Spring LCLUC Meeting

22 Apr 2010

LANDSAT DATA GAP APPROACH IRS AWIFS / SPOT

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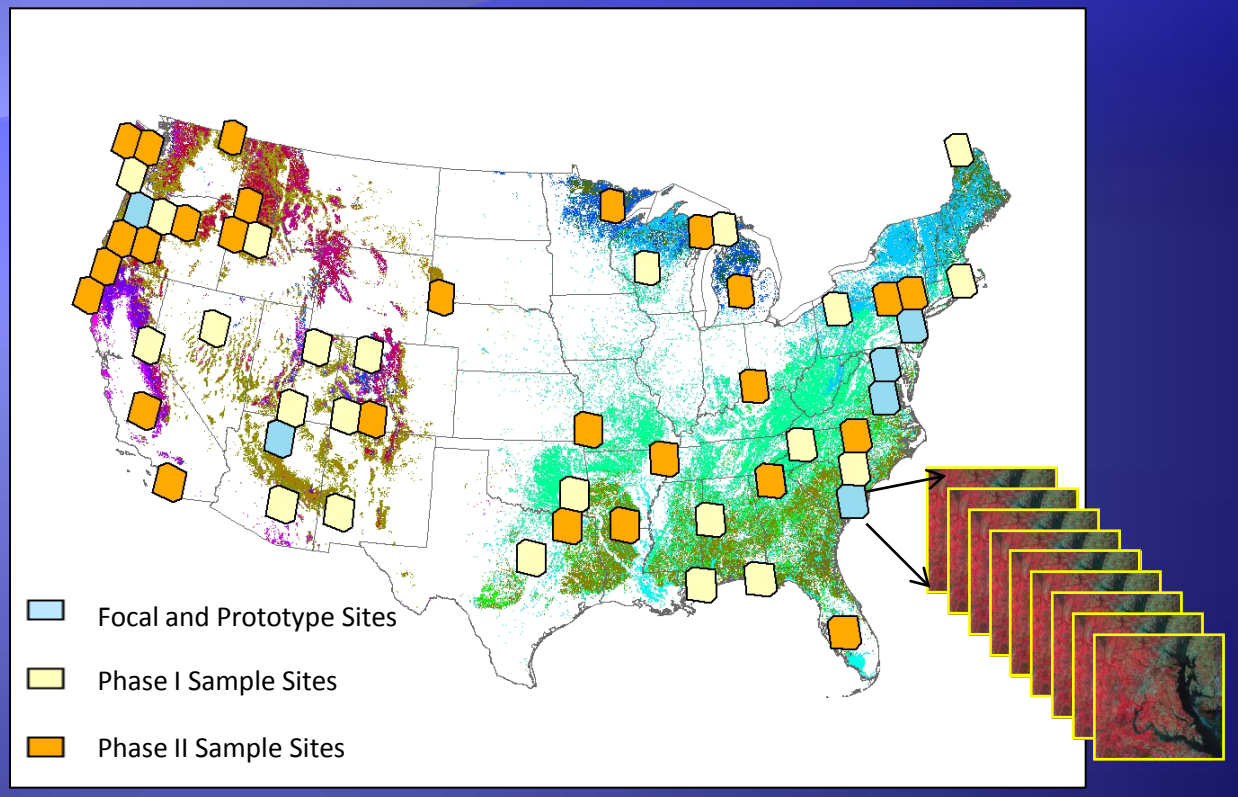
Geography – University of Maryland

North American Forest Dynamics (NAFD): A core project of NACP



PHASE I - 23 Sample Sites

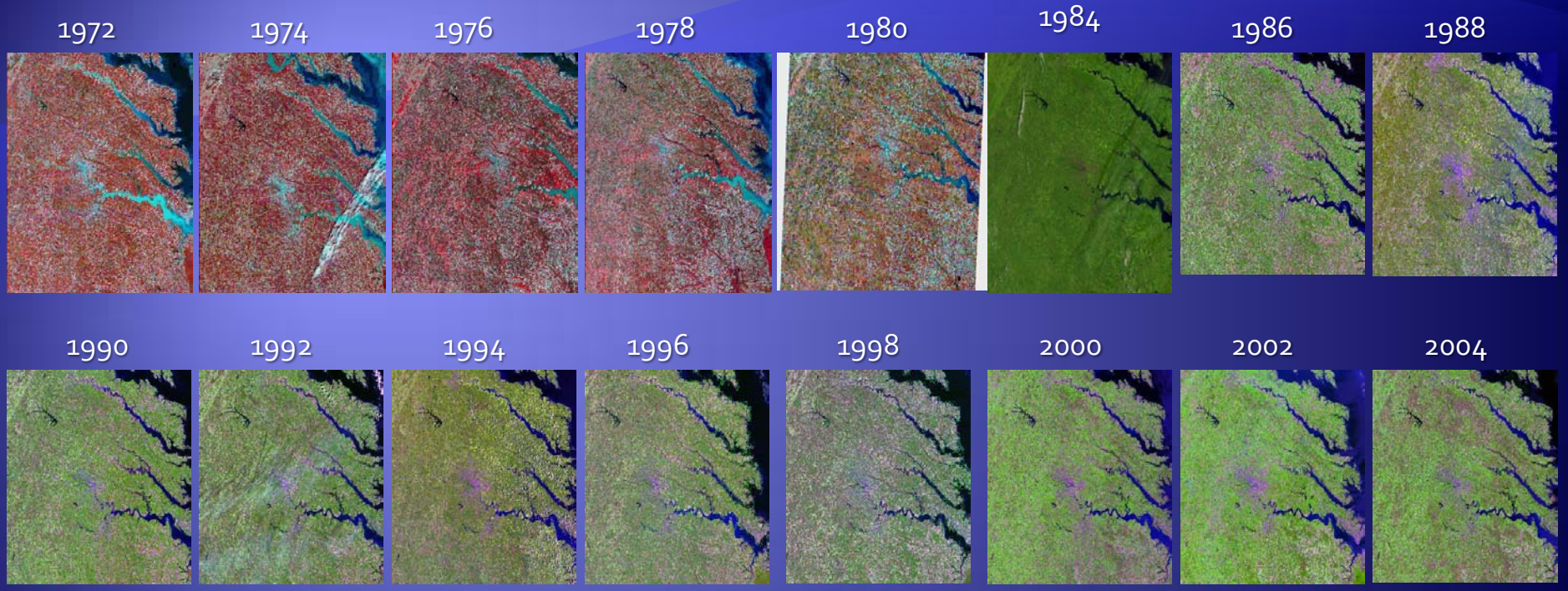
Biennial Time Series (1984-2005)

PHASE II – 27 Sample Sites

Annual Time Series (1984-2010)

Kennedy et al., submitted

Landsat Time Series Stacks (LTSS)



DATA

- Landsats 1-5, 7
- TM/ETM+: 1982 – future
- MSS: 1972 - ~1990
- Growing Season (June-Sept)
- Cloud-free (mostly)

ADJUSTMENTS

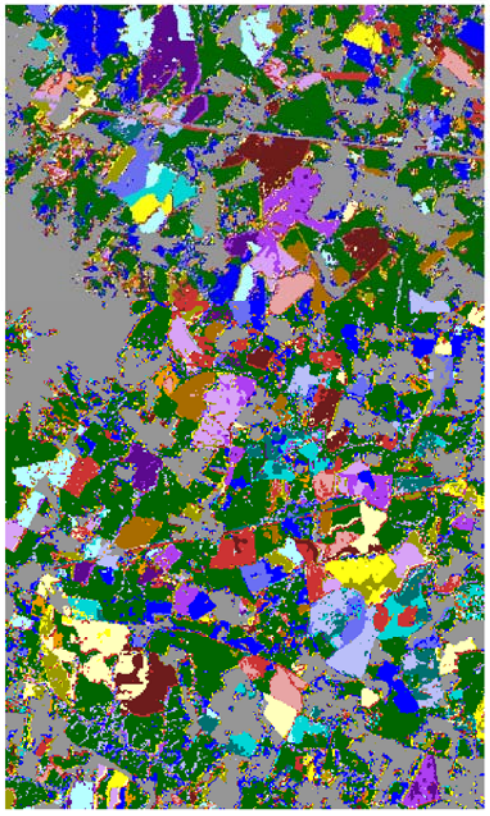
- Orthorectification - SRTM DEM
- Radiance Re-calibration - L5 particularly
- Surface Reflectance – atmospheric adjustment

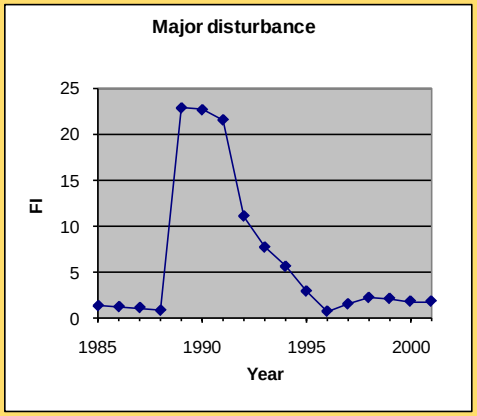
Huang et al., 2009

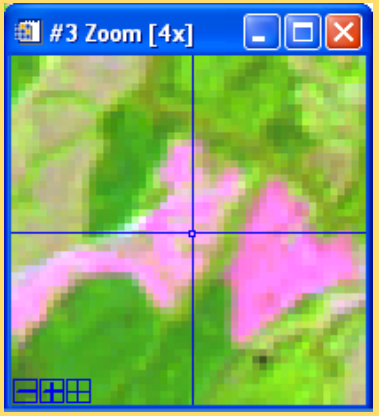
Vegetation Change Tracker

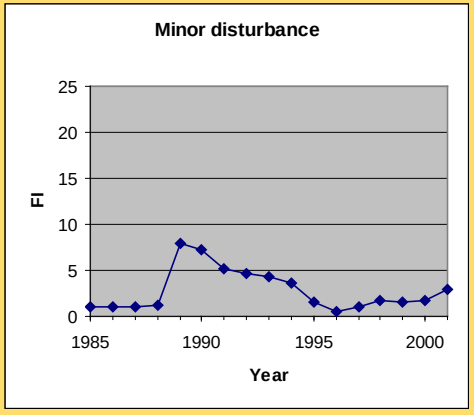
Year Disturbed

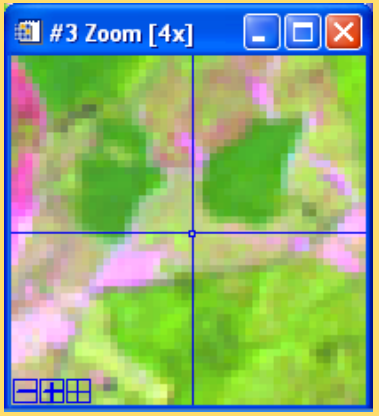
- 1985
- 1986
- 1987
- 1988
- 1989
- 1990
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- Forest
- Nonforest











