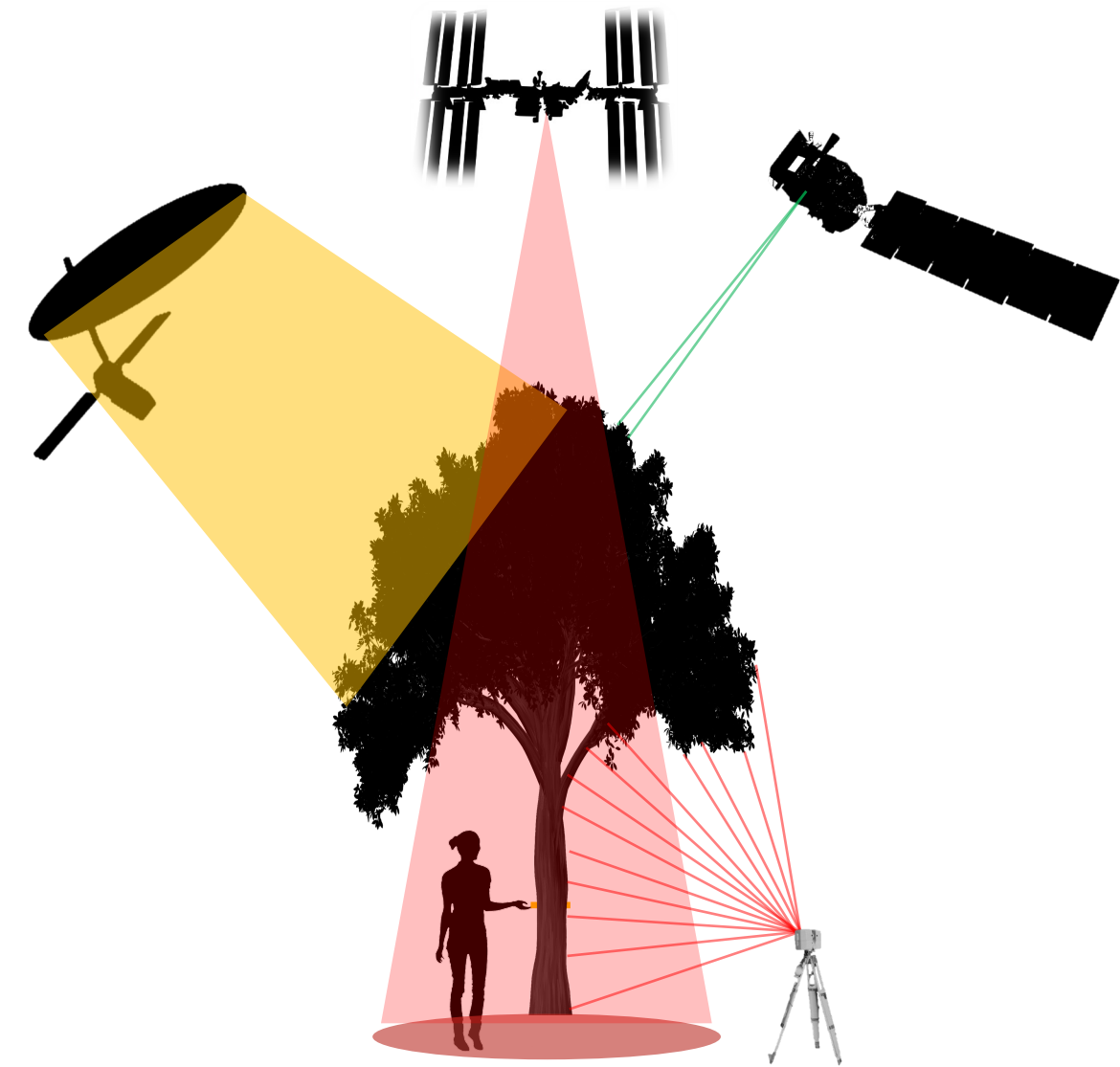


# Satellite Lidar for 3D Forest Structure

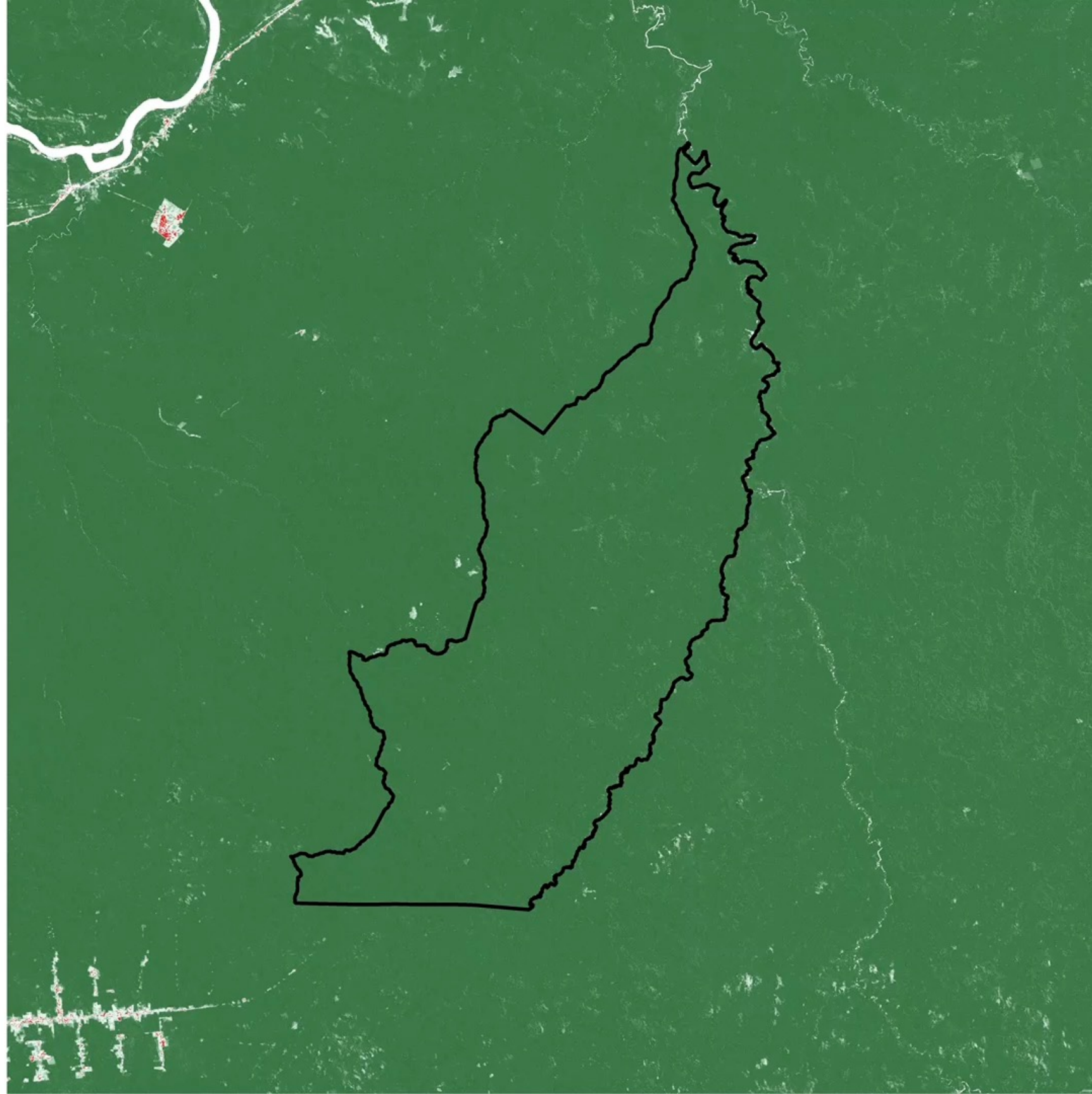
Laura Duncanson, University of Maryland




**GEDI**  
**ECOSYSTEM LIDAR**



**1985**



 Karipuna territory

