U. S. NAVAL TECHNICAL MISSION TO JAPAN
CARE OF FLEET POST OFFICE
SAN FRANCISCO, CALIFORNIA

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6 December 1945

RESTRICTED

From: Chief, Naval Technical Mission to Japan.
To : Chief of Naval Operations.

Subject: Target Report - Ship Signatures and Related Data.

Reference: (a)"Intelligence Target Japan" (DNI) of 4 Sept. 1945

1. Subject report, covering Target O-07 of Fascicle O-1 of reference (a), is submitted herewith.

2. The report was prepared by Lt. Comdr. L.V. Goldsworthy, RANVR, and El. Lt. Comdr. R.C.R. Brooke, RNVR.

C. G. GRIMES
Captain, USN

SHIP SIGNATURES AND RELATED DATA

"INTELLIGENCE TARGETS JAPAN" (DNI) OF 4 SEPT. 1945

FASCICLE O-1, TARGET O-07

DECEMBER 1945

U.S. NAVAL TECHNICAL MISSION TO JAPAN

SUMMARY

ORDANCE TARGETS

SHIP SIGNATURES AND RELATED DATA

The object of the investigation was to obtain as much information as possible in connection with the magnetic, acoustic, and pressure signatures of Japanese ships, together with the methods used to obtain this data.

Interrogation has revealed that no serious effort had been made to obtain accurate information on this subject for mining purposes and showed also that the methods used were quite elementary.

Charts of the magnetic field in the Pacific have been obtained, but these are reported to be based on U.S. charts obtained before the war.

TABLE OF CONTENTS

REFERENCES

Japanese Personnel Interrogated:

Tech. Lieut. Comdr. M. HIGUCHI, IJN, Naval Technical Department, TOKYO.

Lieut. MIZUTA, IJN, Lieut. IKEDA, IJN, Lieut. TSUKAMOTO, IJN, and Mr. SHIBATA, all of YOKOSUKA Mine Research Laboratory, KURIHAMA.

All the above men are familiar with mines of the magnetic and acoustic type and have been interrogated very closely upon the subject of ship signatures. There was no reason to believe that they were deliberately withholding information about this subject. Lieut. MIZUTA and Mr. SHIBATA can be regarded as very capable technical men and are familiar with all aspects of magnetic and acoustic mine research.

LIST OF ENCLOSURES

(A) "Magnetic Variation in Waters near Japan" - #6024.
(NavTechJap. Document Number ND 50-3200)

(B) "Magnetic Dip in Waters near Japan" - #6043.
(NavTechJap. Document Number ND 50-3201)

(C) "Magnetic Horizontal Force in Waters near Japan" - #6044.
(NavTechJap. Document Number ND 50-3202)

(Note: The originals of the above enclosures have been forwarded to the Washington Document Center via ATIS. They have been assigned ATIS Document Number 3085.)

LIST OF ILLUSTRATIONS

THE REPORT

1. Magnetic Signatures

Information regarding magnetic fields was obtained in two ways. The first and most used method was the employment of the MITSUBISHI type field-measurer, and the second was the ordinary ground loop method.

The MITSUBISHI instrument utilizes the change of reluctance of Permalloy with change of field intensity.

CIRCUIT DIAGRAM OF MITSUBISHI INSTRUMENT

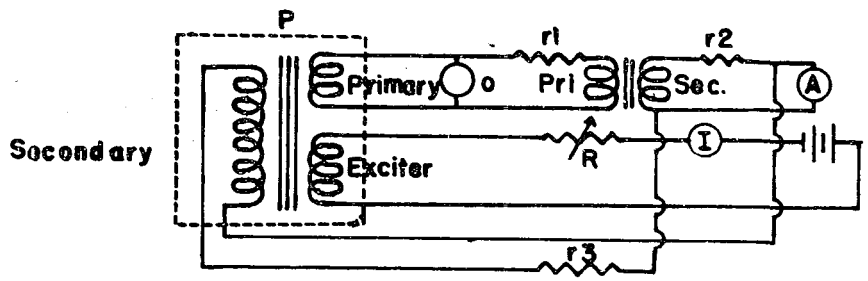


FIG. I

P - Permalloy core (Under water unit).
O - Oscillator 4000 cycles.
A - Ammeter for detecting change of field.
I - Ammeter for reading D.C. field current.
R, r1, r2, r3 - resistances.

