



National Aeronautics and
Space Administration

EARTHDATA

NASA's Earthdata GIS¹ (EGIS) Enterprise:
Transforming Earth Observation and
Human Dimension (EOHD) Data and
Building Dynamic Analysis Ready Web
Services for Faster and Easier Data
Interrogation

Presentation Date 12/12/2024

Allison Alcott

Presenter on behalf of EGIS as a contractor with Adnet Systems Inc.



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Roadmap

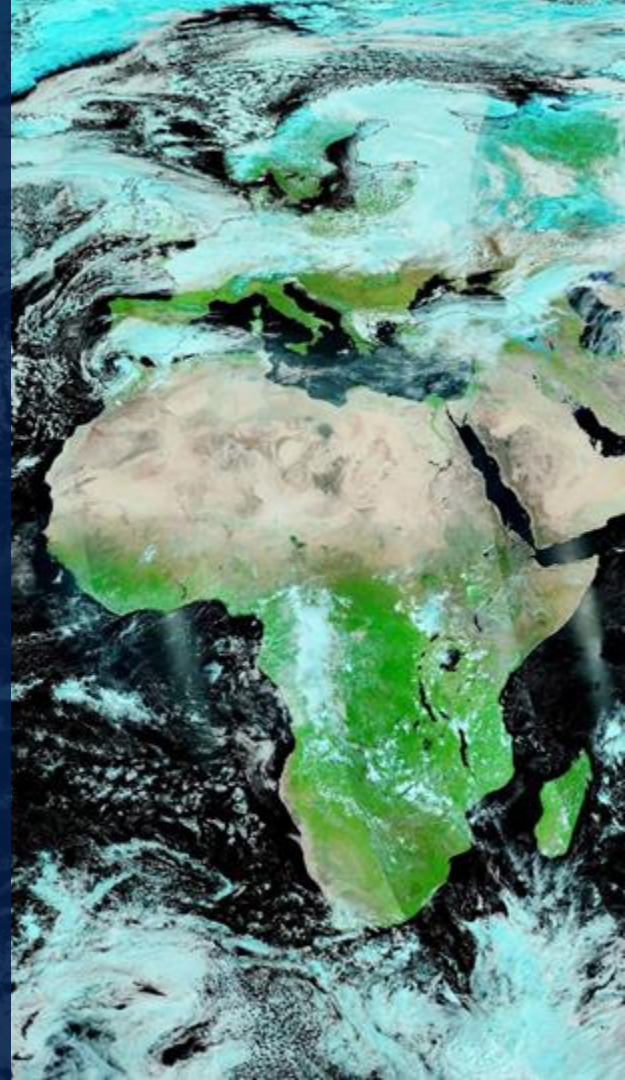
Resources

Find NASA Earth Science Here

Feedback



Earthdata Overview





EARTH FLEET

INVEST/CUBESATS

- NACHOS 2022
- CTIM 2022
- NACHOS-2 2022
- MURI-FD 2023
- SNOOPI* 2024
- HYTI* 2024
- ARGOS* 2024

JPSS INSTRUMENTS

