

Tropical Weather

EASTERN NORTH PACIFIC TROPICAL CYCLONES

A 23 Year Survey of Minimum
Measured Central Pressures.
1957 - 1980

Stephen M. Blumel (1)
National Weather Association
Tropical Meteorology Committee
P.O. Box 2424
Ft. Myers, FL 33902

Abstract

A review of available ship & aircraft reconnaissance reports for Eastern North Pacific hurricanes, period 1957 thru 1980, reveals two main points. One, that hurricanes occurring in this part of the world are both more numerous & more intense than pre-1966 data would indicate. Two, that a good, long term & consistent data base does not exist for this region, the inverse of that available for the Atlantic & Western North Pacific Oceans. This brief report will serve to examine reasons for this lack of both qualitative and quantitative meteorological data, to reveal the very violent degree to which these hurricanes may intensify, and to document the available minimum central pressure data which exists for the most intense of these storms, occurring within the aforementioned study period.

1. INTRODUCTION

The study area covered by this report (Figure 1), extends from the Mexican Pacific Coast on the northeast, longitude 90°W to the southeast, westward across the Eastern Pacific north of the equator, to longitude 140°W. Annual tropical cyclone reports prepared for the Eastern North Pacific Ocean for the period 1957 thru 1980 served as the main data base. Good, consistent data before this time were not available. Ship reports constituted the sole source of minimum pressure data before 1970, while aircraft reconnaissance supplied all data from 1970 onward. With the advent of the first fully operational meteorological satellite system by the U.S. in 1966, ship routing became more efficient, hence the frequency of ships suddenly and unexpectedly encountering these hurricanes, & consequently acquiring pressure data simultaneously with eye passage, has become virtually nil. This accounts for the sudden drop-off of data (in the eye) from ships by 1970 (Figure 2).

2. DISCUSSION

The first recorded category 5 hurricane (see Table 2) in the Eastern North Pacific Ocean occurred in June 1973 (Table 1, Hurricane Ava), during the course of a special NOAA Research Flight Facility aerial reconnaissance monitoring of this storm. Prior to this time, the lowest observed & reported sea-level pressure occurring in a Eastern North Pacific hurricane was 27.45

in., occurring on Oct. 25, 1939, off the west coast of Mexico. However, a review of data contained in Table 1 indicate the frequency & intensity of hurricanes in this Region are much greater than pre-1970 data would indicate. Frequent monitoring of these hurricanes by aerial reconnaissance during the 1970's has revealed that central pressures below 28.00 in. are quite common, & that intense "super hurricanes" (central pressure 27.50 in. or less) are not the extremely rare events previous climatologies would indicate. Further, hurricanes of such intensity as Ava in 1973, with a minimum pressure of 27.02 in., are also likely more common than the current data indicate. See Figure 2 for annual minimum pressure since 1957.

The principal reason for the uncertainties in hurricane climatology for this Region lies in the lack of an annual, consistent aircraft reconnaissance program. This in turn is a result of lack of funds for a dedicated research program involving the very detailed, but expensive observations only aircraft can provide. While it is true that Eastern North Pacific hurricanes seldom present a major threat to the SW coast of North America, with the vast majority travelling west or northwest and dissipating over the cool ocean waters east of Hawaii, those that do recurve north & northeast can and do wreak severe damage to Mexico, Baja California and the SW United States. An excellent and very recent example of this is Hurricane Paul-Sept. 1982 Paul formed SW of Guatemala in the Pacific, & described a parabolic course a few hundred miles offshore of the Pacific west coast of Mexico. Recurvature to the north and northeast, in response to a 500 mb. trough over the western U.S., brought the well-defined "eye" across the extreme SE tip of Baja Calif. on Sept. 29. Maximum sustained winds at this time were estimated near 120 mph. Cabo San Lucas, located on the SW tip of Baja measured peak wind gust of 127 mph., in the "weaker" left-front quadrant of the hurricane. Continuing NNE across the Gulf of California, the center again made landfall near Loss Mochis, Mexico. This station measured wind gust of 98 mph. The hurricane continued inland, turning NE & moving into southern New Mexico as a dissipated surface system, but maintaining an excel-

lent, satellite-defined, comma-shaped mid and upper-level circulation/cloud system. Torrential rains accompanied Paul's transit across this rugged, mountainous terrain, with water up to four feet deep in highway underpasses at El Paso, located in extreme SW Texas, near the New Mexico/Mexico border.

From a purely meteorological standpoint, routine detailed quantitative data are highly desirable, with the aim of compiling a truly quantitative climatology for tropical cyclones of the Eastern North Pacific Ocean.

3. SUMMARY

With today's round-the-clock satellite surveillance of the Eastern North Pacific allowing evasive ship-routing, & budget restraints ever-increasing in the atmospheric sciences, compilation of an in-depth, qualitative & quantitative climatology of hurricanes/tropical storms occurring in this Region on a regular, seasonal basis will have to await future technological advances in satellite-born microwave/radiometric sensors.

