13.17 QUANTIFICATION OF MEASUREMENT ERROR OF POLARIMETRIC X-BAND RADARS IN MOUNTAINOUS REGIONS

NAN.YU[1], NICOLAS.GAUSSIAT[1]

[1] Radar Meteorology Centre, Mto-France, France
nan.yu@meteo.fr

Four X-band dual-polarization radars were deployed in the French Alps between 2011 and 2015 and more recently have been incorporated formally into the radar network of Météo-France.

In this mountainous region, the radars′ beam shielding by the complex terrain, the very different altitudes of the radars, the significant attenuation at X-band and the low density of rain gauges have made the integration of these radars into the operational service a challenging exercise. In this study, a framework used to evaluate the corrections applied to the volume data produced by the radars is presented. The residual errors related to the partial beam blockages, the attenuation by rain, the wet radome, and the melting layer are carefully studied and disentangled. The results of the analysis suggest that: 1) the beam blockage correction requires the use of a much higher resolution digital elevation models (DEM) in mountainous regions than the 250 m resolution DEM currently used, 2) the dual-pol reflectivity (Zh) attenuation correction used at Météo-France performs well in the rain but the differential attenuation on Zdr is overestimated, 3) the attenuation of wet snow is underestimated and a mean error of 2 dB is induced by the melting layer in spring and autumn, 4) the wet radome, as well as producing significant attenuation on Zh , induces differential attenuation on Zdr.

The attenuation in the melting layer is further investigated taking advantage of the height difference between the radars sites. A new specific attenuation coefficient for wet snow is suggested and it is shown to reduce the seasonal bias on three particular events observed in spring and autumn.