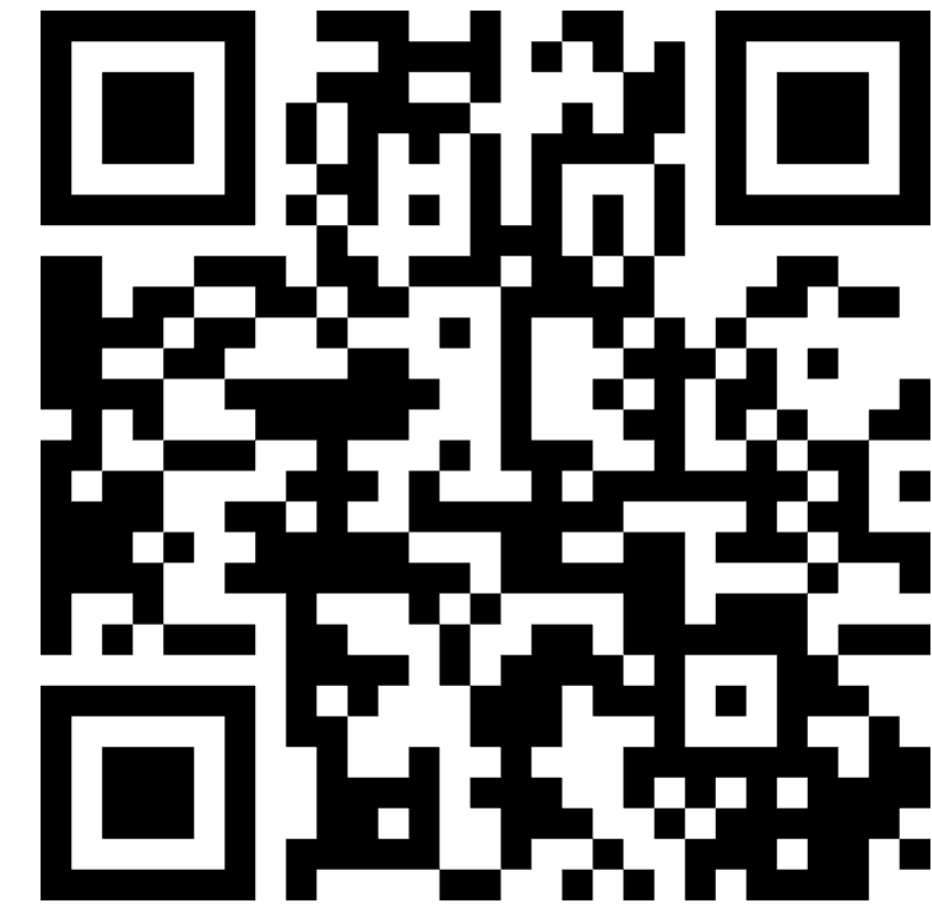


An aerial photograph of a river delta, likely the Colorado River, showing a complex network of blue water channels branching out into a green and brown landscape. A large, dark purple, semi-transparent overlay covers the left side of the image, creating a gradient effect from dark purple to black.

NASA Environmental Justice Data Search Interface Overview

Have you used (or tried to use) NASA data?