A circuit diagram, supplied by the Japanese, giving details of the oscillator ("O", above) follows:

CONNECTION DIAGRAM OF OSCILLATOR
FOR WEAK MAGNETIC FIELD MEASURMENT INSTRUMENT

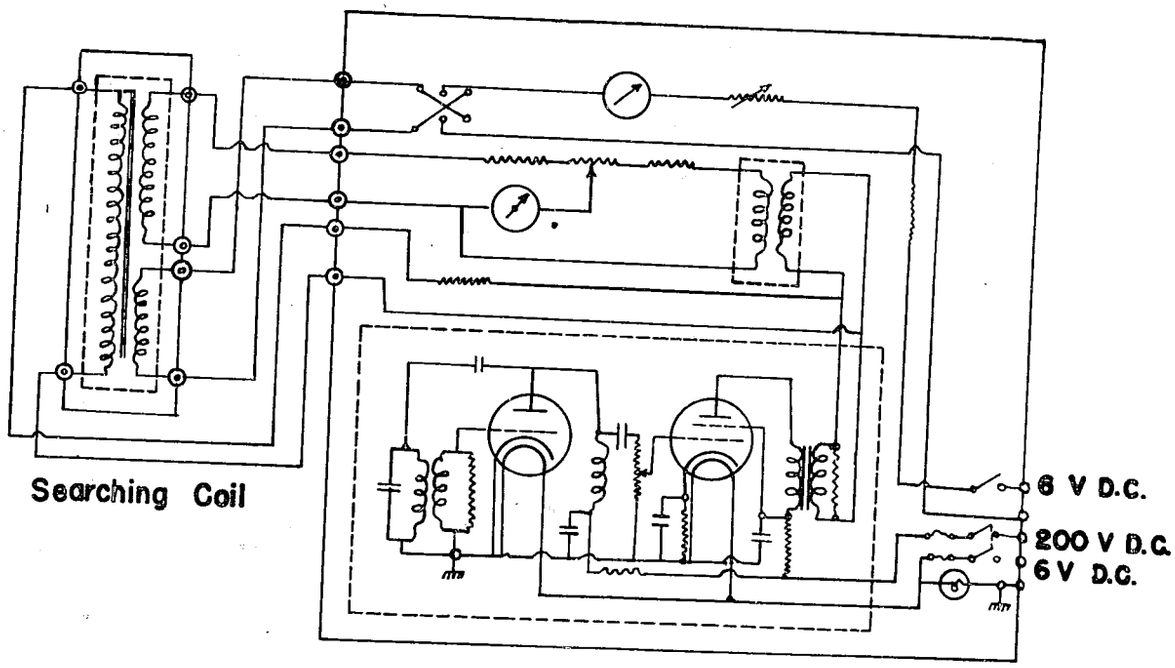


FIG. 2

The magnetic signatures of Japanese ships were obtained by taking a series of readings of field strength on meter "A", Fig. 1. These readings were taken at equal intervals of time while the ship passed over the measuring unit at a constant speed. The readings were then plotted on a graph showing ship's field versus ship's position relative to the unit. No actual records of any ship's signature were available as all had been burned; however, an example sketch, Fig. 3, shows the type and form of records made by the Japanese for magnetic signatures.