Increasing ability to monitor forest cover losses through time (Landsat Example)

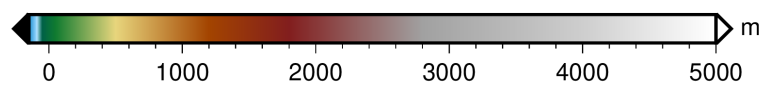
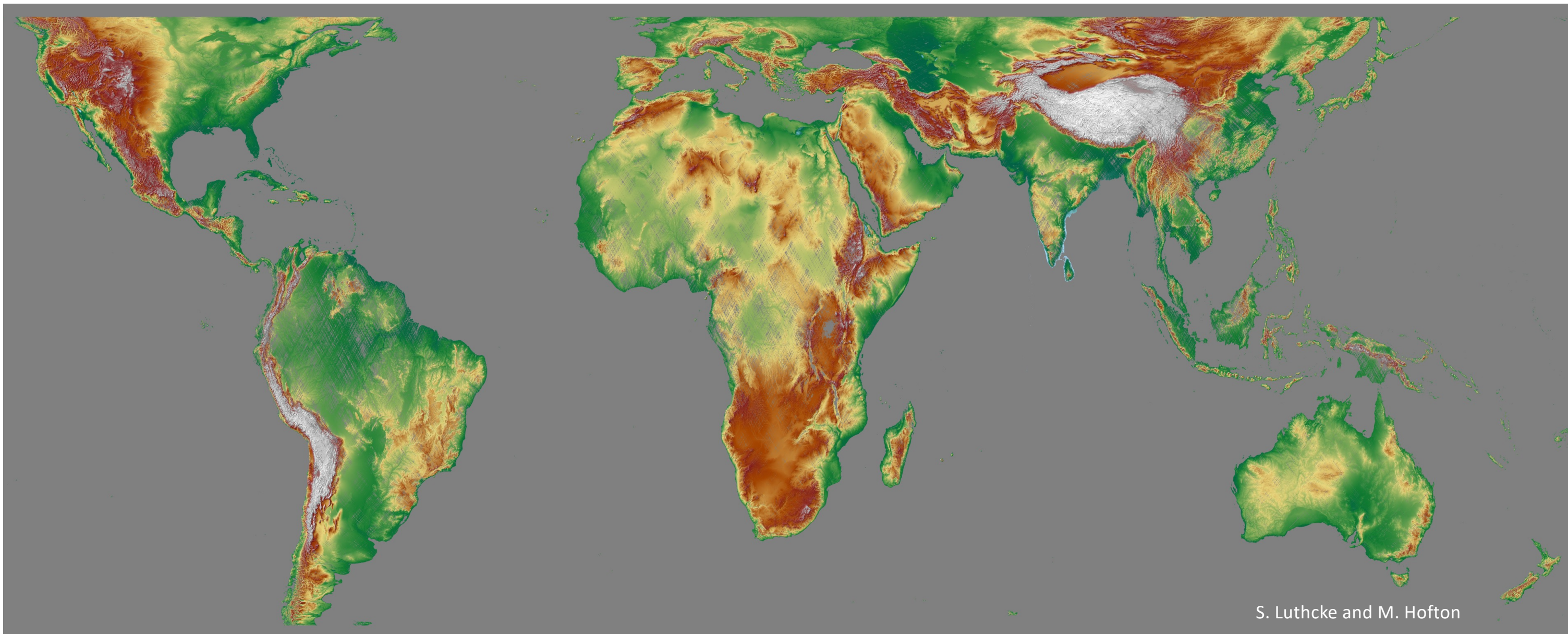
This animation shows forest loss surrounding a protected area in the Brazilian Amazon

