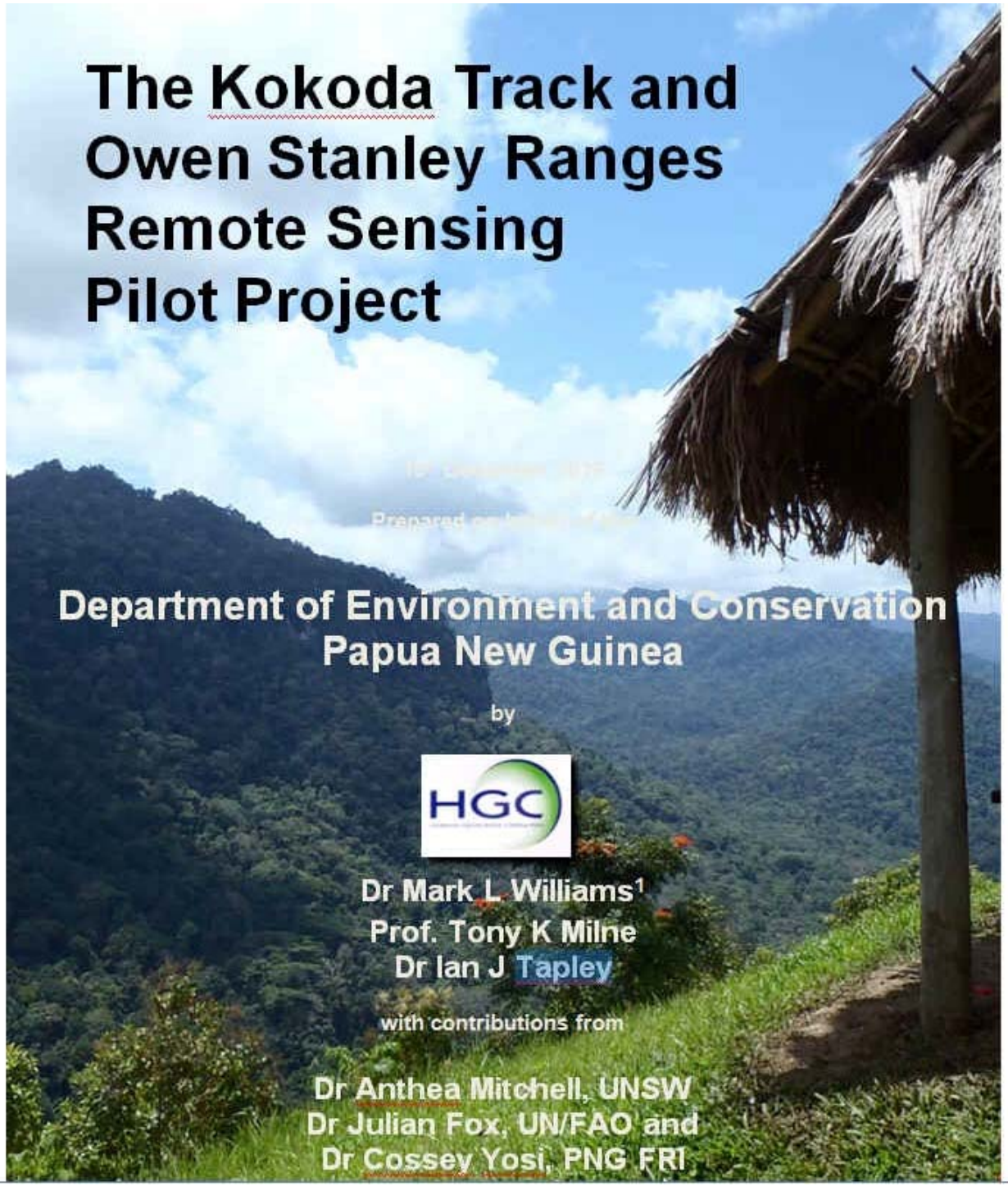
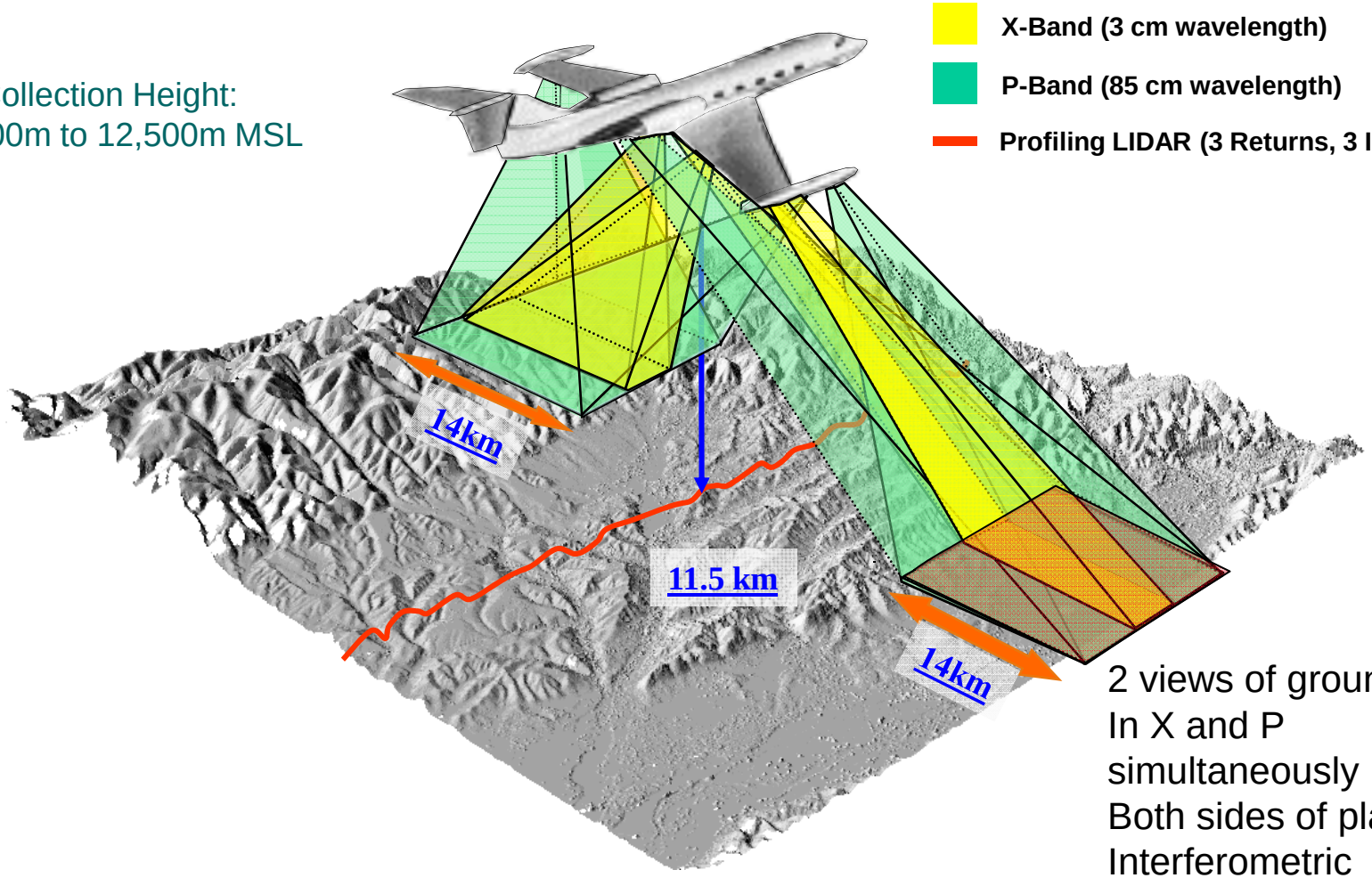

The Kokoda Track and
Owen Stanley Ranges
Remote Sensing
Pilot Project
Department of Environment and Conservation
Papua New Guinea
by
HGC
Dr Mark L Williams[1]
Prof. Tony K Milne
Dr Ian J Tapley
with contributions from
Dr Anthea Mitchell, UNSW
Dr Julian Fox, UN/FAO and
Dr Cossey Yosi, PNG FRI

