Geophysical Research Abstracts
Vol. 19, EGU2017-10938, 2017
EGU General Assembly 2017

The Vertical Characteristics of Temperature inside Summer Monsoon Precipitating Clouds as Measured by TRMM PR and IGRA

Yun-Fei Fu

University of Science and Technology of China, School of Earth and Space Sciences, School of Earth and Space Sciences, Hefei, China (fyf@ustc.edu.cn)

To reveal the nature of the vertical structure of temperature and humidity inside precipitating clouds, a quasi-spatiotemporal synchronization dataset of temperature and humidity profiles, collocated with precipitation profiles, is generated in this study by merging Tropical Rainfall Measuring Mission (TRMM) Precipitation Radar (PR) and the Integrated Global Radiosonde Archive (IGRA) from 1998 to 2012. Based on this dataset, the characteristics of precipitation, temperature, humidity and convective available potential energy (CAPE) in the East Asian Summer Monsoon (EASM) region and Indian Summer Monsoon (ISM) region are investigated. Case studies indicate wet air in the atmospheric column inside deep convective precipitating clouds, together with weak wind in the upper atmosphere; while for stratiform precipitating clouds, wet air occurs below the layer of 850 hPa, accompanied by decreasing humidity and strengthening wind with height. Statistics illustrate a heavier precipitation intensity in the EASM region than in the ISM region, and the heights of storm tops can reach 17 km and 12 km for convective and stratiform precipitation, respectively, in the EASM region. Usually, the height of storm tops in the ISM is 1 km lower than that in the EASM region. Moreover, results also indicate that convective precipitation in the ISM is greatly impacted by the propagation of the monsoon. The significant difference of temperature for the precipitation scenario between the EASM region and ISM region also appears near the surface, i.e. about 4°C higher in the ISM than in the EASM region. Generally, relative dryer air occurs inside convective precipitating clouds in the ISM region, as compared to in the EASM region, and there is a larger CAPE precipitation scenario in the ISM region than in the EASM region.