DATAGURU 炼数成金

数据分析、展现与R语言 第12周

2013.04.20

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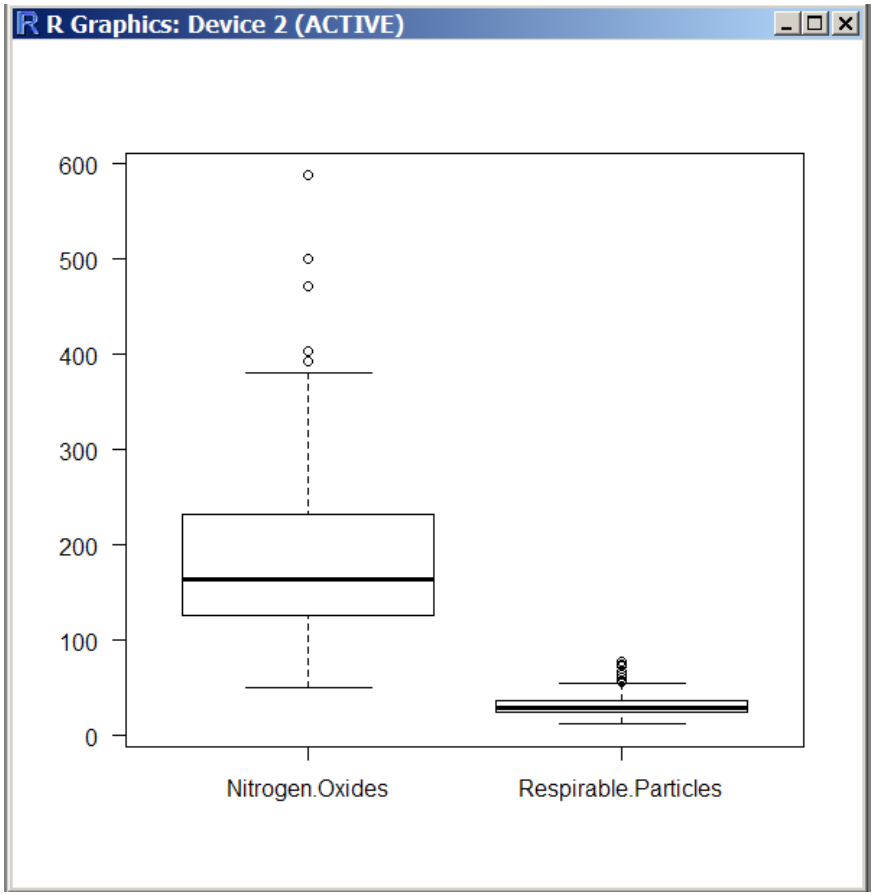
http://edu.dataguru.cn

箱型图

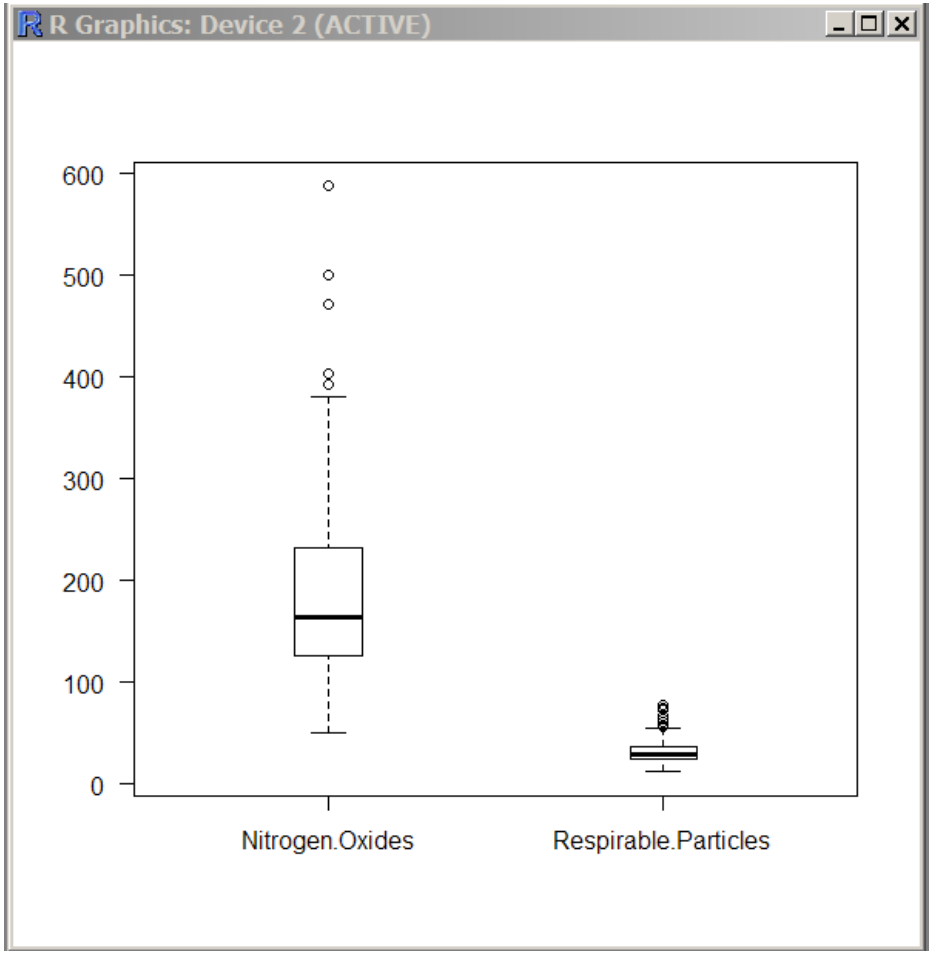
使用第七周数据

```
air<-read.csv("airpollution.csv")
boxplot(air,las=1)
```



