The Valley of the Sun

Enhancing Extreme Heat Intervention and Preparedness Activities in Maricopa County, AZ

NASA Langley Research Center – DEVELOP Team Arizona Health and Air Quality

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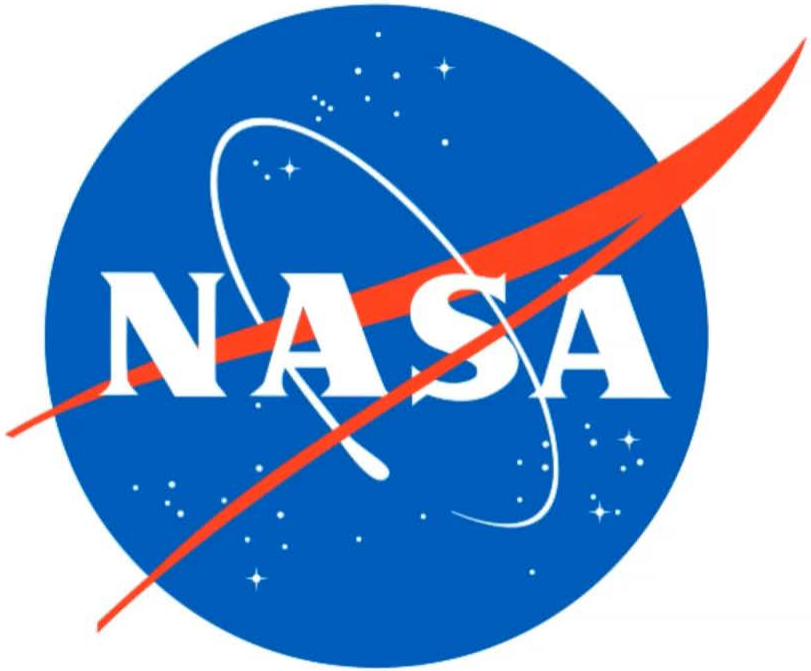
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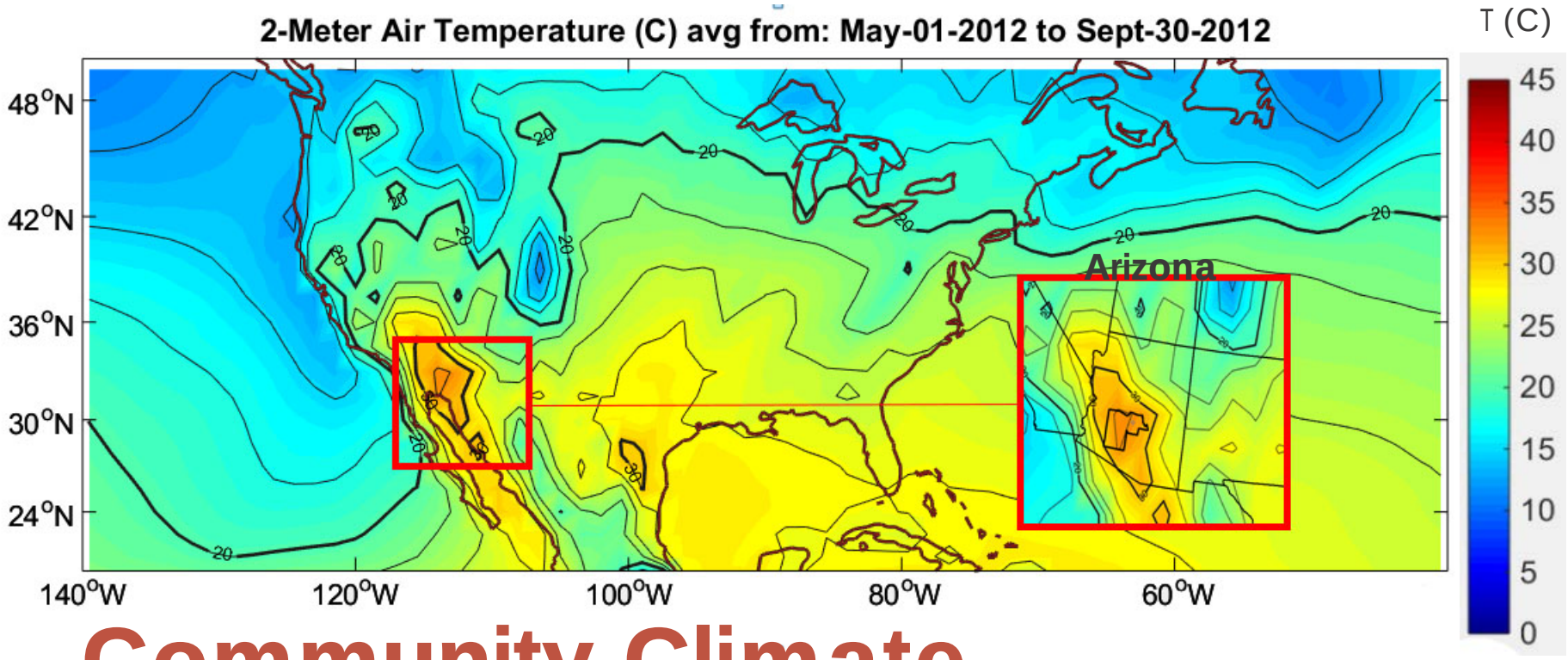
PROJECT PARTNERS

