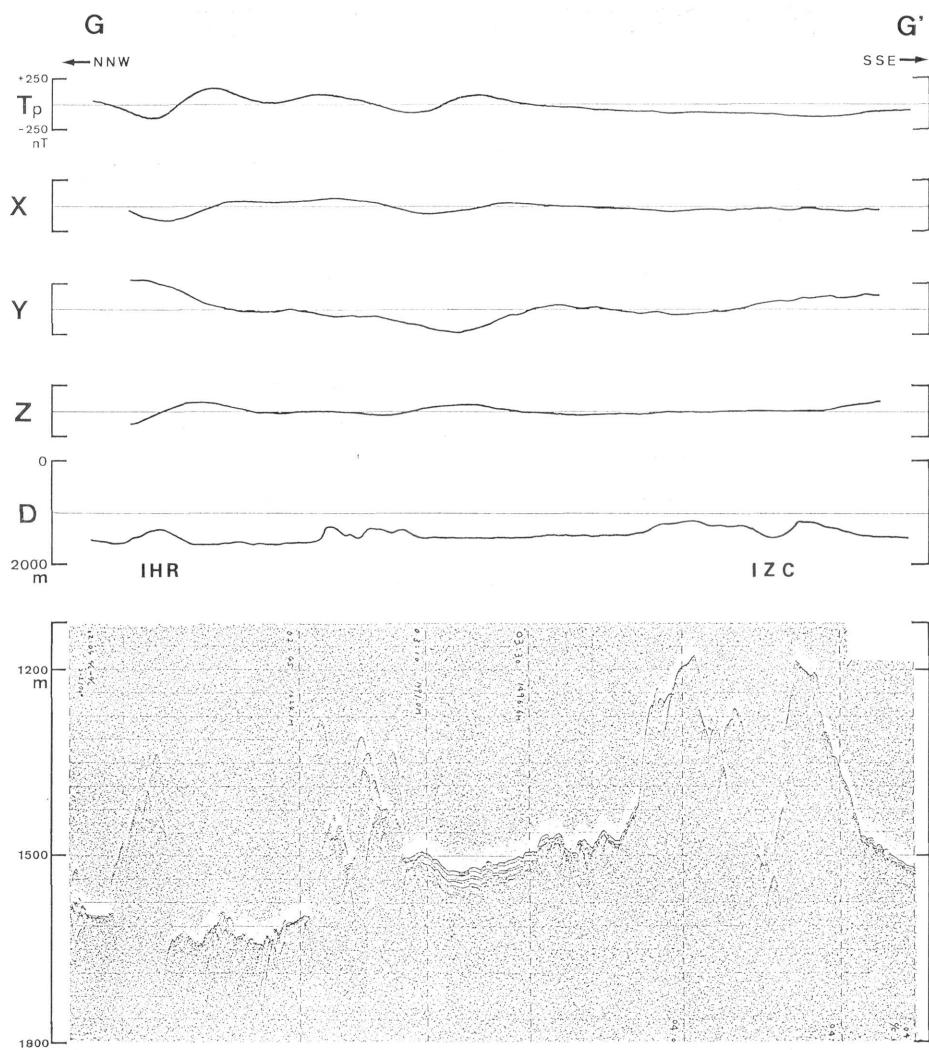


Fig. 10a.

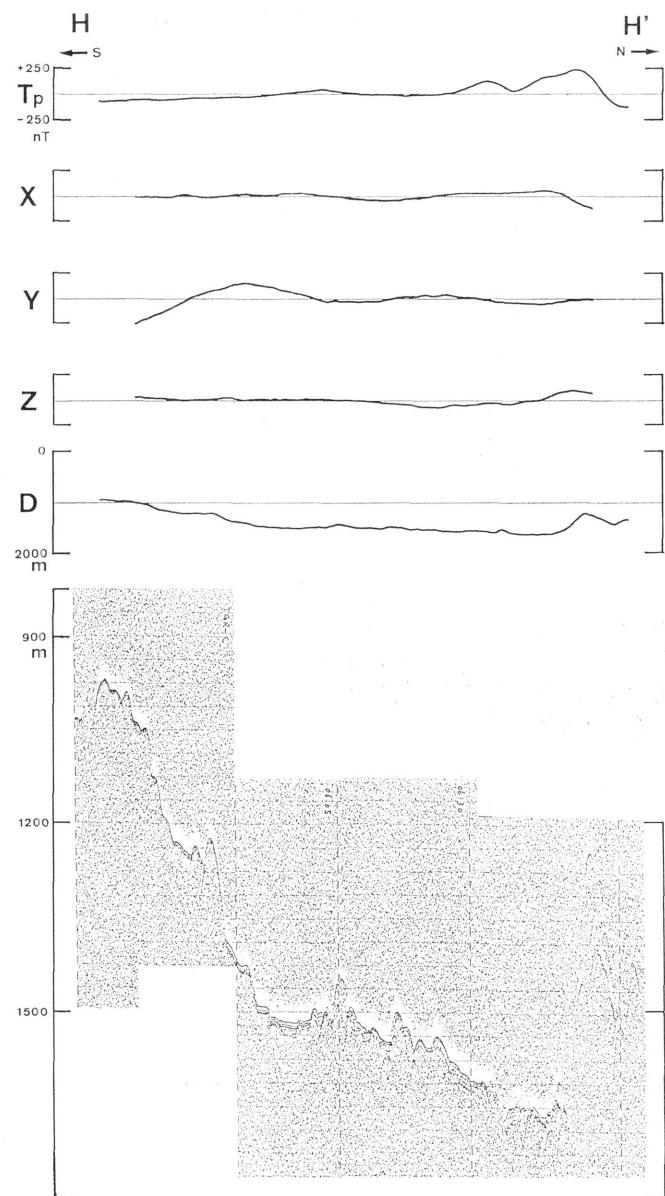


Fig. 10b.

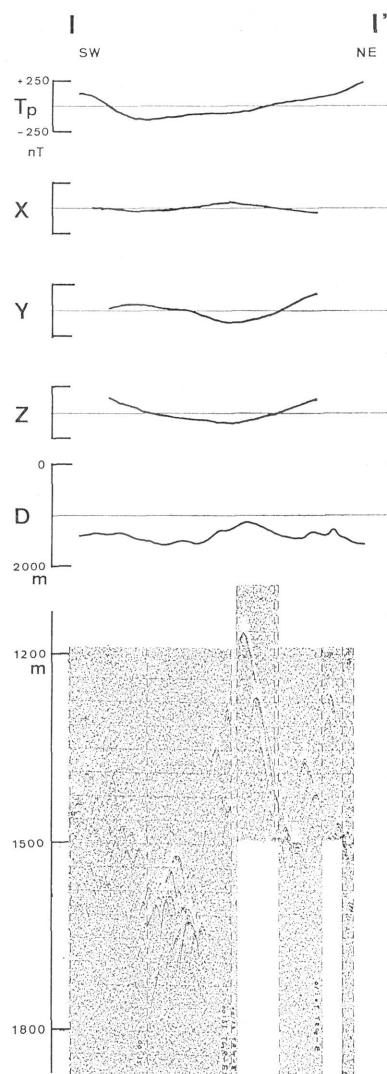


Fig. 10c.

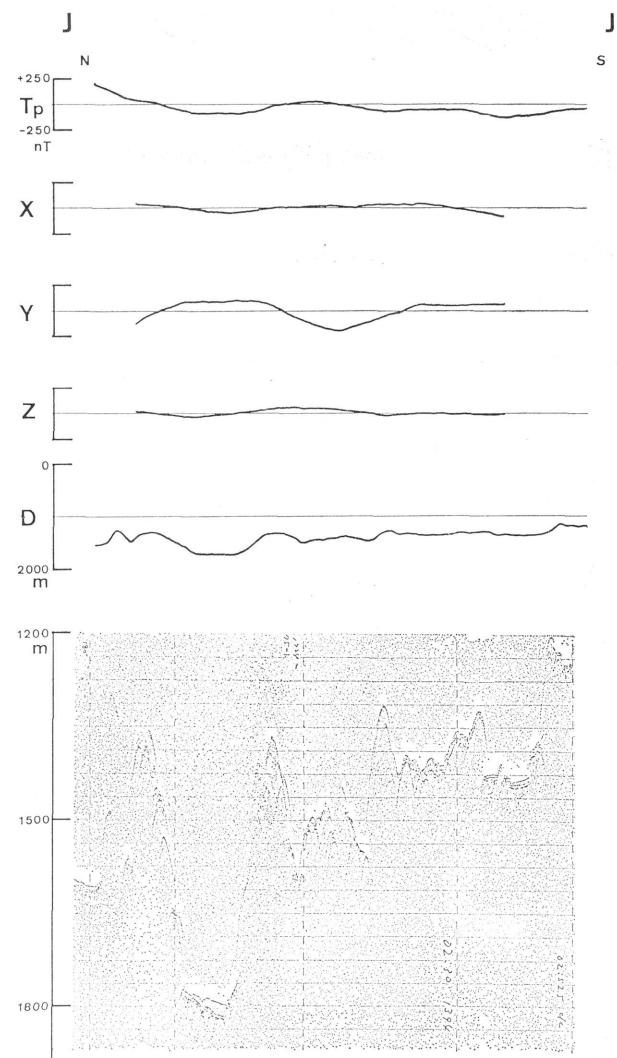


Fig. 10d.

Fig. 10. Geomagnetic anomaly profiles ( $T_p$ , X, Y, Z), water depth (D), and 3.5 kHz profile across the axial area of the middle part of the Okinawa Trough. Locality of the profiles is shown in Figure 4. IHR=Iheya Ridge. IZC=Izena Cauldron.



Fig. 11. Linearity and directions of the magnetized body calculated from the geomagnetic three components measured by STCM in the southwestern part of the Okinawa Trough. Hatched area shows the location of the Yaeyama Graben in the trough.

