Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11344, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11344
EGU General Assembly 2008

Rain rate estimation and hydrometeor classification using dual-polarization weather radar measurements

H. Paulitsch, F. Teschl

Institute of Broadband Communications, Graz University of Technology, Austria
(helmutp@radar.tugraz.at)

Dual polarization is becoming the standard for new weather radar systems, like the new Austrian C-band weather radar on the Valluga mountain. In contrast to conventional weather radars, where the reflectivity is measured in one polarization plane only, a dual polarization radar provides transmission in either horizontal, vertical, or both polarizations while receiving both the horizontal and vertical channels simultaneously. Since hydrometeors are not exactly spherical, the back-scatter and propagation is different for horizontal and vertical polarization. Comparing the reflected horizontal and vertical power returns and their ratio and correlation, information on the size, shape, and ice density of cloud and precipitation particles can be obtained. Polarimetric radar variables are expected to increase the accuracy of the rainrate estimation compared to standard Z-R relationship of non-polarimetric radars. For the Valluga radar rainrate estimators based on Zh/ZDR and KDP/ZDR relationships are implemented. Deriving the type of precipitation from dual polarization parameters can be difficult, since there is no clear discrimination between the different values. Fuzzy logic approaches have been shown to work well with overlapping conditions and imprecisely defined class output. The CSU hydrometeor classification model with adaptations for C-band is selected for the Valluga radar. The preliminary implementation has been verified with simulated data based on recorded precipitation events. In this paper details of the implementation, first results and evaluations are presented.