

# 國立中央大學大氣物理研究所書報討論

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## **Assimilation of 3D polarimetric microphysical retrievals in a convective-scale NWP system**

### **Abstract**

In recent years, dual-polarimetric radar has provided data with potential of improving our understanding of cloud, microphysics, and NWP. Consequently, the use of radar data for data assimilation has become an important research major in recent years. Polarimetric moments can be linked to microphysical model state variables using (1) direct assimilation via radar forward operator, or (2) indirect assimilation via retrieval algorithm.

However, the direct assimilation is still challenging because of rather rudimentarily represented or rarely considered hydrometeor shape, size, and orientation distributions in NWP models. In contrast, indirect assimilation avoids these model deficiencies.

The authors try to assimilate retrieval variables LWC and IWC from DWD radar network (German) into kilo-scale ensemble data assimilation system, which is a kind of indirect assimilation. JQS, FSS and BSS are used for evaluating the improvement of QPF in different configurations, assimilation strategies, and 9-h forecast.

Certain configurations that may improve or degrade the forecast have been identified in this paper. The authors also determine the optimal assimilation strategies through comparisons across all cases. In addition, degradation is observed in IWC observation, which is also the key discussion. Finally, the 9-h forecasts are performed to verify the first-guess results.

### **Keywords :**

liquid water content (LWC) 、 ice water content (IWC) 、 melting layer 、 indirect assimilation

### **Reference :**

Reimann, L., Simmer, C., and Trömel, S. , 2023: Assimilation of 3D polarimetric microphysical retrievals in a convective-scale NWP system, *Atmos. Chem. Phys.*, **23**, 14219–14237, <https://doi.org/10.5194/acp-23-14219-2023>