

Reduction of blind zone for GPM DPR

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The Dual-frequency Precipitation Radar (DPR) onboard the GPM Core Observatory cannot observe precipitation at low altitude near the ground contaminated by surface clutter, that is called blind zone. The DPR algorithm estimates Clutter Free Bottom (CFB) which is the lowest altitude not included in the blind zone, and observes precipitation at altitudes higher than CFB. High CFB over mountainous area is an obstacle to the detection of shallow precipitation and the estimation of low-level enhanced precipitation, which is common over mountainous areas. Over the mountainous area in northern Taiwan, we found six cases which KuPR missed rainfall over 10mm/h observed by rain gauges because CFB was estimated to be higher than actual by KuPR. In this study, we improved the detection and estimation of precipitation by improving the CFB estimation algorithm and narrowing the blind zone. In the previous algorithm, CFB was estimated using only the received power value data of Ku-band radar among the two radars constitute DPR, Ku-band radar (KuPR) and Ka-band radar (KaPR). In this study, the CFB was estimated using the received power value data of both KuPR and KaPR. By lowering the CFB, KuPR succeeded in the detection of missed precipitation and the estimation of underestimated precipitation.