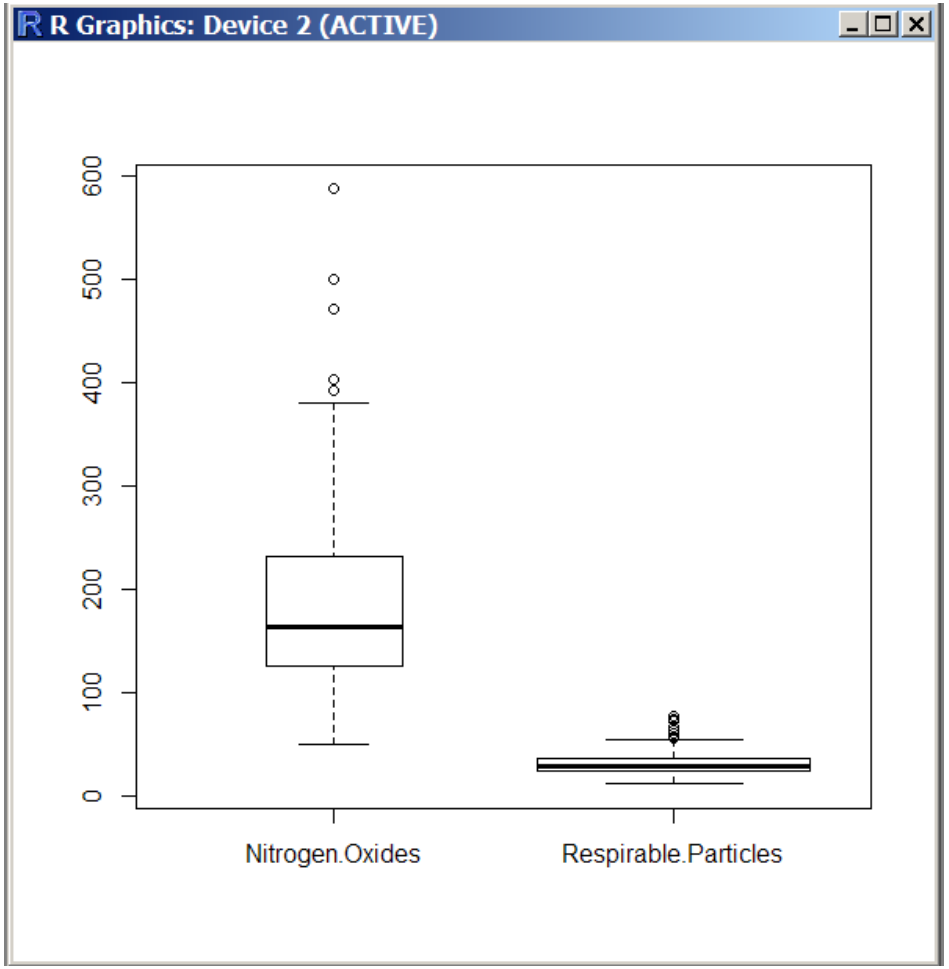
收窄箱体宽度

boxplot(air,boxwex=0.2,las=1)



指定箱体的宽度

boxplot(air,width=c(1,2))



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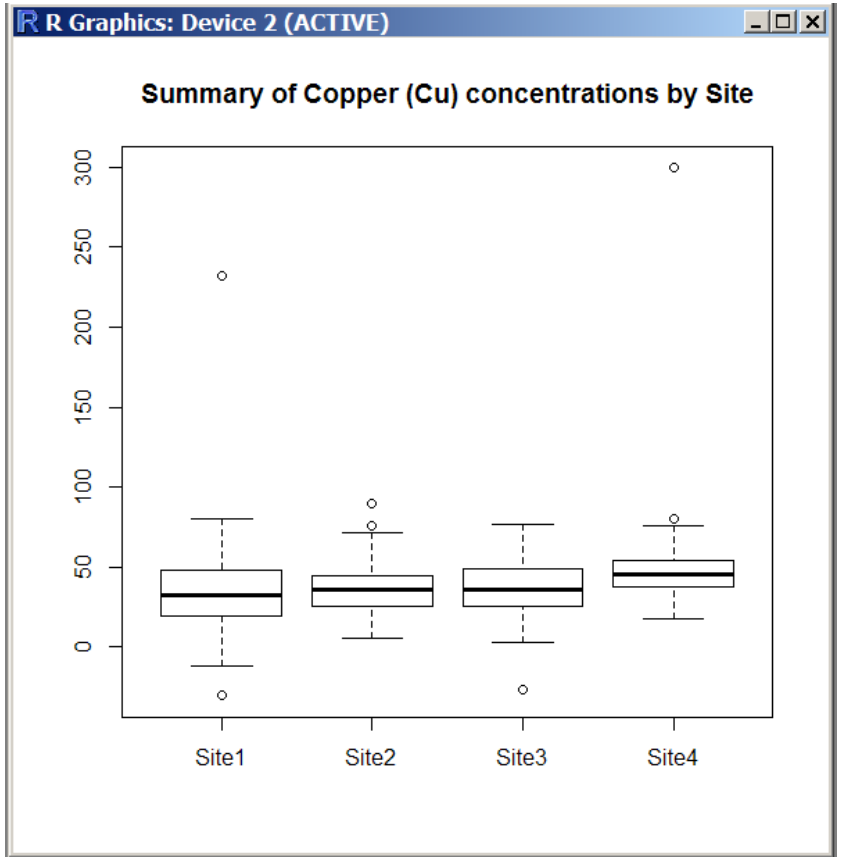
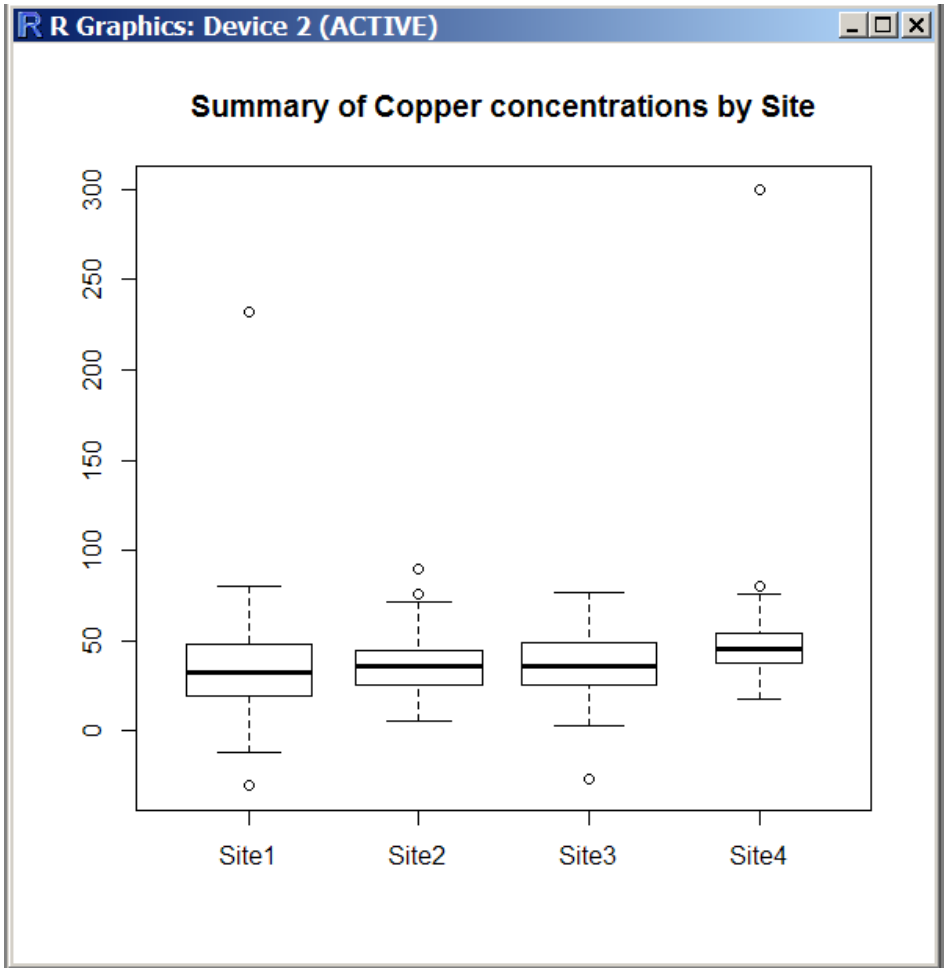
分组

```
metals<-read.csv("metals.csv")
boxplot(Cu~Source,data=metals,
main="Summary of Copper (Cu) concentrations by
      Site")
boxplot(Cu~Source*Expt,data=metals,
main="Summary of Copper (Cu) concentrations by
      Site")
```