**Hansen et al.**

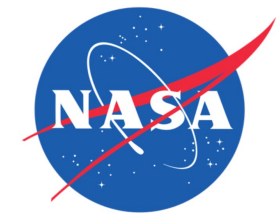
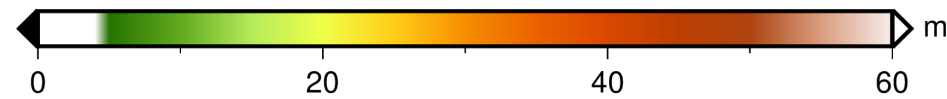
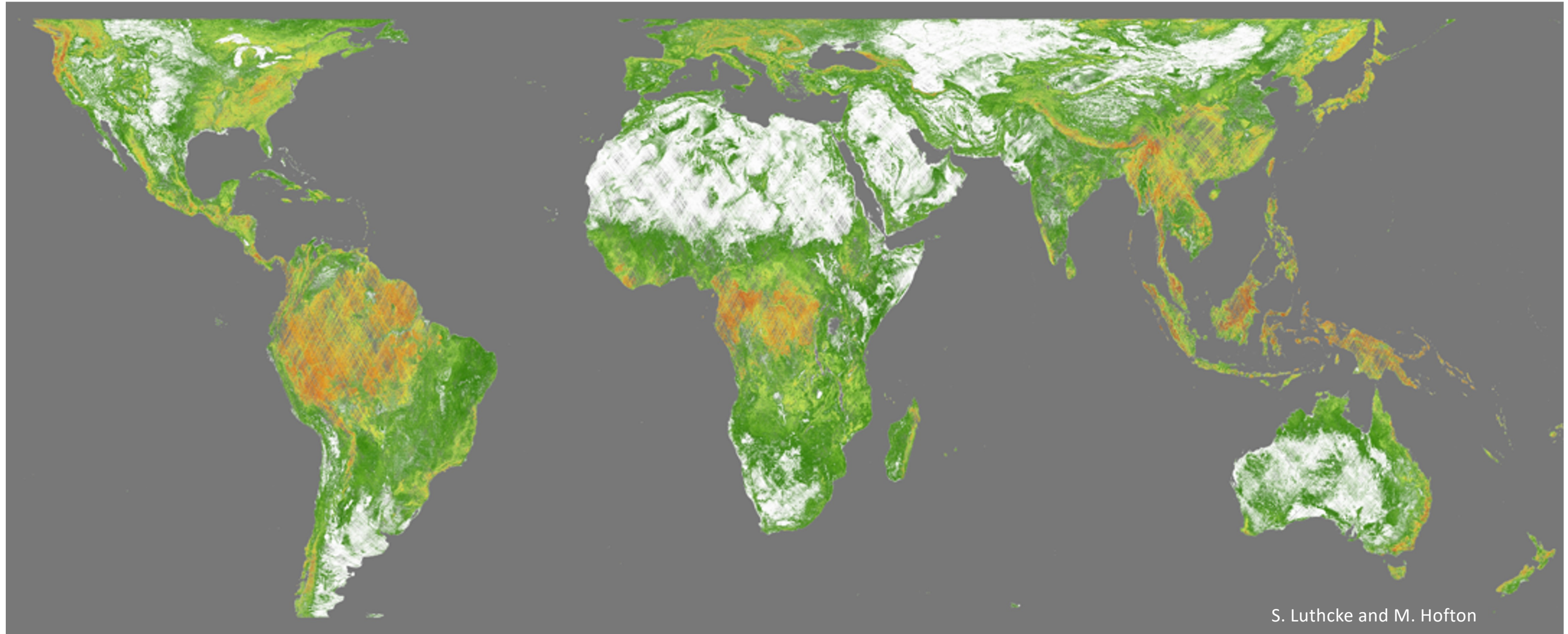
University of Maryland, College Park (glad.umd.edu)



