Fri. Feb. 09, 2018

• Reading:
  – Chapter 3 (Landsat)

• Today
  – Ch2. “Photographs” from Aircraft and Satellites
    • Note -- parts are “old” technology -- just look for principles, not details
      – Skip description of old imaging systems at the end.
      – Much better sources exist now -- will cover in Chapter 3
    • Stereo Imaging (review Wednesday lab)
      – Recent sources of data: NAPP (and older NHAP)
        » http://glovis.usgs.gov/
  • Photomosaics
  • Phase angle, sun and vegetation effects
Using the Nomograph

- Start with apparent slope at the bottom
- Move vertically upward to the correct vertical exaggeration
- Follow the curved line to the top of the plot where you then read the real slope
Aerial Photography Programs

  - (aerial images removed from 2018 version)
- http://earthexplorer.usgs.gov/

- NHAP  (National High Altitude Photograph) program  1980-1989
- NAPP  (National Aerial Photography Program)  
  1987-2007, repeat coverage every 5-7 years  
  Online images have pixel size of ~2.5 meters

- Since then -- USGS buying special purpose commercial coverage of limited regions  (satellite, aircraft)

- Repeat satellite coverage available from Landsat, and other satellites we'll discuss later.
NAPP
Color IR (False Color)
Greybull, WY
Sheep Mountain

• http://glovis.usgs.gov/
NAPP
Alkali Anticline
Bighorn Basin


- Laramie example on-line
  - Lat, Long = 41.3 -105.6
• Lab 2 (and 3 maps) should be similar to this (except use colored lines, rather than stippling, etc.)
Online glovis demonstration

• http://glovis.usgs.gov/
  – Aerial images seemed to have been removed in 2018 version -- use Earth Explorer for those.
  – Laramie example on-line
    • Lat, Long = 41.3 -105.6

• http://earthexplorer.usgs.gov/
• Computer generated elevations based on measured shifts within digital stereo pairs

Schenk et al. 1998
Photomosaics

A. Photomosaic. From Sabins (1973A, Figure 6).

- Fig. 2-10: Coachella Valley, CA
Photomosaics

A. Photomosaic. From Sabins (1973A, Figure 6).

• Fig. 2-10: Coachella Valley, CA
Modern (Io/Galileo) Photomosaics

In modern computer generated mosaics seems “almost” disappear

Be careful about subtle artifacts along the seams:

Don't map “faults” there
Effects of Sun Angle on Lunar Photos
Sabins Sun Angle Effects

- Scarps more evident in "low sun angle" image
Effect of snow, plus sun angle

A. Summer image acquired June 18, 1973, with a 45° sun elevation.

B. Winter image acquired April 2, 1974, with a 27° sun elevation.

Figure 3-22 Landsat MSS band 4 seasonal images of Bathurst Inlet, Arctic Canada.
Vegetation Effects

- Conifers usually have lower reflectance in near-IR than deciduous trees
- Much of near-IR light scattered from leaves scatters off the interior structures, not just the leaf surface
- Changes in water content/stress of leaves changes amount of reflected IR
- As growing season ends chlorophyll disappears, red reflectance goes up
  - First symptom is often a shift in the λ of the red absorption edge

Figure 2-30 Reflectance spectra of green and senescent foliage. In the autumn, chlorophyll deteriorates, which reduces the absorption of incident red energy. The development of anthocyanin and tannin causes the yellow-red fall colors. From Schwaller and Tkach (1985, Figure 2).