观测值数量决定箱体宽度

```
boxplot(Cu ~ Source, data =
    metals,varwidth=TRUE,
main="Summary of Copper
    concentrations by Site")
```



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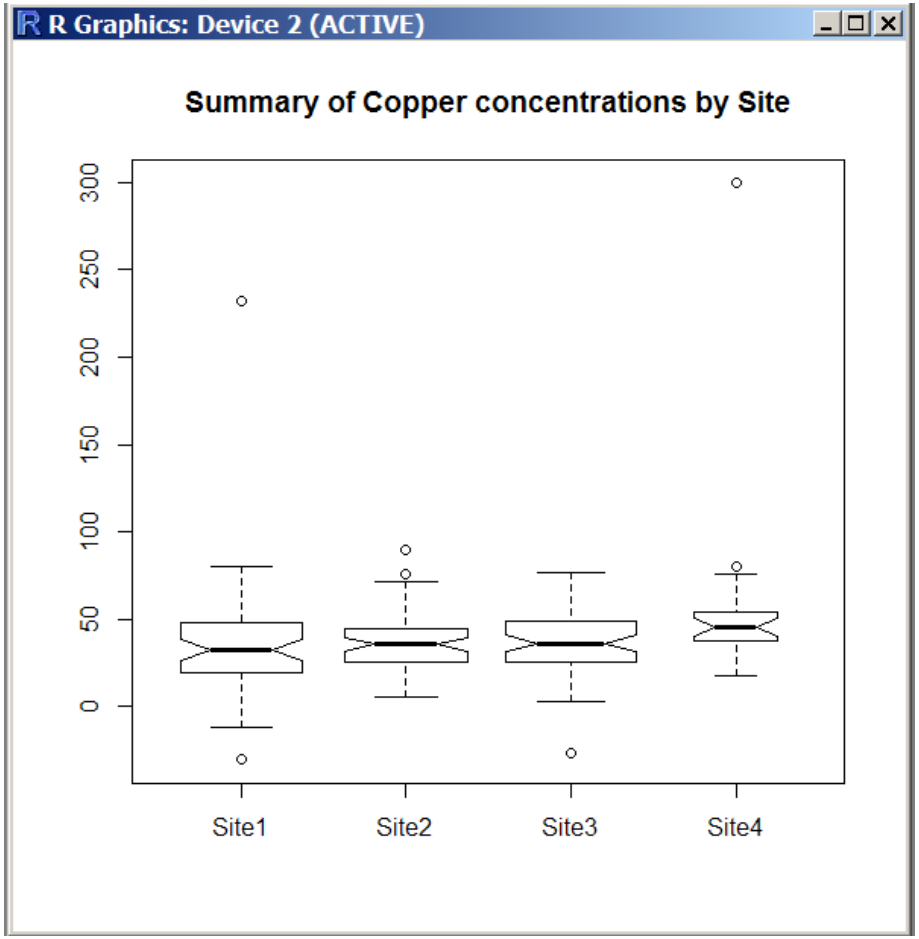
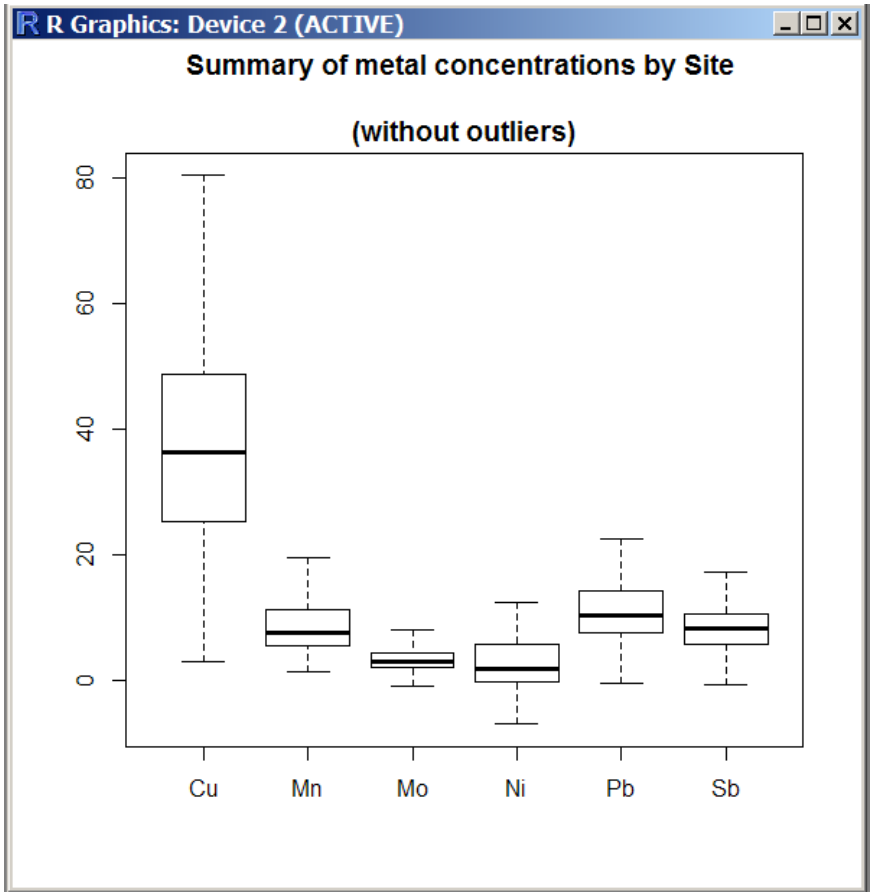
带notch的箱型图

```
boxplot(Cu ~ Source, data = metals,
varwidth=TRUE,notch=TRUE,
main="Summary of Copper
    concentrations by Site")
```



