

ALOSK&C Initiative
An international science collaboration led by JAXA

K&C Phase 3 – JAXA EORC global mosaic, forest mapping activities, MRV experiments (plan)

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March 28 2012, RESTEC HQs

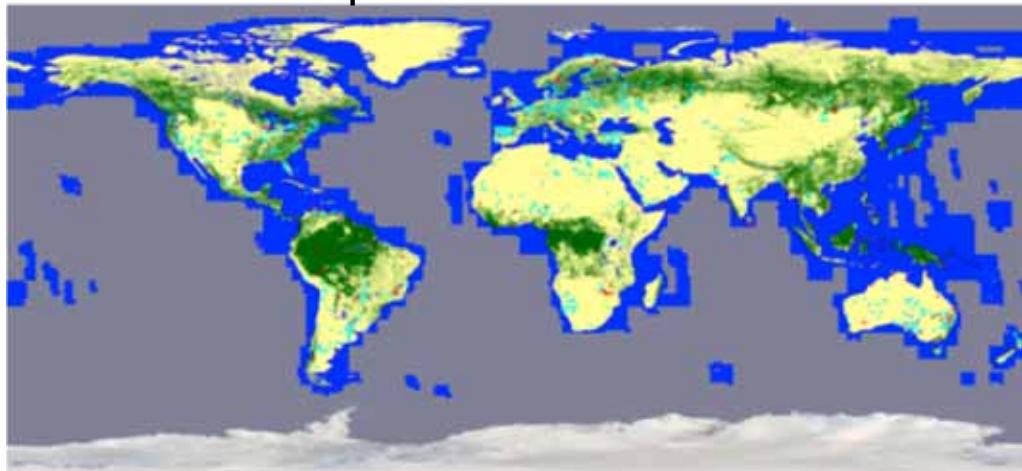
Science Team meeting #16 – Phase 3 Kick-off
JAXA TKSC/RESTEC HQ, Tsukuba/Tokyo, October 17-21, 2011

Contents

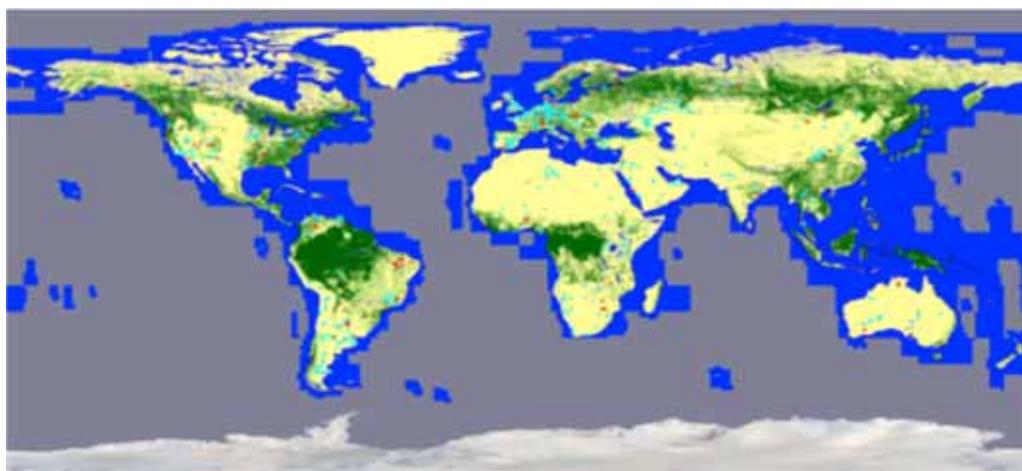
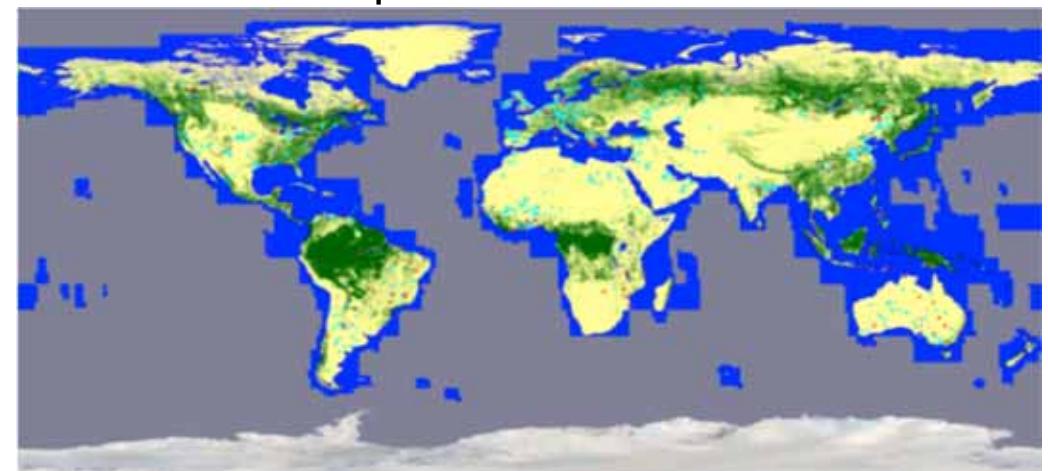
- Status of the product generation
- 25 m resolution: 2007-2010 generated already
- ScanSAR mosaic: in progress
- JERS-1 SAR mosaic (25m) regeneration in progress
- MRV system generation
- Pi-SAR-L2 campaign 2012

Accuracy evaluation of FNF2007-2009 using DCP data Reprocessing using the screened data

