

The 11th UNISEC-Global Meeting

Day 4, Panel Discussion (2)

—Bridging the gap between upstream and downstream —

Moderator: Masatoshi Kamei, RESTEC

Panelists:

Naruo Kanemoto, SPACE SHIFT

Shota Iino, SpaceData

Maho Kurasawa, JICA

Ake Rosenqvist, soloEO

Corporate profile

Company Name	Space Shift, Inc.
CEO	Naruo Kanemoto
Capital	638 million JPY
Year of establishment	December 2009
Number of Employees	30FTE + 30< interns
Location	Inspired.Lab, 6th floor, Otemachi Building 1-6-1 Otemachi, Chiyoda, Tokyo 100-0004 Japan
Other Locations	Tottori, Japan/ US / EU(Planning)
Web site	https://www.spcsft.com/en
Business fields	Development of software for satellite data analysis, business related to the analysis of satellite data, consulting related to space business

Raised \$7M as series-A and B in Total investment rounds (Mar 2024)



Source: <https://ssl4.eir-parts.net/doc/8739/tdnet/1936117/00.pdf>



Shota Iino, Ph.D

(Product manager, SpaceData Inc.)

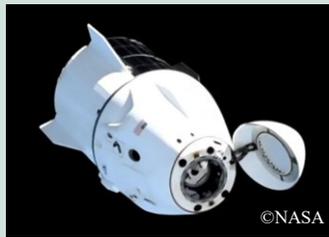
Satellite development

- Ground system development



Verification & Validation

- Independent Verification and Validation
- Safety analysis of space crafts



Operation

- Flight Controller of ISS and HTV



Service Provision

- GNSS application (at Keio uni)
- AI-based SAR satellite image analysis (at PASCO)
- Digital twin (SpaceData)



Ake Rosenqvist

Academics

- 1988: M.Sc. – Royal Institute of technology (Sweden)
- 1997: Dr. Eng. – University of Tokyo (Japan)

Past affiliations (1988–2009)

- University of Tokyo, Inst. of Industrial Science
- Swedish Space Corporation (SSC)
- National Space Development Agency of Japan (NASDA)
- Japan Aerospace Exploration Agency (JAXA)
- EU Joint Research Centre, Italy (JRC)

solo Earth Observation (soloEO)

- 2009: soloEO established (Sweden)
- 2013: soloEO-Japan (日本ソロ地球観測合同会社)

solo Earth Observation (soloEO)

Scientific consulting and project management in **satellite-borne environmental** monitoring and **microwave (radar)** remote sensing.

Supported organisations:

- Japan Aerospace Exploration Agency (JAXA)
- Remote Sensing Technology Center of Japan (RESTEC)
- National Space Administration of Argentina (CONAE)
- Scientific and Industrial Research Org of Australia (CSIRO)
- European Space Agency (ESA)
- US National Aeronautic and Space Administration (NASA)
- Norwegian Space Centre
- Wetlands International

Satellite mission development and planning:

- JERS-1, ALOS, ADEOS-II, ALOS-2, ALOS-4, SAOCOM-1, NovaSAR-1, SAO-Companion/TangoSat

Earth Observation and Environment:

- Ramsar Wetlands Convention
- GEO Global Forest Observation Initiative (GFOI) and UNFCCC
- Global Mangrove Watch



**Digital
transformation**

JICA - Japan International Cooperation Agency

Maho KURASAWA

Office for Science, Technology and Innovation, and Digital Transformation(Space Unit)
Governance and Peacebuilding Department

JICA Global Network and Operation in FY 2023

Program Value of Program

USD 16.2 B



People

Societies where all can live healthy, safe lives

Accepted Training participants and students



13K +



Peace

Peaceful, just societies without fear and violence

Dispatched experts and JICA volunteers



8.7K +



Prosperity

Prosperous, sustainable economies at harmony with nature

Countries & regions in operation PROJECTS



145

1,500 +



Planet

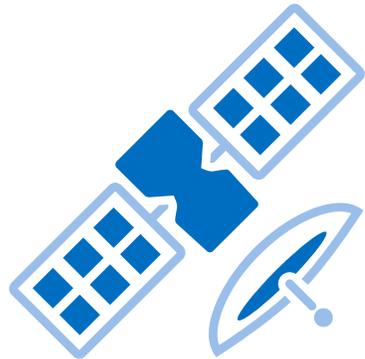
Care for the Planet

JICA's New Cooperation Policy in the field of Space Cooperation



Web site →

I



**Promote the Utilization of
Space Technology and
Satellite Data**

for Socio-Economic Development

II

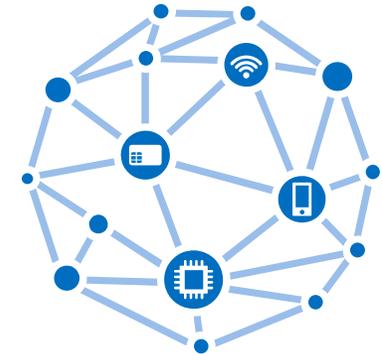


Develop Human Resource

and

**Promote International
Talent Circulation**

III

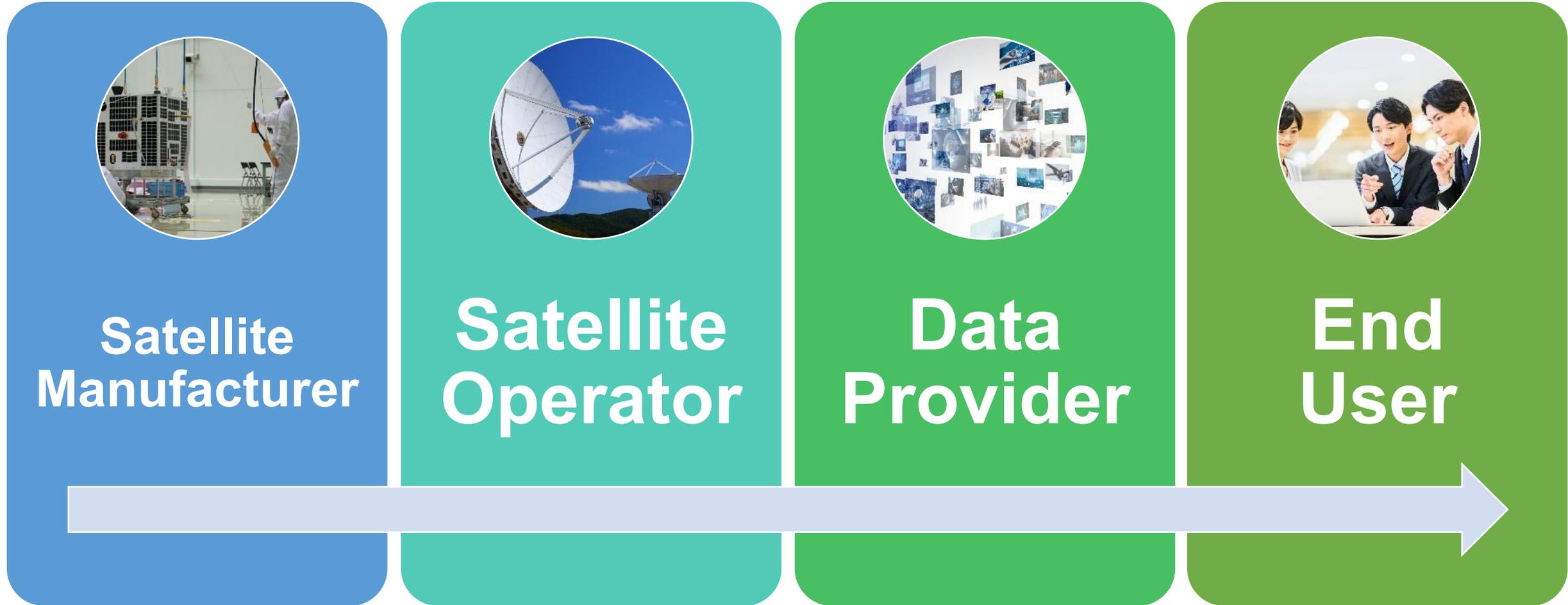


Promote Co-Creation

and

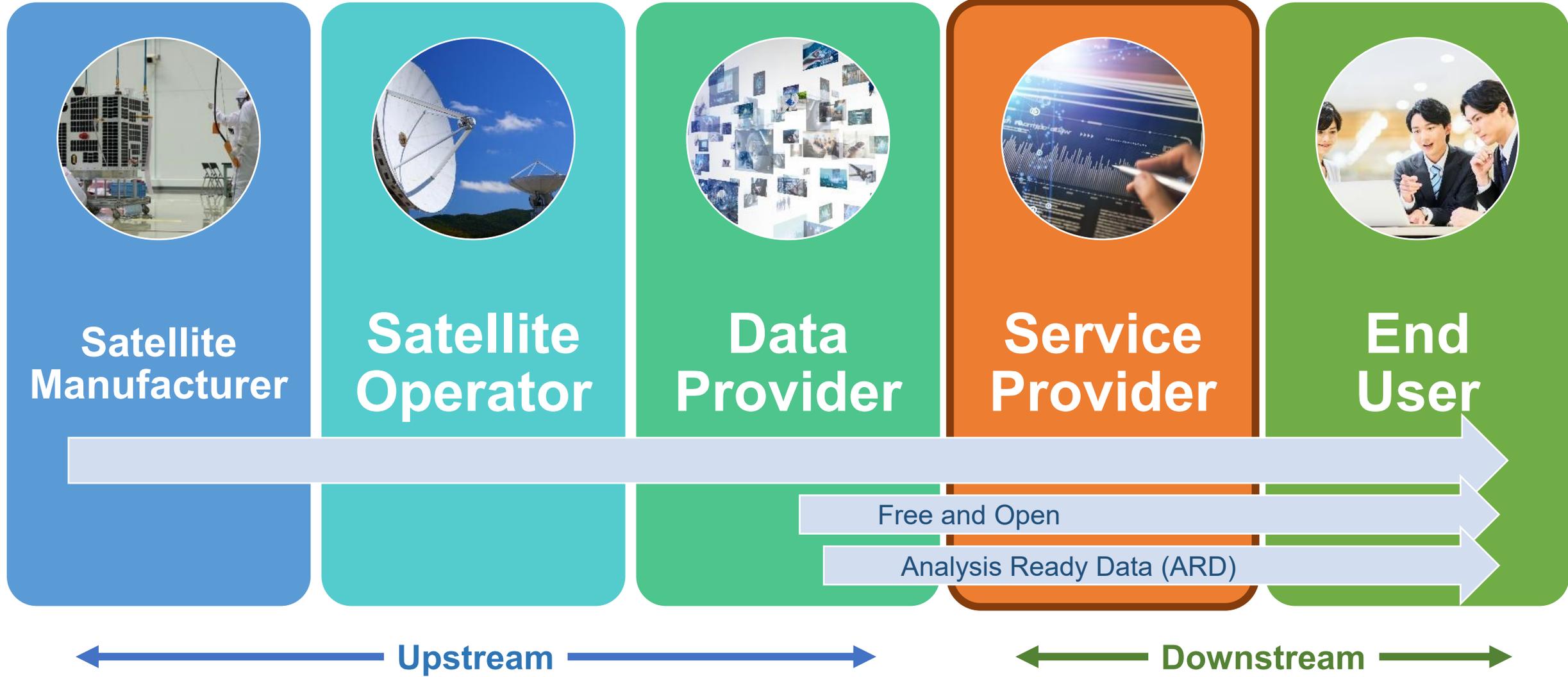
**Establish Industry-
Government-Academia
Partnership Ecosystems**

Bridging the gap between upstream and downstream



Stakeholders in Earth Observation Industry

Bridging the gap between upstream and downstream



Day 4, Panel Discussion (2)

—Bridging the gap between upstream and downstream —

Latest Status on Satellite Data Utilization

Virtual Constellation (Utilize all available satellites)

LARGE Satellites



Cosmo Skymed



Sentinel 1A-1D



TerraSAR-X, TandemX, PAZ



Radarsat Constellation



ALOS2,ALOS4

More Frequency

Develop Algorithms workable with all of SAR satellites
→ Middleware for “Virtual Constellation”

More Insights

Micro Satellite constellations

150-200 micro-SAR satellites will be launched by later 2020's total in the market.

n Planned number of satellites



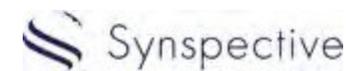
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48



36

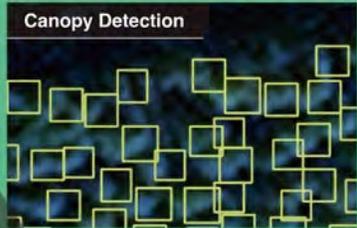
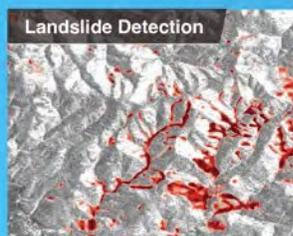
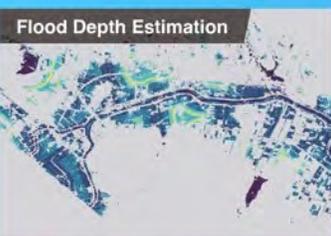


30



36

+ Thousands of Optical Constellations



1 Developed AI analysis technology for Satellite data



Disasters
Maritime
Buildings
Logistics
Agriculture
Forestry etc.

2 AI and Satellite data Professionals



3 Global Partnerships



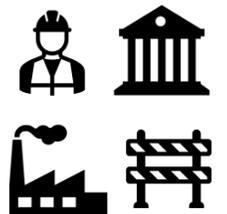
4 Flexible and extensive data utilization with use cases



Satellite Providers



SPACE SHIFT



Platforms End Users

Agriculture solutions

Growth of cabbage field observed by optical satellite

Jun 20, 2017



July 20, 2017



Only one data between these 2 periods for one month due to cloud cover.

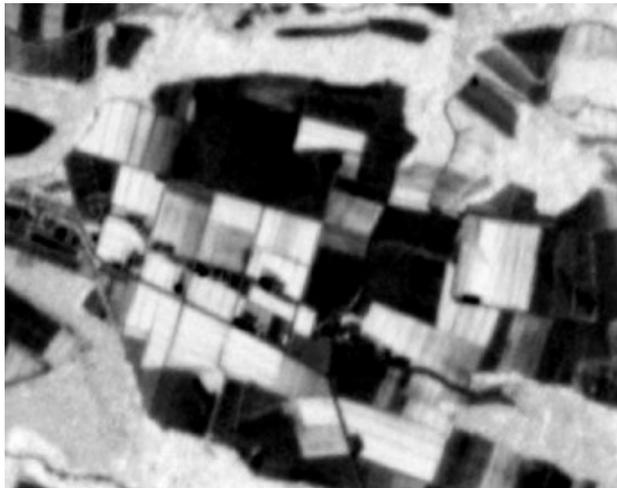


Sep 10, 2017



NDVI processed images

Interpolating with SAR data



SAR analysis of green onion growth using actual farm

Measure and record the length and width



Measuring spectrum with a spectrometer to measure growth with leaf color



Taken photo



Take photo of the entire area from the tall pole near the field

SAR and Optical synthesis for vegetable growth (Cabbage)

Ground Truth

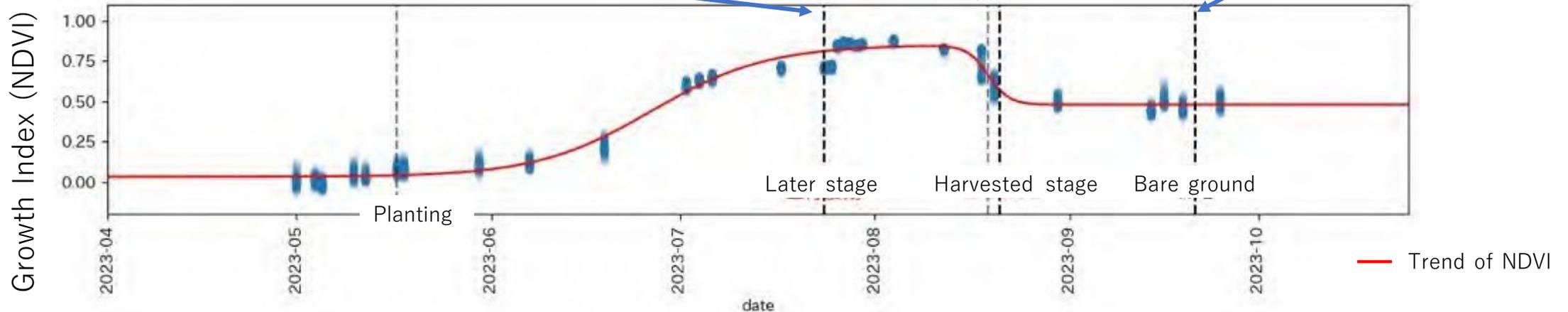
2023/7/24



8/21



9/21



- Precise detection of planting period and harvesting
- **This analysis has been done with Sentinel1(SAR) and 2(Optical) to interpolate cloudy optical scenes.**

