K&C Phase 3 – Brief project essentials

Use of ALOS PALSAR data for supporting forest carbon tracking in Sumatra island: Collaborative research between LAPAN and JAXA

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Background

- The implementation of REDD+ *(Reducing Emissions from Deforestation and Forest Degradation "plus" conservation, the sustainable management of forests and enhancement of forest carbon stocks)* strategy di Indonesia focuses on **the sustainable management of forest** and **peat forest**.

- In G20 Summit in Pittsburg in September 2009, President Susilo Bambang Yudhoyono committed to **26% GHG emission reduction in 2020** in Indonesia, or even to **41% reduction with the international support**.

- Therefore, the wall-to-wall **annual forest cover change** is very important for determining the **annual carbon stock changes**.

- The **interoperability of optical and radar data** is expected to resolve the forest cover mapping in Indonesia.


Humid tropical cloud cover
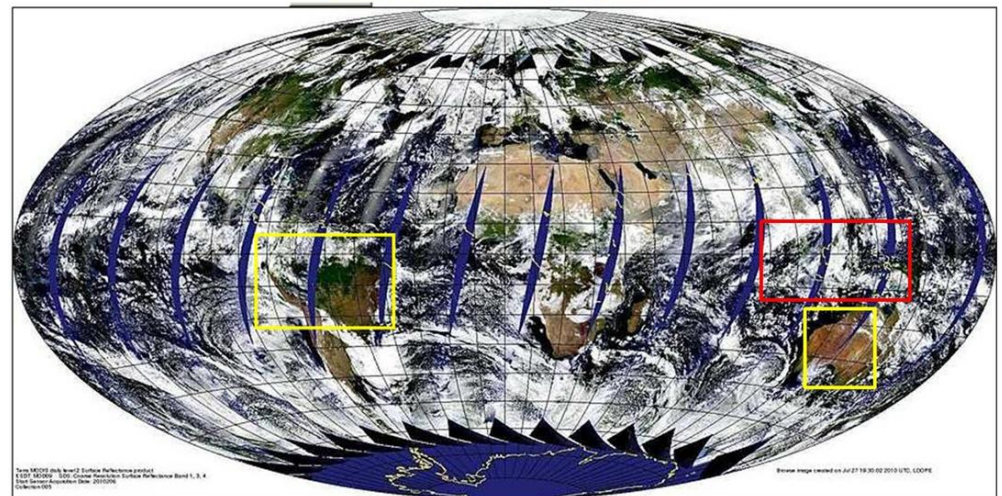
Indonesia's National Carbon Accounting System (INCAS)
(2009-2013)

- INCAS will provide a comprehensive and credible account of Indonesia's land based emissions profile and sinks capacity.

- INCAS will support Indonesia's reporting requirements under the UNFCCC and a post-2012 climate change agreement.

- It will also support entry to carbon markets and the overall MRV system.