PALSAR FNF 2007
84.54%, 925points

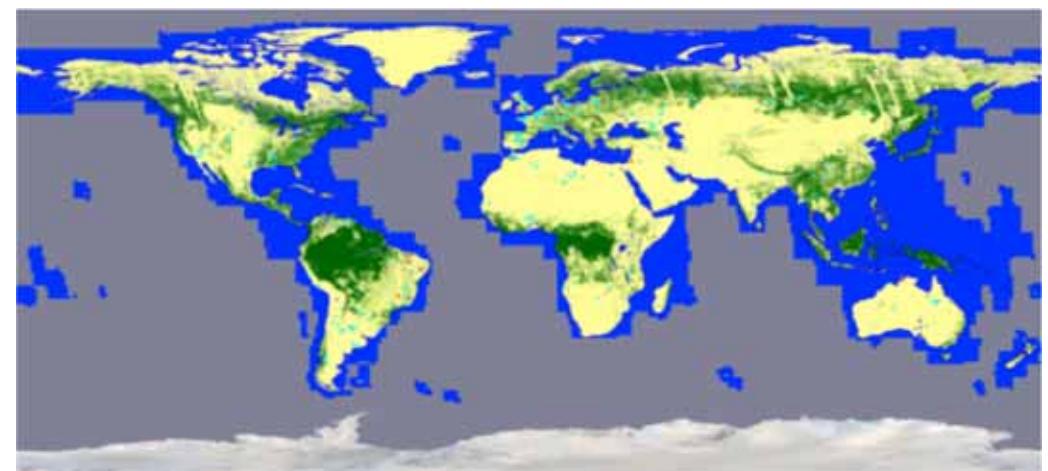


PALSAR FNF 2008
83.02%, 736points



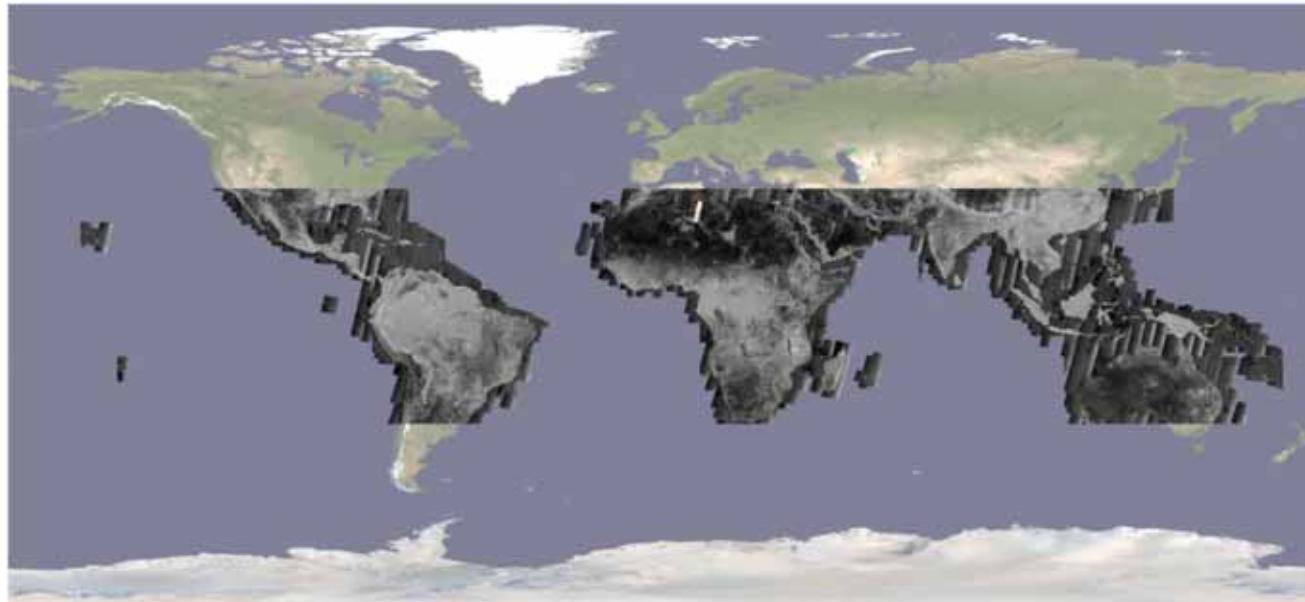
PALSAR FNF 2009
82.68%, 635points

● : Forest, ○ : Non-Forest, ● : Water
● : Correct, ● : Incorrect

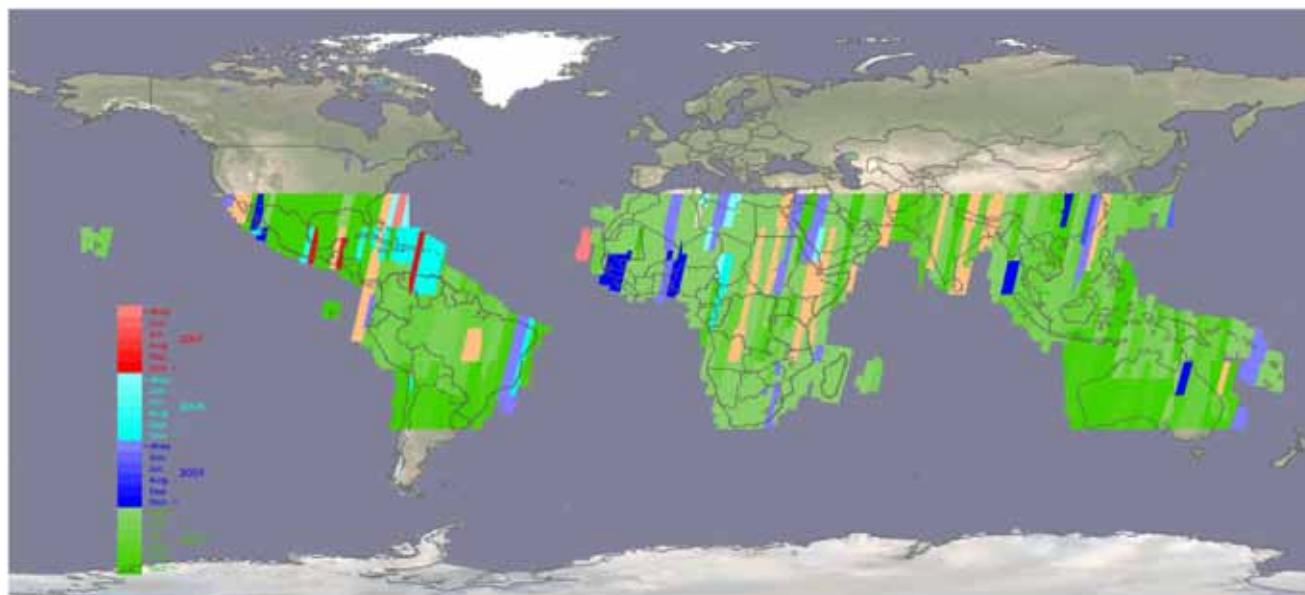


PALSAR FNF 2010
83.93%, 280points

1 . 2010 ScanSAR 100m mosaic

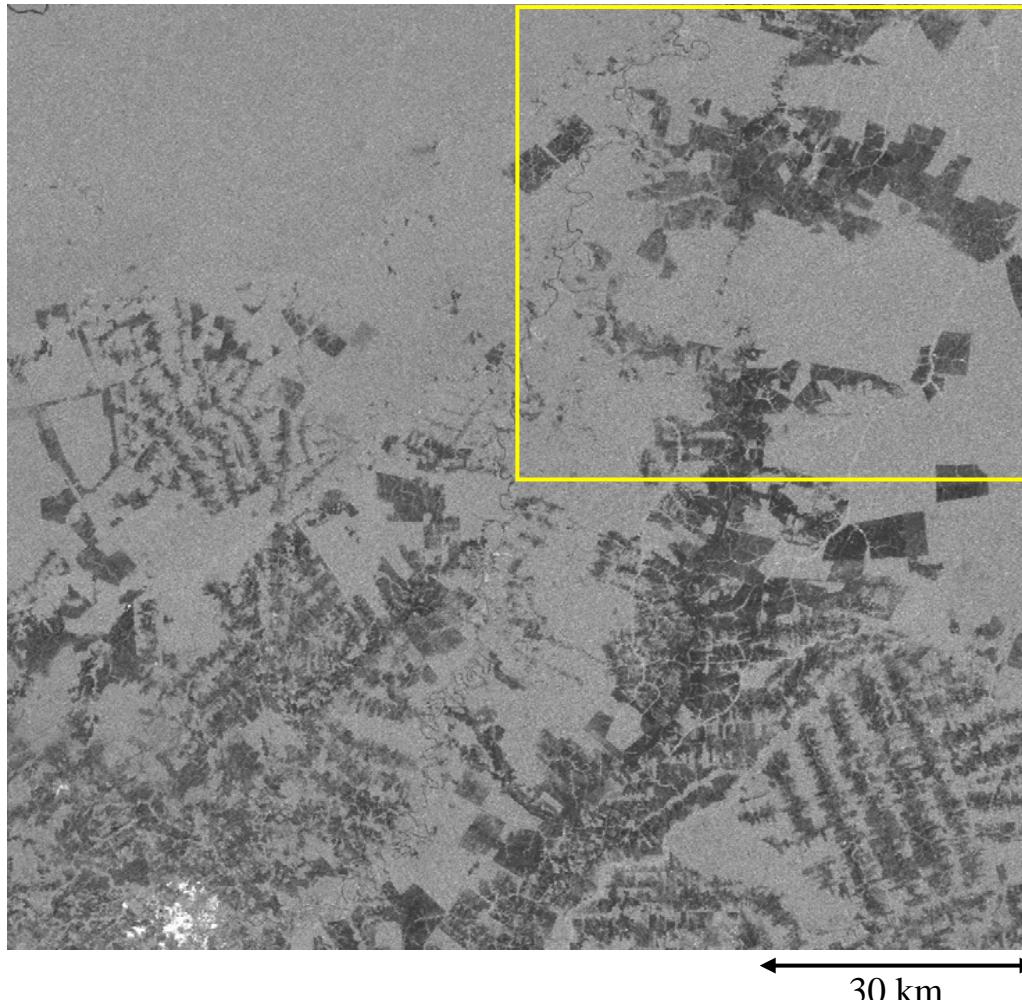
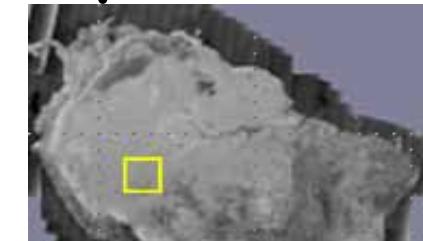


ortho-slope corrected mosaic

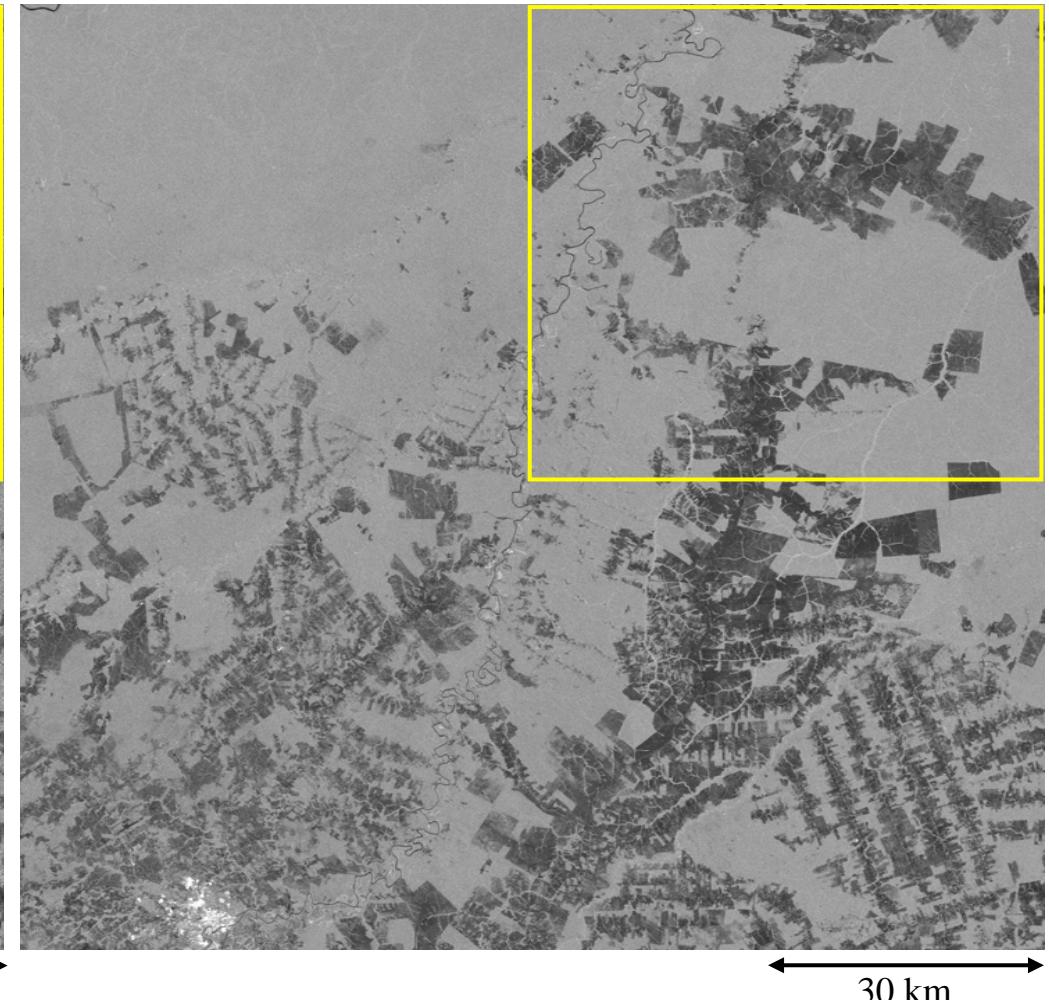


obs.date mosaic

2. ScanSAR Mosaic tile sample (tile number : S09W068)

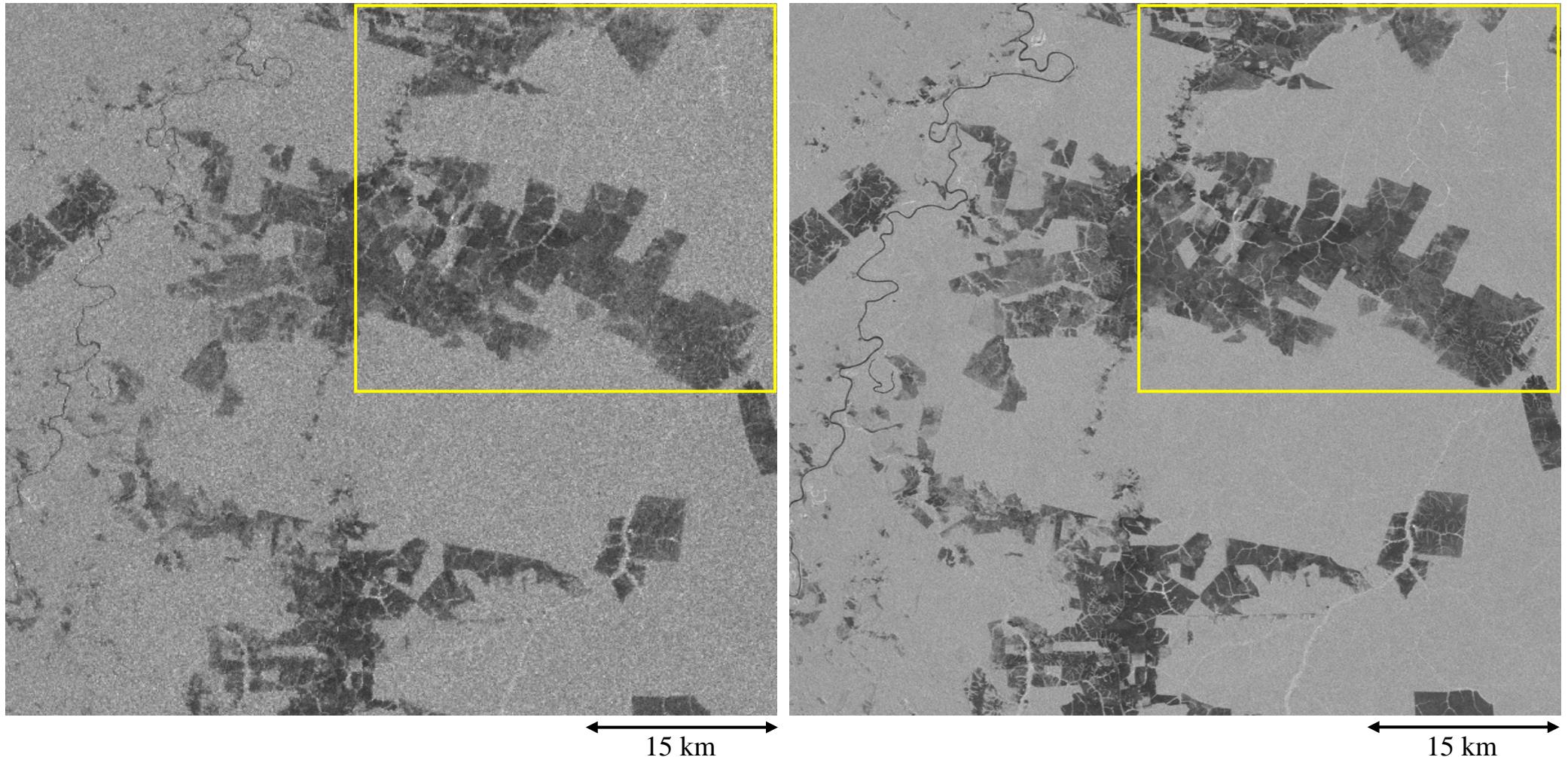


2010 ScanSAR 100m mosaic : HH slope corrected



2010 FBD 25m mosaic : HH slope corrected

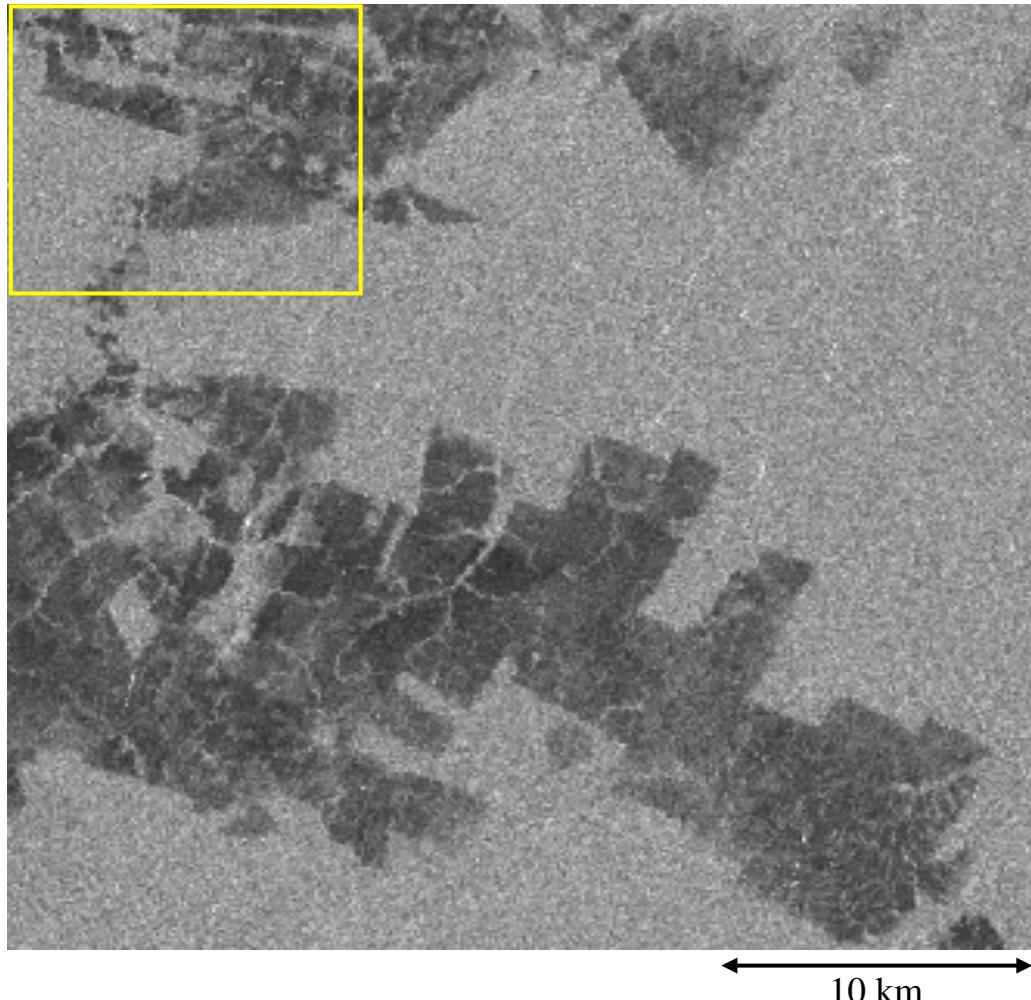
ScanSAR Mosaic zoom image sample (1/4)



