

The Nature of Maps

- ❑ A map is a two-dimensional representation of earth; i.e. of spatial distribution of selected phenomenon. They are scaled drawings of a portion of the landscape.

- ❑ Maps can also be 3 dimensional, if they're globes.

The Nature of Maps



Historical Map of Egypt with Shaded Relief



Geologic Map of Western U.S.

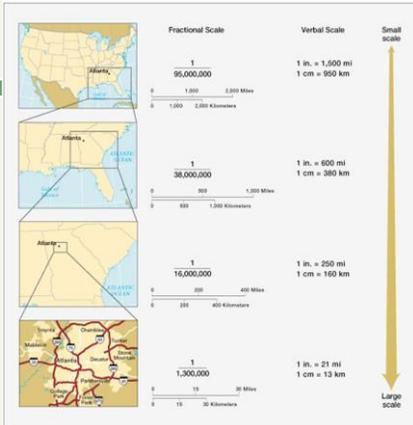
Globes vs. Maps

- ❑ Advantages & Disadvantages:
- ❑ Globes –
 - ❑ They are correct representations
 - ❑ They are cumbersome
 - ❑ You can only see one half at a time
- ❑ Flat Maps –
 - ❑ The whole world can be viewed all at one time
 - ❑ Easy to carry and manage into publications
 - ❑ They offer even at best, only distorted views of the Earth

Map Scale

- A scale is the relationship between the length measured on a piece of paper (map) and the corresponding distance on the ground. In other words, how much of the earth is being shown on a piece of paper.
- Types of Scale (see next slide)
 - ▣ Graphic Scale
 - ▣ Verbal Scale
 - ▣ Representative Fraction or Ratio Scales
- Large and Small Scales:
 - ▣ A large scale map has a small denominator and shows more detail e.g. an architect's blueprint
 - ▣ A small scale map is the opposite e.g. a globe
 - ▣ Which is small and large scale on next slide?

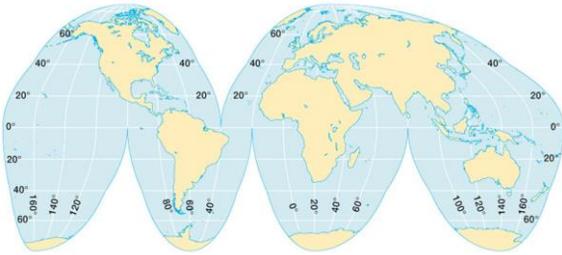
Examples of Map Scales



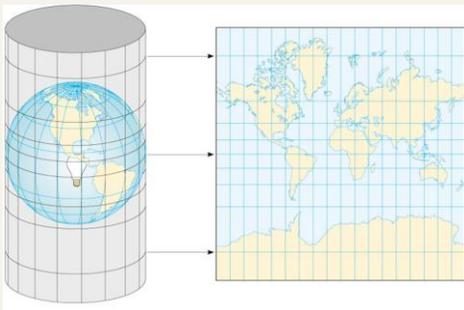
Map Projections

- A system whereby the rounded surface of Earth is transferred onto a flat piece of paper. "Orange peel".
- No projection is perfect, but some are better than others.
- Main types:
 - ▣ Interrupted (Goode's)
 - ▣ Cylindrical / Mercator – many old school maps
 - ▣ Robinson – compromise btw the first 2; found a lot in textbook (and National Geographic). See pg 36, and inside covers
 - ▣ Conic
 - ▣ Plane

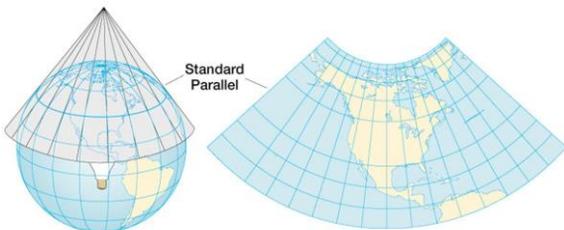
Interrupted Projection



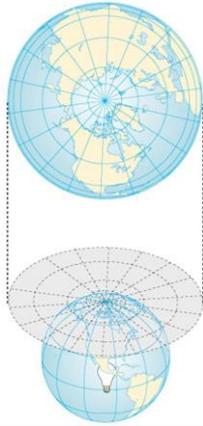
Cylindrical Projection



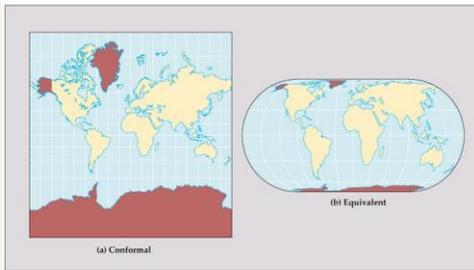
Conic Projection



Plane Projection



Conformality (shape) vs. Equivalence (size)



A cartographer has to decide if shape or size has to be sacrificed. You can't have both. It's impossible.

