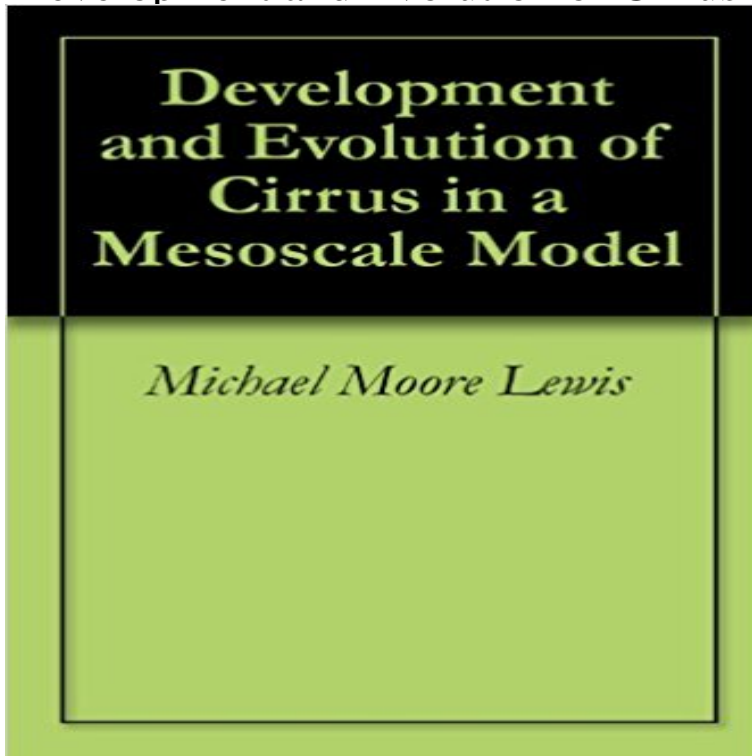


Development and Evolution of Cirrus in a Mesoscale Model



Cirrus cloud forecasting is of particular importance to various Department of Defense programs. This thesis takes a case study approach to study Air Force Weather Agency Mesoscale Model 5 (AFWA MM5) skill in forecasting cirrus clouds, which are not represented explicitly by the model (ice water mixing ratio is used as a surrogate.) Two cases are selected for study. For each case, an initial forecast time of interest is determined which serves as the beginning point for the case study. GOES data and 3-hourly MM5 data are then obtained at 3-hourly intervals to coincide with model forecast time steps between the initial time through the 30-hour forecast. A standard analysis is performed on all data to determine general atmospheric structure for each case at each 3-hourly point. Following this, the models relative humidity with respect to ice, explicit ice water content, vertical velocity, and other fields are considered to determine if the model possesses the proper dynamical factors for cirrus formation. Finally, model coverage of ice cloud is compared to the ABL cloud mask results to determine how well the models ice cloud forecasts verify against each 3-hourly observed ice water field taken from the GOES data. Results indicate that the MM5 underforecasts cirrus coverage, and that the 90% relative humidity field with respect to ice may be a better approximation of observed cirrus coverage than the ice water field.

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