SAR and Optical synthesis for vegetable growth (Green Onion)

6/23/2022



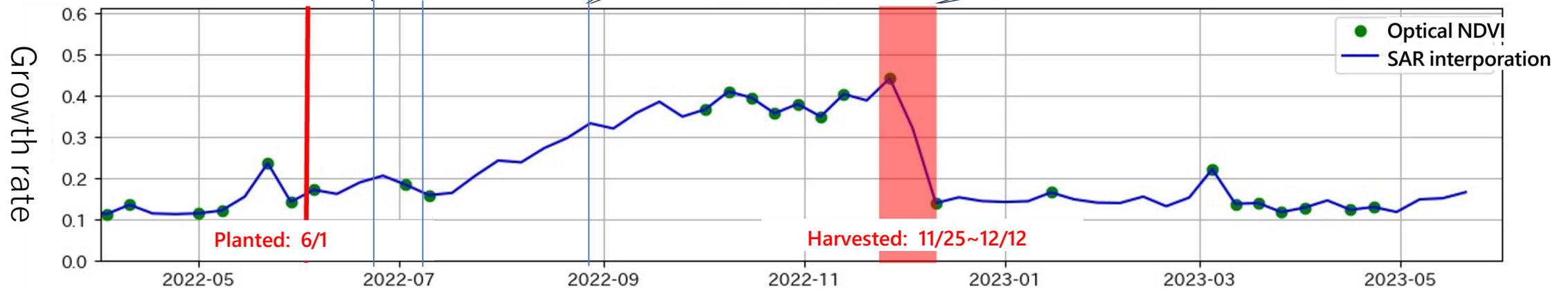
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8/29



12/6

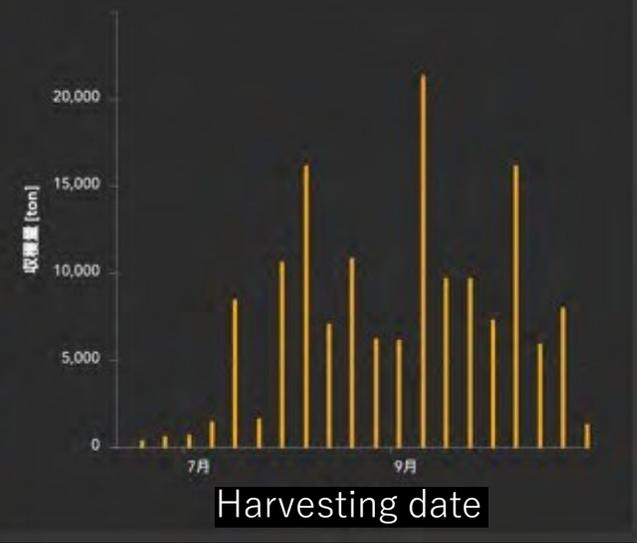
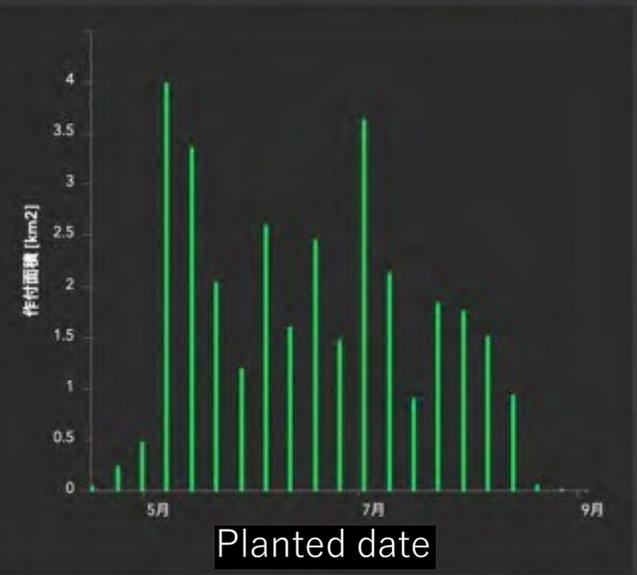
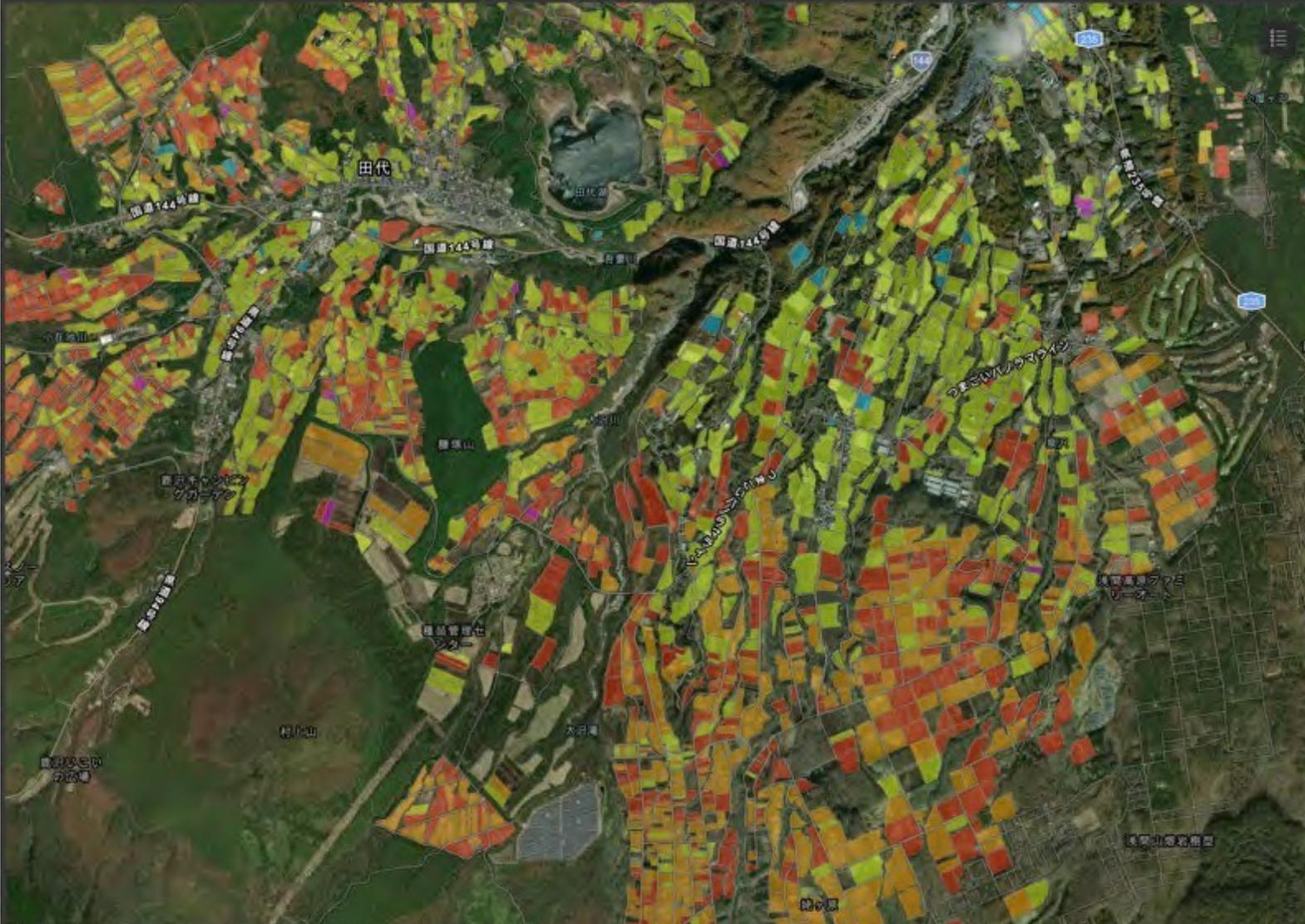


- Vegetable growth monitoring for each single paddy with open free data
- Observation on green dots are made by Optical. Others are by SAR interpolation.

Planting and Harvesting date projection

SPACE SHIFT - Planting date of Cabbages 2023

定植月絞り込み 4 5 6 7 8



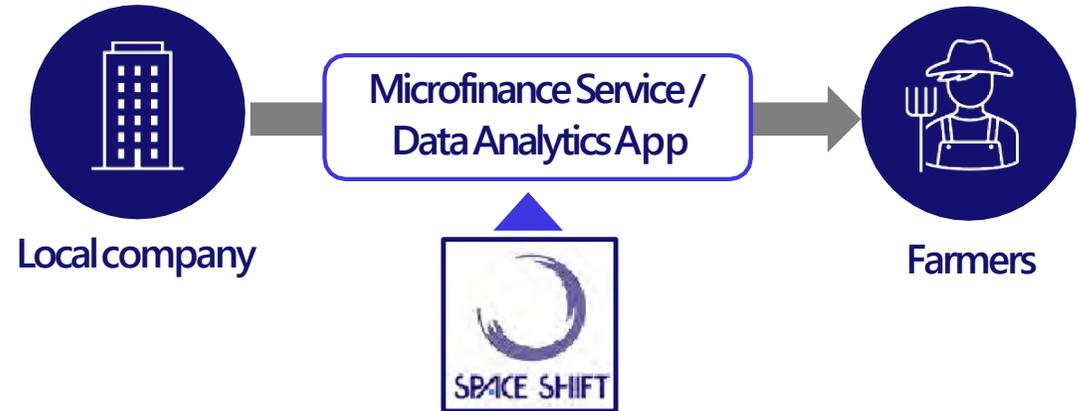
Space Shift focuses on developing business and driving digitalization in the **agricultural sector**

What we do in Africa

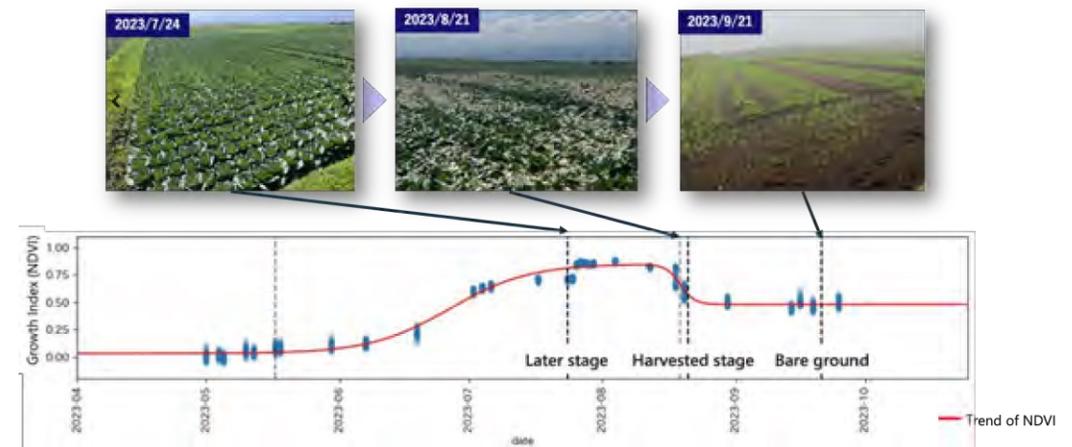
- ✓ Implement “Pilot Project for Microfinance Services for Farmers Using Satellite Data on Agricultural Land” in Nigeria
- ✓ Develop **AI analytics for crop growth monitoring and prediction of harvest timing/volume** by utilizing satellite data
- ✓ Evaluate its potential to **enhance credit scoring for farmers in financial services**



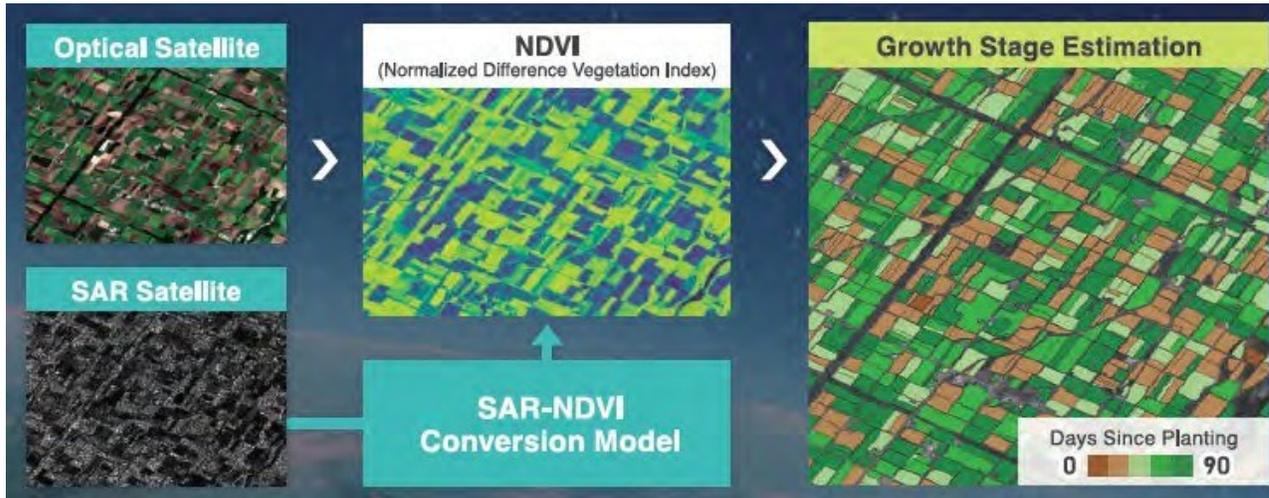
Business Model



Add-on satellite data AI analytics to the services



Utilizing satellite data analytics to achieve sustainable agriculture in Africa



Estimation of planting/harvesting timing using time-series data



Estimation of past harvest performance (track record and capability of farmlands)



Prediction of this year's harvest volume

Expected Effects

[Access finance Services for farmers](#)

- ✓ Utilizing our satellite data analytics AI for credit scoring for farmers, enabling them to access financial services.

[Supply Chain Optimization](#)

- ✓ Provide information about harvest timing and expected volumes to food and logistics companies, contributing to the reduction of food loss and GHG emissions, as well as to effective marketing.

