

# **Practical Spatial Statistics & Econometrics with R**

## **Session 3: Working with Spatial Data**

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# How to excel at spatial stats (or anything else)?

## Understanding

Clear conceptual understanding

Listening, Reading, Thinking, Writing

## Skill

Apply understanding to real world problems.

Doing, Trying, Failing, Coding

~~Watching to a lot of lectures (like this one)~~

~~Reading many programming books~~

# What should we know/will we learn in this session?

## Understanding

What we should know:

- Spatial location, 2D XY plane, coordinates
- Types of spatial data (different from R data types)
  - Geostatistical, lattice, point pattern

## Skill

What we should have already done:

- Installed the `gstat`, `sp` packages
- Loaded the `meuse` data set

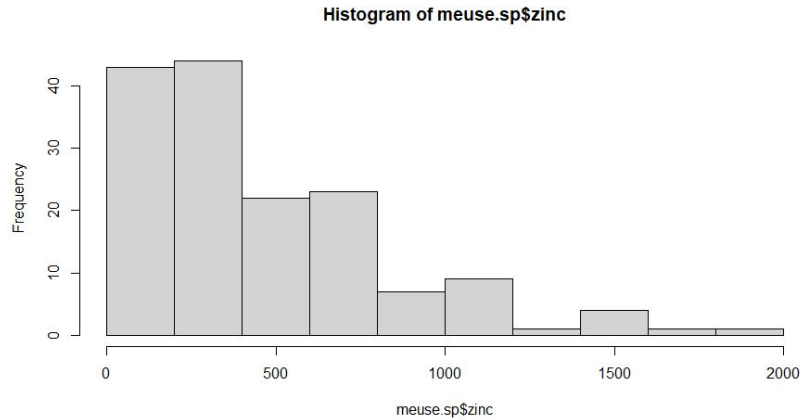
**What we will do now:**

- **Convert tabular data to spatial data**
- **See the difference between tabular and spatial data**
- **Plot spatial data**

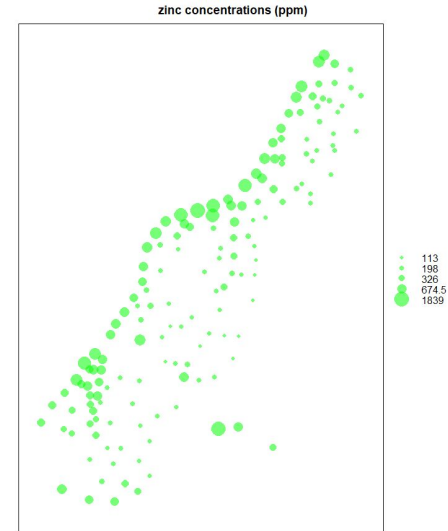
## **Demo 3: Live Coding Session with R**

# Frequency Vs Spatial Distribution

```
hist(meuse.sp$zinc)
```



```
bubble(meuse.sp, "zinc",  
col=c("#00ff0088", "#00ff0088"),  
main = "zinc concentrations (ppm)")
```



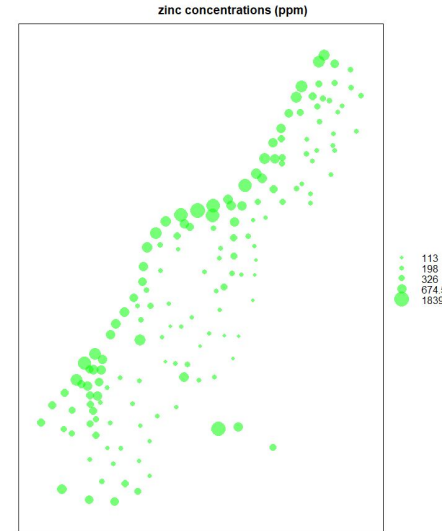
# Exercise

What type of spatial data is in the `meuse.sp` spatial dataframe?

- a) Lattice Data
- b) Geostatistical Data
- c) Point Pattern Data

**Reason:** Zinc concentration has a value at every point in the river bed which is a spatial domain that is a continuous region. The type of spatial data depends on the nature of the spatial domain over which the data is defined and NOT the R data type that is used to store the data.

```
bubble(meuse.sp, "zinc",  
col=c("#00ff0088", "#00ff0088"),  
main = "zinc concentrations (ppm)")
```



# Summary

- **Converted ordinary dataframe to spatial dataframe in R**
- **Compared ordinary and spatial data frames**
- **Plotted spatial distribution of zinc concentrations**
- **Compared frequency distribution (histogram) with spatial distribution**
- **R functions, types**
  - `coordinates, bubble, SpatialPointsDataFrame`
- **R Operators**
  - `~ (formula operator)`