

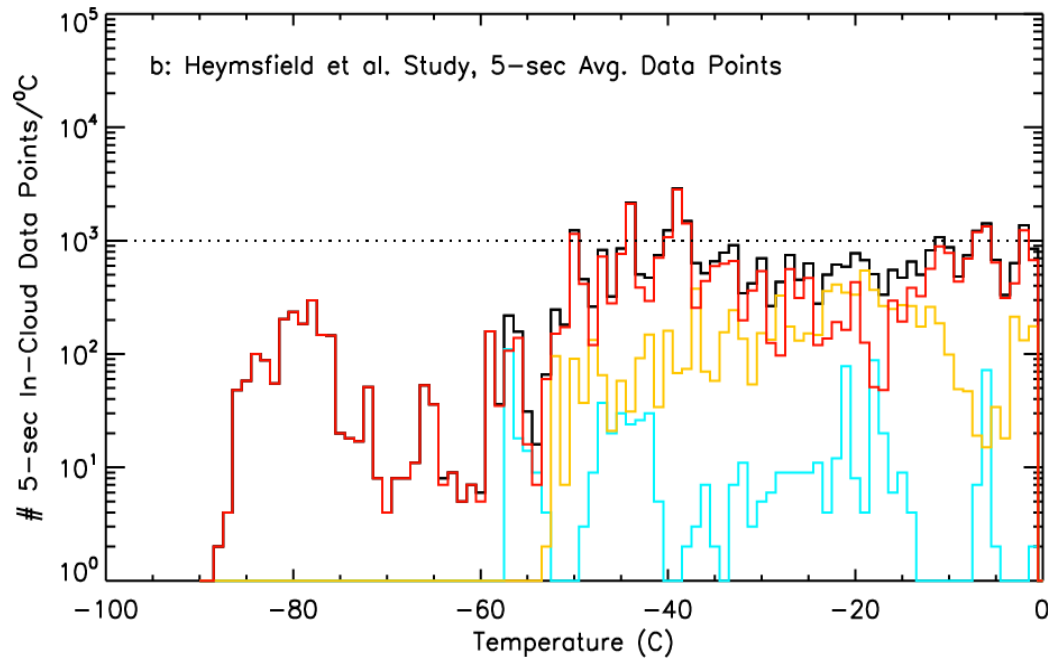
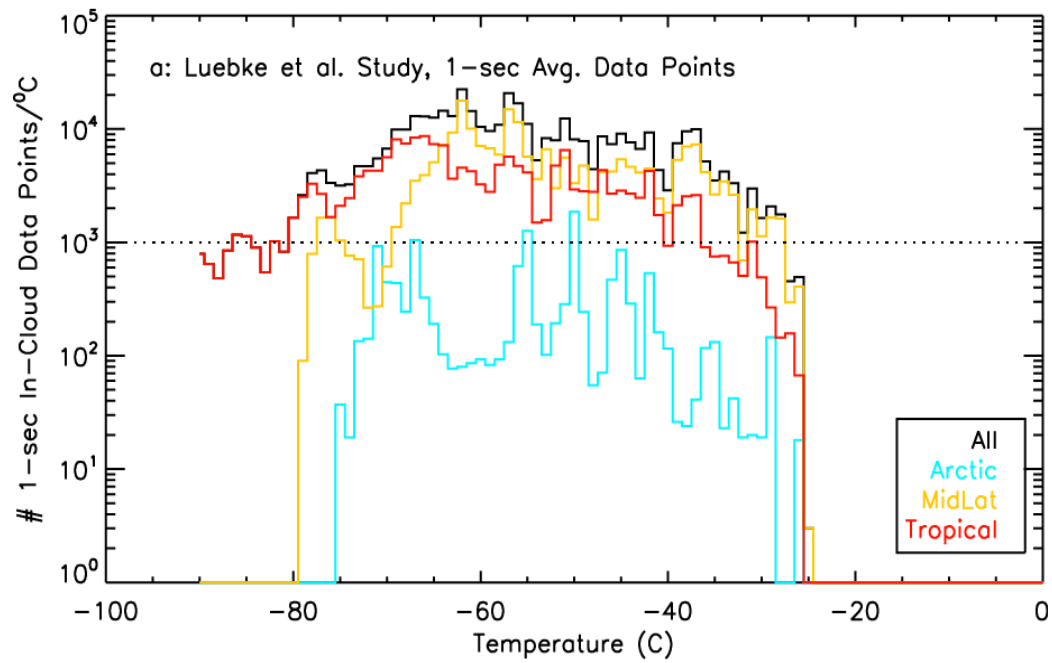
Dependence of the Ice Water Content and Snowfall Rate on Temperature, Globally

