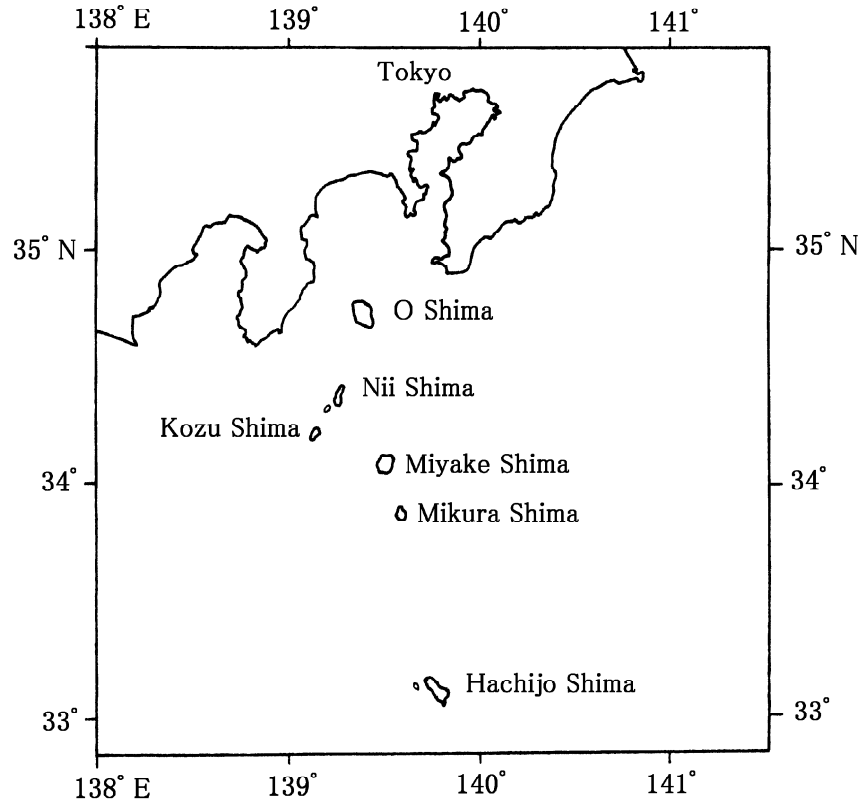
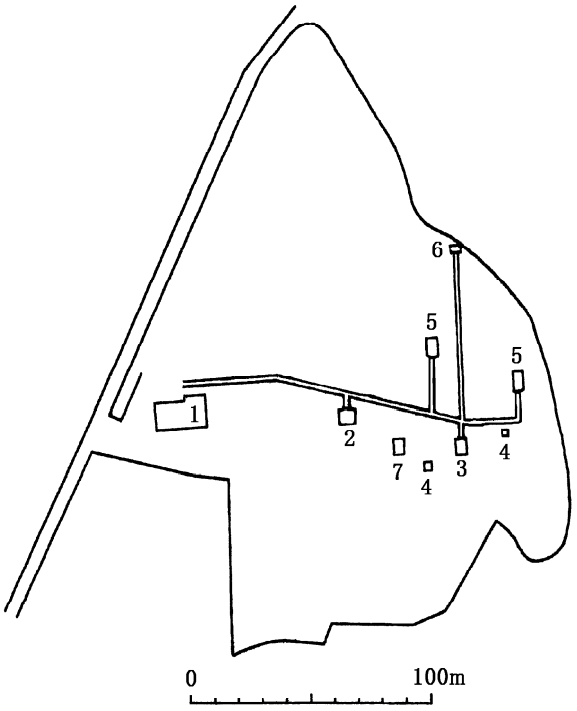




1:Main office
2:Dehumidifier room
3:Absolute observation house
4:Sensor of proton magnetometer
5:Variometer house
6:Azimauth mark
7:Instrument Adjustment room

Location and plan of the Hachijo Hydrographic Observatory

Address : 3621 Nakanogo,Hachijo-tyo,Hachijo Shima,Tokyo,100-1623,Japan
Telephone : 04996(7)0424 Mail Address : hachisui@mbd.sphere.ne.jp

Hachijo Hydrographic Observatory

Magnetometer mounted on the Instrument
Piers of Absolute Observation House

Variometer mounted on the Instrument
Pier of Variometer House

Recording Room

Introduction

The Hachijo Hydrographic Observatory, which is one of the essential magnetic observatories in Japan, was established in 1979 and is currently operated by the Hydrographic and Oceanographic Department, Japan Coast Guard.

