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Results of the Oceanographic Observations along 125°E from 27°N to 20°N in the Spring of 1969 and 1970.

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Abstract

The general oceanographic conditions along the meridian of 125°E from 27°N to 20°N in spring of 1969 and 1970 are presented on the bases of the cruise of the Keiten Maru. The east component of the maximum velocity of the Kuroshio is 109 cm/sec in 1969 and 104 cm/sec in 1970. The geostrophic transport of the Kuroshio is about 38 $\times$ 10^6 m^3/sec in 1969 and 35 $\times$ 10^6 m^3/sec in 1970, those values are 5-10$\times$$10^6$ m^3/sec larger than those in the same season of 1966-1968.

1. Introduction

As a part of the CSK project in 1965 to 1968, the two training ships of Kagoshima University, the Keiten Maru (300.07 ton) and the Kagoshima Maru (1038.14 ton) took a meridional oceanographic section along 125°E from 32°N to 20°N (from 27°N to 20°N in spring of 1968), these results were already reported by Takahashi and Chaen (1971). Since 1969, the Keiten Maru has carried out oceanographic observations along the same section from 27°N to 20°N each spring, in conection with the tuna-fishing conditions east of Taiwan. In this report, the oceanographic

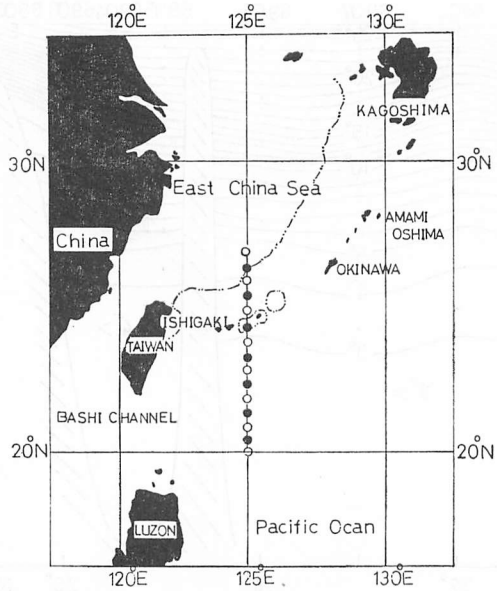

Fig. 1. Map showing the observation stations. Symbols of station: circles, serial oceanographic observation and BT; black circles, BT observation.

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conditions along 125°E from 27°N to 20°N in the spring of 1969 and 1970 are described. The type of observation and the position of stations are almost the same as in the case of the CSK project. The observation stations are shown in Fig. 1.

2. Water temperature and salinity distributions

Distributions of water temperature and salinity between 27°N and 20°N along the meridian of 125°E in 1969 and 1970 are shown in Fig. 2 (a), (b), (c), (d).

The general aspects of water temperature and salinity distribution are almost the same as those in the spring seasons of 1966-1968 (Takahashi and Chaen 1971). In the water-temperature distribution, the slope of isotherms in the region between the edge of the continental shelf and the Ryukyu submarine ridge is a little more sharp in 1969 than in 1970. The warm core more than 25°C was disappeared in 1969, but it was found in 1970. The upwelling found south of the submarine ridge (Yuwaki, Tsrudome and Shimada, 1971), seems to have taken place at 22°N in 1969, and it clearly appeared near the submarine ridge in 1970.

In the salinity distribution, the value of surface salinity is about 34.60 ‰ - 34.70 ‰ in the region between the edge of the continental shelf and the submarine ridge. The salinity maximum of subsurface saline water more than 35.00 ‰ reached at the continental shelf in 1969, but it was found as far as the middle point between the edge of the continental shelf and the submarine ridge in 1970.