Indonesia-Australia Forest Carbon Partnership
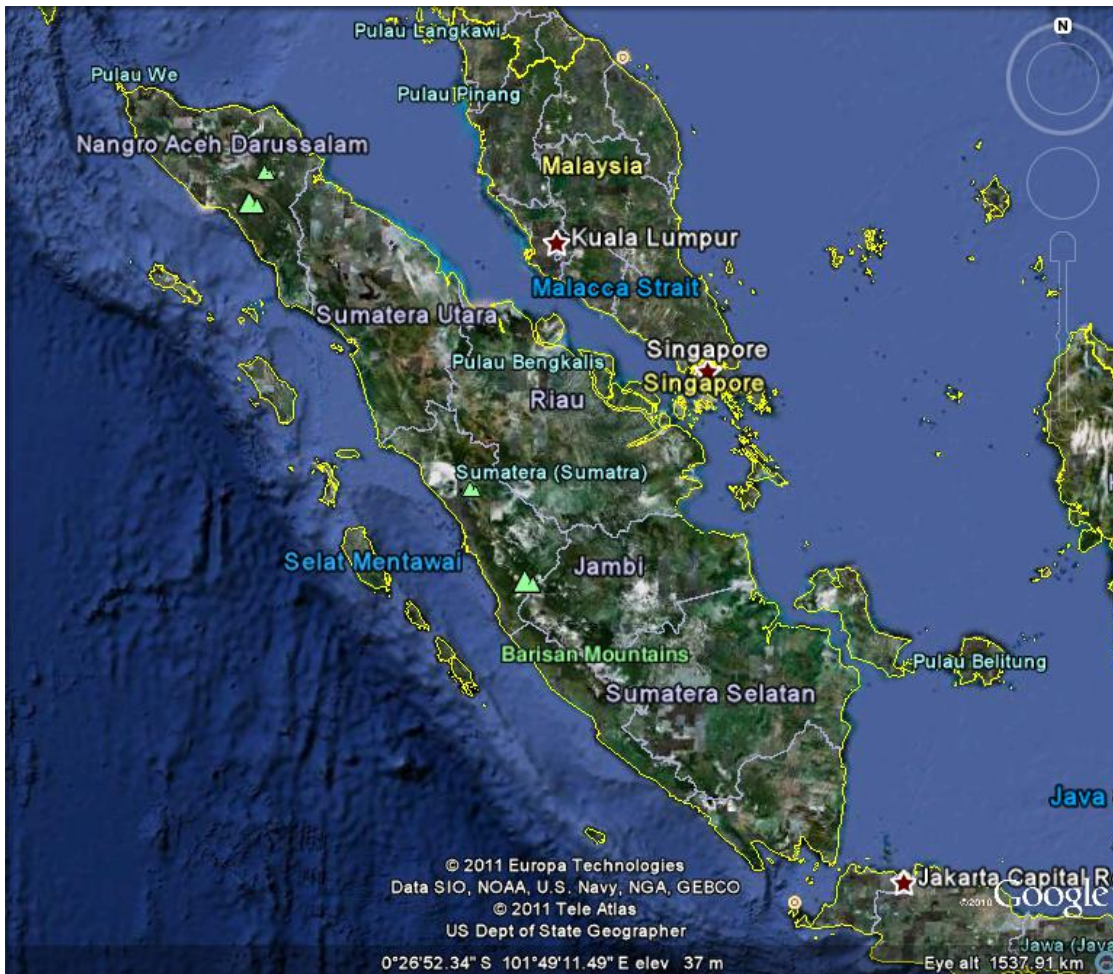
Carbon accounting and reporting model
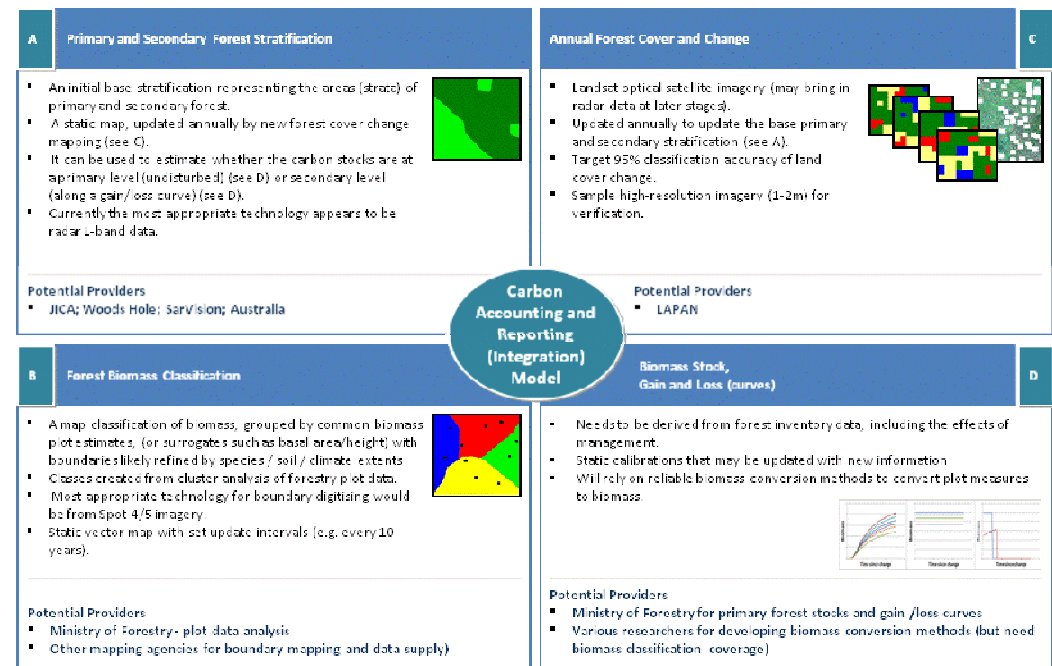
Target:
Nov 2011: Kalimantan FNF map (2000-2009)
Apr 2012 : Sumatera FNF map (2000-2009)

Project area(s)

- Geographic location: Sumatera island
- Local site(s):
- Merang REDD Pilot Project (center point: 2.03S, 104.12E)
- Jambi REDD (2.47S, 101.53E)
- Harapan (2.20S, 103.38E)
- Riau Pelalawan (0.0N, 102.00E)

Project objectives

To conduct the collaboartive research on the use of ALOS PALSAR archives and the verification dataset in Sumatra island through:

- the development of forest carbon tracking modellings
- capacity building
- data sharing
- ground-truth experiments
- information production
- workshop/seminar

The objective of this activity would synchronize with that of the **Group on Earth Observations Forest Carbon Tracking (GEO FCT)** initiative, particulary to support **forest carbon Measurement, Reporting, and Verification (MRV) system** for national REDD+ implementation.