Flight Characteristics

Collection Height:
10,000m to 12,500m MSL



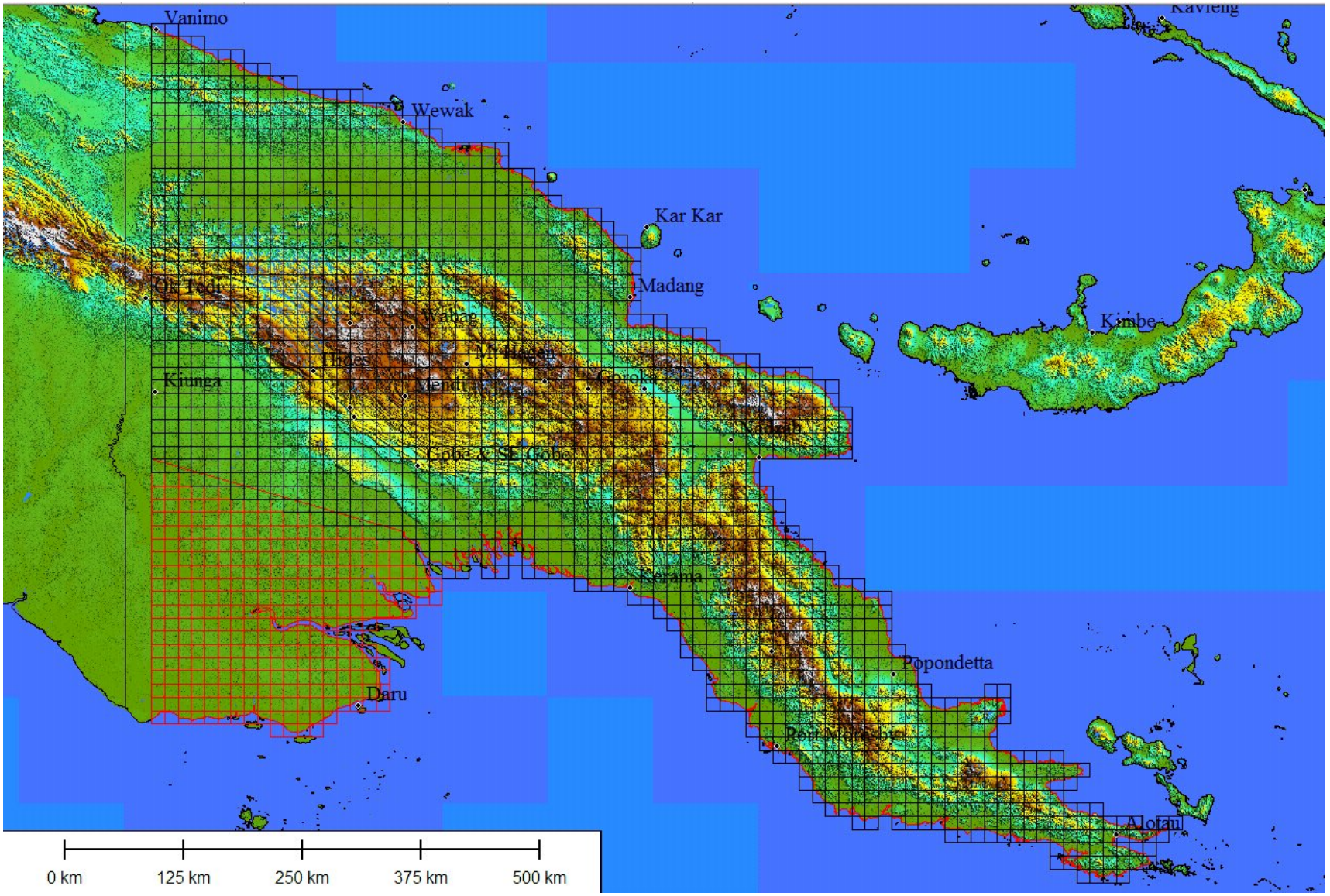
2 views of ground
In X and P
simultaneously
Both sides of plane
Interferometric

GeoSAR Product Characteristics

	X-band	P-band
DEM height accuracy		
Single swath	0.5-1.2 m (Relative)	1-3 m (Relative)
Mosaic	~1.0 m (Absolute)	1-4 m (Absolute)
DEM resolution	2.5 - 5 metres	2.5 - 5 metres
Planimetric Accuracy	1 m (Relative) < 2.5 m (Absolute)	2 m @ 5 km Altitude (Absolute) 4 m @ 10 km Altitude (Absolute)
Ground swath	12 -14 km on each side	12 -14 km on each side
Polarization	VV	HH and HV or VV and VH
Pixel Size	1.25 – 3m	1.25 – 5m

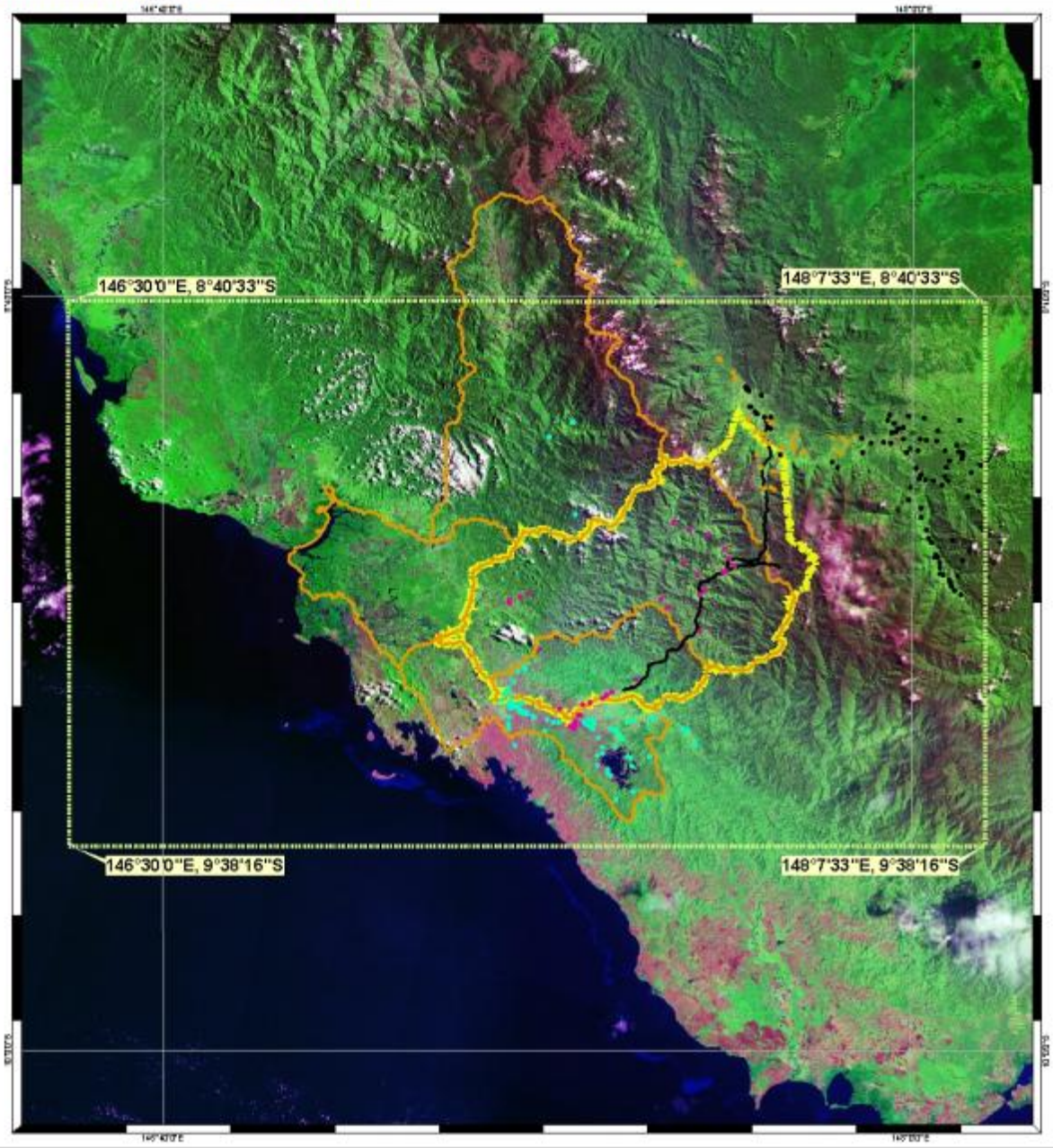
Multi-swath mosaicking and application of Lidar ground measurements results in considerable improvement over single-swath accuracy.

Project AXIS- Papua New Guinea



15' x 15' Map Quads

KOKODA INITIATIVE BOUNDARY



Note:
Kokoda Iniative Boundary map.

Date Produced	April 2010

Legend

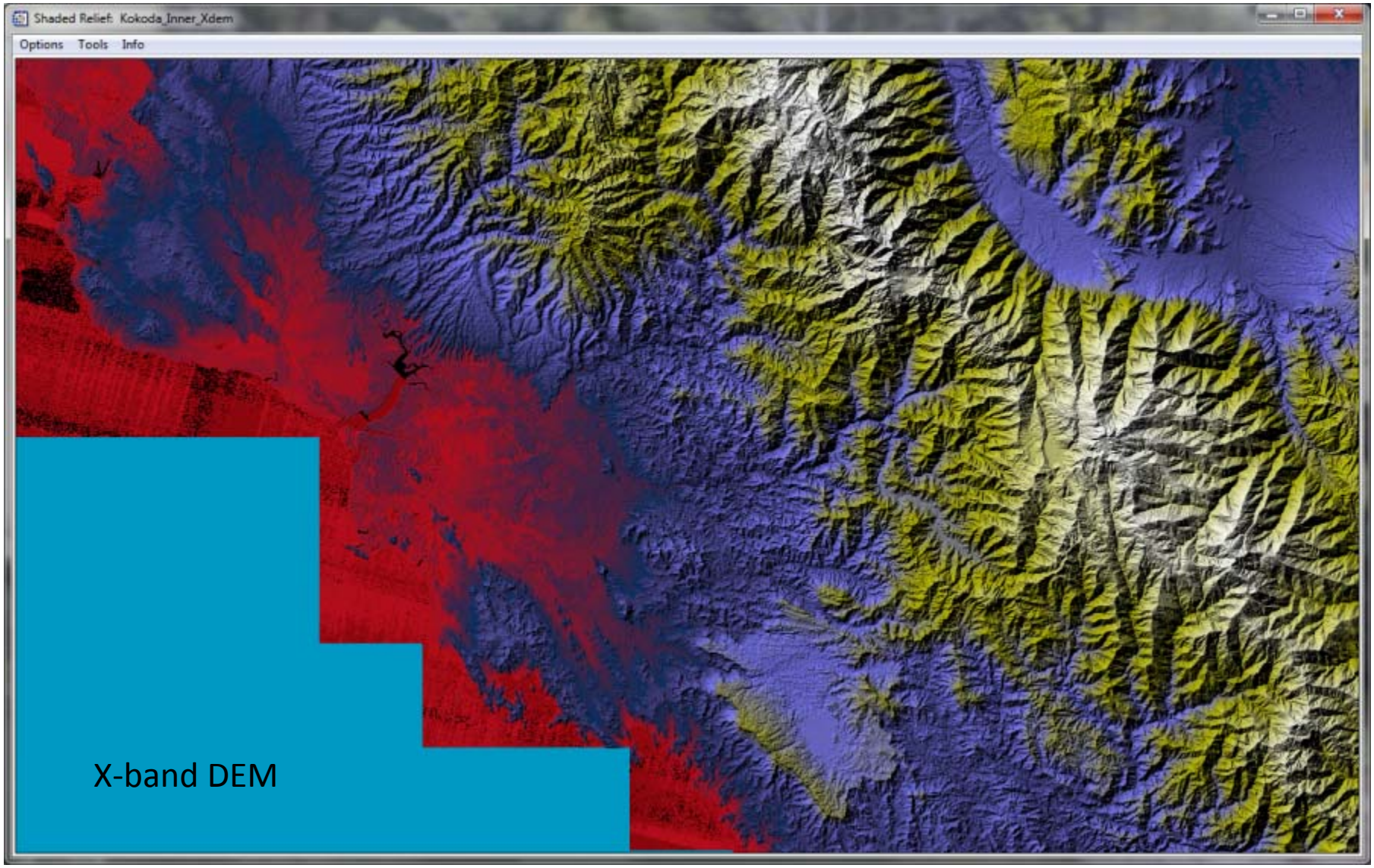
- Kokoda Initiative Inner Boundary
- Koiari non track villages
- Koiari track villages
- Kokoda non track villages
- Kokoda-track-villages_AGD66_point
- Bill James Current WGS-84
- Catchments - Will Rileys version
- Interim Protection Zone

