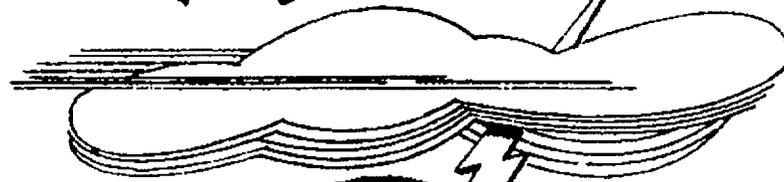


# ANNUAL TYPHOON *Report*



19

65



**FLEET WEATHER CENTRAL/JOINT TYPHOON WARNING CENTER**  
**Guam, Mariana Islands**

U. S. FLEET WEATHER CENTRAL/  
JOINT TYPHOON WARNING CENTER  
COMNAVMARIANAS BOX 12  
SAN FRANCISCO, CALIFORNIA

J. F. STEUCKERT  
Captain, U.S. Navy

COMMANDING

ROBERT E. BOYCE  
Lieutenant Colonel, USAF

DIRECTOR, JOINT TYPHOON WARNING CENTER

STAFF

LCDR John R. Lincoln, USN  
CAPT Stephen J. Balint, USAF  
LTJG Jack K. Pogue, USN  
ENS Nathan L. Greenfeldt, USN  
CWO-4 Leslie L. Britten, USAF  
TSGT Robert H. Lajoie, USAF  
A1C Albert G. Larson, USAF  
Anderson D. Prudhomme, AGAN, USN  
Jeffrey J. Broderick, AGAN, USN  
A2C Thomas J. Hawkins, USAF  
Larson H. Stacey, AGAN, USN  
A2C Fred L. Perkins, USAF  
Mrs. Nancy Pressley, Secretary

1965

ANNUAL TYPHOON REPORT

U. S. FLEET WEATHER CENTRAL/  
JOINT TYPHOON WARNING CENTER  
COMNAVMARIANAS BOX 12  
SAN FRANCISCO, CALIFORNIA

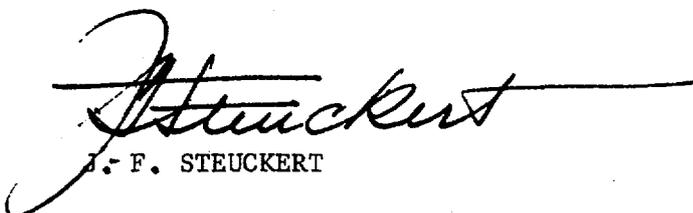
FWC/JTWC:JRL:np  
3140  
Ser: 60  
15 February 1966

From: Commanding Officer, U. S. Fleet Weather Central/Joint Typhoon  
Warning Center, Guam, M. I.  
To: Chief of Naval Operations  
Via: Commander in Chief, U. S. Pacific Fleet

Subj: Annual Typhoon Report, 1965; submission of

Ref: (a) OPNAV Instruction 3140.17E of 29 October 1965  
(b) SECNAV Instruction 5600.16 of 2 November 1960

1. The Annual Typhoon Report, 1965, is submitted herewith in accordance with reference (a).
2. During calendar year 1965, a total of 21 typhoons, 13 tropical storms and six tropical depressions occurred in the Western Pacific area between 180°E longitude and the Malay Peninsula, north of the equator. There were 805 warnings issued in this area in 1965. A new record of 167 calendar days in warning status was established in 1965.
3. Reference (a) directed the Fleet Weather Centrals at Pearl Harbor and Alameda to forward summaries of tropical cyclones in their areas to Fleet Weather Central/Joint Typhoon Warning Center Guam for inclusion in the subject report. Fleet Weather Central Alameda issued a total of 241 warnings on one hurricane, nine tropical storms and two tropical depressions in their area of responsibility. One of these tropical storms (DOREEN) crossed to the west of 140°W and Fleet Weather Central Pearl Harbor issued three warnings on this cyclone. A complete summary of tropical cyclones east of 180 degrees longitude is included in Annex A.
4. One interesting fact of the 1965 typhoon season was that a record number of "super typhoons" (i.e., sustained surface winds of 130 knots or more) occurred in the FWC/JTWC Guam area of responsibility. There were 11 typhoons in this category which surpassed the previous record of eight.
5. This report has been reviewed and approved in accordance with reference (b).

  
J. F. STEUCKERT

Copy to:

CNO (2)  
COMSTS (2)  
CINCPAC (1)  
CINCPACFLT (2)  
NAVOCEANO (2)  
CINCLANTFLT (1)  
OFFNAVWEASERV (40)  
COMNAV Marianas (1)  
COMTAIWANPATFOR/COMFAIRWING ONE (1)  
COMNAVPHIL (1)  
COMNAVFORJAPAN (1)  
COMNAVFOR KOREA (1)  
COMSEVENTHFLT (10)  
COMFIRSTFLT (1)  
COMASWFORPAC (1)  
COMSERVPAC (2)  
COMNAV AirPac (17)  
COMPHIBPAC (2)  
COMWESTSEAFRON (1)  
COMCRUDESPAC (1)  
COMINPAC (3)  
COMINFLOT ONE (1)  
FLEWEACEN PEARL HARBOR (1)  
FLEWEACEN ALAMEDA (1)  
FLEWEACEN ROTA (1)  
FLEWEACEN KODIAK (1)  
FLEWEACEN SUTLAND (1)  
FLEWEAFAC SANGLEY POINT (2)  
FLEWEAFAC YOKOSUKA (2)  
FLEWEAFAC JACKSONVILLE (1)  
FLEWEAFAC SAN DIEGO (1)  
NAVWEARSCHFAC (2)  
FLENUMWEAFAC (2)  
NAVREP, NWRC, ASHEVILLE (1)  
SUPT, NAVPGSCOL (2)  
AEWRON ONE (8)  
AEWRON FOUR (1)  
NAS BARBERS POINT (1)  
NAS CUBI POINT (1)  
NAS ATSUGI (1)  
NAS AGANA (1)  
MCAS KANEOHE BAY (1)  
MCAS IWAKUNI (1)  
HQ, AWS, SCOTT AFB (5)  
HQ, IWW (40)  
HQ, 9TH WEA GRP (2)  
55WRS (1)  
56WRS (2)  
54WRS (8)  
HQ, THIRD AIR DIV (8)  
HQ, 315TH AIR DIV (1)  
HQ, 313TH AIR DIV (1)  
3345TH TECH SCHOOL CHANUTE (3)  
MHRCA, NHC, MIAMI (1)  
CHIEF, JUSMAG THAILAND (2)  
CHIEF, JUSMAG PHILIPPINES (2)  
CHIEF, MAAG JAPAN (2)  
CHIEF, MAAG TAIWAN (2)  
CHIEF, MAAG KOREA (2)  
CHINESE AF WEACEN TAIWAN (1)  
ROYAL OBSERVATORY, HONG KONG (1)  
LIBRARY OF CONGRESS (1)  
FILE (30)

