Section 6

VNIR Example: Agricultural Land Cover – Coleambally Irrigation Area

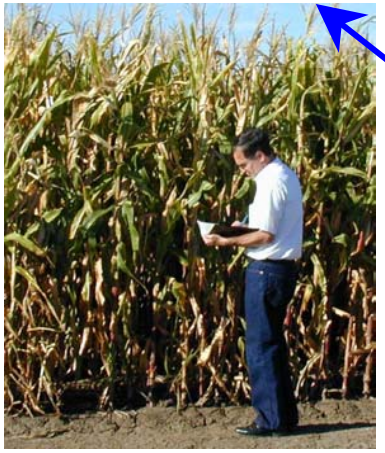
. . . Jay Pearlman
TRW Space & Electronics Group

VNIR Example: Agricultural Land Cover (Coleambally Irrigation Area)

Soybeans

Rice

Corn

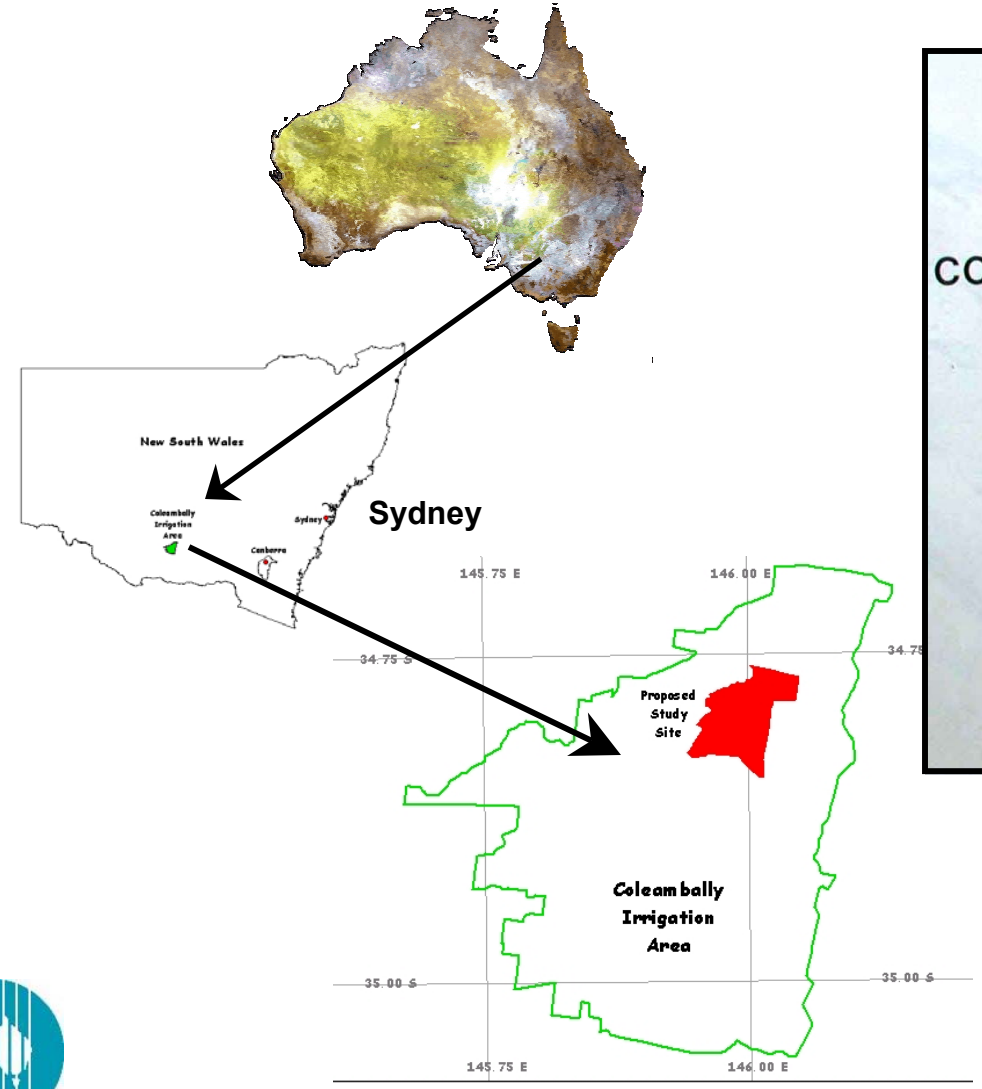


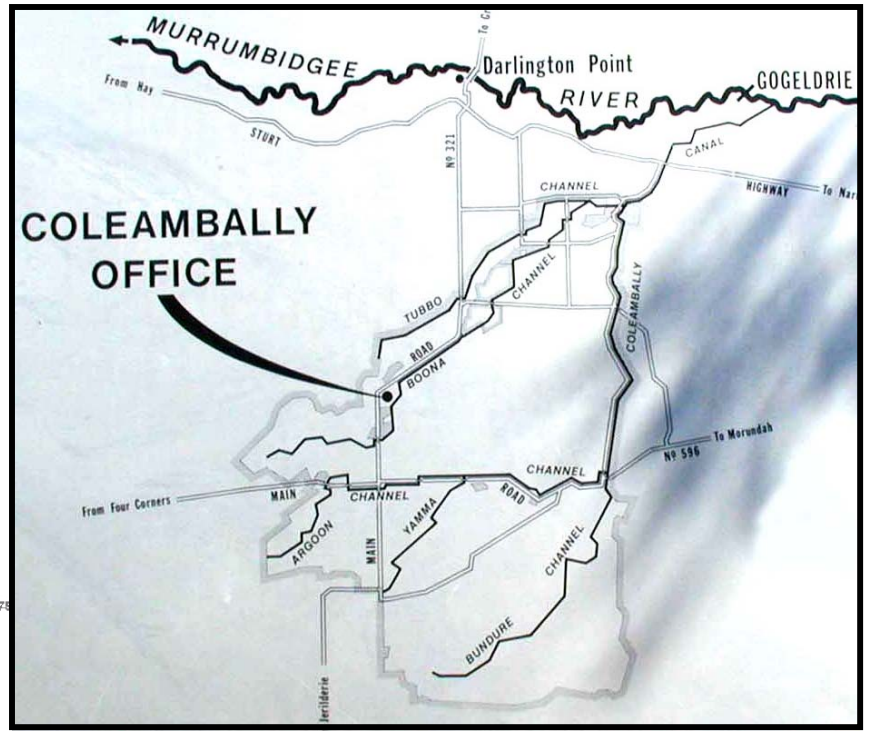
Coleambally Irrigation Area - Overview

Large farms
Irrigated and level
modern management practices

Variety of land cover types
Stable environment

Coleambally Irrigation Area
NSW, Australia





CIA covers 300 sq. miles including 312 large irrigated farms

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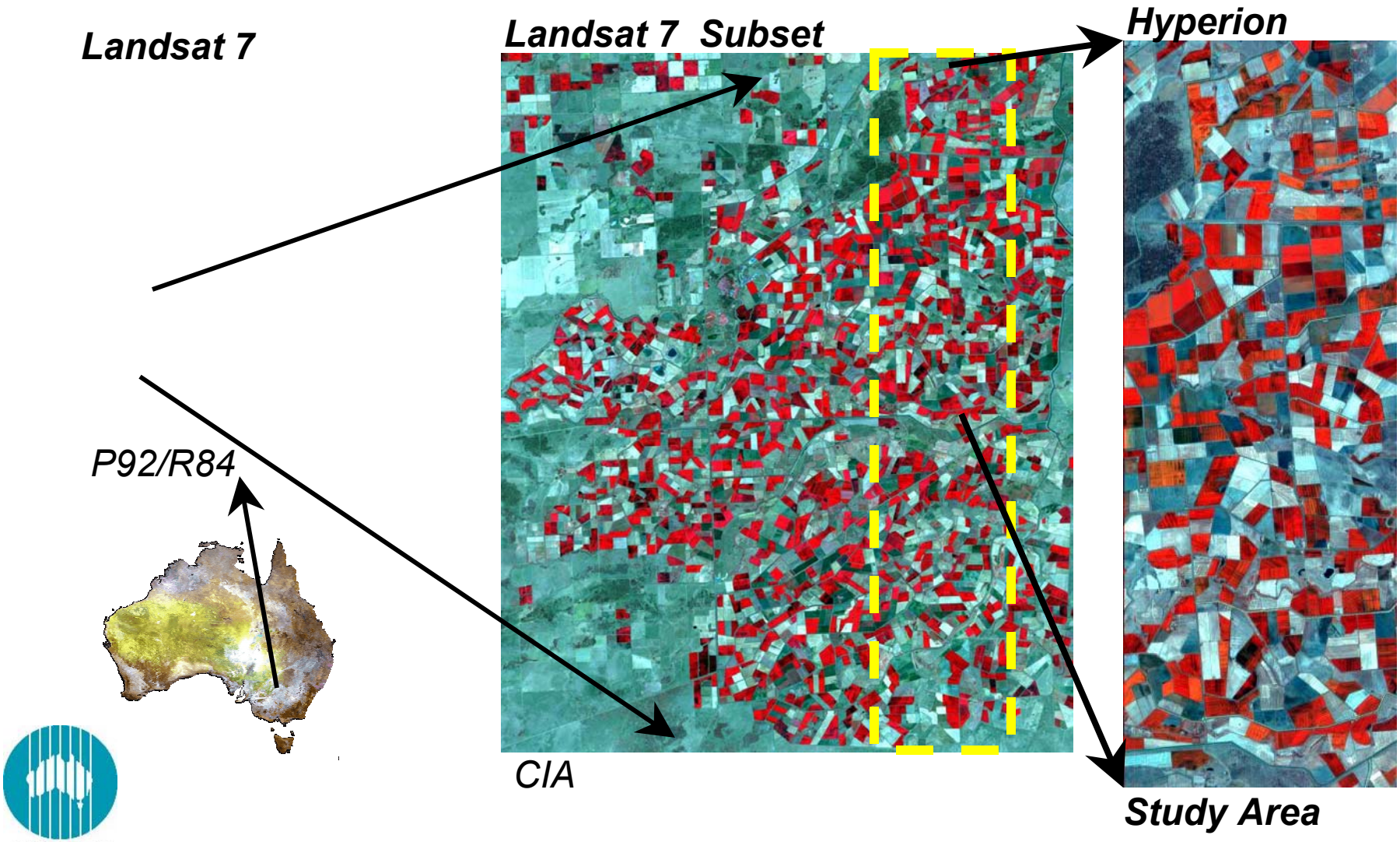
CIA Landsat Image with Hyperion Overlay



