

'Simulators'

Cloud Properties working group has for years worked hard on Z, V, etc. -> cloud fraction, lwc, iwc, etc. (then compare to model)

Yet is it always possible to do this?

Is it better sometimes to do

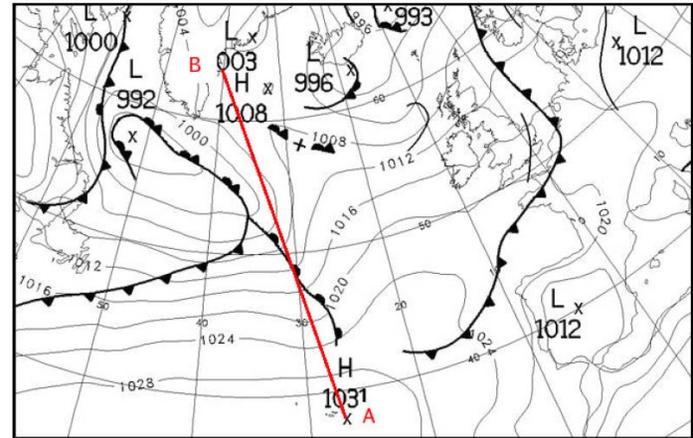
Model clouds -> Model Z, V (then compare to observed Z, V)

?

This is already going on

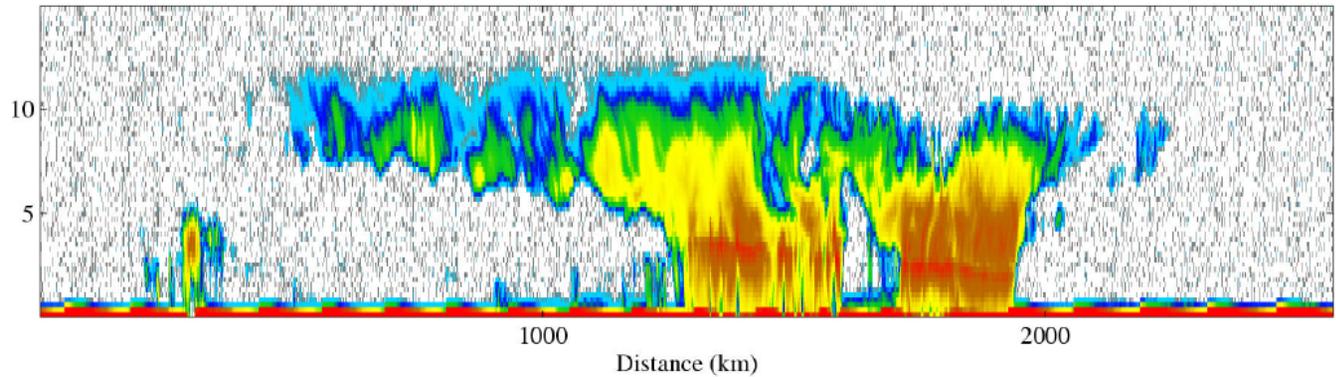
- CloudSat/Calipso is pushing modellers to use simulators
- Not just cloud resolving models...
- Also driven by NWP data assimilation which works in the observable space. That is in radiance space – infrared, (precipitation-sensitive) microwave, passive, and now active

CloudSat & NWP model (Bodas- Salcedo, J. Haynes et al. 2007)