- Arizona Department of Health Services (ADHS)

- Arizona State University Environmental Remote Sensing and Informatics Lab (ASU ERSL)

- Arizona State University Center for Policy Informatics (ASU CPI)



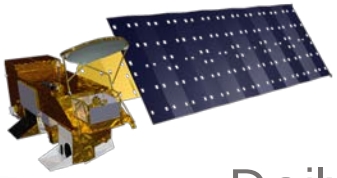
Community Climate

- Extreme heat is a **chronic health hazard** and is expected to become more dangerous with increased urbanization and a warming climate.
- Civilians most affected: those without air conditioning, proper insulation, low-income, newcomers, homeless, minorities, and socially isolated

Objectives

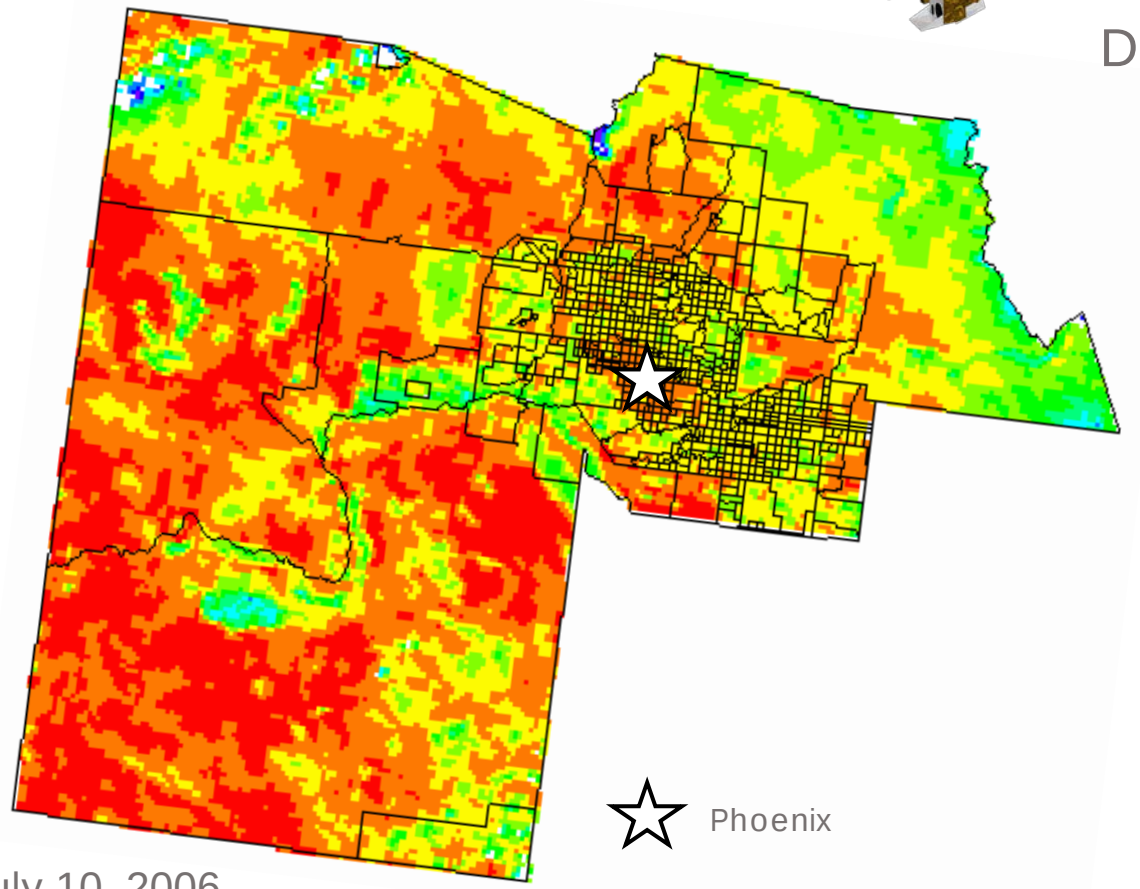
1. Analyze days with extreme heat anomalies
    - Understand **where**, **how**, and **why** daily variations occur
2. Establish how users of heat relief resources correlate with socioeconomic vulnerability
3. Determine **where**, **when**, and **how** relief efforts should intervene

NASA Satellites and Methods



Aqua MODIS

Daily surface temperature data per census tract for statistical comparisons

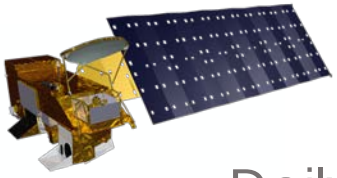


Temperature (C)

- 62.62 - 66.4
- 58.84 - 62.6
- 55.06 - 58.82
- 51.28 - 55.04
- 47.5 - 51.26
- 43.7 - 47.48
- 39.92 - 43.68
- 36.14 - 39.9
- 32.36 - 36.12
- 28.28 - 32.34

