



# Remote land survey

Image enhancement I.

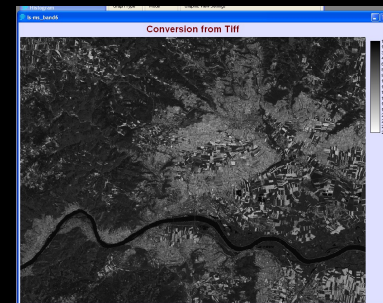
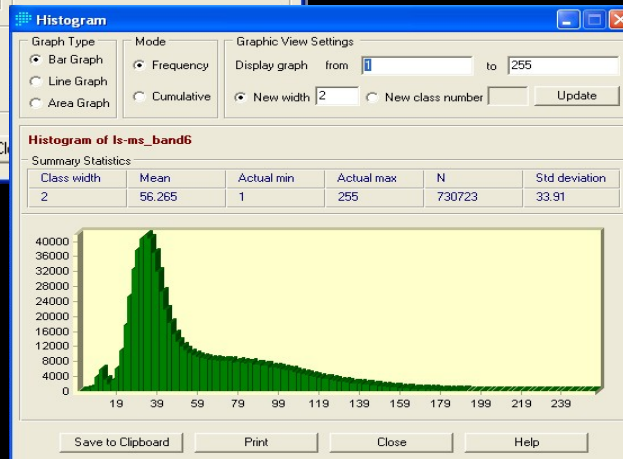
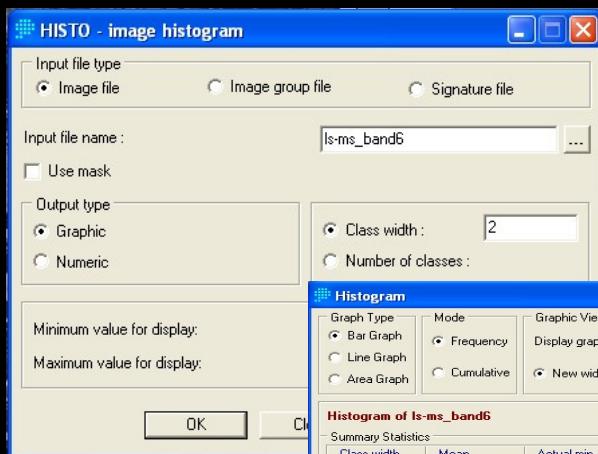


# Types of image enhancement

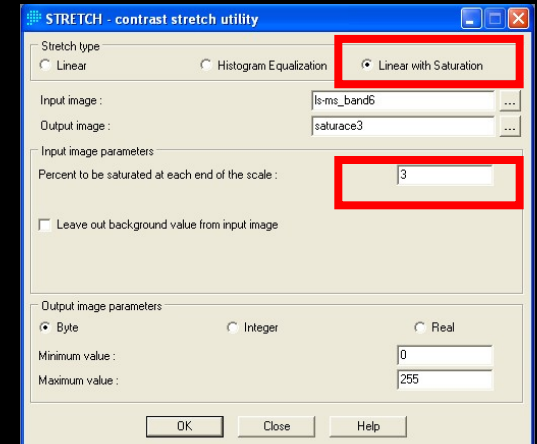
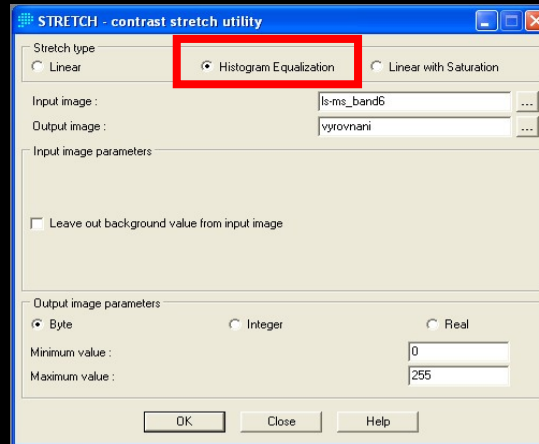
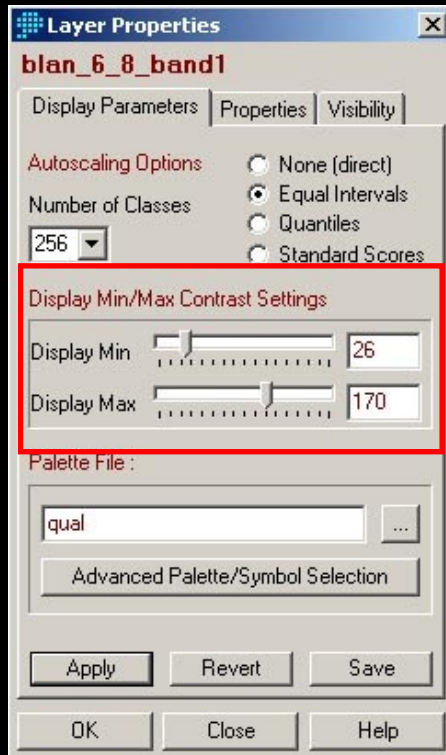
- Radiometric(point)
  - Contrast changes
  - Histogram alignment
  - Threshing
  - Graduated toning (density cuts)
- Spatial
  - Filtration
- Spectral
  - Color syntheses
  - Arithmetic operations with multispectral image bands
  - Principal Component Analysis (PCA)