This is the annual report of magnetic observations carried out at the observatory in 2002. As to the instruments used for magnetic observation, a digital recording variometer, a Fluxgate magnetometer, was introduced in 1986, and additional proton and fluxgate magnetometers were installed in September 1996 and January 1998, respectively.

1. Location of the Observatory

The Hachijo Hydrographic Observatory is located at Hachijo Shima, a small volcanic island about 300 km south of Tokyo. The approximate geographical and geomagnetic coordinates of the observatory are as follows:

Geographical	Latitude:	33 ° 04.4′N
	Longitude:	139 ° 49.5′E
Geomagnetic	Latitude:	23.8°N
	Longitude:	208.9°E

The elevation of the observatory is about 220 meters above the mean sea level.

2. Houses of Observatory

(1) Absolute Observation House

Absolute Observation are made in the Absolute Observation House constructed with non-magnetic wooden materials, apporoximately 19.2 square meters. In the house three marblemade piers are placed on the resin concrete base so that they are separated from the floor of the house. A Fluxgate Declinometer/Inclinometer is useally mounted on the northeast pier. It is replaced by a sensing head of a proton magnetometer when calibration observation of total intensitiy is carried out.

An azimuth mark for declination observation stands on a hill about 80 meters north of the house.

(2) Variometer Houses

The observatory has two variometer houses. These two houses are built under ground and constructed with non-magnetic materials of aluminum and resin concrete. To make the room temperature constant, access to the observation room is protected by an anteroom separated into three spaces. The observation room is 3.2 by 6.1 meters, having an entrance on the south. The indoor temperature and humidity of observation rooms are kept constant by air conditioners.

The instruments for variation observation are installed on a resin concrete platform of 1.4 meters wide and 4.3 meters long in each observation room.

3. Observation of Magnetic Elements

(1) Absolute Observations of Magnetic Elements

A Fluxgate Declinometer/Inclinometer and a proton magnetometer are used for absolute observations. The former one is a fluxgate type magnetometer.

Absolute observations are made once or twice a week.

1) Azimuth Observation

The true azimuth at the station is determined by observing Polaris.

2) Observations of Declination and Inclination

The declination and inclination are measured with the Fluxgate Declinometer/Inclinometer.

The Fluxgate Declinometer/Inclinometer comprises single axis vector magnetometer with the fluxgate probe mounted on a second-of-arc accuracy steel theodolite.

For declination and inclination measurements, the instrument is used in the null mode where the probe is orientated perpendicular to the geomagnetic field.

Observation accuracy is 0.′1 for both the declination and inclination.

3) Observation of Total Intensity

The total magnetic intensity is observed every one minute by the proton magnetometer, and its observed data are simultaneously input to the analogue recorder, the magneto optical (MO) disks, the data obtained every 10 seconds.

The sensitivity is ± 0.1 nano-tesla.

(2) Variation Observation

Variation observations are carried out by two digital variometers.

The Fluxgate magnetometers installed in Variometer House measures variation of the three geomagnetic components (H, D and Z) in digital form every minute in the unit of 0.1 nano-tesla. The data observed every second by the fluxgate magnetometer have also been recorded on magneto-optical (MO) disks since 1993. The hourly mean values of the data are calculated by a computer. Recording and calculation of the data are carried out at a recording room in the main office building of the observatory.

4. Reduction of Results

(1) Time System

The Universal Time (UT) is used in the reduction.

(2) Hourly Mean Values

Table on p.9 ～ 56 shows the hourly mean values of magnetic declination, horizontal and vertical intensities and total force. The values tabulated in this report are obtained from the fluxgate magnetometer. The values are mean values averaged for each hour from 0^m to 59^m beginning 0^h UT.

