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CLASSIFIER OBJECTIVE

Provide accurate hydrometeor phase classifications for any given cloud radar Doppler spectra. Accept input from additional instruments, when available, for enhanced accuracy.

KEY EVALUATION QUESTIONS

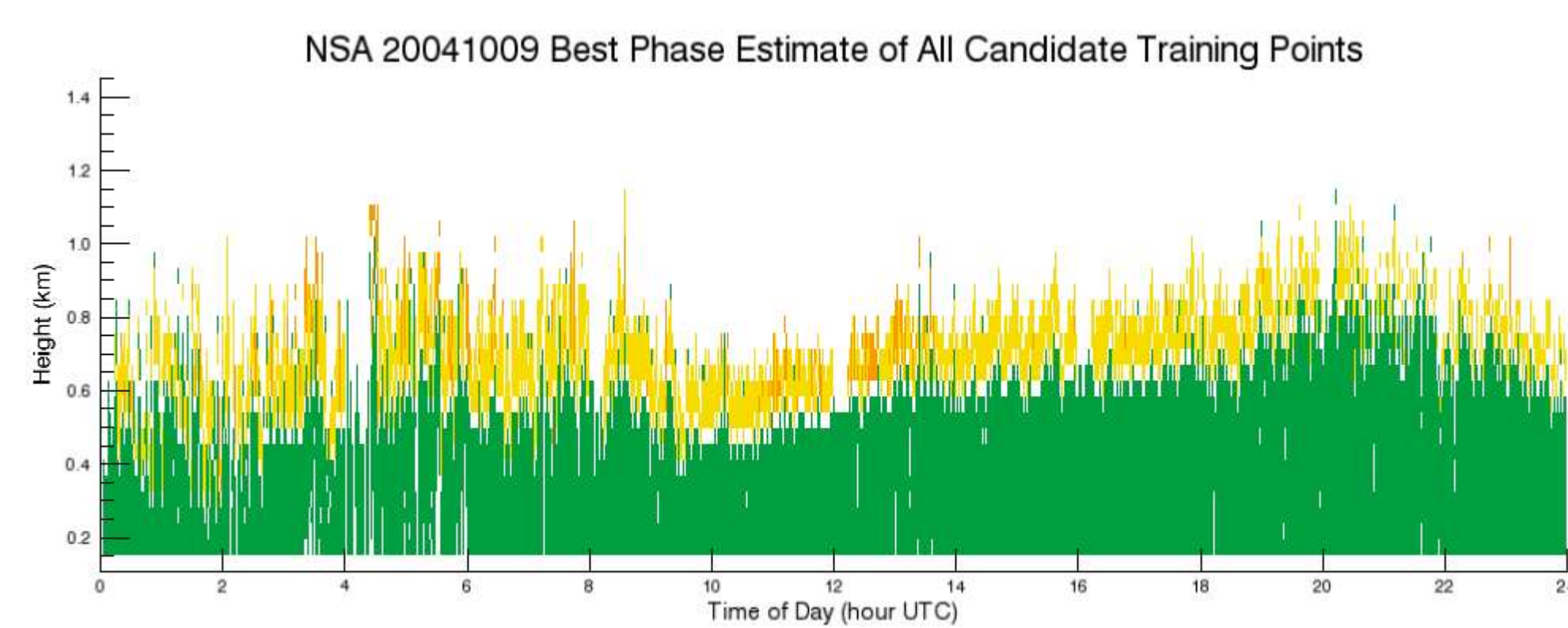
How accurately can combined HSRL, MMCR, MWR, and radiosonde generate the “golden” phase retrievals needed to train an MMCR-only classifier? For further discussion see Shupe, 2007.

How well can the MMCR-only classifier predict the phase of “golden” retrievals it has not been trained on? We focus here on this second question.

EVALUATION METHOD

Align MPACE data to MMCR grid. Select a “high confidence” subset from 10/1/2004 through 10/14/2004. All instruments must be operational with a reasonable SNR for data to be considered “high confidence”; several variations were explored. Resulting subsets contain roughly 1.5 million samples. Randomly choose equal-sized training and validation sets from the “high confidence” data, distributed across classes. Training and validation sets each range from 10,000 to 16,000 samples.

