

Caracterización espectral de coberturas de vegetación en Costa Rica: misiones aerotransportadas y radiometría de campo

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A topographic map of Costa Rica, showing the country's terrain with green for lowlands and brown/gray for highlands and mountains. The map is set against a light blue background representing the surrounding oceans.

Teledetección en Costa Rica

- **Satelital**
- **Aerotransportada (Tripulada)**
- **Aerotransportada (No Tripulada)**

Teledetección Aerotransportada

- **Misión CARTA 2003**

(Dr. rer. nat. Javier Bonatti Coordinador Científico)

Fotografía Aérea a color IR 1: 40 000

Imágenes Multiespectrales en 50 Bandas (0.4 a 13 micrómetros)

- **AIRSAR Mesoamericana 2004**

(Dr. rer. nat. Javier Bonatti Colaborador)

- **Misión CARTA 2005**

(Dr. rer. nat. Javier Bonatti Coordinador Científico)

Fotografía Aérea a color 1: 25 000

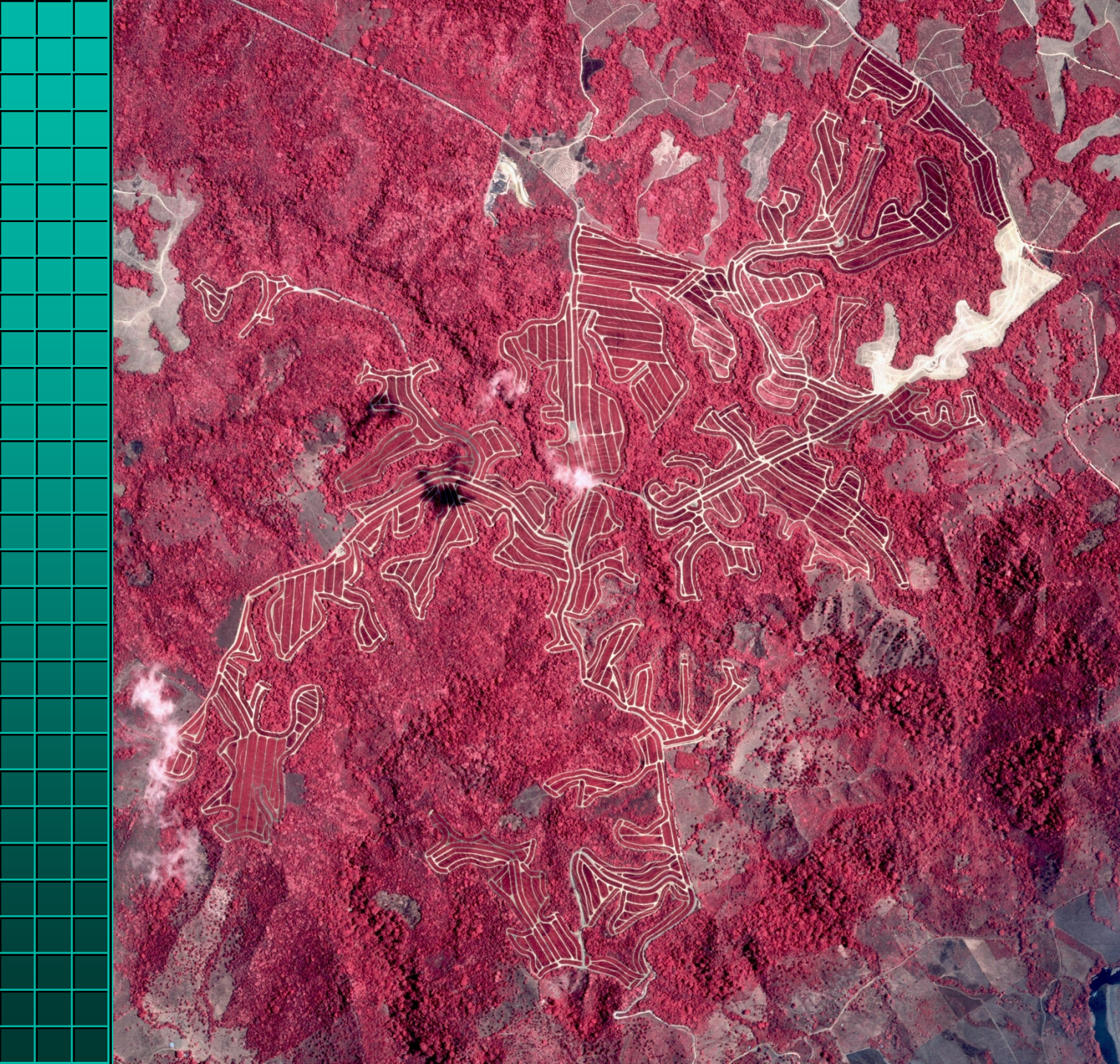
Imágenes Multiespectrales en 50 Bandas (0.4 a 13 micrómetros)

Imágenes Hiperespectrales en 128 Bandas (visible CIR)



(cobertura de nubes menor o igual al 10%)

