

Cloud Microphysical Properties Retrieved from Remote Sensing Measurements

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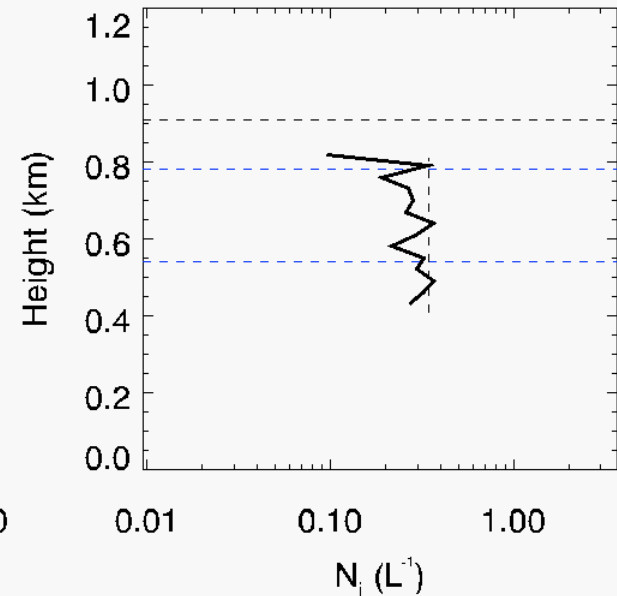
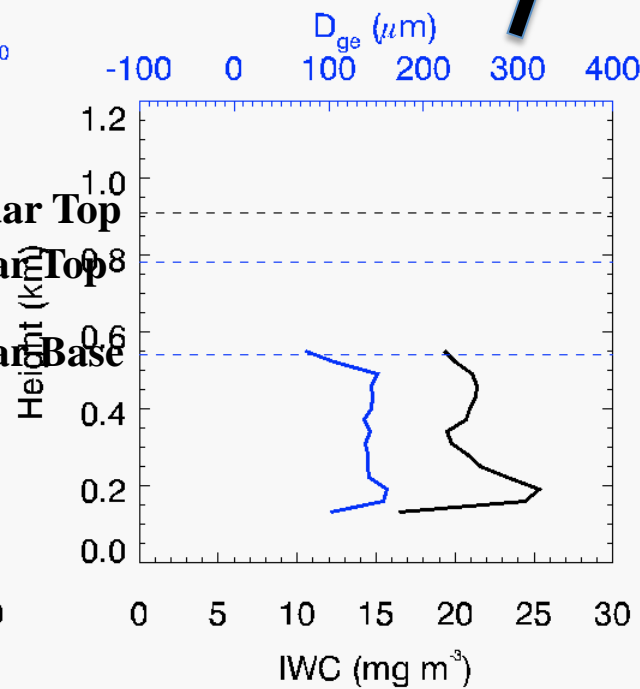
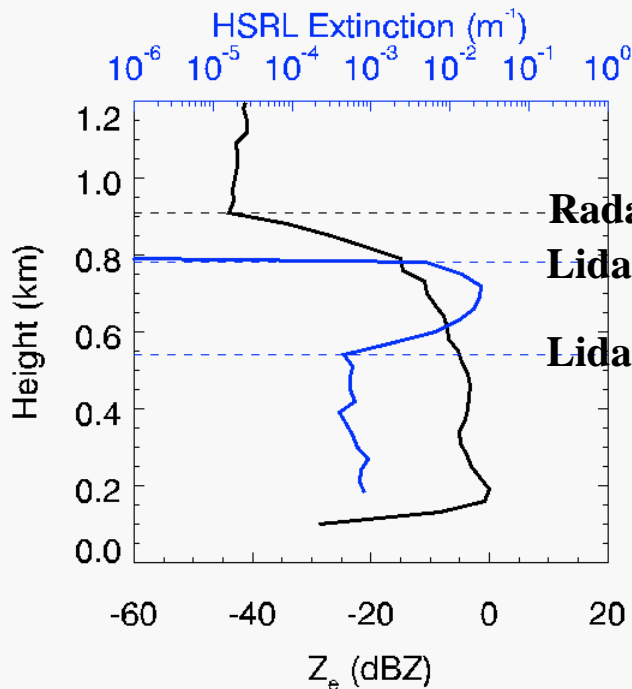
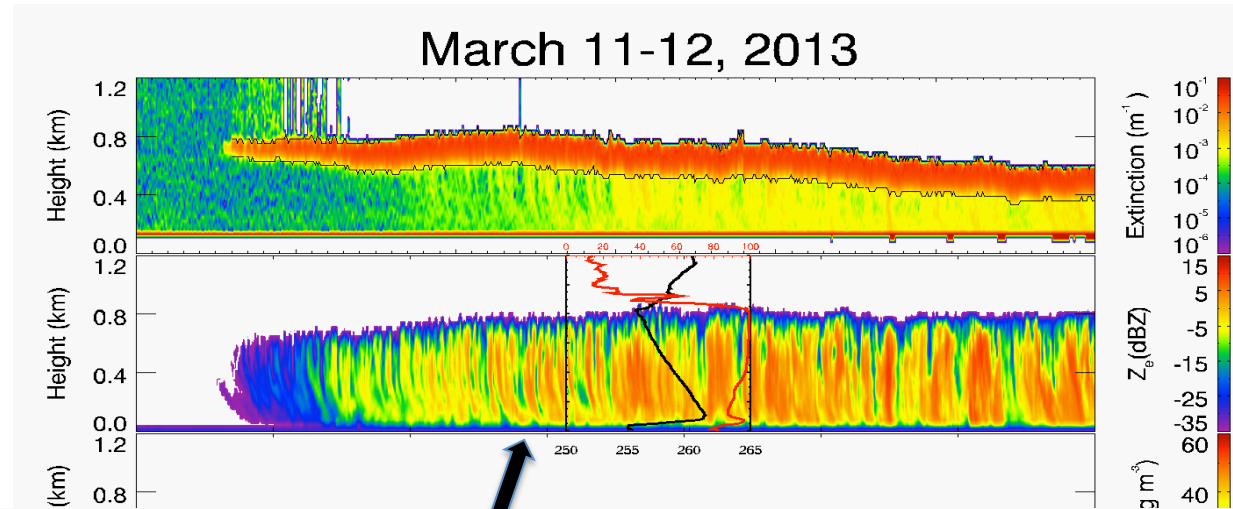


