

## **Polarimetric rainfall retrieval in a tropical environment: consistency analysis for two C-band radars in the Philippines**

Irene Crisologo

University of the Philippines, Philippines

Heistermann, Maik (University of Potsdam, Potsdam, Germany)

Vulpiani, Gianfranco (Civil Protection Department, Rome, Italy)

*E-mail: icrisologo@gmail.com*

The Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) has recently established a network of eight weather radars, two of which are dual-polarized C-band radars. Polarimetric rainfall retrieval provides new opportunities for using C-band weather radars in tropical environments. In particular, they allow addressing the issue of path-integrated attenuation which is a dominant phenomenon for C-band radars that observe highly intensive tropical rainfall events.

For our study, we implemented multiple rainfall retrieval methods using polarimetric techniques: a combination of a fuzzy logic classification scheme to detect and remove non-meteorological echoes, as well as a moving-window range-derivative technique to unfold and reconstruct the differential propagation phase (PhiDP) and retrieve the specific differential phase (KDP). The retrieved KDP was then used to calculate the path-integrated attenuation. Rainfall estimates are derived from three variables: reflectivity, attenuation-corrected reflectivity, specific differential phase, and a mixed estimation approach. These estimates are then verified against automated rain gauges on the ground. All methods have been implemented in the Open Source radar processing library wradlib.

The focus of this study is on the comparison of verification results for the two dual polarized C-band radars in the Philippines: The Mactan C-band radar is located in the Central Visayas, and the Tagaytay C-band radar is situated in Southern Luzon. The analysis will be based on two major events witnessed by each of the radars: the enhanced Southwest monsoon of August 2012 for the Tagaytay C-band radar which saw more than 1000 mm of rain over Metropolitan Manila within three days, and the Severe Tropical Storm Jebi for the Mactan C-band radar which passed across the radar coverage on 28 July 2013. By indentifying common strengths and weaknesses of the implemented retrieval methods for the two radars, we aim to support the development towards a joint retrieval approach for the PAGASA C-band radars.