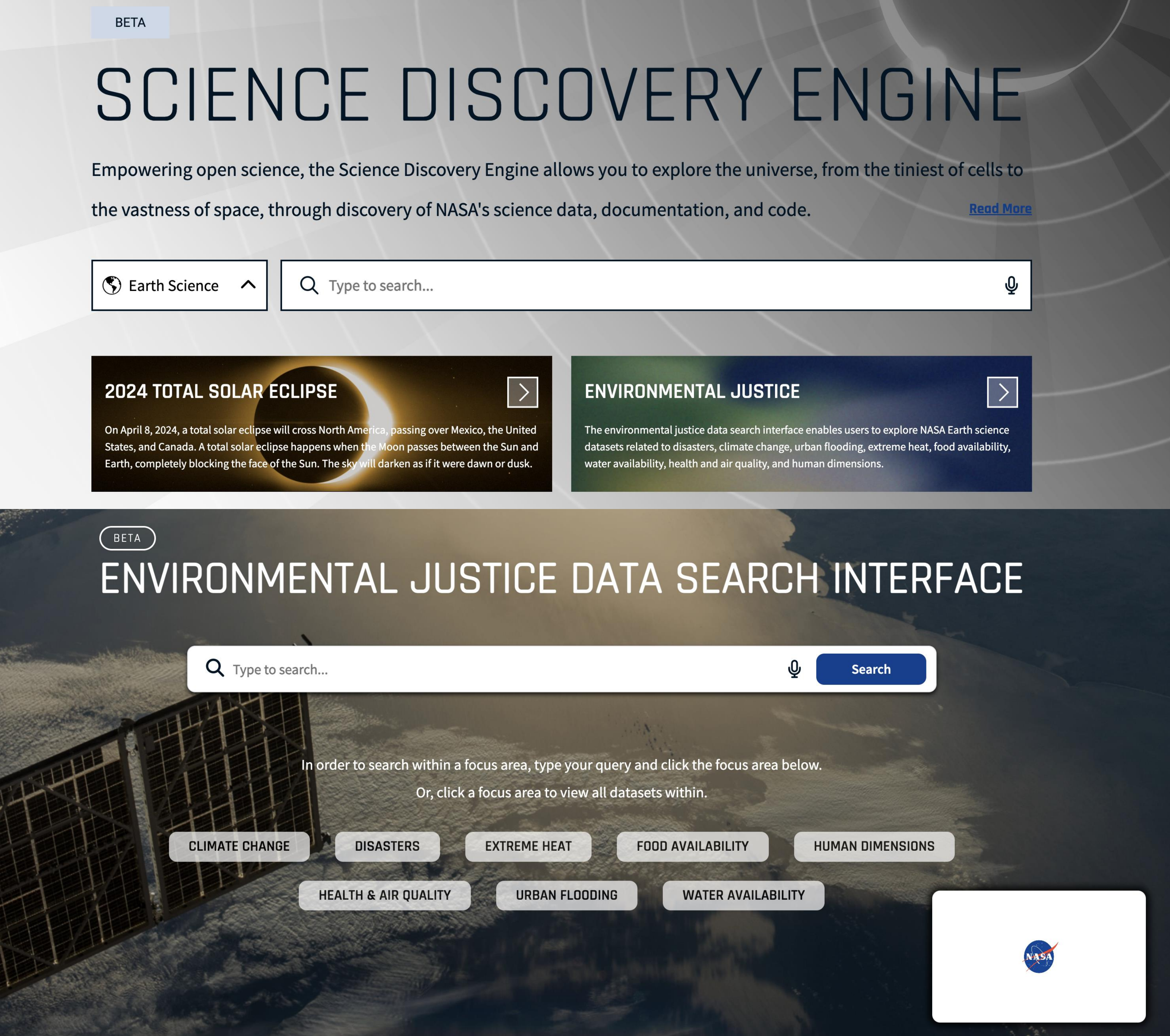
If yes, how was your experience?

Scan the QR code or Go to **menti.com**

use code **4824 6367**



Enabling Open Science to
explore and discover
NASA Data,
documentation, and code



BETA

SCIENCE DISCOVERY ENGINE

Empowering open science, the Science Discovery Engine allows you to explore the universe, from the tiniest of cells to the vastness of space, through discovery of NASA's science data, documentation, and code. [Read More](#)

Earth Science ^

Type to search...

2024 TOTAL SOLAR ECLIPSE

On April 8, 2024, a total solar eclipse will cross North America, passing over Mexico, the United States, and Canada. A total solar eclipse happens when the Moon passes between the Sun and Earth, completely blocking the face of the Sun. The sky will darken as if it were dawn or dusk.

ENVIRONMENTAL JUSTICE

The environmental justice data search interface enables users to explore NASA Earth science datasets related to disasters, climate change, urban flooding, extreme heat, food availability, water availability, health and air quality, and human dimensions.

BETA

ENVIRONMENTAL JUSTICE DATA SEARCH INTERFACE

Type to search...

Search

In order to search within a focus area, type your query and click the focus area below.
Or, click a focus area to view all datasets within.