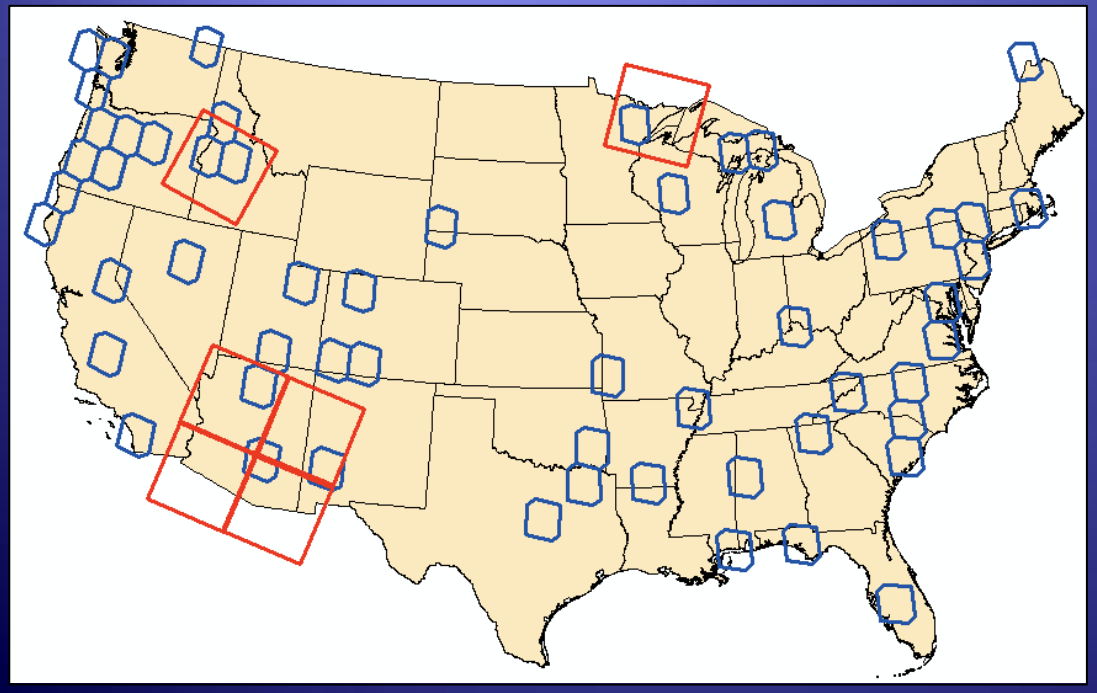
Virginia Site (p15r34)

Huang et al., 2010

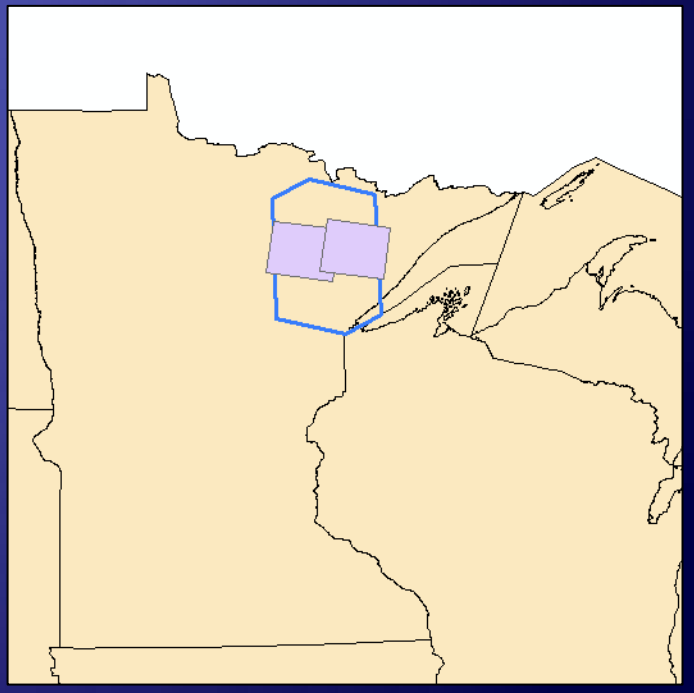
Data Gap

- Three sites for initial look at AWiFS coverage of NAFD sites
- Evaluate Feasibility / Error of AWiFS in VCT stack
- Exploring SPOT scene Usage