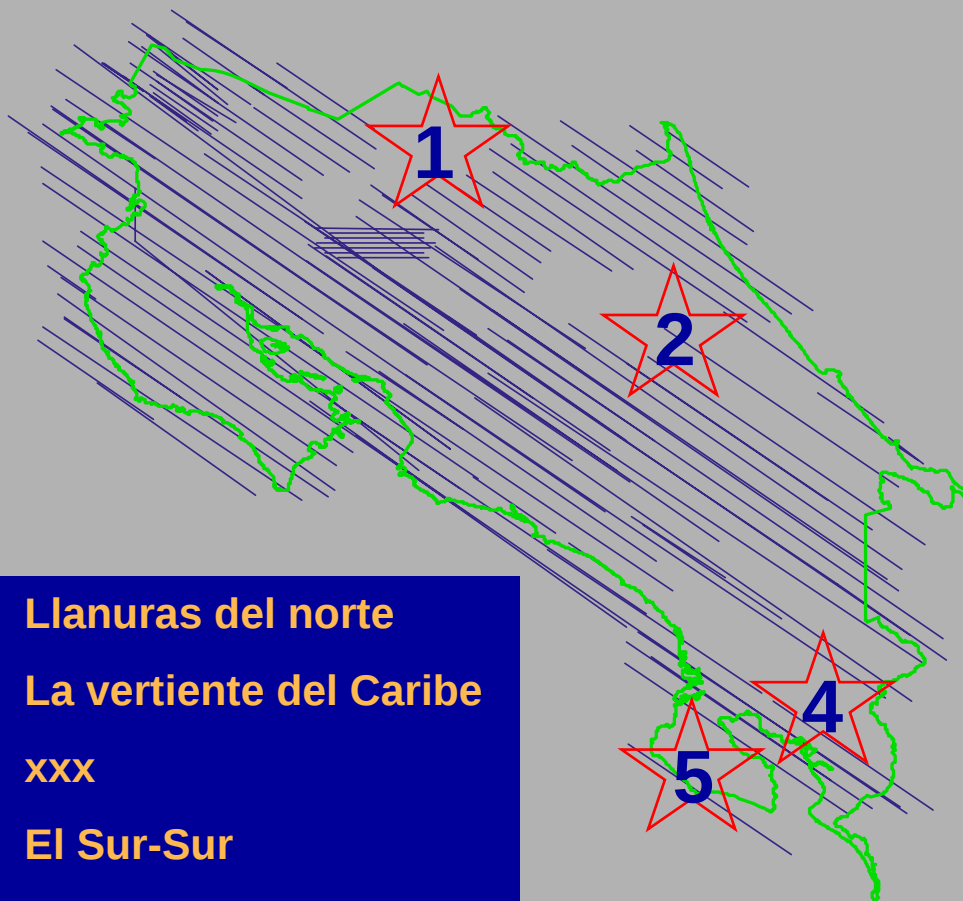




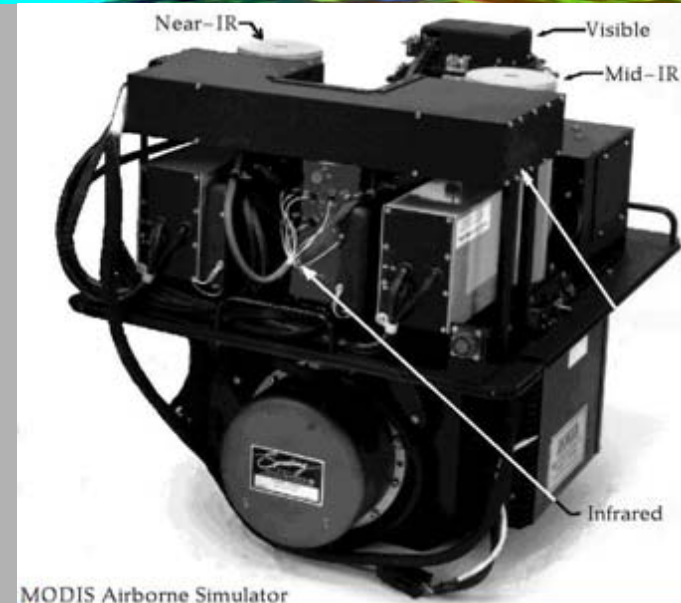
Cultivo de piña Buenos Aires



Sensor Multispectral MASTER



1. Llanuras del norte
2. La vertiente del Caribe
3. xxx
4. El Sur-Sur
5. Península de Osa



**SENSOR
MULTIESPECTRAL
MASTER**



MASTER 50 Bandas

INFRARROJO REFLEJADO		BANDA			BANDA				
		VISIBLE	1	0.44	0.48	26	3.075	3.225	MWIR
			2	0.48	0.52	27	3.225	3.375	
			3	0.52	0.56	28	3.375	3.525	
			4	0.56	0.6	29	3.525	3.675	
			5	0.63	0.69	30	3.675	3.825	
			6	0.69	0.73	31	3.825	3.975	
		NIR	7	0.73	0.77	32	3.975	4.125	MWIR
			8	0.78	0.82	33	4.125	4.275	
			9	0.845	0.885	34	4.275	4.425	
			10	0.885	0.925	35	4.425	4.575	
			11	0.925	0.965	36	4.575	4.725	
		SWIR	12	1.6	1.65	37	4.725	4.875	LWIR
			13	1.65	1.7	38	4.875	5.025	
			14	1.7	1.75	39	5.025	5.175	
			15	1.75	1.8	40	5.175	5.325	
			16	1.8	1.85	41	7.7	8.1	
			17	1.85	1.9	42	8.1	8.5	
			18	1.9	1.95	43	8.5	8.9	
			19	1.95	2	44	8.9	9.3	
			20	2.05	2.1	45	9.5	9.9	
			21	2.135	2.185	46	9.9	10.3	
			22	2.185	2.235	47	10.3	10.95	
			23	2.235	2.285	48	10.95	11.65	
			24	2.297	2.362	49	11.8	12.3	
25	2.362		2.427	50	12.5	13			



IMAGEN MASTER 2003 GOLFO DULCE



AIRSAR

Mesoamericana 2004

Mapeo con Radar de Apertura Sintética (SAR) Aerotransportado sobre áreas de conservación y de patrimonio cultural en al región Mesoamericana



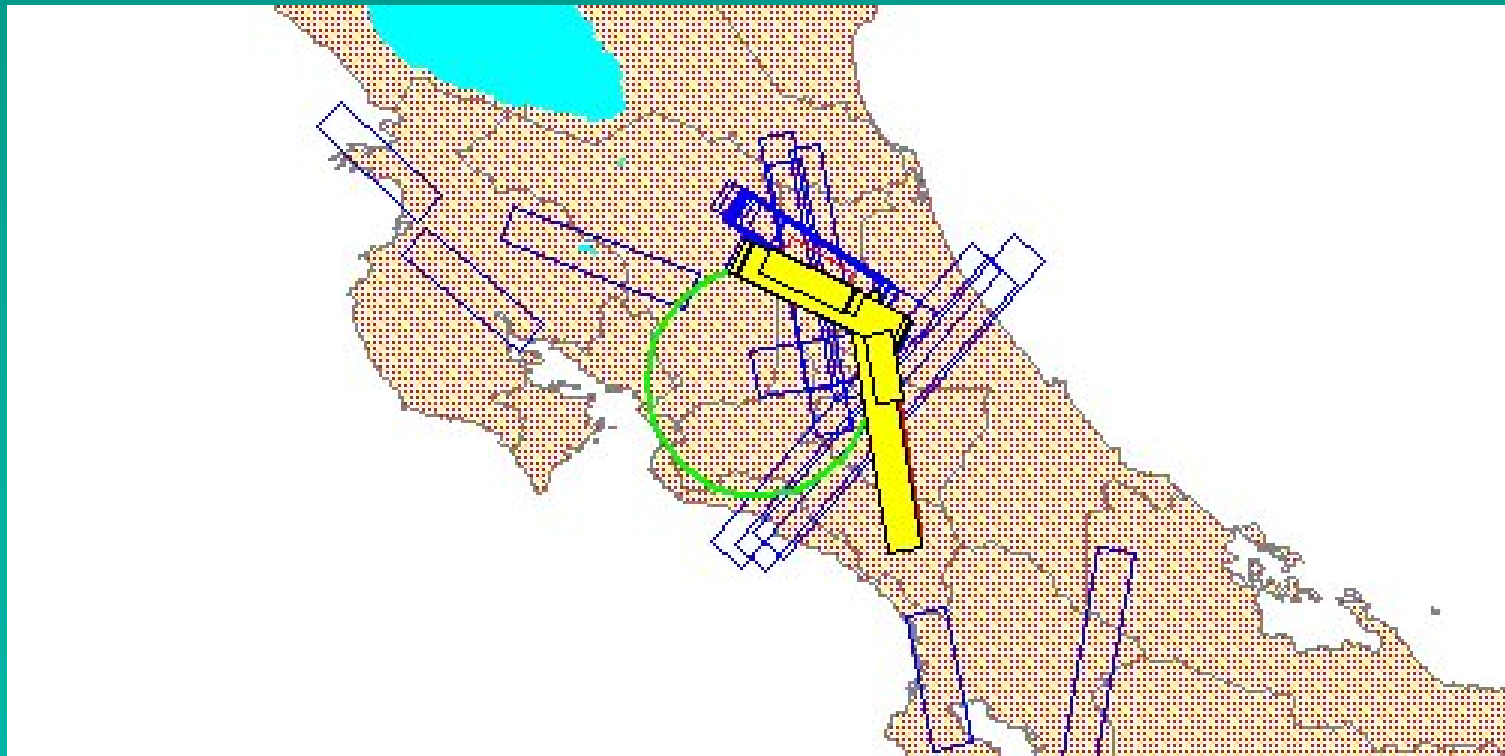
jbonatti@gmail.com



AIRSAR

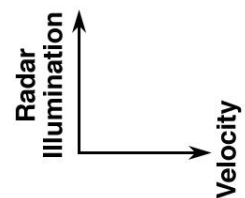
Mesoamericana 2004

(cobertura)





ARENAL290-1



P-Band Total Power
L-Band Total Power
C-Band VV

Date Acquired:

6-MAR-04

Date Processed:

16-AUG-04

CCTID: TS1780

Cntr lat: 10.49

Cntr lon: -84.81

Bandwidth: 40.00

Cross-track:

Ground Swath(km): 11.5

samples in data: 2304

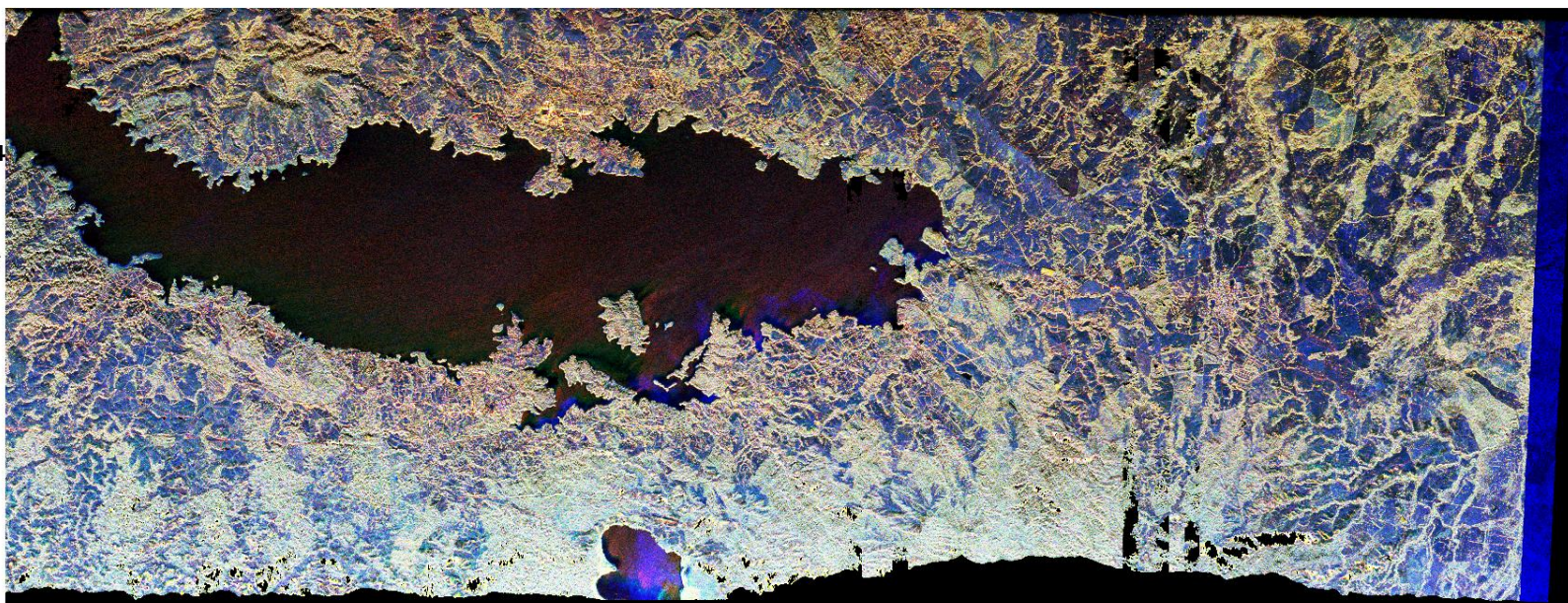
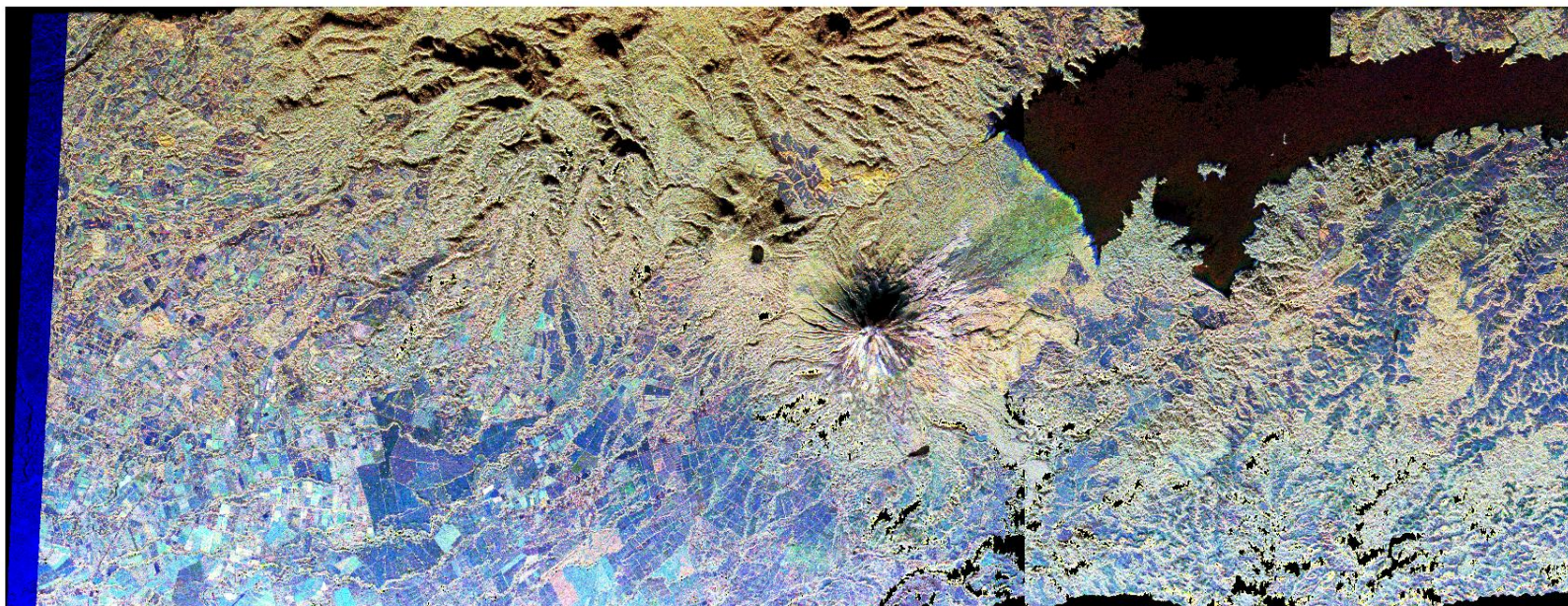
reduction ratio: 0.2

