Exploring droplet variability at the cloud edge and through the cloud transition zone

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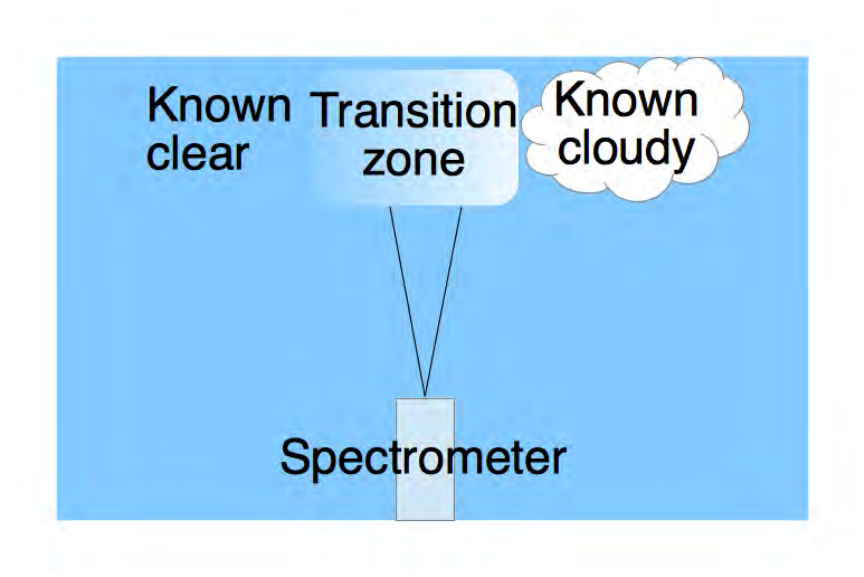
Cloud transition zone

