Meteorological observations and system performance from a C-band phased array weather radar in Beijing, China

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Convective storm, tornado, and microburst often develop rapidly in a short time span that can be less than a minute. Conventional weather surveillance radar such as the U. S. Next-Generation Radar (NEXRAD) and China New Generation Weather Radar (CINRAD) uses mechanical scanning parabolic (dish) antenna to complete a volume scan containing 9 or 14 elevation angles within 5-10 minutes. Therefore, it is difficult to observe the rapid evolution and details during the development phase of these high-impact weather phenomena with operational weather radar systems. In contrast, phased array weather radar (PAWR) enables rapid spatial and temporal sampling of the atmosphere based on the electronic scanning strategy, offering great opportunities to get the insights of the dynamic and microphysical structure of severe storms. In late 2018, a C-band PAWR (C-PAWR) was developed by China Meteorological Research Institute and was deployed in Beijing to improve weather observations in the urban area of Beijing. A number of snow storms and rain storms have been observed by C-PAWR since its first deployment. In this study, the measurement performance of C-PAWR will be assessed during precipitation storms in spring and summer of 2019. Raindrop size distributions measured by a local Parsivel disdrometer are used to derive the rainfall relationships for C-PAWR. The rainfall estimation performance is compared against rain gauge observations and existing S-band CINRAD radar estimates

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