July 10, 2006
MODIS Aqua

NASA Satellites and Methods



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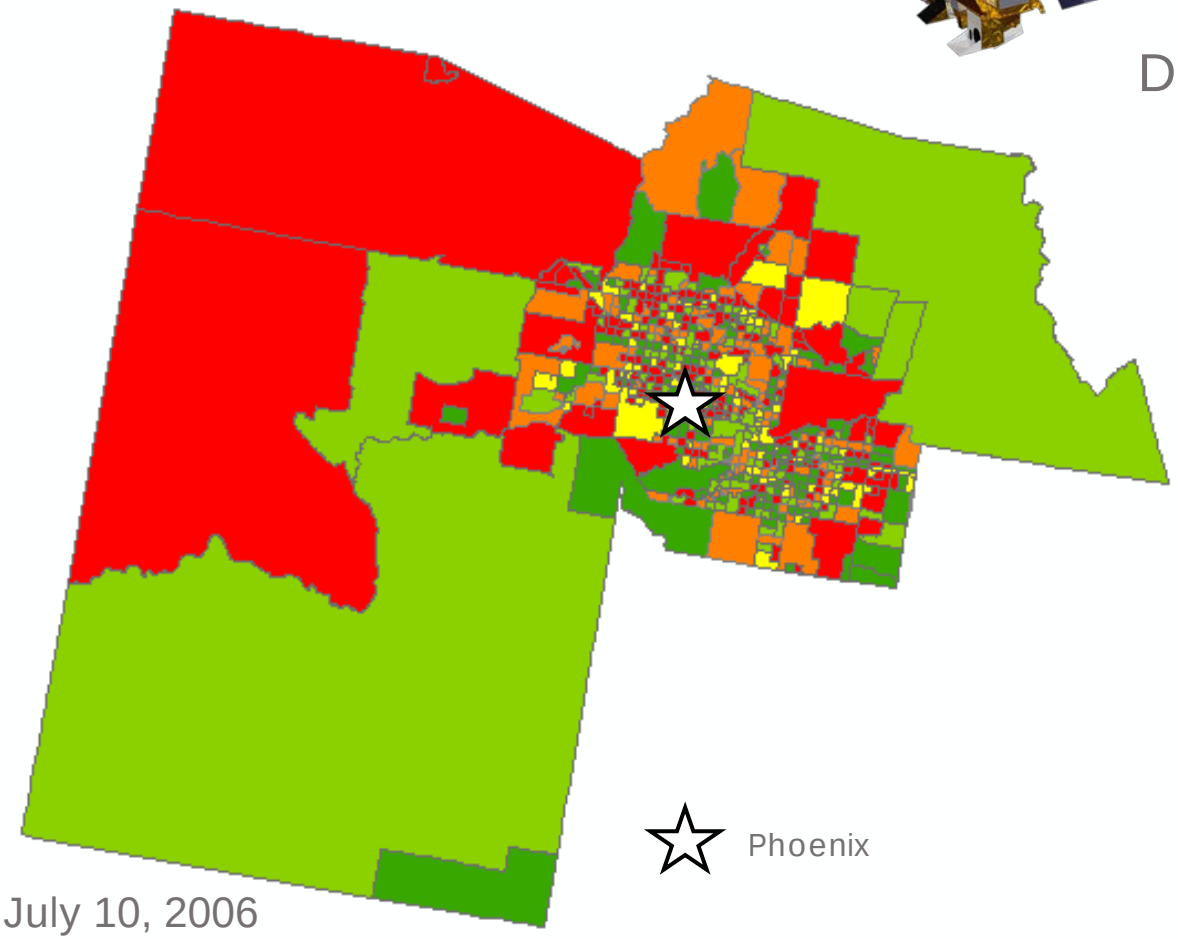

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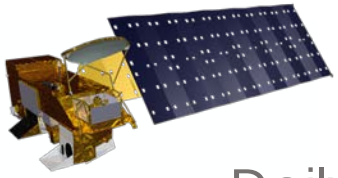

