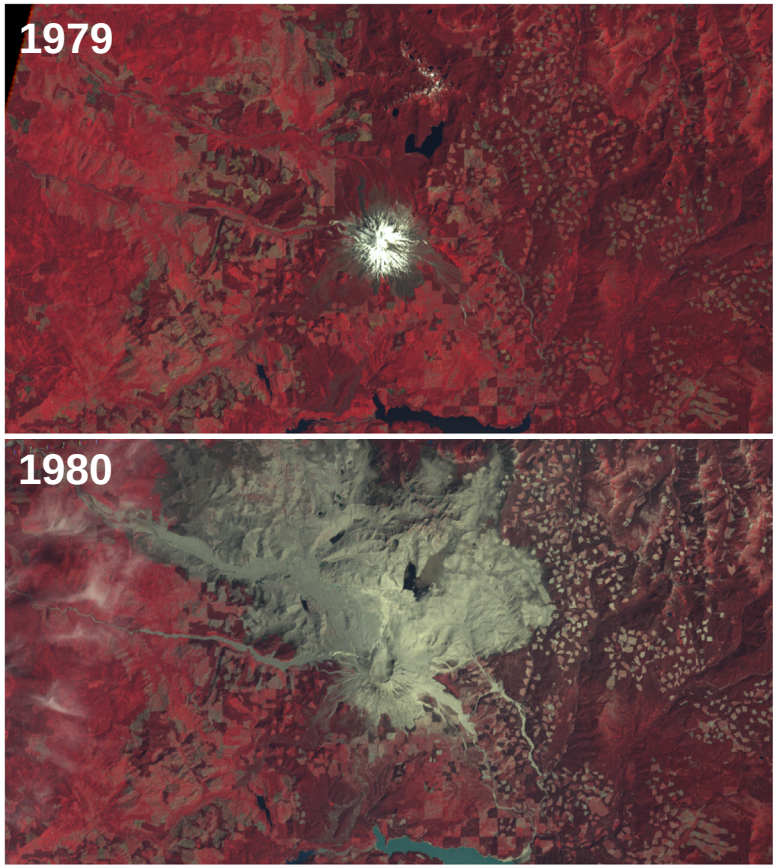
EGM702 – Photogrammetry and Advanced Image Analysis

Week 4, Part 2: Visual Analysis and Binary Detection

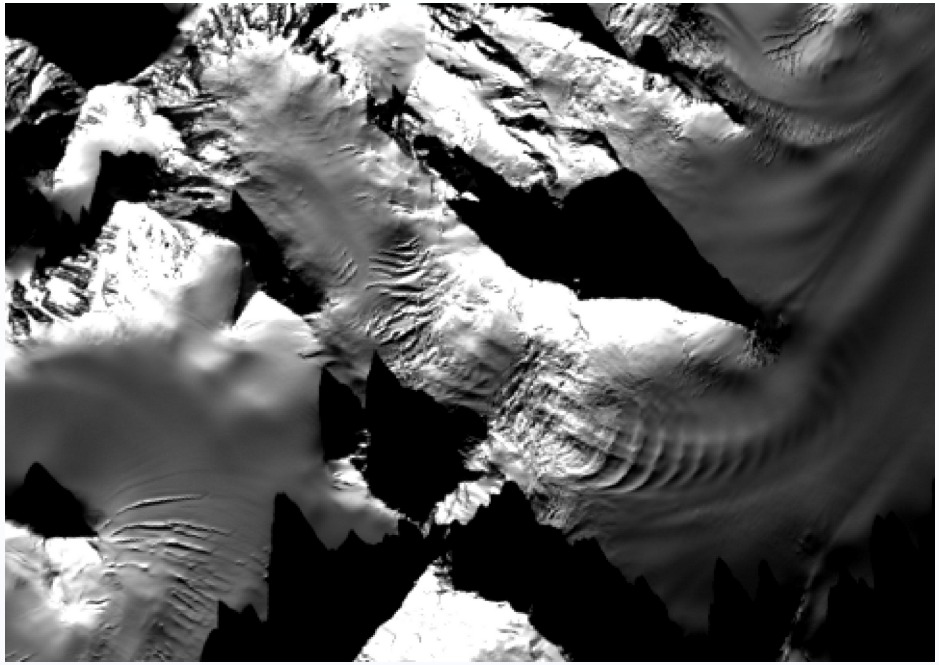
Visual interpretation

- Can be used to select best technique
- Can also use to perform the analysis
- Elements of visual interpretation:
  - Tone/hue
  - Texture, pattern, shape, size, association, shadows



