

## Diagnostic relationships between precipitation and cloud types or regimes

\*Lazaros Oreopoulos<sup>1</sup>, Daeho Jin<sup>2,1</sup>, Jackson Tan<sup>3,1</sup>, Dongmin Lee<sup>2,1</sup>, Nayeong Cho<sup>2,1</sup>

1. NASA Goddard Space Flight Center, 2. University Space Research Association, 3. Morgan State University

I will provide an overview of our group's recent work on obtaining diagnostics that expose the character of precipitation-cloud relationships mainly in tropical regions. The observational datasets on which our analysis is based are TMPA-3B42 precipitation rates and cloud types or regimes from ISCCP and MODIS. For comparisons with GCMs we use model cloud output from the CMIP5 archive that has been processed with the ISCCP simulator. Our investigation has focused on the following issues which I will address in my presentation: (1) Can we quantify the relationship between cloud types and precipitation events of particular strength and does the relationship change substantially between ocean and land? (2) Do Weather States or Cloud Regimes serve us well as a framework for distinguishing between different precipitation regimes? (3) Can we see evidence of aerosol effects on precipitation when the problem is decomposed by Cloud Regime? (4) Do models reproduce the observed dependence of tropical precipitation on Cloud Regime? The presentation will stress the value of spatiotemporally matched cloud and precipitation observations as a way forward for understanding their intricate connections.

Keywords: Cloud Types, Precipitation, Satellites, Cloud Regimes, Global Climate Models