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# Contrasting Tropical Rainfall Regimes Using TRMM and Ground-Based Polarimetric Radar

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The NASA TRMM satellite has provided unprecedented data for over 11 years. TRMM precipitation products have advanced our understanding of tropical precipitation considerably. Field programs in the tropics, specifically TRMM-LBA (January-February 1999 in Brazil; a TRMM ground validation experiment) and NAME (North American Monsoon Experiment, summer 2004 along the west coast of Mexico) have provided opportunities to investigate the characteristics of precipitation using S-band polarimetric radar data. Both of these locales feature heavy, monsoon-like precipitation. However, there is significant variability in precipitation in these regions. In Brazil, two distinct rainfall regimes were observed. During "easterly" phase periods, precipitation was continental like, featuring deep, intense convection. During "westerly" periods, precipitation was more oceanic like, featuring weaker convection embedded in widespread stratiform precipitation. In NAME, precipitation variability was forced more by terrain, opposed to synoptic conditions, as was the case in Brazil.

The National Center for Atmospheric Research S-pol radar was used to diagnose precipitation characteristics. Larger drops, larger ice mass aloft, and larger rain contents were found in the TRMM-LBA easterly phases compared to westerly events. For NAME, larger drops, larger ice mass aloft, and larger rain contents were found for coastal plain convection compared to convection over the higher terrain of the Sierra Madre Occidental or adjacent coastal waters. The effects of these differences on TRMM Precipitation Radar based rainfall estimates are investigated. These microphysical differences suggest the use of different Z-R estimators as a function of regime and elevation. It appears that the TRMM attenuation correction is inadequate for intense convection observed in these two regions.