

## HISTORICAL BACKGROUND

During the third session of Comité Spécial pour l'Année Géophysique Internationale (CSAGI) (Brussels 1955), the Federal Republic of Germany, the then Union of South Africa (now the Republic of South Africa) and the United States of America offered to prepare World Weather Maps for the equatorial zone, the Southern Hemisphere, and the Northern Hemisphere, respectively, during the IGY (July 1957-December 1958) and to publish them at a later time. CSAGI accepted this offer and recommended that the three countries confer directly regarding all technical details which might lead to a uniform presentation of the charts.

The Secretariat of the World Meteorological Organization convened a meeting in Paris in June 1957 between representatives of the three countries to coordinate the technical details of the maps. Further details were agreed upon from time to time by correspondence and WMO was kept informed of the progress of the project. Final decisions on the plotting model, scale, format, etc., were issued by WMO after the Second Session of the Working Group on the IGY in Geneva, November 1959.

The modern series of historical sea-level weather maps for the Northern Hemisphere begins with January 1899 and extends through June 1957. Upper-air maps of the 500-mb. pressure surface were added beginning with the month of December 1944 and extend through June 1957.

This special IGY series is presented on a daily basis for the 18 months of the International Geophysical Year. While a part of the IGY World Weather Maps, the method of presentation has been preserved to such a large degree that these maps are considered as a continuation of the Northern Hemisphere Weather Map historical sequence<sup>1</sup>. Publication of similar charts beginning with those for January 1959 has already begun<sup>1</sup>. (g).

Data tabulations were added to the synoptic map series beginning with the October 1945 issue. Except for two gaps, November and December 1945, and January through June 1955, these monthly data listings are complete and publication is continuing.

## INTRODUCTION

The IGY World Weather Maps consist of a daily series of maps for the period July 1, 1957 through December 31, 1958. These maps are published as monthly booklets in three parts, each containing a surface and 500-mb. map for 1200 GMT each day as follows:

Part I	20° N. to the North Pole. Polar stereographic projection with true scale of 1 to 50 million at latitude 60° N.
Part II	25° N. to 25° S. Mercator's projection with true scale of 1 to 50 million at latitude 22 1/2°.
Part III	20° S. to the South Pole. Polar stereographic projection with true scale of 1 to 50 million along latitude 60° S.

The maps included in Part I are similar to those in the series which begins with maps for January 1949<sup>1</sup>. (e), and are produced by the United States Weather Bureau.

Beginning with the maps for April 1, 1957, all observations are 1200 GMT except those for stations operated by Canada and the United States. Time of these observations changes from 1230 GMT for sea-level and 1500 GMT for 500-mb., to 1200 GMT for both levels on June 1, 1957 unless otherwise indicated.

Data tabulations of synoptic surface reports for 1200 GMT for selected stations and upper-air reports for 0000 GMT for the entire Northern Hemisphere and for all observational times for the North American area also are published, under separate binding.<sup>2</sup>

## DATA

Microcards of IGY meteorological data prepared by IGY World Data Center - C in the Secretariat of the WMO were the main data source used in the preparation of the maps. A general survey of the IGY data collection program, as well as specific references to the various data forms on the microcards, are contained in (3). Even though the data in special instances appear inconsistent or in error, all data were plotted as given on the microcards without alteration.

Data for stations included in Blocks 50 through 59 (see Plotting Chart) were not available on microcards. The analysis shown in this area is based on data from other sources and is believed to be representative of the synoptic situation.<sup>2</sup> Data for these blocks are available in published form.

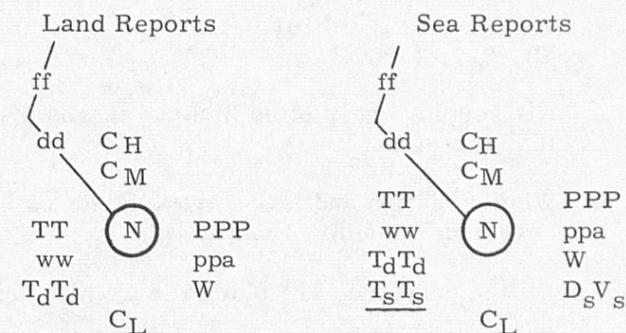
In order to present as accurate an analysis as possible, many other data sources were used or referred to, but do not appear as plotted values on the charts. These other data sources, all of an operational nature, included special reconnaissance flight observations, routine data published by National Meteorological Services, and collections of radio and teletypewriter reports.

The only data which appear on the 500-mb. map and are not on microcards, are some observations from U. S. Navy ships which reported irregularly to satisfy operational requirements. These observations have been checked in the same manner as the U. S. data on microcards and can be made available by the U. S. Weather Bureau.

## PLOTTING MODELS

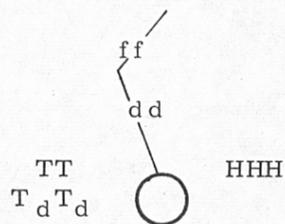
While, in general, plotting models and symbols conform to those in the "Guide to Synoptic Meteorological Practice" CSM-II/ Doc. 25, Annex (18.X.1957), deviations from, and explanations of these symbols as necessary for clarity are presented here:

## Sea-level maps



- Present Weather (ww): Values 00, 01, 02, 03 are not plotted.
- Past Weather (W): Refers to the preceding 6-hour period. Values 0, 1, 2 are not plotted.
- Barometric Tendency (app): Refers to the 3-hour change in barometric pressure. Plus (+) and Minus (-) signs are not plotted.
- Wind (ddff):
  - No symbol is plotted when the wind is calm.
  - A missing wind direction is indicated by an inferred reasonable direction but with an X plotted through the shaft.
  - A missing wind speed is indicated by an X plotted in the position normally occupied by the feathers.
  - A variable wind (reported as direction 99) is indicated by a concentric circle and an inferred reasonable direction with an X plotted through the shaft.
  - Wind speed in knots is indicated for five (3-7) knots; for ten (8-12) knots; and for fifty (48-52) knots. Any of these symbols in combination indicates a wind speed within a range of two knots greater or less than their sum. indicates a wind speed of 1-2 knots.
- All temperatures are plotted in Celsius degrees.
- Ships Speed (V<sub>S</sub>): is plotted in code as received.
- Missing elements: Missing elements are not indicated except for wind (see d. above), pressure, and air temperature, for which an X will be plotted for each missing digit.
- Off-time plotted reports are indicated by an underlined two-figure time group directly above the station, i. e., 06Z.

