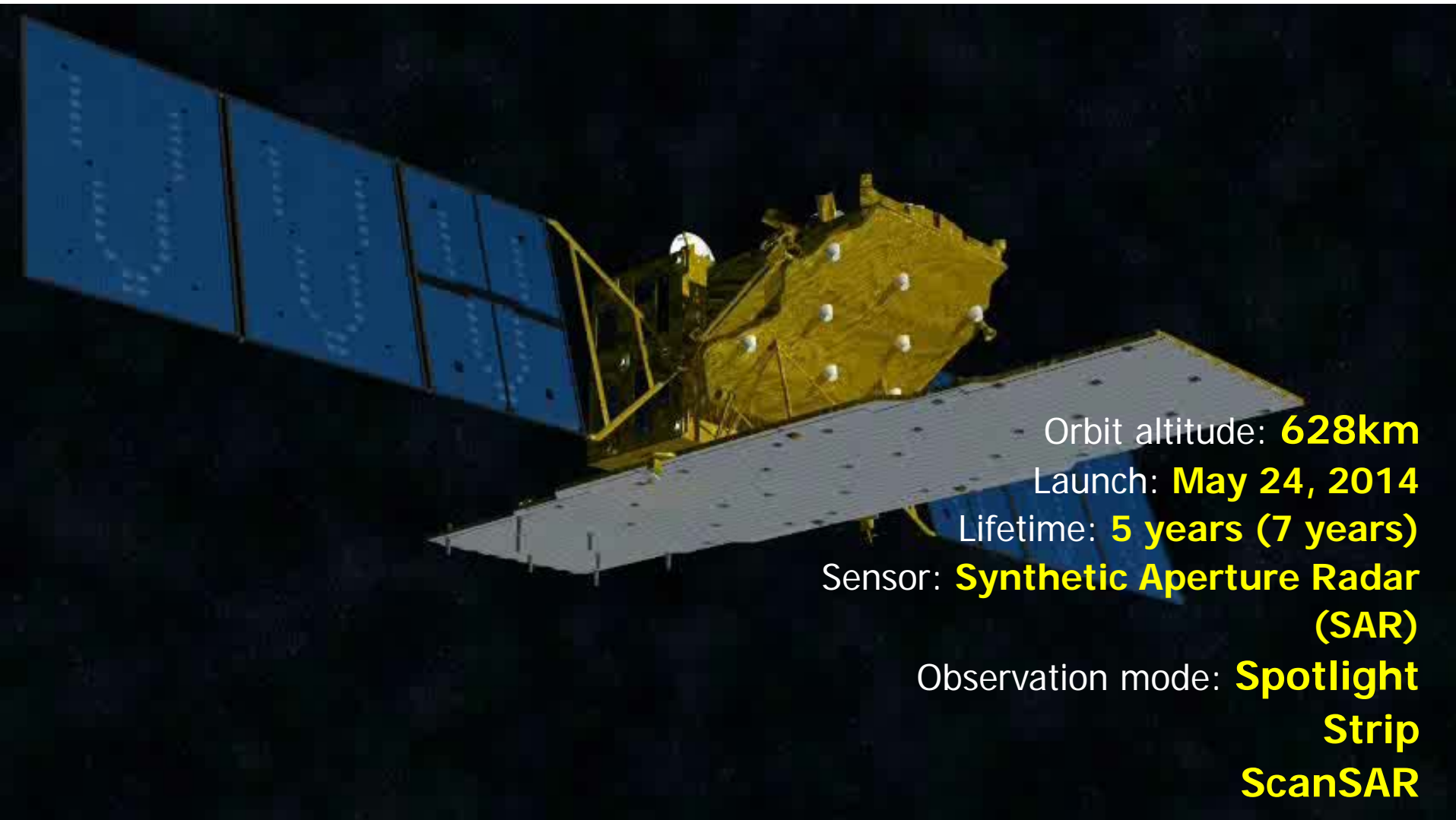




**Deforestation Monitoring System:  
JICA-JAXA  
Forest Early Warning System in the Tropics  
