The Convection, Aerosol, and Synoptic-Effects in the Tropics (CAST) experiment iss a continuing atmospheric monitoring experiment based in Puerto Rico. CAST instruments include remote and ground-based sensors including a three-channel LIDAR system, a ceilometer, multiple sunphotometers in the Aerosol Robotic Network (AERONET), soil moisture sensors, radiosondes, a disdrometer, high resolution TropiNet radar, and an air sampler. CAST provided an opportunity to study the large, local, and microscale processes important for Caribbean rain production. CAST Phase I (22 June 2016 – 10 July 2016) kicked off during the summer of 2015- one of the driest summers in recent history. CAST Phase II was conducted during a low dust dry season that produced multiple intense rain events (6 – 22 February 2016). Investigation of large scale datasets and local CAST data during Phase I showed that the presence of a strong El Niño, moderate vertical wind shear (VWS), reduced sea surface temperature (SSTs) and high concentrations of Saharan dust led to drier conditions over the Caribbean. On the local scale of Puerto Rico, convective storms were suppressed under intense dust conditions. Analysis of the low dust Phase II rainfall events suggest that local wind direction, soil moisture, and topography are vital for storm production.

Keywords: convection, aerosol, dust, dynamics, campaign, tropics, precipitation, drought