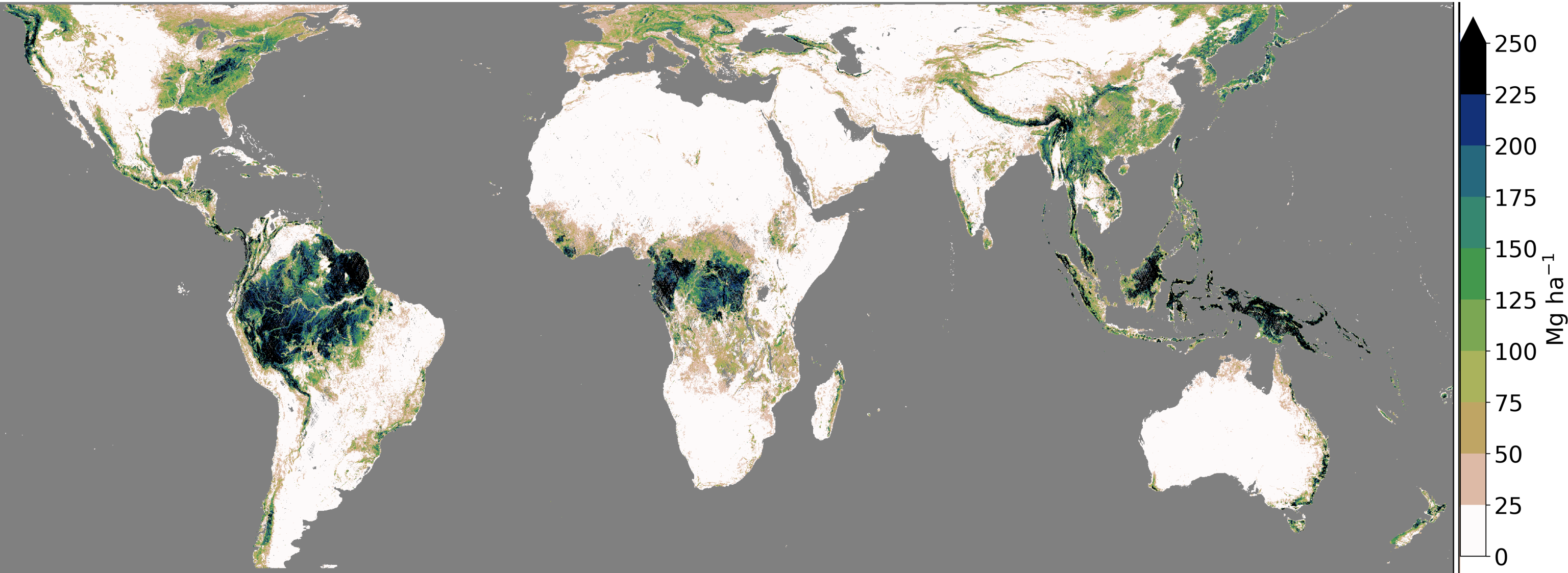
# GEDI Topography (2.75 years)