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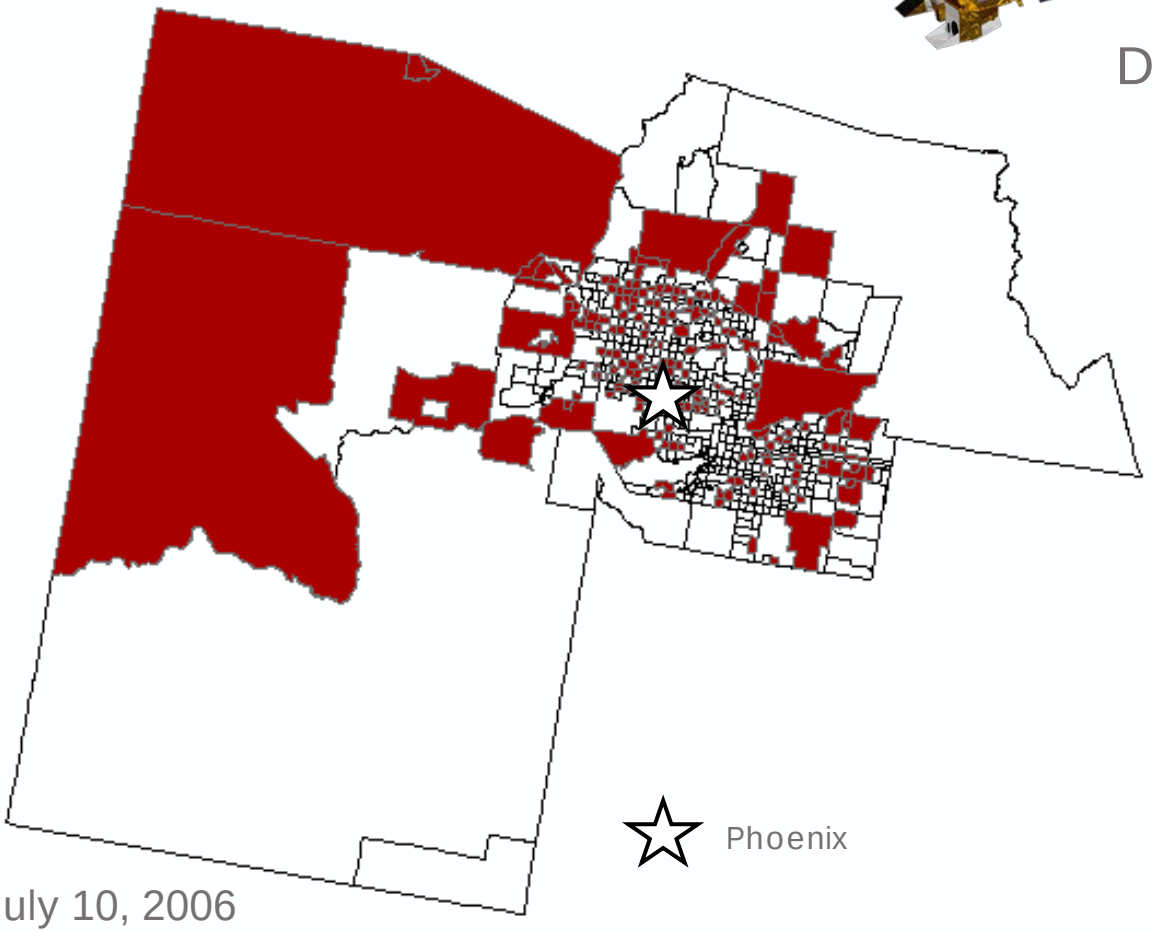

