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Radar hydrometeorology using a vertically pointing radar

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Abstract. A Vertically Pointing Radar (VPR) has been commissioned and deployed at a number of sites in southern England, to investigate numerically spatial and temporal variations in the vertical reflectivity profile (Z_{vp}): particularly those associated with the intersection by the radar beam of a melting layer – the bright band. Comparisons with data from other instrumentation, notably with the S-band research radar at Chilbolton, but also with disdrometer data and rainfall measurements from a number of sophisticated rain gauges, show that VPR scans of the atmosphere provide detailed and reliable quantitative measurements of the Z_{vp} . Analysis of a three year archive of Z_{vp} data for Manchester has shown a bright band to be present in over 80% of rainfall events, highlighting the extent of the problem of bright band errors in scanning weather radar data. The primary characteristics of the bright band such as the height and magnitude (in dBZ) of the top, bottom and peak are identified objectively from VPR Z_{vp} data by an automatic bright band recognition algorithm. It is envisaged that this approach could form the basis of an objective, automatic real time correction procedure for scanning weather radars.

Keywords: Vertically Pointing Radar, weather radar, hydrometeorology, bright-band, melting-layer, vertical radar reflectivity

[Final Revised Paper](#) (PDF, 16846 KB)

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