EXAMPLE MAGNETIC FIELD OF DESTROYER—SHIOKAZE

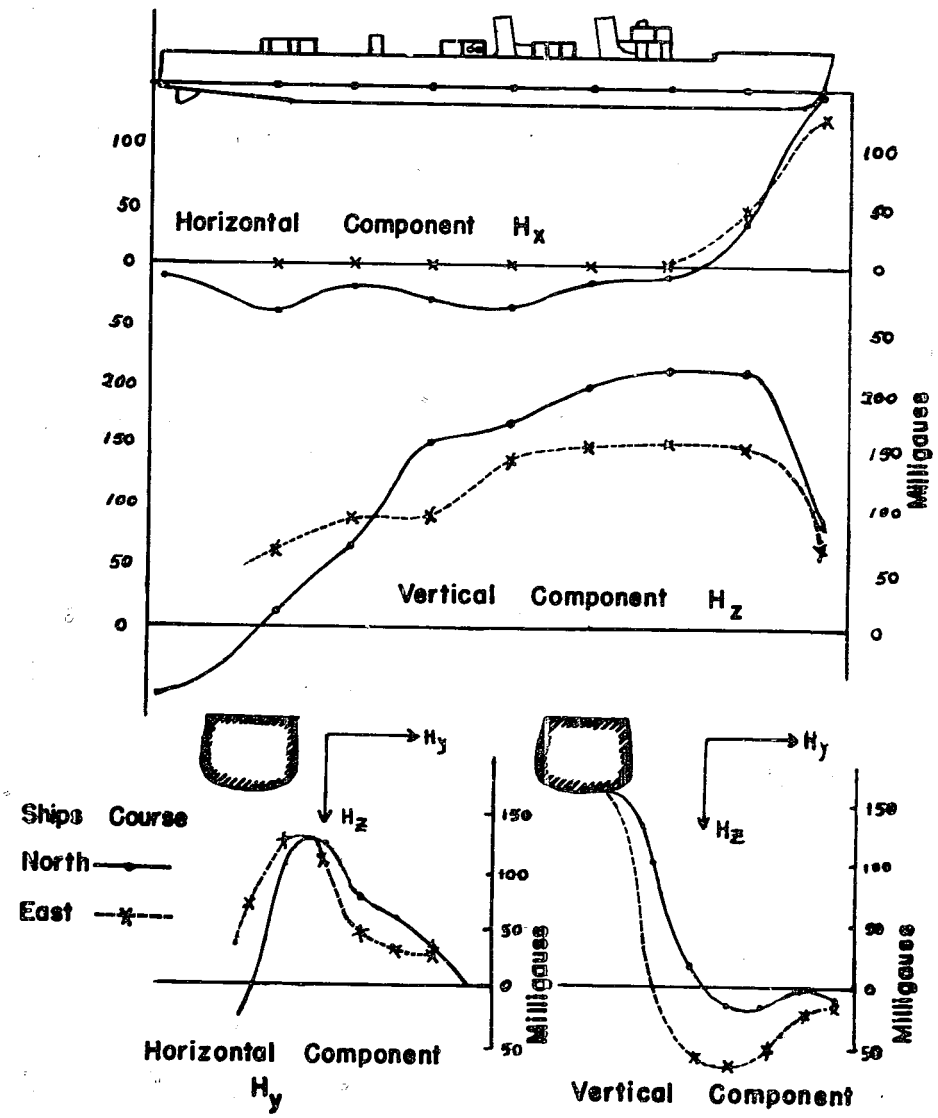


FIG. 3

2. Acoustic Signatures

The measurement of acoustic signatures was carried on at MAIZURU using a microphone and amplifier, the output of which was measured on a suitable meter, indicating the sound output in dynes/cm2. Readings were plotted on a graph, in the same manner as was done for magnetic signatures, showing sound output against ships' position relative to the microphone.

Apparently no attempts had been made to obtain details of sound frequency, sound intensity only being considered. The choice of 30 and 40 K.C. firing frequency for the Japanese type "P" mines was purely by guesswork. (See NavTechJap report on "Japanese Mines", Index No. O-04.). As in the case of magnetic signatures, all records of actual acoustic signatures had been destroyed.

3. Pressure Signatures

No research work had been carried out by the Japanese on the subject of ship's pressure signatures. Efforts were directed towards sweeping the U.S. pressure mine, and the use of a wood-filled ship was under consideration for this purpose.

4. Magnetic Field at Points in the Pacific

Charts giving details of the earth's magnetic field were obtained from AMERICA before the war and seem to have formed the basis of charts used by the Japanese.

Magnetic investigations have been carried out during the last three years, but the information has not yet been collected for publication. It is expected that the information will be available in about six months.

A book entitled "Investigation on the Disturbance of the Earth's Magnetic Field Due to a Magnetic Mass" was written by Mr. SHIBATA of the Mine Research Laboratory.