AWiFS Scenes

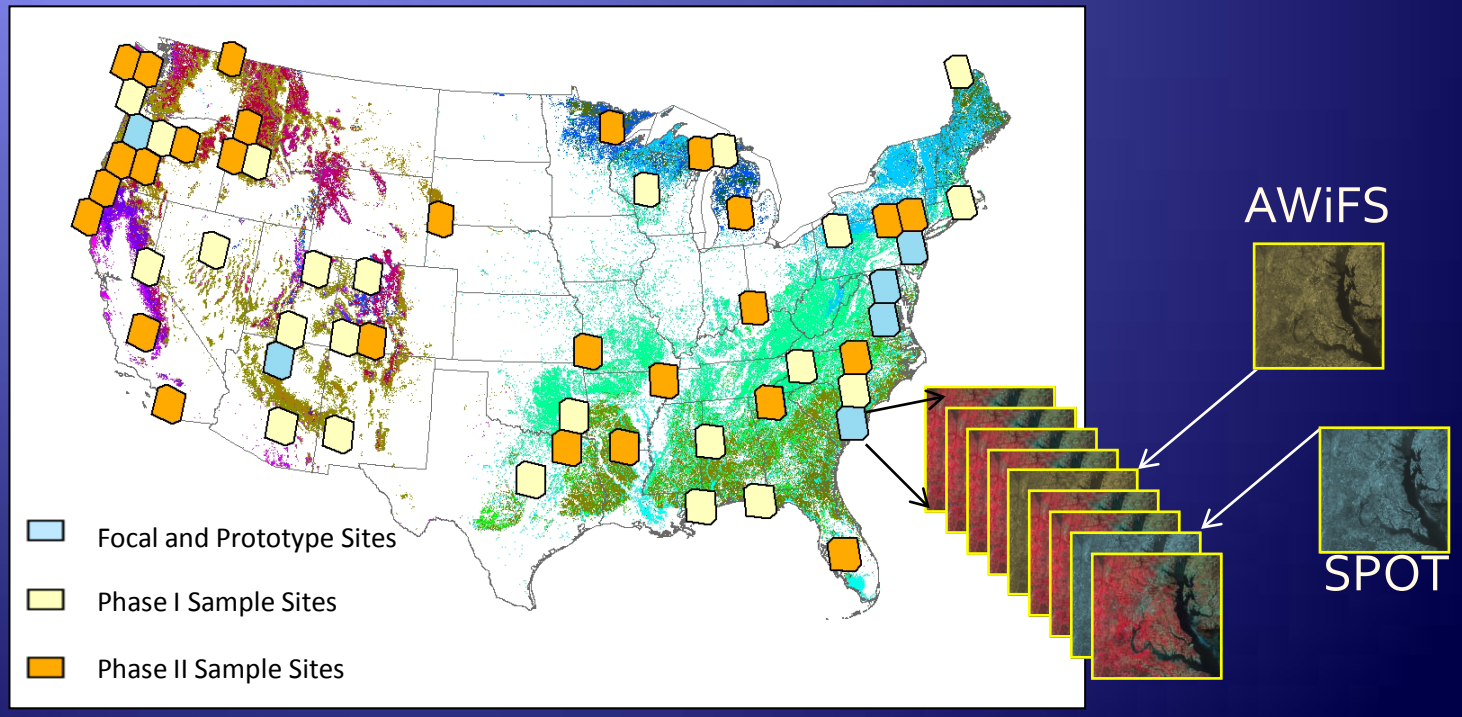


Example SPOT Scenes



AWiFS / SPOT Incorporation

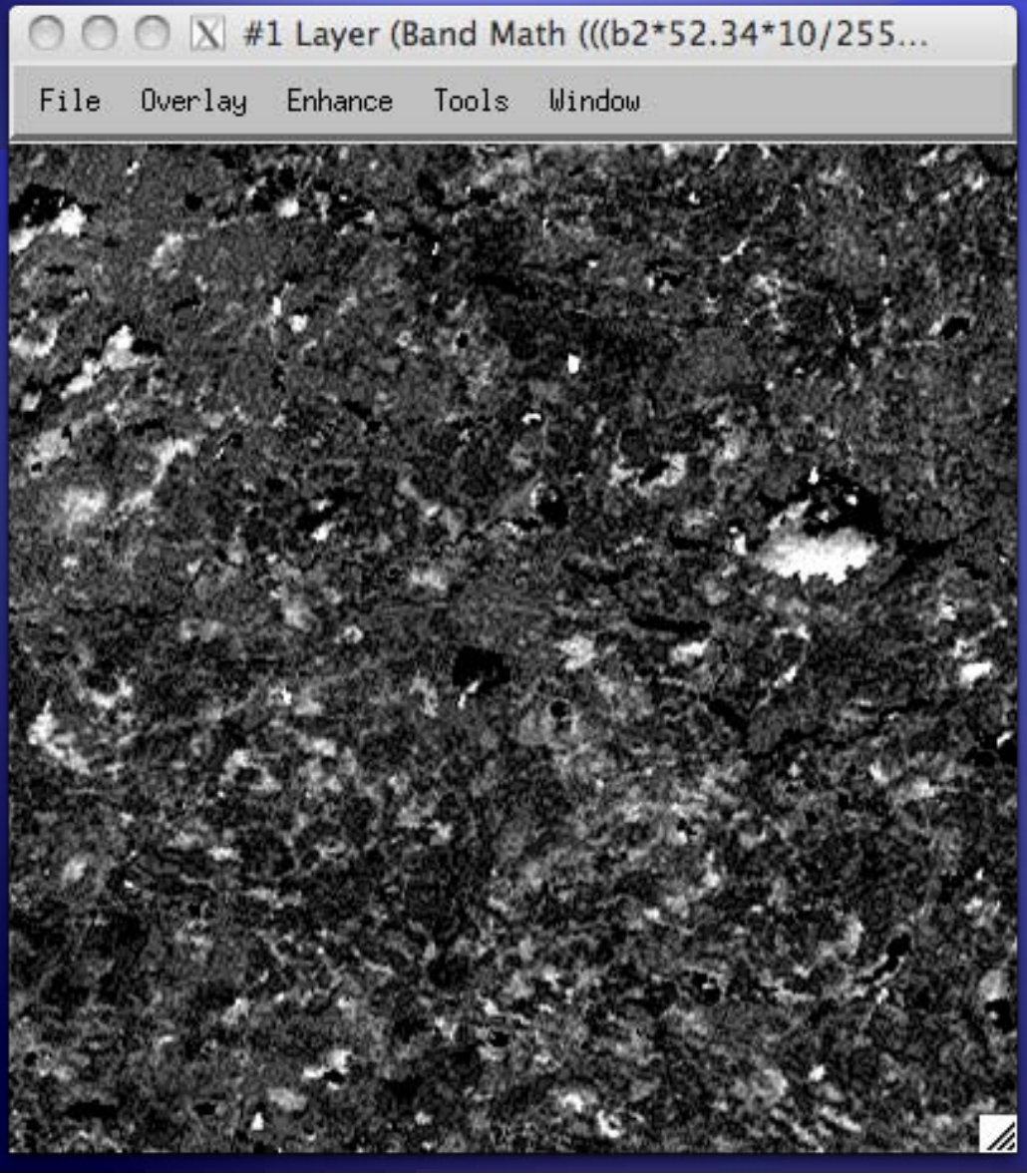
- Quantify Error/Uncertainties
  - IFOV, BRDF, Radiometric Calibration
  - Identify other sources of error
- Expect Phase 2 accuracy of over 80%
  - Will AWiFS/SPOT images lower accuracy?

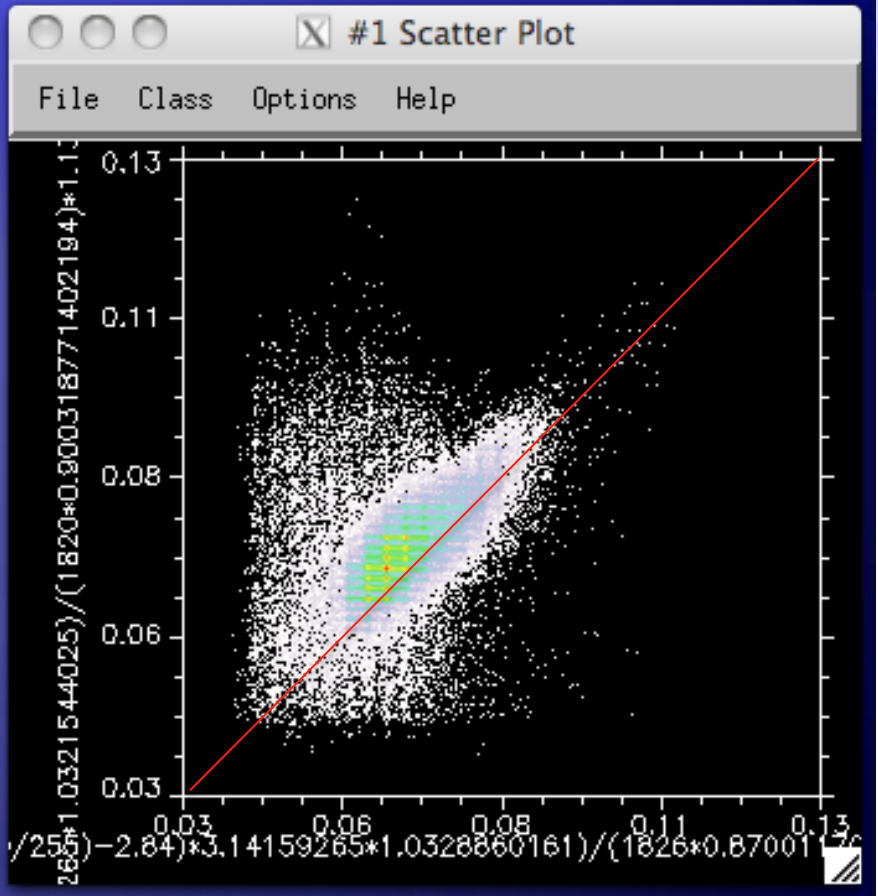


p27r27 – Band 2 Comparison

AWiFS (17Jun05)

Landsat 5 (22Jun05)