Mean hourly values of all days in each month are given in Table on p.57 ～ 58.

(3) Corrections for the Absolute Observations

The correction values used in this report were determined by comparing our instruments with the standard magnetometer at the Kakioka Magnetic Observatory.

(4) International Quiet and Disturbed Days

The days marked by Q and D in the tables of hourly mean values show five international quiet and disturbed days, respectively.

Mean hourly mean values of five international quiet and disturbed days in each month are given in Table on p.59 ～ 62.

(5) Index *K* and *C*

The magnetic character on each day is estimated by means of three-hour-range index, *K*, for each three-hour-period from 0^h ～ 24^hUT.

The scale adopted for this purpose is constructed as follows:

K-index	0	1	2	3	4	5	6	7	8	9
renge	0nT	3nT	6nT	12nT	24nT	40nT	70nT	120nT	200nT	300nT

C is assigned on the useal scale of “ 0 ” for quiet, “ 1 ” for moderately disturbed and “ 2 ” for severely disturbed days.

The eight individual *K*-index and daily *C* for each day of the month are given in Table on p.64 ～ 65.

(6) Main Magnetic Disturbances

The significant occurrences of the magnetic disturbances are shown in Table on p.66 ～ 67.

(7) Magnetic Solar Flare Effects

The magnetic solar flare effects (sfe), observed at the Hachijo Hydrographic Observatory, are listed in Table on p.68.

(8) Reproductions ofMagnetograms

All the ordinary magnetograms, observed at the Hachijo Hydrographic Observatory, are shown in Figures after p.71.

References

The reports of geomagnetic observation at the Hachijo Hydrographic Observatory for the preceding years were presented in the follow issues:

Data Report of Hydrographic Observations Series of Geomagnetism, No.15, for the year 1979,
ibid., No.16, for the year 1980,
ibid., No.17, for the year 1981,
ibid., No.18, for the year 1982.

Data Report of Hydrographic Observations, Geomagnetic Observations at the Hachijo Hydrographic Observatory, No.1, for the year 1983,
ibid., No. 2, for the year 1984,
ibid., No. 3, for the year 1985,
ibid., No. 4, for the year 1986,
ibid., No. 5, for the year 1987,
ibid., No. 6, for the year 1988,
ibid., No. 7, for the year 1989,
ibid., No. 8, for the year 1990,
ibid., No. 9, for the year 1991,
ibid., No.10, for the year 1992,
ibid., No.11, for the year 1993,
ibid., No.12, for the year 1994,
ibid., No.13, for the year 1995,
ibid., No.14, for the year 1996,
ibid., No.15, for the year 1997,
ibid., No.16, for the year 1998,
ibid., No.17, for the year 1999.
ibid., No.18, for the year 2000.
ibid., No.19, for the year 2001.

The annual mean values of geomagnetic three components at the Hachijo Hydrographic Observatory are listed below.

Year	*D*	*H*	*Z*	*F*
1980*	7°41.1′W	31415nT	31770nT	44679nT
1981	7°01.2′W	31480nT	31864nT	44792nT
1982	7°03.0′W	31474nT	31893nT	44808nT
1983	7°04.5′W	31483nT	31918nT	44832nT
1984	7°06.0′W	31480nT	31945nT	44849nT
1985	7°07.1′W	31489nT	31971nT	44874nT
1986	7°08.6′W	31487nT	32001nT	44894nT

1987	7	°10.0′W	31497nT	32039nT	44928nT
1988	7	°11.4′W	31488nT	32075nT	44948nT
1989	7	°13.1′W	31470nT	32108nT	44959nT
1990	7	°14.8′W	31474nT	32151nT	44992nT
1991	7	°16.4′W	31457nT	32195nT	45011nT
1992	7	°17.7′W	31459nT	32245nT	45048nT
1993	7	°19.0′W	31457nT	32304nT	45089nT
1994	7	°20.6′W	31440nT	32363nT	45120nT
1995	7	°22.0′W	31438nT	32417nT	45158nT
1996	7	°23.5′W	31436nT	32463nT	45189nT
1997	7	°25.5′W	31420nT	32508nT	45209nT
1998	7	°26.6′W	31396nT	32546nT	45222nT
1999	7	°27.5′W	31380nT	32573nT	45229nT
2000	7	°28.2′W	31360nT	32591nT	45229nT
2001	7	°28.0′W	31355nT	32593nT	45227nT
2002	7	°28.1′W	31346nT	32590nT	45218nT