Though we tried to identify the lineation by the above method on the southwest Okinawa Trough area, we could not detect a magnetic anomaly lineation in the area (Fig. 11). We can conclude from the geomagnetic anomaly pattern shown in Figure 11 that there are no conspicuous magnetic lineations which suggest the back-arc spreading in the southwest Okinawa Trough. But discontinuous lineation of the magnetic anomalies is recognized in the axial part of the trough between the Yaeyama Central Sea-Knoll and the Irabu Sea-Knoll in the Yaeyama Graben (Fig. 3). This lineation suggests that the back-arc spreading with volcanism has initiated only in the eastern half of the Yaeyama Graben in the southwestern part of the Okinawa Trough. The lineation is about 50 km in length and elongated about EW direction. The length of the lineation is the same as that of the Iheya Ridge (about 50 km) in the middle part of the trough.

### Acknowledgments

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### Appendix 1

During the magnetic measurements, the research vessel was spinned around occasionally to check the varying intensity of the permanent and induced magnetization of the steel vessel. This measurement allows us to remove some spurious field of ship's hull in addition to actual geomagnetic field components. The date, time, and position of this routine monitoring is listed below.

Date and Time month-day-hour-minute	Latitude degree-minute (N)	Longitude degree-minute (E)
7-04-06-43	32-56. 34	133-48. 58
7-05-18-00	29-19. 18	130-33. 08
7-07-17-15	24-26. 84	124-41. 36
7-24-15-00	25-47. 86	124-24. 93
7-28-12-30	26-15. 36	127-35. 02
7-30-08-30	33-55. 71	137-01. 75

### Appendix 2

List of field data of the three components of the geomagnetic field, total geomagnetic intensities and bathymetric depths are presented. The list includes 12 items from left to right blocks as follows:

1. Sampled instance: year, (I2)
2. Sampled instance: month/day/time/minute, (4I3)
3. Ship's position: latitude in degree, (F8.5)
4. Ship's position: longitude in degree, (F9.5)
5. IGRF-85 base deviatic values of three components of the geomagnetic field: X/Y/Z components, unit in nT, (3I6)
6. Total intensity: unit in nT, (I6)
7. Water depth: unit in meter, (I6)

Data are presented every 10 minutes for the entire period of the cruises. When data are not available, the corresponding spaces are filled with several "9" characters.

88	7	3	11	10	34.38874	136.96944	-72	303	93	99999	99999
88	7	3	11	20	34.35455	136.96554	182	-247	-167	99999	99999
88	7	3	11	30	34.32037	136.96163	-40	123	40	99999	99999
88	7	3	11	40	34.28618	136.95773		143	27	99999	99999
88	7	3	11	50	34.25199	136.95383	99999	99999	99999	99999	99999
88	7	3	12	0	34.23116	136.92866	99999	99999	99999	99999	99999
88	7	3	12	10	34.21149	136.90816	-140	26	-84	99999	99999
88	7	3	12	20	34.19116	136.88916	-185	-107	-45	99999	99999
88	7	3	12	30	34.17516	136.87199	-257	135	79	99999	99999
88	7	3	12	40	34.15549	136.84599	-48	-39	30	99999	99999
88	7	3	12	50	34.14183	136.82316	-30	-93	44	99999	99999
88	7	3	13	0	34.12666	136.80066	10	81	45	99999	99999
88	7	3	13	10	34.11066	136.77799	-23	82	157	99999	99999
88	7	3	13	20	34.09516	136.75283	41	137	83	99999	99999
88	7	3	13	30	34.07899	136.73133	-82	51	90	99999	99999
88	7	3	13	40	34.06166	136.70916	35	24	-21	99999	99999
88	7	3	13	50	34.04466	136.68599	40	34	-17	99999	99999
88	7	3	14	0	34.02416	136.66149	63	-13	-28	99999	99999
88	7	3	14	10	34.00699	136.64099	56	-87	-45	99999	99999
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88	7	3	15	50	33.83233	136.41616	49	-110	-10	99999	99999
88	7	3	16	0	33.81366	136.39116	-12	-73	67	99999	99999
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88	7	3	17	20	33.67698	136.21817	-23	55	-62	99999	99999
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88	7	3	21	50	33.33983	135.43533	51	-2	33	99999	99999
88	7	3	22	0	33.33583	135.40333		15	58	99999	99999
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88	7	3	22	40	33.31799	135.28016	46	19	-53	99999	99999
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88	7	4	2	30	33.23566	134.54816	77	30	-51	99999	99999
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88	7	4	2	50	33.20999	134.49316	-48	-20	41	99999	99999
88	7	4	3	0	33.19833	134.46566	33	-95	-32	99999	99999
88	7	4	3	10	33.18833	134.44133	-33	-168	22	99999	99999
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88	7	4	9	30	32.76799	133.43816	66	-5	-42	46271	99999
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88	7	4	9	50	32.74133	133.38166	67	-44	-166	46261	99999
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88	7	4	15	50	32.53483	132.44950	99999	99999	99999	99999	99999
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88	7	4	18	50	32.18383	132.14116	-25	-96	8	46287	99999
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88	7	9	2	40	25.09617	124.48783	-205	-107	-204	44044	2037
88	7	9	2	50	25.08122	124.49034	-330	-2	4	44028	2008
88	7	9	3	0	25.06628	124.49285	99999	99999	99999	99999	1781
88	7	9	3	10	25.05133	124.49535	99999	99999	99999	99999	2014
88	7	9	3	20	25.03639	124.49786	149	-6	101	44463	2012
88	7	9	3	30	25.02144	124.50037	103	18	-14	44335	2008
88	7	9	3	40	25.00650	124.50288	66	214	-100	44232	1896
88	7	9	3	50	24.99156	124.50538	16	231	-20	44185	1476
88	7	9	4	0	24.97661	124.50789	-39	-12	-9	44169	1123
88	7	9	4	10	24.96167	124.51040	-37	-20	19	44172	887
88	7	9	4	20	24.94672	124.51291	-33	-38	15	44176	668
88	7	9	4	30	24.93178	124.51542	13	83	80	44200	732
88	7	9	4	40	24.91683	124.51792	5	182	138	44200	580
88	7	9	4	50	24.90189	124.52043	36	69	43	44201	627
88	7	9	5	0	24.88695	124.52294	80	342	14	44193	644
88	7	9	5	10	24.87200	124.52545	89	163	32	44205	660
88	7	9	5	20	24.85706	124.52795	62	18	28	44184	616
88	7	9	5	30	24.84211	124.53046	72	-48	48	44156	618
88	7	9	5	40	24.82717	124.53297	93	230	-10	44133	579
88	7	9	5	50	24.81223	124.53548	46	-86	20	44111	559
88	7	9	6	0	24.79728	124.53798	56	-47	31	44091	523
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88	7	9	6	20	24.76739	124.54300	24	-100	52	44058	436
88	7	9	6	30	24.75245	124.54551	13	185	47	44046	436
88	7	9	6	40	24.73750	124.54801	-25	-100	39	44033	400
88	7	9	6	50	24.72256	124.55052	-26	-64	60	44023	375
88	7	9	7	0	24.70762	124.55303	-29	-96	105	44015	302
88	7	9	7	10	24.69267	124.55554	-30	-220	124	44008	281
88	7	9	7	20	24.67773	124.55804	-31	-102	31	44000	373
88	7	9	7	30	24.66278	124.56055	-34	-78	49	43988	413
88	7	9	7	40	24.64784	124.56306	-25	156	-56	43987	391
88	7	9	7	50	24.63290	124.56557	-31	-102	-100	44003	371
88	7	9	8	0	24.61795	124.56807	-42	-364	-95	43993	355
88	7	9	8	10	24.60308	124.56979	-22	-102	-69	43992	363
88	7	9	8	20	24.58837	124.56966	5	-143	-286	43987	349
88	7	9	8	30	24.57367	124.56952	-11	-108	64	43980	310
88	7	9	8	40	24.55896	124.56939	-11	64	67	43973	289
88	7	9	8	50	24.54426	124.56926	-1	-92	26	43967	283
88	7	9	9	0	24.52956	124.56912	6	6	-9	43959	246
88	7	9	9	10	24.51485	124.56899	34	150	-47	43953	308

