UNIVERSITY OF THE PHILIPPINES

AN ANALYSIS OF THE 2012 SOUTHWEST MONSOON SURGE IN THE PHILIPPINES

By

LEA L. DASALLAS

A Master's Thesis Submitted to the
Institute of Environmental Science and Meteorology
College of Science
University of the Philippines
Diliman, Quezon City

In Partial Fulfillment of the Requirements
for the Degree of
Master of Science in Meteorology

April 2014

ABSTRACT

The driving mechanisms, i.e., atmospheric and weather conditions and processes that prompted the occurrence of the intense southwest monsoon surge that occurred on over Central, Northern, and western parts of Southern Luzon 06–08 August 2012 were investigated. The rainfall generated by the surge produced 153.35-175.11% increase in Metro Manila PAGASA synoptic stations. Only three cases of more than 1000 mm August rainfall total had occurred in Metro Manila since 1960; the other two cases were typhoon-induced and not significantly extraordinary. The unusually high rainfall event was analyzed through surface and upper-air observational method that included study of the cumulative rainfall amount, Multifunctional Transport Satellite (MTSAT-IR) images, Doppler radar outputs, and streamline and pressure gradient charts gathered from the Philippine Atmospheric Geophysical Astronomical Services Administration (PAGASA). The upper-air numerically reanalyzed data sets comprise the outputs gathered from the National Centers for Environmental Prediction and National Center for Atmospheric Research (NCEP/NCAR) reanalyzed data set and Global Spectral Model (GSM). The results indicated that the torrential rainfall was triggered by an anomalously active Southwest Monsoon (SWM) activity that was enhanced by a slow moving Tropical Cyclone (TC) Haikui, vortex located outside the boundaries of the Philippine Area of Responsibility (PAR). The cyclone's relatively slow movement appeared to be caused by the impedance of semi-permanent subtropical highs and TC Haikui's brief interaction with another cyclone Saola. The cloud mass, which also appeared to be a part of TC Haikui's elongated feeder bands, stayed stationary over a long period of time due to the influence of two low pressure areas (LPAs): LPA-downgraded TC Saola to the northwest and TC Haikui to the northeast. Further analysis showed that neither ENSO nor Madden-Julian Oscillation prominently influenced the high rainfall event associated with this particular SWM.