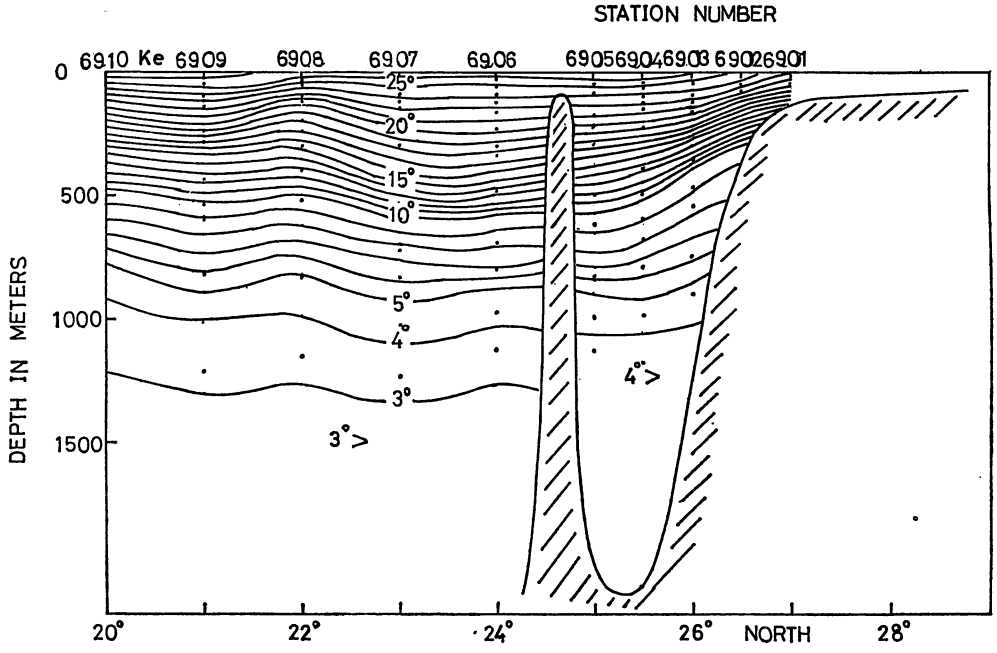
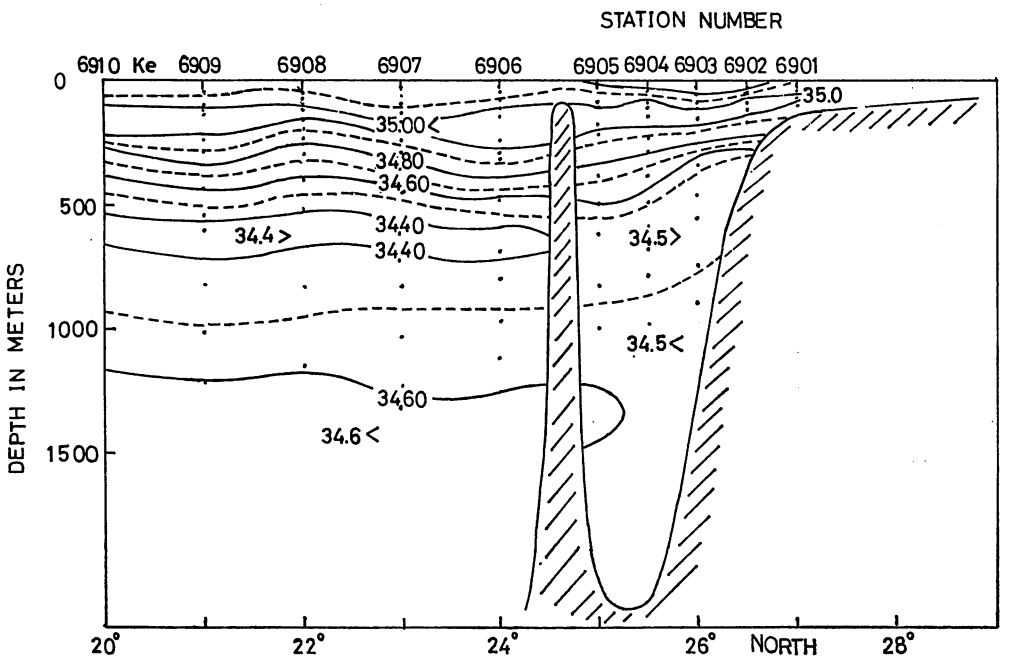


Fig. 2. (a)