88	7	9	9	20	24.50015	124.56886	23	274	-42	43946	273
88	7	9	9	30	24.48544	124.56872	9	55	-101	43943	361
88	7	9	9	40	24.47074	124.56859	30	13	-124	43936	407
88	7	9	9	50	24.45603	124.56846	10	-387	-189	43930	438
88	7	9	10	0	24.44133	124.56833	11	259	129	43924	445
88	7	9	10	10	24.42662	124.56819	8	263	106	43915	459
88	7	9	10	20	24.41192	124.56806	-13	-8	93	43910	496
88	7	9	10	30	24.39721	124.56793	-10	-35	55	43901	502
88	7	9	10	40	24.38251	124.56779	15	302	11	43894	510
88	7	9	10	50	24.36781	124.56766	-15	-80	-4	43893	506
88	7	9	11	0	24.35310	124.56753	-21	-138	-27	43890	504
88	7	9	15	30	24.28913	124.59203	99999	99999	99999	99999	99999
88	7	9	19	30	24.35399	124.56916	99999	99999	99999	43882	501
88	7	9	19	40	24.38783	124.57366	99999	99999	99999	43888	489
88	7	9	19	50	24.41333	124.57598	-47	-244	-50	43904	462
88	7	9	20	0	24.44133	124.57897	5	63	19	43922	403
88	7	9	20	10	24.46934	124.58196	11	25	-10	43939	320
88	7	9	20	20	24.49734	124.58494	34	88	28	43956	293
88	7	9	20	30	24.52534	124.58793	60	140	37	43974	288
88	7	9	20	40	24.55335	124.59092	58	14	42	43992	299
88	7	9	20	50	24.58135	124.59390	38	-43	47	44012	303
88	7	9	21	0	24.60935	124.59689	28	149	83	44024	310
88	7	9	21	10	24.63736	124.59987	-4	124	64	43999	302
88	7	9	21	20	24.66536	124.60286	-64	106	-42	43985	194
88	7	9	21	30	24.68849	124.60716	-40	-25	-44	44002	84
88	7	9	21	40	24.71200	124.61160	-48	79	-52	44015	173
88	7	9	21	50	24.73233	124.61549	-58	-179	-74	44023	190
88	7	9	22	0	24.75449	124.61966	-43	-11	-75	44040	175
88	7	9	22	10	24.77649	124.62549	30	-64	4	44069	91
88	7	9	22	20	24.79783	124.63249	99999	99999	99999	44105	167
88	7	9	22	30	24.80949	124.63616	14	11	7	44132	177
88	7	9	22	40	24.81566	124.63649	15	156	18	44151	190
88	7	9	22	50	24.82249	124.63683	4	116	-12	44172	209
88	7	9	23	0	24.83460	124.63562	-27	-59	-10	44200	224
88	7	9	23	10	24.85062	124.63335	35	156	-56	44242	237
88	7	9	23	20	24.86664	124.63107	19	-103	-2	44320	249
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88	7	9	23	40	24.89869	124.62652	49	80	27	44377	435
88	7	9	23	50	24.91471	124.62425	-16	202	-11	44256	482
88	7	10	0	0	24.93073	124.62197	99999	99999	99999	99999	427
88	7	10	0	10	24.94675	124.61969	-56	-109	-24	44177	591
88	7	10	0	20	24.96277	124.61742	-32	-83	-22	44171	1221
88	7	10	0	30	24.97879	124.61514	8	94	-26	44171	1968
88	7	10	0	40	24.99481	124.61287	51	-125	24	44191	2017
88	7	10	0	50	25.01083	124.61059	99999	99999	99999	44224	2030
88	7	10	1	0	25.02685	124.60832	99999	99999	99999	44237	2039
88	7	10	1	10	25.04287	124.60604	99999	99999	99999	44209	2052
88	7	10	1	20	25.05889	124.60376	99999	99999	99999	44188	2051
88	7	10	1	30	25.07491	124.60149	23	-31	8	44199	2054
88	7	10	1	40	25.09093	124.59921	-9	-149	6	44214	2065
88	7	10	1	50	25.10695	124.59694	-7	116	-21	44206	2073
88	7	10	2	0	25.12298	124.59466	-4	-61	-15	44222	2091
88	7	10	2	10	25.13900	124.59238	28	-50	15	44255	99999
88	7	10	2	20	25.15502	124.59011	99999	99999	99999	44260	99999
88	7	10	2	30	25.17104	124.58783	99999	99999	99999	44254	99999
88	7	10	2	40	25.18706	124.58556	99999	99999	99999	44247	99999
88	7	10	2	50	25.19199	124.58516	99999	99999	99999	44246	99999
88	7	10	3	0	25.19599	124.58416	99999	99999	99999	44243	99999
88	7	10	3	10	25.20333	124.58283	99999	99999	99999	44256	99999
88	7	10	3	20	25.22233	124.59066	-4	-23	-23	44299	2261
88	7	10	3	30	25.24216	124.59833	-5	37	-18	44365	2274
88	7	10	3	40	25.26199	124.60616	49	-142	11	44417	2253

88	7	10	3	50	25.30699	124.62949	54	92	21	44445	2142
88	7	10	4	0	25.32583	124.63966	9	84	6	44452	2112
88	7	10	4	10	25.34633	124.64525	99999	99999	99999	44490	2107
88	7	10	4	20	25.37220	124.63572	54	19	-15	44514	2098
88	7	10	4	30	25.39806	124.62619	19	-73	-32	44523	2089
88	7	10	4	40	25.42392	124.61666	-4	-52	-51	44530	2079
88	7	10	4	50	25.44979	124.60712	-18	98	-53	44544	2070
88	7	10	5	0	25.47565	124.59759	-3	120	13	44558	2063
88	7	10	5	10	25.50151	124.58806	-39	-85	-11	44560	2077
88	7	10	5	20	25.52738	124.57853	-113	-87	25	44549	2067
88	7	10	5	30	25.55324	124.56899	-48	-19	179	44543	2053
88	7	10	5	40	25.57910	124.55946	-37	-155	81	44535	2037
88	7	10	5	50	25.60497	124.54993	-50	-143	4	44532	2019
88	7	10	6	0	25.63083	124.54040	11	-128	-45	44559	2011
88	7	10	6	10	25.65669	124.53087	75	210	-83	44605	1996
88	7	10	6	20	25.68256	124.52133	-21	16	-1	44654	1988
88	7	10	6	30	25.70716	124.51449	26	87	-30	44718	1976
88	7	10	6	40	25.72933	124.51416	39	-40	-24	44801	1729
88	7	10	6	50	25.75133	124.51383	7	35	-3	44875	1379
88	7	10	7	0	25.77381	124.51231	45	-94	-9	44899	99999
88	7	10	7	10	25.80201	124.50378	22	146	10	44877	333
88	7	10	7	20	25.83022	124.49525	-27	-20	-3	44804	289
88	7	10	7	30	25.85842	124.48672	97	20	44795	234	
88	7	10	7	40	25.88663	124.47819	-68	-147	-4	44735	204
88	7	10	7	50	25.91483	124.46966	46	-9	1	44782	190
88	7	10	8	0	25.93533	124.46133	28	36	48	44775	176
88	7	10	8	10	25.95149	124.44633	47	31	78	44821	163
88	7	10	8	20	25.96566	124.42833	61	42	48	44803	156
88	7	10	8	30	25.97783	124.40883	-128	108	-69	44773	147
88	7	10	8	40	25.98983	124.38883	86	153	-117	44794	142
88	7	10	8	50	26.00199	124.36949	-8	-66	291	44790	141
88	7	10	11	40	26.04083	124.31957	99999	99999	99999	99999	99999
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88	7	10	14	10	25.97097	124.36677	99999	99999	99999	99999	99999
88	7	10	16	20	25.84033	124.33893	99999	99999	99999	99999	99999
88	7	10	18	30	25.68503	124.37417	99999	99999	99999	99999	99999
88	7	10	19	0	25.62537	124.38543	99999	99999	99999	99999	99999
88	7	10	19	40	25.65080	124.39223	99999	99999	99999	99999	99999
88	7	10	19	50	25.59113	124.38883	99999	99999	99999	99999	99999
88	7	10	20	0	25.57207	124.38983	99999	99999	99999	99999	99999
88	7	10	20	10	25.55540	124.39163	99999	99999	99999	99999	99999
88	7	10	20	20	25.55270	124.39163	99999	99999	99999	99999	99999
88	7	10	20	30	25.53763	124.39273	99999	99999	99999	99999	99999
88	7	10	20	40	25.51817	124.40200	99999	99999	99999	99999	99999
88	7	10	20	50	25.50700	124.40170	99999	99999	99999	99999	99999
88	7	10	21	0	25.49303	124.40310	99999	99999	99999	99999	99999
88	7	10	21	10	25.47297	124.40550	99999	99999	99999	99999	99999
88	7	10	21	50	25.43947	124.38293	-113	161	73	44544	99999
88	7	10	22	0	25.41922	124.36889	-90	127	81	44544	99999
88	7	10	22	10	25.39898	124.35486	-59	220	93	44545	2073
88	7	10	22	20	25.37874	124.34083	-67	165	124	44540	2080
88	7	10	22	30	25.35850	124.32679	-63	-2	119	44532	2087
88	7	10	22	40	25.33826	124.31276	134	-271	-167	44516	2104
88	7	10	22	50	25.31802	124.29873	191	-292	-249	44494	2118
88	7	10	23	0	25.29778	124.28469	123	-80	-142	44466	2134
88	7	10	23	10	25.27754	124.27066	57	-47	-89	44429	2189
88	7	10	23	20	25.25729	124.25662	27	-63	-100	44382	2280
88	7	10	23	30	25.23705	124.24259	-47	-36	56	44379	2291
88	7	10	23	40	25.21681	124.22856	6	-19	57	44415	2270
88	7	10	23	50	25.19657	124.21452	74	68	-35	44396	2179
88	7	11	0	0	25.17633	124.20049	80	-157	-72	44375	2124
88	7	11	0	10	25.15899	124.18599	15	80	24	44339	2097