(JJ-FAST)**

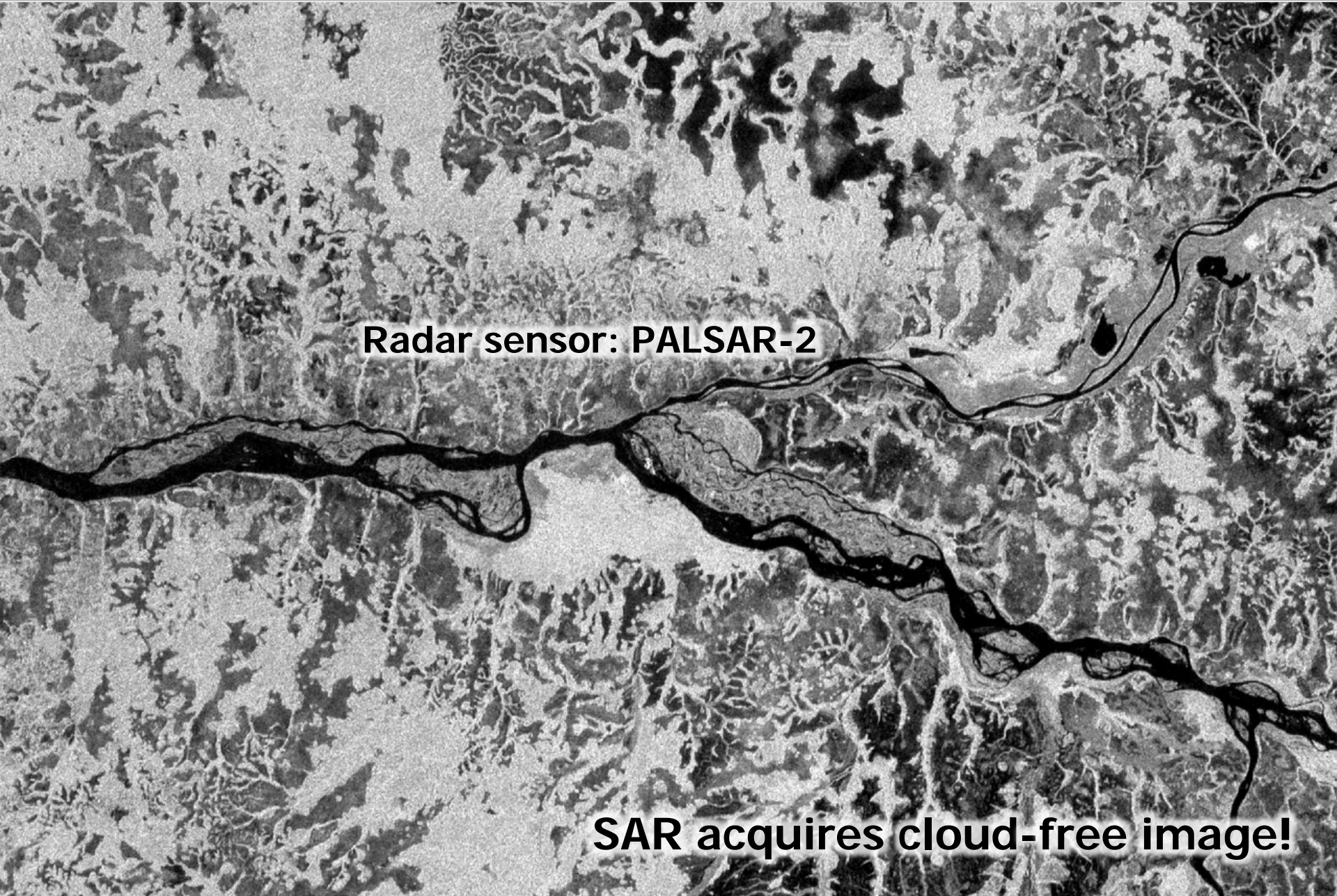
*Masato Hayashi & Izumi Nagatani  
Japan Aerospace Exploration Agency (JAXA)*