# Histogram in Idris

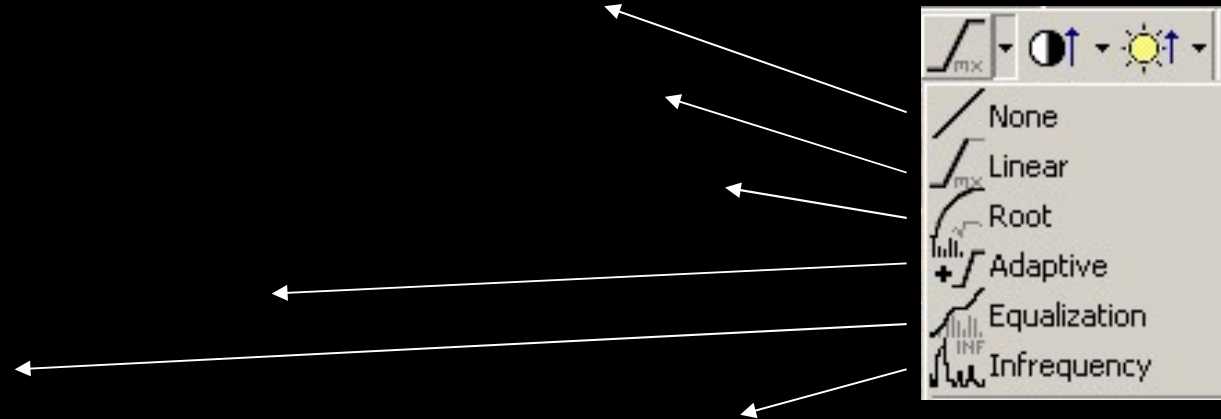
- Image Processing / Statistics / HISTO



# 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

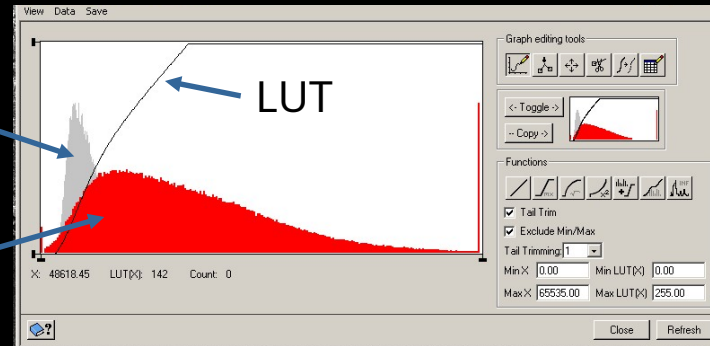
- See

- Pra



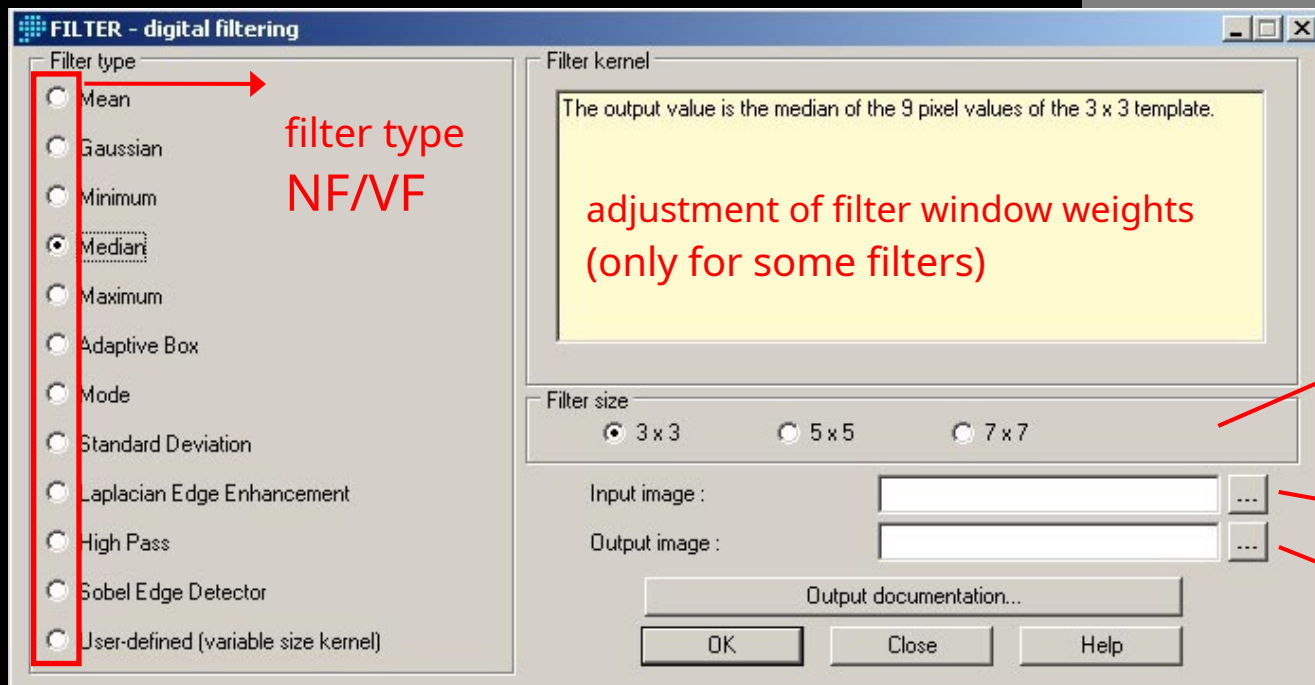
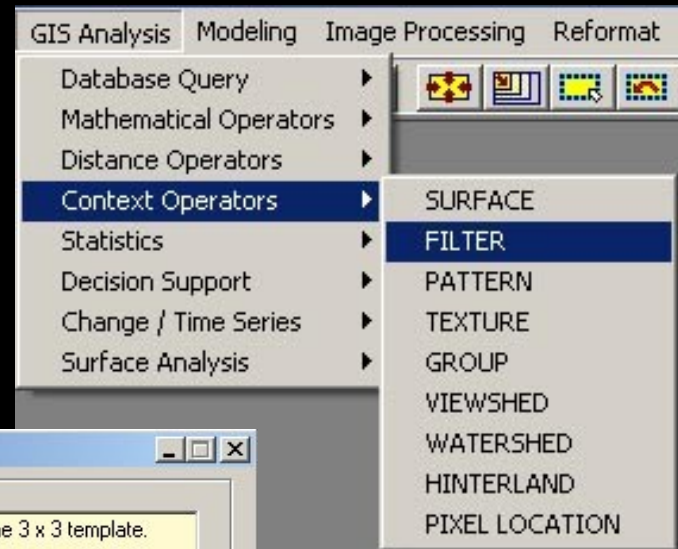
Original picture