- OMPS-LIMB 2022
- LIBERA 2027
- OMPS-LIMB 2027
- OMPS-LIMB 2032

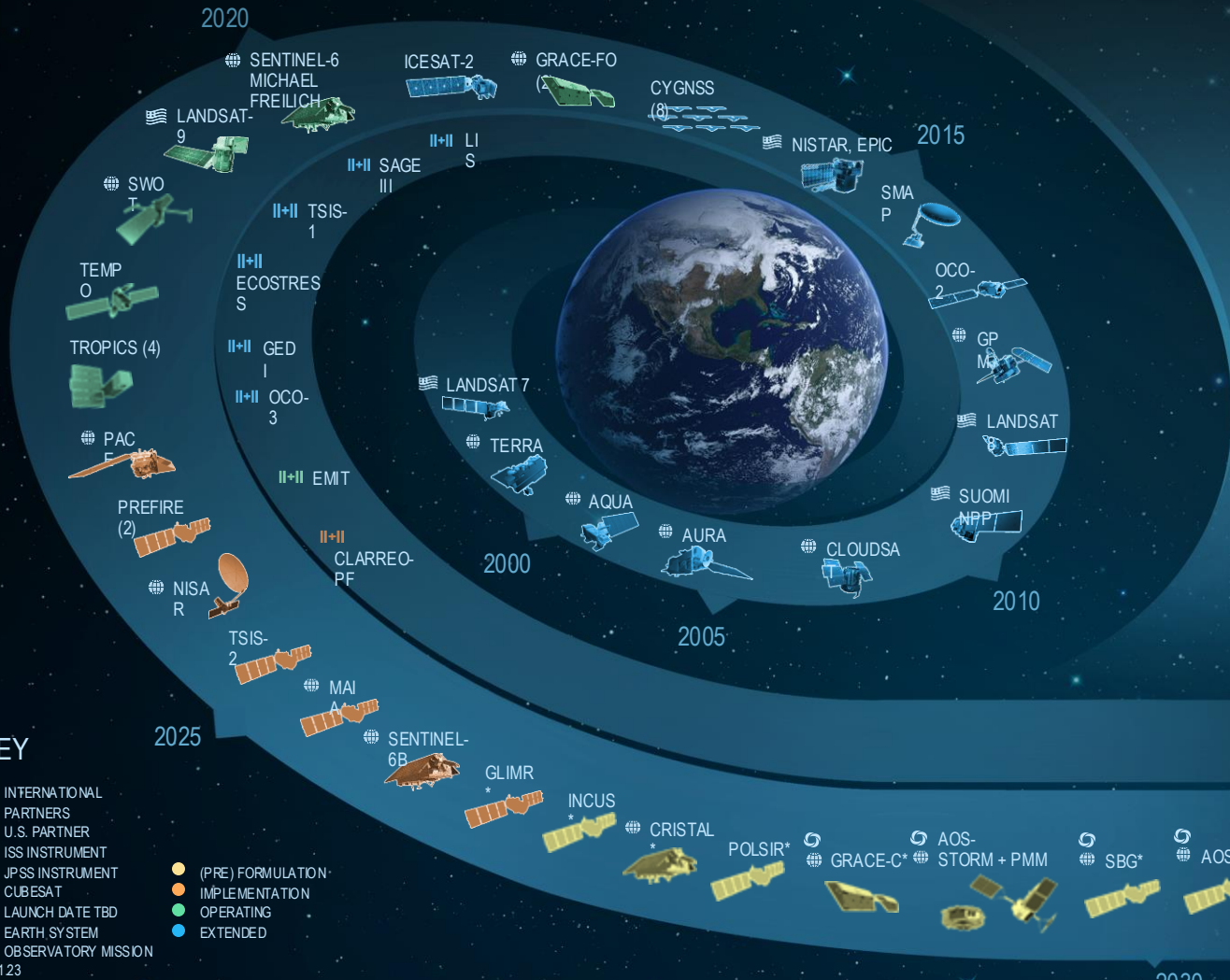
ISS INSTRUMENTS

MISSIONS

KEY

- INTERNATIONAL PARTNERS
- U.S. PARTNER
- ISS INSTRUMENT
- JPSS INSTRUMENT
- CUBESAT
- LAUNCH DATE TBD
- EARTH SYSTEM OBSERVATORY MISSION

- (PRE) FORMULATION
- IMPLEMENTATION
- OPERATING
- EXTENDED



Earthdata Trends: Open Data & Science

Responding to...

- **Increased attention** on climate, requiring historical *and* projected data
- **Focus** on Earth systems, and their interdependencies
- **Science-conscious** general public, seeking transparency and access to data

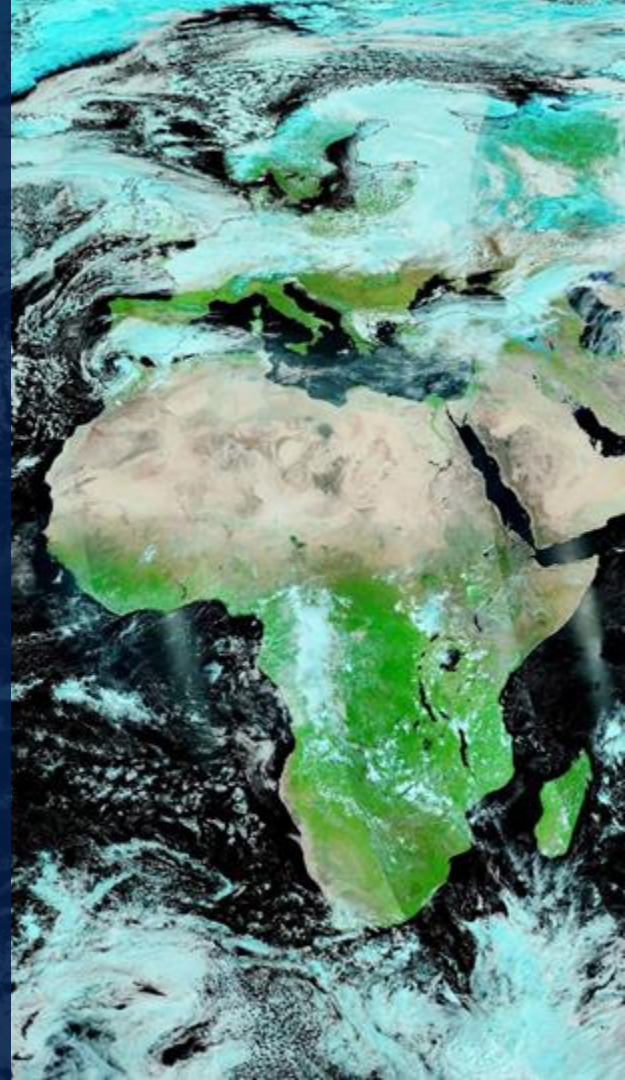
Building a new ecosystem to...