Fig 2. Distributions of water temperature (°C) and salinity (‰) along the meridian of 125°E by serial observation in spring of 1969 (a), (b) and 1970 (c), (d).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1000
1500
DEPTH IN METERS
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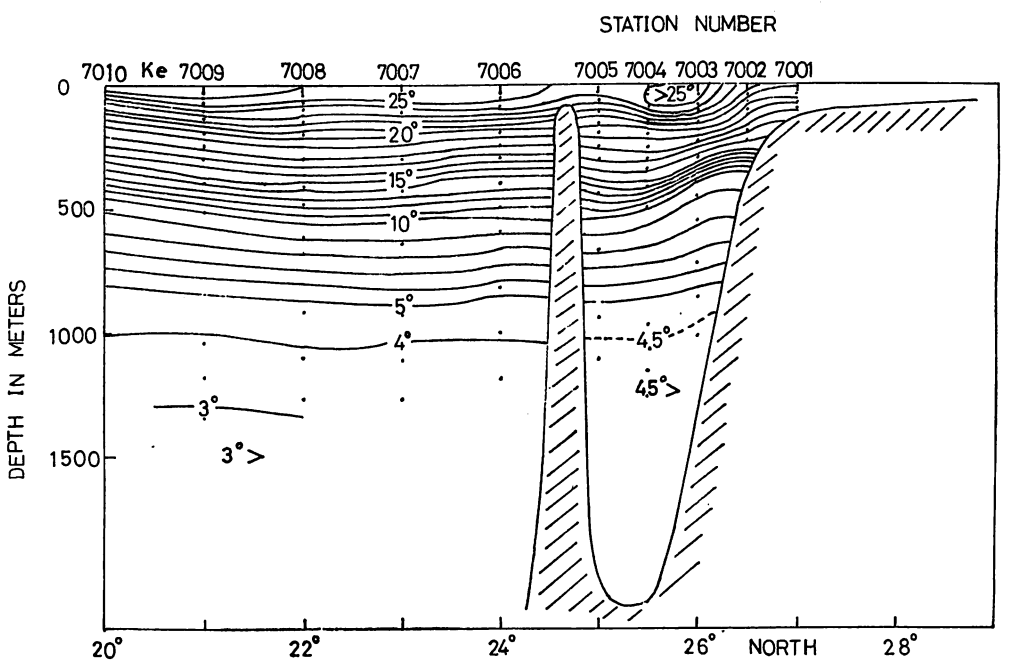
35.00<
34.80
34.60
34.40
34.4>
34.40
34.5>
34.5<
34.60
34.6<
20°
22°
24°
26°
NORTH
28°

Fig. 2. (b)


STATION NUMBER
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500
1000
1500
DEPTH IN METERS
25°
(>25°)
20°
15°
10°
5°
4°
4.5°
4.5°>
3°
3°>
20°
22°
24°
26°
NORTH
28°

Fig. 2. (c)

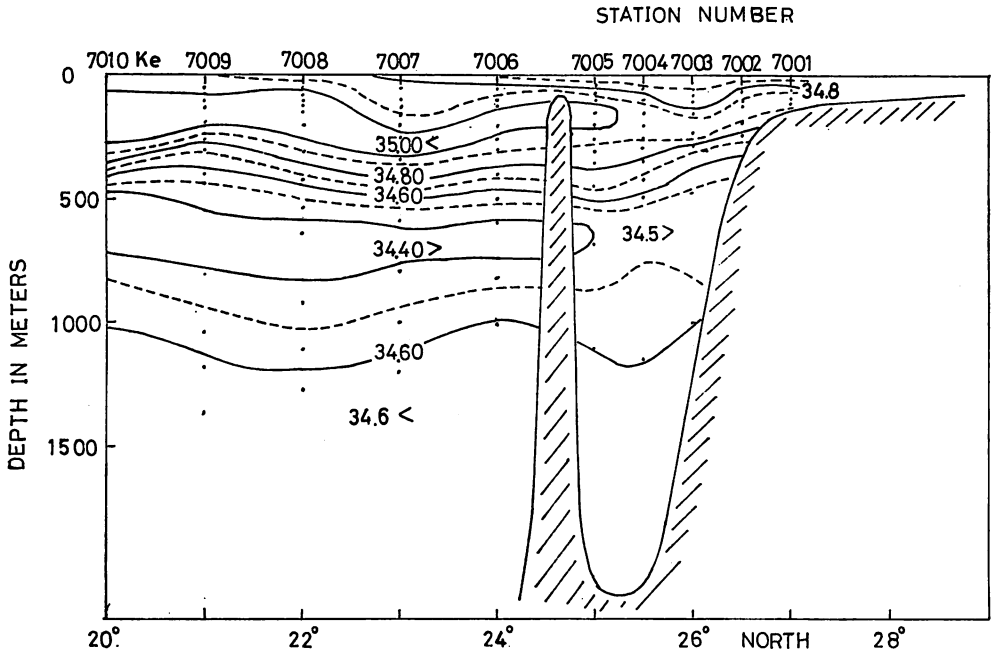

Fig. 2. (d)