## FOREWARD

This report is published annually and summarizes Western North Pacific Tropical Cyclones. Effective this year, Annex A is added to summarize Tropical Cyclones from 180 degrees eastward to the North American Coast.

When directed by CINCPAC in May 1959, CINCPACFLT redesignated Fleet Weather Central Guam as Fleet Weather Central/Joint Typhoon Warning Center (FWC/JTWC), Guam with the following responsibilities:

1. To provide warnings to U. S. Government agencies for all tropical cyclones west of 180 degrees longitude north of the equator to the Asiatic coast and Malayan Peninsula.
2. To determine tropical cyclone reconnaissance requirements and assign priorities.
3. To conduct investigative and post analysis programs including preparation of the Annual Typhoon Report.
4. To conduct tropical cyclone forecasting and detection research as practicable.

Fuchu Air Force Weather Central, coordinating with Fleet Weather Facility Yokosuka was designated as alternate JTWC in case of failure of FWC/JTWC Guam.

The JTWC, which is an integral section of FWC/JTWC Guam, is staffed by three Air Force and three Navy meteorologists and three enlisted men from each service. The senior Air Force Officer has been designated as the Director, JTWC.

The Joint Hurricane Warning Center in Hawaii, a coordinated agency composed of the U. S. Weather Bureau, Honolulu, the Air Force Kunia Weather Center, and Fleet Weather Central Pearl Harbor, is responsible for surveillance and issuance of warnings in the Central North Pacific area north of the equator between 180 degrees and 140 degrees west.

The Fleet Weather Central, Alameda, California, is responsible for issuance of warnings between 140 degrees west and the North American Coast.

## TABLE OF CONTENTS

Chapter I	Operational Procedures -----	1
	A. General -----	3
	B. Analyses -----	3
	C. Forecast Aids -----	3
	D. Warnings -----	5
Chapter II	Evaluation of Techniques -----	7
	A. General -----	9
	B. Surveillance Methods -----	9
	C. Evaluation of Aerial Reconnaissance -----	10
	D. Evaluation of Data -----	10
	E. Communications -----	12
	F. Summary of Reconnaissance Support -----	13
	G. Evaluation of Numerical Weather Products -----	15
	H. Evaluation of Operational Forecast Procedures -----	15
Chapter III	JTWC Studies -----	17
	A. Typhoon HARRIET - Rapid Movement before Recurvature -	20
	B. Typhoons AMY and FAYE - Unusually Fast Movement After Recurvature -----	21
	C. An Example of False Radar Eye Development -----	22
	D. An Example of Differential Movement at Two Levels ---	25
	E. Extratropical Surge -----	28
	F. TIROS Verification -----	34
	G. The Statistical Verification Program -----	41
	H. Final Report on 700mb Numerical Grid -----	43
	I. Changes in Sea Surface Temperature (SST) Resulting From the Transit of Typhoons SHIRLEY and TRIX -----	44
	J. Changes in Mixed Layer Depth (MLD) Resulting From the Transit of Typhoons SHIRLEY and TRIX -----	49
	Typhoon Tracks 1953-1964 -----	53
	Typhoon Distribution by Month -----	69
Chapter IV	Summary of Tropical Cyclones 1965 -----	71
	1965 Forecast Vector Errors -----	75
	1965 Forecast Errors (In Terms of Closest Distance to Best Track) -----	76
	Forecast Error Tabulation - 1965 -----	77
	Distance Between Operational Warning Posits and Best Track Posits -----	78
	1965 Typhoon Tracks -----	79
	1965 Tropical Cyclones -----	80
	1965 Tropical Storm Tracks -----	82
	Tropical Storms 1965 Position Data -----	83
	Tropical Depressions 1965 Position Data -----	87

Chapter V	Individual Typhoons of 1965 -----	89
	PATSY -----	91
	WANDA -----	97
	AMY -----	102
	BABE -----	108
	CARLA -----	114
	DINAH -----	120
	FREDA -----	129
	HARRIET -----	136
	JEAN -----	142
	IVY -----	153
	LUCY -----	159
	MARY -----	168
	OLIVE -----	175
	ROSE -----	181
	SHIRLEY -----	187
	TRIX -----	194
	VIRGINIA -----	202
	BESS -----	208
	CARMEN -----	215
	DELLA -----	223
	FAYE -----	229
Annex A	Summary of Tropical Cyclones in the Northeast Pacific ----	239
Appendix A	Abbreviations and Definitions -----	255