## 2. Influence of cloud cover

3

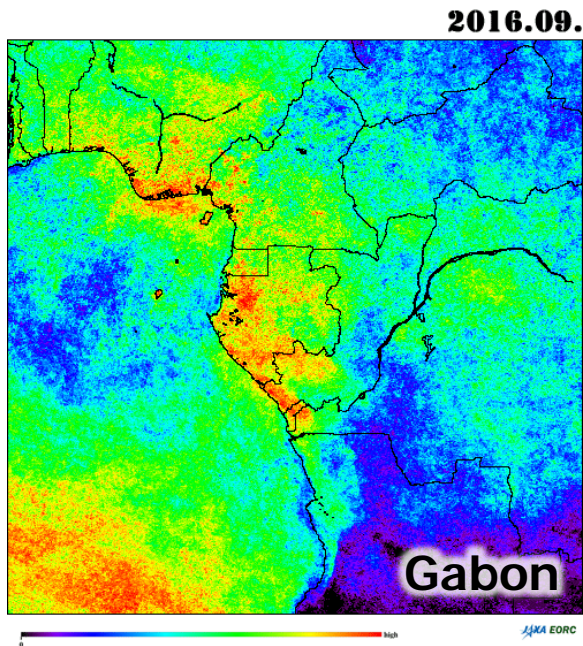
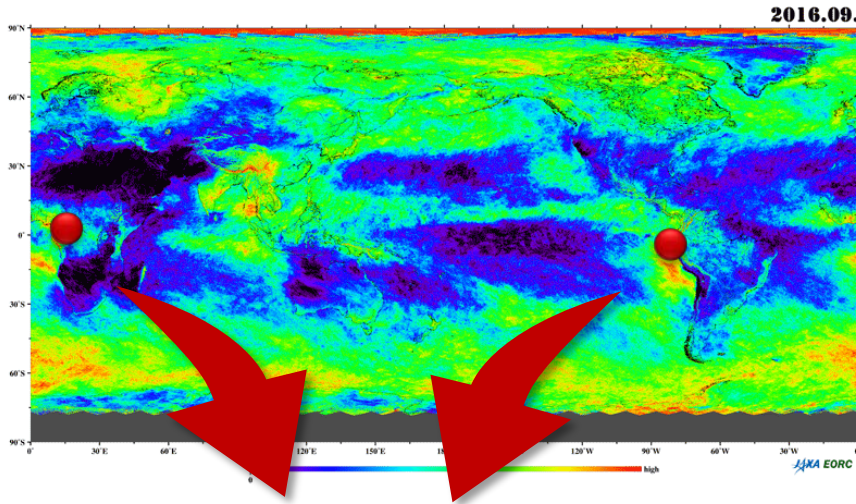


**Radar sensor: PALSAR-2**

**SAR acquires cloud-free image!**



# 2. Influence of cloud cover



Country	Cloud cover ratio
Ecuador	97%
Gabon	88%
Equatorial guinea	75%
Colombia	65%
Bhutan	63%
Indonesia	60%
Vietnam	56%
Congo	54%
⋮	⋮

