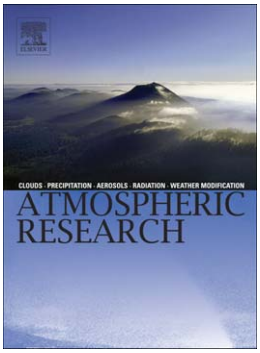

The added value of IMERG in characterizing rainfall in tropical cyclones

Manuel F. Rios Gaona, Gabriele Villarini, Wei Zhang, Gabriel A. Vecchi

PII: S0169-8095(17)31065-7
DOI: doi:10.1016/j.atmosres.2018.03.008
Reference: ATMOS 4209

To appear in: *Atmospheric Research*

Received date: 12 October 2017
Revised date: 8 February 2018
Accepted date: 12 March 2018

Please cite this article as: Rios Gaona, Manuel F., Villarini, Gabriele, Zhang, Wei, Vecchi, Gabriel A., The added value of IMERG in characterizing rainfall in tropical cyclones, *Atmospheric Research* (2018), doi:10.1016/j.atmosres.2018.03.008

The added value of IMERG in characterizing rainfall in tropical cyclones

Manuel F. Rios Gaona[a,*], Gabriele Villarini[a], Wei Zhang[a], Gabriel A. Vecchi[b,c]

[a] *IIHR - Hydroscience & Engineering, The University of Iowa, Iowa City, Iowa, USA.*

[b] *Department of Geosciences, Princeton University, Princeton, New Jersey, USA.*

[c] *Princeton Environmental Institute, Princeton University, Princeton, New Jersey, USA.*

Abstract

Heavy rainfall associated with landfalling tropical cyclones (TCs) is responsible for significant societal and economic impacts. Improved characterization and description of how rainfall during these storms changes as a function of distance from the center of circulation are critical to increase our preparedness against this natural hazard. Since March 2014, the hydrometeorological community has benefitted from the Global Precipitation Measurement mission (GPM), especially with its gridded-rainfall product IMERG (Integrated Multi-satellitE Retrievals for GPM), which offers global rainfall estimates with a spatiotemporal resolution of $0.1^\circ \times 0.1^\circ$ every 30 minutes, on a near-real time basis.

We analyze here 166 TCs worldwide from March 2014 through March 2016. For every TC, we extract from IMERG V04 a 2,000 km rainfall swath along the TC track. This allows us to characterize with great accuracy the spatial structure of TC-rainfall, from its development all the way to its landfall and dissipation. We stratify the analyses by basin of origin, intensity of the storm, and whether the TC was over ocean or land. We find that the South Pacific, West Pacific, and North Indian basins yield (median) rainfall intensities between 6 and 7.5 $mm \cdot h^{-1}$ at radii $\sim$50 km. These intensities are for TCs over ocean, and in most

*Corresponding author

Email address: manuelfelipe-riosgaona@uiowa.edu (Manuel F. Rios Gaona)