**NASA DEVELOP National Program**

NASA Langley Research Center

**Summer 2015**

**Short Title: Arizona Health & Air Quality**

**Updated Abstract**

Extreme heat causes more human fatalities in the United States than any other natural disaster, elevating the concern of heat-related mortality. Maricopa County, Arizona is specifically known for its high heat index and is the leading megapolitan area in the U.S. for population growth and urbanization. As Phoenix expands, the increase in an urban environment raises nighttime temperatures and induces a positive feedback loop by further raising daytime temperatures, creating an urban heat island (UHI) effect. Individuals at higher risk are unequally distributed, leaving the poor, homeless, non-native English speakers, elderly, and the socially isolated vulnerable to heat events. While this is a devastating incidence, it can be prevented. The Arizona Department of Health Services and the Phoenix Heat Relief Network, among others, are working to create more effectively placed cooling centers and heat warning systems to aid those with the highest exposure. Using NASA Earth observation technology from Landsat 8 and MODIS satellites, the daily variability within the UHI was quantified over the summer seasons of 2005 – 2014 in terms of spatial distribution and average surface temperature shifts. A series of one-way ANOVAs revealed significant differences between daily surface temperature averages of the top 30% of census tracts by month within a single season. These results provided detailed information regarding nuances within the UHI effect and will allow pertinent recommendations regarding the health department’s adaptive capacity. They also hold essential components for future policy decision-making regarding appropriate locations for cooling centers and efficient warning systems.