Xband radar based Rainfall Quantitative Estimation during MeghaTropiques GV exercises

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Abstract

Over the years, radar imposed itself as an indispensable tool for measuring and study precipitation as well systems producing them. Since, the first traditional radars until those which use diversity of polarimetry, considerable advanced have been realized. However today, many things still to do in sight of improve considerably QPE. One of the major difficulties that met researchers has been the correction of attenuation due to hydrometeors. Indeed, short length's electromagnetic waves (X-band) are strongly attenuated and data from it need to be correct prior before doing a QPE or any others applications. Many authors proposed different schemes of attenuation's correction which can be classify in simple and sophisticated algorithms based on polarimetry.

The simplest way to correct attenuated reflectivity (Zh,v) or differential reflectivity (Zdr) consist in adding a multiplicative factor with differential phase (Phidp) to attenuated reflectivities. The source of such approach rely on existence of linear relations between specific or differential attenuations and specific differential phase (Kdp) as follow: Ah=αKdp ; Adp=βKdp (Bringi et al. 1990).

Unfortunately, it exist a wide variability of these coefficients (α and β) with mainly DSD, some authors proposed sophisticated algorithms that take coefficient's variability in account (Testud et al. 2000; Carey et al. 2000; Bringi et al. 2001; Matrosov et al. 2002; Anagnostou et al. 2004; Park et al. 2005; Gorgucci et al. 2006).

The 2010 (Niamey, Niger) and 2012 (Burkina Faso, Ouagadougou) MeghaTropique calibration and validation field permitted acquisition of great set of data. It offers us a unique occasion to test the consistency of each kind of algorithms and to provide high resolution radar rainfields derived from polarimetric parameters for a good comparison and validation of satellite products over West African region where rain gauges networks are poor.

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