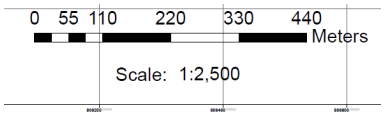
LECTURE 6

Georeferencing and Map Projections

MUST KNOW- SCALE OF A MAP

- Map scale is a method for expressing how map distance compares to ground distance, or the distance on the surface of the earth.
- Distance on map
  Distance on Ground

SCALE- SCALE BAR

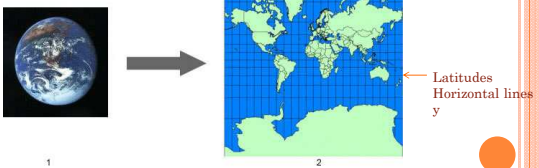


LARGE-SCALE VERSUS SMALL-SCALE MAPS

- 1:2500 Large Scale
- 1:200 000 Small scale
- A smaller scale number means a large scale
- A large scale number means a small scale

MAP PROJECTION CONCEPTS

- Before the digital data can be analyzed, they may have to undergo other manipulations—projection and coordinate conversions, for example—that integrate them into a GIS.



MAP PROJECTION CONCEPTS

- Whether you treat the earth as a sphere or a spheroid, you must transform its three-dimensional surface to create a flat map sheet.
- It is convenient surface to deal with as opposed to 3-dimensional surfaces
  - Measurements and
  - Visualisation of spatial information
- This mathematical transformation is commonly referred to as a map projection.

Map Projection Concepts

- One easy way to understand how map projections alter spatial properties is to visualize shining a light through the earth onto a surface, called the projection surface.
- One way to think of a map projection, therefore, is that it transforms a position on the Earth's surface identified by latitude and longitude (ϕ, λ) into a position in Cartesian coordinates, (x, y).

$x = f(\phi, \lambda)$

$y = g(\phi, \lambda)$

Map Projection Concepts

$X = \lambda$

$Y = \ln \tan [\frac{\phi}{2} + \pi/4]$

- The inverse transformations that map Cartesian coordinates back to latitude and longitude

$\lambda = x$

$\phi = 2tan^{-1}e^{y} - \pi/2$

Map Projection Concepts

- This process (the transformation) always results in distortion to one or more map properties, such as area, scale, shape, or direction.
- Because of this, hundreds of projections have been developed in order to accurately represent a particular map element(the area of the earth-) or to best suit a particular type of map

Map Projection Concepts

- Data sources for maps come in various projections depending upon which characteristic the cartographer chooses to represent more accurately (at the expense of other characteristics).

Geocoding Methods

- Street name
- By Postcode
- Boundary