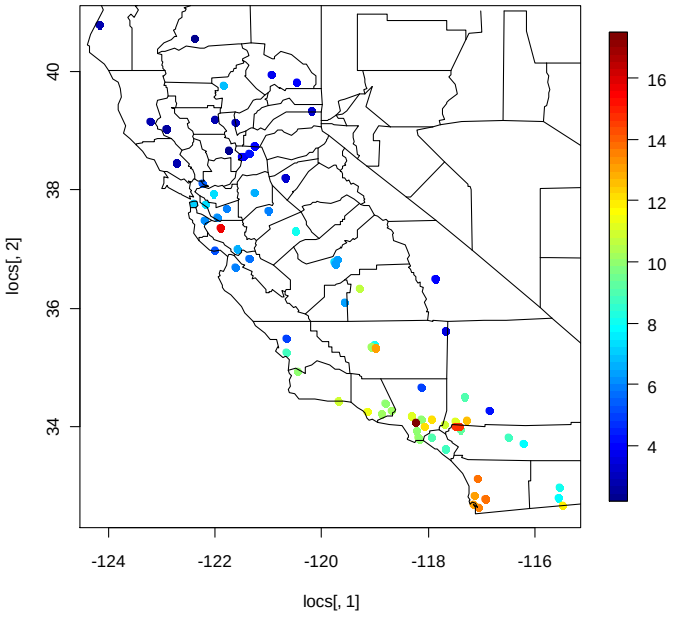
Ordinary Kriging in R

```
library(geoR);library(fields);library(maps)

#You will need to change the directory to load these files:
source("...\\plot.field.points.R")
load("...\\PM25.RData")

#Combine the spatial coordinates in a 84x2 matrix
s<-cbind(long,lat)

#Plot the data
plot.field.points(s,PM,map.border="county",cex=1.5)
X11()

#Estimate parameters by maximum likelihood:
ml <- likfit(data=PM,coords=s,
        fix.nugget=F,cov.model="exponential",
        ini = c(30, 5),nugget=5)
summary(ml)

#Create grid of prediction points:
sp1<-seq(min(s[,1]),max(s[,1]),length=100)
sp2<-seq(min(s[,2]),max(s[,2]),length=100)
sp<-expand.grid(sp1,sp2)
inCA<-map.where("state",x=sp[,1],y=sp[,2])
inCA[is.na(inCA)]<-"NA"
inCA<-inCA=="california"

#Perform ordinary Kriging (value of cov.pars and nugget are copied from mle output):
pred<-krige.conv(data=PM,coords=s,locations=sp,
          krige=krige.control(cov.model="exponential",
                    cov.pars=c(14.73,6.144),
                    nugget=4.299))
pred$predict[!inCA]<-NA
pred$krige.var[!inCA]<-NA

#Plot the predicted values:
image.plot(sp1,sp2,matrix(pred$predict,100,100),zlim=range(PM))
map("county",add=T)

#Plot the standard errors:
image.plot(sp1,sp2,matrix(sqrt(pred$krige.var),100,100),zlim=c(2,3.5))
map("county",add=T)
points(s)
```

Output

Raw data:

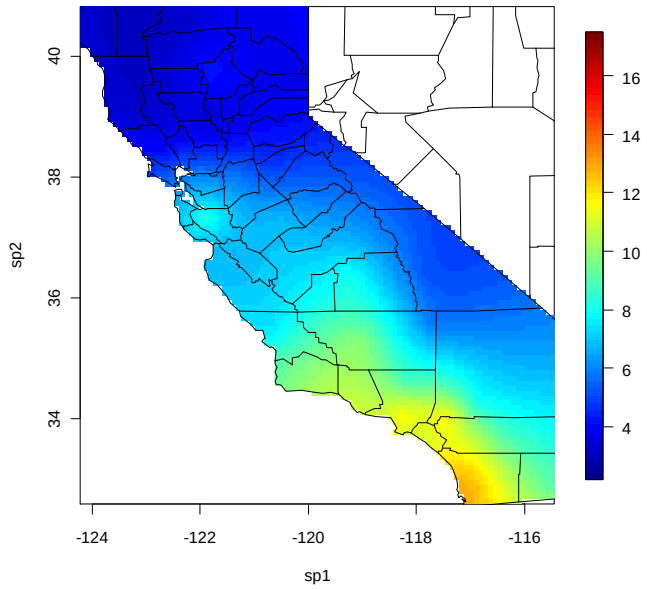


> summary(ml)
Parameters of the mean component (trend):
beta
6.6346

Parameters of the spatial component:
correlation function: exponential
(estimated) partial sill = 14.73
(estimated) range parameter = 6.144

Parameter of the error component:
(estimated) nugget = 4.299

Predicted values



Standard deviations