Algorithms Description

- **Inputs:** Cloud radar Z_e and mean Doppler velocity (MDV), lidar (MPL or HSRL) backscattering or extinction, temperature profile, MWR LWP.
- **Outputs:**
 - Ice phase: IWC, general effective radius (Wang and Sassen 2001), precipitation flux, and ice concentration (N_i) in the mixed-phase layer (Zhang et al. 2014, JAS, in revision).
 - liquid phase: droplet concentration, LWC, and effective radius (Wang' talk at CAPI low cloud section).

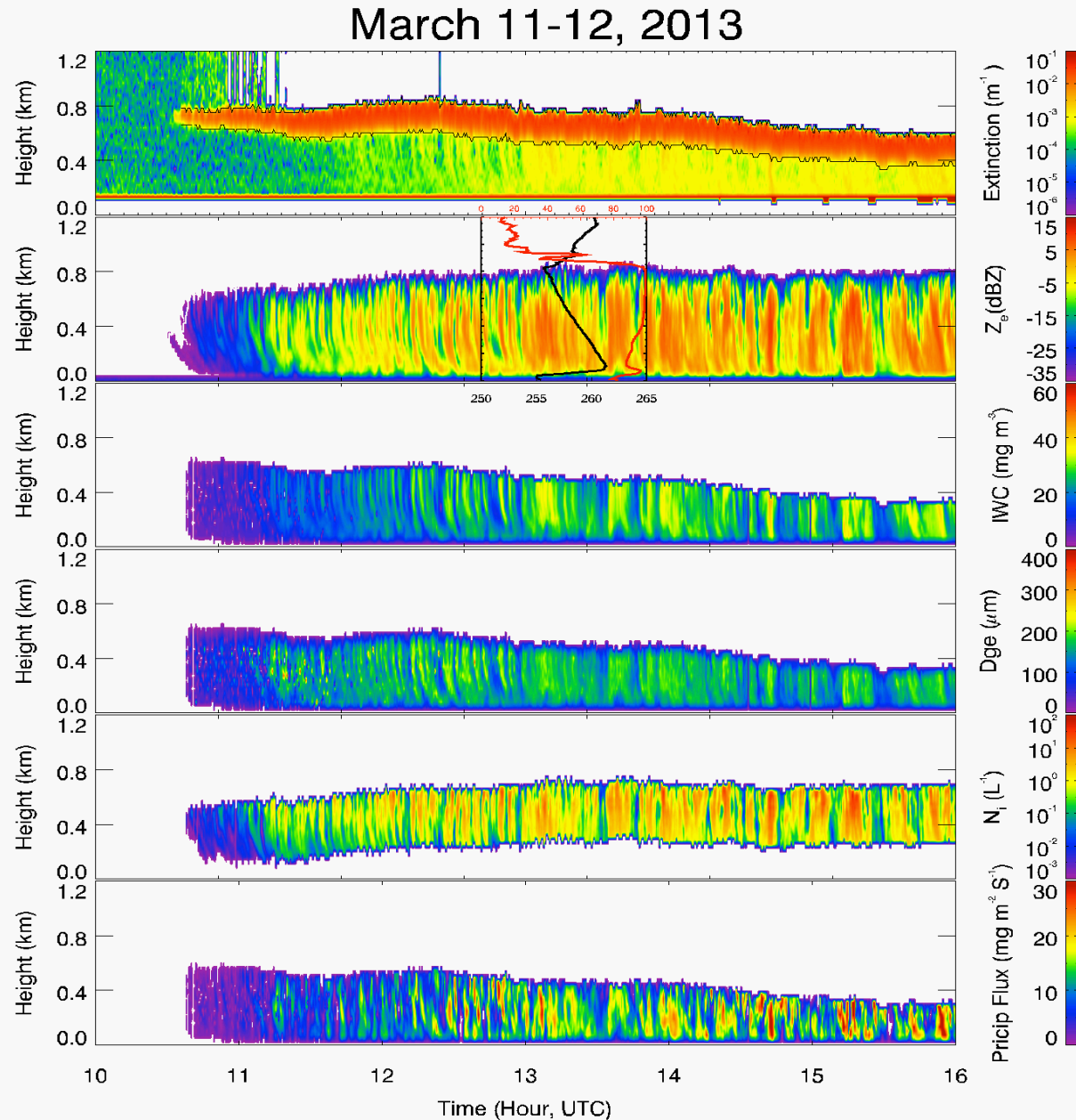
March 11th, 2013 Time period: 10-16

- Stratiform Mixed-phase Cloud.
- Liquid-dominated layer ~ 400 m.