Shown below is the data pool contributed by 10/9/2004 prior to random selection, with color depicting assumed true phase. The data pool is limited to areas where HSRL can penetrate.

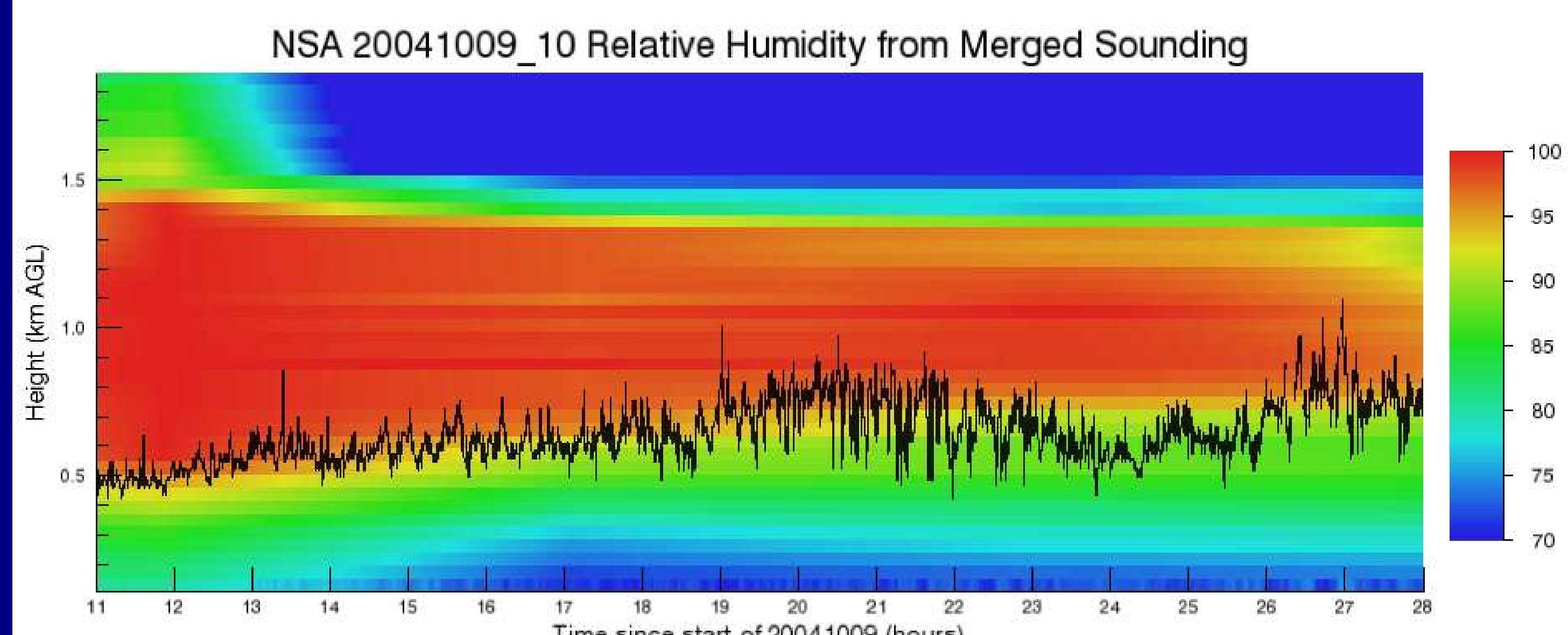
