

Remote land survey

Image enhancement I.

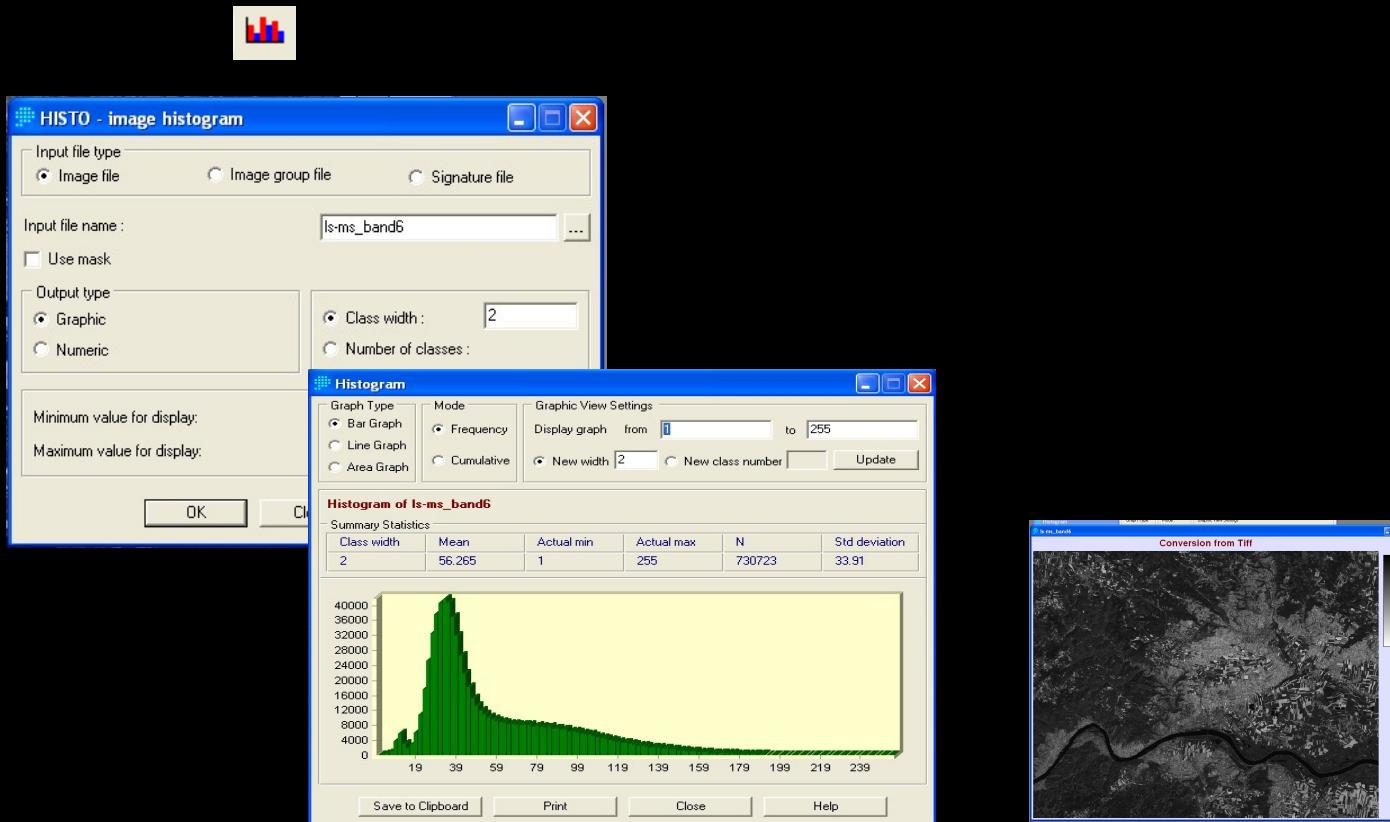


Types of image enhancement

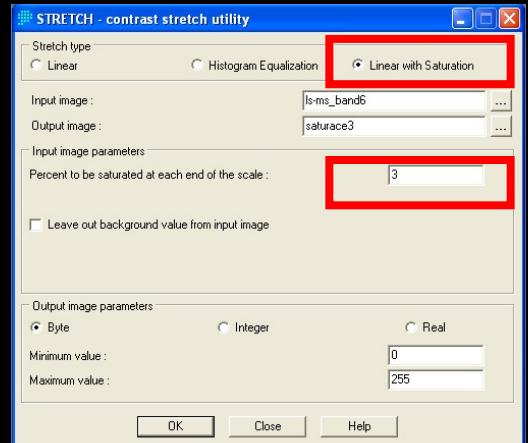
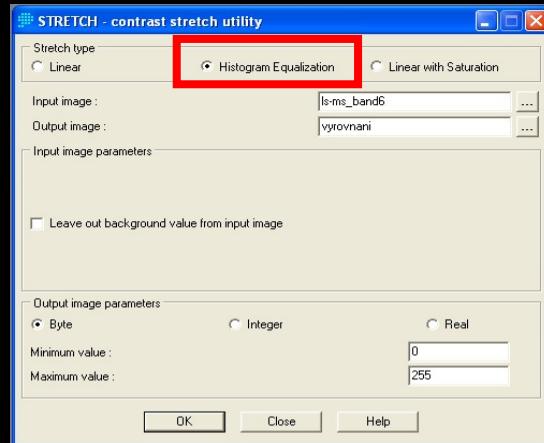
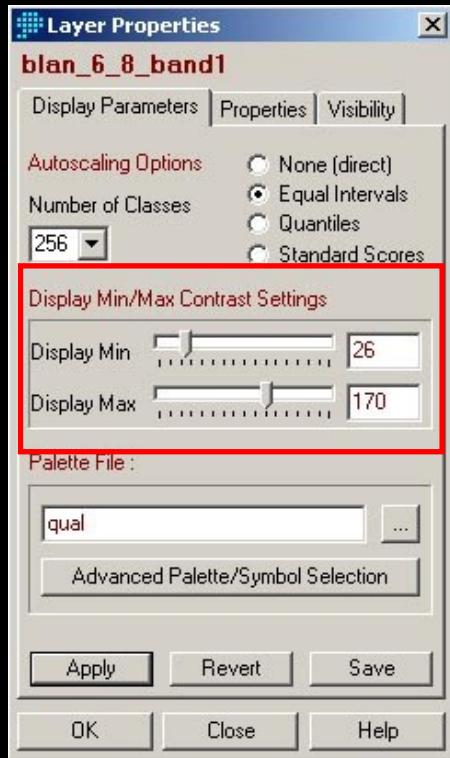
- Radiometric(point)
 - Contrast changes
 - Histogram alignment
 - Threshing
 - Graduated toning (density cuts)
- Spatial
 - Filtration
- Spectral
 - Color syntheses
 - Arithmetic operations with multispectral image bands
