

What's New at the NASA Land Processes DAAC

Data Active Archive Center

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U.S. Department of the Interior
U.S. Geological Survey



Agenda

The Year of
Open
Science

AppEEARS

New Data
and
Updates

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Open-Source Science Initiative

Unlocking the full potential of a more equitable, impactful, efficient, scientific future



Policy development, education, compliance tools
Updating NASA policies on scientific information to better enable the activation of open science ([SPD41a](#))



ROSES* Elements Supporting open-source software, tools, frameworks, libraries, platforms, and training with over \$5 million dollars in grants

* **ROSES:** Research Opportunities in Earth and Space Sciences



Core Services for Science Discovery
Developing core data and computing services to enable open science



Community Building & Partnerships - Transform to Open Science (TOPS)
Accelerating adoption of open science



2023 Is the Year of Open Science!

U.S. Geological Survey

1. Policy

2. Funding

3. Infrastructure

This block contains three numbered items, each with a corresponding icon. Item 1, "Policy", is accompanied by icons of a padlock, a gear, and a Wi-Fi symbol. Item 2, "Funding", is accompanied by an icon of a globe with network lines. Item 3, "Infrastructure", is accompanied by an icon of a blue cloud with data points.

NASA's Open-Source Science Initiative
\$20M/Year

4. Outreach



Land Processes DAAC is Committed to Evolving Towards Open Science



OPEN (TRANSPARENT) SCIENCE
scientific process and results should be visible, accessible, and understandable

OPEN (ACCESSIBLE) SCIENCE
data, tools, software, documentation, and publications should be accessible to all (FAIR)



OPEN (INCLUSIVE) SCIENCE
process and participants should welcome participation by and collaboration with diverse people and organizations

OPEN (REPRODUCIBLE) SCIENCE
scientific process and results should be open such that they are reproducible by members of the community



Capacity Sharing - Resources: Open Science Curricula

5 Modules Organized as a Scientific Workflow

What is open science, why does it benefit me, and why does it benefit the greater scientific community?



How to share software



Best practices for sharing all results and analysis, as well as peer reviewing

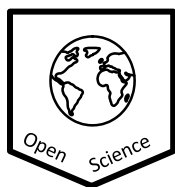
ETHOS OF OPEN SCIENCE

OPEN TOOLS & RESOURCES

OPEN SOFTWARE

OPEN DATA

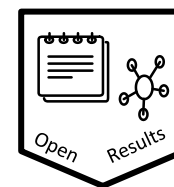
OPEN RESULTS



How to use popular open science tools



How to effectively use and share open data



Earn Badges at Each Level



Complete All 5 & earn TOPS Open Science Badge & Certification

ROSES-2023 Opportunities

F.15 High Priority Open-Source Science

Innovative open-source tools, software, frameworks, data formats, and libraries that will have a significant impact on the SMD science community (*Rolling deadline in [ROSES-23](#)*)

F.7 Support for Open Source Tools, Frameworks, and Libraries

Improve and sustain open source tools, frameworks, and libraries that are significantly used by the SMD community (*[ROSES-23](#) dates TBD*)

F.8 Supplemental Open Source Science Awards

Supplemental award to support open science including the conversion of legacy software to open source. (*Rolling deadline in [ROSES-22](#); [ROSES-23](#) dates TBD*)

F.16 Supplement for Scientific Software Platforms

Supplemental support of existing awards for use of scientific analysis platforms (*[ROSES-23](#) dates TBD*)

F.2 Topical Workshops, Symposia, and Conferences

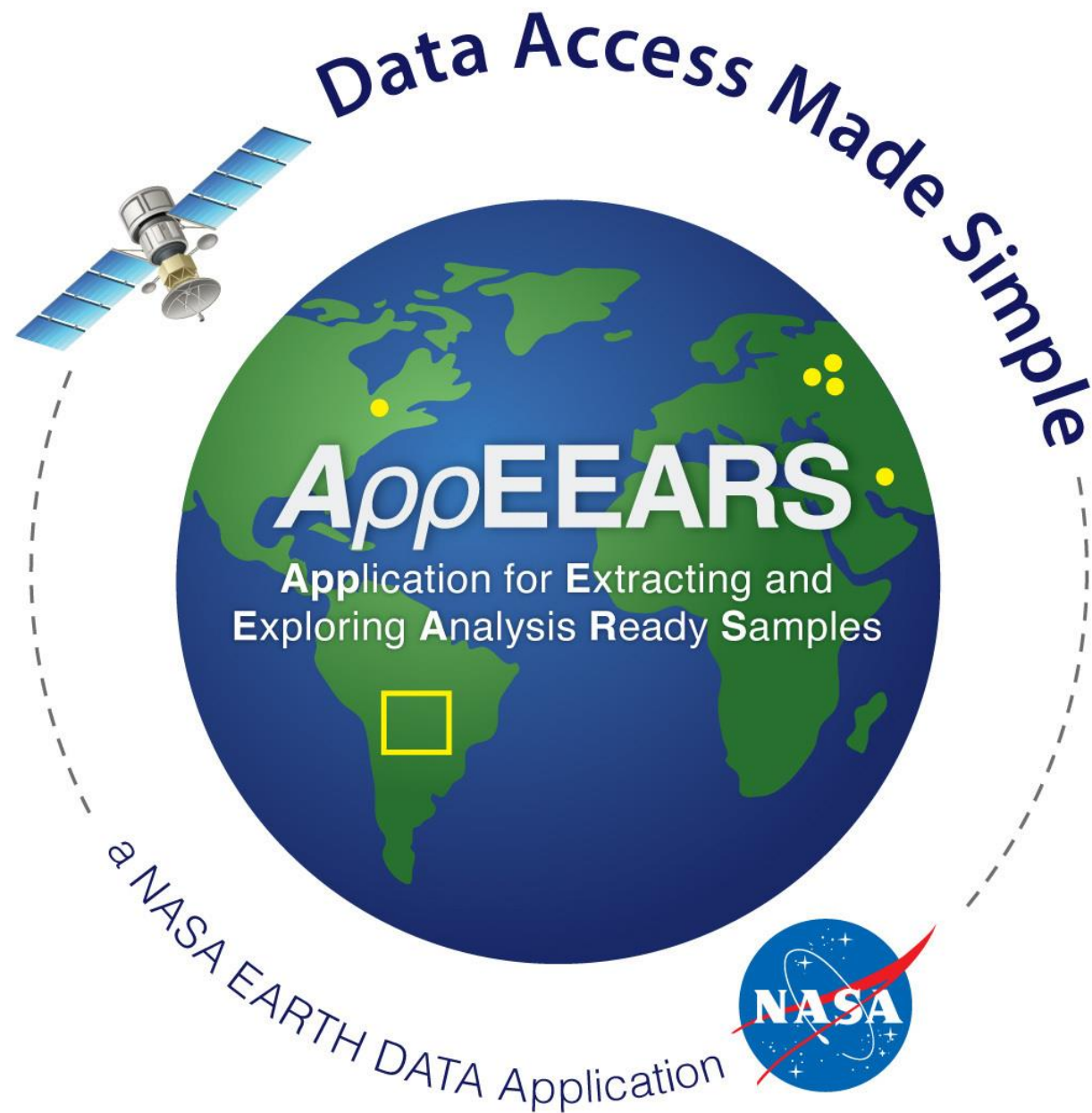
Events, hackathons, un-conferences, and challenges that build open science skills. (*Rolling deadline in [ROSES-22](#); to be released as standalone [ROSES-23](#) element*)