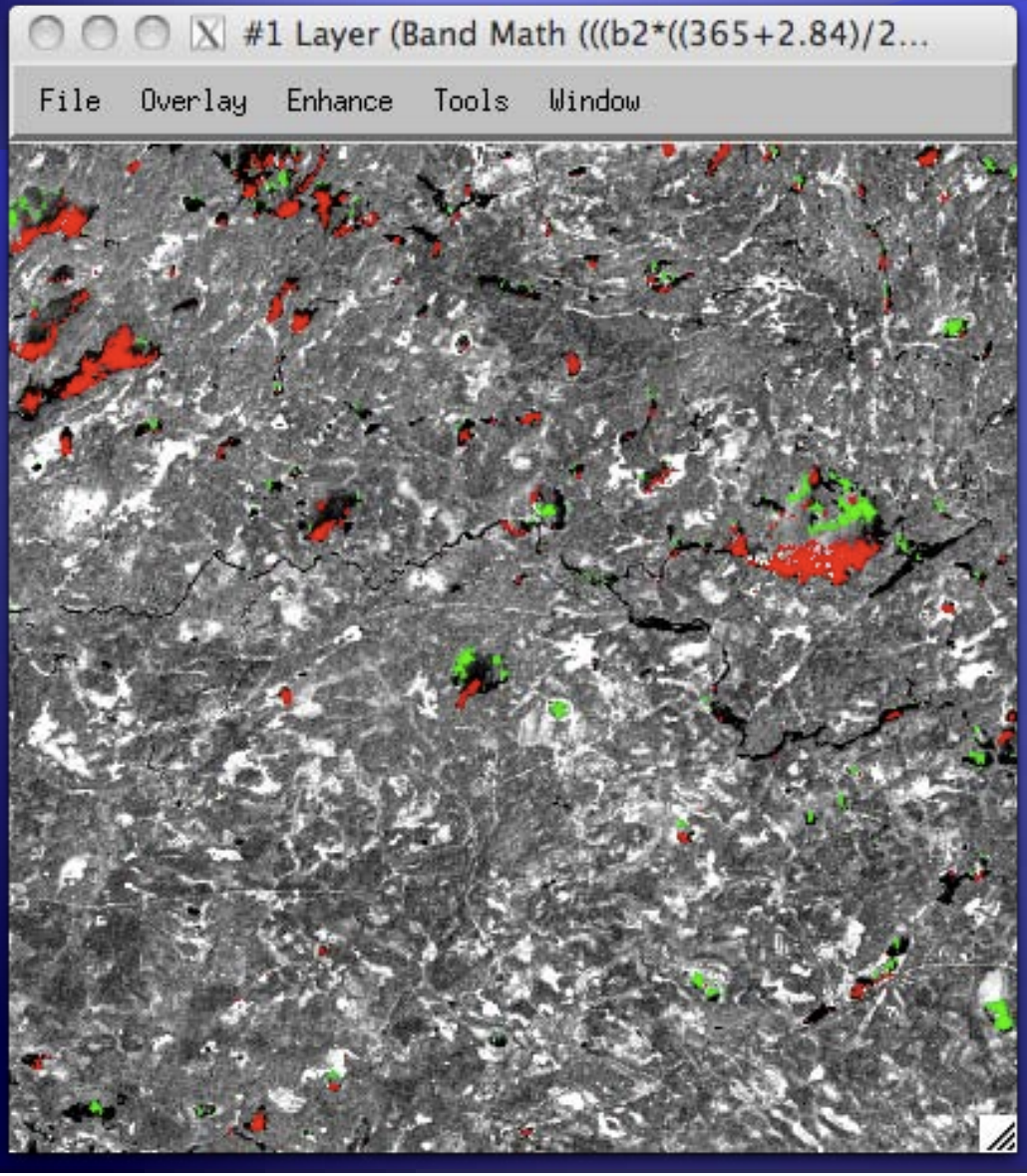
X = L5 band 2

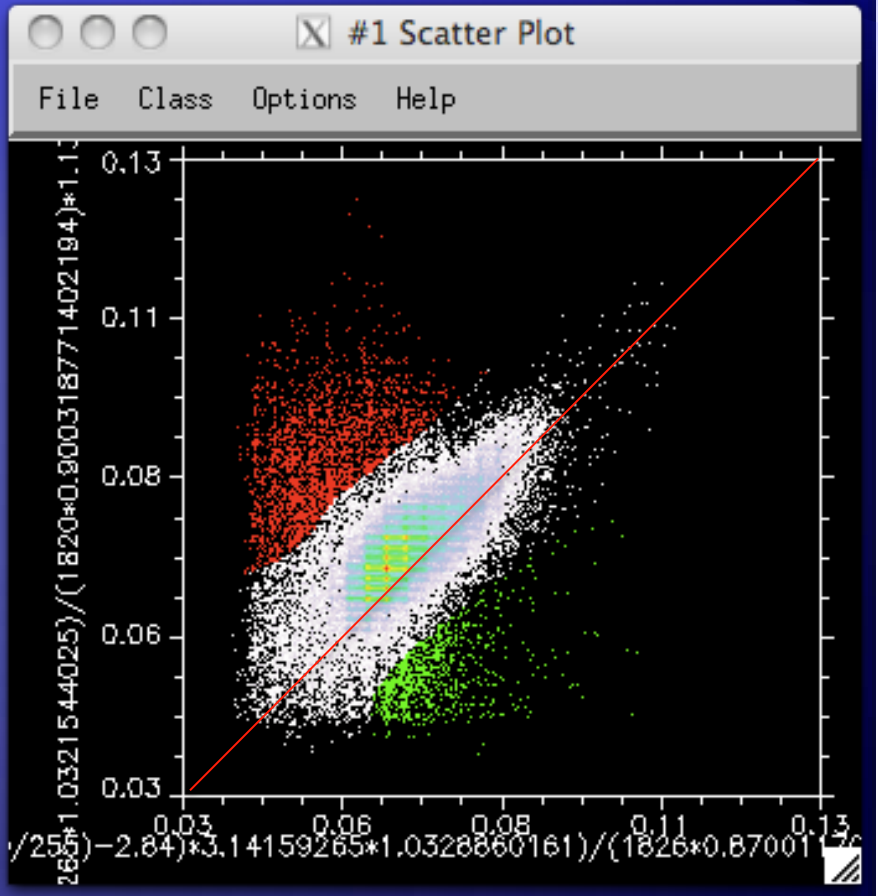
Y = AWiFS band 2

p27r27 – Band 2 Comparison

AWiFS (17Jun05)

Landsat 5 (22Jun05)





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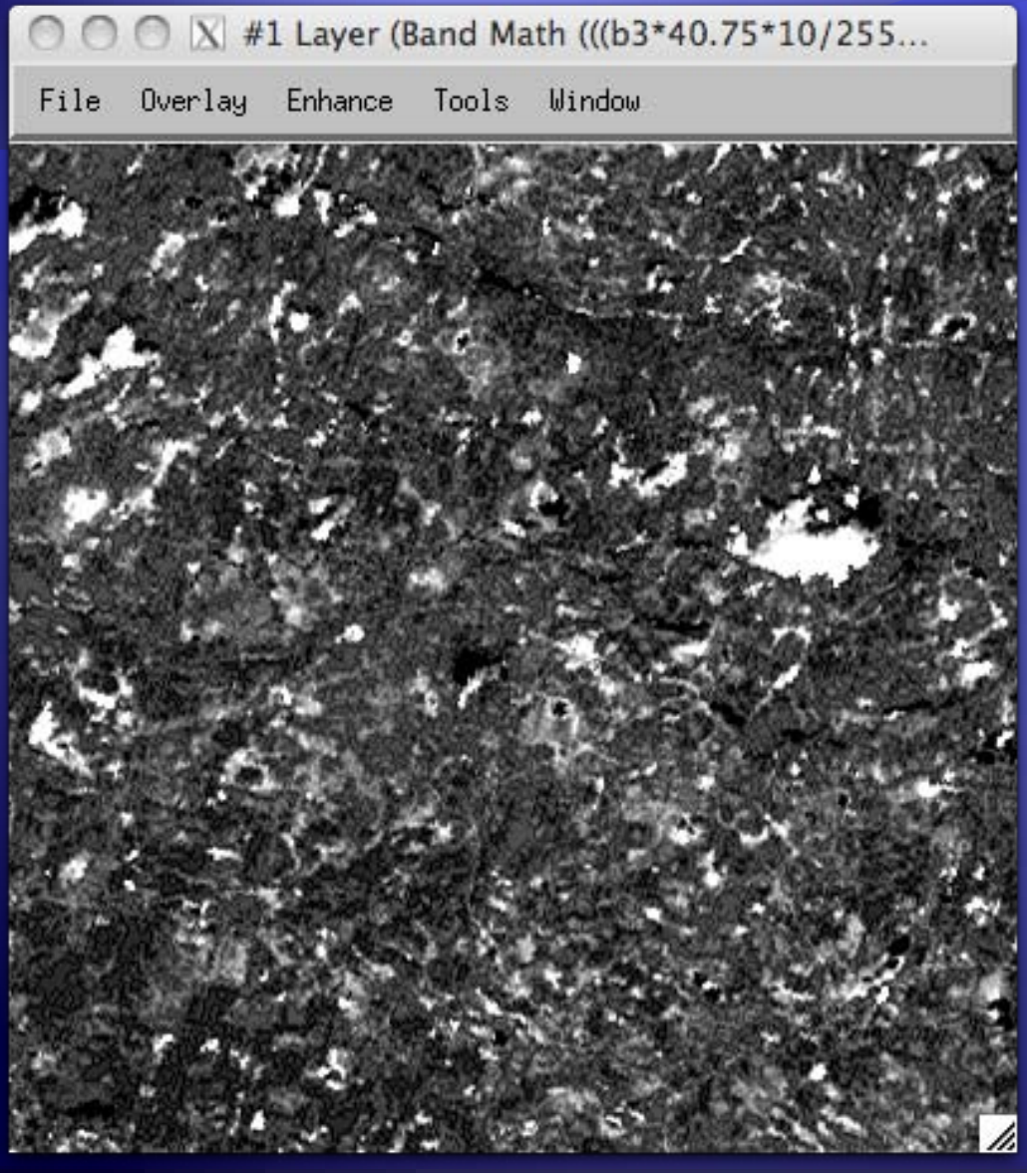
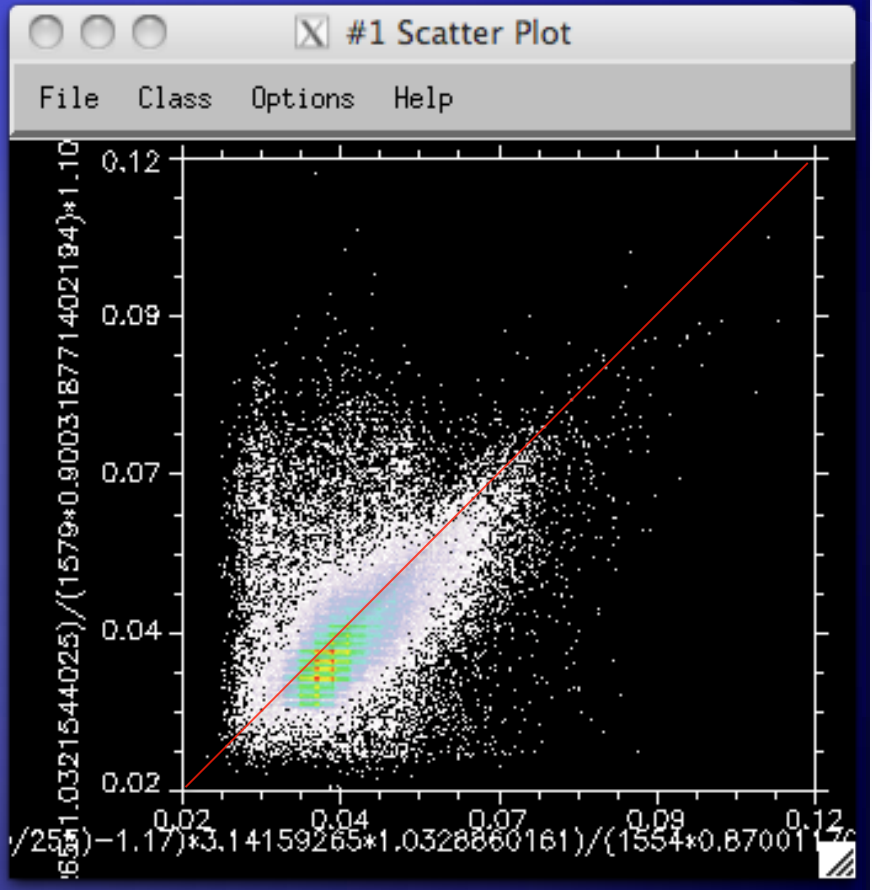
p27r27 – Band 3 Comparison

AWiFS (17Jun05)

Landsat 5 (22Jun05)





