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*Abstract:* Typhoons coming close to the island of Okinawa interrupted the otherwise idyllic summer season. I was stationed as a weather forecaster for a two year period at Kadena Base Weather Station as a part of my military obligation. This was my first introduction to single station analysis and forecasting typhoons. Okinawa is affected by an average of four to six named typhoons from May to October. That a typhoon will pass near Okinawa in July is listed as an almost sure thing by the weather center in Japan. The typhoons were usually tracked by reconnaissance aircraft out of Guam, the Philippines, and Japan. If a typhoon was close to Okinawa, it could be tracked on radar. This paper is historical in nature, reporting the weather and typhoon activity on Okinawa some fifty-five years ago. This was before satellite observations became available.

## 1. Introduction

My introduction to typhoons was the day after I arrived at the weather station, Kadena AFB on Okinawa on September 20<sup>th</sup> 1954, and on the following day went to the radar site at the north end of the island. Our radar officer, a captain, invited me to have a look at Typhoon Marie which was swinging by just west of the island. Typhoon Marie had started south of the Ryukyus island chain and neither the Philippines nor Japan was alerted to track her by aircraft. The captain got sick and went down the hill and I was left to track Typhoon Marie on the radar scope as it went past the island of Okinawa. I had studied weather at UCLA in the 1953-1954 semesters and had taken Palmer's six week course in Hawaii on tropical meteorology before being sent to Okinawa. I had not tracked a typhoon on a radar scope.

After passing Okinawa typhoon Marie went into the strait of Hormuth between Kyushu and Hokkaido and caused a naval disaster with the sinking of the ferry boat *Toya Maru*, which claimed over 1400 deaths. In the following two years of my service with the Air Force as a weather forecaster, I was fortunate to learn about the typhoon season and experienced several. I was on deployment in Taiwan when a typhoon came directly over Okinawa and my wife and new born son got to experience being in the eye of Emma in 1956.

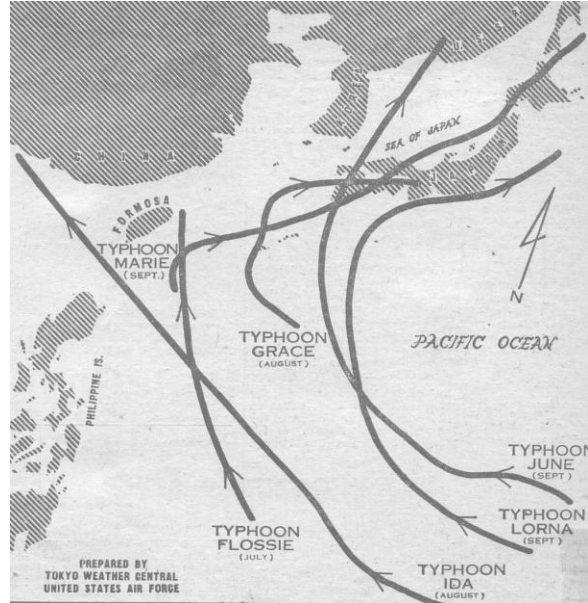


Fig. 1. Track of Typhoons during the 1954 season with special emphasis on Typhoon Marie.

## 2. Normal Weather Station Duties

Normal weather duties at the Kadena Base Weather Station included, to observe weather in the local area, check FAX machine for upper air conditions, prepare synoptic weather charts, brief weather for outgoing flights, debrief weather from incoming flights, broadcast noon weather on the Far East Air Force, (FEAF) radio to the local population, brief weather forecasters at shift changes, and visit with the weather observers and pilots. The normal forecast weather was a high temperature of 80° and a low of 70°, increasing cloudiness in the morning and rain showers in the afternoon. There were lots of additional duties, such as route familiarization flights, assignment to deploy with a squadron, and testifying local weather conditions at hearings and trials. There was only one problem at that time, the weather station got no reports out of China. Thus when a cold front came off China during the winter months, the weather forecasters had no clue it was approaching.

Besides the normal duties required of a weather forecaster, there were sports activities. I engaged in softball, volleyball, basketball, and tennis.