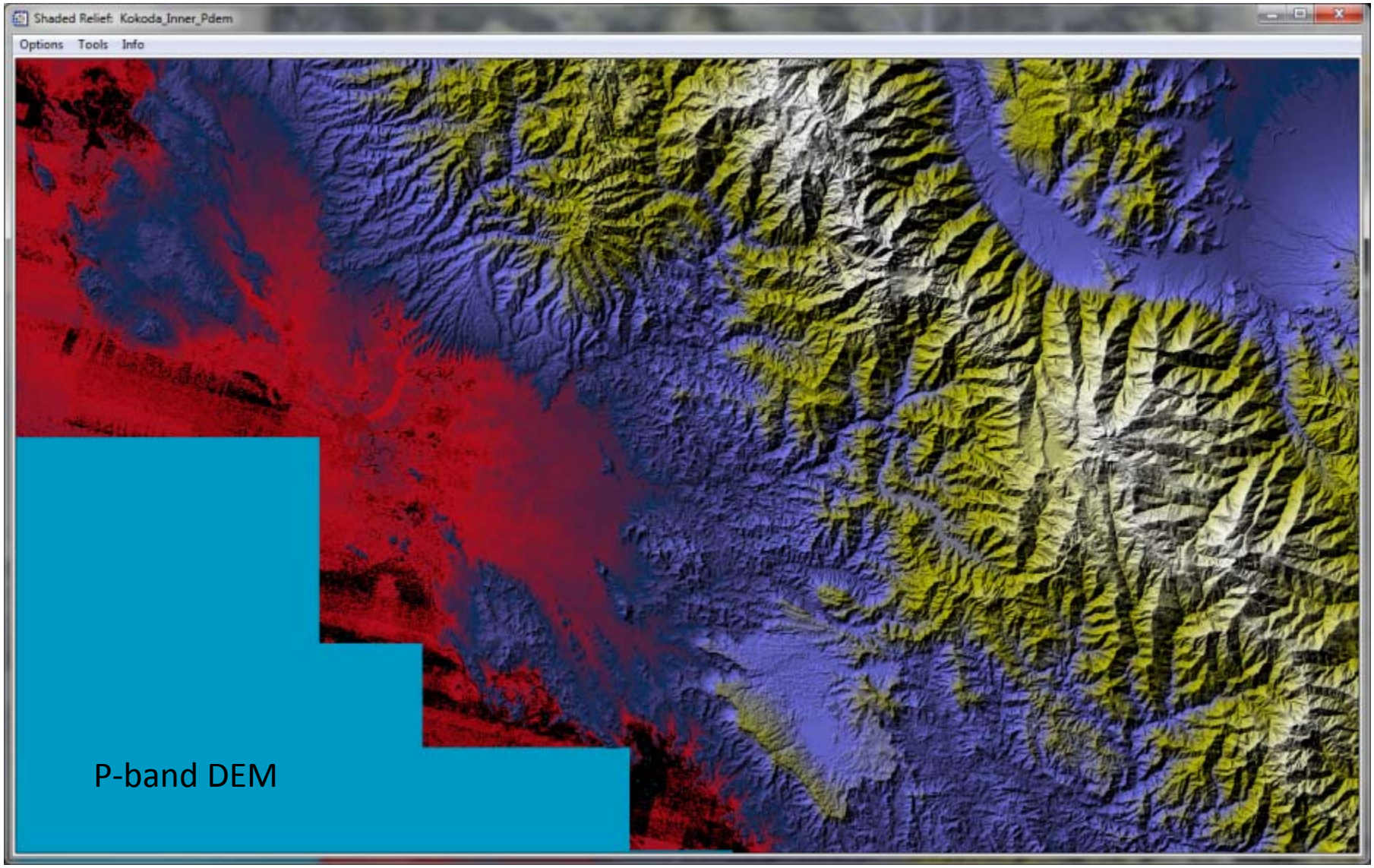
N
W E
S

Papua New Guinea

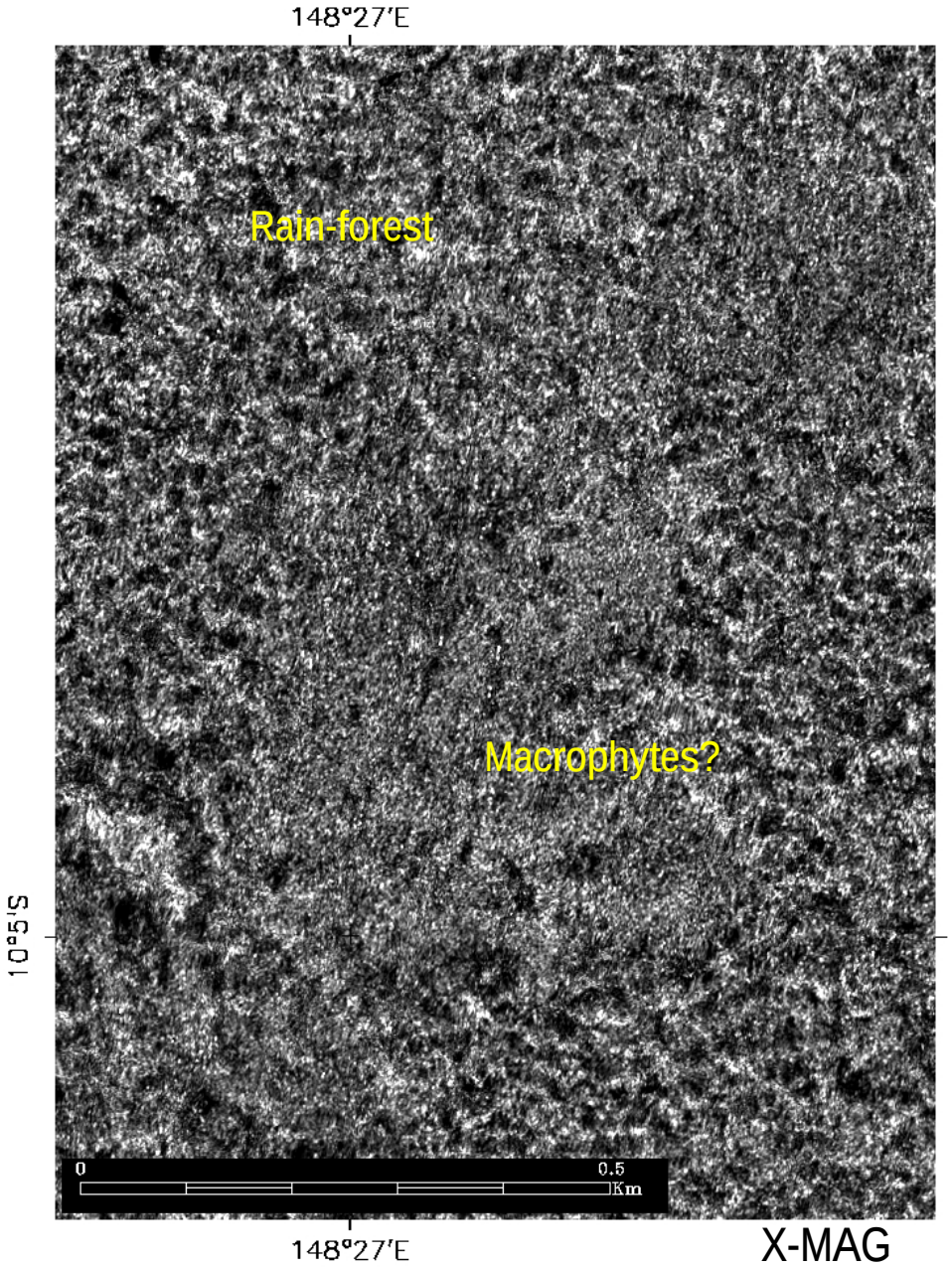
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Spatial Data and Systems Branch