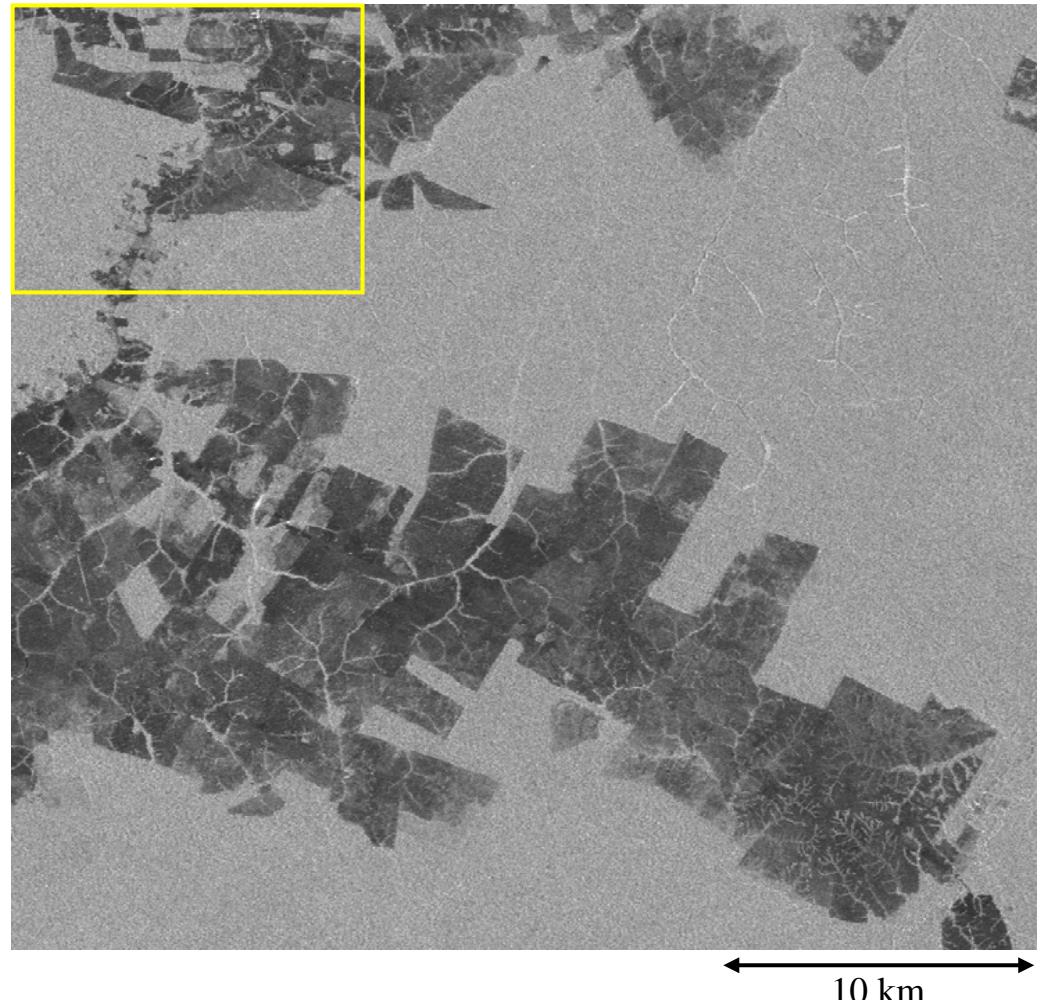
2010 ScanSAR 100m mosaic : HH slope corrected

2010 FBD 25m mosaic : HH slope corrected

ScanSAR Mosaic zoom image sample (2/4)



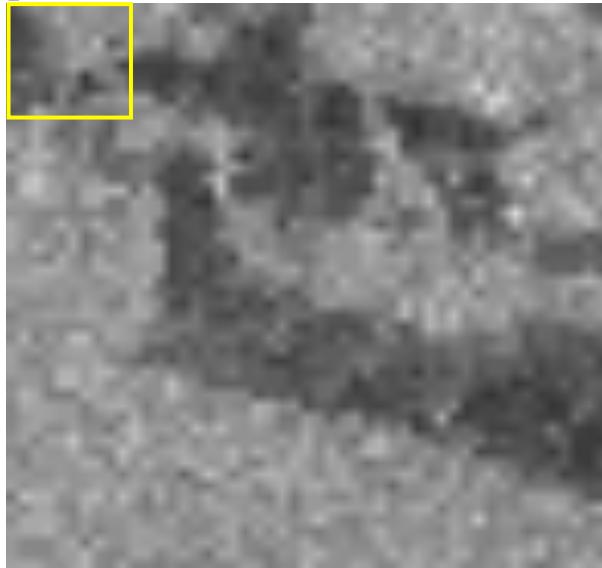
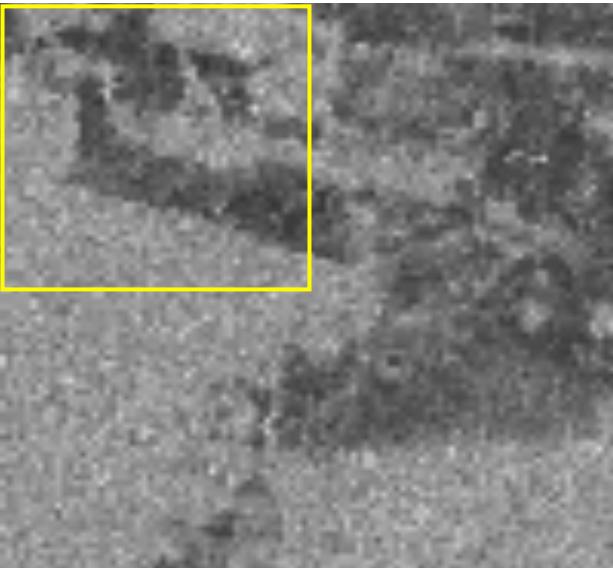
2010 ScanSAR 100m mosaic : HH slope corrected



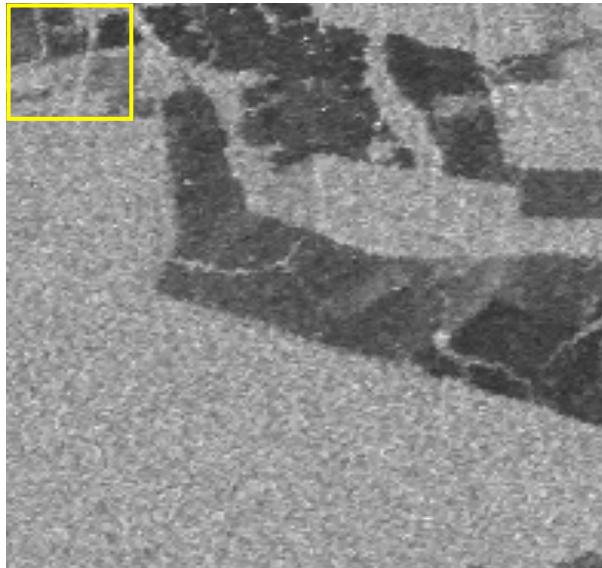
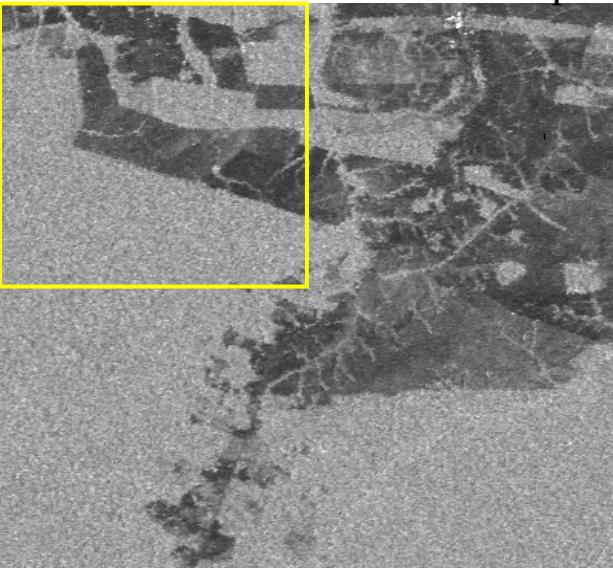
2010 FBD 25m mosaic : HH slope corrected

ScanSAR Mosaic zoom image sample (3/4)

2010 ScanSAR 100m mosaic : HH slope corrected



2010 FBD 25m mosaic : HH slope corrected



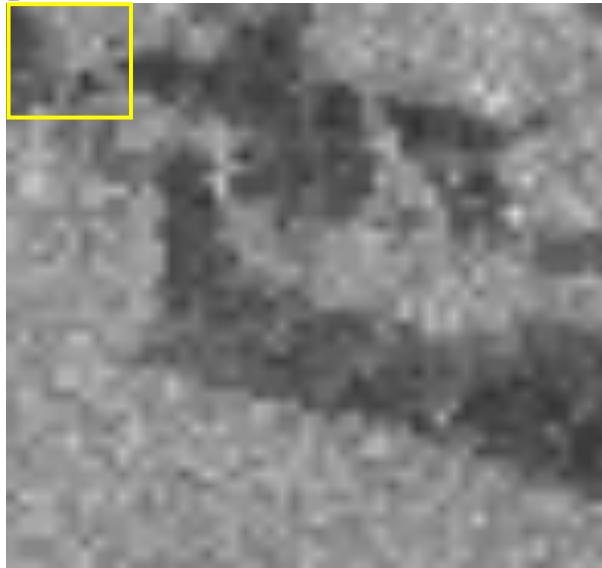
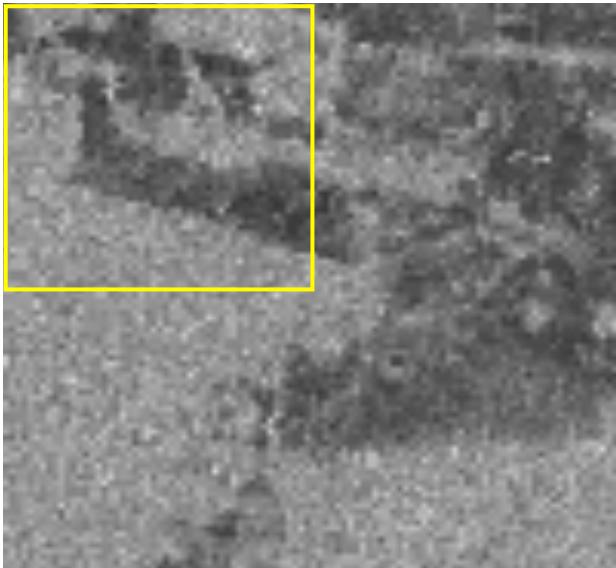
10 km

