

# Harmonized Landsat and Sentinel-2 (HLS) Update

John Mandel, HLS Production Team

NASA MSFC



American Geophysical Union Fall Meeting

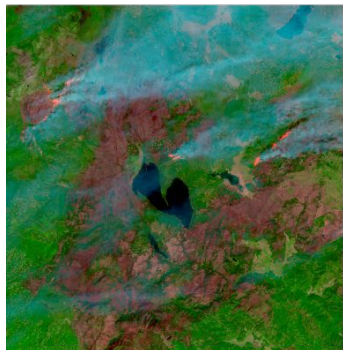
December 13, 2023



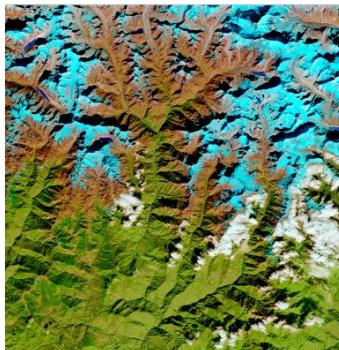
# The Goal

The HLS project was selected by the **Satellite Needs Working Group** as a Cycle 1 solution to satisfy government user needs for greater revisit rates of multispectral data.

HLS data has demonstrated utility for:



**Active Fires**



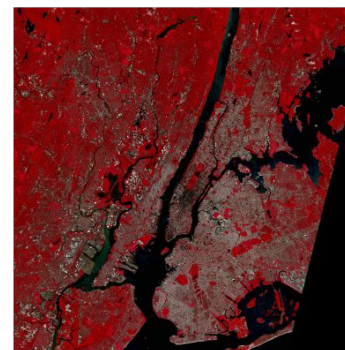
**Snow Extent**



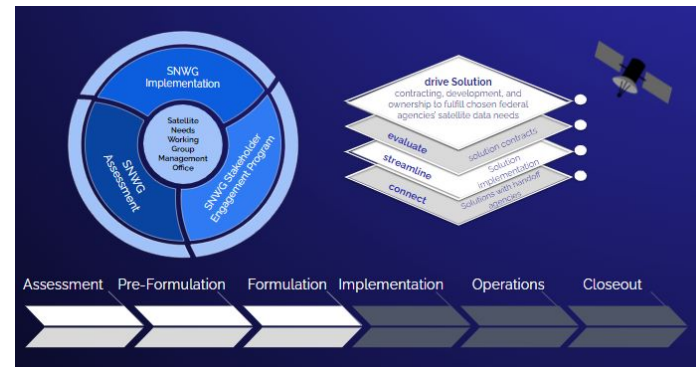
**Agriculture**



**Inland Flooding**



**Urban Monitoring**



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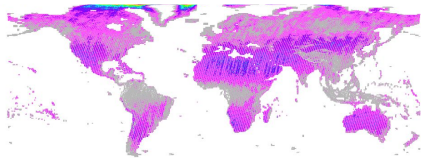
[Status](#)

[Year in Review](#)

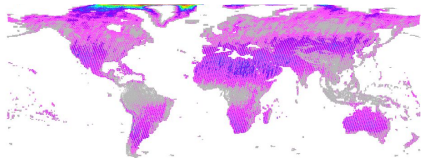
[Year Ahead](#)

[See the Data](#)