[Sustainable Agriculture by satellite data and AI](#)

- ✓ Collaborating with local companies and governments in Africa to realize data-driven Smart Agriculture

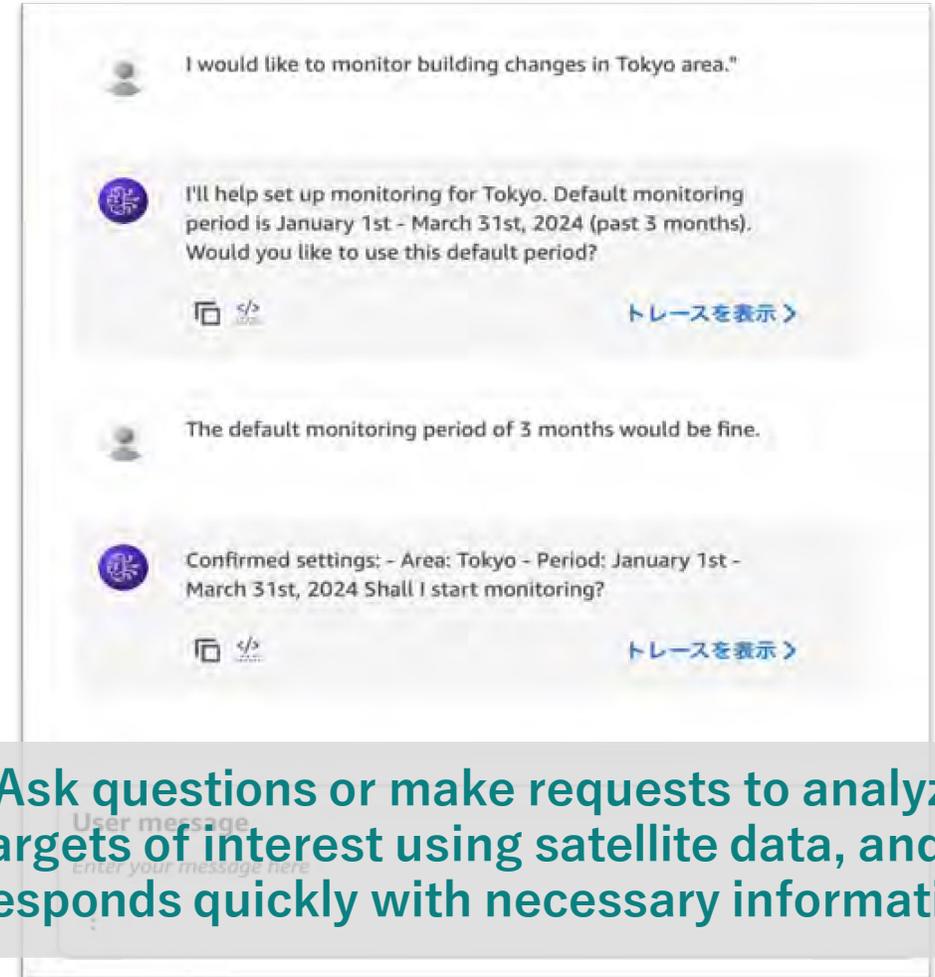
Space Shift's advanced AI enables easier and more effective data utilization for businesses

✓ Land Use Monitoring

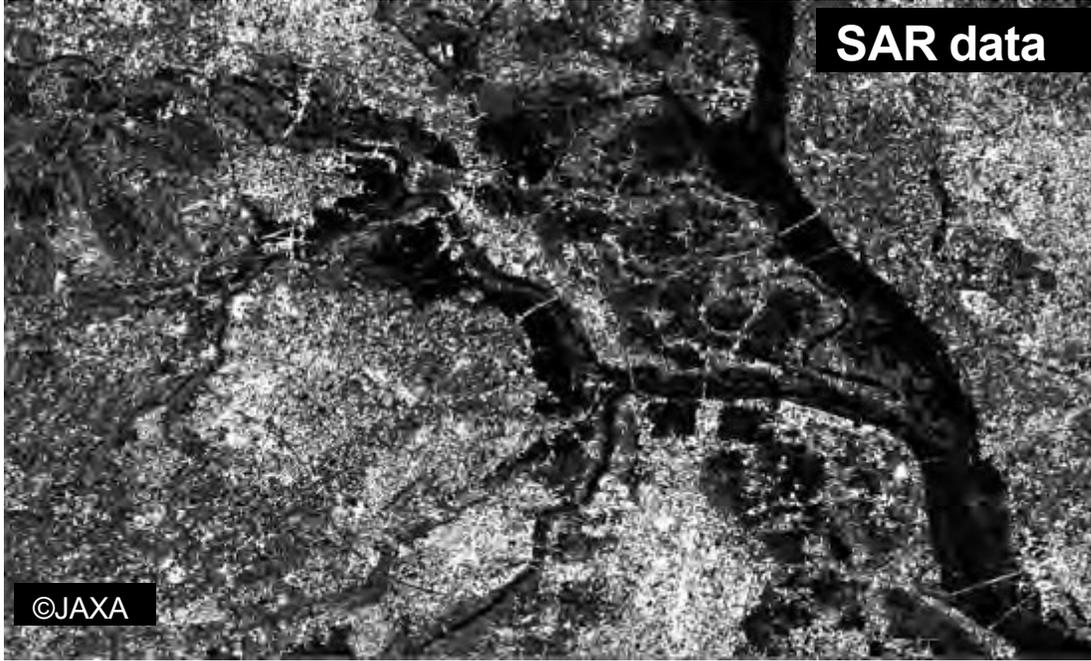


Time-series satellite data can analyze changes in cities, detecting new buildings, vacant lots, and inactive farmland.

✓ Generative AI

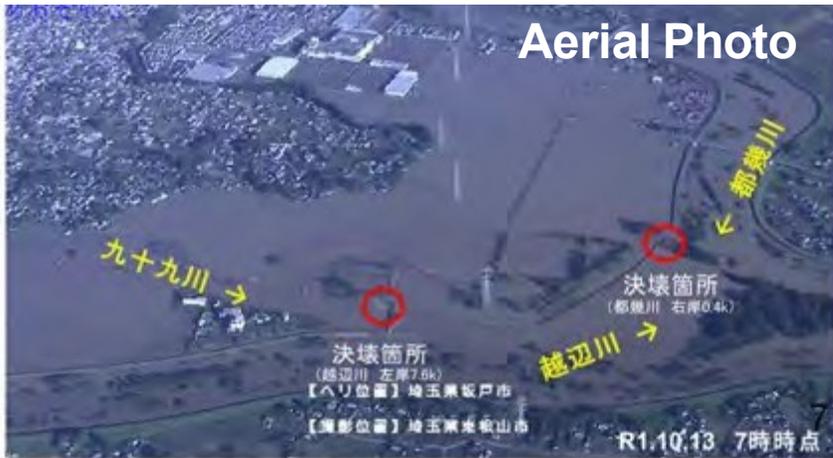


Ask questions or make requests to analyze targets of interest using satellite data, and AI responds quickly with necessary information



Flood area analysis with SAR satellite data by AI

Result: Flood extent



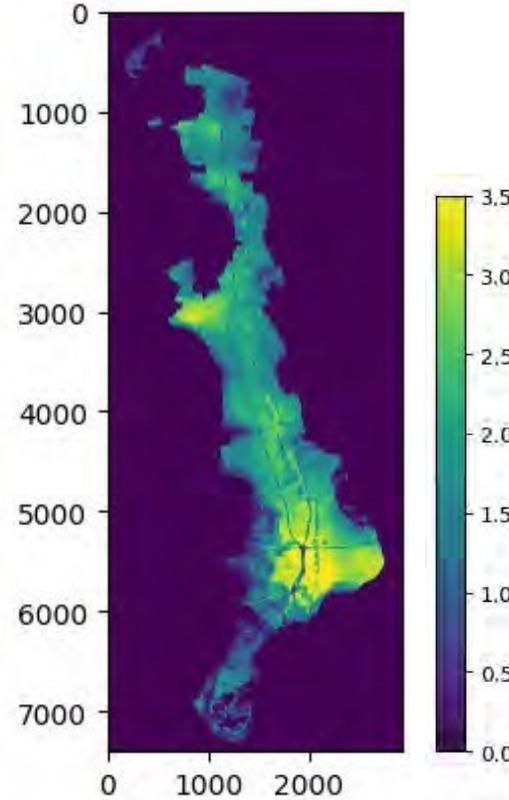
Aerial Photo



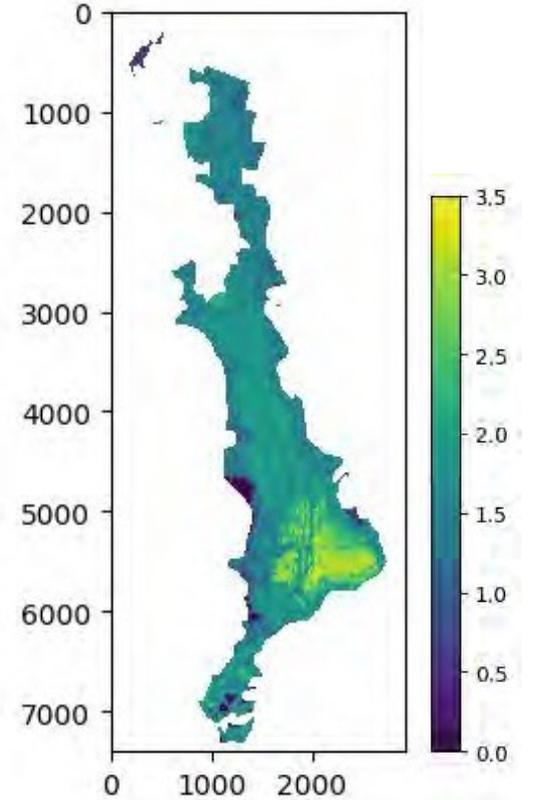
SAR satellite



Actual Depth

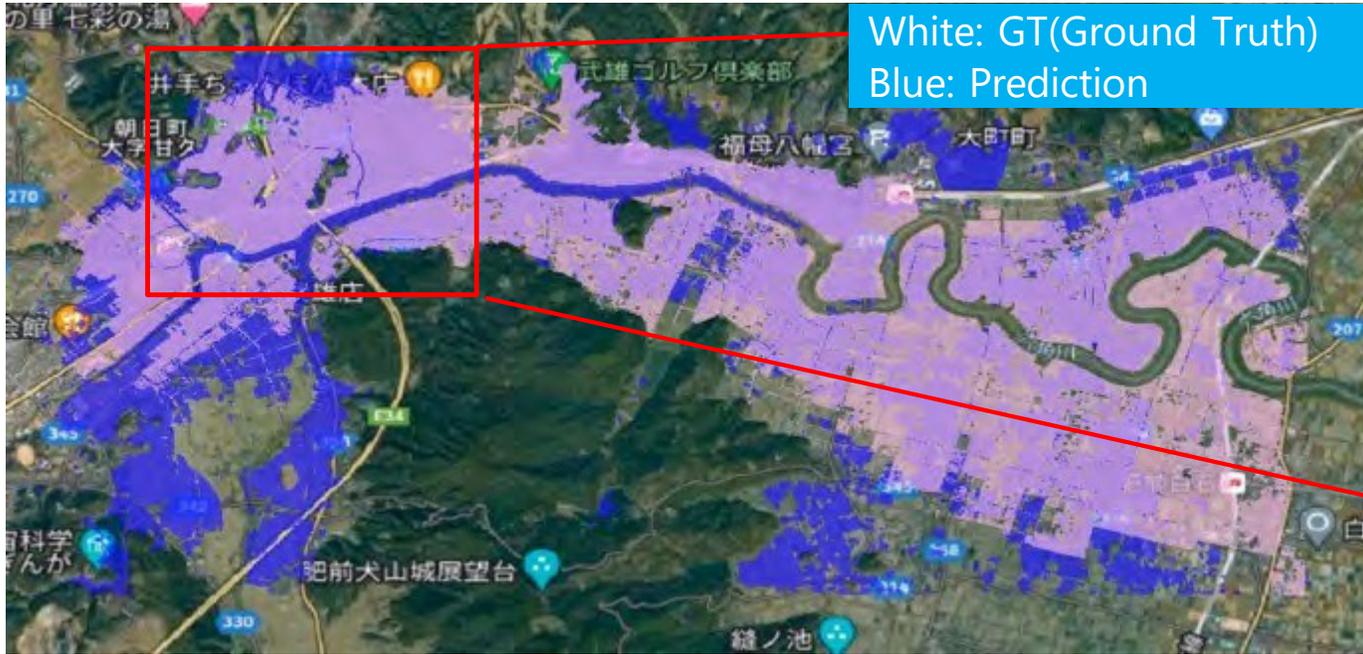


Predicted Depth

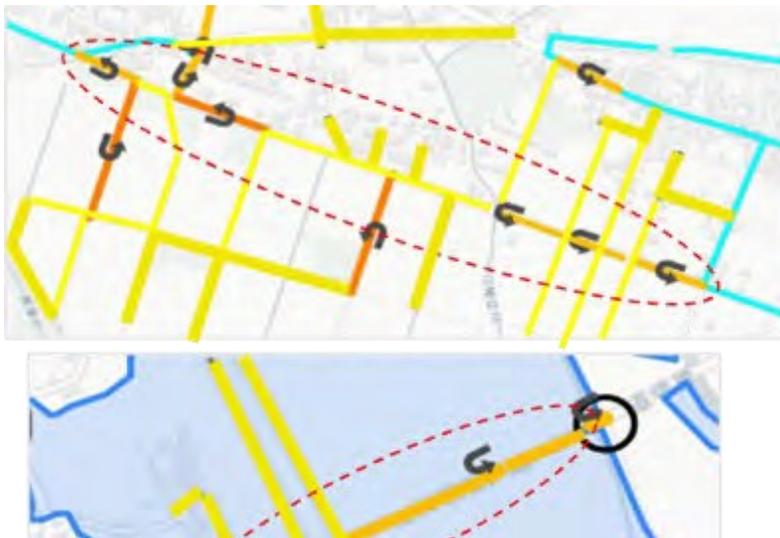


By combining data from the inundation area with existing elevation information, we will detect the degree of inundation (inundation depth), which has been done in field surveys so far. It is expected to be used as highly real-time disaster prevention information, such as confirming the situation in the event of flood damage, which could not be realized by on-site surveys after the water recedes. This technology is being considered for introduction by local governments and insurance companies.

Disaster Monitoring



↓ SAR satellites were able to complement residential areas where changes were difficult to capture.





SPACE SHIFT

Sense the Unseen from Orbit



<https://www.spcsft.com/en>

Thank you!

Day 4, Panel Discussion (2)

—Bridging the gap between upstream and downstream —

Latest Status on Satellite Data Utilization

Satellite images



Building footprints



Real world

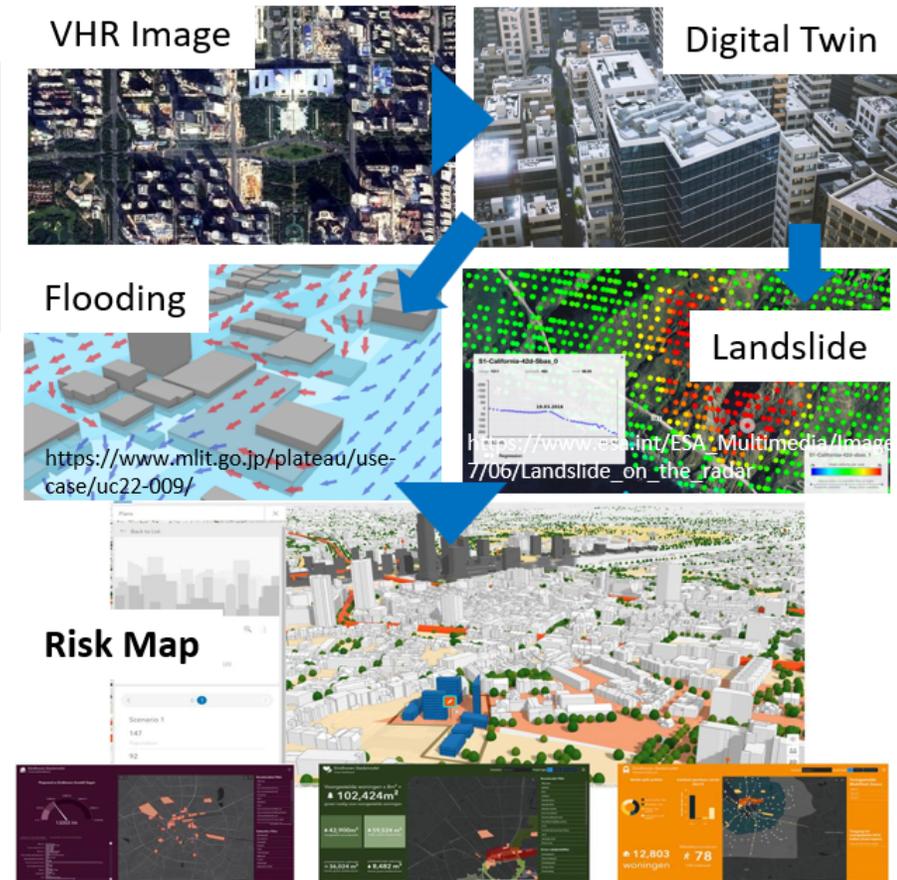
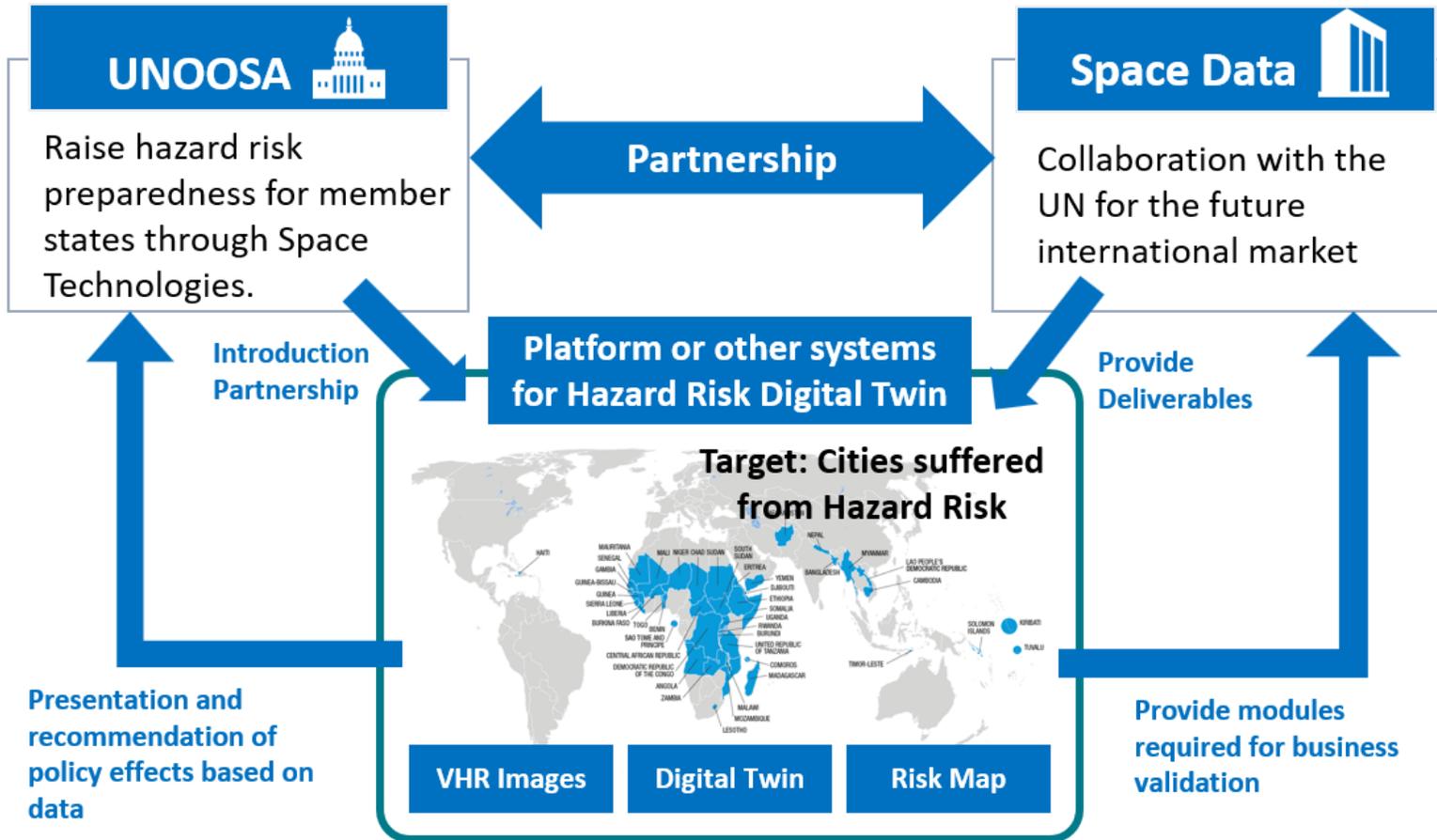
Digital Twin



Virtual



United Nations Office for Outer Space Affairs (UNOOSA) collaboration for disaster management



Day 4, Panel Discussion (2)

—Bridging the gap between upstream and downstream —

Latest Status on Satellite Data Utilization

The role of Earth Observation and satellite remote sensing.

