

An aerial photograph of a river delta, likely the Nile Delta, showing a complex network of water channels. The water is color-coded: a large central area is a deep red, while the surrounding channels and smaller branches are a bright cyan. The land between the channels appears as a textured, brownish-green. The overall scene is a dense, branching pattern of water and land.

Resolutions

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Resolution

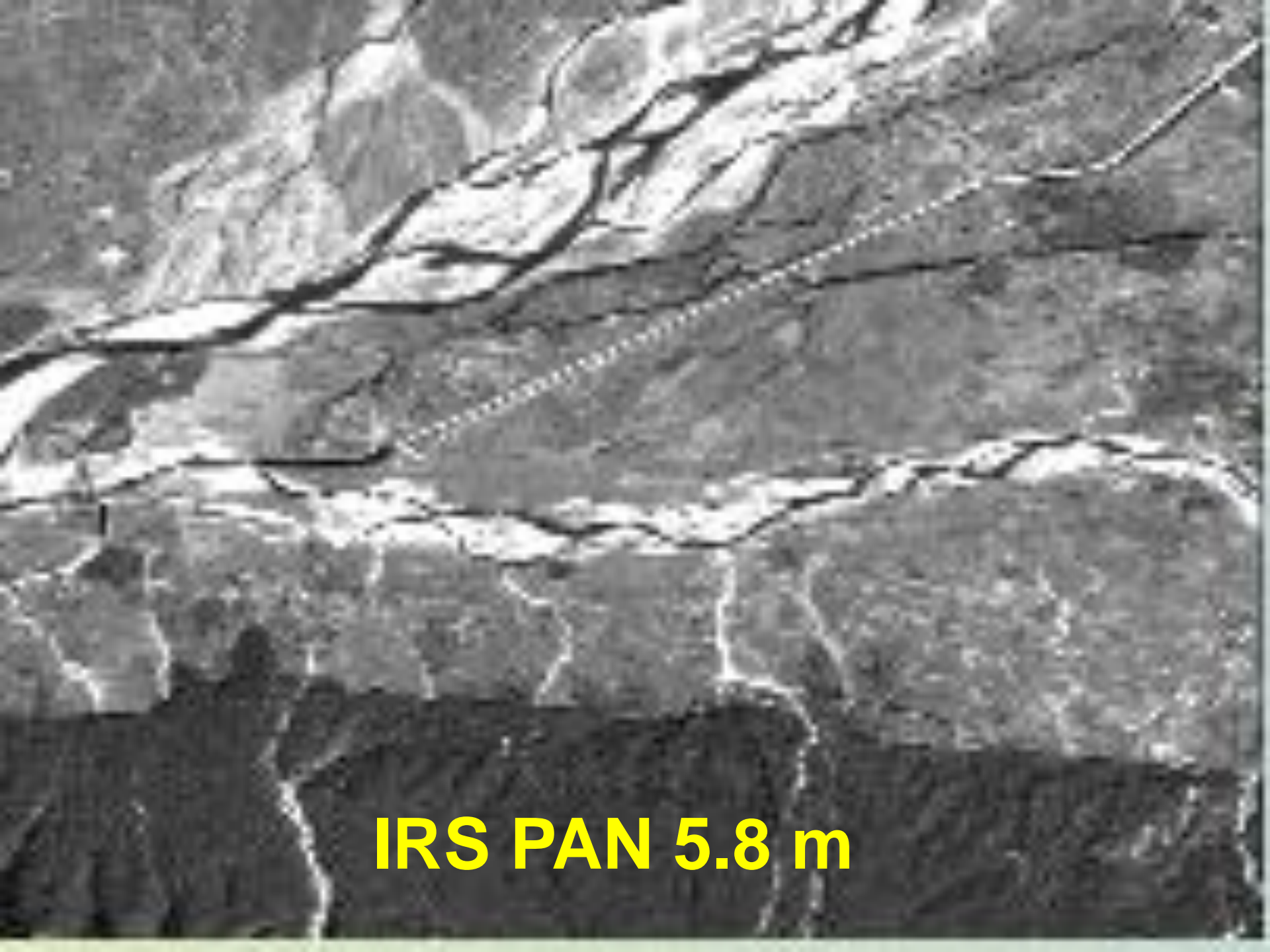
Remote Sensing involves the discretization of a natural scene into an array of picture elements(pixel).One can interpret a pixel as a sample of a new natural scene.Pixels only occasionally contain one cover type but a very bright or dark object may dominate overall pixel brightness.