CLIMATE CHANGE

DISASTERS

EXTREME HEAT

FOOD AVAILABILITY

HUMAN DIMENSIONS

HEALTH & AIR QUALITY

URBAN FLOODING

WATER AVAILABILITY



1

**Identified Gap
Between Users &
NASA Data**

2

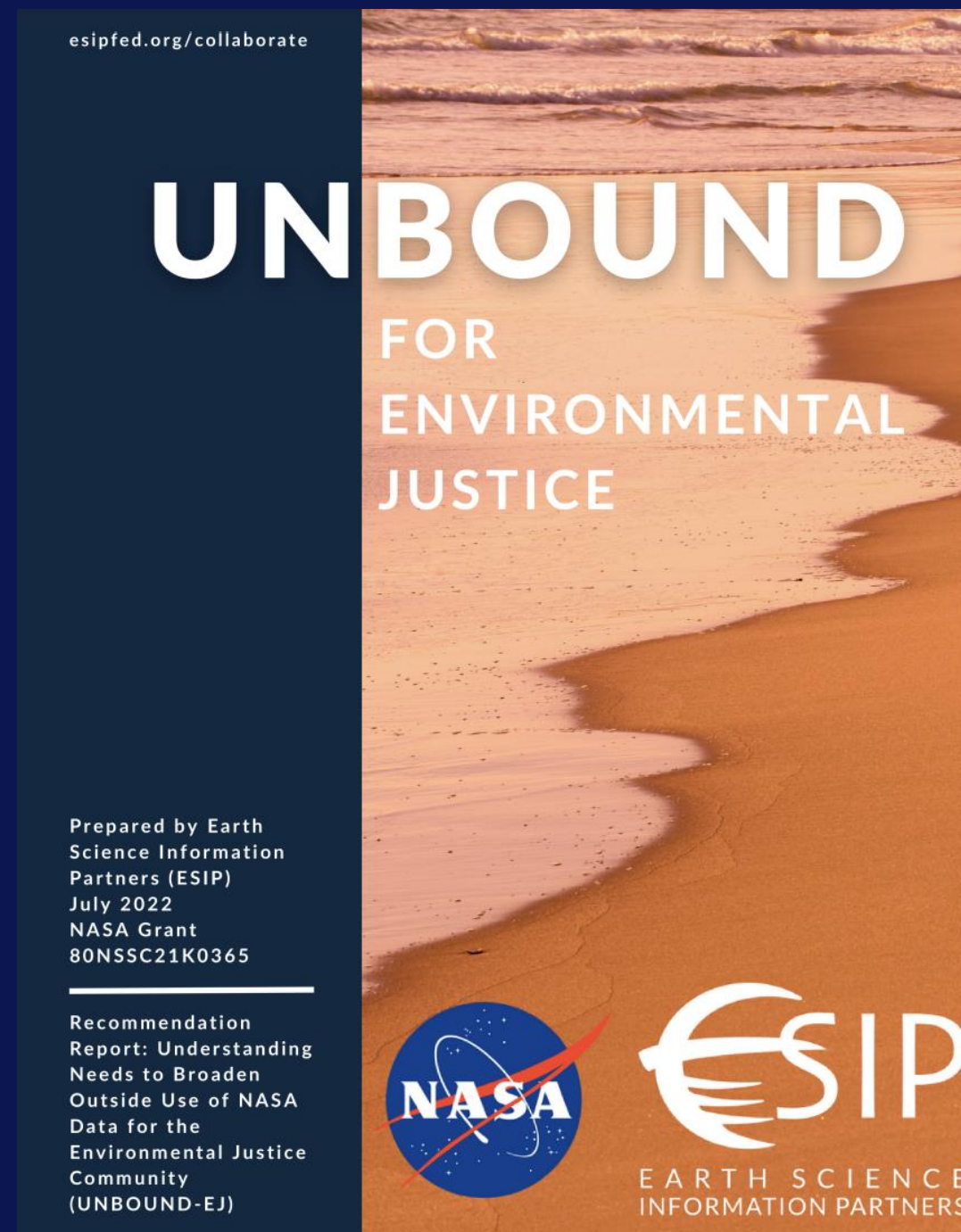
**Leveraged NASA
Data Services**

3

**Feature & Data
Prioritization**

4

**Data Workflow
Process**



- NASA data available publicly
- Datasets relevant to environmental justice
- Users expressed challenges with discovery of relevant data



