

12.10 OCCURRENCE AND VERTICAL DISTRIBUTION OF CLOUDS IN KOREAN PENINSULA FROM GROUND-BASED KA-BAND CLOUD RADAR OBSERVATIONS

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The cloud observations from ground-based millimeter wavelength radar provide vertical distribution of cloud layers with good accuracy and high vertical resolution and can be utilized to produce cloud type climatologies. We examine statistical cloud properties according to the cloud types using Ka-band cloud radar (KCR) observations that are operated by National Institute of Meteorological Sciences (NIMS) of Korea Meteorological Administration (KMA) since 2013.

For stable and accurate statistics of cloud information, system biases in measurements from KCR were adapted and strong echoes from insects in the boundary layers were removed. We, thus, conducted the calibration of system biases in reflectivity in KCR by using observations from collocated external instrument. The system biases were corrected by direct comparison with reflectivity from vertically pointing X-band radar (VertiX) and Micro Rain Radar (MRR) that are pre-calibrated by using drop size distributions from two-dimensional video disdrometer (2DVD) and Particle Size Velocity (PARSIVEL) disdrometer for rain events. Furthermore, strong echoes from insects and noise in the boundary layers were then removed using linear depolarization ratio and reflectivity thresholds.

Cloud properties (i.e., cloud occurrence, top and base heights of the cloud, and cloud thickness) were examined according to the cloud types that were objectively classified with their altitude, presence of precipitation, and vertical extents in vertical profiles of reflectivity. First, clouds were categorized into high, middle and low clouds based on height of cloud base. The low clouds were then divided into “rain” and “non-rain” based on presence of precipitation. The “rain” clouds were classified into deep and shallow clouds by their vertical extents. Preliminary analysis shows that the cloud occurrences of high and deep rain clouds are dominant in comparison with other cloud types during summer season (JJA). On the other hand, the occurrence of middle and low rain clouds are dominant during winter season (DJF).