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88	7	11	0	20	25.14166	124.17149	-21	-80	6	44299	2069
88	7	11	0	30	25.12433	124.15716	-17	158	7	44266	2041
88	7	11	0	40	25.10716	124.14283	-45	117	42	44247	2006
88	7	11	0	50	25.08833	124.12716	-104	230	139	44232	1981
88	7	11	1	0	25.07249	124.11399	-42	-80	-4	44197	1958
88	7	11	1	10	25.05533	124.09983	99999	99999	99999	44214	1934
88	7	11	1	20	25.05867	124.10786	-16	284	89	44191	1949
88	7	11	1	30	25.06511	124.12673	-6	-3	-23	44208	1962
88	7	11	1	40	25.07761	124.14809	21	-265	-65	44237	1987
88	7	11	1	50	25.09617	124.17195	8	-98	-45	44250	2028
88	7	11	2	0	25.11472	124.19582	24	131	-34	44273	2064
88	7	11	2	10	25.13328	124.21968	71	36	-92	44311	2093
88	7	11	2	20	25.15184	124.24354	32	132	-8	44344	2093
88	7	11	2	30	25.17040	124.26740	53	62	-51	44365	2134
88	7	11	2	40	25.18896	124.29127	-59	193	74	44372	2183
88	7	11	2	50	25.20751	124.31513	-11	4	-17	44382	2211
88	7	11	3	0	25.22607	124.33899	-68	161	105	44418	2262
88	7	11	3	10	25.24463	124.36285	-25	25	89	44493	2276
88	7	11	3	20	25.26233	124.38633	-85	-84	214	44395	2118
88	7	11	3	30	25.27499	124.40649	-107	46	-15	44241	2276
88	7	11	3	40	25.28783	124.42666	54	-214	-64	44372	2265
88	7	11	3	50	25.30116	124.44716	118	-89	-59	44453	2181
88	7	11	4	0	25.33833	124.50399	63	-5	-47	44474	2144
88	7	11	4	10	25.35271	124.52773	-127	91	134	44478	2112
88	7	11	4	20	25.36783	124.54999	99999	99999	99999	44488	2098
88	7	11	4	30	25.38066	124.52899	-3	57	17	44499	2092
88	7	11	4	40	25.39083	124.50366	-25	7	-36	44506	2089
88	7	11	4	50	25.39466	124.47816	49	69	-70	44512	2084
88	7	11	5	0	25.40675	124.45458	-28	86	7	44522	2074
88	7	11	5	10	25.42934	124.44376	6	75	59	44540	2067
88	7	11	5	20	25.45194	124.43295	-57		44553	2057	
88	7	11	8	30	25.23833	124.42377	99999	99999	99999	99999	99999
88	7	11	12	0	25.13503	124.45690	99999	99999	99999	99999	99999
88	7	11	16	30	24.80000	124.47087	99999	99999	99999	99999	99999
88	7	11	18	40	24.65320	124.46400	-26	45	-83	44035	472
88	7	11	18	50	24.65300	124.43950	-6	22	-81	44067	436
88	7	11	19	0	24.65090	124.41600	35	42	-82	44098	391
88	7	11	19	10	24.64860	124.39200	54	47	-114	44098	351
88	7	11	19	20	24.64699	124.36649	83	9	-33	44151	328
88	7	11	19	30	24.64566	124.34166	69	-32	-77	44153	356
88	7	11	19	40	24.64433	124.31649	13	-125	-96	44126	361
88	7	11	19	50	24.64280	124.29000	-107	-144	19	44094	311
88	7	11	20	0	24.64283	124.26633	-35	-38	160	44074	301
88	7	11	20	10	24.64372	124.24035	-27	-290	172	44085	336
88	7	11	20	20	24.64606	124.20399	-22	-103	138	44087	359
88	7	11	20	30	24.64840	124.16762	-74	-290	137	44060	383
88	7	11	20	40	24.65074	124.13125	-25	-32	-2	44020	501
88	7	11	20	50	24.65308	124.09488	16	-5	-79	44007	734
88	7	11	21	0	24.65542	124.05852	8	-69	-103	44024	823
88	7	11	21	10	24.65776	124.02215	29	98	-88	44052	981
88	7	11	21	20	24.67050	124.00042	86	-45	-151	44098	1582
88	7	11	21	30	24.69884	124.00065	97	-223	-104	44174	1838
88	7	11	21	40	24.72718	124.00087	163	-340	-10	44291	1867
88	7	11	21	50	24.75552	124.00110	148	-265	200	44439	1867
88	7	11	22	0	24.78387	124.00132	-95	106	187	44238	1872
88	7	11	22	10	24.81221	124.00155	-104	311	1	44141	1880
88	7	11	22	20	24.84055	124.00177	-51	75	-47	44199	1863
88	7	11	22	30	24.86889	124.00200	38	71	19	44307	1867
88	7	11	22	40	24.89724	124.00222	-63	197	222	44376	1852
88	7	11	22	50	24.92558	124.00245	-134	190	-92	44106	1884
88	7	11	23	0	24.95392	124.00267	-29	137	3	44277	1892
88	7	11	23	10	24.98226	124.00290	-81	24	-6	44275	1914

88	7	11	23	20	25.01061	124.00312	-90	44	-5	44281	1949
88	7	11	23	30	25.03895	124.00335	-140	-116	-58	44243	1975
88	7	11	23	40	25.06729	124.00357	-105	-101	-78	44262	2003
88	7	11	23	50	25.09563	124.00380	-113	-199	-110	44288	2024
88	7	12	0	0	25.12397	124.00403	-18	-11	-121	44329	2085
88	7	12	0	10	25.15232	124.00425	1	-183	-102	44414	2215
88	7	12	0	20	25.18066	124.00448	78	74	-40	44477	2266
88	7	12	0	30	25.20900	124.00470	48	-140	-14	44514	2276
88	7	12	0	40	25.23734	124.00493	143	71	24	44594	2222
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88	7	19	17	20	26.37300	126.50629	-430	636	44368	1449	
88	7	19	17	30	26.36431	126.47989	-489	741	23	44423	1311
88	7	19	17	40	26.35563	126.45349	-351	386	-22	44441	1258
88	7	19	17	50	26.34694	126.42709	-554	559	308	44506	1393
88	7	19	18	0	26.33825	126.40069	-455	516	-65	44429	1680

88	7	19	18	10	26.32956	126.37429	-549	395	86	44437	1797
88	7	19	18	20	26.32088	126.34789	-494	450	63	44428	1798
88	7	19	18	30	26.31219	126.32149	-590	648	140	44422	1714
88	7	19	18	40	26.30350	126.29508	-422	697	-27	44378	1358
88	7	19	18	50	26.29481	126.26868	-506	602	66	44371	1049
88	7	19	19	0	26.28613	126.24228	-340	685	-72	44370	1584
88	7	19	19	10	26.27744	126.21588	-352	596	15	44399	1807
88	7	19	19	20	26.26875	126.18948	-449	518	101	44452	1962
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88	7	19	19	40	26.25474	126.13887	-184	579	-151	44461	2024
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88	7	19	20	10	26.23645	126.06474	-262	328	-76	44452	2053
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88	7	19	20	30	26.22426	126.01531	-243	418	-93	44472	2059
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88	7	19	20	50	26.21207	125.96589	-245	346	72	44538	2076
88	7	19	21	0	26.20597	125.94117	-154	325	22	44554	2104
88	7	19	21	10	26.19987	125.91646	-130	254	-11	44564	2119
88	7	19	21	20	26.19378	125.89175	-30	269	-110	44575	2129
88	7	19	21	30	26.18768	125.86703	-102	254	27	44566	2149
88	7	19	21	40	26.18158	125.84232	-229	337	141	44556	2151
88	7	19	21	50	26.17549	125.81761	-289	275	128	44521	2150
88	7	19	22	0	26.16939	125.79290	-113	199	-64	44496	2148
88	7	19	22	10	26.16329	125.76818	-105	262	-46	44487	2140
88	7	19	22	20	26.15719	125.74347	-92	267	-106	44485	2114
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88	7	19	22	50	26.13890	125.66933	-30	68	-179	44497	2087
88	7	19	23	0	26.13281	125.64462	51	20	-257	44504	2076
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88	7	20	0	20	26.08403	125.44692	96	41	-194	44532	1984
88	7	20	0	30	26.07794	125.42221	80	-24	-160	44552	1963
88	7	20	0	40	26.07184	125.39749	-12	-25	-15	44580	1942
88	7	20	0	50	26.06574	125.37278	142	70	-158	44601	1888
88	7	20	1	0	26.05965	125.34807	83	-6	-63	44618	1877
88	7	20	1	10	26.05355	125.32336	-8	-21	-6	44625	1856
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88	7	20	2	0	26.02306	125.19979	77	-58	-79	44607	1733
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88	7	20	3	50	25.95600	124.92795	-118	-123	-18	44515	1488
88	7	20	4	0	25.94990	124.90324	-71	-214	-26	44527	1476
88	7	20	4	10	25.94381	124.87853	-201	-41	119	44545	1527
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88	7	20	4	50	25.91942	124.77968	-18	-204	222	44723	1599
88	7	20	5	0	25.91332	124.75497	49	-179	197	44736	1656
88	7	20	5	10	25.90722	124.73025	64	9	167	44732	1522
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88	7	20	5	30	25.89503	124.68083	108	-81	188	44782	1212
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88	7	20	5	50	25.88284	124.63140	216	-134	175	44856	99999
88	7	20	6	0	25.87674	124.60669	163	-331	199	44824	211
88	7	20	6	10	25.87064	124.58198	221	-556	140	44840	197
88	7	20	6	20	25.86455	124.55726	178	-427	231	44885	185
88	7	20	6	30	25.85845	124.53255	187	-280	271	44897	173
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88	7	20	7	50	25.80505	124.34153	99	-348	208	44799	658
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88	7	20	9	10	25.74840	124.15519	241	-264	-146	44653	629
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88	7	20	9	50	25.73166	124.08821	177	-237	-154	44700	300
88	7	20	10	0	25.74388	124.10855	22	-200	-67	44698	277
88	7	20	10	10	25.75611	124.12890	32	-164	-86	44681	244
88	7	20	10	20	25.76833	124.14925	57	123	-109	44683	234
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88	7	20	10	40	25.79277	124.18994	25	51	-36	44708	388
88	7	20	10	50	25.80499	124.21029	-125	66	165	44692	476
88	7	20	11	0	25.81721	124.23063	-130	-172	104	44652	670
88	7	20	11	10	25.82944	124.25098	14	-6	-116	44642	717
88	7	20	11	20	25.84166	124.27133	-7	63	52	44720	270
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88	7	20	14	20	25.88743	124.35950	99999	99999	99999	99999	99999
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88	7	20	21	0	25.78828	124.63040	-12	32	90	44715	2014
88	7	20	21	10	25.76301	124.64022	53	294	34	44666	2020
88	7	20	21	20	25.73773	124.65003	23	83	26	44615	2018
88	7	20	21	30	25.71246	124.65985	9	38	-49	44568	2012
88	7	20	21	40	25.68719	124.66966	-124	-25	44525	1971	
88	7	20	21	50	25.66192	124.67948	-38	-266	-37	44489	2030
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88	7	20	22	10	25.61137	124.69911	-20	147	-49	44455	2047
88	7	20	22	20	25.58610	124.70892	-30	232	-4	44450	2060
88	7	20	22	30	25.56083	124.71874	-13	-31	-25	44456	2065
88	7	20	22	40	25.53555	124.72855	-10	-16	17	44458	2071
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88	7	21	2	0	25.11483	124.80917	99999	99999	99999	44238	2045
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88	7	21	4	0	25.33168	124.55842	18	53	82	44468	2116
88	7	21	4	10	25.35350	124.53483	55	-123	18	44489	2099
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88	7	21	4	50	25.41600	124.46733	-25	-207	39	44536	2067
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88	7	21	11	40	25.35480	124.48553	99999	99999	99999	99999	99999
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88	7	21	22	50	25.21767	124.34317	-117	-480	132	44365	2234
88	7	21	23	0	25.21467	124.36767	-252	83	144	44361	2212
88	7	21	23	10	25.21133	124.39167	-208	490	156	44366	2202
88	7	21	23	20	25.21127	124.40684	104	201	-36	44359	2201
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88	7	22	0	10	25.21401	124.55690	243	-29	-281	44240	2206
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88	7	22	1	10	25.21728	124.73699	84	-151	-41	44220	2284
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88	7	22	2	30	25.22192	124.98431	180	101	-199	44094	2085
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88	7	23	22	10	25.09071	124.20649	9	-59	-7	44190	1993
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88	7	23	22	30	25.05514	124.19412	99999	99999	99999	44135	1976
88	7	23	22	40	25.03735	124.18794	-71	-495	-245	44065	1953
88	7	23	22	50	25.01956	124.18176	-185	-309	-159	44012	1929
88	7	23	23	0	25.00241	124.18016	122	87	95	44129	1898
88	7	23	23	10	24.98588	124.18315	214	229	193	44353	1569
88	7	23	23	20	24.96935	124.18614	174	298	104	44366	1400
88	7	23	23	30	24.95282	124.18912	131	86	-12	44330	1506
88	7	23	23	40	24.93630	124.19211	53	223	-65	44299	1685
88	7	23	23	50	24.91977	124.19509	-81	-275	-93	44239	1798
88	7	24	0	0	24.90324	124.19808	-320	-104	-14	44180	1923
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88	7	24	0	20	24.90764	124.20946	129	-259	-147	44168	1883
88	7	24	0	30	24.91993	124.21660	90	-431	-24	44221	1898
88	7	24	0	40	24.93221	124.22374	186	-363	-109	44279	1828
88	7	24	0	50	24.94873	124.23184	114	153	128	44340	1852
88	7	24	1	0	24.96630	124.24017	83	135	129	44338	1513
88	7	24	1	10	24.98387	124.24850	-179	180	258	44196	1973
88	7	24	1	20	25.00144	124.25684	-166	231	30	44082	1989
88	7	24	1	30	25.01901	124.26517	-127	15	-32	44094	2009
88	7	24	1	40	25.03658	124.27350	-109	182	-18	44129	2018

