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OCEAN CURRENTS

IN THE

VICINITY OF THE JAPANESE ISLANDS AND
CHINA COAST

1.24

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1964

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EXPLANATION OF CHARTS

The surface current regimes in most of this area are extremely varied and complex. In some regions the currents are mainly tidal; in others they are induced by the prevailing trades or by the seasonal monsoon winds. The Kuroshio is a permanent current that flows northeastward from the east coast of Formosa past the southeast coast of Honshu. The strong and stable Kuroshio is little changed by the opposing (winter) monsoon. Although this current shows little seasonal variation, it is slightly stronger during summer.

The main effect of the seasonal reversal of the monsoon is a corresponding reversal in the surface current direction off the mainland from Formosa Strait to about 30°N. Changes in the direction of current flow seem to agree closely with changes in wind direction. The most variable currents occur during the transitional months of April and May, and September. The most persistent current sets occur in December and July.

South of the Kuroshio, variable current sets are frequently observed; these currents may last for short or long periods of time. The inset on each chart indicates a secondary set that may occur at any time in the given month. The exact cause of the unusual circulation in this region is not known, but there is evidence of mixing or upwelling of the Oyashio, a southwest-setting current that flows under the Kuroshio in this region.

In the northern part of the East China Sea and in the Yellow Sea, the combination of tidal and monsoon drift currents frequently results in confused and variable current sets. Currents in the Yellow Sea are predominantly tidal; the flood current sets northward off the Korean coast and southward off the China coast. In the middle of the sea, tidal currents are usually rotary clockwise throughout the tide cycle. In Liao-tung Wan and the Po Hai, the currents are also mainly tidal; the flood current usually sets toward the heads of the gulfs, and the ebb current sets seaward. Speeds range between 1 and 2 knots, and considerable inequality may occur between strength and duration of succeeding flood and ebb currents because of the mixed character of the tides. Heavy summer rains, which cause increased outflow from coastal runoff and river discharge, accelerate the ebb and retard the flood current. In winter, the current formed by the stronger of the two monsoons is not stable in the Yellow Sea; it begins in October as an unsteady and generally weak southward flow that is easily influenced by the rotary tidal currents. It becomes more stable and increases in speed as it flows along the China coast and nears Formosa Strait.

The Tsushima Current, a branch of the Kuroshio, sets north-northeastward west of Kyushu. In summer, a branch of the current may flow along the west coast of Korea as far as the east-central part of the Yellow Sea; the main branch sets northeastward through Korea Strait, where both its speed and direction may be influenced by tidal currents, with occasional speeds up to 3 knots. The Tsushima Current divides after flowing through Korea Strait; a small branch flows northward along the east coast of Korea, but the main branch flows northeastward along the Japan coast as far north as Tatar Strait. The prevailing Tsushima Current influences the speed and direction of the weak tidal currents off the northwest coast of Honshu. During winter, when the prevailing current is weakest, the opposing tidal current may be strong enough at times to set southwestward.

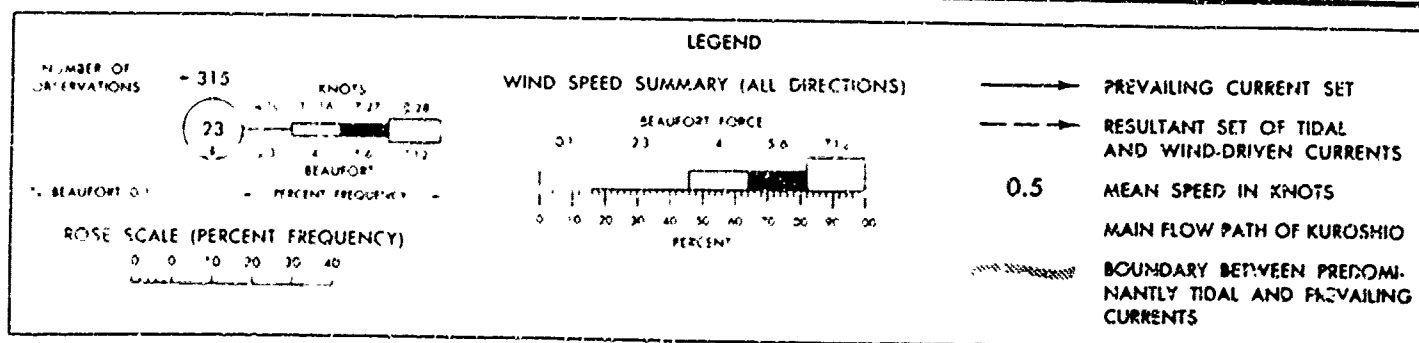
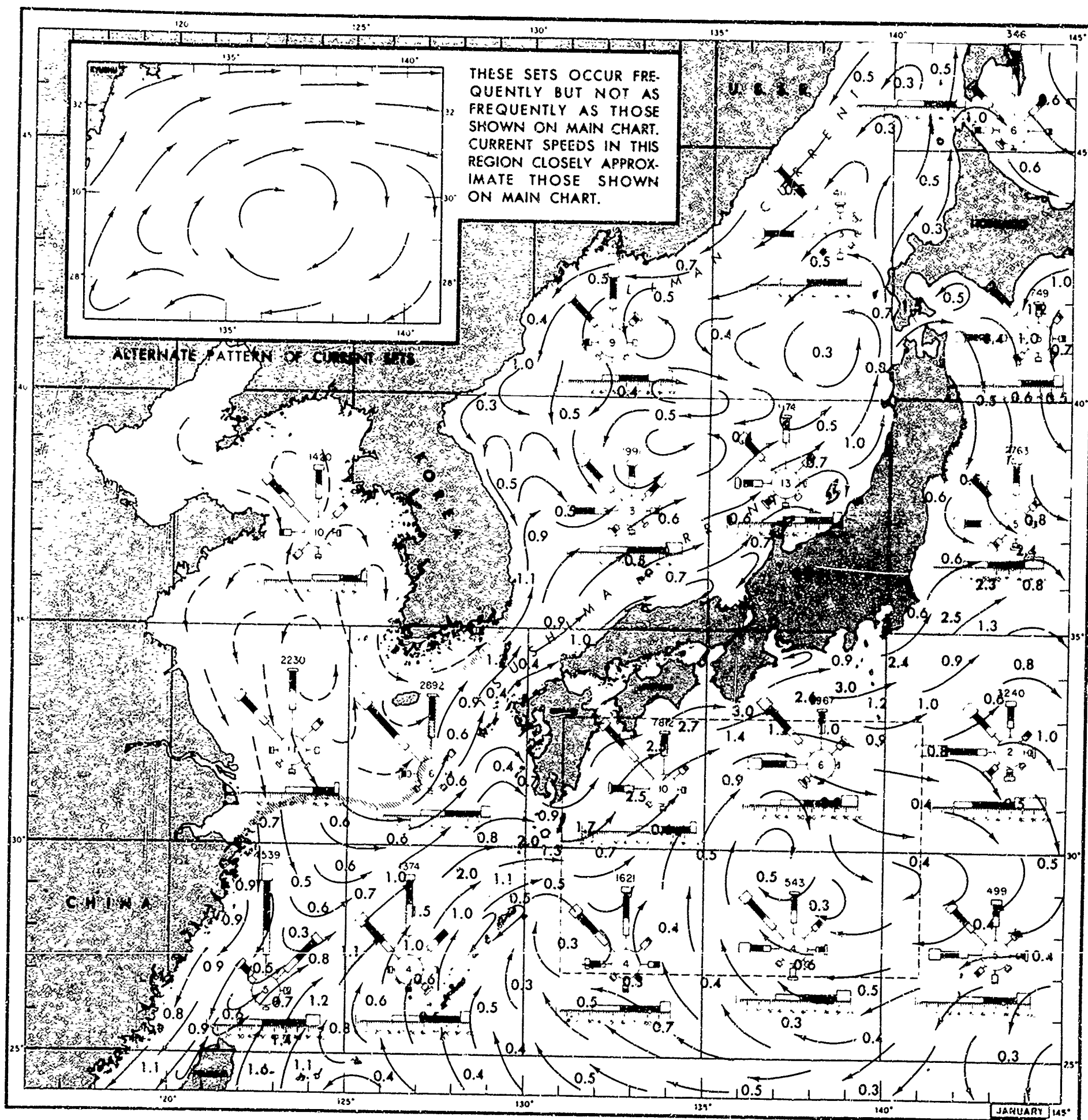
South of 47°N the Liman Current sets southwestward along the Siberian coast and completes the general counterclockwise circulation in the Sea of Japan. In some winters, the Liman Current has been observed as far south as 35°N, with speeds ranging from 0.3 to 0.7 knot.

