

JAXA's SAR Analysis Ready Data (ARD) and the status

Core data: JERS-1/ALOS/ALOS-2
25m data/100m data

Radar backscatter and forest/non-forest data

M. Shimada
JAXA/TDU

2017/April/9-12
SDCG-Ho chi min, Vietnam

JERS-1/SAR (1992-1998)

ALOS/PALSAR(2006-2011)

結果について

ALOS-2 followon-2020

ALOS-2(2014/5~)

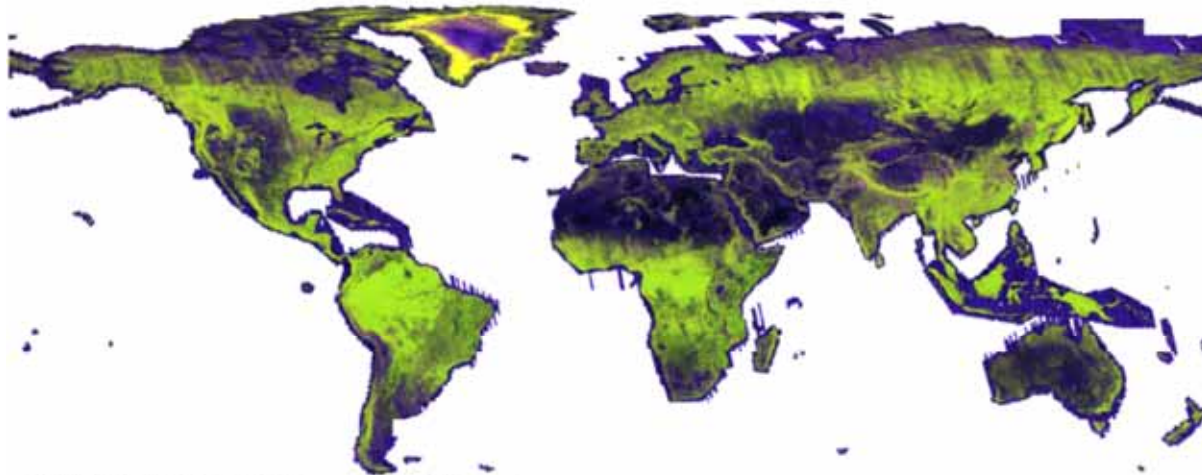
shimada-masanobu

Summary

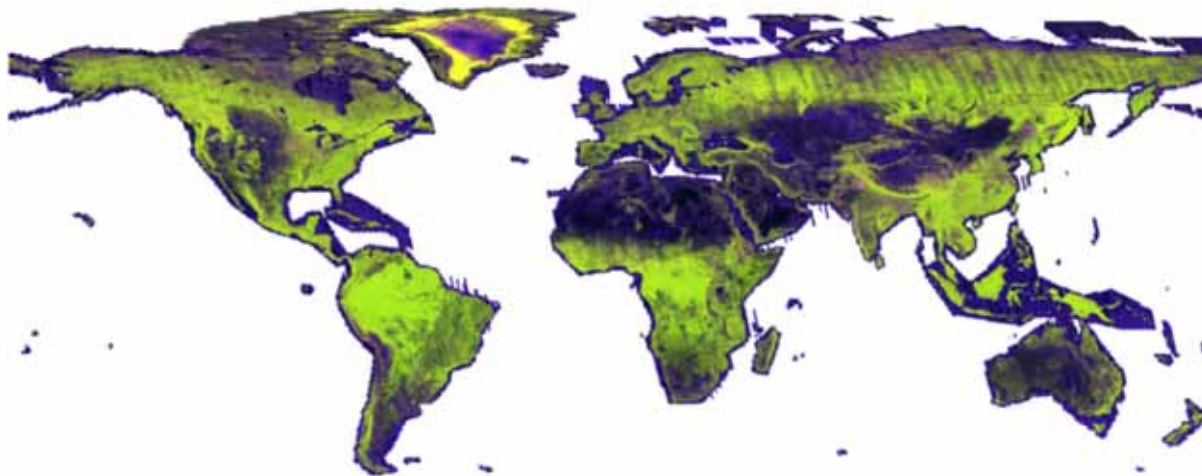
- JAXA generates the 25 m slope corrected and ortho-rectified 25 m time series L-band SAR data set from 2007, as the ARD for CEOS.
- Four annual PALSARs for 2007-2010, and one JERS-1 for 1992-1998.
- Once, PALSAR-2 2014+2015 generated in 2015 end.
- Recalibration of the PALSAR-2 produced revised PALSAR-2 2014+2015 mosaic and generated PALSAR-2 2016 mosaic, recently.
- Those two data sets will be open to the public, April 25 2017 for free downloading.
- ALOS-2 : in good condition: carrying many fuels
- ALOS-2 follows on : to be launched in 2020: carries SAR: 200km swath high resolution available:

PALSAR-2 Global Mosaic Updated

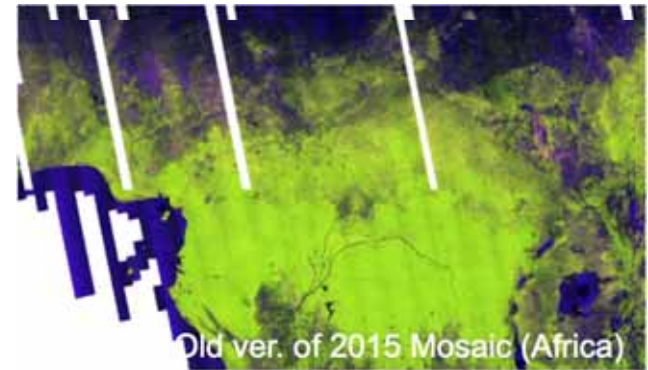
25m resolution global mosaic using PALSAR-2 FBD data



2015 PALSAR-2 25m Global Mosaic

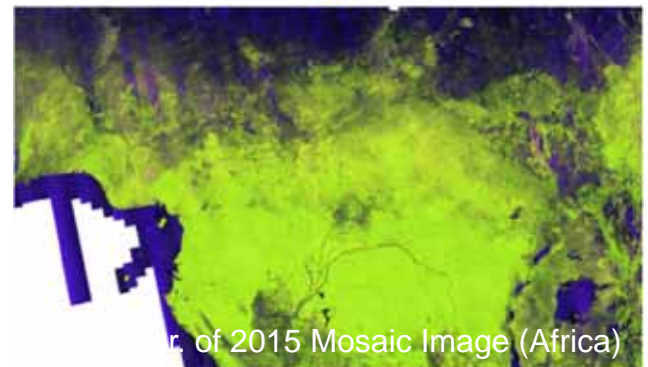


2016 PALSAR-2 25m global mosaic



Old ver. of 2015 Mosaic (Africa)

Stripes in the old version of mosaic

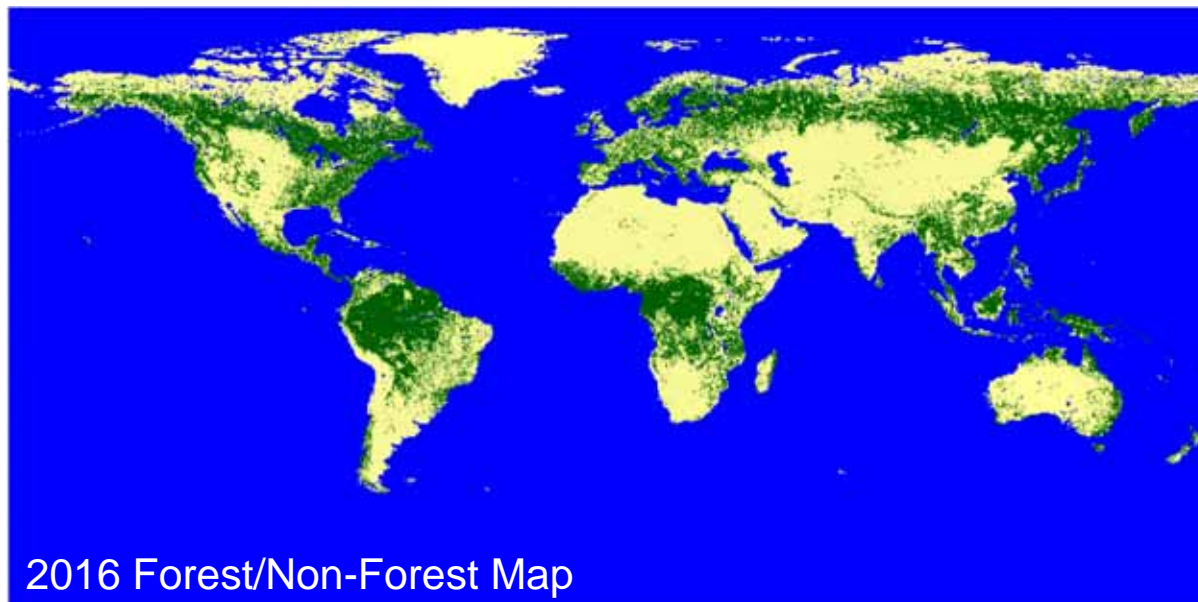
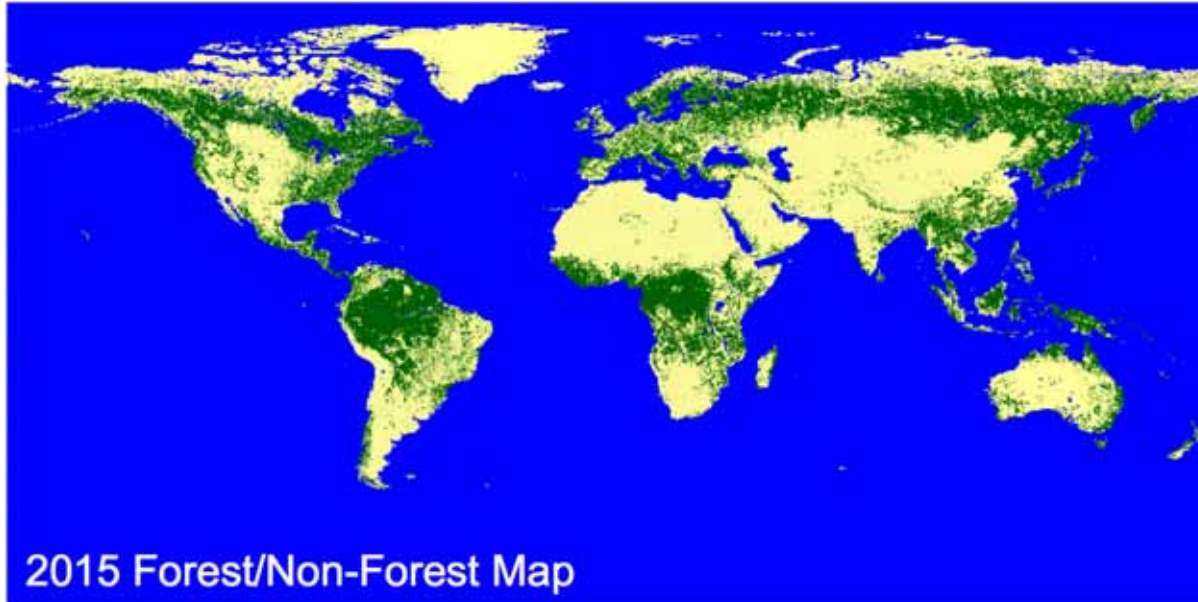


New ver. of 2015 Mosaic Image (Africa)

No stripe in the new version of mosaic.

PALSAR-2 Global Mosaic Updated

25m resolution Forest/Non-Forest Map



	森林面積 (1000ha)		森林増減率
	2015	2016	2016年の2015年 に対する)
Indonesia	119316	117256	-1.73
Congo (RDC)	178887	179178	0.16

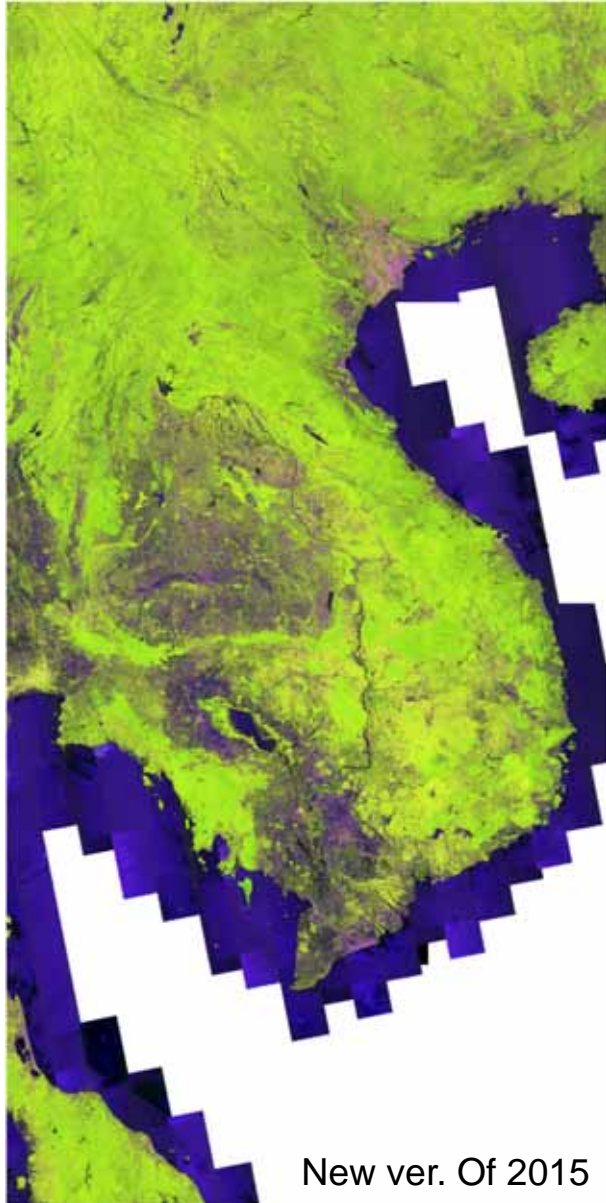
Validation using Google Earth
image (3912points for validating
forest/non-forest)



