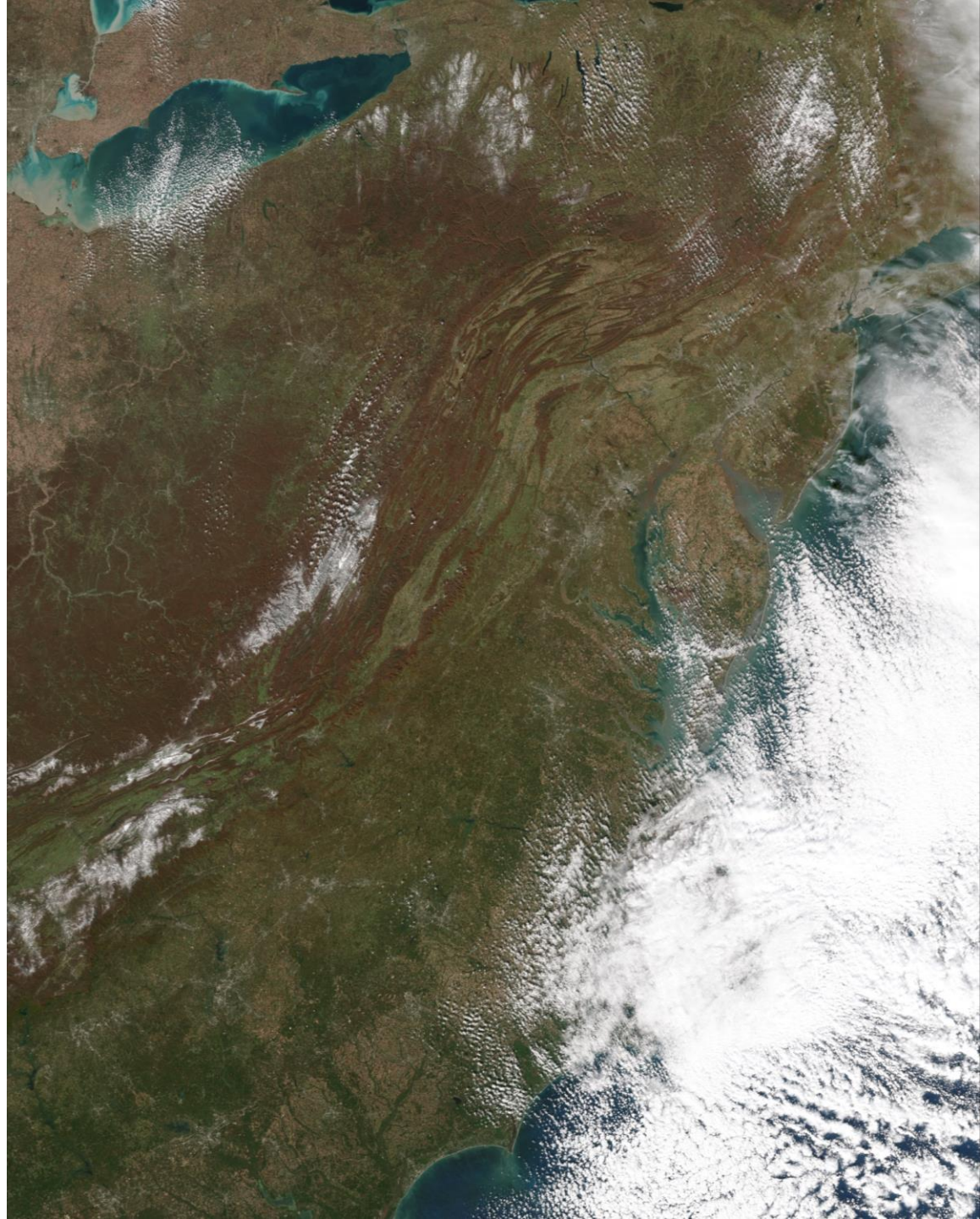
Earth Observations for Environmental Justice: Health and Air Quality

Shobhana Gupta, MD PhD

Equity and Environmental Justice Program, Associate Program Manager

EARTH SCIENCE
APPLIED SCIENCES



Harnessing Earth observations to find solutions to Earth's greatest challenges.