Project schedule

- **June-December 2011**: the preparation phase, which covers the coordination meetings, data inventories, software development and improvements, and hardware preparation.

- **January-December 2012**: the implementation phase-1, which covers the trainings, operational for ALOS PALSAR processing and classification, and ground-truth experiments.

- **January-December 2013**: the implementation phase-2, which covers result analysis and interpretation, accuracy assessment, and workshop/seminar.
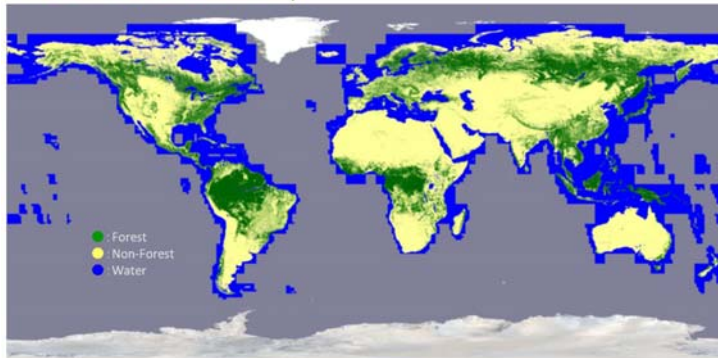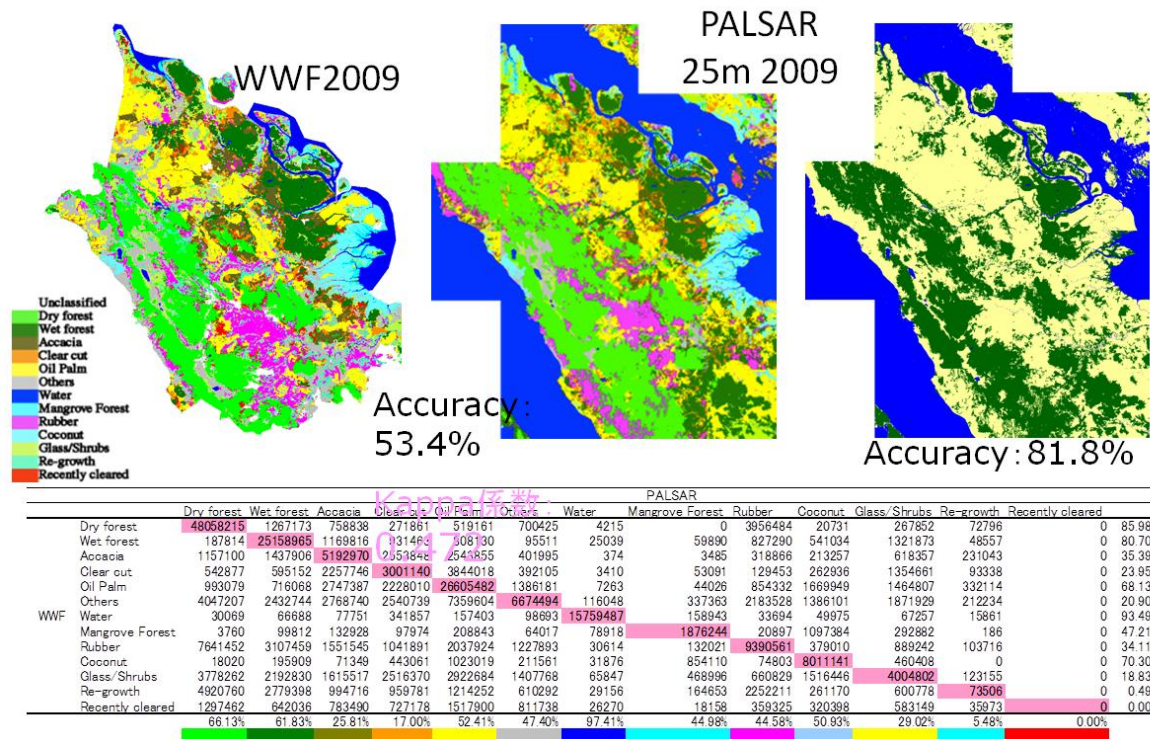
Support to JAXA's global forest mapping effort

The activity is expected to improve the PALSAR global forest products (at the 10-25m pixel spacing) that are currently conducted by JAXA EORC for Sumatera island.