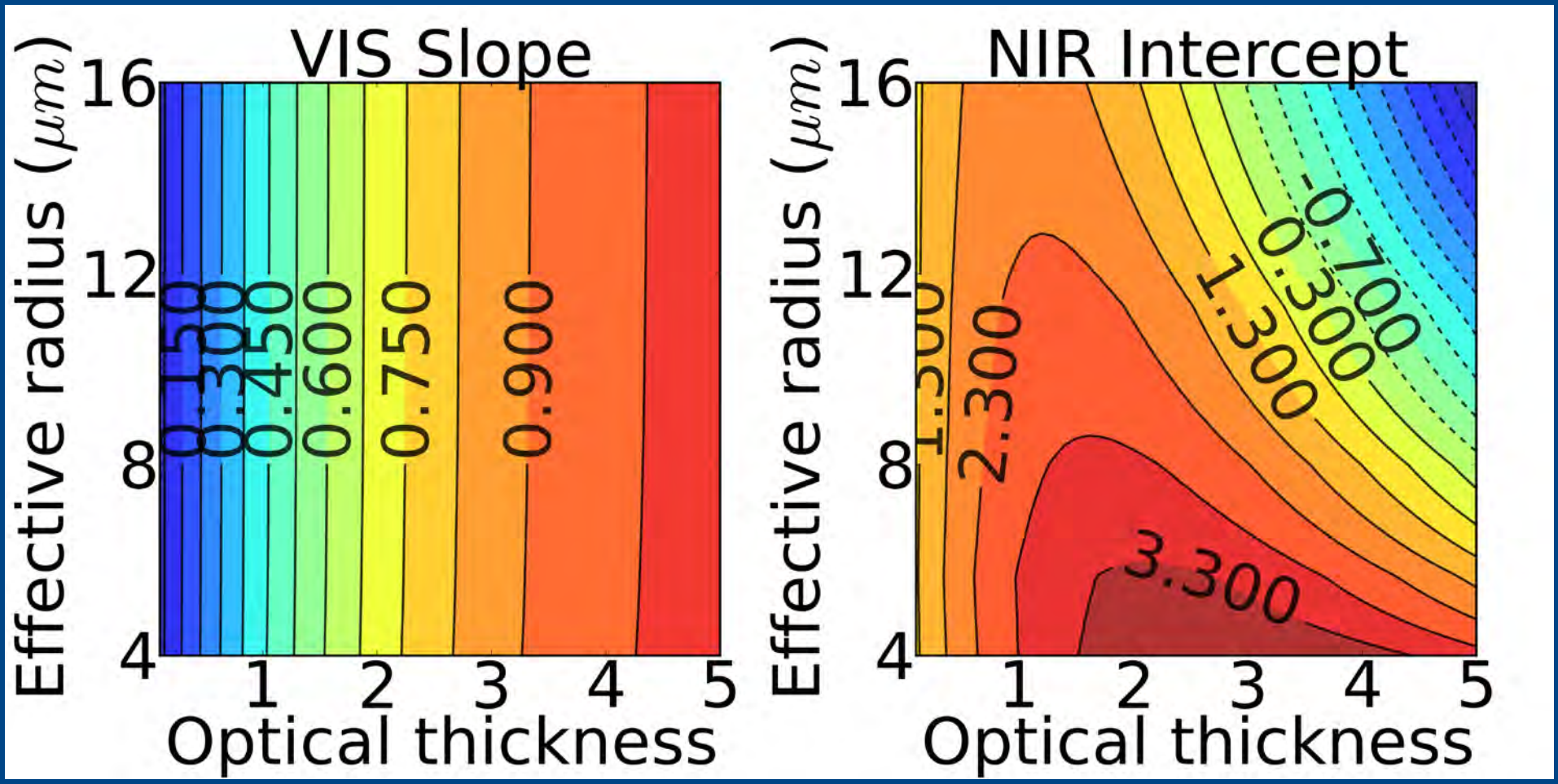


Retrieve ***qualitative*** cloud properties in the cloud transition zone using *m* and *b.*

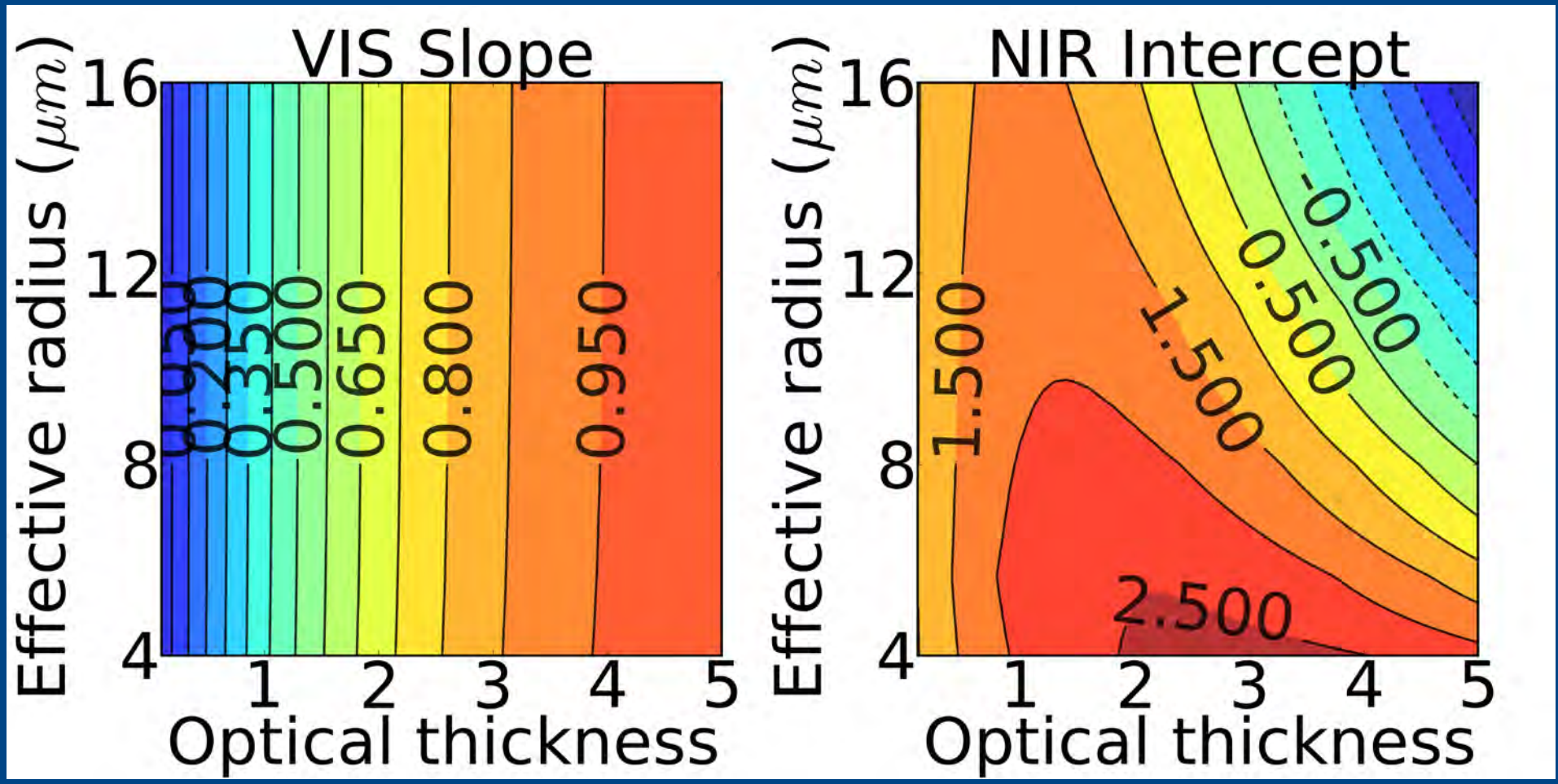
$$\frac{I(t,\lambda)}{I(t_{known\_clear},\lambda)} = \frac{I(t_{known\_cloudy},\lambda)}{I(t_{known\_clear},\lambda)} m(t) + b(t)$$