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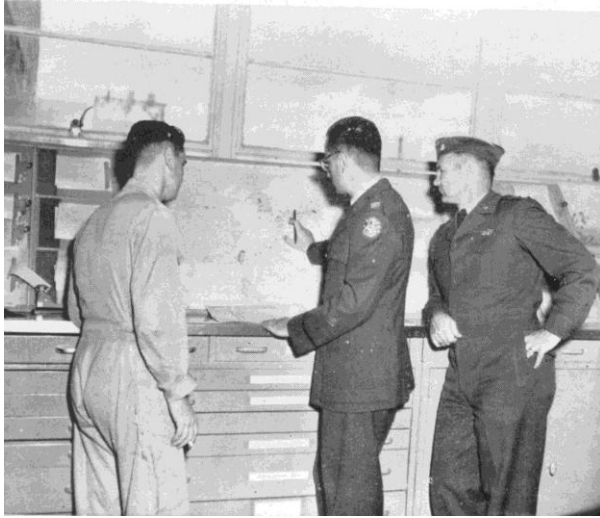


Fig. 2. Forecaster briefing a pilot on weather conditions prior to an evacuation of aircraft.

### 3. Typhoon Alley

Okinawa is sometimes referred to as “Typhoon Alley.” The island sits between Japan and Taiwan in what is referred to as the Ryukyus chain of islands. The island experience between six and eight typhoon alerts each year and a typhoon comes directly over the island every so often. There were weather reconnaissance flights out of Guam, the Philippines, and Japan. Occasionally a typhoon would develop in the area of Okinawa, and we would track it on local radar. Such was the case for Typhoon Marie. At the weather station the forecaster on duty would be responsible for alerting the base to any expected typhoon type weather. We were required to issue typhoon warnings, conditions III, II, and I, go up to the radar station, monitor typhoon movements on the radar scope, report to the base weather station, and keep base squadrons informed. Condition III was 50 knot winds expected within 48 hours, condition II, 50 knot winds in 24 hours, and condition I, 50 knot winds in 12 hours. The typhoon conditions III, II, and I, as well as the ladies names for typhoons have changed over the years.

Beginning on 1 January 2000, tropical cyclones in the Northwest Pacific basin are named from a new list of names. The new names are Asian names and were contributed by 14 nations. The new names will be given to tropical storms by the Tokyo Typhoon Centre of the Japanese Meteorological Agency. These newly selected names have major differences from the rest of the world's tropical cyclone name rosters. There are a few men's and women's names, but the majority are names of flowers, animals, birds, trees, or even foods, etc, while some are descriptive adjectives.

Major Fuerst in his book, “The Typhoon-Hurricane Story” of 1956, wrote the following about Okinawa Typhoons. “Like some lady drivers, Marie changed her path so often that only a prophet could read her turn about mind. Opal was a colorful and exciting lady who grew up in a depression near Guam. Typhoon Harriett, like a tantalizing chorus-cutie of the same name, proved to be an expensive little number. After 36 hours of ravishment at the mercy of temperamental and perverse Emma, Okinawa families began coming out of their tombs.” I served with Major Fuerst on Okinawa.

### 3.1 Typhoon Clara

Typhoon Clara was well documented and started like most typhoons as an easterly wave down in the South Pacific east of Guam. It developed through the stages of vortex, tropical depression, tropical storm, and finally a designated and named typhoon. Planes from Guam originally tracked the storm and then turned it over to Japan for tracking. The typhoon bypassed Okinawa but did severe damage to the tiny island of Kerama-Jima in the Ryuku’s chain. Typhoon Clara was also tracked by navy ships in the area. It represented the best in typhoon tracking from the early stages as an easterly wave until designated as a typhoon with winds rising to a maximum of 138 mph.



Fig. 3 Typhoon monitoring on the radar scope.