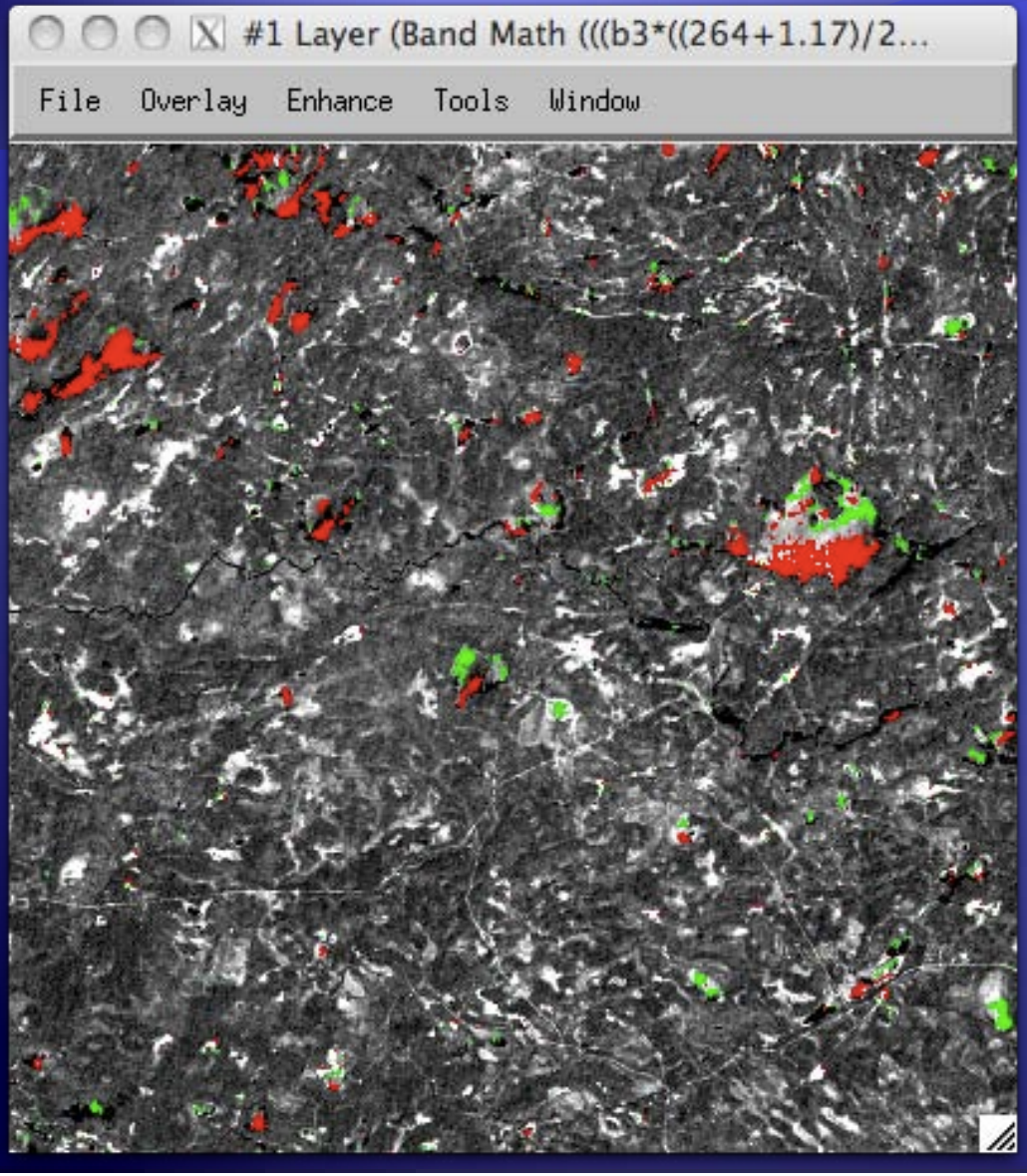
X = L5 band 3

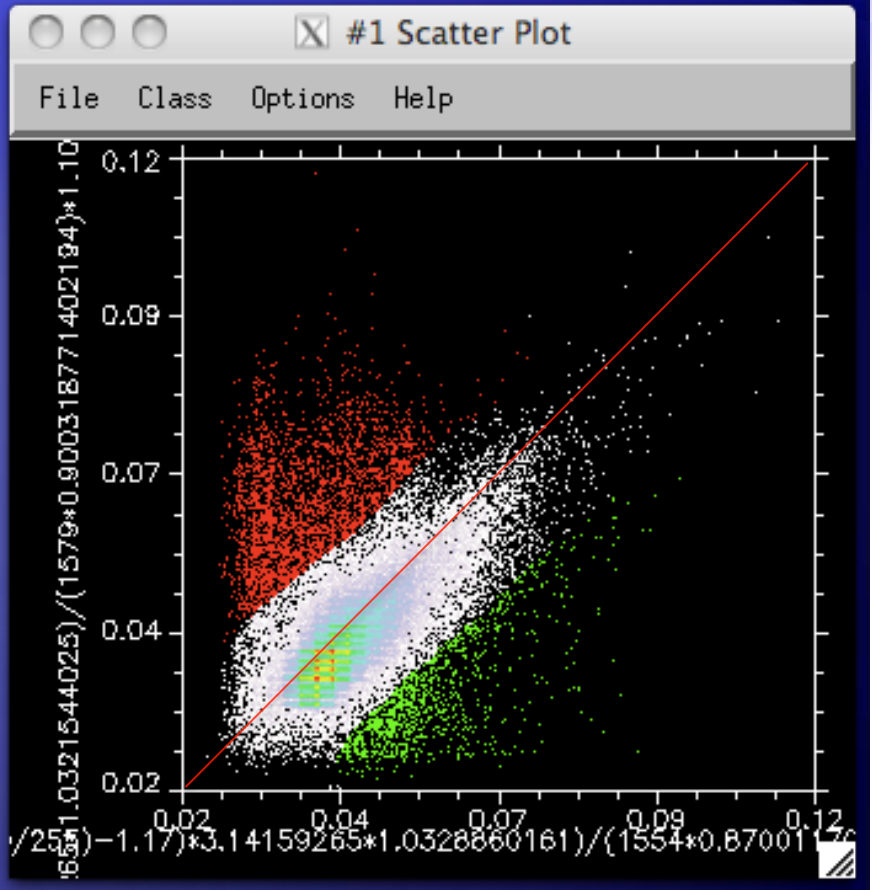
Y = AWiFS band 3

p27r27 – Band 3 Comparison

AWiFS (17Jun05)

Landsat 5 (22Jun05)





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p27r27 – Band 4 Comparison

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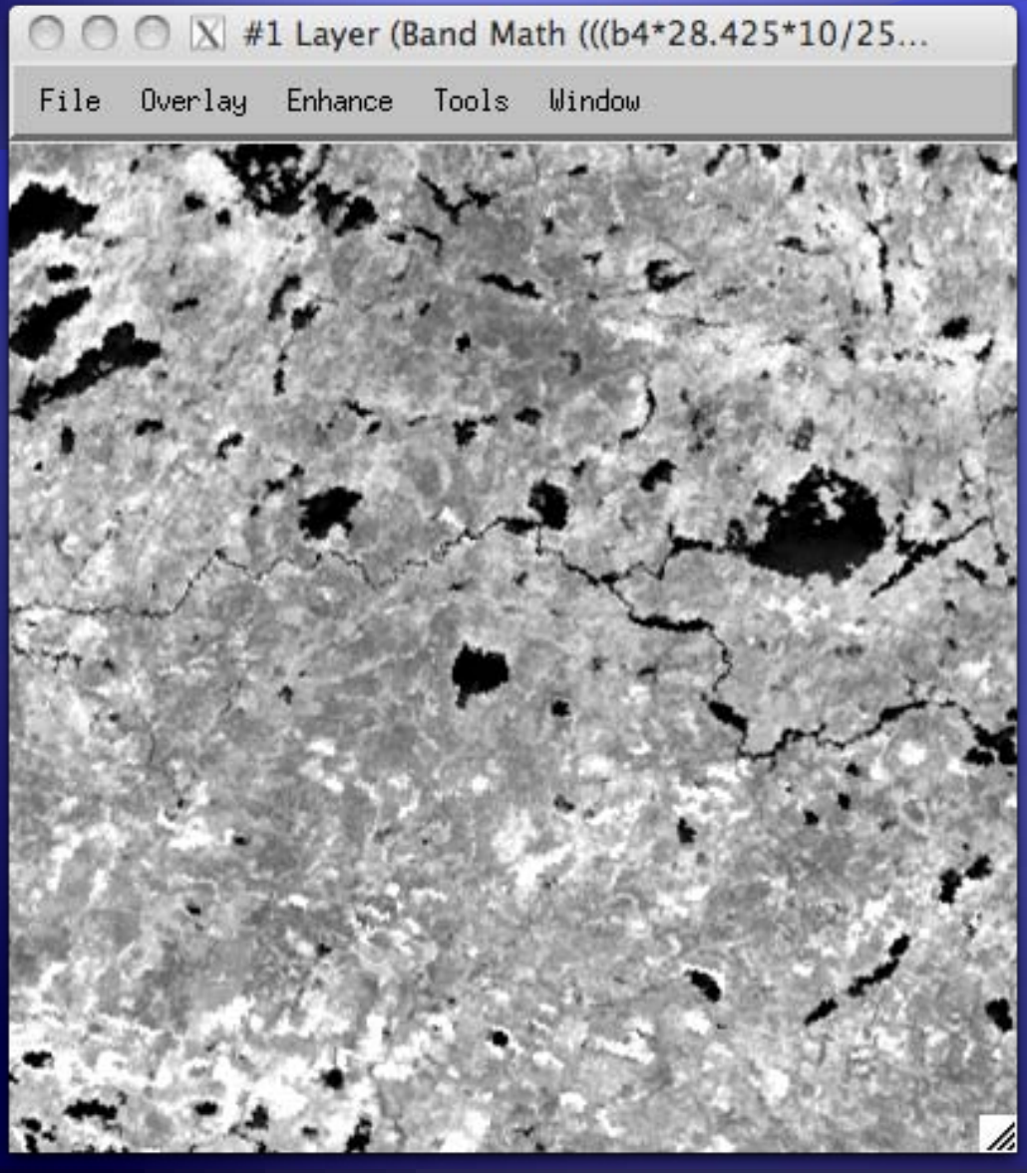
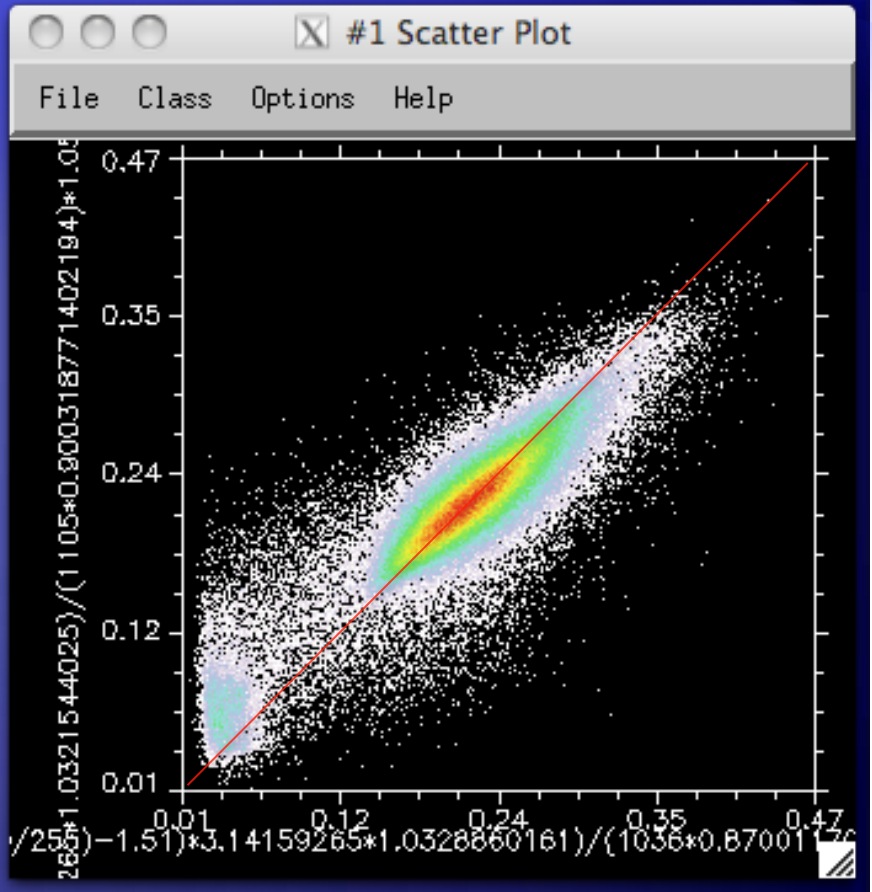
Landsat 5 (22Jun05)