Topic: Monitoring of the Earth's Environment:

- Covering LARGE AREAS
- Using TIME-SERIES of satellite data to detect CHANGES

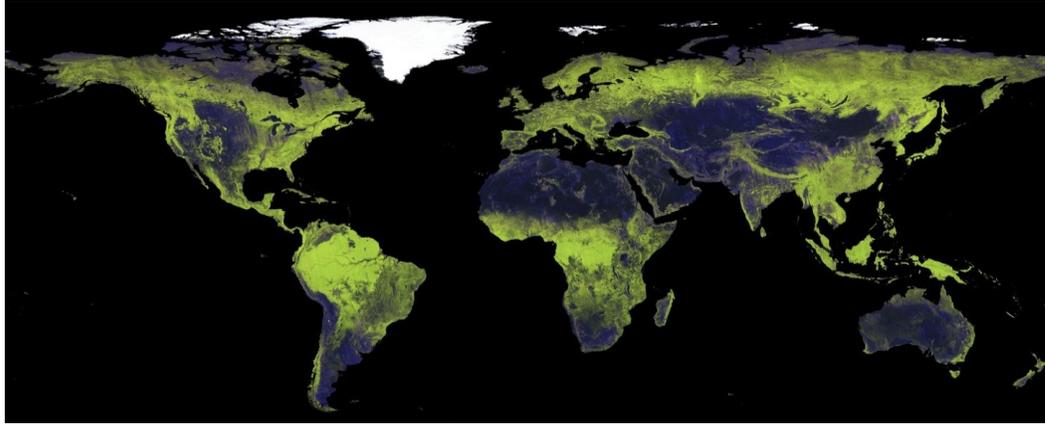
Examples:

- The Global Mangrove Watch – Annual time-series; Global coverage
- ALOS-2 Amazon Wetlands Mapping – Monthly time-series; Regional coverage

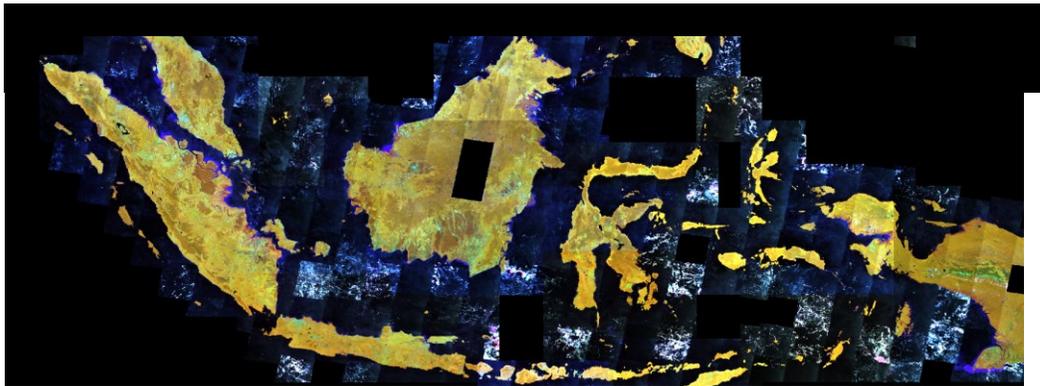
Satellite Data Utilisation Examples

The Global Mangrove Watch

A consistent global dataset of mangrove extent and changes generated from Earth observation data – Annual data (1994–present)



Satellite radar (ALOS PALSAR)



Optical satellite data (Landsat)

Satellite Radar (JERS-1, ALOS, ALOS-2):

- Acquisitions regardless of clouds, smoke and haze.
- Sensitive to vegetation structure and for detection of changes.

Satellite Optical (Landsat):

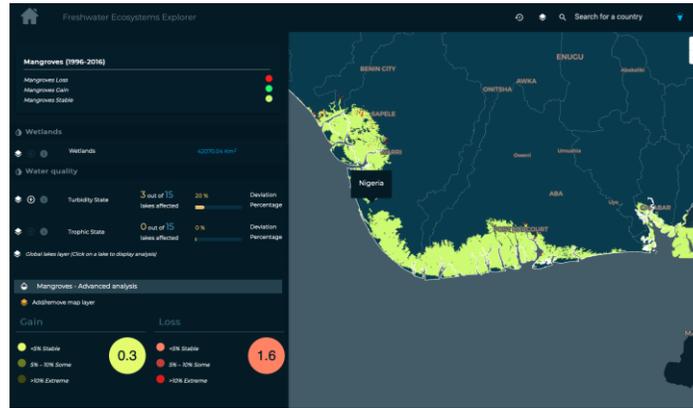
- Sensitive to vegetation spectral characteristics.
- Distinction of mangrove/non-mangrove.
- Limited by cloud cover

Satellite Data Utilisation Examples

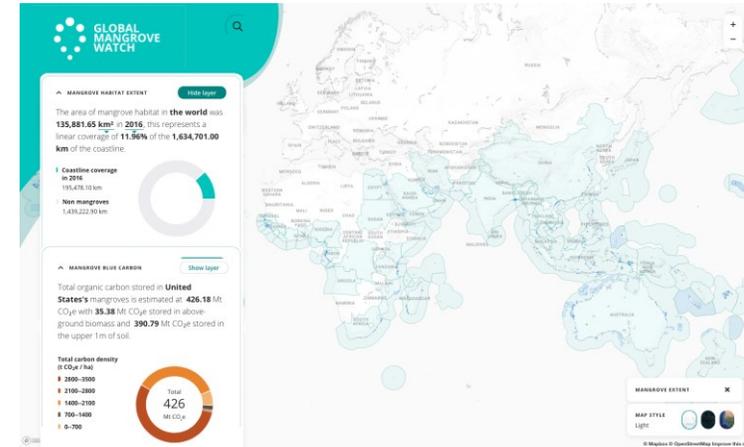
The Global Mangrove Watch



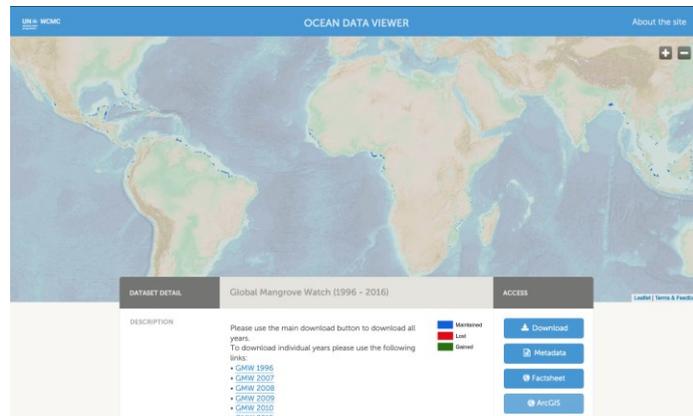
Global organisations using Global Mangrove Watch



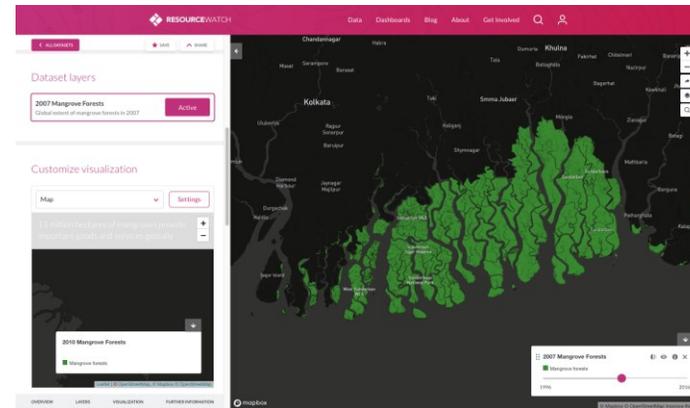
Freshwater Explorer (UNEP)
Official mangrove layer for SDG 6.6.1
<https://sdg661.app>



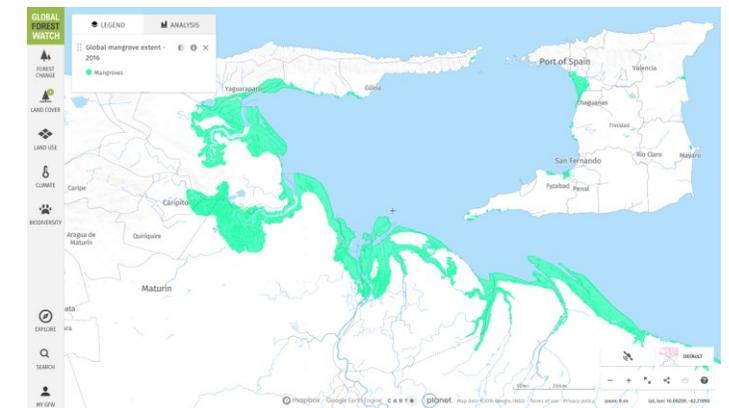
Global Mangrove Watch Platform – Home
<https://www.globalmangrovetwatch.org>



Ocean Data Viewer (UNEP-WCMC)
<https://data.unep-wcmc.org/datasets/45>



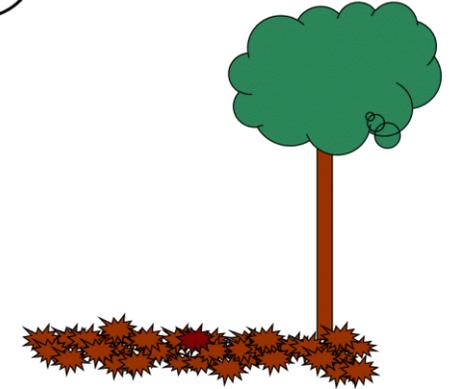
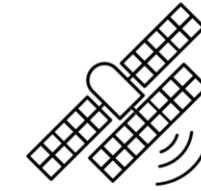
Resource Watch (WRI)
<https://resourcewatch.org/data/explore/f0r005a-Mangrove-Forests>

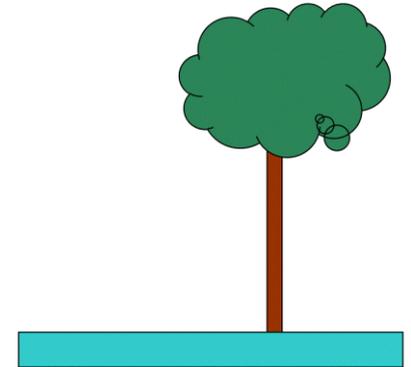
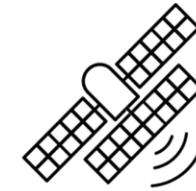
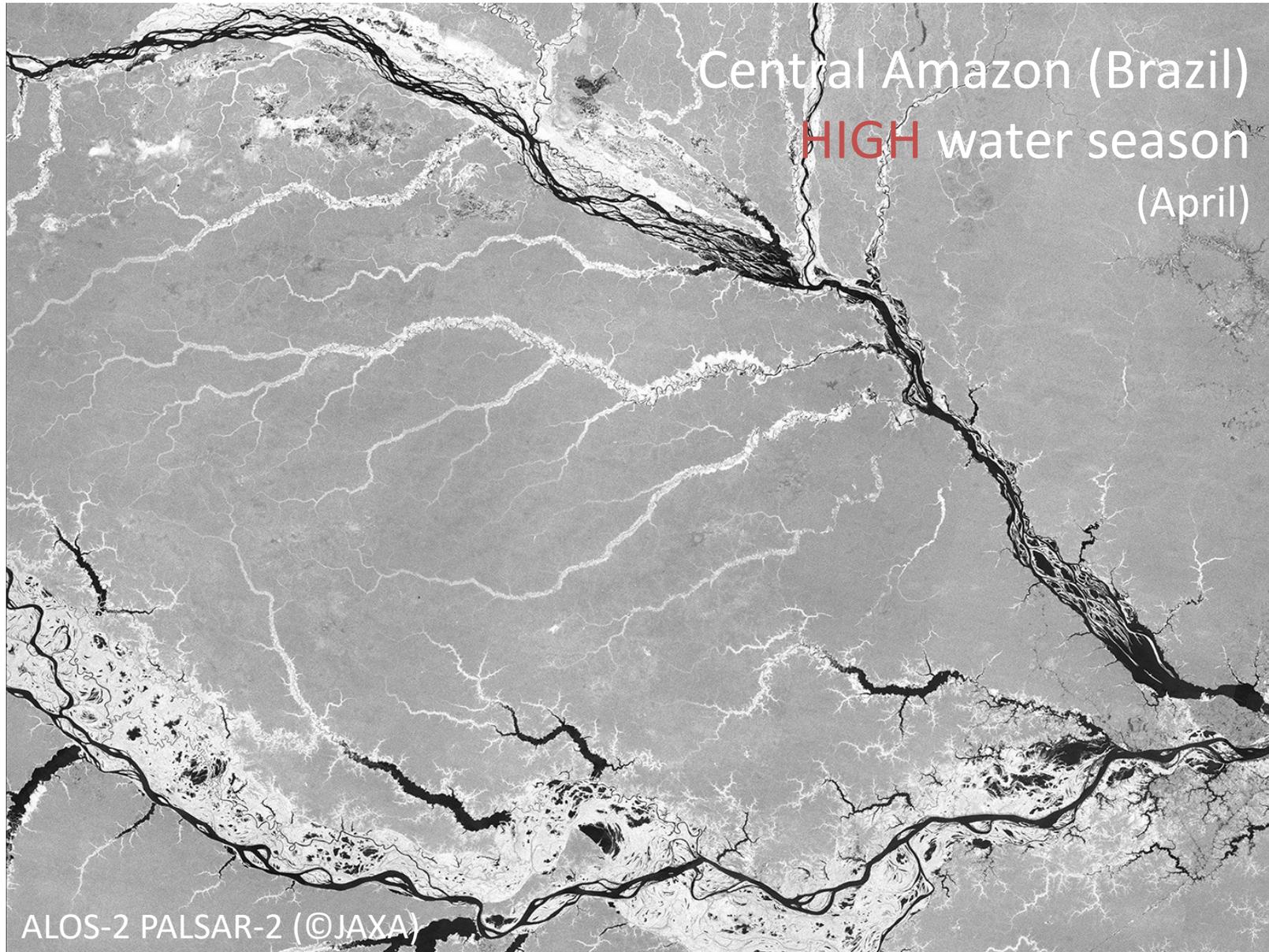