1

**Identified Gap
Between Users &
NASA Data**

2

**Leveraged NASA
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**Feature & Data
Prioritization**

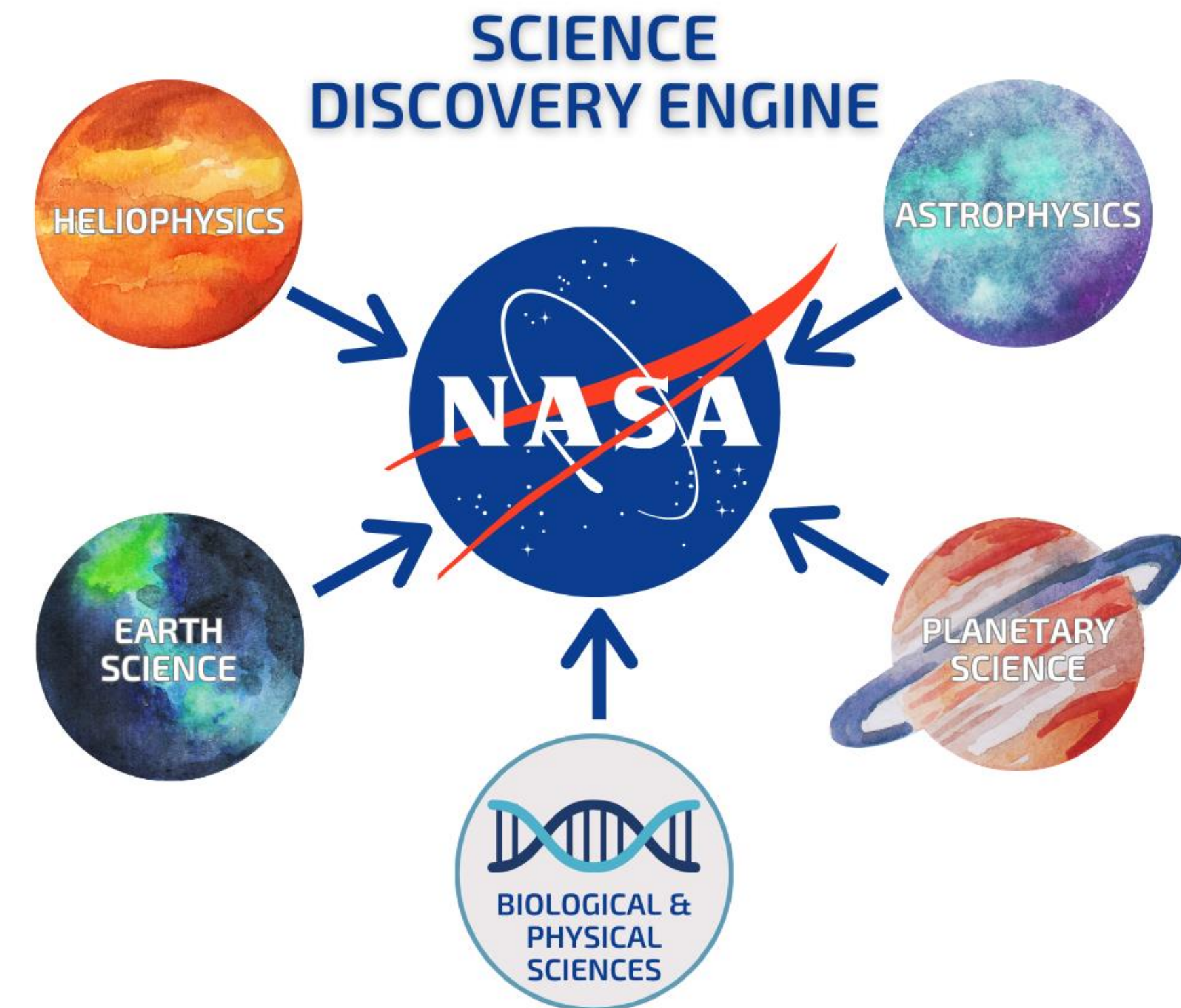
4

**Data Workflow
Process**

The Science Discovery Engine is a unified search experience that enables discovery of NASA's **open science** information. Users can access:

- Metadata about science data
- Code
- Documentation
- Images
- Tutorials
- Mission and instrument information

SCAN ME



We tailored aspects of the SDE UX for EJ data users

Access at: <https://sciencediscoveryengine.nasa.gov/>

1

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Data Workflow
Process

Feature	Priority
Change background on hover	P1 ☒
Help Tutorial	P1 ☒
Filter by indicator	P1 ☒
Filter by intended use	P1 ☒
View by list	P1 ☒
View by columns (table mode)	P1 ☒
View dataset overview	P1 ☒
Share dataset	P1 ☒
View tool tips for metadata categories	P1 ☒

Feature	Priority
Filter by geographic area	P2 ☐
Add or remove columns (compare mode)	P2 ☒
Download dataset	P2
Sort by newest first or alphabetical	P3
View dataset visualization	P3
View dataset images	P3
Explore related source to a data set	P3
View related variables as an attribute	P3
Explore source in SDE	P3 ☒