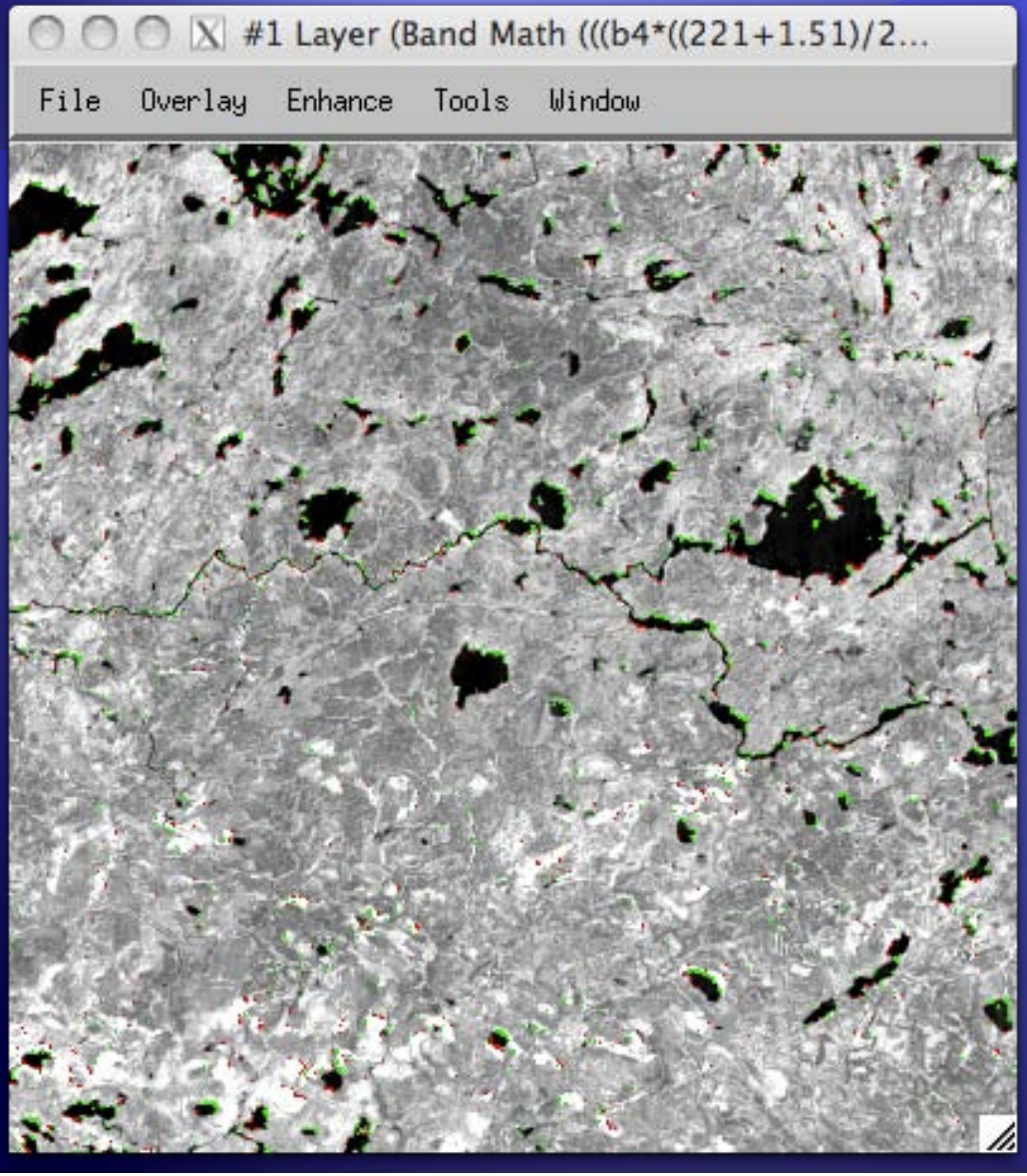
X = L5 band 4

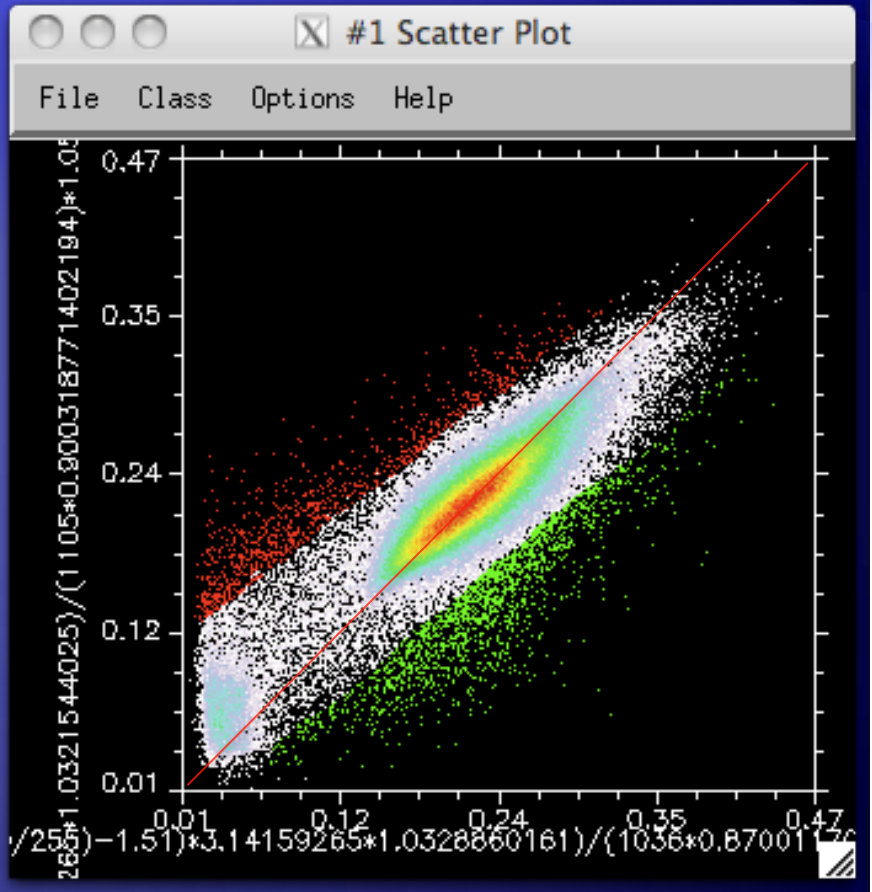
Y = AWiFS band 4

p27r27 – Band 4 Comparison

AWiFS (17Jun05)

Landsat 5 (22Jun05)