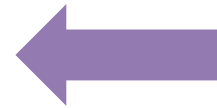
Accuracy:
2015:85.85%
2016:87.24%

PALSAR-2 Global Mosaic In Vietnam

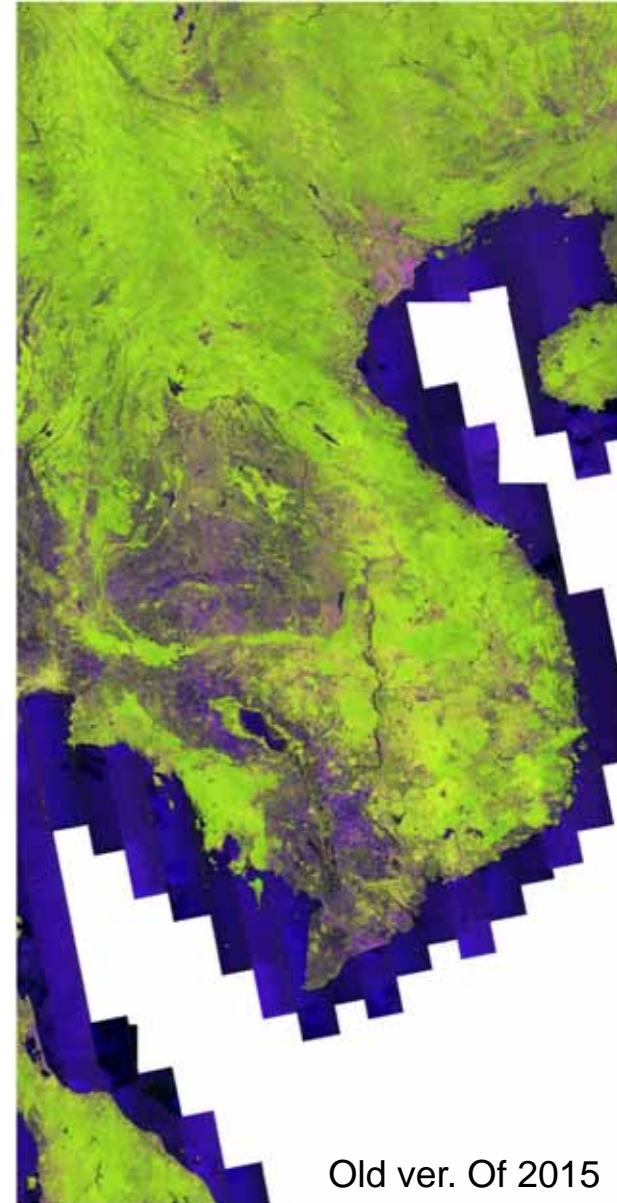
25m resolution global mosaic in Vietnam



New ver. Of 2015



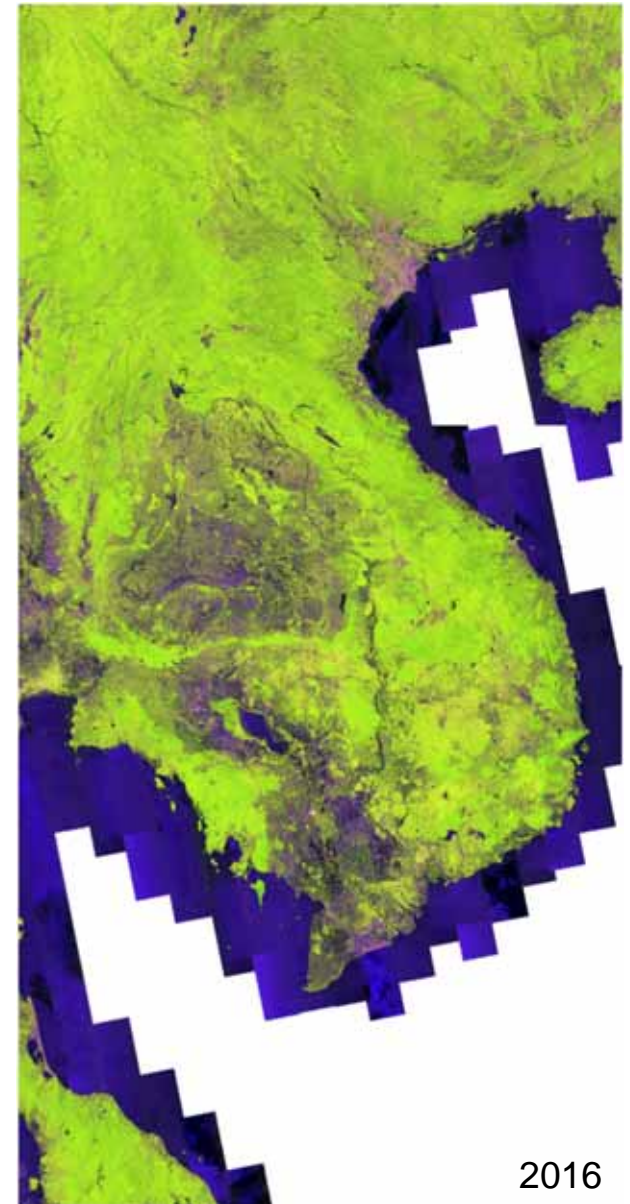
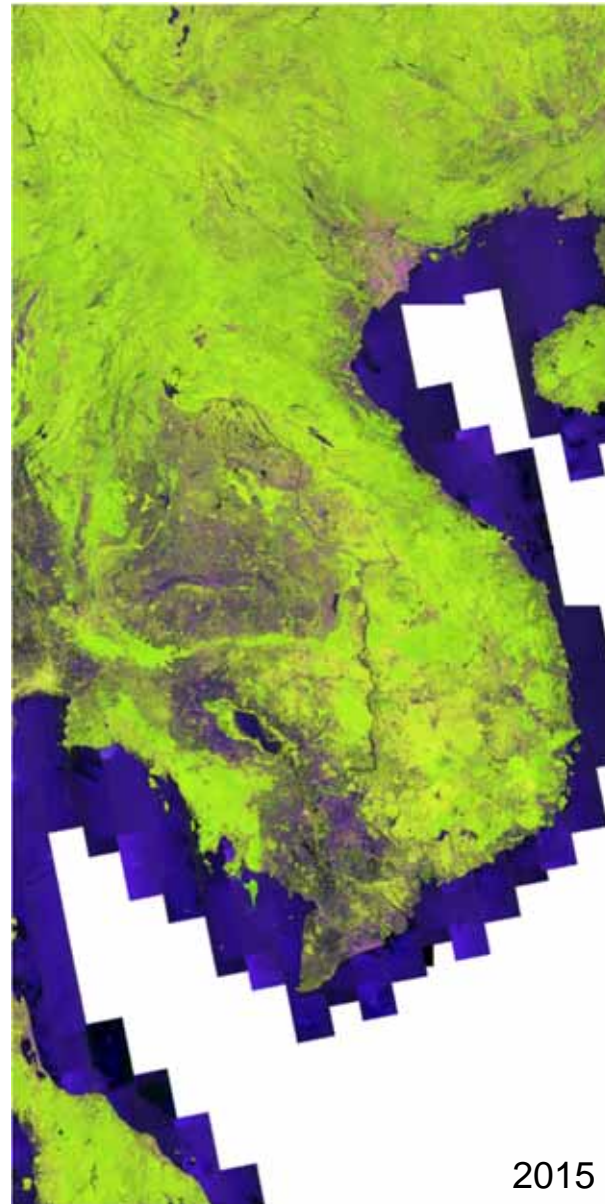
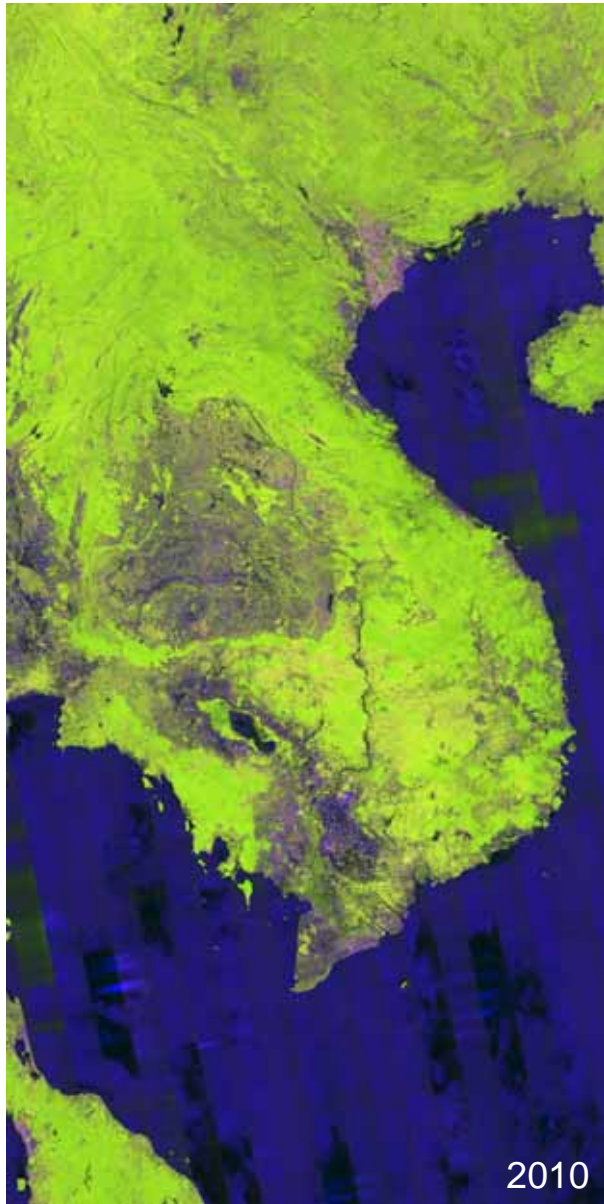
Reduced the stripes between path.



Old ver. Of 2015

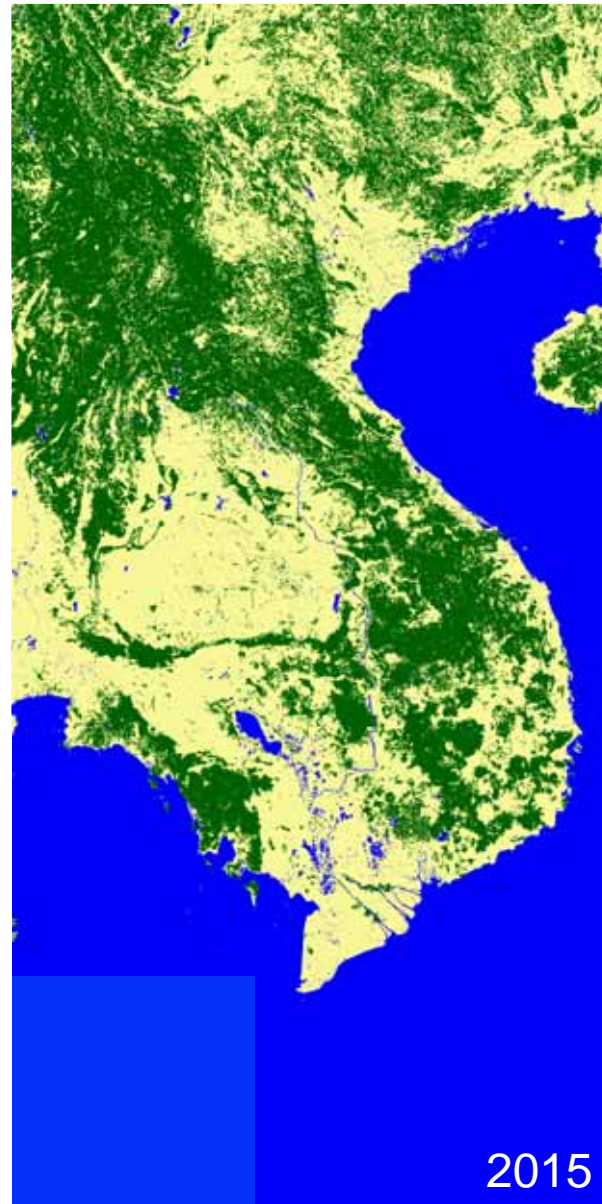
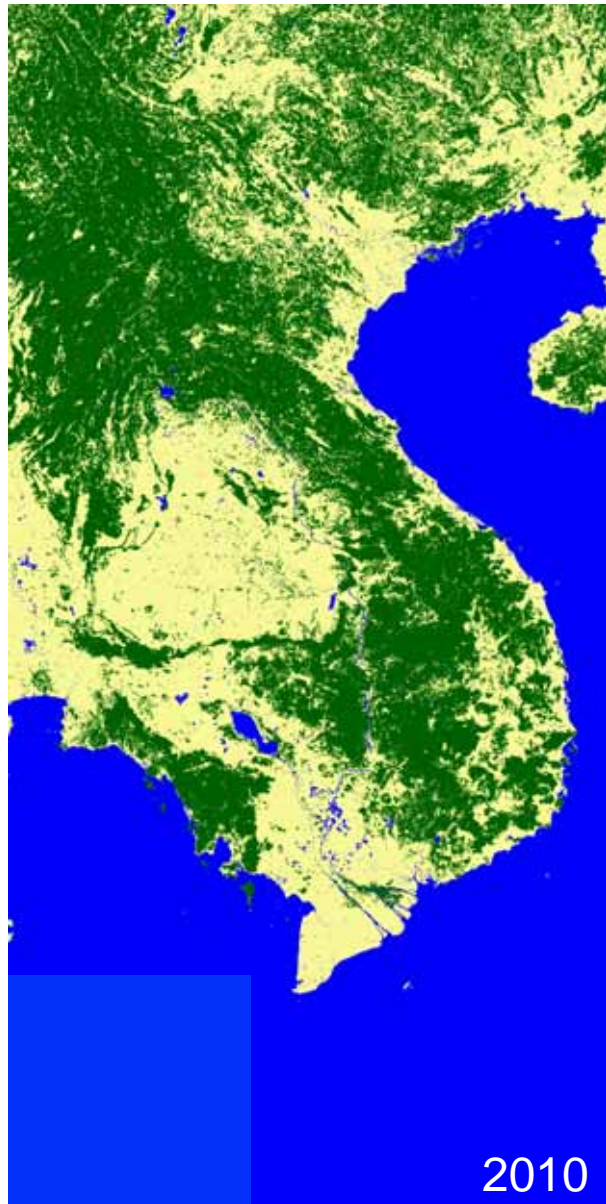
PALSAR-2 Global Mosaic In Vietnam