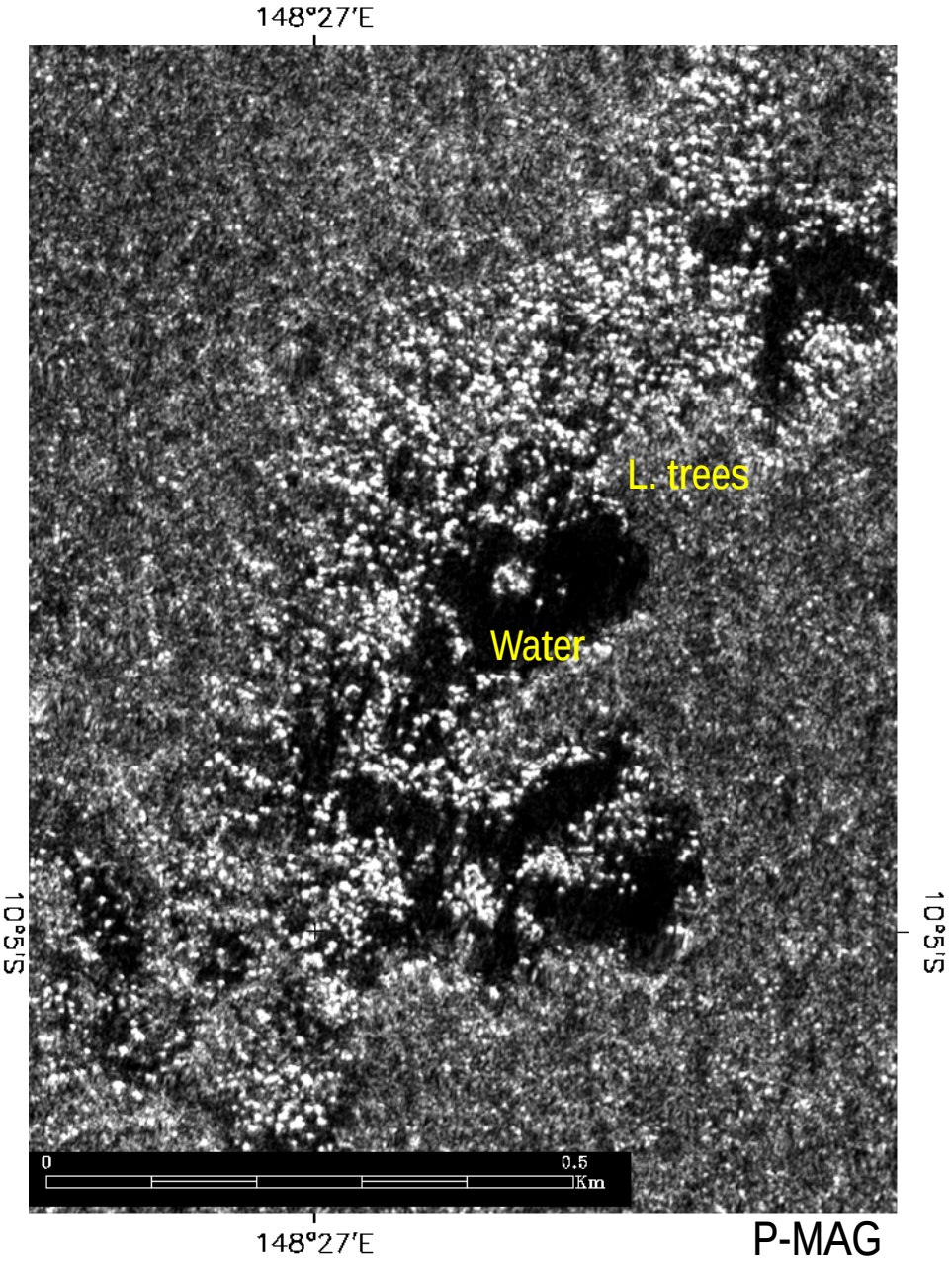
BASE MAP	PNG Landsat
0 5 10 20 30 Kilometers	Scale: 1 cm = 8 km
	Projection: GCS WGS 84 Zone 55