A. Heymsfield, M. Kramer, A. Gettelman, P. Field,
N. Wood, G. Liu

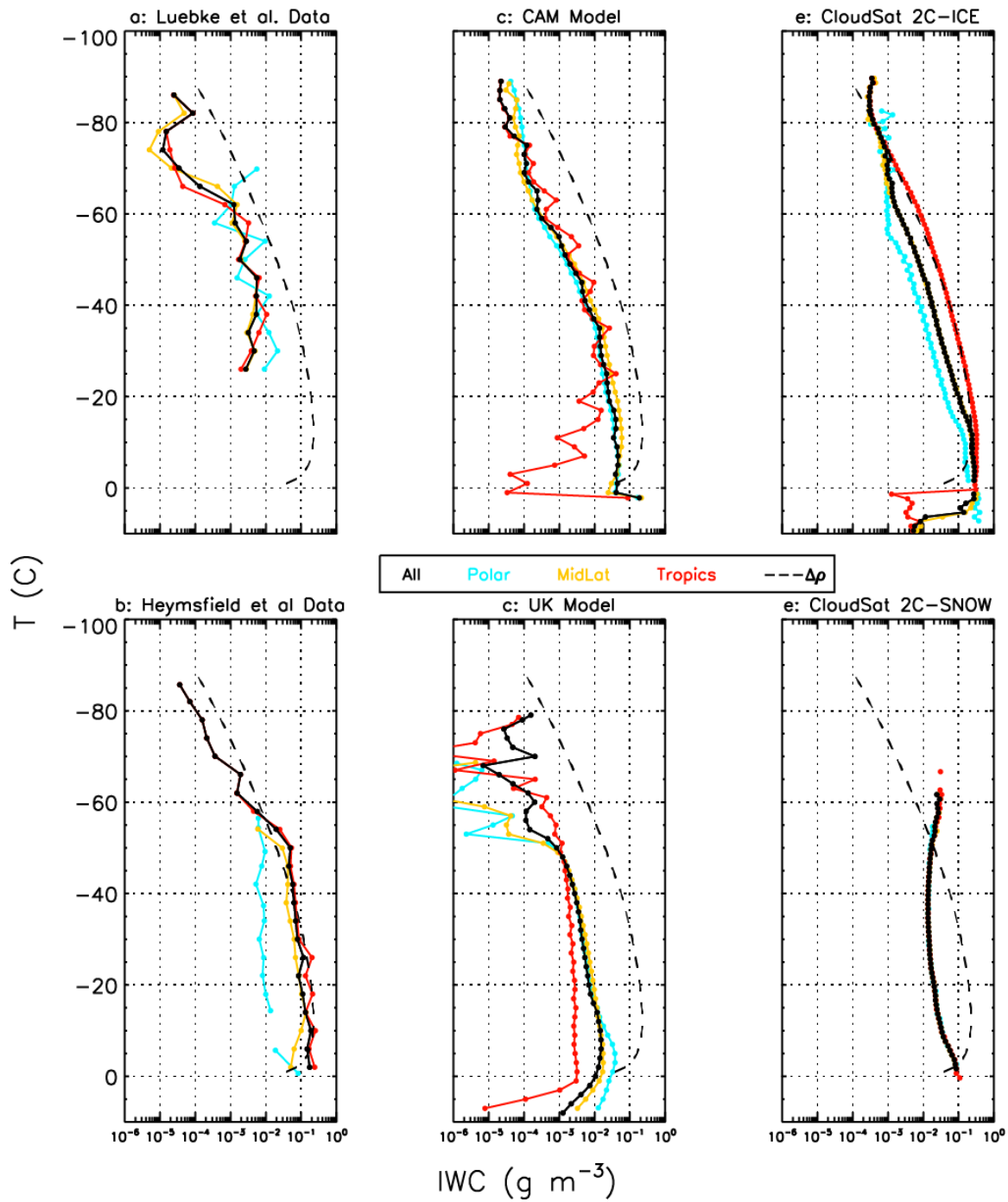
Data Sources

- Aircraft in-situ measurements from Arctic to Tropics
 - ~344,000 km of in-situ sampling
- CloudSat/CALIPSO data for 6 years, with retrievals
- GPM retrievals
- CAM5 runs, 3 years
- UK Met Office Unified Model runs, 1 year