Along-track:

Swath(km): 60.7

lines in data: 12147

reduction ratio: 0.2





MISION CARTA 2005

6 Sensores

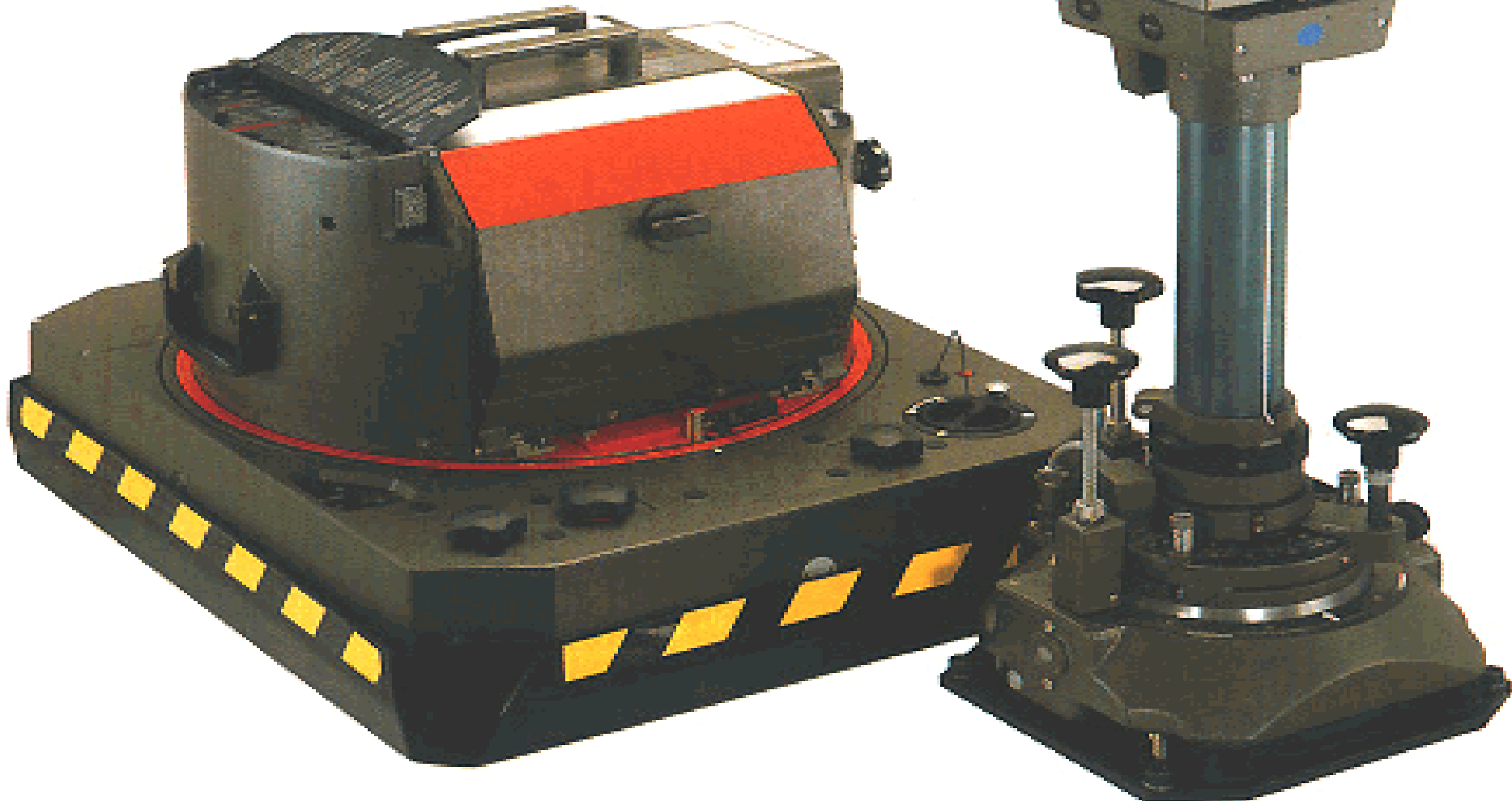
- 1) RC-30: Cámara Fotográfica. Fotografía a color
Sistema ASCOT de Navegación
Res = 60cm
- 2) DCS: Cámara Digital.
Imágenes Infrarrojas en tiempo Real
Res = 1-2 m (igual a CARTA 2003)
- 3) MASTER: Sensor Remoto Multiespectral
50 bandas, Todo CR
Res = 15-20m
- 4) HyMap: Sensor Remoto Híperespectral
128 bandas, Todo CR
Res = 15-20m
- 5) LVIS: Sensor Remoto Láser (Avión propio)
Zonas selectas
Baja altura 0.50 cm en al vertical
- 6) AVEMS: Sensor In-Situ de Gases (Espectrómetro de Masas) (Avión de CR)
Medición de Concentraciones en Volcanes y ciudades.