P1: must-have, P2: good-to-have, P3: nice-to-have

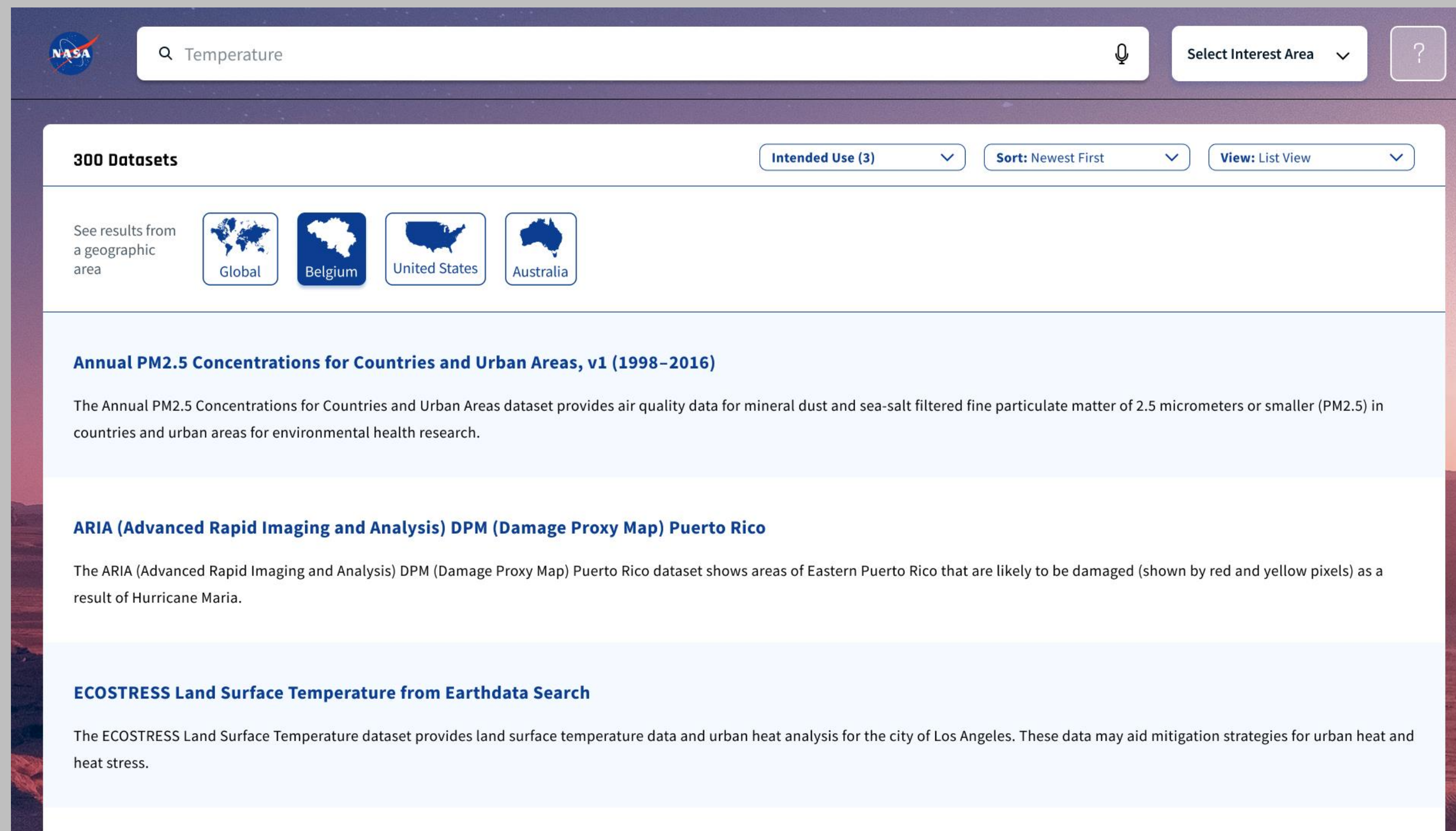
☒: Complete, ☐: In progress

1
Identified Gap
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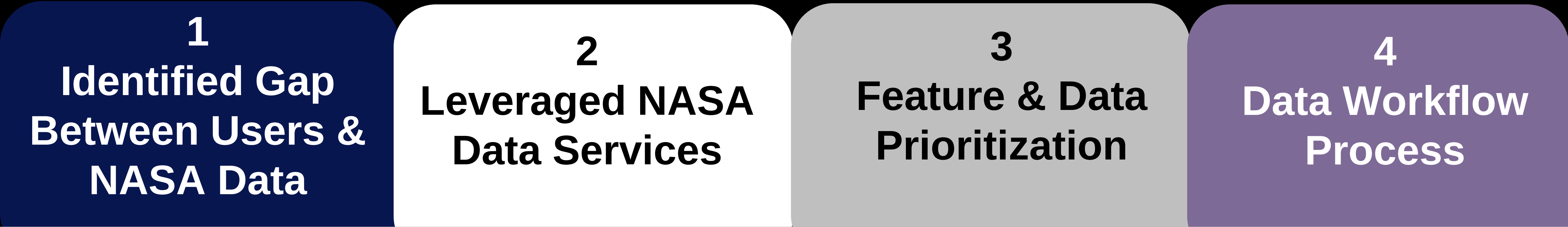
2
Leveraged NASA
Data Services