The **Applied Sciences Program** helps people across the world use NASA data to solve big problems right here on Earth.

HEALTH & AIR QUALITY

DISASTERS

WILDFIRES

AGRICULTURE

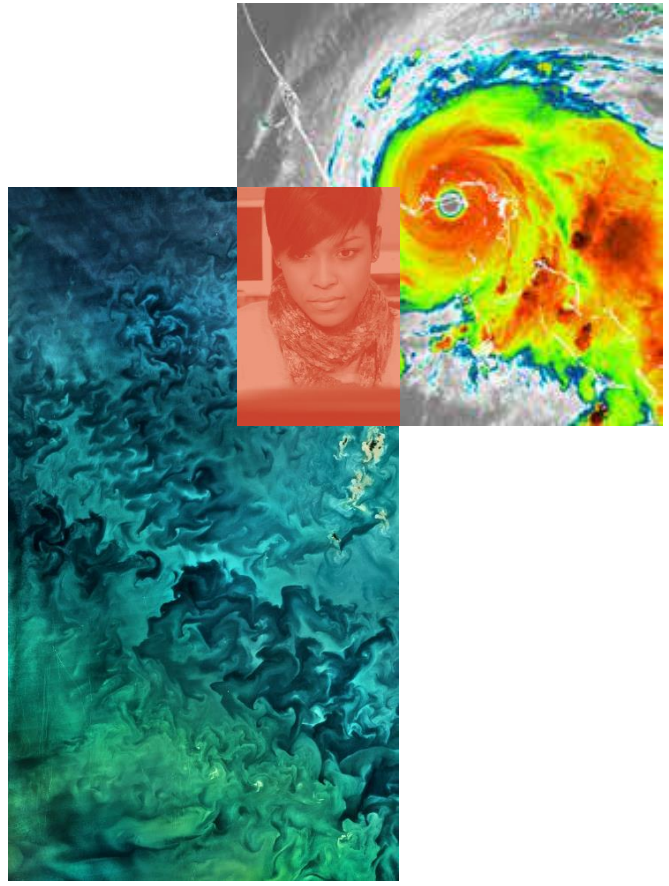
ECOLOGICAL FORECASTING

WATER RESOURCES

CLIMATE

CAPACITY BUILDING

Making Earth Data Accessible to All



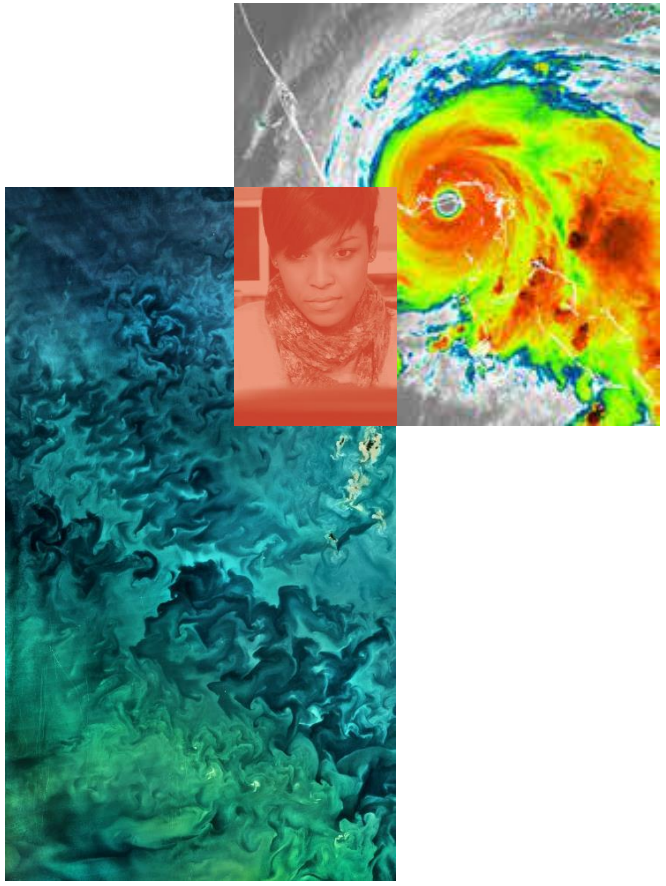
The **Capacity Building Program** provides individuals and institutions with workforce development, training activities, and collaborative projects as a means to strengthen understanding of Earth observations and expand their use around the world.