 - Principal Component Analysis (PCA)

Histogram in Idris

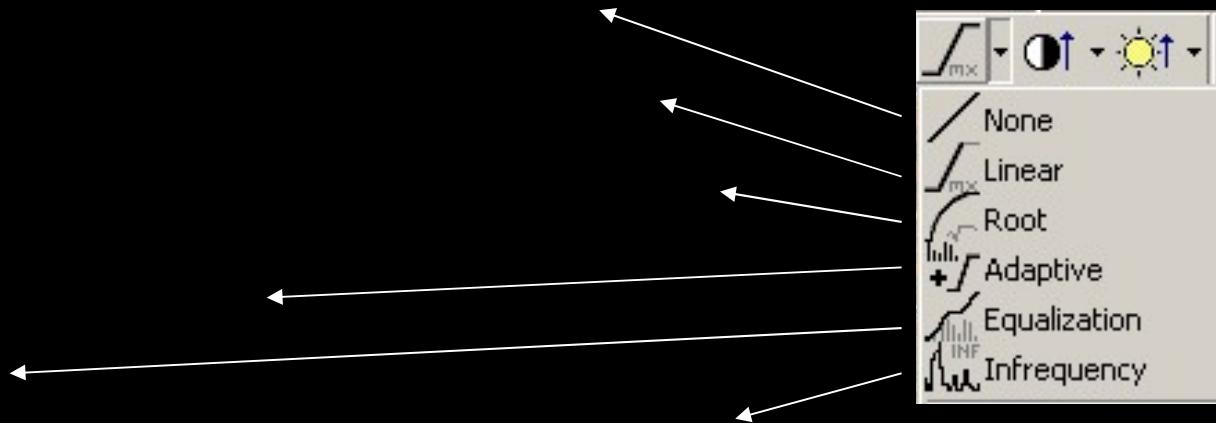
- Image Processing / Statistics / HISTO



Editing a histogram in IDRISI



Adjust the band MS7* (intro_LS_band6) first by flattening the histogram, then by linear stretching with 3% saturation. Create histograms of the resulting images. Compare the original image and the two edited ones, as well as their histograms.

