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

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SDCG-Ho chi min, Vietnam

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.
- 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

Old ver. of 2015 Mosaic (Africa)

Stripes in the old version of mosaic

2016 PALSAR-2 25m global mosaic

No stripe in the new version of mosaic.
PALSAR-2 Global Mosaic Updated

25m resolution Forest/Non-Forest Map

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

Accuracy:
2015: 85.85%
2016: 87.24%

<table>
<thead>
<tr>
<th></th>
<th>森林面積 (1000ha)</th>
<th>森林増減率 (2016年の2015年に対する)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
<td>2016</td>
</tr>
<tr>
<td>Indonesia</td>
<td>119316</td>
<td>117256</td>
</tr>
<tr>
<td>Congo (RDC)</td>
<td>178887</td>
<td>179178</td>
</tr>
</tbody>
</table>
PALSAR-2 Global Mosaic In Vietnam

25m resolution global mosaic in Vietnam

Reduced the stripes between path.

New ver. Of 2015

Old ver. Of 2015
PALSAR-2 Global Mosaic In Vietnam

25m resolution global mosaic in Vietnam
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
One examples for generating a mosaic image

Pre-processing (Multiple path processing)

Multiple raw data

DEM preparation

SLC generation, Ortho-rectification+ Slope correction

Multiple ortho generations

Mosaic (processing)

Flow chart of producing a mosaic
PALSAR/PALSAR-2 25 m global mosaic and FNF


Contents


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

Download 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

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

Grid 28
Bulk download of data over 5°×5° region (25 tiles 1°×1° each)

OR

click on a tile on the grid to download the individual 1° tile
Backscatter (HH)
Radar backscatter, normalised for incidence angle ($g^o = s^o / \cos q_i$)
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 \( g^o = s^o / \cos \theta_i \)

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
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

Global 25 m mosaic (Ortho+slope correction)

Global 25m Forest/non-forest map
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

SAR antenna

Solar paddles

PALSAR-2
- L-band Synthetic Aperture Radar
- Active Phased Array Antenna type
- Two dimensions scan (range and azimuth)
- Antenna size: 3m(El) 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

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>1 degree latitude-longitude geographical unit</td>
</tr>
<tr>
<td>Reference location</td>
<td>Latitude and longitude of north west corner</td>
</tr>
<tr>
<td>Coordinate system</td>
<td>Latitude-longitude coordinate</td>
</tr>
<tr>
<td>Spacing</td>
<td>0.8 arcsec unit providing the spacing at 25m</td>
</tr>
<tr>
<td>Resolution of SAR image</td>
<td>36 m (azimuth) × 20 m (range)</td>
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<tr>
<td>Number of pixels and lines</td>
<td>4500 pixels × 4500 lines</td>
</tr>
<tr>
<td>Data volume</td>
<td>40.5 MB (per tile)</td>
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<tr>
<td>Contents</td>
<td>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)</td>
</tr>
</tbody>
</table>
### ALOS PALSAR/ALOS-2 PALSAR-2 100 m global mosaic data

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
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</thead>
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<td>Unit</td>
<td>10 degree latitude-longitude geographical unit</td>
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<tr>
<td>Reference location</td>
<td>Latitude and longitude of north west corner</td>
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<tr>
<td>Coordinate system</td>
<td>Latitude-longitude coordinate</td>
</tr>
<tr>
<td>Spacing</td>
<td>3.2 arcsec unit providing the spacing at 25m</td>
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<tr>
<td>Number of pixels and lines</td>
<td>1125 pixels × 1125 lines</td>
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<tr>
<td>Data volume</td>
<td>2.5 MB (per tile)</td>
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<tr>
<td>Contents</td>
<td>0: NoData</td>
</tr>
<tr>
<td></td>
<td>1: Water</td>
</tr>
<tr>
<td></td>
<td>2: Blank</td>
</tr>
<tr>
<td></td>
<td>3: Non-Forest</td>
</tr>
<tr>
<td></td>
<td>4: Forest (10-25%)</td>
</tr>
<tr>
<td></td>
<td>5: Forest (26-50%)</td>
</tr>
<tr>
<td></td>
<td>6: Forest (51-75%)</td>
</tr>
<tr>
<td></td>
<td>7: Forest (76-100%)</td>
</tr>
</tbody>
</table>
Deforestation examples
South America (Brazil)
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.