We work with everyone at every level — from first-time users to long-time professional users of Earth science data. We work to promote open data access and coordinate capacity building activities focused on users needs.

Four elements:

ARSET	DEVELOP	SERVIR
Community Action	Indigenous Peoples Initiative, Prizes & Challenges, and Equity & Environmental Justice	

Making Earth Data Accessible to All



The **Capacity Building Program** provides individuals and institutions with workforce development, training activities, and collaborative projects as a means to strengthen understanding of Earth observations and expand their use around the world.

We work with everyone at every level — from first-time users to long-time professional users of Earth science data. We work to promote open data access and coordinate capacity building activities focused on users needs.

Four elements:

ARSET

DEVELOP

SERVIR

Community Action

Indigenous Peoples Initiative, Prizes & Challenges, and Equity & Environmental Justice

NASA's Equity & Environmental Justice

Communities around the world are facing environmental challenges, including poor air and water quality, sea level rise, extreme heat, and more. Marginalized communities, particularly in the poorest and most vulnerable areas, bear the burden of these challenges. The EEJ program is committed to ensuring that the investment the nation has made in NASA satellites and science benefits people across the U.S. and helps them make informed decisions about the very real challenges they face in their communities.

EEJ Efforts & EJ-related Activities:

- 39 ROSES A.49 projects
- 1 FINESST project
- 1 AIST project
- *A subset of Indigenous Peoples Initiative activities*
- *A subset of DEVELOP projects*

EEJ Program Team:

- **Program Manager**: Owen Hooks
- **Associates**: Shobhana Gupta, Emma Yates, Sabrina Delgado Arias, Lauren Childs-Gleason, and Nikki Tulley
- **Interns**: Gina Knox, Emily Loker, Izellah Sanchez, Cari Reinert, and Nati Phan
- **CBP Support**: Sydney Neugebauer

ROSES A.49 Solicitation Purpose & Objectives

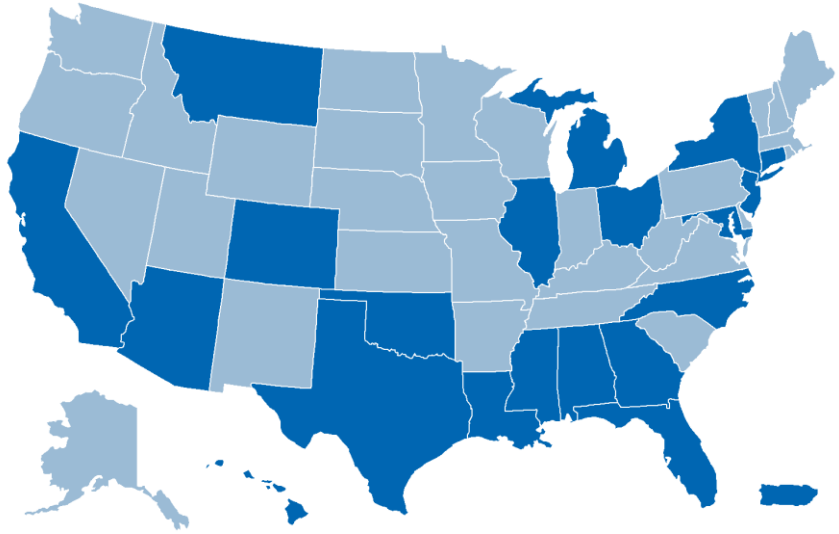
Purpose: Advance progress on EEJ domestically through better understanding of community needs and increased use of Earth science, geospatial, and socioeconomic information.

Objectives:

- Advance EEJ and those that work to promote it, enabling uses of Earth science information in its support.
- Advance NASA ESD's understanding of issues faced by EJ and underserved communities, preferred engagement approaches, organizations supporting them, and effective ways for ESD to contribute.
- Advance integration of Earth science, geospatial, and socioeconomic information.
- Expand the community of practice who use Earth science to advance environmental justice issues and inform future strategies.