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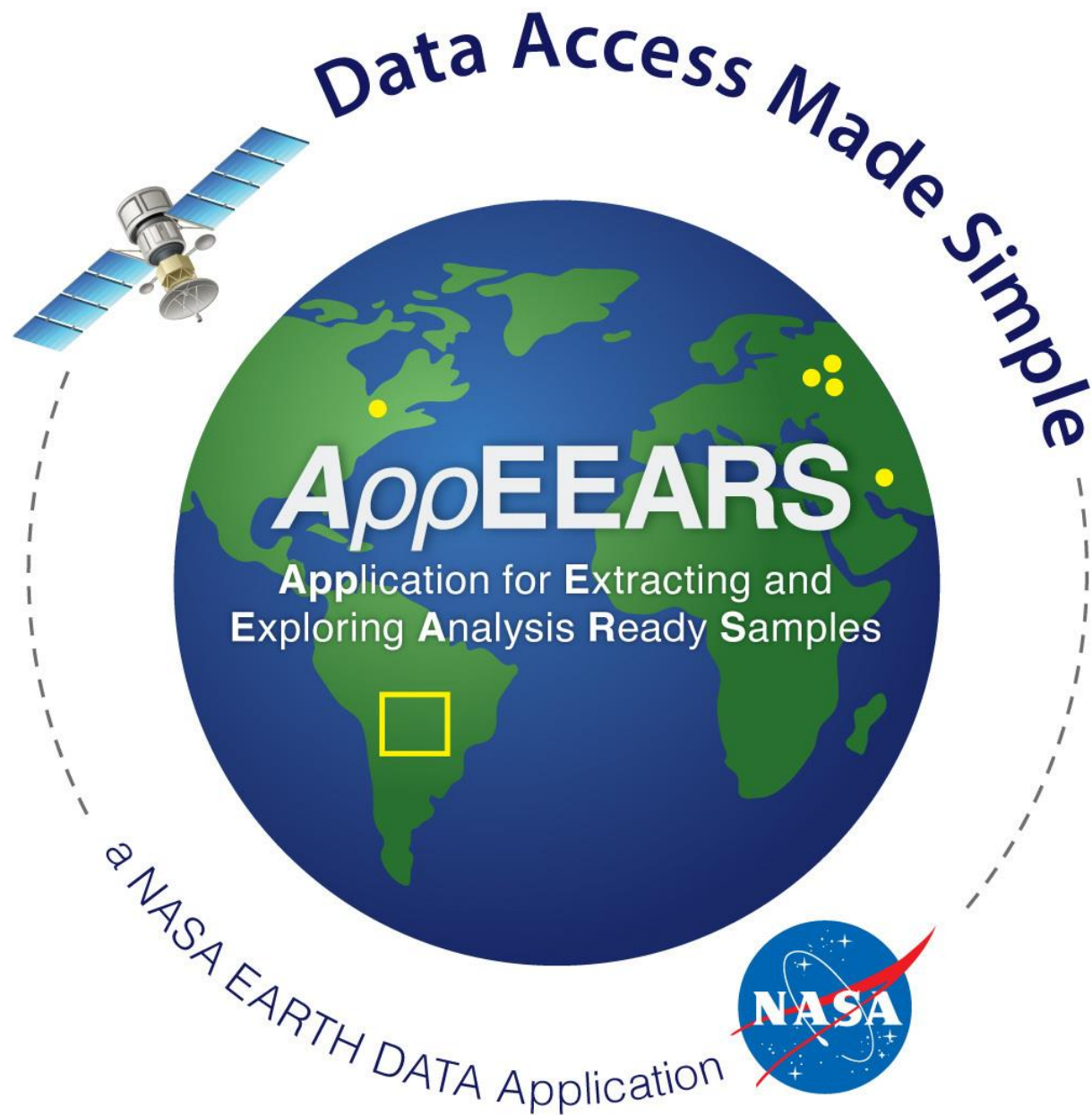


U.S. Geological Survey

[AppEEARS \(nasa.gov\)](https://www.nasa.gov/appears)

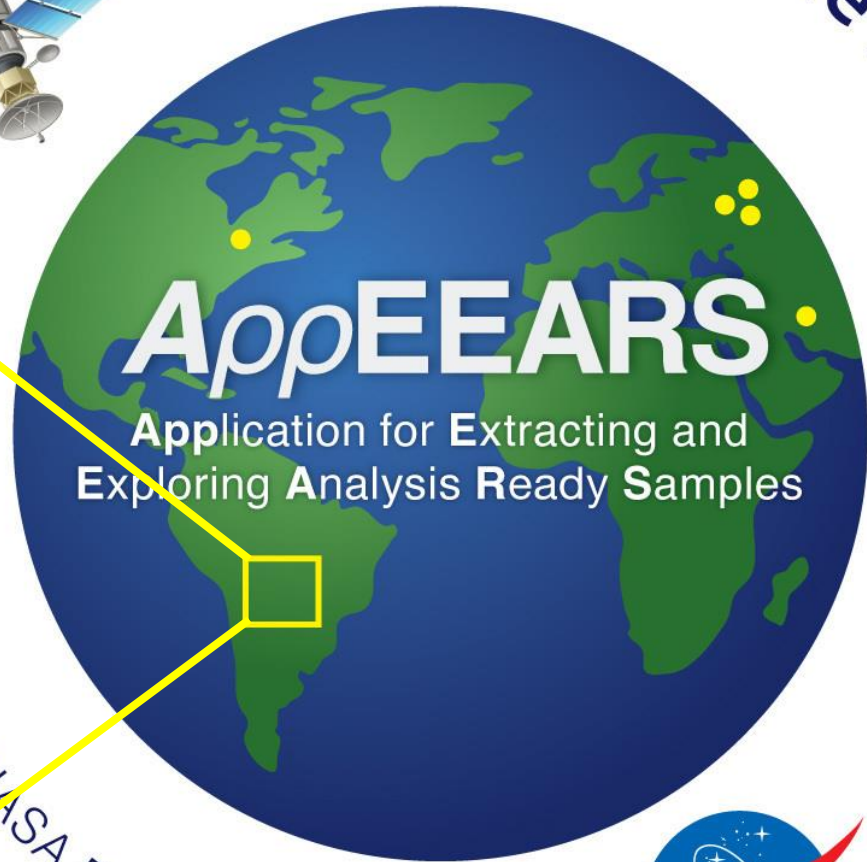
AppEEARS helps you extract data based on:

- Space
- Time
- Band



[AppEEARS \(nasa.gov\)](https://nasa.gov)

Data Access Made Simple



Spectral Reflectance		Precipitation
Human Population	Vapor Pressure	Water Bodies
Land Cover	Elevation	Freeze Thaw Date
Snow Water Equivalent		Snow Cover
Evaporative Stress	Vegetation Phenology & Indices	
Evapotranspiration	Soil Moisture	
Water Use Efficiency	Albedo	Fire
Temperature and Emissivity		

a NASA EARTH DATA Application



[AppEEARS \(nasa.gov\)](https://www.nasa.gov/app-ears)

USGS AppEEARS Extract Explore Admin Help atliesc

Extract Area Sample

Enter a name to identify your sample
Upper Colorado Basin - MOD13Q1

Upload a file or draw a polygon using the or icon

Drop a vector polygon file containing the area feature(s) to extract or click here to select the file.