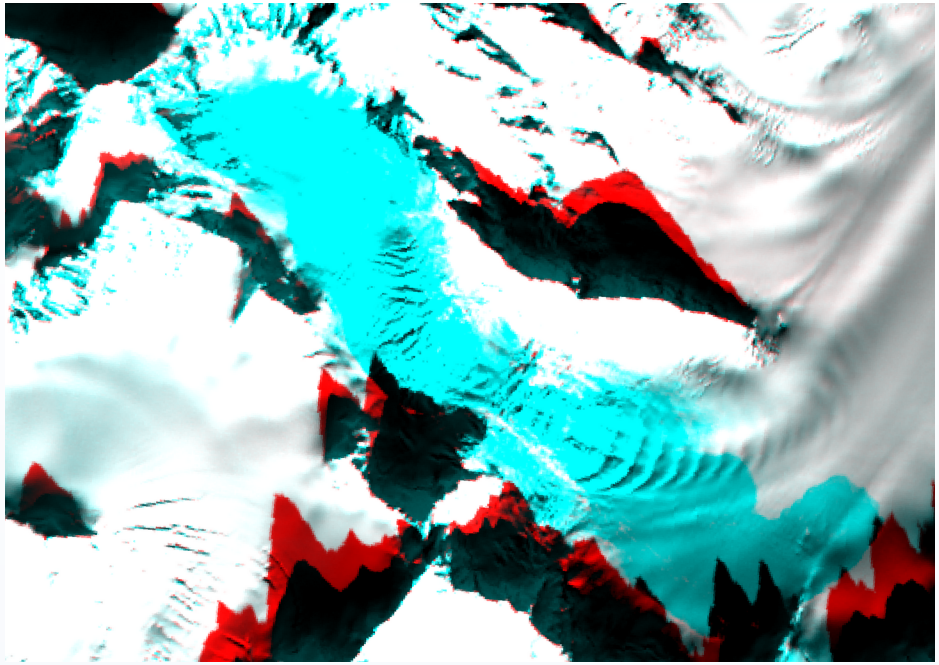
Dynamic visualisation

- Includes: swiping/flickering, side-by-side, animation
- Example: 16 February 2014 landslide, Mt La Perouse, Alaska
- Works well for large changes



