SURFACE CURRENTS

NORTHWEST SOUTH PACIFIC OCEAN INCLUDING THE CORAL AND SOLOMON SEAS
ABSTRACT

Data from the ship in which it is a part, is computer generated and automatically entered. It makes available to the user, data from recent surveys, where data collected and will be updated through incorporation, amounts of data are added to the data pool. These and any other sources are based on a vast quantity of data as compared to the previous manually compiled edition, trained in terms of accuracy.

The computer version guarantees a higher quality of data where efficiency is maintained, the crew in their respective positions, and the machinery are in their optimal state. This ensures higher accuracy and reliability are achieved by the system.
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RFACE CURRENTS.

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G THE CORAL AND SOLOMON SEAS.
ACKNOWLEDGMENTS

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made major contributions to this atlas.

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FOREWORD

THIS ATLAS, ONE IN A SERIES OF 43 REGIONAL SURFACE CURVE PROFILES, IS PRODUCED TO FULFILL A NEED OF NAVY PLANNING STAFFS AND THE SCIENTIFIC COMMUNITIES FOR THE LATEST AVAILABLE OCEAN SURFACE CURVE. THESE ATLASES ADD TO THE WEALTH OF NAUTICAL INFORMATION UPON WHICH NAUTICAL PLANNING, NAVIGATIONAL SAFETY, AND SHIPPING ECONOMY DEPEND. PRODUCTION AND WIDE DISSEMINATION OF THIS ATLAS ARE MADE POSSIBLE LARGELY THROUGH THE USE OF LATEST COMPUTER TECHNIQUES.

THE CONSTANT IMPROVEMENT IN THE QUALITY OF SURFACE CURVE RECEIVED OVER THE YEARS IS MADE POSSIBLE LARGELY BY THE MORE THOROUGH USE OF VOLUNTARY OBSERVERS IN RECENT YEARS. THE DEFENSE MAPPING AGENCY, OCEANOGRAPHIC OFFICE, AND THE USER OF THE ATLASES RELY ON THE OBSERVATIONS OF THE MAN WHO HAS "BEEN THERE." MARINERS: IN REPORTING YOUR OBSERVATIONS, RENDER A SERVICE NOT ONLY TO YOURSELVES BUT ALSO TO THOSE WHO GO DOWN TO THE SEA IN SHIPS." WITH THE ADVANCE OF NUCLEAR POWER, NAVIGATION AIDS, AND 300,000-TON SHIPS, UP-TO-DATE, RAPIDLY DISSEMINATED ENVIRONMENTAL AND NAVIGATIONAL INFORMATION HAS BECOME INCREASINGLY IMPORTANT.

JOHN R. McDoNELL
Captain, U.S. Navy
Commander
FOREWORD

IN A SERIES OF 43 REGIONAL SURFACE CURRENT ATLASES, THE NEED OF NAVY PLANNING STAFFS AND THE SCIENTIFIC AND TECHNICAL COMMUNITY FOR THE LATEST AVAILABLE OCEAN SURFACE CURRENT DATA BECOMES EVER MORE VITAL. A WEALTH OF NAUTICAL INFORMATION UPON WHICH OPERATIONAL SAFETY, AND SHIPPING ECONOMY DEPEND. RAPID DISSEMINATION OF THIS ATLAS ARE MADE POSSIBLE BY THE ADVANCEMENTS IN THE QUALITY OF SURFACE CURRENT DATA.


JOHN R. MCDONNELL
Captain, U.S. Navy
Commander
This series of computerized atlases replaces the old Hydrographic Office atlases of surface currents (HOP 566, 568, 569, 570) which were manually compiled from data obtained during the period 1903 - 1934. These new atlases conform to the standard Navy ocean area and region index limits shown below: e.g., NOO SP 1402-NP 10 covers North Pacific region 10 east of the Philippines.

Recent improvements in the data file assure the inclusion of the latest, high quality surface current data available. The file now contains more than 4,200,000 observations and a general update of the file will be made.

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FACE CURRENT ATLASES

AS AMOUNTS OF NEW DATA WARRANT, MOST LIKELY EVERY 12 - 18 MONTHS.