- **Shorten the time** it takes for a new user to find and learn how to use data
- **Increase community contributions** with hands-on engagement
- **Explore and exploit data** in new ways - share knowledge!
- **Incentivize and energize** innovation



EARTHDATA

Earthdata GIS (EGIS) Enterprise



Leveraging an Enterprise Approach

Earthdata GIS (EGIS) exposes users to NASA Earthdata through open science, tools, and experiences via OGC² compliant services, common web API³s, common open science APIs/tools, and Native SDK⁴s.





Earthdata GIS

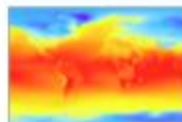
NASA's Earthdata Geographic Information System (EGIS) is in active development. Therefore, users may notice some functionality is not fully enabled. At this time, 'sign in' options are restricted. Additionally, users are currently unable to save or print web maps from the viewer.

EGIS is a resource for distributing cloud-native, GIS-ready NASA Earth observation data, services, and resources. This includes ArcGIS and Open Geospatial Consortium (OGC)-compliant raster and feature geospatial services and raster analytic functions. EGIS will provide a consistent user experience and enhance resource discovery through primary platforms commonly used by the GIS community.

Get information and guides to help you find and use NASA Earth science data, services, and tools.

Please Featured Layers

NASA authoritative data sets enabled as web services to be used in GIS. Layers are visual representations of a geographic dataset in a digital map environment. These layers, often referred to as services, reference a data source that defines how the data should be visualized and contain the underlying data properties and values.



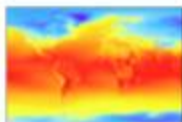
Imagery Layer
POWER Monthly Meteorology
This service provides global monthly meteorology data from 1981 to Near Real Time (NRT) from the 1980s.



Imagery Layer
GPM IMERG Early Precipitation
Image service of IMERG Early product displaying precipitation rate intensity at 30-minute intervals.



Imagery Layer
GPM Version 4 Population Density
The GPM Version 4 Population Density data is part of the Global.



Imagery Layer
POWER Annual Meteorology
This service provides global annual meteorology data from 1981 to Near Real Time (NRT) from the 1980s.



Imagery Layer
Global Annual PM2.5 Grids from NOAA
Global Annual PM2.5 Grids from NOAA, a global product displaying annual PM2.5 concentrations.



Imagery Layer
The VIIRS Plus DMSP Change in Light
The VIIRS Plus DMSP Change in Light data set uses nighttime light data.



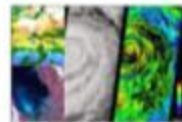
The Layer
Global Road
The data set contains the best available road data by country into a global road coverage.



Imagery Layer
Human Footprint
Global Human Footprint data is the relative human influence in each terrestrial biome.

Featured Apps

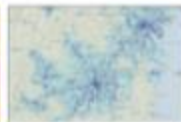
Applications provide a focused experience for interacting with maps and data. These resources can include web maps with additional widgets, StoryMaps, sites, dashboards, and more. Apps provide a specific purpose and targeted functionality. Apps can be easily embedded and shared with others.



Web Mapping Application
NASA Earth Science Thematic Data Access Viewer
This app provides a focused experience for interacting with maps and data.



Web Mapping Application
POWER Data Access Viewer
This app provides a focused experience for interacting with maps and data.



Web Mapping Application
GPM and IMERG Data Viewer
This app provides a focused experience for interacting with maps and data.



Web Mapping Application
About the Prediction of Weather in the StoryMap
This app provides a focused experience for interacting with maps and data.



Web Mapping Application
SEDAC Global COVID-19 Viewer
This app provides a focused experience for interacting with maps and data.



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- 1) EGIS Portal home banner
- 2) Screen shot of EGIS's featured web services
- 3) EGIS's Featured Applications
- 4) QR Code which directs users to EGIS's Portal

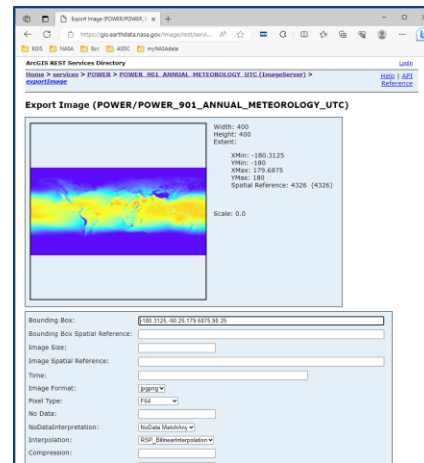
Why Earthdata GIS?