25m resolution global mosaic in Vietnam

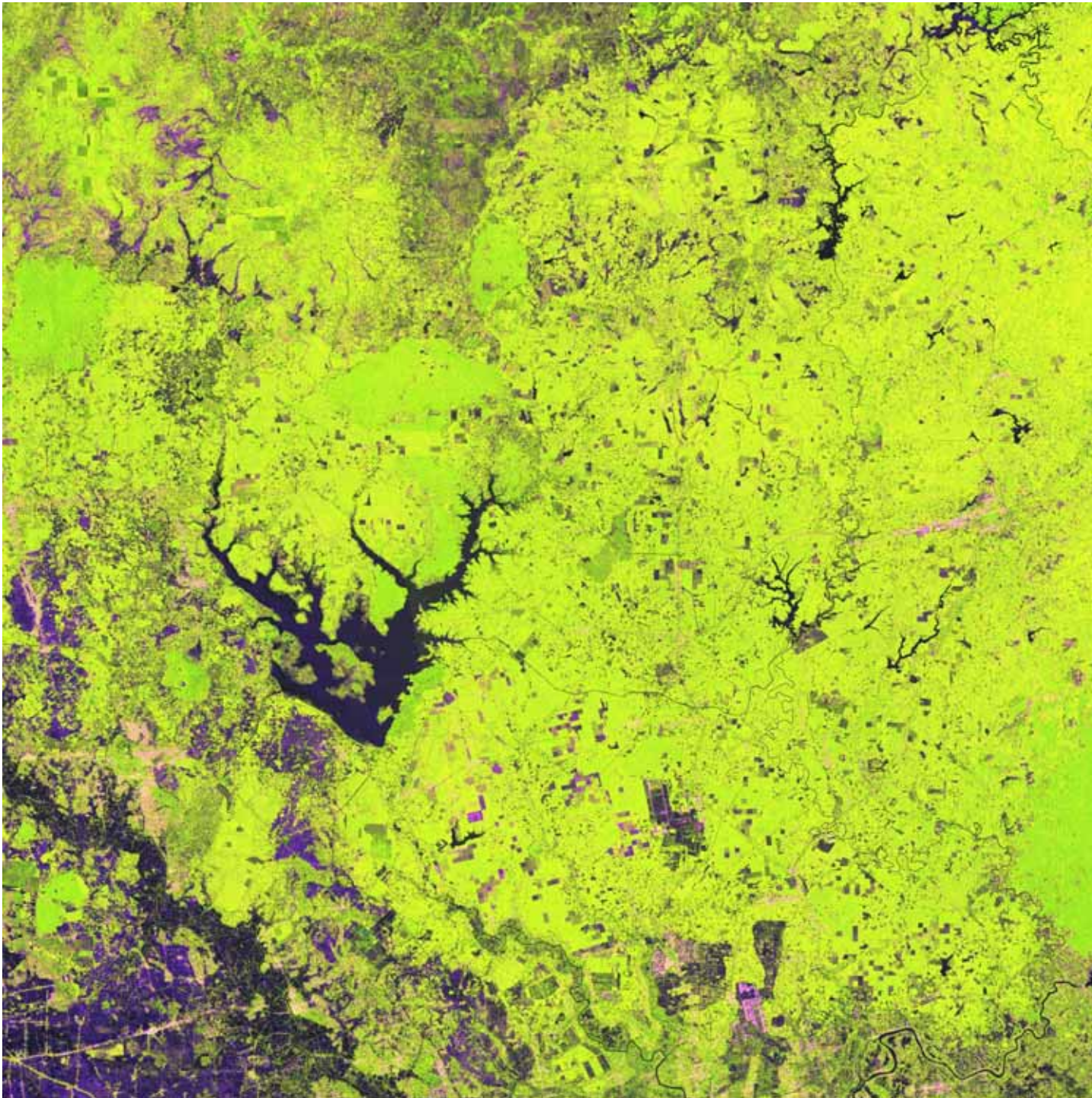


PALSAR-2 Global Mosaic In Vietnam

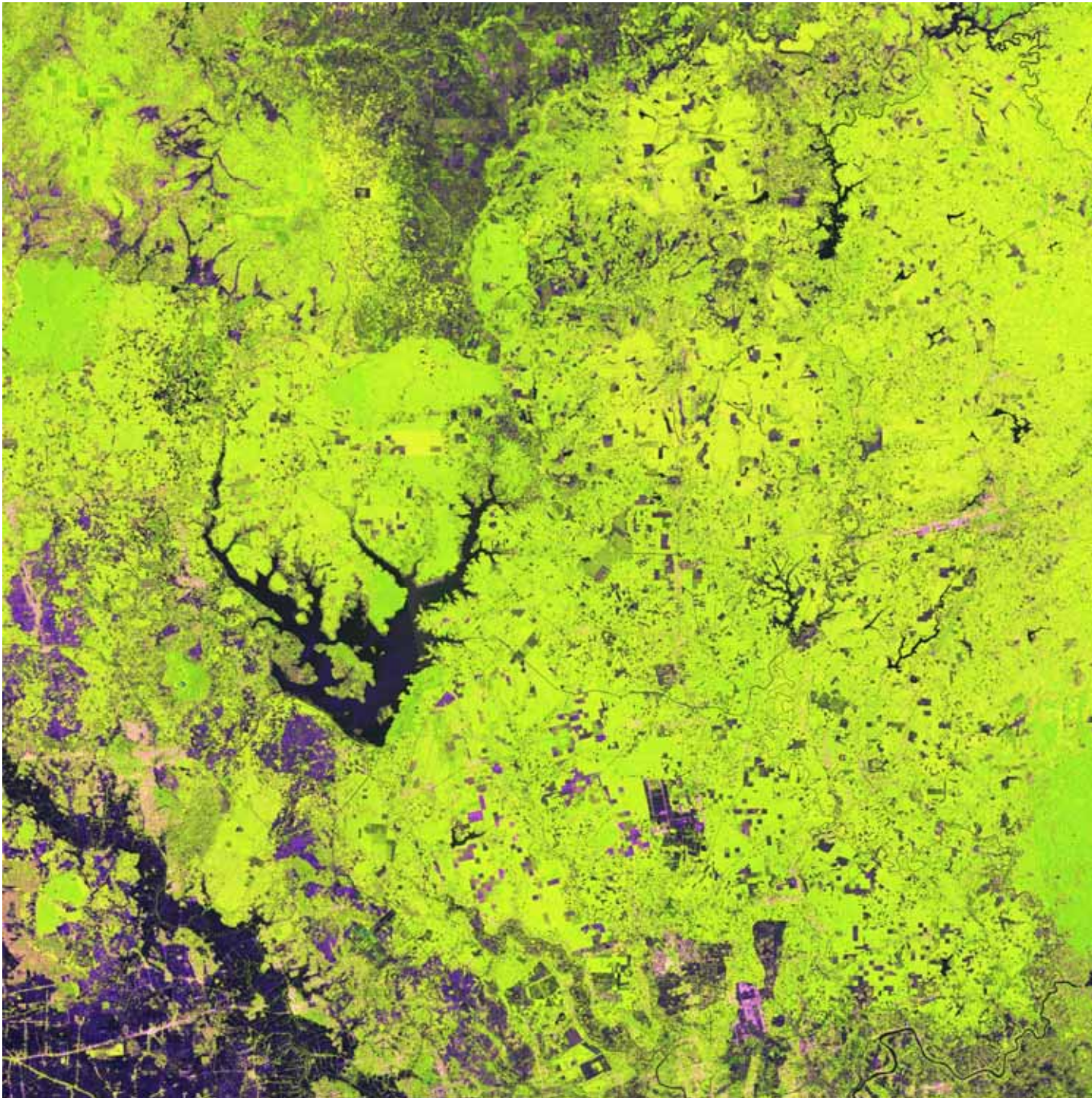
25m resolution Forest/Non-Forest map in Vietnam



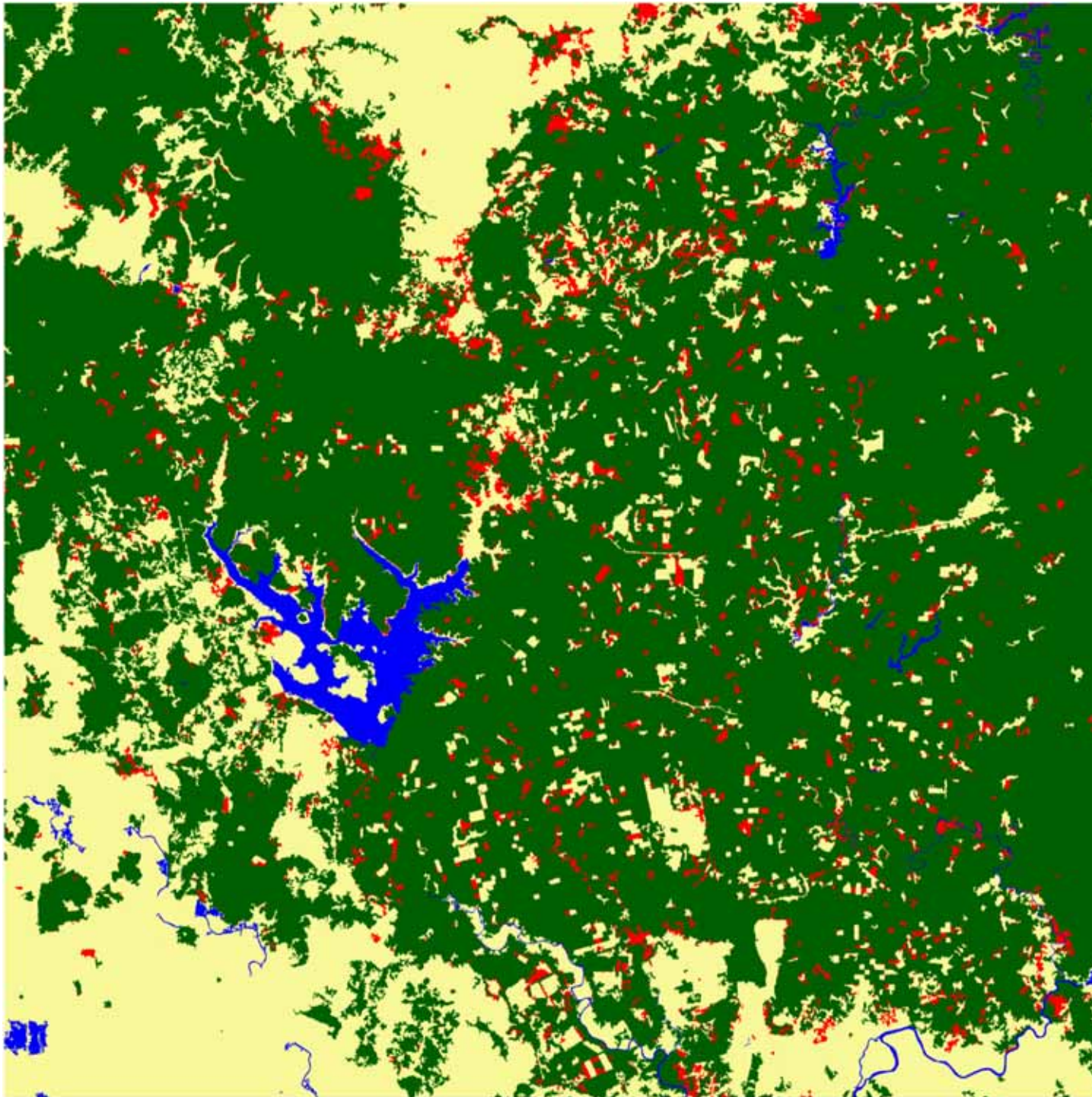
2015



2016



FNF and
update



Target date (Data Release)

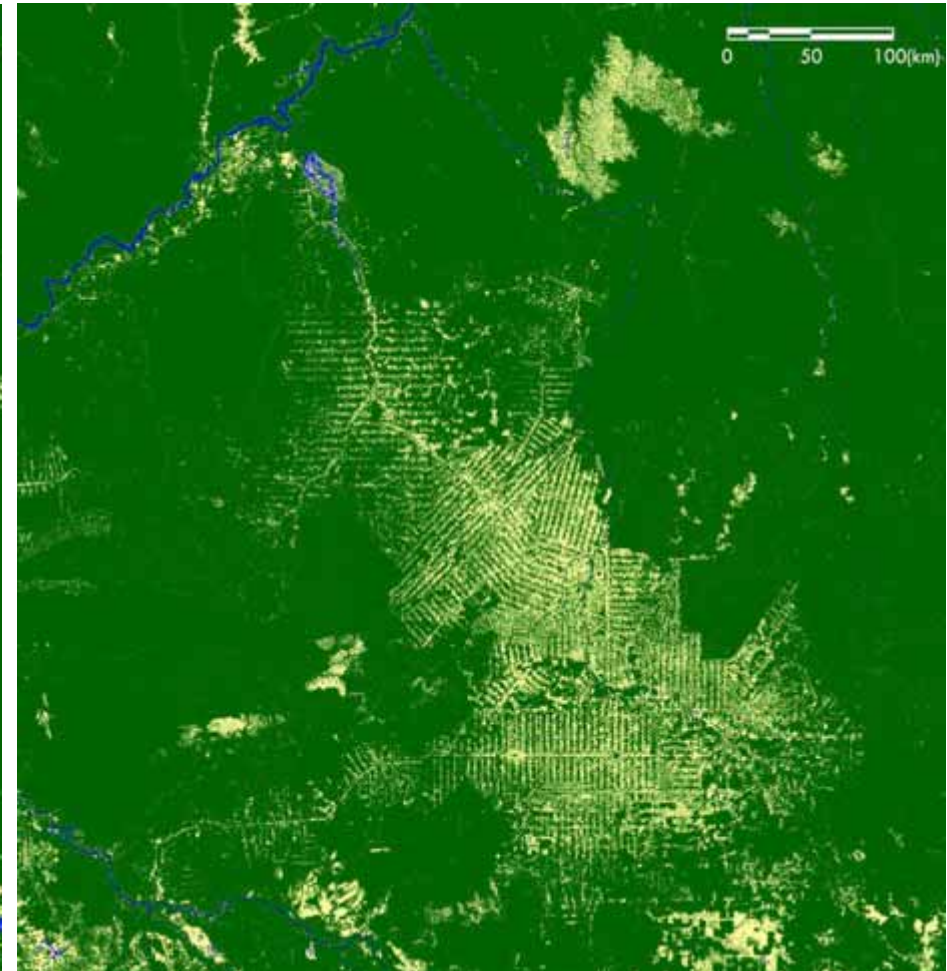
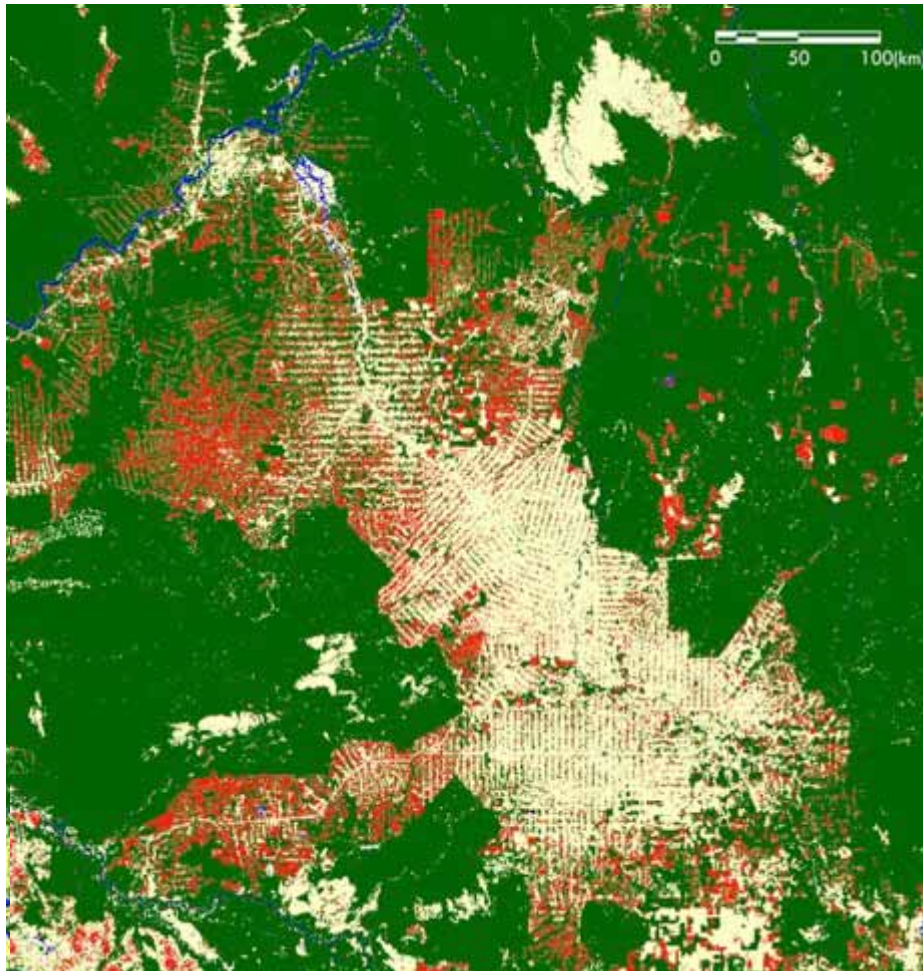
- April 25 2017
- Same way to the 2010 data set

Deforestation process from L-band SAR time series

2009年 (ALOS/PALSAR)

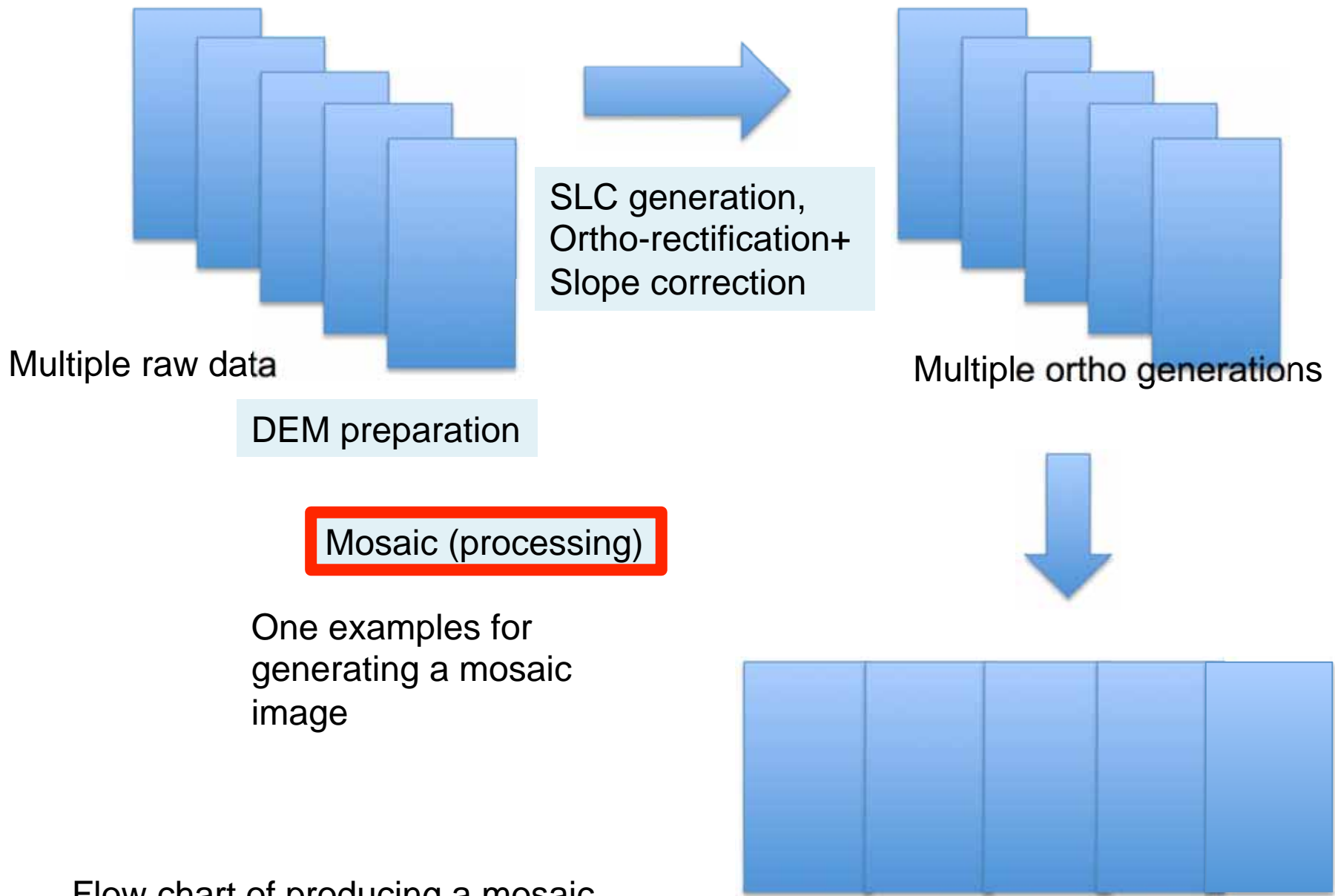
13年

1996年 (JERS-1/SAR)



Brazil Rondonia

Pre-processing (Multiple path processing)



Mosaic (processing)

One examples for generating a mosaic image

Flow chart of producing a mosaic

PALSAR/PALSAR-2 25 m global mosaic and FNF

Download: JAXA's SAR ARD (analysis ready Data), available from the site (http://www.eorc.jaxa.jp/ALOS/en/palsar_fnf/fnf_index.htm).