Cámara de mapeo

RC-30

Vuelo Fotogramétrico

Escala 1: 25 000



Mar Caribe

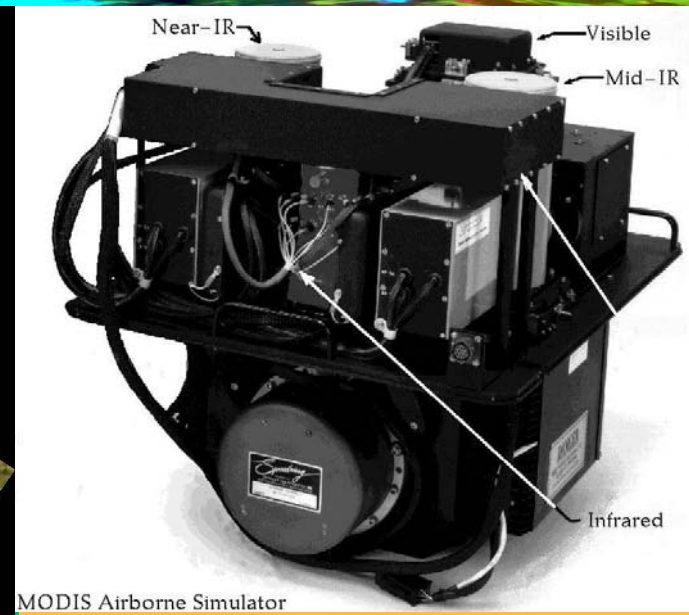
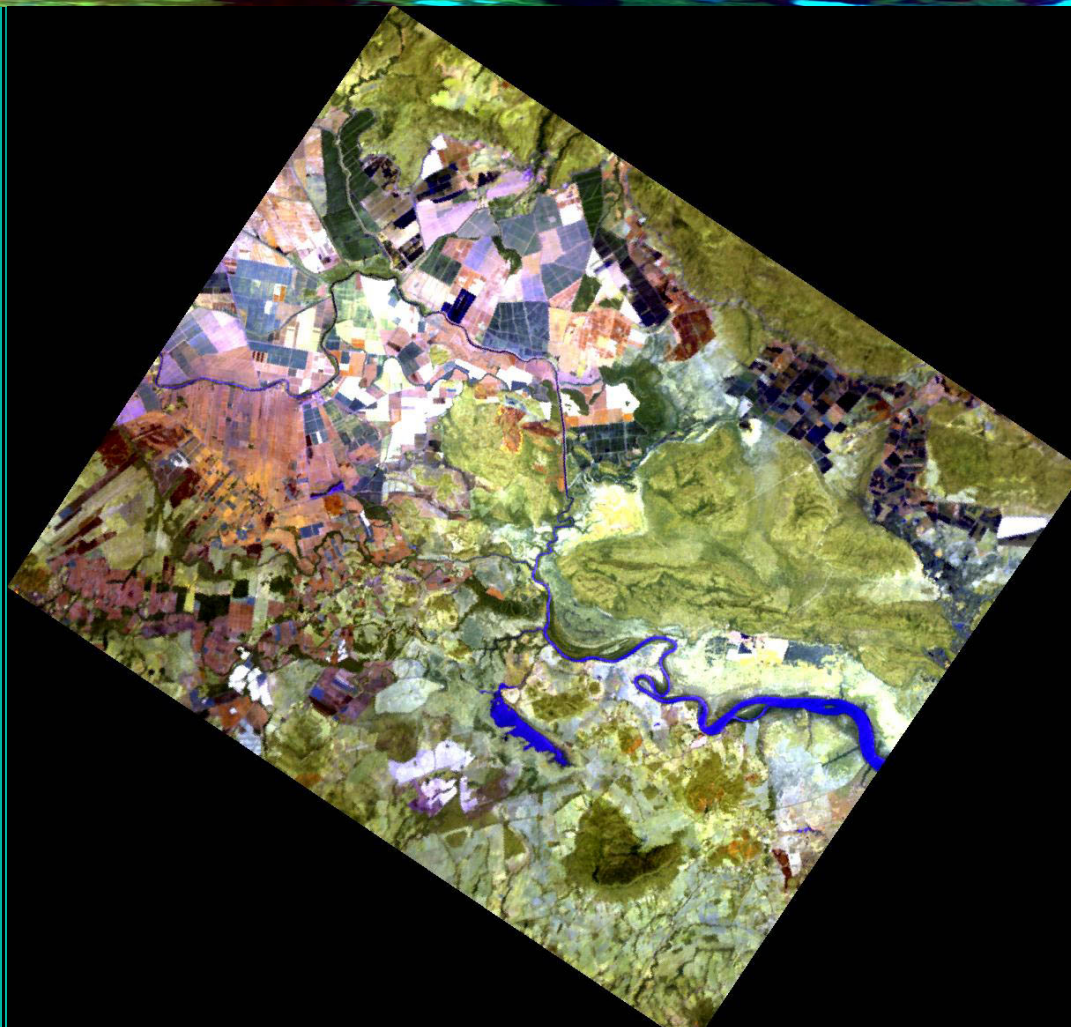
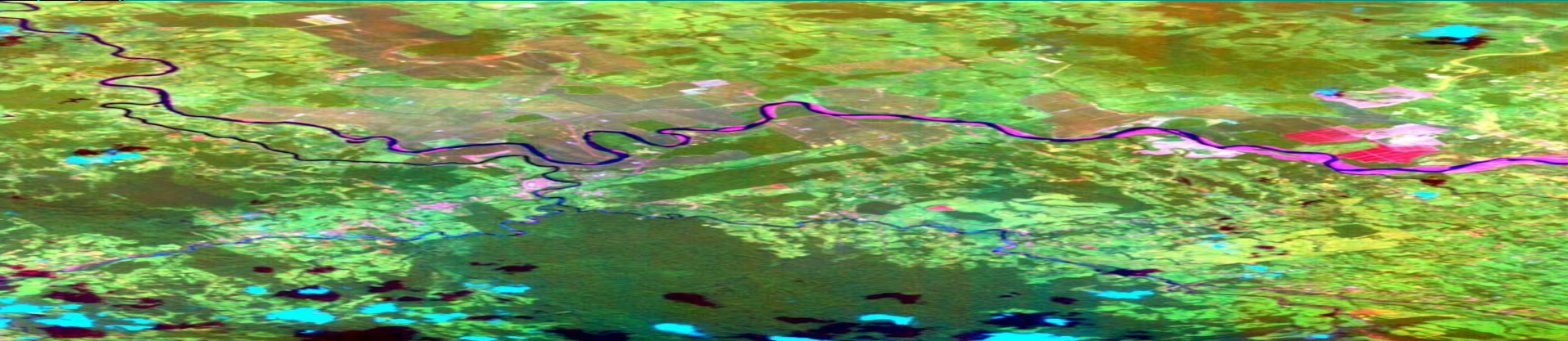
Océano Pacífico



CARTA 2005
Plan de Vuelo
Total Líneas: 57



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El HyMap



Spectral Configuration – 128 channels			
Module	Spectral range	Bandwidth across module	Average spectral sampling interval
VIS	0.45 – 0.89 μm	15 – 16 nm	15 nm
NIR	0.89 – 1.35 μm	15 – 16 nm	15 nm
SWIR1	1.40 – 1.80 μm	15 – 16 nm	13 nm
SWIR2	1.95 – 2.48 μm	18 – 20 nm	17 nm

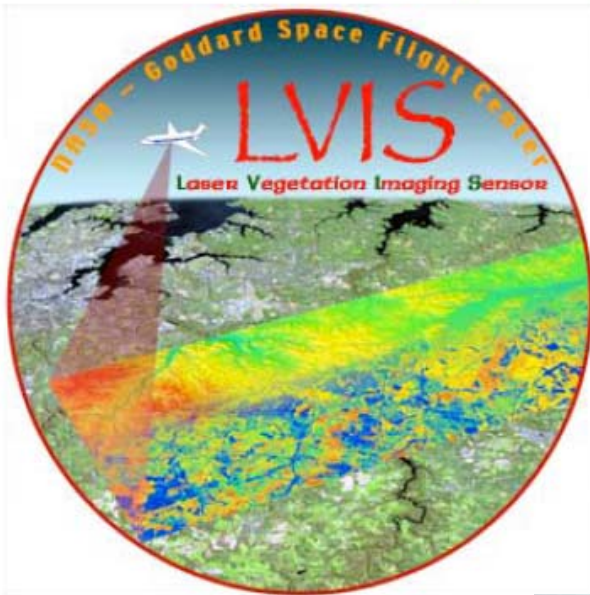


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www.hyvista.com



The Laser Vegetation Imaging Sensor (LVIS)



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Laser Remote Sensing Branch, NASA Goddard
Space Flight Center, Greenbelt MD
James.B.Blair@nasa.gov, 301 614 6741

Michelle Hofton

Department of Geography, University of Maryland,
College Park MD

David Rabine and Phillip Padden

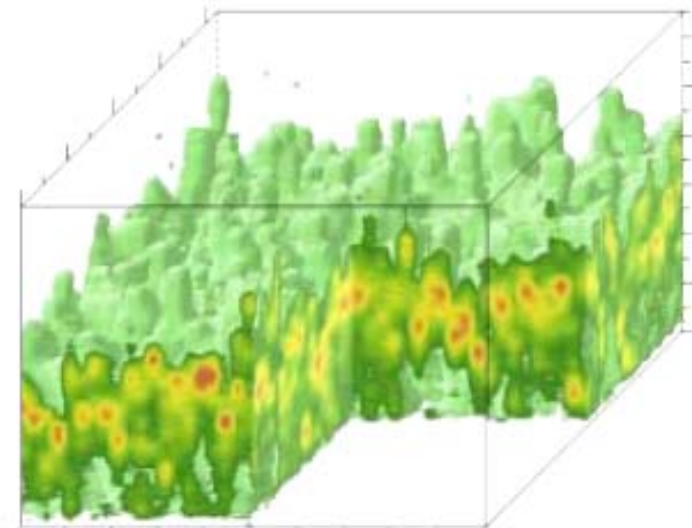
Science Systems and Applications, Inc., Lanham MD

