

6.10 ENHANCING THE CONSISTENCY OF SPACEBORNE AND GROUND-BASED RADAR COMPARISONS BY USING QUALITY FILTERS

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Coinciding monsoon and typhoon seasons in the Philippines cause torrential rainfall, and associated hazards such as flooding and landslides. While early warning systems require accurate radar-based rainfall estimates, low-density rain gauge networks in the Philippines make it challenging to monitor the calibration of the ground-based radars (GRs). As an alternative, we explore the potential of spaceborne radar (SR) observations from the Ku-band precipitation radars on board the TRMM and GPM satellites as a reference to quantify the calibration bias of an S-band GR in the Philippines. To this end, the 3-D volume-matching algorithm proposed by Schwaller and Morris (2009) is implemented and applied to five years (2012-2016) of observations. We further extend the procedure by a framework to take into account the data quality of each ground radar bin. Through these methods, we are able to assign a quality index to each matching SR-GR volume, and thus compute the GR calibration bias as a quality-weighted average of reflectivity differences in any sample of matching GR-SR volumes. We exemplify the idea of quality-weighted averaging by using the beam blockage fraction as a basis of a quality index. As a result, we can increase the consistency of SR and GR observations, and thus the precision of calibration bias estimates. The remaining scatter between GR and SR reflectivity, as well as the variability of bias estimates between overpass events indicate, however, that other error sources are not yet fully addressed. Still, our study provides a framework to introduce any other quality variables that are considered relevant in a specific context.