Shaded Relief: Kokoda_Inner_Xdem
Options Tools Info
X-band DEM


Shaded Relief: Kokoda_Inner_Pdem
Options Tools Info
P-band DEM

Trees occupying a wetland site

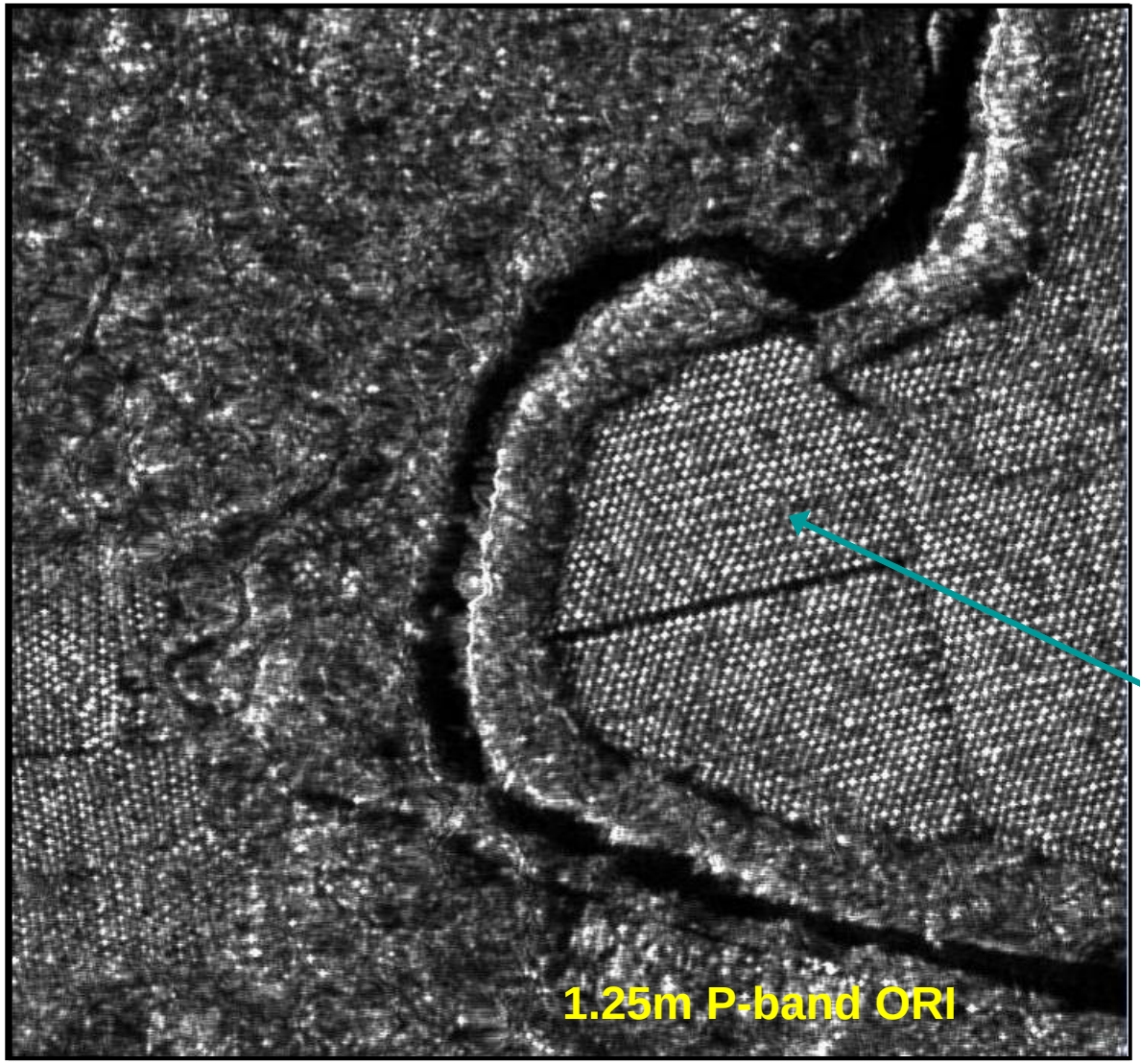




Wetlands

Airborne GeoSAR Xand P band

Airborne GeoSAR Xand P band



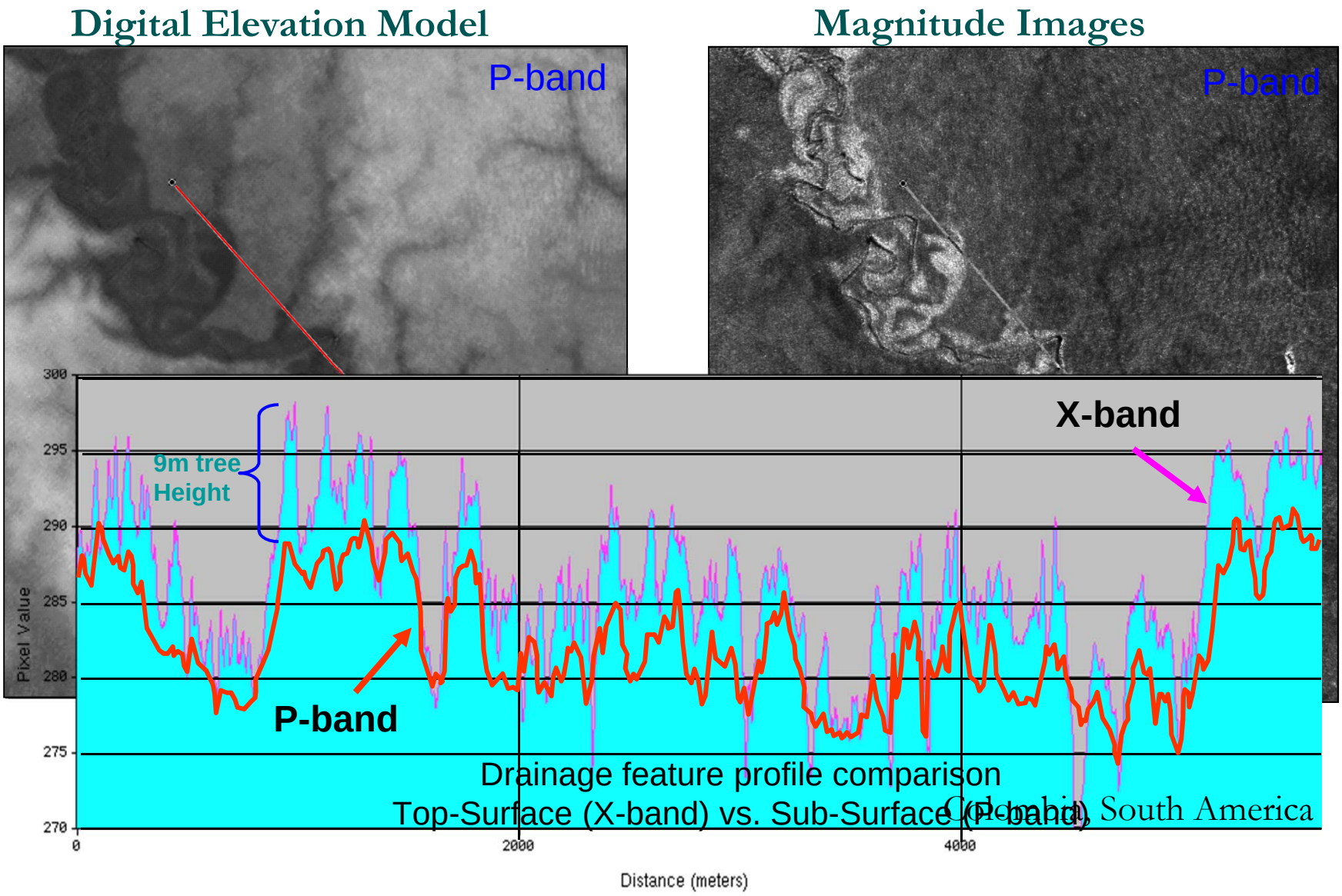
1.25m X- and P-band Radar Images

Orchards and trails, irrigation patters, drainages exposed in P-band

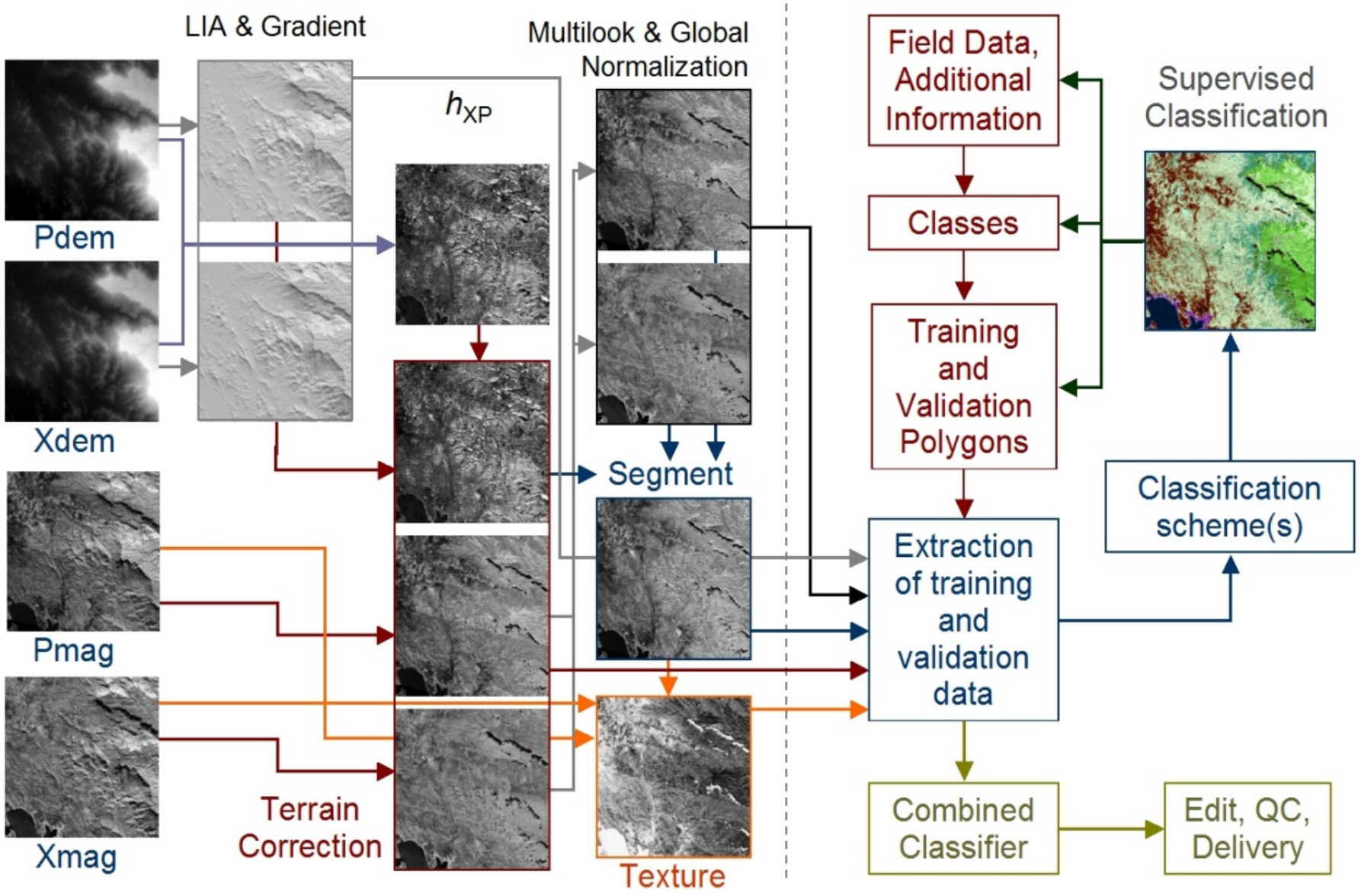
Capable of counting trees in orchards

Papua New Guinea

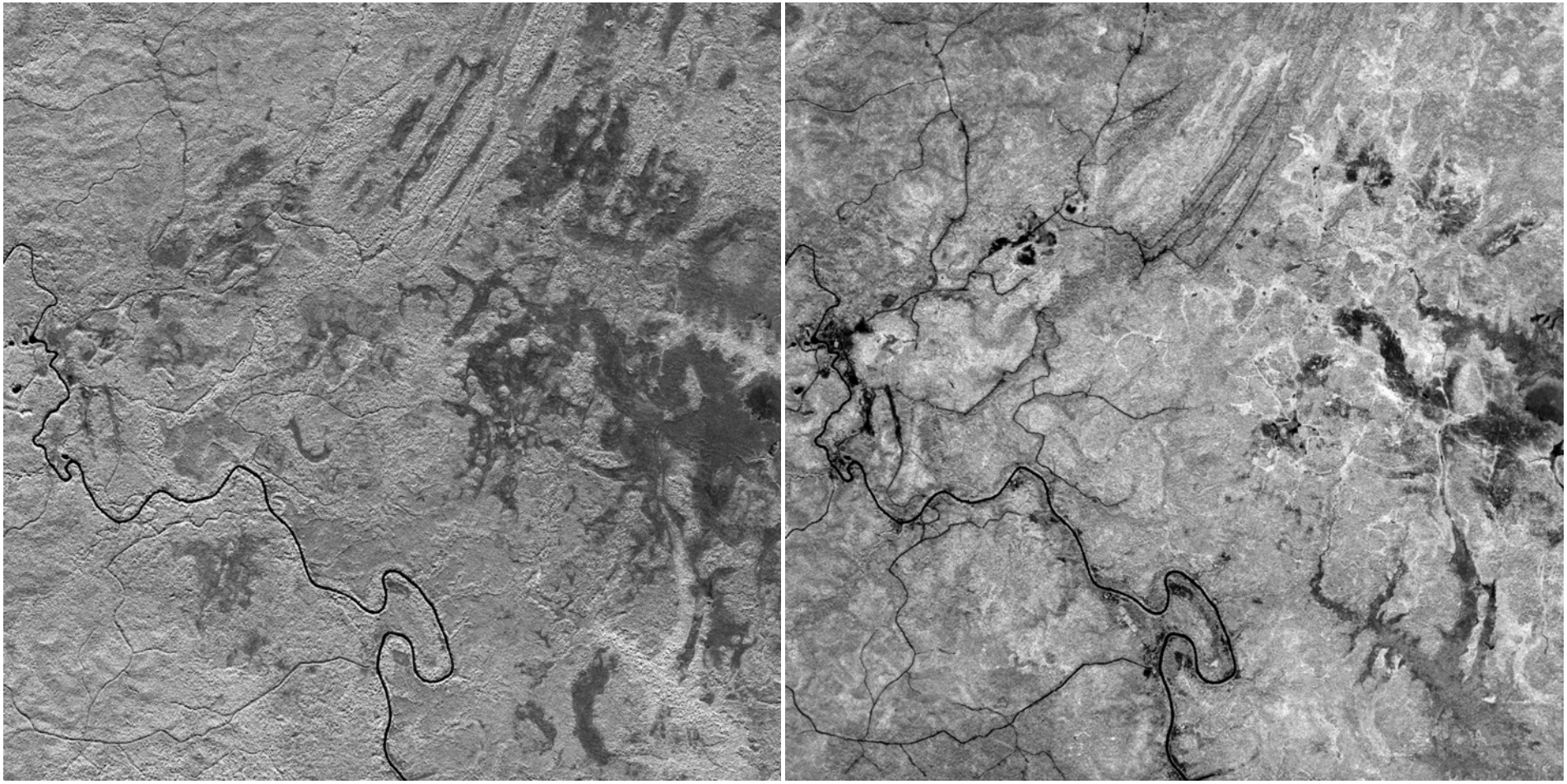
Airborne GeoSAR Xand P band



Forest and land cover classification

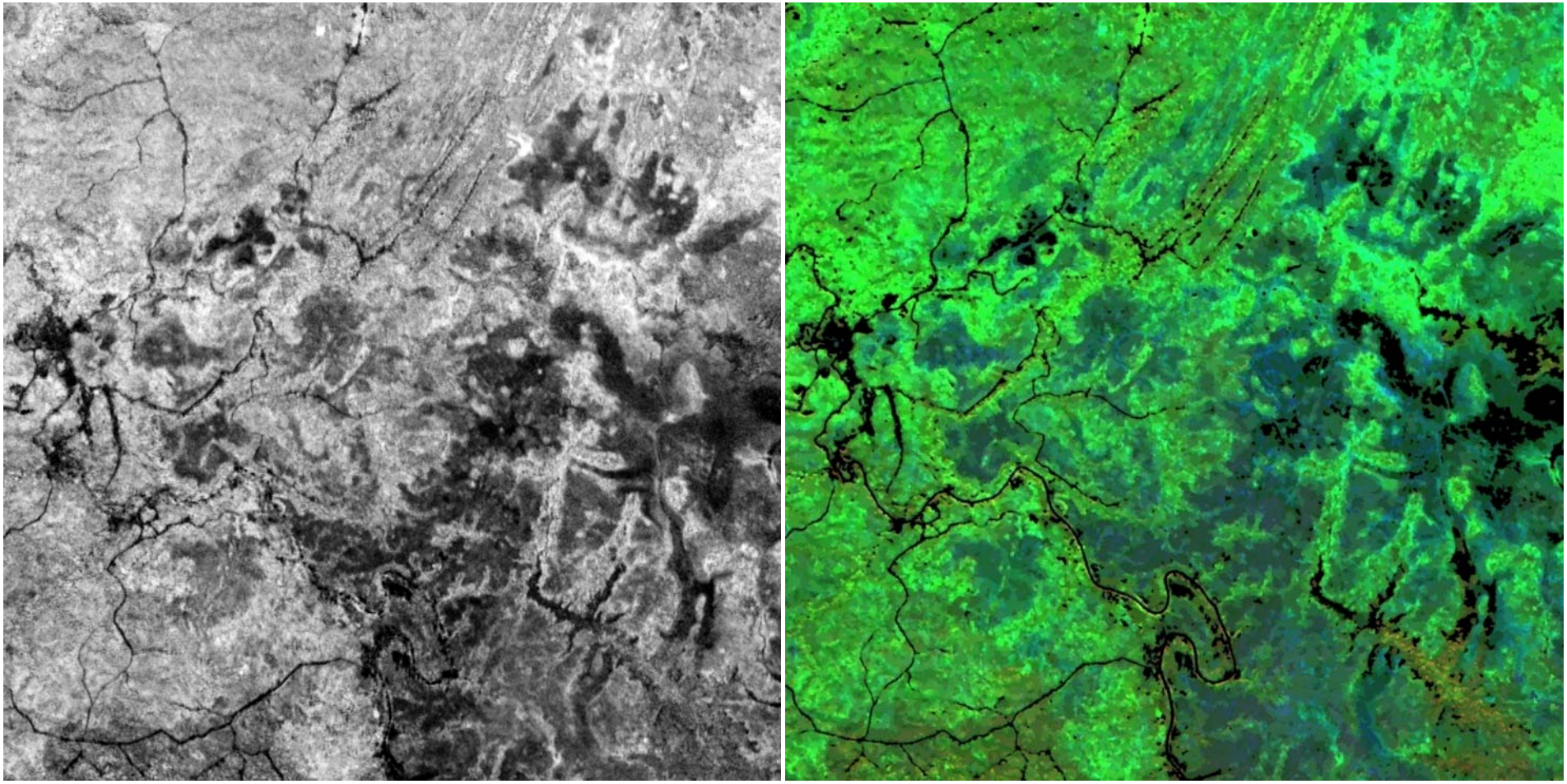