CHART OF MAGNETIC VARIATION IN WATERS NEAR JAPAN

日本近海磁針偏差圖

1937

等偏差線及等年差線

昭和7年及8年ノ測量ニ基キ算定調製
但シ一部ハ下記資料ニ據ル

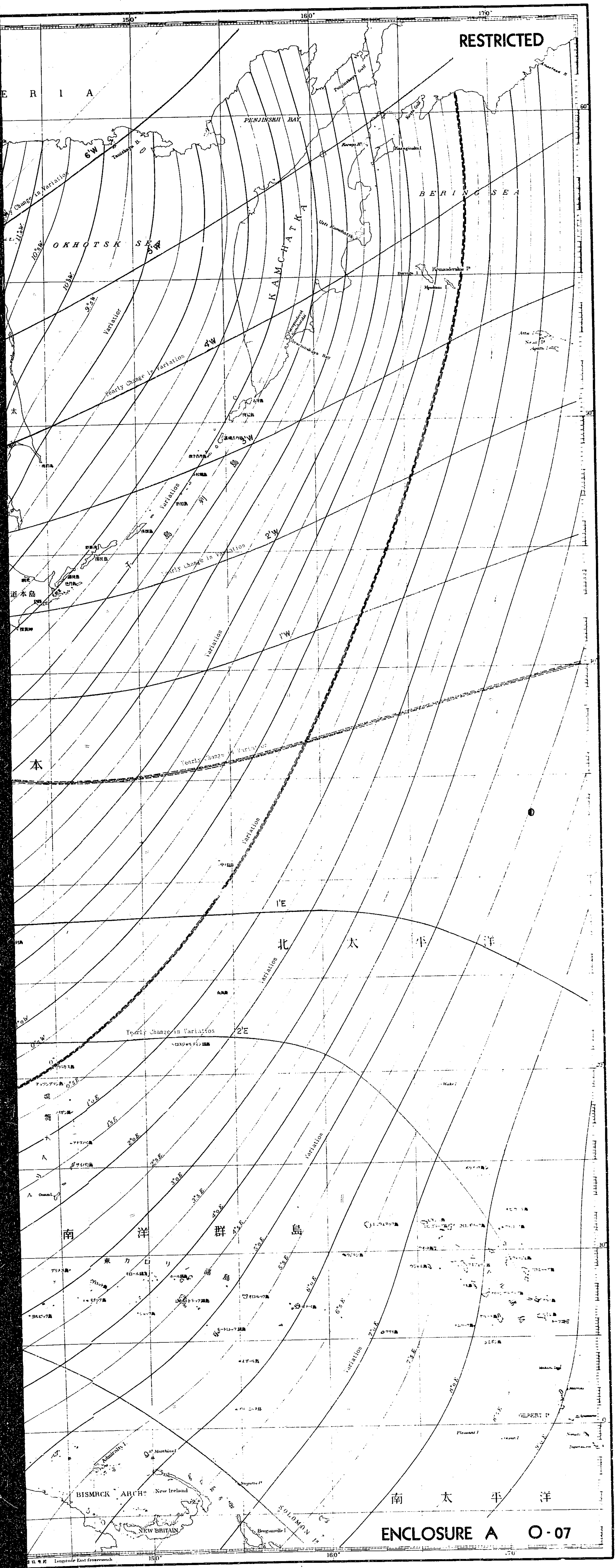
Science Department, Imperial University, Tōkyō.
Central Meteorological Observatory, Tōkyō.
Department of Terrestrial Magnetism Carnegie Institution of Washington.
Terrestrial Magnetism and Atmospheric Electricity, Baltimore.
Central Geophysical Observatory, Leningrad.
L'Observatoire, Zikawei, Shanghai.
Royal Observatory, Hongkong.
British Hydrographic Department, Admiralty.