Geographic Reach of

39 Projects Selected



Direct community impact

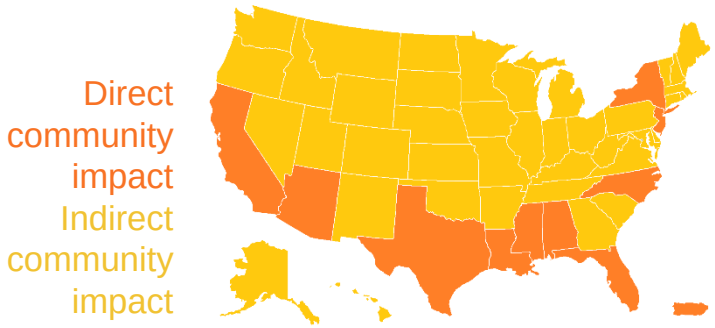
Indirect community impact

Landscape Analyses

Studies that use participatory data collection and assessment processes to increase NASA's understanding of the EEJ "landscape". Projects support characterization of EJ communities, environmental issues they face, their familiarity/use of EO, and opportunities for working with them to support planning and investment decisions.

Length: 6-9 months

10 Landscape Analyses

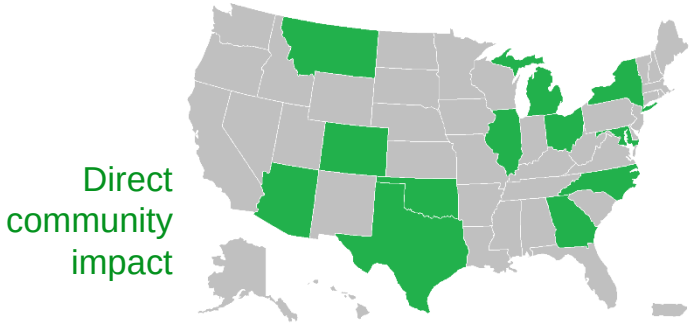


Community-based Feasibility Studies

Short-term projects that explore and test ways to address environmental issues facing EJ and underserved communities with the help of Earth science and geospatial information. Address community needs by co-designing with community organizations projects tailored to community needs and test and validate use of EO for local decision making.

Length: 12-18 months

13 Feasibility Studies

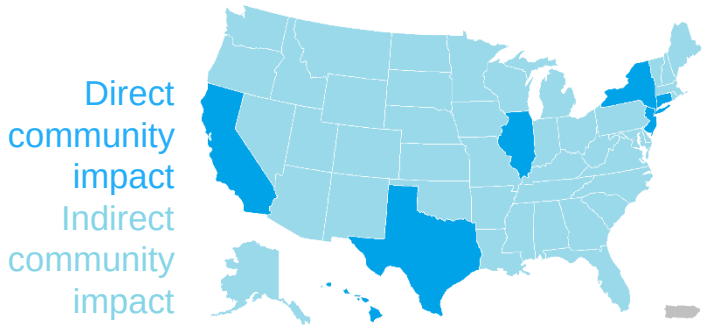


Data Integration Projects

Projects that develop, test, and demonstrate sustained use of integrated Earth science, geospatial, and socioeconomic data, tools, and/or applications to support EJ communities with novel insights into community-level management. Culminate in GIS-enabled products or tools for public dissemination to support EEJ communities.

Length: 12-24 months

16 Data Integration Projects



Data Integration Projects	3	9	10	0	7	4	2	1	1	6	1
Feasibility Studies	0	8	6	1	4	4	1	2	1	5	3
Landscape Analyses	1	6	4	0	3	1	2	3	1	1	3

Thematic Topics Addressed

22 Heat projects, topics: Extreme Heat, Urban Heat Islands, Climate Hazards

14 Ecological Conservation, topics: Urban greenspace, Green infrastructure, Urban Forestry, Tree canopy coverage

13 Air Quality projects, topics: Air pollution, Wildfire Smoke

10 Disasters projects, topics: Urban flooding, Green infrastructure solutions, Stormwater management

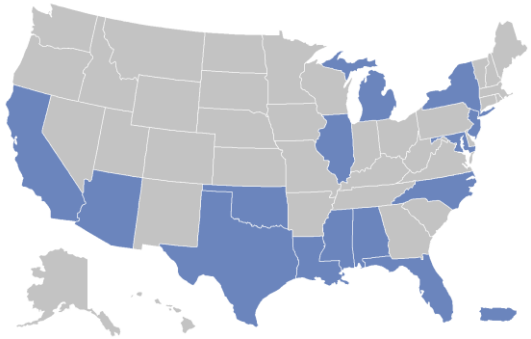
5 Wildfires projects, topics: Fire management, Fire risk & exposure

