

Influence of the Philippine landmass on traversing tropical cyclones

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ABSTRACT

Landfalling tropical cyclones (TCs) are among the most destructive forces in nature. They bring strong winds, torrential rain, and storm surge, which cause heavy economic and human losses. According to the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the Philippine Area of Responsibility (PAR) is the most active TC basin in the world. About 19.4 TCs enter the region every year of which eight or nine make landfall in the Philippines, an archipelagic nation between the Philippine Sea and South China Sea in the Western North Pacific. Previous studies cover the effects of TC to the Philippines, however, only a few studies were done on the effects of the Philippines to TCs. The objective of this study is to investigate the influence of Philippine landmass to the characteristics and structure of TCs that traversed the archipelago. TCs from 1956-2015 using the best-track data from the Joint Typhoon Warning Center will be analyzed. Changes in TC characteristics such as maximum sustained winds, circulation size, translation speed, and eye diameter, before and after landmass interaction will be presented. This study hypothesizes that the Sierra Madre mountain range, which is about 700 km in length and flanks the eastern Luzon Island in the Philippines, exert significant influence on TC speed and intensity. It is hoped that the research will provide new insights into the interaction between TCs and local terrain and aid in operational forecasting and disaster risk management.

Keywords: Tropical cyclones, Typhoons, Landfall, Orography