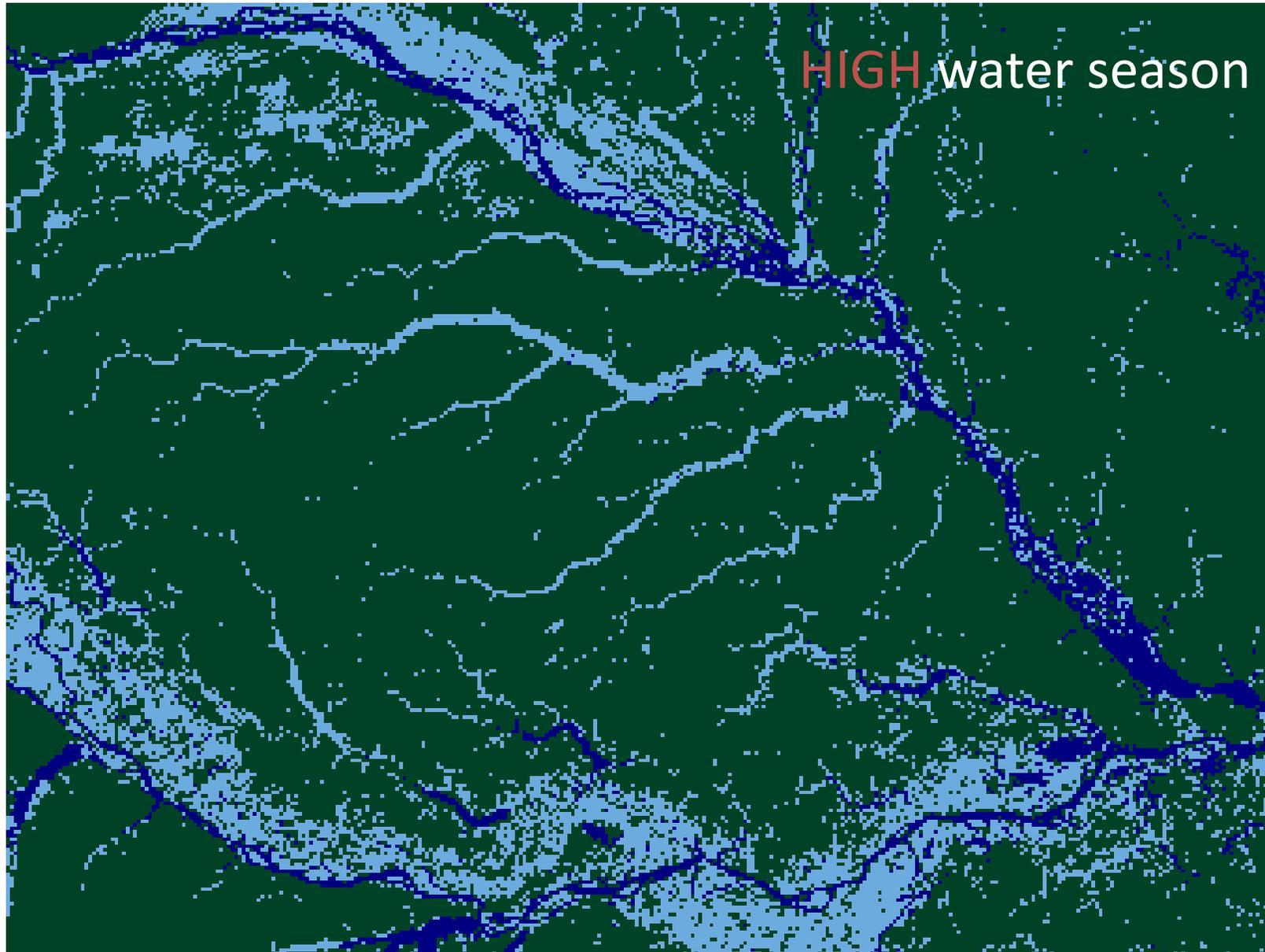
Global Forest Watch (WRI)
<https://www.globalforestwatch.org>