4 Water projects, topics: Water pollution, Stormwater management, Precipitation monitoring, Green infrastructure solutions

4 Agriculture projects, topics: Crop health, Food insecurity, Urban ag, Ag burning

A.49 PROJECTS SUMMARY

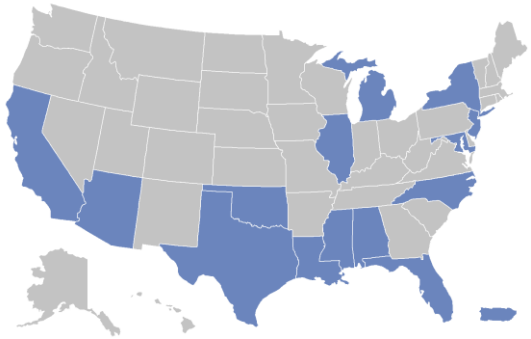
22 Heat-related Projects



PI	Title	EEJ Communities & Collaborators	Geography	Project Type
Meenar	From Green to GrEEEn: Utilizing an EJ lens and Earth sci data to enhance greenspace Equity, Exposure, and Experience	Social Responsibility Through Me	Camden & Jersey City, NJ	Landscape
Marcotullio	Spatial and temporal variations in land surface temperature, vegetation, and socio-economic and health characteristics in frontline EEJ neighborhoods in New York City: Integrating Scientific Study with Community Perspectives	We Act, Environmental Justice Alliance	NYC	Landscape
Flynn	Leveraging EO data to support environmental justice: A Puerto Rico coastal community case study	Communidad Las Margaritas	Puerto Rico	Landscape
Mothes	Leveraging Earth science data to heighten awareness of environmental injustices within the U.S. prison system	Prisons Agriculture Lab	US-wide	Landscape
Wilkins	Assessment of Wildland Fire-Related Environmental Exposure Issues Impacting Vulnerable Populations in CA	Science for Nature and People Partnership	California	Landscape
Fernandez	Can remote data connect us to the land? A landscape analysis for braiding satellite-based information and indigenous knowledge in California	Indigenous communities in CA	California	Landscape
Morrow	Assessment of the Gulf Coast Environmental Justice Landscape for Equity (AGEJL-4-Equity)	Deep South Center for EJ, Inc.	Gulf Coast	Landscape
Wolf	GPM, IMERG precipitation estimate in an arid, environmental justice area of Tucson, Arizona, USA	Sonora Environmental Research Institute, Inc.	Tucson, AZ	Landscape
Rice-Boayue	Exploring Synergistic Opportunities Between Charlotte-Area EJ Initiatives and NASA Earth Science Information	City of Charlotte NC	Charlotte, NC	Landscape
Mueller	Improved monitoring and management of urban tree equity: integrating metrics of tree quality with tree cover	Cuyahoga County Planning Commission, Holden Arboretum	Baltimore, MD	Feasibility
Smith	Equity, EJ, and Extreme Heat: Leveraging EO to Strengthen Community Driven Climate Mitigation Strategies	Midway Community Development Corp	Baltimore, MD	Feasibility

