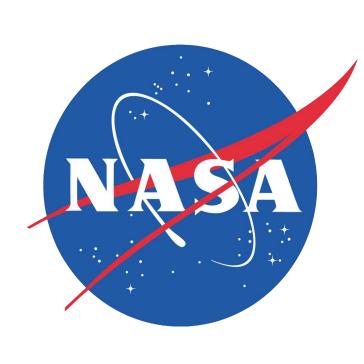
https://worldview.earthdata.nasa.gov https://earthdata.nasa.gov/gibs

Matthew Cechini¹, Ryan Boller², Katie Baynes², Jeffrey Schmaltz¹, Charles Thompson³, Joe Roberts³, Joshua Rodriguez³, Ben King¹, Minnie Wong¹, Zach Rice⁴, Mike McGann¹, Ed Plato⁴, Alexander DeLuca¹, Jerome King¹, Natalie Pressley¹

I - Science Systems and Applications, Inc., 2 - NASA Goddard Space Flight Center, 3 - NASA Jet Propulsion Laboratory, 4 - ASRC Federal Holding Company

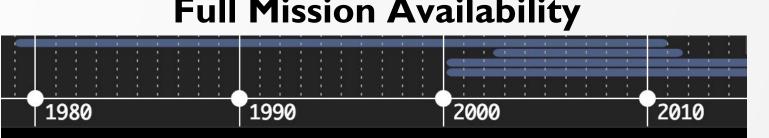


What is GIBS?

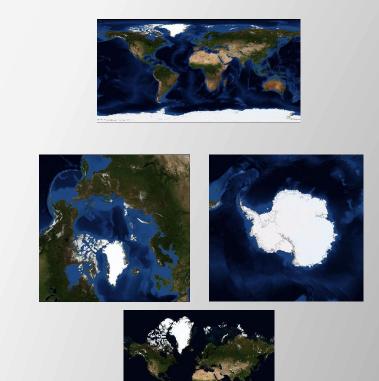
The Global Imagery Browse Services (GIBS) provides full resolution imagery representations of NASA Earth science data through a free, open, and interoperable application programming interface. Through responsive and highly available web services, it enables interactive exploration of data to support a wide range of applications including scientific research, applied sciences, natural hazard monitoring, outreach, and more. GIBS imagery represents nearly 800 satellite imagery products. Most imagery is available with a few hours after satellite overpass and some span over 18 years.