ACKNOWLEDGMENTS

This report was funded solely thru personal, out-of-pocket funds.

I would like to express my sincere thanks to Mr. Dick DeAngelis, meteorologist -- National Oceanographic Data Center, Wash., DC, and Dr. Leonard Snellman -- Chief, Sci. Services Division, NWS Western Region, Salt Lake City, UT, who both supplied much of data upon which this report is based. Additionally, I would like to acknowledge the work of the staff of Mariner's Weather Log for their excellent dedication to documenting, for the marine & meteorological/oceanographic community, meteorological and oceanographic data that are both timely & invaluable; Mr. Vernon Dvorak, National Earth Satellite Service-Wash., DC, for his pioneering work towards satellite wind-speed intensity estimates of hurricanes; and the National Climatic Center for the excellent documentation, as prepared by the E. Pacific Hurricane Center, of the annual hurricane summaries for this Region since 1956, in the publication "Climatological Data-National Summary, Annuals 1956 thru 1980" (terminated with the 1980 issue due to government budget cuts).

Table 1

YEAR	STORM NO.	NAME	DATE	LOWEST MEAS. MILLIBARS	PRESSURE INCHES	K E Y
1957	09	---	Oct. 20-21	959	28.32	S
1958	10	---	Sept. 29-Oct.04	960	28.35	S
1959	12	---	Oct. 22-27	958	28.29	S
1960	Not Available					
1961	"					
1962	"					
1963	08	Mona	Oct. 17-18	961.4	28.39	S
1964	Not Available					
1965	"					
1966	"					
1967	16	Oliva	Oct. 05-14	939.0	27.73	S
1968	17	Rebecca	Oct. 05-11	965	28.50	S
1969	Not Available					
1970	12	Lorraine	Aug. 15-27	963	28.44	R
1971	15	Oliva/ (Irene)	Sept. 20-30	948	27.99	R
1972	07	Gwen	Aug. 21-31	941	27.79	R
1973	01	Ava	June 01-12	915	27.02	R
1974	13	Maggie	Aug. 26-Sept. 01	928	27.40	R
1975	Not Available					
1976	01	Annette	June 03-14	925	27.32	R
1977	Not Available					
1978	"					
1979	09	Ignacio	Oct. 23-30	937	27.67	R
1980	Not available					

KEY - R Reconnaissance Report (Measured Data)
S Ship Report (Measured Data)

Oliva/ (Irene) Pacific Name was Oliva, Atlantic Name was Irene.

Table 2 (Saffir/Simpson Diaster Scale)

Category Number	Maximum Sustained Winds(MPH)	Minimum Central Pressure(IN.)	Maximum Storm Surge(FT.)
1	74 - 95	28.94 or Above	4 - 5
2	96 - 110	28.50 - 28.93	6 - 8
3	111 - 130	27.91 - 28.49	9 - 12
4	131 - 155	27.17 - 27.90	13 - 18
5	Over 155	Below 27.17	Over 18

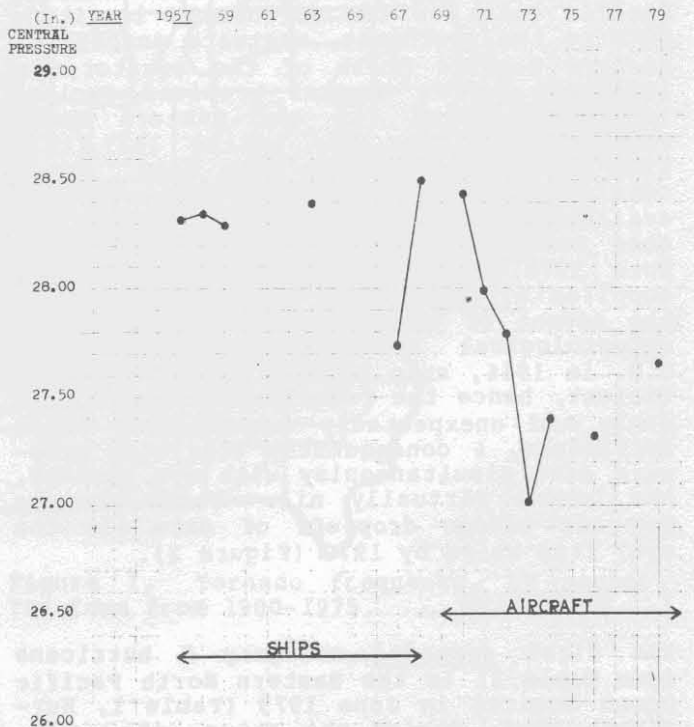


Figure 2. Annually-measured minimum central pressures, Eastern North Pacific Ocean, 1957 - 1980.