3
Feature & Data
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4
Data Workflow
Process



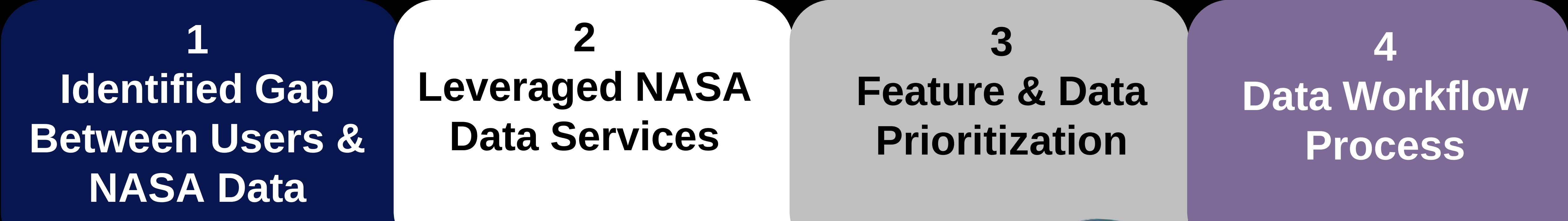
Geographic Search



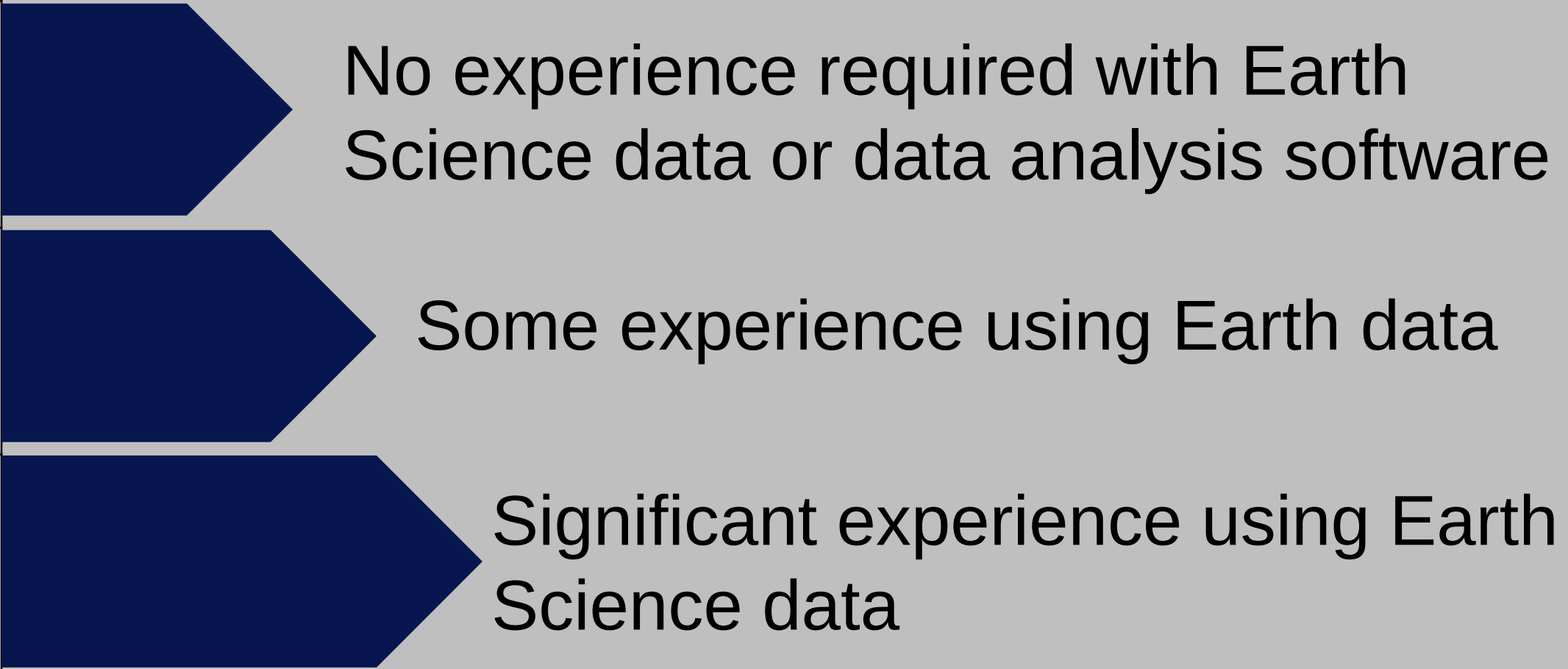
EJ Indicator	# of Datasets Tagged
Human Dimensions	34
Health & Air Quality	25
Climate Change	24
Food Availability	17
Disasters	13
Extreme Heat	9
Urban Flooding	6
Water Availability	6

Total number of datasets: 90

*Some datasets are tagged with multiple indicators



Intended Use (Paths in the Spreadsheet)	# of Datasets in this Category
Exploration	5
Basic Analysis	60
Advanced Analysis	25



1

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**Data Workflow
Process**

The technical team identified best practices for data:

- Curation
- Cleansing and
- Storage in the interface

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Next Steps

- Incorporate remaining selected NASA datasets/documents
- Incorporate additional/new NASA datasets or related documentation
- Incorporate remaining identified features
 - Filter by geographic area
 - Sort by newest first or alphabetical
- Assess other requested features for feasibility
- Assess accuracy of prototype workflow that, using AI, classifies datasets as relevant to EJ and assigns an indicator based on CMR metadata
- User Feedback!