圖中黒線ハ等偏差線赤線ハ等年差線

Black lines Variation

Red lines Yearly change in variation

RESTRICTED



ENCLOSURE A O-07

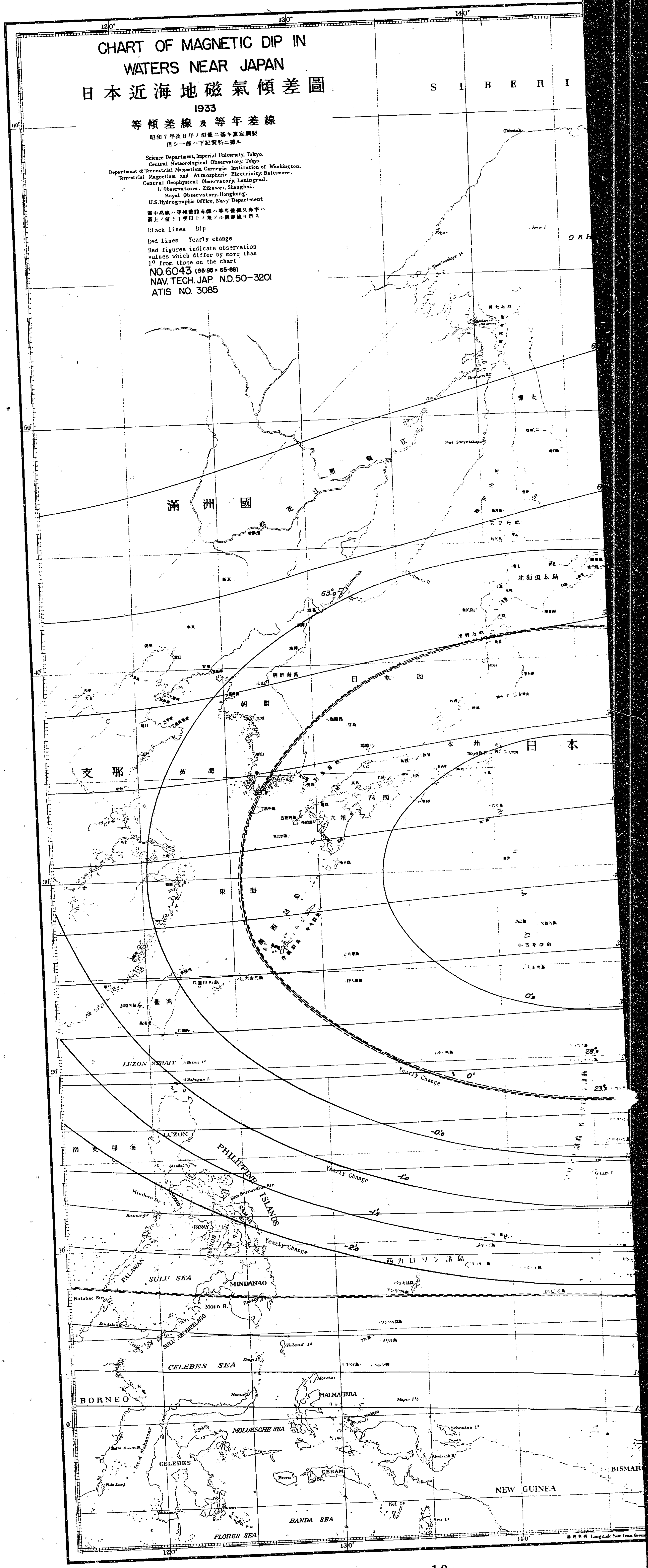
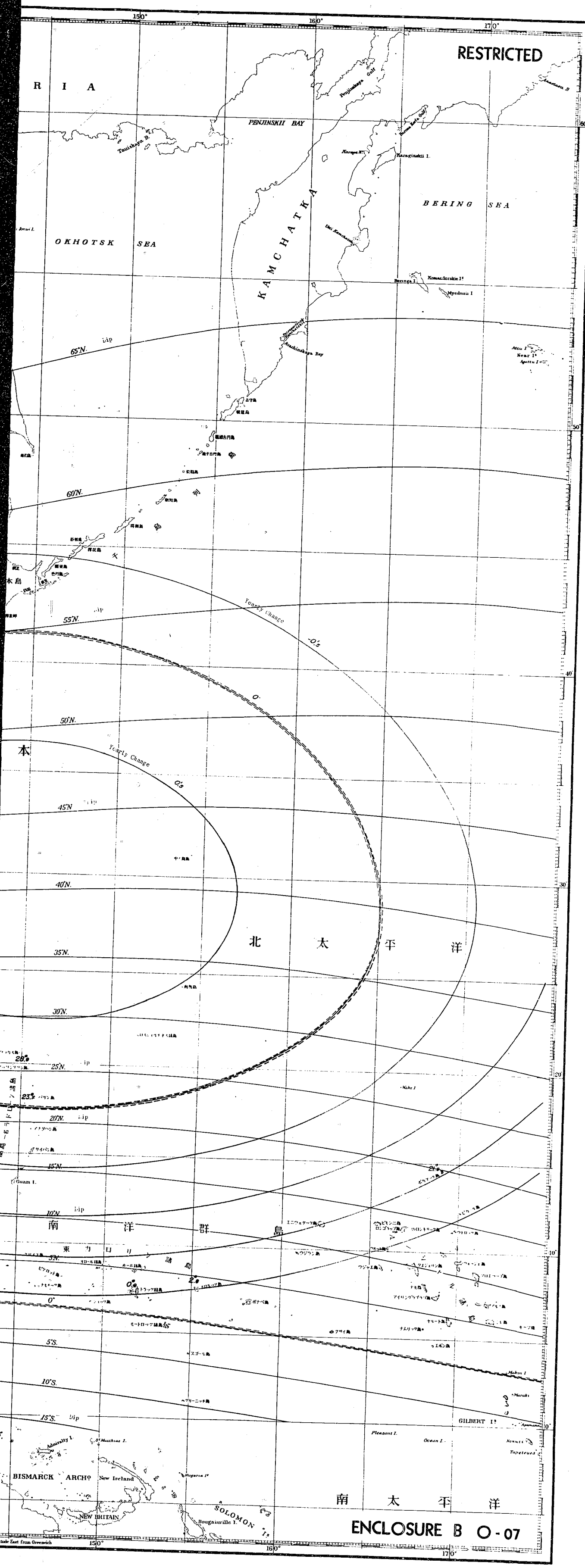