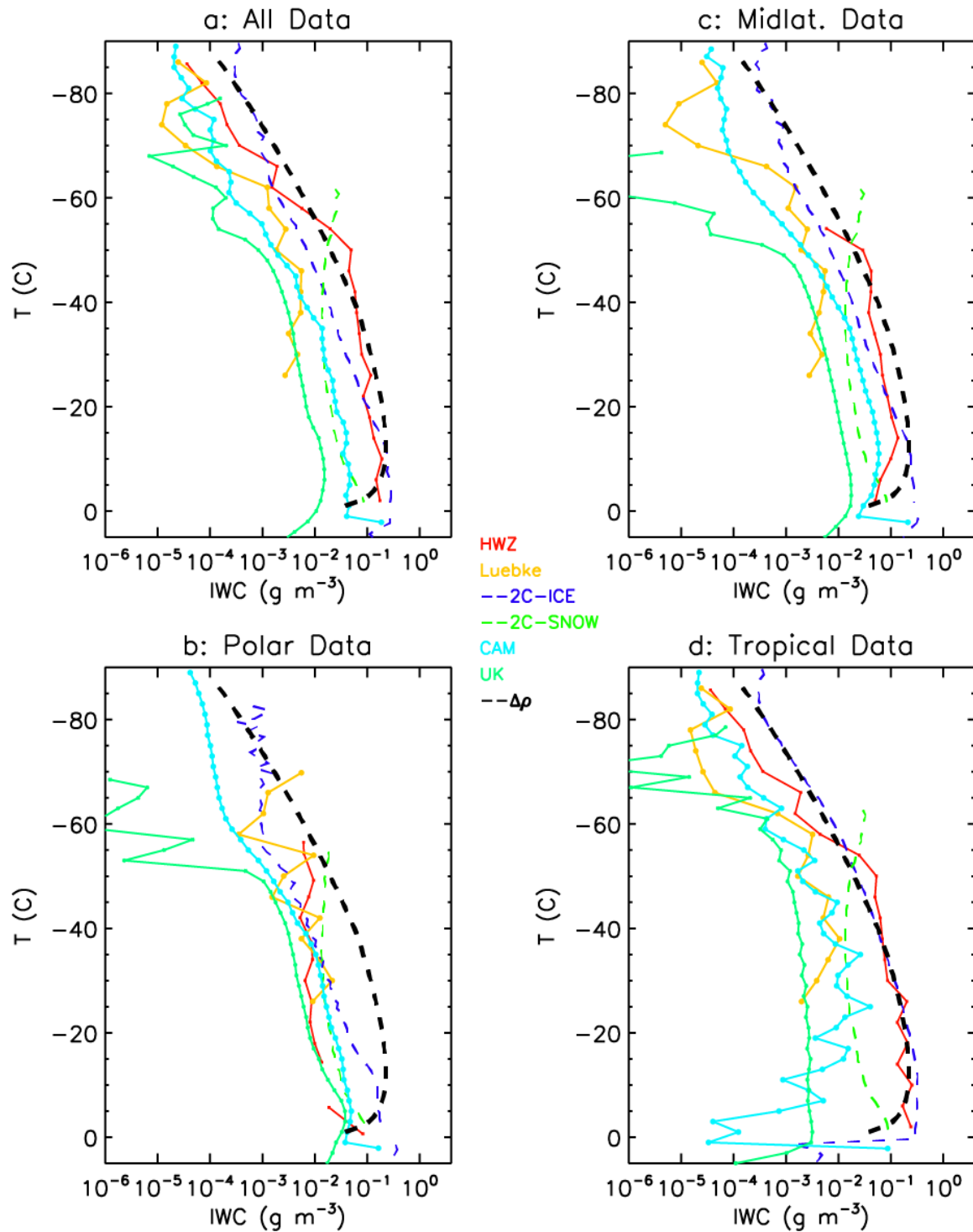
Summary of Cirrus In-Situ Data Collected