# GEDI Canopy Height (2.75 years)



# GEDI Gridded Biomass (1 km @ 2.75 years)



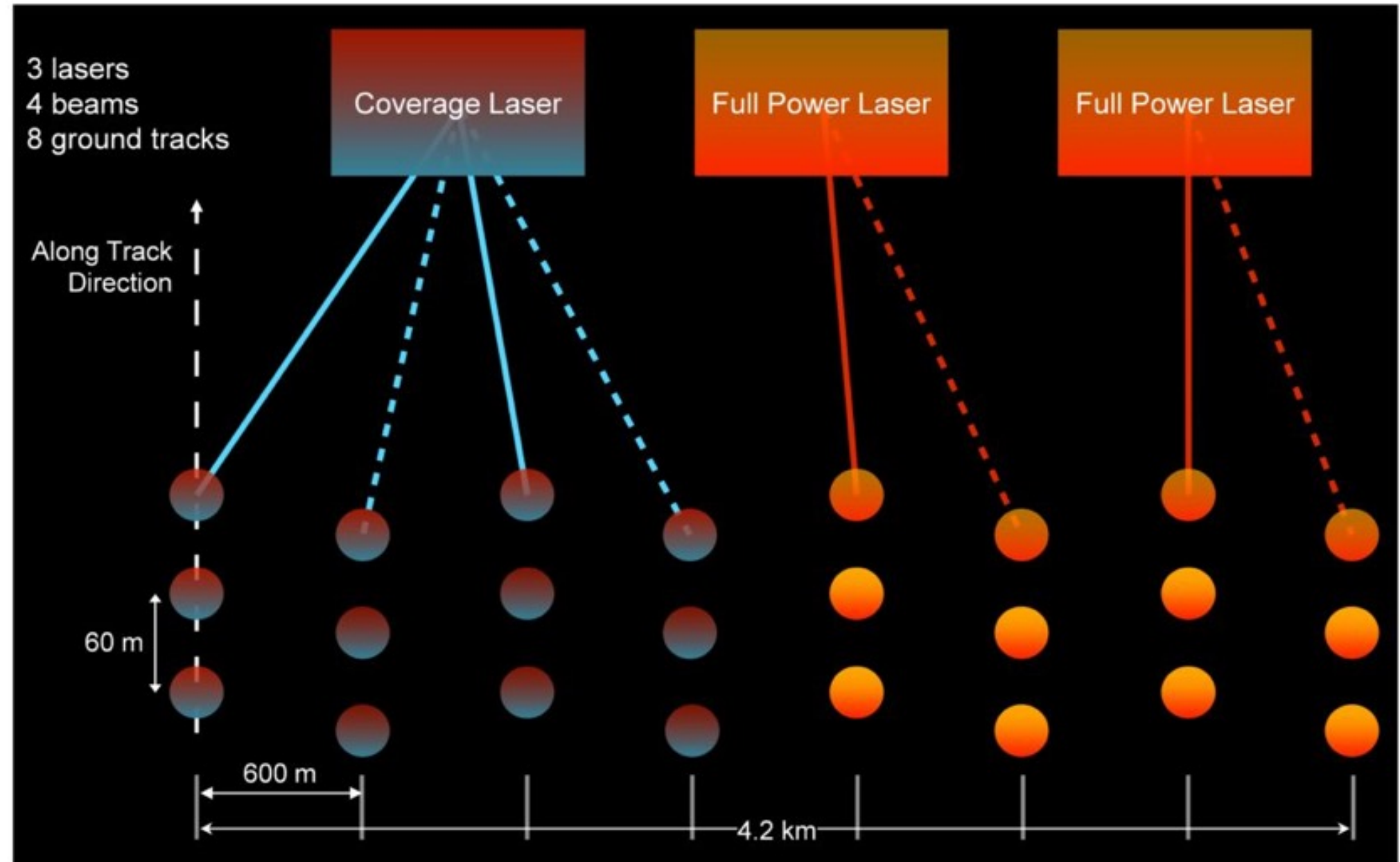
# GEDI Beam Pattern

- **3 Lasers, 4 Beams**

- 2 power
- 1 coverage

- **8 Ground Tracks**

- Originally 14 tracks



# GEDI's Biomass Models Will Continually Improve

Remote Sensing of Environment 270 (2022) 112845



Contents lists available at ScienceDirect

Remote Sensing of Environment

journal homepage: [www.elsevier.com/locate/rse](http://www.elsevier.com/locate/rse)



