

## Words of caution on the use of radar-lidar observations for model evaluation

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Bureau of Meteorology

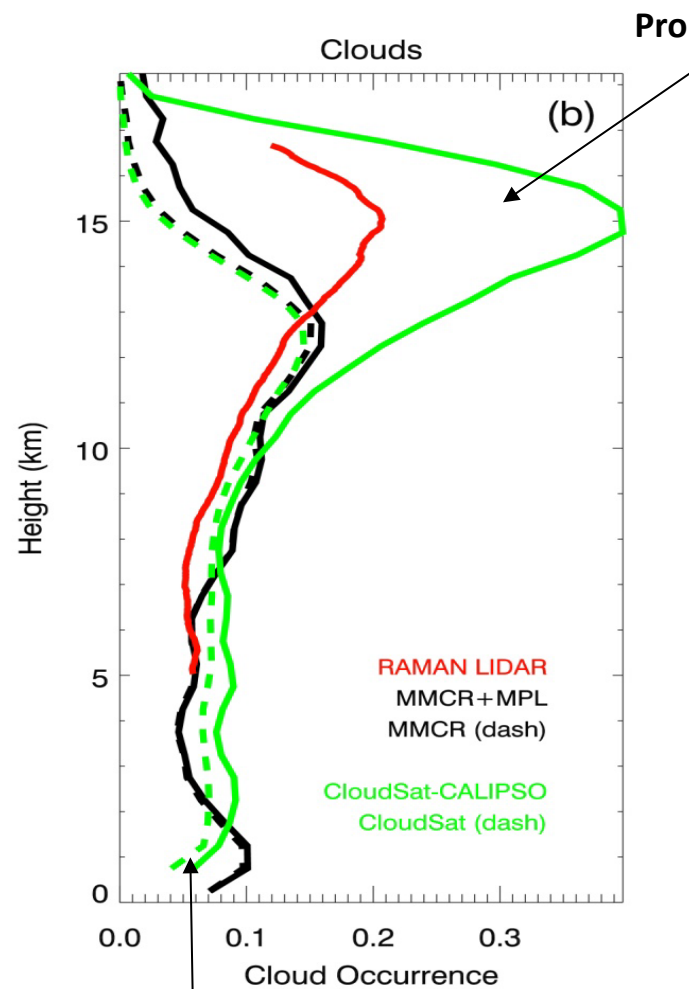
**The Centre for Australian Weather and Climate Research**  
A partnership between CSIRO and the Bureau of Meteorology



# Ground – satellite comparisons at Darwin

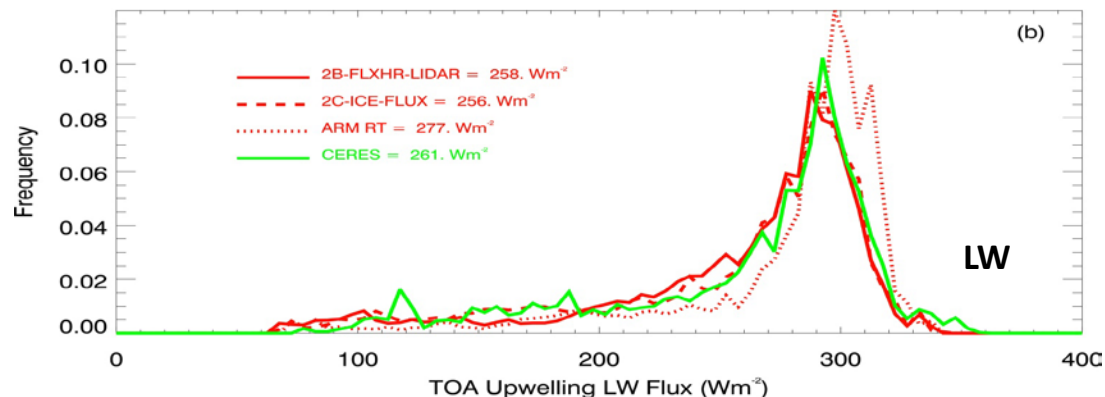
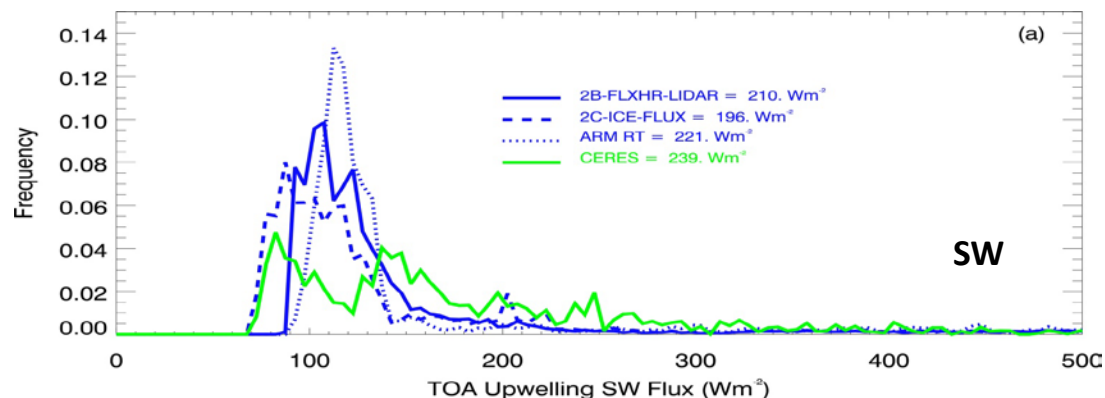


