Executive Summary:

WORKING TOGETHER; A Landscape Analysis to Inform Practical, Innovative, and Beneficial Use of NASA Earth Science Data to Advance Equity and Environmental Justice in the Gulf South Region

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Authors:
Dr. Beverly Wright, Dr. David Padgett, and
Dr. Nathan Morrow

EXECUTIVE SUMMARY

Four Environmental Justice (EJ) networks convened to map priorities and discuss NASA Earth science data to advance underserved, primarily African American, EJ communities of the Gulf South: the National Black Environmental Justice Network, Historically Black College and University-Community Based Organization (HBCU-CBO) Gulf Coast Equity Consortium, the Deep South Center for Environmental Justice (DSCEJ) Community Advisory Board, and the Environmental Justice Forum. The "Communiversity" model for co-created participatory action research guided the community-led academic-supported process. Grounded firmly in Environmental Justice Movement principles, the Communiversity approach safeguards equitable participation in research and honors the wealth of diverse knowledge held by EJ communities.

This Landscape Analysis intends to inform longer-term NASA Earth Science Division equity and environmental justice (EEJ) efforts and Applied Sciences Program's EEJ-oriented application activities. A context analysis summarizes relevant background and trends in EJ activism and scholarship, EJ policy development, hazards of the Gulf South in relation to climate change, open community-engaged science, NASA data, and NASA EEJ initiatives. Impact case studies of EJ networks' Communiversity action research and results of participatory EJ network convenings are presented in synthetic findings of 1) EJ priorities and 2) strategic NASA Earth science engagement opportunities.

Environmental Justice priorities were complex and multidimensional, relating immediately to the experience of frontline communities. **Air quality**-related adverse health outcomes, unexplained odors, smoke, dust, or toxic emissions leaving corrosive residues in homes and across front-line communities intersected with unacceptable current air quality monitoring and calls for more localized community-engaged research. **Localized flooding** invoked discussion of larger water management priorities of clean water, groundwater contamination, sink holes, energy and climate justice, infrastructure investment decision processes and implementation that could be framed within associated personal economic and health burdens. Cultural **legacy and heritage** research using observational data in community asset mapping intersected with concerns of **gentrification** resulting from poorly informed EJ action. **Climate Crisis and cumulative effects** exemplified EJ community integrated impact-centric understanding of increased storms, localized flooding, and heat combined with the complexity of economic bias, health disparities, and multi-source toxic and environmental exposures. **Novel areas of research** came both from the EJ communities experience, such as marsh fires, and from consideration of NASA's current projects, such as heat mapping. Two foundational priorities were emphasized as foundational in every consultation:

- Integrity in engagement with honest, open, transparent, and committed partnership sharing values to advance EEJ.
- Fairness in data ownership as a foundation of equity in all aspects of partnering with EJ organizations and EJ communities.

Opportunities to improve measurement of EJ disparities should be primarily place-based on a local scale. TEMPO and the Multi-Angle Imager for Aerosols (MAIA) missions that increase spatial and temporal resolution more closely align to EJ priorities than sensors from global scale monitoring missions. Commercial data sets (CSDA) are promising for local-level infrastructure, gentrification, and localized flooding investigations. Landcover change timeseries, including Harmonized Landsat Sentinel-2 (HLS), may improve EJ research into drivers of disparity and distance-based exposure science. Historical patterns of harm central to EJ theory development require innovative approaches that could include radar data. Future PACE and GLIMR missions with hyperspectral and high temporal frequency capabilities promise a data transformation for coastal environmental, climate, and ocean justice research. Lacking sufficient integrated socio-environmental data, available measures and models continue to ignore not only disparities, but participation, recognition, and other essential EJ concepts.

Opportunity to improve participation of EJ communities in decisions that affect their lives is the most immediate opportunity for NASA to advance EJ with its current data and systems. NASA landcover mapping and information system products about land, water, climate, and air are perfectly suitable as base maps for community-led participatory mapping. Mapping assets, hazards, risks, and patterns of harm can all benefit from integration of NASA products in data collection, synoptic analysis, and presentation. Visualizations for both community-engaged investigations and EJ issue advocacy could be supported with open-source tools by academic partners or backbone functions of bridging organizations. Capacity development to improve the scale, scope, and scientific validity of community-engaged science could leverage existing NASA initiatives: TOPS, ARSET, DEVELOP, and FINNEST. A timely opportunity for impactful data use exists to expand focus on decision support to Justice40 for both covered programs, of Community Engagement and Climate Resilience, and beyond.

Opportunity to recognize the value of EJ community knowledge and honor the historical and cultural foundations of the EJM can be realized with EJ community-academic engagement models such as Dr. Beverly Wright's Communiversity model and mandating alignment with Environmental Justice Principles and Ways of Working. Open science capacity development and certification could promote novel and high-quality EJ community-led research, bring new insights, understanding, and advancing EJ science (theory, methods, measurement, findings, and evidence-based action).

Participants in the AGEJL-4-Equity convenings welcomed NASA EEJ program development and perceived the benefit of NASA data products to advance and strengthen EJ communities. Acting on these opportunities does not imply small or simple adjustments, but instead calls for sustained transformative commitment and investment that 1) focuses on wellbeing and prioritizes EJ community development, 2) develops capacity and strengthens community institutions, and 3) supports community-led engagement in all steps of scientifically valid research.

The authors make the following recommendations based on the conclusions of the analysis and their understanding of the EJ context, policy, and policy implementation landscape in the Gulf South:

Recommendation 1 Institutionalize **Dr. Beverly Wright's Communiversity model** at NASA with sustainable funding for EJ community-academic partnerships

Recommendation 2 Promote **Open Science for EJ community-engagement** as a basis for training initiatives and network development in the Gulf South through a regional hub partner

Recommendation 3 Recognize, support capacity development, and sustainably fund **"backbone" functions of bridging EJ organizations** to advance equity and environmental justice with NASA data products

Recommendation 4 Empower EJ and underserved communities with NASA data and open science capacity support focused on planning, monitoring, and evaluating **Justice40 infrastructure investments** to safeguard anticipated fair distribution and intended benefits to underserved and EJ communities

Recommendation 5 Extend and prioritize funding to integrated multidisciplinary community-driven research that contributes to **diversification and development of EJ theory** and related open access publishing

Recommendation 6 Adapt **ARSET and DEVELOP** approaches for needs of EJ communities

Recommendation 7 Initiate **youth engagement and workforce development for EJ Communities** in community-engaged open Earth science

Recommendation 8 Stand-up a Distributed Active Archive Center **(DAAC) for EJ** located in the Gulf South to address a great challenge for advancing EJ – lack of appropriate data