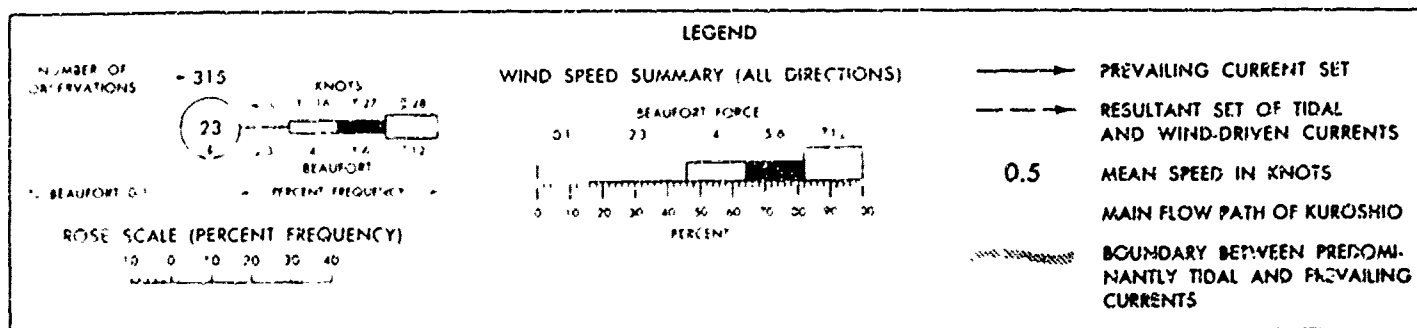
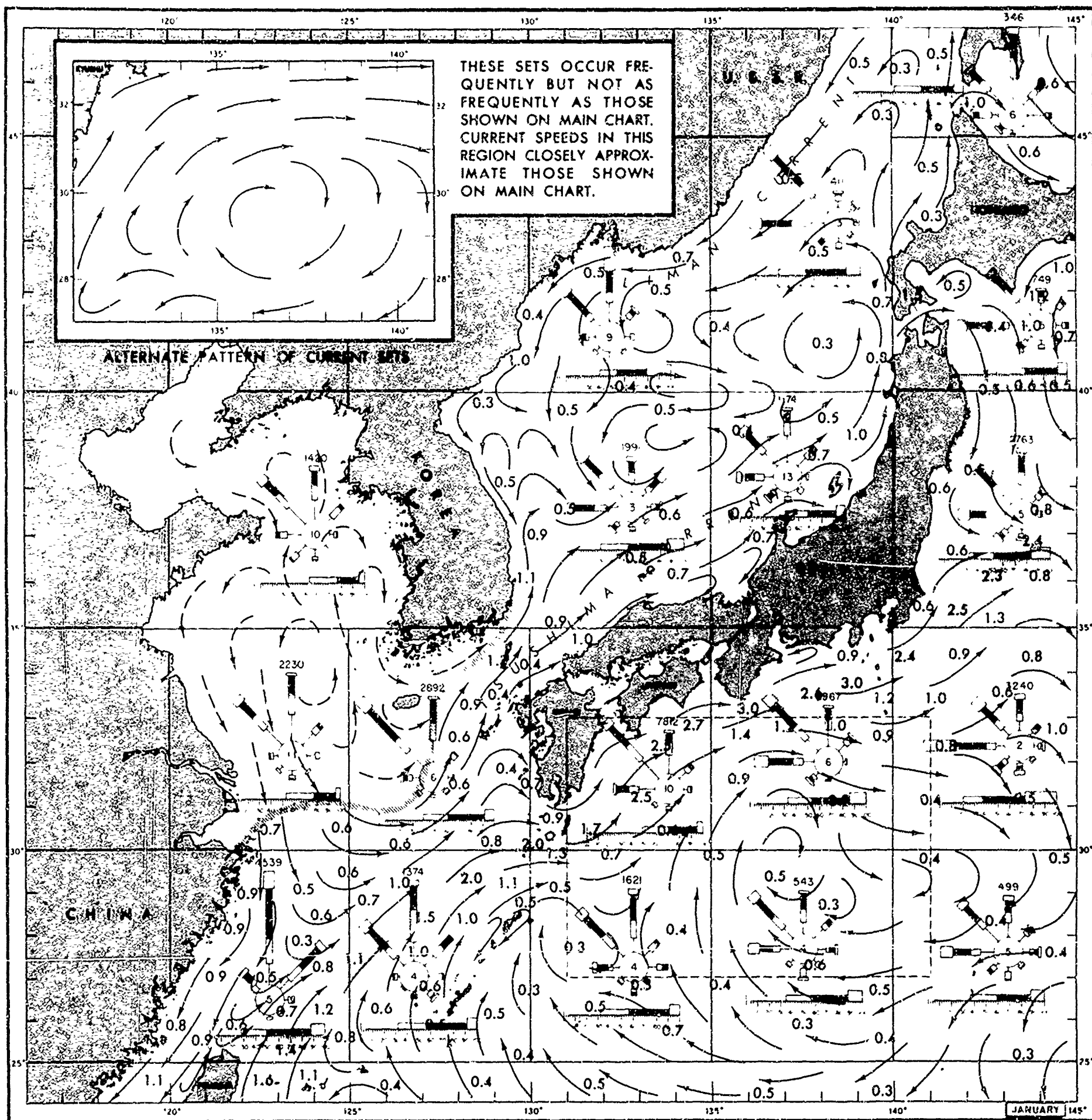
The information on surface currents was prepared at the U. S. Naval Oceanographic Office from all available sources of observed data, including direct measurements of all types; most of the data were from Japanese, Netherlands, and United States sources.