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p27r27 – Band 5 Comparison

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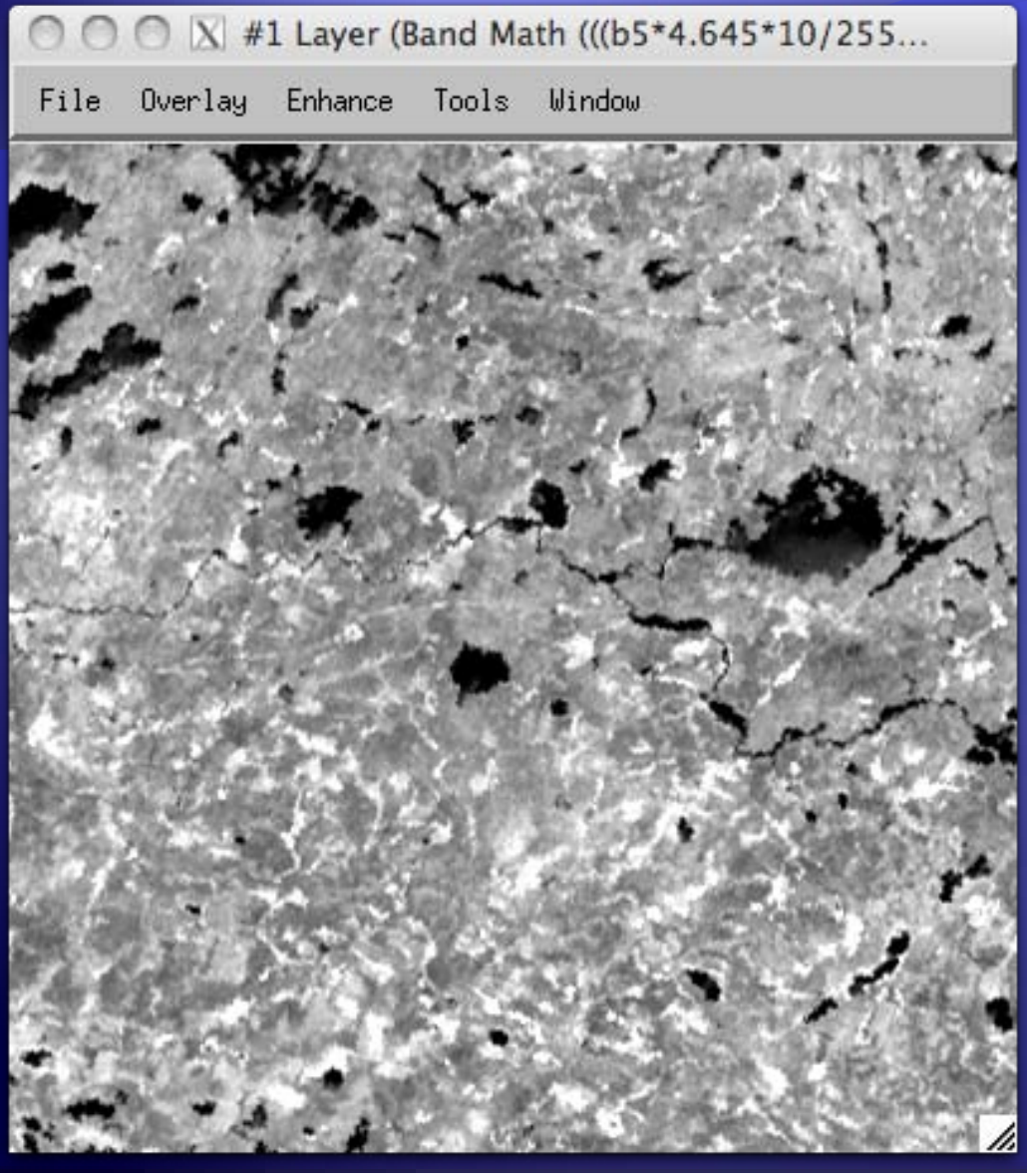

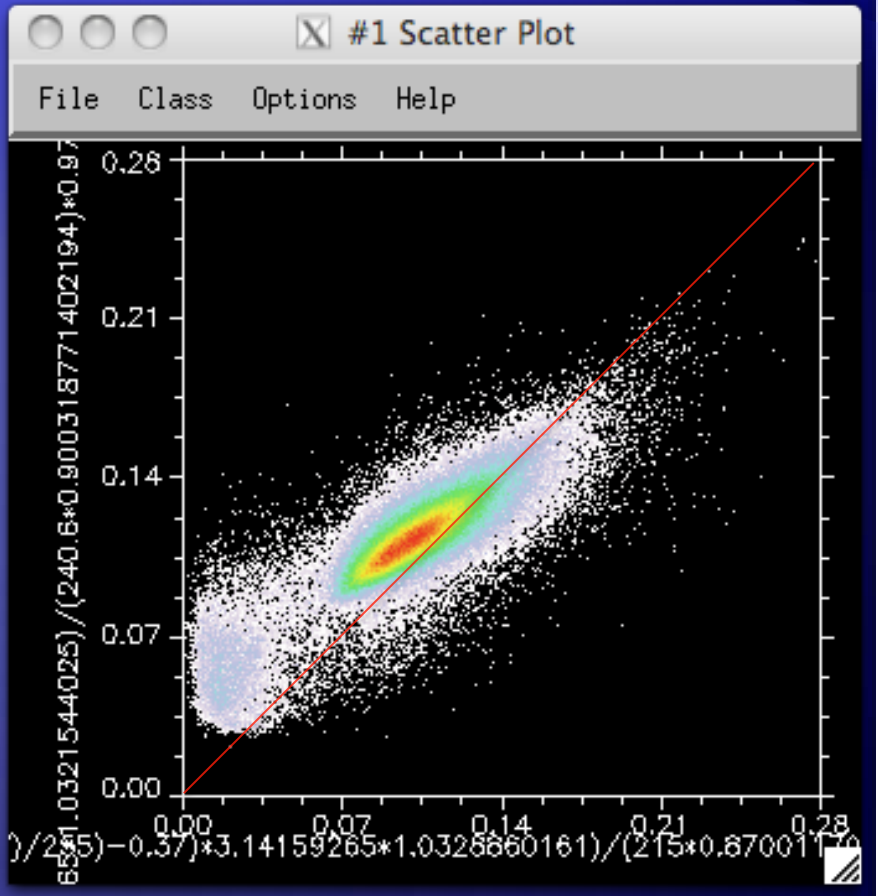

X = L5 band 5

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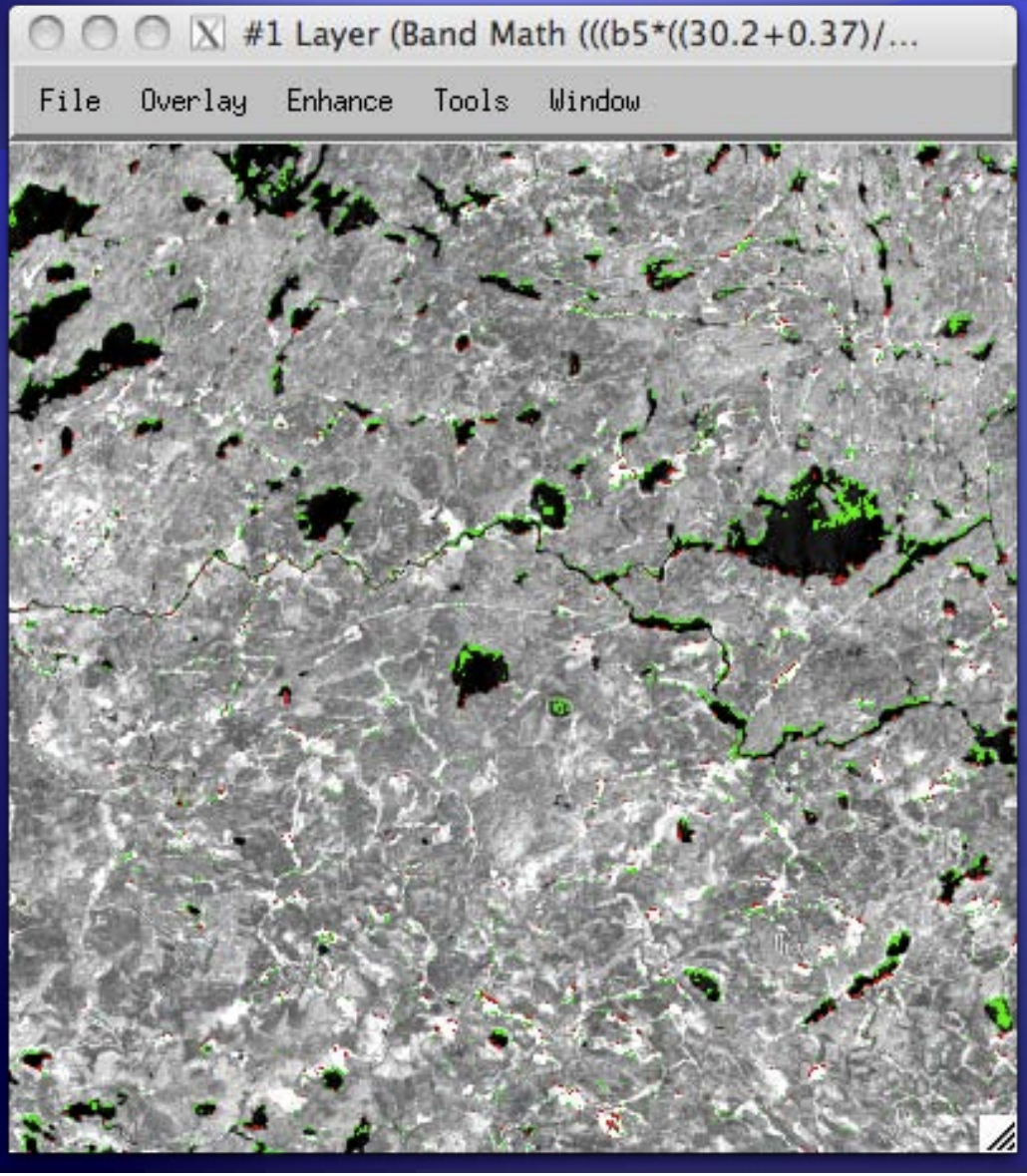
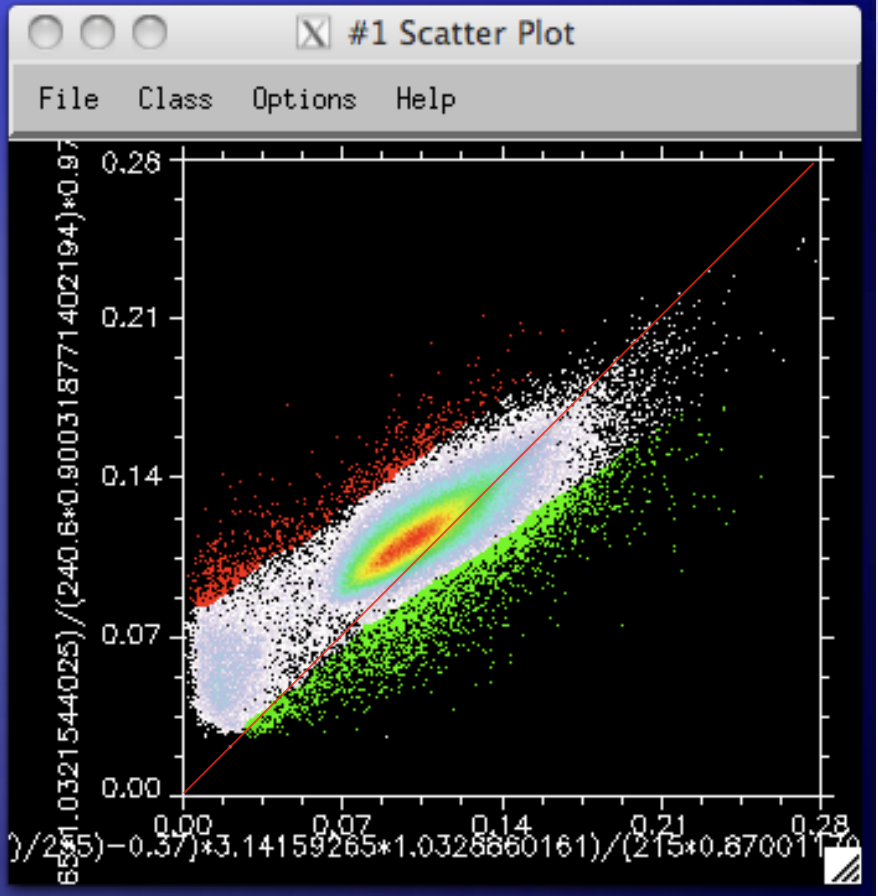
p27r27 – Band 5 Comparison