Full Mission Availability

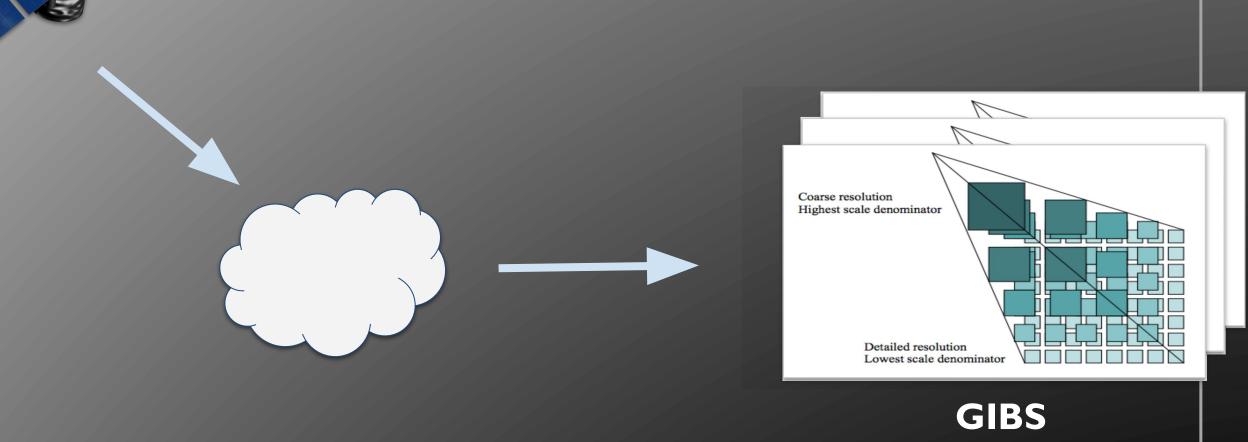


4 Map Projections

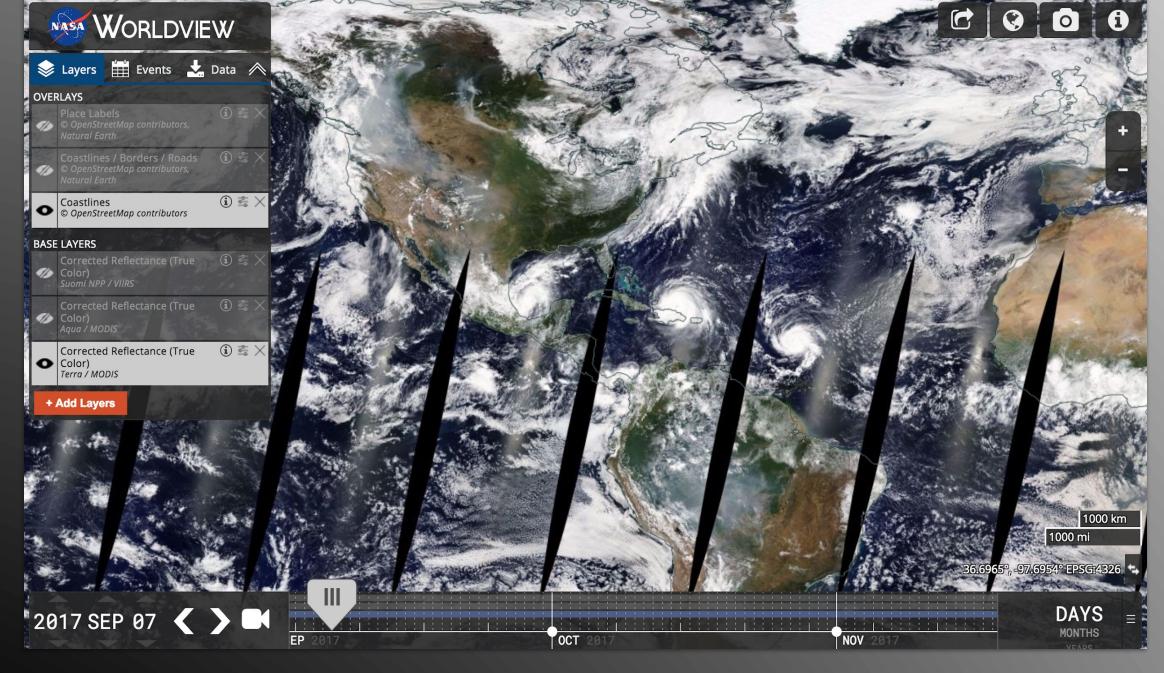


Near Real-Time

~800 Science Products







https://worldview.earthdata.nasa.gov

What is Worldview?

WORLDVIEW

Typhoon Meari Thursday, November 3

Boteler Fire, NORTH CAROLINA Tuesday, October 25

Jacobson Fire, CALIFORNIA Thursday, October 20

Junkins Fire, COLORADO Monday, October 17

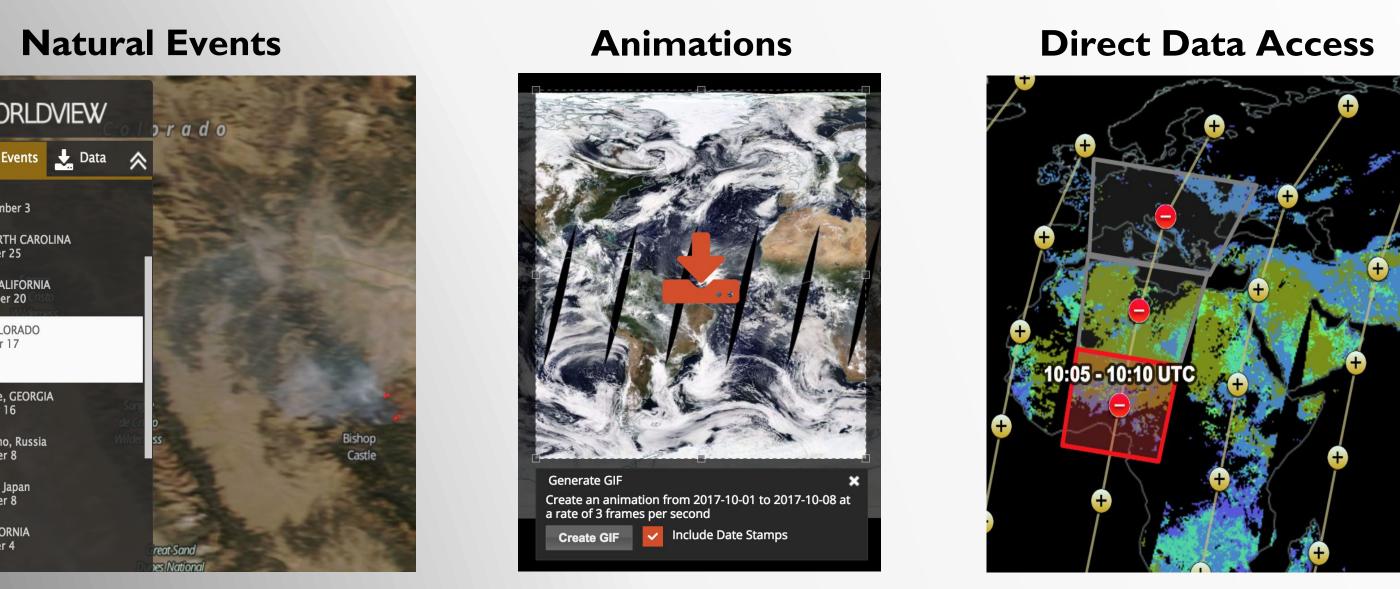
Rough Ridge Fire, GEORGIA Sunday, October 16