CHART OF MAGNETIC DIP IN
WATERS NEAR JAPAN
日本近海地磁氣傾差圖
1933
等傾差線及等年差線
昭和7年及8年ノ測量ニ基キ算定調製
但シ一部ハ下記資料ニ據ル
Science Department, Imperial University, Tokyo.
Central Meteorological Observatory, Tokyo.
Department of Terrestrial Magnetism Carnegie Institution of Washington.
Terrestrial Magnetism and Atmospheric Electricity, Baltimore.
Central Geophysical Observatory, Leningrad.
L'Observatoire, Zikawei, Shanghai.
Royal Observatory, Hongkong.
U.S. Hydrographic Office, Navy Department
Black lines Dip
Red lines Yearly change
Red figures indicate observation values which differ by more than 1° from those on the chart
NO. 6043 (95·85 x 65·88)
NAV. TECH. JAP. N.D. 50-3201
ATIS NO. 3085
120°
130°
140°
60°
50°
40°
30°
20°
10°
0°
S I B E R I
OKH
Okhotsk
Jonas I.
Shantarskiye Is
Port Sovyetskaya
De Kastri B.
樺太
滿洲國
黑龍江
松花江
Vladivostok
63.0°
北海道本島
日本海
朝鮮
朝鮮海灣
支那
黄海
東海
本州
日本
四國
九州
五島列島
小笠原群島
Tokyo
0.8'
28.9°
23.7°
Yearly Change
0'
-0.8'
-1.0'
-1.5'
-2.0'
臺灣
八重山列島
宮古列島
LUZON STRAIT
Batan Is
Babuyan I.
LUZON
南支那海
PHILIPPINE ISLANDS
Manila
San Bernardino Str.
Mindoro Str.
MINDORO
SAMAR
PANAY
NEGROS
Busuanga
PALAWAN
SULU SEA
MINDANAO
Balabac Str.
Moro G.
Davao
Sandakan B.
SULU ARCHIPELAGO
西カロリン諸島
Guam I.
Talaud Is
Sangi Is
CELEBES SEA
Morotai
HALMAHERA
Mapia Is
Menado
BORNEO
Waigeo
Schouten Is
Yapen
Geelvink B.
MOLUKSCHE SEA
Balik Papan B.
Str. of Makassar
CELEBES
Buru
CERAM
NEW GUINEA
BISMARC
Pulo Laut
Makassar
Buton
Kei Is
Aru Is
BANDA SEA
FLORES SEA
Longitude East from Greenwich

