EE/GP140-The Earth From Space- Winter 2008 **Handout #29**
Lab Exercise #6

Today we'll be looking at some images of forests and learning about the sorts of information we can gain from remote sensing images.

Part I. Deforestation images and Physical Properties

1. Begin by downloading the Ex. 6 zip folder from the web page. Uncompress onto the Desktop. Start Scion Image as before.

2. Open the image "p224aL.tif" (in the Ex. 6 folder), which shows areas of deforestation in the Amazon. This is our usual color IR images with infrared reflectance in the red channel. The dense forests appear dark red; areas of regrowth are a lighter shade of red; and deforested regions are a light blue color. Identify examples of each of these in the image.

3. Close this image.

4. Open "Bebeduro.TIF". This is a dual frequency radar image of the Amazon region. You can move around the image with the hand tool. Identify some areas of deforestation in the images. What do you look for to identify them? Why do they appear as they do in this display format?

5. Close this image.

Part II. Amazon River

6. Open "Manaus". This is an L-band radar image covering an area of 8 x 40 km in size. The two large rivers you see are the Rio Negro and the Rio Solinoes, which combine at Manaus to form the Amazon River. North is to the top left.

7. Locate the differences between the April and October images. Certain areas appear brighter in one image; others are essentially the same. Speculate on the cause of this change.

8. Close this image.

Part III. Yellowstone

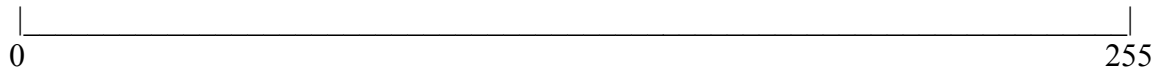
9. Open "yellowstone". This radar image of a 45 x 71 km area in Yellowstone National Park was acquired at L band, using vertically polarized transmitting and horizontally polarized receiving antennas (LVH). In 1988, a devastating fire burned much forest in the park. Surveys concluded that 793,880 acres were burned. This radar image, though taken 6 years later, shows that the burned areas are still visible.

10. Locate Yellowstone Lake. Locate areas of burned forest.

11. Under the Options menu, select “Preferences” and then “Invert Pixel Values”.

12. What are the DN values of the lake? What about the values for the different burned areas? The forested areas?

13. Draw these DN values on a scale from 0-255.



14. Under the Options menu, select “Density Slice”. Use the arrow tool to move the red color to different DN values and ranges in the LUT window (the little vertical rectangle with a color scale in it). When using a particular density slice, you assign certain DN ranges to be displayed as a particular color (red in this case). As an example, try to make only the water bodies red; then just the forests.

15. You can use many different color tables when doing density slicing. Under “Options”, select “Color Tables”, “20 colors”. What effect does this have on your image? Try sliding the color scale bar around (click in the LUT window, and slide the cursor up and down).

16. Open “yellow-lut”. This is a color table that was produced specifically for this image to highlight the different areas that have been burned. Locate the water, the forests, and the burnt areas.

17. Open “yellow-com”. This image shows a comparison of the two images (the gray scale and the density sliced version). Note how useful this technique can be in highlighting areas of interest.

18. Close these images.

Part IV. Raco, Michigan

19. Open “Raco.tif”. This is a radar image of a 20 x 50 km area in Michigan. Lake Superior can been see in the upper right hand corner of the image. Red is LHH; green is LHV; blue is CHH. This site is at the boundary between the boreal forests and the northern temperate forests. This transition zone is expected to be biologically sensitive in the event of climate warming.

20. The colors in this image arise from a variety of trees that act as reflectors:
    Light green/yellowish areas are red pine
    Brownish yellow areas are jack pine
    Light greenish/blue areas are a mix of aspen and birch
    The dark blue areas in the left corner represent a large frozen swamp

21. What causes the different trees to show up differently in the image?

22. What are the blue areas in the lower center portion of the image?

23. Open "RacoVegMap.tif". This classification map was produced from the radar image that you are also looking at. Compare the two, and evaluate the classification of the vegetation.

Part V. Maui, Hawaii

24. Start matlab, and read in the three files maui.983.lhh, maui.983.chh, and maui.983.chh-lhh. These are SIR-C images of Maui, each with a line length of 983 pixels, and with lhh, chh, and the difference of these two polarizations.

25. Create a three color image of these three files, and experiment with the color assignments until you find a pleasing one.

26. Given the properties of the wavelengths that you are aware of, identify regions with denser vegetation growth. Do these occur more in the agricultural regions, or in the mountains?

27. Close the images, and log out of your PC.

28. Have a good weekend.