## Land and Sea Reports



- All heights are plotted in units of tens of geopotential meters.
- Wind direction and force are plotted as in d. above under Sea-level maps.
- All temperatures are plotted in Celsius degrees.
- When off-time reports are plotted in combination with on-time reports at the same station, underlining of the time refers to the temperature soundings and overlining to the wind soundings. If both temperature and wind data are off-time, but at different times these will be indicated by appropriate under- and overlining of the two digit time groups.

## 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.

Analyses of the sea-level (and upper-air) charts was aided by a careful study of weather maps published by various National Meteorological Services, and by a study of intermediate charts prepared by the Weather Bureau's National Meteorological Center. The original observation forms of the weather reporting ships at sea, in addition to trans-ocean flight reports, were available and were used by the analysis unit as an aid to continuity.

Instability or squall-lines were entered on the charts when the associated weather warranted them and after close study of 6-hourly intermediate charts, when available.

On the 500-mb. charts height contours were drawn as solid lines at intervals of 80 meters beginning with the maps for July 1957; a contour interval of 200 feet was used in all previous series. Isotherms at 5° C. intervals were drawn as single dashed lines.

Surface and upper-air analyses have been closely coordinated, particularly in areas where data were sparse, in order to insure that the final analysis would be the best possible in view of the limited data and would be completely consistent with the surface analysis.

The analysis of the three Parts was coordinated in the common (20°-25°) zones by exchanging tracings of the analysis. The Federal Republic of Germany acted as the main coordinator in this exchange and as such assumed much of the responsibility for tying-in the analysis.

- U. S. Weather Bureau. Daily Synoptic Series Historical Weather Maps, Northern Hemisphere Sea Level, January 1899, to June 1939, inclusive.
  - U. S. Weather Bureau. Daily Series Synoptic Weather Maps, Northern Hemisphere Sea Level Charts, July 1939 to November 1944, inclusive.
  - U. S. Weather Bureau, Daily Series Synoptic Weather Maps, Northern Hemisphere Sea Level and 500-Millibar Charts, December 1944 to September 1945, inclusive.
  - Headquarters, Air Weather Service, AAF. Northern Hemisphere Historical Weather Maps, Sea Level and 500 Millibars, October 1945 to December 1948, inclusive.
  - U. S. Weather Bureau. Daily Series Synoptic Weather Maps, Northern Hemisphere Sea Level and 500-Millibar Charts, January 1949 to June 1957, inclusive.
  - U. S. Weather Bureau. IGY World Weather Maps, Part I, Northern Hemisphere, Sea Level and 500-Millibar Charts, July 1957 to December 1958, inclusive.
  - U. S. Weather Bureau. Daily Series Synoptic Weather Maps, Part I, Northern Hemisphere Sea Level and 500-Millibar Charts, January 1959, et seq.
- U. S. Weather Bureau. Daily Series Synoptic Weather Maps, Part II, Northern Hemisphere Data Tabulations, July 1955, et seq.
- World Meteorological Organization; International Geophysical Year 1957-1958, Meteorological Programme, General Survey; WMO - No. 55. IGY.1; Geneva, Switzerland; Secretariat of the World Meteorological Organization, 1956.

## LIST OF SYMBOLS USED ON MAPS

## SEA-LEVEL MAPS

	COLD FRONT -- SURFACE
	COLD FRONT ALOFT
	WARM FRONT -- SURFACE
	WARM FRONT ALOFT
	QUASI-STATIONARY FRONT -- SURFACE
	QUASI-STATIONARY FRONT ALOFT
	OCCLUDED FRONT -- SURFACE
	OCCLUDED FRONT ALOFT
	FRONTOGENESIS, RESULTING IN THE FORMATION OF A COLD FRONT AT THE SURFACE

	FRONTOGENESIS, RESULTING IN THE FORMATION OF A WARM FRONT AT THE SURFACE
	FRONTOGENESIS, RESULTING IN THE FORMATION OF A QUASI-STATIONARY FRONT AT THE SURFACE
	COLD FRONT AT THE SURFACE UNDERGOING FRONTOLYSIS
	WARM FRONT AT THE SURFACE UNDERGOING FRONTOLYSIS
	QUASI-STATIONARY FRONT AT THE SURFACE, UNDERGOING FRONTOLYSIS
	OCCLUDED FRONT AT THE SURFACE, UNDERGOING FRONTOLYSIS
	INSTABILITY LINE (NON-FRONTAL LINE ALONG WHICH SQUALLS OR OTHER EVIDENCES OF MARKED INSTABILITY EXIST)
	SHEAR LINE

	TROUGH LINE
	INTERTROPICAL CONVERGENCE ZONE
	ISOBAR
	INTERMEDIATE ISOBAR
	TROPICAL STORM, WINDS 35-64 KNOTS
	TROPICAL STORM, WINDS 65 KNOTS OR HIGHER

## 500-MILLIBAR MAPS

	HEIGHT CONTOUR
	INTERMEDIATE HEIGHT CONTOUR
	ISOTHERM