Coleambally Land cover

Riverbed

Brush

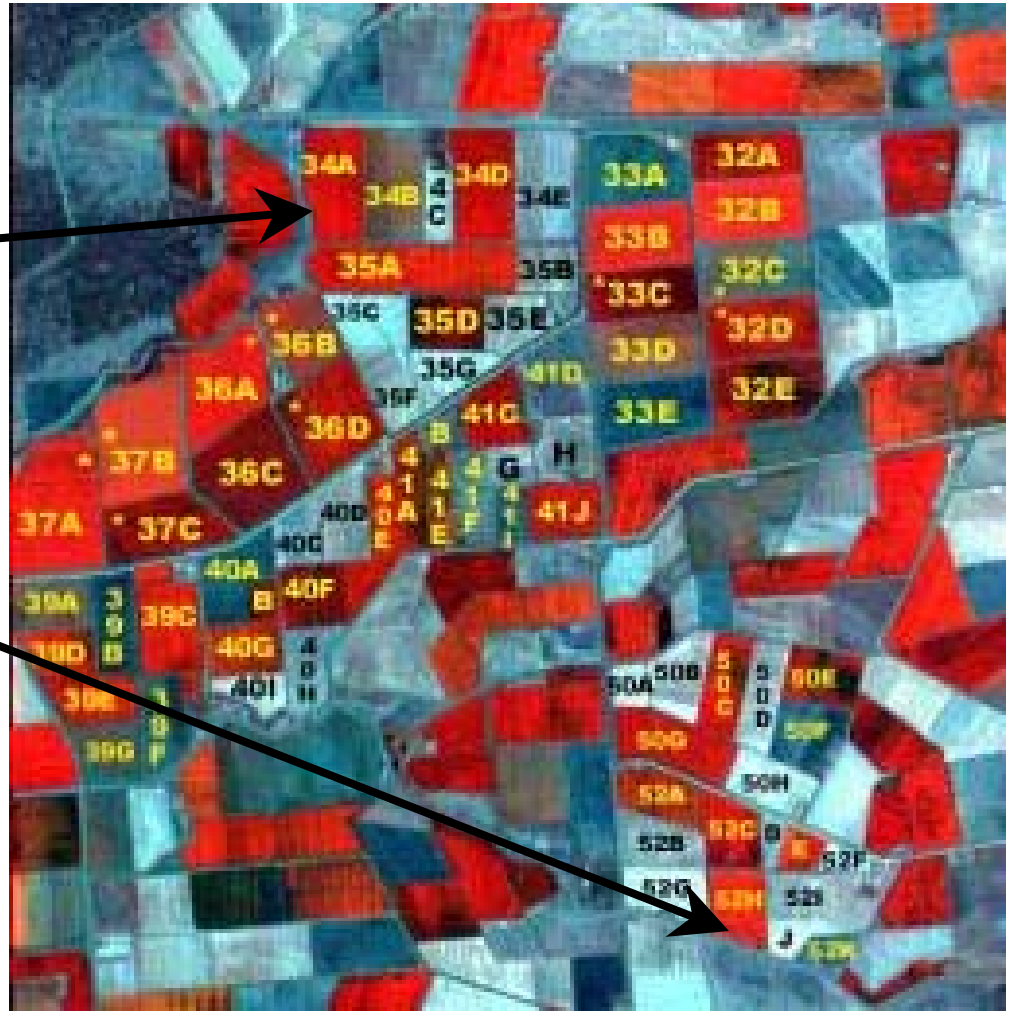
Paddock – Planted

Main Road

Bare Soil

"Dirt Road"

Paddock References



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Coleambally Data Set – March 7, 2001

- ***Satellite-based***
  - ***Hyperion***
  - ***LANDSAT 7***
  - ***ALI (later)***
- ***Airborne***
  - ***Photography***
- ***Ground-based***
  - ***ASD spectra (later)***
  - ***Photography***

EO-1 Collection History - Coleambally

Date (GMT)	Julian Day (GMT)	Path/ Row	X-track Position	In-track Position	Comments
23-Dec-00	358	93/84	100	3148	Cum (South); VNIR
1-Jan-01	001	92/84	82	2131	Clear
9-Jan-01	009	93/84	-	-	UARDRY
17-Jan-01	017	92/84	-	-	Cloudy
25-Jan-01	025	93/84	95**	2481**	High Clouds (North)
2-Feb-01	034	92/84	36	2599	Clear
9-Feb-01	041	93/84	-	-	Cloudy
18-Feb-01	049	92/84	41	3782	Shadows (East)
25-Feb-01	056	93/84	-	-	
6-Mar-01	065	92/84	95	3977	Clear
13-Mar-01	072	93/84	104	2926	Clear
22-Mar-01	082	92/84	-	-	Cloudy

Blue Arrows indicate demonstration data set

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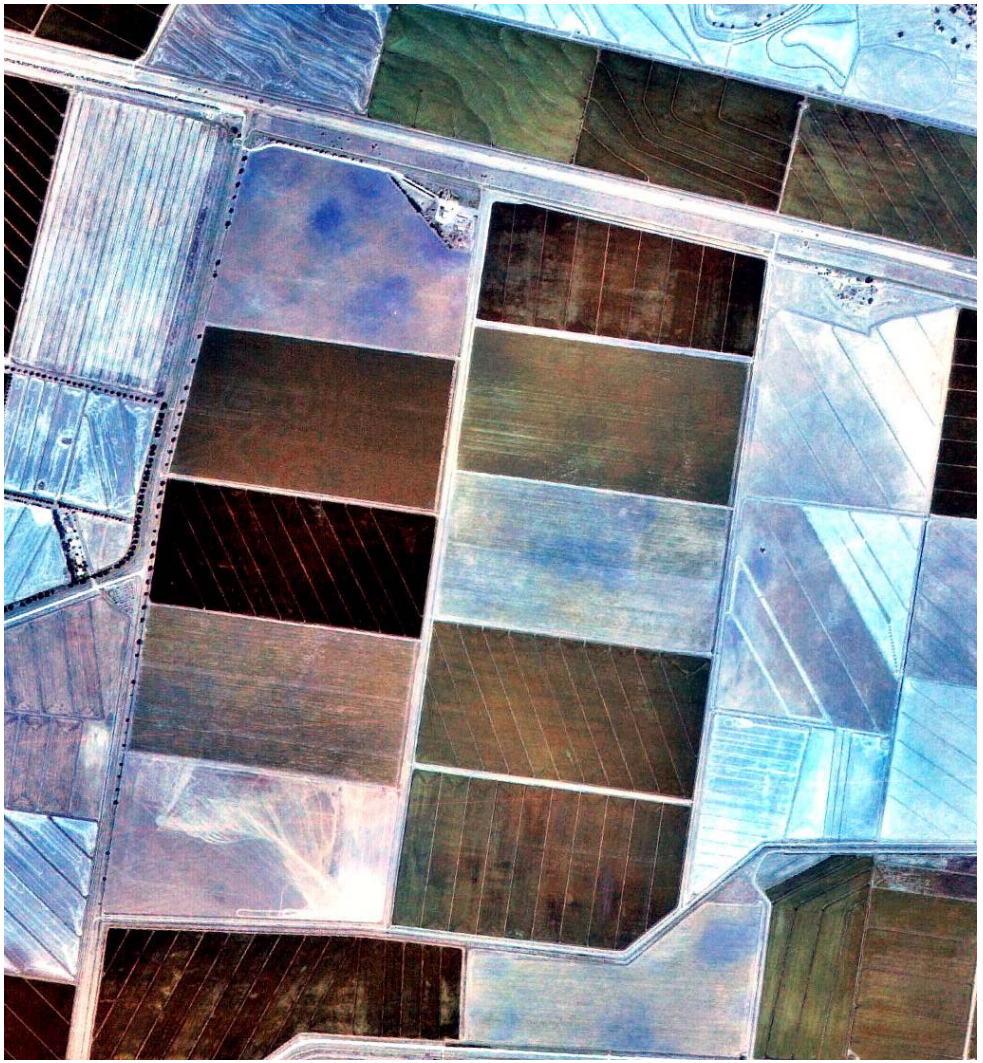
Aerial Photography & Control Points Enable Geometric Correction

