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An Observational Study of Macroscopic and Microphysical Characteristics of Clouds and Precipitation on Mount Lu, Jiangxi, China

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The Mount Lu (Lushan) observational station of cloud and fog in Jiujiang, China was restarted in 2015. The observational experiment of clouds/fog and precipitation was conducted from 2015 to 2018 in Mount Lu station. The observation dataset of clouds/fog on the Mount Lu were collected and established. The observational characteristics of clouds and precipitation were investigated from November 2015 to February 2018, including microphysics properties of clouds/fog and precipitation of 15 months in cold and warm seasons. The statistical results suggested that the heavy precipitation on the Mount Lu was frequent in summer with the maximal daily precipitation exceeding 100 mm. The maximal number of clouds and fogs days reached 25 days per month, with the lowest visibility about 20m. Due to radiative effect of clouds and fog in the (early) morning, the lowest temperature in the diurnal variation of temperature happened at about 9 o'clock, right before the dissipation of clouds and fog. Based on the analysis of radar data, stratiform precipitation, stratocumulus and convective precipitation in the autumn and winter respectively accounted for 29%, 44% and 27% of the total precipitation, and convective and stratocumulus precipitation in the spring and summer respectively accounted for 83% and 17% of the total precipitation. Compared with precipitation in urban areas, the small and medium raindrops were predominant in the precipitation processes on Mount Lu. Compared with fog in urban areas, the clouds and fog were characterized by smaller number concentration, the more significant bimodal and wider spectra. With the increase of precipitation within cloud, the more raindrops in number and larger raindrops in size were easier to initiate the coagulation mechanism, resulting in reduction of cloud droplets smaller than 11 μ m and larger than 30 μ m. As a result, the peak at 11 μ m became more obvious. During the snowfall periods, the small cloud droplets were abundant, and the solid precipitation growth consumed large freezing cloud droplets through the rimming process.