

# 國立中央大學大氣物理研究所書報討論

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## **Electrification life cycle of incipient Thunderstorms Observed by Polarimetric Radar**

Previous studies have shown that lightning activity was highly correlated with cloud microphysical characteristics, such as Hail mass、Graupel mass or vertically aligned ice particles produced by strong electrical field. The author attempts to use statistical methods to investigate the time evolution of high Very High Frequency (VHF) source and their corresponding vertical profile of Polarimetric radar measurements.

The results suggest that reflectivity ( $Z$ ) within grid cells containing High VHF source are significantly higher than others. In addition, differential reflectivity ( $ZDR$ ) and correlation coefficient ( $\rho_{hv}$ ) decrease within mix-phase layer ( $0^{\circ}C \sim -40^{\circ}C$ ), likely due to the rain-graupel-hail mixing region formed by strong accretion and freezing process. Strong electric field within thunderstorms also force ice crystal to align vertically, resulting in negative specific differential phase (KDP) in glaciated layer ( $<-40^{\circ}C$ ). During the evolution of thunderstorms, the above-mentioned parametric signatures can also be clearly observed.

### **Keywords:**

Dual-Polarimetric Radar parameters (雙偏極化雷達參數)

### **Reference:**

Mattos, E. V., L. A. T. Machado, E. R. Williams, and R. I. Albrecht, 2016: Polarimetric radar characteristics of storms with and without lightning activity. *JGR Atmospheres*, **121**, <https://doi.org/10.1002/2016JD025142>.

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