

INTRODUCTION

(Revised October 1947)

The series of Northern Hemisphere Historical Weather Maps, from October 1945 to December 1948, has been produced by the Air Weather Service of the U. S. Air Force. Each volume of the series contains a sea-level map, an upper-air constant-pressure surface (500-millibar) map for each day of the month and a tabulation of the synoptic reports available for each of the maps.

SEA-LEVEL MAPS

DATA

The sea-level maps in this series were prepared from data observed at or near 1230 GMT in order to utilize the maximum amount of synoptic data available and to maintain continuity with the Weather Bureau's 40-year series of Northern Hemisphere Weather Maps already completed and the Northern Hemisphere series commencing with January 1949.

Data from every available source were utilized. The coded reports transmitted via radio and teletype constituted the basic source of data. Various series of published weather maps such as the Indian and Egyptian "Daily Weather Reports," as well as manuscript weather maps from Air Weather Service units and the WBAN Analysis Center, were used as supplementary sources of data.

Insofar as possible, the International Plotting Code models were used. Station models for land, ship, and aircraft reports have been printed on each map, and a description of the symbols used in the models has been included in the prefaces to the tabulated reports.

Starting with the month of November 1947, the barometric pressure, reduced to the 1,000 geodynamic meter level and transmitted by certain stations, was further reduced to sea-level using one-half of the dry adiabatic lapse rate.

ANALYSIS

In the analysis of the Northern Hemisphere sea-level synoptic maps, frontal systems with well established histories were retained until the data revealed that frontolysis had taken place. Every effort has been made to indicate all frontal systems characterized by a reasonable day-to-day continuity. It was physically impracticable to indicate in detail on maps, presented at 24-hour intervals, the rapid transformations of pressure and frontal systems which may have taken place in the interval between maps.

Extensive use was made of three-hourly logs from permanent ships, island stations in the Atlantic and Pacific, Arctic stations, and, after March 1948, six-hourly logs for 16 selected stations in the U.S.S.R. In addition, series of maps prepared by the Air Weather Service and Weather Bureau units, most of which were analyzed for six-hourly intervals, were utilized.

As an aid in tropical analysis, time-space sections were constructed from hourly sea-level observations and six-hourly winds aloft observations. In areas devoid of data, the Intertropical Trough was placed near the mean position for that season of the year.

500-MILLIBAR MAPS

The maps of the 500-millibar surface have been included in this series for their value in portraying the upper-air patterns associated with the sea-level systems.

DATA

The 500-millibar maps in this series were prepared from data observed at or near 0400 GMT in order to utilize the maximum amount of synoptic data available. Whenever large areas were devoid of 0400 GMT data, off-time data, if available, were added with the time of observation indicated. In India, however, only 1300 GMT radiosonde observations were available, and these data were plotted with no time indicated.

Because of the paucity of data over the oceans and Asia, the height and temperature of the 500-millibar surface at selected points were computed from sea-level data considering the reported weather, clouds, upper-level temperature, circulation pattern and the next day's observations in the sparse area.

Beginning with December 1947, if an observation appeared to be in error, it was checked for plotting, coding, transmission, hydrostatic and other errors. If no error was found, a small "x" was placed beside the element of the observation disregarded. If an error was detected, the correction was plotted in brackets. In addition, pilot reports obtained from commercial airline flights over ocean areas were plotted. These reports can be differentiated from aerial weather reconnaissance reports in that only wind direction, speed and the time of the report were plotted.

ANALYSIS

The major circulation systems and those minor perturbations which could be identified on successive maps have been indicated in the analysis.

Beginning in December 1947, 1,000-millibar charts were prepared from the sea-level maps, and the 1,000- to 500-millibar thickness charts were constructed by the differential analysis technique. These thickness charts were used to check the relationship between sea-level isobars and upper-air contours, the validity of the sea-level fronts and the upper-air isotherm patterns.

Only those trough lines which were migratory and oriented generally north-south were identified from day to day. Troughs were determined either by connecting points of maximum cyclonic curvature or by connecting points of lowest latitude reached by the contour lines. The initial trough line west of 0° on the first day of the month was identified by the letter "A" at the bottom of the line. Proceeding westward, trough lines were labeled with successive letters. A trough line on the first day of a new month bears the old letter designation at the top of the trough with the new letter at the bottom. When a new trough developed from one already established, the prime symbol ("'") was used with the identifying letter of the original trough.

KEY TO CHART SYMBOLS Sea-Level Map

	COLD FRONT
	WARM FRONT
	OCCLUDED FRONT
	STATIONARY FRONT
	COLD FRONTOGENESIS
	WARM FRONTOGENESIS
	STATIONARY FRONTOGENESIS
	COLD FRONTOLYSIS
	WARM FRONTOLYSIS
	OCCLUDED FRONTOLYSIS
	STATIONARY FRONTOLYSIS
	COLD FRONT ALOFT
	WARM FRONT ALOFT
	OCCLUDED FRONT ALOFT
	INTERTROPICAL TROUGH
	EASTERLY TROUGHS
	WESTERLY TROUGHS
	SHEAR LINE
	SQUALL LINE
500-Millibar Map	
	CURRENT TROUGH
	TROUGH POSITION 24 HOURS AGO
	TROUGH POSITION 48 HOURS AGO