A newly calibrated long-term radar dataset of tropical convection
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1. Introduction

The C-band POLarimetric (CPOL) radar stationed near Darwin (11°S, 131°E) Australia from 1998 to 2017 is a great tool for studies of tropical convection. CPOL is a research dual-polarization Doppler radar that has collected 18 wet seasons (November to May) of observations since 1998, producing more than 350,000 PPIs.

The objective of this work is to produce a new quality-controlled dataset using latest developments in radar post-processing, in order to facilitate tropical convection studies.

We use a 3-step calibration technique to calibrate CPOL.

2. Step 1: Monitoring clutter.

A ground monitoring technique: Pros: can be automated, precision, speed. Cons: relative calibration value.

3. Step 2: Comparison with TRMM/GPM.


4. Step 3 - Self-consistency check.

The self-consistency technique has been also used. Disdrometer measurements and for selected stable calibration periods. Pros: Absolute calibration of both $Z_H$ and $Z_D$. Cons: T-matrix calculations (small changes have an important impact, DSD, canting angle, ...), some cases of ambiguity between $Z_H$ and $Z_D$.

5. New radar processing

Level 1a: Calibrated raw products (CF/radial PPI format only): $Z_H$, $Z_D$, $\phi_{dp}$, $\rho_{hv}$, spectrum width, and Doppler velocity.

Level 1b: 18 new fields, including rainfall rate, $N_0$, $D_w$, radiosounding temperature, echo classification, etc. Available in CF/radial PPI formats or gridded format at two resolutions: 150 km range (2.5 km grid) and 70 km range (1 km grid).

Level 2: Daily files with constant dimensions. All level 1b fields at 2.5 km altitude plus Steiner classification, echo top height, 0-dB height, etc.


7. Level 2 processing

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