A.49 PROJECTS SUMMARY

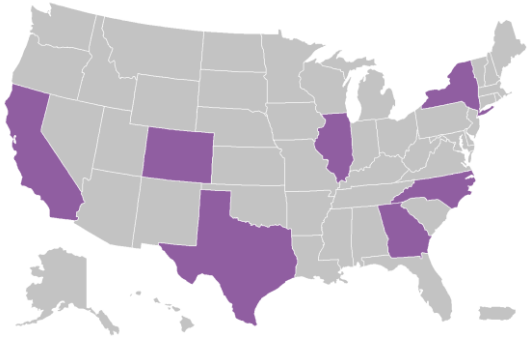
22 Heat-related Projects



PI	Title	EEJ Communities & Collaborators	Geography	Project Type
Miller	Addressing Inequitable Flood Risks in Southeast Michigan through Green Infrastructure	SE Michigan Council of Governments	SE Michigan	Feasibility
Adamo	Pairing EO and socioeconomic data to enable student-led hazard monitoring for environmental justice in New York	Bronx Center for Science and Math HS, WE ACT, NYC Mayor's Office of Resiliency	NYC	Feasibility
Cheng	A spatial decision support system for identifying heat vulnerability based on a comprehensive energy budget model and multi-criteria decision analysis in Oklahoma City, OK	City of Oklahoma, AARP Oklahoma State, Neighborhood Alliance of Central Oklahoma	Oklahoma City, OK	Feasibility
Carrion	Identifying temperature disparities, energy insecurity, and social vulnerability for energy justice in New York State	Green and Healthy Homes Initiative	New York	Feasibility
Douglas	Communities for a Better Environment: Triangulating NASA Data and Participatory GIS with Local Organizing to Advance EJ in LA	Communities for a Better Environment	Los Angeles, CA	Data Int
Marlier	Mapping Vulnerable Populations in California to Climate-Related Hazards	Tracking California	California	Data Int
Liu	Investing In EEJ: An Urban Decision-Support Tool Integrating Earth Observations, Socioeconomic Data, And Ecosystem Service Models	Food Policy Council of San Antonio, City of San Antonio	San Antonio, TX	Data Int
Stuhlmacher	Designing for Just Green Enough: A Data Integration Tool for Informing Community Green Space Planning	Community of Pilsen & Chicago Ward 25	Chicago, IL	Data Int
Bixler	ATX CA3TCH UP: Climate Atlas for Accountability and Advocacy Strategies through Co-production with Historically Underserved Community Partners in Austin, TX	City of Austin Office of Sustainability, Go Austin Vamos Austin	Austin, TX	Data Int
Heris	Developing an interactive data portal for connecting vulnerable communities to the science of urban heat mitigation	Greenville Community Partnership	NYC & Jersey City, NJ	Data Int
Dronova	Where the Grass Grows Greener: The Impacts of Urban Greening on Housing Prices & Neighborhood Stability	Association of Bay Area Governments Metro Transportation Commission	San Francisco, CA	Data Int

A.49 PROJECTS SUMMARY

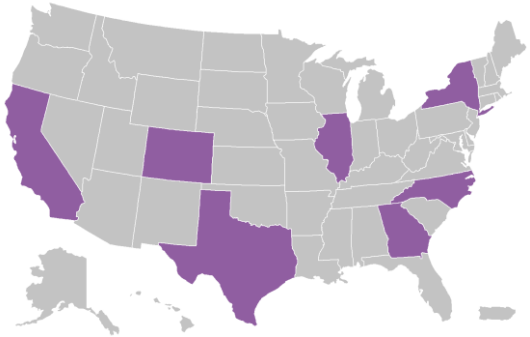
13 Air Quality-related Projects



PI	Title	EEJ Communities & Collaborators	Geography	Project Type
Marlier	Mapping Vulnerable Populations in California to Climate-Related Hazards	Tracking California	California	Data Int
Raysoni	Integration of Satellite data on Air Pollution with Socioeconomic Indicators to assess the impacts of agricultural burning on local communities in the Lower Rio Grande Valley of South Texas.	Cameron County Emergency Management	Lower Rio Grande Valley, TX	Data Int
Rice-Boayue	Exploring Synergistic Opportunities Between Charlotte-Area EJ Initiatives and NASA Earth Science Information	City of Charlotte NC	Charlotte, NC	Landscape
Mothes	Leveraging Earth science data to heighten awareness of environmental injustices within the U.S. prison system	Prisons Agriculture Lab	US-wide	Landscape
Wilkins	Assessment of Wildland Fire-Related Environmental Exposure Issues Impacting Vulnerable Populations in CA	Science for Nature and People Partnership	California	Landscape
Hang	Using NASA Earth Observations to Support EJ Communities in Atlanta, Georgia	Center for Sustainable Communities	Atlanta, GA	Feasibility
Adamo	Pairing EO and socioeconomic data to enable student-led hazard monitoring for environmental justice in New York	Bronx Center for Science and Math HS, WE ACT, NYC Mayor's Office of Resiliency	NYC	Feasibility
Ibsen	Unequal distributions of commuter exposure to extreme heat and air pollution at neighborhood and microscales: A Community-based Feasibility Study designed for NASA's Earth Science Applications focused on Equity and Environmental Justice	Groundwork Denver, Denver Public Health & Environment, Denver Regional Transportation District, Jefferson County	Denver, CO	Feasibility
Tessum	An Observation-Driven Framework for Air Pollution Equity and Justice Intervention Modeling	City of Madison, American Lung Association, Respiratory Health Association	US-wide	Data Int