*Please help us fill gaps!*

## Aboveground biomass density models for NASA's Global Ecosystem Dynamics Investigation (GEDI) lidar mission

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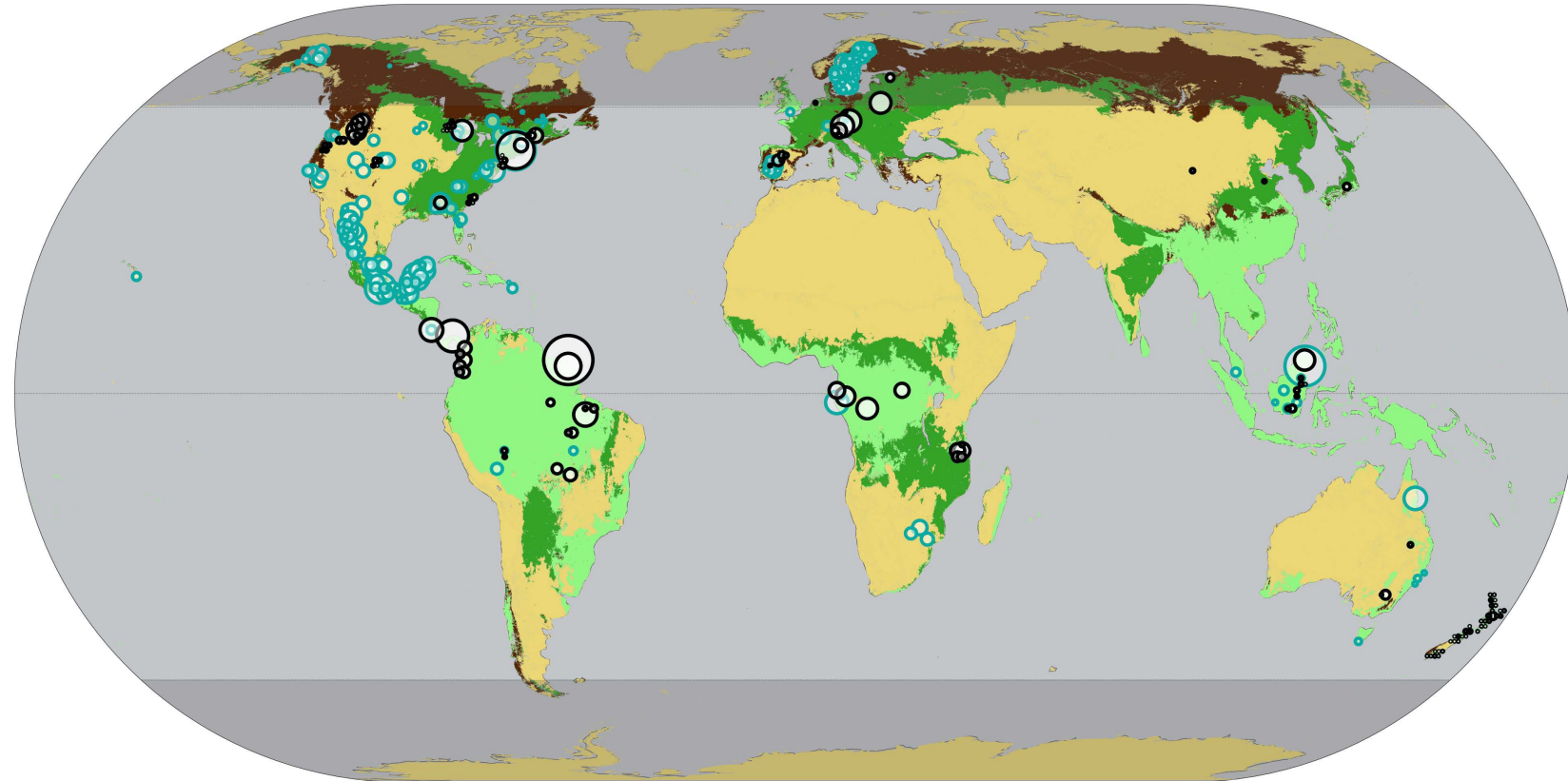
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### # Training samples

- 10
- 100
- 1000

### Inclusion in L4A

- L4A v1
- Future versions

### Plant functional type

- DBT
- EBT
- ENT
- GSW





# GEDI Data Available at LPDAAC and ORNLDAAC

NASA EARTHDATA Find a DAAC - Feedback ?

USGS science for a changing world NASA Home - About - Data - Tools - Resources - Contact -

Home / Data / Search Data Catalog

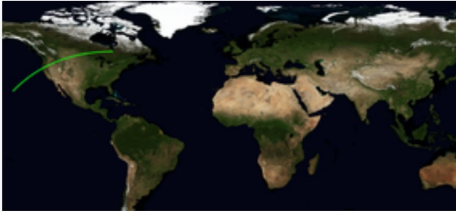
## Search Data Catalog

GEDI Search

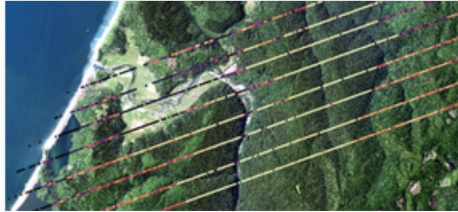
Cloud Access Temporal Range Collection Version Keyword Spatial Resolution >

STATUS: OPERATIONAL x

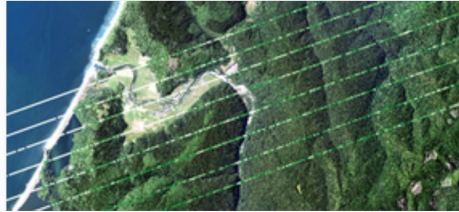
Showing 1 - 3 of 3 results Cards List Sort by: Product Name v



GEDI01\_B v002



GEDI02\_A v002



GEDI02\_B v002

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## Global Ecosystem Dynamics Investigation (GEDI)

### Overview



The Global Ecosystem Dynamics Investigation (GEDI) produces high resolution laser ranging observations of the 3D structure of the Earth. GEDI's precise measurements of forest canopy height, canopy vertical structure, and surface elevation greatly advance our ability to characterize important carbon and water cycling processes, biodiversity, and habitat. GEDI was funded as a NASA Earth Ventures Instrument (EVI) mission. It was launched to the International Space Station in December 2018 and completed initial orbit checkout in April 2019.

The lower-level science data products (L1B, L2A, and L2B) are available from the Land Processes DAAC (<https://lpdaac.usgs.gov/>), and the higher-level products (L3, L4A, and L4B) are available from ORNL DAAC. L3 provides gridded canopy and land surface metrics. L4A and L4B provide aboveground biomass density at footprint and grid levels.

