

PALSAR-2 Global Land Cover Classification

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URL: <https://www.jss.jaxa.jp/en/ar/e2022/20857/>

● Responsible Representative

Shinichi Sobue

● Contact Information

Sota Hirayama(hirayama.sota@jaxa.jp)

● Members

Naoyoshi Hirade, Sota Hirayama, Koichi Imamura

● Abstract

Focusing on the Asian region where ALOS-2/PALSAR-2 ScanSAR data is abundant, we have developed a prototype high-resolution land-cover classification map for the Asian region. The classification is based on convolutional neural networks and uses the SACCLASS2 method, which specializes in processing time-series data, and utilizes not only ALOS-2/PALSAR-2 data but also JAXA earth observation satellite data such as GCOM-C/SGLI and GsMaP. The overall accuracy of 86% was achieved.

Ref. URL: https://www.eorc.jaxa.jp/ALOS/en/dataset/lulc_e.htm

● Reasons and benefits of using JAXA Supercomputer System

Accelerate machine learning use and large-scale data processing

● Achievements of the Year

The use of JSS3 enabled the classification process, which originally took several days to several months, to be performed in about one day. This enabled us to conduct many classification trials, and led to the improvement of the accuracy of the land cover map.

No	特徴量		正規化手法
1	ALOS-2/PALSAR-2 FBD	HH	DNを後方散乱係数 ($\gamma_s=10\log_{10}(DN^2)-83.0$ dB) にしてから、
2		HV	-40未満を-40、0超を0として、
3		HH-HV/HH+HV	40を足して40で割る
4		Texture	4000($\mu+3\sigma+\alpha$)超を 4000として、4000で割る
5		局所入射角	90超を90として、90で割る
6	ALOS-2/PALSAR-2 WBD	HH	DNを後方散乱係数 ($\gamma_s=10\log_{10}(DN^2)-83.0$ dB) にしてから、
7		HV	-40未満を-40、0超を0として、
8		HH-HV/HH+HV	40を足して40で割る
9		Texture	4000($\mu+3\sigma+\alpha$)超を 4000として、4000で割る
10		局所入射角	90超を90として、90で割る
11	GCOM-C/SGLI	地表面温度	$x'_i = \frac{x_i - \min(x)}{\max(x) - \min(x)} \quad (i=1 \dots n)$ <small>観測値_{観測} - 最小値(全観測値) = 最大値(全観測値) - 最小値(全観測値)</small>
12		短波放射量	
13		NDVI	
14		SWIR	
15	GSMaP	降水量	
16	AW3D	DSM	
17	Suomi NPP	夜間光	100超を100として、100で割る
18	経度		$x'_i = \frac{x_i - \min(x)}{\max(x) - \min(x)} \quad (i=1 \dots n)$ <small>観測値_{観測} - 最小値(全観測値) = 最大値(全観測値) - 最小値(全観測値)</small>
19	緯度		

Fig. 1: Data used for classification

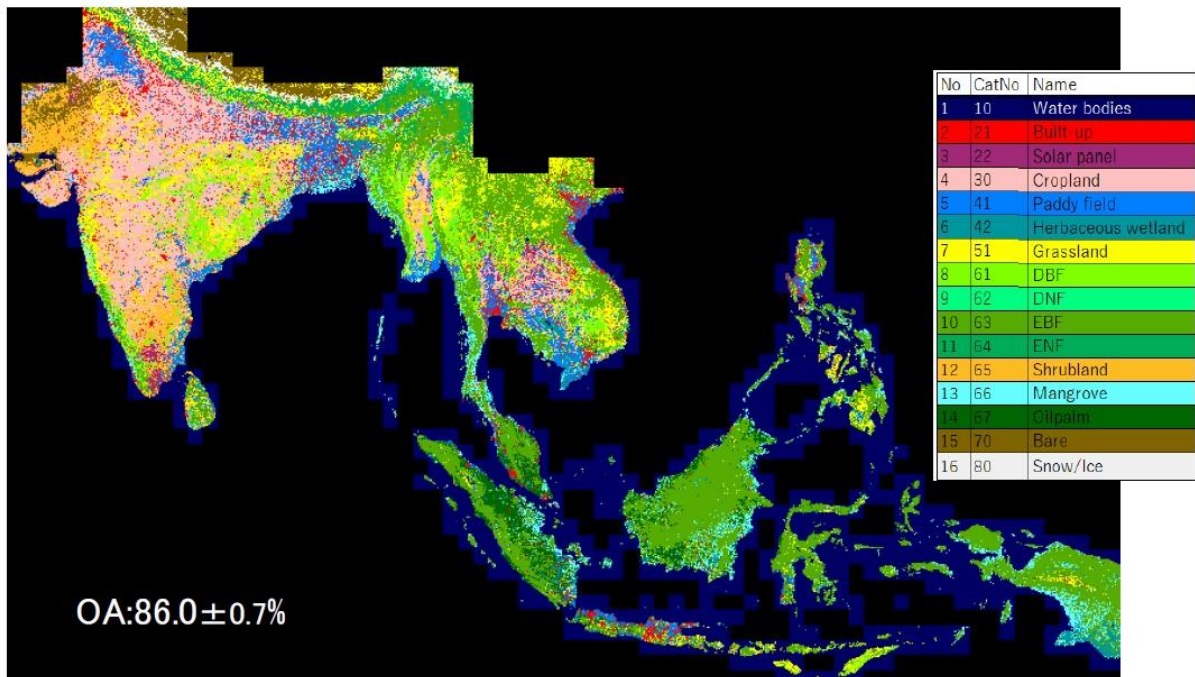


Fig. 2: Prototype land-cover classification map in Asia

● **Publications**

N/A

● **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	Parallel execution of shell script with xargs
Thread Parallelization Methods	N/A
Number of Processes	5 - 6
Elapsed Time per Case	35.8 Hour(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources*1(%): 0.01

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage *2(%)
TOKI-SORA	0.00	0.00
TOKI-ST	423.93	0.00
TOKI-GP	22,437.62	0.95
TOKI-XM	0.00	0.00
TOKI-LM	675.41	0.05
TOKI-TST	0.00	0.00
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage* ² (%)
/home	25.00	0.02
/data and /data2	51,450.00	0.40
/ssd	5,370.00	0.74

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage* ² (%)
J-SPACE	0.00	0.00

*1: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.

● **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage* ² (%)
ISV Software Licenses (Total)	0.00	0.00

*2: Fraction of Usage : Percentage of usage relative to each resource used in one year.