A.49 PROJECTS SUMMARY

13 Air Quality-related Projects

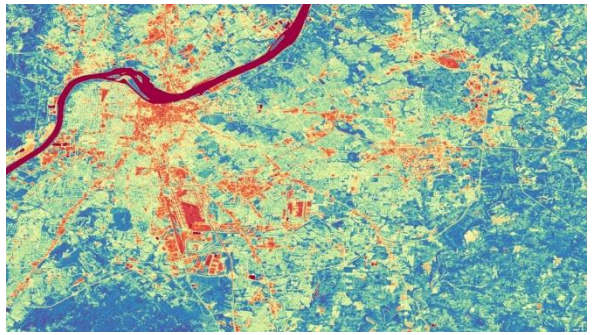


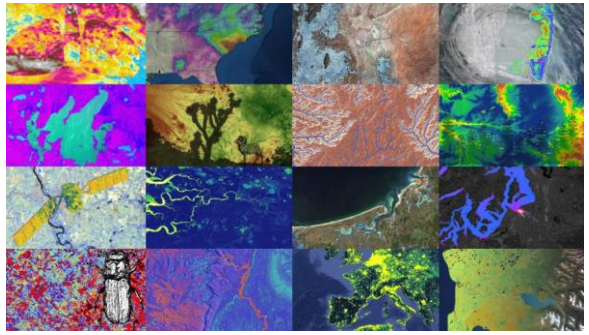
PI	Title	EEJ Communities & Collaborators	Geography	Project Type
Wood	Applying the EVDT Integrated Modeling Framework for Environmental Justice Applications	Campaign to Fight Toxic Prisons	US-wide	Data Int
Comer	Predictive Environmental Analytics and Community Engagement for Equity and Environmental Justice (PEACE for EEJ)	South Coast AQ Management District, Los Angeles Mayor's Office	Los Angeles, CA	Data Int
Sharma	e-JUST: Environmental Justice using Urban Scalable Toolkit	Greenleaf Communities, Blacks in Green	Chicago, IL	Data Int
Douglas	Communities for a Better Environment: Triangulating NASA Data and Participatory GIS with Local Organizing to Advance Environmental Justice in Los Angeles	Communities for a Better Environment	Los Angeles, CA	Data Int

EEJ A.49 Projects

https://nspires.nasaprs.com/external/viewrepositorydocument/cmdocumentid=890446/solicitationId=%7B9C5CDB21-B9B4-AFE8-8435-052107DDDAEA%7D/viewSolicitationDocument=1/EEJ21%20SELECTIONS%20Final_v2.pdf

WHAT'S NEXT?





- Continue developing opportunities within Applied Sciences
  - Solicitations
  - DEVELOP projects
  - ARSET trainings
  - Prize competitions
- Continue to identify and work with people at NASA, other federal agencies, regional governmental organizations, and non-profit and for-profit organizations in the private sector to progress towards positive EEJ outcomes

1. What recommendations do you have for the EEJ team?
   - Engaging communities
   - Inspiring new generations of scientists
   - Sharing EO resources for positive impact
2. What synergies do you see with your work in Health and Air Quality?

THANK YOU

Shobhana Gupta, shobhana.gupta@nasa.gov

EEJ Program Manager:

Owen Hooks, richard.o.hooks@nasa.gov

https://appliedsciences.nasa.gov/

EARTH SCIENCE
APPLIED SCIENCES