5 km

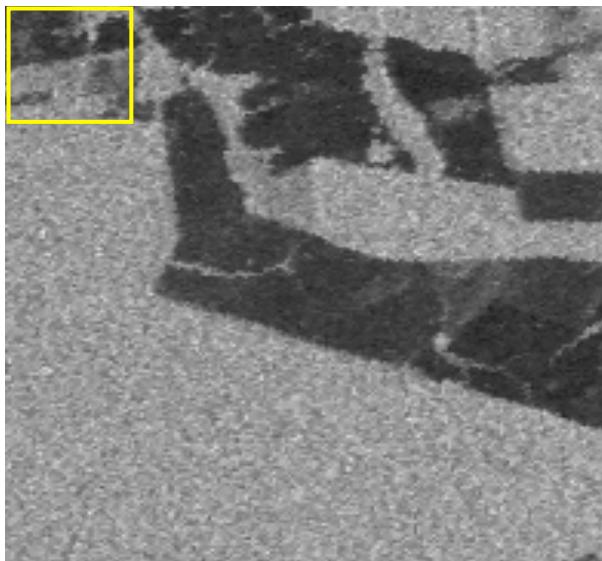
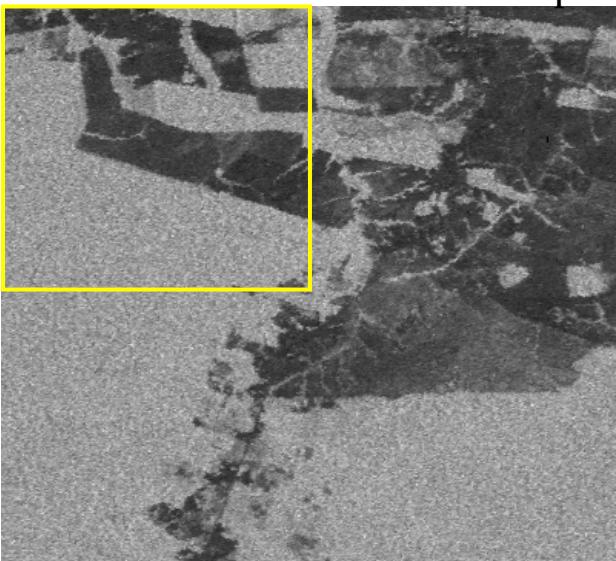
1 km

ScanSAR Mosaic zoom image sample (4/4)

2010 ScanSAR 100m mosaic : HH slope corrected



2010 FBD 25m mosaic : HV slope corrected

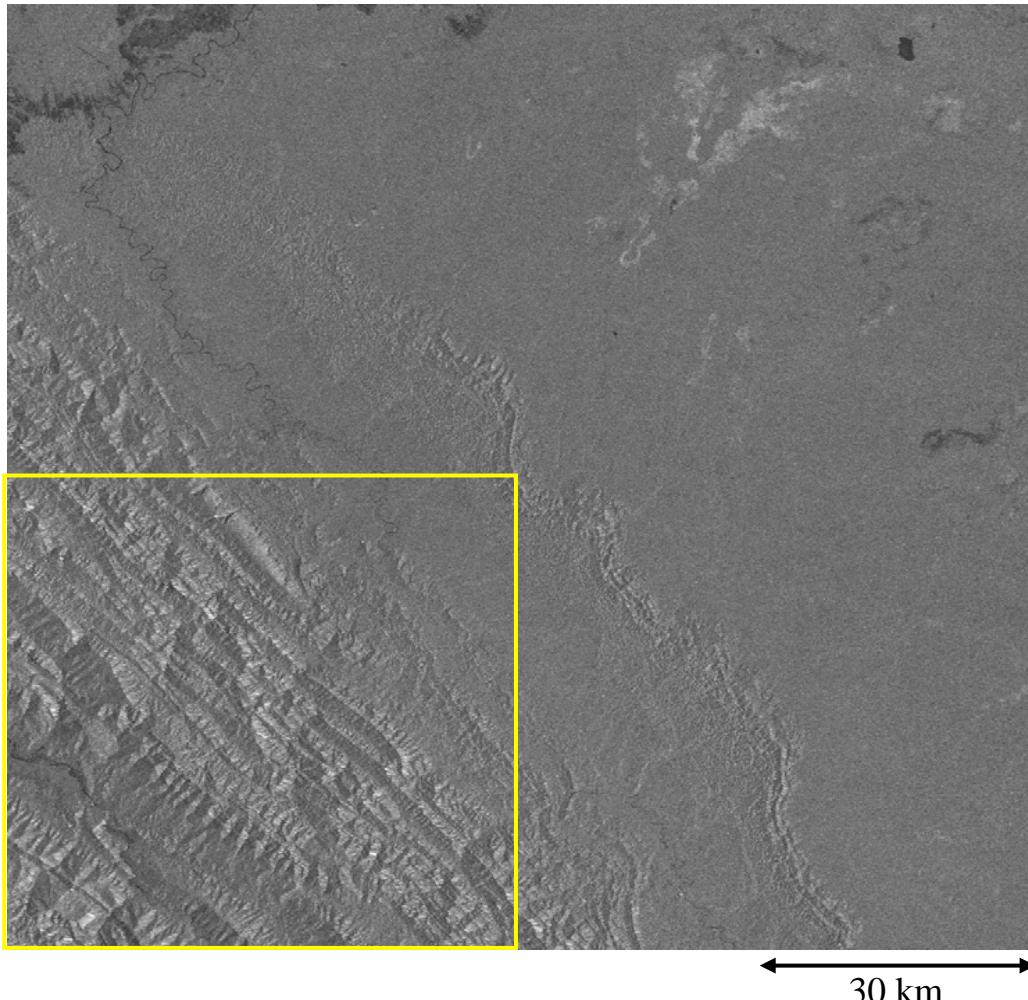


10 km

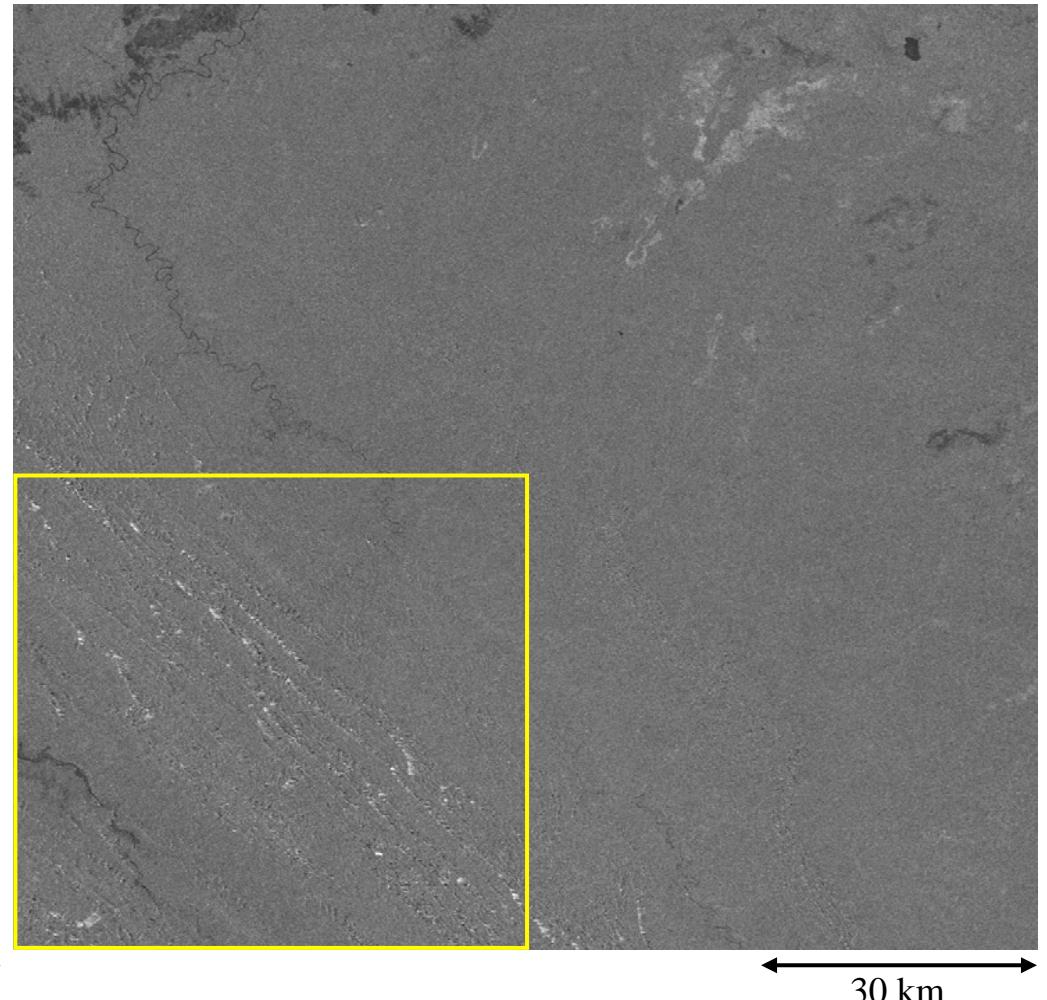
5 km

1 km

3 . ScanSAR Mosaic non-slope corrected vs slope corrected(1/3)