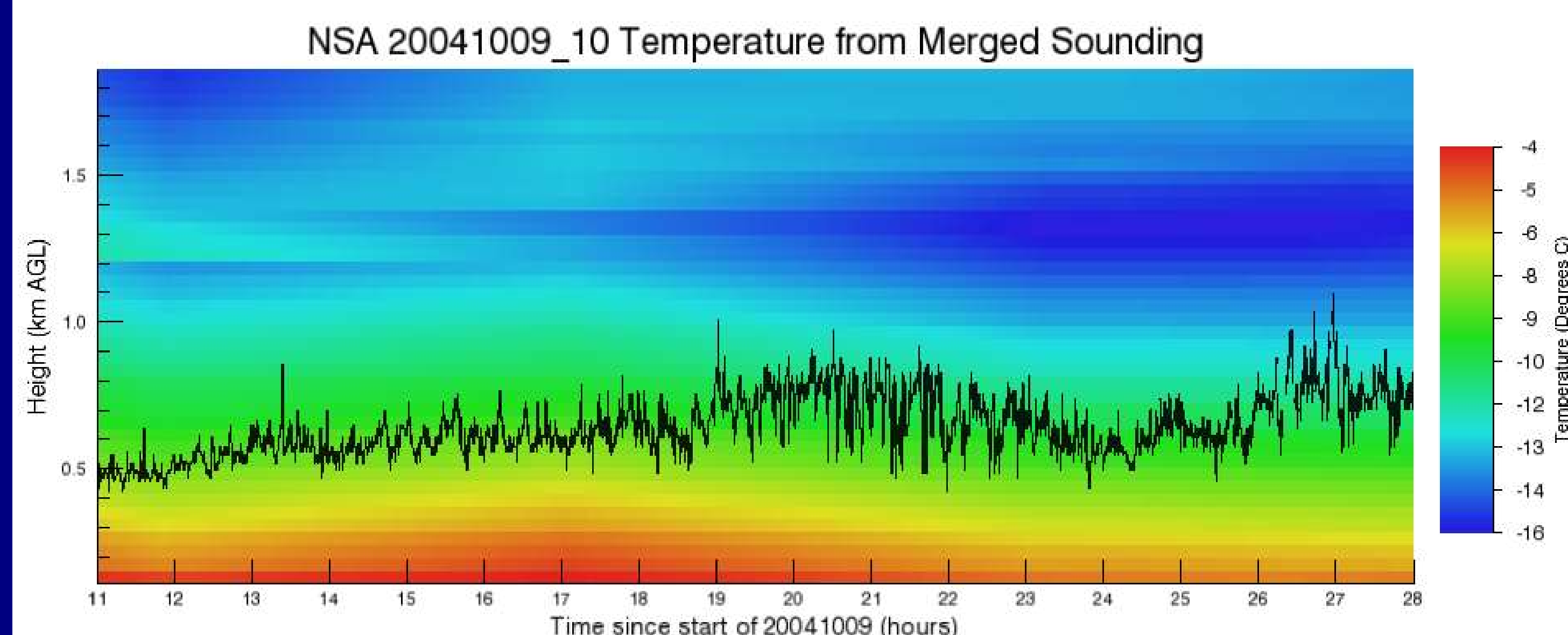
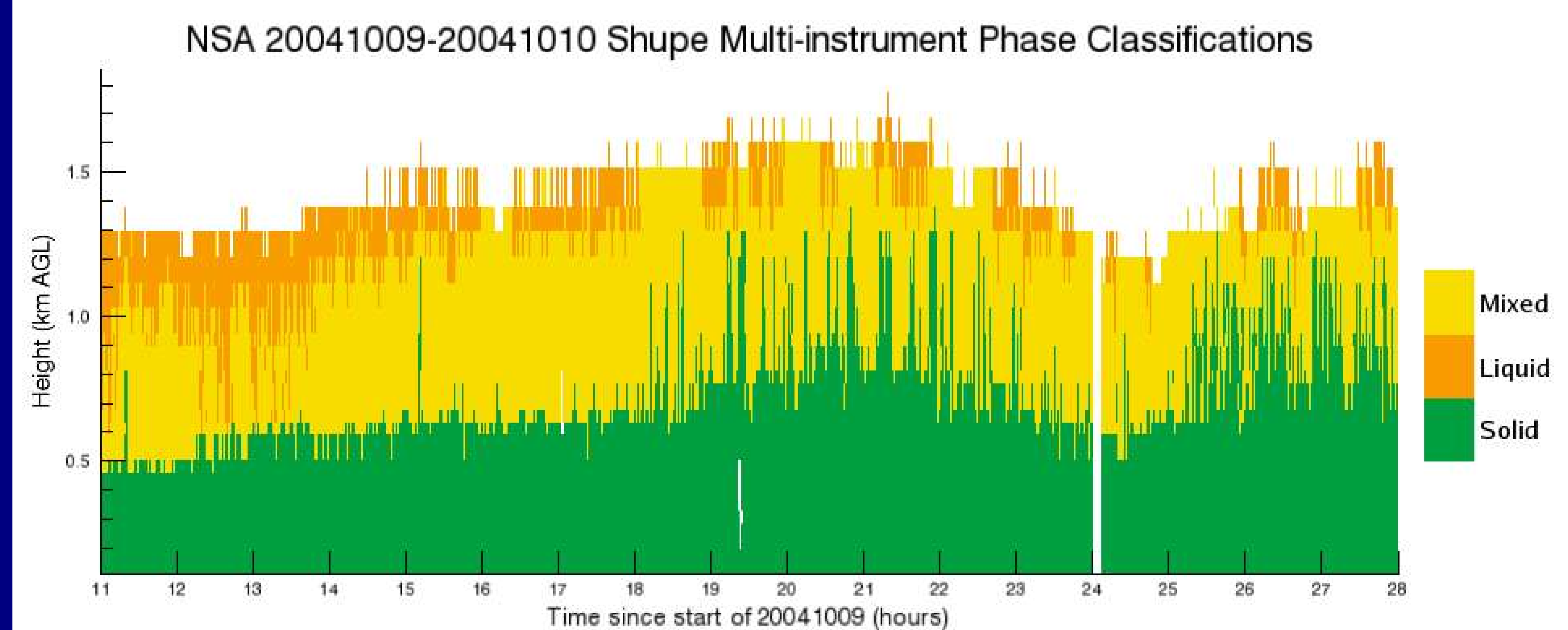
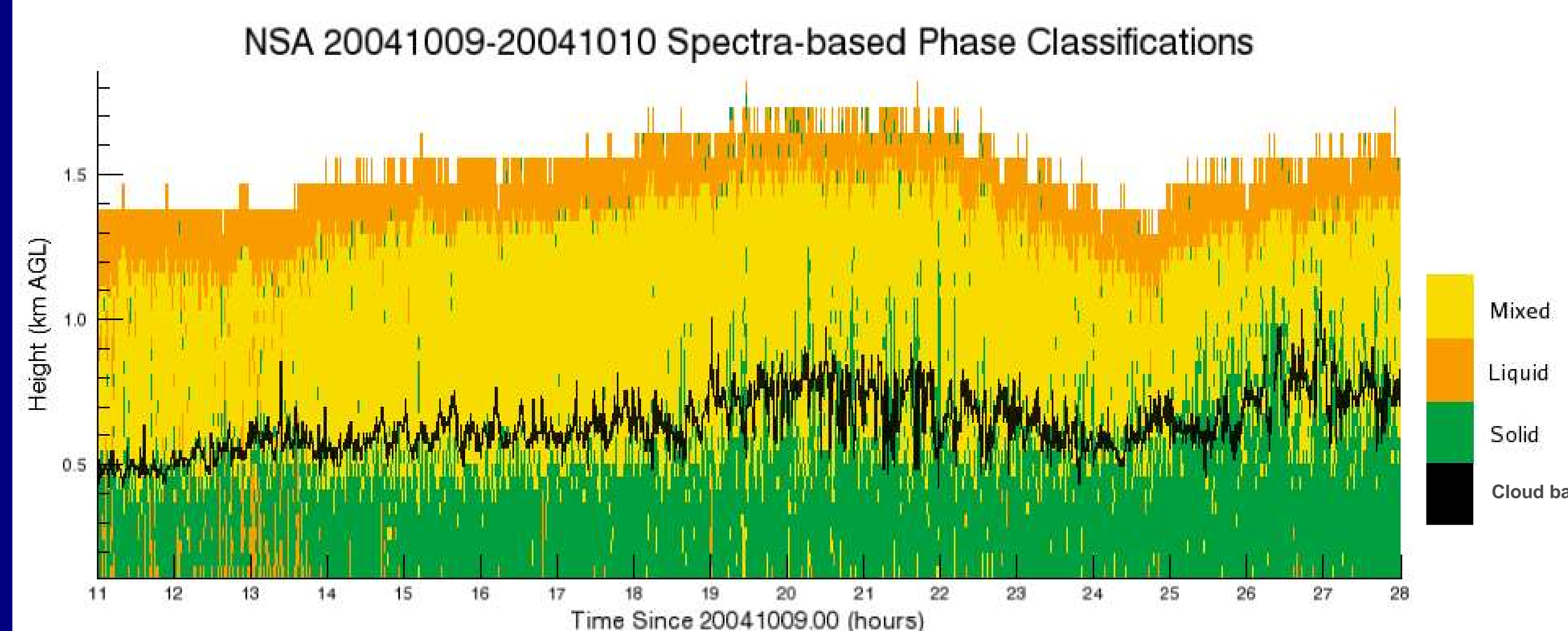