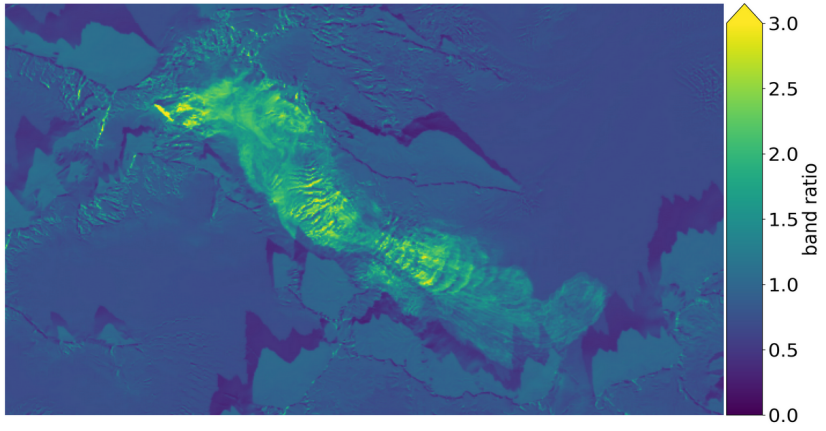
Multi-temporal false colour composites

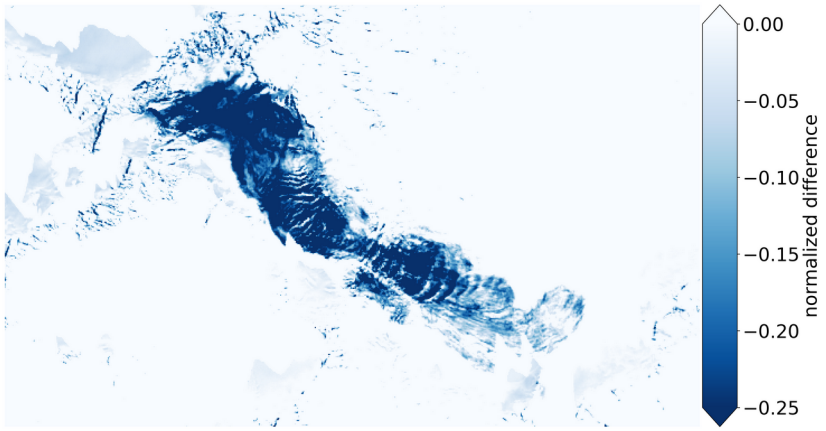
- Composite bands (or differences, spectral indices) from multiple dates
- Example:
  - Red: 2 March
  - Green, Blue: 7 February
- Red → shortening shadows
- Blue → landslide
- White/Gray → no change



Band maths

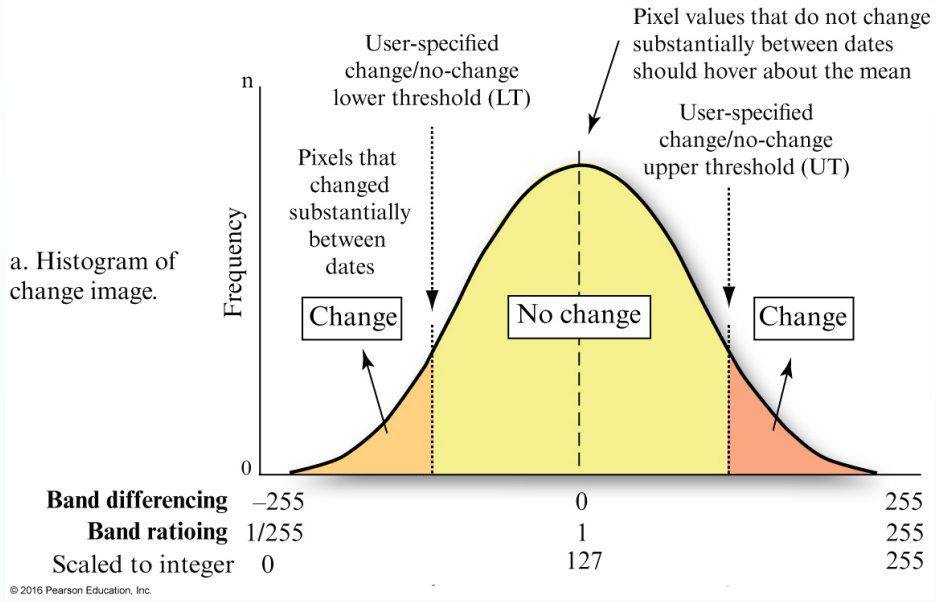
- Enhance differences using arithmetic
- Useful for binary classification
  - i.e., change/no change
- Must pick a threshold value to determine change
- Can also use arithmetic images as input
  - e.g., a difference of differences





Choosing a threshold

- Distribution usually approximately normal
  - May need to enhance/adjust image (e.g., histogram matching)
- Change pixels are in the tail(s) of the distribution
- Thresholds can be chosen:
  - Statistically (i.e., using σ)
  - Symmetrically
  - Asymmetrically



a. Histogram of change image.

Jensen

Summary

- Visual interpretation:
  - Can be used help choose a change detection method
  - Can be used to interpret/quantify changes
- Band maths: also useful for change detection
- Binary change detection: picking a threshold to classify change/no change

Additional resources

- Lillesand, Kiefer & Chipman – Chapter 7
- Jensen – Chapter 12
- Sader and Winne, 1992 [Int J Rem Sens]
- Wilson and Sader, 2002 [Rem Sens Env]
- Im et al., 2007 [Rem Sens Env]