IWC Data Base, Summary



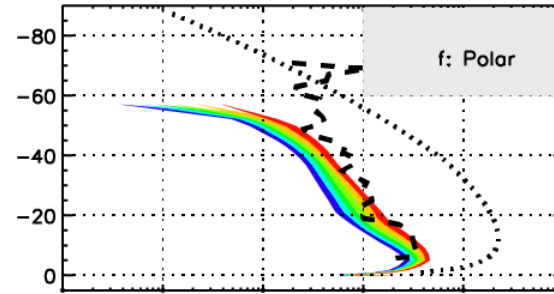
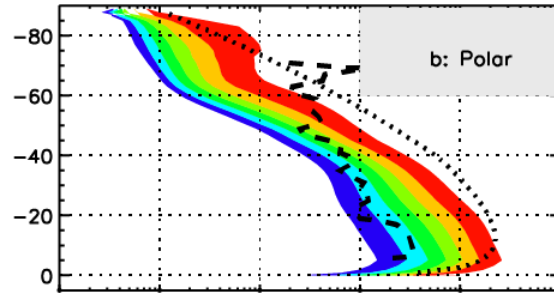
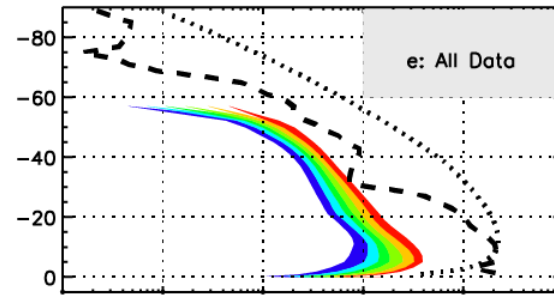
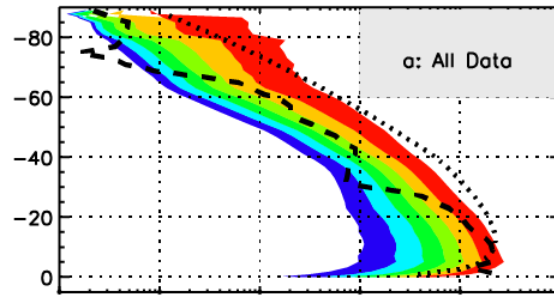
IWC Comparison All Convective and Stratiform Clouds



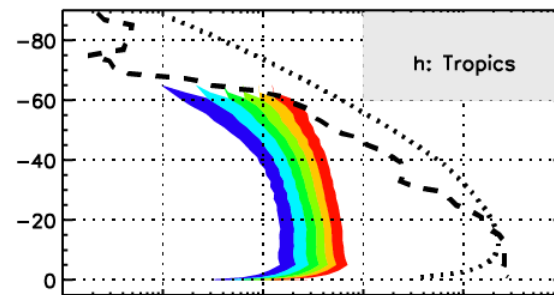
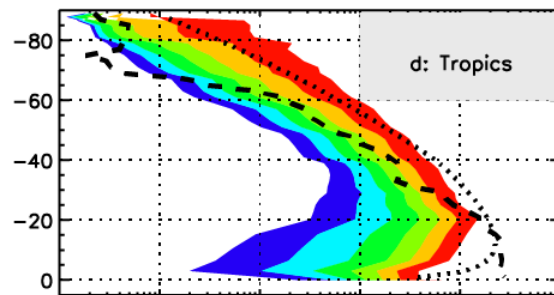
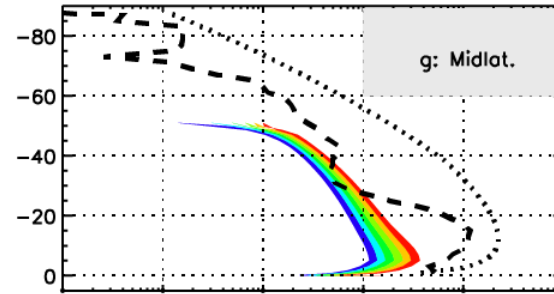
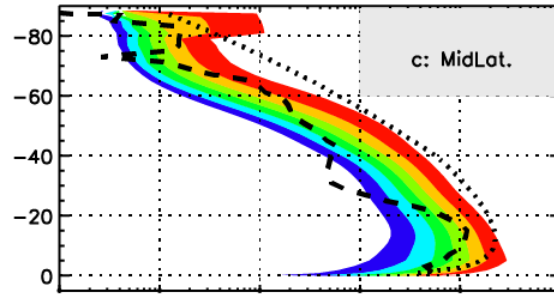
CAM

