

Using C-band radar differential phase measurements for extreme rainfall estimation: comparison with estimates based on horizontal reflectivity

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Polarimetric radar capabilities are increasingly spreading from research to operational systems. Arpa Piemonte manages two polarimetric operational radar in North-Western Italy: Bric della Croce and Monte Settepani. This work focuses on the analysis of two flash flood events occurred during the summer of 2006. Rainfall rate at the ground is estimated by using KDP, the range derivative of the differential phase Φ_{DP} . The accuracy of these estimates is evaluated by using raingauge measurements as a reference. KDP- based estimates are compared with concurrent estimates based on horizontal reflectivity measurements and processed by applying correction of partial beam blocking, attenuation and vertical profile of reflectivity. This comparative study aims at assessing the reliability of rainfall estimates from polarimetric measurements and quantifying the benefit deriving from the operational use of differential phase measurements for hydrological applications.