Cloud Properties from Doppler Radar Spectra - a Growing Suite of Information Extraction Algorithms

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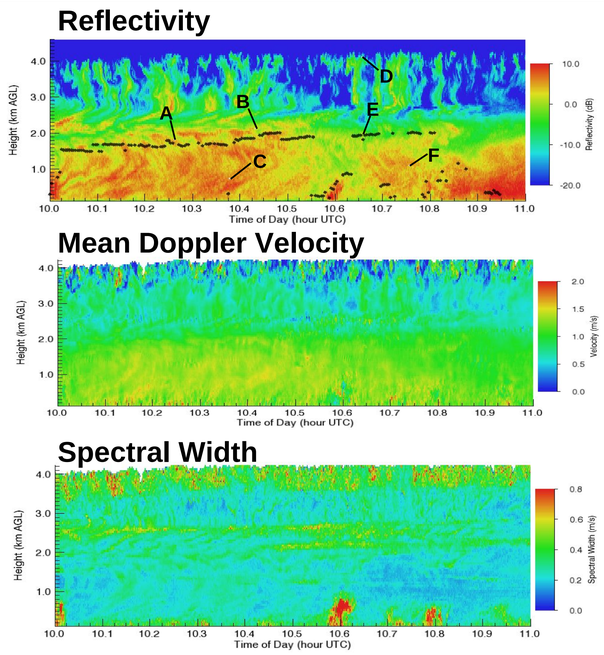
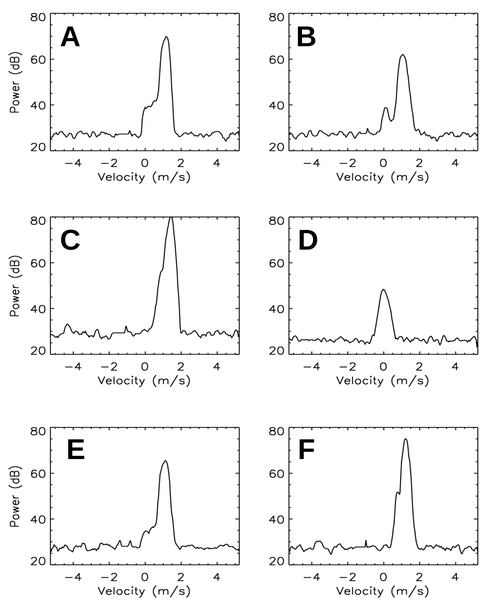
DOPPLER RADAR MOMENTS

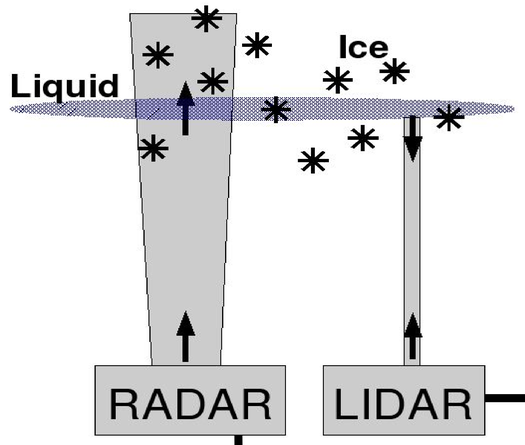


There are multiple mixed-phase layers present, but these Doppler radar moments do not capture them.

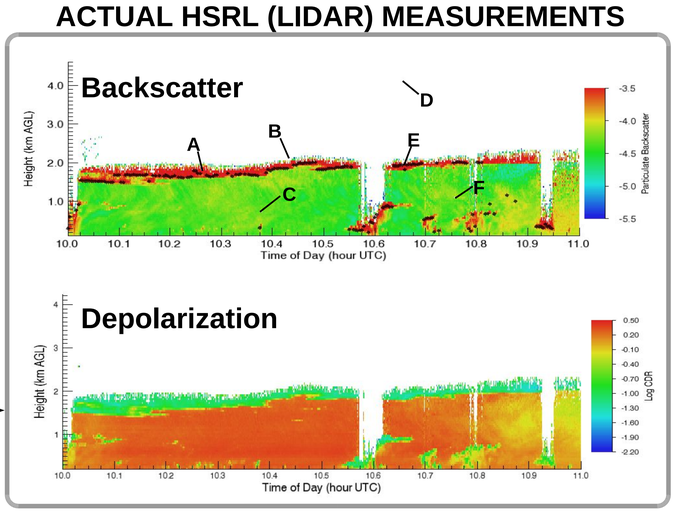
DOPPLER RADAR SPECTRA



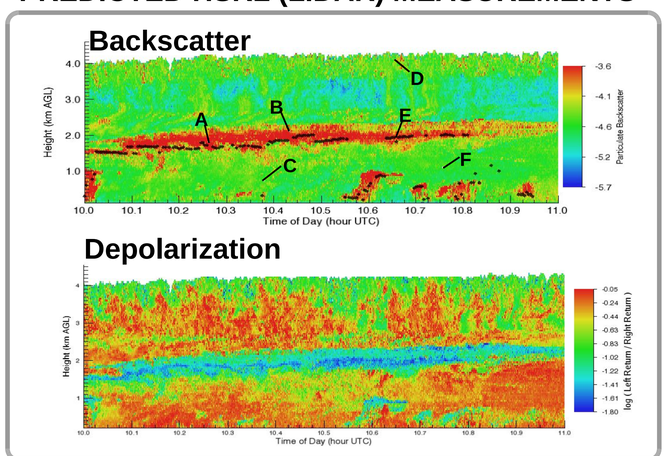
These example spectra are from positions A-F shown in the time-height plots. Spectral signatures produced by mixed-phase conditions are sometimes multimodal, but also often unimodal and very subtle.