### Related Links

- [Browse GEDI datasets](#)
- [Search GEDI datasets](#)
- [Publications citing GEDI](#)
- [NASA GEDI Mission Page](#)

GEDI Project Site

### Global Ecosystem Dynamics Investigation Datasets List

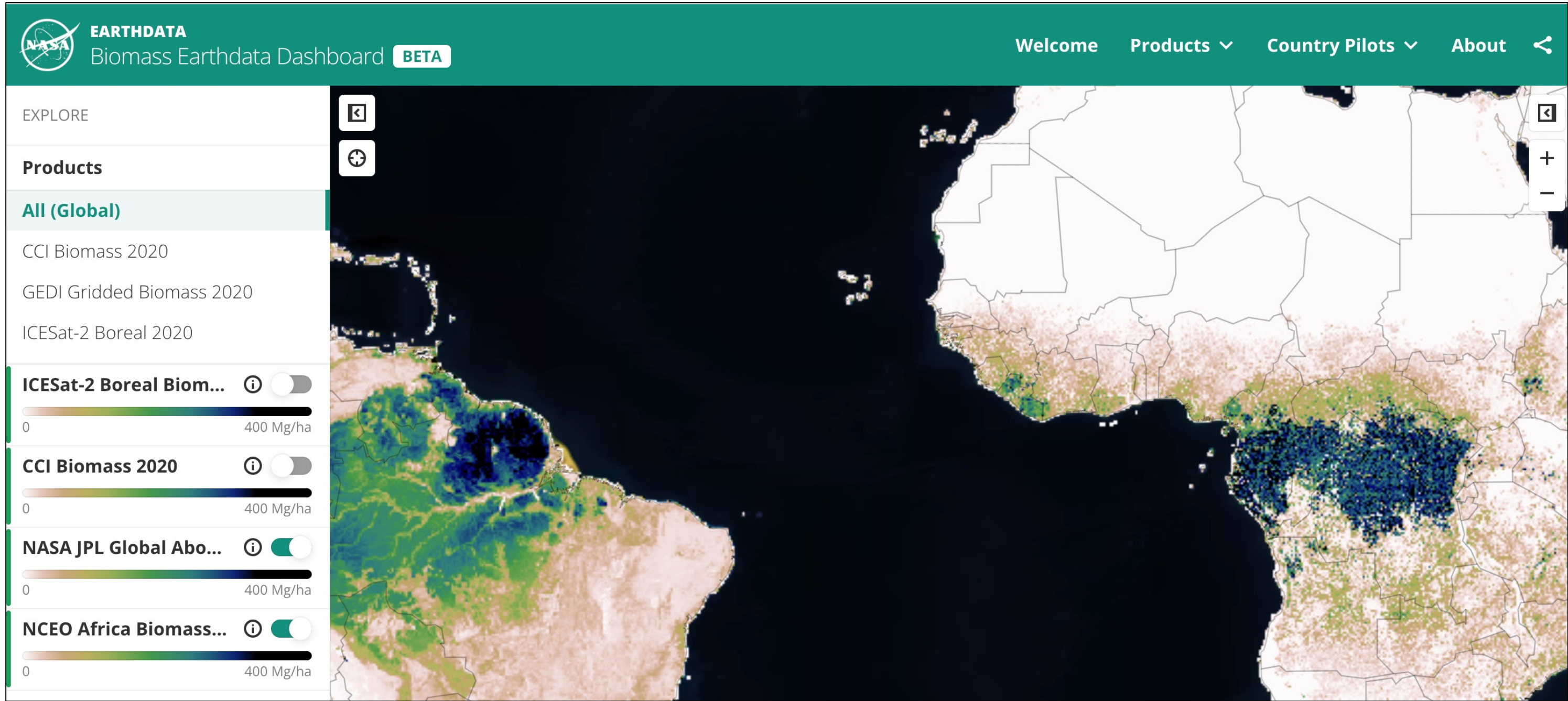
Sign in to download GEDI datasets.

4 GEDI datasets  
Show All entries

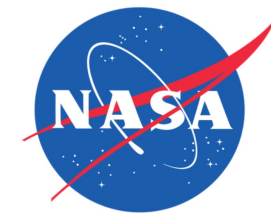
Filter:

<input checked="" type="checkbox"/>	GEDI dataset	Updated	Published	User Guide	Download	Size	SDAT
*	<a href="#">GEDI L4A Footprint Level Aboveground Biomass Density, Version 2.1</a>	2022-08-26	2022-03-17			<small>size of GEDI dataset bundle</small>	

# Dashboard for COP26 - Explore 2020 Biomass Products!



<https://earthdata.nasa.gov/maap-biomass>

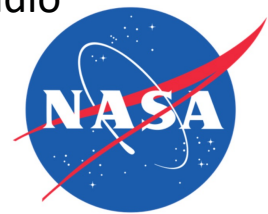


# GEDI is Scheduled for Decommission in Early 2023



NASA Scientific Visualization Studio

**Help keep GEDI up! #KeepGEDIUp #Save GEDI**



# Many more exciting active remote sensing missions on the horizon...



## Biomass Missions



2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

### Radar Sensors

L-band

Updated August 2020

Current/Past Mission

Future Mission

ALOS-2 (JAXA)

ALOS-4 (JAXA)

NISAR L-band (NASA)

SAOCOM Series (CONAE)