Luis Ramos

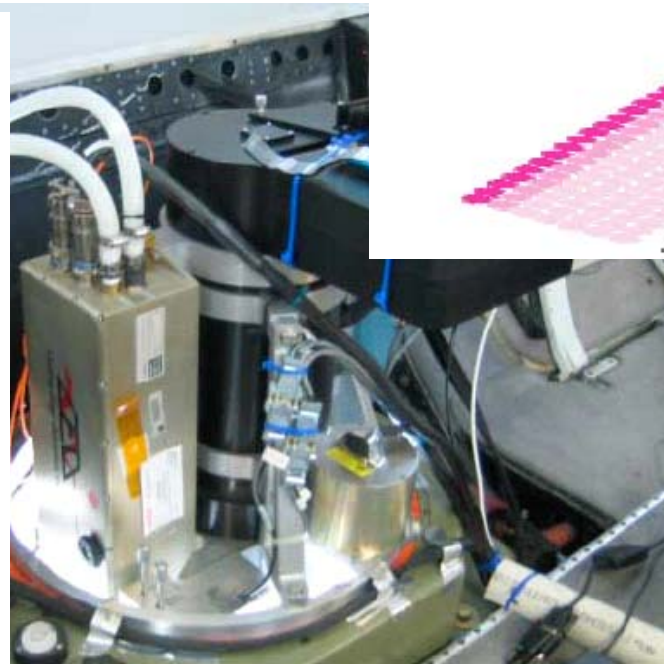
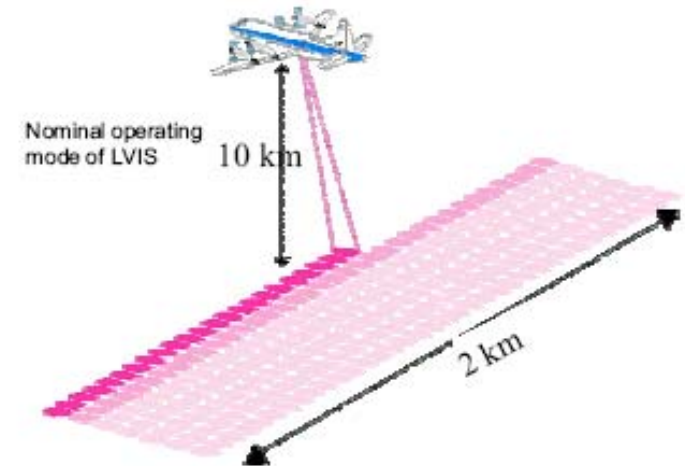
NASA Goddard Space Flight Center, Greenbelt MD

Wayne Welch

Welch Mechanical Designs LLC, Glen Burnie MD



3-D surface structure of a 1 km² area of Costa Rica. mapped using LVIS

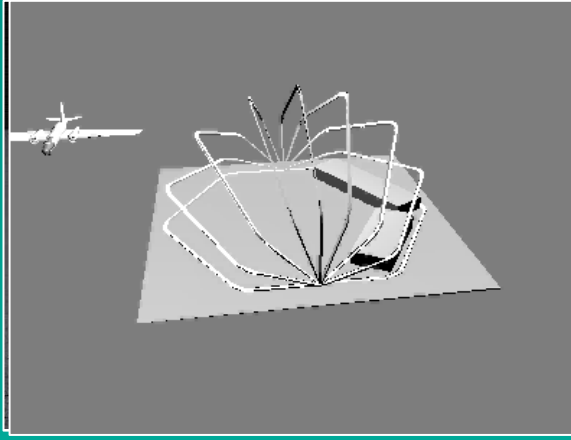


Hangar Nacional de Investigaciones Aerotransportadas (HANIA)

Aeropuerto Juan Santamaría (SJO), Costa Rica



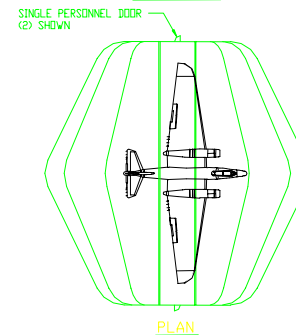
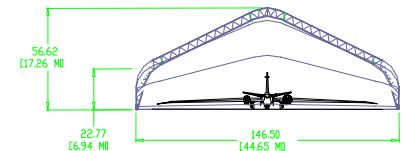
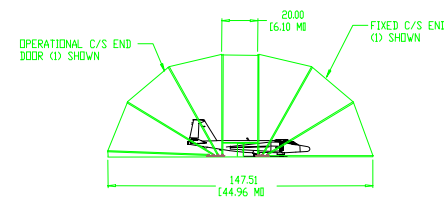
Costa Rica Hangar Facility



Laboratorio de Soporte



Construido por el Gobierno de
Costa Rica



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CHECKED [Signature]	APPROVED [Signature]	SCALE 1/400	
MATERIAL [Blank]	DRAWING NO. F-22-146-TICC	SHEET NO. 1 OF 2	REV. DATE

Captura de Firmas



En qué se puede mejorar

Facilitar la toma de la data

Diseñar un dispositivo para la toma eficiente de las firmas espectrales !!!

