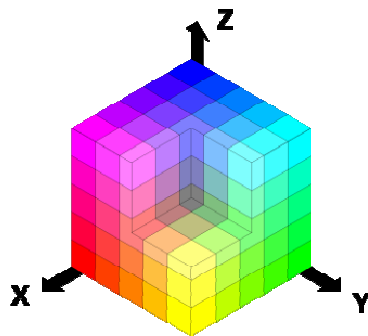


HSI and RGB Transformation and Applications

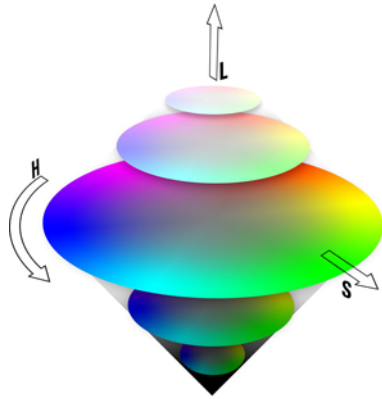
with Tim Welch

(R)ed (G)reen (B)lue Model



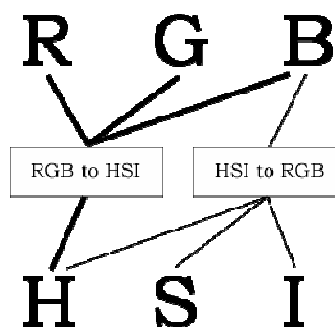
- Color cube representation
- Range 0-255
- Black (0,0,0)
- White (255,255,255)

(H)ue (S)aturation (I)ntensity Model



- Can represent with a double-cone, double-hexcone, even a sphere.
- Hue (color 0-360°)
 - Outer edge
 - Determined by angle
- Saturation (purity 0-1.0)
 - Distance from vertical axis
 - Closer -> Paler
- Intensity (brightness 0-1.0)
 - Distance from bottom

RGB/HSI Transform



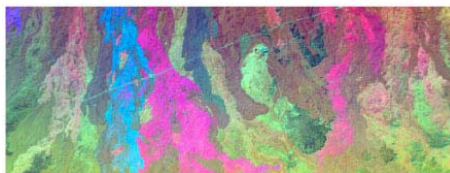
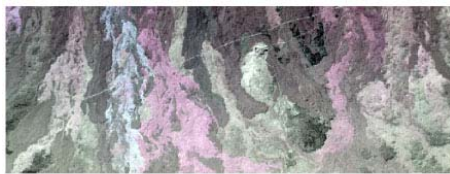
HSI for Image Enhancement

Contrast Decorrelation

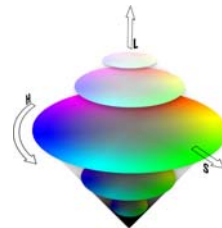
- Step 1:** Convert image from RGB to HSI
- Step 2:** Apply contrast stretch to intensity and saturation component (but not hue)
- Step 3 (Optional):** Convert image back to RGB

HSI for Image Enhancement

Contrast Decorrelation



Mauna Loa lava flows.



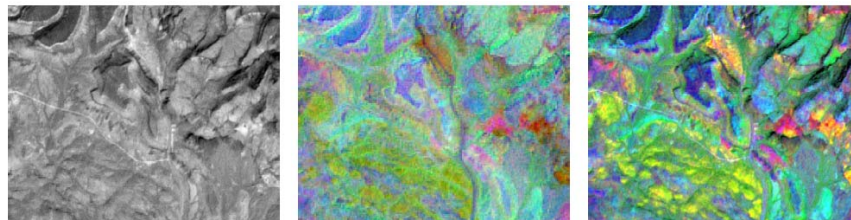
HSI for Combining Images

Panchromatic With Multispectral

- Step 1:** Resample the images to the same resolution
- Step 2:** Co-register the images
- Step 3:** Transform multi-spectral image from RGB to HSI
- Step 4:** Substitute panchromatic image for intensity component of multi-spectral image.
- Step 5:** Convert new image back to RGB

HSI for Combining Images

Panchromatic With Multispectral



Landsat 7 Panchromatic
15m resolution

Landsat 7 Multispectral
30m resolution

Combined Image



Questions?