Contents

Satellite: JERS-1/SAR(1995), ALOS/PALSAR (2007-2010), and ALOS-2/PALSAR-2(2015-)

Frequency: annual summer data (June-September)

Data: gamma-zero and forest/non-forest (FNF), ancillary data (local incidence, mask, etc.), spaced in 25m (and averaged in 100m), ortho-rectified, and slope corrected,

Geometric accuracy: 10m

Expression: 2byte data(unsigned short integer)

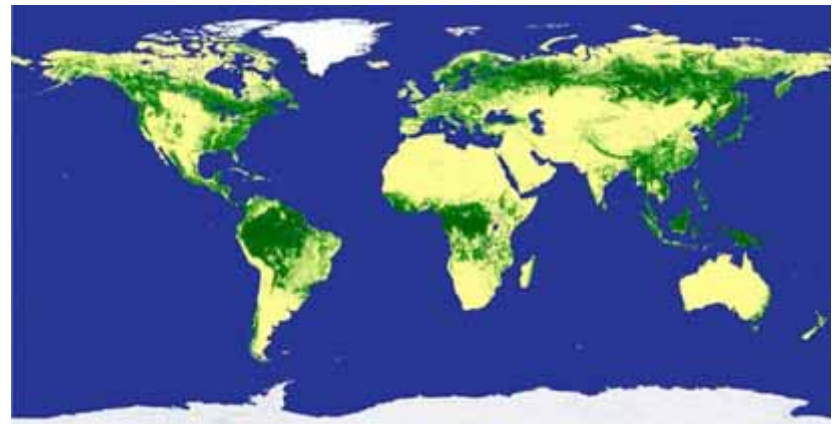
Area: Global Land

Down load unit: 1 degrees x 1 degrees

Access

Free of charge

Email registered



ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release

User Registration

www.eorc.jaxa.jp/ALOS/en/palsar_fnf/registration.htm

Taj Login info Google Gmail Gmail - HTML Yahoo! Mail ALOS@EORC JRC webmail K&C Wiki Ekitan Reading Tutor AUGC

New Global Forest/Non-Forest Maps

from ALOS PALSAR data (2007-2010)

User Registration

Please fill following items to download mosaics.
We will automatically send registration check e-mail to your registered address.

- * Users will be prompted to provide an Email address for user registration.
- * The registration is free.

If you have any question, problem with accessing URL, please contact
E-mail: aproject@jaxa.jp

1. Name:

2. E-Mail:

3. Affiliation:

4. Country: * select Country

5. Research Category: * select Category

http://www.eorc.jaxa.jp/ALOS/en/palsar_fnf/registration.htm

PALSAR Global Forest / Non-forest Map "2007"

www.eorc.jaxa.jp/ALOS/en/palsar_ff/data/2007/map.htm

Most Visited - Gmail soloEO-Mail 天球 Ekita KAC Wiki ALOS@EORC AUGC MUFG Bank 天球 Norda Swedbank/FR

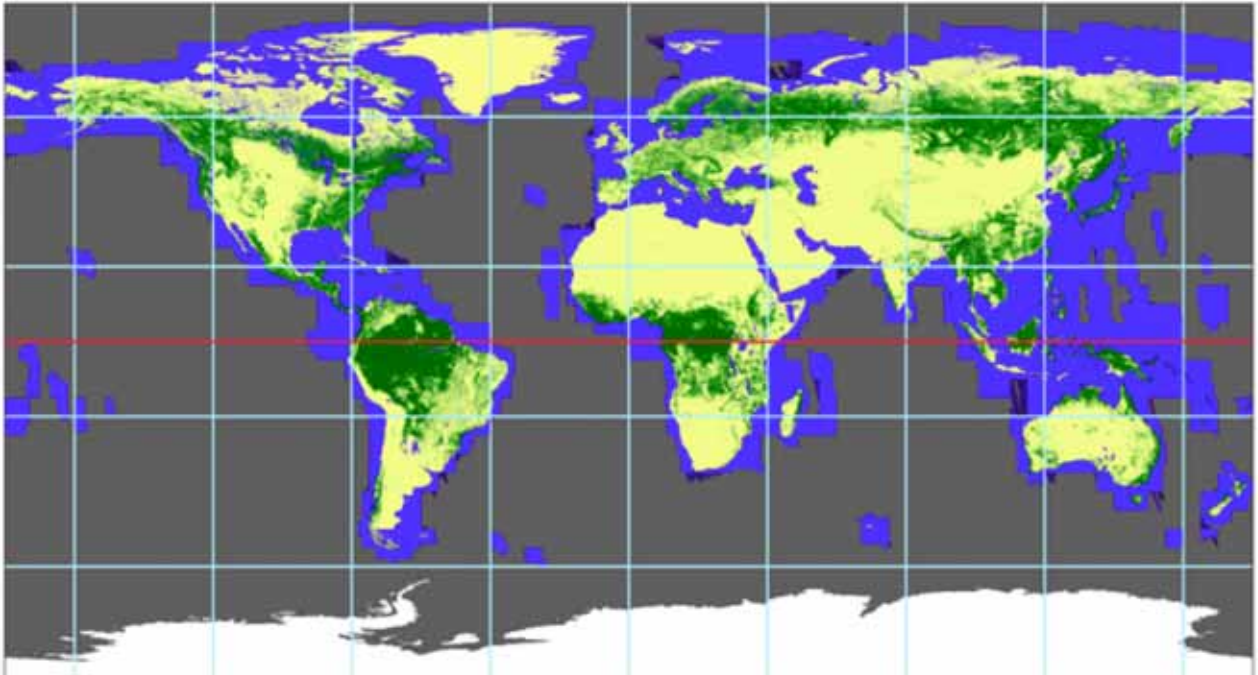
New Global Forest/Non-Forest Maps

from ALOS PALSAR data (2007-2010)


PALSAR Global Forest / Non-forest Map "2007"

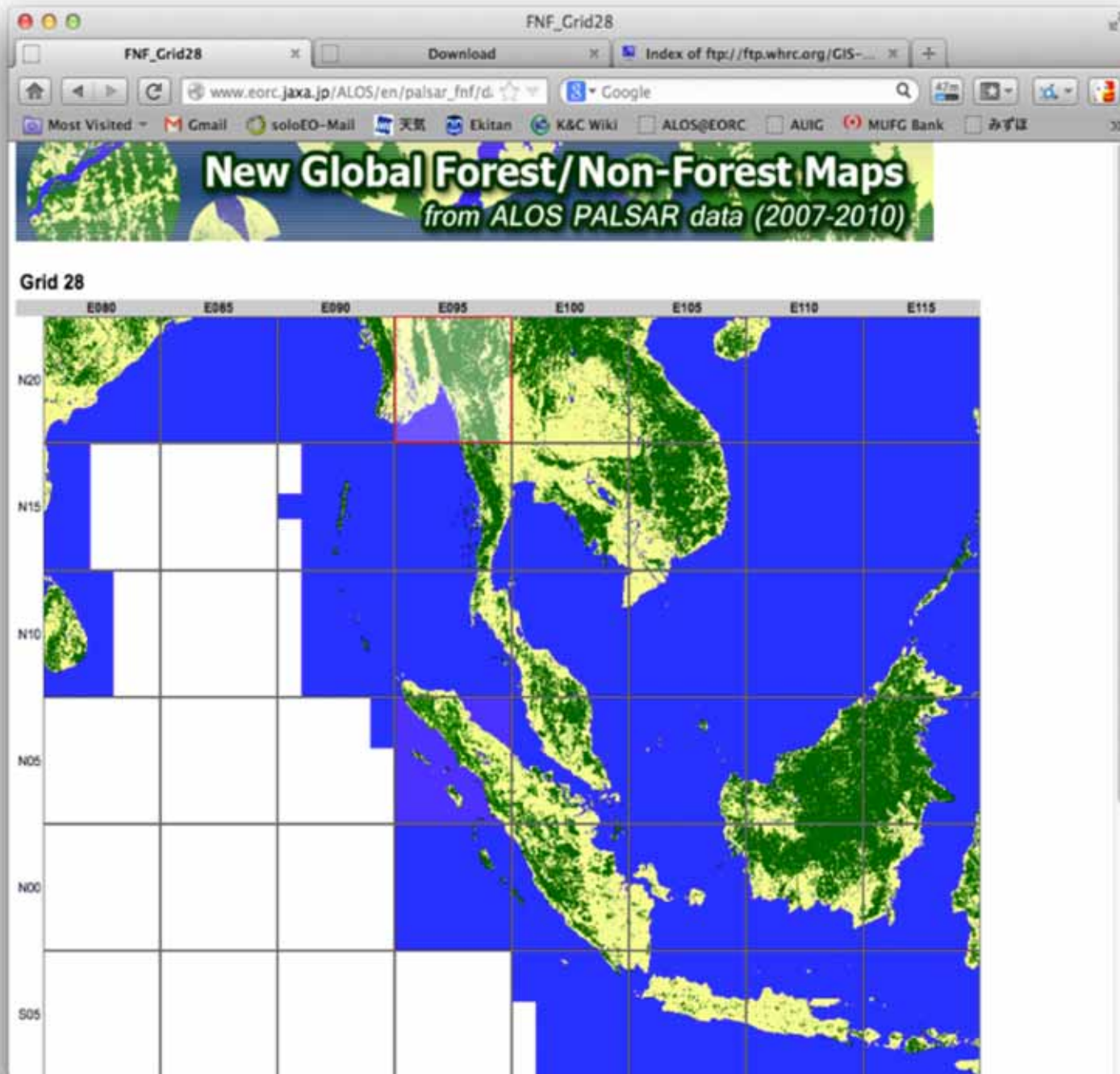
>> 2010 >> 2009 >> 2008

Please click the area which downloads a mosaic.



Earth Observation Research Center
Copyright©1997- JAXA EORC All rights reserved.





Mozilla Firefox

http://www.eorc...Grid28_fnf.htm Download Index of ftp://ftp.whrc.org/GIS-...

www.eorc.jaxa.jp/ALOS/en/palsar_fnf/d... Google

Most Visited - Gmail soloEO-Mail 天気 Ekitan K&C Wiki ALOS@EORC AUIG MUFG Bank みずほ

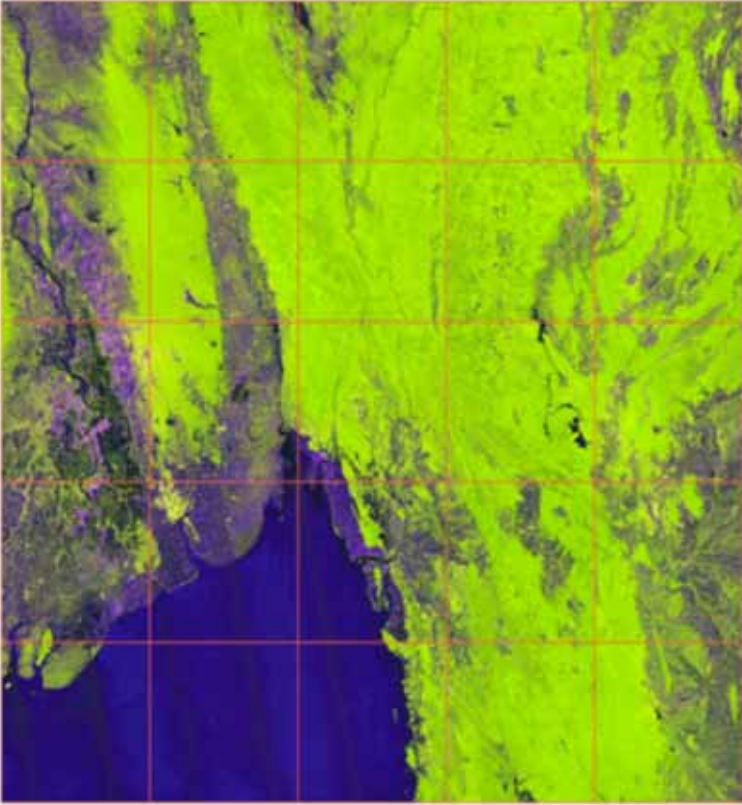
New Global Forest/Non-Forest Maps from ALOS PALSAR data (2007-2010)

2007 N20E095 Please do not use "Back" button of a browser.

Download for image data of this area (5 by 5)

- Forest / Non forest data
- HH / HV mosaic data

• Please click the tile to view and download the image data of "1 by 1".