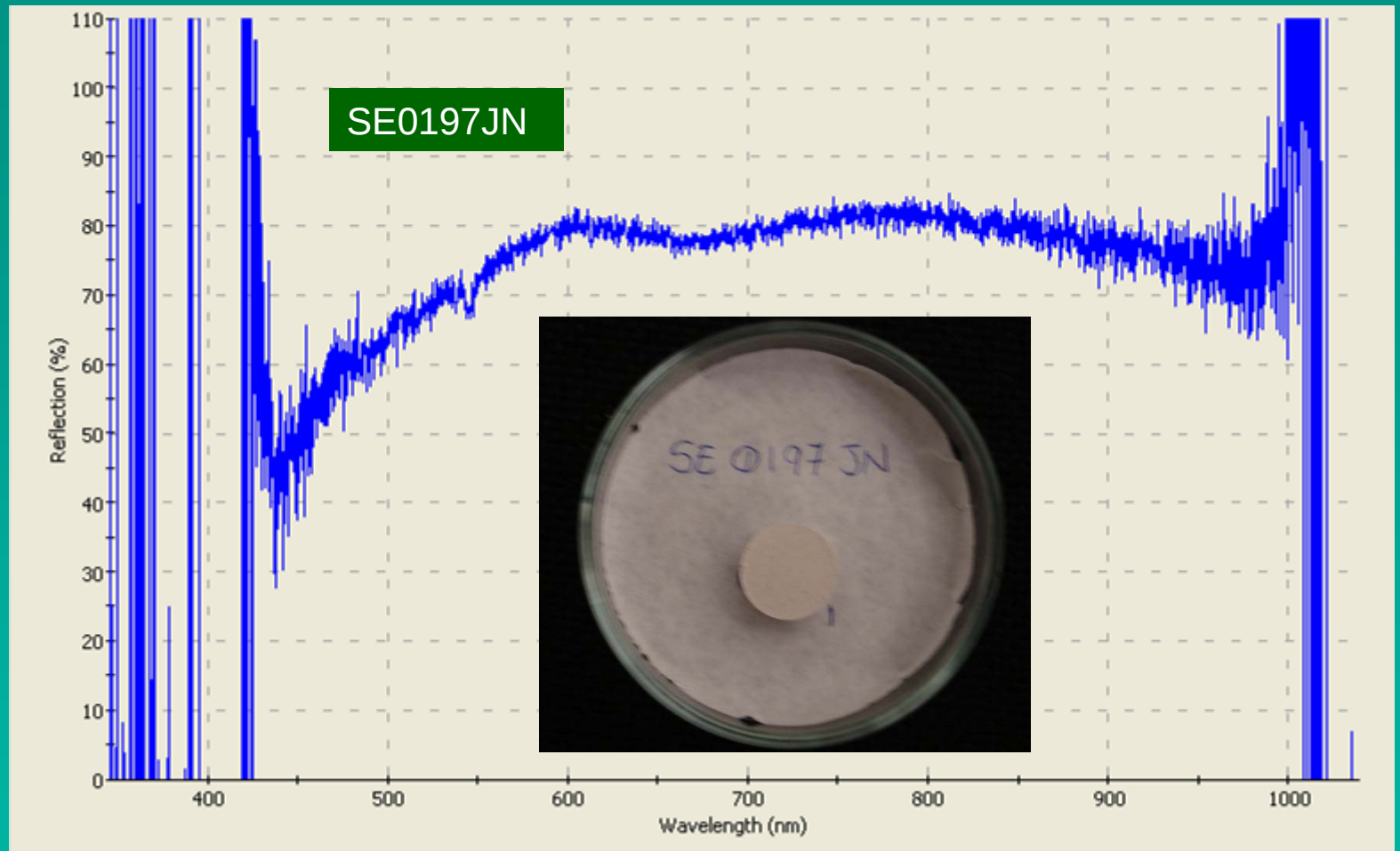


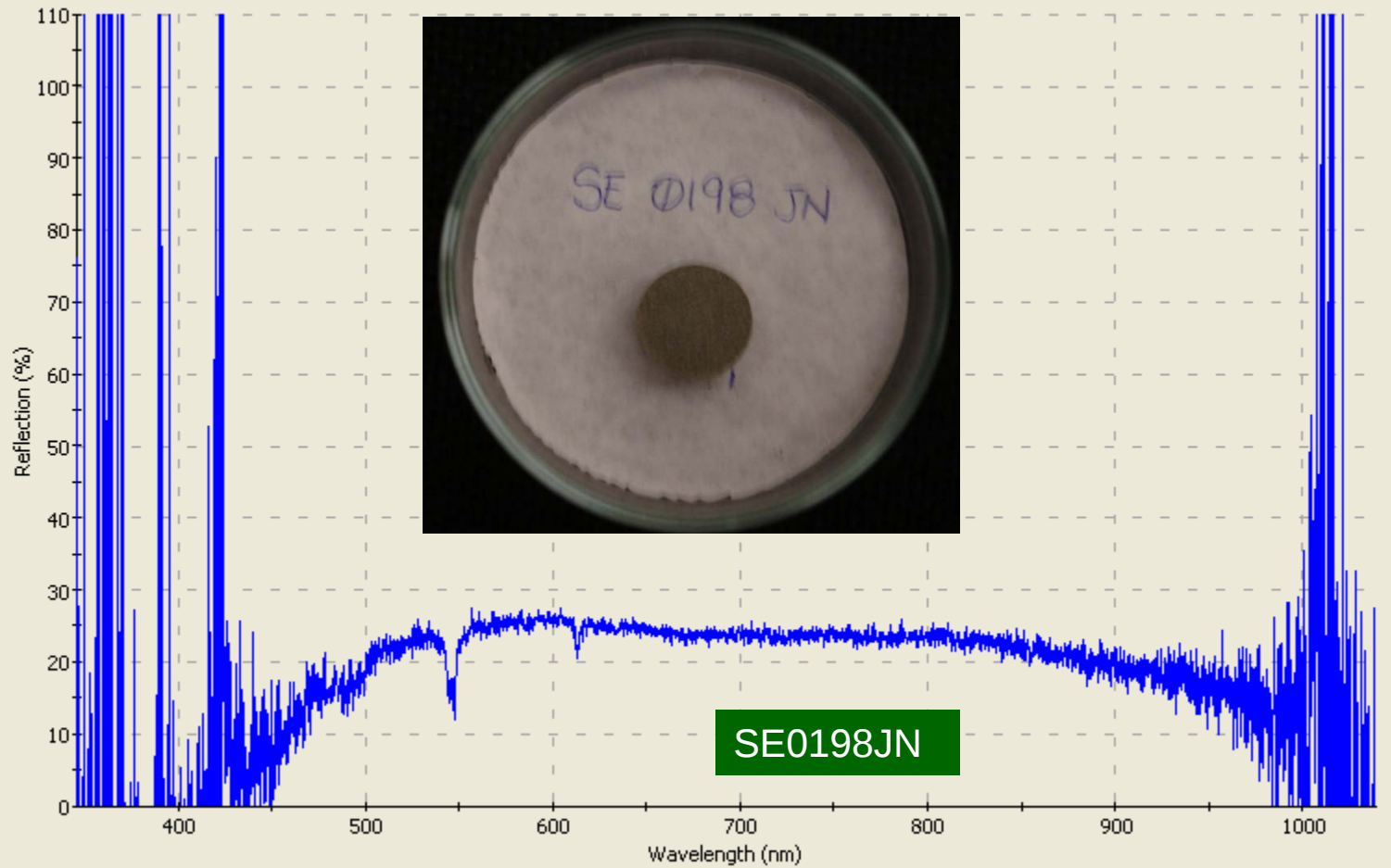


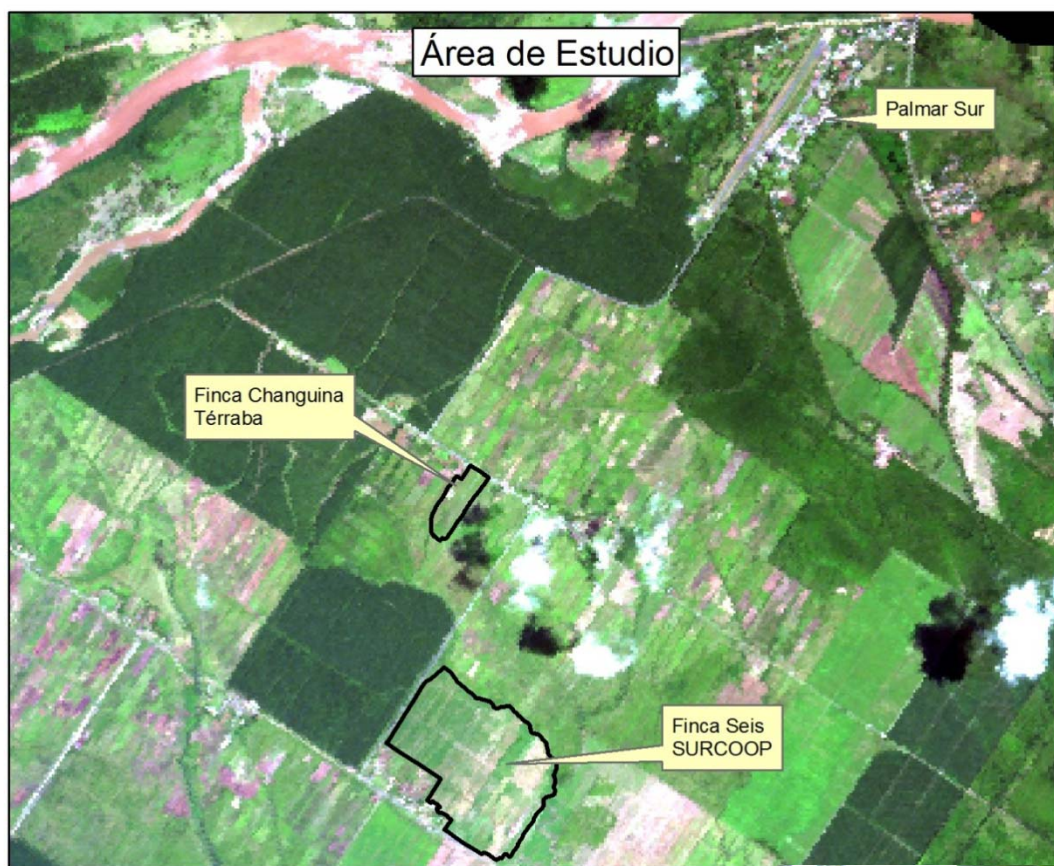


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Gráfico N° 5
Muestras de plátano joven y adulto

