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# Simulations of Mesoscale Disturbance Over Metro Manila with a Mixed Layer Model

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The standard mixed layer model is modified in order to incorporate the prediction of clouds, rainfall and other microphysical variables. The computations of the microphysical variables are incorporated in the model by using the Kessler formulation. The model is integrated for simulating the development of mesoscale disturbances which are generated by the heating of the ground due to solar radiation. The model simulations are made in order to determine the effects of topography, the large scale prevailing flow, and the stability of the atmosphere on the characteristics of the mesoscale disturbances. The initial conditions which are prescribed for the simulations are idealized conditions. In order to determine the effect of topography, the model is used to simulate cases with flat terrain and also with real terrain. For the purpose of determining the effect of the prevailing flow, a control run is first made with initial conditions corresponding to a weak or calm wind condition. This control run is then compared with results which correspond to different prevailing wind speeds and wind directions. The results of the simulations indicate the importance of terrain variations and the existence of lakes and the configuration of coastlines. In this connection, the existence of Laguna de Bay generates strong modifications on the effect of Manila Bay. Regions of convergences between the Manila sea breeze and the Laguna de Bay lake breeze are generated. The Sierra Madre mountains east of Manila generate a strong mesoscale circulation which modifies the sea breezes which are generated by Manila Bay and Laguna de Bay. During the morning hours, separate mesoscale circulations are generated by each of the two bays and the mountains. These circulations subsequently intensify and merge with the circulation which is generated by the Sierra Mountains. The investigation of the effect of the large scale prevailing flow is concentrated on cases corresponding to the southwest monsoon and northeast monsoon conditions. The simulations show the importance of the speed and the direction of the prevailing flow on the mesoscale wind patterns. The corresponding effects on cloud and rainfall occurrence will be presented.