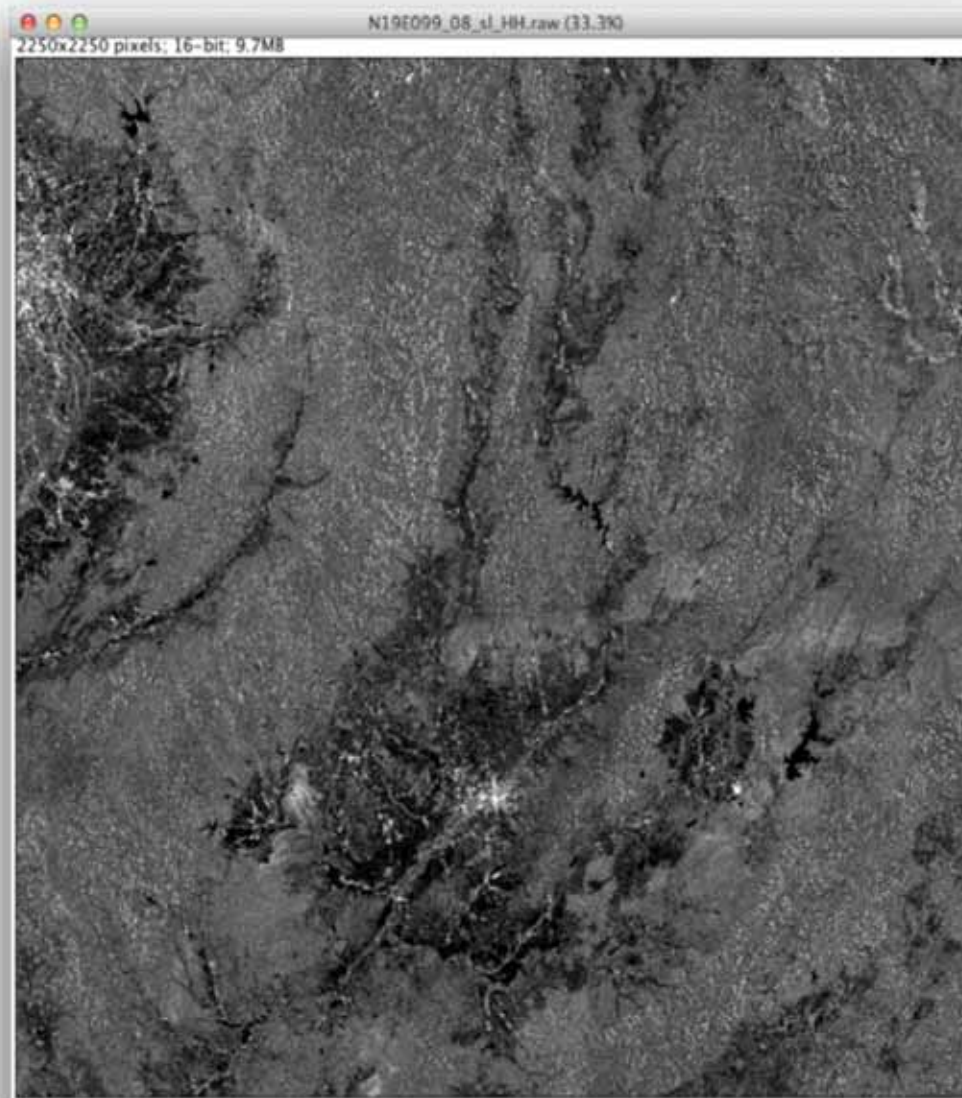


← Bulk download of data over 5°x 5° region (25 tiles 1°x1° each)

OR

← click on a tile on the grid to download the individual 1° tile

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release



Backscatter

(HH)

Radar

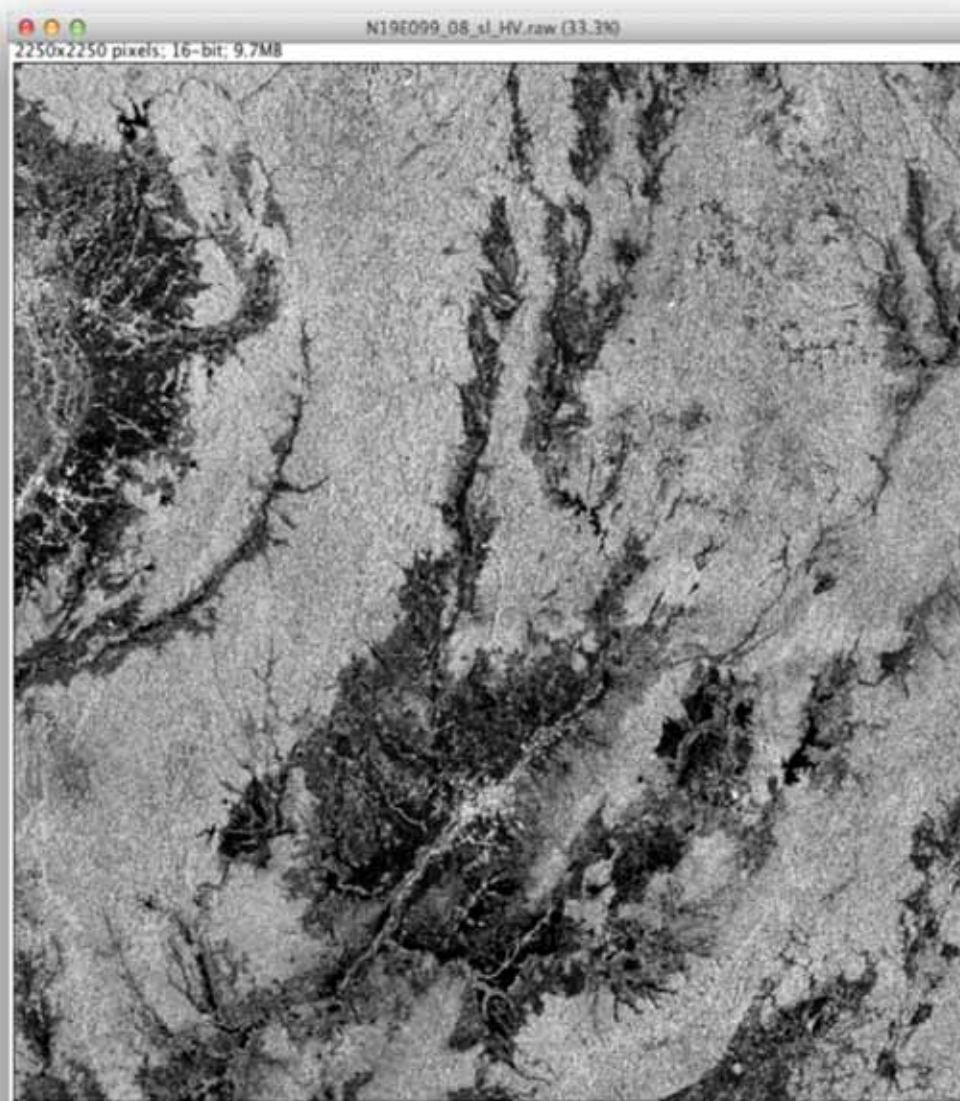
backscatter,
normalised for
incidence angle
($g^{\circ} = s^{\circ}/\cos\alpha_i$)

Radiometric and
geometric corr
for topography

GEOTIF header
information

16 bits (UINT)

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release



Backscatter

(HV)

Radar

backscatter

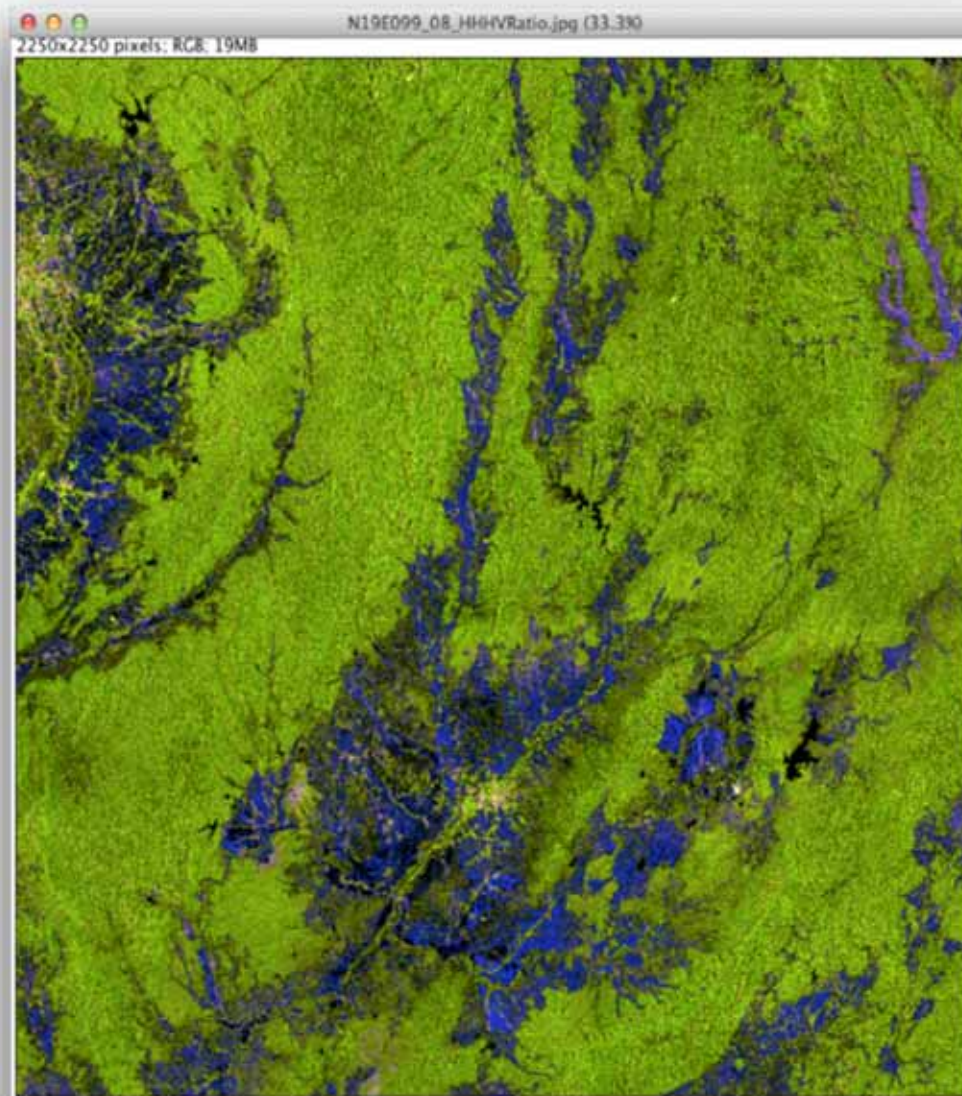
normalised for
incidence angle

($g^{\circ} = s^{\circ} / \cos q_i$)

Radiometric and
geometric corr
for topography

16 bits (UINT)

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release



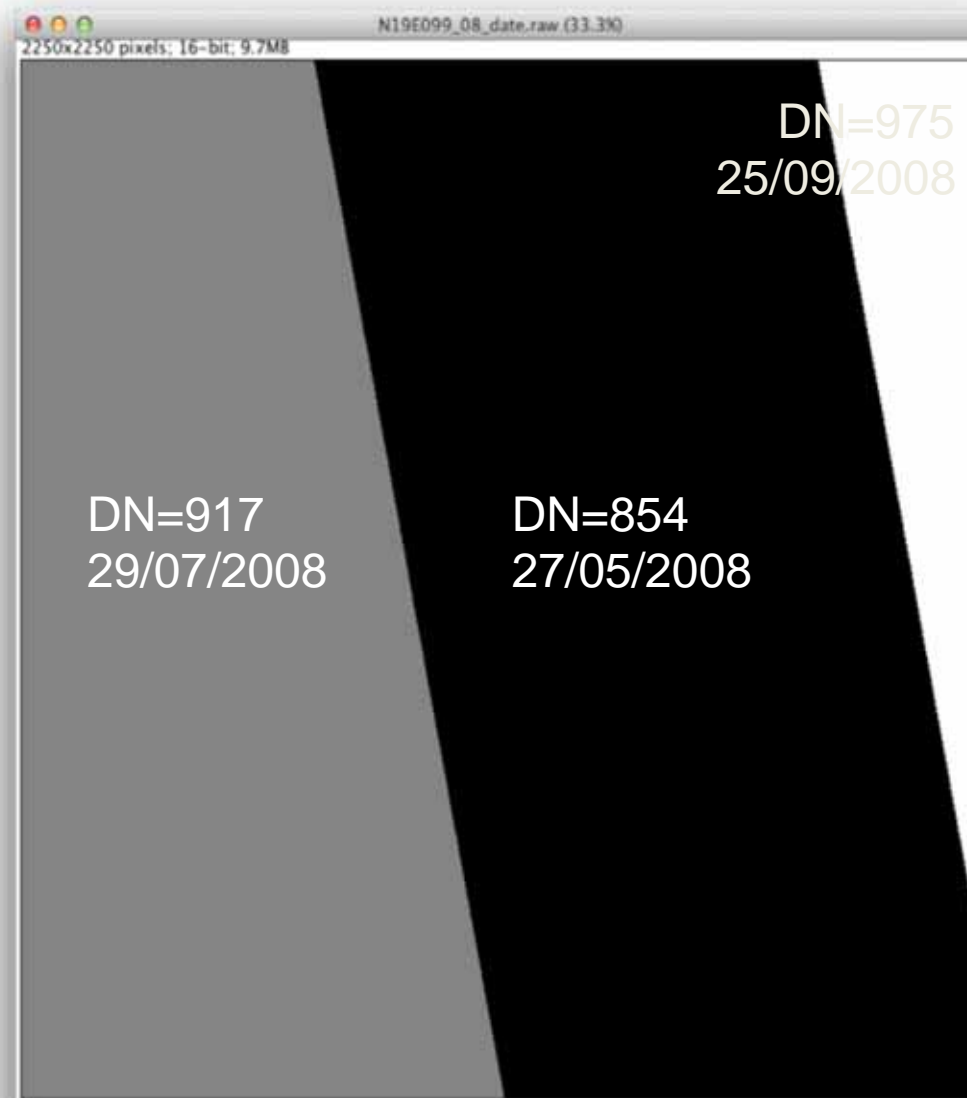
Backscatter
false-colour
composite

R: HH

G: HV

B: HH/HV

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release



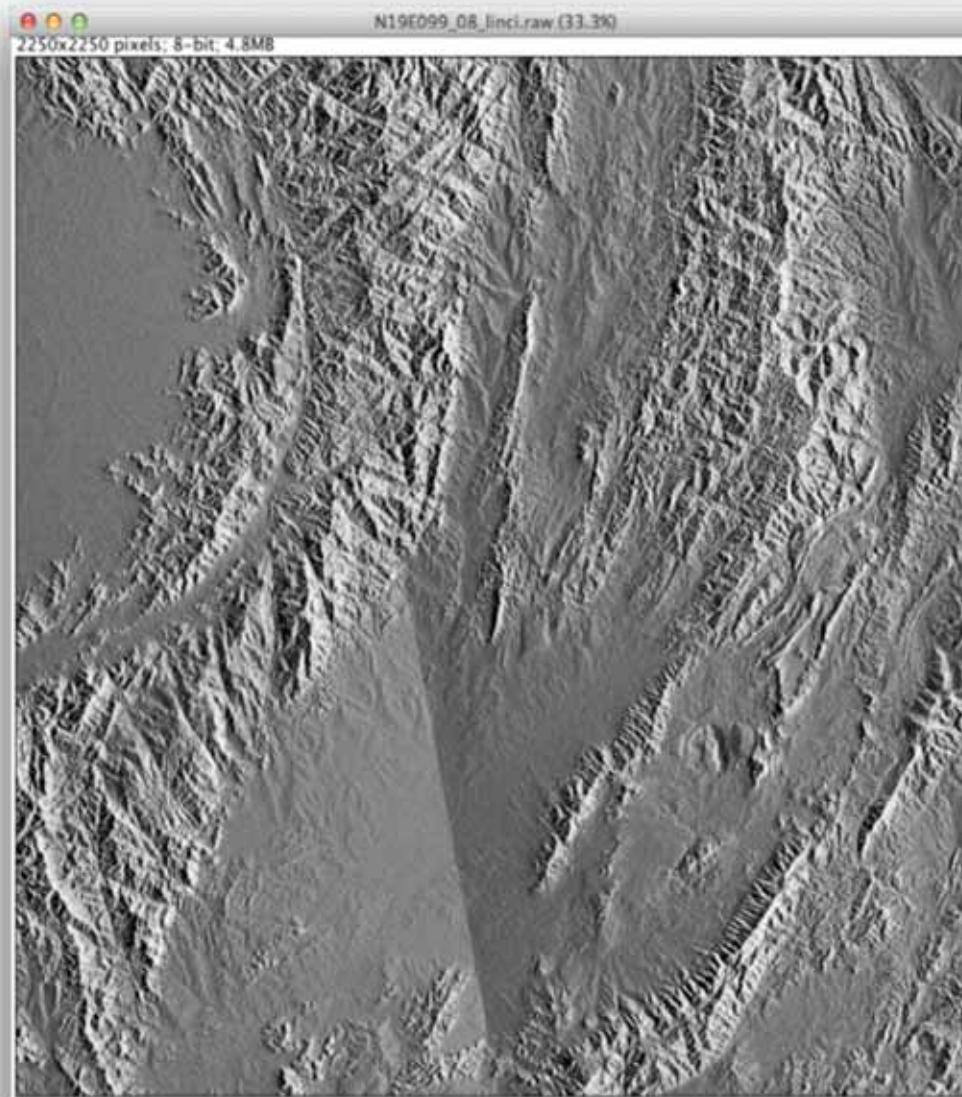
Observation date

Data layer showing the acquisition date for each pixel in the image:

Date = 24/1/2006 + DN

16 bits (UINT)

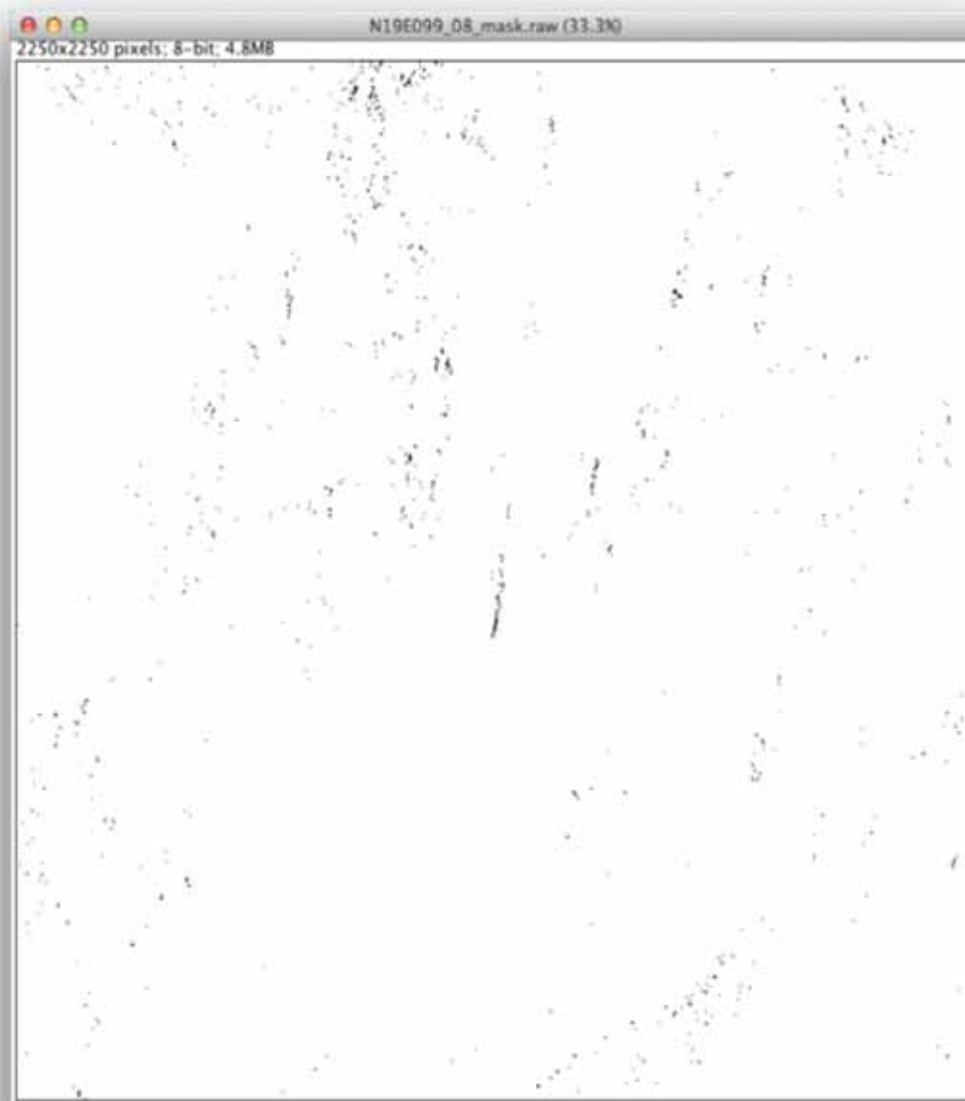
ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release



Incidence angle
Layer with local
incidence angle
for each pixel

16 bits (UINT)

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release

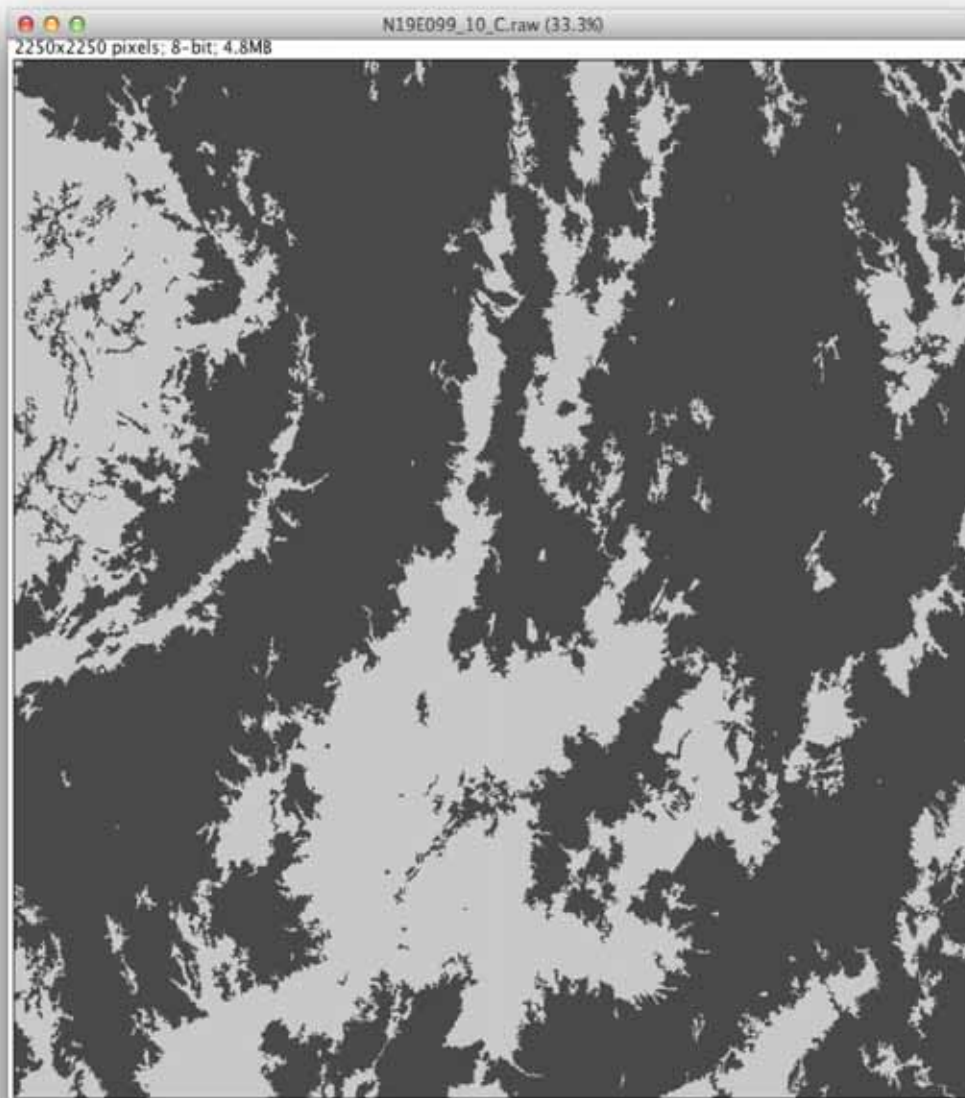


Mask data

Layer showing
ocean and no-
data areas:
layover,
shadow.

8 bits

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release

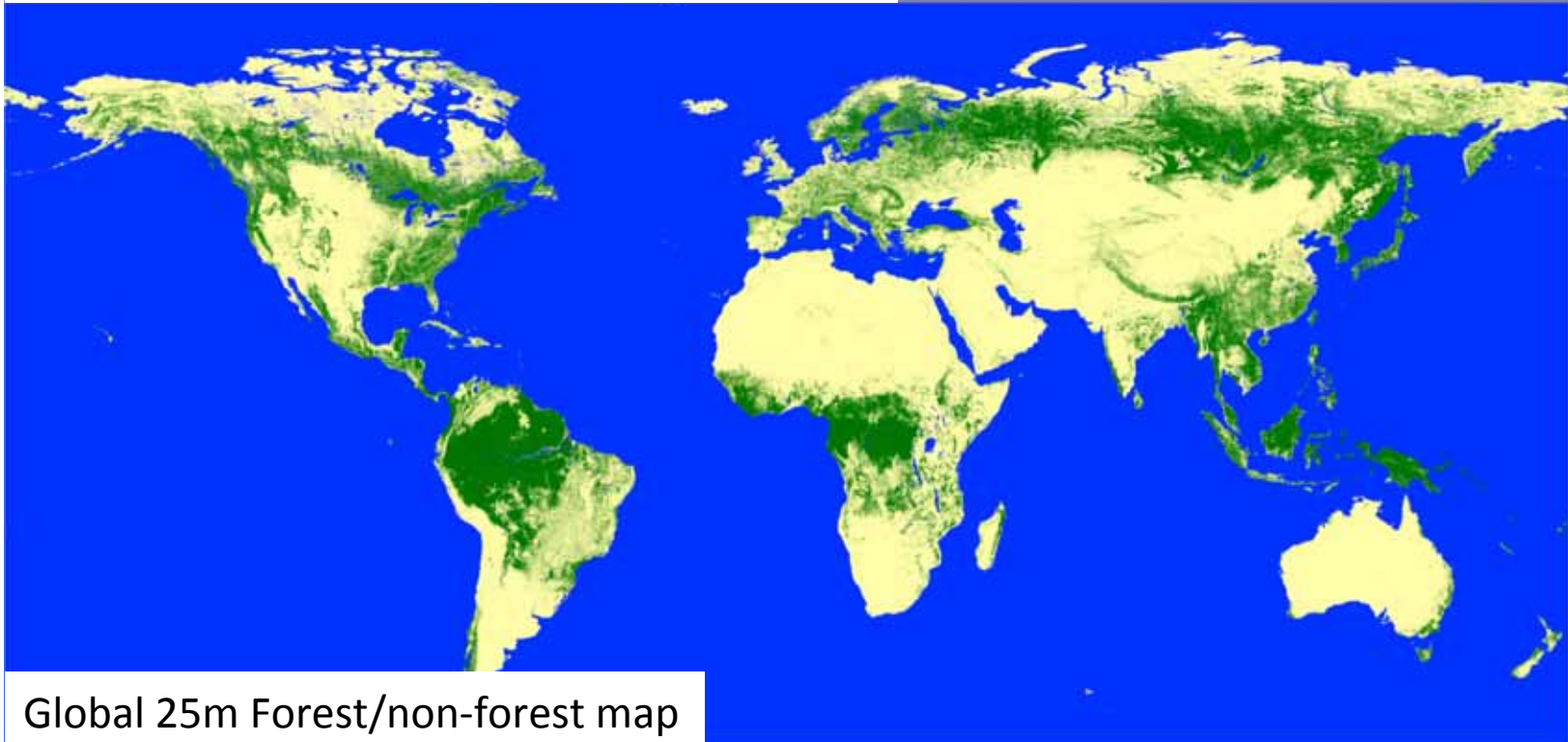
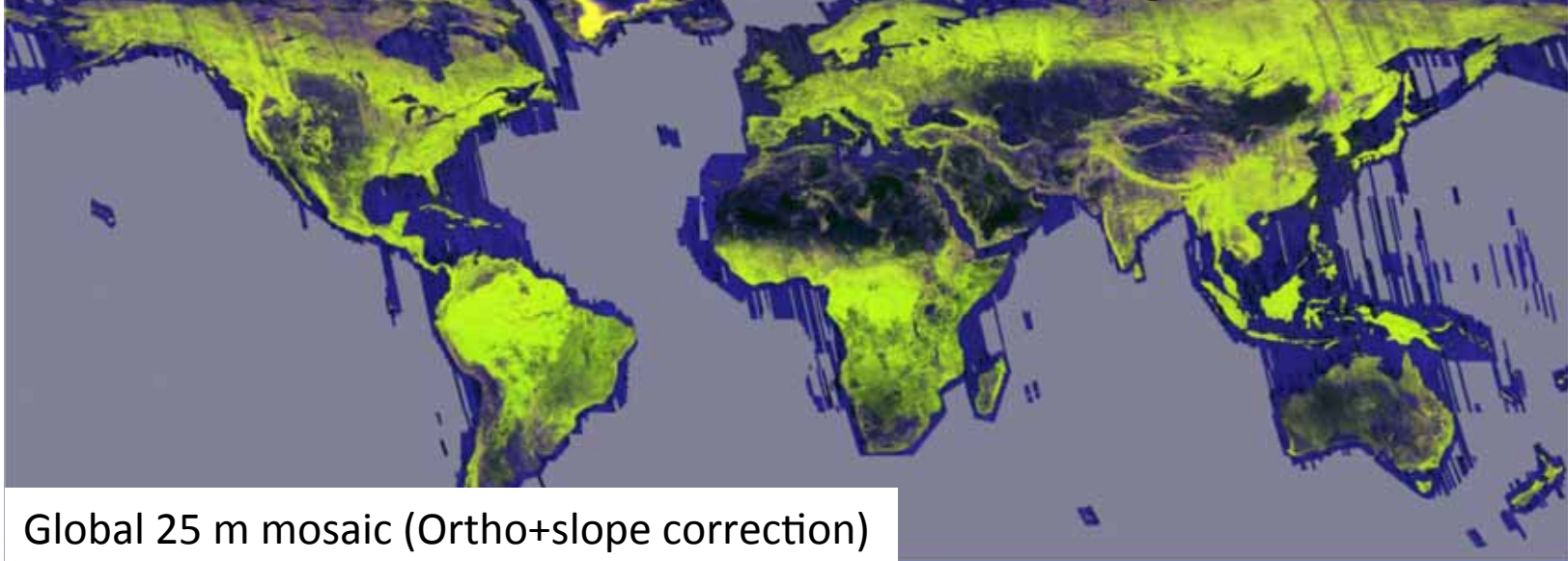