ALOS-2 Amazon Wetlands Seasonal Inundation Dynamics



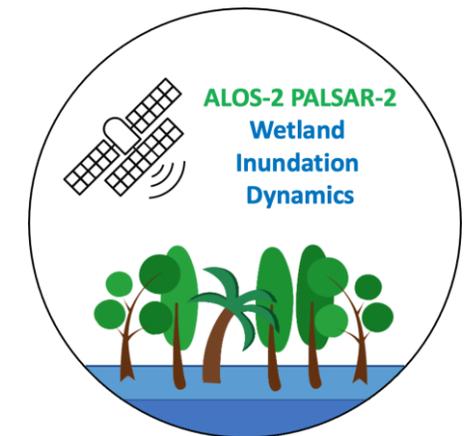


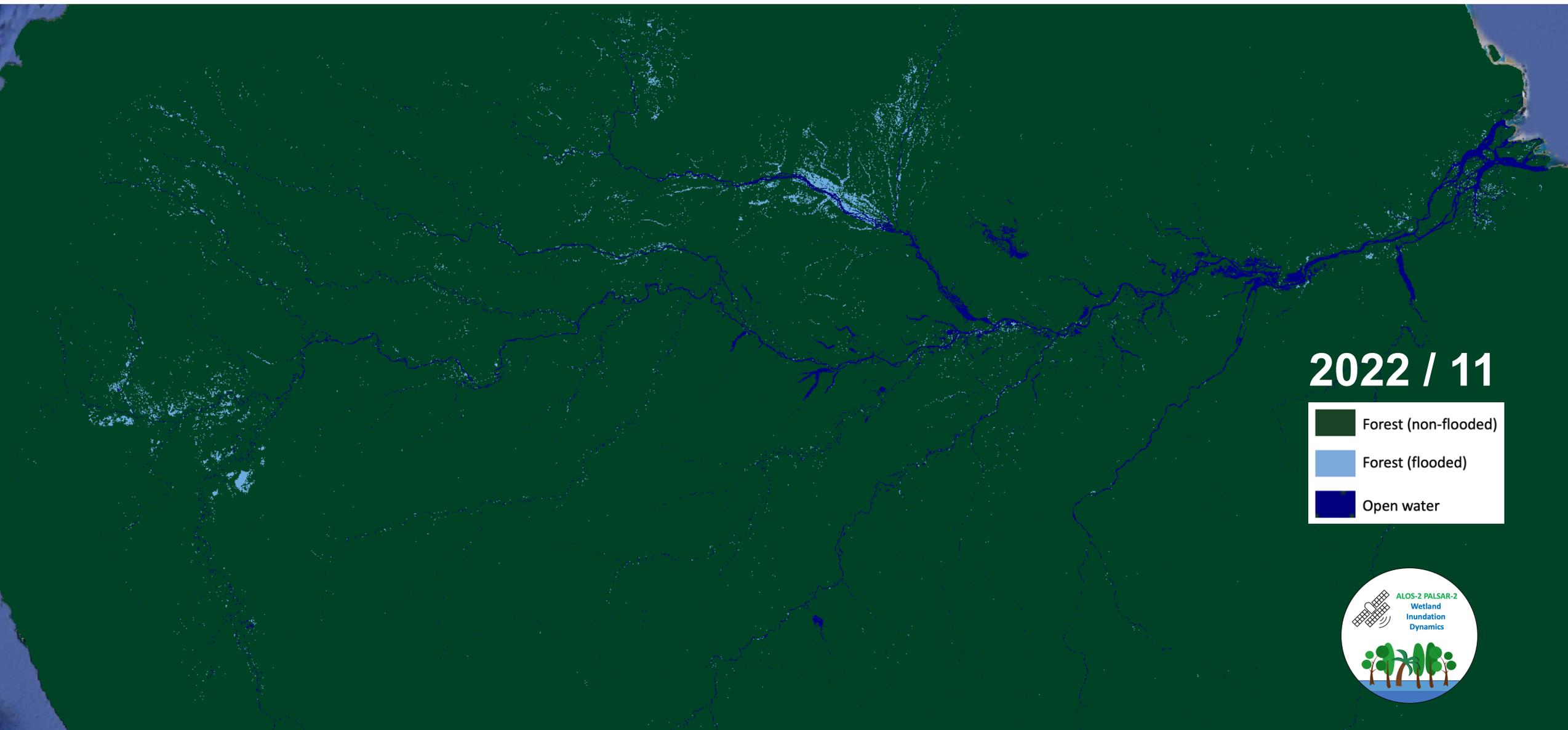


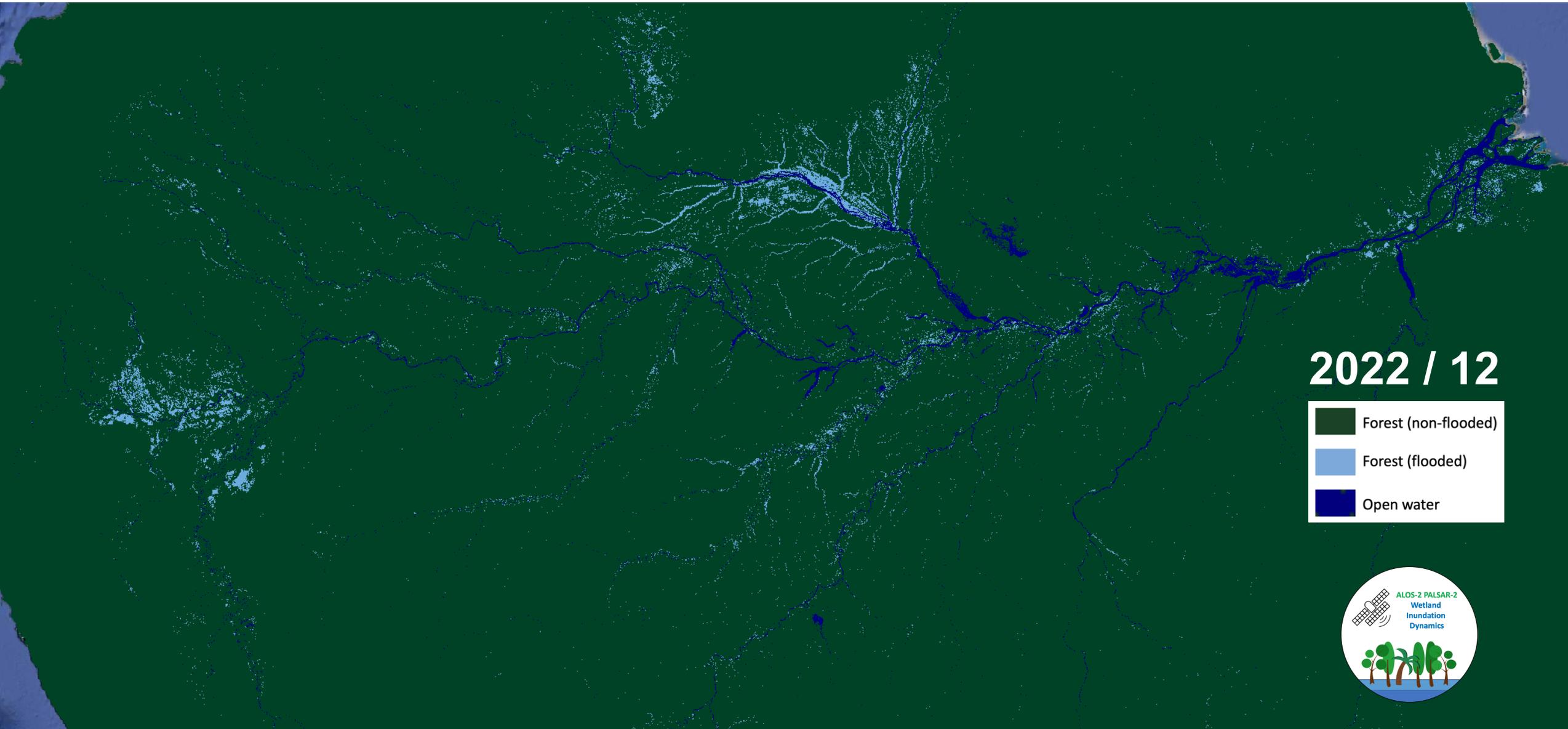


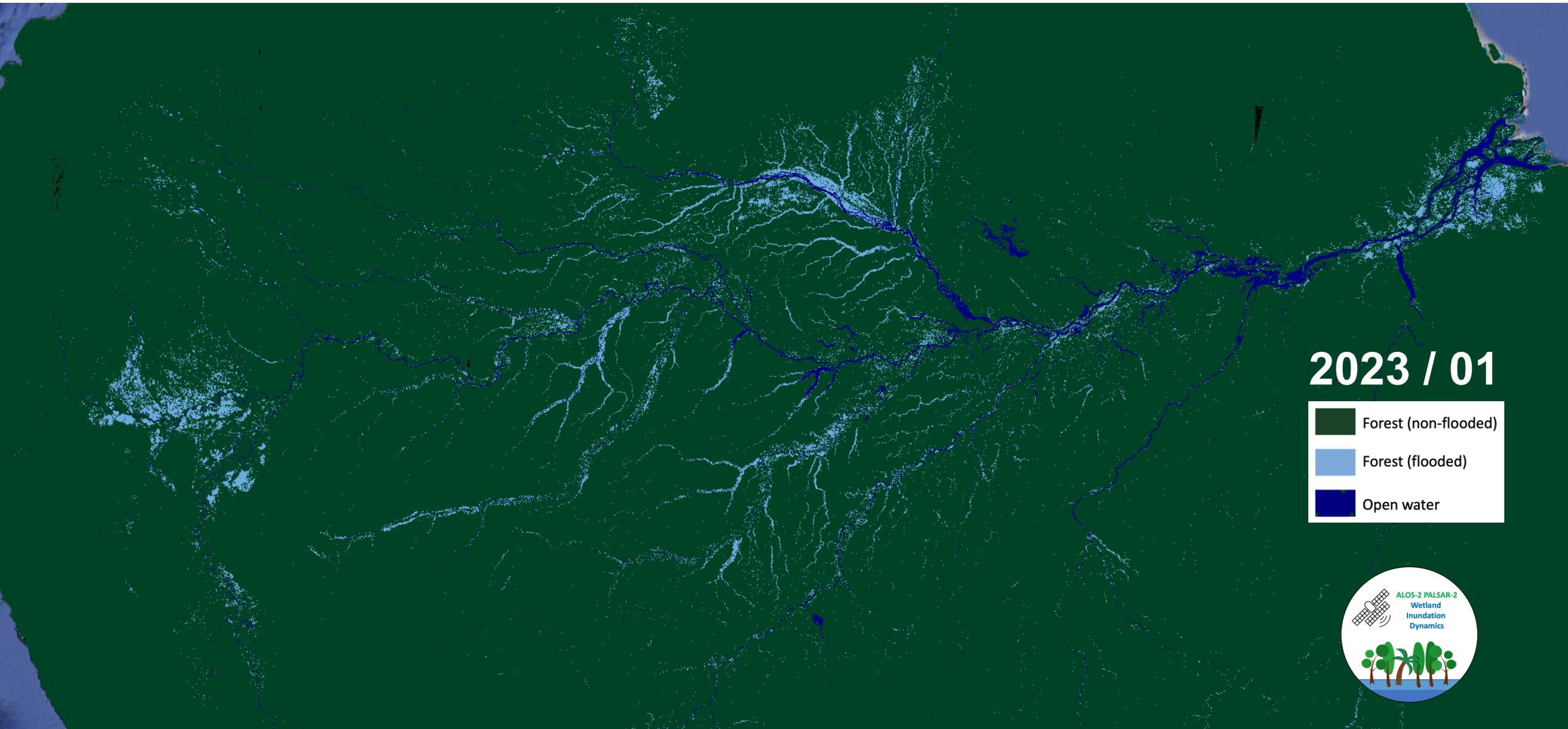
HIGH water season

-  Forest (non-flooded)
-  Forest (flooded)
-  Open water





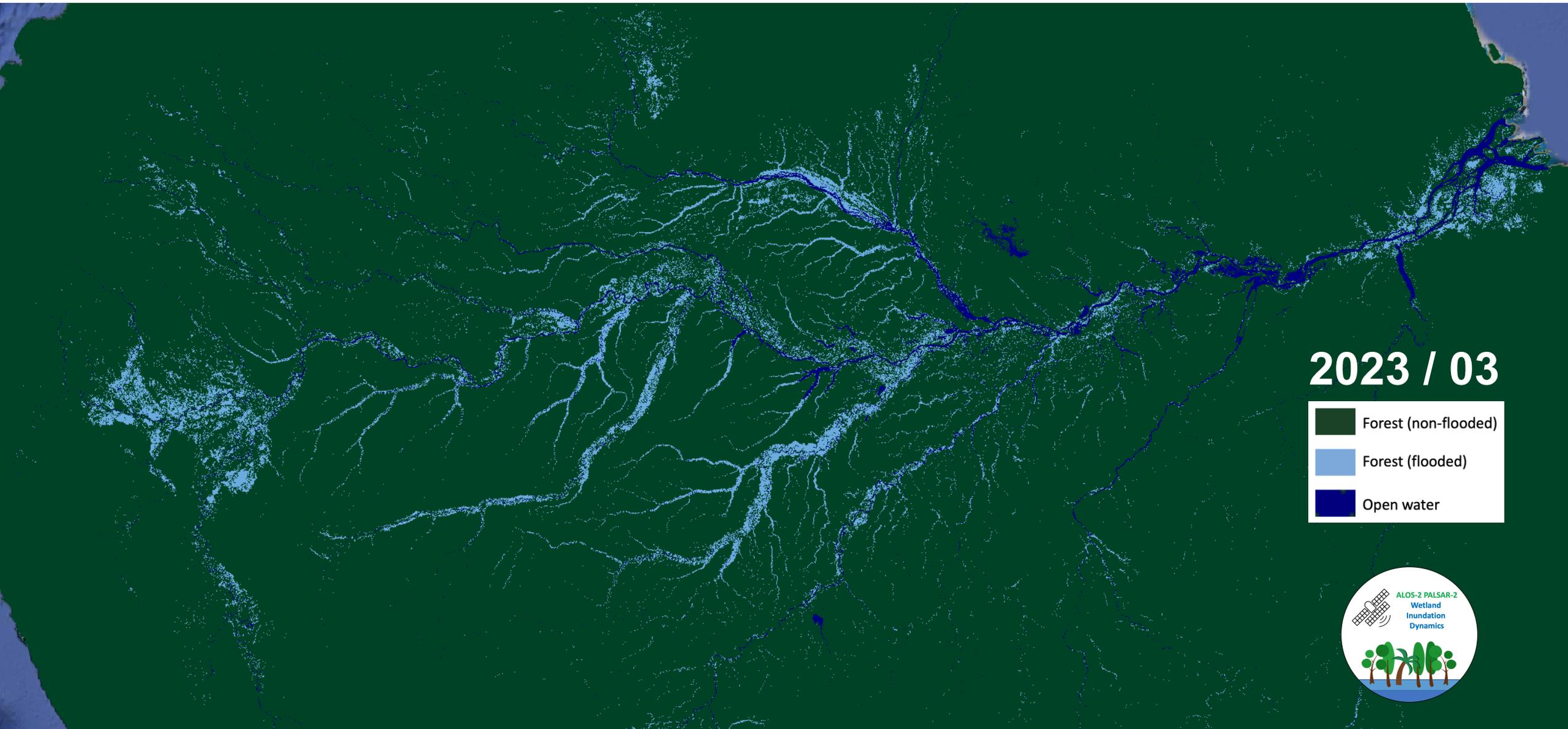




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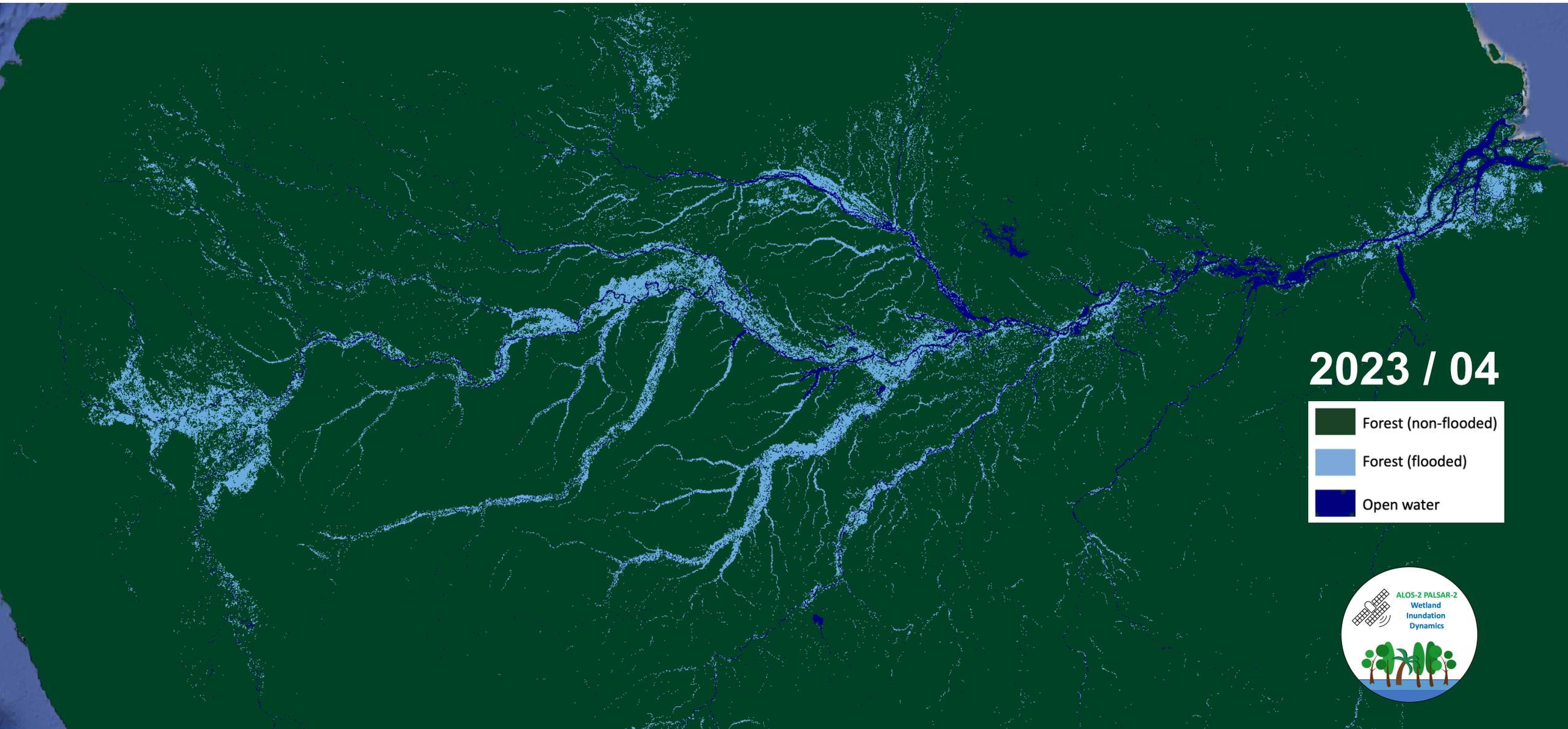
	Forest (non-flooded)
	Forest (flooded)
	Open water



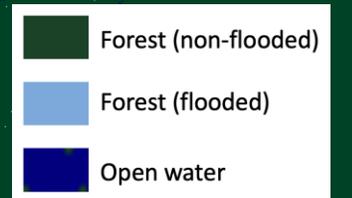


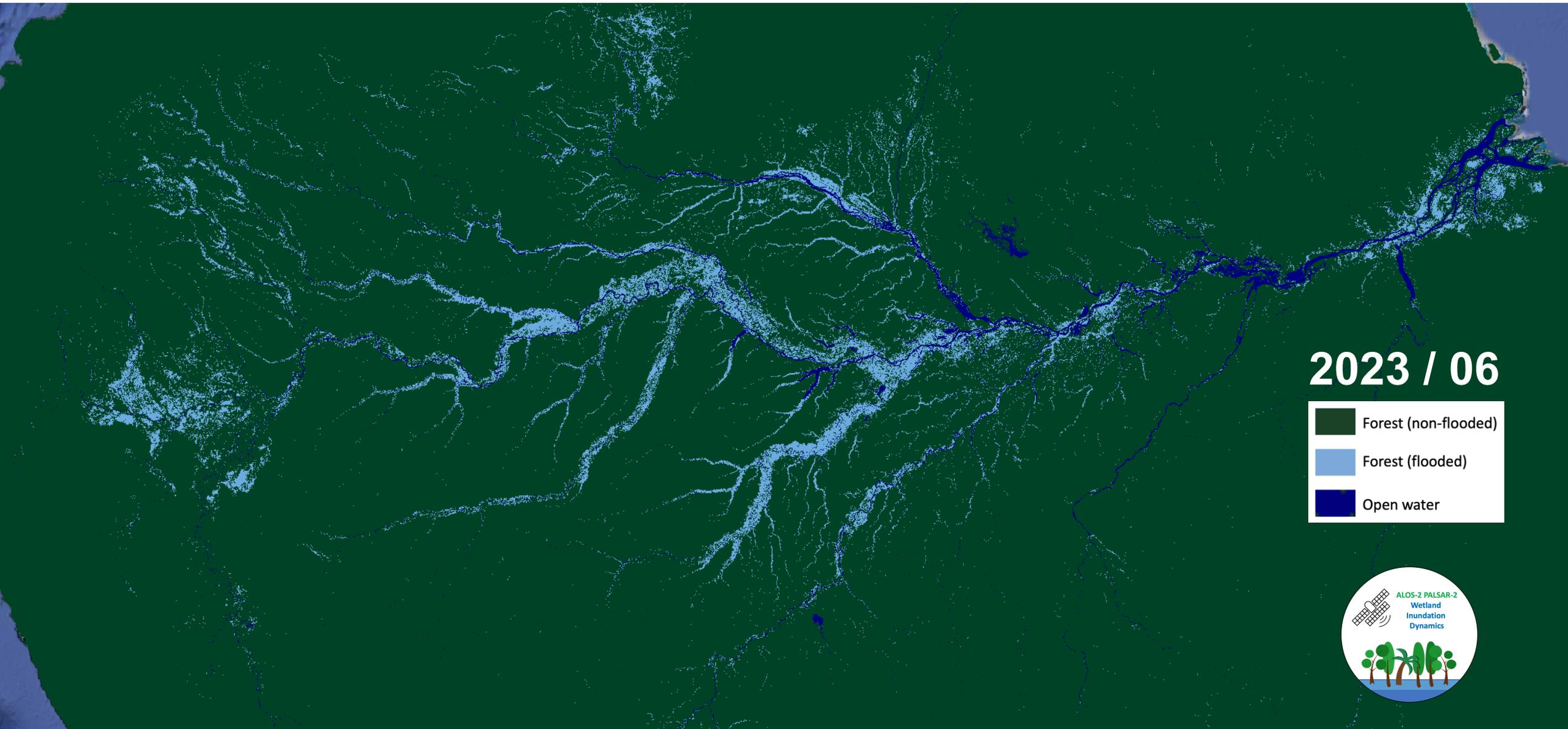
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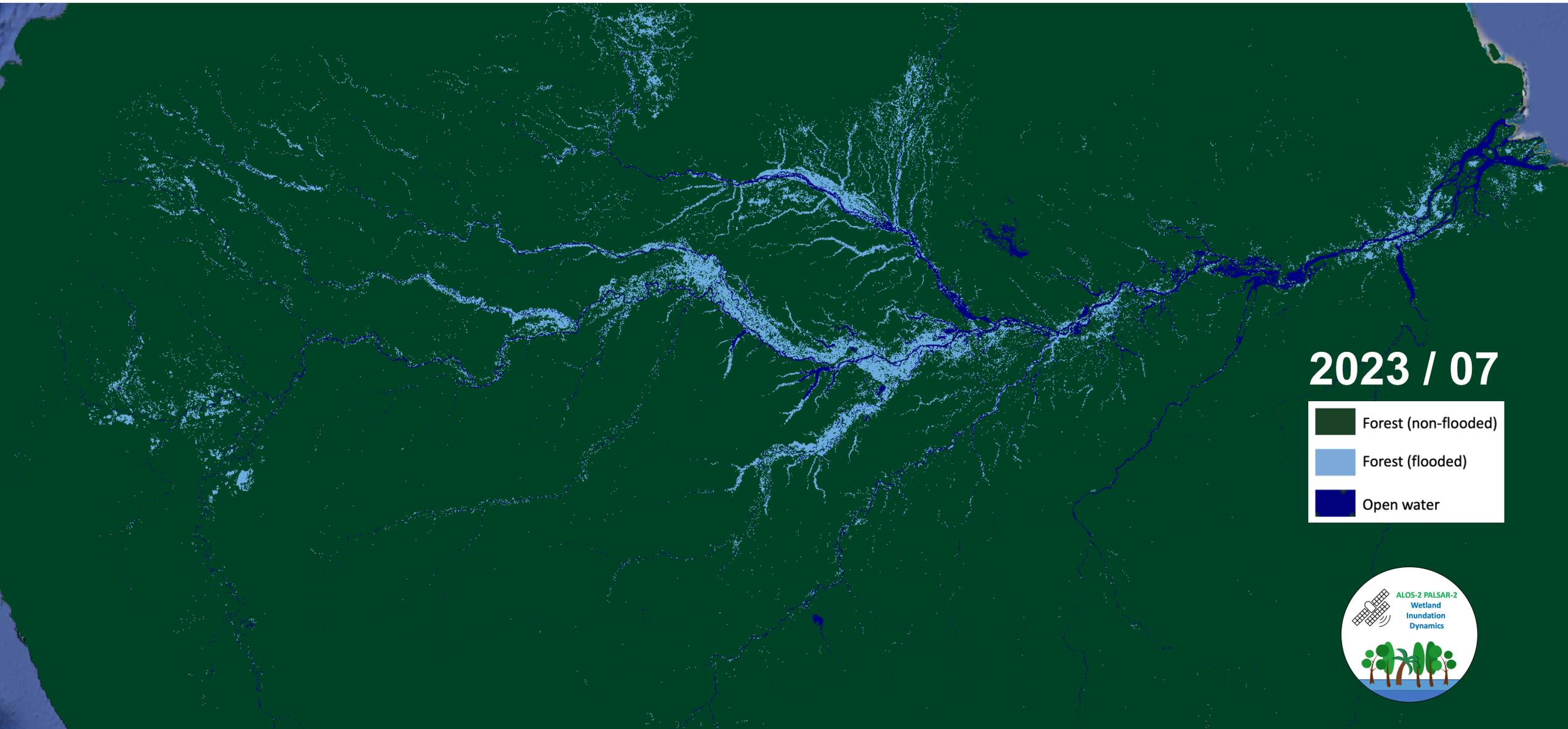
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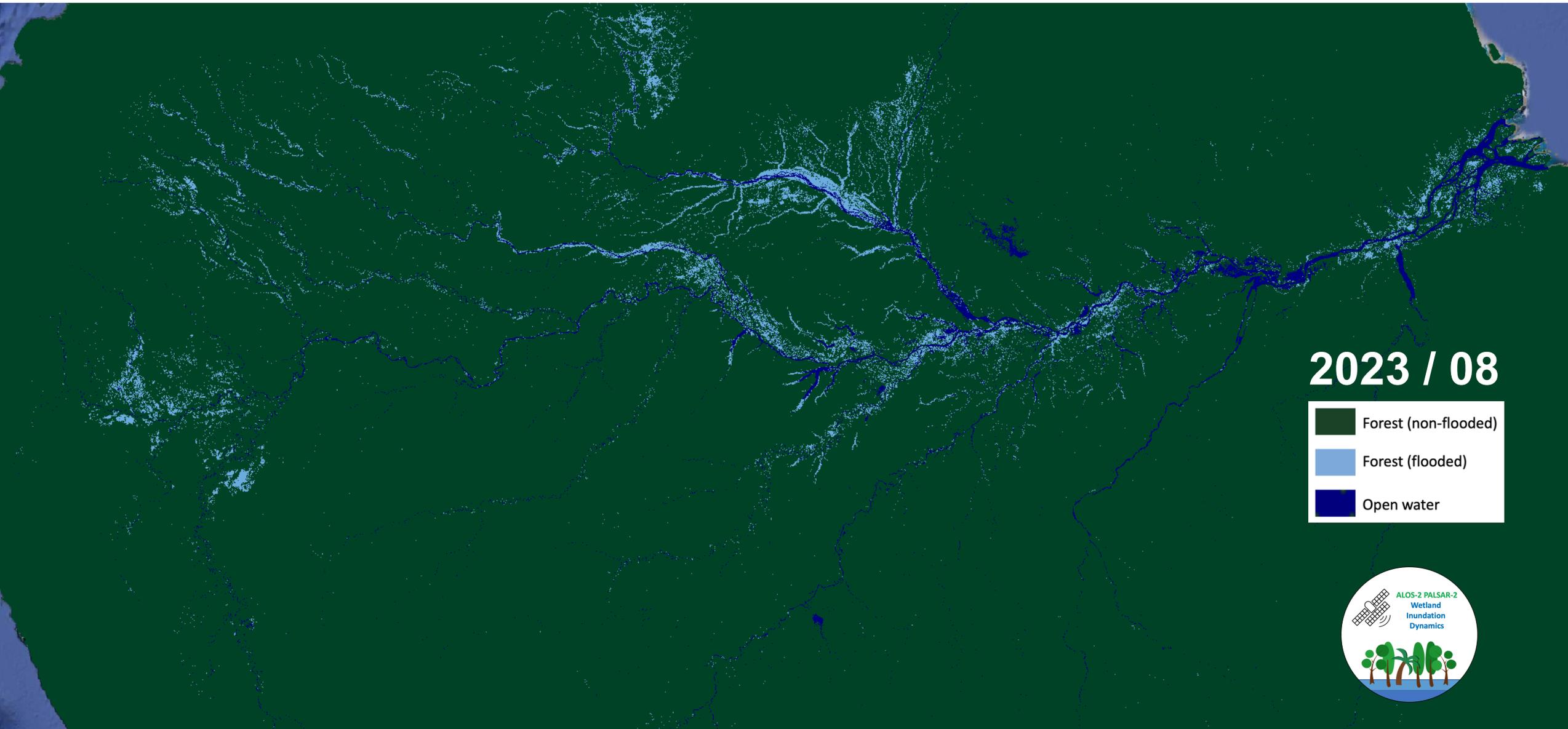
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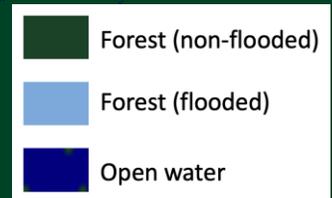


