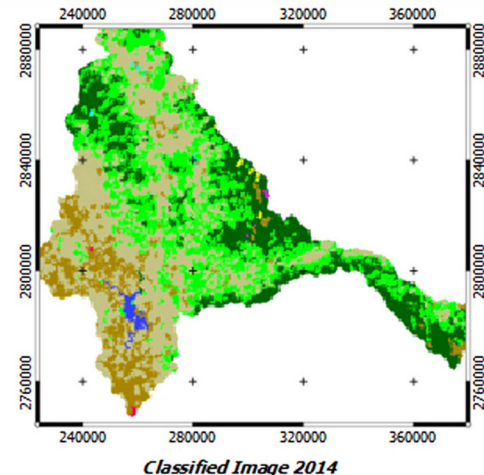
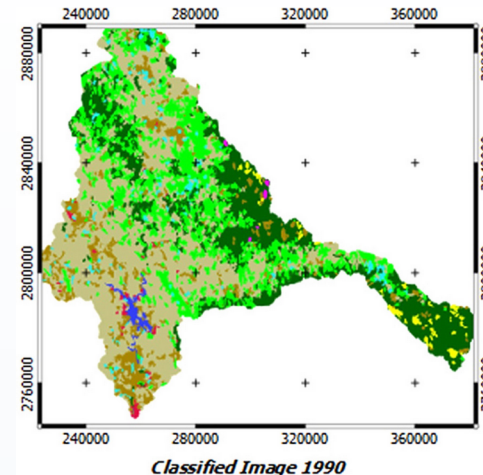


EGM702 – Photogrammetry and Advanced Image Analysis

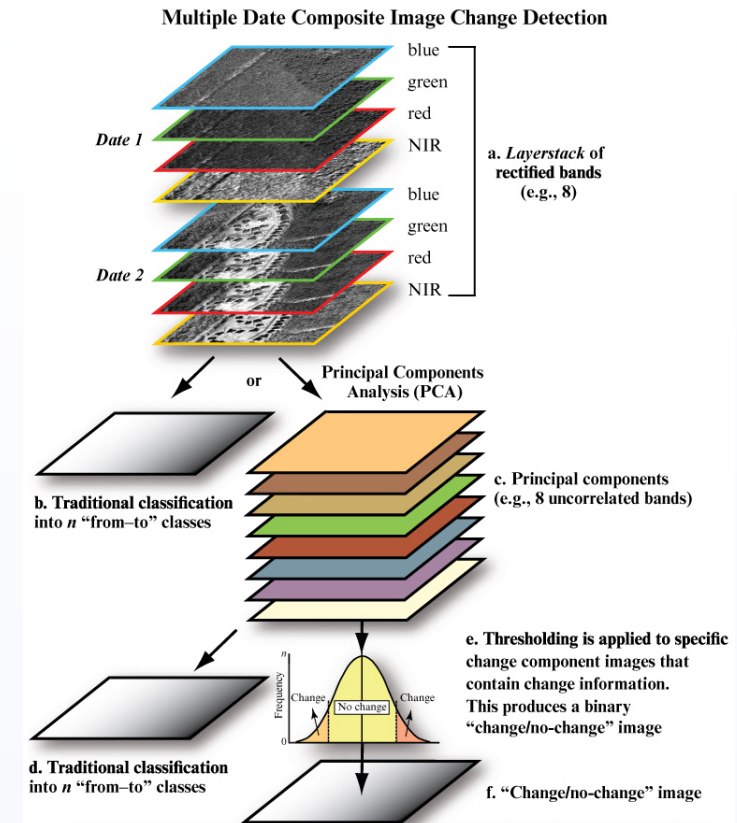
Week 4, Part 4: Multi-temporal Classification

- Procedure:
 - Using two (or more) images
 - Classify image at time 1, time 2 (time 3, ...)
 - Compare classified images
- Advantage: change/no change is clear
- Disadvantage: dependent on classification accuracy