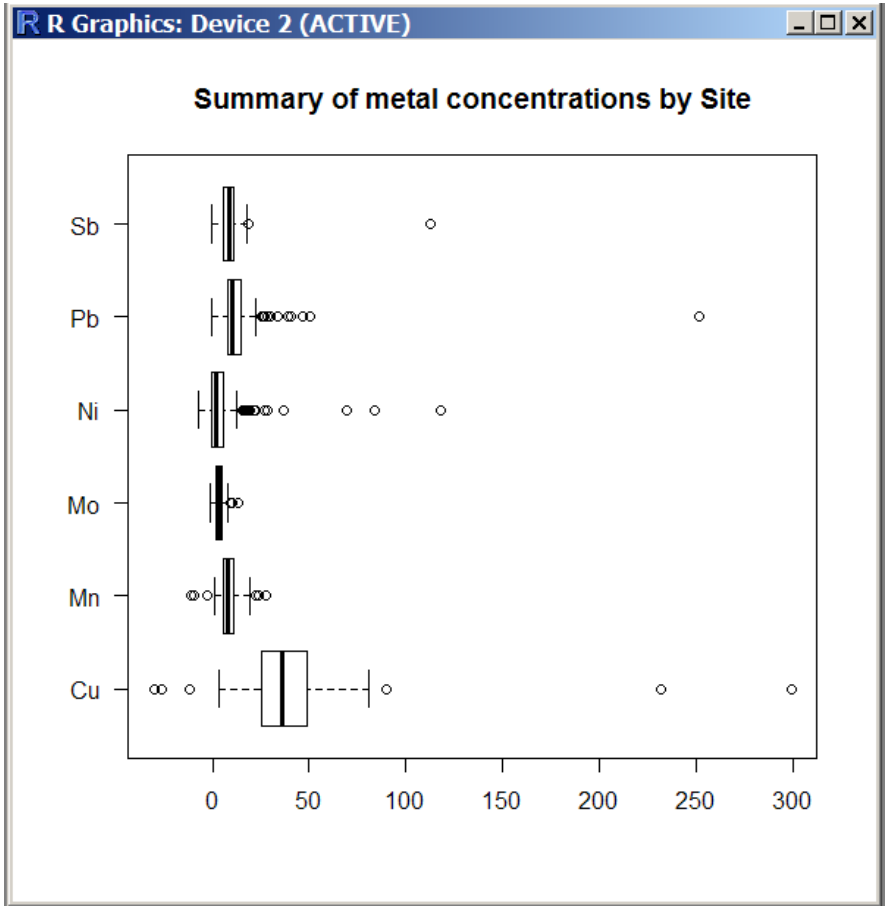
排除离群值

```
boxplot(metals[,-1],outline=FALSE,
main="Summary of metal
    concentrations by Site \n
(without outliers)")
```



水平放置

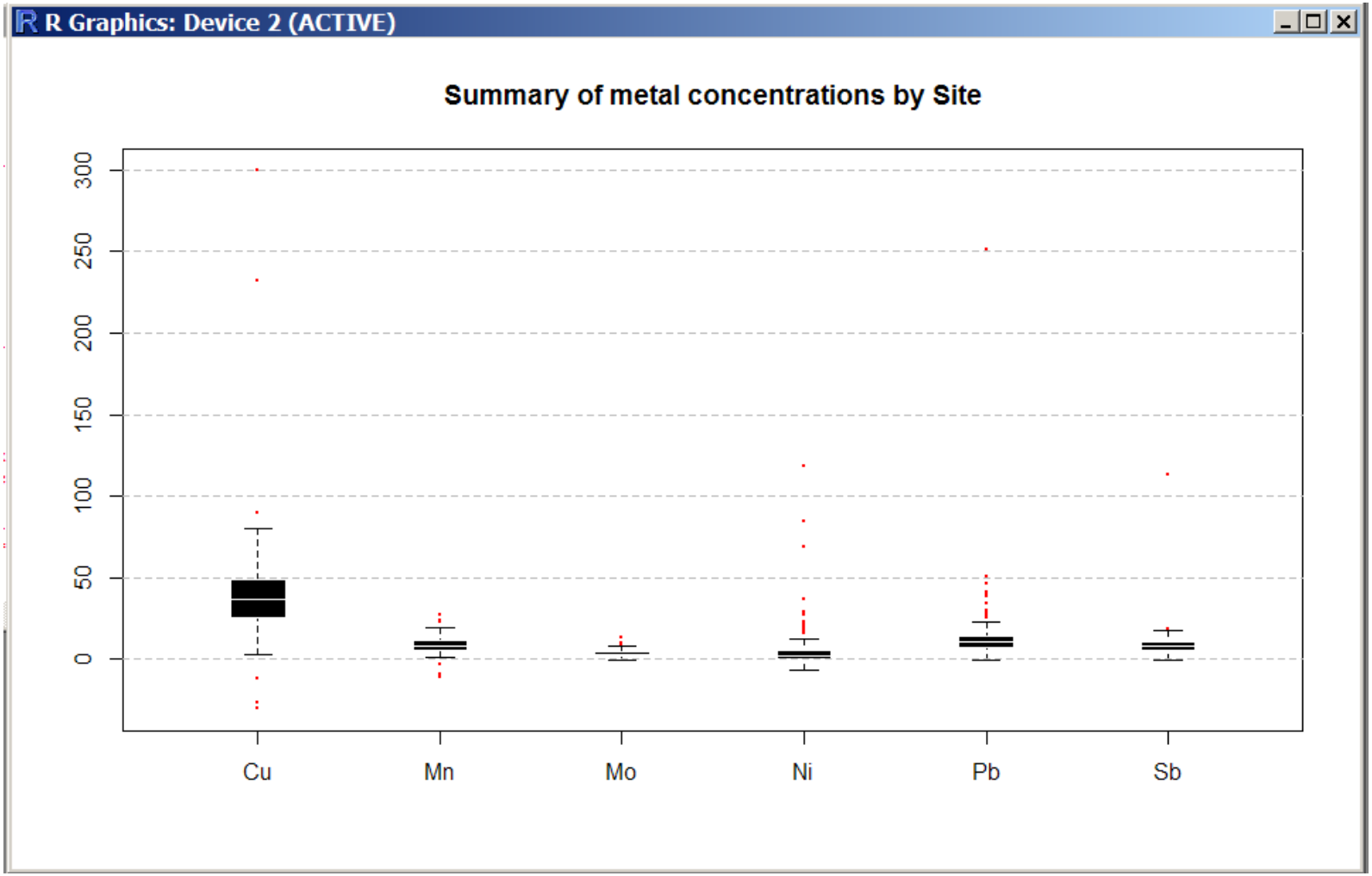
```
boxplot(metals[,-1],
horizontal=TRUE,las=1,
main="Summary of metal
      concentrations by Site")
```



改变箱型风格

```
boxplot(metals[,-1],
border = "white",col = "black",boxwex = 0.3,
medlwd=1, whiskcol="black",staplecol="black",
outcol="red",cex=0.3,outpch=19,
main="Summary of metal concentrations by Site")
grid(nx=NA,ny=NULL,col="gray",lty="dashed")
```