88	7	24	1	50	25.05416	124.28183	-32	132	-160	44151	2027
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88	7	24	2	10	25.08930	124.29850	53	142	-213	44187	2022
88	7	24	2	20	25.10687	124.30683	-59	34	-30	44222	1986
88	7	24	2	30	25.12444	124.31517	-50	-15	59	44263	2039
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88	7	24	2	50	25.15958	124.33183	59	-117	-164	44284	2124
88	7	24	3	0	25.17716	124.34017	120	63	-223	44303	2145
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88	7	24	11	0	25.59273	124.41767	99999	99999	99999	99999	99999
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88	7	24	15	50	25.77944	124.44392	-81	27	-89	44801	360
88	7	24	16	0	25.79915	124.46939	-52	-74	-29	44831	284
88	7	24	16	10	25.81887	124.49485	124	145	-63	44990	166
88	7	24	16	20	25.83858	124.52032	99999	99999	99999	44989	158
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88	7	24	17	0	25.91742	124.62218	114	-20	-36	44815	237
88	7	24	17	10	25.93713	124.64765	87	-114	-292	44744	823
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88	7	24	17	50	26.01582	124.75998	-41	-44	-158	44632	1435
88	7	24	18	0	26.03544	124.79126	-27	-6	-303	44578	1504
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88	7	24	18	30	26.09431	124.88510	-92	75	-88	44580	1561
88	7	24	18	40	26.11393	124.91638	47	68	-204	44618	1608
88	7	24	18	50	26.13355	124.94767	130	163	-222	44660	1584
88	7	24	19	0	26.15317	124.97895	46	120	-48	44684	1421
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88	7	24	19	20	26.19242	125.04151	149	97	-106	44760	1537
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88	7	24	19	50	26.25128	125.13535	-104	78	270	44800	888
88	7	24	20	0	26.27090	125.16664	-116	156	164	44740	682
88	7	24	20	10	26.29053	125.19792	-91	280	156	44751	447
88	7	24	20	20	26.31015	125.22920	17	61	-12	44735	280
88	7	24	20	30	26.32977	125.26048	-94	189	264	44814	271
88	7	24	20	40	26.34939	125.29176	57	144	42	44814	292
88	7	24	20	50	26.36901	125.32304	-131	240	272	44790	294
88	7	24	21	0	26.38863	125.35433	-186	271	323	44768	314
88	7	24	21	10	26.40826	125.38561	-42	-23	65	44763	330
88	7	24	21	20	26.42788	125.41689	-18	41	70	44780	762
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88	7	24	22	0	26.49623	125.53477	-70	64	124	44750	1617
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88	7	24	22	40	26.56121	125.65024	28	-16	-10	44776	1416
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88	7	24	23	20	26.62619	125.76571	-27	52	88	44778	1483
88	7	24	23	30	26.64243	125.79457	-116	-25	226	44773	1480
88	7	24	23	40	26.65868	125.82344	103	-85	-153	44757	1501
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88	7	25	0	40	26.75614	125.99664	-22	-55	6	44736	1650
88	7	25	0	50	26.77238	126.02551	47	134	-100	44727	1674
88	7	25	1	0	26.78863	126.05438	47	54	-121	44738	1697
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88	7	27	5	50	26.96448	127.35940	61	195	124	44600	979
88	7	27	6	0	26.93913	127.36842	145	-12	32	44561	1070
88	7	27	6	10	26.91377	127.37743	81	215	121	44533	1170
88	7	27	6	20	26.88842	127.38645	160	1	23	44515	1167
88	7	27	6	30	26.86306	127.39546	166	-101	48	44495	1147
88	7	27	6	40	26.83771	127.40447	142	165	31	44485	1020
88	7	27	6	50	26.81235	127.41349	402	213	-1	44472	876
88	7	27	7	0	26.78700	127.42250	325	115	67	44464	806
88	7	27	7	10	26.76160	127.43243	326	34	-2	44422	758
88	7	27	7	20	26.73620	127.44235	337	96	84	44470	785
88	7	27	7	30	26.71081	127.45228	215	32	102	44483	683
88	7	27	7	40	26.68541	127.46220	135	101	118	44426	572
88	7	27	7	50	26.66001	127.47213	167	-63	52	44397	530
88	7	27	8	0	26.63461	127.48206	92	37	58	44365	510
88	7	27	8	10	26.60921	127.49198	146	68	-45	44336	482
88	7	27	8	20	26.58381	127.50191	88	-54	10	44318	442
88	7	27	8	30	26.55842	127.51184	-82	178	74	44303	252
88	7	27	8	40	26.53302	127.52176	-28	23	-22	44282	392
88	7	27	8	50	26.50762	127.53169	-142	11	4	44263	513
88	7	27	9	0	26.48222	127.54161	-47	-152	-107	44245	605
88	7	27	9	10	26.45682	127.55154	-126	-71	-62	44228	631
88	7	27	9	20	26.43142	127.56147	-279	-192	-111	44204	640
88	7	27	9	30	26.40603	127.57139	-297	-116	-93	44194	599
88	7	27	9	40	26.38063	127.58132	-324	-380	-95	44186	442
88	7	27	9	50	26.35523	127.59124	-372	-323	-111	44171	371
88	7	27	10	0	26.32983	127.60117	-429	-302	-48	44165	76
88	7	28	13	10	26.29586	127.62833	41	-182	-48	44195	66
88	7	28	13	20	26.32168	127.62795	-10	-219	-3	44204	82
88	7	28	13	30	26.34796	127.62701	47	-73	-31	44215	378
88	7	28	13	40	26.37423	127.62607	-28	285	32	44225	446
88	7	28	13	50	26.40051	127.62512	34	129	-43	44237	502
88	7	28	14	0	26.42679	127.62418	30	312	-47	44252	594
88	7	28	14	10	26.45306	127.62324	-25	68	12	44267	578
88	7	28	14	20	26.47934	127.62230	-96	-102	107	44284	558
88	7	28	14	30	26.50562	127.62135	-6	-309	-18	44303	522
88	7	28	14	40	26.53189	127.62041	-105	-39	132	44325	570
88	7	28	14	50	26.55817	127.61947	-32	115	101	44349	445
88	7	28	15	0	26.58445	127.61853	-6	-93	25	44363	447