An Example of GeoSAR Biomass Estimation



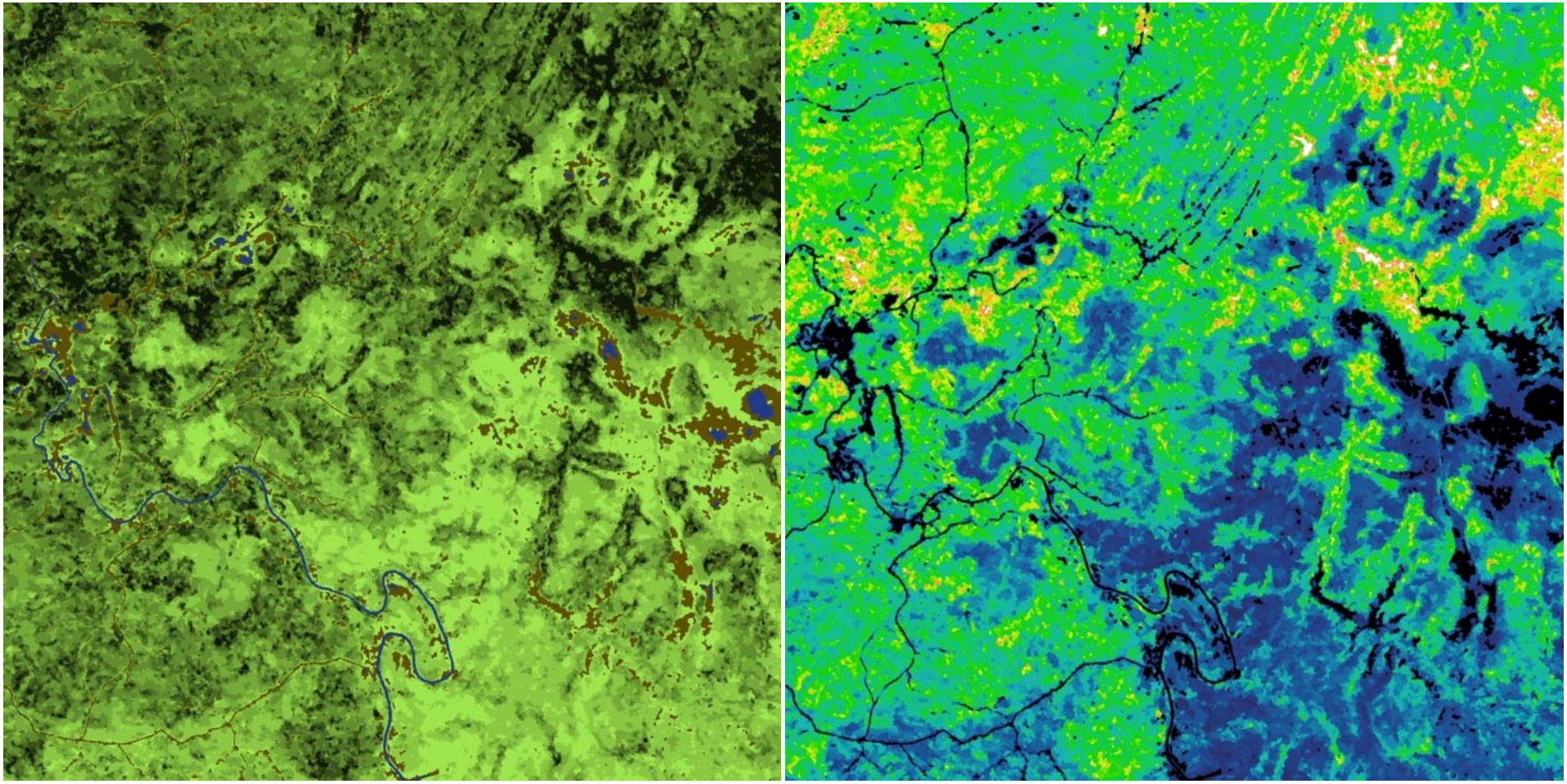
- Left: X-band magnitude, right: P-band magnitude. The area is ~25,000ha. Data from Papua New Guinea collection

An Example of GeoSAR Biomass Estimation



- Left: X-band - P-band interferometric height, h_{int}, is a surrogate vegetation height.
- Right: (R:X, G:h_{int}, B:P) for forested areas.

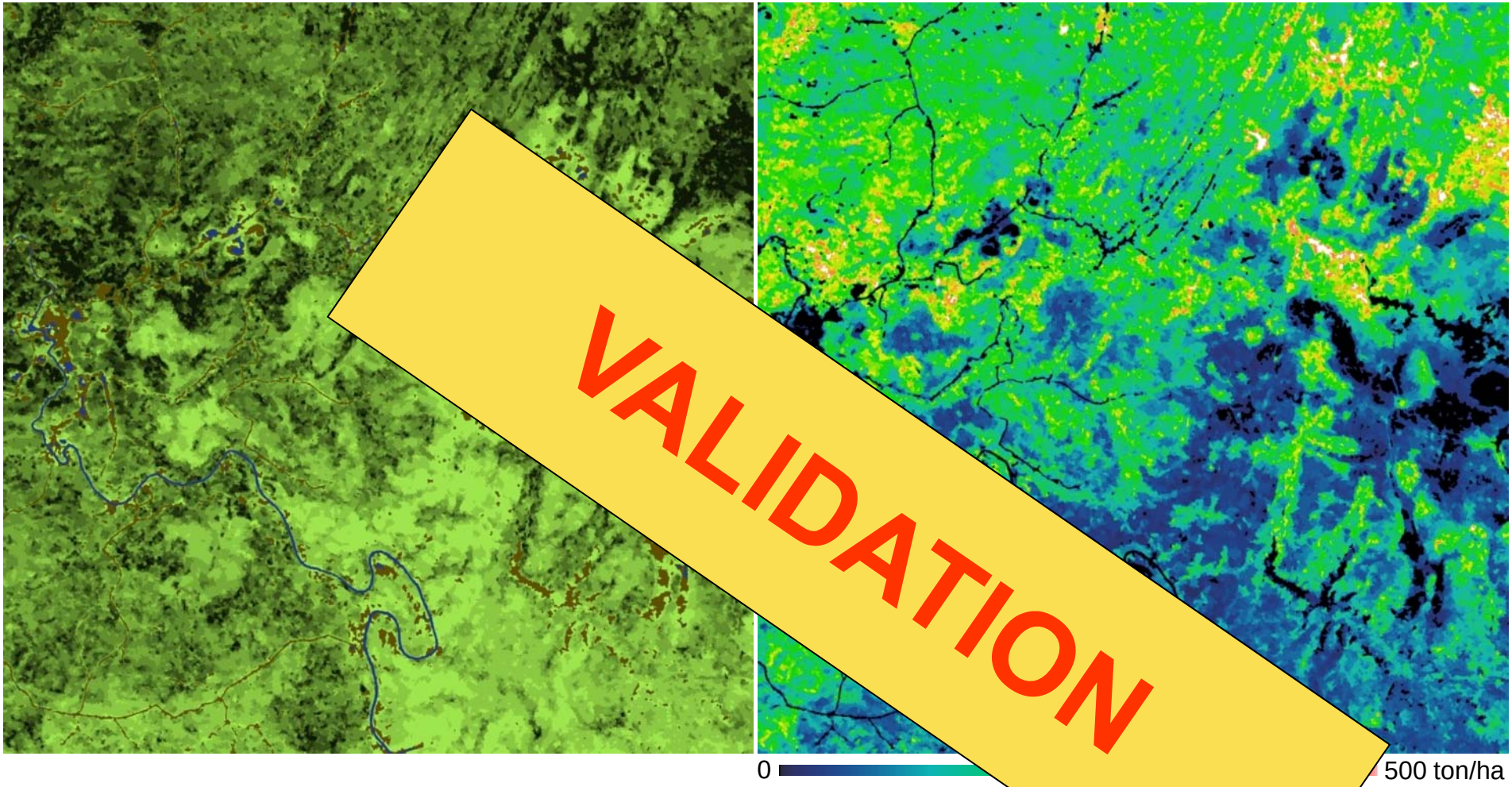
An Example of GeoSAR Biomass Estimation



- Left: Multi-channel data within segments is used to produce a terrain class map (dark green is high-biomass forest).
- Right: Multi-channel data within segments is used to produce a quantitative biomass estimate at high resolution.