Karymsky Volcano, Russia Saturday, October 8

Asosan Volcano, Japan Saturday, October 8

The Worldview tool provides the capability to interactively browse global, full-resolution satellite imagery hosted by the GIBS system. Users may view imagery based on a curated list of current natural events, including wildfires, tropical storms, and volcanic eruptions. Users may also choose to download the raw data files underlying the imagery.

Browsing on tablet and smartphone devices is generally supported for mobile access to the imagery.



Imagery Platforms

GIBS and Worldview provide visualizations from dozens of remote sensing platforms and scientific disciplines.



Recent Imagery Activities

Celebrating 18 Years of

processing the full 18 year record

allowing users to interactively view

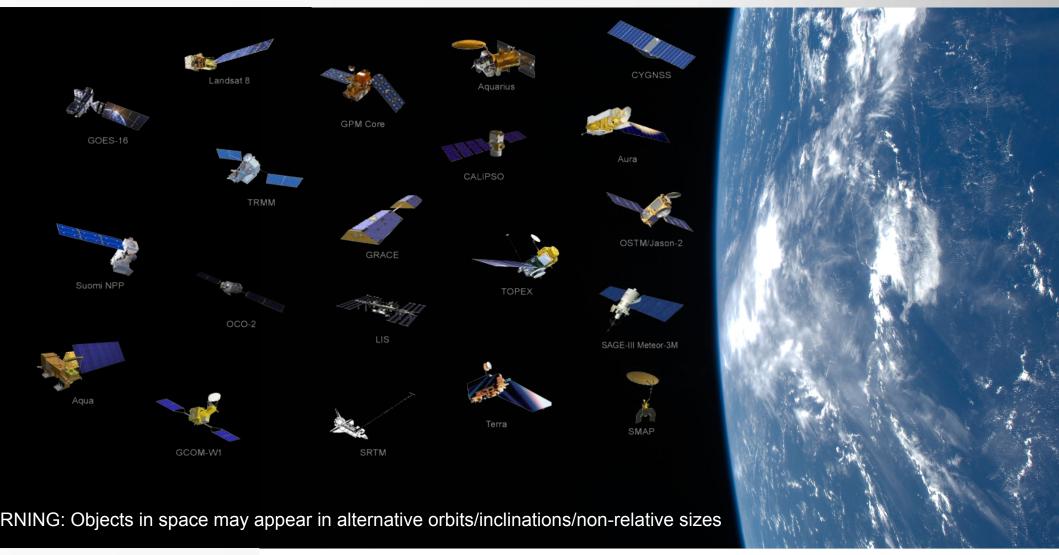
interactively explore almost 20

MODIS Data

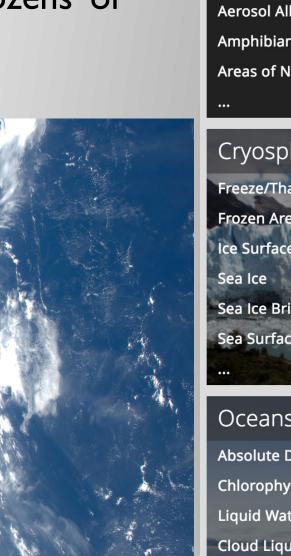
In 2018, GIBS completed

of MODIS data visualizations

their world their way and



The GIBS team is continually working with expand its catalog of visualization products and capabilities.