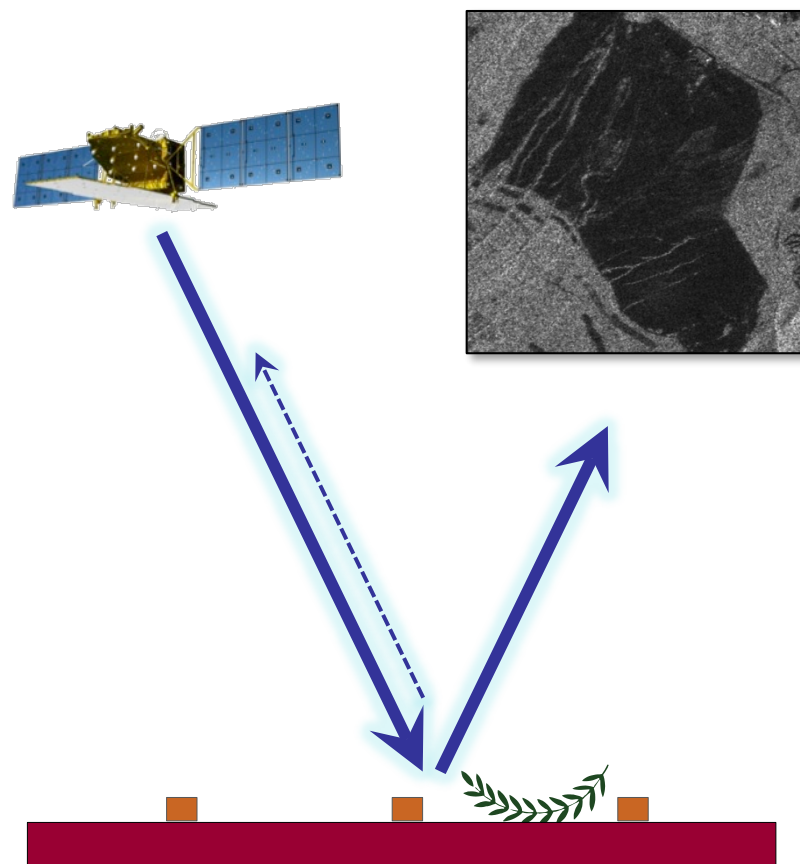
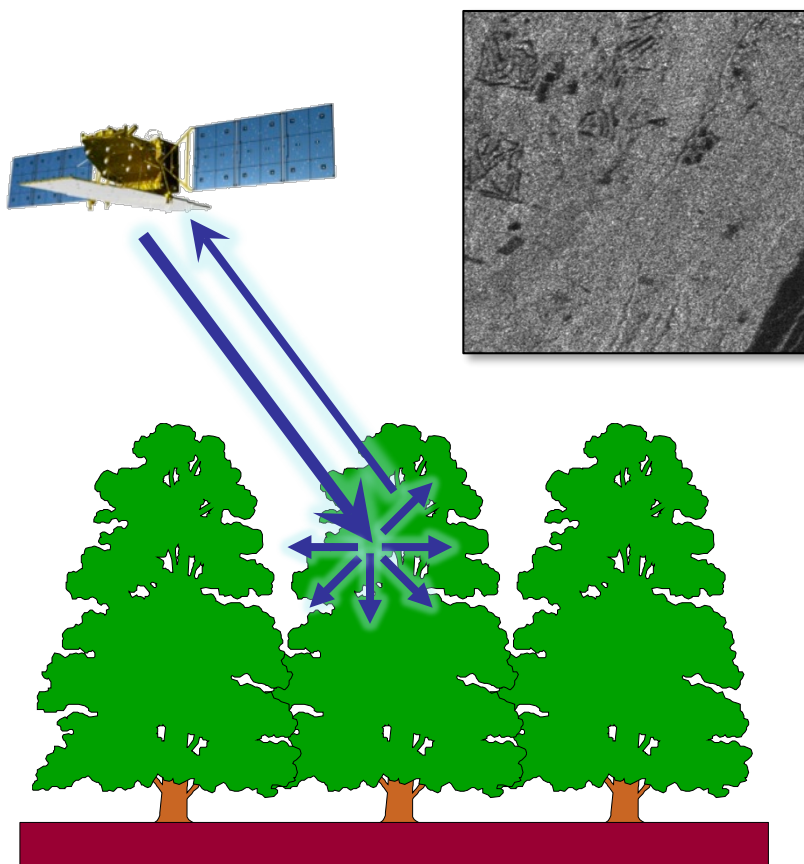
Ratio of period with more than 50% cloud-cover (in 2015.01-2017.09).