Supported file formats:

- Shapefile (.zip including .shp, .shx and .dbf files)
- GeoJSON (.json or .geojson)

Start Date: 01-01-2020 End Date: 02-01-2022

Is Date Recurring?

Select the layers to include in the sample

Terra MODIS Vegetation Indices (NDVI & EVI)
MOD13Q1.061, 250m, 16 day, (2000-02-19 to Present)

- _250m_16_days_EVI
- _250m_16_days_MIR_reflectance
- _250m_16_days_NIR_reflectance
- _250m_16_days_NDVI

Selected layers

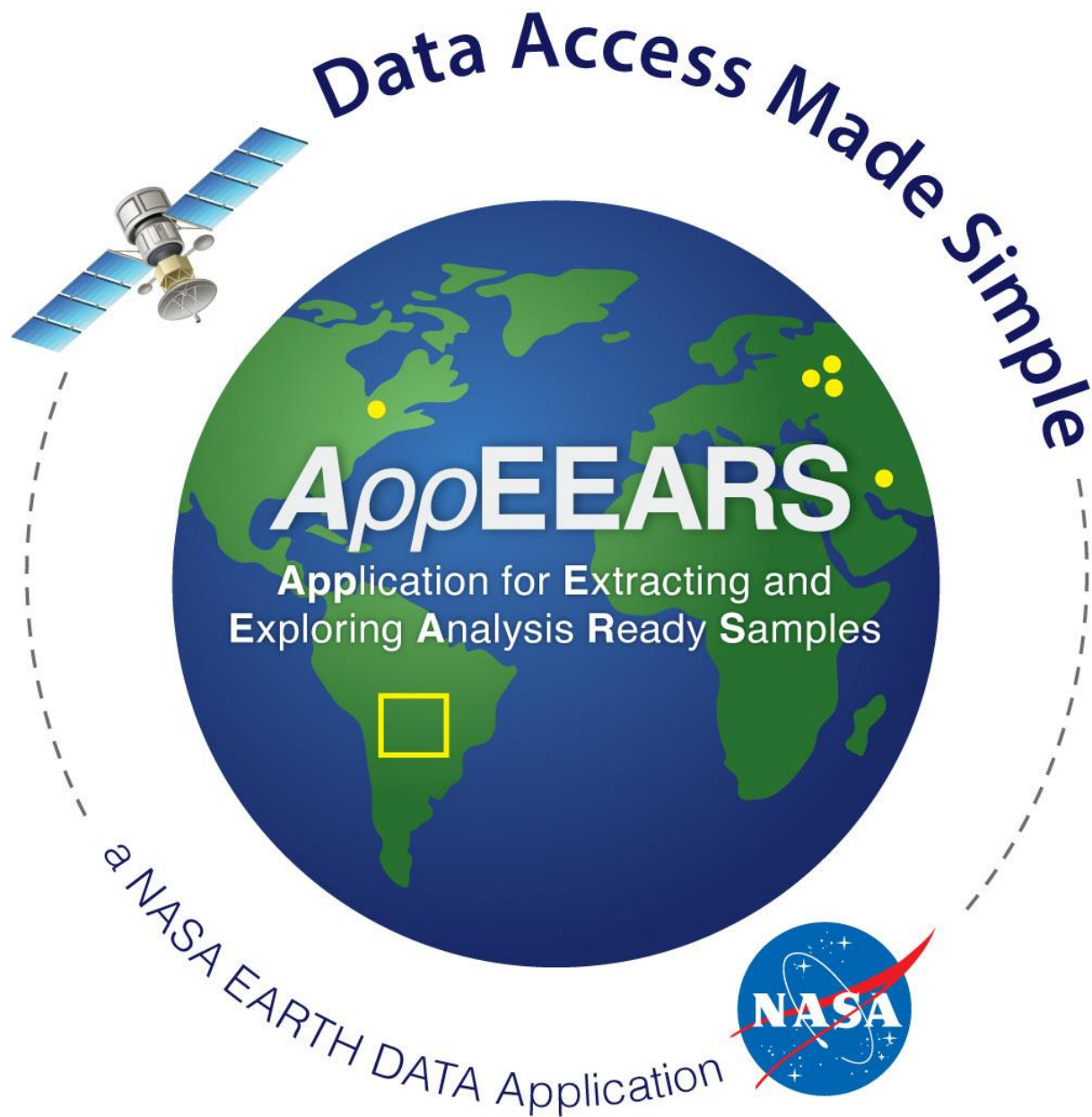
- NASADEM_HGT 30m, Static
- _250m_16_days_NDVI 250m, 16 day

Output Options

File Format:

Projection:

NOTE: Be aware that any reprojection of data from its source projection to a different projection will inherently change the data from its original format. All reprojections use GDAL's `gdalwarp` function in combination with the PROJ 4 string listed above. For additional information, see the AppEEARS help documentation.



Explore Requests and Quality Information

Extract Area Sample

Enter a name to identify your sample

Upload a file or draw a polygon using the # or # icon

Upload a file or draw a polygon using the # or # icon

Draw a vector polygon file containing the area/feature(s) to extract or click here to select the file

Supported file formats:

- ESRI Shapefile (.shp) including any .dbf, .prj and .xml files
- GeoJSON (.geojson)

Select Date: Start Date: End Date:

Do you have a sampling?

Select the layers to include in the sample:

Combined 30x30m Level 2 imagery (MODIS/033/04_B01_Nearby_20180101-20181231)

How many to export available to the product:

Default Layers:

- 30m Imagery (30m, Nearby)
- 30m Imagery (30m, Nearby)
- 30m Imagery (30m, Nearby)
- 30m Imagery (30m, Nearby)
- 30m Imagery (30m, Nearby)

Output Details:

File Name: Output: Input: File Path: Output Path:

Submit Cancel

Explore Requests

Please see [Sample Request Retention](#) for details on expired requests.

Showing requests 1 - 32 of 32

« Prev 1 Next »

Request	Type	Status	Details	Date Submitted	Date Completed	
bangor_land2	Area Sample	Done	Details	11-14-2022 9:44:13 PM CST	11-14-2022 9:47:10 PM CST	Chart Download Print
SF_landc2	Area Sample	Done	Details	11-14-2022 9:37:47 PM CST	11-14-2022 9:39:02 PM CST	Chart Download Print
SiouxFalls_Landcover	Area Sample	Done	Details	11-14-2022 9:31:36 PM CST	11-14-2022 9:31:52 PM CST	Chart Download Print
SiouxFalls_daymet	Area Sample	Done	Details	11-14-2022 9:30:46 PM CST	11-14-2022 9:31:48 PM CST	Chart Download Print
Bangor_landcover	Area Sample	Done	Details	11-14-2022 9:29:39 PM CST	11-14-2022 9:31:06 PM CST	Chart Download Print
Bangor_All2	Area Sample	Done	Details	11-14-2022 9:28:09 PM CST	11-14-2022 9:30:47 PM CST	Chart Download Print
Bangor_all	Area Sample	Done	Details	11-14-2022 9:21:15 PM CST	11-14-2022 9:23:36 PM CST	Chart Download Print
SiouxFalls_all	Area Sample	Done	Details	11-14-2022 9:19:14 PM CST	11-14-2022 9:21:30 PM CST	Chart Download Print
Chicago_landcover	Area Sample	Done	Details	11-14-2022 7:28:44 PM CST	11-14-2022 7:30:50 PM CST	Chart Download Print
Chicago2	Area Sample	Done	Details	11-14-2022 7:11:43 PM CST	11-14-2022 7:15:25 PM CST	Chart Download Print
Chicago_All	Area Sample	Done	Details	11-14-2022 11:42:14 AM CST	11-14-2022 11:48:55 AM CST	Chart Download Print
Anchorage_temp2	Area Sample	Done	Details	11-14-2022 11:29:00 AM CST	11-14-2022 11:32:16 AM CST	Chart Download Print