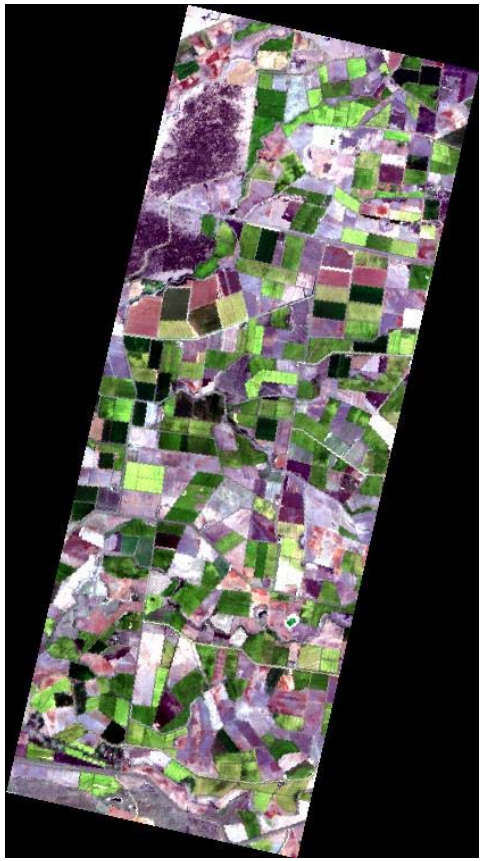


2m aerial photographs provide base for Geometric corrections

Data Processing Levels

Level 1A:
delivered data through 11/15/01

Level 1B:
L1A+VNIR/ SWIR overlay after 11/15/01

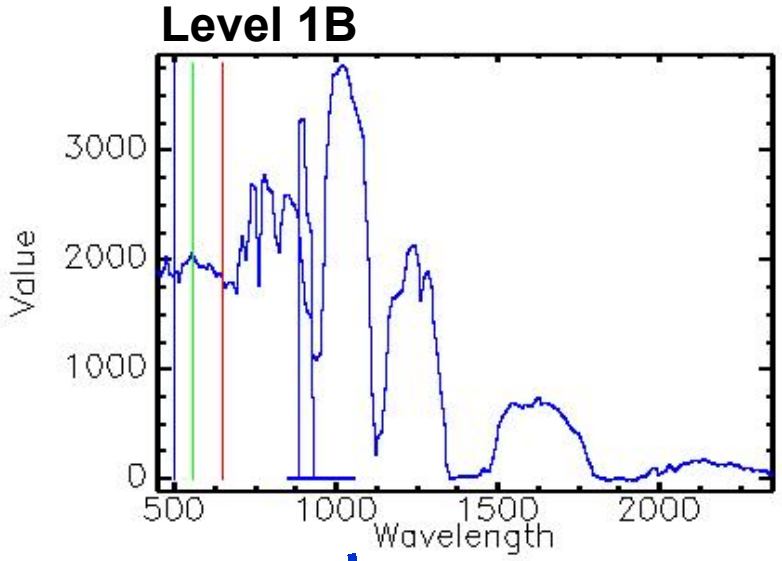


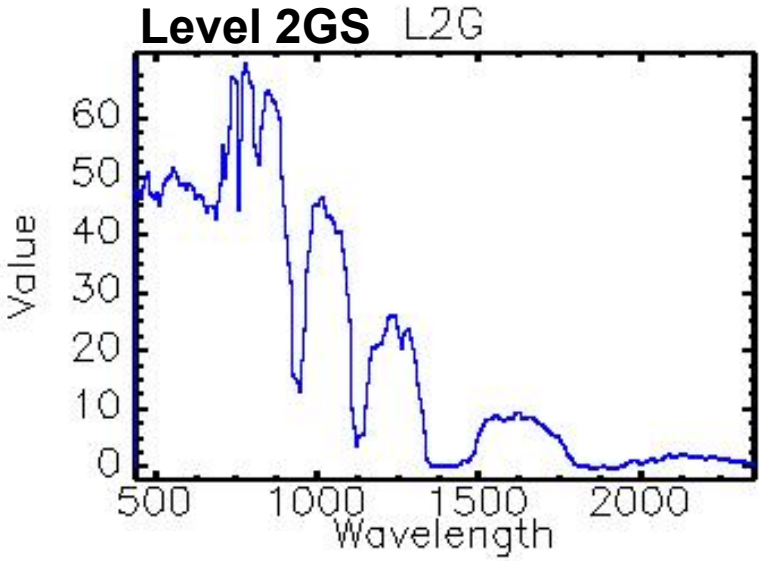
Level 2G:
Geometric and VNIR/SWIR merge

Level 1 Processing History

Level 1 version	.cal	.L1	.L1_A	.L1_A3	.L1_B
Effective date	pre-flight	4/1/2001	7/1/2001	10/23/2001	11/15/2001
Level 1 parameters mods					
Ratio file	ratio.txt	ratio.txt	ratio_revA.txt	ratio_revB.txt	ratio_revB.txt
Gain file	PriRadL0.bin	hypgain.txt	HypGain_revA.dat	HypGain_revB.dat	HypGain_revB.dat
Data type	uint16	uint16	int16	int16	int16
Calibration multiplier VNIR	100	100	40	40	40
Calibration multiplier SWIR	100	100	80	80	80
Cal Min	0	0	-32768	-32768	-32768
Cal Max		40000	32768	32767	32767
Bad pixel file	badpix	badpix2	badpix2	badpix3	badpix3
Level 1 algorithm mods					
Bad pixel repair	yes	yes	yes	yes	yes
Saturated pixel report	no	no	yes	yes (update)	yes (update)
Offset removal	nearest	nearest	interpolated	interpolated	interpolated (update)
VNIR/SWIR co-alignment	no	no	no	no	yes

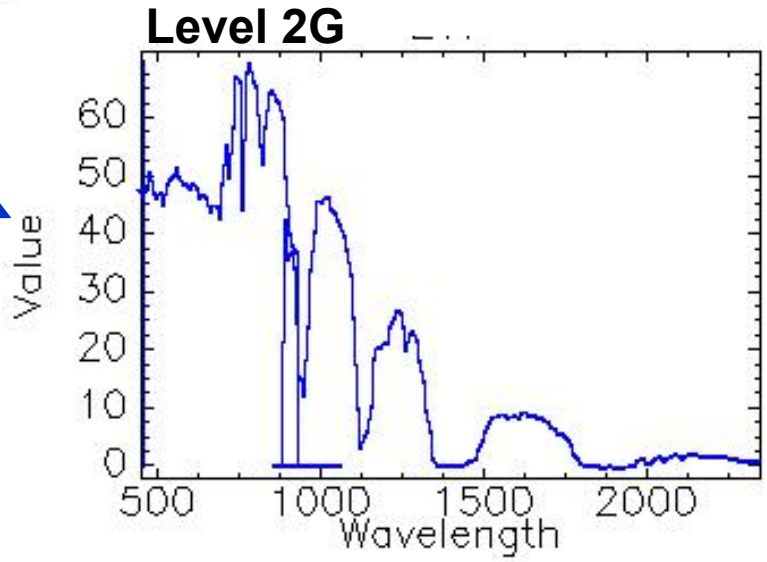
Data Evolution Through Processing: L1A – L2G





Level 1B:
delivered data

Level 2G:
Geometric and VNIR/SWIR merge



VNIR/SWIR merge:
Bands 9-55
& 77-220

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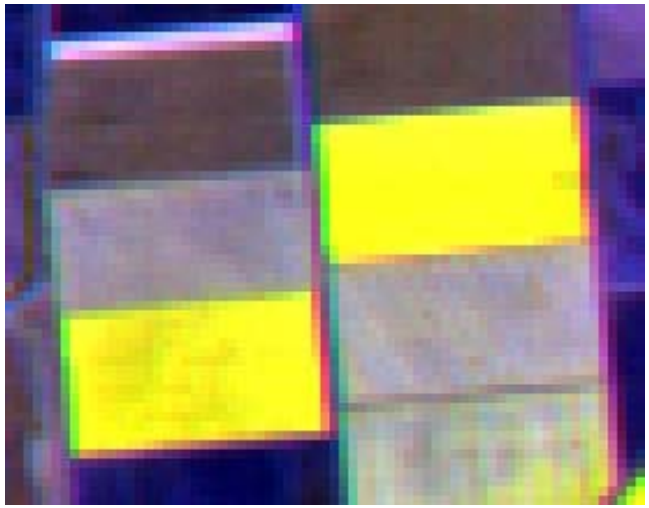
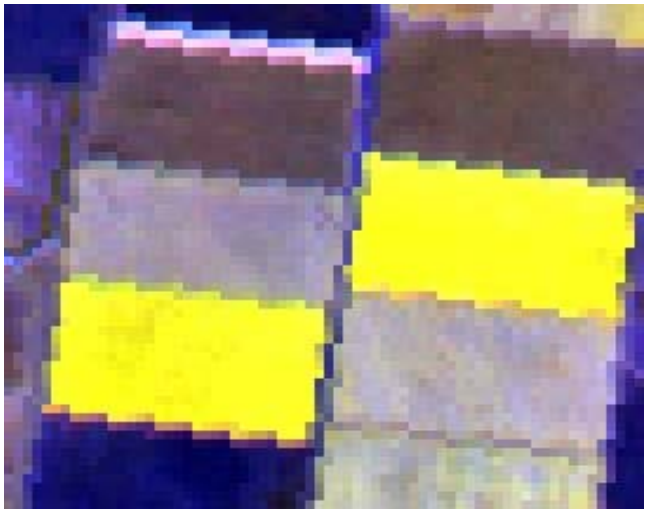
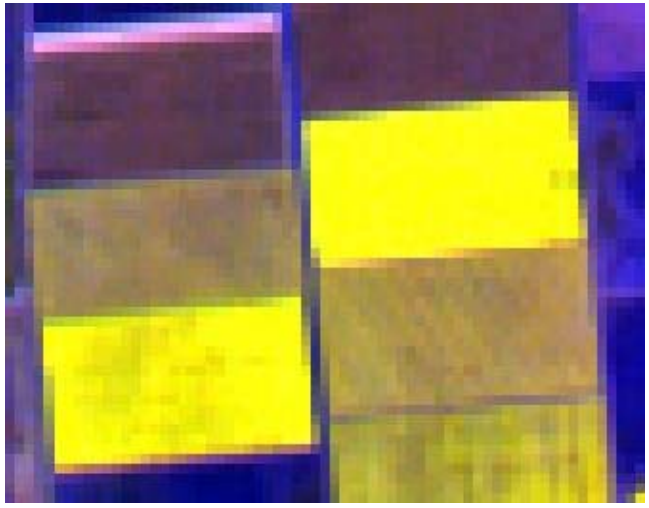
Geo-Correction: L1A, L1B, L2G