*The absolute observation point was shifted to the present site. The difference between old and new sites is given as follows:

ΔD(new-old) = -41.′2

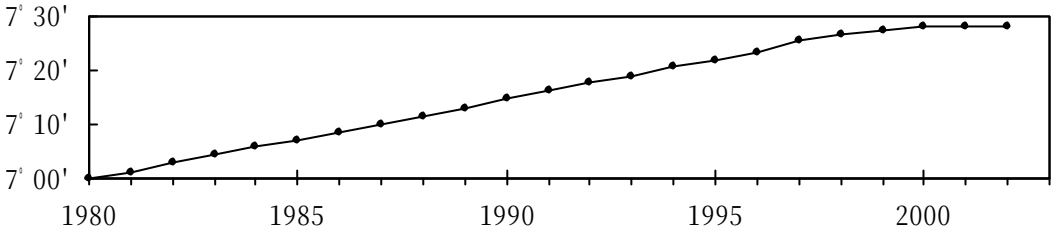
ΔH(new-old) = +71 nT

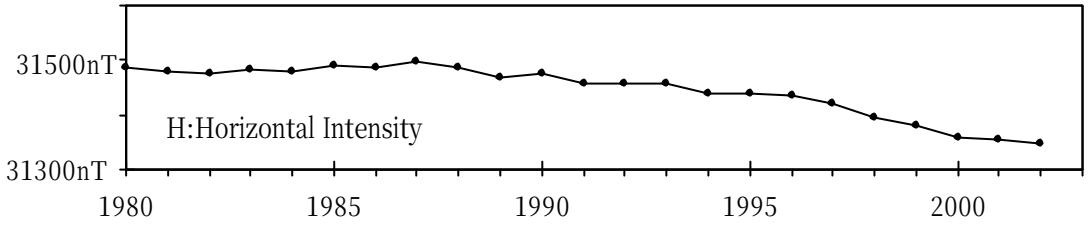
ΔZ(new-old) = +78 nT

ΔF(new-old) = +105 nT

Summary of Annual Means

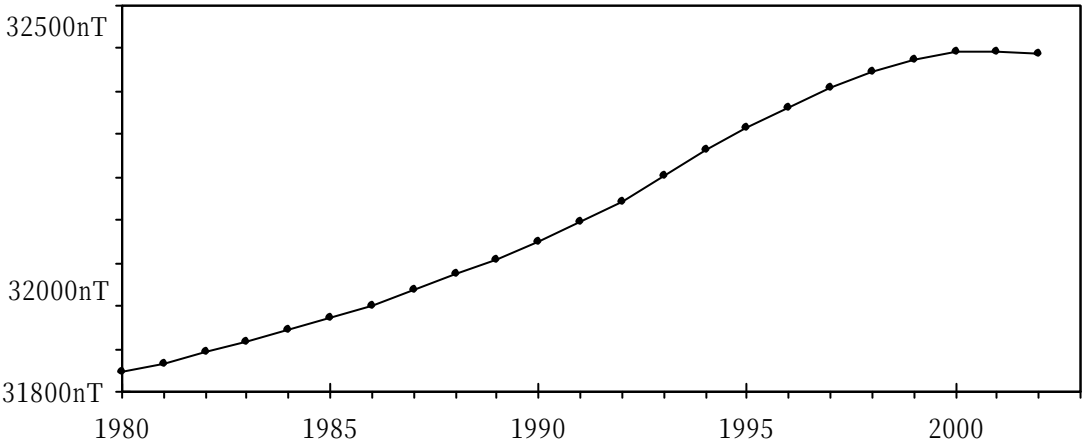
D:Declination





32700nT

Z:Vertical Intensity



45300nT

F:Total Force