改变箱型风格



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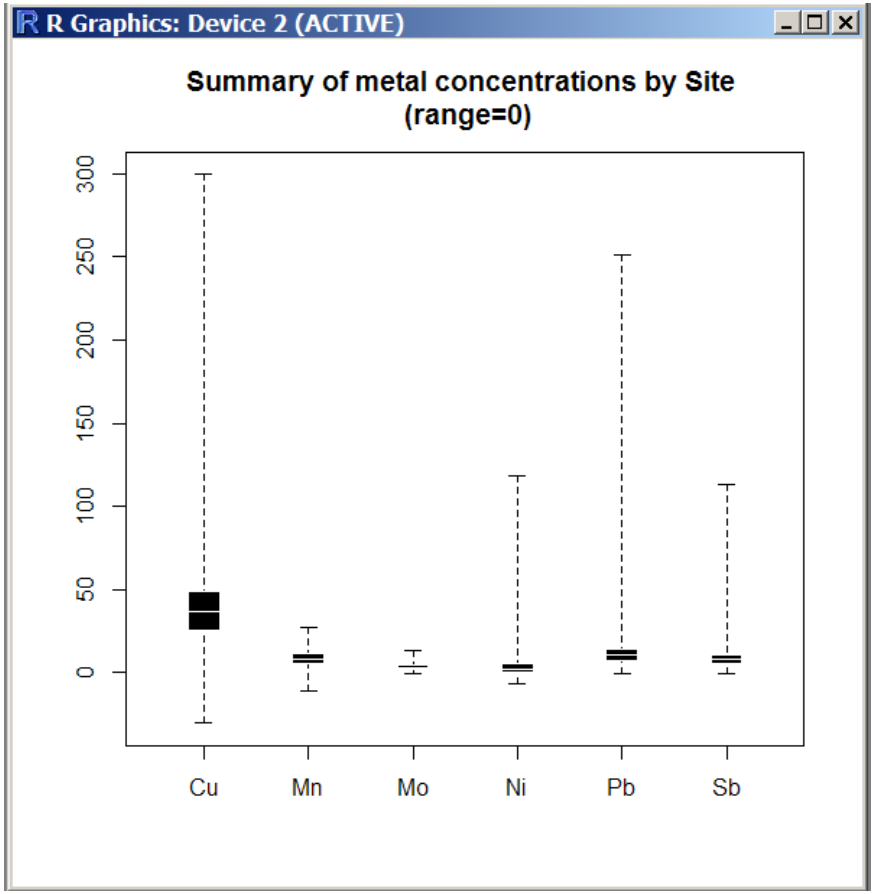
延长须线

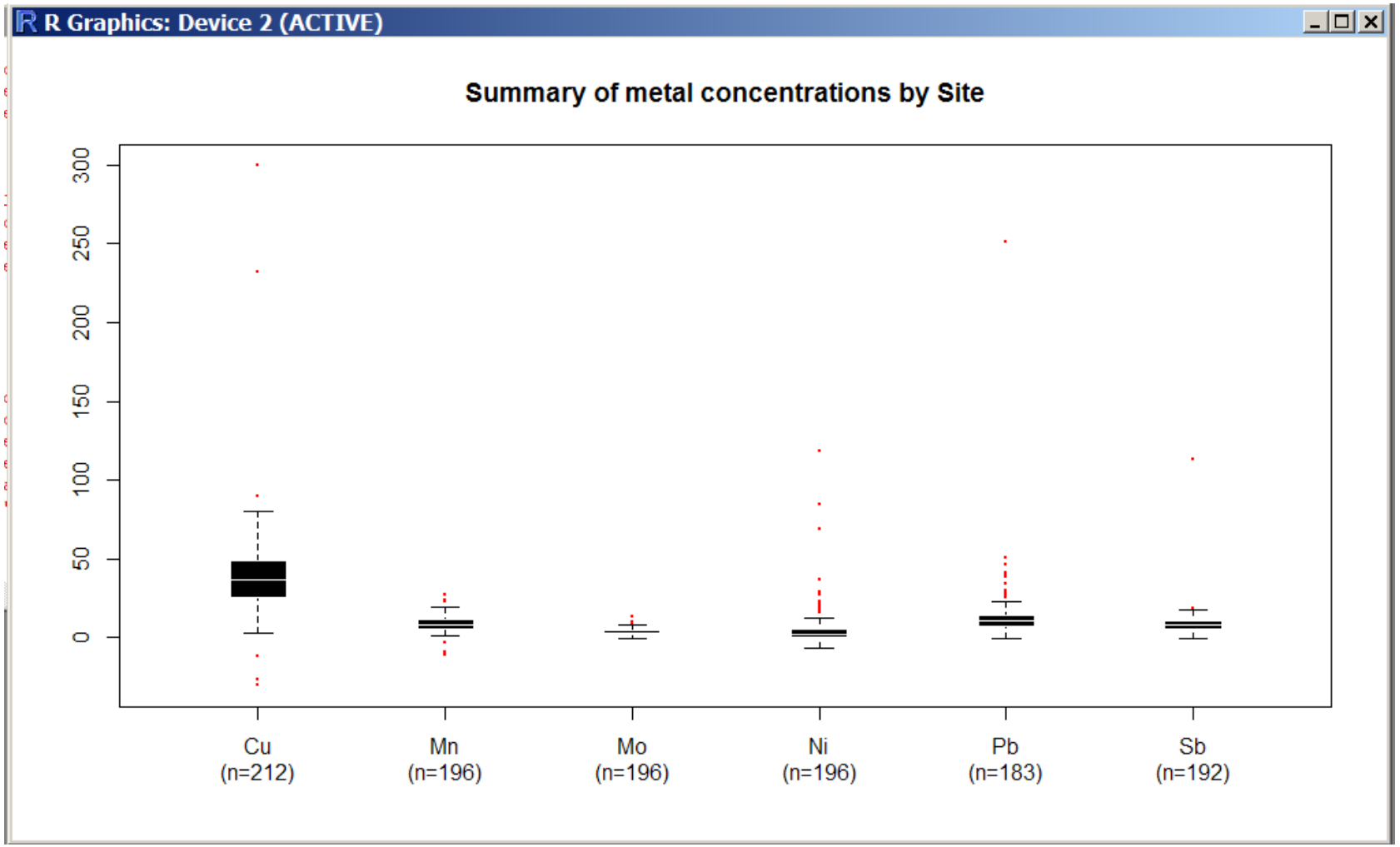
```
boxplot(metals[,-1],
range=0,border = "white",col =
    "black",
boxwex =
    0.3,medlwd=1,whiskcol="black",
staplecol="black",outcol="red",cex=0.
    3,outpch=19,
main="Summary of metal
    concentrations by Site \n
    (range=0)")
```