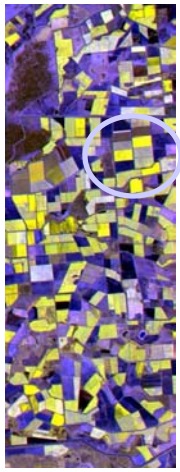
L1A

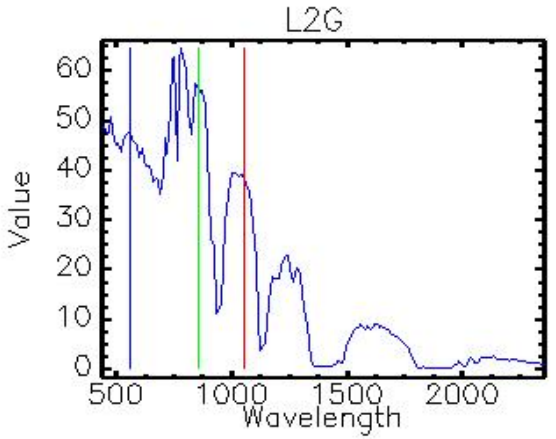


L2G



L1B





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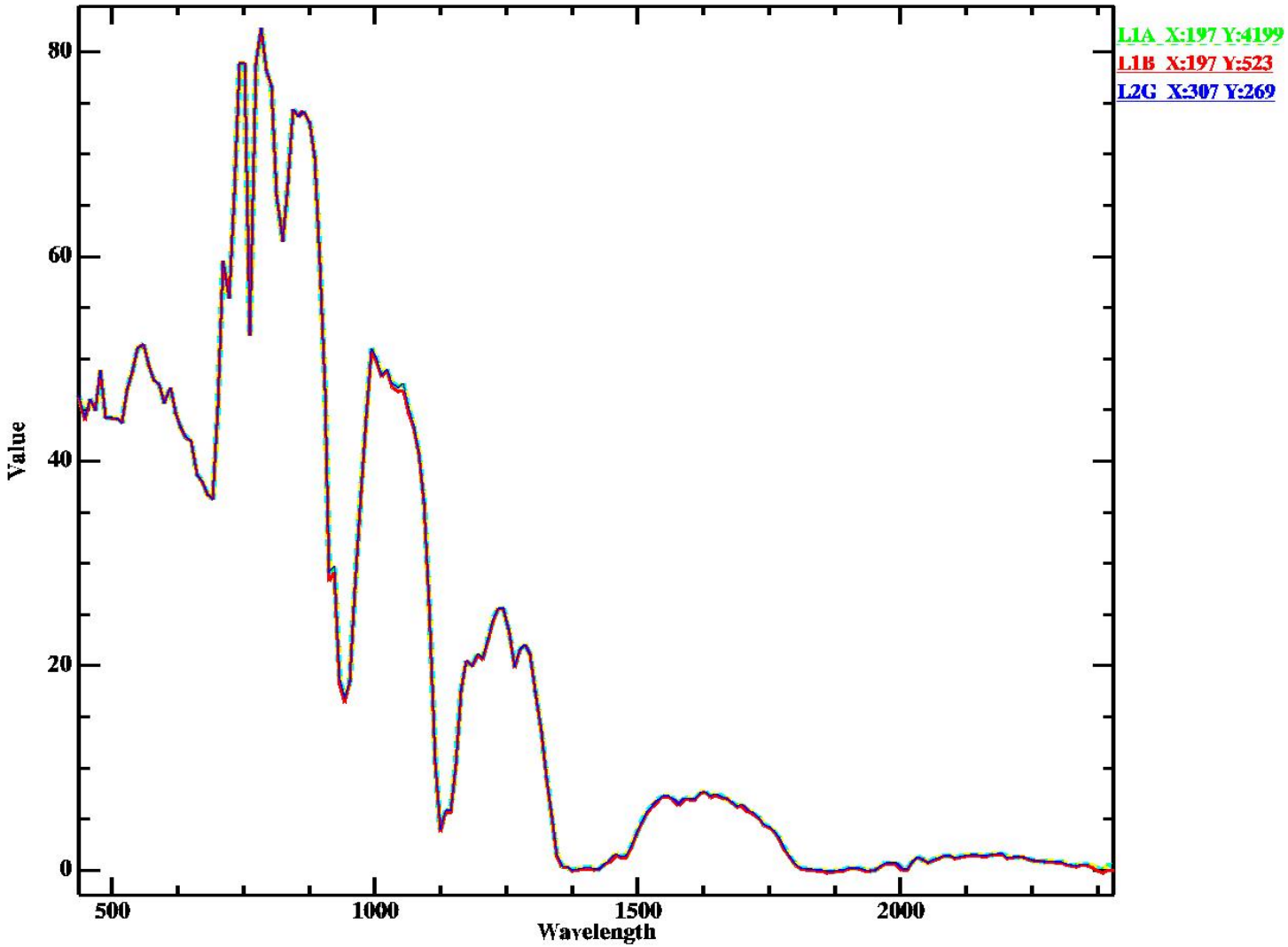
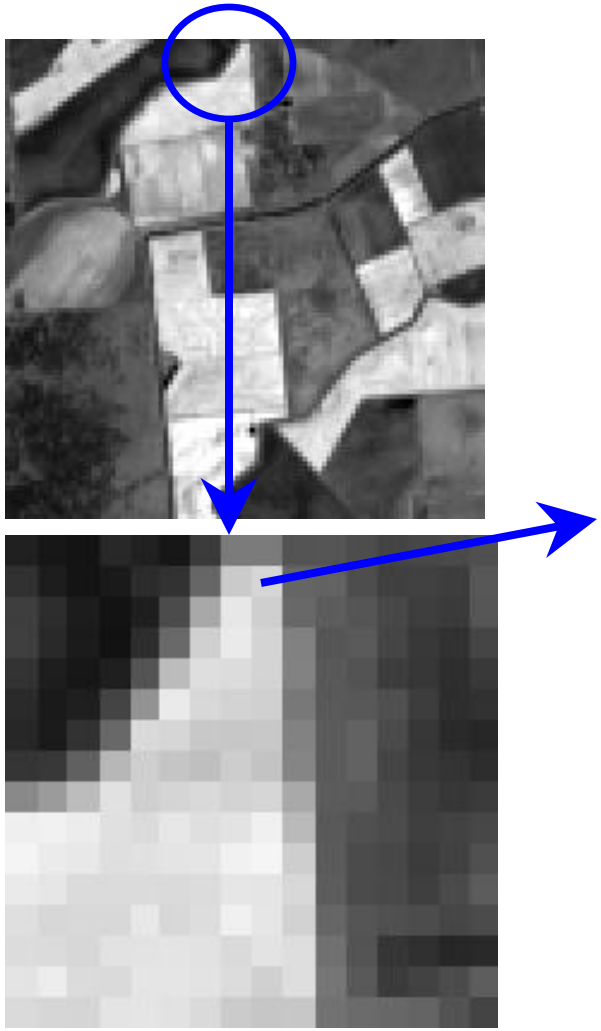
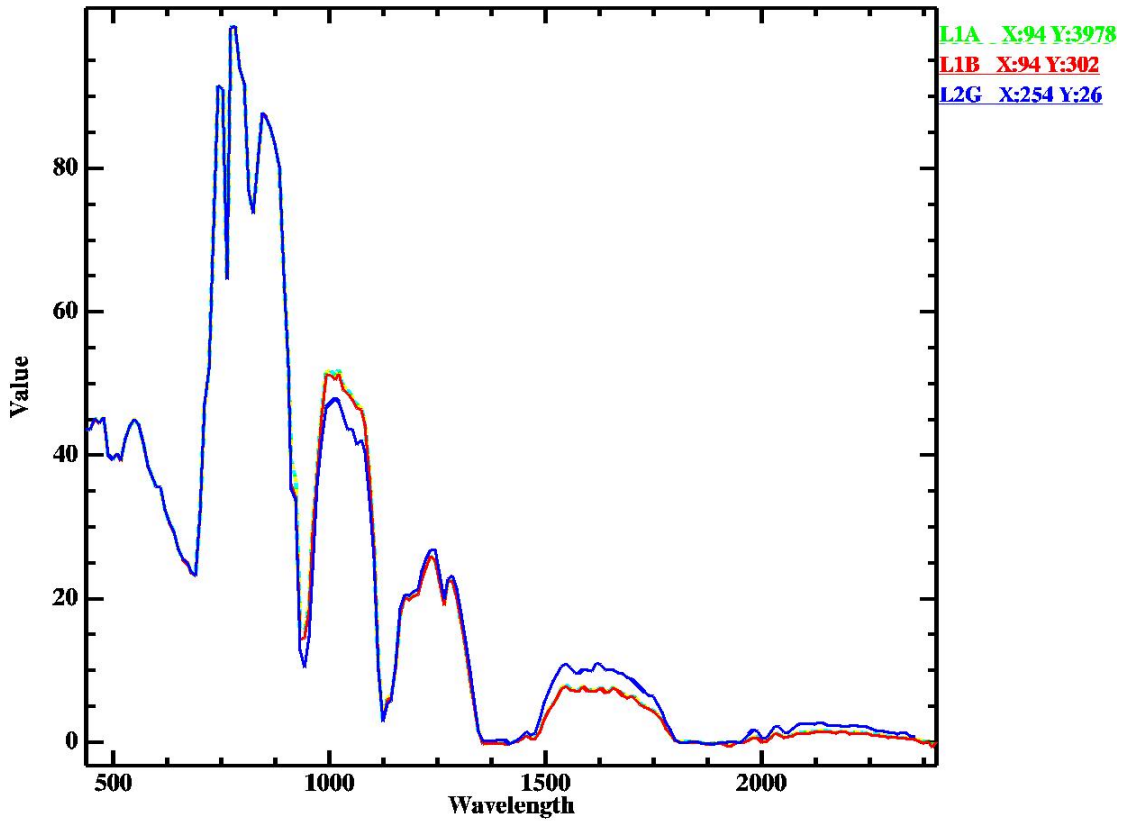
L1 & L2 Comparison
Paddock 32C