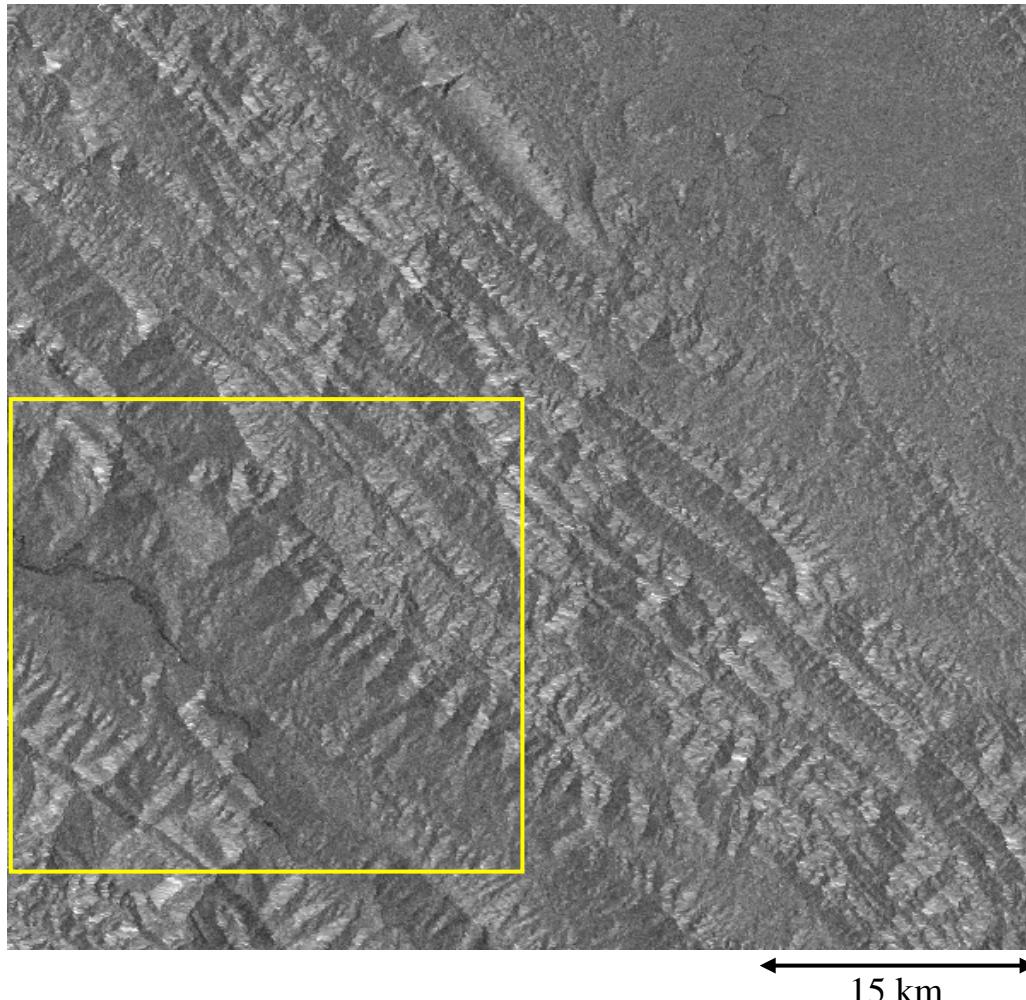


2010 ScanSAR 100m mosaic : HH non-slope corrected

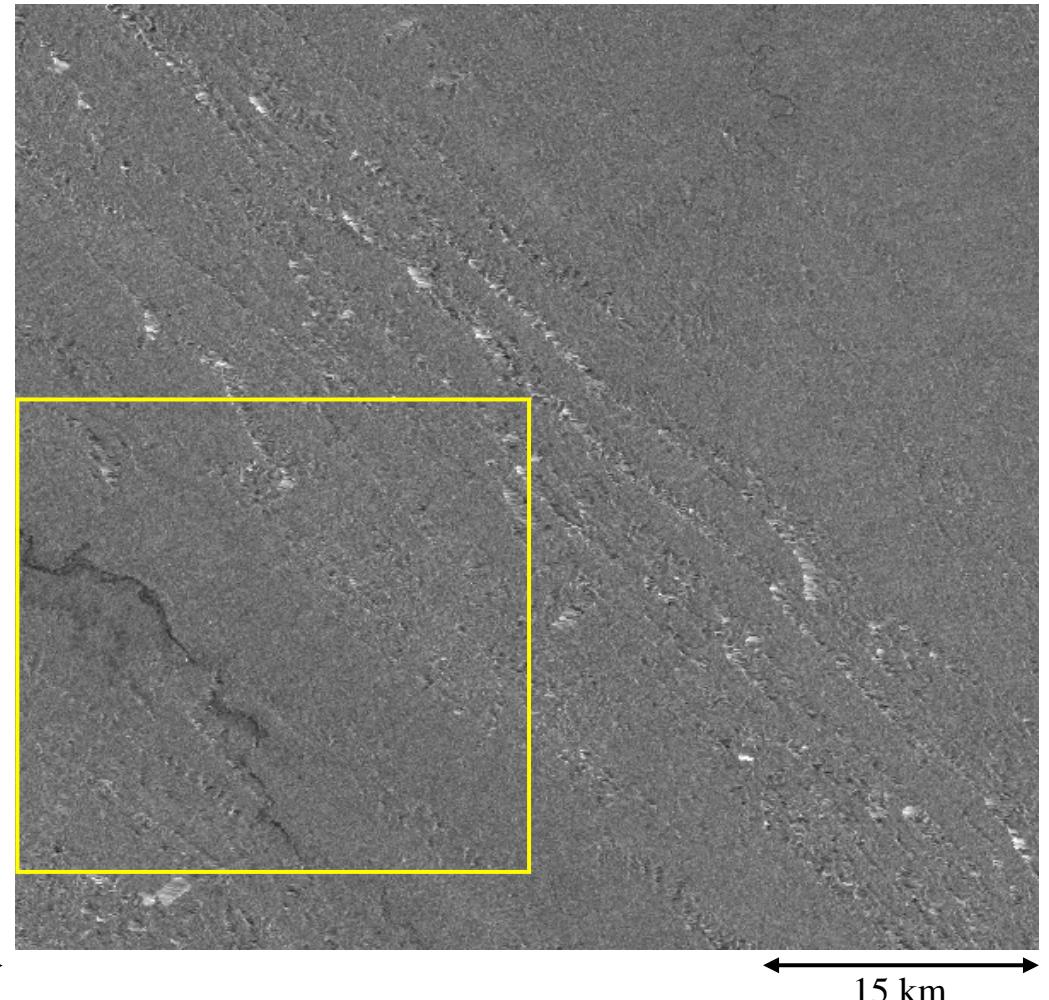


2010 ScanSAR 100m mosaic : HH slope corrected

3 . ScanSAR Mosaic non-slope corrected vs slope corrected(2/3)

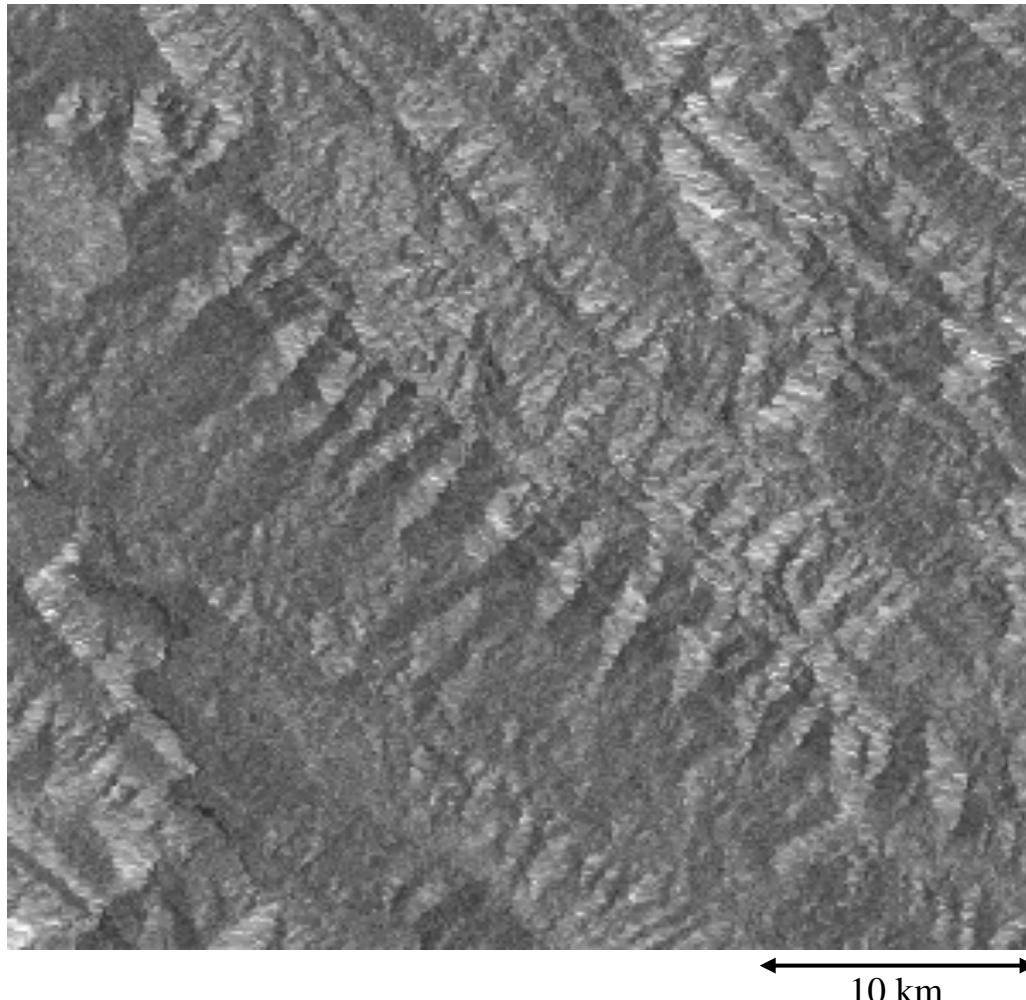


2010 ScanSAR 100m mosaic : HH non-slope corrected

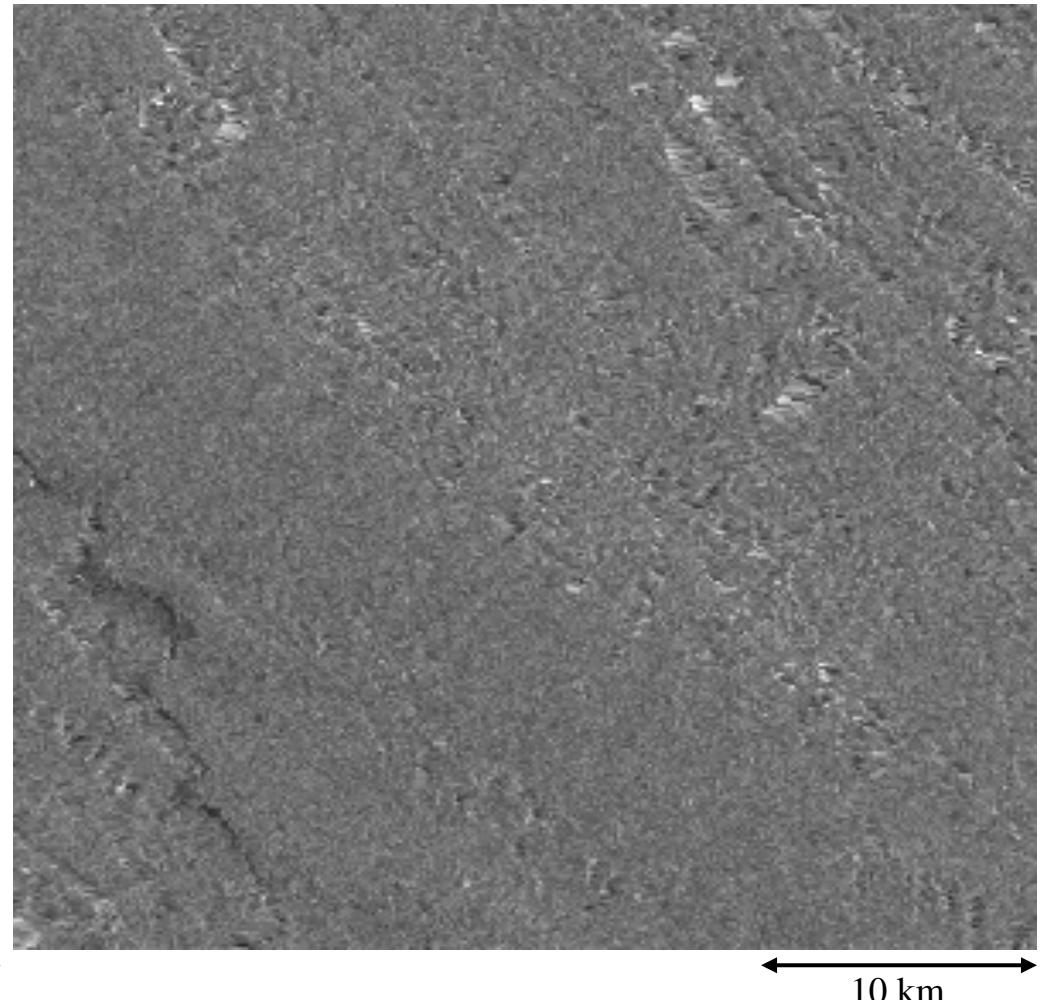


2010 ScanSAR 100m mosaic : HH slope corrected

3 . ScanSAR Mosaic non-slope corrected vs slope corrected(3/3)