SUMMARY

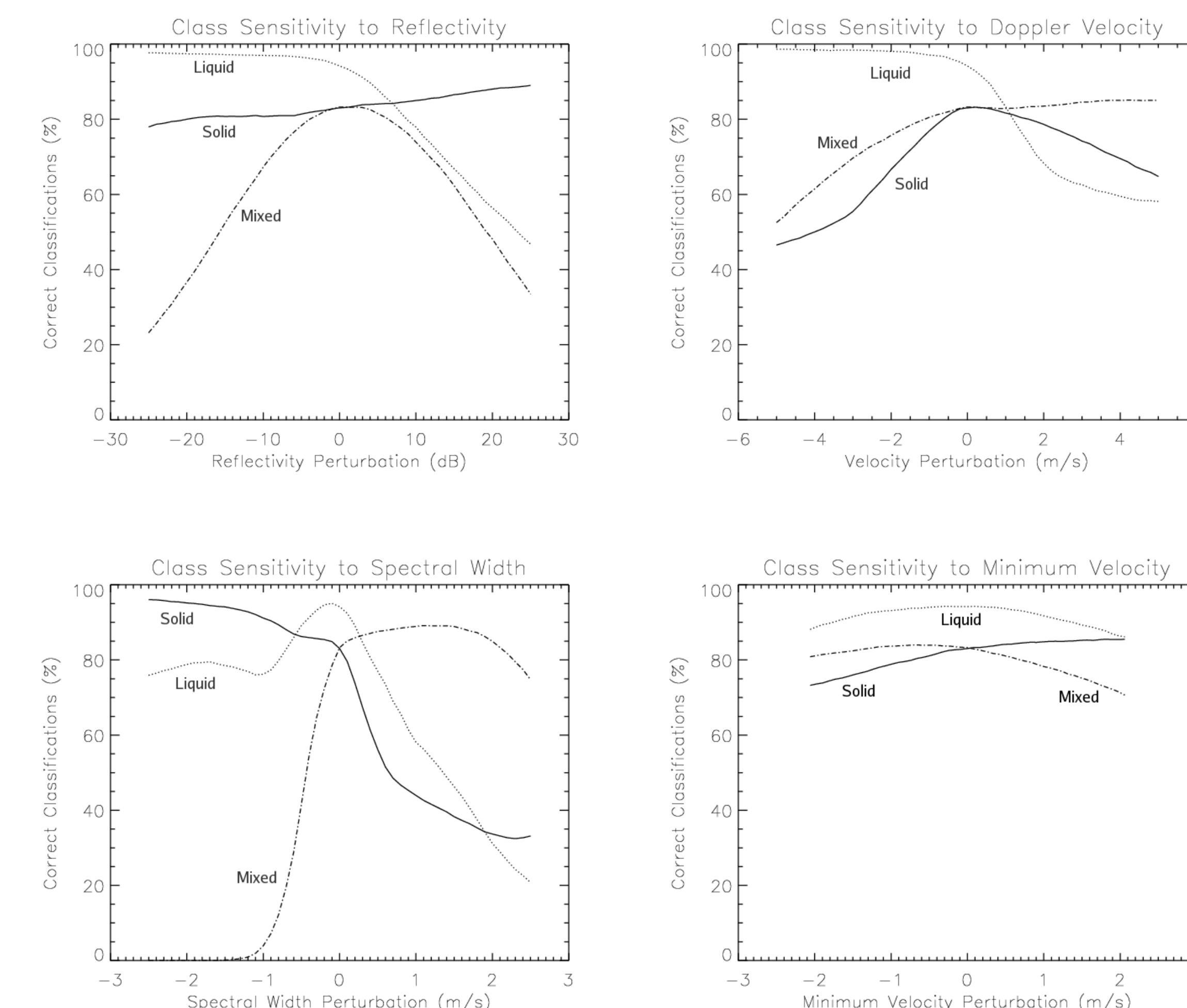
Probability of Correct Phase Classification (best of several “high confidence” subsets)