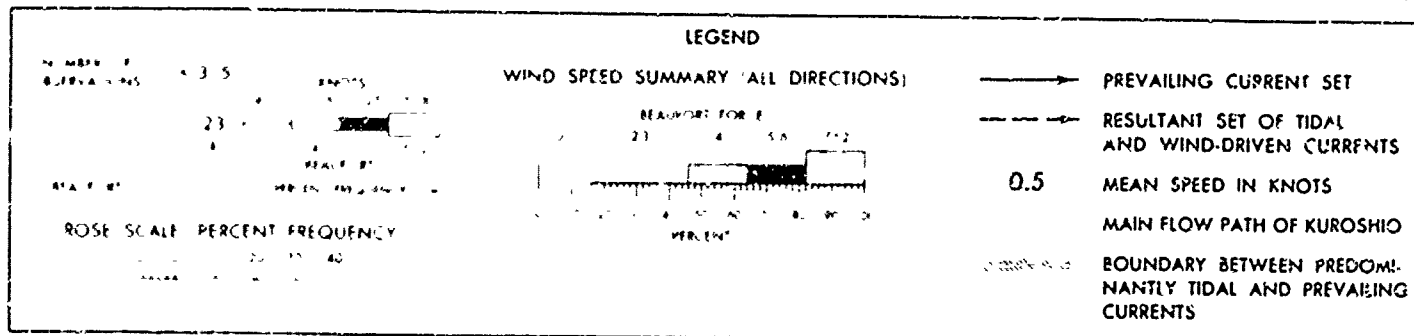
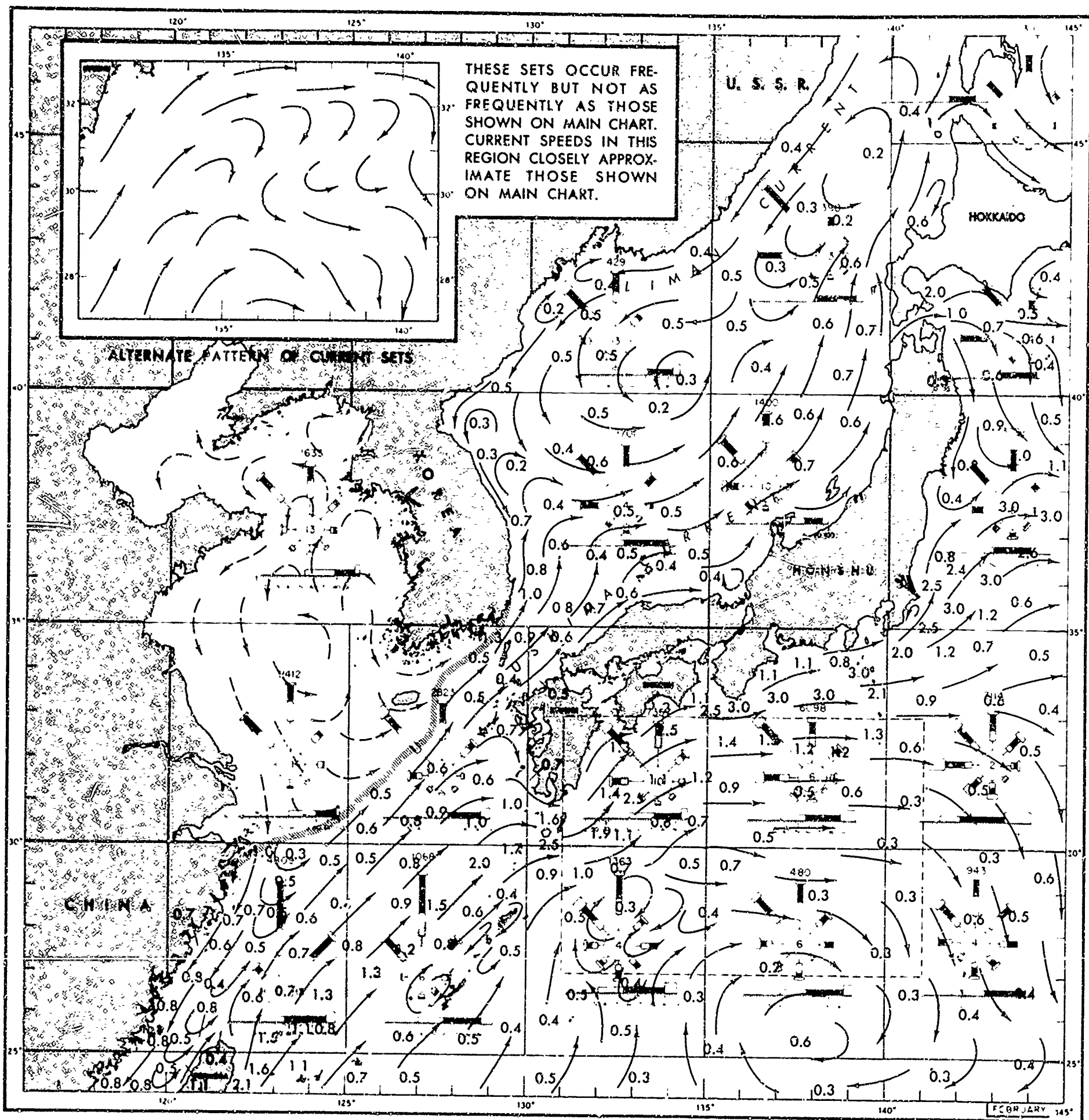
The basic surface current data in each 1° quadrangle were tabulated by direction to eight points of the compass. Solid arrows indicate prevailing current, the direction of flow most frequently observed during the month; dashed arrows show resultant current, the vector mean of all current directions observed during the month.