Data policy to be confirmed

TanDEM-L (DLR)

P-band

Biomass (ESA)

S-band

NISAR S-band (ISRO)

NovaSAR-1 (UKSA)

Commercial system

X-band

TerraSAR-X, TanDEM-X (DLR)

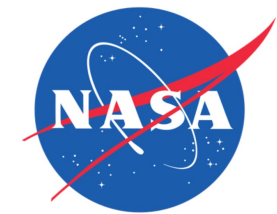
LiDAR

GEDI (NASA)

HRWS SAR (DLR)

ICESat-2 (NASA)

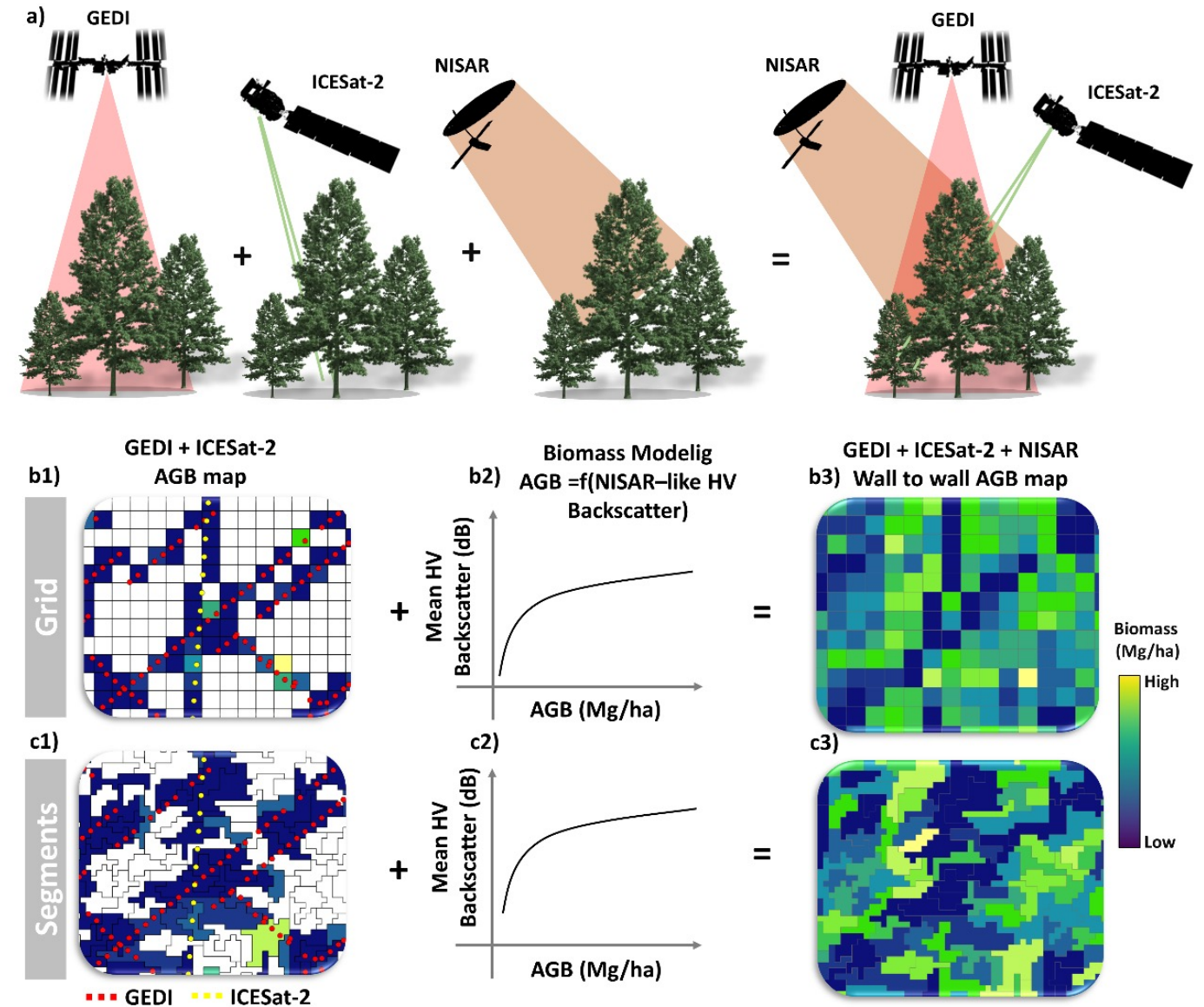
MOLI (JAXA)



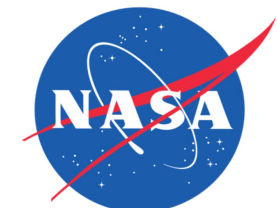
# Many Biomass Mapping Approaches Through Fusion

Combining Multiple Data Streams (e.g. GEDI, ICESat-2, NISAR, BIOMASS, ALOS4) allows:

- Reduced errors
- Higher resolution maps
- Gap-free (no clouds!)



Carlos Silva et al., RSE, 2021



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