

## Accepted Manuscript

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PII: S0169-8095(16)30168-5  
DOI: doi: [10.1016/j.atmosres.2016.06.015](https://doi.org/10.1016/j.atmosres.2016.06.015)  
Reference: ATMOS 3720

To appear in: *Atmospheric Research*

Received date: 25 February 2016  
Revised date: 14 June 2016  
Accepted date: 16 June 2016



Please cite this article as: Deo, Anil, Walsh, Kevin J.E., Contrasting tropical cyclone and non-tropical cyclone related rainfall drop size distribution at Darwin, Australia, *Atmospheric Research* (2016), doi: [10.1016/j.atmosres.2016.06.015](https://doi.org/10.1016/j.atmosres.2016.06.015)

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## Contrasting Tropical Cyclone and non-Tropical Cyclone related Rainfall Drop Size Distribution at Darwin, Australia

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### Abstract

In this study the rainfall drop size distribution (DSD) during the passage of seven tropical cyclones (TCs) over Darwin is compared and contrasted with that associated with non-tropical cyclone (non-TC) events, using the impact disdrometer data at the Darwin Atmospheric Radiation and Measurement (ARM) site. The disparity of the DSD with respect to rainfall types (between TC and non-TC conditions) and distance from TC centre is also examined. It is shown that TC DSDs are statistically different from the non-TC DSDs, the former encompassing a larger concentration of small to moderate drop sizes. The TC mass-weighted mean diameter ( $D_m$ ) is lower than the non-TC values at all rain rates and also for the different precipitation types (convective, transition and stratiform). The TC DSD varies with distance from the TC centre, as rainfall near the TC centre (< 60 km) comprises of relatively smaller drops which are strongly evident at small to moderate rain rates (< 30 mm hr<sup>-1</sup>). Such variations in the DSD have implications for the parameters used in the algorithm that

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