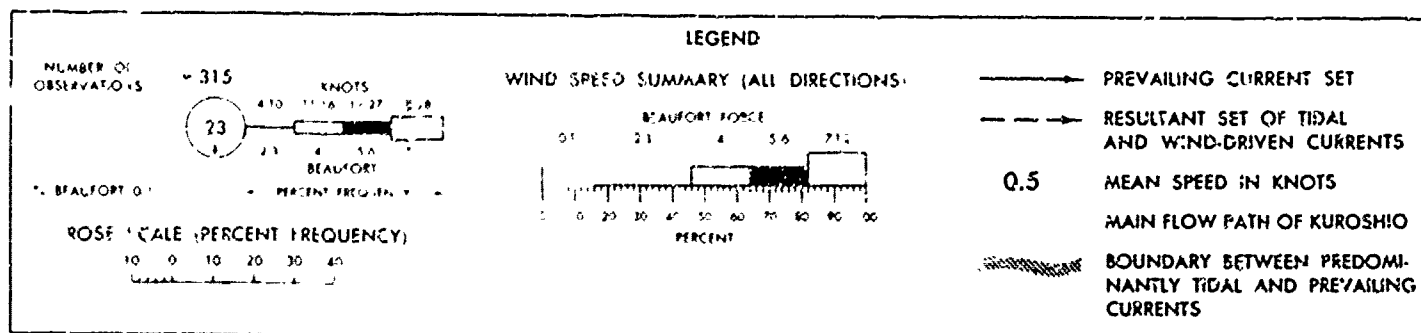
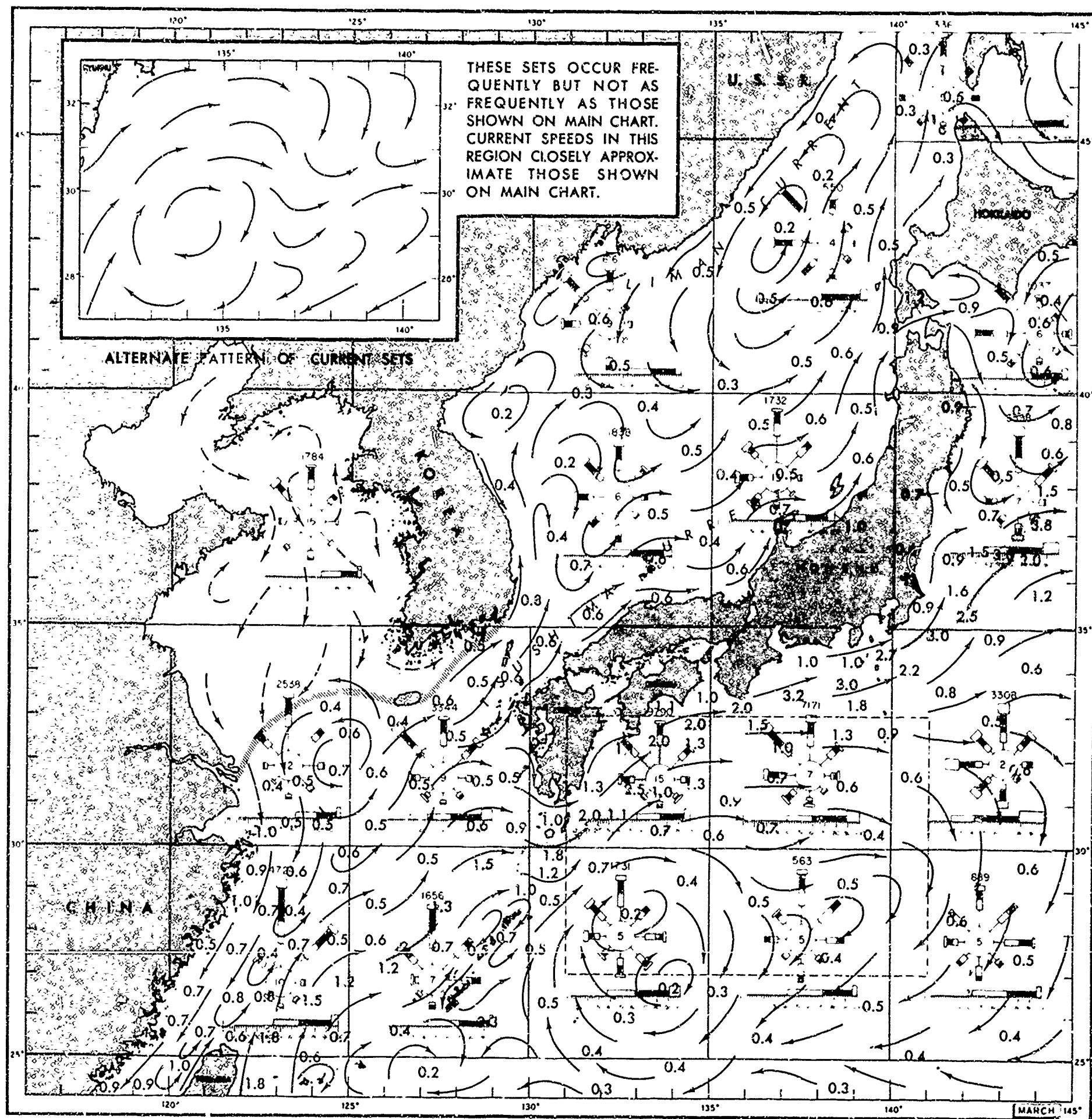
Although atmospheric circulation has a profound influence on the major current systems, local winds have little overall effect. Local winds, however, tend to reinforce the current flow when blowing parallel to it and to hinder slightly the surface flow when opposing it. Also, local winds often set up local currents.

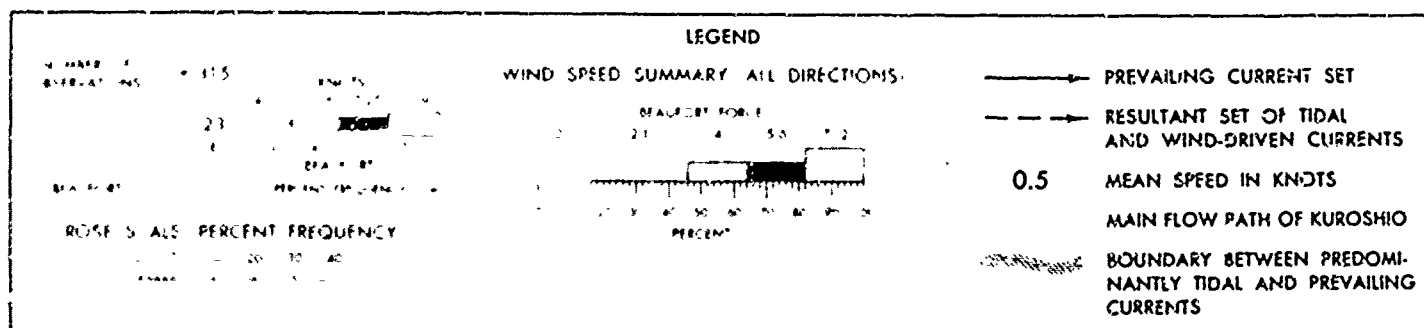
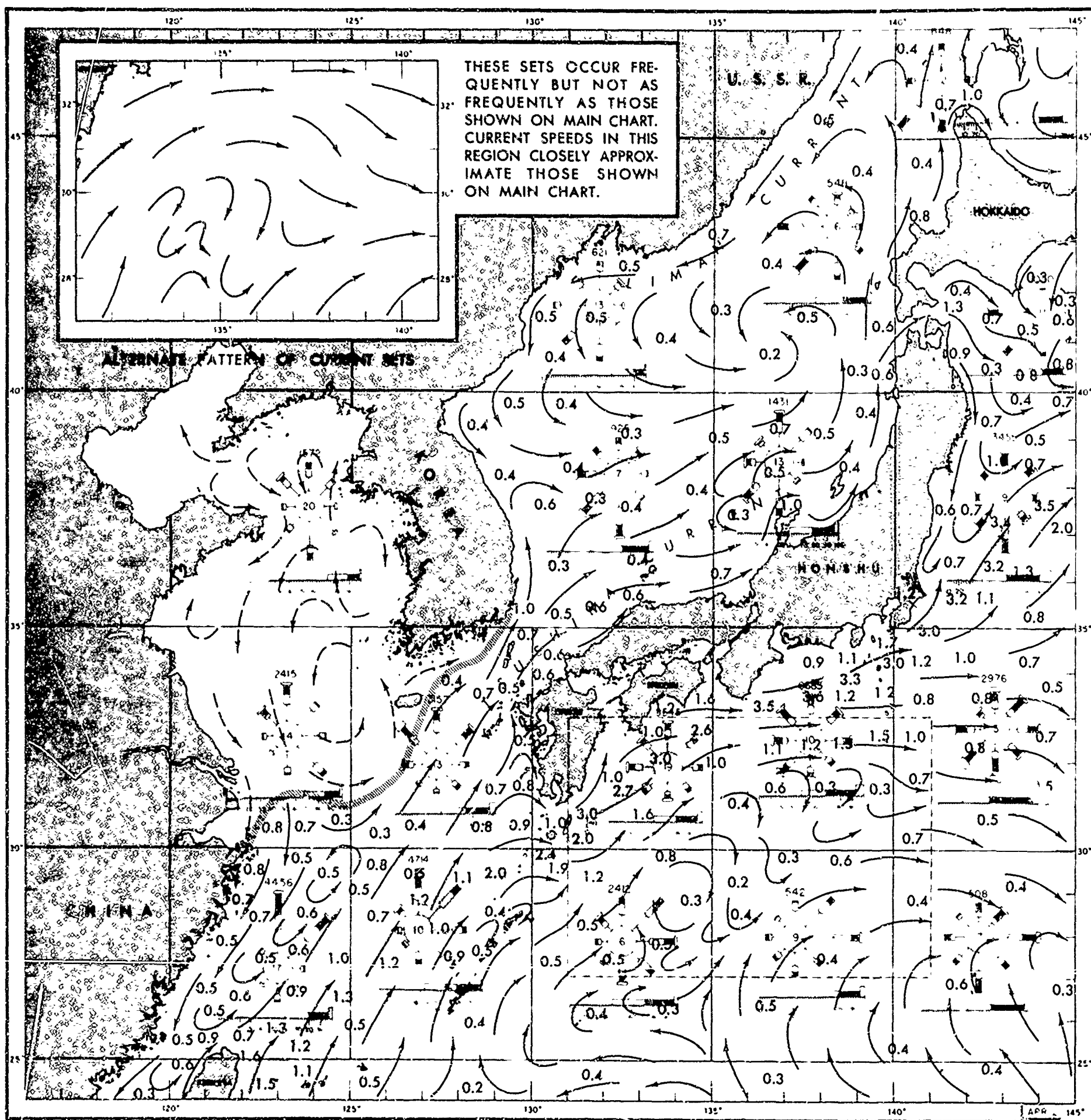
The wind data in this atlas were obtained from British, German, Netherlands, and United States sources. The wind roses for each month give the relative frequencies of selected wind speed categories by direction. The bar graph associated with each rose gives the relative frequency of each wind speed category.