Components:

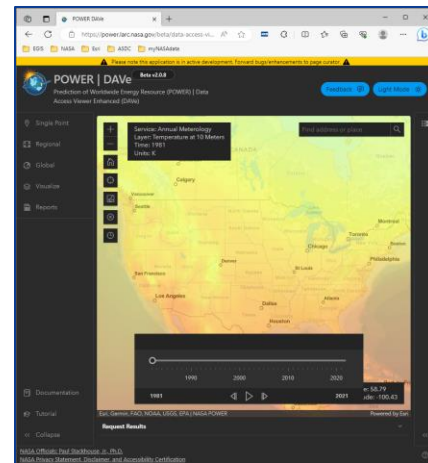
- [ArcGIS Image Services](#) / OGC WMS⁵ & WCS⁶
- [ArcGIS Feature Services](#) / OGC WFS⁷
- [ArcGIS Geoprocessing Services](#) / OGC WPS⁸
- [ArcGIS Portal](#) - Web Maps, Web Applications, StoryMaps

Benefits to users:

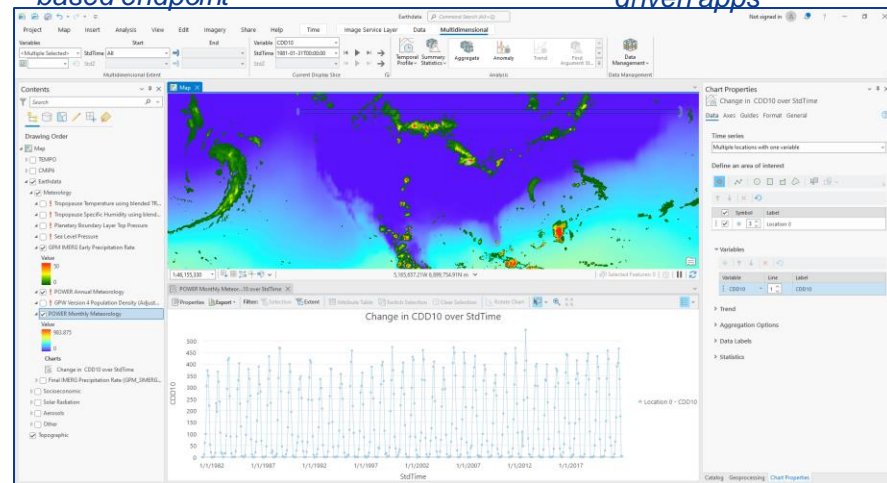
- Reduce time spent on data wrangling and pre-processing
- Increase time for science analysis/inquiry
- Query services to display/process in their specific area of interest
- Perform raster analytics including aggregates, differences, or classifications
- Perform raster functions including reprojection, orthorectification, clipping, application of complex image processing algorithms, and more



