

NASA Data for Your Air Quality Applications Made Easier

National Aeronautics and
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Living in a Changing Environment



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How Might NASA Better Connect Users With Data?

Data Pathfinders provide resources and tools for a variety of user communities to help them make data actionable. NASA's Earth Science Data Systems (ESDS) offers Data Pathfinders that provide resources and tools for a variety of user communities to help them make data actionable. The Pathfinders were developed to make NASA data more accessible by focusing data resources around common Earth systems themes with the goal of reducing barriers to NASA data so that users may jump into exploration, analysis, and application.

Respond to Feedback

In 2023, Earth Science Information Partners (ESIP) hosted the workshop series Understanding Needs to Broaden Outside Use of NASA Data for Air Quality (UNBOUND: AQ) to better understand the needs of air quality data users who are new to using NASA data. These participants were tasked with using and implementing NASA resources like the Air Quality Data Pathfinder.



ESIP released its recommendations to NASA based on the results from the UNBOUND: AQ last May. The UNBOUND for Air Quality Report identified opportunities for NASA to better understand the needs of its users and respond accordingly.

It Takes a Village



Over the last year, ESDS has worked to prepare updates to the Air Quality Pathfinder. ESDS engaged several key collaborators to address issues that came to light in the UNBOUND-AQ report in a redesign of the Air Quality Data Pathfinder.

NASA collaborators on the Air Quality Data Pathfinder update include: the Earth Science Data and Information System (ESDIS) Project, the Earth Action Program, the Global Modeling and Assimilation Office (GMAO), the Applied Remote Sensing Training (ARSET) Program, and others.

Updates to the Data Pathfinder include:

- Data organized by resolution for easy identification
- Resources grouped by parameters
- Data tools organized to aid user selection
- New tools provided for GIS users, programmers, etc.
- And more!

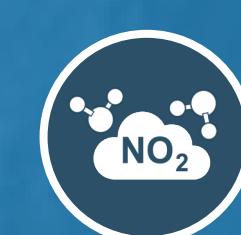
Commonly-Used Air Quality Data Parameters in One Place



Aerosol Data
Aerosol Optical Depth
Aerosol Index
PM2.5
Dust Score



Weather Data*
Air Temperature
Clouds
Precipitation
Wind
Relative Humidity



Trace Gas Data
Nitrogen Dioxide
Sulfur Dioxide
Carbon Monoxide
Ozone
Formaldehyde*
Ammonia*



Land Surface Data*
Soil Moisture
Surface Reflectance
Topography



Human Dimensions Data
Satellite Derived Environmental Indicators*
Population Distribution and Change*
Air Quality Data for Health Related Applications
Climate Change Impacts*
Environmental Performance Index*
Poverty and Economic Indicators*

*New additions to this version of the Air Quality Data Pathfinder include: Weather, Land Surface, Human Dimensions criteria, and two trace gases. These categories were added based on their appearance in research publications, use cases, and trainings.

Data Table is Organized by Resolution for Easy Identification, Not by Platform or Sensor

Those who are new to Earth observation data may have limited knowledge of NASA platform and sensor names. To better help these users, data in the Air Quality Data Pathfinder have been reorganized based on resolutions, not platform or sensor.

Spatial Resolution	Spatial Coverage	Temporal Resolution	Temporal Coverage	Spectral Resolution	Satellite/Platform	Name (Sensor, Model, etc.)	Observation, Model, or Reanalysis	File Format
250 m, 500 m, 1 km, 10 km, 3 km	Global	Daily, 8-day, 16-day, monthly, quarterly, yearly	2000 (Terra/2002 Aqua)-present	36 spectral bands ranging in wavelengths from 0.4 μ m to 14.4 μ m	Terra/Aqua	*Moderate Resolution Imaging Spectroradiometer (MODIS)	Observation	HDF-EOS
6km, 1"	Global	Daily Monthly/15-minute	2012-present	0.600 - 0.680 μ m, 3.55 - 3.93 μ m, 10.5 - 12.4 μ m	NASA/NOAA Suomi National Polar-orbiting Partnership (Suomi NPP) and NOAA-20	Visible Infrared Imaging Radiometer Suite (VIIRS); Deep Blue	Observation	HDF5, HDF-EOS5
6km	Global	<1-minute	2012-present	0.600 - 0.680 μ m, 3.55 - 3.93 μ m, 10.5 - 12.4 μ m	NASA/NOAA Suomi NPP Dark Target	*Visible Infrared Imaging Radiometer Suite (VIIRS); Dark Target	Observation	netCDF4
0.25", 13x24 km	Global	Daily, 1-98 minutes	2004-present	1.0 - 0.45 nm Full Width and Half Maximum (FWHM)	Aura	*Ozone Monitoring Instrument (OMI)	Observation	HDF-EOS5
7 x 3.5 km 2.7 x 2.8 km 0.41 band 7 x 7 km 25WIR bands	Global	Daily	2017-present	270 nm - 2.3 μ m, 0.55 nm	Sentinel-5P	TROPOMI	Observation	netCDF
10km	Global	12-24 per day	2017-present	10 channels from 317-779 nm	DISCOVR	EPIC	Observation	HDF5
0.5" x 0.625"	Global	3 hourly, monthly	1980 to near present	n/a		MERRA-2	Reanalysis	netCDF
N/A	Varies	sub-hourly	Varies by site		Ground-based	AERONET	Observation	ASCII