Forest/Non-Forest

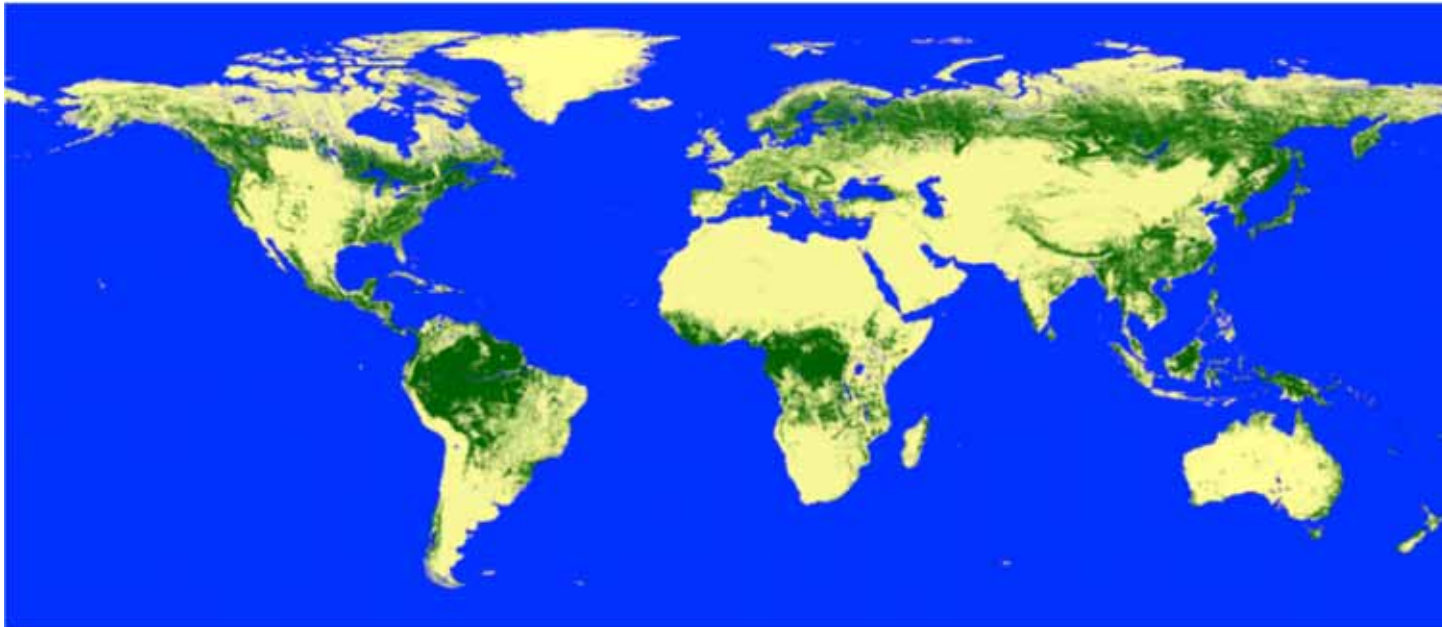
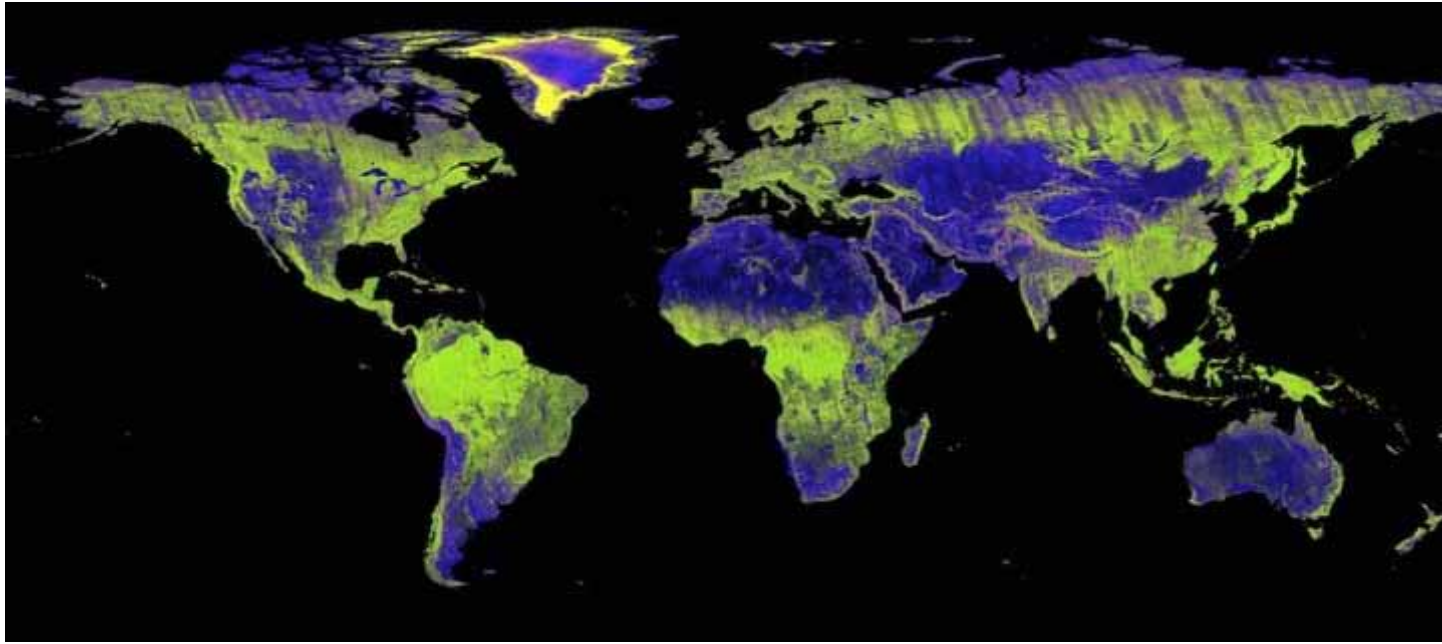
JAXA global classification (version 0)

8 bits

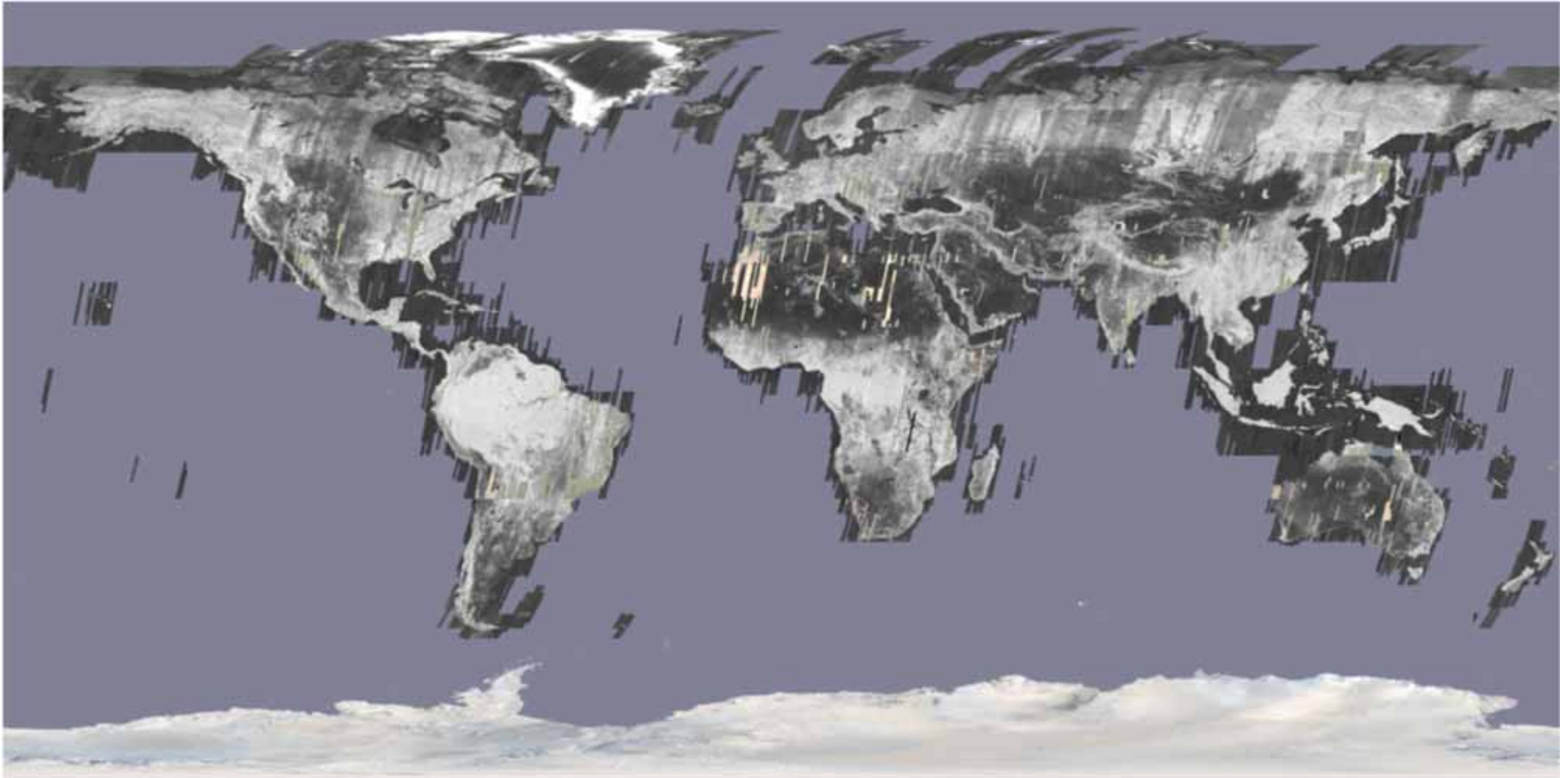
■ Environment – Global Forest Monitoring-ALOS/PALSAR



ALOS-2 PALSAR-2 Global Mosaic & Forest/Non-forest Map 2015 (25 m resolution, first generated)



JERS-1 SAR Mosaic data (HH)

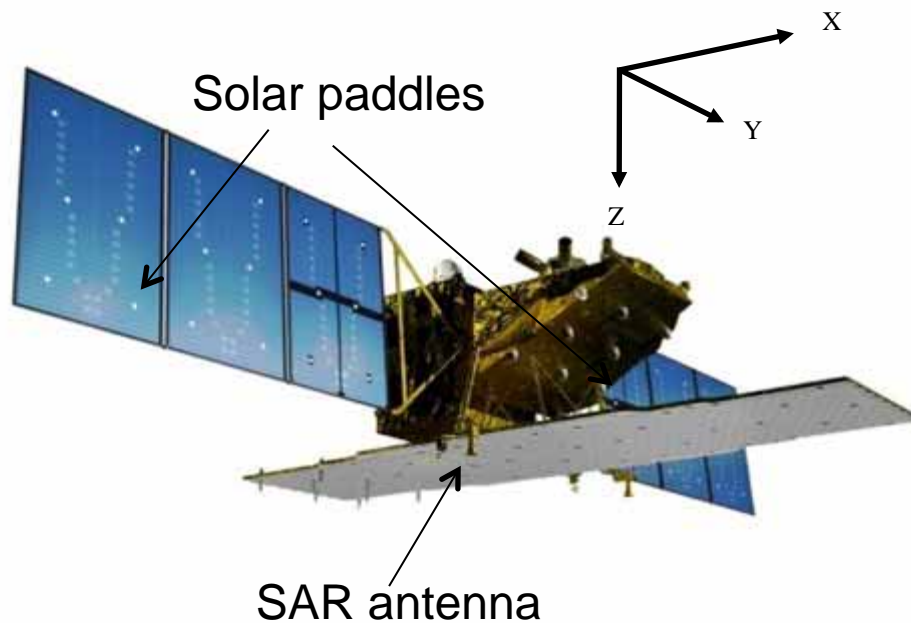


1992-1998

ALOS-2 Specifications

ALOS-2 satellite

- **Launch** : **May 24, 2014**
- **Orbit type** : Sun-synchronous
- **Altitude** : 628 km +/- 500 m (for reference orbit)
- **Revisit time** : 14 days
- **LSDN** : 12:00 +/- 15 min



ALOS-2

PALSAR-2

- L-band Synthetic Aperture Radar
- Active Phased Array Antenna type
 - two dimensions scan (range and azimuth)
- Antenna size : 3m(EI) x 10m(Az)
- Bandwidth : 14 – 84MHz
- Peak transmit Power : 5100W
- Observation swath : 25 – 490km
- Resolution : Range: 3 m to 100 m
Azimuth: 1 m to 100 m

Status of the forest after 2014?

ALOS PALSAR/PALSAR-2/JERS-1 25 m global mosaic data Open release

Product specifications and ancillary data

25m resolution data

Characteristic	Description
Unit	1 degree latitude-longitude geographical unit
Reference location	Latitude and longitude of north west corner
Coordinate system	Latitude-longitude coordinate
Spacing	0.8 arcsec unit providing the spacing at 25m
Resolution of SAR image	36 m (azimuth) × 20 m (range)
Number of pixels and lines	4500 pixels × 4500 lines
Data volume	40.5 MB (per tile)
Contents	Normalized radar cross-section, gamma-naught in HH and HV, mask information (ocean flag, effective area, void area, layover, shadowing), local incidence angle, total dates from the ALOS launch (1:30:Jan. 24, 2006:UTC)
No of tiles per year	2007: 27062, 2008: 27163, 2009: 27703, 2010: 27923

ALOS PALSAR/ALOS-2 PALSAR-2 100 m global mosaic data

FNF100

Characteristic	Description
Unit	10 degree latitude-longitude geographical unit
Reference location	Latitude and longitude of north west corner
Coordinate system	Latitude-longitude coordinate
Spacing	3.2 arcsec unit providing the spacing at 25m
Number of pixels and lines	1125 pixels × 1125 lines
Data volume	2.5 MB (per tile)
Contents	0: NoData 1: Water 2: Blank 3: Non-Forest 4: Forest (10-25%) 5: Forest (26-50%) 6: Forest (51-75%) 7: Forest (76-100%)
No of tiles per year	2007: 367, 2008: 369, 2009: 376, 2010: 370

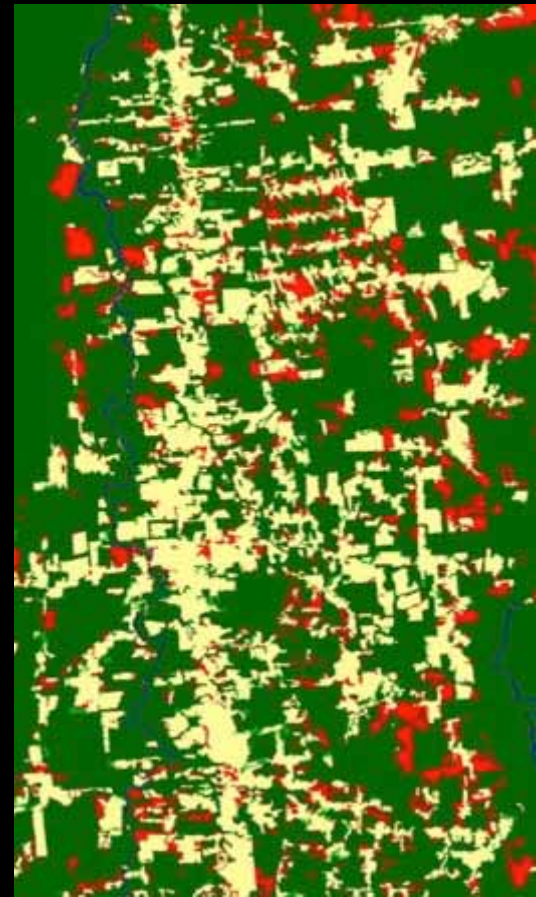
Deforestation examples



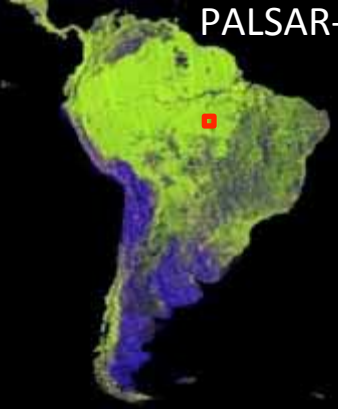
PALSAR-2 2015



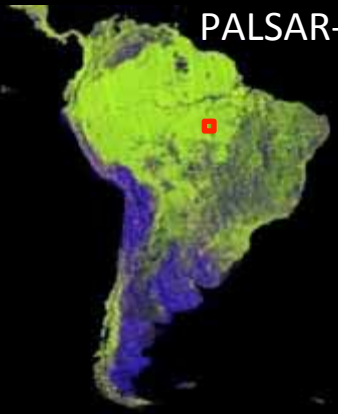
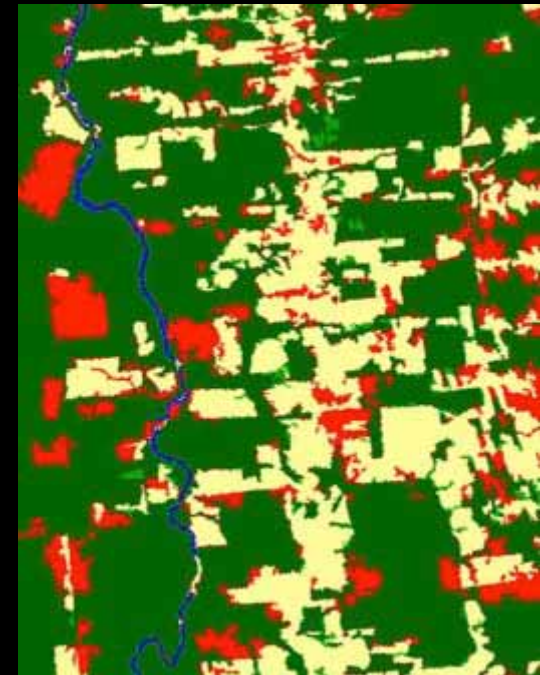
PALSAR 2010