Examples: Health & Air Quality

Health & Air Quality / EJ Example: Aerosols and Their Impacts on Houston, TX

- This use case explored the relationships between urbanization, socioeconomic disparities, and environmental effects
- Incorporated the following datasets:
 - Aerosol optical depth (AOD)
 - Impervious surfaces
 - CDC's Social Vulnerability Index
- Initial findings show that trends are highly localized:
 - Galveston Bay: decrease in AOD from 2000 to 2019, potentially due to the Clean Air Act
 - Western Suburbs of Houston, TX: localized increase of AOD that correlates to urbanization

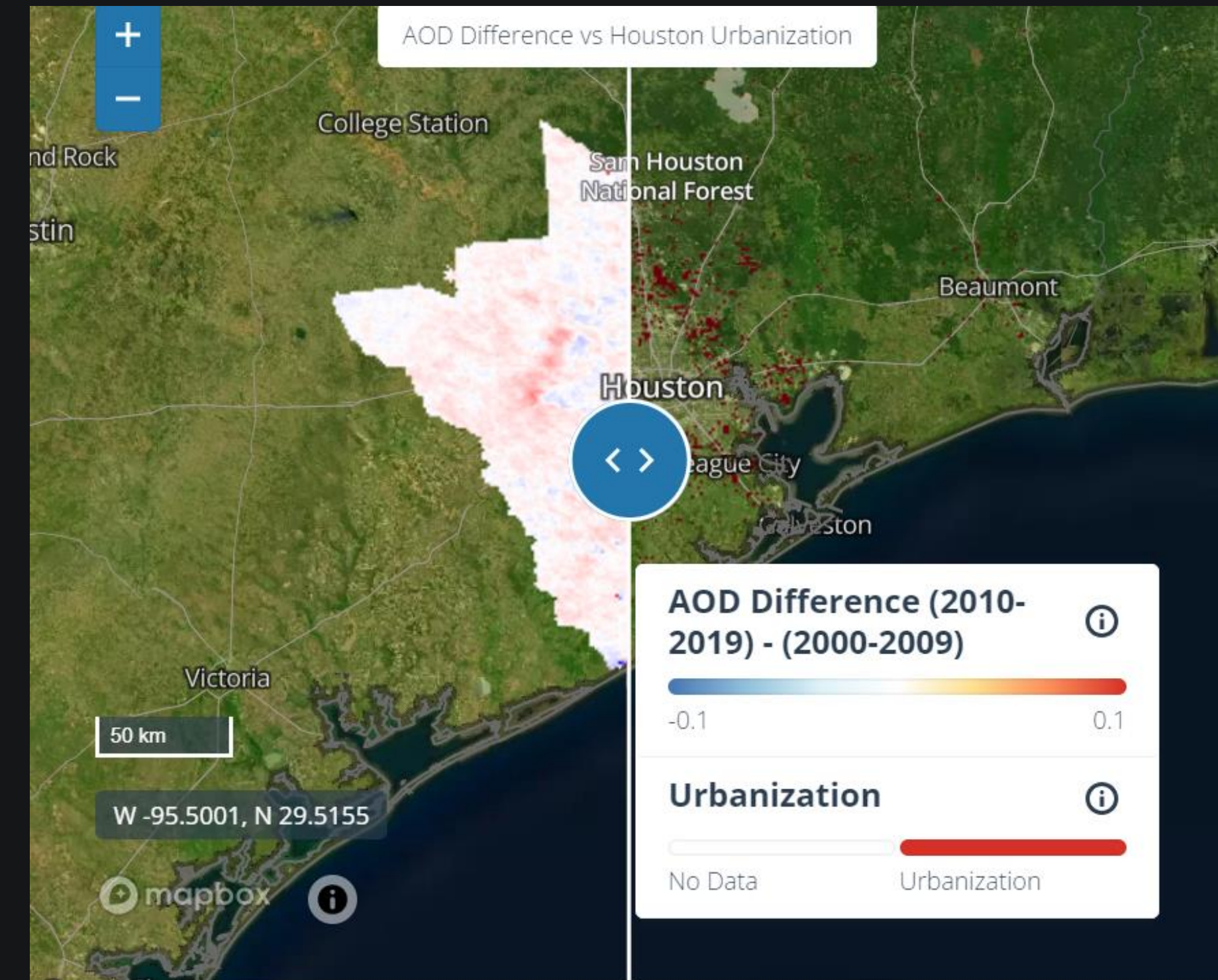
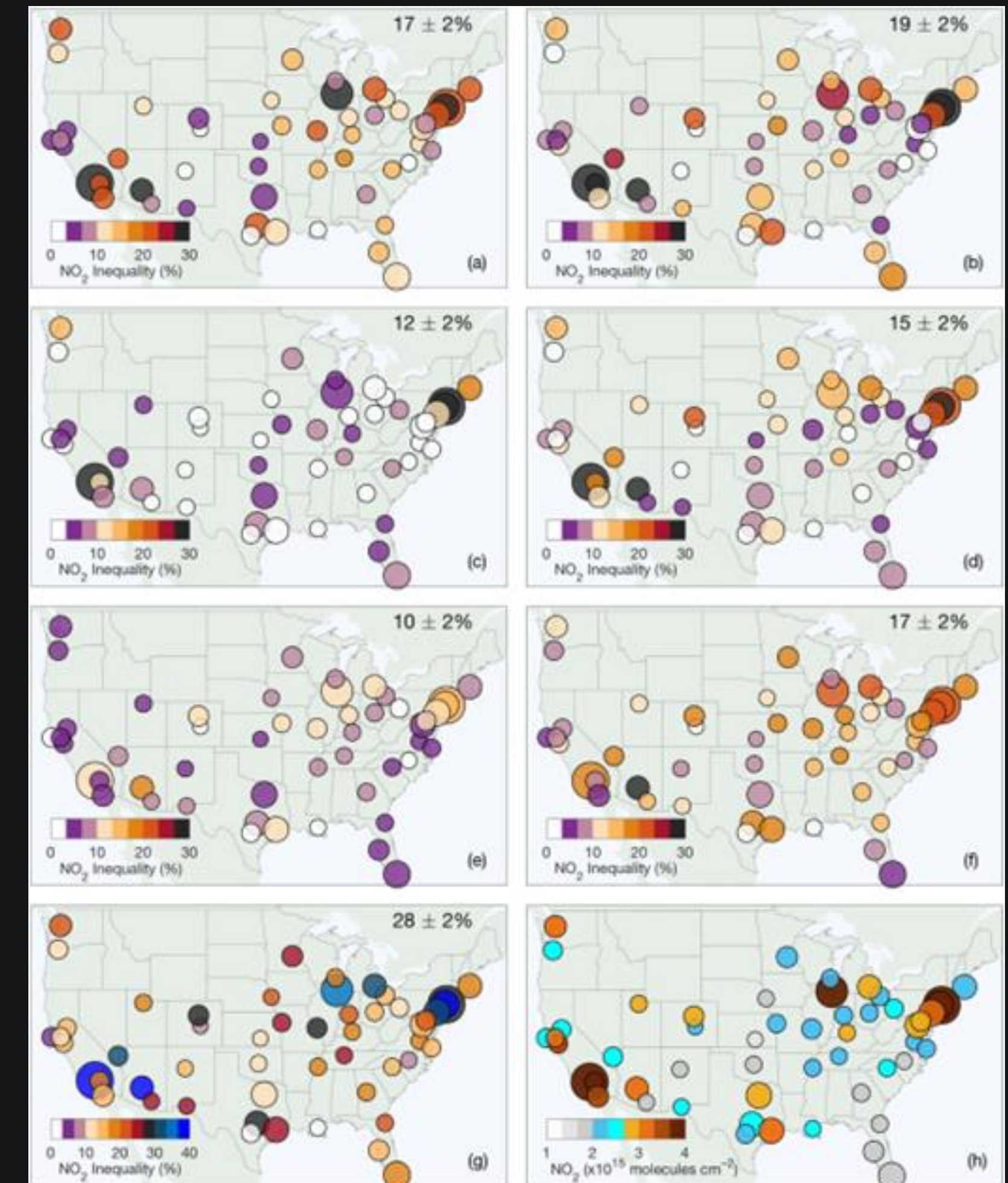