显示观测数量

```
b<-boxplot(metals[,-1],
xaxt="n",border = "white",col = "black",
boxwex = 0.3,medlwd=1,whiskcol="black",
staplecol="black",outcol="red",cex=0.3,outpch=19,
main="Summary of metal concentrations by Site")
axis(side=1,at=1:length(b$names),
labels=paste(b$names,"\n(n=",b$n,")",sep=""),
mgp=c(3,2,0))
```

显示观测数量



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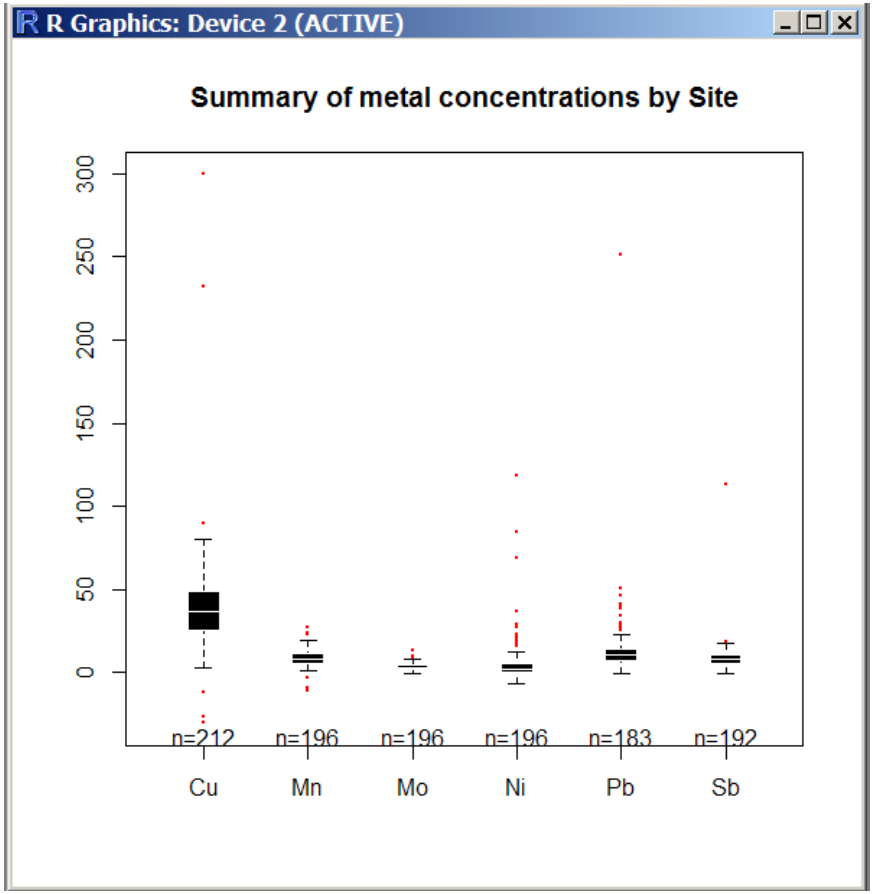
使用gplot包

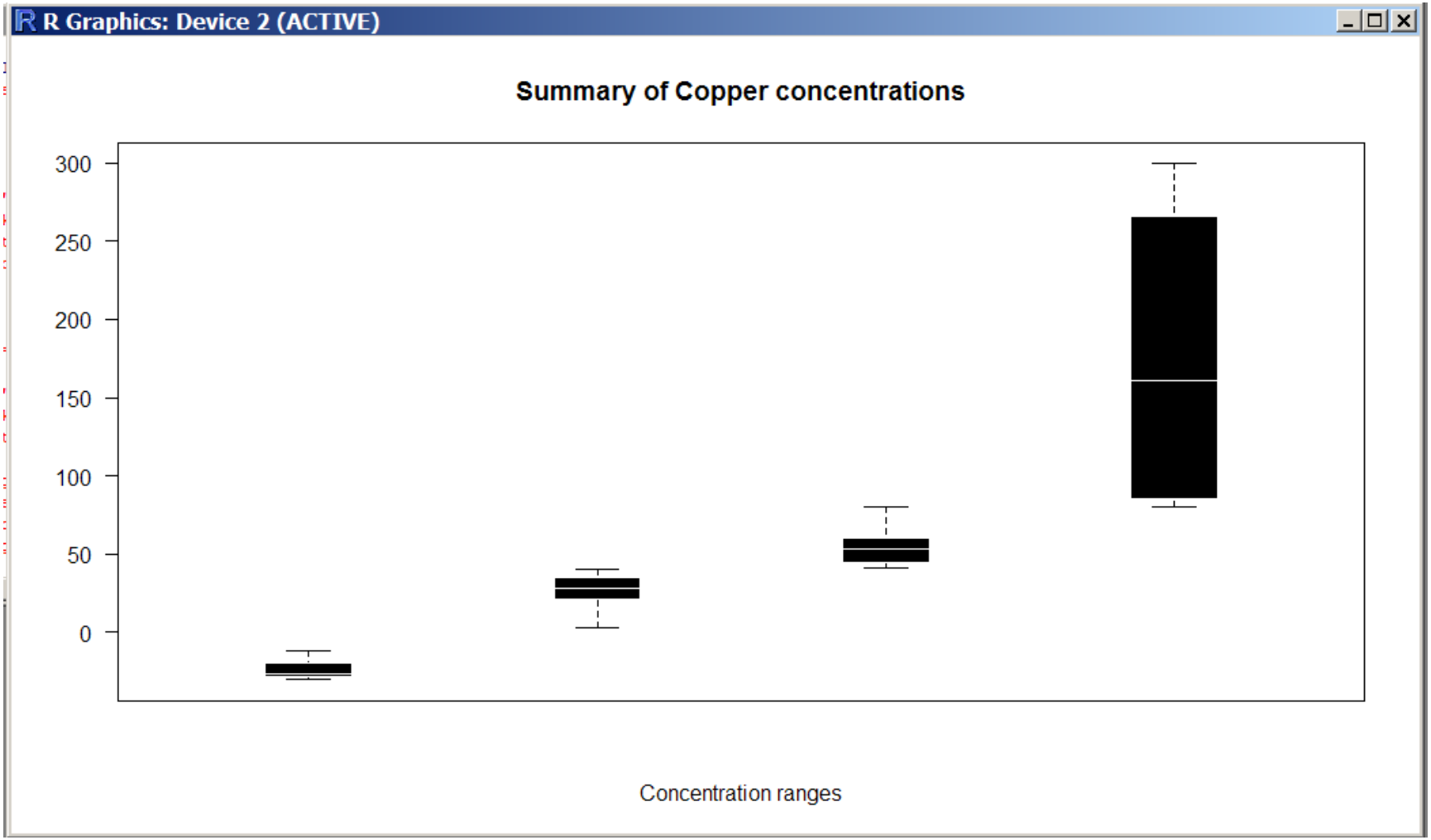
```
install.packages("gplots")
library(gplots)
boxplot.n(metals[,-1],
border = "white",col =
    "black",boxwex = 0.3,
medlwd=1,whiskcol="black",staple
    col="black",
outcol="red",cex=0.3,outpch=19,
main="Summary of metal
    concentrations by Site")
```