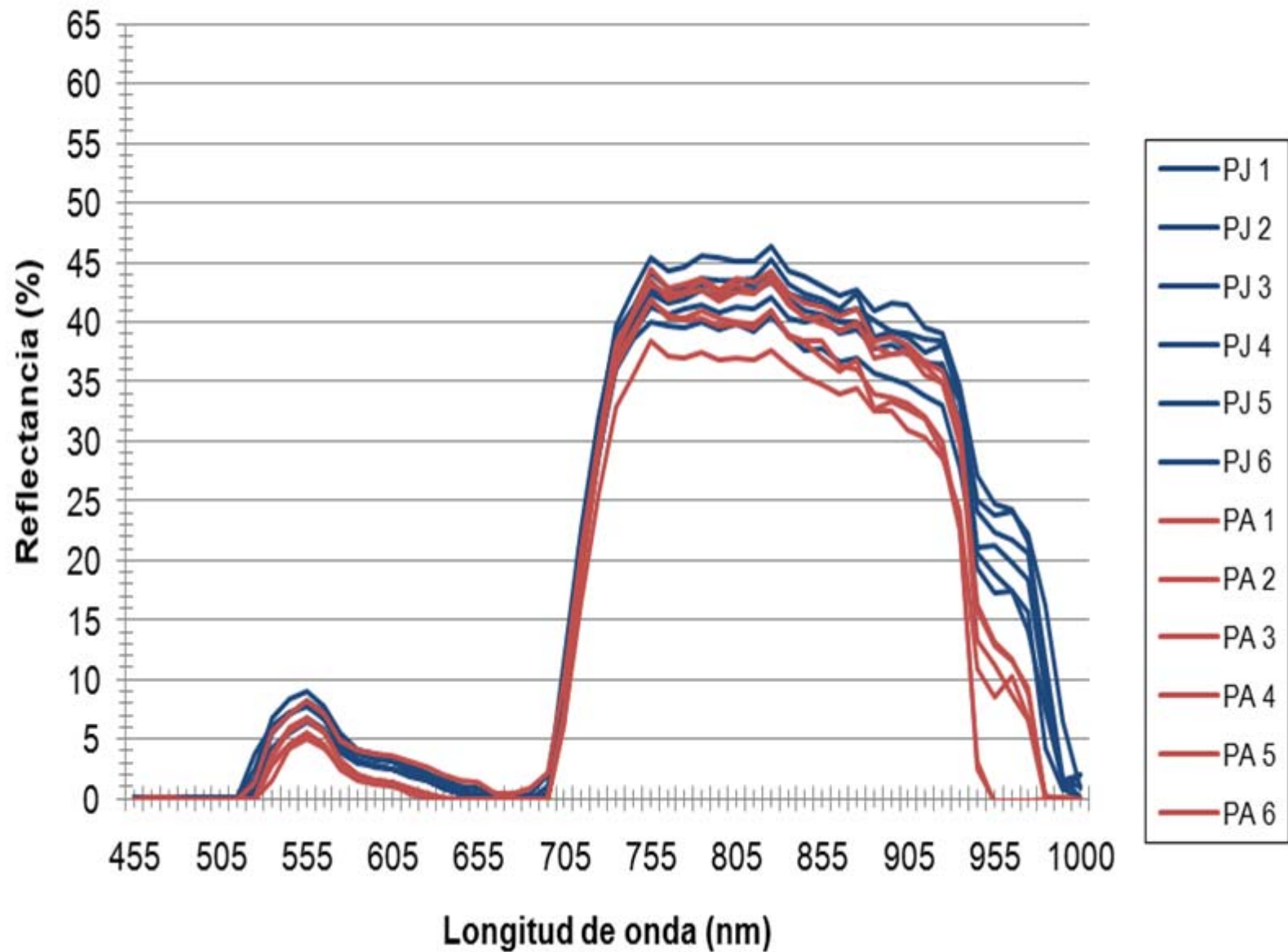


Gráfico N° 6
Promedio muestras de plátano

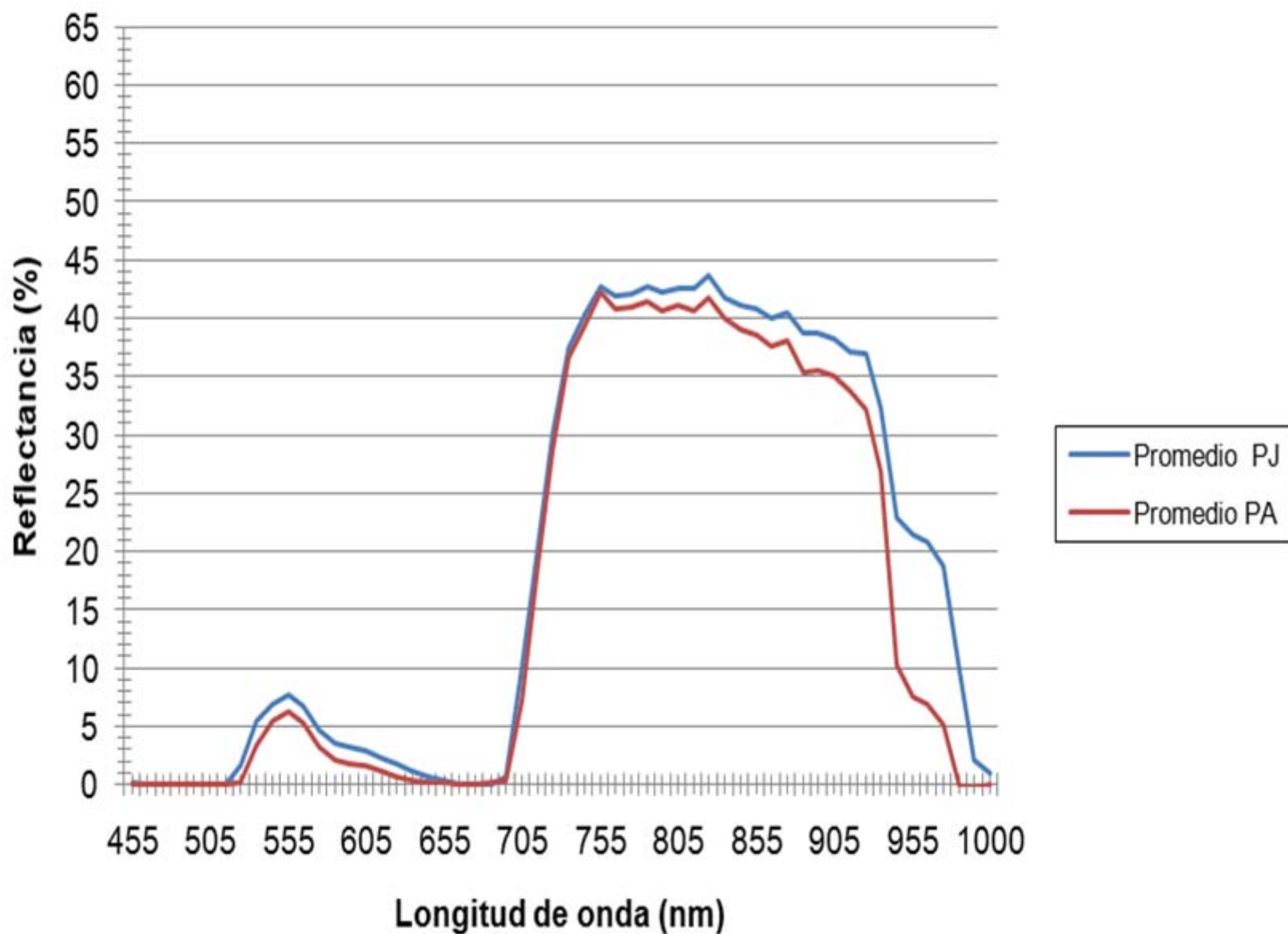


Gráfico N° 6
Promedio muestras de plátano

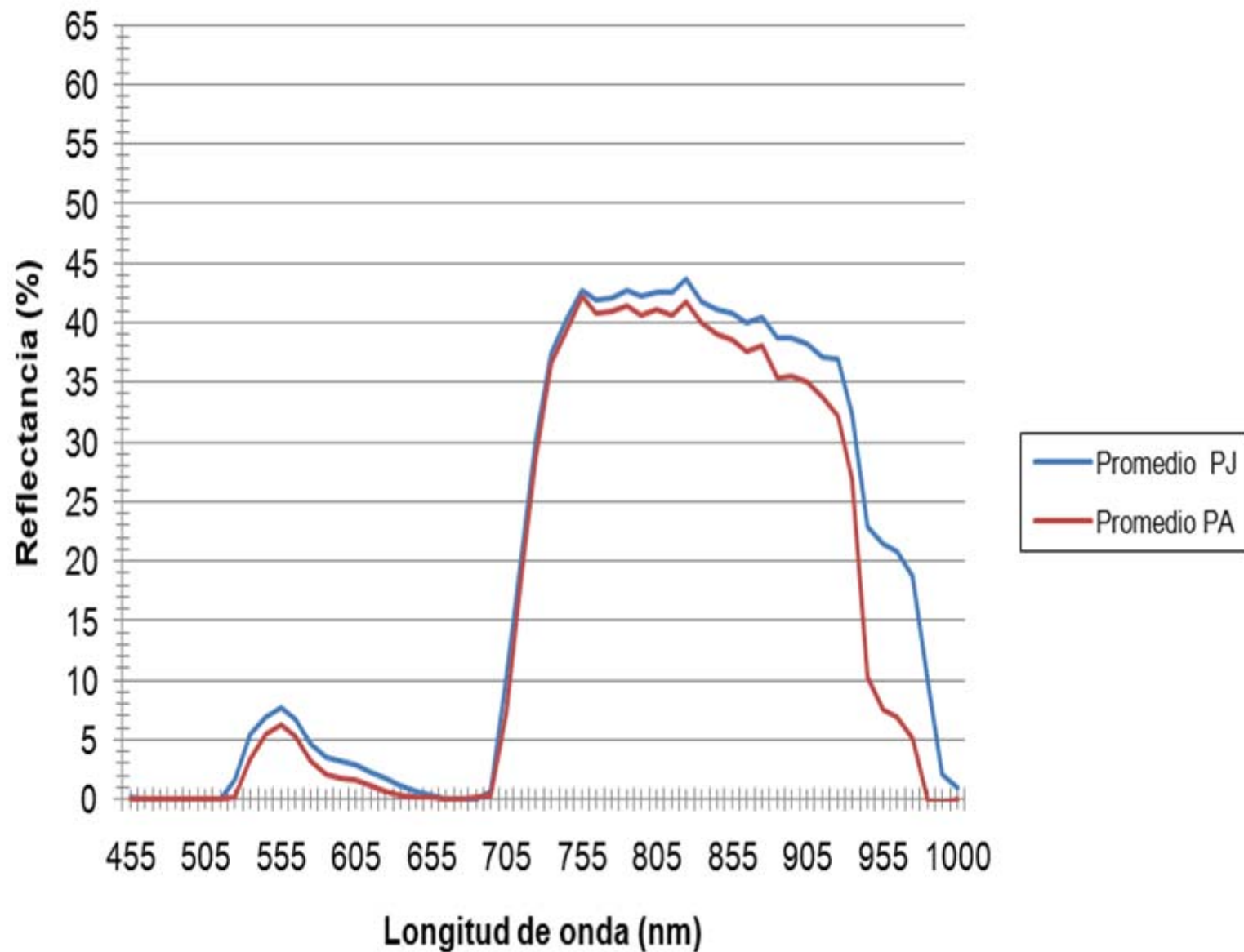


Gráfico N° 13
Promedio muestras de plátano joven y Sigatoka Negra