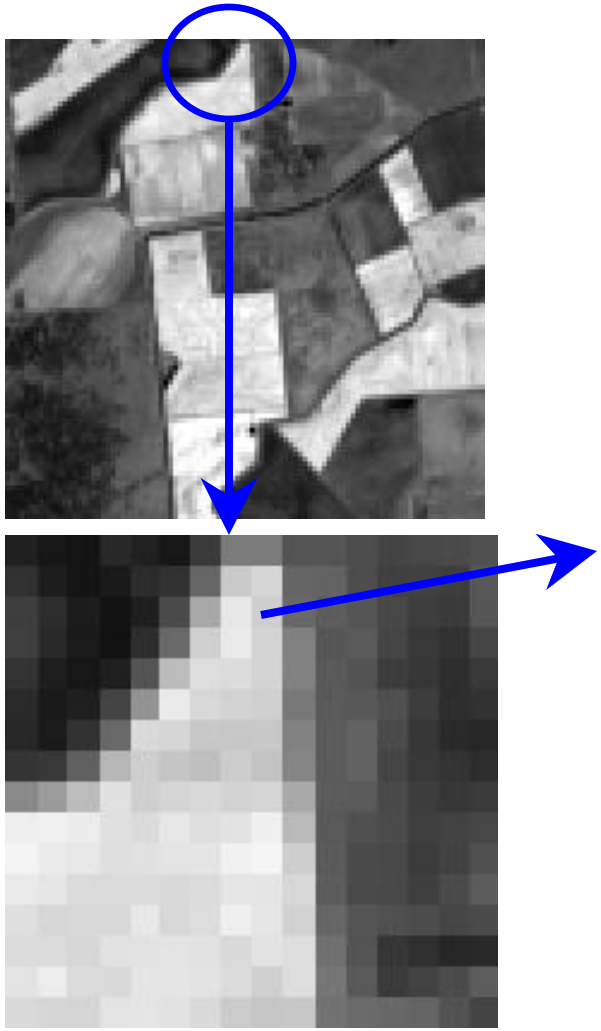


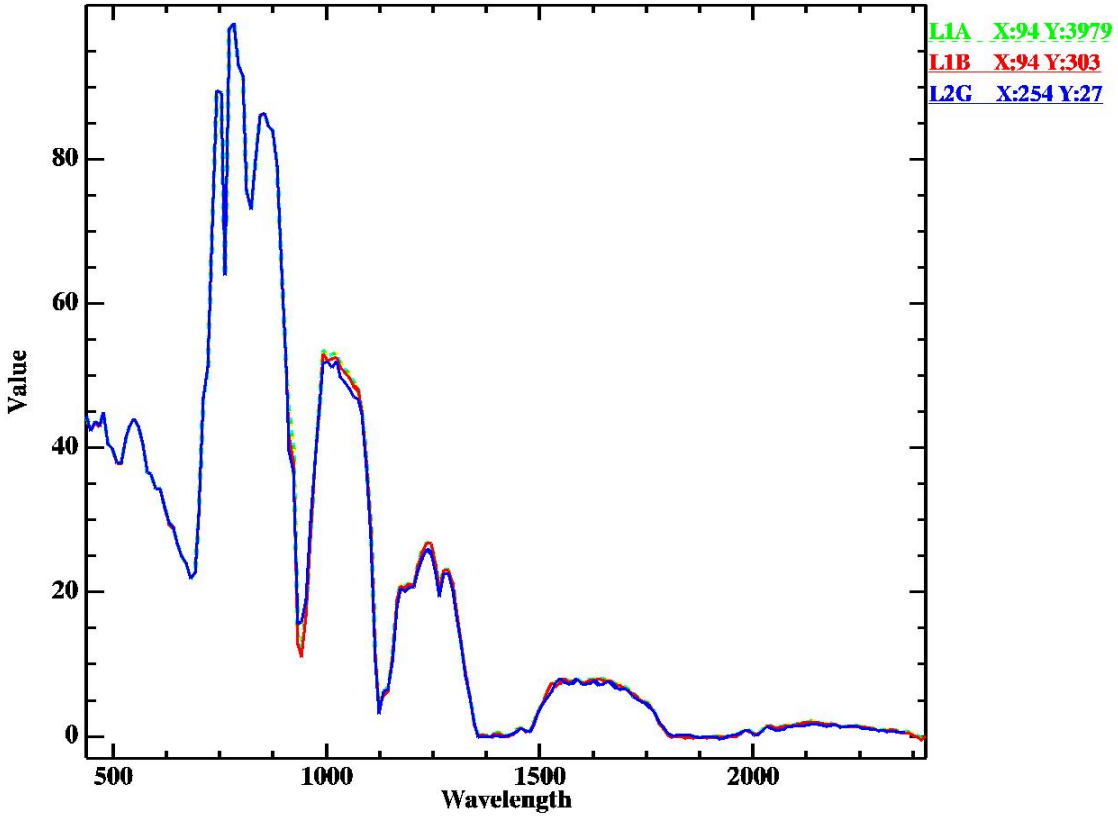
L1 & L2 Comparison



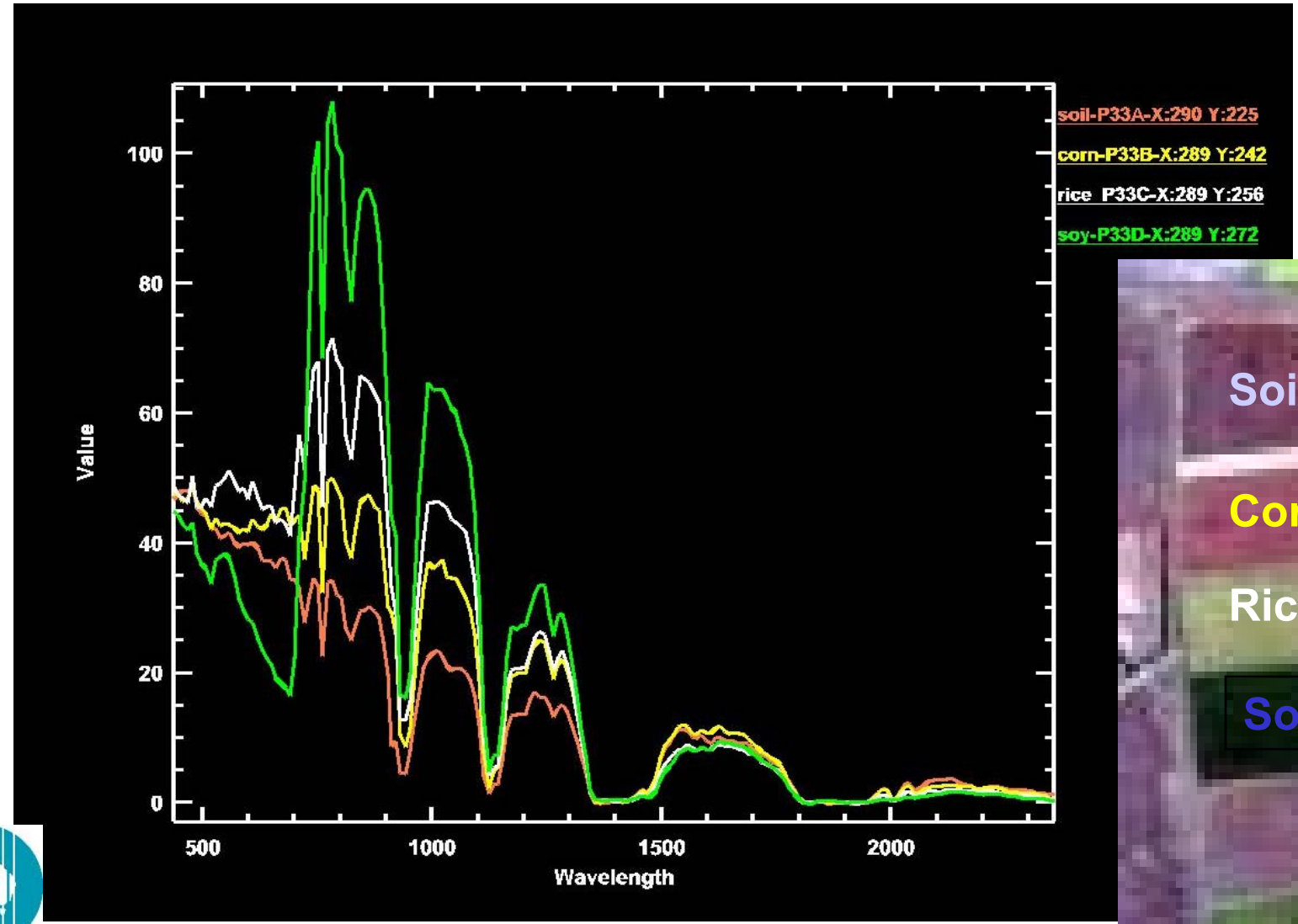