OGC Web Map Service

To facilitate better integration with

GIS tools such as ArcMap and

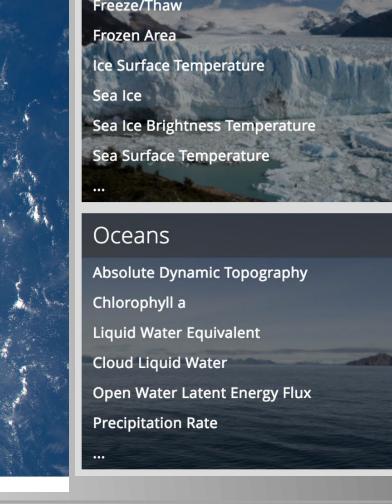
Map Service (WMS) endpoint

allowing non-tiled access to all

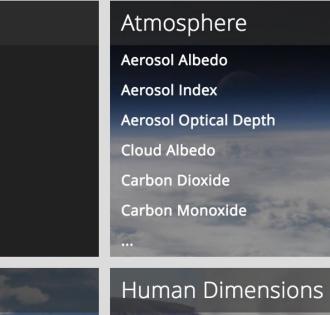
GIBS visualization products.

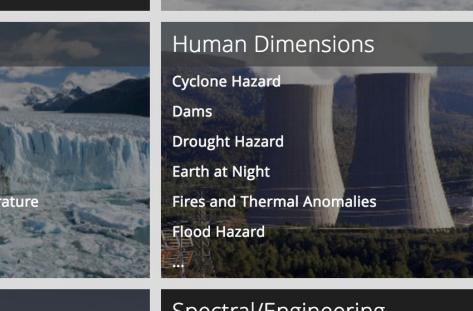
QGIS, GIBS has released a Web

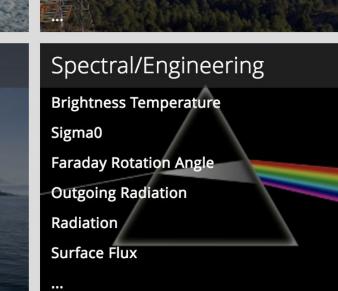
(WMS) Support

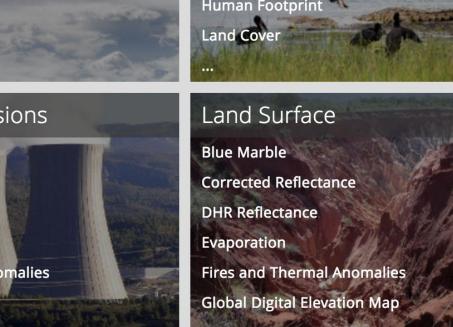


Aerosol Optical Depth



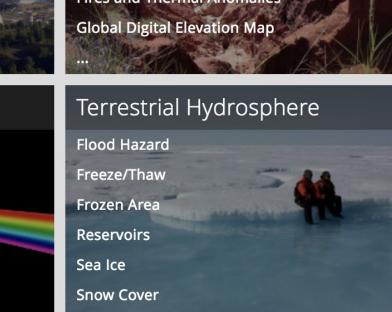






Forests, Mangrove

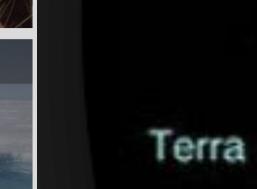
Gross Primary Productivity

















Worldview Highlights

Compare two imagery products from the same day, compare the

same products "before" and "after", or compare whatever

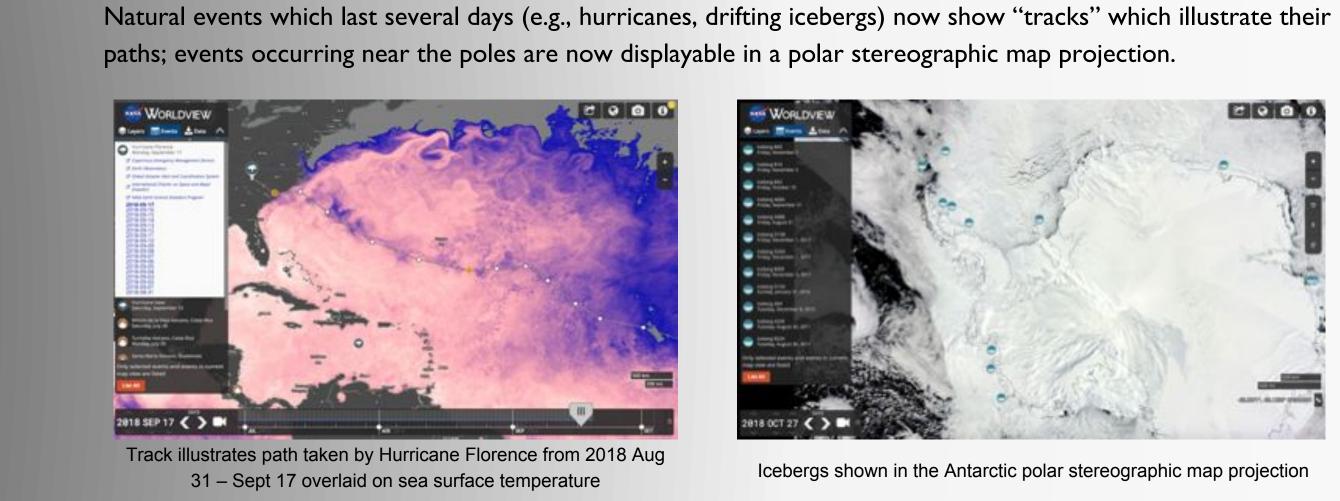
Comparison Mode

combination you like.

2018 MOV 88 (> BM

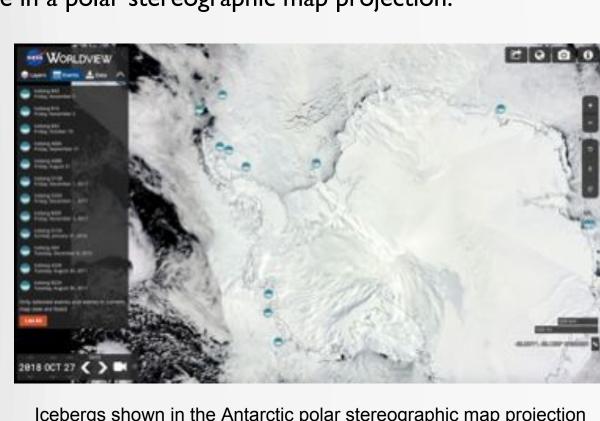
2818 NOV 88 (> BN

The Worldview team actively works with its community to add new features that benefit a continually expanding user community.



Enhanced Natural Event Tracking

Frack illustrates path taken by Hurricane Florence from 2018 Aug



