



UNIVERSITY
of HAWAI'I
MĀNOA

Department of Atmospheric Sciences M.S. Defense Announcement

Department of Atmospheric Sciences, S.O.E.S.T., University of Hawai'i at Mānoa
2525 Correa Road, HIG 350; Honolulu, HI 96822 ☎956-8775



M.S. Defense Title:

THE RELATIONSHIPS BETWEEN DROUGHT SEVERITY, PRECIPITATION AND AEROSOL IN CALIFORNIA DURING THE 2012-2014 DROUGHT

Ms. Jessica Gartzke

Atmospheric Sciences M.S. Candidate

Department of Atmospheric Sciences
School of Ocean and Earth Science and Technology
University of Hawai'i at Mānoa

Date: Wednesday, February 28, 2018
Time: 8:30am
Location: IRPC Conference Room, POST 414

Abstract:

The 2012-2014 severe drought in California was notably destructive due to especially high temperatures and precipitation amounts lower than climatological means. This drought caused calamitous and far reaching effects for the environment, economy and public health. Unlike previous periods of drought, understanding the causes of the most recent drought can now be accomplished through satellite based measurements. Satellites offer global measurements of precipitation, temperature and aerosol; all of which can be used to estimate drought severity and impact. This study offers a 14-year climatology of precipitation, the Palmer Drought Severity Index (PDSI) and aerosol. The NCDC computes the monthly averaged PDSI for the state of California. Using this climatology of drought severity and MODIS Level 3 aerosol optical depth we can evaluate the impact drought intensity has on atmospheric aerosol loading. Increased aerosol has significant regional impacts including effects that directly impact communities, such as air quality and visibility, as well as impacts on the regional hydrological cycle by impacting cloud microphysical characteristics and precipitation. Precipitation observations from TRMM and GPCP are also analyzed in relation to PDSI. The type of precipitation, its intensity, and duration are all important for determining drought severity and are considered here. The findings suggest a strong correlation between drought and aerosol, meaning that periods in severe drought tend to also correspond to high levels of aerosol. We will also demonstrate precipitation and drought trends over the last 14 years.