INTRODUCTION

This series of Northern Hemisphere Weather Maps covers the general period of World War II and is produced by the United States Weather Bureau in an effort to make available a sequence of published maps, continuous from 1899, of a similar type of analysis to those Northern Hemisphere Weather Maps that have already been completed.[1] Each volume of the series consists of Northern Hemisphere maps for one month, there being one sea-level map for each day of the month.

DATA

The sea-level maps in this series were prepared from data observed at or near 1230 GMT. In localities where weather observations are taken only once a day, 1230 GMT is the usual time of the observation. Thus, the greatest number of data for the entire Northern Hemisphere has been made available. Furthermore, the use of 1230 GMT data provides continuity with other series of Northern Hemisphere Historical Weather Maps.[1] However, because of the difficulty in acquiring data for this particular war period, observations taken within three hours of 1230 GMT in areas of scarce synoptic reports were considered as synoptic and plotted without notation. For plotted observations that were taken more than three hours from 1230 GMT, the time of observation has been indicated in brackets immediately below the plotted data.

Observations were used from every available source. Since at the time of plotting this map series the original teletypewriter and radio collections of reports were not available, it was necessary in some cases to transcribe data from maps which had been prepared on an operational basis at United States military bases during the war. United States and some ocean data were available from U. S. Weather Bureau, Air Force, and Navy original records. Many reports were kindly provided by the meteorological services of other countries, either in punched card or tabular form; and other data were obtained from the published bulletins of other countries. For example, British, Indian, and German (through March 1945) reports were plotted from the published bulletins of those countries, and data for Japan, Korea, and Manchuria were plotted from microfilm of Japanese data tabulations when available.

Where applicable, the International Plotting Code models were used in plotting the maps, but in some instances, because of the great variance in sources of data and elements reported within individual observations, this was not possible. In some cases the relative humidity was plotted in place of the dew point, and in other cases cloud types and/or precipitation types had to be generalized so that they could be plotted in symbolic form.

Station pressures, instead of sea-level pressures, were recorded by some stations in the hemisphere and occasionally, if the station was above 1,000 meters, the pressure was reduced to that level. The latter reports, reduced to sea level, appear on the maps. Pressures not reduced to sea level appear enclosed in parentheses.

ANALYSIS

In the analysis of the Northern Hemisphere sea-level charts, all frontal structures with well-established histories were retained until the data showed that frontolysis had taken place. In those cases frontolysis has been shown and the front has been dropped from the maps. Every effort has been made to carry all major frontal systems. Minor fronts were carried on the maps only when the data indicated that a minor front did exist and the resulting weather was significant. Every effort was made to distinguish between a cold front and a polar trough, both over land and over water. Great care was exercised to include all frontal boundaries causing significant weather. However, it is physically beyond the scope of these charts, presented in 24-hour intervals, to indicate in detail each secondary or swiftly redeveloped frontal system whose inception, growth, and full development may easily have taken place in the interval between maps. Representation of these features must necessarily be shown, in some cases, as merely an indication of what took place in the interim. These indications have been considered a major part of the analysis and have been represented in the most feasible fashion in accordance with the particular situation being analyzed.

Analysis of the charts was aided by a careful study of various published national maps of foreign countries, and of intermediate charts prepared by the U. S. Weather Bureau and the U. S. Air Force. Maps prepared operationally at U. S. Air Force bases overseas were also used as an analysis aid; some of those most frequently used were prepared during the war for areas surrounding Bovington, England; Harmon Field, Newfoundland; Churchill, Canada; Poltava, U. S. S. R.; Elmendorf, Alaska; and Hickam Field, Hawaii.

Analysis in tropical areas are necessarily incomplete. In areas of few or no data a reasonable isobaric pattern has been carried for completeness in lieu of entering the mean position of the Intertropical Convergence Zone for that particular time of year. Whenever available data made it possible to determine the position of the zone of convergence, that position was entered.

Easterly waves, westerly troughs, and shear lines were entered only when the data definitely supported these phenomena and intermediate charts confirmed them.

Instability or squall lines were entered on the charts when the associated weather warranted them and after close study of intermediate charts, when available.

In areas of relatively sparse data, intermediate charts were carefully studied to obtain the best possible solution. When no intermediate data or charts were available the analysis was extrapolated and interpolated, with careful consideration to continuity, through areas of sparse or totally lacking data in order to give a continuous representation of frontal developments and isobaric patterns. The analysts preparing this series of charts have had considerable experience in Northern Hemisphere analysis and in maintaining continuity in areas of sparse data coverage. In areas of few data, every attempt was made to check the data and the many sources of data for accuracy and representativeness and then to analyze accordingly, with established mean patterns used only as a control factor.

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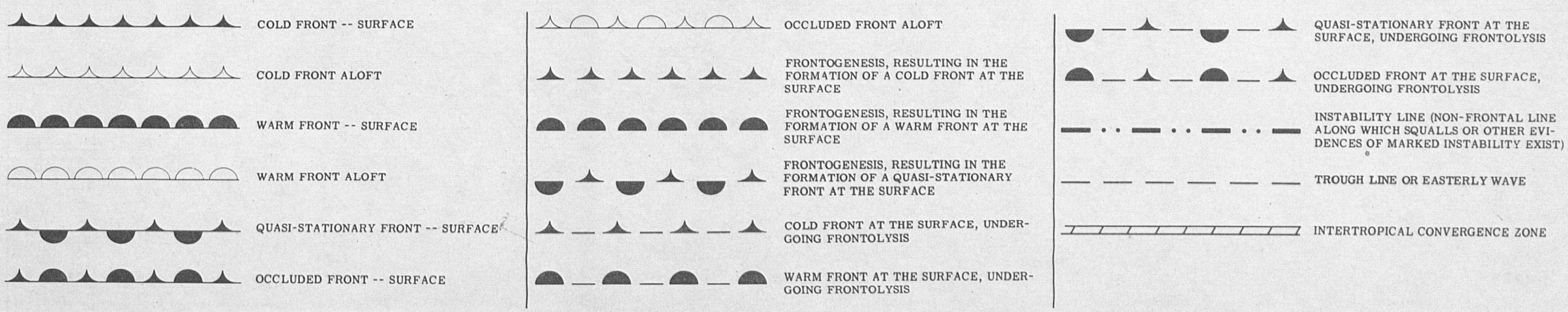
1 (a) U. S. Weather Bureau, Daily Synoptic Series Historical Weather Maps, Northern Hemisphere Sea Level, January 1899 to June 1939, inclusive.

(b) U. S. Weather Bureau, Daily Series Synoptic Weather Maps, Northern Hemisphere Sea Level and 500 Millibar Charts, December 1944 to September 1945, inclusive.

(c) Headquarters, Air Weather Service, AAF, Northern Hemisphere Historical Weather Maps, Sea Level and 500 Millibars, October 1945 to December 1948, inclusive.

(d) U. S. Weather Bureau, Daily Series Synoptic Weather Maps, Northern Hemisphere Sea Level and 500 Millibar Charts, January 1949 et seq.

LIST OF SYMBOLS USED ON MAPS