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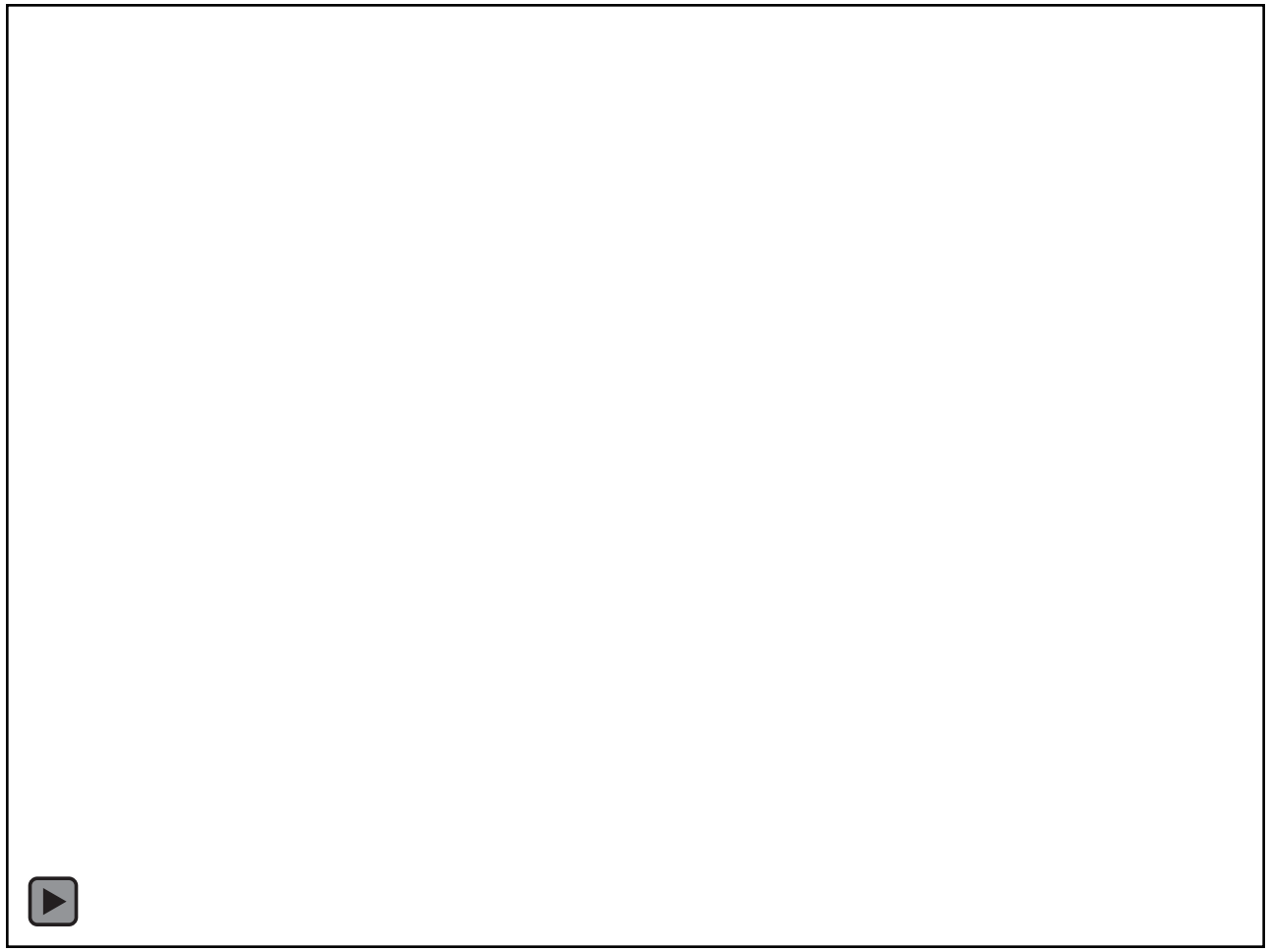
