GEOGRAPHY 38/42:376
GIS II

TOPIC 8:
ISARITHMIC MAPPING

CHAPTER 9: DENT

WHAT IS AN ISARITHMIC MAP?

- Portrays continuous surfaces using isolines
  - quantitative line features
  - represent constant value

- Located with reference to control points

- Surfaces may be:
  - real (e.g. a topographic, or barometric surface)
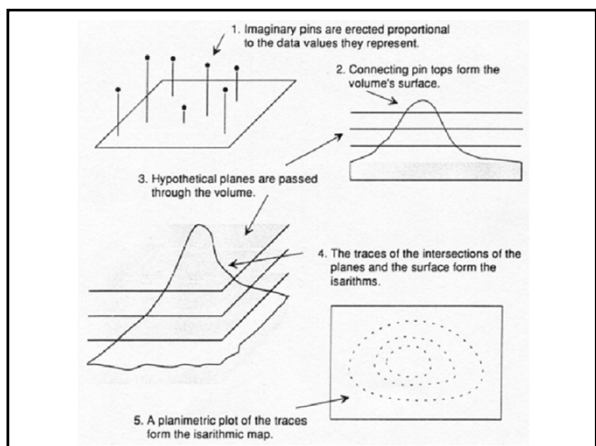 - or conceptual (e.g. population or tortoise density)

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1. Imaginary pins are erected proportional to the data values they represent.

2. Connecting pin tops form the volume's surface.

3. Hypothetical planes are passed through the volume.

4. The traces of the intersections of the planes and the surface form the isarithms.

5. A planimetric plot of the traces form the isarithmic map.
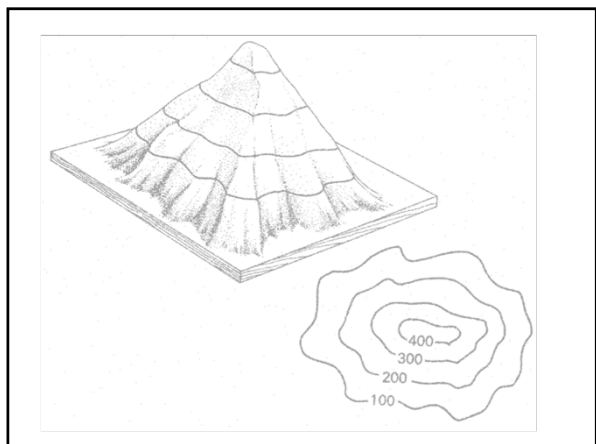
INTERPRETING AN ISARITHMIC MAP?

• Isolines depict:
  •
  •
  •
  •

• Interpreted by observing:
  •
  •
  •

25 Foot Contour Interval
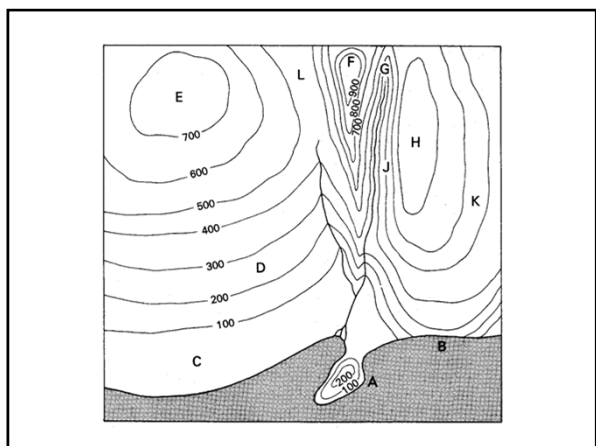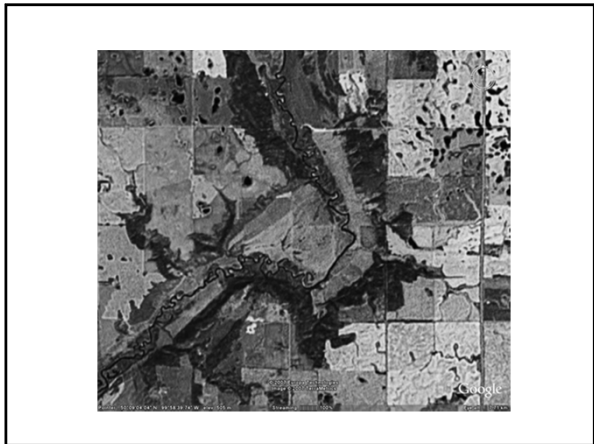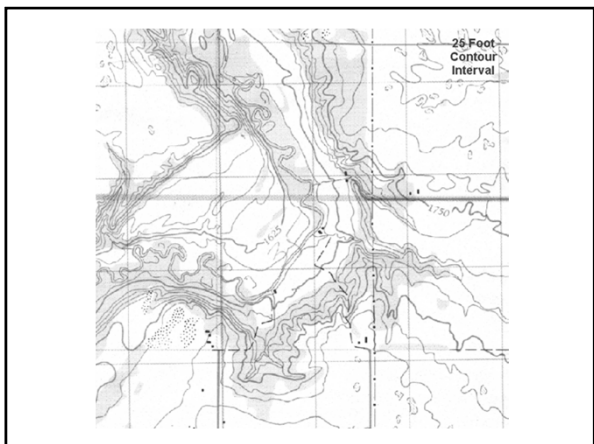
WHEN IS IT USED?