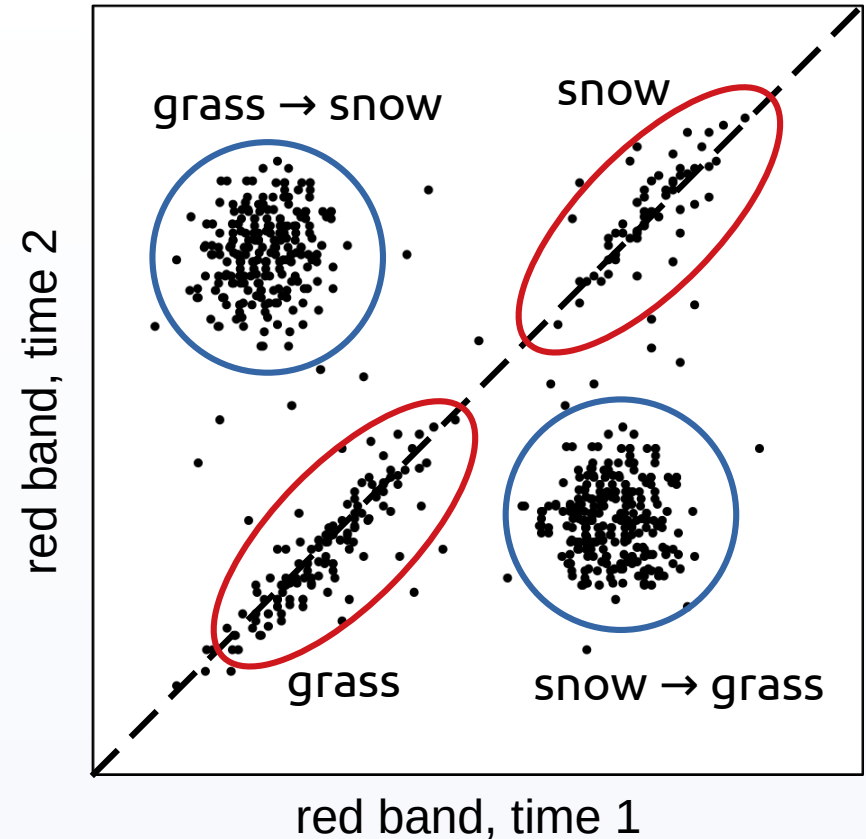


Sanhouse-Garcia et al., 2017

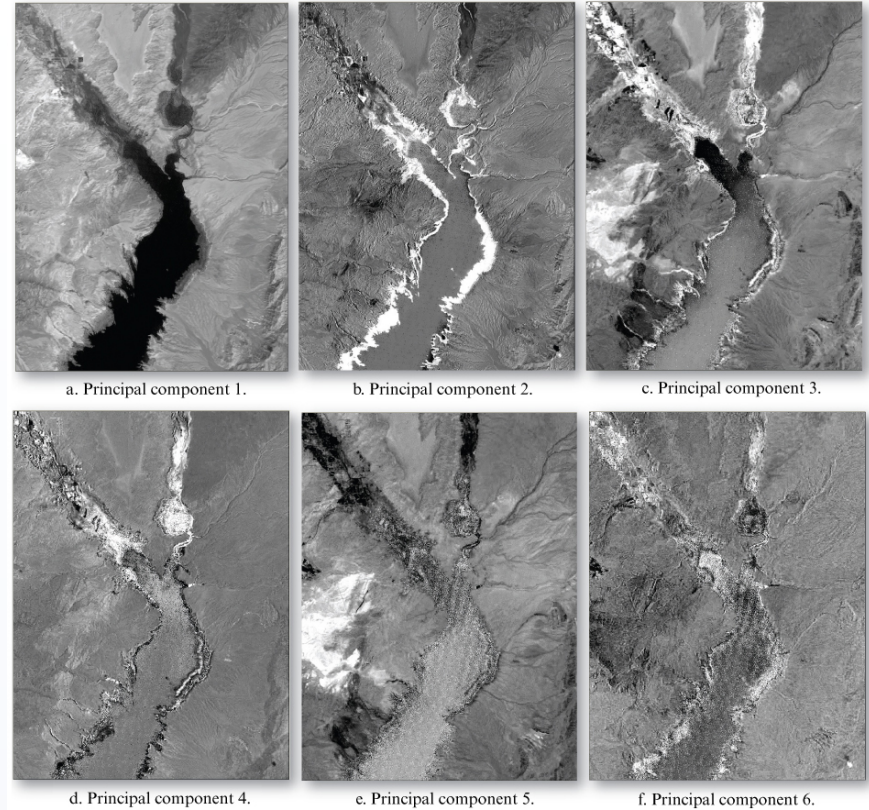
- Perform classification using stacked images
 - Supervised
 - Unsupervised (clustering)
- Classifying **change classes**, “**non-change**” classes
- How similar is “change” to “non-change”?
- Can use with principal component analysis
 - Reduce redundancy, dimensionality
 - PCA also be used for change detection



- Example: snowfall + melt
 - Fresh snow: high ρ in visible bands
 - Grass: low ρ in visible red wavelengths
- Constant (no-change) pixels on diagonal
- Change pixels off diagonal

