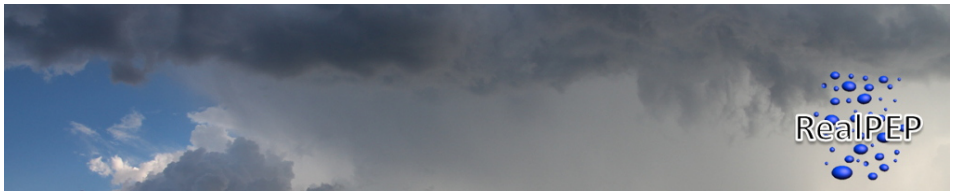


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# Microphysical model development guided by radar observations

*Tuesday, October 6, 2020 4:20 PM (20 minutes)*

Microphysical schemes in numerical weather prediction models are based on the basic equations that govern the growth and interaction of liquid drops and ice particles (hydrometeors) in the atmosphere. Unfortunately, our knowledge of these microphysical processes is still incomplete. In addition, quite drastic simplifications are necessary to make the problem tractable in numerical weather prediction. Hence, we need observations to test, validate and improve the microphysical parameterizations.

Here we give two examples of this validation and development process. First, a deficiency in the properties of unrimed snowflakes is identified using Doppler spectra of a vertically pointing radar. The snowflake properties are improved based on aggregation modeling, and the revised microphysical model is validated using multi-wavelength radar data. Second, the use of a one- vs two-moment microphysics is compared for forecasts of deep convection. The two-moment scheme has several advantages, but shows a bias in the diurnal cycle of the forward-simulated radar cell-tracking statistics. This can be traced back to a delayed initiation of convection, which is caused by a bias in the cloud-radiation interaction of the two-moment microphysics. After this issue is fixed, several biases of the NWP system are improved, e.g. radar cell statistics and near-infrared brightness temperature histogram.

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