分割数据

```
cuts<-c(0,40,80)
Y<-split(x=metals$Cu, f=findInterval(metals$Cu, cuts))
boxplot(Y,xaxt="n",
border = "white",col = "black",boxwex = 0.3,
medlwd=1,whiskcol="black",staplecol="black",
outcol="red",cex=0.3,outpch=19,
main="Summary of Copper concentrations",
xlab="Concentration ranges",las=1)
axis(1,at=1:4,
labels=c("Below 0","0 to 40","40 to 80","Above 80"),
lwd=0,lwd.ticks=1,col="gray")
```

分割数据



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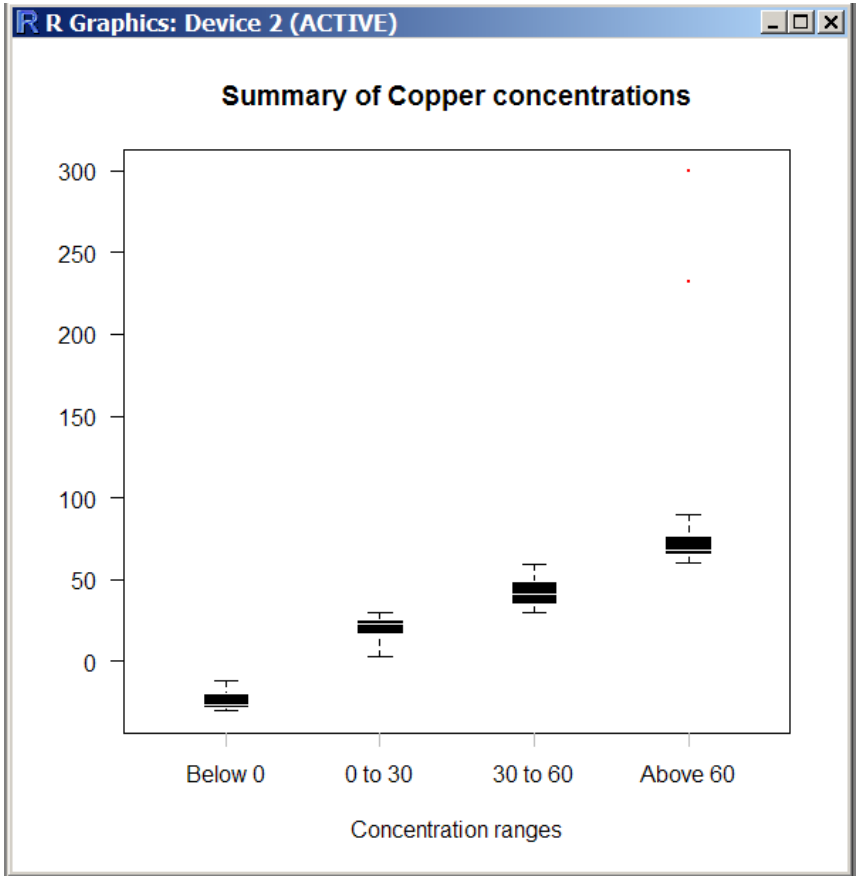
函数化

```
boxplot.cuts<-function(y,cuts,...) {
Y<-split(metals$Cu, f=findInterval(y, cuts))
b<-boxplot(Y,xaxt="n",
border = "white",col = "black",boxwex = 0.3,
medlwd=1,whiskcol="black",staplecol="black",
outcol="red",cex=0.3,outpch=19,
main="Summary of Copper concentrations",
xlab="Concentration ranges",las=1,...)
clabels<-paste("Below",cuts[1])
for(k in 1:(length(cuts)-1)) {
clabels<-c(clabels, paste(as.character(cuts[k]),
"to", as.character(cuts[k+1])))
}
clabels<-c(clabels,
paste("Above",as.character(cuts[length(cuts)])))
axis(1,at=1:length(clabels),
labels=clabels,lwd=0,lwd.ticks=1,col="gray")
}
```

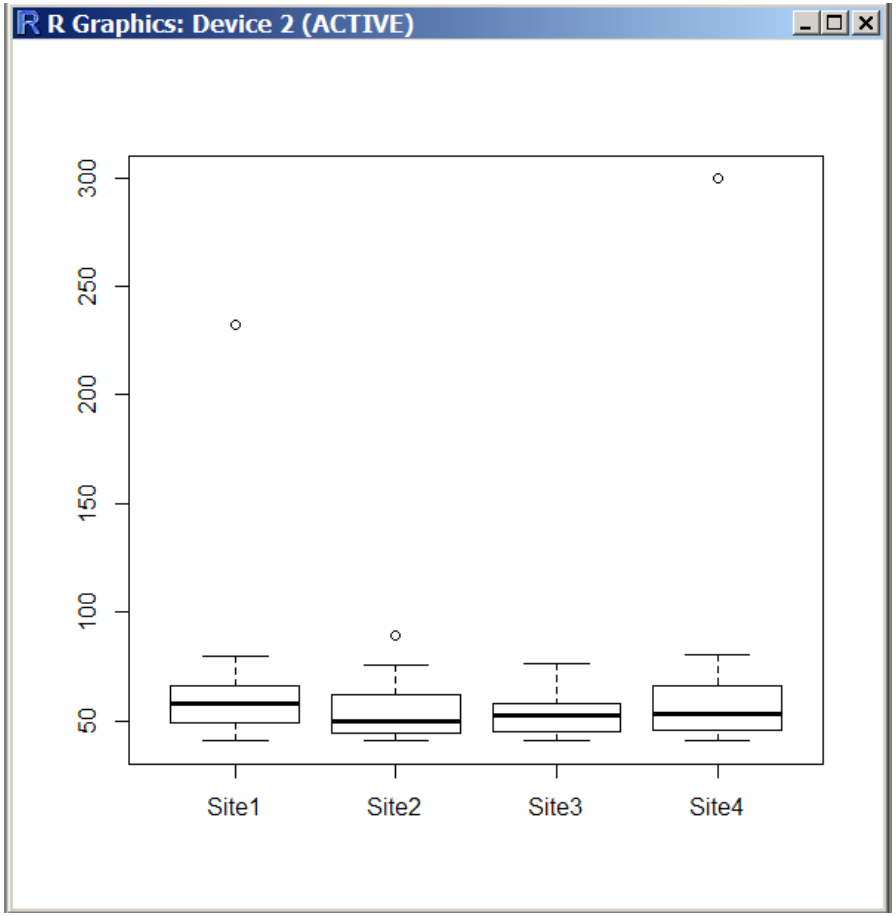
函数化

boxplot.cuts(metals$Cu,c(0,30,60))