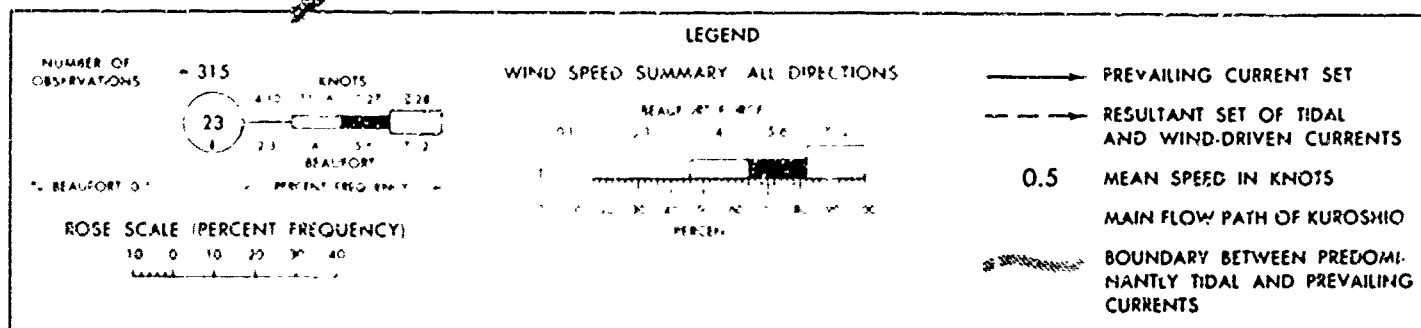
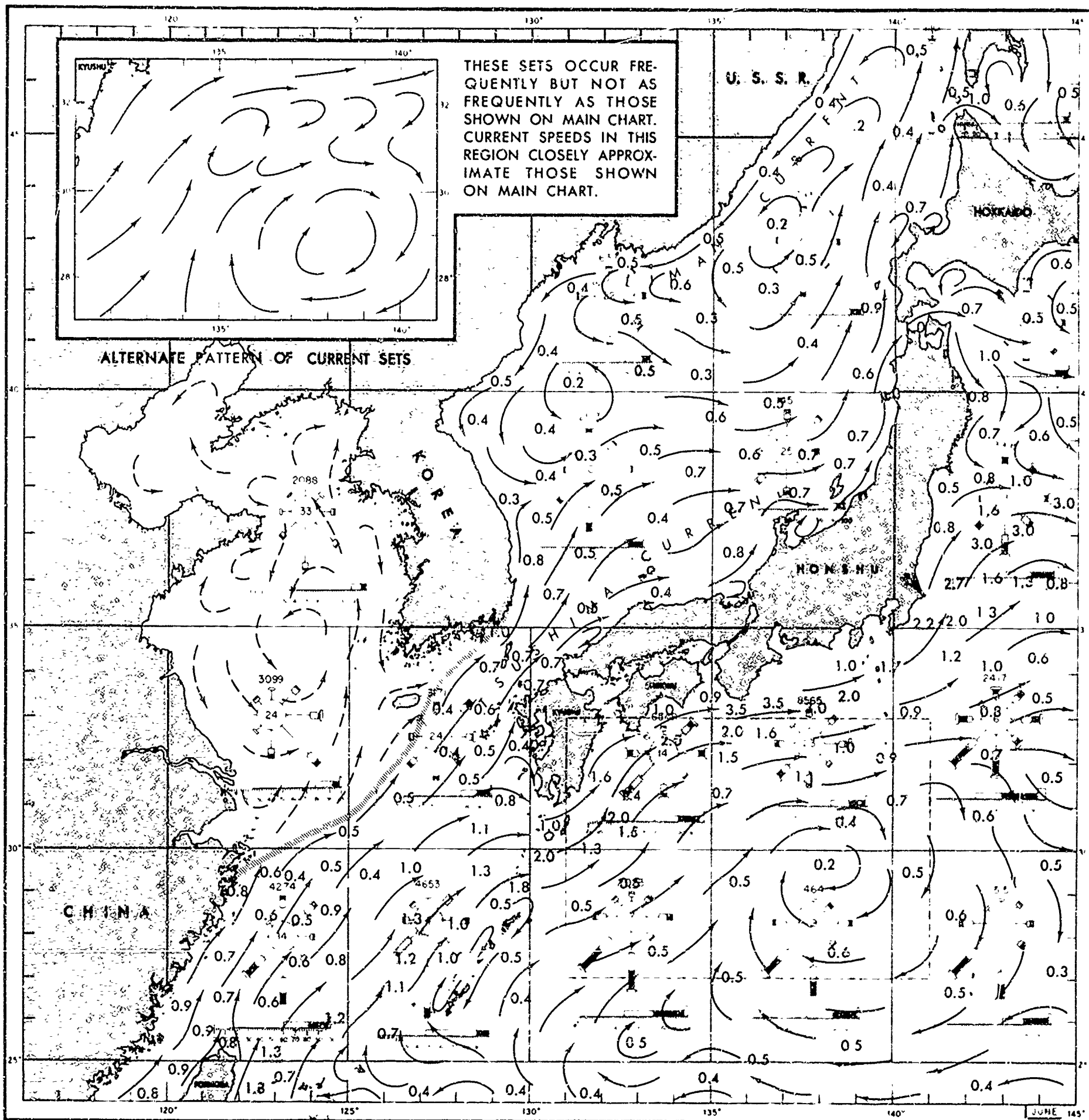


