

Improved Ice Aggregation Formulation in a Two-Moment Microphysics Scheme

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Accurate simulation of ice aggregation is important for precise precipitation prediction, especially when sophisticated models are used, e.g. two-moment bulk microphysics schemes. We simulated 43 days with ICON-LEM and applied a radar forward operator to perform a statistical comparison between synthetic and observed multifrequency radar measurements. The analysis reveals an overestimation of the Doppler velocity and snow particle sizes at higher temperatures.

We implemented new particle property relations inferred from aggregation modeling and updated other microphysical parameters that affect aggregation rates (e.g. formulation of the aggregation kernel, sticking efficiency). This allowed us to evaluate the sensitivity of aggregation to these parameters. The particle properties and the aggregation kernel have the largest impact and their improvement in the scheme leads to smaller biases in the simulated Doppler velocity and snow particle size.