**Vast forests are covered by cloud!**

# 3. Deforestation detection

Forest: Bright

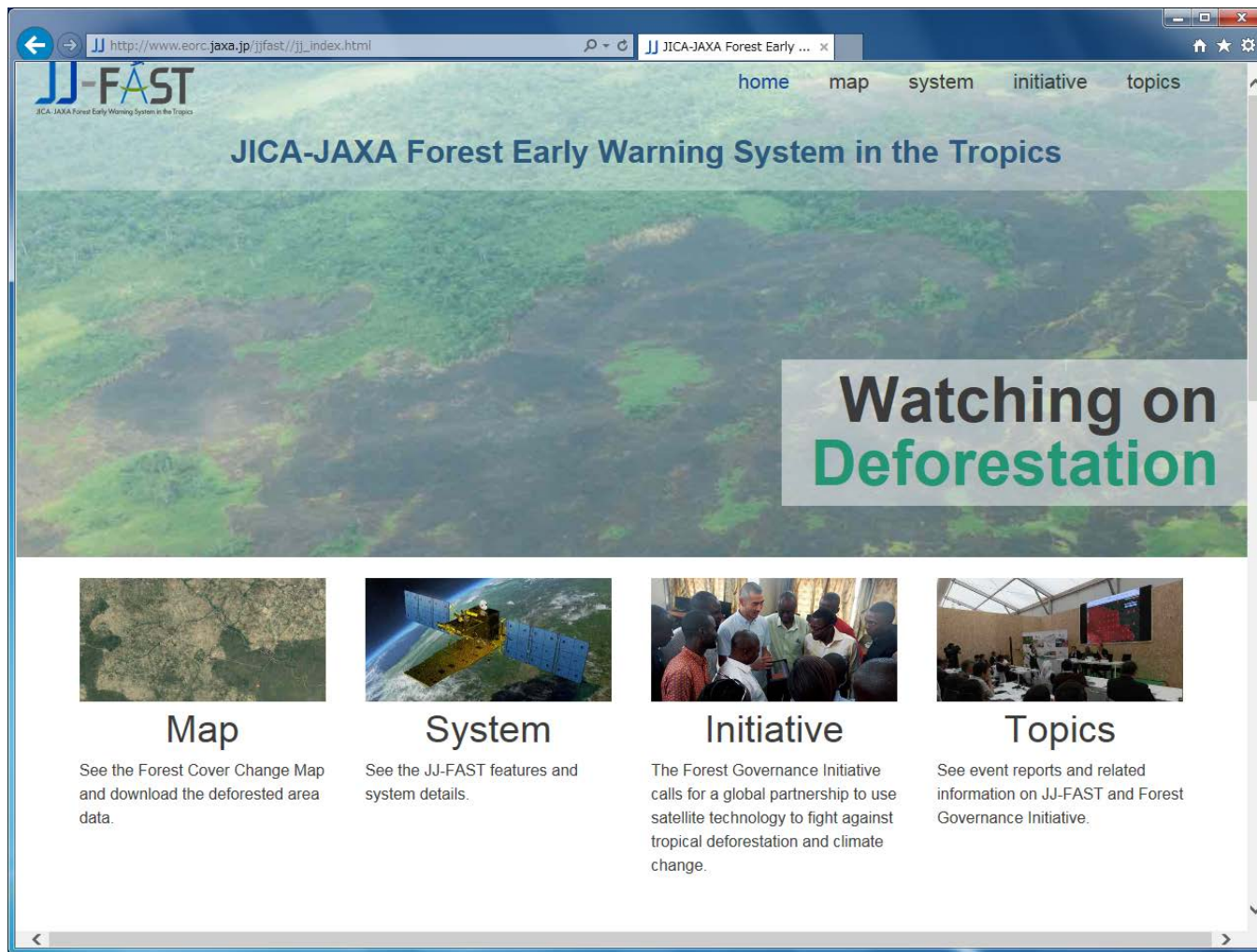
Non-Forest: Dark



**Dark change area may represent deforestation!**

# 4. New monitoring system: JJ-FAST

6



The screenshot shows a web browser window displaying the JJ-FAST website. The browser's address bar shows the URL [http://www.eorc.jaxa.jp/jjfast/jj\\_index.html](http://www.eorc.jaxa.jp/jjfast/jj_index.html). The website header includes the JJ-FAST logo and navigation links for home, map, system, initiative, and topics. The main content area features a large satellite image of a forested area with a semi-transparent text box that reads "Watching on Deforestation". Below this image are four columns, each with a small image, a title, and a brief description:

- Map**: See the Forest Cover Change Map and download the deforested area data.
- System**: See the JJ-FAST features and system details.
- Initiative**: The Forest Governance Initiative calls for a global partnership to use satellite technology to fight against tropical deforestation and climate change.
- Topics**: See event reports and related information on JJ-FAST and Forest Governance Initiative.