Data retrieval via browser-based endpoint

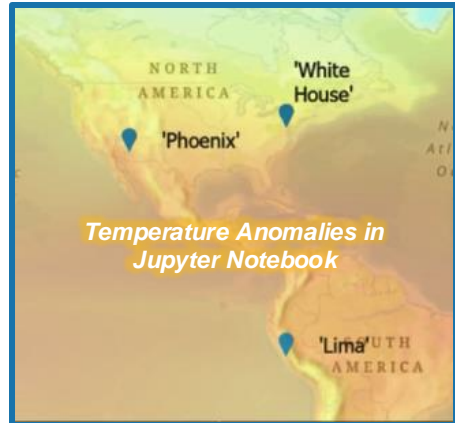
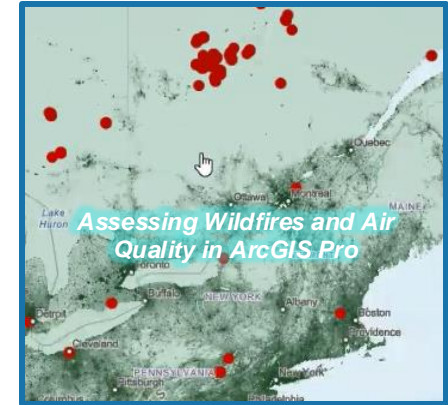
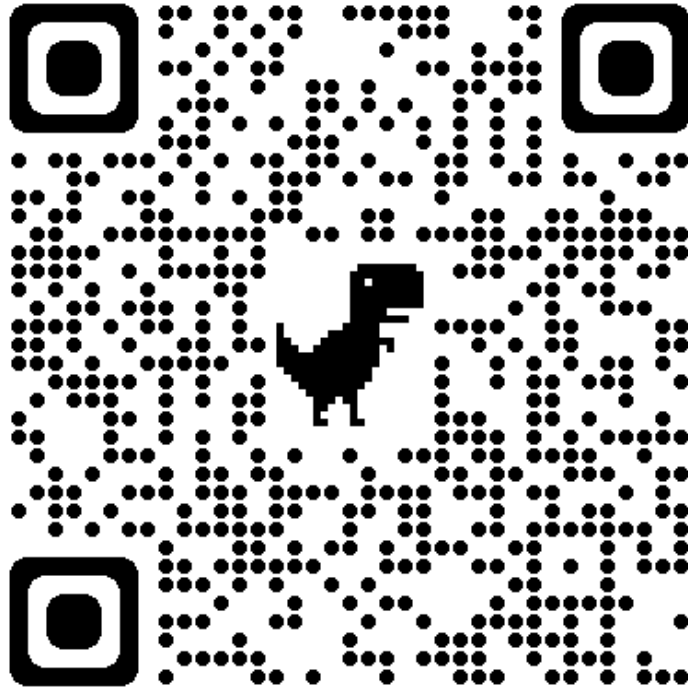


Integration with interactive data-driven apps



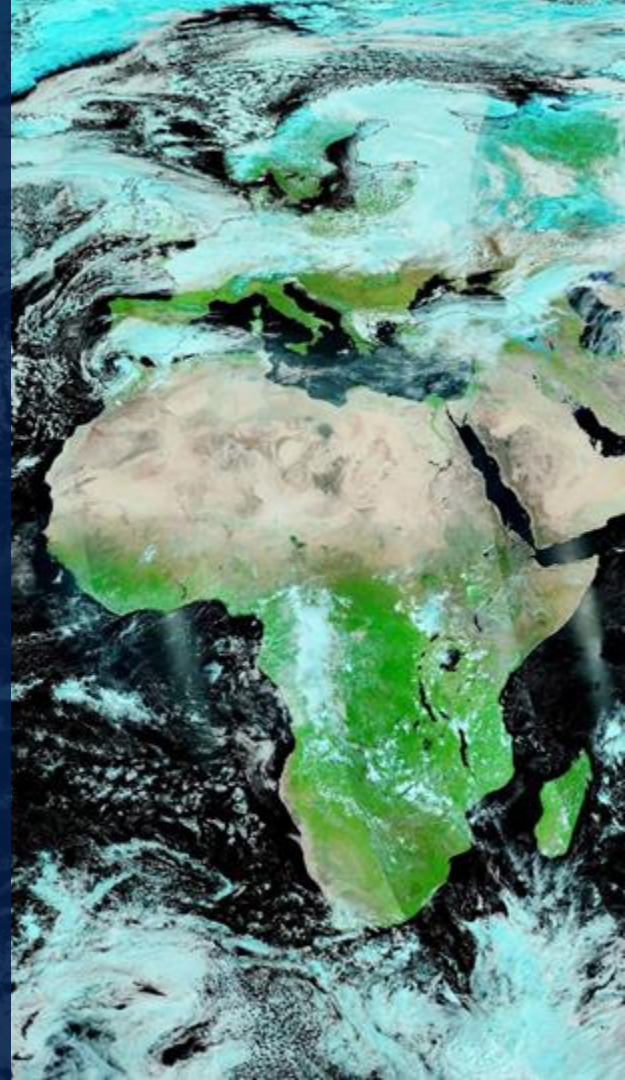
Extensive functionality and analytic capabilities with ArcGIS tools

Image Services in Action



- 1) QR code to access interactive Image Services in Action
- 2)-5) Screenshots of interactive maps overlaid with text describing each map

Roadmap



Currently Available (Image Services)

Low Elevation Costal Zone (LECZ)

Gridded Population of the World (GPW) v4

- Population Density
- Basic Demographics
- Population Counts

Global Seasonal Sentinel-1 Interferometric Coherence and Backscatter (GSSICB)

- Median 6- & 12 day
- HH, VV, and more!

POWER⁹

- Monthly & Annual Meteorology
- Monthly & Annual Radiation
- Monthly & Annual U, V Wind Components; and more!