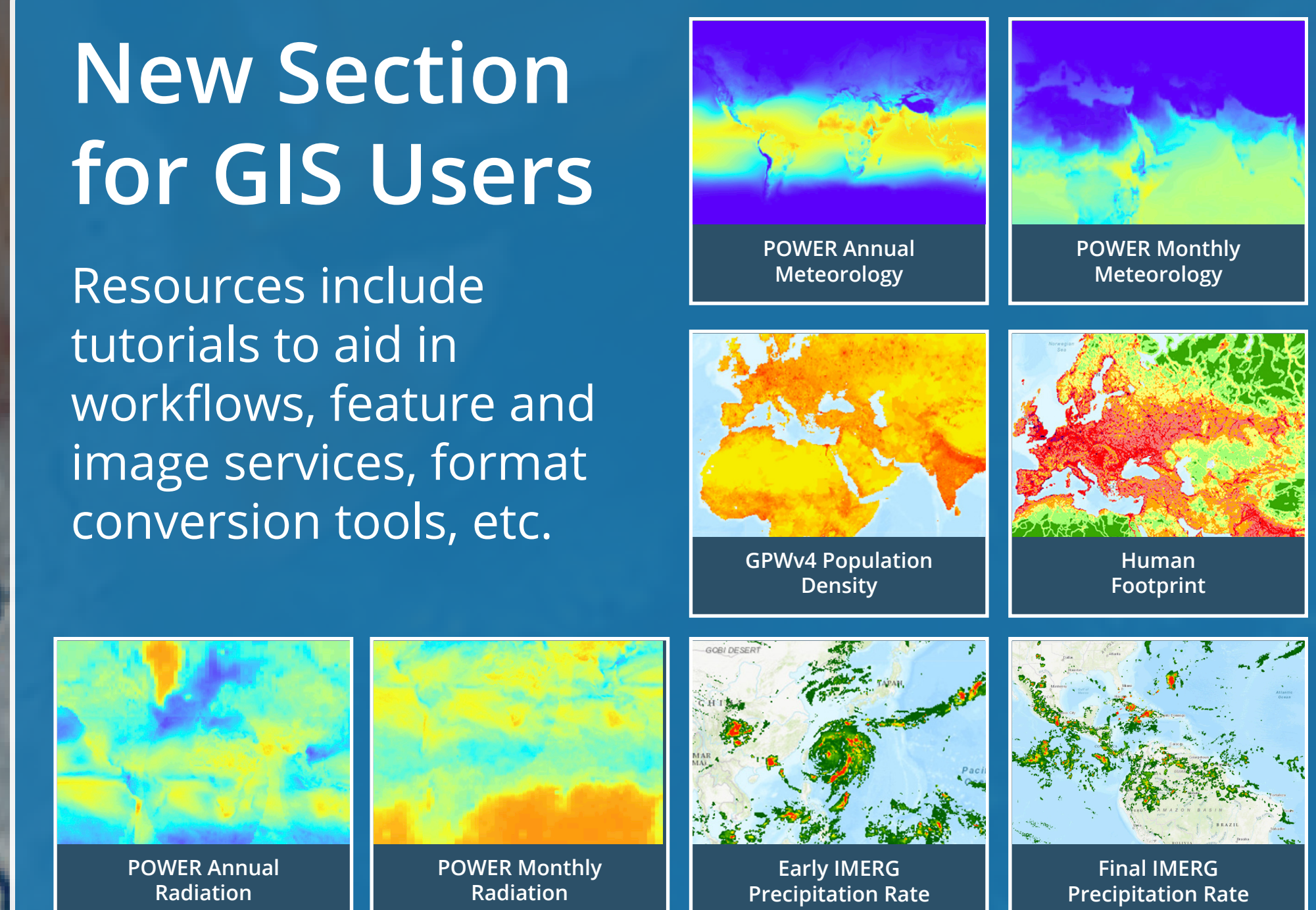
Tools for Using the Data

Access the right tool for the job by selecting from a range of tools developed to help users work with NASA data. These include tools that help data users achieve the following activities with our data:



New Section for GIS Users

Resources include tutorials to aid in workflows, feature and image services, format conversion tools, etc.



Resources Grouped by Parameters



Tutorials
Parameters and data-specific tutorials are integrated to help users access NASA data.



Use Cases and Articles
Inspiring stories showcase how data are used to address air quality issues around the world.



Data Customizing Resources
Tools for subsetting, reformatting, and reprojection are also suggested in this pathfinder.



Data Access Resources
Other resources range from visualization tools to those that enable data download.



Updated Resources for Programmers

APIs, Jupyter Notebooks, tutorials, and much more are available in one place for your parameter of interest.

Access this Pathfinder (and more) today!



<https://www.earthdata.nasa.gov/learn/pathfinders/air-quality-data-pathfinder>