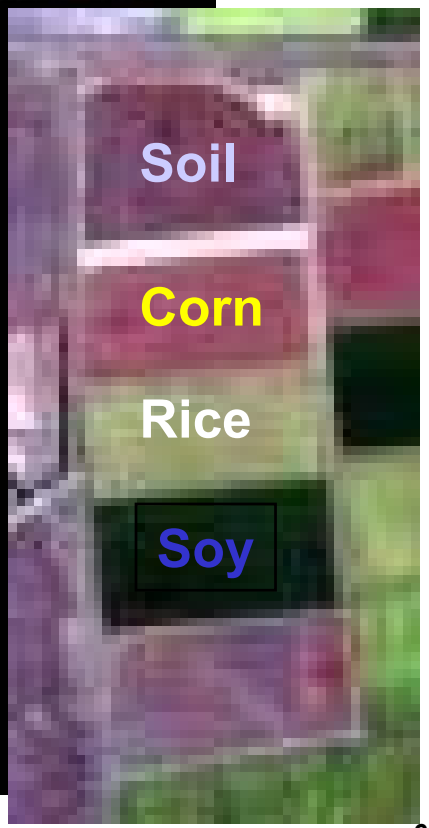
L1 & L2 Comparison



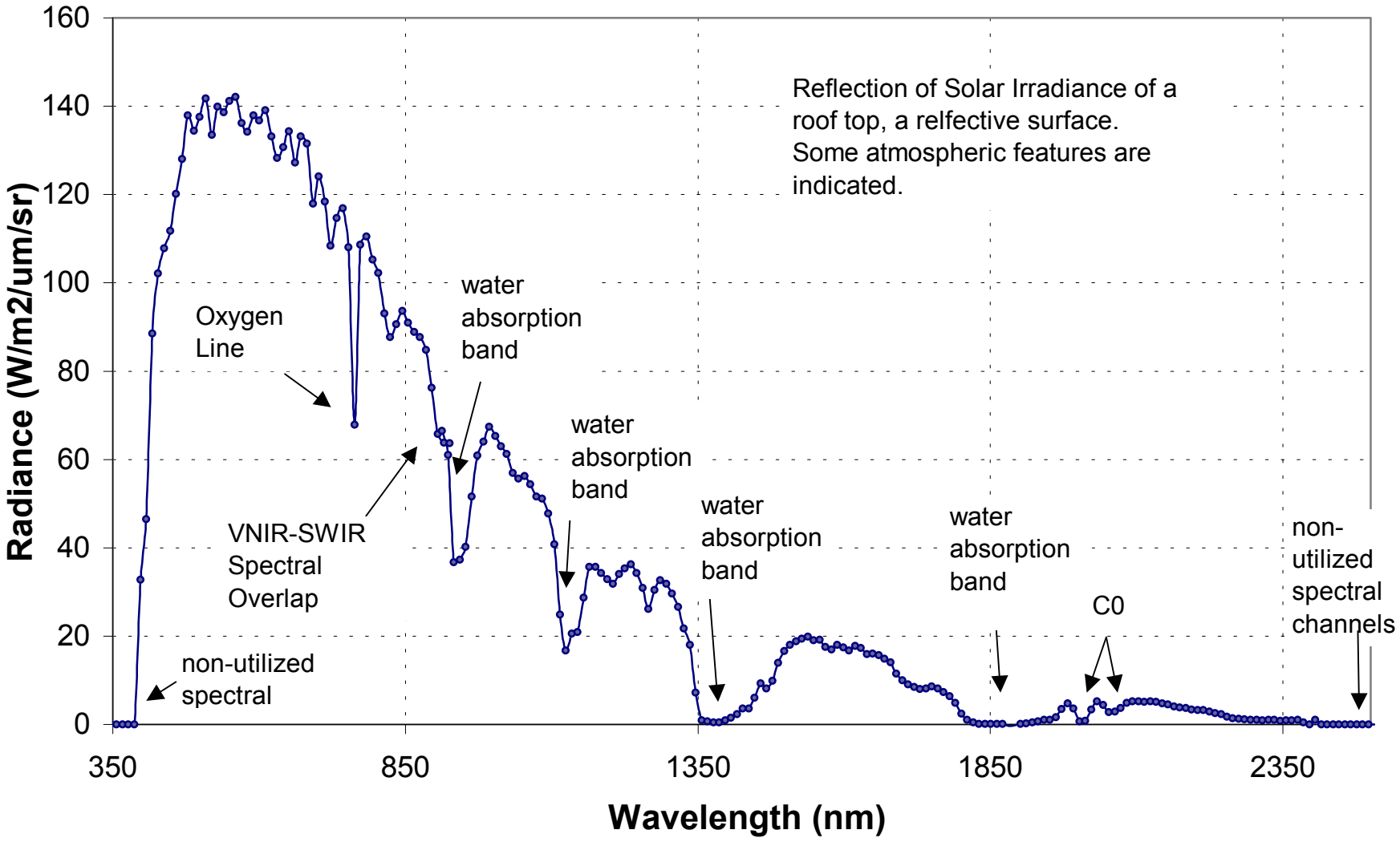


Spectral Signatures (Paddock 33-3/7/01)