Icebergs shown in the Antarctic polar stereographic map projection

Remote Sensing User Training

The Applied Remote Sensing Training (ARSET) program provides training via online webinars and in-person workshops to build the skills to acquire and use NASA satellite and model data for decision support. In-Person training

89% of ARSET trainees reported that Worldview was immediately usable and required no addition training after initial introduction.

Source: Survey of 600+ users after training

workshops provide hands-on activities that include NASA Worldview.



Level 0, Fundamentals of Remote Sensing atellites, Sensors, Data, and Tools for Land Management and Level 1, Basic Training Remote Sensing of Forest Cover and Change Assessment for

Level 2, Advanced Training Advanced Webinar: Land Cover Classification with Satellite Data

Worldview Augmented Reality

Worldview AR utilizes GIBS, Unity3D and commodity devices to bring earth

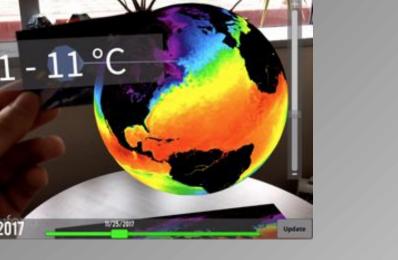
Above: using a vertical slider bar to compare the view of a wildfire petween MODIS "true color" visible imagery (left half of app) vs MODIS

"false color" infrared imagery (right half of app)