(Mark L. Williams, 2009)

An Example of GeoSAR Biomass Estimation



- Left: Multi-channel data within segments is used to produce a ter green is high-biomass forest).
- Right: Multi-channel data within segments is used to produce a quantitat ss estimate at high resolution.

(Mark L. Williams, 2009)

crc·si crc for spatial information

Kokoda Track and Owen Stanley Ranges Conservation Initiative: Remote Sensing Pilot Project

Progress Report Presentation Slides

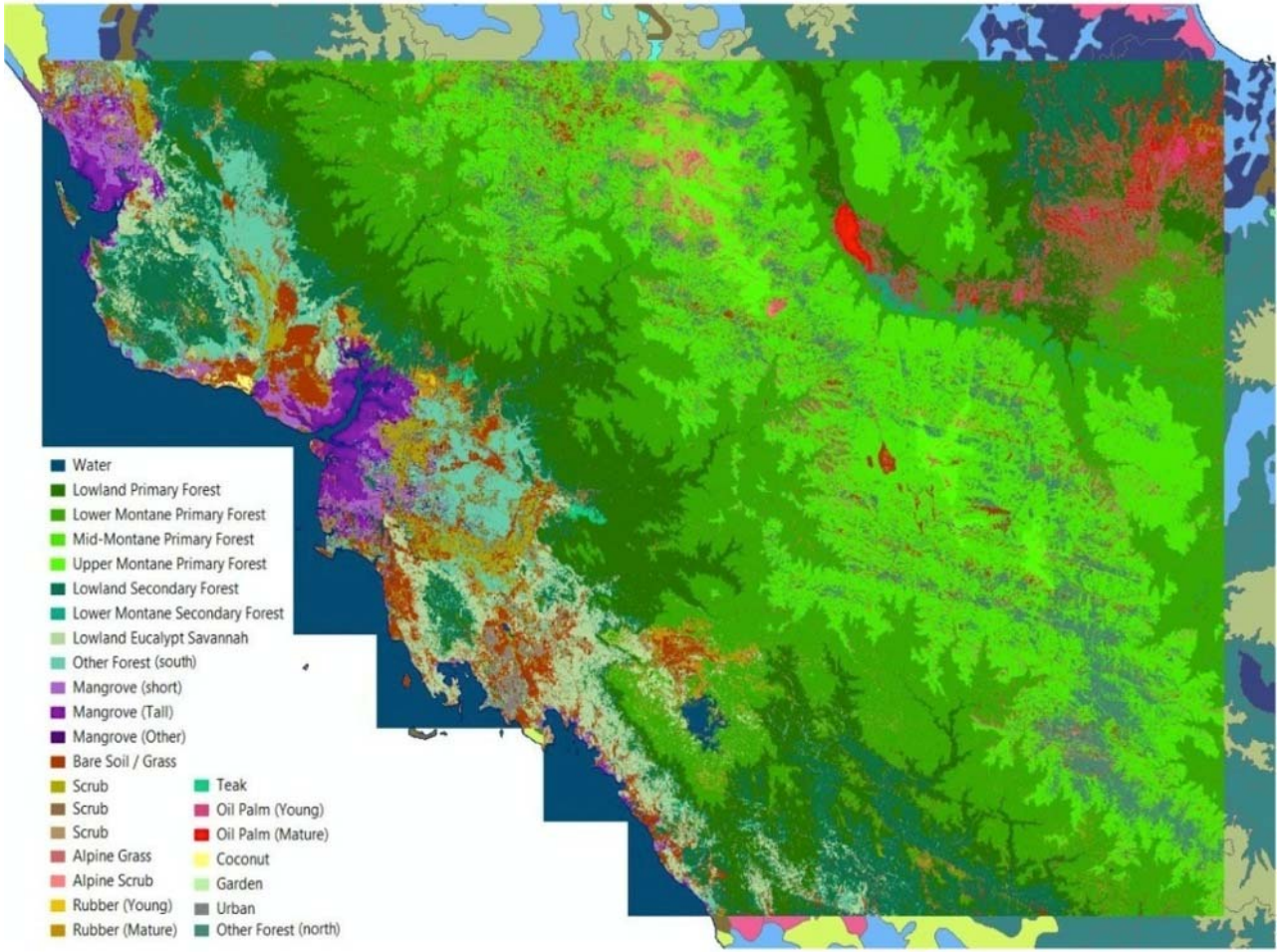
December 2010

Prof. A K Milne
Dr I Tapley
Dr J Fox
Ms A I Yohannan
Dr M L Williams

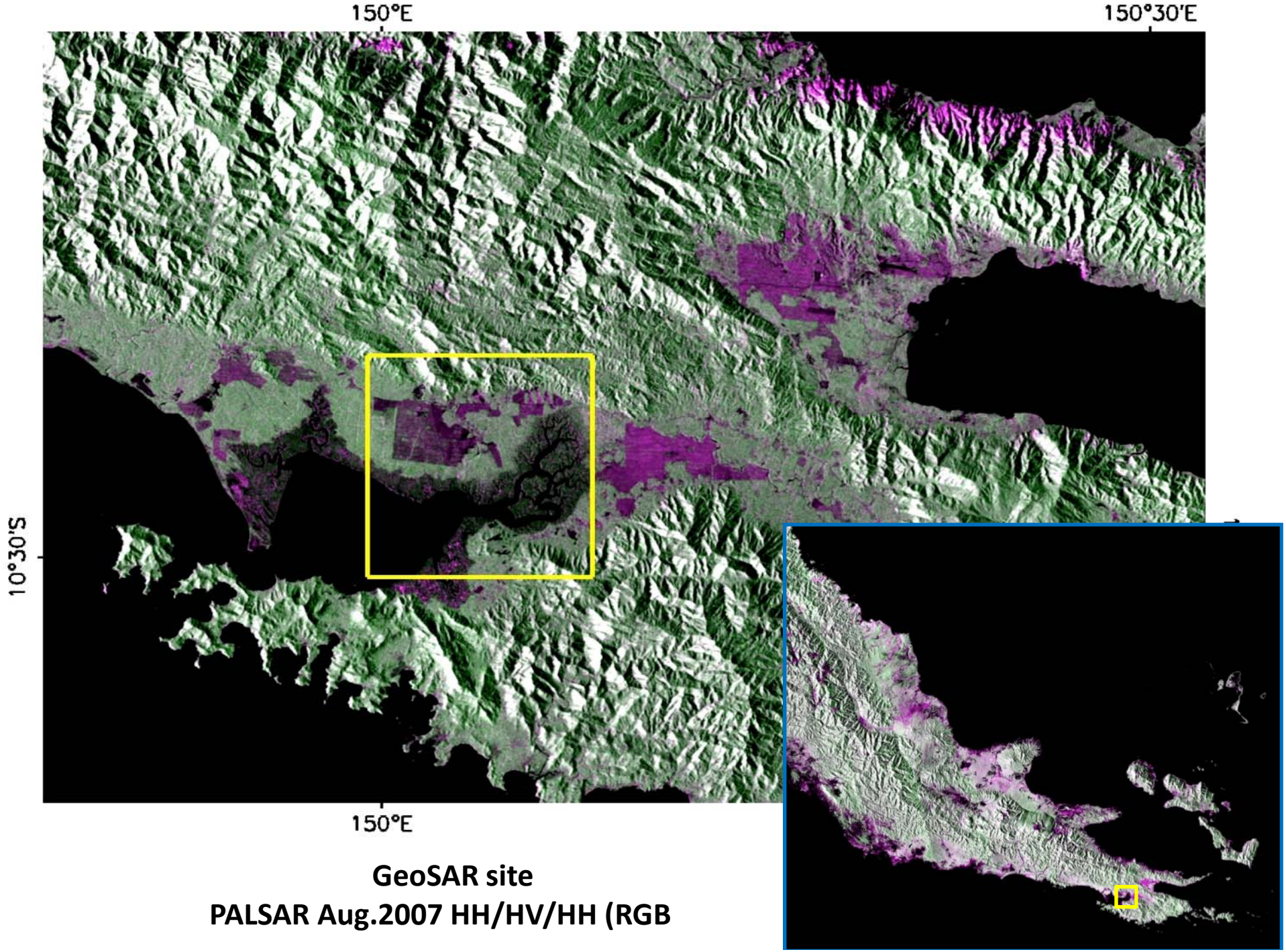
HGC
HORIZON GEOSCIENCE CONSULTING

mark.williams@physics.org

Kokoda Area Classification

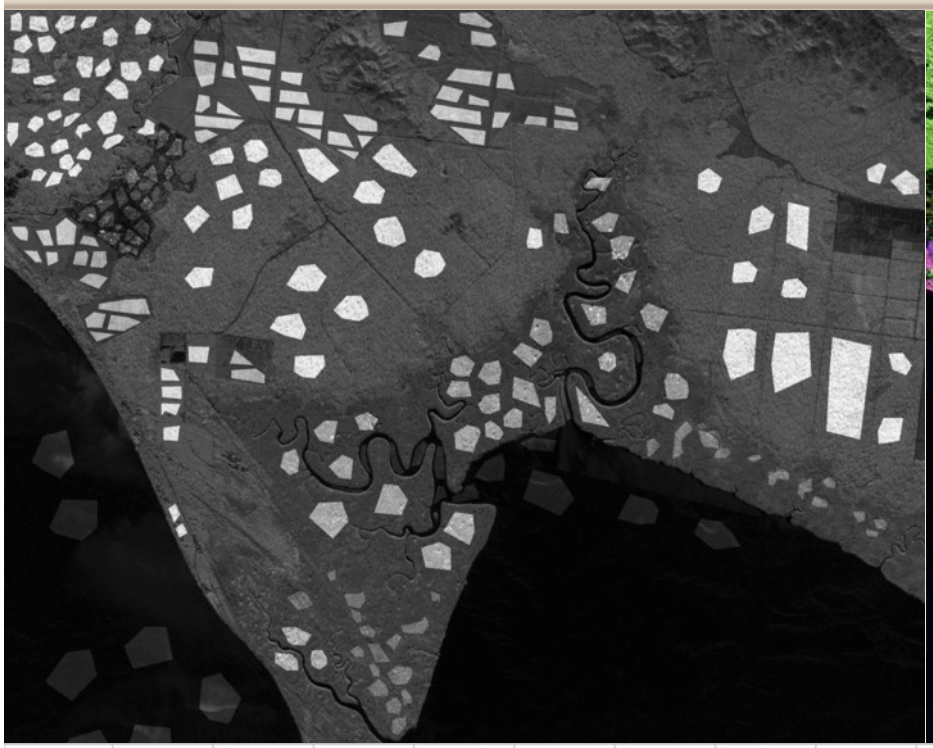


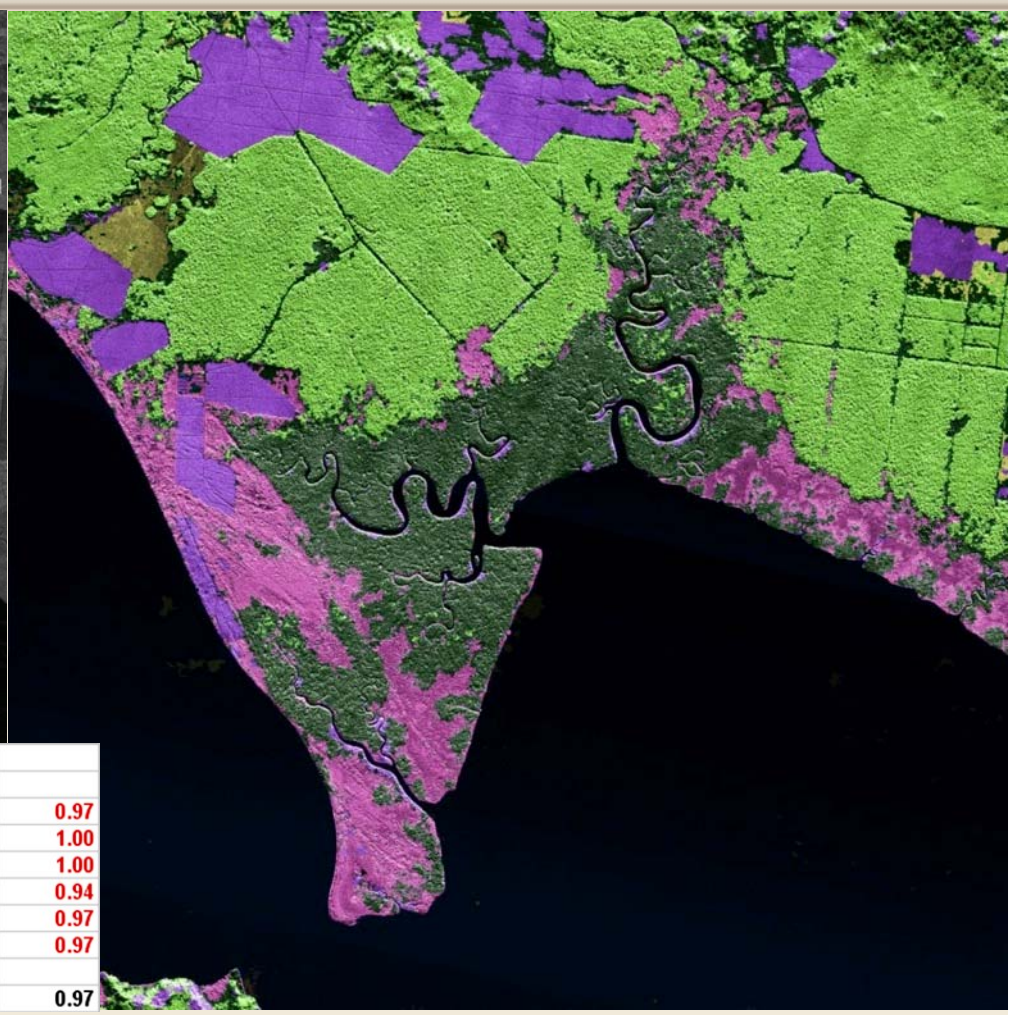
Land cover classification for the inner Kokoda AOI derived using a variety of ground data, auxiliary data and the 2006 GeoSAR data.