AWiFS (17Jun05)

Landsat 5 (22Jun05)





X = L5 band 5

Y = AWiFS band 5

UMD
Preliminary Conclusions

- First look comparison of Landsat TM and IRS AWiFS looks promising
- Spatial registration looks excellent but IFOV differences will need to be addressed.
- Spectral comparison looks reasonable but differences as a result of calibration and/or atmospheric variations present.

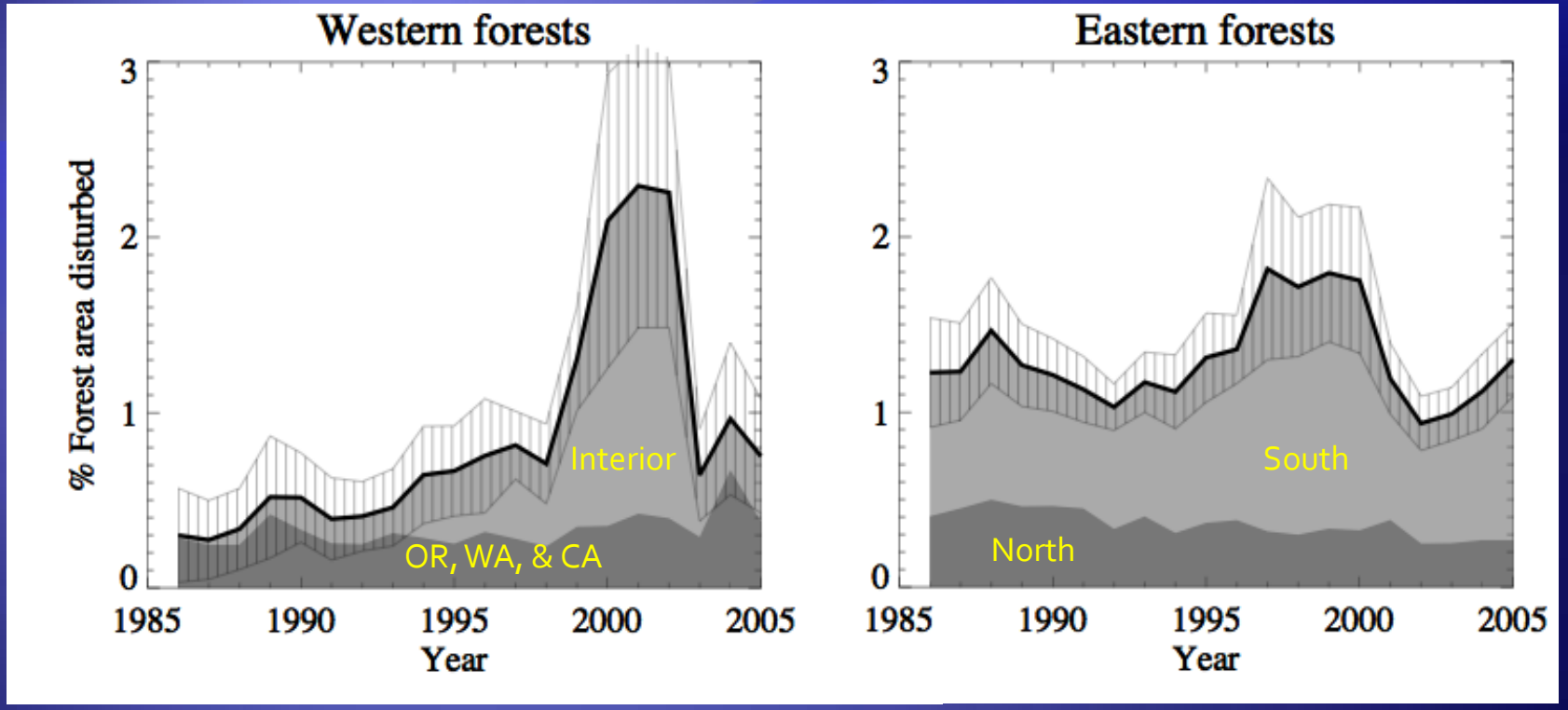
Preliminary Conclusions
AWiFS Analysis Team

- Landsat and AWIFS comparison is promising
- IFOV differences need to be more fully examined
- Planetary reflectance discrepancy increasing since IRS launch. Suggests AWIFS CCD Degradation
- AWiFS atmospheric adjustment approach needed
- Most understanding from camera B (B/D quads)
  - Need camera A (A/C quad) imagery for radiometry and BRDF analysis
- Study progress constrained by AWiFS data access

Use of Landsat complimentary observatories requires:
Continuous systematic monitoring of observatory performance

Backup Slides

Phase I National Results



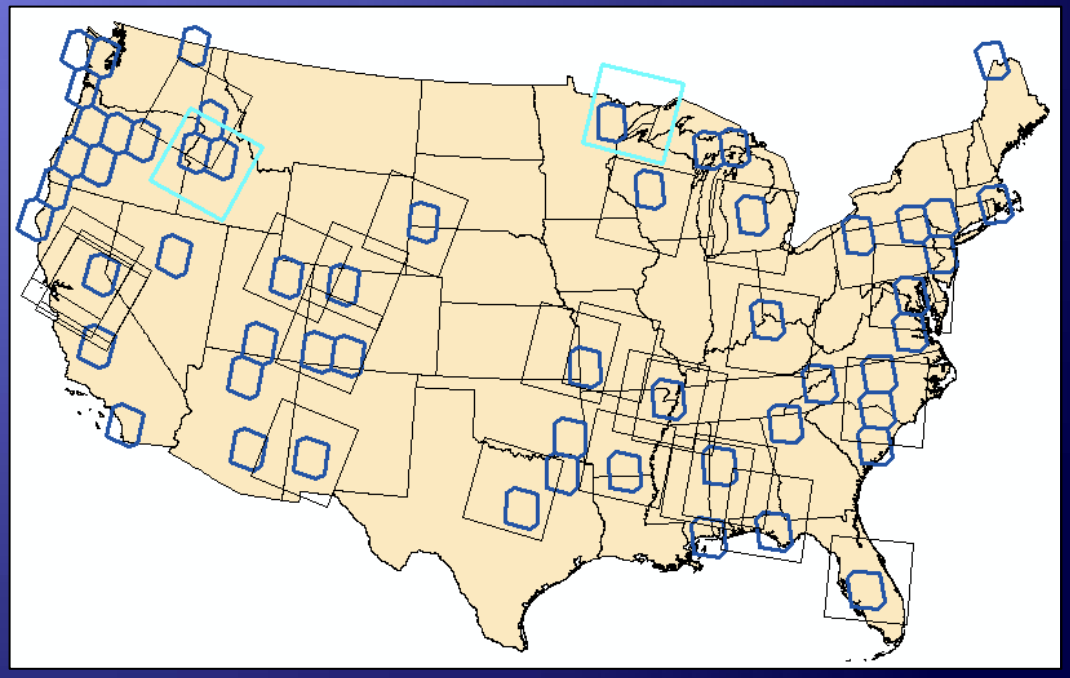
Mean western disturbance rate: 0.75 M ha/yr
~ 122 year replacement time

Mean eastern disturbance rate: 2.09 M ha/yr
~ 78 year replacement time

Kennedy et al., to be submitted

EarthExplorer Archive

- Multiple Criteria limits number of usable AWiFS images
  - 15 Jun-15 Sep, Contain a NAFD site (105 images)
  - B or D Quad (81 Images)
  - Terrain vice Systematic correction (69 Images left)
  - 1984 to 2006 (27 Images Left)
  - Full metadata (16 Images Left)
  - No Clouds (2 Images)
- Some Images can be tiled



p36r37 – Quads A, B, C & D

AWiFS (29Jun05)