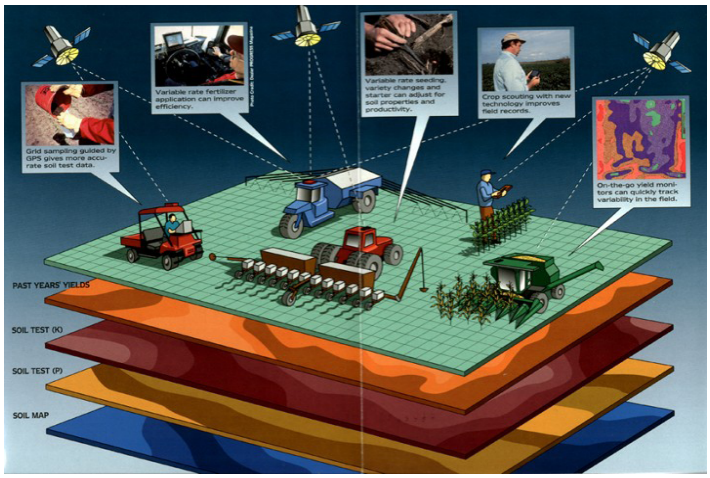
Spatial Data

Three types of data:

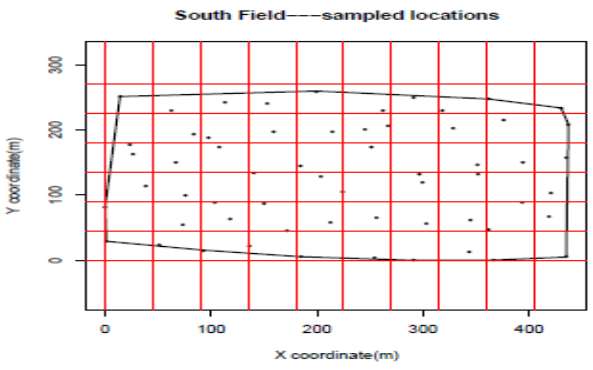
- Geostatistical: measurements at points
- Areal: measurements in areas
- Point process: locations of events, perhaps with add'n information

Some examples, in pictures

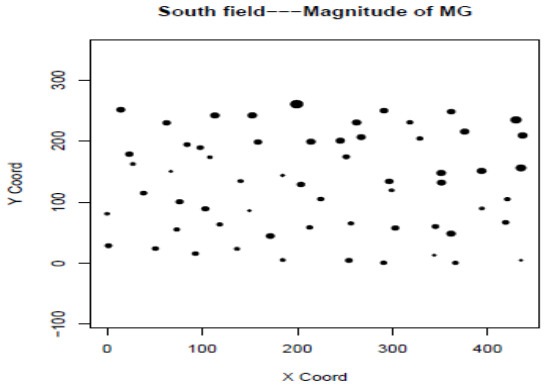
Geostatistical data: precision Ag



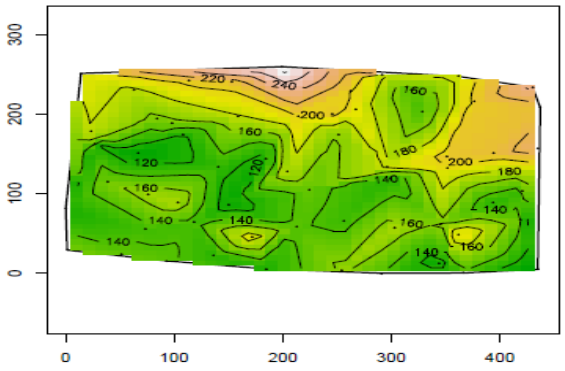
Geostatistical data: precision Ag



Geostatistical data: precision Ag

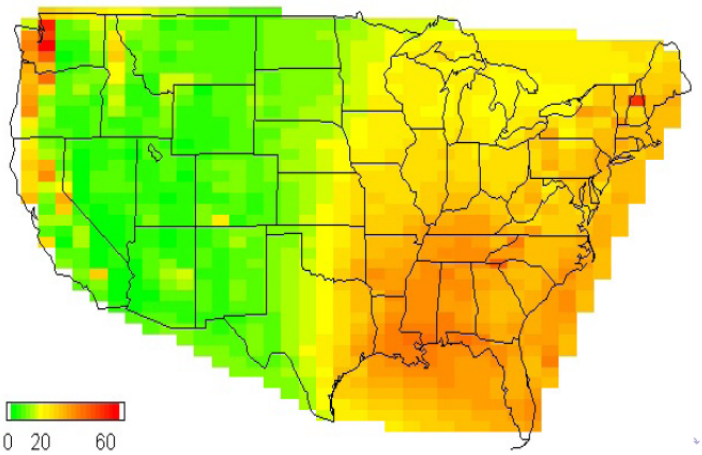


Geostatistical data: precision Ag

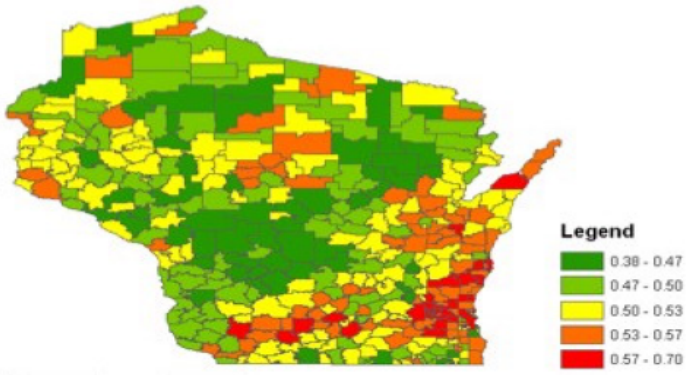


Geostatistical data: precipitation

Geostatistical data: precipitation

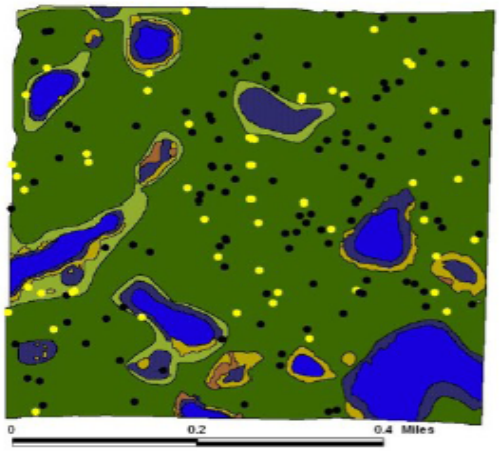


Areal data: Wisconsin math proficiency



7th graders, 2003 data, reported by county

Point pattern: Duck nests



Point pattern: Papaya phytoplasmas

This course

For each type of data, we will consider:

- How to visualize the data
- How to evaluate whether there is any spatial pattern
- How to describe that spatial pattern
- How to predict values at new locations
  which means we can draw a map
- How to make inferences (e.g. about trt diff.), accounting for spatially correlated obs.
- How to simulate spatial data

This course

Emphasis on application:

- what could you do (i.e., what methods are available)
- how to choose an appropriate analysis
- doing the analysis
- interpreting the results

Theory (concepts, some equations) where informative
If you want the mathematical details, consider Stat 506

This course

Computing is crucial: how to get the computer to do an analysis
Will use R and associated spatial libraries

- Standalone ability to manipulate spatial data
- Strong links to GIS databases, e.g., ArcGIS, GRASS
- Implements huge number of statistical methods
- Easily extensible

Considerable amount of class time on computing