88	7	28	15	10	26.61072	127.61758	32	287	-39	44360	370
88	7	28	15	20	26.63700	127.61664	-12	-239	-29	44384	400
88	7	28	15	30	26.66328	127.61570	55	-58	-77	44413	142
88	7	28	15	40	26.68955	127.61476	37	170	-56	44434	221
88	7	28	15	50	26.71731	127.61694	3	-37	-95	44465	121
88	7	28	16	0	26.74922	127.62531	-49	87	-132	44415	81
88	7	28	16	10	26.77854	127.63674	-92	258	101	44444	79
88	7	28	16	20	26.80527	127.65123	-53	124	25	44480	355
88	7	28	16	30	26.83201	127.66572	-71	-81	35	44493	412
88	7	28	16	40	26.85874	127.68021	-118	-57	93	44509	430
88	7	28	16	50	26.88548	127.69470	15	-157	-34	44523	519
88	7	28	17	0	26.90966	127.71080	102	-14	-130	44543	480
88	7	28	17	10	26.93215	127.72797	101	62	-83	44564	443
88	7	28	17	20	26.95463	127.74513	97	66	-56	44586	466
88	7	28	17	30	26.97712	127.76230	47	122	69	44609	327
88	7	28	17	40	26.99960	127.77946	-37	15	167	44604	264
88	7	28	17	50	27.02209	127.79663	53	-36	-71	44583	340
88	7	28	18	0	27.04457	127.81379	-63	130	140	44589	459
88	7	28	18	10	27.06706	127.83096	-52	-97	87	44614	532
88	7	28	18	20	27.08954	127.84813	58	-56	-77	44639	532
88	7	28	18	30	27.11203	127.86529	32	-99	-12	44668	602
88	7	28	18	40	27.13451	127.88246	-67	24	97	44666	597
88	7	28	18	50	27.15700	127.89962	24	14	-32	44689	590
88	7	28	19	0	27.17948	127.91679	37	-83	-172	44684	581
88	7	28	19	10	27.20197	127.93396	-5	64	-44	44678	598
88	7	28	19	20	27.22445	127.95112	7	-30	-7	44716	616
88	7	28	19	30	27.24694	127.96829	-41	-148	50	44735	630
88	7	28	19	40	27.26942	127.98545	-7	-164	-149	44697	634
88	7	28	19	50	27.28986	128.00445	149	1062	-1	44768	664
88	7	28	20	0	27.31007	128.02364	172	1054	-21	44806	682
88	7	28	20	10	27.33028	128.04284	44	1350	264	44863	557
88	7	28	20	20	27.35049	128.06204	-107	1164	147	44706	572
88	7	28	20	30	27.37071	128.08123	99999	99999	99999	99999	809
88	7	28	20	40	27.39092	128.10043	-83	-221	253	44786	741
88	7	28	20	50	27.41113	128.11963	104	-532	259	44983	479
88	7	28	21	0	27.43134	128.13882	-78	-743	355	44969	492
88	7	28	21	10	27.45155	128.15802	-200	-637	-93	44539	644
88	7	28	21	20	27.47176	128.17722	43	-380	-140	44727	760
88	7	28	21	30	27.49197	128.19641	-107	-504	-88	44650	973
88	7	28	21	40	27.51218	128.21561	-77	-260	-68	44654	946
88	7	28	21	50	27.53239	128.23481	-70	-213	-81	44669	982
88	7	28	22	0	27.55261	128.25400	-50	-358	-53	44694	913
88	7	28	22	10	27.57282	128.27320	32	-357	-175	44699	814
88	7	28	22	20	27.59303	128.29240	63	-271	-189	44712	631
88	7	28	22	30	27.61324	128.31159	63	-228	-169	44723	594
88	7	28	22	40	27.63345	128.33079	-26	-255	-70	44729	539
88	7	28	22	50	27.65366	128.34999	-29	-151	-61	44724	537
88	7	28	23	0	27.67387	128.36919	-48	-25	-20	44726	560
88	7	28	23	10	27.69408	128.38838	1	-65	-65	44729	544
88	7	28	23	20	27.71430	128.40758	45	-215	-161	44737	586
88	7	28	23	30	27.73451	128.42678	-165	-108	44743	605	
88	7	28	23	40	27.75472	128.44597	49	-132	-134	44753	590
88	7	28	23	50	27.77493	128.46517	88	-82	-205	44759	567
88	7	29	0	0	27.79514	128.48437	-24	-121	-52	44769	549
88	7	29	0	10	27.81535	128.50356	-20	11	-40	44780	538
88	7	29	0	20	27.83467	128.52200	-65	2	3	44791	485
88	7	29	0	30	27.85200	128.53883	-72	-283	-11	44801	445
88	7	29	0	40	27.87117	128.55733	-63	-93	44808	394	
88	7	29	0	50	27.88772	128.57333	-32	-13	-7	44824	344
88	7	29	1	0	27.90400	128.58933	-75	177	54	44841	319
88	7	29	1	10	27.92117	128.60600	-27	47	27	44852	292
88	7	29	1	20	27.93867	128.62300	-30	43	33	44866	348

88	7	29	1	30	27.95600	128.63983	2	-9	-5	44891	387
88	7	29	1	40	27.97517	128.65833	117	4	-71	44920	419
88	7	29	1	50	28.00347	128.67963	105	-41	-31	44954	572
88	7	29	2	0	28.05729	128.71118	118	160	34	45002	1014
88	7	29	2	10	28.07992	128.72913	171	12	38	45057	1016
88	7	29	2	20	28.10256	128.74709	155	98	223	45134	994
88	7	29	2	30	28.12519	128.76504	178	-60	246	45176	977
88	7	29	2	40	28.14783	128.78300	67	-11	233	45134	965
88	7	29	2	50	28.17046	128.80095	20	85	234	45064	951
88	7	29	3	0	28.19310	128.81891	-25	-149	158	45023	916
88	7	29	3	10	28.21573	128.83686	-87	50	102	44919	870
88	7	29	3	20	28.23837	128.85482	-37	98	-22	44901	868
88	7	29	3	30	28.26100	128.87277	-99	201	47	44883	882
88	7	29	3	40	28.28364	128.89073	-71	338	-26	44861	912
88	7	29	3	50	28.30627	128.90868	-62	110	-70	44863	934
88	7	29	4	0	28.32891	128.92664	-114	339	24	44874	930
88	7	29	4	10	28.35154	128.94459	-97	334	10	44888	910
88	7	29	4	20	28.37418	128.96254	-41	151	-163	44904	952
88	7	29	4	30	28.39681	128.98050	-106	-90	-56	44920	951
88	7	29	4	40	28.41945	128.99845	-103	-131	-74	44934	955
88	7	29	4	50	28.44208	129.01641	-158	-377	-57	44955	959
88	7	29	5	0	28.46472	129.03436	-247	-236	153	44975	960
88	7	29	5	10	28.48735	129.05232	-12	-60	-113	44999	960
88	7	29	5	20	28.50999	129.07027	54	26	-135	45015	961
88	7	29	5	30	28.53262	129.08823	100	10	-117	45040	960
88	7	29	5	40	28.55526	129.10618	-18	-103	-2	45075	952
88	7	29	5	50	28.57789	129.12414	-66	-147	132	45105	947
88	7	29	6	0	28.60054	129.14152	-26	-73	177	45132	925
88	7	29	6	10	28.62325	129.15661	122	-57	49	45150	895
88	7	29	6	20	28.64596	129.17170	40	-1	26	45094	874
88	7	29	6	30	28.66867	129.18679	-114	101	68	45024	816
88	7	29	6	40	28.69138	129.20189	2	176	-120	44981	799
88	7	29	6	50	28.71409	129.21698	-84	-20	-85	44997	794
88	7	29	7	0	28.73680	129.23207	-90	-41	23	45026	815
88	7	29	7	10	28.75952	129.24716	41	-104	-159	45057	821
88	7	29	7	20	28.78223	129.26225	-63	-73	-13	45080	823
88	7	29	7	30	28.80494	129.27734	6	-57	-24	45111	828
88	7	29	7	40	28.82765	129.29244	110	-294	-128	45146	827
88	7	29	7	50	28.85036	129.30753	161	-140	-185	45162	796
88	7	29	8	0	28.87307	129.32262	82	-149	-44	45181	751
88	7	29	8	10	28.89578	129.33771	118	89	38	45180	722
88	7	29	8	20	28.91849	129.35280	39	202	108	45190	719
88	7	29	8	30	28.94120	129.36789	80	21	30	45202	705
88	7	29	8	40	28.96391	129.38299	130	274	-33	45220	677
88	7	29	8	50	28.98662	129.39808	45	145	151	45250	642
88	7	29	9	0	29.00933	129.41317	43	146	84	45223	609
88	7	29	9	10	29.03134	129.42994	-16	-65	161	45219	615
88	7	29	9	20	29.05335	129.44672	37	118	33	45186	720
88	7	29	9	30	29.07535	129.46349	129	-143	-111	45195	833
88	7	29	9	40	29.09736	129.48027	90	84	73	45240	904
88	7	29	9	50	29.11937	129.49704	86	278	134	45251	942
88	7	29	10	0	29.14138	129.51382	68	71	127	45263	953
88	7	29	10	10	29.16338	129.53059	139	327	68	45291	904
88	7	29	10	20	29.18539	129.54736	83	228	132	45293	884
88	7	29	10	30	29.20740	129.56414	89	401	84	45279	886
88	7	29	10	40	29.22945	129.58383	63	309	-100	45257	892
88	7	29	10	50	29.25151	129.60476	167	436	-67	45248	904
88	7	29	11	0	29.27358	129.62570	40	370	-17	45233	945
88	7	29	11	10	29.29564	129.64664	29	241	-59	45222	969
88	7	29	11	20	29.31771	129.66758	-46	350	-40	45221	982
88	7	29	11	30	29.33978	129.68851	88	255	-140	45221	980
88	7	29	11	40	29.36184	129.70945	-61	55	-76	45229	965