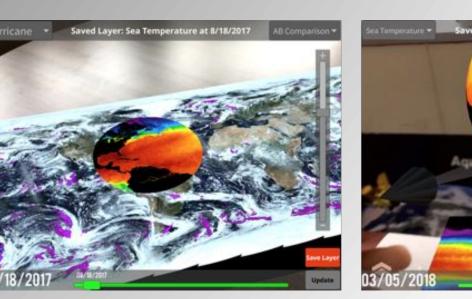
SMAP

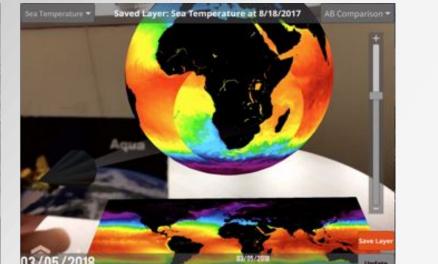
The color probe tool allows users to take





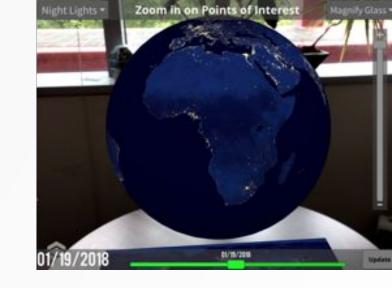
Comparison Tool: Using the AB comparison tool, users may compare multiple data sets with different layers and dates.





Users can use the magnifying glass tool to zoom into points of interest on the map. Additionally, users can scale and rotate the globe at any time

Magnifying Glass / Zoom:



Future Imagery Activities

Geostationary Imagery Support The GIBS team is actively working with two teams, GeoNEX and SPoRT, to visualize 15-minute increment geostationary imagery products from the GOES-16 satellite. These products provide a unique view into the active changes in earth systems not as easily scene through the standard NASA polar orbiting satellite.



Enhanced support for vector-based visualizations will allow the ability to display vector data and dynamically style it within the browser. GIBS is working to transition its existing vector-based layers and also to add new products such as wind speed and



Near Real-Time GOES-16 Thermal Anomalies MODIS Polar Atmosphere MODIS Multi-Angle Implementation of Atmospheric Correction (MAIAC)

Standard

Future Catalog Additions

Jason-2

 AMSR-U2 Rain and Ocean NASA DEM OCO-2 Carbon Dioxide, Water Vapor, and Solar-induced Chlorophyll Fluorescence Sentinel-I Radiometrically Terrain-Corrected (RTC) SAR TRMM Brightness Temperature And Precipitation VIIRS Night Lights (Daily, Monthly, Annual)

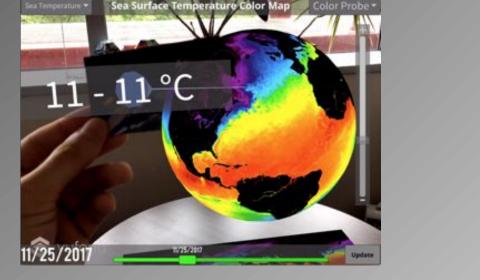


VIIRS Land, Snow, Ice, and Atmosphere

observing satellite imagery into the real world.

Color Probe:

measurements of color map data sets on both the map and globe.



for further analysis.



years of planetary change. **MODIS Level 3 Imagery Products** The GIBS team has worked with the teams that process and distribute MODIS data to

scientific parameters are included in this processing:

Snow and Ice Day/Night Ice Surface Temperature (Daily) Sea Ice Extent (Daily)

 Snow Extent (8-Day) Snow Cover (Daily and Monthly)

 Land/Water Mask (Annual) Land Cover Type (Annual)

 Fraction of Photosynthetically Active Radiation (8-day and 4-day) Gross Primary Productivity (8-Day) Leaf Area Index (8-Day and 4-Day)

BRDF-Adjusted Reflectance (Daily)

In 2018, GIBS has added 300 new Terra and Aqua satellites. Processing is ongoing for these products. The following visualization products across numerous active and retired remote sensing platforms and instruments. This enriches the experience for GIBS users looking to

Expanded Instruments and

Platforms

MODIS Terra Daily Albedo

 Day/Night Land Surface Temperature (Monthly, 8-Day, and Daily) Albedo (Daily)

visualize new daily and multi-day Level 3 products across the entire history of the

https://bit.ly/2Klpf4J

 Enhanced/Normalized Difference Vegetation Indices (Monthly and 16-Day) True and False Color Surface Reflectance (8-Day and Daily)

compare and explore earth science data.