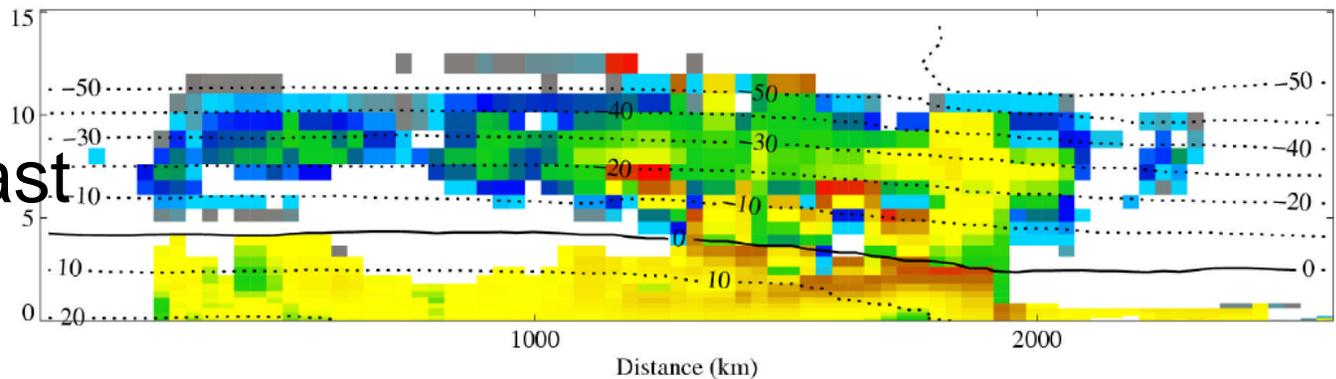


dBZ

CloudSat

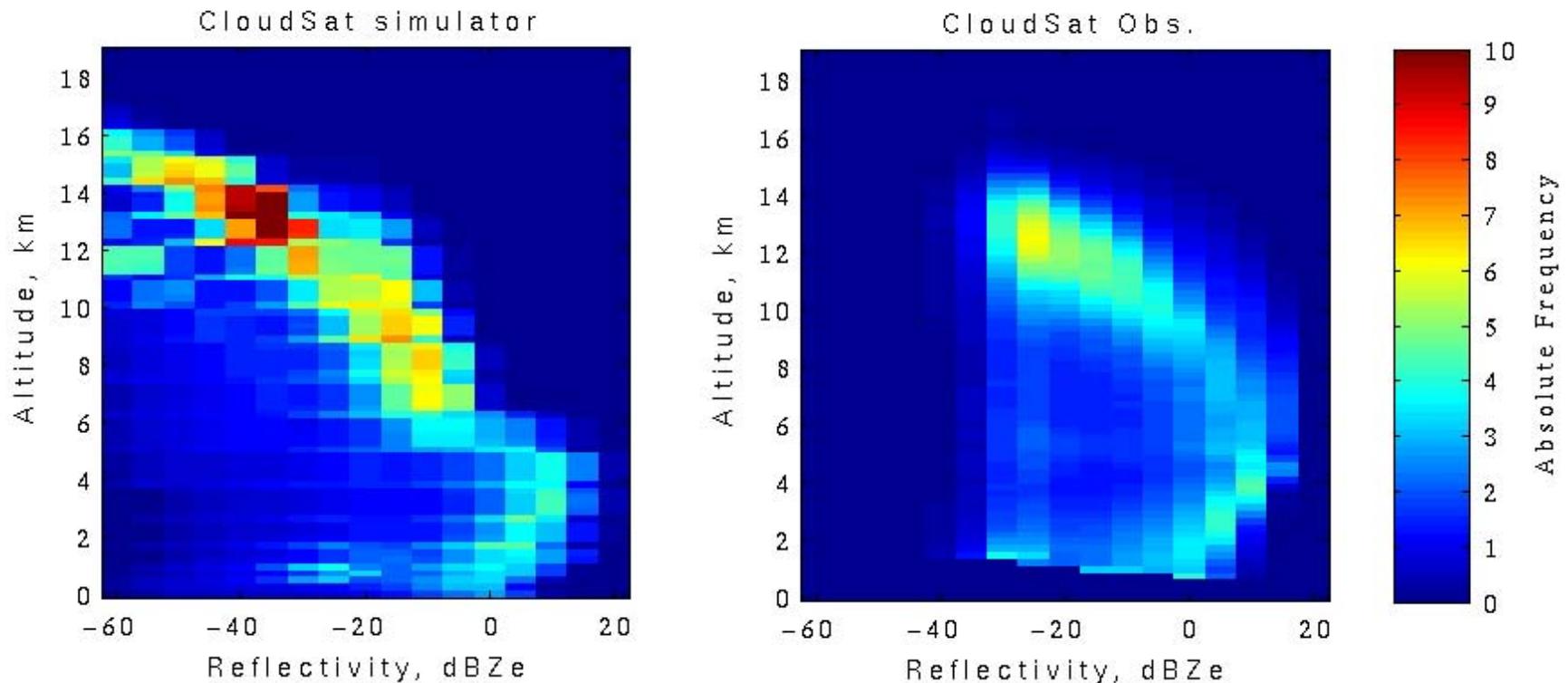


UKMO Forecast
Model



CloudSat & MMF ('Superparameterization')

(Roger Marchand et al.)



Data from the Tropical Western Pacific

Simulator (Haynes/Stephens)

- Simulates both cloud and precipitation wavelength radars (e.g. CloudSat, TRMM)
- Simulates up and down views (e.g. Cloudsat vs. ARM MMCRs)
- Has 'fast' version – pre-computed look-up tables for Mie scattering

Is this a useful joint area of discussion and activity between CPWG and CMWG?

Discussion Questions

1. How complicated should the simulator be? Is it to only compare to the vertically pointed radar integrated reflectivity? Or do you want it to simulate scanning capabilities of the radar and/or spectra?
2. What is the proper balance between efficiency of calculations and completeness of simulator model?

Discussion Questions

3. Are the operators that convert model cloud microphysics to radiometric descriptions easy enough to adapt to the plethora of microphysical representations in different models?
4. Are the results too sensitive to the assumptions used in constructing the operators such that equally plausible assumptions yield results that do NOT constrain models?

Discussion Questions

5. How does one relate the difference in observables to quantities that the modelers work with?
6. Should there be a joint activity between CPWG and CMWG on simulators? If so, what should it look like?