Solar spectral flux radiometer

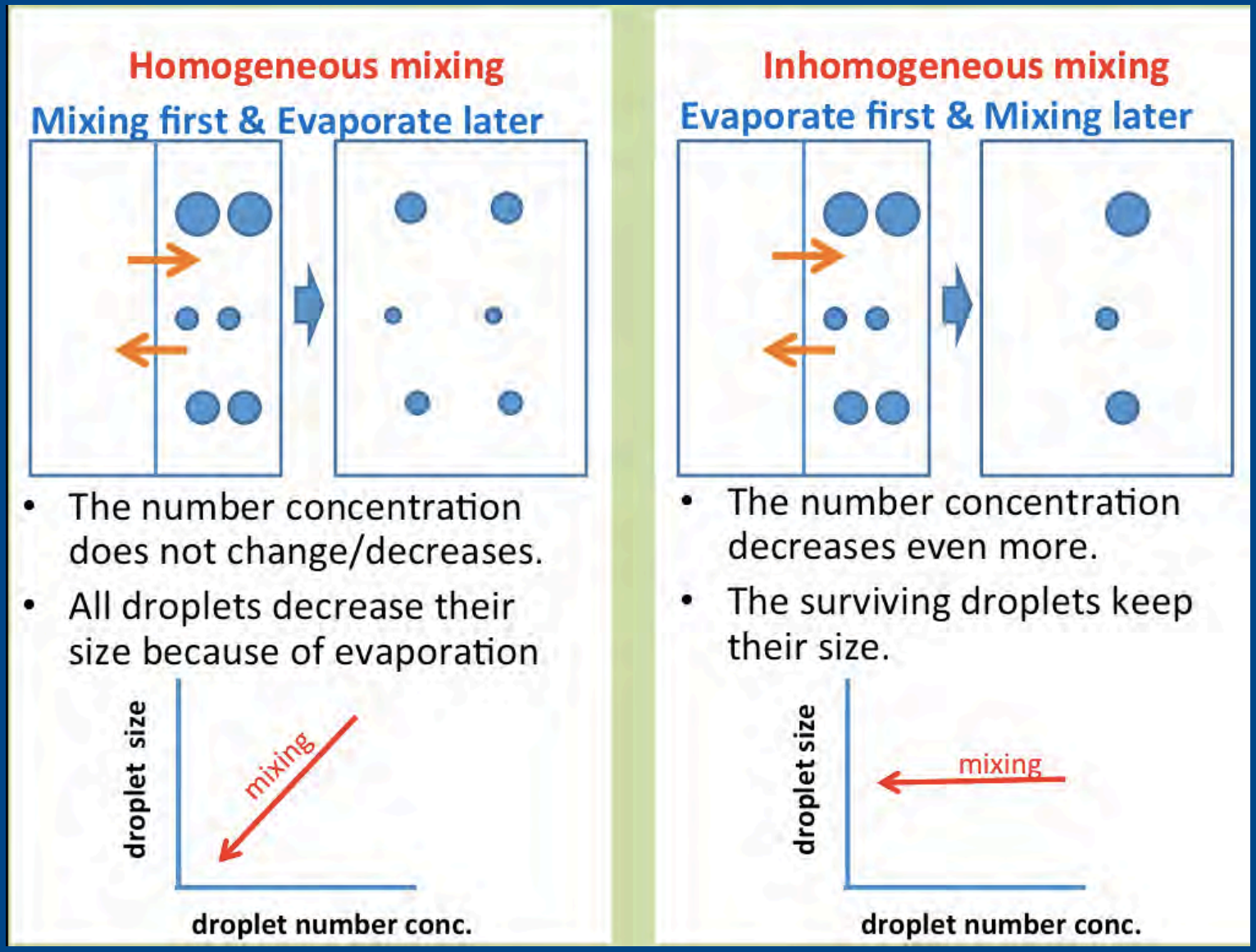
Modeled slope and intercept



Unknown “known clear”