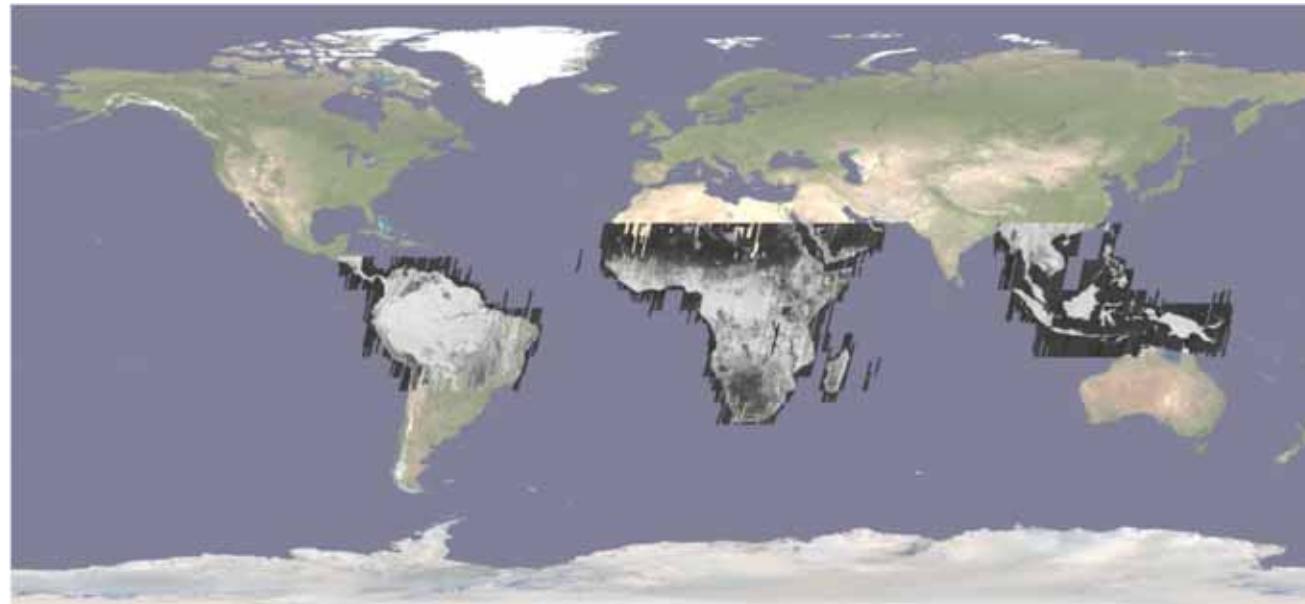


2010 ScanSAR 100m mosaic : HH non-slope corrected

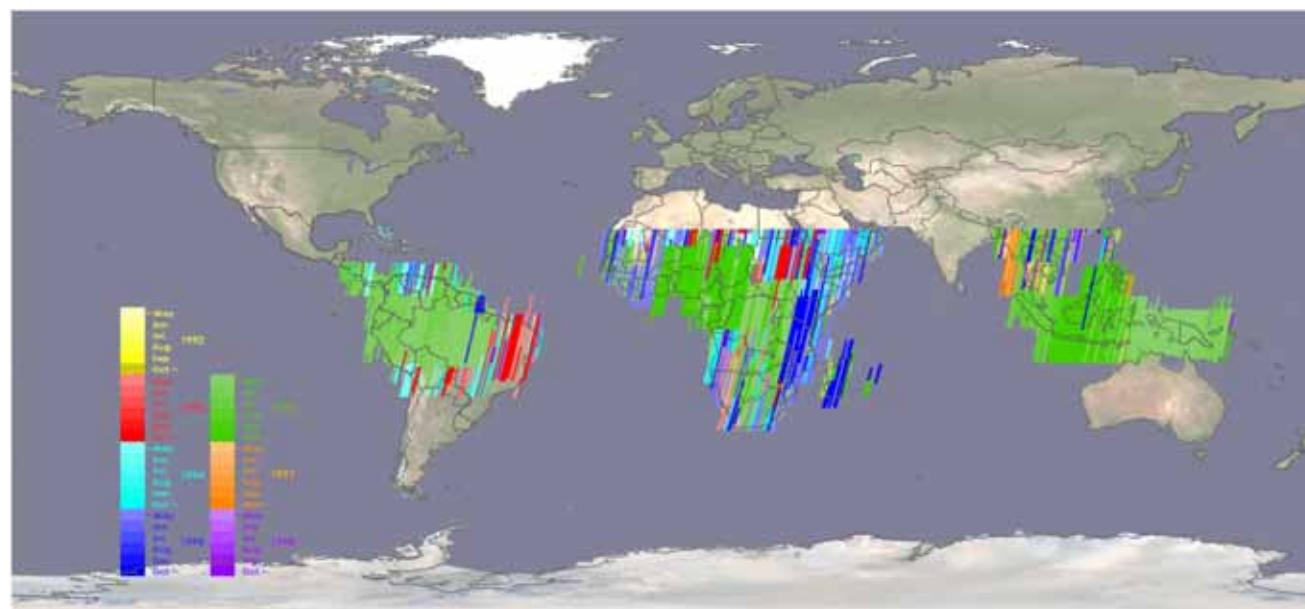


2010 ScanSAR 100m mosaic : HH slope corrected

4 . JERS-1/SAR 25m mosaic



ortho-slope corrected mosaic



obs.date mosaic

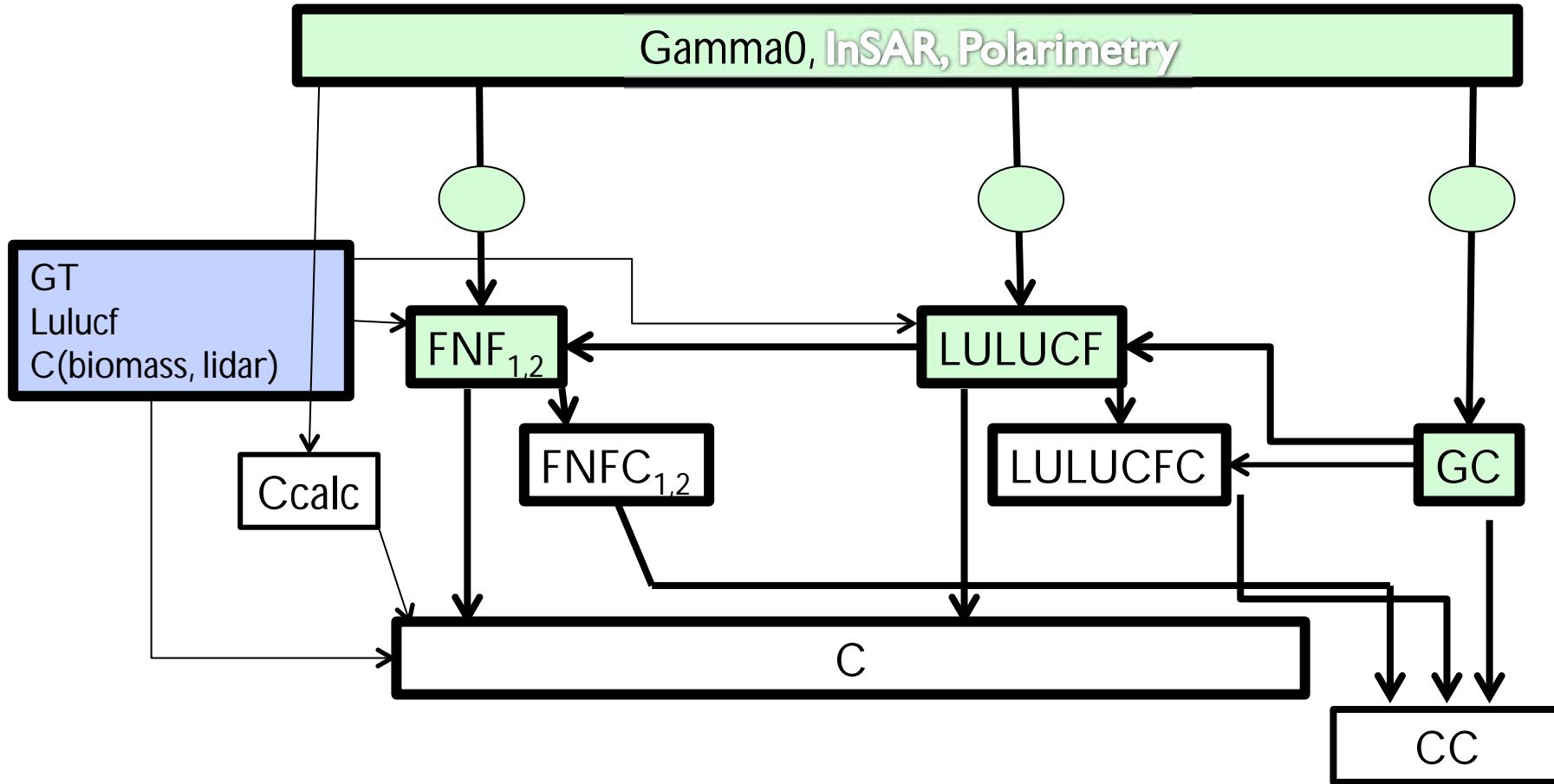
MRV Development

- Generate the Horizon products defined in the GEO-FCT
- Algorithm development as JAXA REDD+ project
- Algorithm development for monitoring the forest (LULUCF, FNF, LULUCF-C, FNF-C)
- Estimate the biomass with accuracy assessment
- Development of the forest area decrease – area estimation
- Validation in JFY2012 (April 2012-March 2013)

JAXA-MRV (Draft)

Basic Information
Ortho, Slope
Mosaic, Multi season
Processing

Time series SAR



Temporal change of gamma-naught (2007-2009)

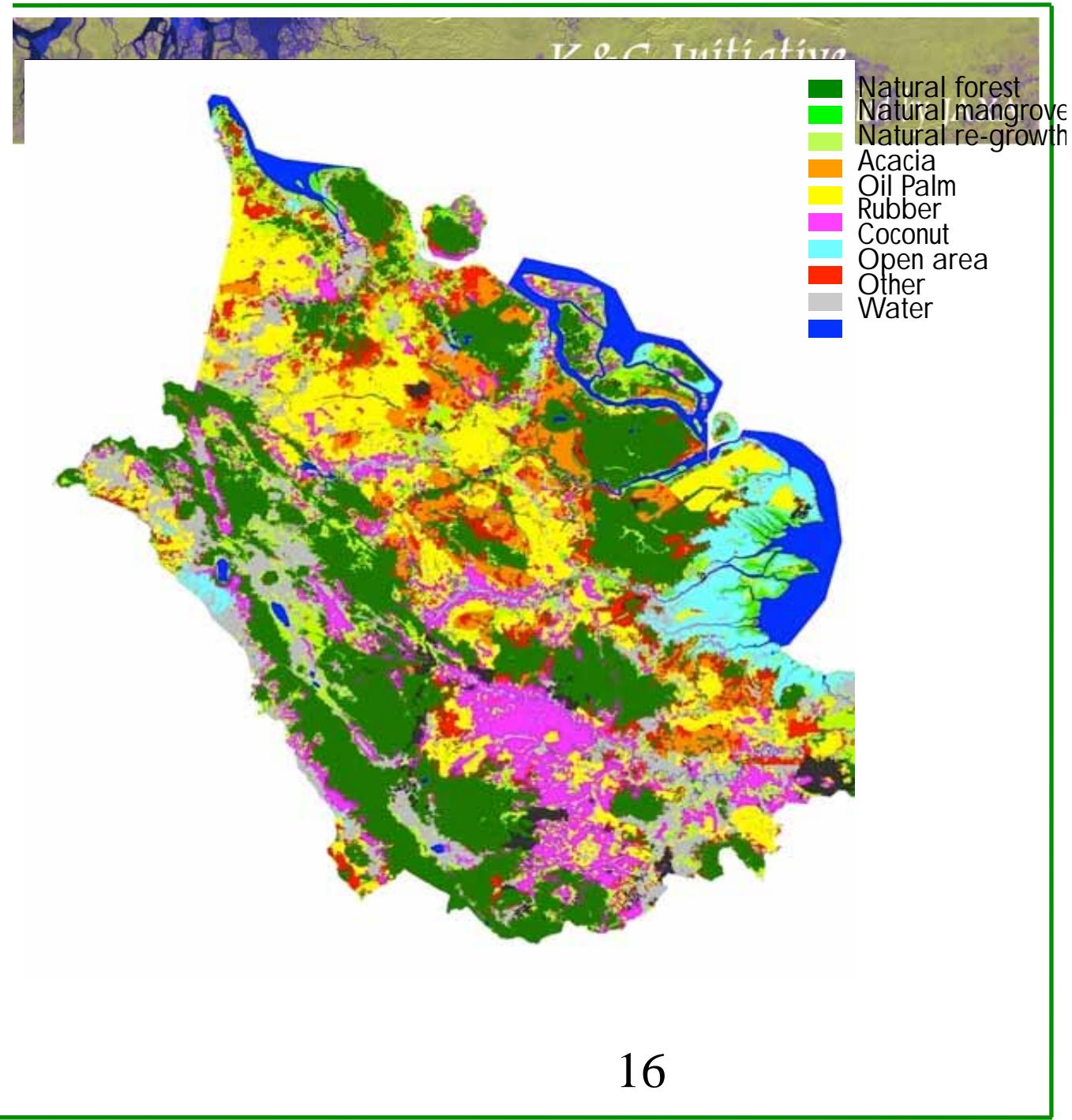
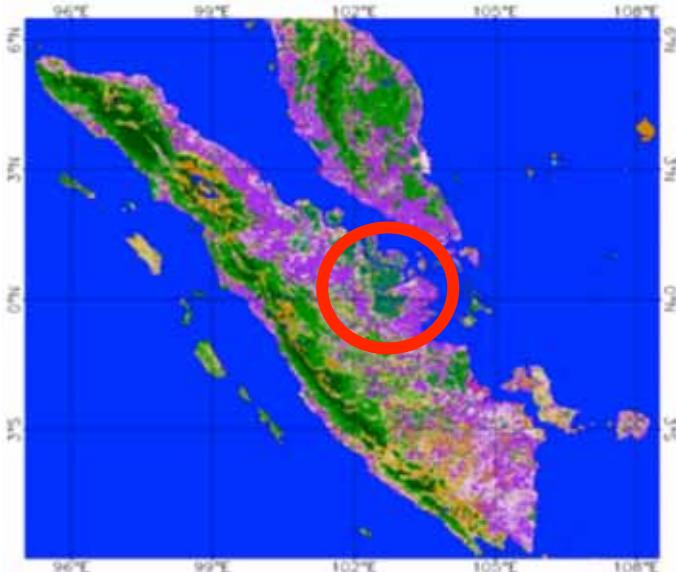
Three colors

Green: No change

Blue: decrease

Red: Increase

Larger blue color shows forest .