One can distinguish four important types of resolution:

- 1. Spatial Resolution**
- 2. Radiometric Resolution**
- 3. Spectral Resolution**
- 4. Temporal Resolution**

Spatial Resolution

The **Spatial Resolution** can be defined as the instantaneous field of view (ifov) which can be defined as the field of a scanner with the scan motion stopped. When expressed in linear or area units such as meters or hectares, it has an altitude dependent measure of the ground resolution of the scanner. If one pixel is a ground cell sample of 20 by 20 meter then no objects smaller than 20 meter can be distinguished from their background. This does not mean they can not be detected. e.g. Fires as small as 10 by 10 meters can be detected by the NOAA/AVHRR satellites which have a spatial resolution of 1.1 x 1.1 k.m. These fires are detected not resolved.



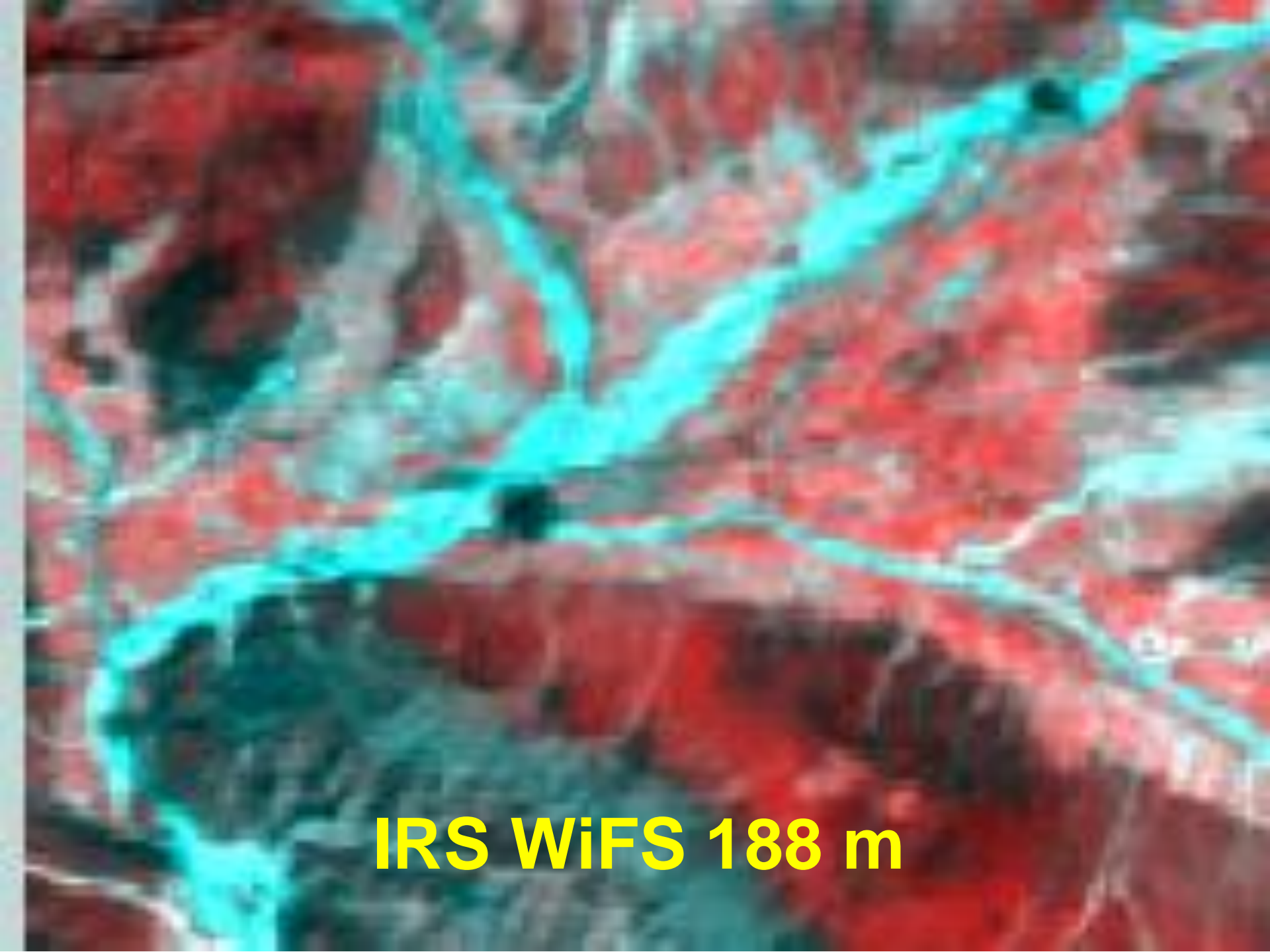
IRS PAN 5.8 m



IRS LISS III 23.5 m



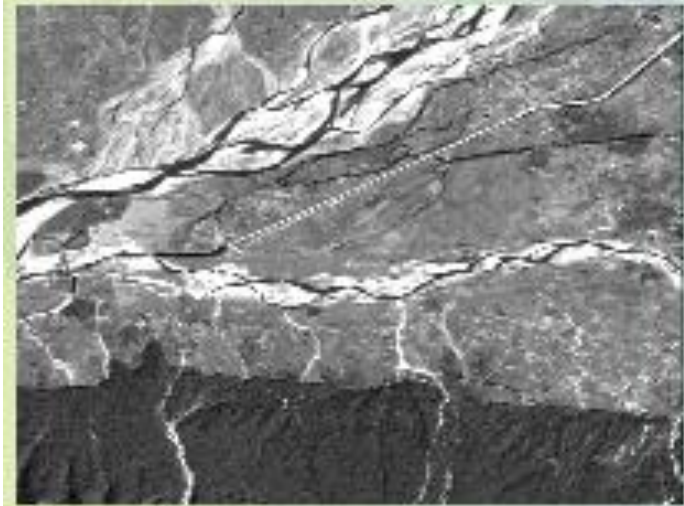
IRS LISS II 36.25 m



IRS WiFS 188 m

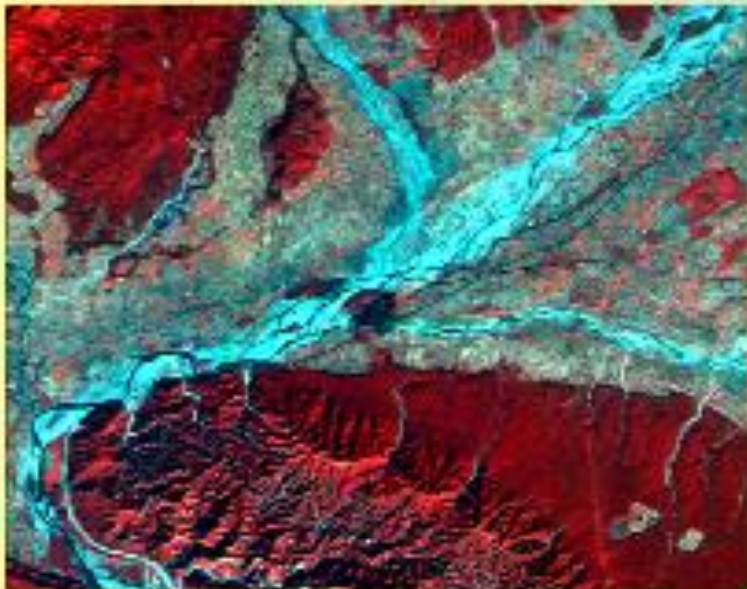


IRS LISS III 23.5 m

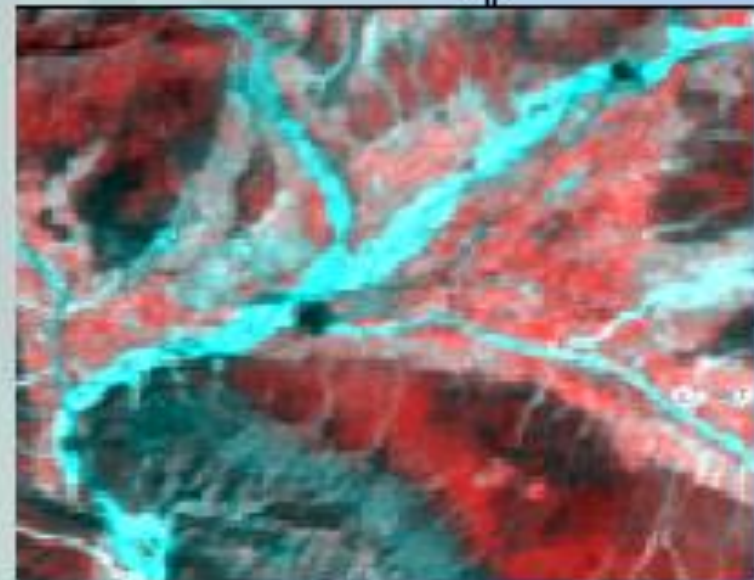


IRS PAN 5.8m

IRS LISS II 36.25m

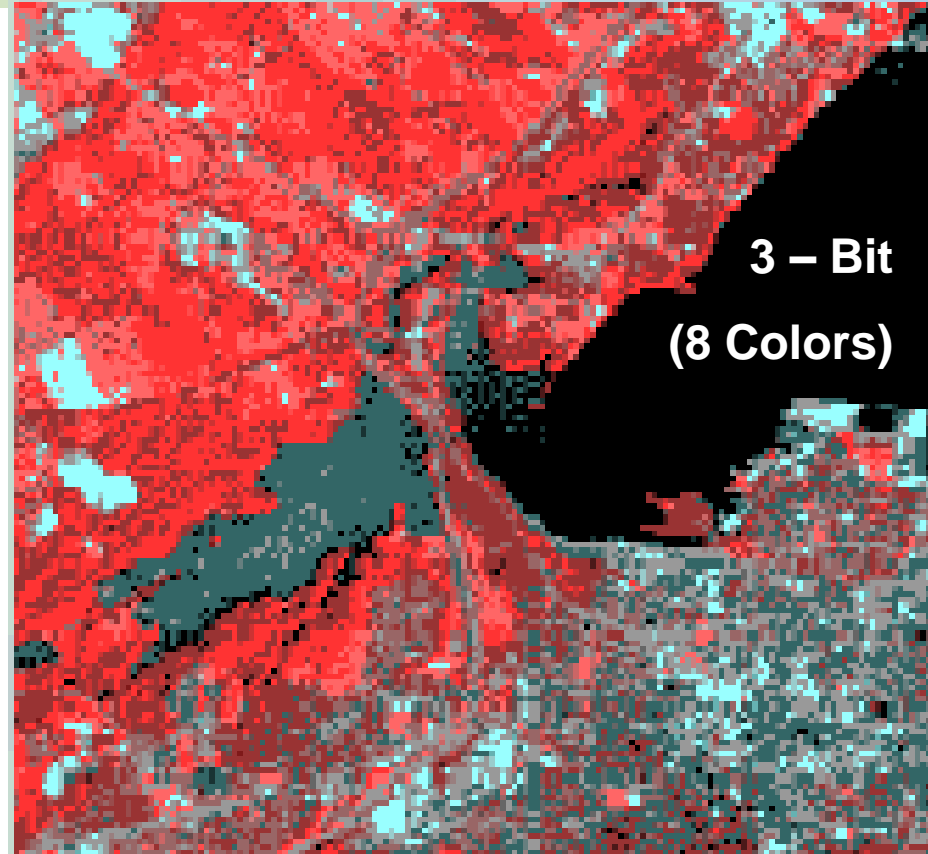
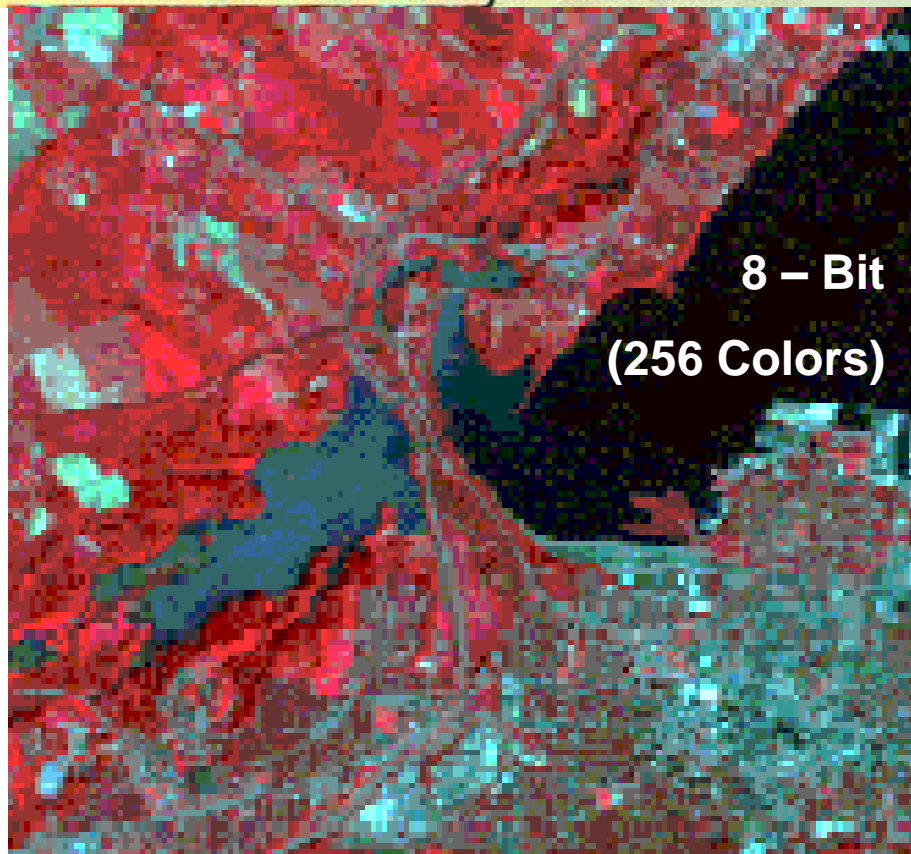