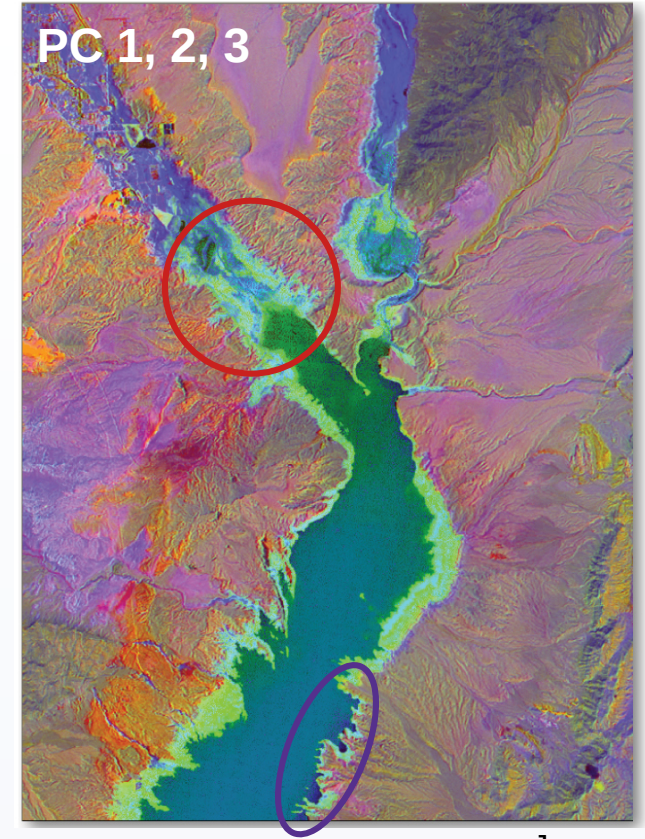
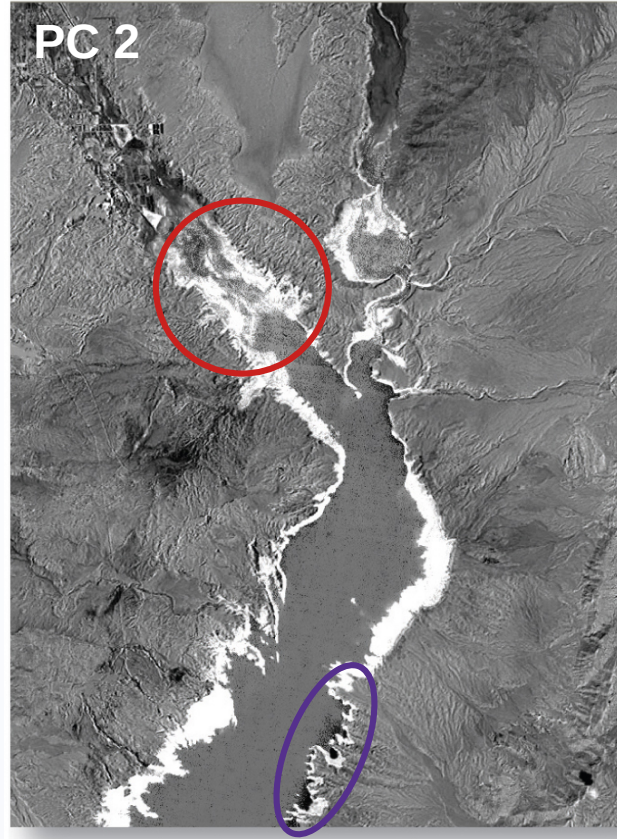
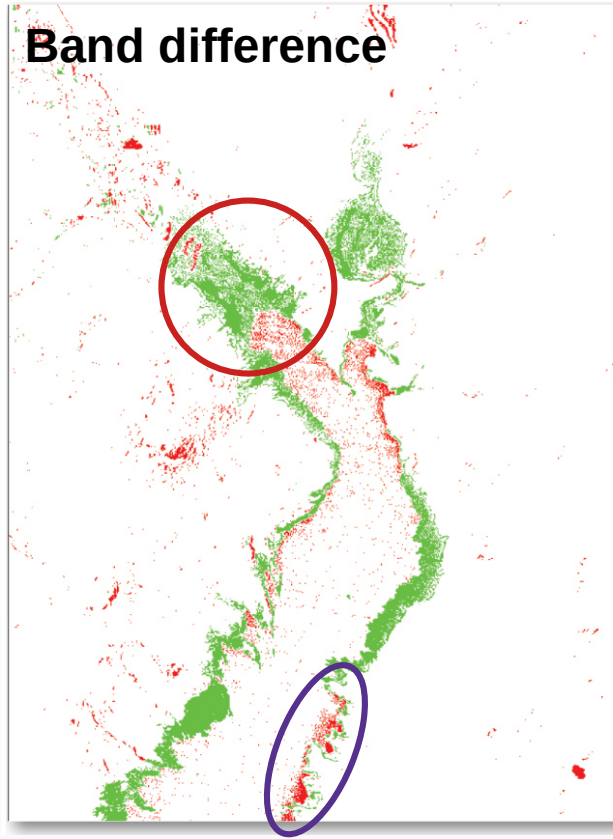


- Typically:
 - First 1-2 PCs: stable
 - PCs 3, 4: change
- Depends on amount of change
- Can threshold change/no-change



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Image difference vs Multi-temporal PCA



- Post-classification comparison:
 - Can be easier to interpret
 - Can be noisy/inaccurate
- One solution: use classification techniques on stacked multi-temporal data
 - Supervised/Unsupervised classification
 - Principal component analysis

- Lillesand, Kiefer & Chipman – Chapter 7
- Jensen – Chapter 12
- Sanhouse-Garcia et al., 2017 [[Rem Sens Appl](#)]
- Häme et al., 1998 [[Int J Rem Sens](#)]
- Celik, 2009 [[IEEE Geosci Rem Sens Lett](#)]
- Collins and Woodcock, 1996 [[Remote Sensing Env](#)]