ALOS PALSAR data assimilation into INPE's Brazilian Amazon Deforestation Monitoring Program (PRODES and DETER)

Phase 1 Report

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1.0S

K&C Meeting # 11 - Tsukuba – Jan/2009

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LOS

PRODES – Assessment of yearly deforestation rate in Brazilian Amazon (4 Mi sq km)



ALOS

•Near-real time deforestation and intensive degradation assesment

•Support for law enforcement action

•Public awareness of deforestation issue



PALSAR data are essential to monitor areas with constant cloud cover as in the northern part of the Brazilian Amazon Region.

NPE – K&C database	(Sept.2008)	– raw data
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ALOS

Product	Radiometric Resolution	Spatial Resolution (m)	# Images	Off-nadir	Processing Level	Img	ı/year
FBS	-	-	-	-	-		-
						2006	0
FBD		37.5x51	212 34.3	34.3		2007	212
						2008	0
	16 Dito	100	179	27.1	Slant- Range	2006	9
WB1	TO DIIS					2007	86
						2008	84
		18x70	19	27.1		2006	0
WB2						2007	7
						2008	12
Total						otal	410





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ALOS















ALOS

Forest degradation Marcelância (MT)

Alos PALSAR (12.5 m) 2007-01-14 HH - FBS 2007-07-17 HH, HV - FBD 2008-01-17 HH - FBS TM/Landsat 226/68 (2007-0<mark>8-17)</mark>

(D)

Forest Degradation Field Work - 2008/Feb Besides the clear cut pattern, forest degradation is also detected with PALSAR data.

- - 11 Yr

S11:05:00 O53:50:00

(Fine resolution)

PALSAR data are essential to monitor areas with constant cloud cover as in the northern part of the Brazilian Amazon Region.

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Synergistic application of ALOS/PALSAR in support to PRODES and DETER projects - Phase 1

Work Tasks

LOS

- Evaluate the accuracy of ALOS/PALSAR to detect deforestation in the Brazilian Amazônia
- Apply ALOS/PALSAR data to complete the deforestation assessment on cloud covered area

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OS

Operational procedure for ALOS/PALSAR images depends on image geometry

Operational procedure for ALOS/PALSAR images depends on image geometry

ALOS

Image Processing (16 bits)	Minimum	Maximum	Media	Standard Deviation
Level 1.0 image	628	22599	4927,28	1561,76
After geocoding	39,09	118882,03	12774,38	4795,59

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ScanSar Mode original 1.0 level image

After radiometric calibration and geocoding

Operational procedure for ALOS/PALSAR images depends on image geometry

ALOS/PALSAR ScanSar (08/30/2008) geocoded and orthorectified

ALOS

Operational procedure for ALOS/PALSAR images depends on image geometry

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ALOS/PALSAR ScanSar (08/30/2008) geocoded and orthorectified

ALOS

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ALOS/PALSAR ScanSar (08/30/2008) geocoded and orthorectified

ALOS

Operational procedure for ALOS/PALSAR images depends on image geometry

ALOS/PALSAR Fine Beam Double Mode image (08/01/2007) compared to NASA/Geocover RGB images

ALOS

17 Pixel

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MINISTÉRIO DA CIÊNCIA E TECNOLOGIA INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS

Synergistic application of ALOS/PALSAR in support to PRODES and DETER projects - work from Phase 1

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WT1- ALOS/PALSAR to detect deforestation in the Brazilian Amazônia

ALOS

K&C images to detect deforestation in Brazilian Amazônia to qualify deforestation results from DETER projects
 results.
 Route 1: 416 km

September 2008

INPE/IBAMA

Itaituba

Novo Progresso

ALOS

Altamira

• Web Portal to select ALOS PALSAR K&C images, verifying scenes coverage

Parâmetros do Banco Banco: Files			Image	Dad s between 2 Po	os de Imag 1008-01-01 a Ilarization HH	jes and 2008-12-3:	L
Tabela: Images Acessar Configurações	Nre	ro Filename	Date	Images ne	xt to (-2.08, Upper left lat	-55.10) Upper left long	Upper rig lat
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	4	4 KC_003-19409N08S16WB1SLT1.tar.gz	2008-06-04	НН	7.14785385	-51.86725616	7.817
Lat.: -2.08		6 KC_003-20409N09S17WB1SLT1.tar.gz	2008-07-20	НН	7.57900953	-51.77285385	8.251
Long.: -55.10		7 KC_003-21409N08S16WB1SLT1.tar.gz	2008-09-04	HH	7.20635462	-51.85453415	7.879
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http://www.dpi.inpe.br/sima/bancos/

Arley Ferreira de Souza

ALOS

ALOS

• ALOS PALSAR K&C images, WB1 – August, 2008 and Deforestation Polygons Deter (May-Aug/2008)

Synergistic application of ALOS/PALSAR in support to PRODES and DETER projects - work from Phase 1

WT1- ALOS/PALSAR to detect deforestation in the Brazilian Amazônia

ALOS-PALSAR image assessment for DETER clear-cut polygons verified during the fieldwork

LOS

	Deter Clear-cut	ALOS detection	%
May	12	6	50.00
June	17	7	41.18
July	14	10	71.43
August	24	14	58.33
Total	67	37	55.22

Average Area of DETER clear-cut polygons verified during the fieldwork

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	DETER polygons average area (km ²)					
Month	Detected Not detected					
Мау	7.00	3.86				
June	5.51	3.21				
July	2.46	1.68				
August	2.35	1.83				
Average	4.33	2.65				

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WT1- ALOS/PALSAR to detect deforestation in the Brazilian Amazônia

Considering DETER- September

LOS

Alos Palsar WB1 image (10-15-2008) coverage and DETER Alert Polygons for September 2008 (red vectors).

DETER cloud cover – September 2008

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Synergistic application of ALOS/PALSAR in support to PRODES and DETER projects - work from Phase 1

ALOS (10-15-2008)	DETER Polygons (Sept-2008)	%	Area (km²)
Detected	34	44.74	0.92
Undetected	42	55.26	0.75
Total	76		

LOS

1.3 Publications

Imagens ALOS-PALSAR K&C no Monitoramento do Desmatamento da Amazônia por Satélite. In XIV Simpósio Brasileiro de Sensoriamento Remoto, 2009. Natal-BR (Accepted)

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GOVERNO EEDERA

WT1- ALOS/PALSAR to detect deforestation in the Brazilian Amazônia WT2 - Apply ALOS/PALSAR data to complete the deforestation assessment on cloud covered area (incomplete)

To incorporate ALOS PALSAR K&C images in the operational deforestation monitoring:

- Radiometric and geometric corrections;
- Image classification segmentation /automatic procedure to detect deforestation polygons;
- Methodological procedure to detect deforestation at ALOS PALSAR

ALOS

•PRODES and DETER deforestation data to calibrate results from ALOS imagery.

OBS: Areas with flat relief (as north of Mato Grosso figure) are especially suitable to radar image monitoring.

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LOS

INPE sincerely thanks JAXA for the very inportant support for relevant SAR application program

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