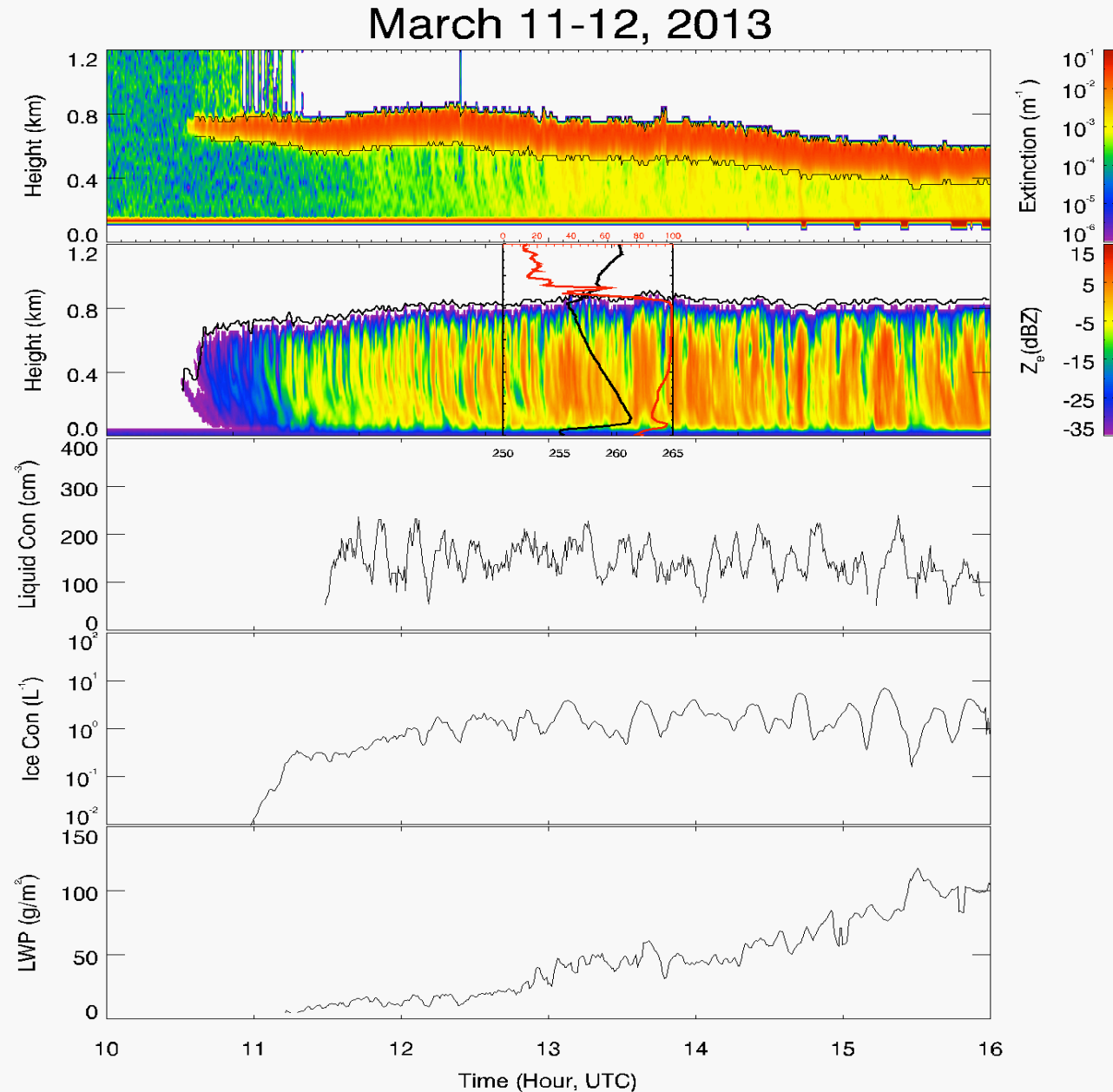
Ice Phase Cloud Properties

- IWC: 20-30 mg m^{-3} .
- D_{ge} : 120-180 μm .
- N_i : 0.1-10 L^{-1} .
- Precipitation Flux:
IWC * MDV



Cloud Layer Properties

- N_{liquid} : mean of $\sim 150 \text{ cm}^{-3}$, with variations between 80 and 250 cm^{-3} .
- N_i : mean of $\sim 1 \text{ L}^{-1}$, with variations between 0.1 and 1 L^{-1} .
- LWP: increase to $\sim 100 \text{ g/m}^2$.



Next Step

- Using radar Doppler spectrum to estimate reflectivity-weighted particle velocity V_t and vertical air motion w .
- Add w as an input for N_i retrieval.
- Precipitation flux estimation with Doppler spectrum data.
- Work on the November 5th case (more turbulent).