Global Human Footprint v2 and v3

Global Man-made Impervious Surfaces (GMIS)

Global Human Built-up And Settlement Extent (HBASE)

Currently Available (Image Services)

Global Precipitation
Measurement (GPM)
IMERG (Integrated
Multi-SatellitE
Retrievals for GPM)

Yale Center for Earth
Observation (YECO)
Surface Urban Heat
Islands – Version 4
• 2003 – 2018

Annual Global High-
Resolution Extreme
Head Emissions
(GEHE)

U.S. Social
Vulnerability Index
Grids, Revision 1

Tropospheric
Emissions: Monitoring
of Pollution (TEMPO)
• Nitrogen Dioxide
Vertical Column

Global Annual PM2.5
Grids and Aerosol
Optical Depth (AOD)

OPERA¹⁰ Radiometric
Terrain Corrected
Products
• VV
• VH

Currently Available (Feature Services)

Building & Thermal
Moisture Climate
Zone Differences

- 1981/1995 vs
2007/2021

POWER Annual
Radiation: All Sky
Insolation Clearness
Index

4-Year Rolling
Building Thermal &
Thermal Moisture
Climate Zones

- 1984 – 2021

Global Reservoir and
Dam Database
(GRanDv1)

- Dams
- Reservoirs



Sustainable
Development Goal
(SDG) Indicator

- 11.2.1 Urban Access to
Public Transport, 2023



Sustainable
Development Goal
(SDG) Indicator

- 9.1.1 Rural Access
Index, 2023



Sustainable
Development Goal
(SDG) Indicator

- 7.1.1 Access to
Electricity, 2023



Sustainable
Development Goal
(SDG) Indicator

- 11.7.1 Urban Public
Space, Availability and
Access, 2023



EGIS Roadmap

Soon

- Modern-Era Retrospective analysis for Research and Applications (MERRA2)
- Satellite Imagery and Clouds Products (SatCORPS¹¹)
- Surface Water and Ocean Topography (SWOT) hydrology
- OPERA Surface Water Extend (DSWx)

Later

- Daymet: Annual Min/Max Temperature, Precipitation, Vapor Pressure, Radiation, Snow Water Equivalent
- Soil Moisture, evapotranspiration, Snow Cover, Wind Speed, and Groundwater (Land Data Assimilation System (LDAS))
- Lightning Imaging Sensor (LIS)
- Radiometric Terrain-Corrected (RTC) Synthetic Aperture Radar (SAR)

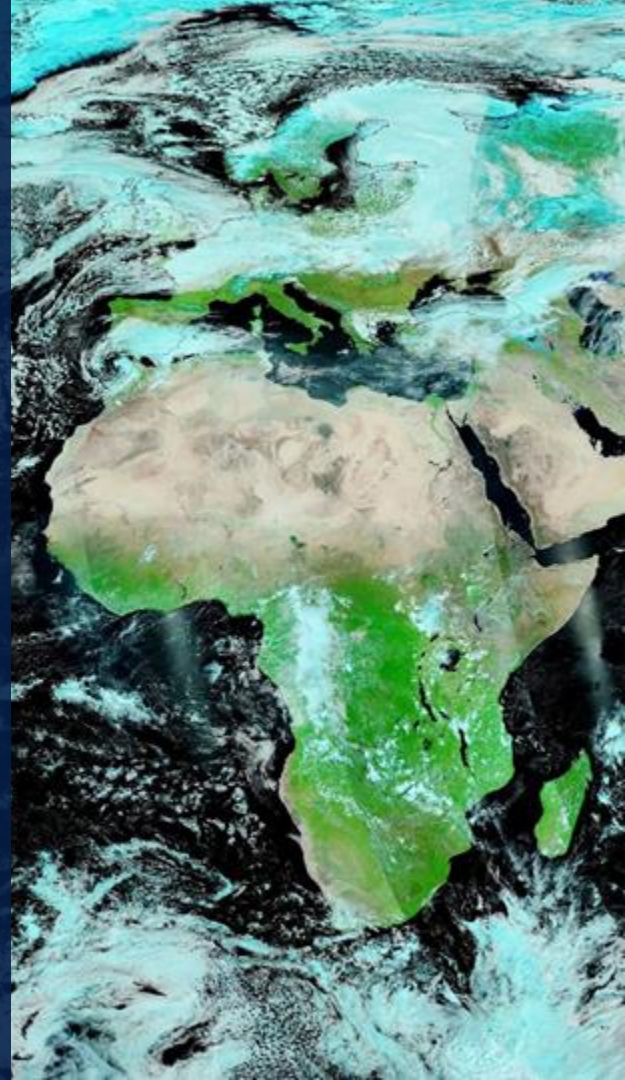
Long Term

- The most popular NASA Earthdata collections at your fingertips in GIS native formats
- Powerful, robust services fueling your workflows...
- **You shouldn't have to download the Earth to do Earth Science!**



EARTHDATA

Resources



Resources: Earthdata Forum

- 1) Earthdata Forum homepage
- 2) Distributed Active Archive Center (DAAC) Data Recipes portal
- 3) Search Earthdata Forum posts for GIS related questions using the "Services/Usage" tag

Ask questions directly to NASA
Subject Matter Experts & read
through Data Recipes!

