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## Evaluate the Impact of Dual-Polarization Radar Data Assimilation Using Observation Operators

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The characteristics of simulated dual-polarimetric (dual-pol) parameters are significantly affected by configurations of dual-pol operators, leading to different covariance structures and results of data assimilation. In this study, the simulated reflectivity (ZH) and differential reflectivity (ZDR) are obtained via two different calculation methods, analytic and numerical integration of the scattering amplitude (SA). The former fits the SA with power law to obtain an analytic solution while the latter integrates the SA bin by bin. The results show that the ZHH structure can be well simulated by the analytic integration method, but it leads to negative ZDR values for small raindrops and exaggeratedly large ZDR values for large raindrops. Besides, the joint frequency between ZDR and ZHH is different from observation. On the contrary, the numerical integration method presents reasonable simulation of both ZHH and ZDR and well capture the joint frequency pattern of ZHH and ZDR. To sum up, directly integrating SAs bin by bin results in a reasonable ZDR structure in the background field and leads the analysis closer to the observation.

**VAT**

### Session

Seamless Prediction: Data assimilation integrating nowcasting and new observations

### Preferred Contribution Type

Oral Presentation

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