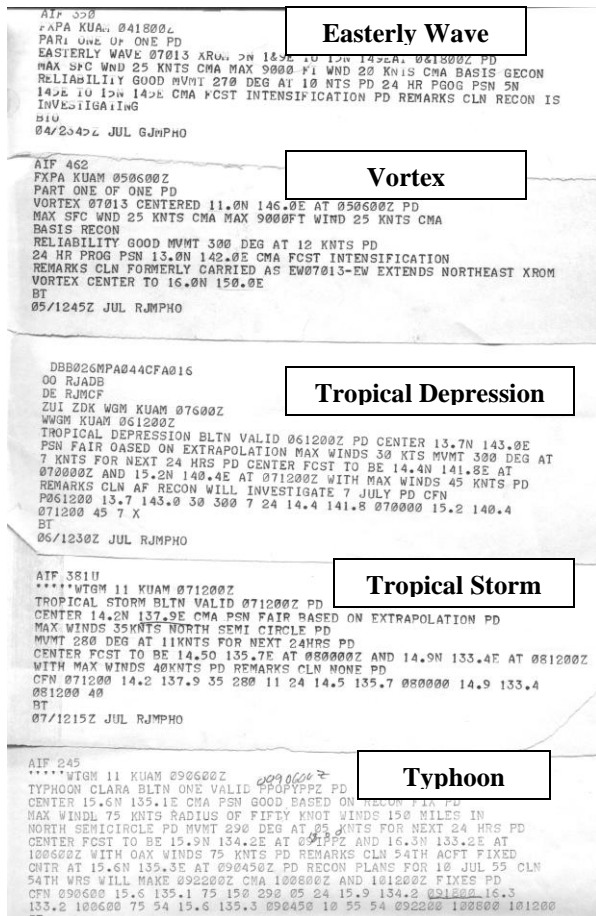


Fig. Teletype messages as Clara developed from an easterly wave into a typhoon.



Fig. 5. Typhoon Clara is plotted by a forecaster.

### 3.2 Typhoon Emma

Typhoon Emma came over southern Okinawa while I was on deployment with a jet fighter squadron in Tainan, Taiwan. The weather was fine in Taiwan, but my wife and baby son had the experience of being in the eye of typhoon Emma. They were in the eye for two hours from midnight till 0200. The house they were in did not suffer any extensive damage, only a few roof tiles were missing. Emma hit Okinawa with all the fury of a full-grown Pacific typhoon. Tons of rain sweeping across the island at speeds of up to 156 mph. breached sea walls, wrecked the Ryukyus Command building, reduced 3rd Marine Division headquarters to rubble and killed a military policeman. While Okinawa's 40,000 Americans shook inside their typhoon-proof but half-flooded houses, World War II Quonset huts were hurled into paddies and wrapped around telegraph poles. Thirty-five hours later, Okinawa found 7,000 homes and 80 public buildings totally destroyed, 27 fishing boats wrecked. Gone was 40% of the island's precious rice crop, 80% of the sweet-potato crop, and 60% of the sugar cane. Estimated damage to U.S. military installations: \$10 million.

### 3.3 Typhoon Jean

The last typhoon before the three of us left Okinawa, forming in the western Pacific, was Jean. Jean was headed toward Okinawa but turned and went across the northern part of the Philippines.

### 4.0 Acknowledgments

This was my first deployment to Okinawa after the school of meteorology at UCLA. The courses at UCLA were very beneficial and I wish to thank my professors at UCLA and the class of special students during my tenure there in the 1953-1954 school year. I also wish to thank the professors of the tropical meteorology sessions which I attended in Honolulu, Hawaii at Palmers College of Tropical Knowledge. I am indebted to my first assignment people who nurtured me through the early stages of my career with the two years on Okinawa: Colonels Walker and Slater, Major Robert Fuerst (photos are taken from his 1956 book), Captains Ruiz and Ginsberg, and my fellow lieutenants, Fred and Frank Lane (twins) and Paul Morgenstern. I owe much to the enlisted personnel (sergeants, and corporals) on Okinawa who helped me. My final six months of active duty were spent in Michigan. Coming back to Arizona I remained as a reservist with the Air Force and was with Luke AFB as a weather forecaster. My last duty, of 18 years in the reserves, was with the AF Academy as a Liaison Officer to several high schools in the west valley of Phoenix. Thanks to all.