PALSAR 10m Mosaic 2009
Forest/Non-Forest Map

Forest
Non-Forest
Water

Source: JAXA EORC

Classification Result WWF x PALSAR: Level slicing

WWF2009

PALSAR 25m 2009

Unclassified
Dry forest
Wet forest
Accacia
Clear cut
Oil Palm
Others
Water
Mangrove Forest
Rubber
Coconut
Glass/Shrubs
Re-growth
Recently cleared

Accuracy: 53.4%

Accuracy: 81.8%

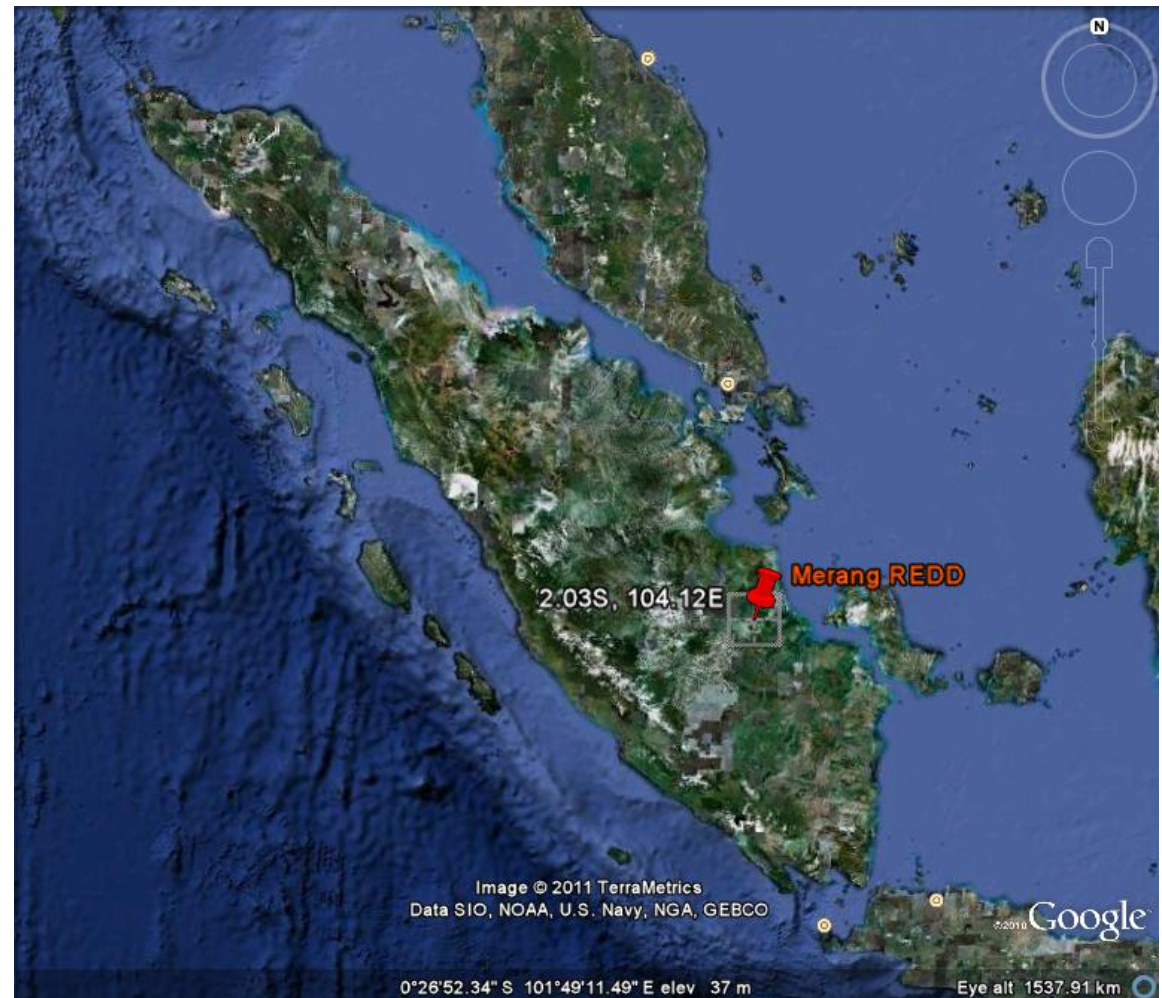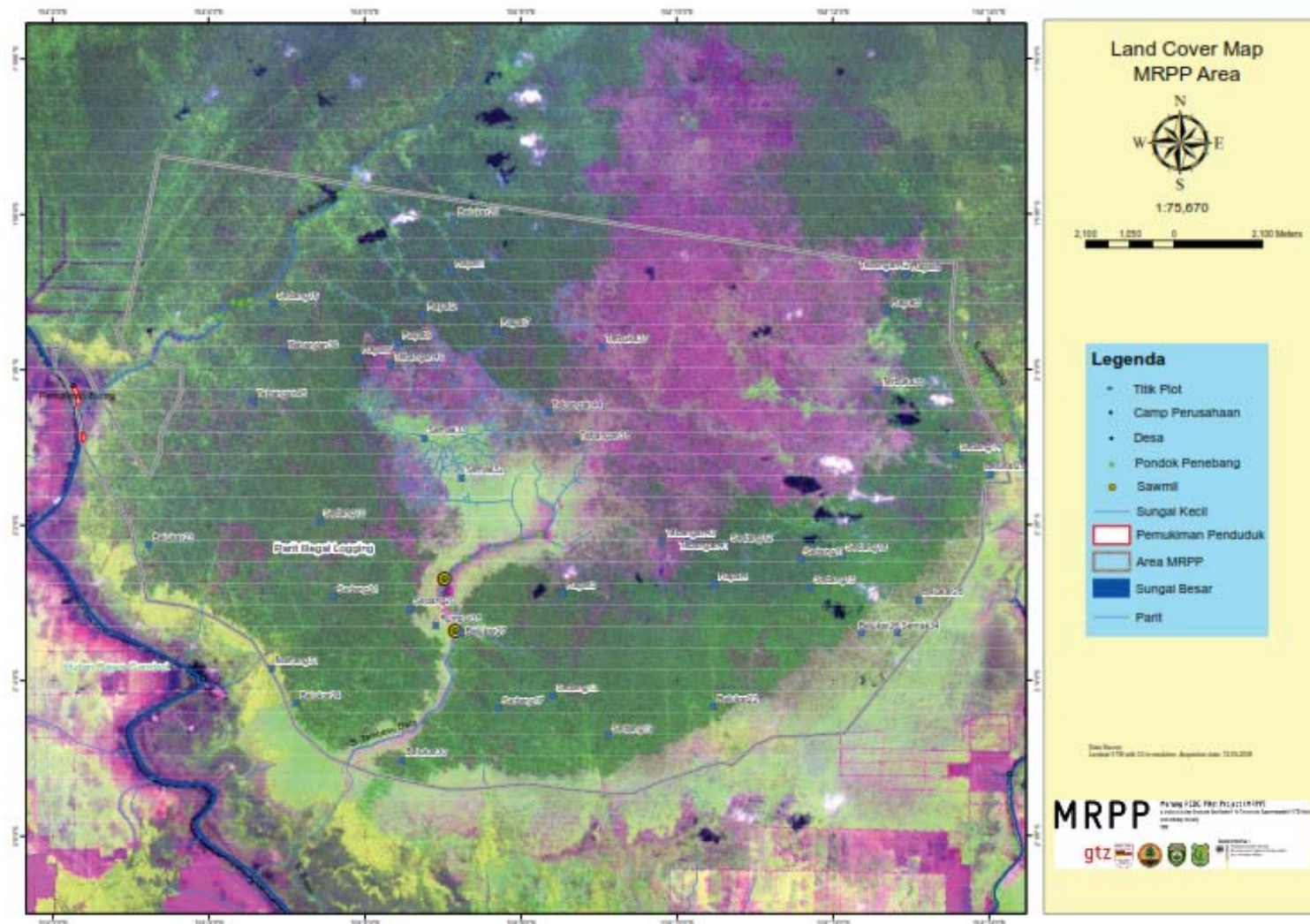|		PALSAR														
		Dry forest	Wet forest	Accacia	Clear cut	Oil Palm	Others	Water	Mangrove Forest	Rubber	Coconut	Glass/Shrubs	Re-growth	Recently cleared		
	Dry forest	48058215	1267173	758838	271861	519161	700425	4215	0	3956484	20731	267852	72796	0	85.98%	
	Wet forest	187814	25158965	1169816	031463	508130	95511	25039	59890	827290	541034	1321873	48557	0	80.70%	
	Accacia	1157100	1437906	5192970	2653848	2543855	401995	374	3485	318866	213257	618357	231043	0	35.39%	
	Clear cut	542877	595152	2257746	3001140	3844018	392105	3410	53091	129453	262936	1354661	93338	0	23.95%	
