

AN UNUSUAL LOW IN THE NORTHWEST PACIFIC OCEAN

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1. INTRODUCTION

An unusual development and track of a tropical depression occurred during the period of 3 December 2008 to 12 December 2008. This system trekked through the National Weather Service (NWS), Weather Forecast Office (WFO) Guam's Area of Responsibility (AOR). This low was very unusual in its path and even the destruction that ensued during this time frame. It was first noted and realized in the National Centers for Environmental Prediction (NCEP) Global Forecast System (GFS) and European model European Center for Medium range Weather Forecasting (ECMWF) data in conversations within the tropical community and discussions with WFO Guam forecasters. Originating near 25N 144E, it trekked roughly east-northeast to near 32N 163E and then continued in a clockwise direction around Wake Island to just north of the Republic of the Marshall Islands. The system reached as far south as 12N 162E where it became tropical in nature as it moved westward in the easterlies (Figure 1). On 10 December 2008 the Joint Typhoon Warning Center picked up the system as Tropical Depression 27W. Tropical Depression 27W continued to intensify and was eventually named Typhoon Dolphin 27W.

Furthermore, it was the only tropical system during the calendar year 2008 to affect the WFO Guam's AOR which covers the area between the Equator and 27N from 130E to the Date Line. It is not at all unusual to see as many as 20 tropical cyclones in this area in a given calendar year. La Nina conditions prevailed throughout the calendar year 2008 which may be a factor to the less than normal amount of tropical systems in this area. In La Nina years it is not at all uncommon for most tropical activity to develop in the far western Pacific Ocean or within the South China Sea.

Other indications to this past year being a La Nina year was cooler sea surface temperatures and prolonged periods of enhanced easterlies. Numerical Models as well as satellite data indicated prolonged easterlies with a long fetch of near gale force winds from the central pacific which created higher sea levels throughout the deep tropics. It was these higher sea levels and subsequent large swells that caused extensive damage during several spring and neap tides early in 2008 to many reef lines and valuable crops grown throughout Micronesia.

2. DAMAGE, DATA AND PICTURES FROM THIS UNUSUAL LOW

2.1 Crops and inundation

Most all islands from Wake Island to the Republic of the Marshall Islands and the Federated States of Micronesia noted extensive damage to banana and taro crops from the period 8 December to 11 December, 2008. Inundation in many of these low lying islands was reported as being any where from 100 to 300 meters inland.

2.2 Pictures

Numerous pictures were received from sources throughout the Micronesian Islands affected by this system. Some of the most remarkable pictures from this event were the size of the breaking waves within the surf zone that was generated by this low. Some of this surf was estimated to be as high as 15 to 18 feet with locally higher sets, much like the surf common to the north shore of the island of Oahu in Hawaii. Surf heights of this magnitude are very unusual within Micronesia and therefore it is quite understandable as to why there was so much damage.

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2.3 Data

Wave Watch III data from NCEP did a fairly representative job of alerting forecasters to the event, but may have fallen short in actual heights of wave information. Some reports from forecasters indicated that the wave heights were as much as

winds slowly diminished over the next two days as the low moved slowly towards the southwest to near 12N 162E. At this point the system became tropical in nature and the winds decreased below gale force.

3. SCATTEROMETER DATA

Fortunately, satellite derived winds from both ASCAT and QuikSCAT on 4 – 6 December, 2008 was able to capture the low roughly within or less than three hours of each other. Scatterometer (largely QuikSCAT) and other surface reports indicated a large area of 50 to 60 knot surface winds along the low pressure's northern periphery (northerly and easterly winds). As it moved slowly southward to near 20N 174E (by 7 December 2008) surface winds weakened slightly, but remained at gale force. The gale force

One of the most notable items of interest is that that above paragraph references QuikSCAT data. The ASCAT data was useful, but the narrow swaths (two 550 km swaths) of the ASCAT passes inhibits the forecaster from gaining the full realization of just how large an area of greater than gale force winds were associated with the low. The value of the large swath and higher resolution QuikSCAT data is clearly and easily identified in this event (Figure 2).

4. SUMMARY

This event and paper remains a work in progress and is expected to be researched further.