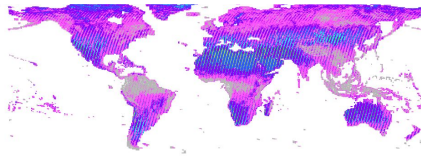
Landsat 8



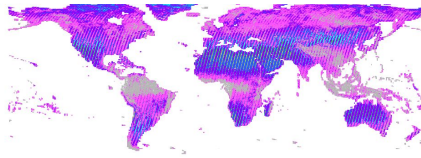
Landsat 9



Sentinel-2A



Sentinel-2A



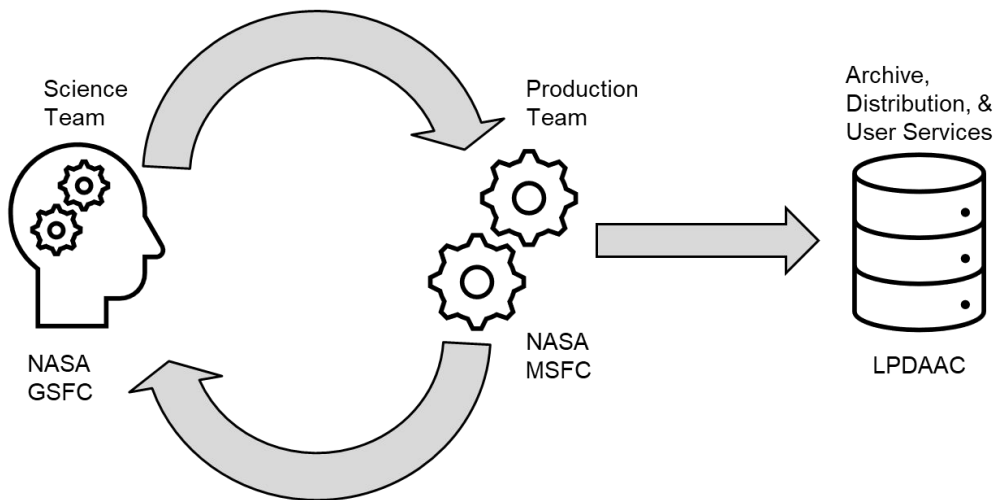
# Constellation Overview



The HLS dataset combines and normalizes land imagery from Landsat 8 & 9 and the Sentinel-2 constellation, creating a 4 satellite virtual constellation with a 2-5 day revisit.

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# The HLS Team & History

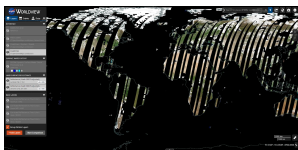

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# Data Access

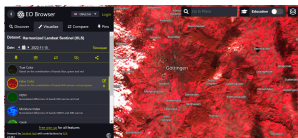
Download the data and access tutorials at the Land Processes (LP) DAAC



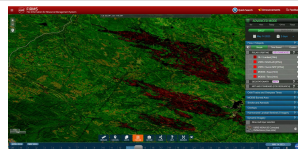
Visualize the data and derived products and create custom color composites on NASA worldview



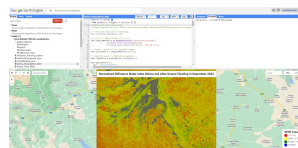
Visualize the data and create custom color composites and spectral indices on Sentinel Hub



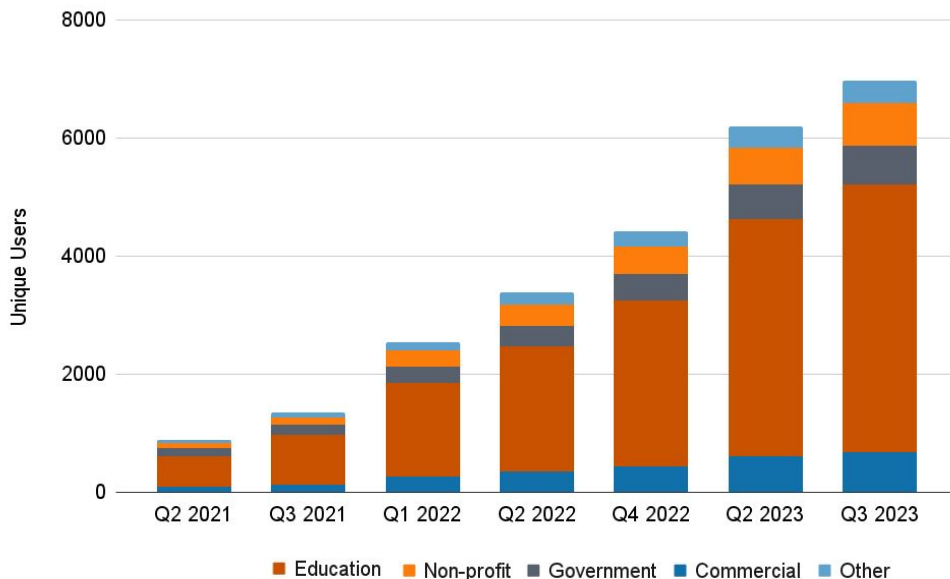
Visualize the data alongside other fire observation and detection products at NASA FIRMS



Future: HLS L30 is being ingested by Google Earth Engine, with >70% of the dataset currently available



User statistics from LP DAAC show a steady increase in users and usage since entering operations in 2021