	Oil Palm	993079	716068	2747387	2228010	26605482	1386161	7263	44026	854332	1669949	1464807	332114	0	68.13%	
	Others	4047207	2432744	2768740	2540739	7359604	6674494	116048	337363	2183528	1386101	1871929	212234	0	20.90%	
WWF	Water	30069	66688	77751	341857	157403	98693	15759487	158943	33694	49975	67257	15861	0	93.49%	
	Mangrove Forest	3760	99812	132928	97974	208843	64017	78918	1876244	20897	1097384	292882	186	0	47.21%	
	Rubber	7641452	3107459	1551545	1041891	2037893	1227893	30614	132021	9390561	379010	889242	103716	0	34.11%	
	Coconut	18020	195909	71349	443061	1023019	211561	31876	854110	74803	8011141	460408	0	0	70.30%	
	Glass/Shrubs	3778262	2192830	1615517	2516370	2922684	1407768	65847	468996	660829	1516446	4004802	123155	0	18.83%	
	Re-growth	4920760	2779398	994716	959781	1214252	610292	29156	164653	2252211	261170	600778	73506	0	0.49%	
	Recently cleared	1297462	642036	783490	727178	1517900	811738	26270	18158	359325	320398	583149	35973	0	0.00%	
		66.13%	61.83%	25.81%	17.00%	52.41%	47.40%	97.41%	44.98%	44.58%	50.93%	29.02%	5.48%	0.00%		