Liquid	Solid	Mixed
92%	81%	81%

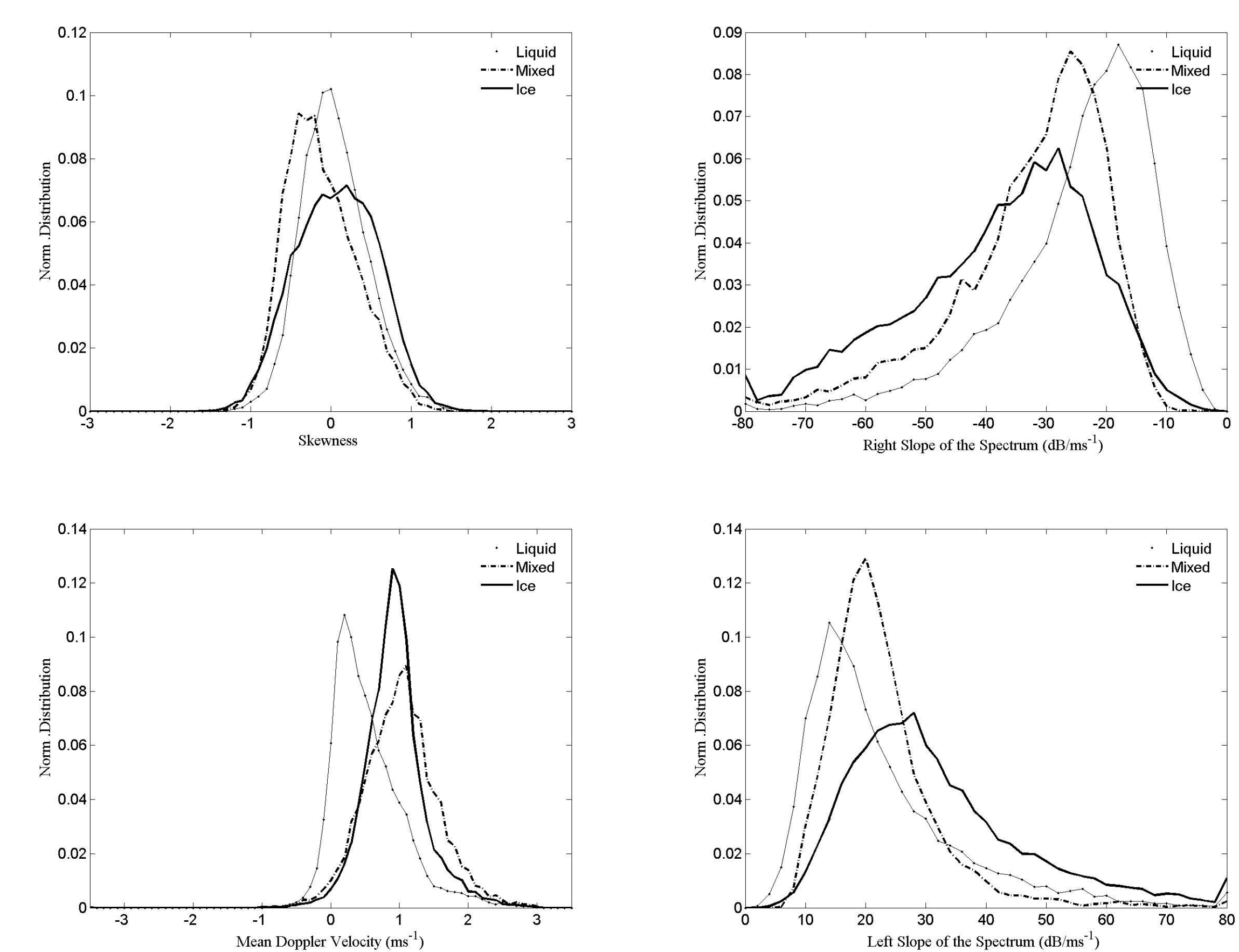
COMPARISONS



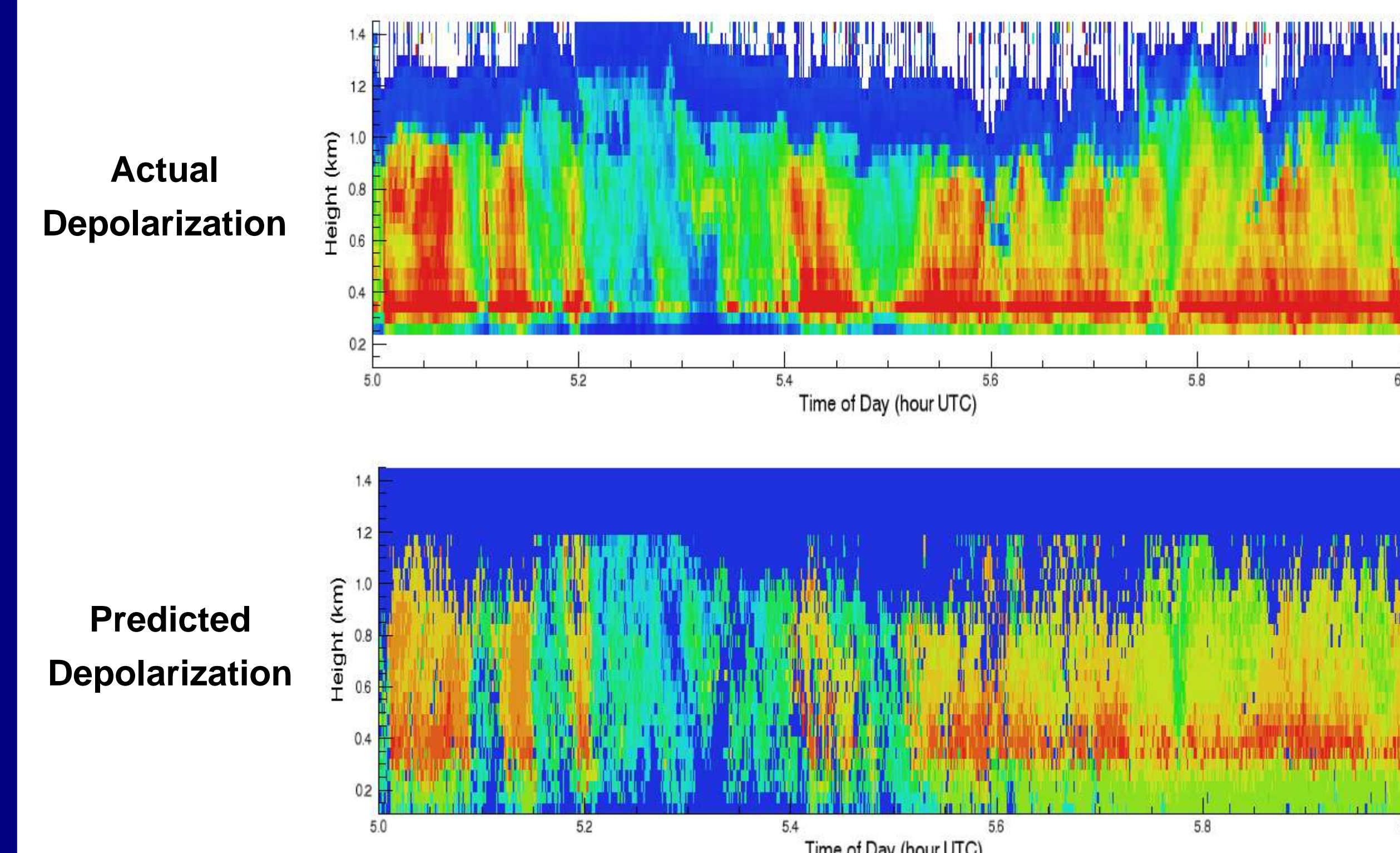
Classifier Sensitivity to Certain Input Parameters



Probability Distributions of Certain Input Parameters



Predicting HSRL depolarization with MMCR classifier



REFERENCES

Kollias, P., E. Luke and M. D. Shupe, 2007: Cloud phase identification using radar Doppler spectra. In preparation to J. Atmos. Oceanic Technology

Luke, E., P. Kollias, K. J. Johnson and E. E. Clothiaux, 2007: A technique for the Automatic Detection of Insect Clutter in Cloud Radars. Submitted to J. Atmos. Oceanic Technology

Shupe, M. D., 2007: A Ground-Based Multiple Remote-Sensor Cloud Phase Classifier. Submitted to GRL