View Area Sample

Search: bangor_land2

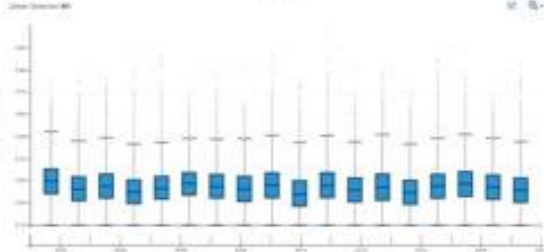
Title:

Feature: [Bangor Landcover](#)

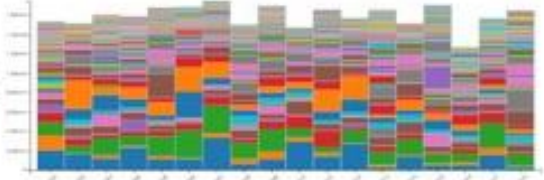
Layer: [Bangor Landcover](#)



Layer Style: [Default](#)



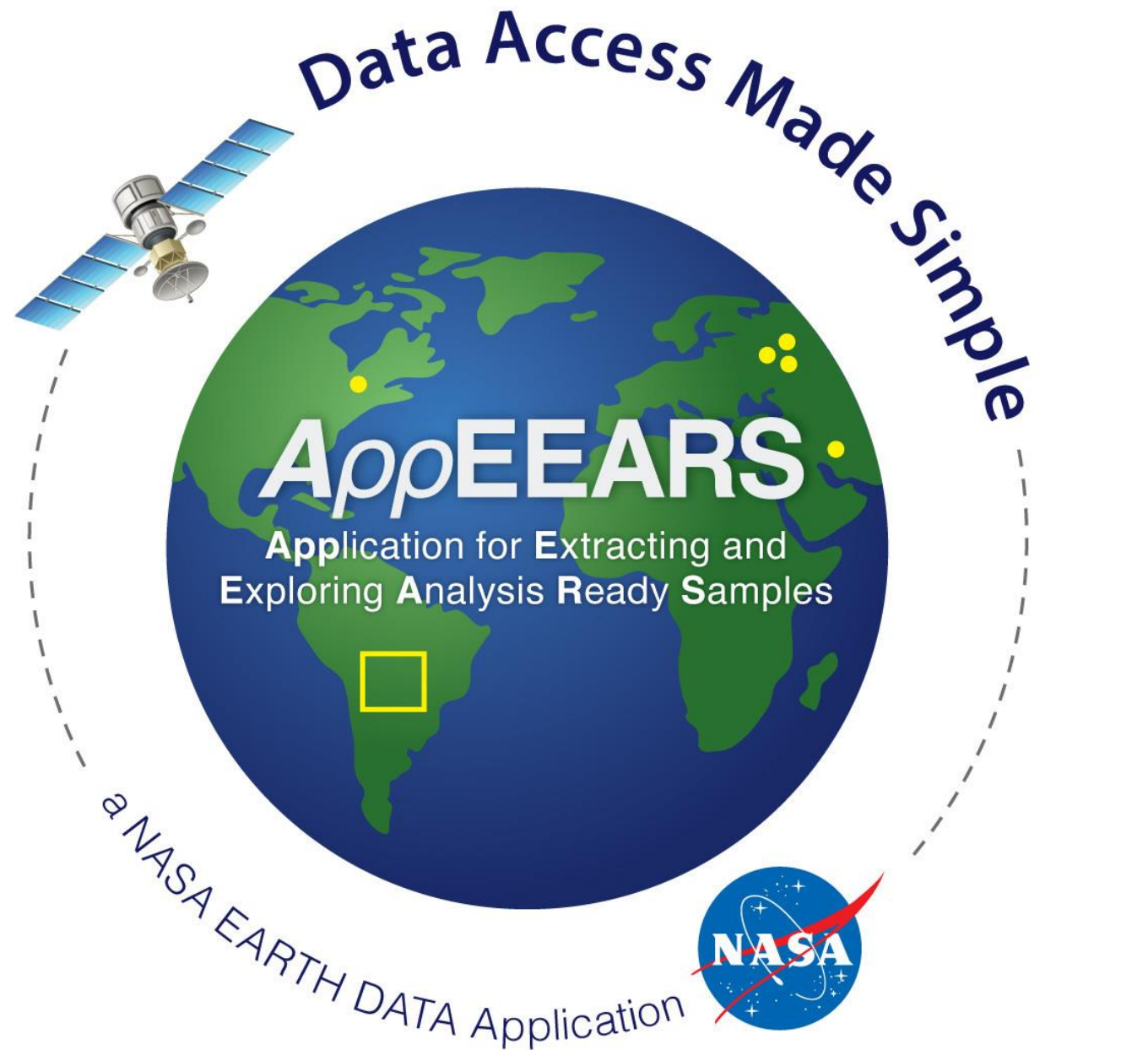
Q1 Stats for QA_Default_0



Q1 Stats for QA_Default_1



- A single access point
- No Grids, Tiles, or Julian dates
- No file naming conventions
- Ability to subset multiple bands
- Download only what you need



[AppEEARS \(nasa.gov\)](https://www.nasa.gov/appEEARS)