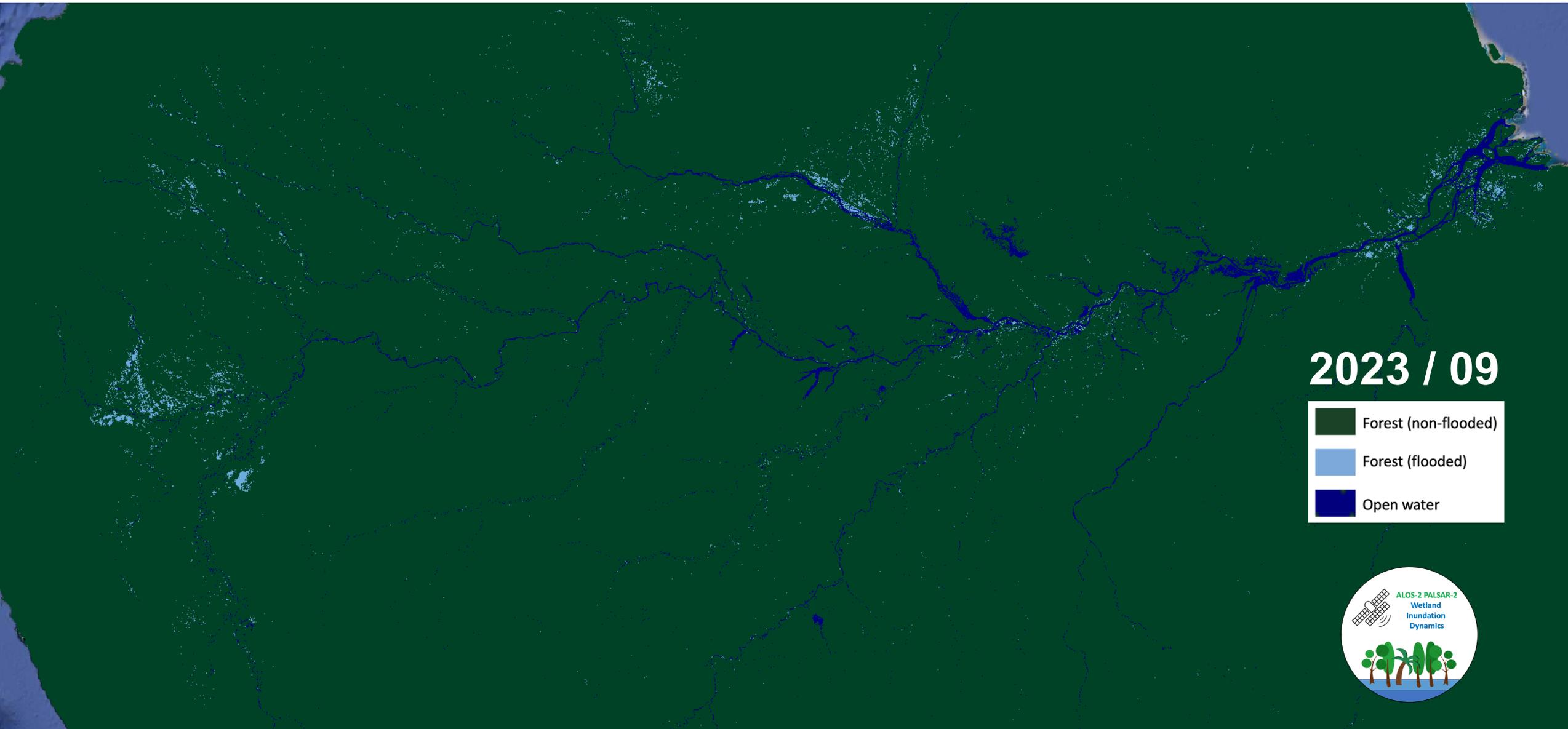
2023 / 07

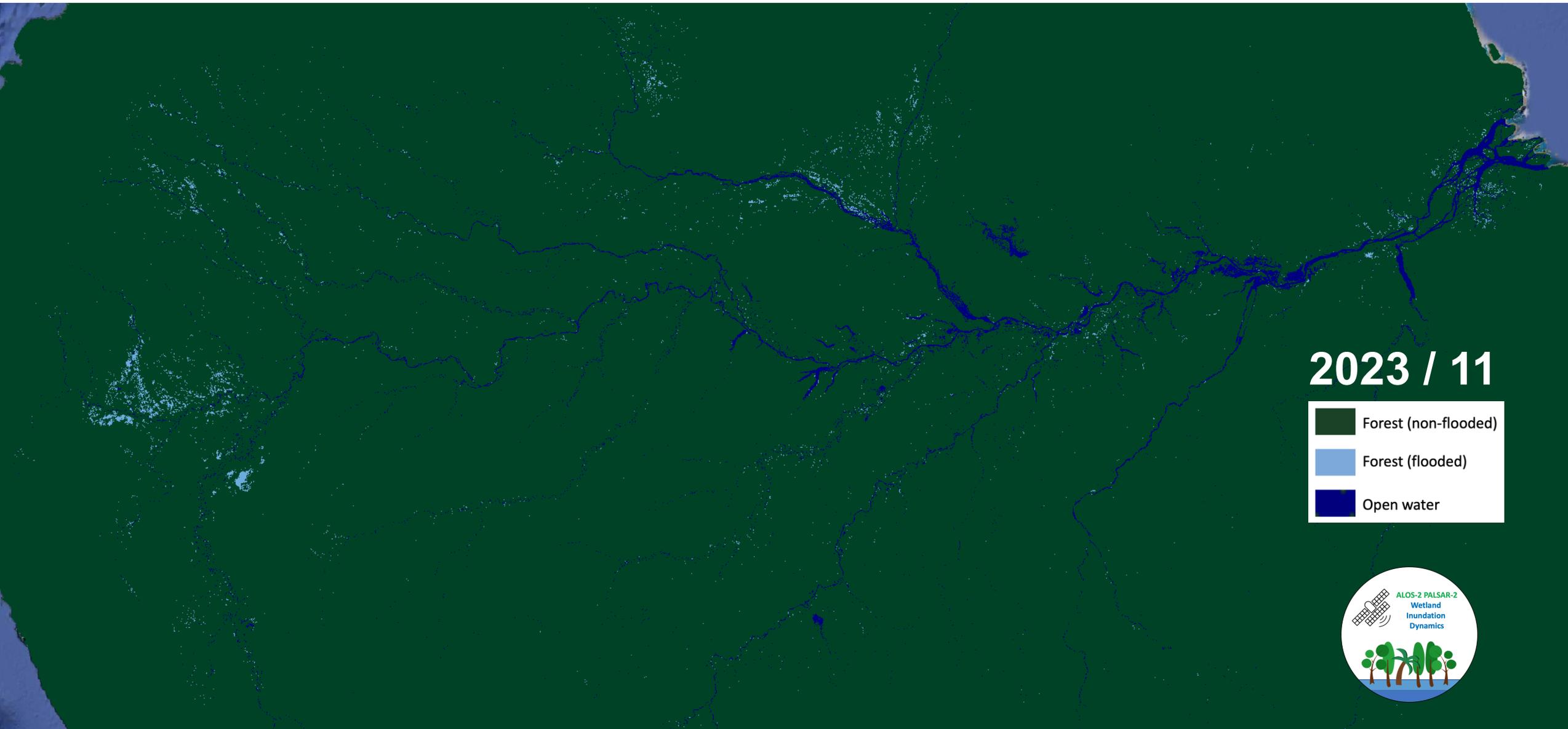




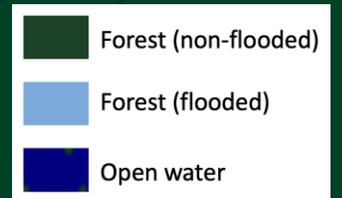
2023 / 08

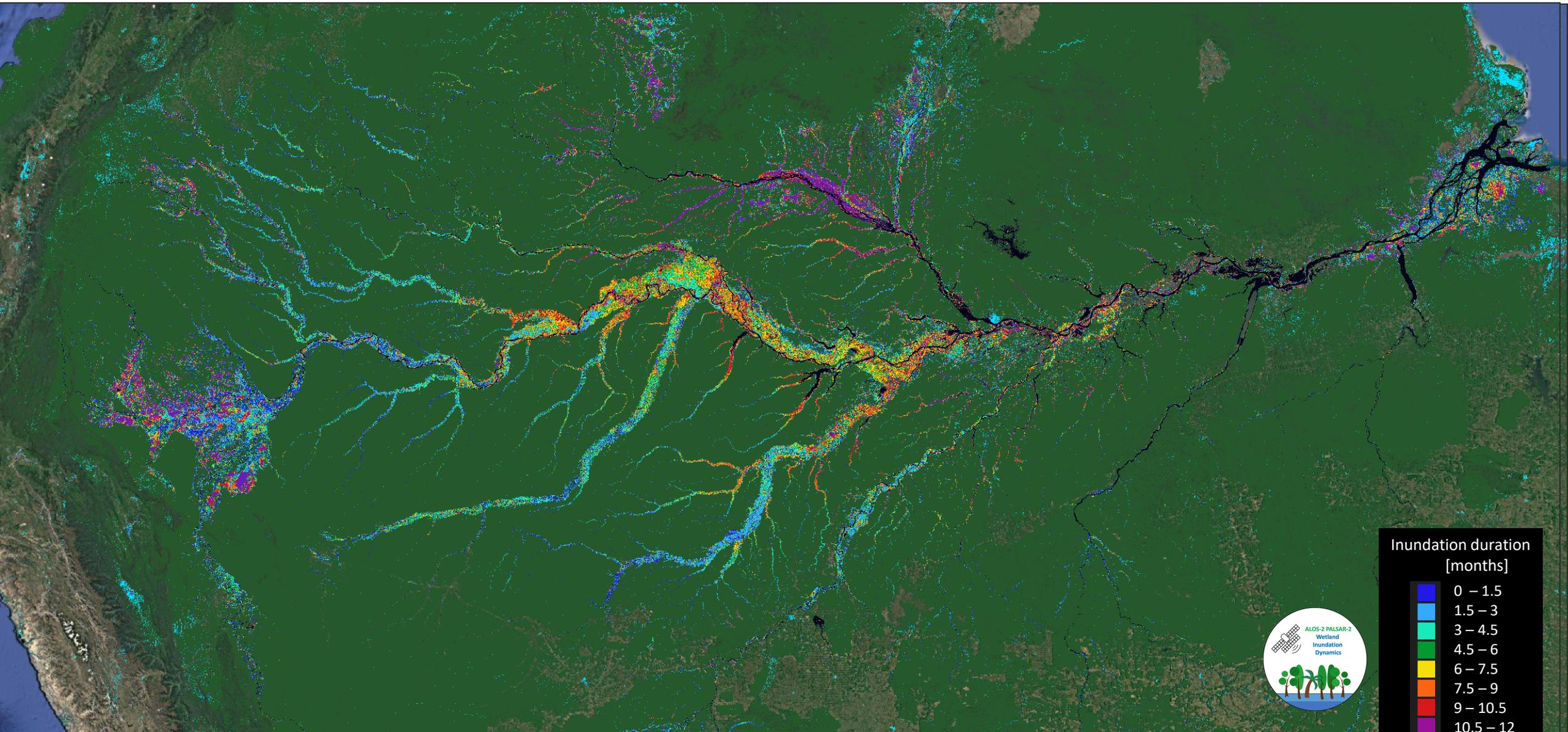


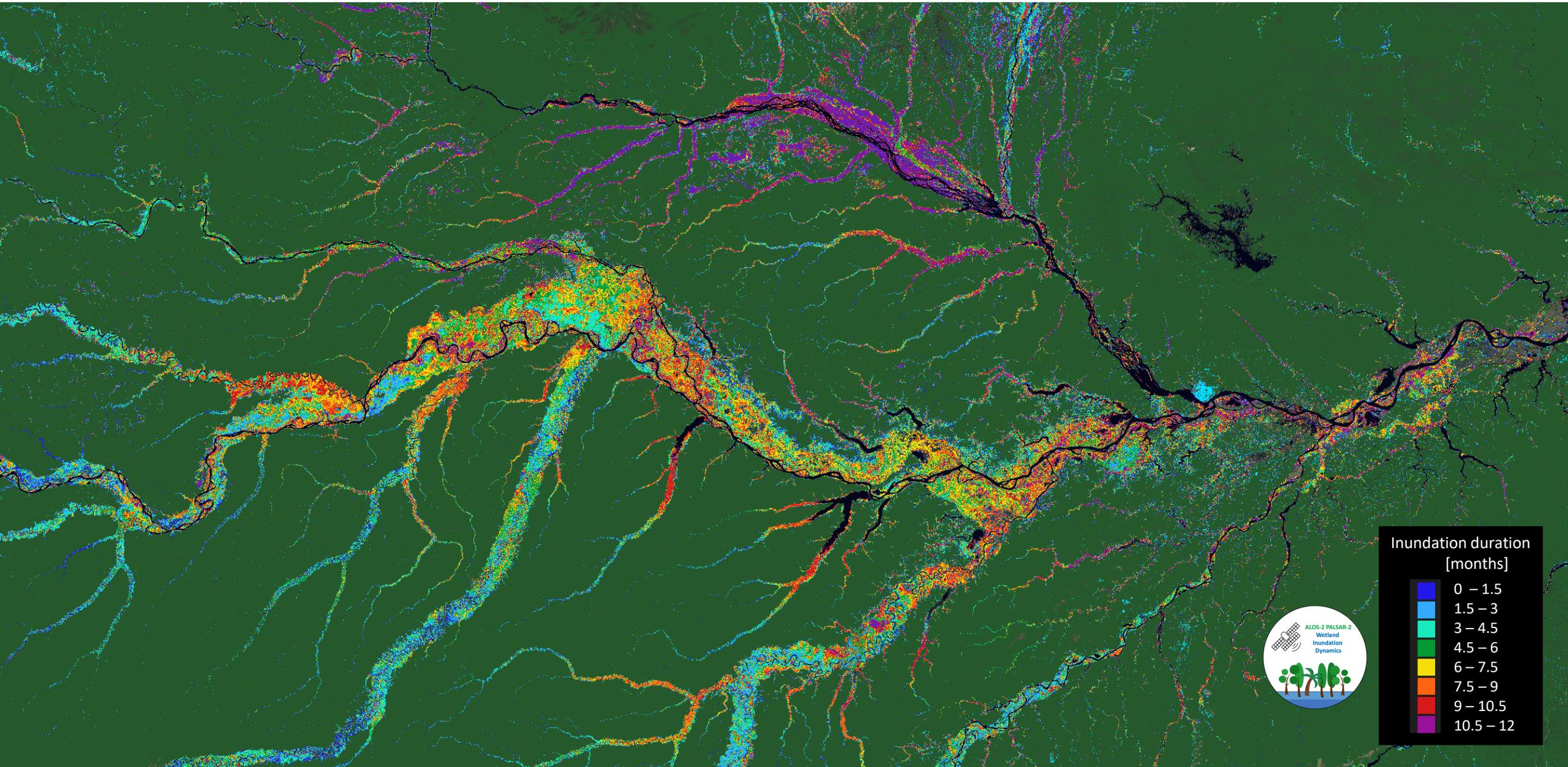


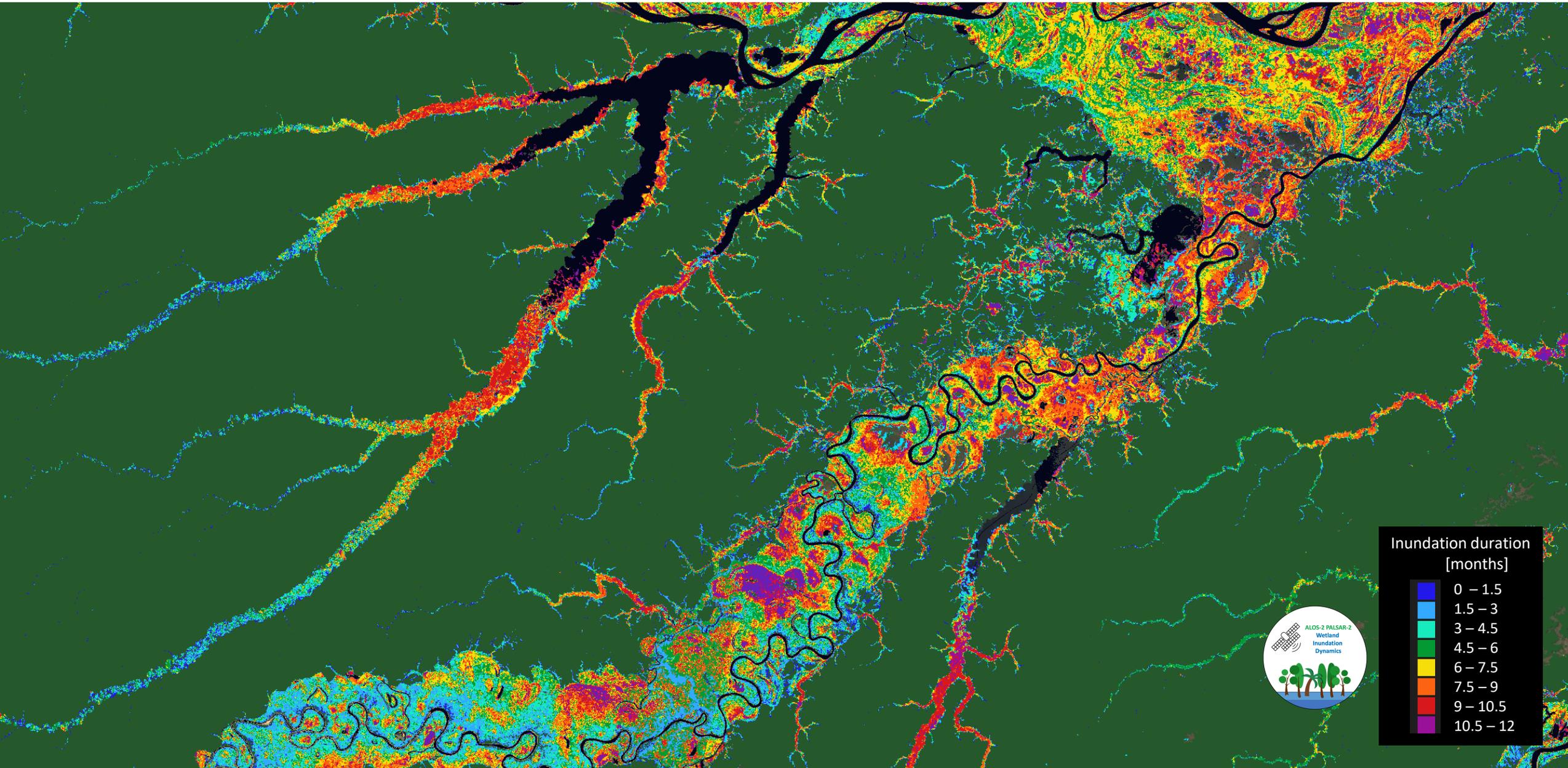


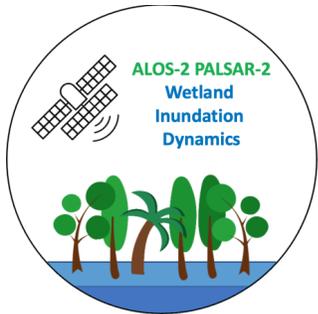
2023 / 11











Satellite-based measurements provide critical data about the Earth's environment at global, regional and local scales.

- **Sustainable Development Goals (SDG 6.6.1):**
Change in the extent of water-related ecosystems over time
- **Ramsar Convention on Wetlands:**
Supporting National Wetlands Inventories
- **UN Convention on Biological Diversity (UNCBD):**
Ecosystem stratification and habitat mapping
- **UN Framework Convention on Climate Change (UNFCCC):**
REDD+ Activity Data & Blue Carbon

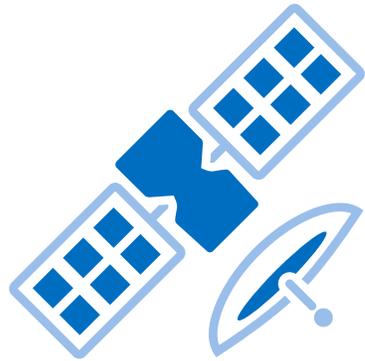
Day 4, Panel Discussion (2)

—Bridging the gap between upstream and downstream —

Latest Status on Satellite Data Utilization

JICA's Cooperation Policy in the field of Space Cooperation

I



**Promote the Utilization of
Space Technology and
Satellite Data**

for Socio-Economic Development

II

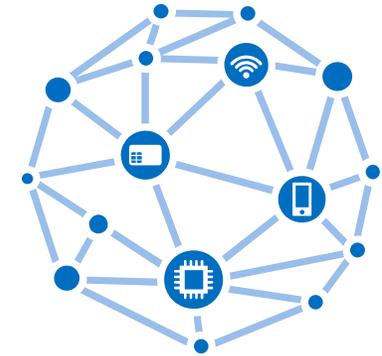


Develop Human Resource

and

**Promote International
Talent Circulation**

III



Promote Co-Creation

and

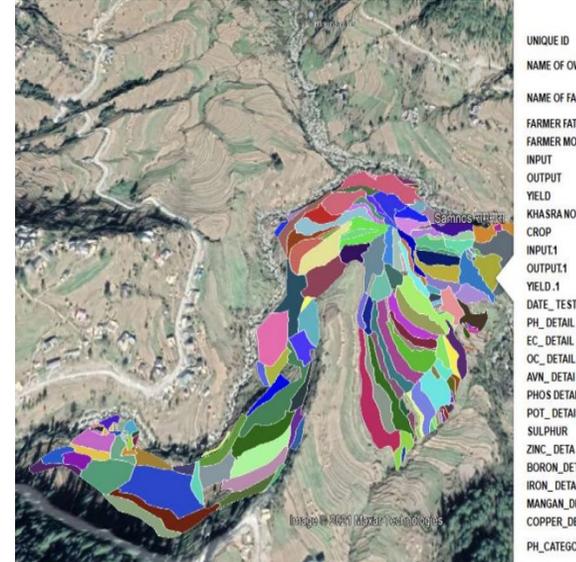
**Establish Industry-
Government-Academia
Partnership Ecosystems**

Satellite data utilization in JICA projects (2000s~)

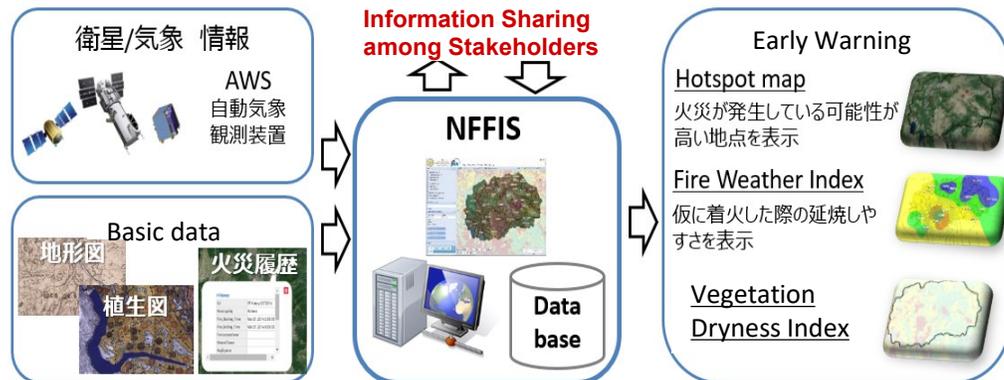
JICA have used satellite data in **150+ Projects**



Improving control of illegal deforestation in the Brazilian Amazon (2021-2026)

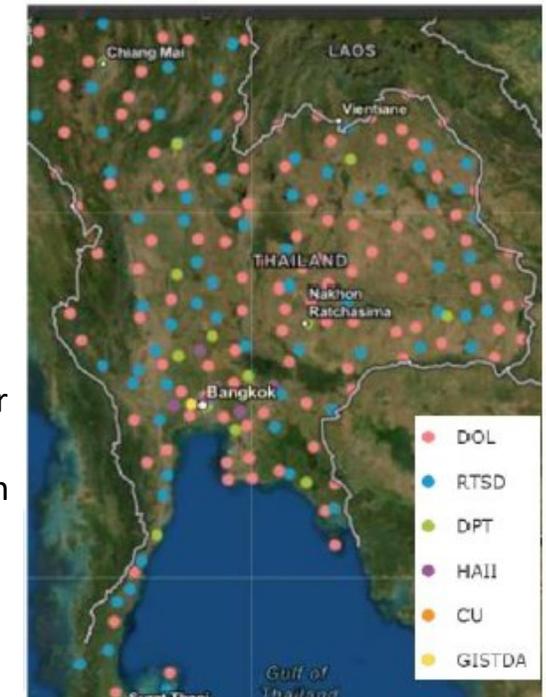


Digital Agricultural Mapping for the Crop Diversification Promotion Project in India (2021)



Establishment and Operational Support of a National Forest Fire Information System in the Western Balkans (2021-2026)

Establishing a National data center and promoting the utilization of GNSS Operating Reference Station in Thailand (2020-2024)



JICA projects Targeting Space Agencies (2023~)

Paraguay



Technical Cooperation (2023-2025)

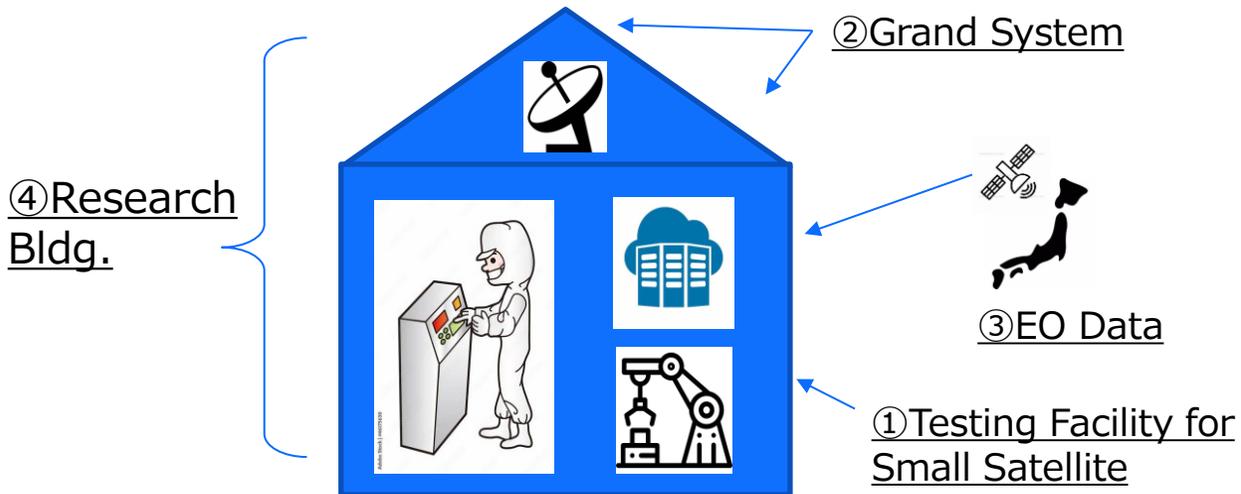


Rwanda

HRD in Space Sector (2023-2025)



Grant Aid (*) Under consideration



Day 4, Panel Discussion (2)
—Bridging the gap between upstream and downstream —

Future Capacity Building Approach

Analysis Ready Data (ARD) – the ideal starting point for Capacity Building

Satellite data fully processed by data provider:

- Full geometric corrections (“Ortho rectified”)
- In ground projection (e.g. UTM, lat/long)
- Full radiometric corrections
 - Optical: atmospheric corrections
 - Radar: Radiometric slope correction

No additional processing required by end-users

- User-friendly formats – e.g. GeoTiff
- ARD – import directly into your GIS
- Designed to support End-Users with limited previous experience of satellite data



<http://ceos.org/ard>

CEOS Committee on Earth Observation Satellites

Overview Strategy Framework Specifications Resources Logo & Branding FAQ GitHub Datasets