88	7	29	11	50	29.38391	129.73039	-187	229	172	45243	983
88	7	29	12	0	29.40598	129.75133	-146	85	55	45250	967
88	7	29	12	10	29.42804	129.77226	-62	-245	-106	45259	943
88	7	29	12	20	29.45011	129.79320	-133	-440	-62	45252	906
88	7	29	12	30	29.47217	129.81414	-78		-22	45289	859
88	7	29	12	40	29.49424	129.83508	-142	107	91	45314	808
88	7	29	12	50	29.51631	129.85601	54	-81	-115	45329	773
88	7	29	13	0	29.53837	129.87695	-135	-56	140	45346	743
88	7	29	13	10	29.56044	129.89789	-65	-103	-19	45345	735
88	7	29	13	20	29.58250	129.91883	-37	-314	1	45360	722
88	7	29	13	30	29.60457	129.93976	15	-461	-82	45372	720
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88	7	29	13	50	29.64972	129.97688	175	-185	-224	45417	609
88	7	29	14	0	29.67381	129.98831	16	-40	45434	591	
88	7	29	14	10	29.69789	129.99979	99999	99999	99999	99999	591
88	7	29	14	20	29.72200	130.01117	65	-96	-45	45469	595
88	7	29	14	30	29.74609	130.02260	-70	-157	134	45479	604
88	7	29	14	40	29.77019	130.03403	7	-185	36	45477	604
88	7	29	14	50	29.79428	130.04546	-23	-185	16	45474	600
88	7	29	15	0	29.81837	130.05689	69	-388	-130	45460	584
88	7	29	15	10	29.84247	130.06832	43	-104	-69	45451	569
88	7	29	15	20	29.86656	130.07975	43	-42	-72	45448	562
88	7	29	15	30	29.89065	130.09118	66	-99	-143	45455	568
88	7	29	15	40	29.91475	130.10261	-86	195	101	45473	580
88	7	29	15	50	29.93884	130.11404	79	10	-126	45499	606
88	7	29	16	0	29.96293	130.12547	-155	274	199	45521	618
88	7	29	16	10	29.98703	130.13690	-43	92	21	45536	616
88	7	29	16	20	30.01112	130.14833	-78	249	104	45545	579
88	7	29	16	30	30.03522	130.15976	-109	94	96	45549	479
88	7	29	16	40	30.05931	130.17119	-91	482	58	45566	444
88	7	29	16	50	30.08340	130.18262	-10	520	137	45589	494
88	7	29	17	0	30.10750	130.19405	34	527	107	45606	547
88	7	29	17	10	30.13159	130.20548	37	306	-3	45606	557
88	7	29	17	20	30.15568	130.21691	-106	388	155	45635	570
88	7	29	17	30	30.17978	130.22834	116	86	-50	45648	584
88	7	29	17	40	30.20387	130.23977	73	108	-25	45671	582
88	7	29	17	50	30.22796	130.25120	14	-72	2	45667	591
88	7	29	18	0	30.25206	130.26263	24	-126	-80	45655	590
88	7	29	18	10	30.27615	130.27406	-40	-244	-121	45643	589
88	7	29	18	20	30.30025	130.28549	57	-438	-241	45648	594
88	7	29	18	30	30.32434	130.29692	-8	-401	-104	45679	594
88	7	29	18	40	30.34843	130.30835	-45	-188	55	45720	594
88	7	29	18	50	30.37253	130.31978	-80	-458	94	45759	595
88	7	29	19	0	30.39662	130.33121	135	-150	-26	45819	598
88	7	29	19	10	30.42071	130.34264	66	-87	-36	45848	622
88	7	29	19	20	30.44283	130.35959	-150	66	121	45747	604
88	7	29	19	30	30.46198	130.38482	-55	474	116	45798	500
88	7	29	19	40	30.48113	130.41005	99999	99999	99999	99999	409
88	7	29	19	50	30.50027	130.43527	146	-77	154	45982	331
88	7	29	20	0	30.51942	130.46050	141	-26	222	46060	215
88	7	29	20	10	30.53857	130.48573	76	-386	312	46136	164
88	7	29	20	20	30.55772	130.51095	-72	-381	319	46001	131
88	7	29	20	30	30.57687	130.53618	-144	-301	140	45825	143
88	7	29	20	40	30.59601	130.56141	-141	15	-42	45684	176
88	7	29	20	50	30.61516	130.58663	-96	-139	-101	45676	184
88	7	29	21	0	30.63431	130.61186	-239	-23	108	45699	183
88	7	29	21	10	30.65346	130.63709	-95	-538	-93	45705	180
88	7	29	21	20	30.67261	130.66231	-122	-503	-49	45718	181
88	7	29	21	30	30.69175	130.68754	-135	-371	33	45734	184
88	7	29	21	40	30.71090	130.71277	-208	-204	136	45747	189
88	7	29	21	50	30.73005	130.73799	-135	-184	9	45754	191
88	7	29	22	0	30.74920	130.76322	-191	-221	129	45758	186

88	7	29	22	10	30.76835	130.78845	-15	-229	-81	45762	172
88	7	29	22	20	30.78749	130.81368	-41	-27	-28	45773	139
88	7	29	22	30	30.80664	130.83890	-75	-182	16	45778	134
88	7	29	22	40	30.82579	130.86413	33	-282	-125	45787	123
88	7	29	22	50	30.84494	130.88936	-70	-230	15	45785	113
88	7	29	23	0	30.86409	130.91458	-77	-64	27	45796	110
88	7	29	23	10	30.88323	130.93981	91	-27	-139	45815	106
88	7	29	23	20	30.90238	130.96504	58	38	-157	45811	124
88	7	29	23	30	30.92153	130.99026	81	328	-61	45827	120
88	7	29	23	40	30.94068	131.01549	111	217	-149	45821	113
88	7	29	23	50	30.95983	131.04072	18	531	-99	45839	106
88	7	30	0	0	30.97897	131.06595	144	508	-138	45842	106
88	7	30	0	10	30.99812	131.09117	223	453	-256	45830	95
88	7	30	0	20	31.01727	131.11640	35	258	-86	45840	96
88	7	30	0	30	31.03642	131.14163	25	219	-49	45851	96
88	7	30	0	40	31.05557	131.16685	8	-65	27	45857	95
88	7	30	0	50	31.07472	131.19208	174	55	-225	45860	99
88	7	30	1	0	31.09386	131.21731	119	126	-100	45866	109
88	7	30	1	10	31.11301	131.24253	184	184	-181	45873	112
88	7	30	1	20	31.13364	131.26768	41	334	-26	45878	119
88	7	30	1	30	31.15650	131.29271	117	315	-132	45875	125
88	7	30	1	40	31.17936	131.31773	124	306	-124	45880	129
88	7	30	1	50	31.20221	131.34276	61	214	-44	45886	133
88	7	30	2	0	31.22507	131.36778	121	316	-98	45893	135
88	7	30	2	10	31.24792	131.39281	123	260	-156	45902	139
88	7	30	2	20	31.27078	131.41784	140	290	-125	45906	143
88	7	30	2	30	31.29364	131.44286	127	86	-270	45909	147
88	7	30	2	40	31.31649	131.46789	37	128	-4	45918	155
88	7	30	2	50	31.33935	131.49292	48	90	-103	45930	167
88	7	30	3	0	31.36221	131.51794	61	250	-18	45943	178
88	7	30	3	10	31.38506	131.54297	-75	268	85	45953	189
88	7	30	3	20	31.40792	131.56799	178	192	-183	45965	206
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88	7	30	3	40	31.45363	131.61805	99	264	-56	45985	263
88	7	30	3	50	31.47649	131.64307	131	260	-179	46000	302
88	7	30	4	0	31.49934	131.66810	154	179	-144	46009	342
88	7	30	4	10	31.52220	131.69312	124	29	-22	46025	406
88	7	30	4	20	31.54506	131.71815	141	-59	-3	46039	466
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88	7	30	4	40	31.59077	131.76820	163	69	-55	46061	625
88	7	30	4	50	31.61362	131.79323	76	-132	55	46065	678
88	7	30	5	0	31.63648	131.81825	-33	-51	256	46069	751
88	7	30	5	10	31.65934	131.84328	22	74	122	46068	811
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88	7	30	5	30	31.70505	131.89333	-54	-14	220	46054	933
88	7	30	5	40	31.72791	131.91836	-13	71	138	46049	990
88	7	30	5	50	31.75076	131.94339	36	-17	27	46048	971
88	7	30	6	0	31.77362	131.96841	47	-76	12	46056	1046
88	7	30	6	10	31.79647	131.99344	-106	-119	217	46063	1100
88	7	30	6	20	31.81933	132.01846	-62	-311	100	46076	1226
88	7	30	6	30	31.84219	132.04349	-76	-163	170	46078	1396
88	7	30	6	40	31.86389	132.07292	-160	-63	89	46082	1538
88	7	30	6	50	31.88481	132.10528	-285	195	287	46085	1642
88	7	30	7	0	31.90574	132.13764	-34	-36	100	46083	1759
88	7	30	7	10	31.92667	132.17001	-116	-6	117	46070	1868
88	7	30	7	20	31.94759	132.20237	-250	-25	164	46056	1866
88	7	30	7	30	31.96852	132.23473	-126	-23	78	46045	1954
88	7	30	7	40	31.98945	132.26709	-181	197	44	46038	1955
88	7	30	7	50	32.01037	132.29946	-241	-86	67	46035	1894
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88	7	30	8	10	32.05223	132.36418	-155	138	-30	46044	1910
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88	7	30	8	30	32.09408	132.42891	-50	-79	54	46056	1865
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88	7	30	8	50	32.13593	132.49363	-130	245	10	46073	1657
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88	7	30	9	10	32.17779	132.55836	-5	82	-60	46084	1587
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88	7	30	10	0	32.28242	132.72017	99999	99999	99999	99999	1353
88	7	30	10	10	32.30335	132.75254	20	37	-73	46088	1333
88	7	30	10	20	32.32427	132.78490	103	-60	-153	46093	1223
88	7	30	10	30	32.34520	132.81726	82	-129	-150	46100	1111
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88	7	30	11	0	32.40798	132.91435	39	1	-50	46142	666
88	7	30	11	10	32.42891	132.94671	40	-184	9	46151	376
88	7	30	11	20	32.44983	132.97908	-39	-96	143	46156	217
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88	7	30	11	40	32.49068	133.04477	39	-161	88	46155	278
88	7	30	11	50	32.50655	133.08196	-136	9	124	46159	306
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88	7	30	12	10	32.53483	133.15383	-76	201	-28	46154	604
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88	7	30	12	30	32.56267	133.23200	-105	-79	106	46145	697
88	7	30	12	40	32.57600	133.26800	-4	32	1	46142	775
88	7	30	12	50	32.58933	133.30417	-81	38	69	46134	847
88	7	30	13	0	32.60333	133.34167	30	29	-179	46135	894
88	7	30	13	10	32.61833	133.37367	-2	34	50	46135	869
88	7	30	13	20	32.63233	133.41033	-131	166	137	46139	874
88	7	30	13	30	32.64683	133.44817	-35	29	96	46144	886
88	7	30	13	40	32.66283	133.48117	-128	271	165	46145	849
88	7	30	13	50	32.67617	133.51817	9	405	20	46144	854
88	7	30	14	0	32.68900	133.55367	30	233	32	46142	872
88	7	30	14	10	32.70233	133.59033	-105	286	154	46134	938
88	7	30	14	20	32.71033	133.63583	54	31	9	46127	1000
88	7	30	14	30	32.72317	133.67200	111	112	-31	46125	1003
88	7	30	14	40	32.73583	133.70717	-11	91	71	46122	1019
88	7	30	14	50	32.74883	133.74283	-71	154	68	46112	1036
88	7	30	15	0	32.76517	133.77583	-30	-28	-16	46099	1048
88	7	30	15	10	32.77800	133.81183	118	-162	-77	46089	1064
88	7	30	15	20	32.79100	133.84900	27	-237	-36	46085	1082
88	7	30	15	30	32.80450	133.88517	268	-395	-184	46086	1090
88	7	30	15	40	32.81817	133.92208	154	-264	-143	46082	1073
88	7	30	15	50	32.83183	133.95717	99999	99999	99999	99999	1050
88	7	30	16	0	32.84683	133.99717	99999	99999	99999	99999	1007
88	7	30	16	10	32.86183	134.03717	99999	99999	99999	99999	960
88	7	30	16	20	32.87683	134.07717	99999	99999	99999	99999	933
88	7	30	16	30	32.89183	134.11717	99999	99999	99999	99999	1003
88	7	30	16	40	32.90683	134.15717	99999	99999	99999	99999	919
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88	7	30	17	50	32.95750	134.39333	384	-384	-57	46031	425
88	7	30	18	0	32.97183	134.42900	213	-201	-16	46025	662
88	7	30	18	10	32.98398	134.46992	182	-39	28	46015	573
88	7	30	18	20	32.99555	134.50619	225	10	-112	46005	277
88	7	30	18	30	33.00800	134.54367	239	26	-95	46001	303
88	7	30	18	40	33.02161	134.58419	82	-97	22	45999	177
88	7	30	18	50	33.03099	134.61936	-147	106	143	45994	183
88	7	30	19	0	33.04000	134.65500	-115	-5	52	45983	206
88	7	30	19	10	33.04717	134.69150	-156	178	-114	45971	182
88	7	30	19	20	33.05250	134.72767	-326	151	39	45960	217