Ground-based data

The ground-based data that will be shared with JAXA are expected to be obtained from the **local government offices** in Sumatra and the **Merang REDD Pilot Project (MRPP)** activity in South Sumatra.
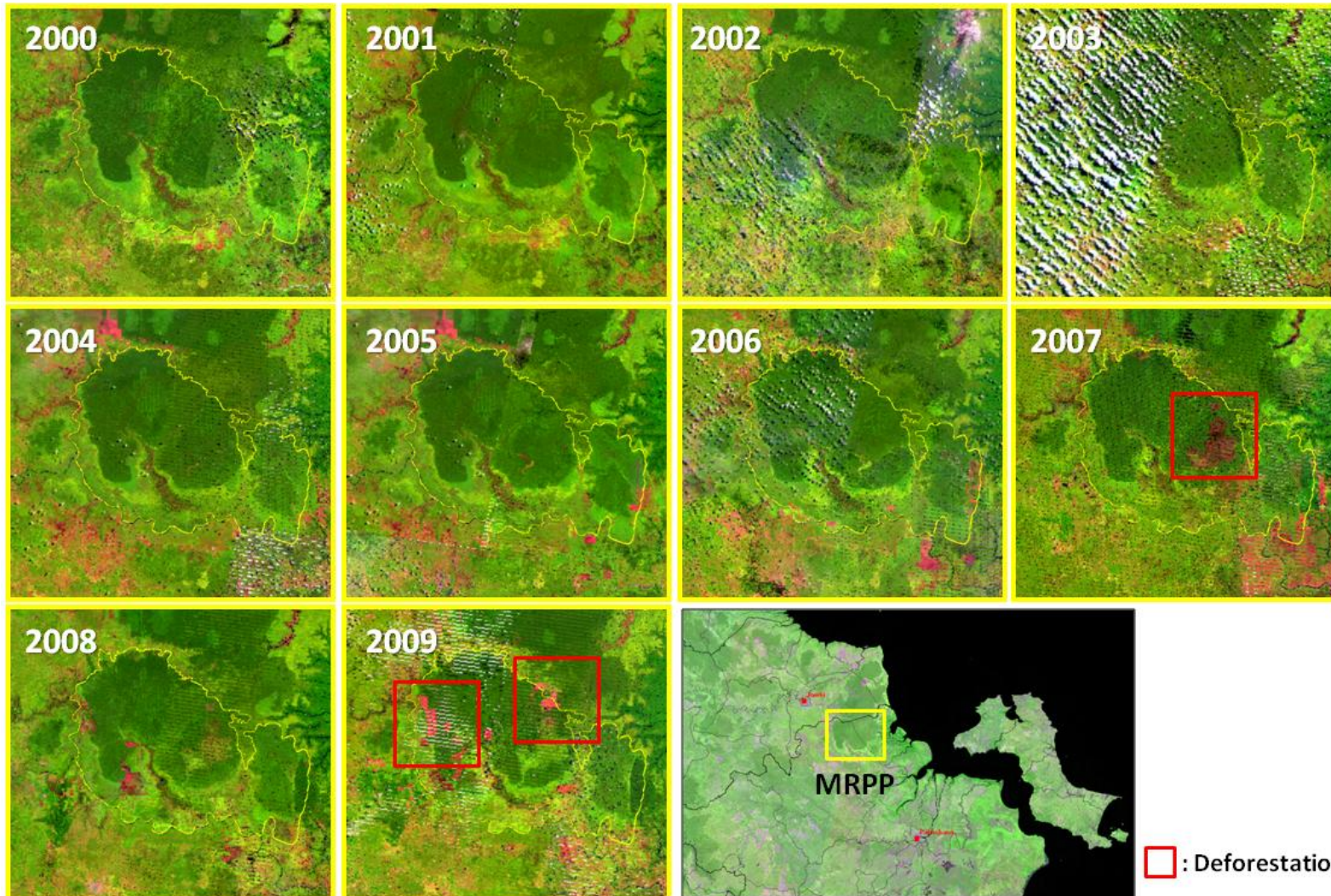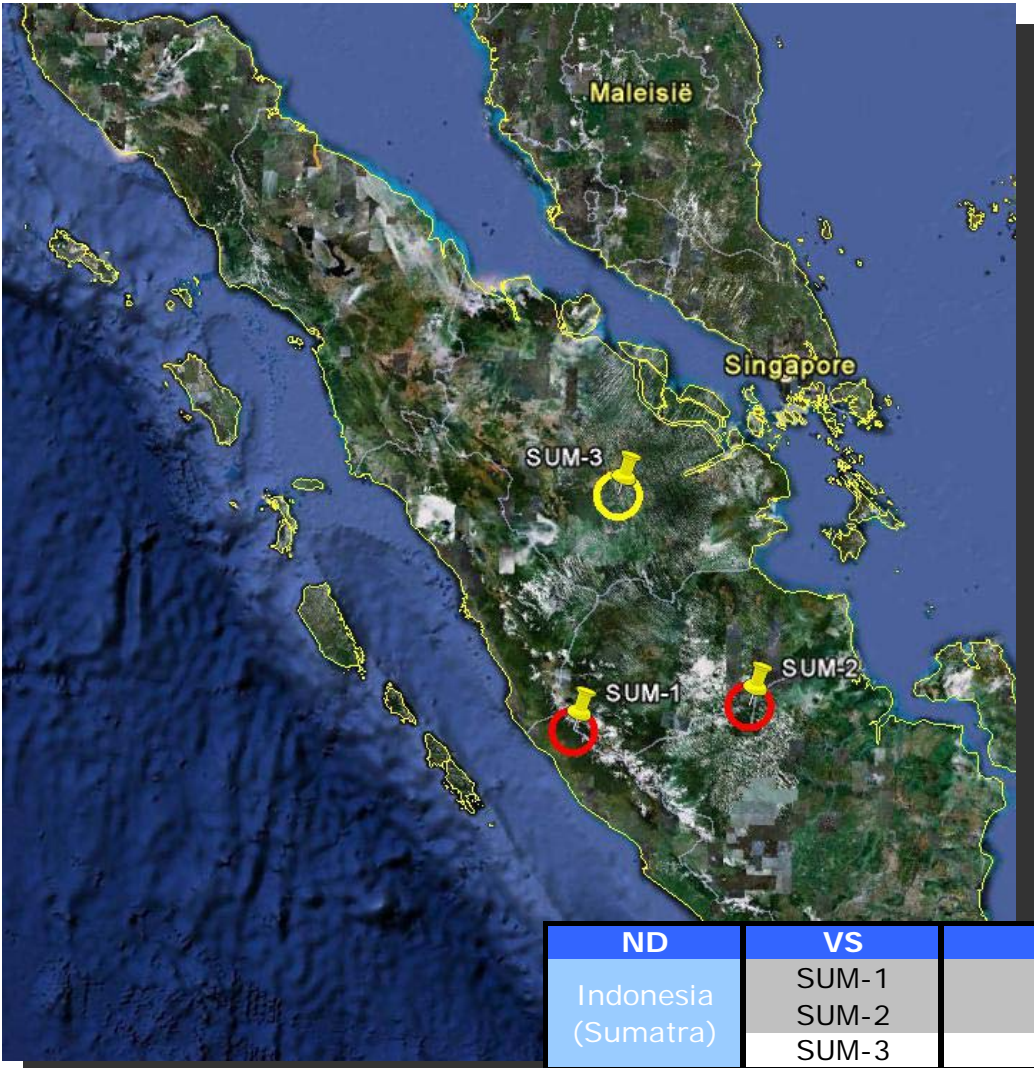
Land cover of MRPP area (source: Landsat 2008)