CEOS ANALYSIS READY DATA

CEOS-ARD Product Family Specifications

<p>CEOS-ARD Product Family Specification</p> <p>Surface Reflectance</p>	<p>Surface Reflectance</p> <p>v5.0.1</p> <p>6 Dec 2023</p> <p>PDF Word</p>	<p>CEOS-ARD Product Family Specification</p> <p>Surface Temperature</p>	<p>Surface Temperature</p> <p>v5.0</p> <p>8 Jun 2020</p> <p>PDF Word</p>	<p>CEOS-ARD Product Family Specification</p> <p>Aquatic Reflectance</p>	<p>Aquatic Reflectance</p> <p>v2.0</p> <p>29 May 2025</p> <p>PDF Word</p>
<p>CEOS-ARD Product Family Specification</p> <p>Nighttime Lights Surface Radiance</p>	<p>Nighttime Lights Surface Radiance</p> <p>v1.0</p> <p>2 Oct 2022</p> <p>PDF Word</p>	<p>CEOS-ARD Product Family Specification</p> <p>Synthetic Aperture Radar</p>	<p>Combined CEOS-ARD for Synthetic Aperture Radar</p> <p>Normalised Radar Backscatter [NRB]</p> <p>Polarimetric Radar [POL]</p> <p>Ocean Radar Backscatter [ORB]</p> <p>Geocoded Single-Look Complex [GSLC]</p> <p>Interferometric Radar [INSAR]</p>		

Free Access to Earth Observation data from public satellite missions

Public missions – Open and free for anyone to use

- Landsat-8/9 (USA), CBERS (Brazil), Sentinel-2/3 (Europe)
- Sentinel-1 (Europe), BIOMASS (Europe) NISAR (USA/India)

Public missions – Restricted/commercial

- ALOS-2/ALOS-4 (Japan)
- SAOCOM (Argentina)
- More...

“UNISEC-Global is dedicated to fostering a world where space science and technology are accessible to individuals and institutions across all nations, regardless of their economic status.”

Appeal to Japan: Make ALOS-2/ALOS-4 data open to the public!

- Public missions = Paid by tax payers → Owned by the people!
- Stimulates EO industry: Start-ups and EO value-added companies
- Fairness to other countries making their satellite data openly available
- Fairness to users in developing countries



Day 4, Panel Discussion (2)
—Bridging the gap between upstream and downstream —

Future Capacity Building Approach

Cross-disciplinary Capacity Building in Satellite Development and Utilization

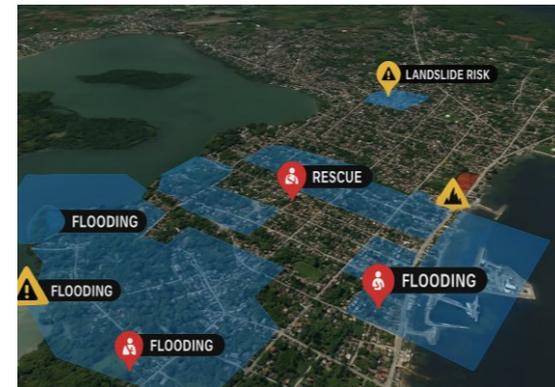
Phase 1: Satellite development training (ex. HEPTA-SAT)

➤ HEPTA-SAT Hands-on Training (Design, Communication, and Operation of Small Satellites)



Phase 2: Satellite Data Utilization and 3D Digital Twin Training

➤ Data analysis and application training (Satellite image analysis and Digital twin integration)



- Build capacity through hands-on experience in both satellite hardware and data applications
- Cultivate professionals who can connect technology with real-world user needs

Cross-disciplinary Skills for Space Technology Capacity Building



System Design and
Integration

Data Processing

Project
Management and
Team Collaboration

AI and Machine
Learning

GIS and Spatial
Analysis

The 11th UNISEC-Global Meeting

Day 4, Panel Discussion (2)

—Bridging the gap between upstream and downstream —

Moderator: Masatoshi Kamei, RESTEC

Panelists:

Naruo Kanemoto, SPACE SHIFT

Shota Iino, SpaceData

Maho Kurasawa, JICA

Ake Rosenqvist, soloEO