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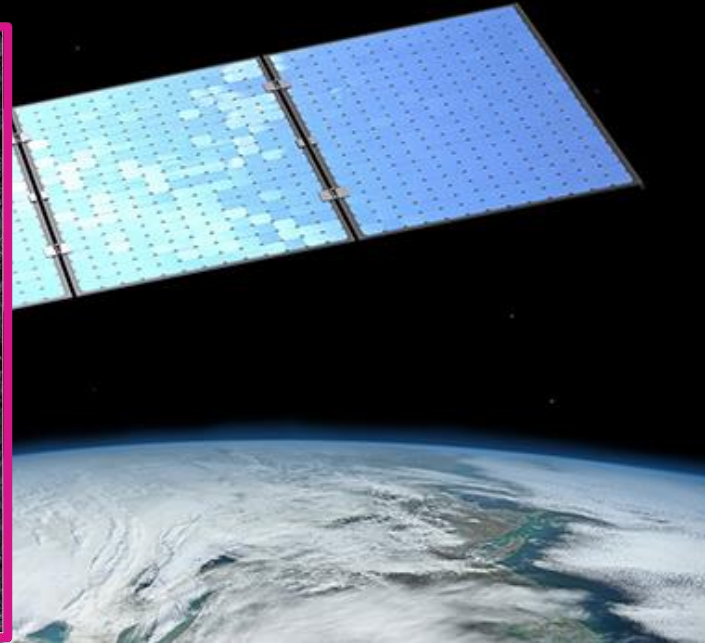
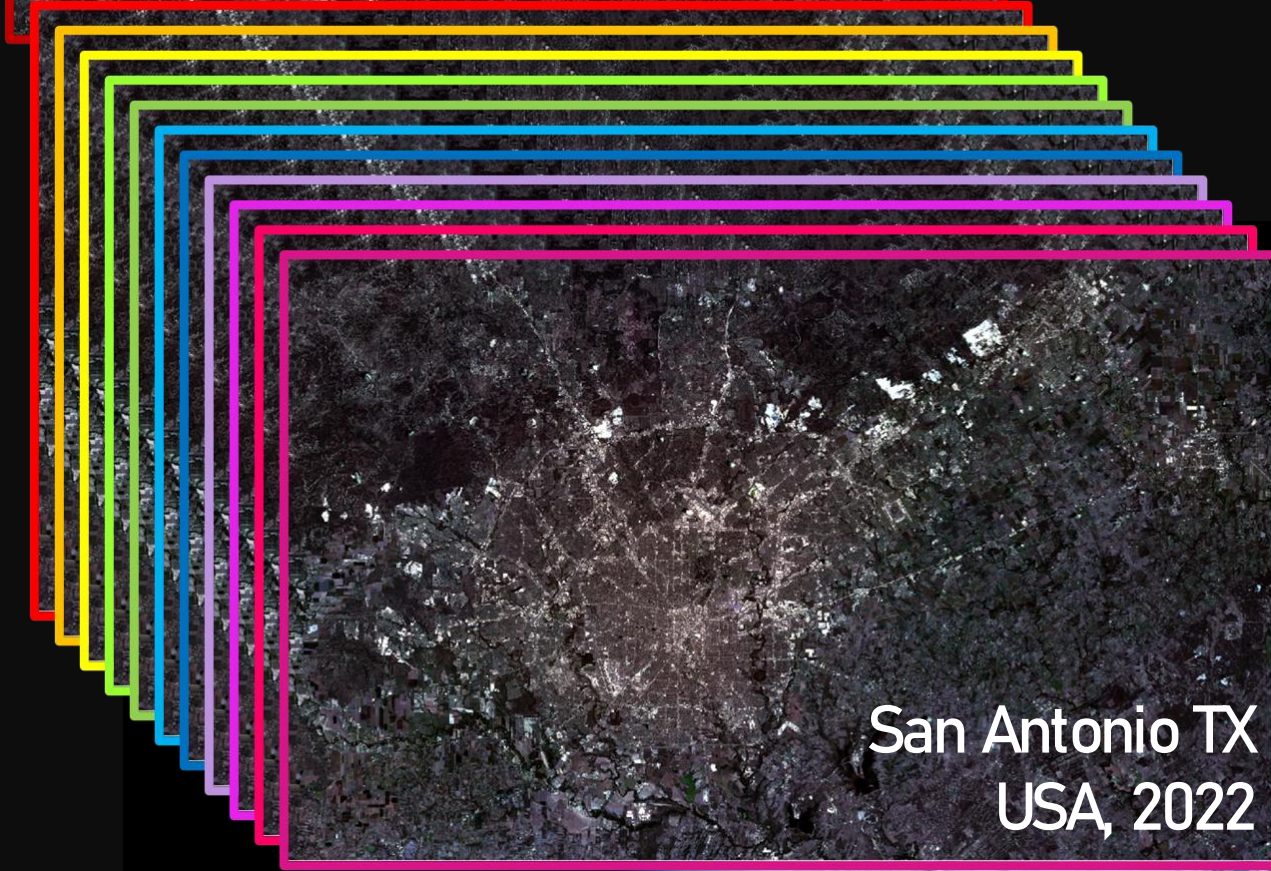
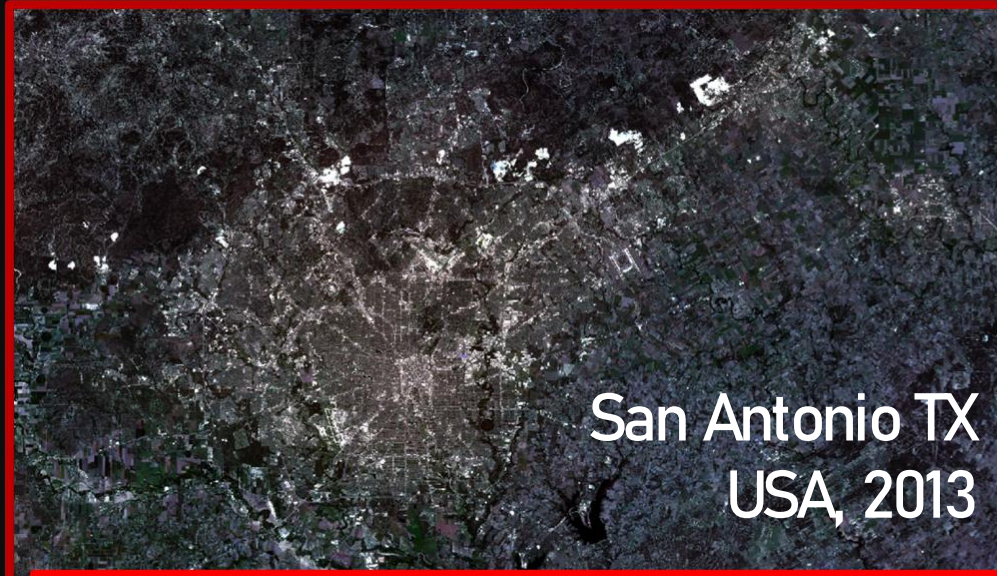
New Data
and
Updates

HLSS30 historical
processing is
complete!

HLSS30 expected
completion Dec. 2023

San Antonio TX
USA, 2013

San Antonio TX
USA, 2022



Observational Products for End Users from Remote Sensing Analysis

OPERA Land Surface Disturbance Alert Product from HLS

Made by the Satellite Needs Working Group (SNWG)