88	7	30	19	30	33.05800	134.76400	-357	192	92	45943	292
88	7	30	19	40	33.06317	134.80050	-328	116	-23	45931	286
88	7	30	19	50	33.06793	134.83677	-360	106	69	45925	304
88	7	30	20	0	33.07260	134.87310	-378	322	97	45919	395
88	7	30	20	10	33.07867	134.90917	-184	406	-73	45916	616
88	7	30	20	20	33.08500	134.94550	-209	29	-7	45915	830
88	7	30	20	30	33.09317	134.98117	122	40	-17	45919	938
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88	7	30	21	0	33.12624	135.08603	192	-43	-48	45932	976
88	7	30	21	10	33.13617	135.12083	84	17	-83	45927	1155
88	7	30	21	20	33.14550	135.15583	84	142	-31	45922	1218
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88	7	30	22	0	33.18559	135.29532	104	-155	-16	45888	1238
88	7	30	22	10	33.19604	135.33110	71	-63	-23	45885	1339
88	7	30	22	20	33.20550	135.36683	75	312	41	45881	1474
88	7	30	22	30	33.21533	135.40383	-13	108	100	45878	1563
88	7	30	22	40	33.22433	135.43900	28	38	20	45876	1562
88	7	30	22	50	33.23350	135.47400	-75	-215	91	45875	1511
88	7	30	23	0	33.24267	135.50850	12	-64	-19	45874	1522
88	7	30	23	10	33.25201	135.54318		-76	11	45876	1546
88	7	30	23	20	33.26178	135.57773	-221	-147	176	45877	1574
88	7	30	23	30	33.27145	135.61183	-127	-150	52	45877	1604
88	7	30	23	40	33.28268	135.64517	83	44	3	45880	1664
88	7	30	23	50	33.29550	135.67800	58	134	28	45884	1829
88	7	31	0	0	33.31000	135.71000	89	301	-70	45876	1595
88	7	31	0	10	33.32400	135.74217	-9	112	51	45860	1486
88	7	31	0	20	33.33750	135.77500	34	57	-109	45852	1045
88	7	31	0	30	33.35083	135.80833	-40	-168	81	45854	845
88	7	31	0	40	33.36417	135.83990	84	-251	-119	45858	805
88	7	31	0	50	33.37833	135.87086	11	-34	-49	45854	757
88	7	31	1	0	33.39250	135.90181	-48	-217	22	45857	811
88	7	31	1	10	33.40750	135.93117	-129	-75	100	45855	715
88	7	31	1	20	33.42200	135.95983	-25	-259	19	45865	838
88	7	31	1	30	33.43700	135.98917	54	-62	-28	45868	901
88	7	31	1	40	33.45150	136.01783	120	-158	-142	45859	1120
88	7	31	1	50	33.46050	136.04817	-405	471	86	45844	1402
88	7	31	2	0	33.47258	136.07646	-97	98	133	45844	1418
88	7	31	2	10	33.48600	136.10400	27	-102	-10	45845	1457
88	7	31	2	20	33.49967	136.13183	-53	-25	98	45844	1585
88	7	31	2	30	33.51433	136.15950	36	-82	8	45847	1664
88	7	31	2	40	33.52883	136.18617	-55	45	67	45852	1678
88	7	31	2	50	33.54300	136.21267	-1	-168	27	45856	1806
88	7	31	3	0	33.55623	136.23880	130	129	-157	45856	1899
88	7	31	3	10	33.56868	136.26480	-139	104	176	45857	1907
88	7	31	3	20	33.58150	136.29067	-129	7	172	45856	1955
88	7	31	3	30	33.59450	136.31733	149	-139	-124	45858	1916
88	7	31	3	40	33.60717	136.34333	133	120	-100	45861	1889
88	7	31	3	50	33.61105	136.37237	99999	99999	99999	99999	1820
88	7	31	4	0	33.61425	136.40167	99999	99999	99999	99999	2041
88	7	31	4	10	33.61745	136.43096	99999	99999	99999	99999	2056
88	7	31	4	20	33.62067	136.46033	-192	217	83	45830	2062
88	7	31	4	30	33.63100	136.48733	-34	-9	62	45832	2068
88	7	31	4	40	33.64200	136.51417	-95	14	107	45833	2068
88	7	31	4	50	33.65183	136.54017	80	9	-65	45832	2070
88	7	31	5	0	33.66200	136.56667	39	130	-29	45834	1980
88	7	31	5	10	33.67450	136.59203	75	117	-110	45832	2016
88	7	31	5	20	33.68728	136.61770	62	-140	-94	45832	2022
88	7	31	5	30	33.70083	136.64329	7	49	-112	45828	2025
88	7	31	5	40	33.71400	136.66850	-37	-56	36	45824	2022

88	7	31	5	50	33.72667	136.69367	-8	-161	-19	45821	2006
88	7	31	6	0	33.74033	136.71950	33	-59	-14	45816	2001
88	7	31	6	10	33.75450	136.74467	85	-30	-70	45811	1963
88	7	31	6	20	33.76967	136.76993	40	117	-37	45806	1909
88	7	31	6	30	33.78489	136.79489	49	-132	-64	45808	1803
88	7	31	6	40	33.80033	136.81967	85	3	-27	45807	1713
88	7	31	6	50	33.81583	136.84467	147	-68	-157	45807	1657
88	7	31	7	0	33.83133	136.86983	36	-98	-62	45809	1512
88	7	31	7	10	33.84733	136.89417	-22	-217	58	45814	1381
88	7	31	7	20	33.86344	136.91929	-40	-144	91	45816	1260
88	7	31	7	30	33.87983	136.94467	38	162	-6	45816	1282
88	7	31	7	40	33.89539	136.97111	-218	300	146	45815	1406
88	7	31	7	50	33.91117	136.99767	-118	181	83	45811	1596

## DELP 1988 年度沖縄トラフ海域研究航海報告

## 5. 地磁気三成分および全磁力測定

神戸大学理学部  
 古川雅英  
 近藤信哉  
 三木雅子  
 伊勢崎修弘

DELP 1988 航海において、地磁気三成分および全磁力の観測をおもに沖縄トラフの南西部海域で行った。その結果、トラフ底に分布する地形的高まりに対応した 300 nT をこえる地磁気異常が認められた。地磁気三成分異常にについて解析した結果、トラフ南西部では、八重山海底地溝域を除いて顕著な磁気異常の連続性は認められなかった。八重山海底地溝域においては、地溝の伸び（ほぼ東西）に沿った地磁気異常の連続性が認められ、地磁気異常の原因物体の 2 次元的な分布が推定された。八重山海底地溝には、火山岩より成ると思われる海丘が点在している。これらに対応した全磁力異常の分布および三成分異常の解析結果より、堆積層下にも貫入岩体の存在が示唆された。この様なことから、少なくとも地溝東半の約 50 km の範囲においては、火山活動とともに背弧海盆形成の活動が行われたことが推定された。