

Observation of Winter Precipitation Using the PX-1000

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Solid-state X-band weather radars have become increasingly popular due to the transportability, longevity, and maintainability of the system. A solid-state X-band polarimetric weather radar, PX 1000, developed at the ARRC (Advanced Radar Research Center) of the University of Oklahoma, was deployed in South Korea for a winter campaign, which began in December 2013. One of the primary goals of this winter campaign was to assess potential of winter QPE (Quantitative Precipitation Estimation) using various instruments and radar systems. Korea is a mountainous country and, as such, there is a strong desire to deploy gap-filling radars to cover the lower atmosphere where large radars would fail due to the terrain blockage. Recent climate change and increasing frequency of localized heavy rainfall or snowfall in the Korean Peninsula also bring more attention to advanced radar technology. A set of X-band radars would be a good choice to fulfill those needs. Briefly, the PX-1000 uses two 100-W solid-state amplifiers and utilizes a pulse compression technique to maximize the system sensitivity and recover range resolution. A time-frequency multiplexing technique is used to simultaneously cover the short and long ranges, with no significant blind range. In this study, comparisons between the PX-1000 and high-quality instruments, e.g., disdrometers and weighing gauges located at approximately 12 km from the PX-1000, will be investigated to assess the quality of weather measurements through a solid-state X-band pulse-compression radar. With the availability of high-quality instruments, which can serve as ground truth, various attenuation correction schemes will be implemented for the PX-1000 to assess their performance in winter precipitation events. To that end, the potential of winter QPE using solid-state X-band pulse compression radars will be demonstrated.