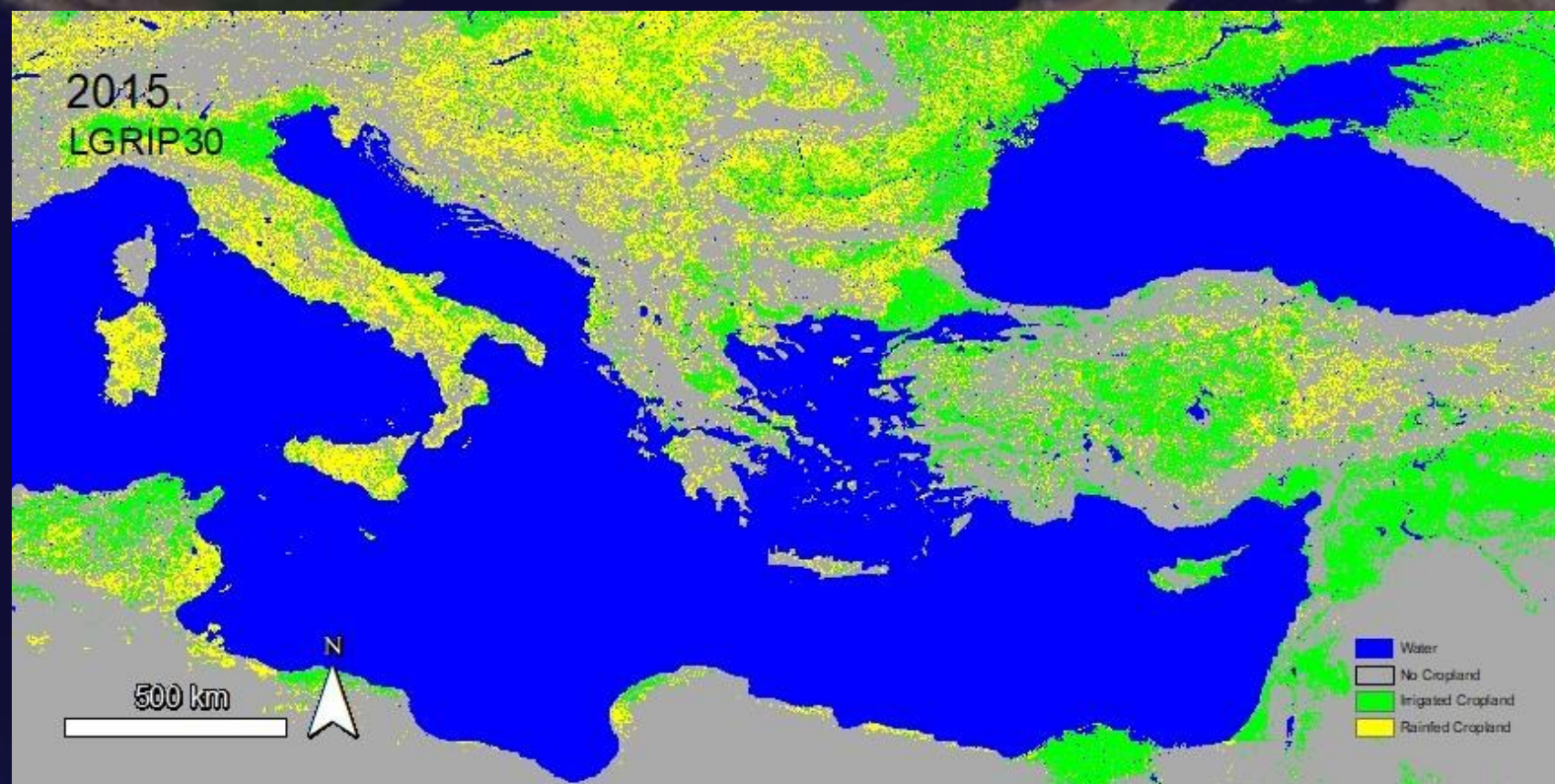
QUICK FACTS:

- 30m pixels, 19 layers
- 2-4 day revisit time
- **4 locations** (for now)
- Spatial Extent: Global
- Temporal extent: 2022
- File format: Geotiff

What is it? Disturbance is mapped any time there is detectable vegetation cover loss within HLS pixels. Logging, mining, fire, drought, and construction (buildings, roads, etc.) - at large enough scales - are all types of disturbance that would result in loss of vegetation cover.

LGRIP

Landsat-Derived Global Rainfed and Irrigated-Cropland Product, 2015



Water



Not Cropland



Irrigated Cropland



Rainfed Cropland

G-LiHT: Goddard's *LiDAR*, *Hyperspectral* & *Thermal* Imager

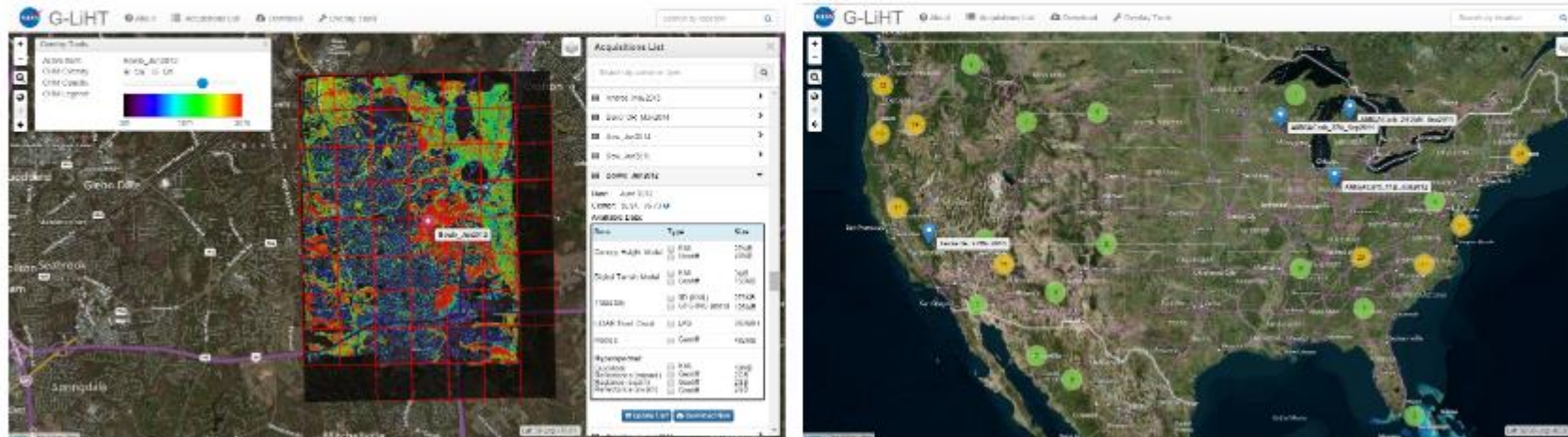
What is G-LiHT?

G-LiHT is a portable, airborne imaging system that *simultaneously maps the composition, structure, and function of terrestrial ecosystems* using:

