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Department of Atmospheric Sciences M.S. Defense Announcement

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa
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M.S. Defense Title:

A Radar-Based Climatology of Thunderstorms in Hawaii

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Date: Wednesday, June 6, 2018
Time: 2:00pm
Location: IRPC Conference Room, POST 414

Abstract:

While relatively infrequent, hazards related to severe convection in Hawai'i do occasionally occur. Our understanding of these events can be improved by using algorithm data from the Weather Surveillance Radar-1988 Doppler (WSR-88D) to help build a spatial, temporal, and intensity climatology which eliminates population density and diurnal sampling biases. Radar can also expand the climatological area by approximately 17 times over that offered by land-based reports only. Surface and upper air observations and storm reports are used to validate the radar algorithm output. Parameters and indices from sounding data at Līhu'e are compared to observed thunderstorms, as well as to output from the Maximum Estimated Hail Size (MEHS) and Tornado Vortex Signature (TVS) algorithms, to establish values significant for the occurrence of these events. The data show that greater instability is typically needed to support thunderstorms in Hawai'i, approximately double that found for similar events over the continental United States. MEHS values greater than 32 mm appear to indicate a higher risk of severe hail in Hawai'i, and these occur within radar range on average every 5.5 days per year. MEHS values likely to be associated with supercells and very large hail occur within radar range about 1.5 day per year. Most TVSs in Hawai'i are associated with delta-V values of $<30 \text{ m s}^{-1}$, but values $\geq 45 \text{ m s}^{-1}$ (known to be associated with strong tornadoes) have been observed. The results presented here should help forecasters to better evaluate the risk of these rare but important events.