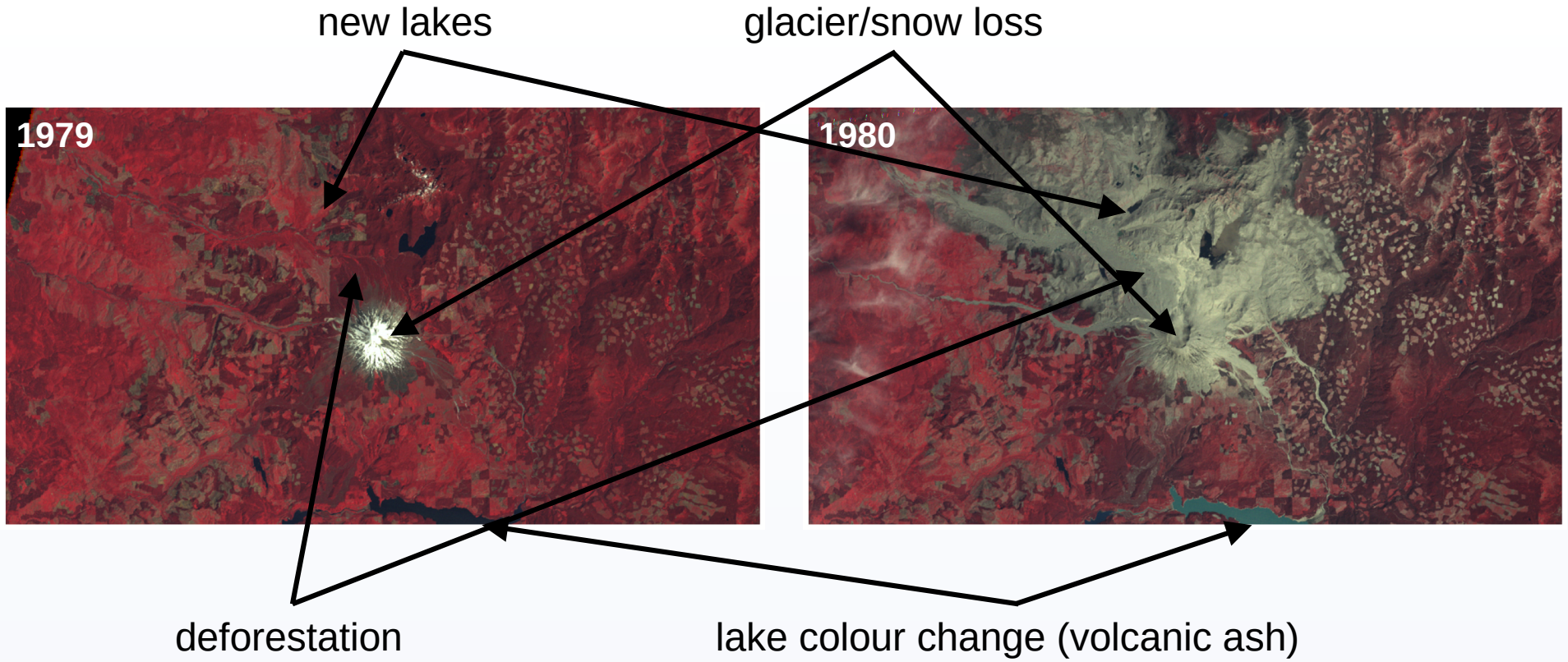
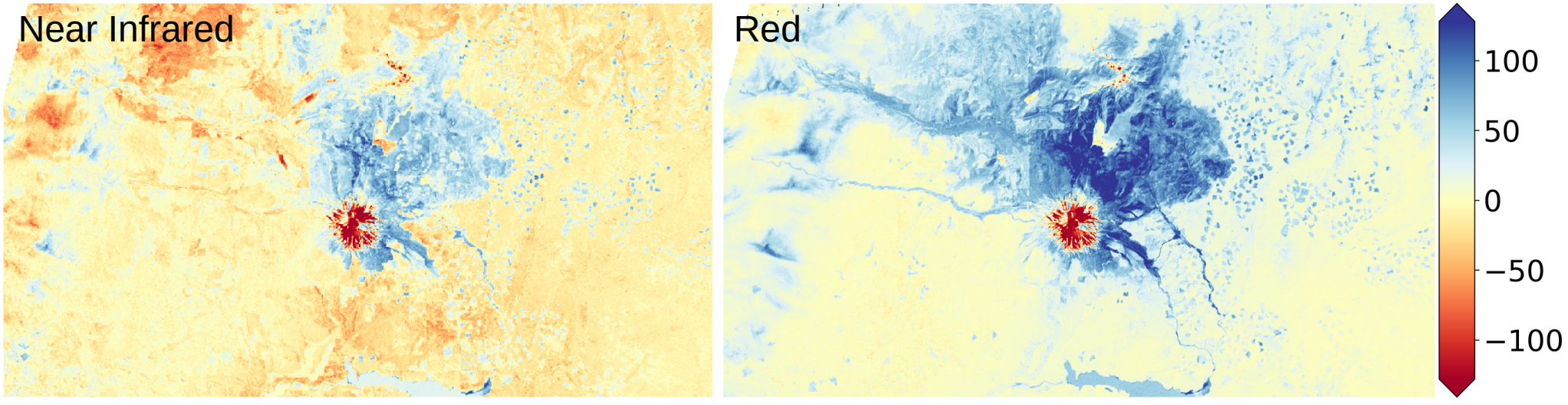
EGM702 – Photogrammetry and Advanced Image Analysis