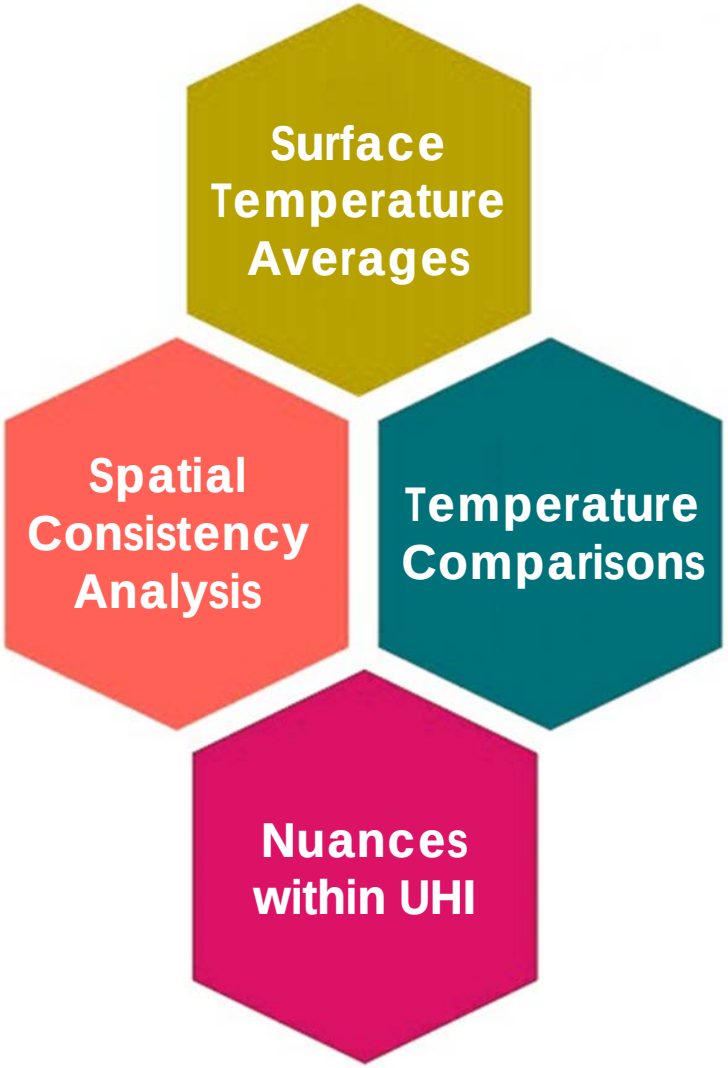
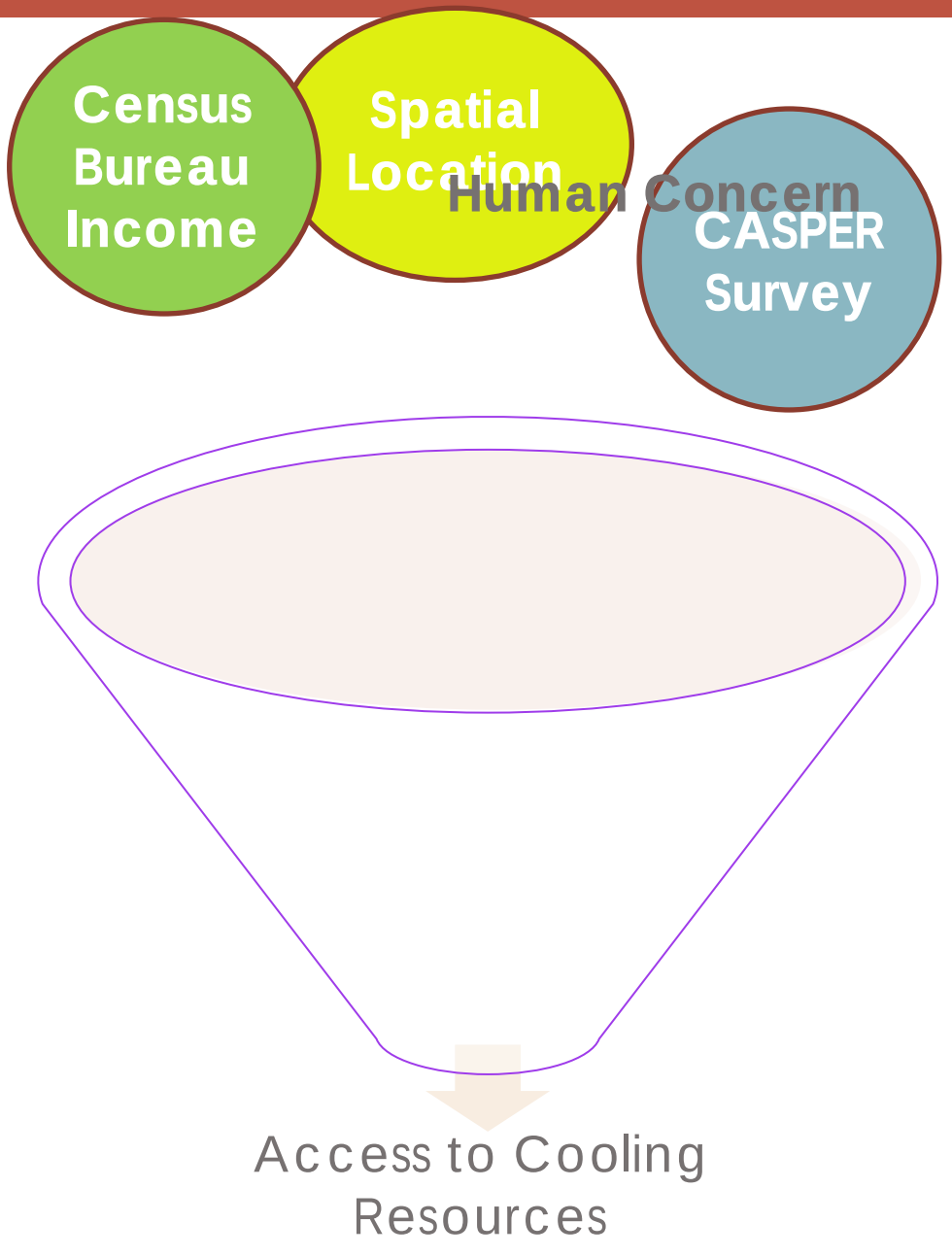