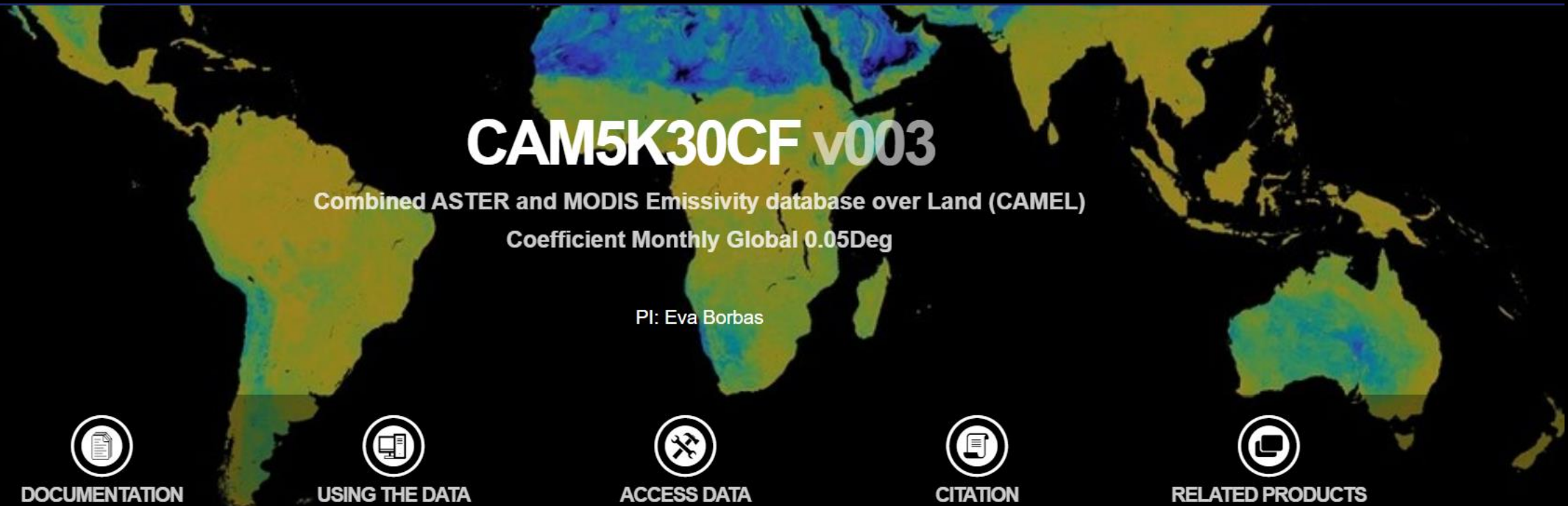
1. *LiDAR* to provide 3D information about the distribution of foliage and canopy elements;
2. *imaging spectroscopy* to discern species composition and variations in biophysical variables; and
3. *thermal measurements* to quantify surface temperatures and detect heat and moisture stress.

G-LiHT Data Center Webmap

G-LiHT data can be browsed and downloaded from our [interactive webmap](#).

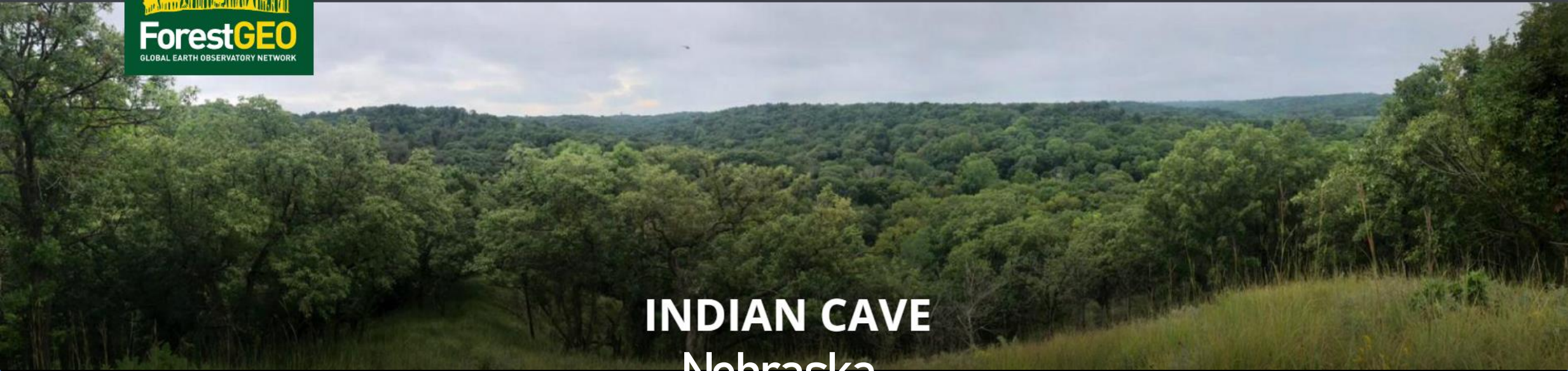


Combined ASTER and MODIS Emissivity database over Land ([CAMEL](#)) Coefficient Monthly Global 0.05Deg





Airborne Hyperspectral Reflectance



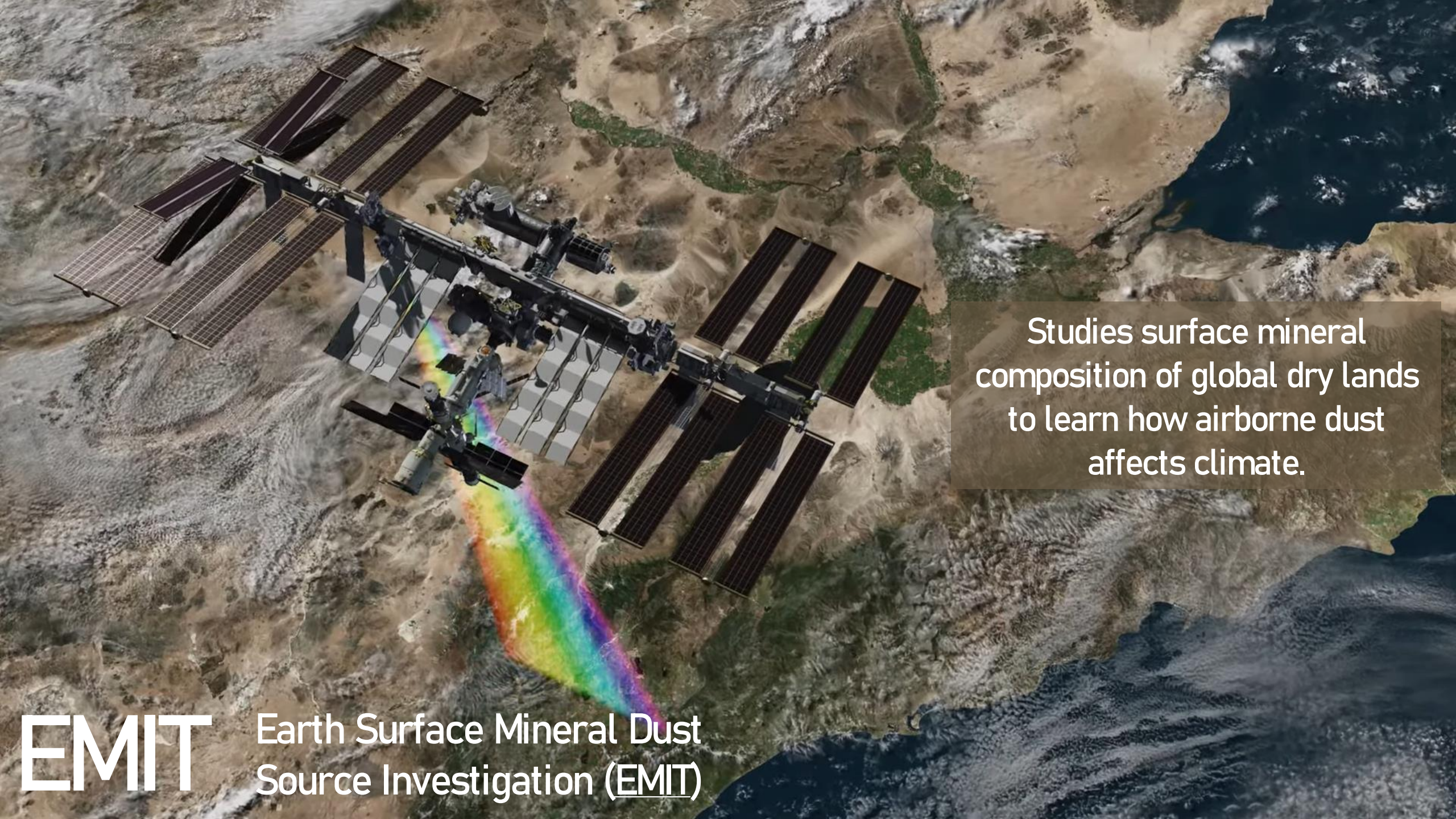
INDIAN CAVE Nebraska

178 hyperspectral bands
radiometrically, geometrically, and atmospherically corrected

RETURN OF THE



EXPECTED SEPTEMBER 2024



Studies surface mineral composition of global dry lands to learn how airborne dust affects climate.

