

Improving radar estimates of rainfall by monitoring the attenuation by the wet radome

Robert Thompson

University of Reading, United Kingdom

Illingworth, Anthony (University of Reading, UK)

Darlington, Tim (Met Office, UK)

E-mail: robert.thompson@reading.ac.uk

Up to now the effect of radome attenuation on radar estimates of rainfall has been ignored. We describe a new method for estimating this attenuation based on the fundamental principle that all attenuators are emitters. The increased microwave emission manifests itself as an increase in the background noise in the radar returns from distant empty gates. Analysis shows that the attenuation generally increases with rain rate at the radar site and has an azimuthal variation depending upon the wind speed and direction. However this dependence is rather variable and prone to hysteresis, so that in practice accurate correction for radome attenuation can best be achieved by monitoring the emission noise at each azimuthal angle for each PPI scan. Analysis of several months rainfall shows that rain rates of 3-5mm/hr are typically accompanied by a radome attenuations of order 2dB. We suggest that the effect of radome attenuation can be significant when estimating rainfall in flood producing situations, and can also lead to difficulties using gauges to calibrate the radar when the radome may be dry or wet.