- : Forest
- : Non-Forest
- : Deforestation
- : Reforestation



South America (Brazil)

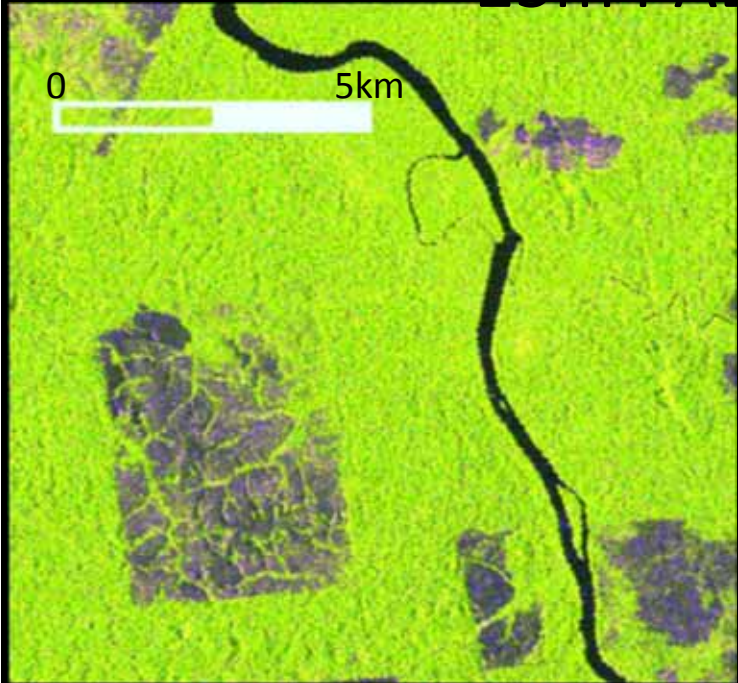


PALSAR-2 2015

PALSAR 2010

South America (Brazil)

- : Forest
- : Non-Forest
- : Deforestation
- : Reforestation



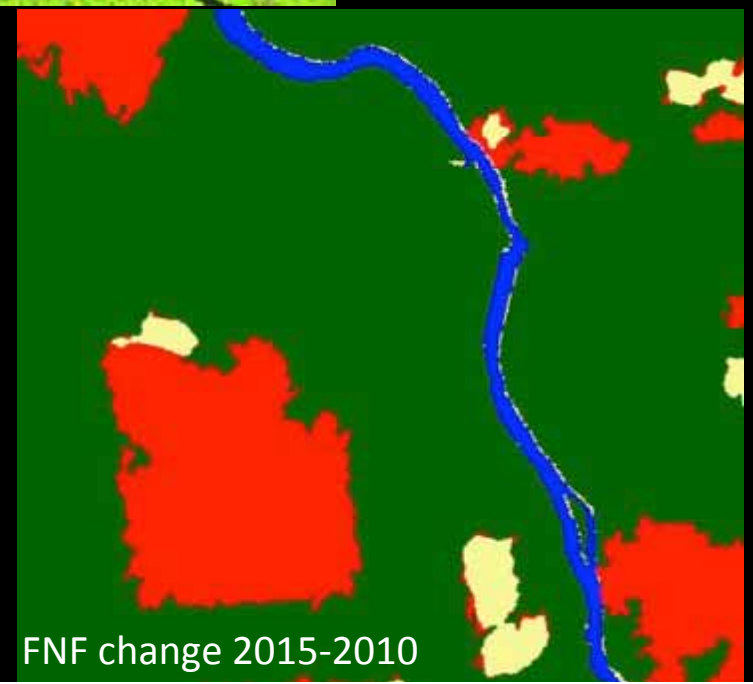
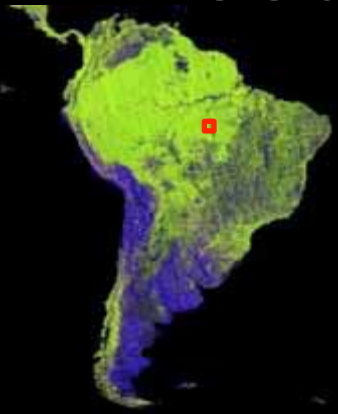
PALSAR-2 2015



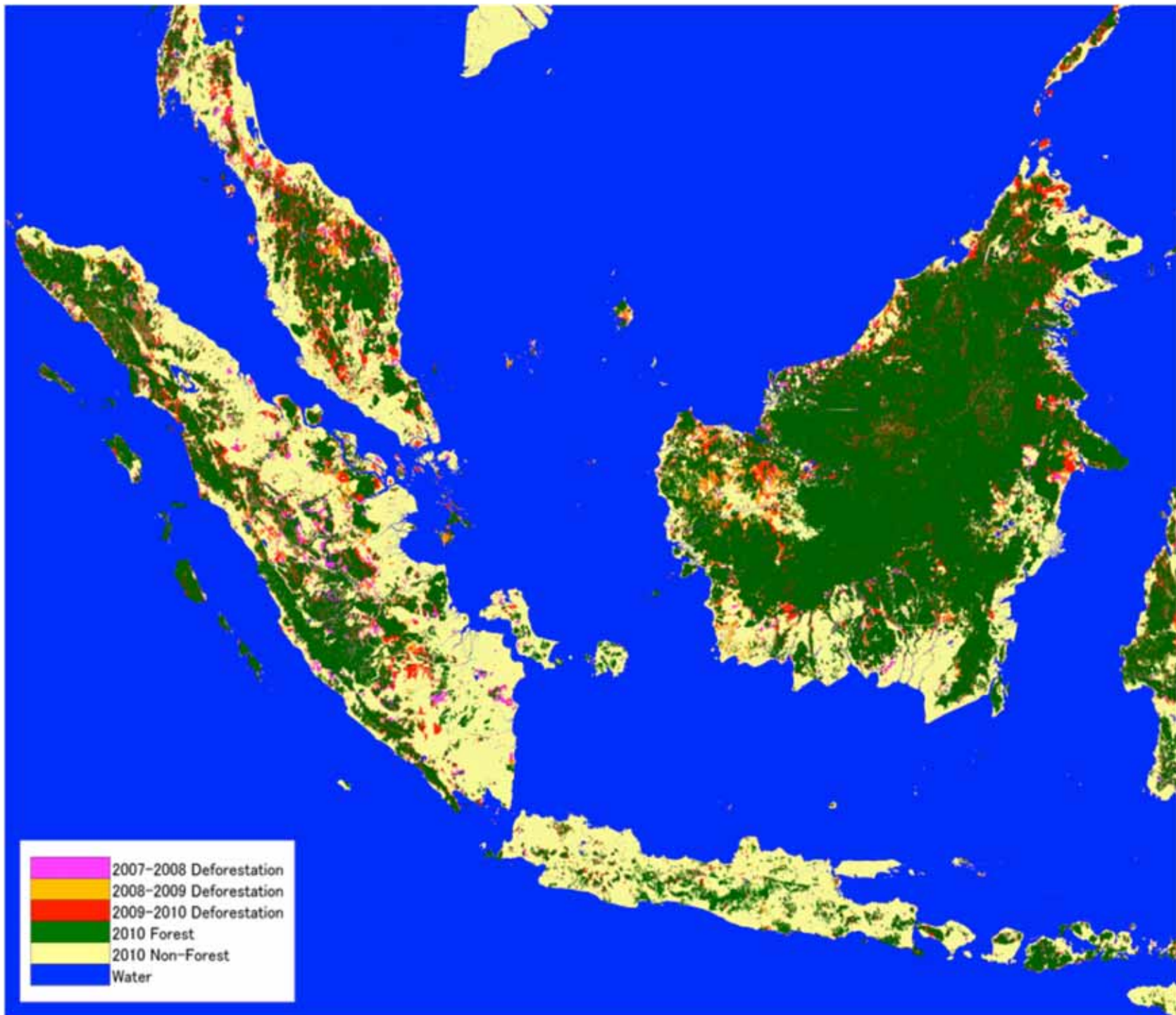
PALSAR 2010

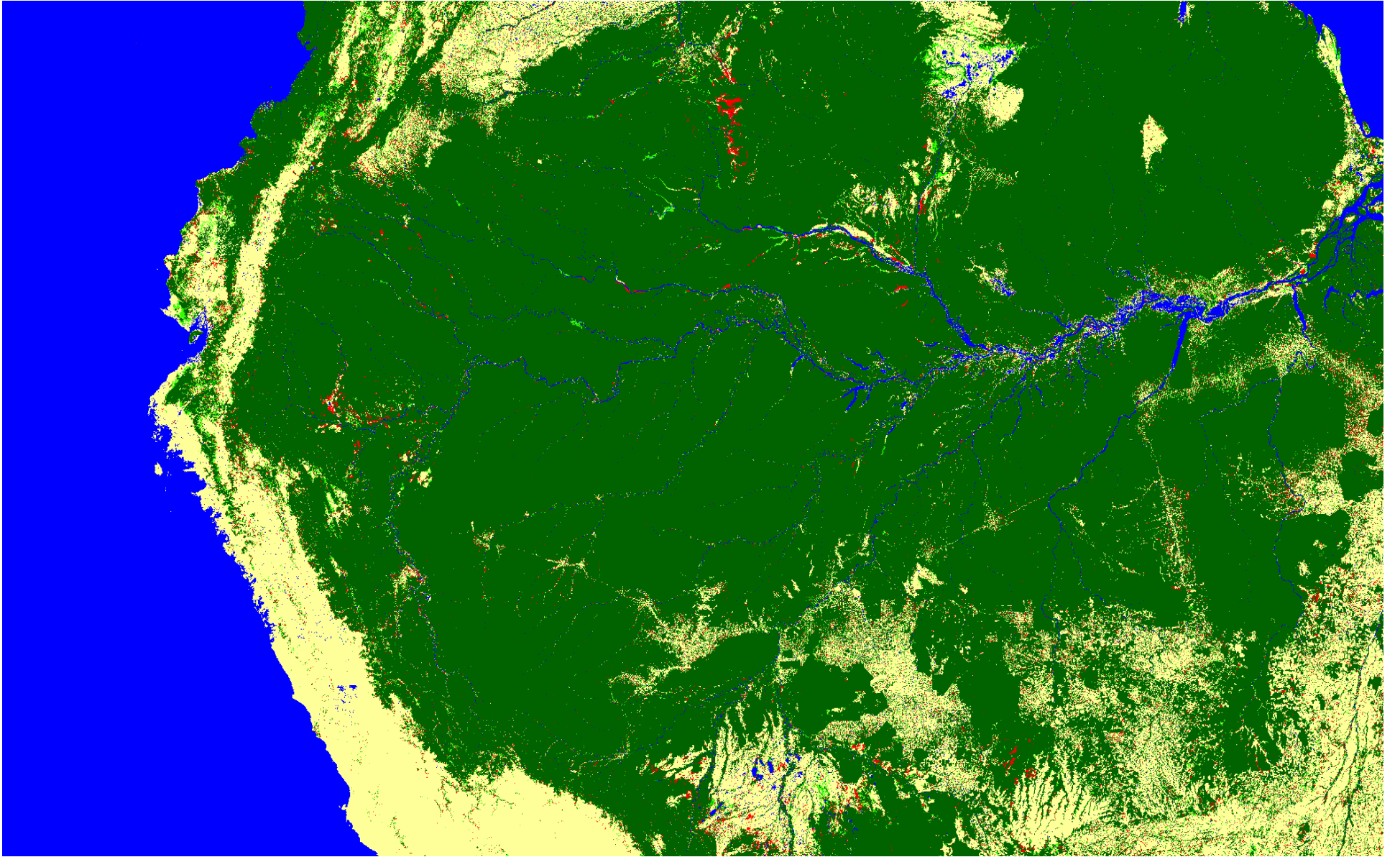
- : Forest
- : Non-Forest
- : Deforestation
- : Reforestation

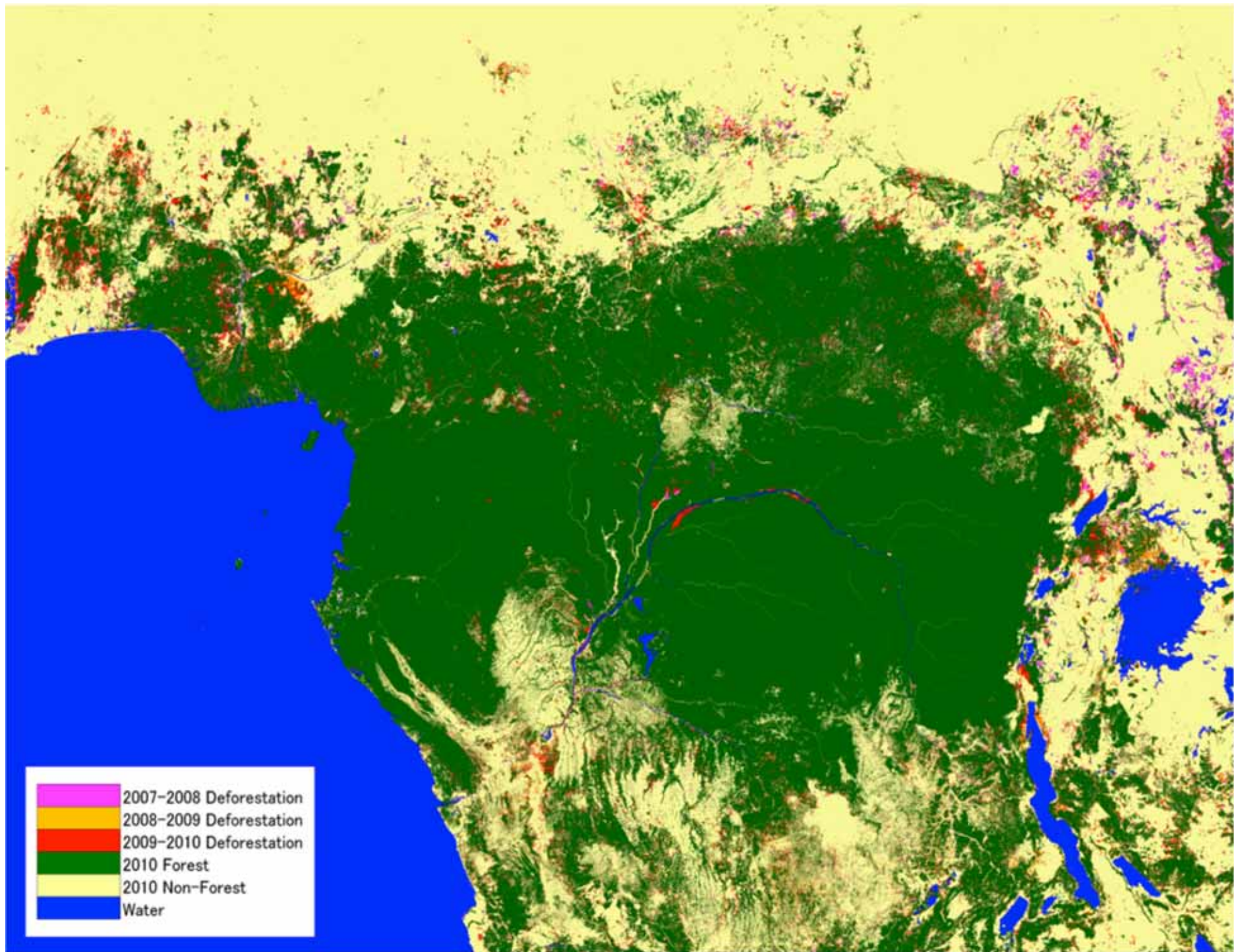
South America



FNF change 2015-2010







Conclusions

- ALOS-2/PALSAR-2 shows the excellent performance (high resolution, low noise level, polarimetry) as a high resolution L-band SAR to monitor the earth environment.
- ALOS-2/PALSAR-2 has started the forest observation already since Aug. 2014, and observed almost 90% of the forest region at least once.
- JAXA started to produce the 25/100m PALSAR-2 forest mosaic (HH-HV-HH/HV), browse mosaic, and open them to the public through JAXA/EORC Web.
- JAXA will continue to produce the high level products.