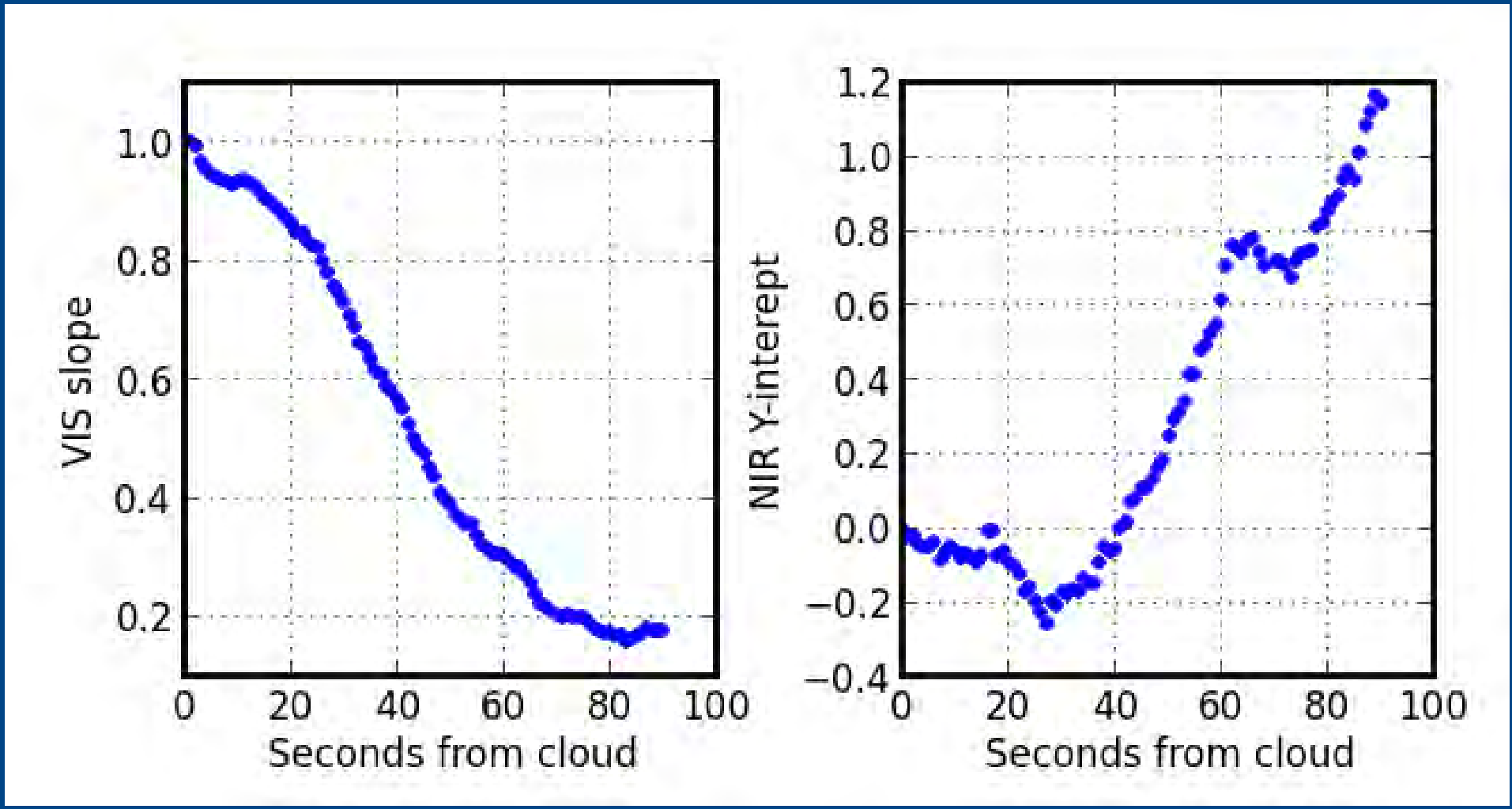


Cloud entrainment



Slide courtesy of Greg McFarquhar

Transition zone from MAGIC

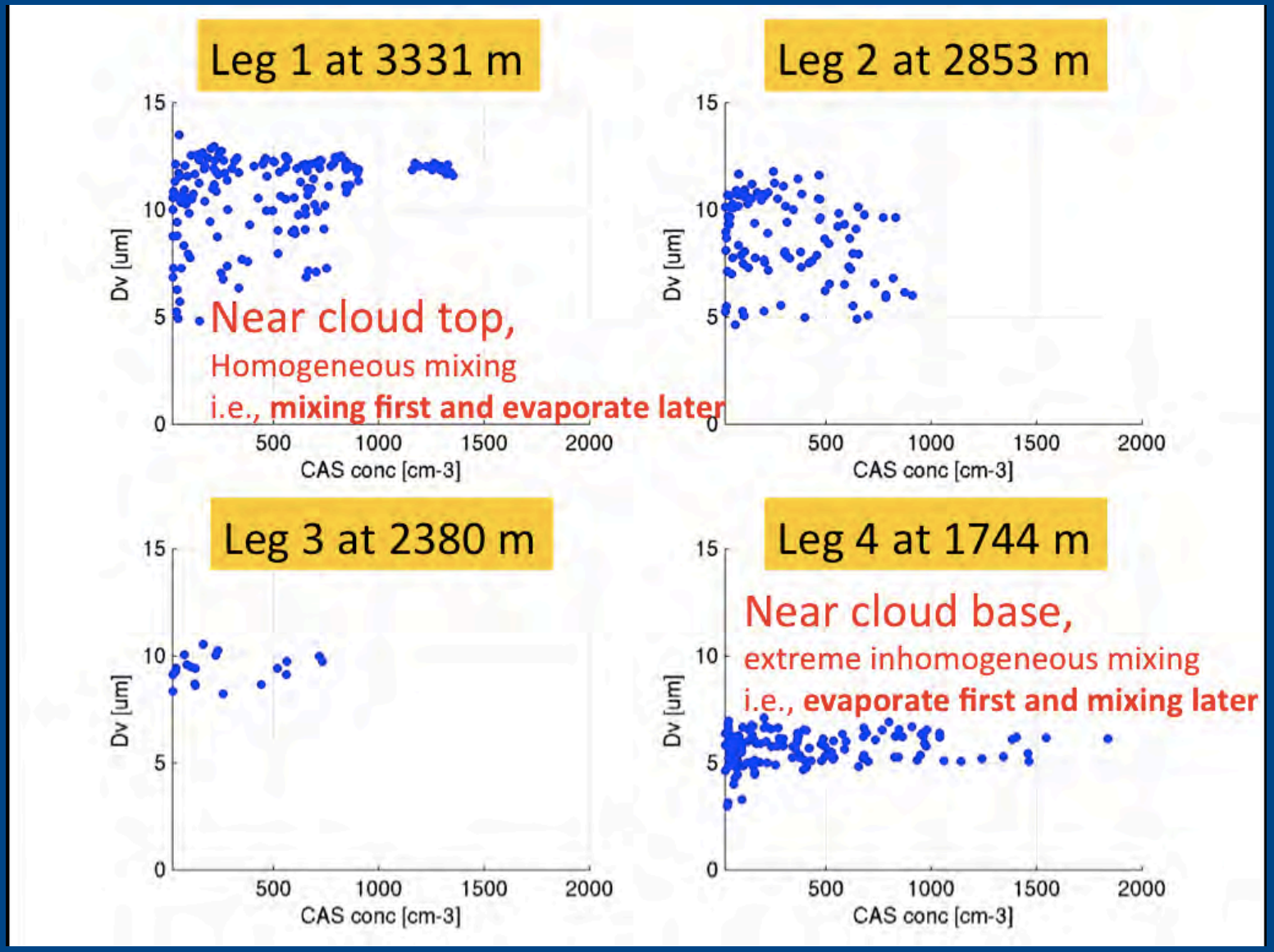


Summary

- Developed a retrieval algorithm to retrieve *relative* change in cloud droplet size with 75% confidence, under the assumption of decreasing cloud optical thickness
- Results are not significantly affected by cloud contamination of the “known clear” spectrum
- Results are applicable to the study of cloud entrainment
- Example from MAGIC showed an unchanging droplet size followed by a period of decreasing droplet size which supports a homogeneous mixing scenario

The end

Results from RACORO



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