5. Figures

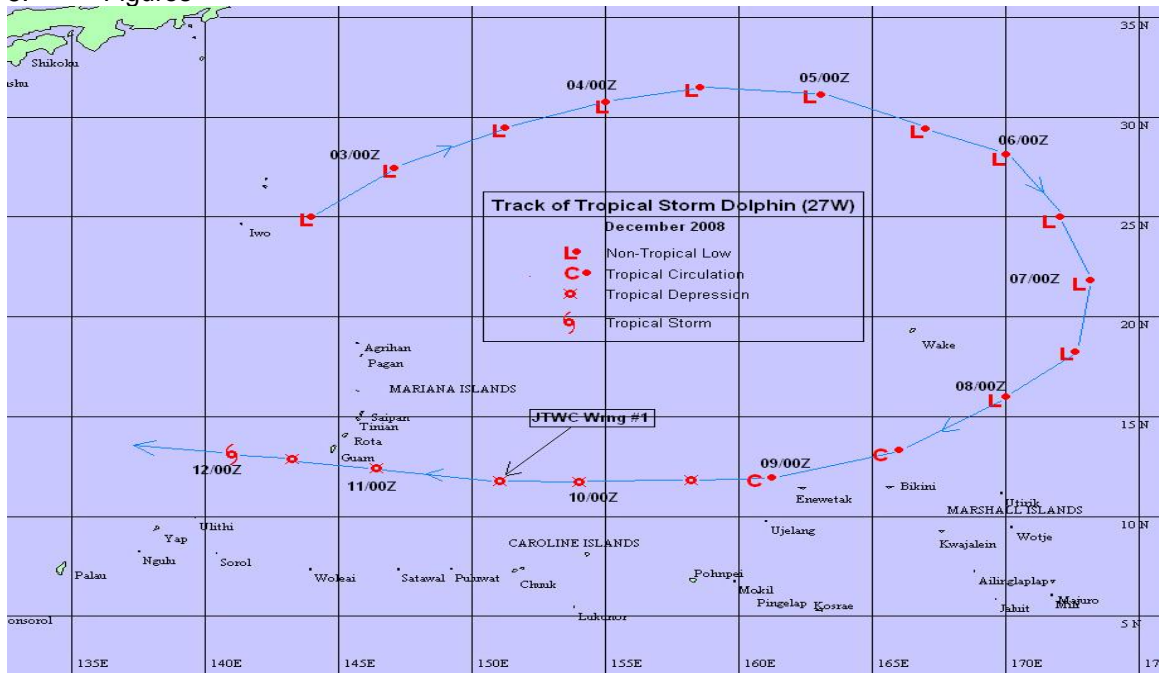


Figure 1. Trek of the unusual low with time line. (Courtesy; Mike Middlebrooke WFO Guam)

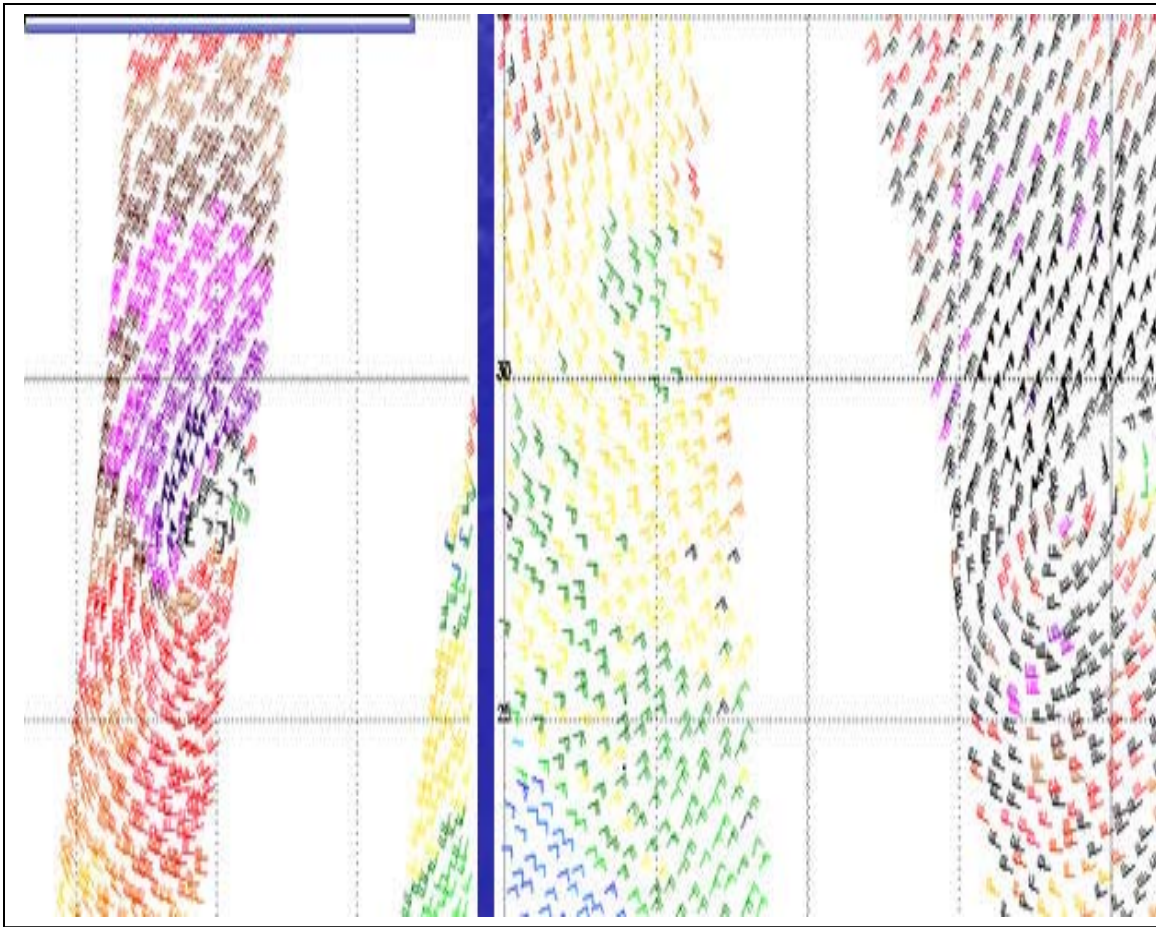


Figure 2. Display of ASCAT (left) vs QuikSCAT (right) 4 December 2008 (Courtesy NOAA/NESDIS/Office of Research and Applications)