Model Results

UK Met. Office

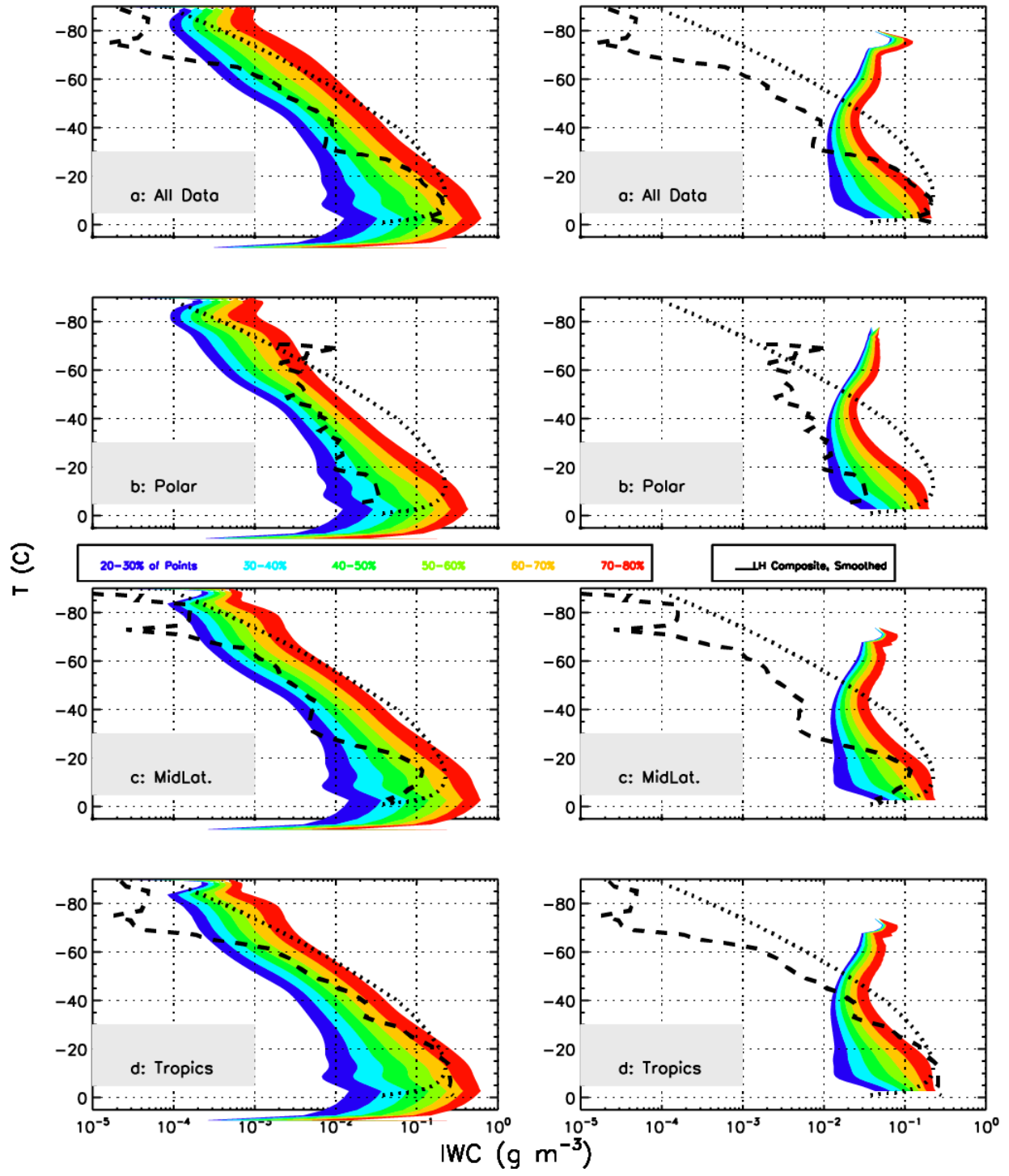


T (C)