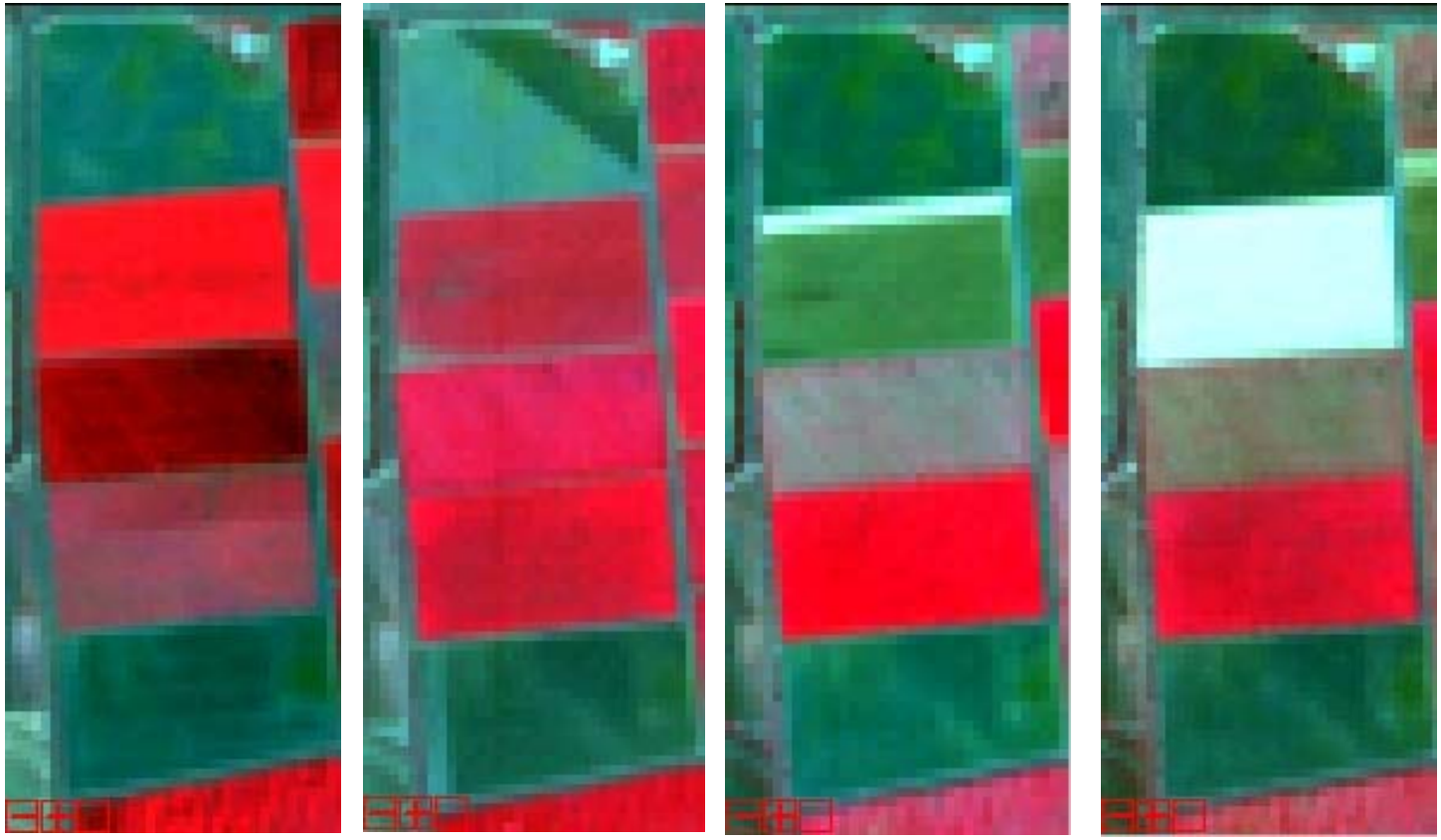


San Francisco
January 17, 2001



Preliminary Results / Spectra

FARM 33



Weeds

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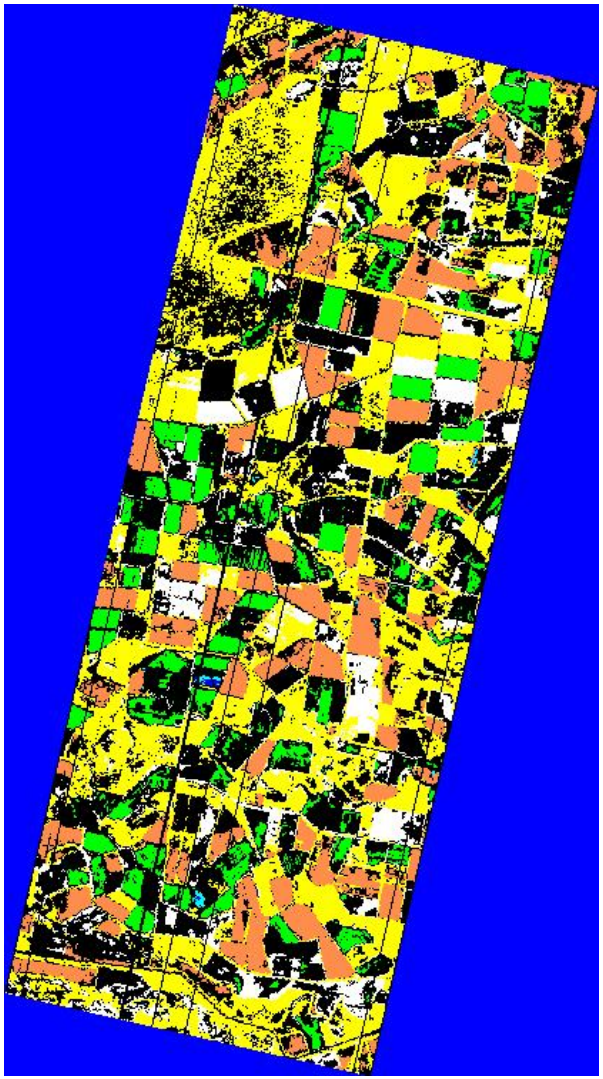
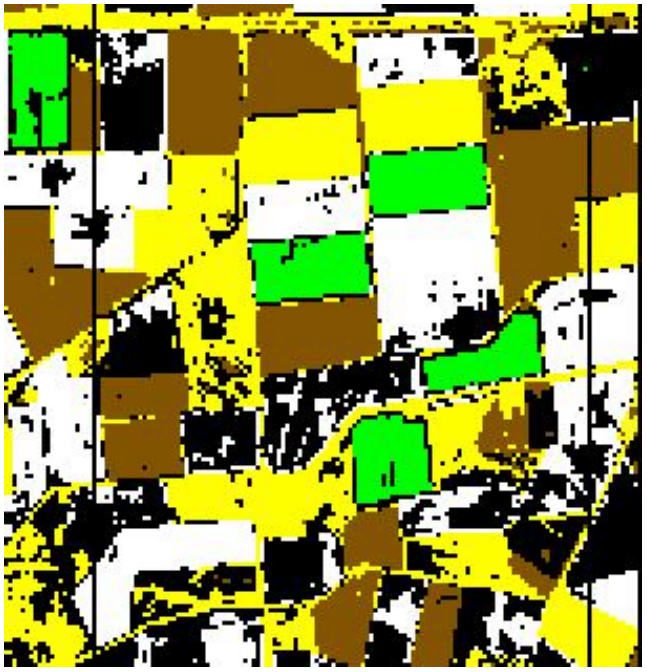
Sample Classification - SAM

L2G



Yellow - *Corn*
Green - *Soy*
White - *Rice*
Brown - *Soil*
Black - *Unclassified*