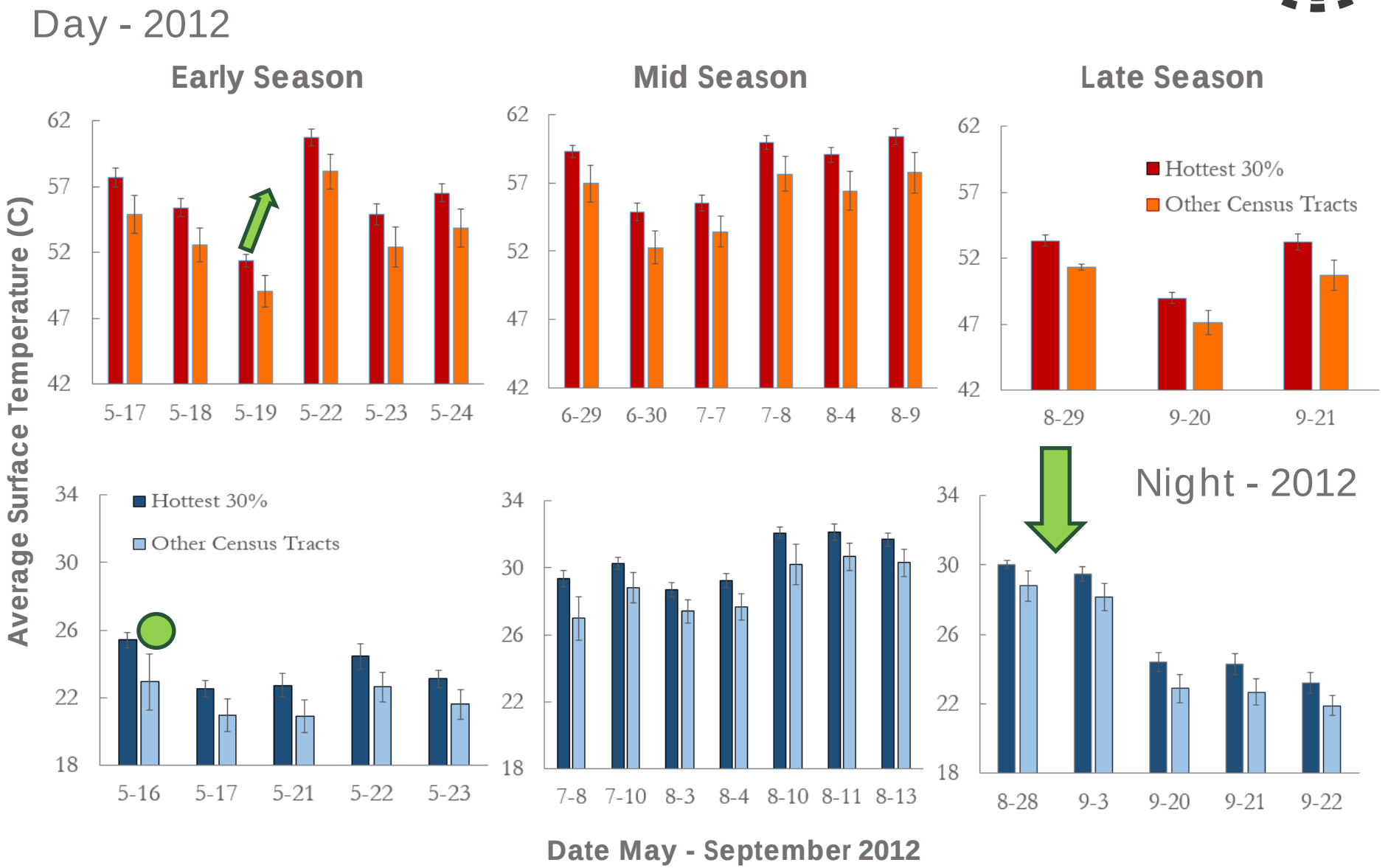
Data Analysis



Physical Concern



Results and Conclusions



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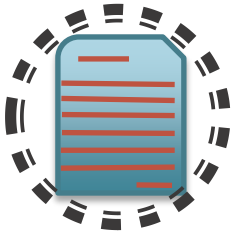
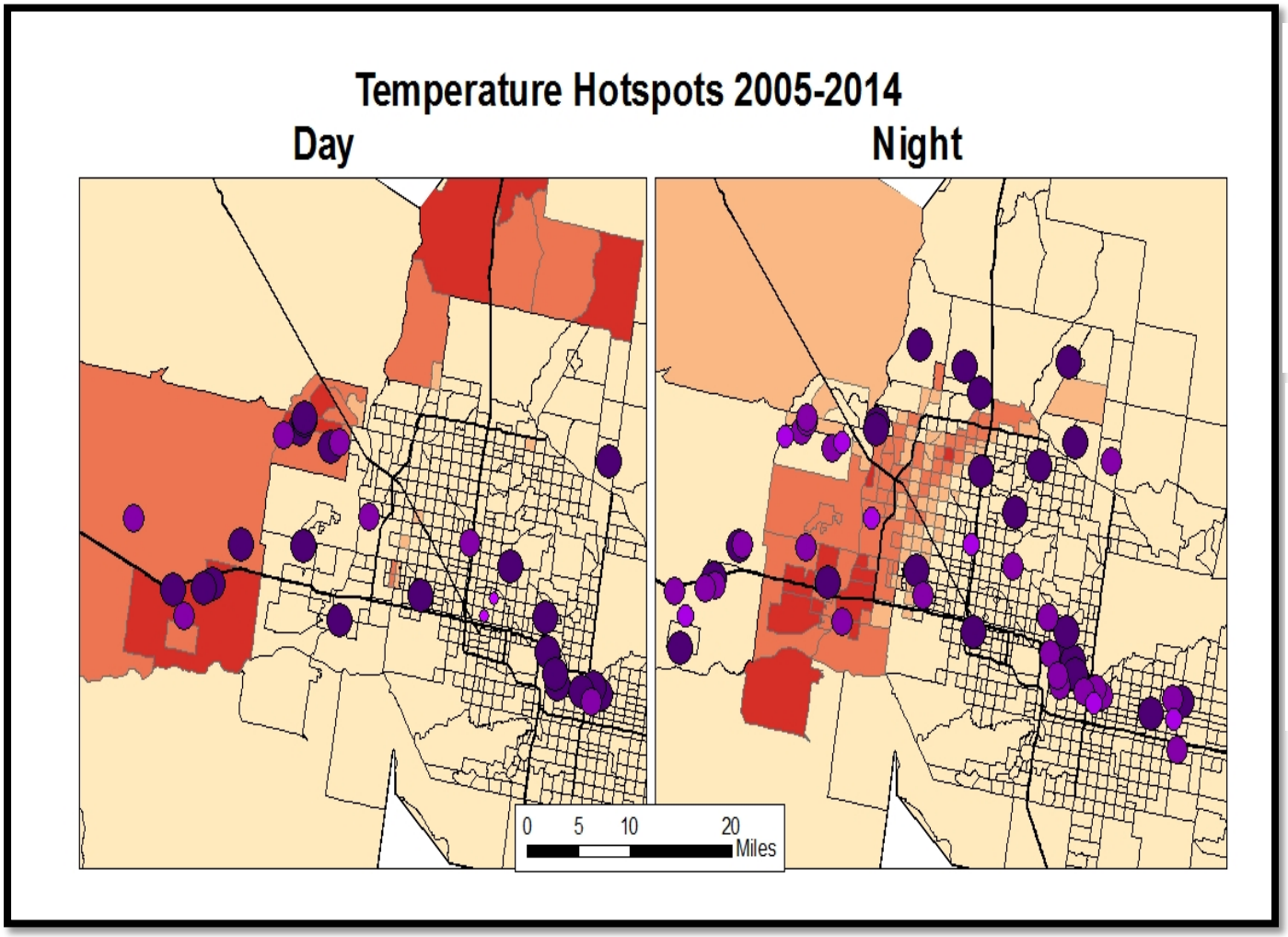


Term	Coefficient	St. Error	Z-Value	*p*-value
Intercept	1.84	0.432	1.415	0.157
Income	1	5.33E-06	1.236	0.216
Non-English (Yes)	0.369	0.3561	-2.798	0.005 **
Percent Non-White	0.997	0.00717	-0.34	0.734

63.1%

Spatial Results and Conclusions



Getis-Ord Gi* Hot Spot Analysis

- 90% Confidence
- 95% Confidence
- 95% Confidence

Air Conditioning Non-Use (Percent)