- Only choice for mapping continuously distributed data <u>as a surface</u>
  -
  -
- Several alternatives to isoplethic form:
  -
  -
  -

ADVANTAGES

- Total form of distribution portrayed

- Method is commensurable and graphic

- Adaptable to different levels of generalization and degrees of precision

SPATIAL DATA CHARACTERISTICS

- Two types of isarithmic maps based on spatial data characteristics
  - Isometric
  - Isoplethic

ASAPTIAL DATA CHARACTERISTICS

- For Isometric type:
  - Raw or derived values may be used:
    - Raw values measured/sampled by instruments at discrete pt. locations
    - Derived values include means, ratios, or proportions <u>based on sampled data</u>

ASAPTIAL DATA CHARACTERISTICS

- For Isoplethic form:
  - Derived values used; never raw
    - Account for differences in:
    - _____
    - or _____
    - of areal units

REQUIREMENTS?

- Feature to be mapped is continuous in nature
- <u>Or</u> can be visualized as a surface

- Isometric requires:
  - sufficient number/distribution of control points

- Isoplethic requires:
  - size, shape, of AUs is reasonably consistent so that there are not significant variations in the density or distribution of control points
  - but what if there is?

CONSIDERATIONS: LOCATION OF CONTROL POINTS

- Isometric:
  - Location of control points are precise
  - Distribution and density are sufficient
- Isoplethic
  - IF areal units are regularly shaped
  - AND phenomenon is evenly distributed
  - Geographic center is acceptable control point

  - IF areal units are irregularly shaped
  - OR phenomenon are clustered/skewed
  - Centre of actual distribution should be chosen

ISOPLETHIC CONSIDERATIONS: SIZE & NUMBER OF AREAL UNITS

- Accuracy and hierarchical level of units
  - as size of AUs increases
  - and number decreases
  - accuracy of isolines and surface decreases

  - as size of AUs decreases
  - and number increases
  - accuracy of isolines and surface increases
  - but interval may have to be increased

CONSIDERATIONS: DATUM AND INTERVAL

- Once location of control pts have been established must select:

  1. Datum
     - Real or arbitrary zero value
     - Exogenous data value
     - Minimum value of data set
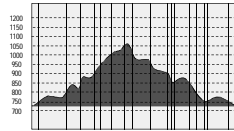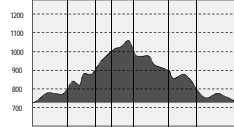
  2. Interval
     - Change in value between consecutive lines

CONSIDERATIONS: DATUM AND INTERVAL

- Why are intervals used?

- Affects number of isolines
  - significantly affects appearance

- How are intervals selected

- Interval are always constant

MAP DESIGN – LINE STYLE

- Should appear as figure within map area

- Graduated colours can be used for lines

- Shading between isolines can be used

MAP DESIGN - LABELING

- Isolines should be labeled to indicate value by:

  - interrupting the isoline

  - placing labels at the end of isolines

  - not every isoline needs to be labeled

LEGEND DESIGN

- Legend should indicate:

  - data type/theme

  - units of isolines

  - and interval between isolines

  - often presented as a statement

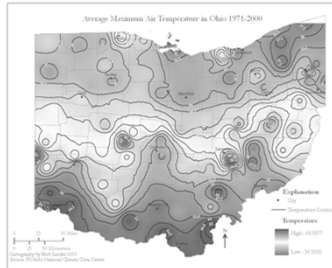## CONSIDERATION: MAP PROJECTION

- What geometric property should be preserved?

Average Maximum Air Temperature in Ohio 1971-2000