3. Geostrophic current

The distribution of the east-west component of geostrophic current refered to 1200 m in 1969 and 1970 are shown in Fig.3 (a) (b) and maximum current velocity and the geostrophic transport are listed in Table 1.

Table 1. Values of the current velocity and the transport of component of geostrophic current across 125E section.

Year	Position of current axis (Lat. N)	East-west component	Current velocity (cm/sec)	Transport (m^3/sec)
1969	26°-15′	East	109	38.0×10^6
	23°-30′	East	11	6.0
	23°-00′	West	69	26.0
	21°-30′	East	32	2.7
	20°-30′	West	25	3.0
1970	26°-15′	East	104	35.0
	25°-15′	West	13	0.6
	24°-30′	East	23	19.0
	23°-15′	West	26	11.0
	21°-30′	East	20	3.5

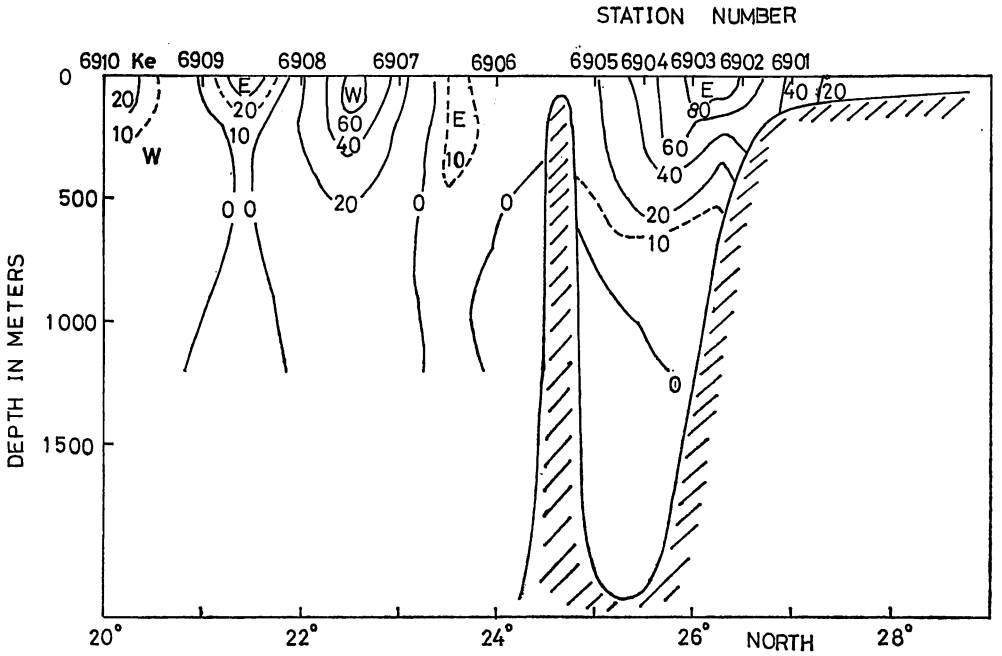

Fig. 3. (a)

Fig. 3. The east-west component (cm/sec) of geostrophic current across 125°E referred to 1,200 m in the spring of 1969 (a) and 1970 (b).

