UNIVERSITY of HAWAI'I MĀNOA

Department of Atmospheric Sciences
M.S. Defense Announcement

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SCHOOL OF OCEAN AND EARTH SCIENCE AND TECHNOLOGY

M.S. Defense Title:

Dual-Polarization Radar Characteristics of Convection in Hawai'i during HERO

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Date: **Tuesday, November 17, 2015**
Time: **2:00 PM**
Location: **ATMO Conference Room, HIG 353**

Abstract:

Dual-polarization radars can send and receive pulses with both horizontal and vertical polarization, allowing them to retrieve hydrometeor characteristics in two dimensions. With this technology, it is possible to gather information about the size, shape and type of hydrometeors. From 22 October to 13 November 2013 the DOW7 mobile radar was deployed to O`ahu as part of the Hawaiian Educational Radar Opportunity (HERO). The project was one of the first dual-polarization field experiments to date performed in Hawai`i. Though the primary purpose of HERO was educational, it provided a unique opportunity to observe the convective environment of O`ahu at very high spatial and temporal resolution. Of the many storms and weather types observed during HERO, two convective cells were chosen to represent some of the most common weather patterns found on the island: a trade wind case on 24 October, and a sea-breeze case on 27 October. On 24 October, it was found that although both the maximum radar reflectivity and overall size grew larger as the shower approached land, the maximum differential reflectivity did not increase much until encountering the mountains. As the storm passed directly over the radar site, the vertical velocity structure of the convective core was observed, and evidence of the downdraft was recorded by the DOW7 mast. On 27 October, the convective lifecycle from initiation through dissipation was studied for a single cell within the sea-breeze storm. From convective initiation, it took 15-19 minutes to reach the convective peak, and another 6 minutes for heavy precipitation to fall at the surface. Statistical methods were also used to further analyze the vertical structure of the convective cell, as well as the raindrop size distribution.