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Retrievals on Tropical small scale humidity variability from multi-channel microwave radiometer

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Small-scale atmospheric humidity structure is important to many atmospheric process studies. In the Tropics especially, convection is sensitive to small variations in humidity. High temporal-resolution humidity profiles and spatially-resolved humidity fields are valuable for understanding the relationship of convection to tropical humidity, such as at convectively-induced cold pools and as part of the shallow-to-deep cloud transition. Radiosondes can provide high resolution vertical profiles of temperature and humidity, but are relatively infrequent. Microwave radiometers (MWR) are able to profile and scan autonomously and output measurements frequently ($\sim$1 Hz). To date, few assessments of microwave humidity profiling in the Tropics have been undertaken. Löhnert et al. (2009) provide one evaluation for Darwin, Australia. We build on this using four months of data from the equatorial Indian Ocean, at Gan Island, collected from University of Miami's (UM) multi-channel radiometer during the Dynamics of Madden-Julian Oscillation (DYNAMO) field campaign. Liquid Water Path (LWP) and Water Vapor Path (WVP) are physically retrieved using the MWR RETrieval (MWRRET) algorithm (Turner et al., 2007b), and humidity profiles in the tropics are retrieved using the Integrated Profiling Technique (Löhnert et al., 2004). Tropical temperature variability is weak and a climatological temperature profile is assumed, with humidity information drawn from five channels between 22 to 30 GHz. Scanning measurements were coordinated with the scanning pattern of NCAR's S-Pol-Ka radar. An analysis of the humidity information content gathered from both the profiling and scanning measurements will be presented.