Highlighted image





# Idrisi Taiga: FILTER module



filter type  
NF/VF

adjustment of filter window weights  
(only for some filters)

choice of size  
filter

windows

input image

resulting image



# A sample of filtered images

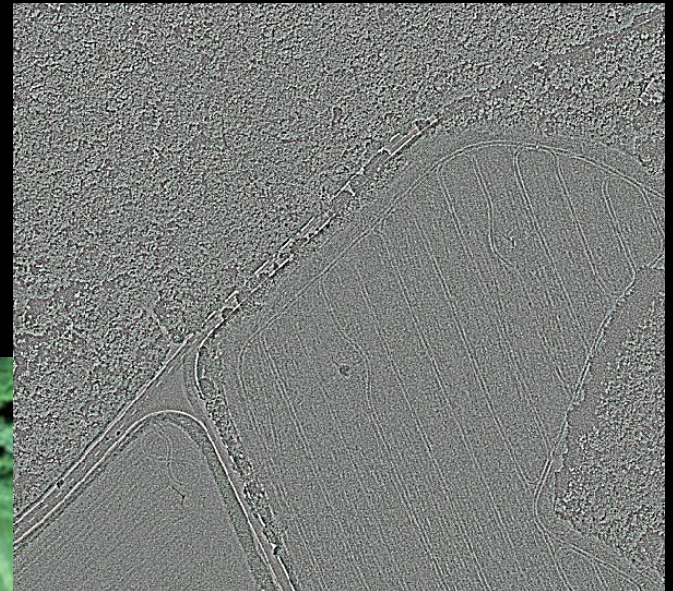
high frequency filter (Laplace)