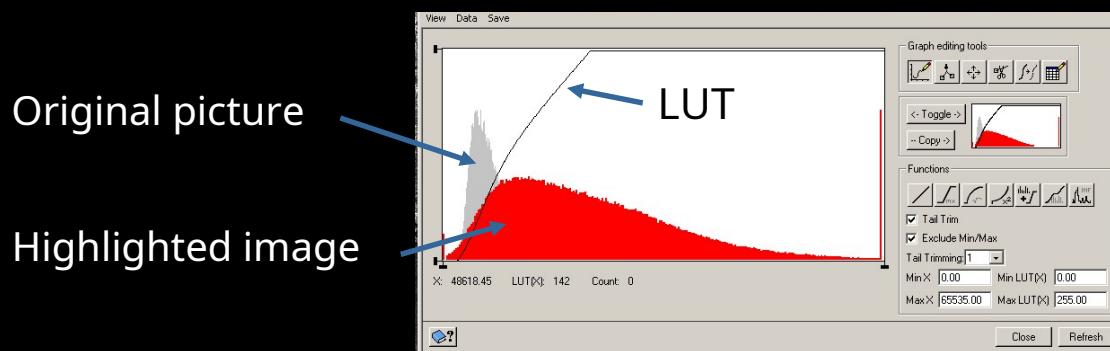


- Modification of predefined functions
 - Set Trim %: determination of the saturation percentage
 - Tail Trim: enable/disable saturation
- Highlighting can be applied from the layer menu in the Map tree
- Contrast and brightness



Look-Up Table

- See
- Pra





Idrisi Taiga: FILTER module

GIS Analysis Modeling Image Processing Reformat

Database Query Mathematical Operators Distance Operators Context Operators ► SURFACE
Statistics Decision Support Change / Time Series Surface Analysis ► FILTER
PATTERN TEXTURE GROUP VIEWSHED WATERSHED HINTERLAND PIXEL LOCATION

FILTER - digital filtering

Filter type

- Mean
- Gaussian
- Minimum
- Median
- Maximum
- Adaptive Box
- Mode
- Standard Deviation
- Laplacian Edge Enhancement
- High Pass
- Sobel Edge Detector
- User-defined (variable size kernel)

filter type
NF/VF

choice of size filter windows

adjustment of filter window weights
(only for some filters)

Filter kernel

The output value is the median of the 9 pixel values of the 3×3 template.

Filter size

3×3 5×5 7×7

Input image : ...

Output image : ...

Output documentation...