ACTUAL HSRL (LIDAR) MEASUREMENTS



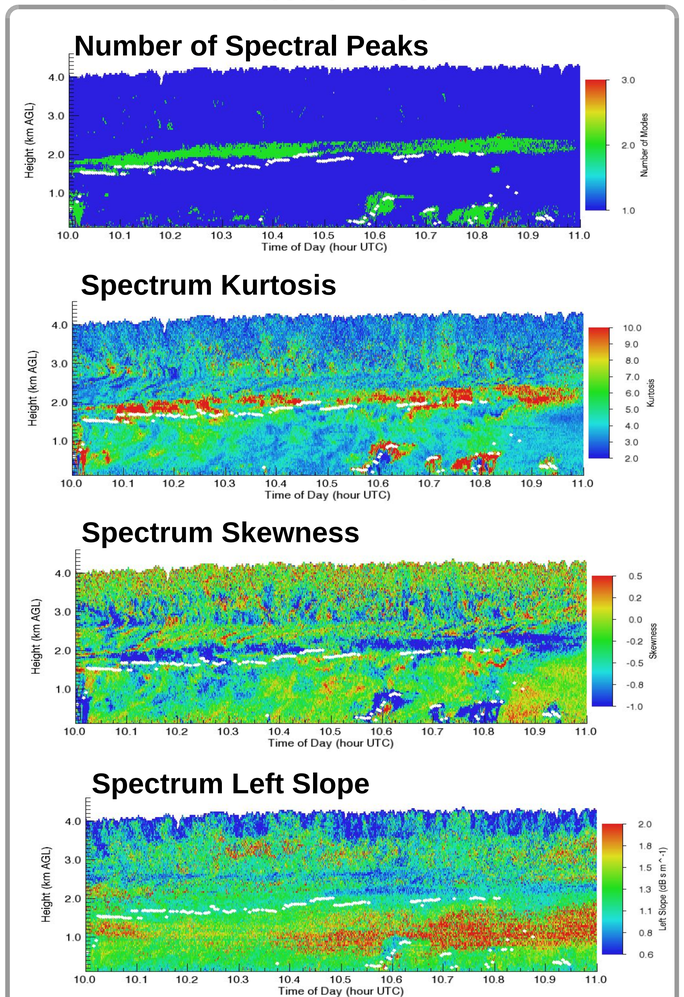
PREDICTED HSRL (LIDAR) MEASUREMENTS



Lidar Prediction Algorithm

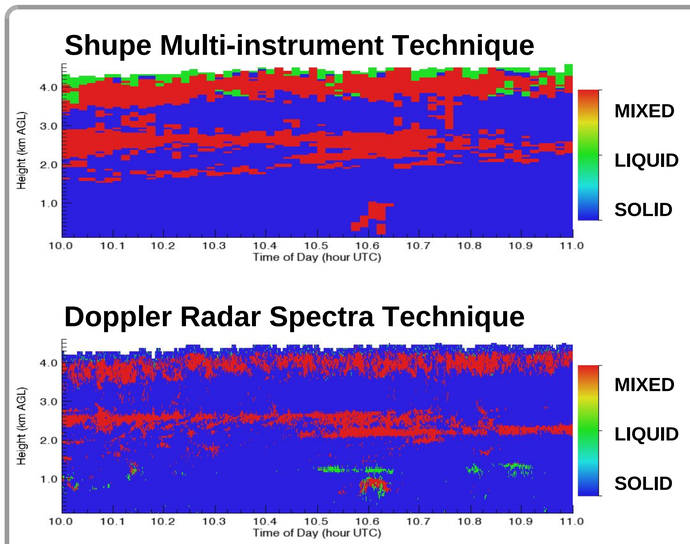
Our lidar prediction algorithm works by analyzing subtle Doppler radar spectrum features. Based on spectra alone, it generates the predictions shown to the right, which agree well with the measurements shown above them.

MICRO-ARSCL



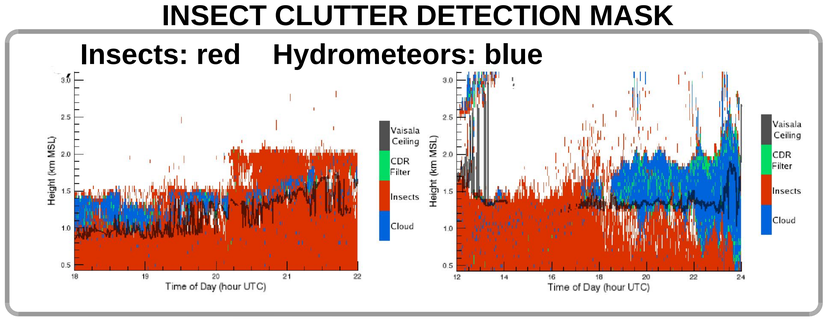
Micro-ARSCL offers an enhanced characterization of microphysics captured by higher-order Doppler moments and statistics.

HYDROMETEOR PHASE CLASSIFICATION

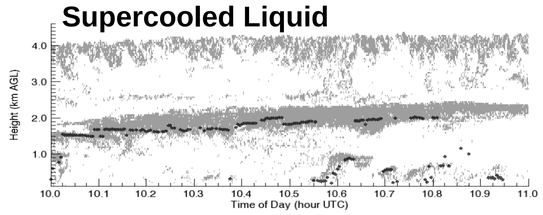


Good agreement between two hydrometeor phase classification techniques, the lower based entirely on Doppler radar spectra analysis.

INSECT CLUTTER DETECTION MASK



Supercooled Liquid



The presence of supercooled liquid is predicted by combining thresholded predictions of lidar backscatter and depolarization, producing agreement about multiple layers with the independent phase classifications to the left. The broken black line shows the independently measured cloud base.

REFERENCES

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