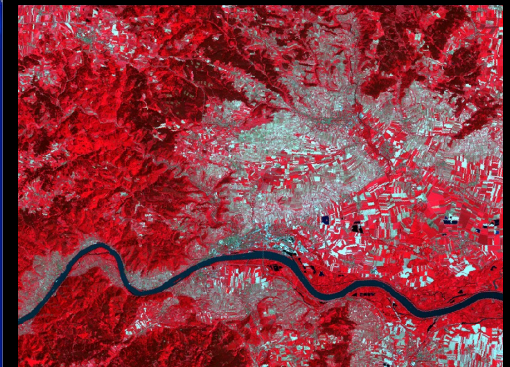
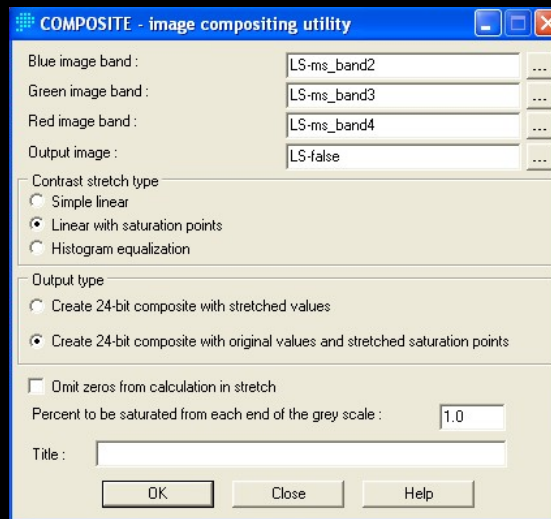
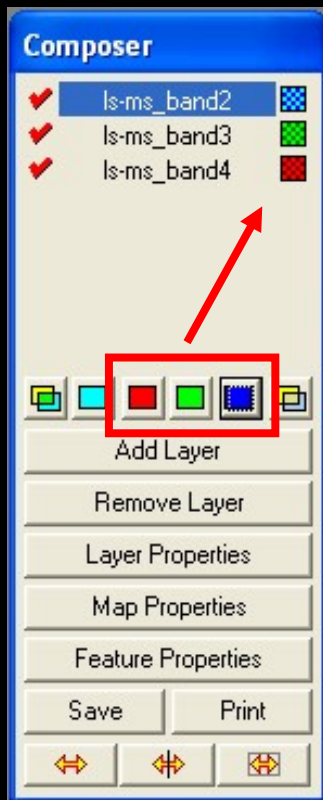
an image  
original



low-pass filter  
(gaussian)