OK Close Help

input image

resulting image

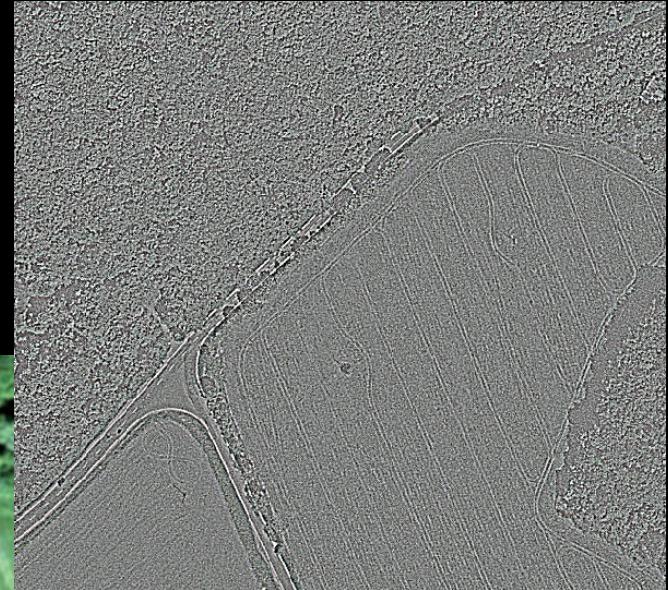


A sample of filtered images

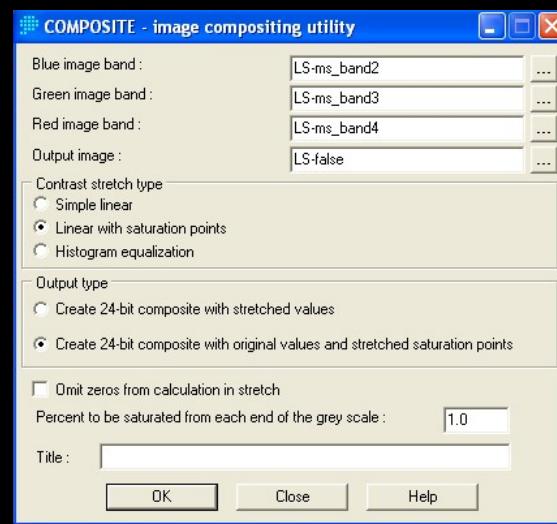
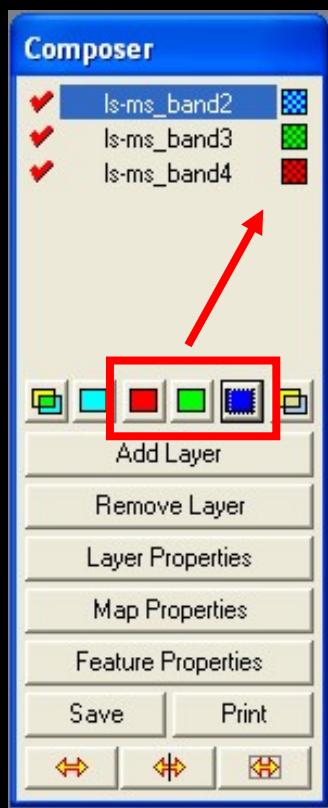
high frequency filter (Laplace)



an image
original



low-pass filter
(gaussian)