Statistical comparisons of cloud frequency of occurrence (CFO) and associated radiative fluxes and heating rates over Darwin, using CloudSat-CALIPSO and ARM data + radiative transfer.



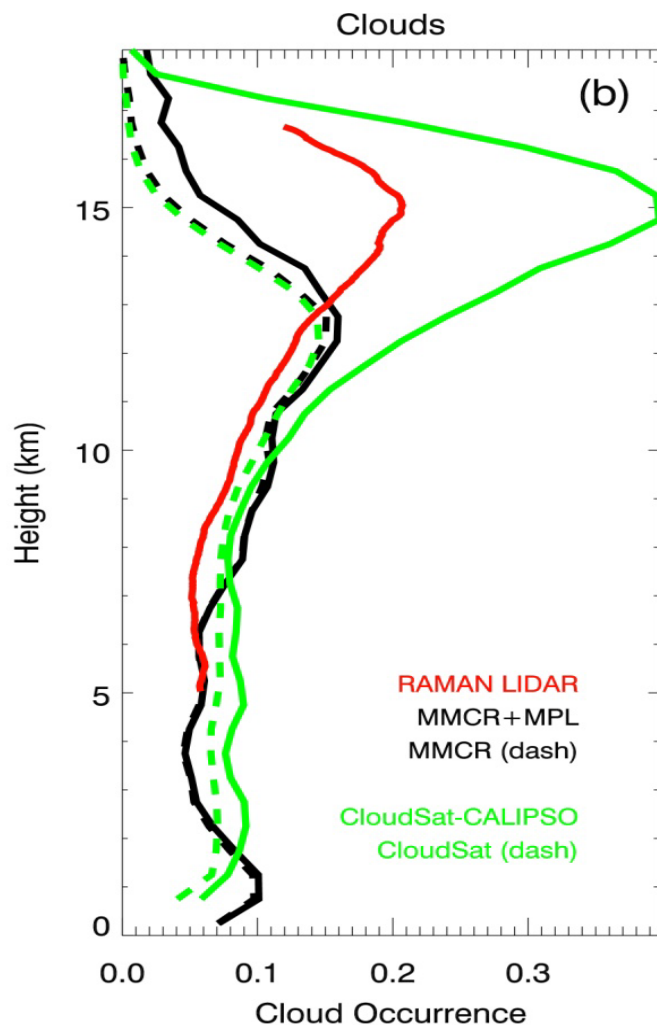
Problem for ground-based radiation budget ?

Basically : 200 km radius around GB site, +/- 1 h around overpass



Problem for satellite radiation budget ?

# Implications for ASR Science



1. I am a radar geek but I must admit lidars are very much needed to complement radar data (not a discovery but always worth recalling).
2. Using ARM cloud microphysics retrievals, radiative transfer and radiative closure to evaluate and improve retrievals is a very good idea, but we need to make sure we are not missing radiatively-important clouds (thin tropical cirrus like here over Darwin)
3. CloudSat-CALIPSO can be used to check that over the other ARM sites. Preliminary work over Barrow shows very different things.
4. More generally for ASR : move away from ARM climatologies and use conditional sampling for model evaluation and improvement – low cloud cover / high cloud cover overlap introduces biases much larger than (I) expected. Here a factor 2 in ice cloud occurrence at 15 km !