RESTRICTED



ENCLOSURE B O-07

CHART OF MAGNETIC HORIZONTAL FORCE IN WATERS NEAR JAPAN

日本近海地磁氣水平力圖

1933

等水平力線及等年差線

昭和7年及8年ノ測量ニ基キ算定調製
但シ一部ハ下記資料ニ據ル

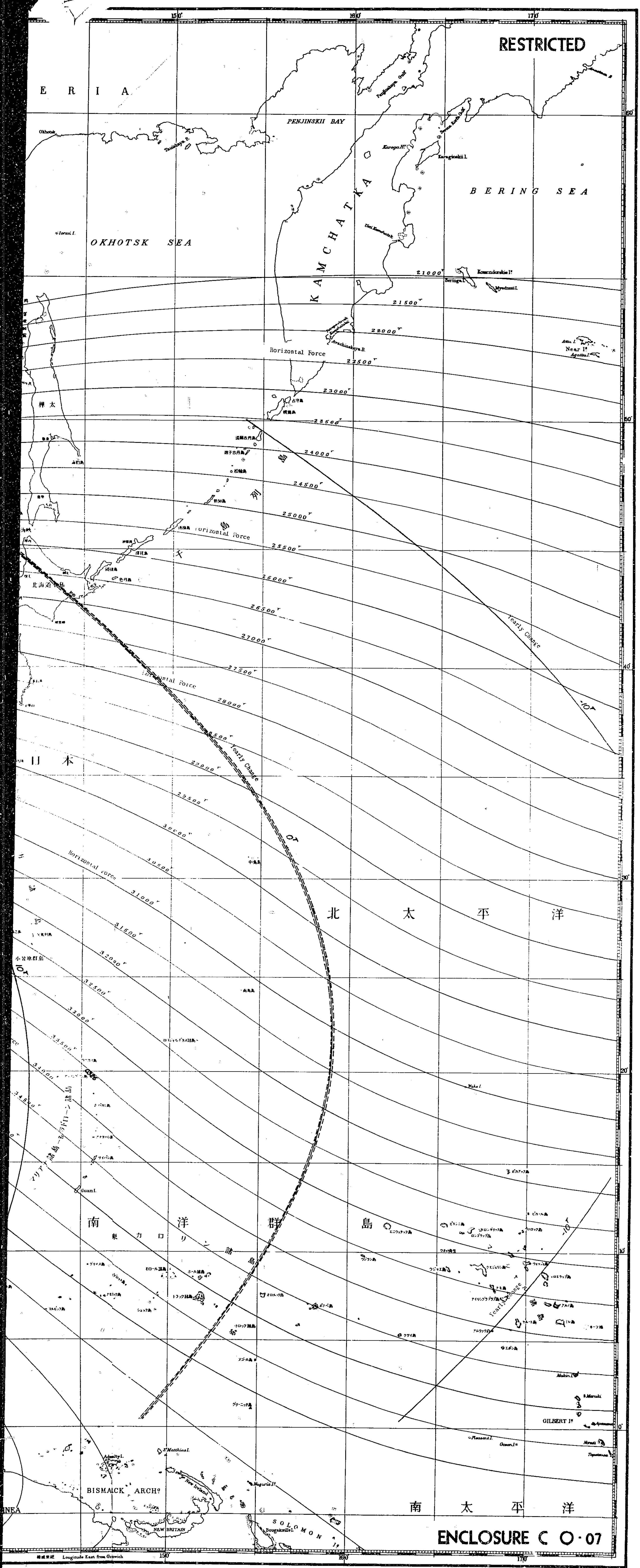
Science Department, Imperial University, Tokyo.
Central Meteorological Observatory, Tokyo.
Department of Terrestrial Magnetism Carnegie Institution of Washington.
Terrestrial Magnetism and Atmospheric Electricity, Baltimore.
Central Geophysical Observatory, Leningrad.
L'Observatoire, Zikawei, Shanghai.
Royal Observatory, Hongkong.
U.S. Hydrographic Office, Navy Department

黒中黒線ハ等水平力線赤線ハ等年差線又赤字ハ
最上ノ値ト0·01 c.g.s.以上ノ差アル觀測値ヲ示ス

Black lines Lines of Horizontal Force
Red lines Yearly Change
Red figures indicate observed values which differ by more than 0.01 C.G.S. from the values on the chart

NO. 6044 (95·80 × 65·83)
NAV. TECH. JAP. N.D. 50-3202
ATIS NO. 3085

RESTRICTED



ENCLOSURE C O-07