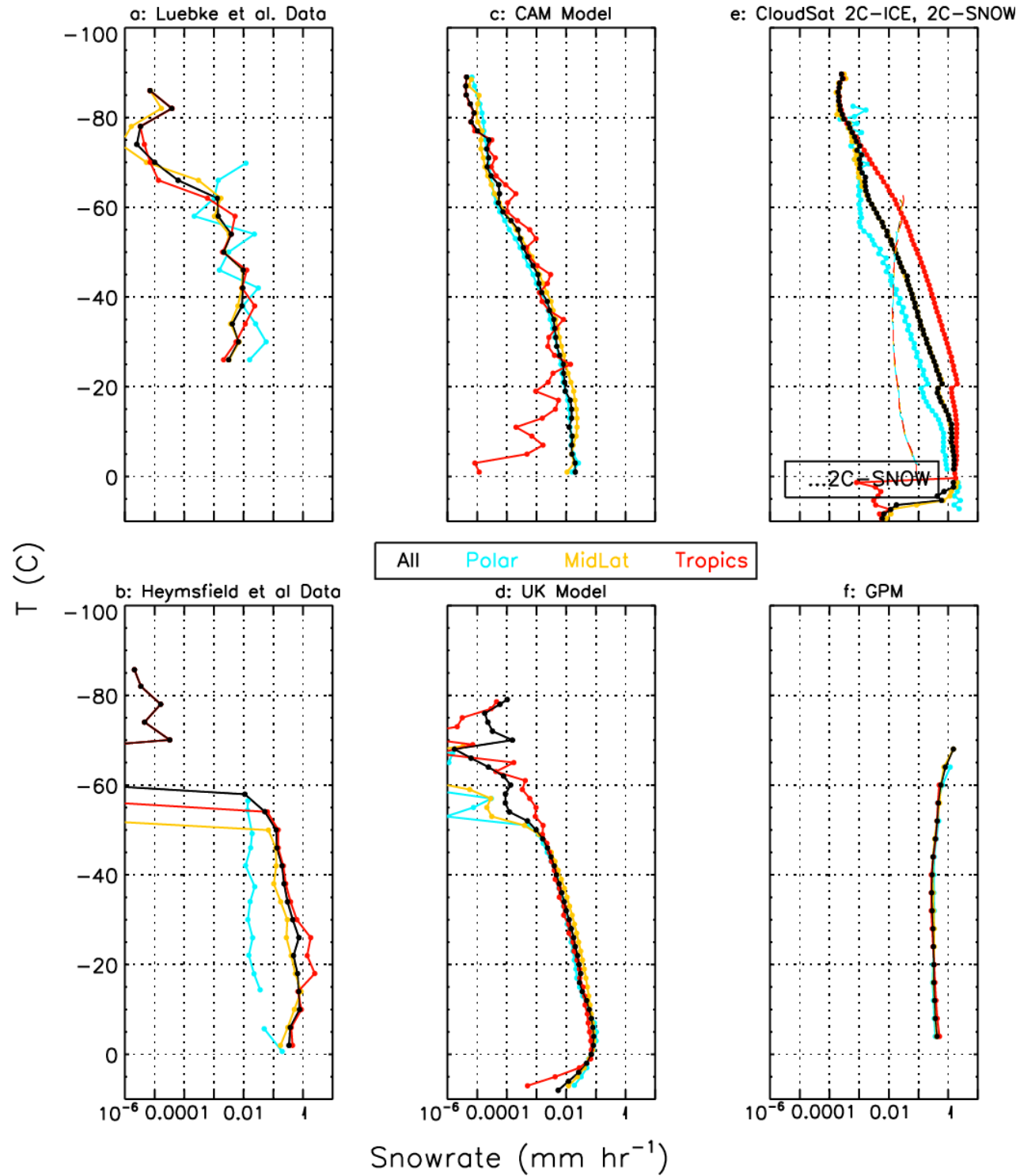


IWC (g m⁻³)

2C-ICE CloudSat Retrievals 2C-Snow-Profile



Snowrate Data Base, Summary



Summary and Conclusions

- For the retrievals snowfall rates, both the 2C-SNOW_PROFILE and GPM retrievals show unrealistic snowfall rates that increase when the temperature decreases below about -25C
- For a given temperature the retrieved snowfall rates are about an order of magnitude higher for GPM than 2C-SNOW-PROFILE, presumably because CloudSat has a lower reflectivity detection threshold than GPM.
- The Unified model exhibits IWCs and snowfall rates that are about a factor of 3 below those of CAM5
- For tropical regions, the snowfall rate for CAM5 increasingly decreases as temperature increases above -25C.