ARID White Paper
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Documentation Revision Date: 2025-01-07
Dataset Version: 1

Summary
This dataset provides a report describing the scoping efforts of NASA's Adaptation and Response in Drylands (ARID) Terrestrial Ecology Field Campaign. The ARID project emphasizes a prioritized research agenda and an initial implementation plan, focusing on the western U.S. to deepen our understanding of national dryland processes and resources. ARID is also leveraging an extensive network of international sites and collaborators in southern Africa, Australia, Mexico, and South America. This global approach facilitates the evaluation, monitoring, and forecasting of drylands worldwide, ensuring a coordinated effort to address and inform solutions for the challenges facing these critical ecosystems. ARID will use cutting-edge approaches to address four Science Themes: Climate Variability and Drought, Ecosystem Structure, Function, and Biodiversity, Carbon Cycle Interannual Variability and Long-Term Trends, and Social-Ecological Systems. The scoping study performed extensive outreach, conducting over 160 meetings and events, which translated to the ARID science plan being co-created with a wide range of contributors and perspectives, including remote sensing, modeling, and dryland scientists; Tribal Nations; and diverse federal entities. This report outlines a targeted plan to deploy field and NASA airborne instruments to vastly augment data derived from satellite observations that, when joined, will substantially advance quantification of drylands large and changing role in the Earth system.
There is one file with this dataset in portable document format (PDF).

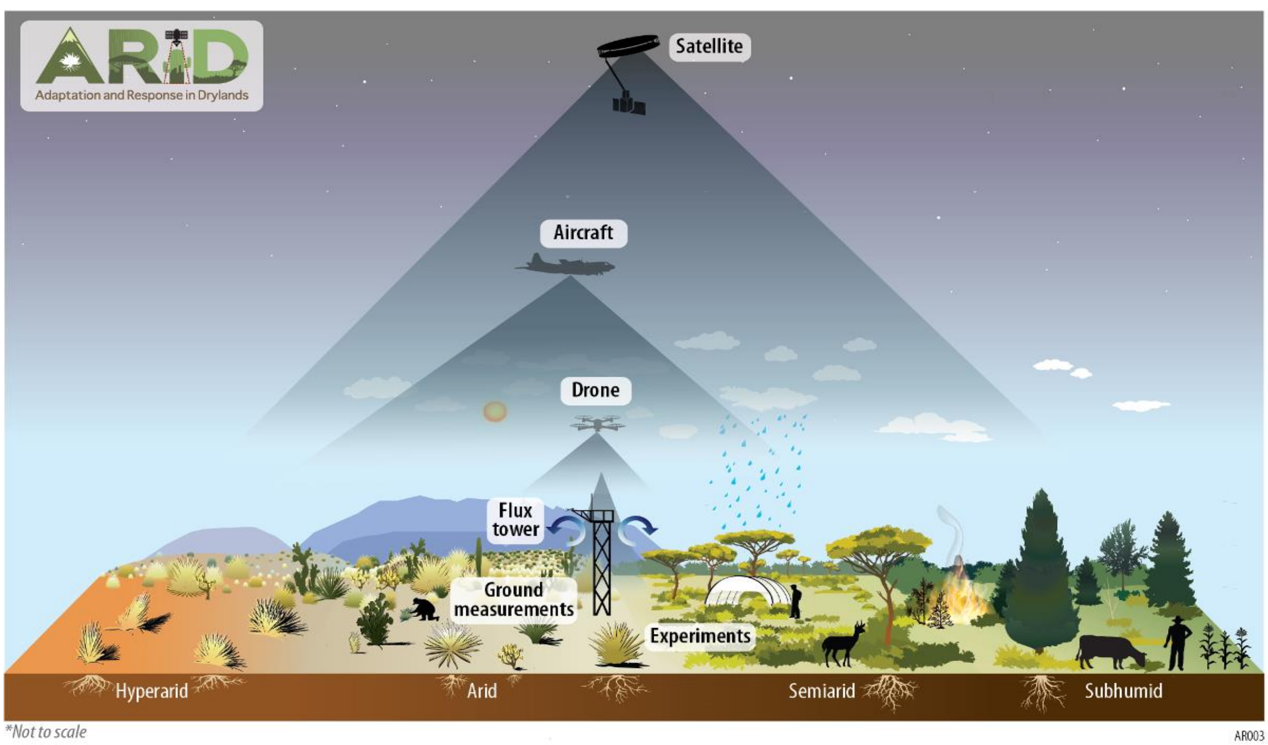

Figure 1. ARID will vastly improve the quantitative and predictive understanding of Earth's drylands, using a nested approach that coordinates in-situ measurements, existing and new research networks, and with drone and aircraft data that harmonize with and inform satellite observations.