**Released in November 2016!**

<http://www.eorc.jaxa.jp/jjfast/>

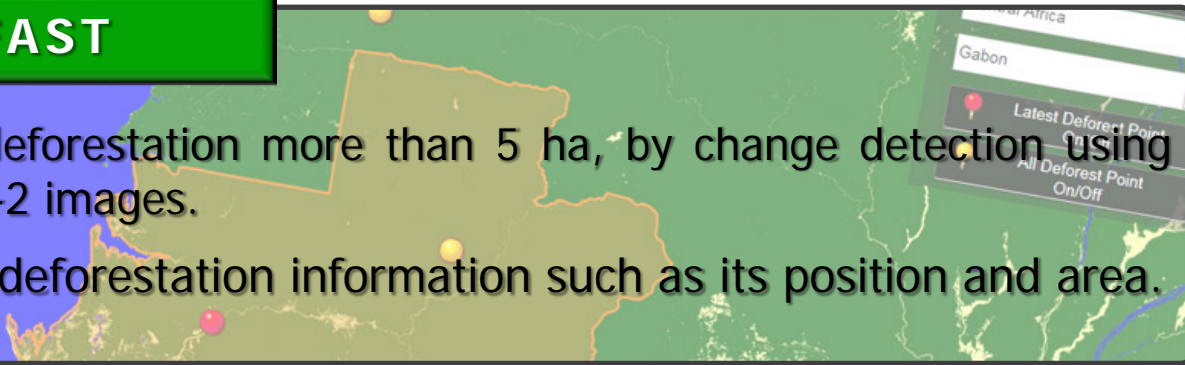


# 4. New monitoring system: JJ-FAST

7

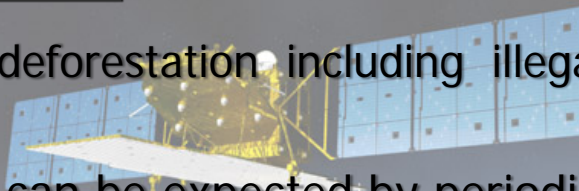
## What is JJ-FAST

- It detects deforestation more than 5 ha, by change detection using two PALSAR-2 images.
- It provides deforestation information such as its position and area.



## Objective of JJ-FAST

- Early warning of deforestation including illegal activity (every 1.5 months).
- Suppression effect can be expected by periodic open information.



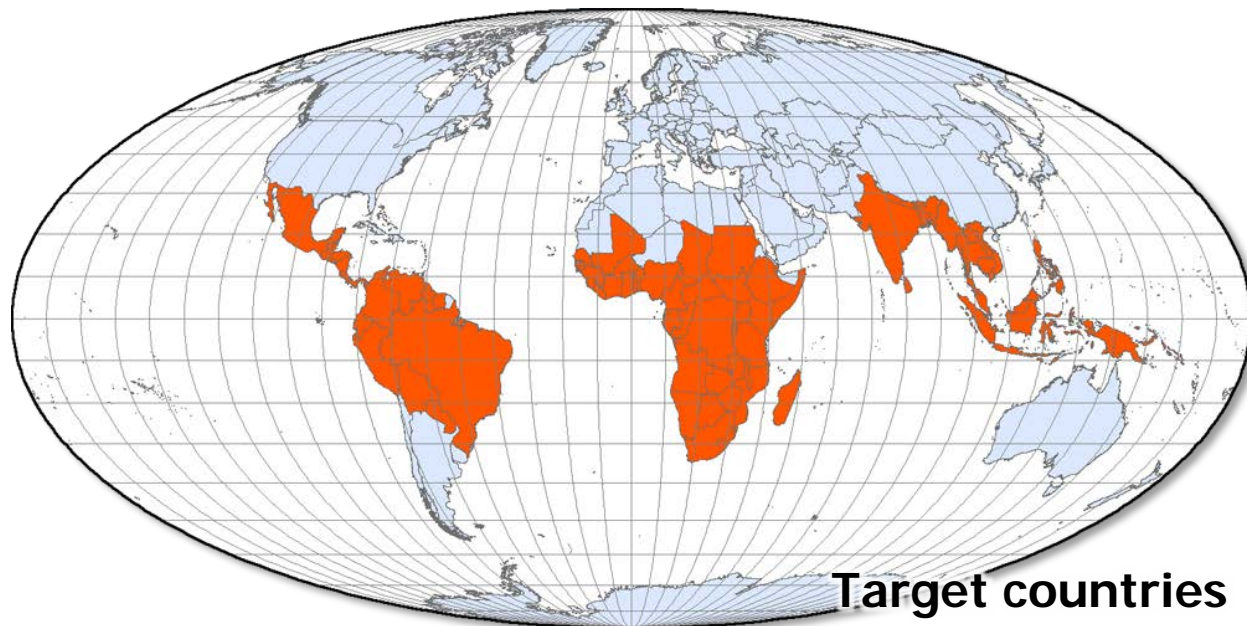
## Usage of JJ-FAST

- User can download deforestation polygon and PALSAR-2 image.
- He can identify illegal activity by GIS analysis using land-use map or concession map.