FOOTNOTES AND REFERENCES

1. Stephen M. Blumel has worked as a Hydrological Technician employed by the U.S. Geological Survey at Ft. Meyers, Florida. He has been a cooperative observer in the Central Florida severe weather network since 1966. He has also been an active NWA member and published previously in the National Weather Digest.

2. National Oceanographic Data Service Mariner's Weather Log, Vol. 1-24, 1957-1980 Wash., DC.

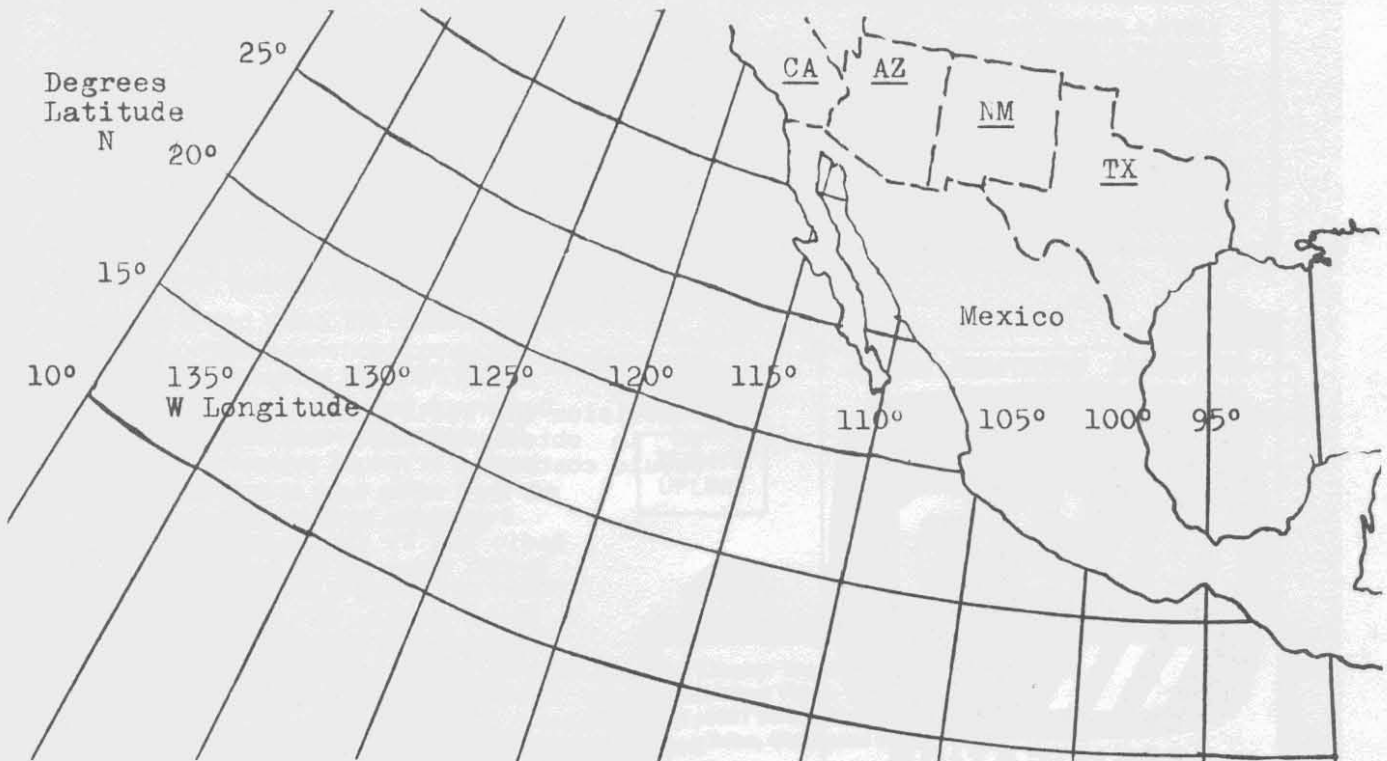
3. National Climatic Center Climatological Data-National Summary, Annuals, Vol. 7-31, 1956-1980 Asheville, NC.

4. Gunther, E.B. & Staff. Annual Data & Verification Tabulation, Eastern North Pacific Tropical Cyclones 1979, NOAA TM NWS-WR 150 1980. Salt Lake City, UT.

5. Gunther, E.B. & Staff. Annual Data & Verification Tabulation, Eastern North Pacific Tropical Storms and Hurricanes 1980, NOAA TM NWS-WR 165, 1981. Salt Lake City, Utah.

6. Court, Arnold. Tropical Cyclone Effects on California. NOAA TM NWS-WR 158, 1980. Salt Lake City, UT.

Figure 1. Map of Study Area-Eastern North Pacific Ocean.



Name _____
 Address _____
 City _____ State _____ Zip _____
 Phone () _____
 Category _____