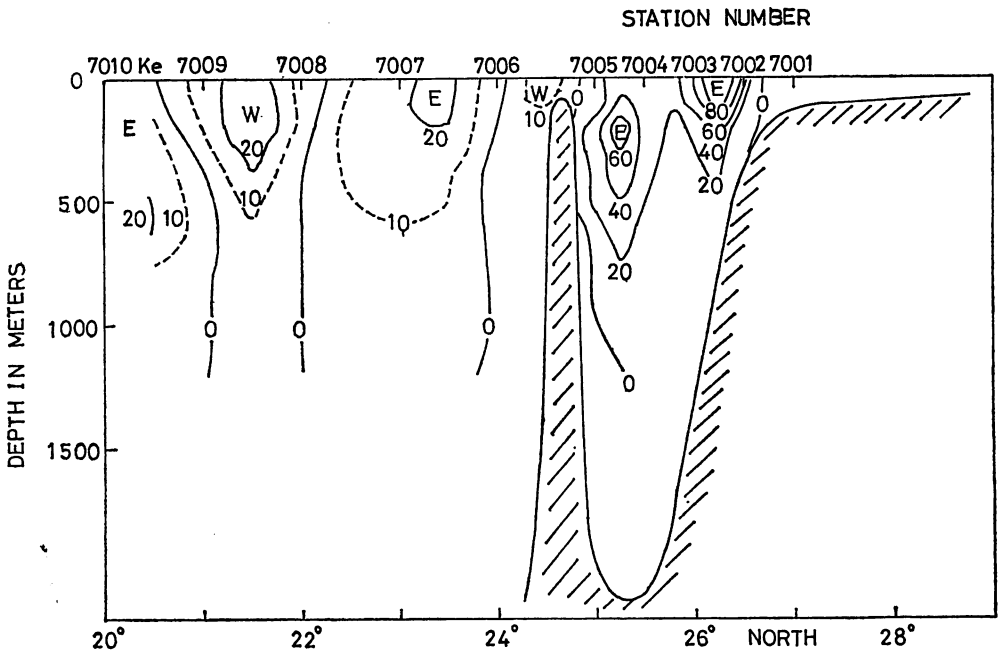

Fig. 3. (b)

The maximum velocity of the Kuroshio in 1969 and 1970 is 109 cm/sec and 104 cm/sec respectively, these values are larger than those of the same season of 1966-1968. According to the results of CSK in 1965 to 1968 (Takahashi and Chaen, 1971), the maximum veloctiy of the Kuroshio during the three years is about 80 cm/sec in April and 100 cm/sec in August respectively, and the results show that the current velocity of the Kuroshio across the meridian of 125°E in the East China Sea in spring seems weaker than that of summer. However, this finding may be counteracted from the results found in the spring of 1969 and 1970. Masuzawa (1965) reported that the surface current velocity of the Kuroshio off Shionomisaki is larger in summer and smaller in autumn, and there is no significant difference between them in spring and summer, according to the bases of statistic on the surface maximum velocity of the Kuroshio during the past 10 years. Recently, Tsuchida (1971) reported that the seasonal variation of the Kuroshio south-east of Yakushima Island, which stated that the current velocity of the Kuroshio becomes larger during spring to early autumn and smaller in winter, as the seasonal characteristic feature. Considering the above mentioned reports, it seems that, significant differences of the Kuroshio velocity in the seasons of spring and summer is not presented.

The current-axis of the Kuroshio in 1970 is situated more south compared with 1969, and the second maximum having about 64 cm/sec is cleared at a depth of 200 m in 1970. The east component of the geostrophic transport of the Kuroshio is estimated to be about 38×10^6 m^3/sec in 1969 and 35×10^6 m^3/sec in 1970 respectively, those values are larger compared with those of 1966-1968. The eastward flow existed near the submarine ridge in 1969, where the westward flow existed in 1970. To the south of the submarine ridge, the component of the current direction is alternately changed. This seems to be due to a complicated hydrographical condition including some eddies in this region (Nitani, 1961, Takahashi and Chaen, 1971).

4. Summary

The oceanographic conditions along the meridian 125°E from 27°N to 20°N in spring of 1969 and 1970 are presented, based on the oceanographic data of the Keiten Maru.

The general aspects of water temperature and salinity distribution are almost the same as those in 1965 to 1968, but the slope of isotherms in the region between the edge of the continental shelf and the submarine ridge in 1969 and 1970 are a little more sharp than those found in 1966 to 1968. The maximum velocity of the Kuroshio is 109 cm/sec in 1969 and 104 cm/sec in 1970. The eastward transport of the Kuroshio referred to 1,200 m in 1969 and 1970 was estimated to be about 38×10^6 m^3/sec and 35×10^6 m^3/sec respectively. The maximum velocity and the transpont of the Kuroshio in the region between the edge of the continental shelf and the submarine ridge is higher than those in the same season of 1966-1968.

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