ASSIMILATING SUBIC RADAR DATA FOR HEAVY RAINFALL PREDICTION

Cyrill Hope T. Depasucat

Metro Manila is the largest densely populated area in the Philippines. With problems left by rapid urbanization in the past decades, the metropolitan has become vulnerable to floods from heavy rainfall events. Some events are a result of the interaction between the land and southwest monsoon (Habagat) along the western coastal areas of the country during June to September. The Philippines also experiences tropical cyclones (TCs) with each TC bringing intense winds and rain on their paths. Coincidentally, peak season of TCs coincides with the Habagat season and TC-enhanced monsoon winds has been shown to cause heavy rainfall over Metro Manila.

In the Philippines, weather radars and numerical models are used to detect and predict precipitation. Weather radars are used for detecting and monitoring precipitation at high spatiotemporal resolution while numerical weather prediction (NWP) models provide future conditions or forecasts. Forecasts over a large area are prepared by combining global information with mathematical equations but forecasts for smaller regions are much more challenging due to the lack of local observations. This study thus aims to improve NWP rainfall forecasts for Metro Manila by assimilating Subic radar observations using the three-dimensional variational (3DVAR) system.

The impact of assimilating radar data in the prediction of heavy rainfall will be examined by simulating 4 heavy rainfall events over Metro Manila from 2018 to 2021 and verifying the forecasts with weather station observations in Metro Manila using the contingency table. The results of the study will be useful in having a better understanding of an intense rainfall event in the region.

Heavy rainfall events can cause floods, leading to property damage and many human casualties when not prepared for. Accurate rainfall predictions are thus important, with this study helping Filipinos reduce damages and risk to human lives during heavy rainfall events.

Keywords: heavy rainfall events, radar data assimilation, Numerical Weather Prediction