Week 4, Part 3: Change Vector Analysis

Turn and face the strange

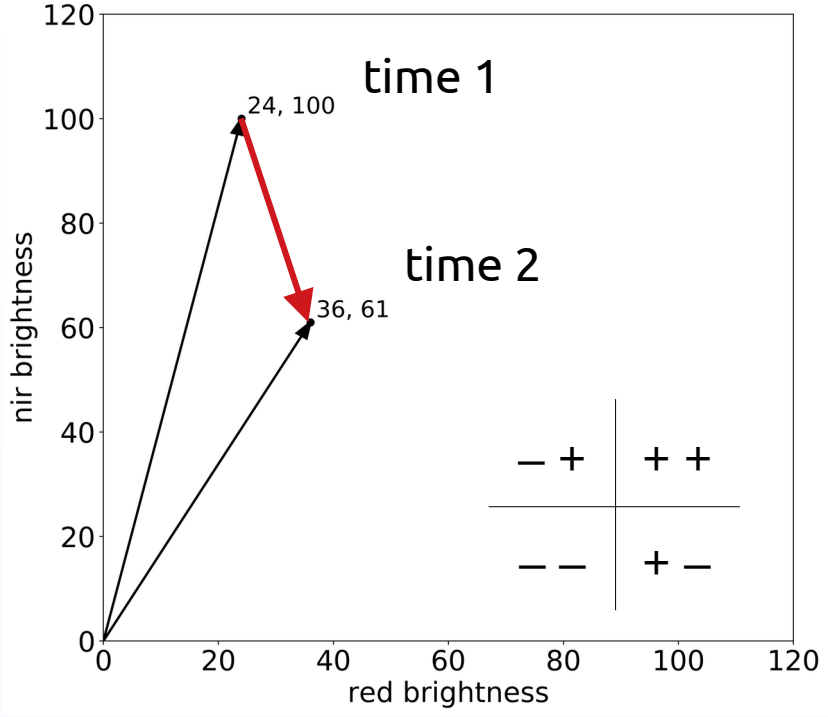


Band differences – NIR and Red



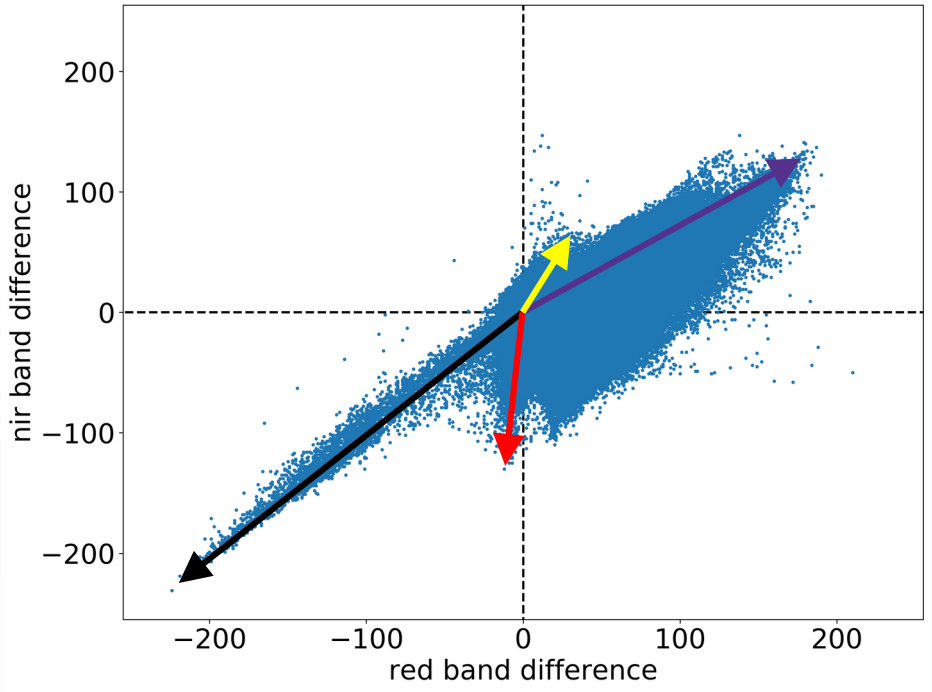
Change vectors

- Single band differences can be difficult to interpret
- Change vector can aid interpretation
  - Magnitude: how much change
  - Angle: what kind of change
- Magnitudes can be thresholded for significance
- Angles can be interpreted, categorized