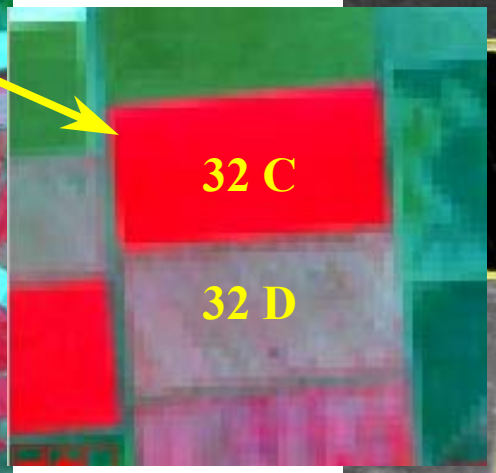
L1A

Enlarged

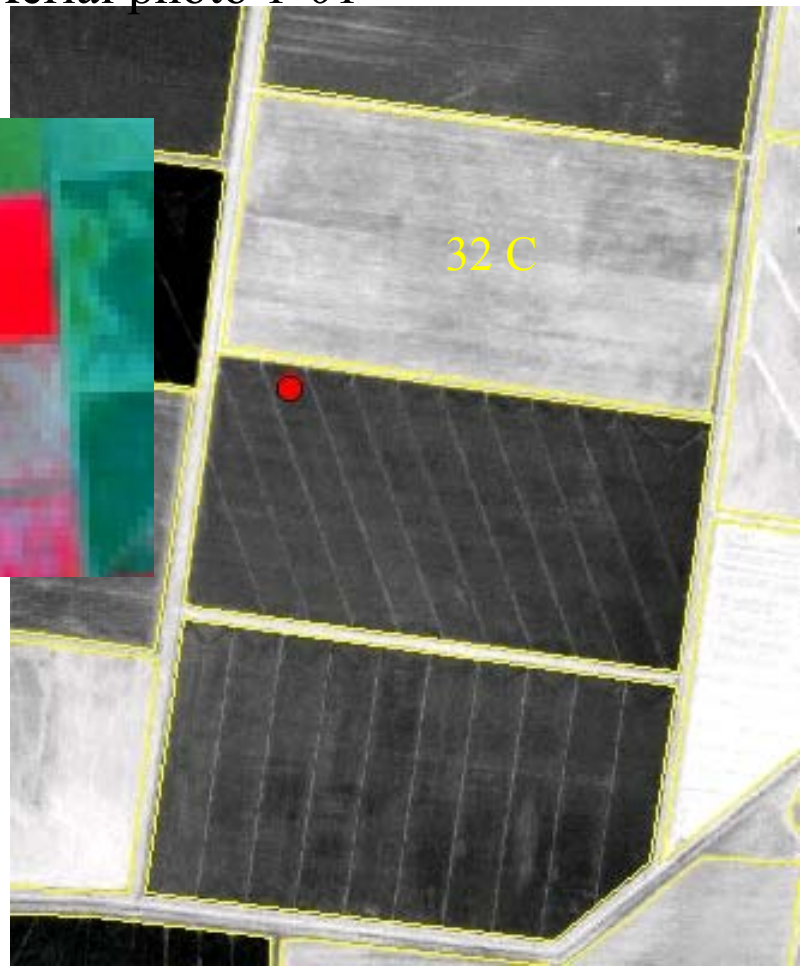
Red Edge Analysis

32 C – SOY
32 D – RICE

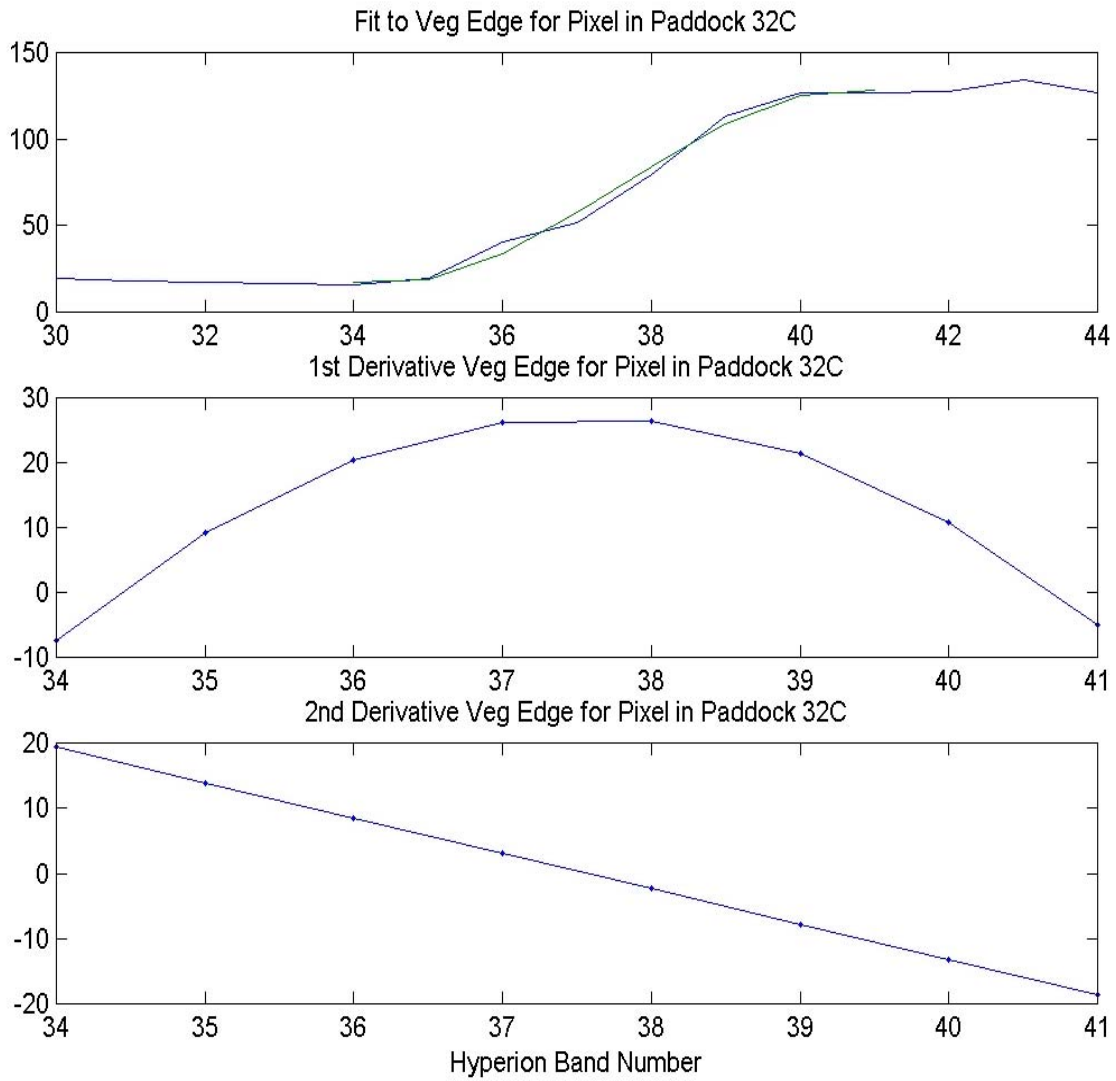
Hyperion image 3-07-01

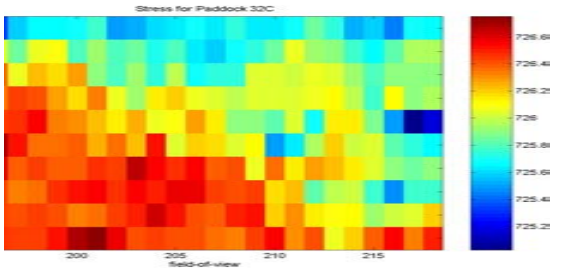


Aerial photo 1-01

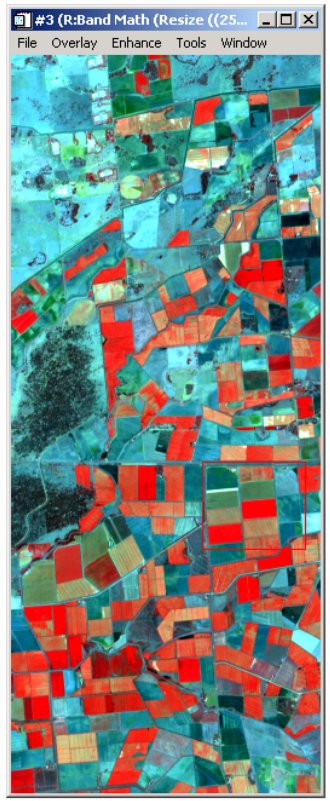


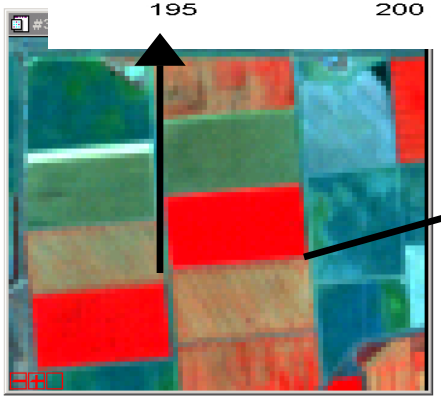
Red Edge Analysis

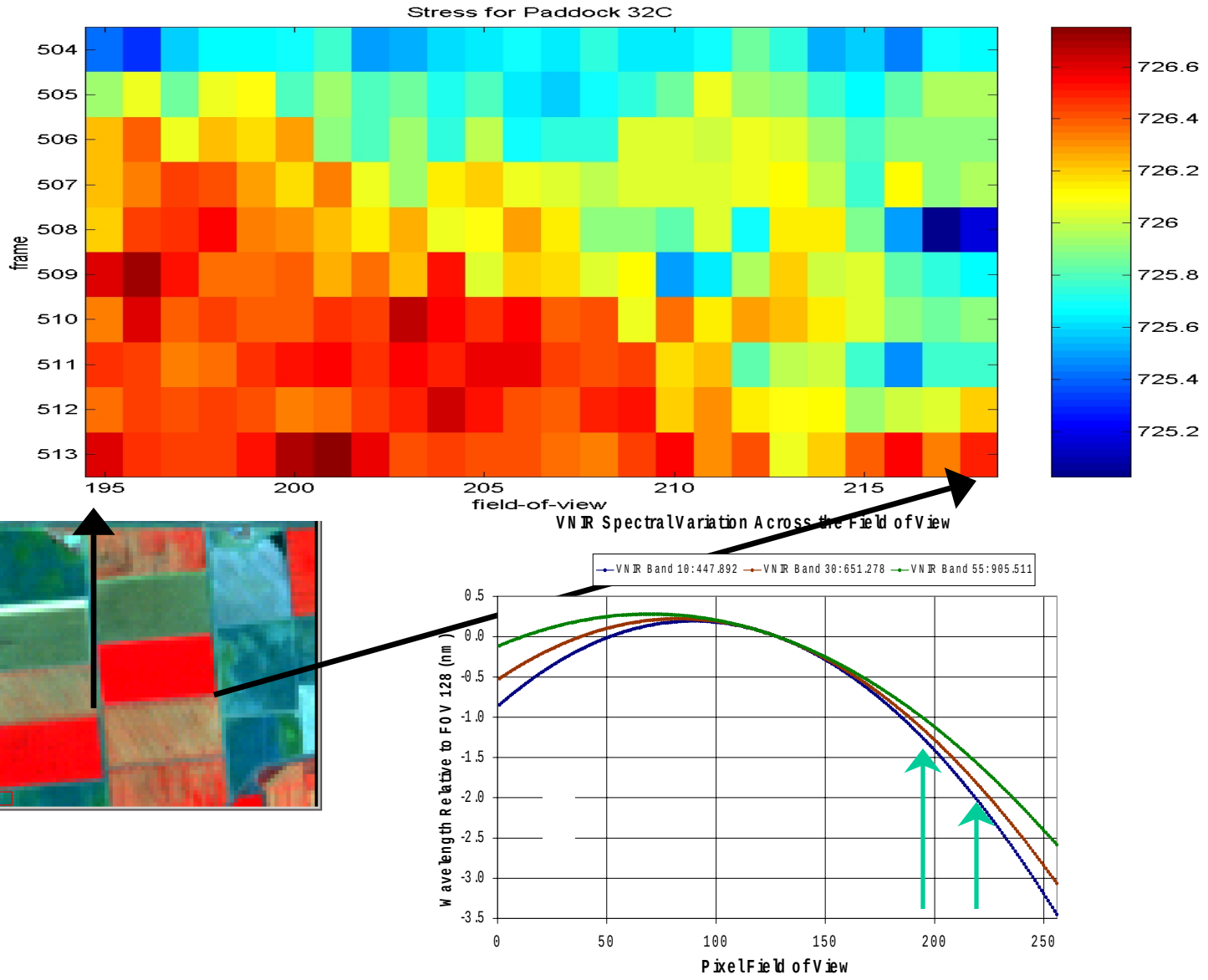




Analysis of Red Edge Shift (sample process)







Tom
Monisha
Susan
Shunlin

Coleambally

Metadata Files