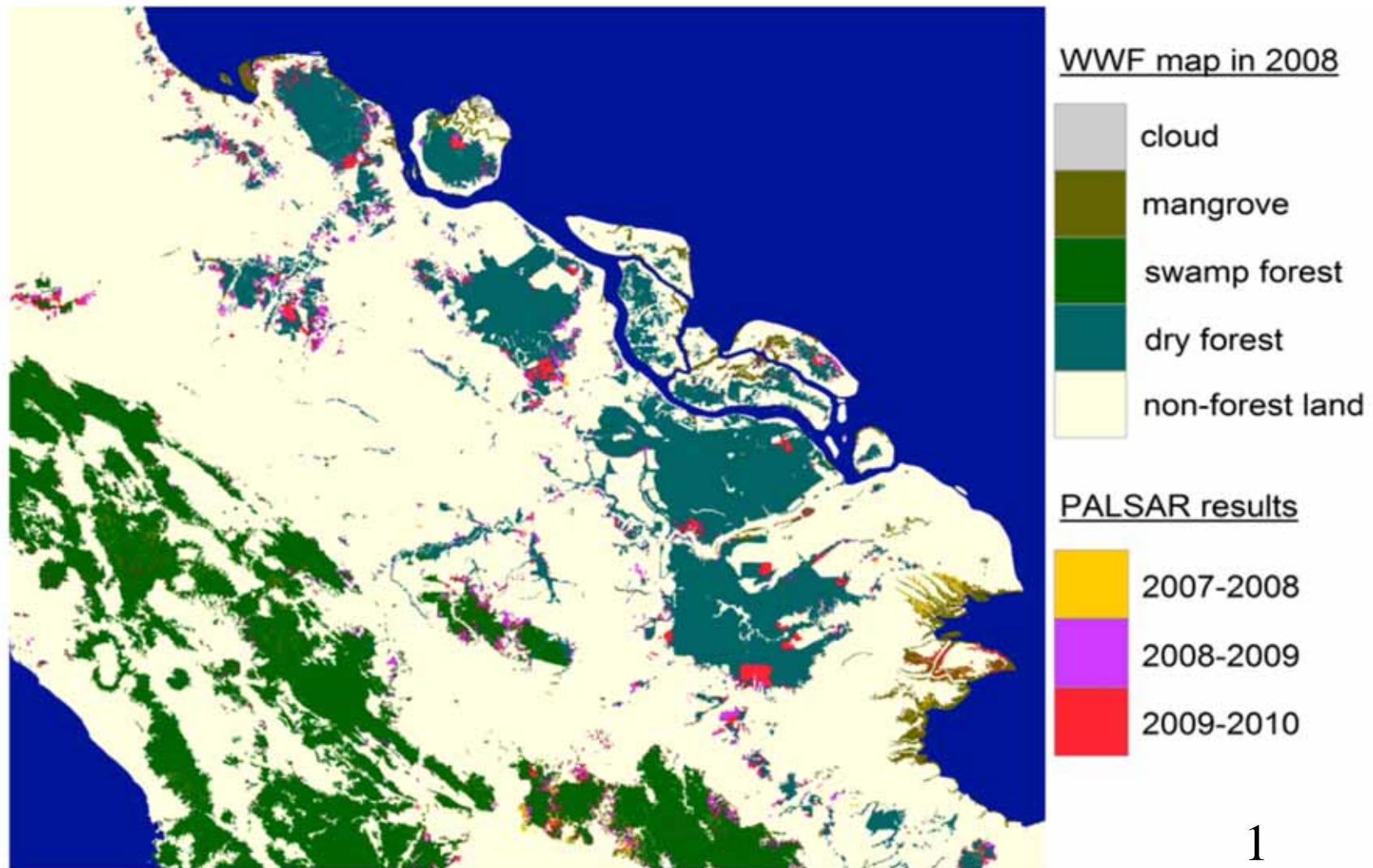


ALOS

Deforestation map of central Sumatra derived by PALSAR 25-m mosaics

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Gamma-naught change : allows the deforestation monitoring and forest changes at the known classes



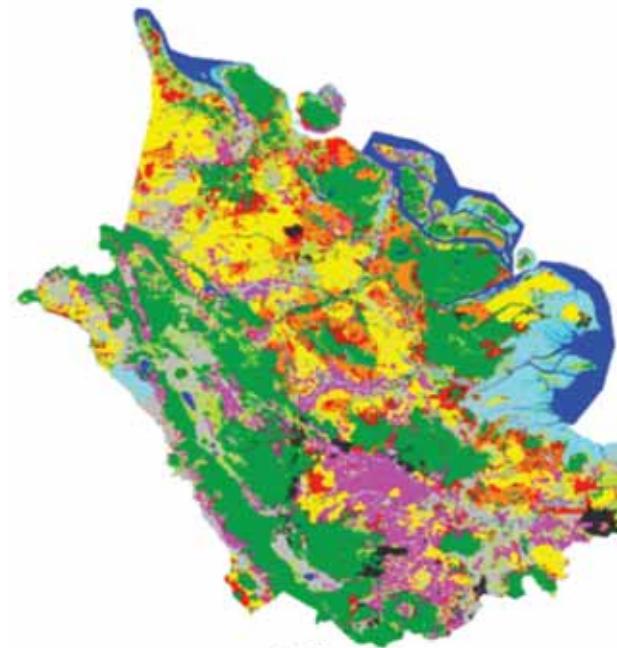
A

Comparison study for 土地利用分類アルゴリズム 開発:LULUCF

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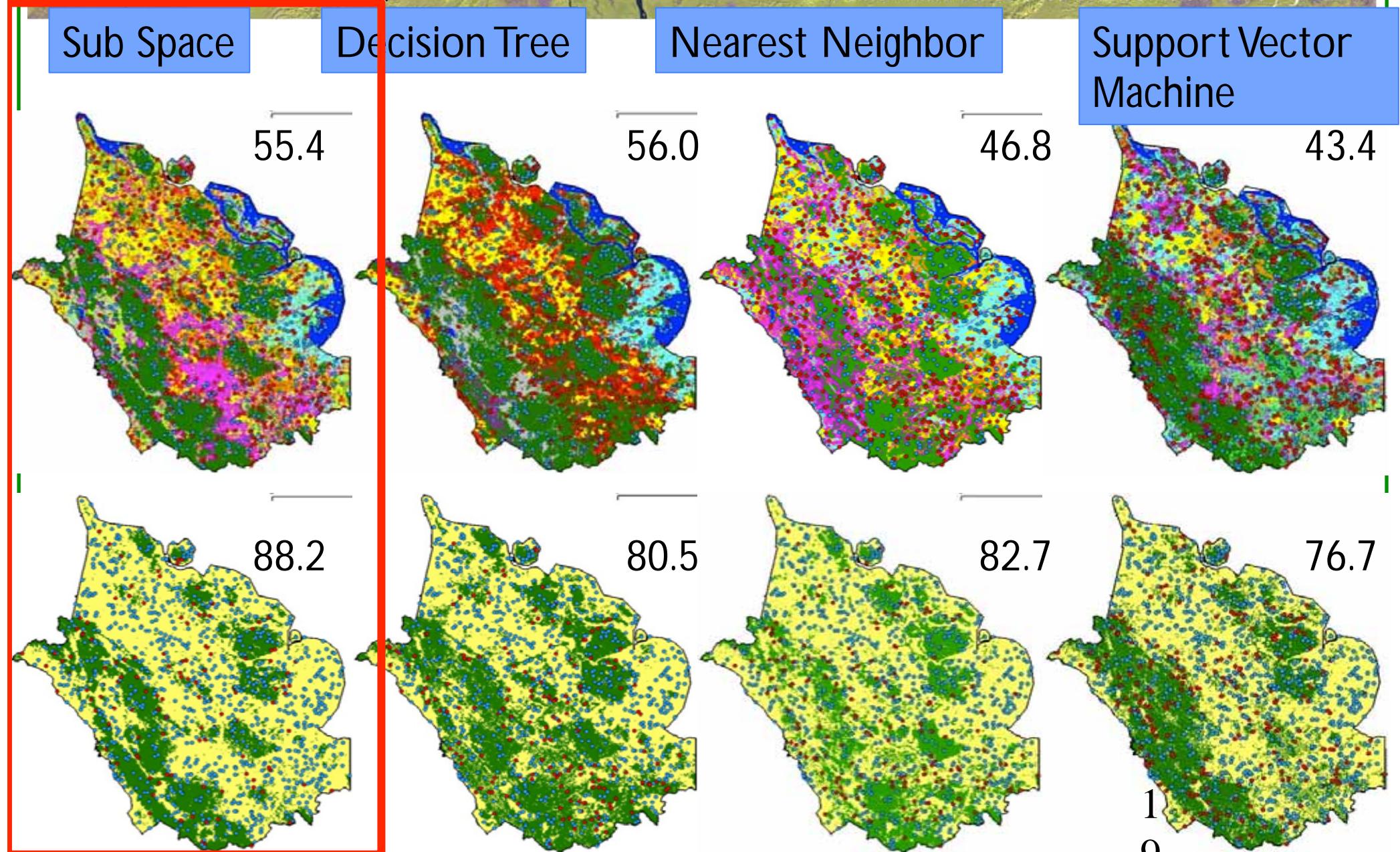
- Area : Riau
- Method : Subspace (SS), Decision Tree (DT), Nearest Neighbor (NN), Support Vector Machine(SVM)
- Output, LULUCF & FNF
- 評価結果: SS>DT>NN>SVM at FNF, SS showed the best of 88%.
- 精度評価:- Stratified random sampling approach

Land cover class	%Landscape	CI ±3
Natural forest	30.19	322
Natural mangrove forest	1.79	19
Natural re-growth	12.17	130
Acacia	5.09	54
Oil Palm	13.53	144
Rubber	9.53	102
Coconut	3.95	42
Open area	6.94	74
Other	10.98	117
Water	5.83	62
Total	100.00	1067



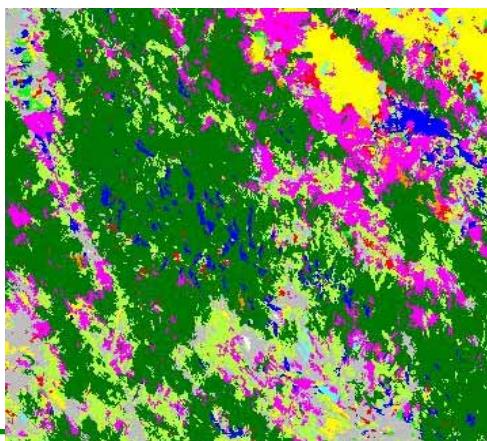
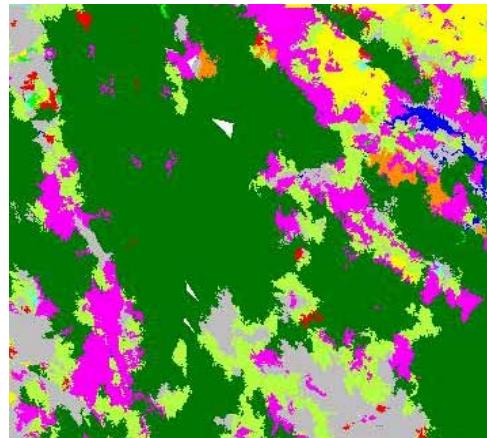
Ground truth WWF Map (2000)

LULUCFアルゴリズムの比較 (数字は精度%, LULUCFは9クラス、FNFは2クラス
青は正解、赤は間違い)



Slope correct effect and advantage of Gamma-naught Visualization

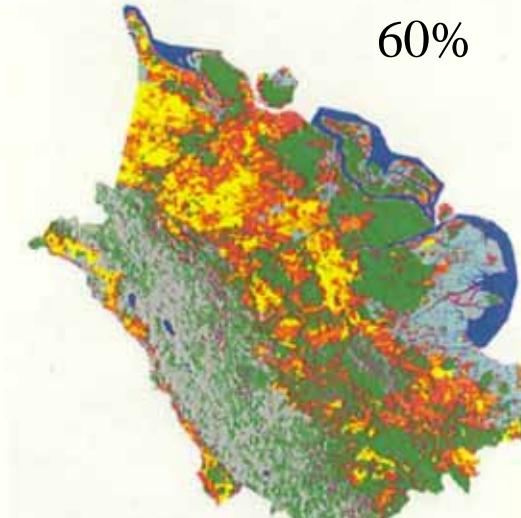
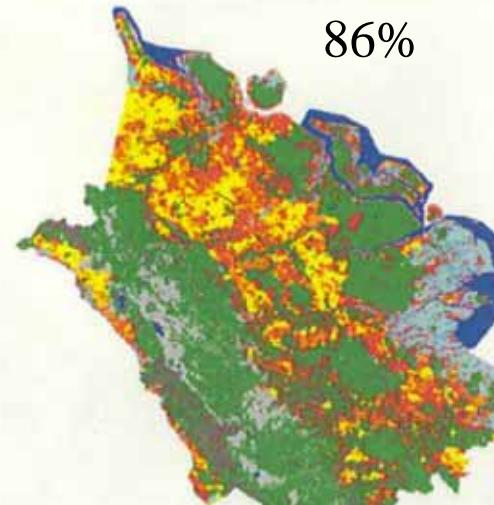
- LULUCF(FNF)
- FNF