THese graphics may not be truly representative of the actual flow in such areas as the North Sea, Persian Gulf, Gulf of Thailand, and Yellow Sea where currents are strongly tidal. For such areas, other sources describing predictable hourly changes of tidal currents should be consulted.

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30° 160°W 140° 120° 100° 80° 60° 40° 20° 0° 20°

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SP 1400 NORTH ATLANTIC OCEAN
SP 1401 SOUTH ATLANTIC OCEAN
SP 1402 NORTH PACIFIC OCEAN
SP 1403 SOUTH PACIFIC OCEAN
SP 1404 INDIAN OCEAN
Introduction

The Surface Current Data File, from which these charts are derived, consists primarily of over four million ship set and drift observations. These data were collected by the Netherlands, Japan, Britain, France, and the United States. The file is supplemented by several thousand Geomagnetic Electrokinetograph (GEM) observations, mostly Japanese. The file spans the period from the early 1850's to the present. The earliest observations were collected by the Netherlands and Great Britain; those of the 1960's through the present are primarily United States data.

General Quality

The quality of this data file is considered high for this type of derived value. The data have been carefully screened for duplication; observations taken under adverse conditions (i.e., high winds and waves, time between observations greater than 12 hours) have been eliminated when warranted. Consideration was given to the reliability of the observer; doubtful shipboard computations of set and drift were edited; and observations with erroneous locations (mostly observations on land) have been eliminated. The accepted data are considered most useful when used collectively as in summaries where a number of observations show trends.

General Observation Technique

The set (direction) and drift (speed) are computed by the navigator from the difference between the dead reckoning (DR) position and the position determined by any type of navigational fix. The drift can be determined along any straight line track and includes all factors which cause changes in the DR position. When a fix is obtained, the current set (direction) is from the DR position to the fix; the drift (speed) is equal to the distance in nautical miles between the DR and the fix, divided by the number of hours since the last fix. For successive observations, the TO POSITION of one observation becomes the FROM POSITION of the next observation.

Because the influence of current may vary along a ship's track, the MEAN POSITION of the track is assigned as the geographic location of the current observation. An example of a current computation is shown in the figure below.

Data Presentation

The following legend shows two types of surface current presentations by 1° quadrangle, type 1 with 12 or more observations and type 2 with fewer than 12 observations. Where there are 11 or fewer observations within a 1° quadrangle, the total number of observations is shown within the 90° quadrant containing the observations.

![Example of a Surface Current (Ship's Drift) Observation](image)

![Legend](image)

If there are 12 or more observations, vector resultants as follows:

1. Persistent Current - 60 percent or more of all observations fall within a 45° sector of the 8-point compass.
2. Prevailing Current - 45° or more of all observations fall within a 45° sector of the 8-point compass.
3. Persistent Flow - Practically all observations are concentrated in opposite pairs of sectors, and one pair contains at least 80 percent as many observations as the pair.
4. Bizonal Flow - Practically all observations are concentrated in opposite pairs of sectors, and one pair contains at least 80 percent as many observations as the pair. This generally indicates variations that occur in zones of entrainment opposing currents (see examples A and quadrangles 1, 2, and 3).
If there are 12 or more observations in a 1° quadrangle, the surface current is depicted by vector resultants as follows:

(1) Persistent Current - 60 percent or more of all observations fall within a 45° sector of the 8-point compass.

(2) Prevailing Current - 70 percent or more of all observations fall within two adjacent 45° sectors.

(3) Primary Current with Secondary Direction
   (a) Primary Current - 50 percent or more of all observations fall within three adjacent 45° sectors.
   (b) Secondary Direction - 20 percent or more of all observations fall within a 45° sector, and the two resultant vector directions are separated by more than 90° of arc.

(4) Bizonal Flow - Practically all observations are concentrated in opposite pairs of 45° sectors, and one pair contains at least 80 percent as many observations as the opposite pair. This generally indicates variability that occurs in zones of entrainment between opposing currents (see examples A and B, quadrangles 1, 2, and 3).

(5) Variable Current - The 45° sector with most observations has less than 25 percent of all observations; direction is indeterminate.

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The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current.