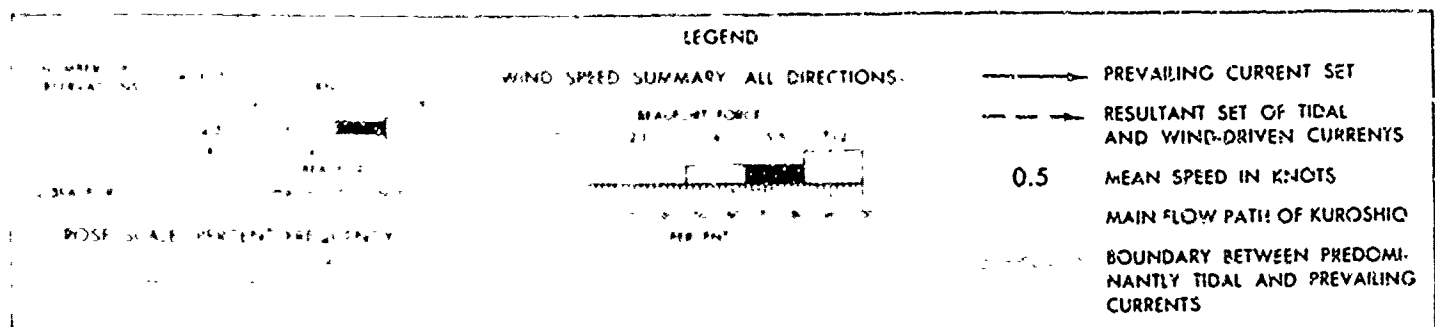
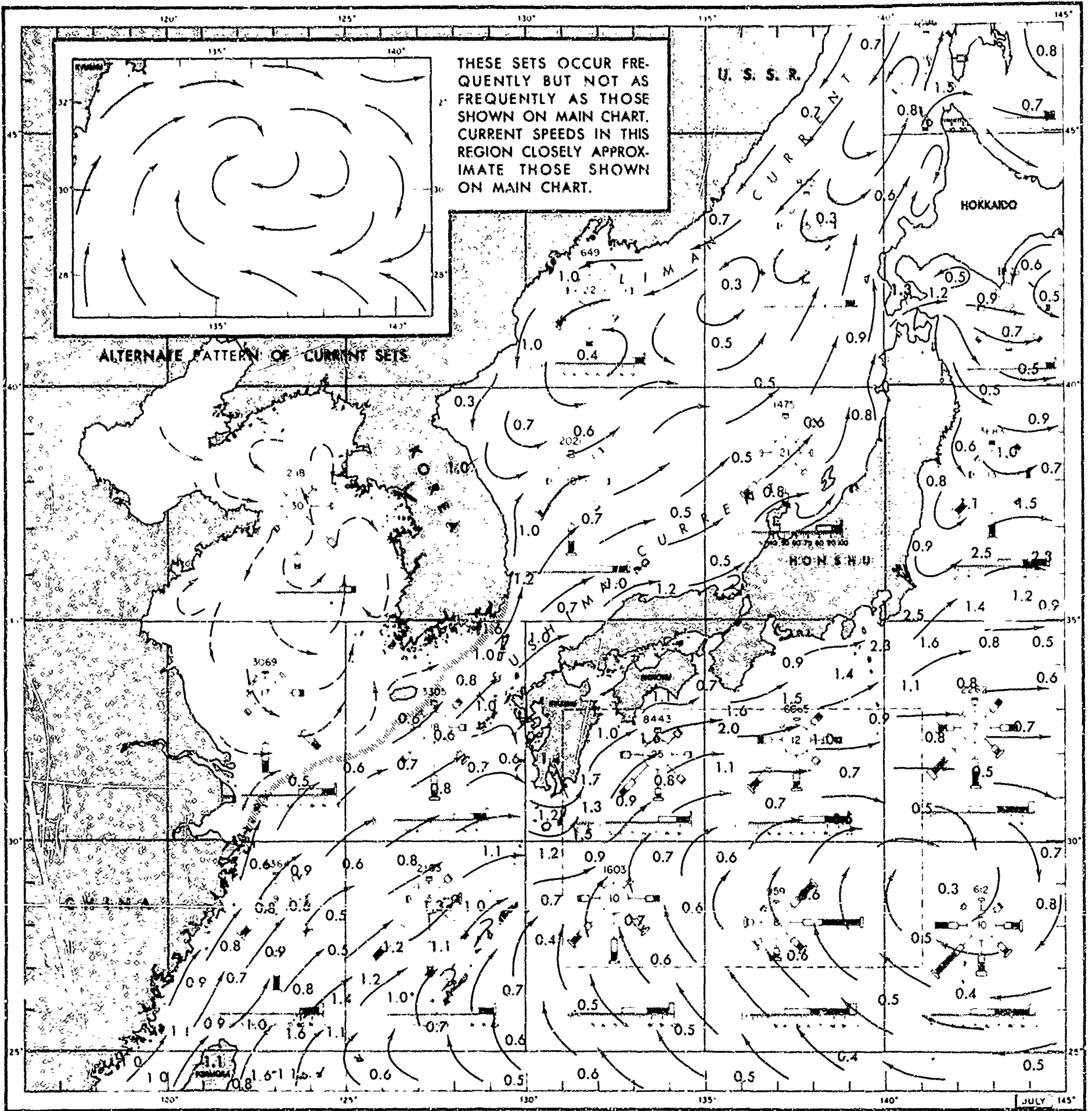