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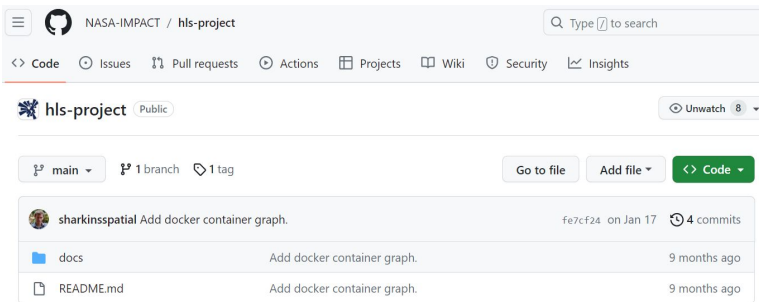
See the Data

# Year in Review



2023 was the year of Open Science, and our goal has been to increase transparency and access to the freely-available HLS dataset. To that end, the HLS codebase is now [open-sourced](#) and available on GitHub.

The IMPACT team also partnered with IBM to create a [geospatial foundation model](#), available through Hugging Face.



**IBM NASA Geospatial** Community

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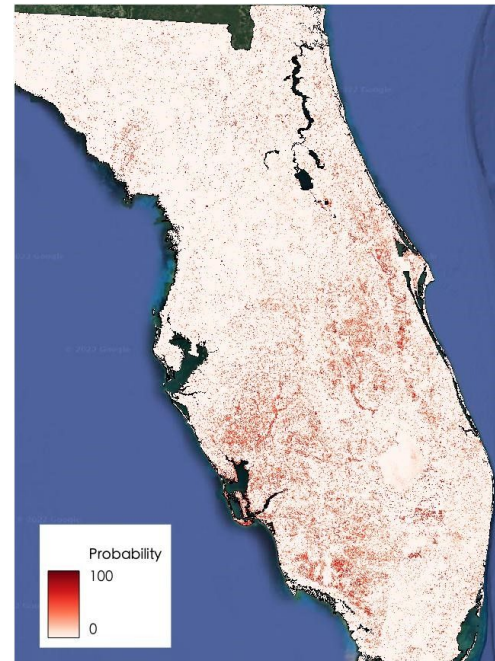
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# Year in Review



We celebrate all the applications we saw HLS used for in 2022-2023:

- Wildfire monitoring in [FIRMS](#)
- [Assessing and reporting damage](#) by Hurricane Ian
- Reservoir water level [monitoring](#)
- Much, much more



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# The Year Ahead

We will incorporate Sentinel-2C after its launch in 2024.

HLS-derived vegetation indices will become available at LP DAAC early in 2024.