Band differences

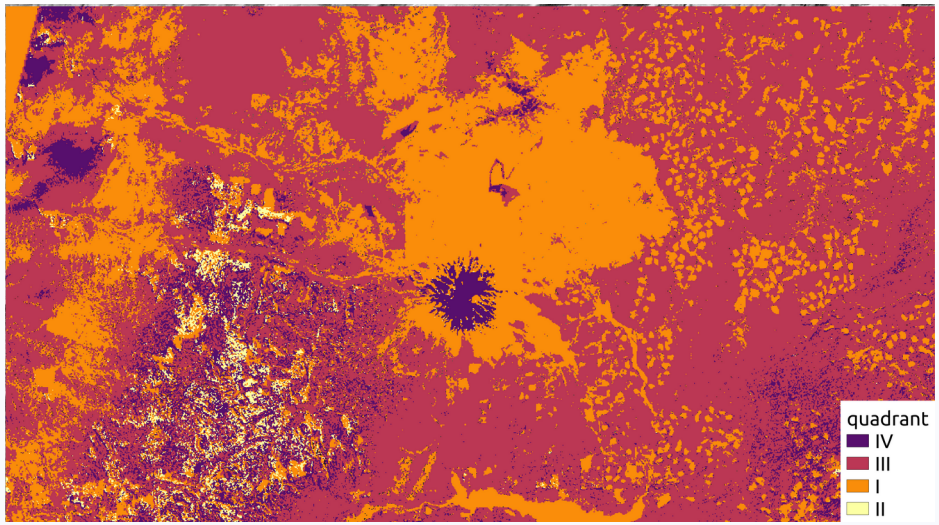
- Each point represents a change vector
- Can see clusters/patterns:
  - Glacier/snow loss
  - New lakes
  - Lake colour
  - Deforestation



Change vector angle

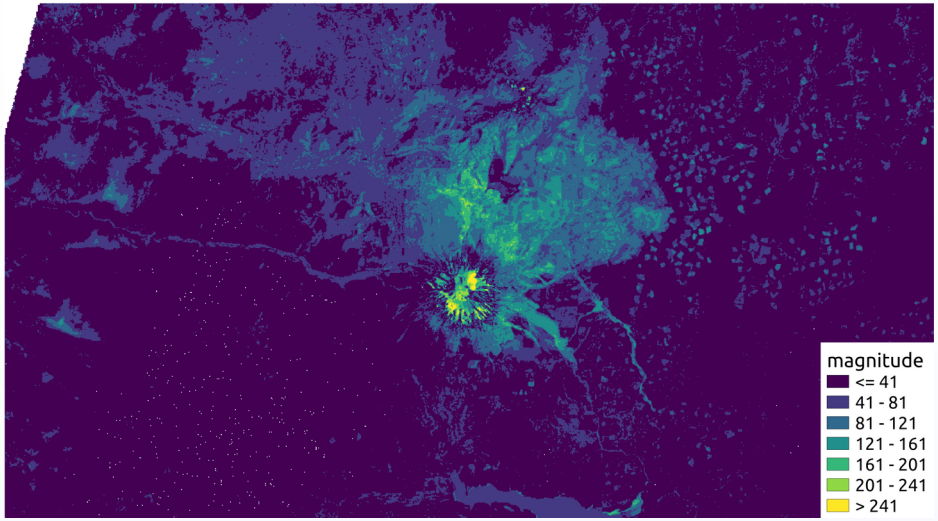
- Broadly, 4 categories:
  - I: ↑NIR, ↑Red
  - II: ↑NIR, ↓Red
  - III: ↓NIR, ↑Red
  - IV: ↓NIR, ↓Red
- Can further subdivide categories

II	– +	+ +	I
IV	– –	+ –	III



Change vector magnitude

- Most of scene is similar between two dates
  - i.e., low magnitude
- Large differences:
  - Glaciers
  - Clouds
  - Deforestation
  - Ash cover



Summary

- CVA: provides a tool for combining, “distilling” information from multiple bands
- No real limit to number of bands we can use
- Magnitude: whether change happened
- Angle (direction): what type of change?

Additional resources

- Lillesand, Kiefer & Chipman – Chapter 7
- Jensen – Chapter 12
- Lambin and Strahlers, 1994 [Rem Sens Env]
- Johnson and Kasischke, 1998 [Int J Rem Sens]
- Chen et al., 2003 [Photog Eng & Rem Sens]