Welcome to the Earthdata User Forum! Here, subject matter experts from several NASA Distributed Active Archive Centers (DAAC) can discuss general questions, research topics and data applications. Users can query how to access, view and interpret the data.

Quick links: FAQ Data Recipes Login

Home

It is currently Fri Dec 18, 2020 12:57 pm America/New_York

Post a New Question

SEARCH

Search for keywords, tags... Advanced Search

OR

SEARCH BY TAGS

Discipline	DAAC	Major Projects	Services/Usage
Select	Select	Select	Select

DAAC Data Recipes

Post Reply



Search this question...



DAAC Data Recipes

by asdc_user_services » Tue Oct 27, 2020 1:42 pm America/New_York

This page provides links to the Data Recipe resources (also called How-To or Tutorials) available from Earthdata Forum member DAACs. The titles below the link for each DAAC are examples of the topics covered. The number in brackets indicate the total number of available resources covering additional topics. For an introduction on how to use the Forum please view our recorded webinar:

YouTube Link: <https://youtu.be/kCKyQscXWA8>

Services/Usage

Select

Select

Algorithms

Cloud

Data Access

Data Download

Data Processing

Data Recipes

Data Search

Data Visualization

Documentation

FAQ

General Science

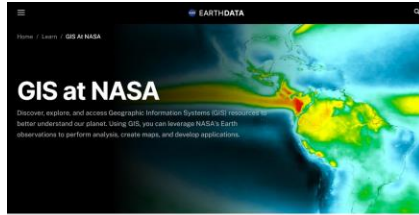
Giovanni

GIS Tools

SeaDAS

SOOT

Resources: Earthdata GIS Pages



Improving the Discovery, Access, and Use of Science Data

Using Geographic Information Systems (GIS), you can leverage NASA's Earth perform analysis, create maps, and develop applications.



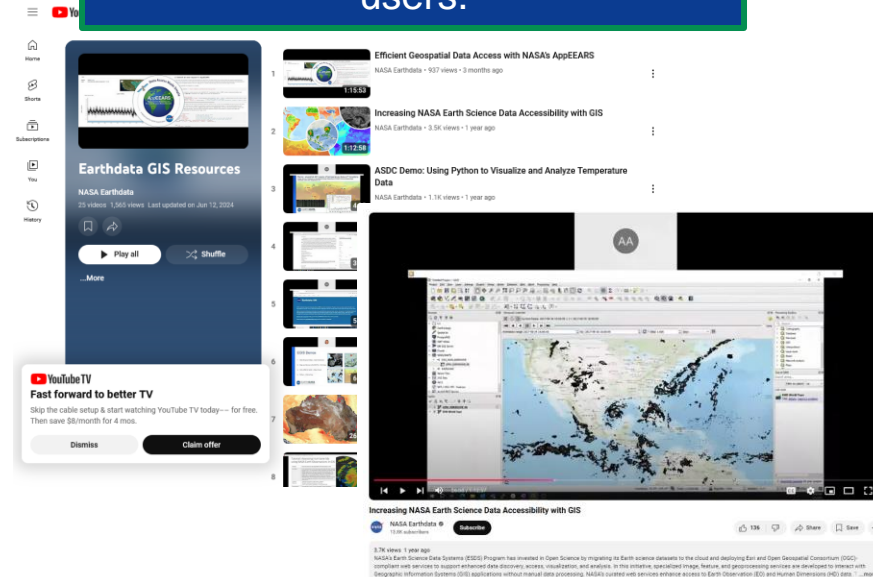
What is GIS?

A Geographic Information System (GIS) is a computer system that analyzes and displays geographically referenced information from a variety of data sources to map and examine changes on Earth. GIS allows for the integration and collective analysis of geospatial data from sources such

A Geographic Information System (GIS) connects a wide range of geospatial data to a map and integrates location data before things and with various types of descriptive information (what things are like there). The vision of NASA's Earth Science Data Systems (ESDS) Program is to identify and deliver high value Earth science data in formats compliant and compatible with GIS

The Earthdata GIS Webpages contain & link to many helpful learning resources as well as info about various GIS data, tools, & services at NASA!

The Earthdata GIS Playlist has videos specific to the GIS-minded users.