Citation

Babst-kostecka, A., Z. Fu, J.K. Green, R.F. Kokaly, R.J. Swap, S. Serbin, C.J. Tucker, L. Wang, J.D. Watts, G.M. Wolfe, A. Flores, J.R. Leaf, R. Washington-allen, K. Prentice, E. Kachergis, J. Reyes, J. Ryan, M. Sanclements, H. Loescher, A. Leidner, T. Swetnam, and B. Cook. 2025. ARID White Paper. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/2397

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Dataset Overview

This NASA **Adaptation and Response in Drylands (ARID)** Scoping Study White Paper presents the scientific justification, key questions, study design, and implementation concept for a new NASA Terrestrial Ecology Field Campaign focused on drylands. ARID is an international campaign, outlining strong research needs, partnerships, and synergistic field campaign initiatives for Australia, northern Mexico, southern Africa, and South America. At the same time there is a significant focus on the United States (U.S.) due the strong national need for actionable dryland science.

Data Characteristics

There is one file with this dataset in PDF format: **ARID_White_Scoping_Paper.pdf.** The pdf provides the scientific justification, key questions, study design, and implementation concept for a new NASA Terrestrial Ecology Field Campaign focused on drylands.

Application and Derivation

Drylands are one of the most vulnerable global ecosystems to anthropogenic change and this has significant implications for food security, water availability, biodiversity, land degradation, and geopolitical stability, as well as large feedbacks to future climate. The ARID campaign would use NASA's extensive current (e.g., ECOSTRESS, EMIT, SMAP, Landsat) and future (e.g., NISAR, SBG, and Landsat Next) satellites in conjunction with a dedicated multi-scale field campaign using NASA airborne assets (e.g., AVIRIS, UAVSAR, and MASTER) and ground measurements. With these spaceborne, aircraft, and field sampling capabilities across scales, NASA is the only agency positioned to bring the science and end-user communities together to address the ARID campaign's four interrelated science themes and overarching questions. Refer to the PDF for additional information.

Quality Assessment
Not Applicable.

Data Acquisition, Materials, and Methods
This white paper outlines a targeted plan to use NASA's extensive current (e.g., ECOSTRESS, EMIT, SMAP, Landsat) and future (e.g., NISAR, SBG, and Landsat Next) satellites in conjunction with a dedicated multi-scale field campaign using NASA airborne assets (e.g., AVIRIS, UAVSAR, and MASTER) and ground measurements that, when joined, will substantially advance quantification of drylands' large and changing role in the Earth system. ARID will use cutting-edge approaches to address four Science Themes aligned with key knowledge gaps:

- ***Climate Variability and Drought:*** *How are climate extremes like droughts, heatwaves, and large rain pulses impacting dryland systems and interacting with fire regimes, land cover change, and land-atmosphere interactions?*
- ***Ecosystem Structure, Function, and Biodiversity:*** *What are the main mechanisms driving the spatiotemporal distributions of dryland structure, function, and biodiversity, and how vulnerable are these ecosystem components?*
- ***Carbon Cycle Interannual Variability and Long-Term Trends:*** *What is the contribution of drylands to the mean, trend, and interannual variability of global terrestrial carbon uptake, what drives these patterns, and what can we expect from them in the future?*
- ***Social-Ecological Systems:*** *What are the consequences of changes in drylands for social-ecological systems, and what management options can sustain the ecosystem services supporting lives, livelihoods, and national security in the face of change?*

Refer to the file **ARID_White_Scoping_Paper.pdf** for details.

Data Access
These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).
ARID White Paper
Contact for Data Center Access Information:

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References
None.