EMIT Earth Surface Mineral Dust Source Investigation (EMIT)

FAST FACTS:

EMIT

Earth Surface Mineral
Dust Source Investigation

Mounted on the International Space Station, Data Collection Began July 2022

Sensor: Optical, 285 bands

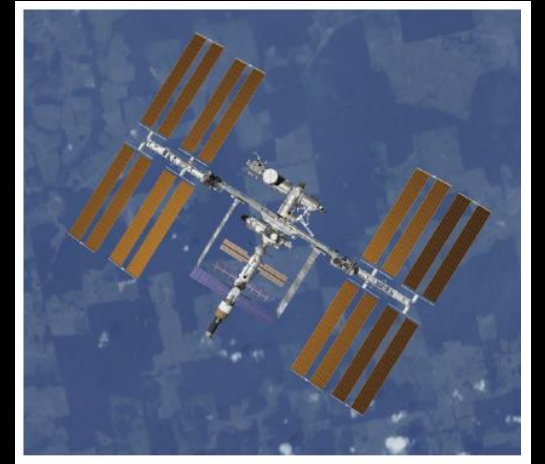
Spatial Resolution: 60 m

Spectral Resolution: ~ 7.5 nm

File format: NetCDF

Existing Resources: Python Tutorials, [GitHub](#)

* Likely available in AppEEARS during 2024



Data Products

Access Now:

- Surface [Radiance](#)
- Surface [Reflectance](#)

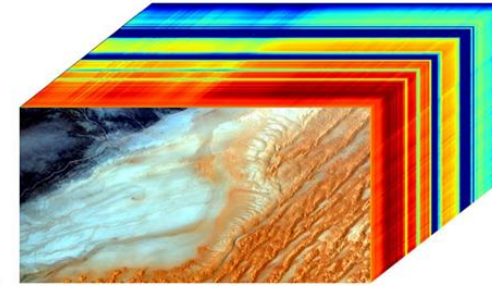
Access in Future:

- Mineral Abundance
- Green House Gas X



Lets work together!

nasa/**EMIT-Data-Resources**



5
Contributors

0
Issues

20
Stars

16
Forks

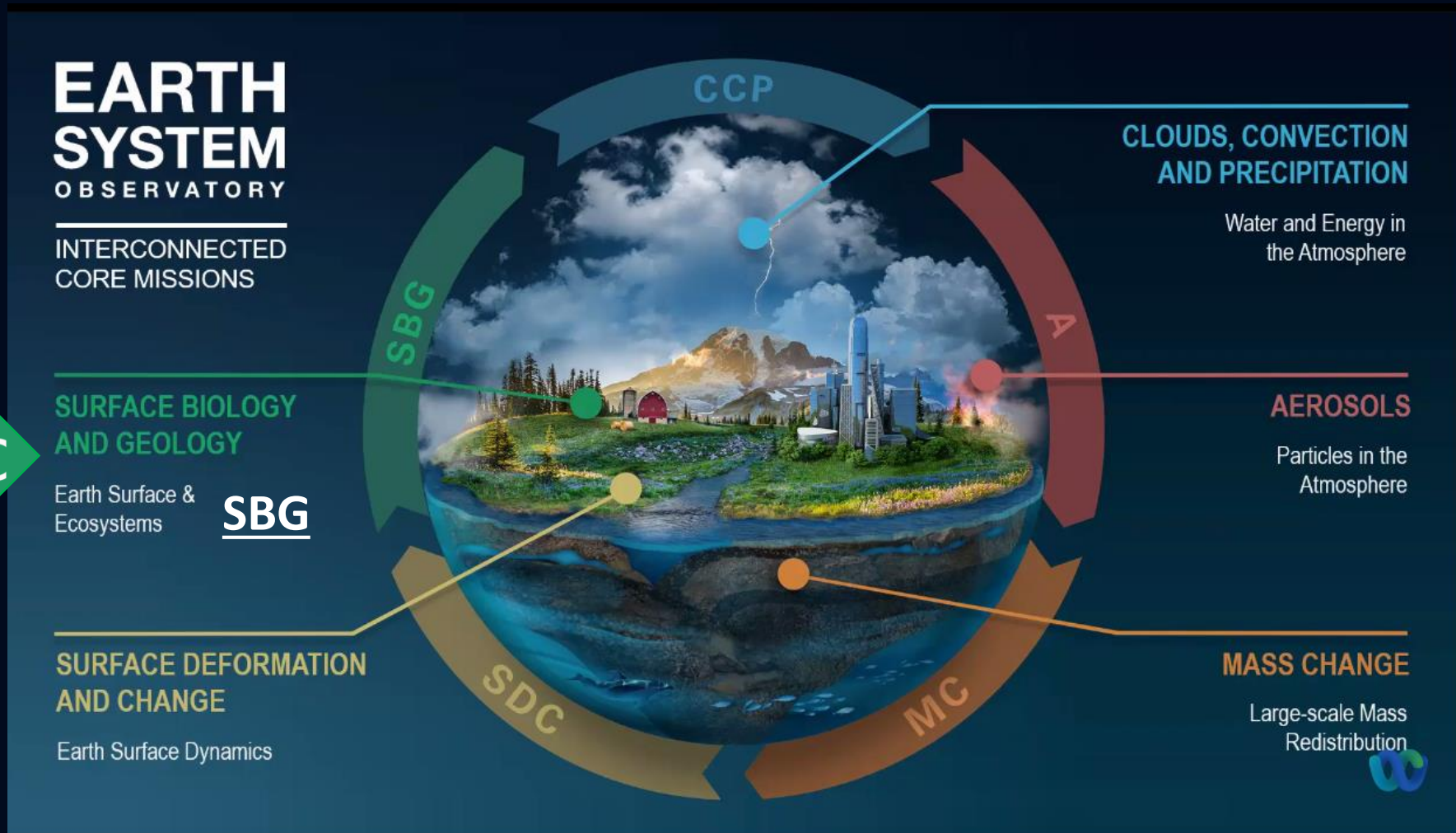


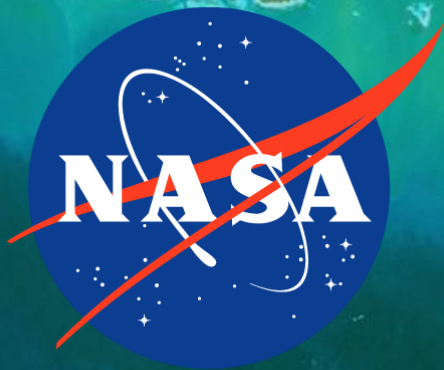
Fork our code repository and make a pull request



[GitHub](#)

On the Horizon, Expected 2022?





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