

The Impact of Aerosol-Cloud Interaction on the Precipitation in Metro Manila and Rizal, Philippines

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ABSTRACT

Atmospheric aerosols are well known due to its adverse impact not only on human health but on weather and climate as well. One of the ways that aerosols alter the weather and climate is due to the Aerosol-Cloud Interaction (ACI). In ACI, aerosols act as Cloud Condensation Nuclei (CCN), modifying the clouds' microphysical characteristics and lifetime including precipitation. Over the past years, numerous studies globally, have shown that due of the increasing concentration of anthropogenic aerosols and deviations in the source strength of natural aerosols, ACI has led to changes in the trend of the different precipitation intensities and orographic precipitation pattern.

In the Philippines, it has been presumed that the two neighbor regions of Metro Manila and Rizal due to the differences in topography, coupled with the increasing amount of urban anthropogenic aerosols in Metro Manila are modifying the different precipitation intensities for both region and the orographic precipitation in Rizal, however this hypothesis has never been established.

In this study, using Weather Research & Forecasting (WRF) Model together with the analysis of observed meteorological data, the influence of ACI and topography on the precipitation formation in the study area including its impact on the different precipitation intensities and orographic precipitation distribution will be assessed. Different environmental factors that may influence precipitation, such as precipitable water and wind shear will also be investigated in this study.

Keywords: Aerosol-Cloud Interaction, Topography, Precipitation