# 4. New monitoring system: JJ-FAST

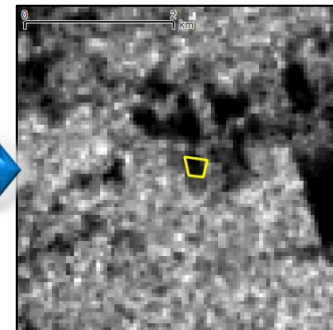
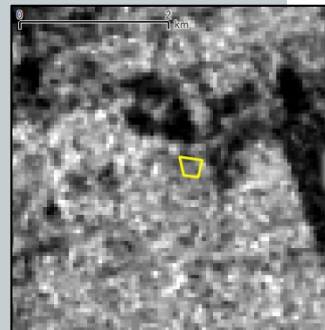
<b>Data source</b>	<b>ALOS-2/PALSAR-2</b> (ScanSAR mode)
<b>Target area</b>	About <b>80 countries</b>
<b>Update</b>	Every <b>1.5 months</b>
<b>Characteristics</b>	<ul style="list-style-type: none"><li>- <b>Global coverage</b>: almost all tropical forests.</li><li>- <b>Cloud-cover area observation</b>: even in rain season.</li><li>- <b>Small data traffic</b>: forester can use it in the field.</li></ul>



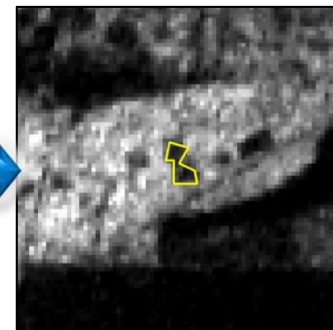
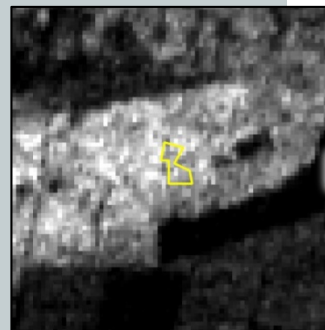


# 5. Field survey for validation

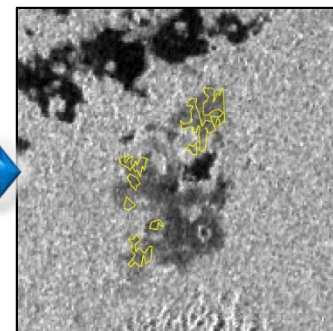
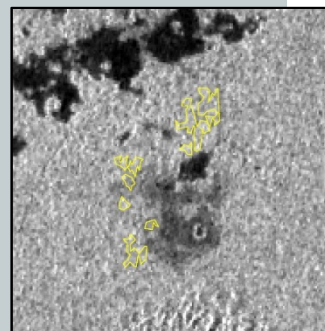
Peru



Botswana



Gabon



User's accuracy = 83.3%

	JFY2016					JFY2017												JFY2018		
	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
Conference	▲ COP22 ▲ ACTO					▲ SADC			▲ COMIFAC			▲ JJ-FAST Int. WS								
Target area	South America / Africa										South America / Africa / Asia (All the 77 countries)									
Algorithm	Semi-Automatic with Interpretation															Full- Automatic				
Validation	▲ Peru					▲ Botswana			▲ Gabon			▲ Brazil/Peru								

**We are now improving the algorithm**  
to be full automatically and more accurately.



## Algorithm improvement

- New algorithm using time-series data.
- Reducing detection errors.
- Small area detection: 5 ha → 1 ha.

## Accuracy assessment

- Field survey in more countries.
- Interpretation of high-resolution image.
- Feedback report from each country.

## Practical usage

- Supporting each country's situation.
- Burnt area detection, forest change map, fusion with existing monitoring system...

The screenshot shows a web browser window with the following content:

- Navigation links: home, map, system, initiative, topics
- Page title: JICA-JAXA Forest Early Warning System in the Tropics
- Section title: Comment form (input)
- Instruction: If you have any comment for target deforest area, please fill following items and pres "Confirm" button.
- Form fields:
  - Target Polygon ID: N03E111\_170828\_170717\_0000001A
  - Name:
  - E-Mail:
  - Residential Country: --Please select your country-- (dropdown menu)
  - Organization/Affiliation:
  - Comment:
- Confirm button:

Deforestation monitoring system **JJ-FAST** ...

- provides up-to-date information for global tropical forests.
- is not influenced by cloud cover, even in rain season.
- strongly supports your forest management!



JICA-JAXA Forest Early Warning System in the Tropics