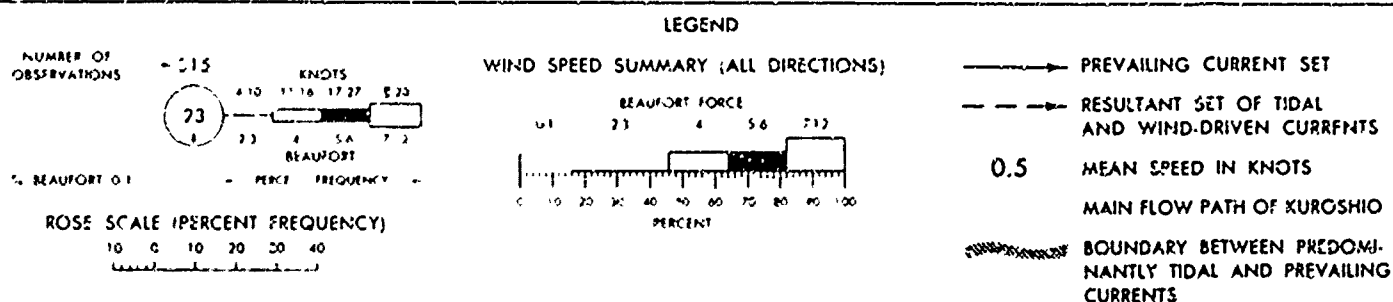
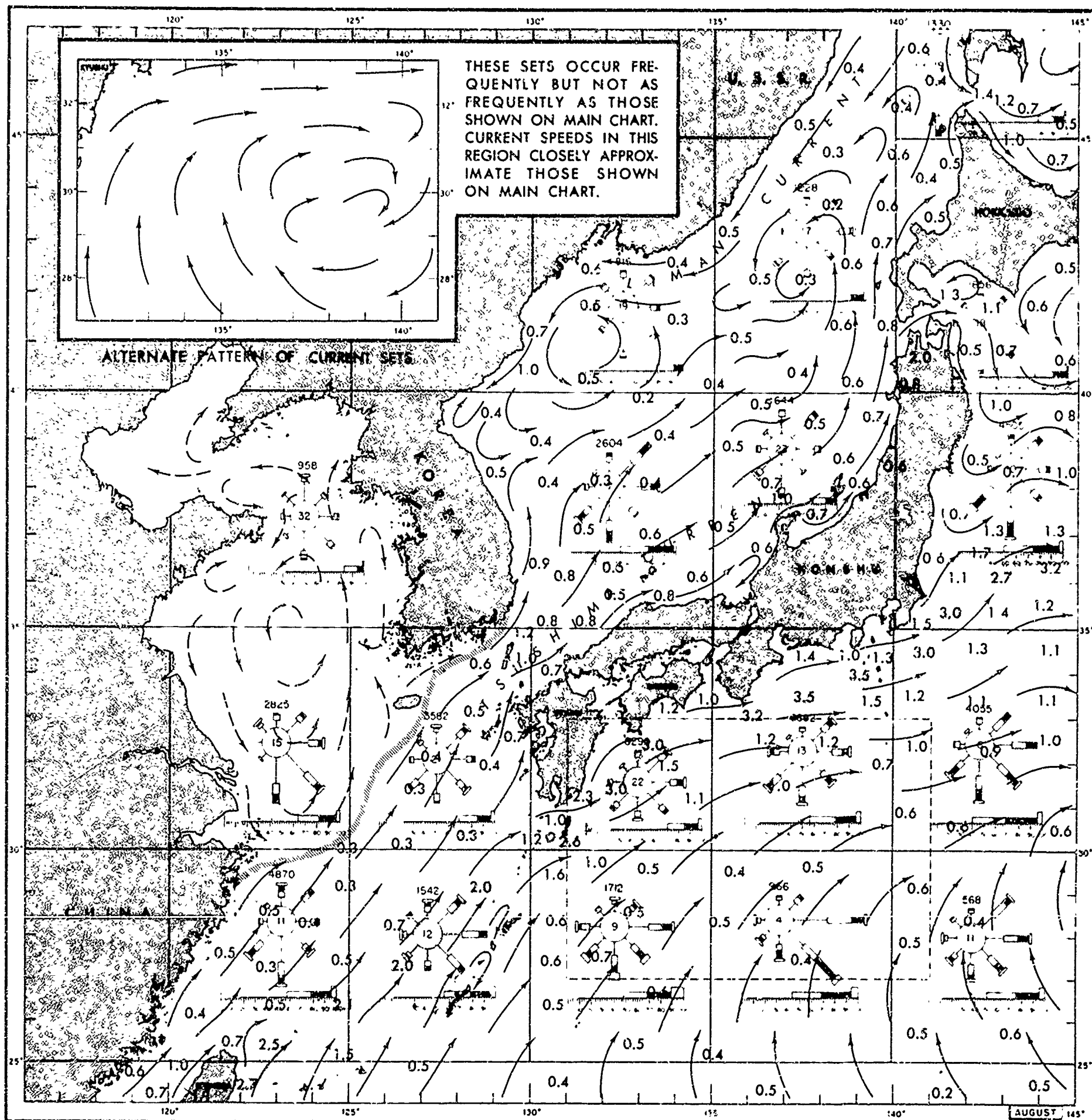


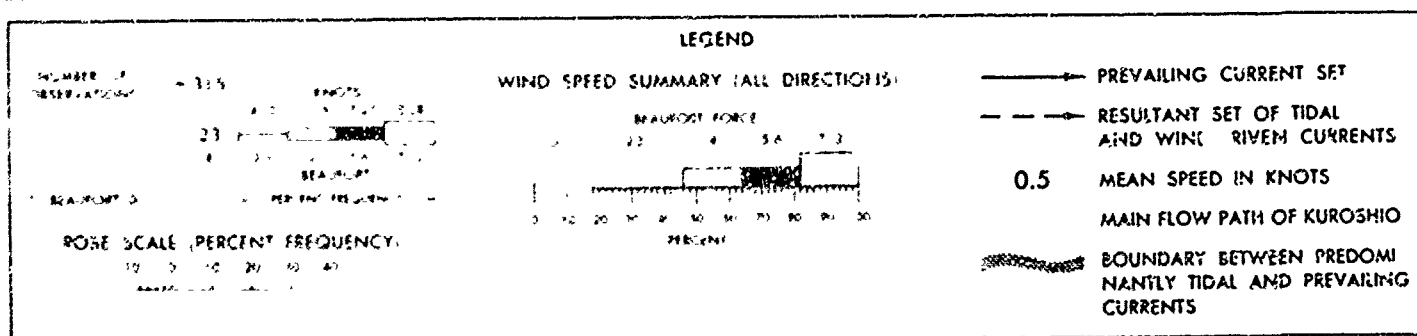
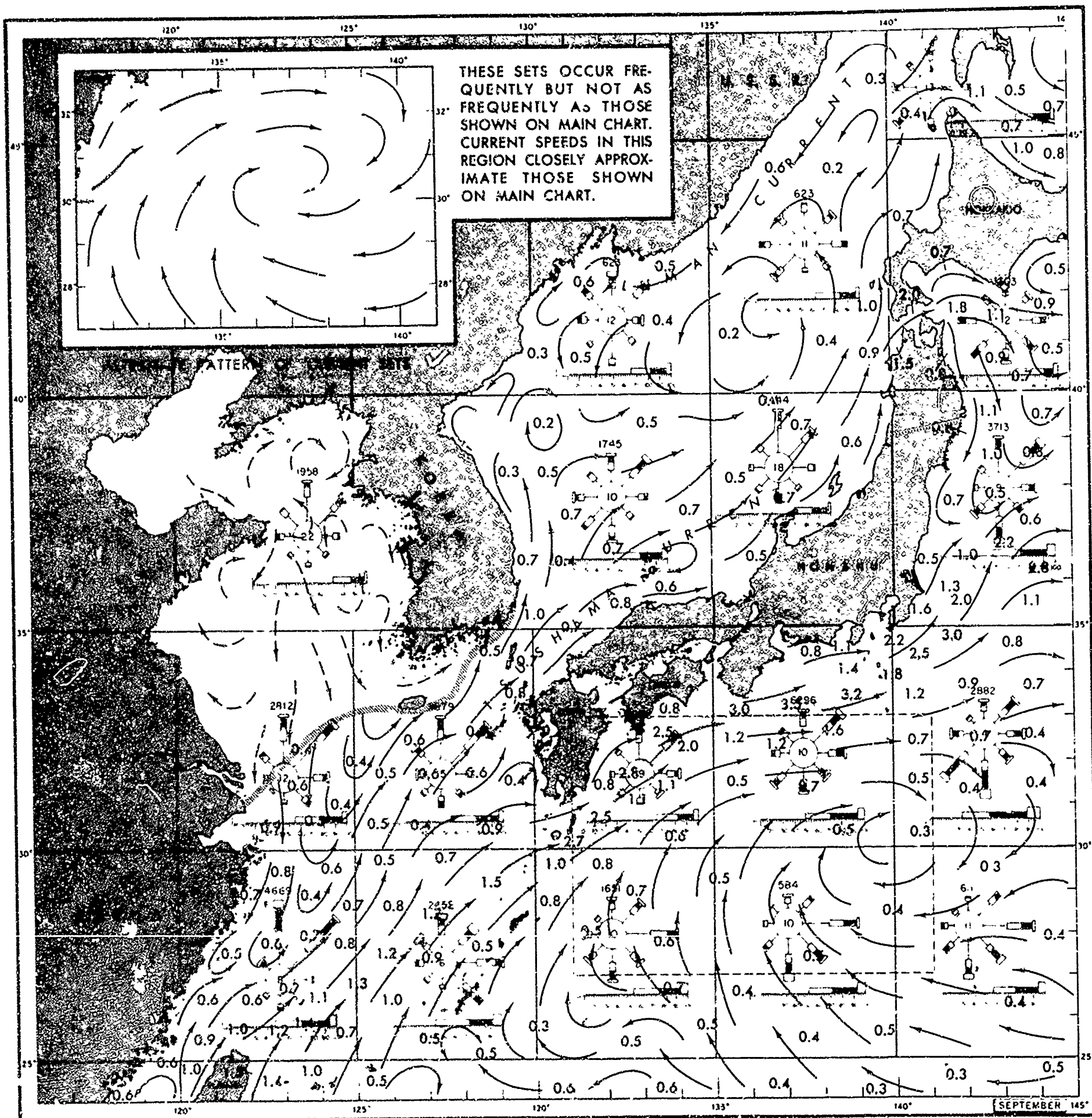