IRS WiFS 188m



Radiometric Resolution

Radiometric Resolution refers to the number of digital levels (colours) used to express the data collected by the sensor. In general, the greater the number of levels the greater the detail in information. At one extreme one could consider a digital image composed of only two levels. As the number of levels increases so the amount of detail visible on the image increases.



Spectral Resolution

The **Spectral Resolution** of a remote sensing instrument (sensor) is determined by the bandwidths of the Electro-magnetic radiation of the channels used. High spectral resolution, thus, is achieved by narrow bandwidths collectively, are likely to provide a more accurate spectral signature for discrete objects than broad bandwidth.

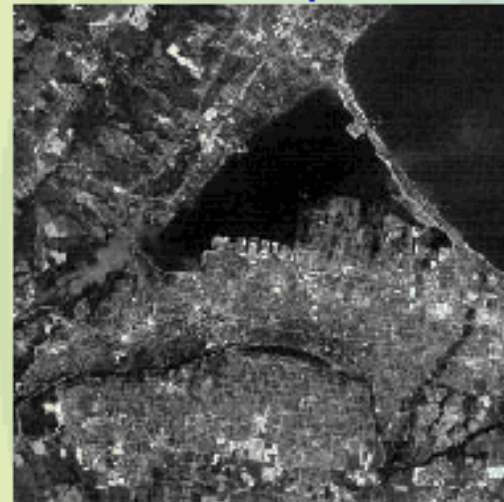
Multispectral scanners - remote sensing instruments which record several spectral bands (usually < 10) simultaneously
"spectral band" = "spectral channel"

Hyperspectral scanners - remote sensing instruments which record hundreds of spectral bands simultaneously

TM1: 0.45–0.52 μ m -Blue



TM2: 0.52-0.60 μ m -Green



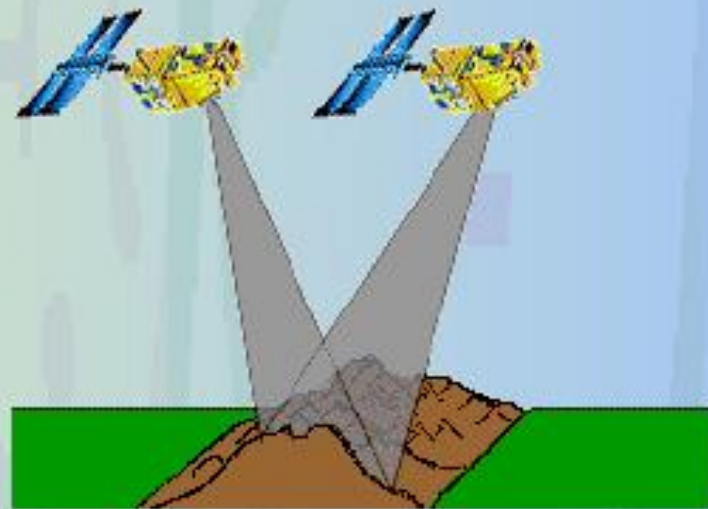
Temporal Resolution

Temporal Resolution is the time between successive image acquisitions. In practice the constrain or orbital parameters, weather and money determine the temporal resolution, while ideally the problem to be solved should determine the temporal resolution.

Change detection - the identification of differences in surface features observed in images acquired over the same area at 2 different times.

Multitemporal remote sensing - change detection involving up to 10 images acquired at different times.

Hypertemporal remote sensing - change detection involving hundreds of images acquired at different times.



Table