Figure 3: Aerosol Optical Depth Compared Decadally from 2000-2009 & 2010-2019 vs the Urbanization of the Houston metro from 2000-2019. The left portion of the map shows the subtracted difference in AOD over the last 20 years over the Houston metropolitan area.

Health & Air Quality / EJ Example: NO₂ Air Pollution Inequality in Major US Cities

- This study explored the relationship between levels of air pollution and health burdens with socioeconomic info on a neighborhood-by-neighborhood basis
- Incorporated the following datasets:
 - Nitrogen dioxide (NO₂) from TROPospheric Ozone Monitoring Instrument (TROPOMI)
 - NO₂ measurements from NASA airborne sensor
 - Tract level census data
- Findings show that:
 - Higher resolution measurements allow us to capture intra-urban inequality
 - Across major U.S. cities NO₂ pollution is higher for people of color in low-income tracts and inequality is largely driven by diesel emissions



Demetillo, M. A. G., Harkins, C., McDonald, B. C., Chodrow, P. S., Sun, K., & Pusede, S. E. (2021). Space-based observational constraints on NO₂ air pollution inequality from diesel traffic in major US cities. *Geophysical Research Letters*, 48, e2021GL094333. <https://doi.org/10.1029/2021GL094333>

An aerial photograph of a river delta, likely the Colorado River, showing a complex network of distributaries flowing into a large body of water. The land is green and brown, indicating vegetation and exposed soil. A large, semi-transparent purple overlay covers the upper left portion of the image, creating a dark background for the text.

Use Case & Demo: Health & Air Quality



DEMO!

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HEALTH & AIR QUALITY

URBAN FLOODING

WATER AVAILABILITY

NASA

Your Turn to Explore with us!

STEP 1: Come up with a research question or thematic area of interest

STEP 2: Navigate to interface

STEP 3: Browse for datasets that are relevant to that area of interest, explore!

STEP 4: Complete the survey as you go!

<https://forms.gle/4VPHc8hLZsNJ6VUU6>

EJ INTERFACE



SURVEY