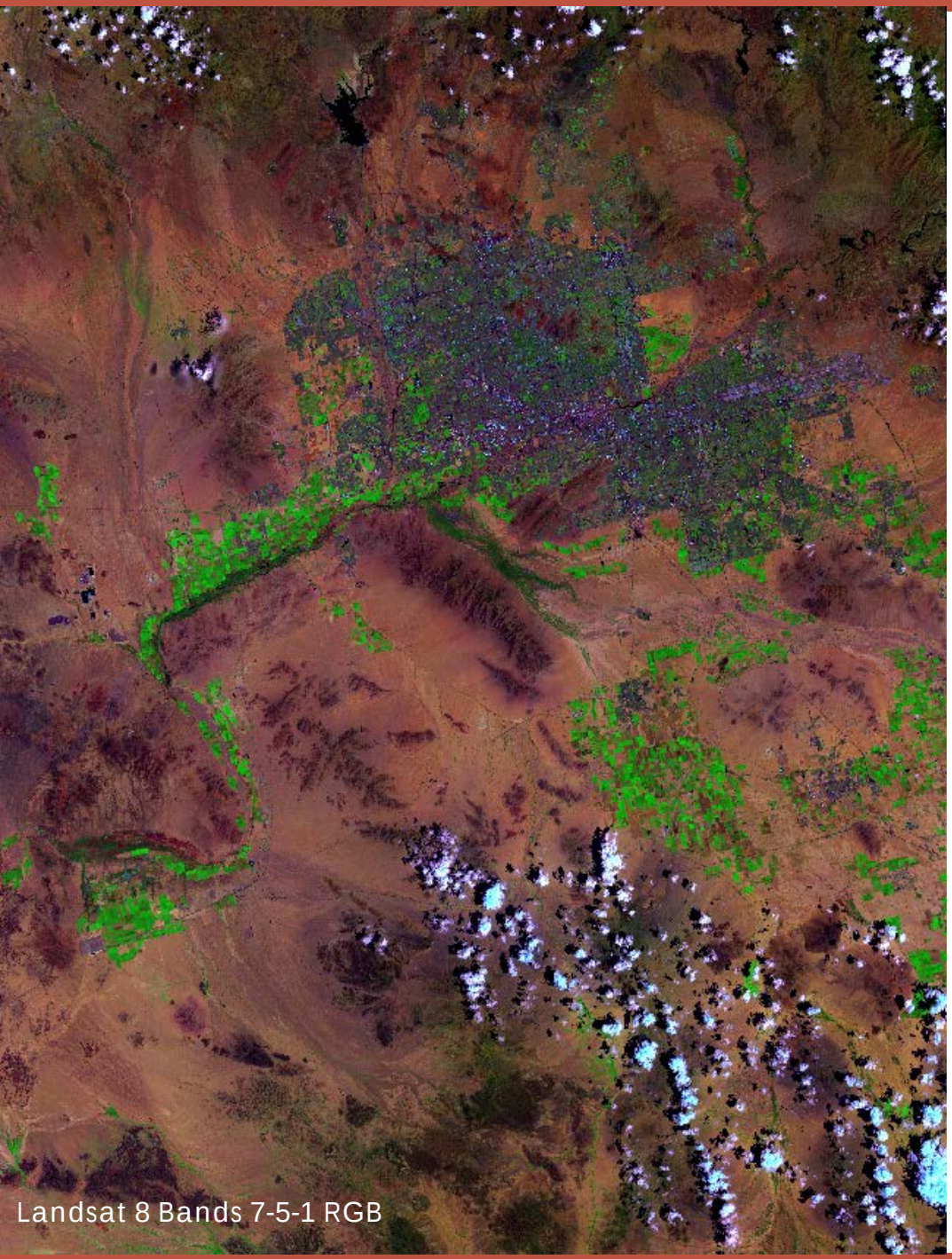
- 51 - 75
- 26 - 50
- 1 - 25
- 0

PROJECT CONCLUSIONS

►Average temperature values within a month and between months throughout the years does significantly vary. Relief efforts should intensify for a daily variable early season and nightly lag into the late season.

►The neighborhoods in the West Valley are consistently among the hottest tracts throughout the seasonal climatology. This is most apparent at night as the radiational cooling flux reduces over the paved surfaces of the city.

►The CASPER Survey should incorporate economic factors during interviews to maximize potential intervention strategies.



Future Work

- The question remains, why is the West Valley so much hotter than the rest of the county? To answer this we must employ land use classification and also take a multisensory approach.
- Once we understand why some areas of the Valley are consistently hotter than others, we can move towards modeling this behavior to better forecast and implement adaptive strategies.
- Present Findings at AGU 2015.

Acknowledgements

Advisors

Dr. David Hondula - *Arizona State University: Geographic Science and Urban Planning*
Dr. Kenton Ross - *NASA DEVELOP National Science Advisor*

Partners

Maricopa County Department of Public Health
Arizona Department of Health Services
ASU GIS Lab
ASU Center for Policy Informatics

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Emily Adams - *NASA DEVELOP LaRC Center Lead*
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Jeff Ely - *NASA DEVELOP Geoinformatics Scientist*
Grant Mercer - *NASA DEVELOP LaRC 2015 Summer Participant*

This material is based upon work supported by NASA through contract NNL11AA00B and cooperative agreement NNX14AB60A.

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