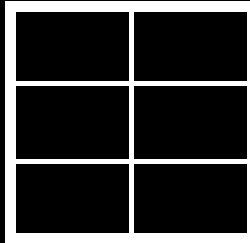
## SEPARATE module

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

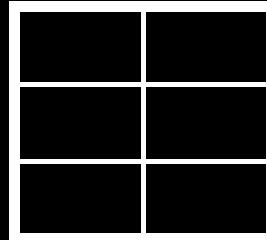


# IKONOS satellite image

True color

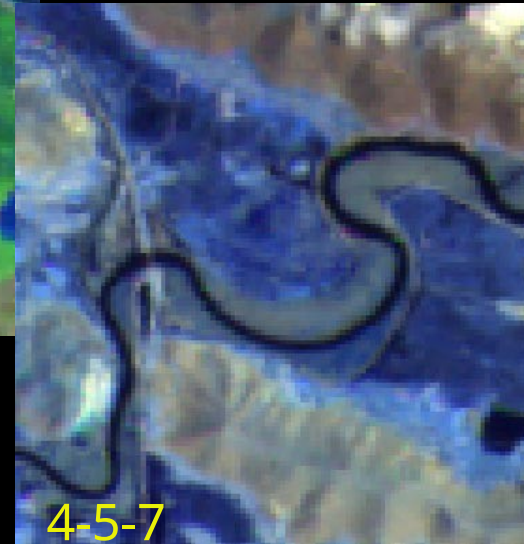


color





# Sample of color syntheses multispectral data



combinations of LANDSAT bands,  
in BGR order

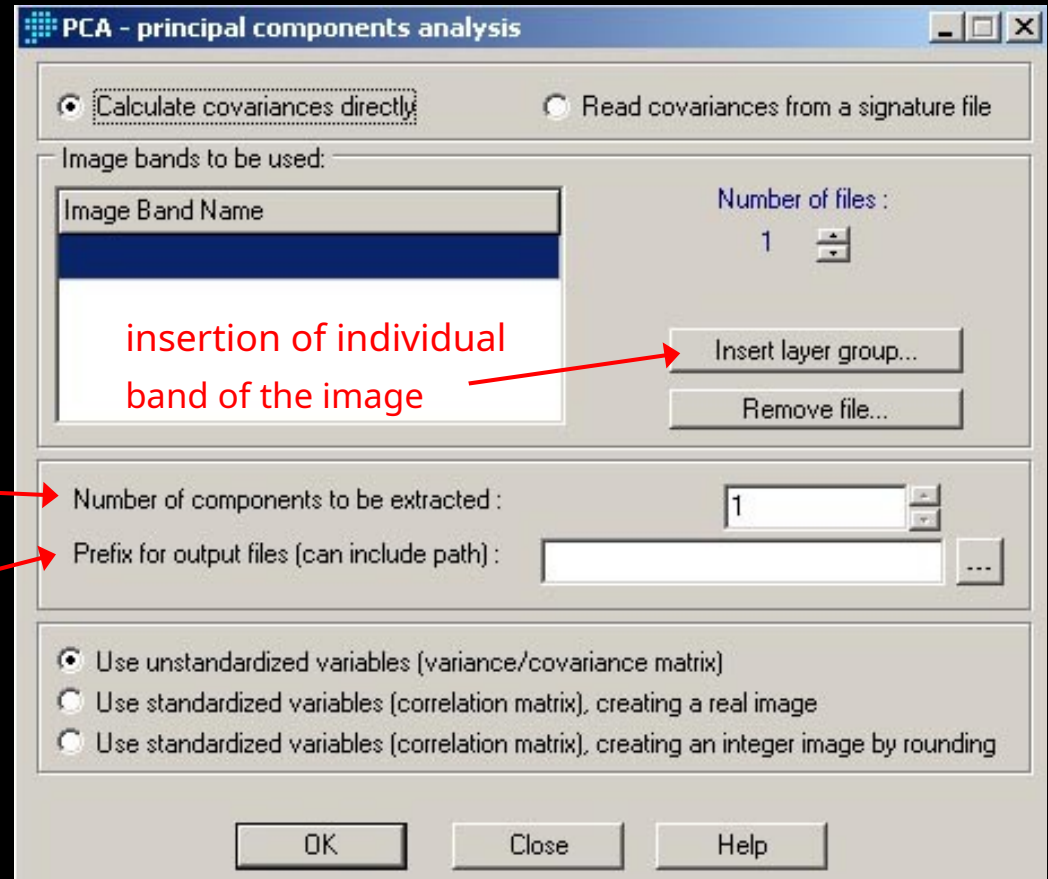
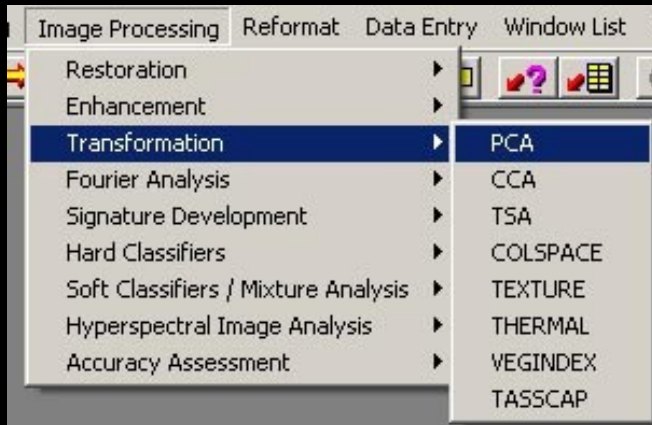


# Pan-sharpening / Image Fusion

- 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