Shown in the background is the low resolution 1:250,000 land cover map from 1995 provided by Dr Julian Fox which up until today was the best reference for land cover in the inner Kokoda AOI.



GeoSAR site
PALSAR Aug.2007 HH/HV/HH (RGB

Kokoda: **Supervised Classification**

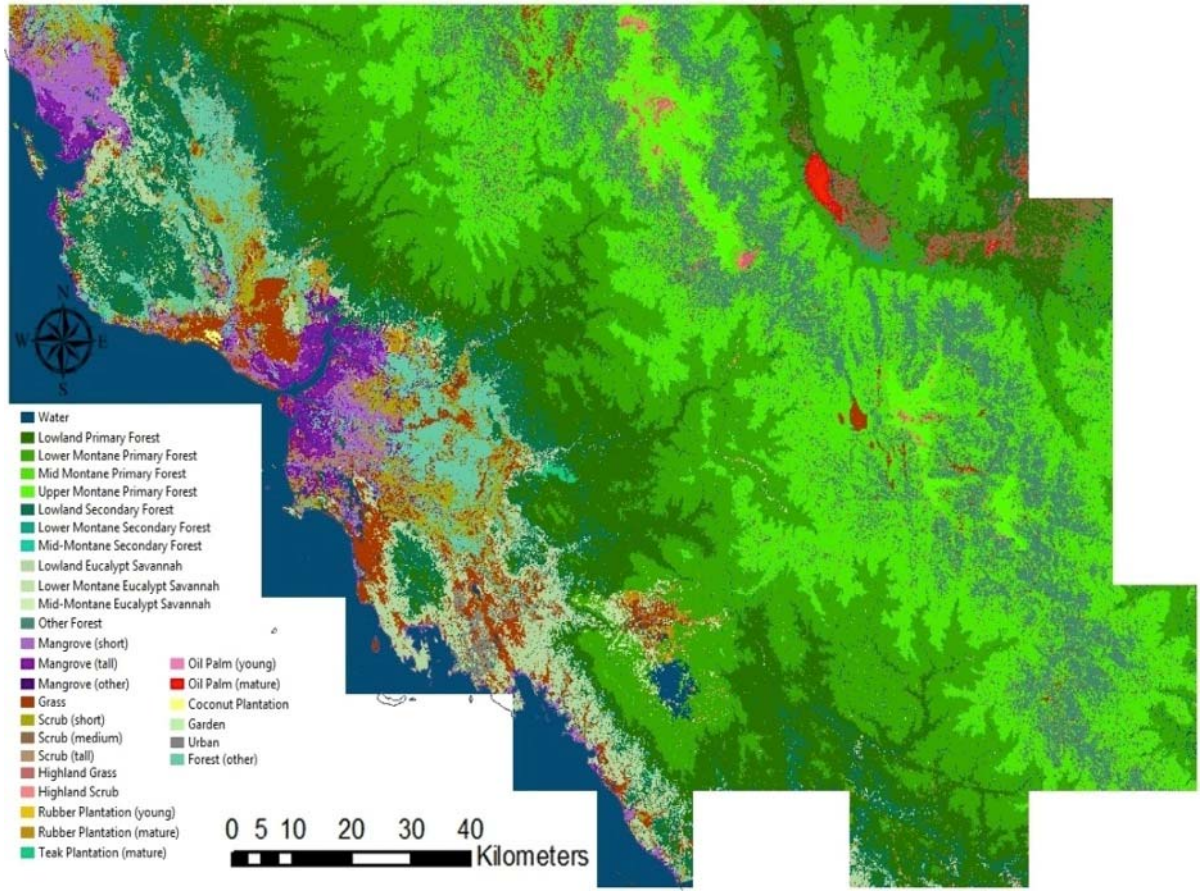




		Forest	Water	Plantation	Mangrove	Grass	Scrub		
		0	1	2	3	4	5		
Forest	0	**2604**		2	66			2672	**0.97**
Water	1		**559**					559	**1.00**
Plantation	2			**306**				306	**1.00**
Mangrove	3	44		2	**1011**	12	5	1074	**0.94**
Grass	4	1	1			**61**		63	**0.97**
Scrub	5	1			12		**385**	398	**0.97**
		2650	560	310	1089	73	390	5072	
		0.98	**1.00**	**0.99**	**0.93**	**0.84**	**0.99**		**0.97**

- Left: training and validation set, right: class map on X-band.
- Overall 97% accuracy with 6 classes using segmentation CART/GLCM methods.

PALSAR Classification 2007



PALSAR Classification 2007 and 2010