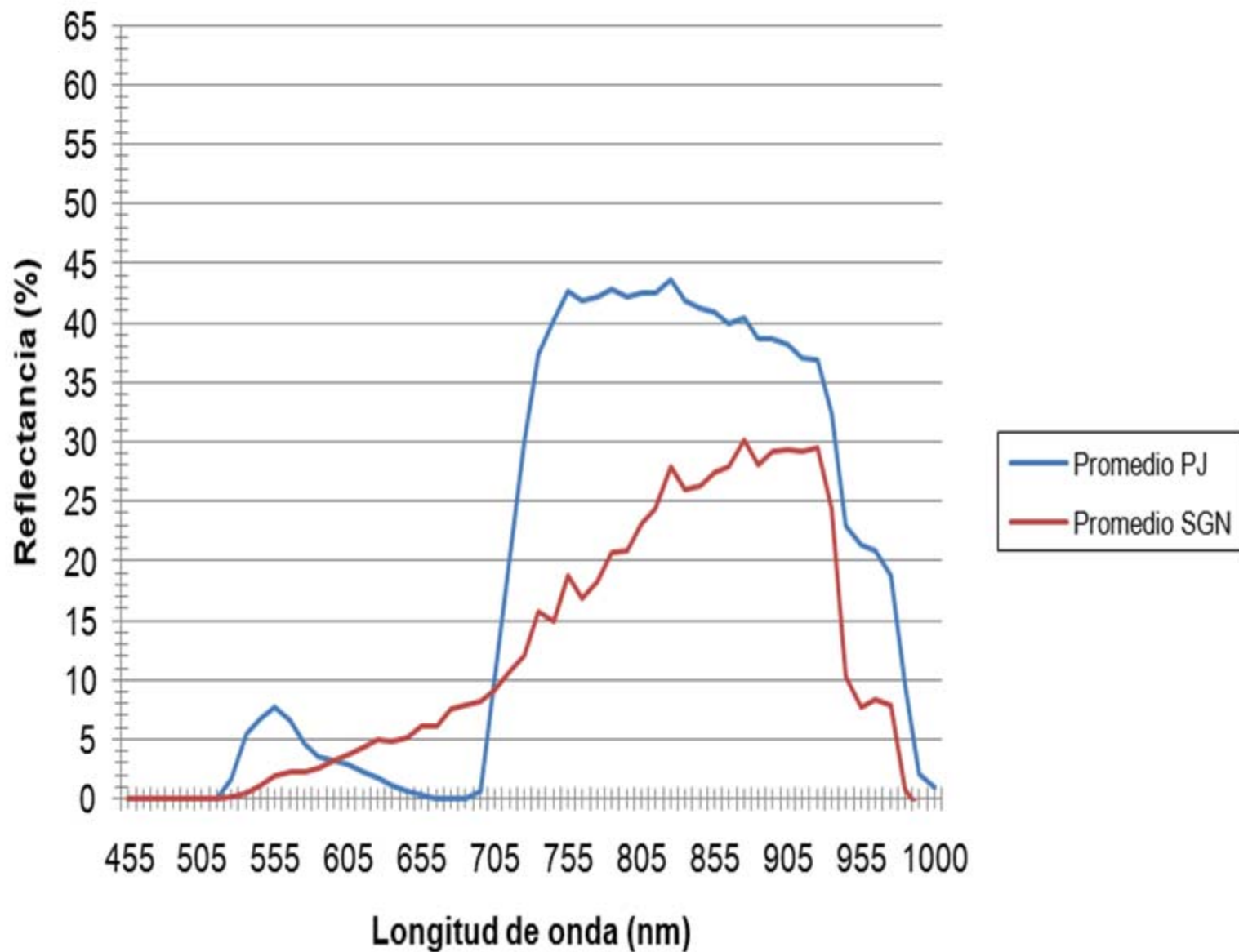


Gráfico N° 16
Promedio muestras de banano adulto y Sigatoka Negra

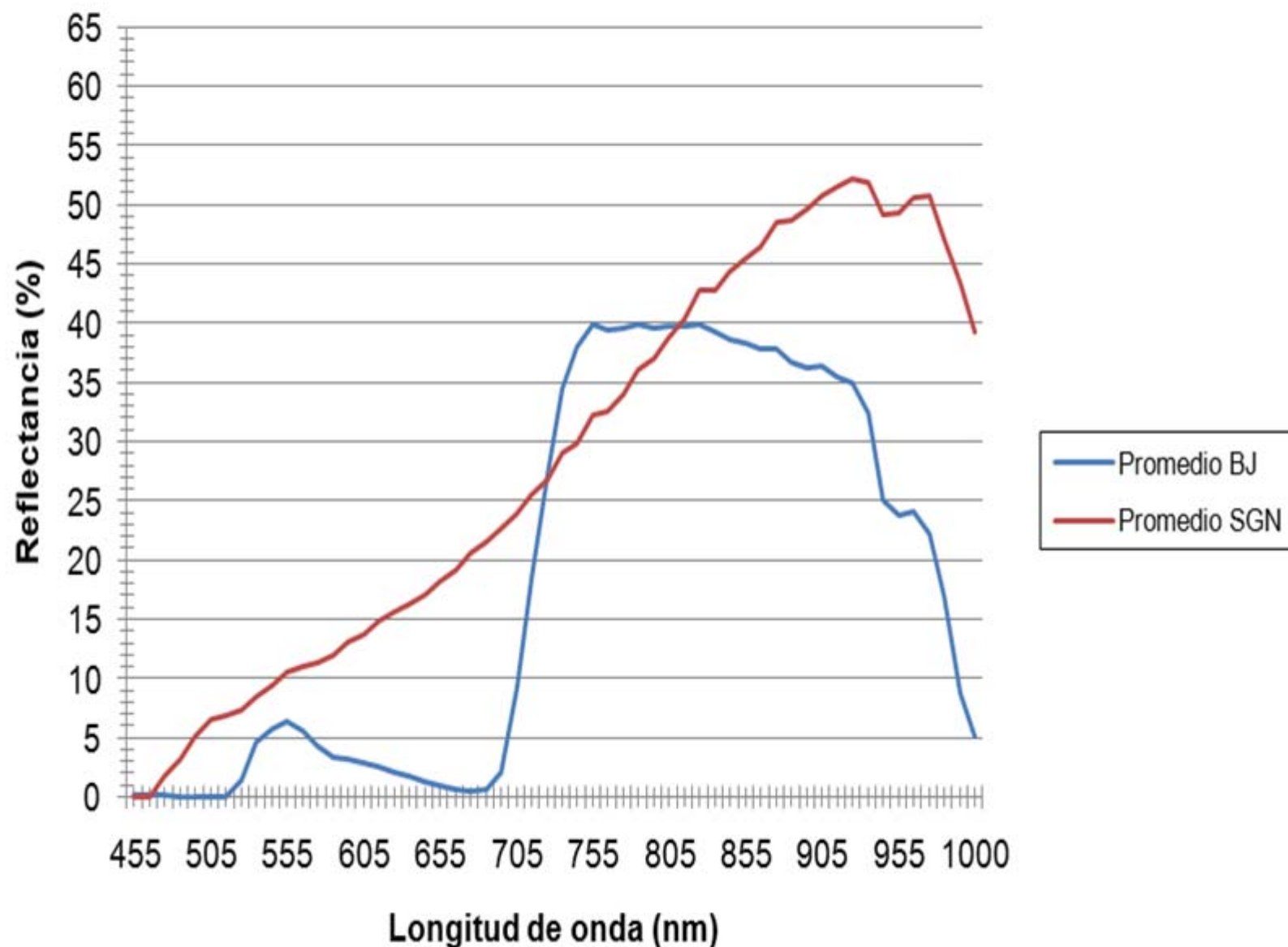
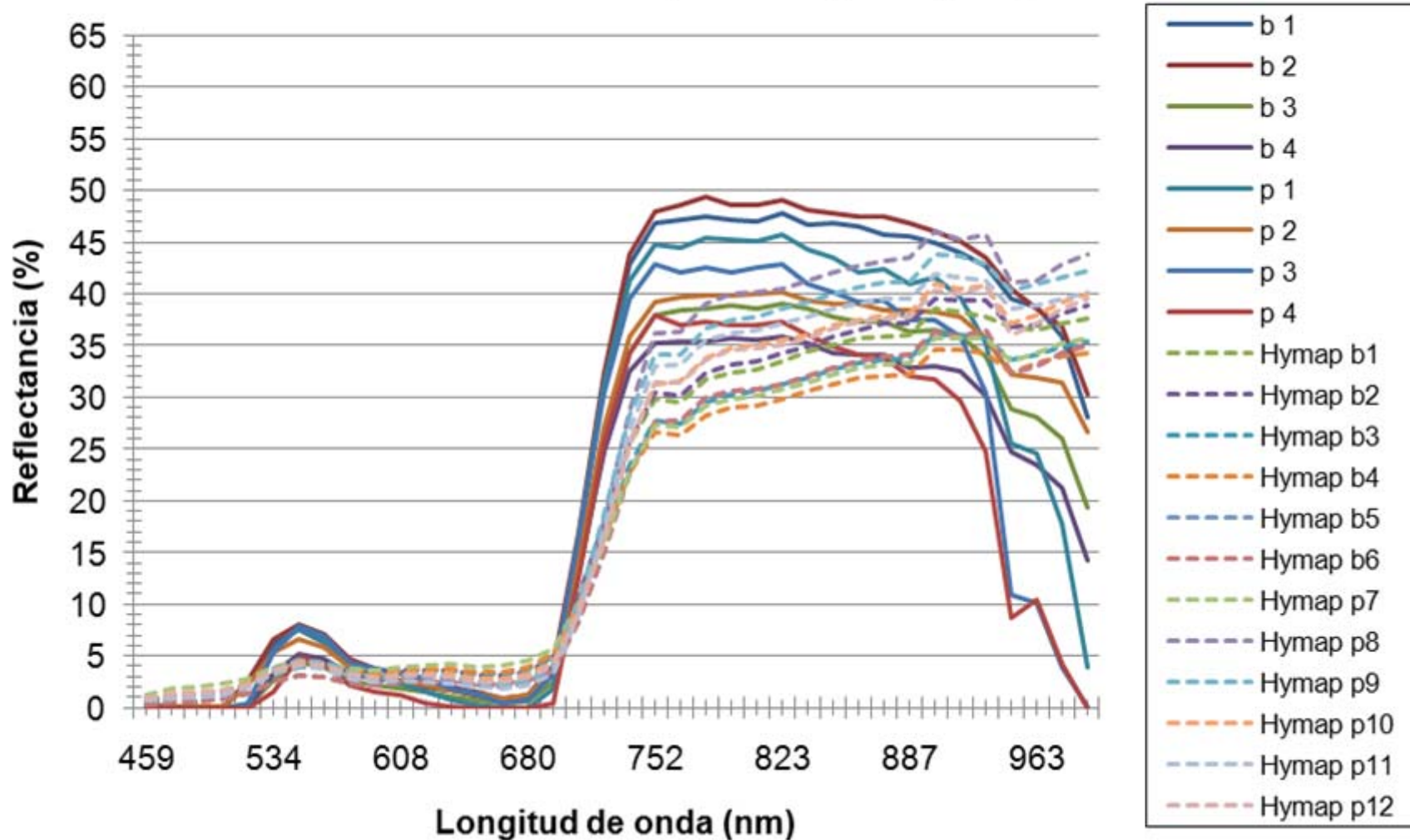


Gráfico N° 18
Muestras de campo e imagen Hymap





Muchas Gracias!

¿Preguntas?