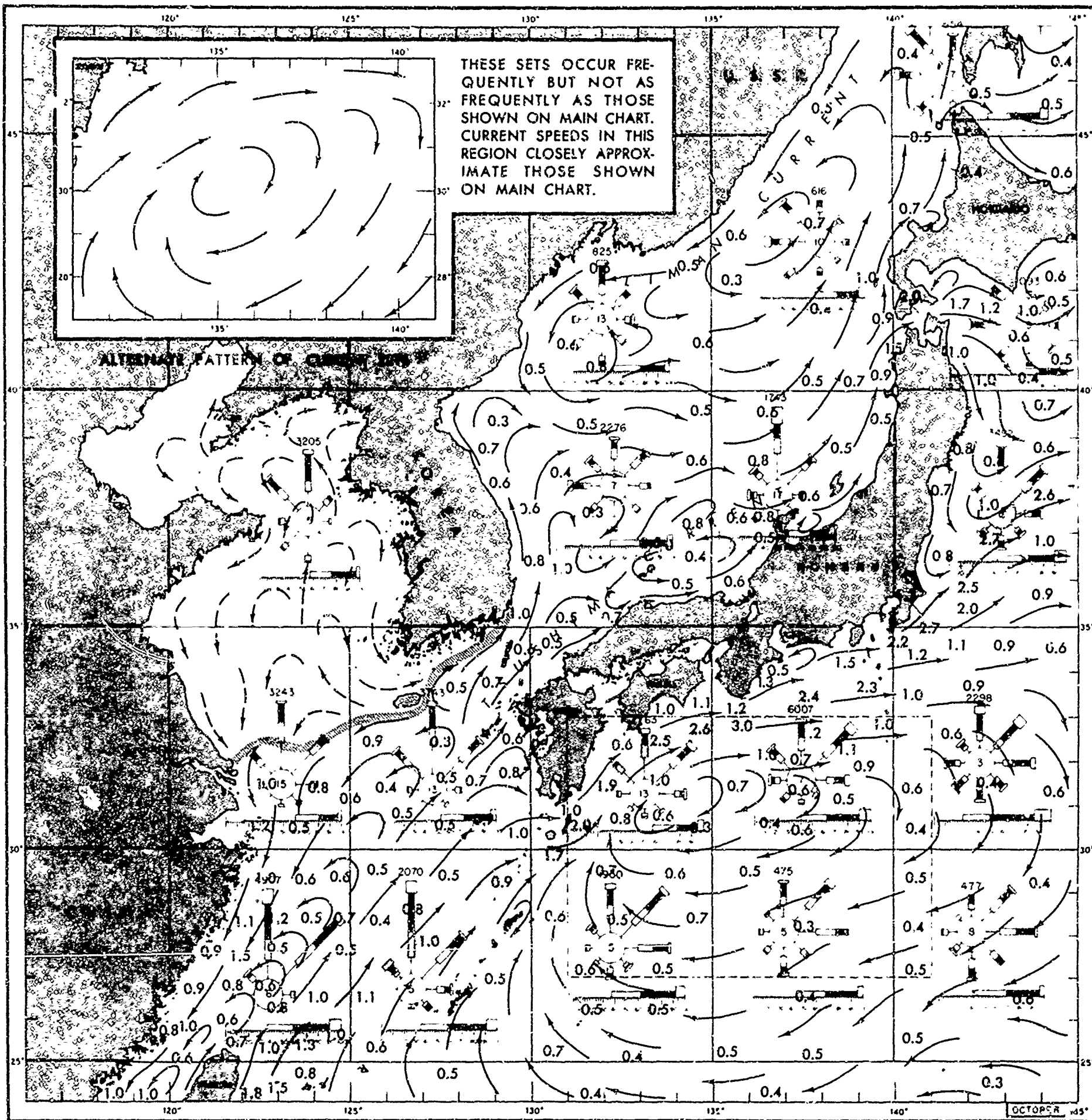






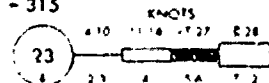






NUMBER OF
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PERCENT FREQUENCY

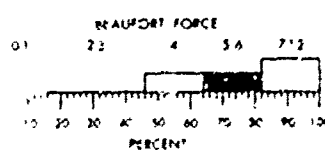
ROSE SCALE (PERCENT FREQUENCY)

10 0 10 20 30 40

PERCENT

LEGEND

WIND SPEED SUMMARY (ALL DIRECTIONS)



PREVAILING CURRENT SET

RESULTANT SET OF TIDAL
AND WIND-DRIVEN CURRENTS

0.5 MEAN SPEED IN KNOTS

MAIN FLOW PATH OF KUROSHIO

BOUNDARY BETWEEN PREDOMINANTLY TIDAL AND PREVAILING
CURRENTS