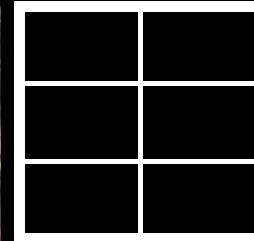
SEPARATE module

the opposite procedure – divides the image into three Display / SEPARATE bands

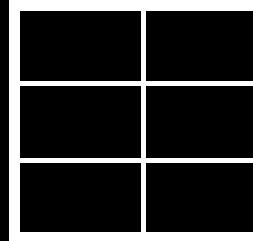


IKONOS satellite image

True color

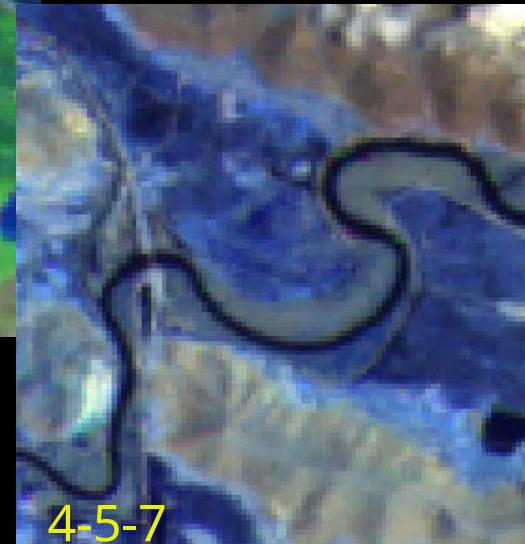


color





Sample of color syntheses multispectral data



combinations of LANDSAT bands,
in BGR order

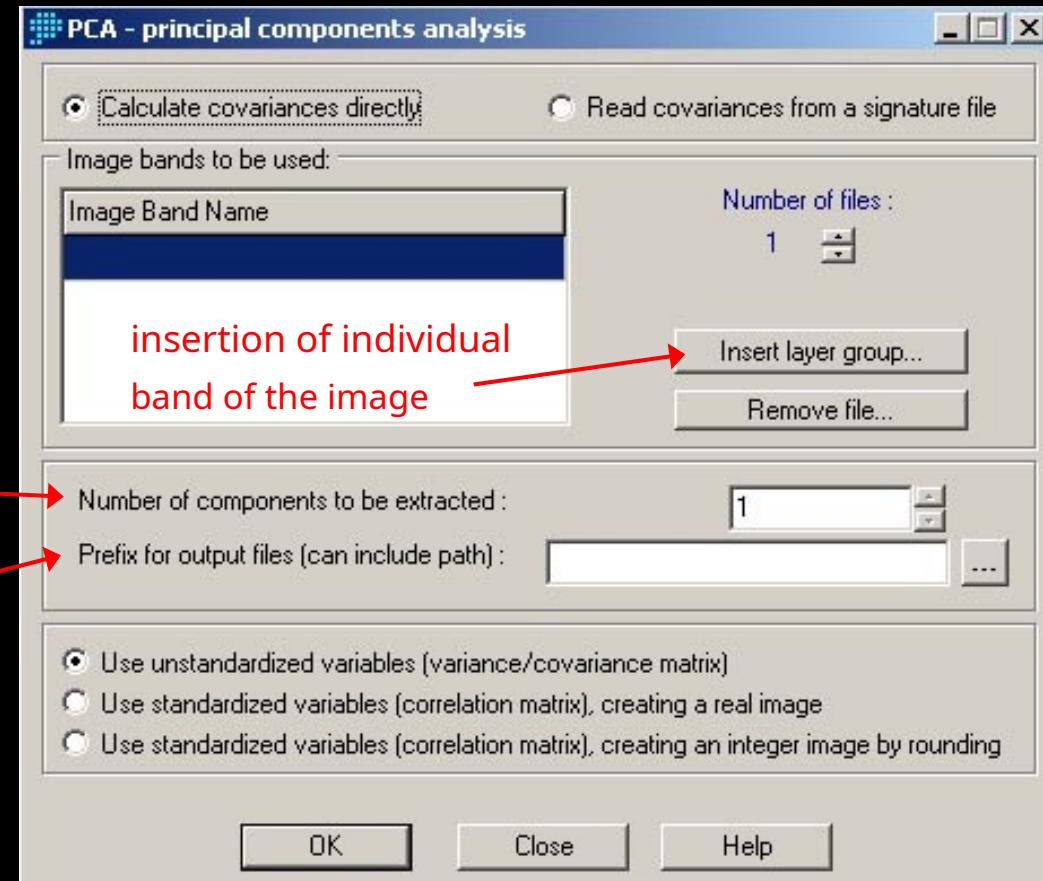
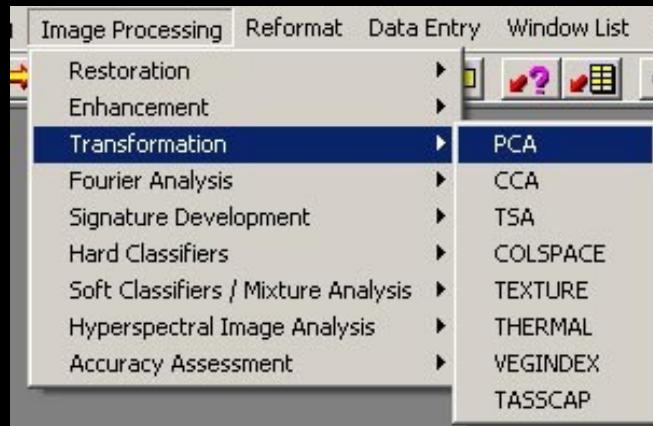


Pan-sharpening / Image Fusion

- Panchromatic focusing
- Idrisi Andes:Image Processing / Enhancement / PANSHARPEN
 - Color space transformation: RGB \longleftrightarrow HLS (hue, lightness, saturation – tone, brightness, saturation; ex. various abbreviations – IHS, HSV, HSB)
 - Principal component transformation
 - Local regression transformation
- Geomatics:Tools / Algorithm Librarian / Image Processing / Data Fusion /
 - FUSE module – IHS transformation
 - PANSHARP module



Idrisi Taiga: PCA



number of components to create

prefix for the resulting images

for exercises - LANDSAT images
brno_tm-190-26-5_band1 to 7



References

- Eastman, JR 2009: Idrisi TAIGA Guide to GIS and Image Processing, Clark Labs, Worcester, MA