Cloud thermodynamic phase discrimination provided by CALIPSO lidar measurements is the most accurate from space, although it can only determine the cloud phase of cloud top (same as MODIS, Parasol and other satellite instruments). Combined with lidar backscatter information, the collocated IIR imager on CALIPSO also provides cloud temperature. This study discusses the findings of cloud phase – temperature relation derived from CALIPSO observation and explains why it is different from other measurements.

The four and half years of CALIPSO measurements suggest that we rarely see ice clouds at temperature warmer than -35 C in the Antarctic/Arctic regions, storm track of southern hemisphere, as well as northern hemisphere storm track region fall/early winter. Lack of ice nuclei may very likely be the reason for the cloud phase – temperature relation.