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The observed properties of summer convective clouds and precipitation over the central Tibetan Plateau

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Macro- and micro-physical properties of summer convective clouds and precipitation over the central Tibetan Plateau (TP) were investigated using the in-situ observations during the Third Tibetan Plateau Atmospheric Sciences Experiment (TIPEX-□) in 2014. The advanced aircraft and radar observational systems were employed during the experiment.
Results show that the convective events over the central TP were characterized as frequently weak precipitation with a significant daily variation. The convections were generally initiated in the late morning and peaked in the late afternoon, and the convective clouds were turned into stratiform clouds in the nighttime. The average heights of cloud top and cloud base were 11.62 ± 2.45 km and 6.89 ± 1.58 km, respectively. The average rain rate was ≈ 1.2 mm/h, and compared to M-P distribution, the Γ distribution was more suitable in describing the raindrop size distribution of precipitation over the central TP.
Aircraft observations show that the clouds over the central TP were normally in a mixed-phase state, and had lower concentrations of cloud particles and weaker updraft, but more larger particles than over plains. The particle size distributions (PSDs) of cloud droplets were mainly bimodal, and the large cloud particles (> 50 μm) had an exponential PSD type. The aircraft observed convective clouds were mainly singular newly born or developing convective cells, in which ice processes happened at early stage, quick and massive glaciation happened at higher altitude, coalescence and rimming contributed to the formation of precipitation.