\*Live Demo\*

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# See The Data For Yourself

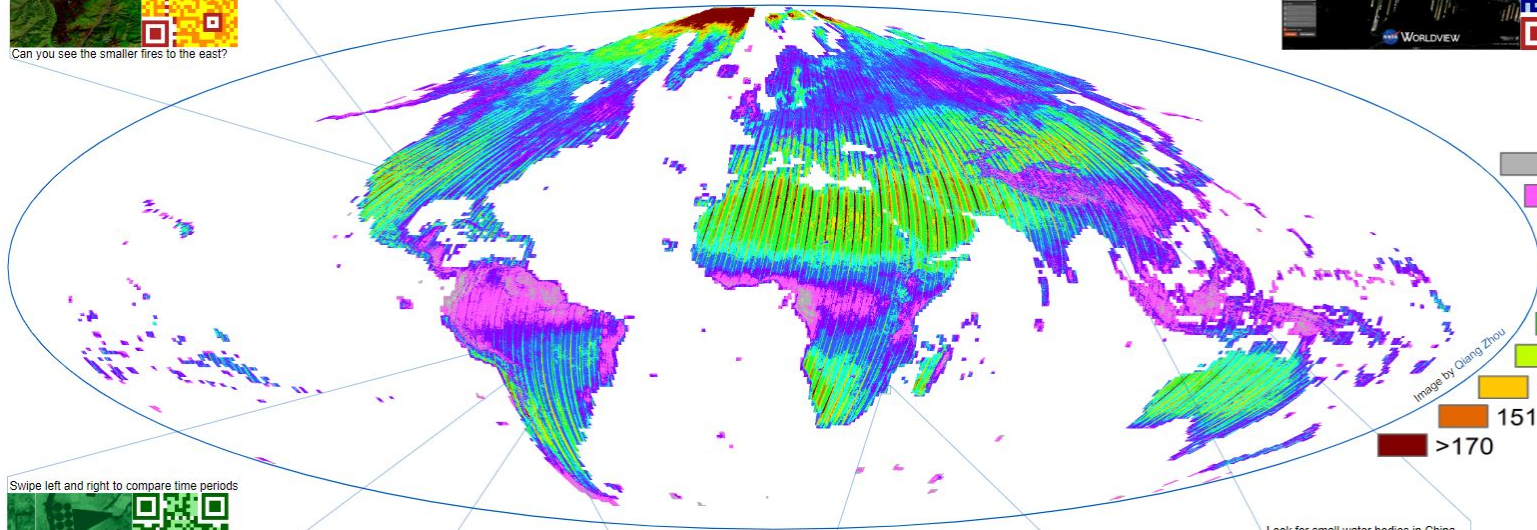
Hell's Canyon Fire



Can you see the smaller fires to the east?

## Cloud-Free Observations in 2022

Explore the Full Dataset on NASA Worldview



Swipe left and right to compare time periods



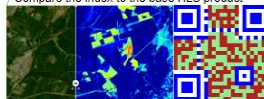
NDVI: Brazilian Agriculture

Use the NIR and SWIR bands to see details beyond what the human eye can see



Change Your Worldview

Compare the index to the base HLS product



NDMI: South African Coast

Look for small water bodies in China



NDWI: Tibetan Lakes

\*Cloud-free according to Fmask detections generated from HLS images from 2022

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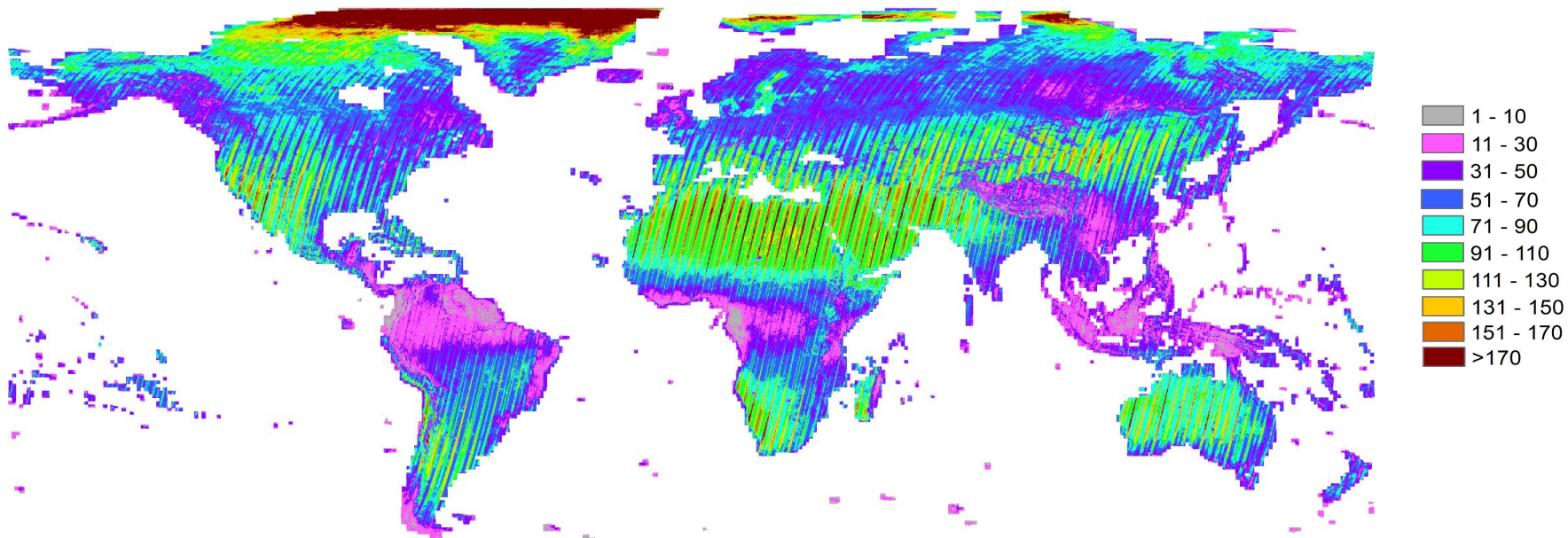
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***Thank You***

# Annual Cloud-Free HLS Observations\*



\*Cloud-free according to Fmask detections generated from HLS images from 2022