MSc Environmental Science

Semester II

Subject: 16P2EVS T08-Remote Sensing and GIS

Topic: Map scale and surveying

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small scale map

- Small scale refers to the map of large regions such as continents or large nations. In other words, they show large areas of land on a small space. World map is a small scale map.
- The representative fraction is relatively small.
- It depicts less details of an area.
- Maps having scales above 1:1,000,000 are treated as small scale maps.
- A small scale map will have a large geographic extent.

Large scale map

- Large scale maps show smaller area such as district maps or town plan map.
- The representative fraction is relatively large.
- It depicts more details of an area.
- Maps having a scale 1:50,000 upto are classified as large scale maps
- A small scale map shows a small geographic extent.

common elements in a map

- Good maps have many common elements
- **Title**: Describes what a map shows.
- **Orientation:** Refers to the cardinal directions and is shown by an arrow of compass rose.
- **Date:** Tells when the map was made and readers judge its accuracy.
- **Border or neat lines**: Separate the map from text; defines the edges of a map
- **Author :** Individuals or institution that create the map.
- **Legend of Key**: Defines the map's symbols.
- **Scale**: Shows the relationship of map distance to actual distances on the earth's surface.
- **Grid**: A set of interesting lines that provide a way of determining the absolute location of a place.
- **Source**: Institution or resource from which the information on the map was compiled.
- **Index:** Presents an alphabetical list of places shown on a map and gives the grid location (latitude and longitude) of each place.

Latitude

- The latitude is specified by degrees, starting from 0° and ending up with 90° to both sides of the equator, making latitude Northern and Southern.

- The equator is the line with 0° latitude.

- These are horizontal parallel lines

- Run east-west as circles parallel to the equator.

Longitude

- The longitude is defined as an angle pointing west or east from the Greenwich Meridian, which is taken as the Prime Meridian.

- The longitude is maximum as 180° east from the Prime Meridian and 180° west from the Prime Meridian.

- These are vertical lines

Plane Surveying

- Plane Surveying is the type of surveying in which the mean surface of the earth is considered as a plane.

- The curvature of the earth is ignored.

- All triangles formed by survey lines are considered plane triangles.

- Line joining any two station is considered to be straight.

- The triangle formed by any three points is considered as plain.

- The angles of the triangle are considered as plane angle.

- Small area and small distances are covered

- Degree of accuracy comparatively low

- This survey is not carried out by the individual organization

- Plane surveys are carried out on sufficiently large scale to determine relative position of individual features of the earth surface.

Radiometric corrections

The radiometric errors include:

- Detector Response Errors: When the detector elements are not working, oversensitive or under sensitive, the result will be periodic line dropout, N-line striping or banding or loss of data in the line. These errors can be corrected by averaging the neighbourhood values and assigning to the corresponding pixel or by applying a low pass filtering

- Atmospheric effects; Short-wavelength scatter, attenuation, solar illumination variations, sun elevation changes etc. can also cause radiometric distortions in the data. These can be corrected by regression adjustment

Image enhancement

- The purpose of enhancement is to allow for improved image interpretation by amplification of the desired spectral or spatial characteristics, while suppressing non-essential characteristics.

- There are various enhancement techniques available in image processing packages. They may be broadly grouped into the following categories

  - <u>Radiometric Enhancement:</u> Manipulation of the DN values of individual pixels, using certain equations. Contrast Enhancement, Binary stretch, Density slicing are included in this.

  - <u>Spatial Enhancement:</u> Transformation of the DN values in the context of the neighbourhood pixel values. This includes spatial filtering techniques.

  - <u>Spectral Enhancement:</u> Combination of DN values of multi band data of each pixel using different equations. Band ratio, Vegetation Indices, Principal component analysis , HIS transformation etc are spectral enhancements.

Need of rectification

- Scene to scene comparison of individual pixels in applications
- GIS data generation
- Creating accurate scale photomaps
- Overlaying an image with vector data
- Comparing image data of different scales
- Accurate distance and area measurements
- Image mosaicking

Supervised Classification Steps:

- Defining classification classes
- Selection of training sites
- Estimation of universal statistics of the training sites
- Classification of the image using appropriate algorithm
- Post classification smoothing
- Classification accuracy estimation.

Space segment of GPS

- Composed of satellites that transmit signals from space, on the basis of which time and position of the user is measured.

- Set of satellites is called as constellation.

- GPS uses two satellite constellations i.e. NAVSTAR and GLONASS.

- NAVSTAR (Navigation satellite timing and ranging)

- NAVSTAR composed of 24 satellites, arrayed in 6 orbital planes, inclined 55 degrees to the equator and with a 12 hours period.

- They orbit at altitudes of about 20,200km each.

Thank you