Depth of peat and ground-based locations of MRPP area

Annual Landsat imageries of MRPP area (2000-2009)

Other ground-based sites

Validation sites: SUM-1, -2, -3

ND	VS	Name	lat	long	Priority
Indonesia (Sumatra)	SUM-1	Jambi REDD	S2.47	E101.53	1
	SUM-2	Harapan	S2.20	E103.38	1
	SUM-3	Riau Pelalawan	N0.0	E102.00	2

Deliverables

The **validated Horizon-1 products** of the **annual forest/non-forest change** and the **annual Land Use/Land Use Change and Forestry (LULUCF)** for 2006-2010.
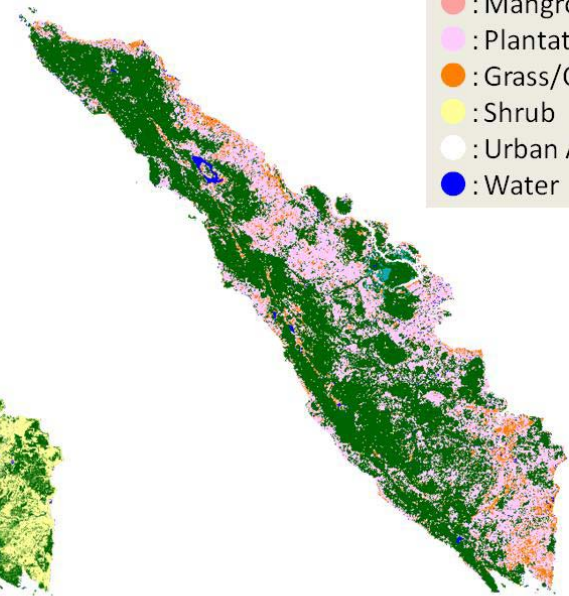
Forest Classification (Sumatra 2009)

1) Forest/Non-Forest Classification

● : Forest
● : Non-Forest
● : Water
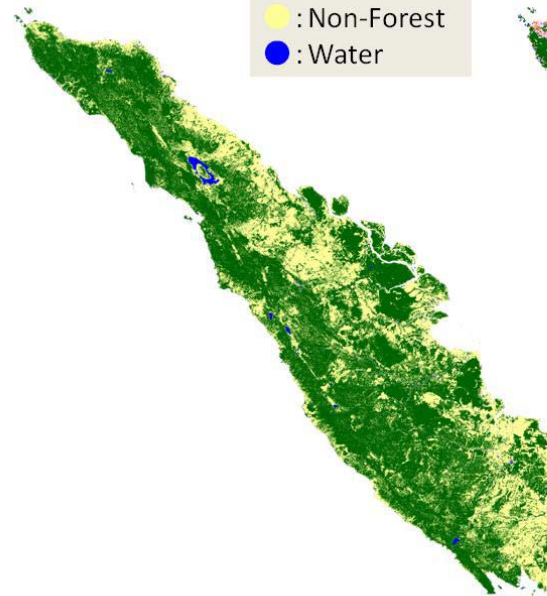
2) Land Cover Classification

● : Forest
● : Peat Forest
● : Mangrove
● : Plantation
● : Grass/Crop
● : Shrub
● : Urban Area
● : Water

Source: JAXA EORC

Responsibilities

LAPAN responsibility

- LAPAN will perform the **forest classification** using the JAXA classification software (JCS) and evaluate the classification results using the ground-truth data (i.e., high-resolution satellite data, ground-based data, etc).

- LAPAN will provide the **evaluation results** and **the ground-truth data** to JAXA for the further classification accuracy improvement.

- LAPAN will provide the **biomass data** obtained from the Merang REDD Pilot Project (MRPP) in South Sumatra.

- LAPAN will support JAXA to conduct the **ground-truth experiments** in Sumatra by supporting permission for the ground-truth experiments.

- LAPAN together with JAXA will conduct **workshop or seminar** on the results of the activity for the related stakeholders.

JAXA responsibility

- JAXA will provide the **25m resolution annual ALOS PALSAR mosaic data** over **Sumatra island** for period of **2006-2010**.

- JAXA will develop and improve the **JCS** and provide it to LAPAN.

- JAXA will conduct the **capacity building** for LAPAN staff, i.e. short-term trainings on SAR processing, image interpretation, and forest classification.

THANK YOU