勾配補正有り

勾配補正有り

勾配補正なし



PALSAR
(HH + HV, Slope Correctionあり)

PALSAR
(HH + HV, Slope Correctionなし)

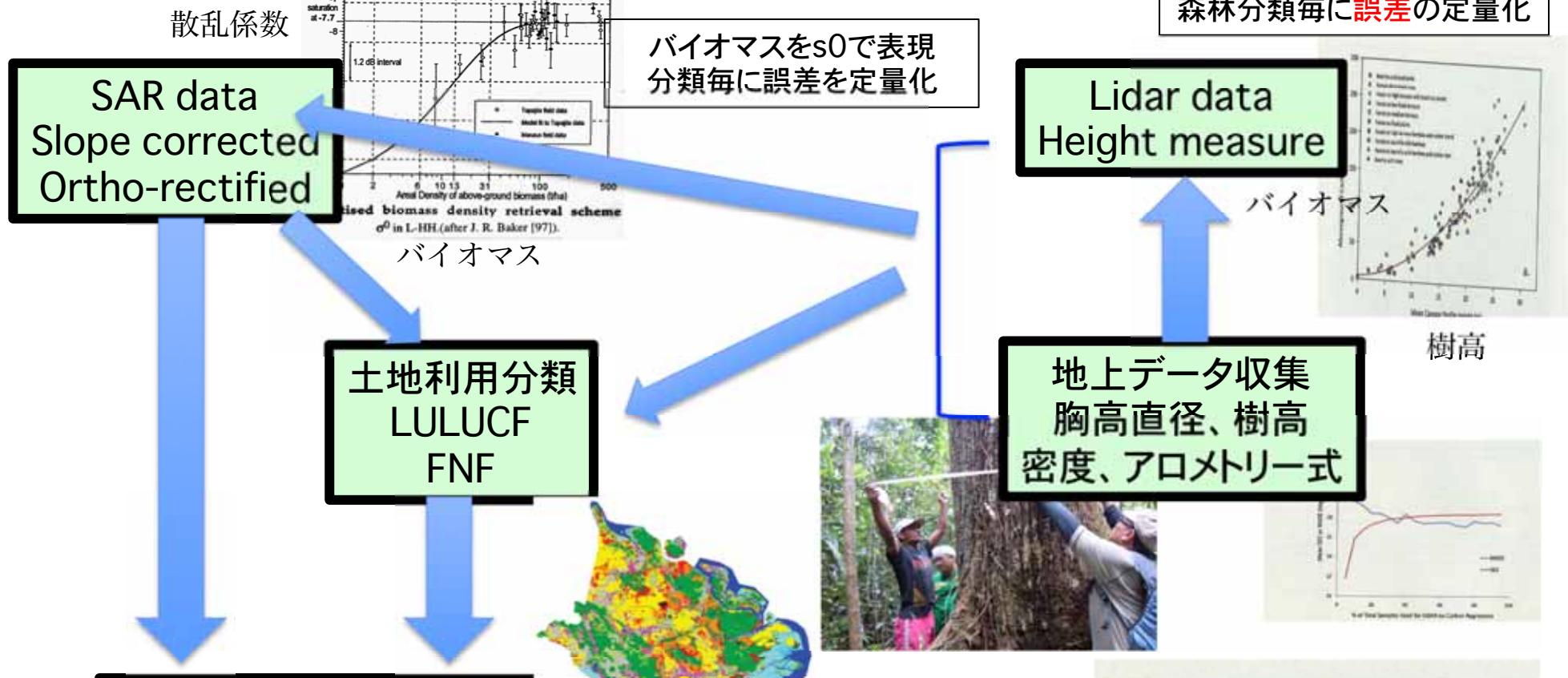
勾配補正なし

森林・非森林
86%
↓
60%

		Forest	Mangrove	ReGrowth	Acacia	Oil Palm	Rubber	Coconut	OpenArea	Others
Slope Correction	Producer'S Accuracy [N]	64.03%	33.57%	0.00%	26.66%	55.39%	20.75%	43.17%	17.03%	29.79%
	User'S Accuracy [N]	86.43%	31.81%	0.00%	12.84%	56.92%	4.03%	69.62%	45.61%	10.52%
Slope Correction	Producer'S Accuracy - [N]	51.49%	27.24%	0.00%	20.14%	52.22%	14.67%	35.97%	14.89%	14.19%
	User'S Accuracy [N]	60.99%	28.00%	0.00%	13.29%	54.49%	2.18%	73.51%	48.03%	23.20%

Slope Correctionされていないデータでは、特に地形の起伏が多い山岳地帯における森林分類の精度が大きく低下した。

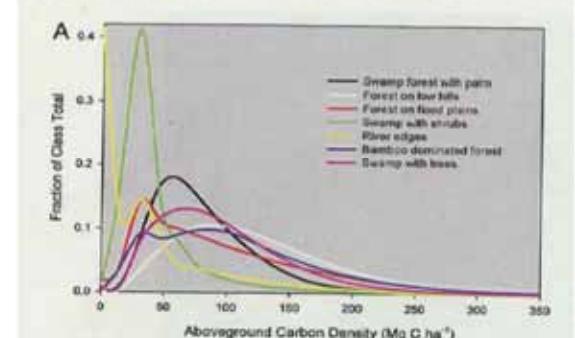
biomass estimation(accuracy) (Tier-2~3)



$$B = \sum_i b_i A_i$$

$$\Delta B = \sqrt{\sum_i (\Delta b_i A_i)^2}$$

度数



バイオマス

MRV Status

Two methods are being developed for the operations, SS for LULUCF, and Gamma-naught change detection estimating the forest area change in Indonesia ad Brazil.

PALSAR basic processing: done.

Ground plotting 48 points in Riau
Lidar data in Riau



A

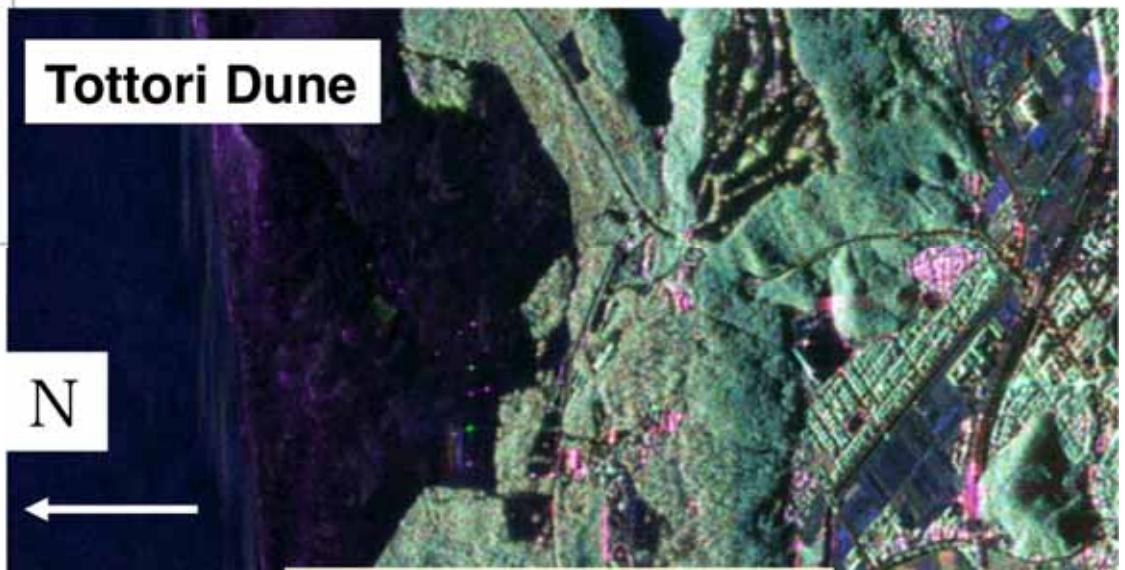
Pi-SAR-L2



Frequency	1.275e9 Hz
Band width	50 MHz- 85MHz
Sampling freq.	61.275MHz, 120
Height	6~12Km
Image swath	<=15Km
AD(I/Q)	8 bits
r (R) slant	3 m, 1.8m
r (A) 4look	3.2 m
s ⁰	1.1 dB
NES0	-45 dB
Inci. Angle	10~60
Polarimetry	Full
t	10micros 35micro
Pt	3.5KW
Beam width(A)	8.4 degrees



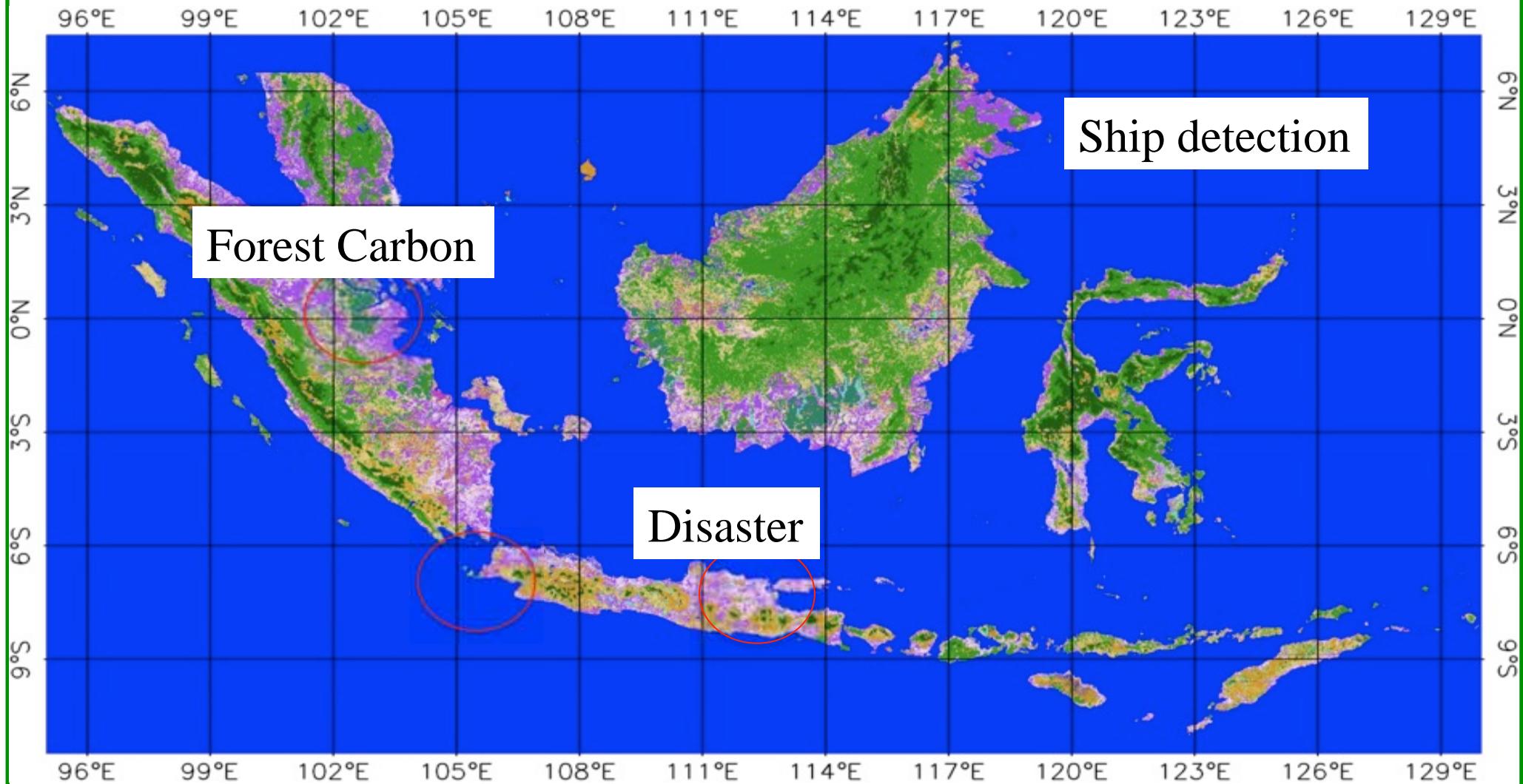
Pi-SAR-L



SIGMA-SAR processor

Test areas - TBD

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Target areas

The ALOS logo is displayed in white text on a dark blue background, which is part of a larger image showing a satellite-derived map of land cover and terrain.

K&C Initiative
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Schedule

Pi-SAR-L2 campaign in Indonesia : Aug 4-11, 2012

Four theme

Forest,

Disaster: Volcano

Ship detection

Geometric evaluation

Under negotiation with RISTEK, BPPT, LAPAN, BAKOSURTANAR