1-year long operational application of Vertical Profile of Reflectivity in the retrieval of the rain rate at the ground: impact and problems.

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The application of Vertical Profile of Reflecitvity (VPR) reconstruction and correction is considered a key point in the framework of precipitation estimate at the ground level from radar reflectivity data, so that several techniques have been developed in the past to address this issue.

Nevertheless its operational use opens questions like the spatial variation of the precipitation vertical development, which is due to the mixing of convective and stratiform precipitation or simply to the incline of the bright band, and makes difficult using a unique VPR in the whole area of observation. Another point is the presence of melting layer or snow at the ground level which should be automatically recognized and dealt with, because it produces a variation in the relation between reflectivity and rain rate.

In this work are presented the results of a 1-year long operational application of a simple method of VPR reconstruction and correction which applies a single time-space averaged profile, distinguishes between snow, melting and liquid precipitation at the ground level and corrects reflectivity data. No stratiform-convective separation is adopted.

Reflectivity corrected data are used to retrieve the intensity of precipitation at the ground level and the hourly cumulated precipitation is obtained with an advective algorithm that takes into account the precipitation movement.

The mean impact of VPR application is evaluated and the effect of the spoiling factors evidenced; moreover some representative cases are analyzed. The results show that the application of the profile correction on the average improves the rain rate estimate, but crucial points, such as hydrometeors phase at the ground and convection, should be dealt with to avoid locally negative effects.