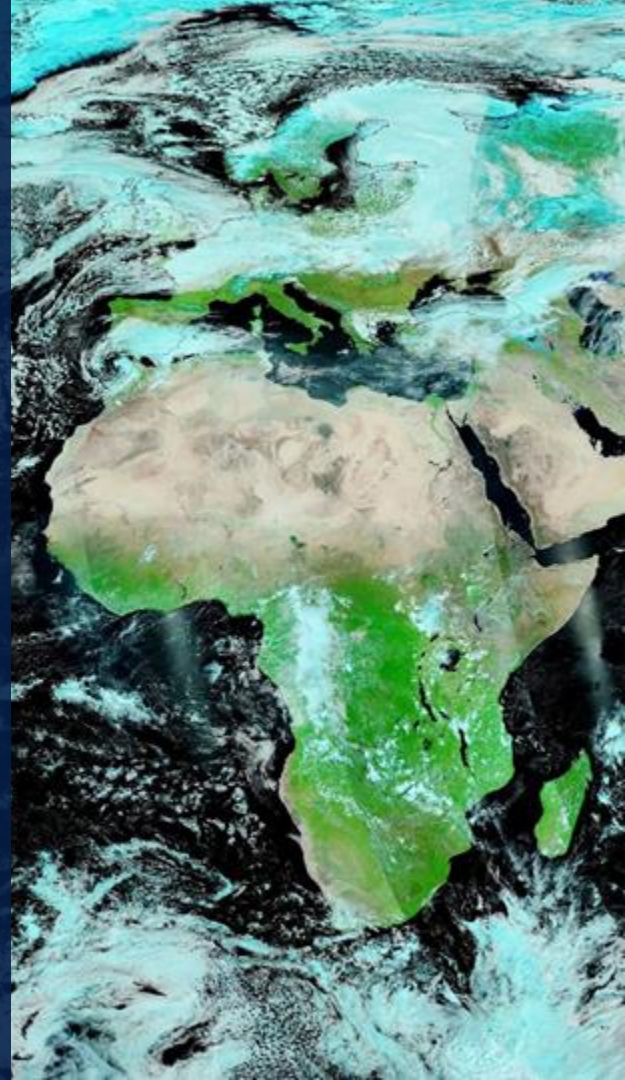
1) Screen captures of the GIS at NASA Homepage and subpages

2) NASA Earthdata GIS YouTube Playlist







3) Screen capture of "Increasing NASA Earth Science Data Accessibility with GIS" video

4) QR Code that points to the NASA at GIS Homepage

NASA EGIS at AGU



EGIS Presentations, Demos, and More:

Day and Time	Title	Type	Location
08:30 PAST	Global Image Services for OPERA Radiometric Terrain Corrected Backscatter from Sentinel-1 (RTC-S1) Products		Hall B-C (Poster Hall) (Convention Center)
16:30 PAST	NASA's Enterprise Earthdata GIS (EGIS) Integrates Earth Observation and Human Dimension (EOHD) Data with GIS Visualization and Analysis for Science and Applications by Building and Releasing REST Services		Hall B-C (Poster Hall) (Convention Center)
16:30 PAST	Enabling Mapping Services with GIS and NASA's PO.DAAC ¹² Dataset Collections		Marquis 12-13 (Marriott Marquis)
08:30 PAST	Developing a Cloud-Based ArcGIS Image Service for TROPOMI ¹³ Level 2 Data: Preprocessing, Transformation, and Publication		Hall B-C (Poster Hall) (Convention Center)
Wednesday 13:00 PAST	Empowering Data Access and Analysis: NASA's Earthdata and ArcGIS Integration		Exhibit Hall (Esri Booth) (Convention Center)
Friday 15:10 NOW	Earthdata GIS (EGIS) Enterprise: Transforming Earth Observation and Human Dimension (EOHD) Data and Building Dynamic Analysis Ready Web Services for Faster and Easier Data Interrogation		Marquis 12-13 (Marriott Marquis)
Monday – Thursday Varies	NASA Exhibit Booth		Exhibit Hall (Convention Center)

We need your feedback!



Questionnaire



support@earthdata.nasa.gov



<https://gis.earthdata.nasa.gov/>

Footnotes

1. GIS – Geographic Information Systems
2. OGC – Open Geospatial Consortium
3. API – Application Programming Interface
4. SDK – Software Development Kit
5. WMS – Web Map Service
6. WCS – Web Coverage Service
7. WFS – Web Feature Service
8. WPS – Web Processing Service
9. POWER – Prediction of Worldwide Energy Resources
10. OPERA – Observational Products for End-User from Remote Sensing Analysis
11. SatCORPS - Satellite CIOud and Radiation Property retrieval System
12. PO.DAAC – Physical Oceanography Distributed Active Archive Center
13. TROPOMI – TROPOspheric Monitoring Instrument

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earthdata.nasa.gov

Thank You for Joining!