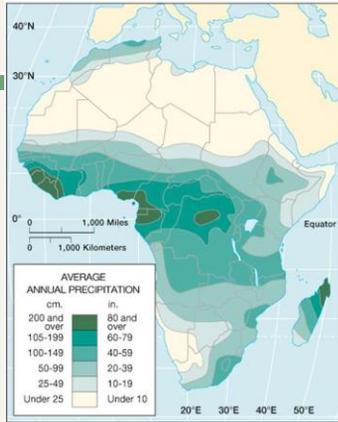
Isolines

- From Greek, "Isos", meaning, "equal". It is any line that joins points of equal value of something e.g., Elevation/contour lines.
- Contours always have intervals between them. And the "closer" the lines, the "steeper" the slope, and vice-versa.



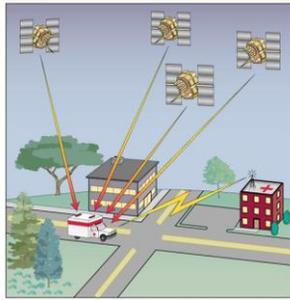
Isolines

- Average Annual Precipitation



Global Positioning System (GPS)

- Satellite-based system originally developed by the military for guiding missiles, etc. Now used for civilian purposes as well.
- It uses longitudes and latitudes to determine positions.
- Pilots use it for navigation, so does On*Star, car & phone GPSes.



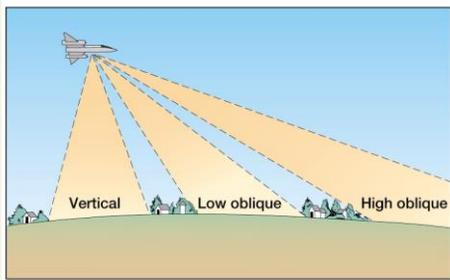
Remote Sensing

- Any measurement or acquisition of information about the Earth by a recording device that is NOT in physical contact with it.
- The earliest ones were taken by balloons (France, 1858; U.S., 1860)
- Later airplanes
- Various types:
 - Aerial Photographs
 - Orthophoto Maps
 - Color and Color-Infrared Sensing
 - Thermal Infrared Sensing
 - Microwave, Radar, and Sonar Sensing
 - Multispectral Remote Sensing

Aerial Photographs

- These can be vertical or oblique.
- They usually overlap
- They used to be black & white, but now come in color
- Of great importance to City Planning Offices

Aerial Photographs



Aerial Photographs



Aerial Photographs



Aerial Photographs

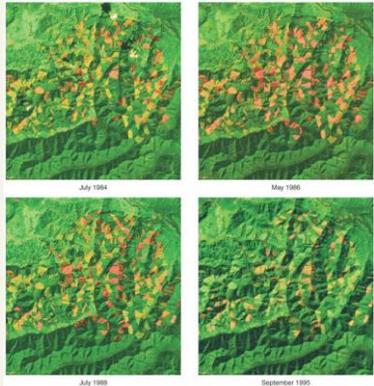


Orthophoto Maps

- These are multi-color distortion-free photographic image maps
- In other words, they're prepared from aerial photos, and a lot of the distortions have been removed



This is color Infra-red sensing (from Landsat). Thermal infra-red uses "heat" to find things.

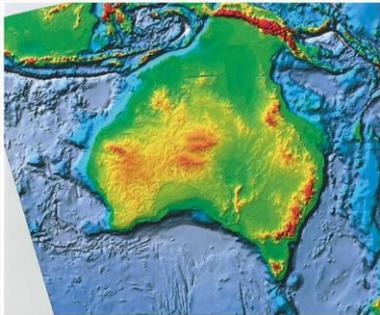


Reddest areas are most recent cuts

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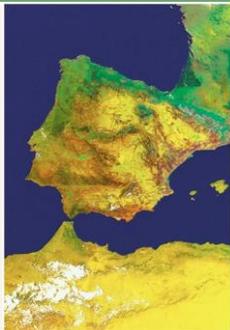
Sonar & Radar Sensing

Microwave technology was developed by the military; by mistake actually.



Multispectral Remote Sensing

□ Landsat Image



Geographic Information System

- Using computers to map and analyze data.

