

Meuse Exercise

This exercise is taken from Noam Ross’ GAM course (<https://noamross.github.io/gams-in-r-course/>)

Setup

```
require(mgcv)

## Loading required package: mgcv

## Loading required package: nlme

## This is mgcv 1.8-28. For overview type 'help("mgcv-package")'.
```

Data

```
data(meuse, package = 'sp')
head(meuse)

##           x           y cadmium copper lead zinc  elev      dist    om ffreq soil
## 1 181072 333611    11.7      85  299 1022 7.909 0.00135803 13.6      1    1
## 2 181025 333558     8.6      81  277 1141 6.983 0.01222430 14.0      1    1
## 3 181165 333537     6.5      68  199  640 7.800 0.10302900 13.0      1    1
## 4 181298 333484     2.6      81  116  257 7.655 0.19009400  8.0      1    2
## 5 181307 333330     2.8      48  117  269 7.480 0.27709000  8.7      1    2
## 6 181390 333260     3.0      61  137  281 7.791 0.36406700  7.8      1    2
##   lime landuse dist.m
## 1    1      Ah     50
## 2    1      Ah     30
## 3    1      Ah    150
## 4    0      Ga    270
## 5    0      Ah    380
## 6    0      Ga    470
```

Task

Model Spatial interaction

- Model cadmium in response to the coordinates
- Try gaussian and Gamma family distributions
- Include the coordinates in an interaction term
- Which smooth term to use?

Model spatial interaction and additional covariates

- Add dist and elev to model
- Does it improve the quality of the model?

Visualize the better fit model

Variables

x,y -> coordinates
cadmium, copper, lead, zinc -> responses
elev -> elevation
dist -> distance from meuse river
dist.m -> distance in meter
om -> organic matter
soil -> soil type
lime -> lime factor