Sensitivity Analysis of Simulating Rainfall over Sri Lanka Associated with the Cyclone Amphan using WRF

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The cyclone "Amphan" is reported from 16th to 21st May 2020. It has affected Sri Lanka during its initial stage and moved towards the "Bay of Bengal". This study is to identify the best set of physics options in simulating the daily rain fall under the influence of the cyclone "Amphan" using Weather Research and Forecasting (WRF) model. The considered physics options are microphysics (MP), cumulus parameterization (CU) and planetary boundary layer (PBL). Twelve different combinations of those physics options are experimented. The best combination is identified by calculating the pattern correlation between the simulated and satellite measured rainfall obtained using Global Precipitation Measurement (GPM). GPM Level 3 dataset is used in this research with $0.1°$ x $0.1°$ resolution.

Pattern correlation is calculated by considering the rainfall of the entire simulation domain for a period of 24 hours. The total length of the simulation was six days and the average pattern correlation is calculated to identify the best physics option combination. The physics option combination which had the highest average pattern correlation was "Thompson Scheme" for MP, "new modified Tiedtke scheme" for CU and "University of Washington scheme" for PBL. In general the intensity of the simulated rainfall is comparatively lower but on the other hand the area and the pattern is accurately simulated by the identified set of physics options. We conclude that the use of such physics option combination with WRF has the potential in forecasting the rainfall in Sri Lanka under the influence of a cyclone.

Keywords: WRF, rainfall and cyclone Amphan

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369