子集

boxplot(Cu~Source,data=metals,subset=Cu>40)

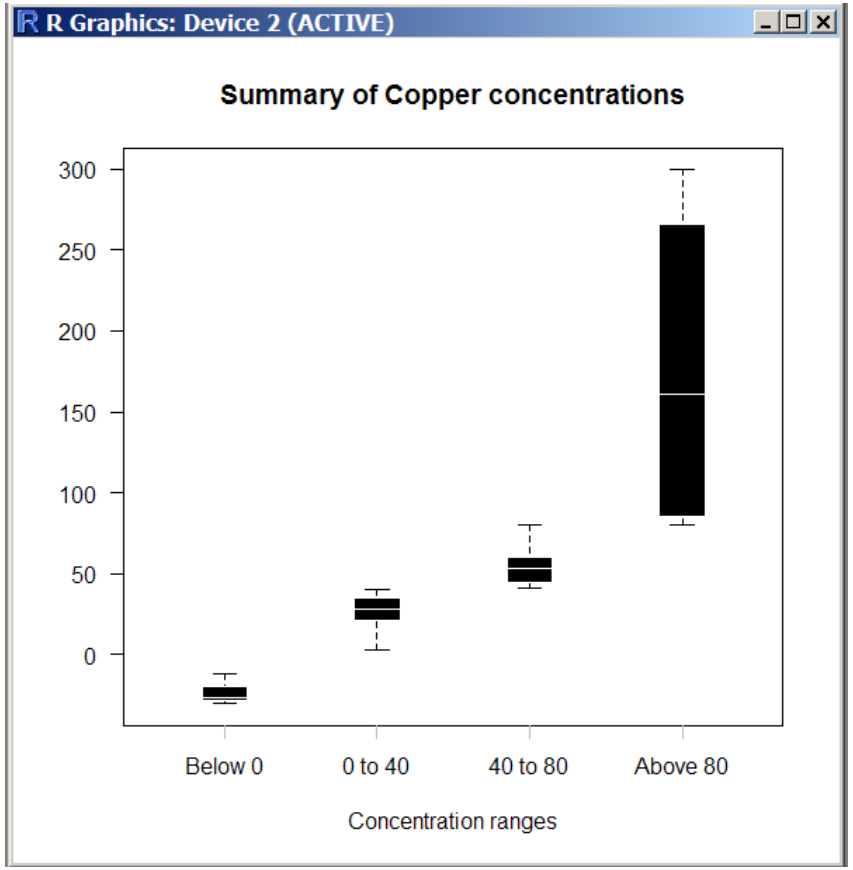


另一个函数

```
boxplot.cuts<-function(y,cuts) {
f=cut(y, c(min(y[!is.na(y)]),cuts,max(y[!is.na(y)])),
ordered_results=TRUE);
Y<-split(y, f=f)
b<-boxplot(Y,xaxt="n",
border = "white",col = "black",boxwex = 0.3,
medlwd=1,whiskcol="black",staplecol="black",
outcol="red",cex=0.3,outpch=19,
main="Summary of Copper concentrations",
xlab="Concentration ranges",las=1)
clabels = as.character(levels(f))
axis(1,at=1:length(clabels),
labels=clabels,lwd=0,lwd.ticks=1,col="gray")
}
```

结果

boxplot.cuts(metals$Cu,c(0,40,80))



热力图

使用第八章数据

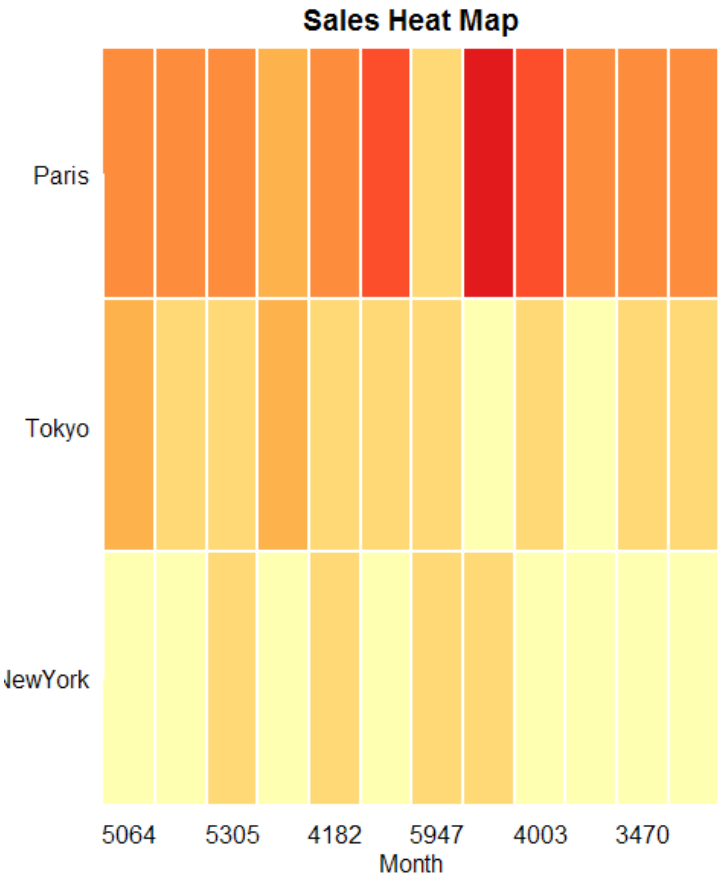
```
sales<-read.csv("sales.csv")


install.packages("RColorBrewer")
library(RColorBrewer)


rownames(sales)<-sales[,1]
sales<-sales[,-1]
data_matrix<-data.mpal=brewer.pal(7,"YlOrRd")
atrix(sales)
breaks<-seq(3000,12000,1500)
```

代码

```
layout(matrix(data=c(1,2), nrow=1, ncol=2), widths=c(8,1),
heights=c(1,1))
#Set margins for the heatmap
par(mar = c(5,10,4,2),oma=c(0.2,0.2,0.2,0.2),mex=0.5)
image(x=1:nrow(data_matrix),y=1:ncol(data_matrix),
z=data_matrix,axes=FALSE,xlab="Month",
ylab="",col=pal[1:(length(breaks)-1)],
breaks=breaks,main="Sales Heat Map")
axis(1,at=1:nrow(data_matrix),labels=rownames(data_matrix),
col="white",las=1)
axis(2,at=1:ncol(data_matrix),labels=colnames(data_matrix),
col="white",las=1)
abline(h=c(1:ncol(data_matrix))+0.5,
v=c(1:nrow(data_matrix))+0.5, col="white",lwd=2,xpd=FALSE)
breaks2<-breaks[-length(breaks)]
```

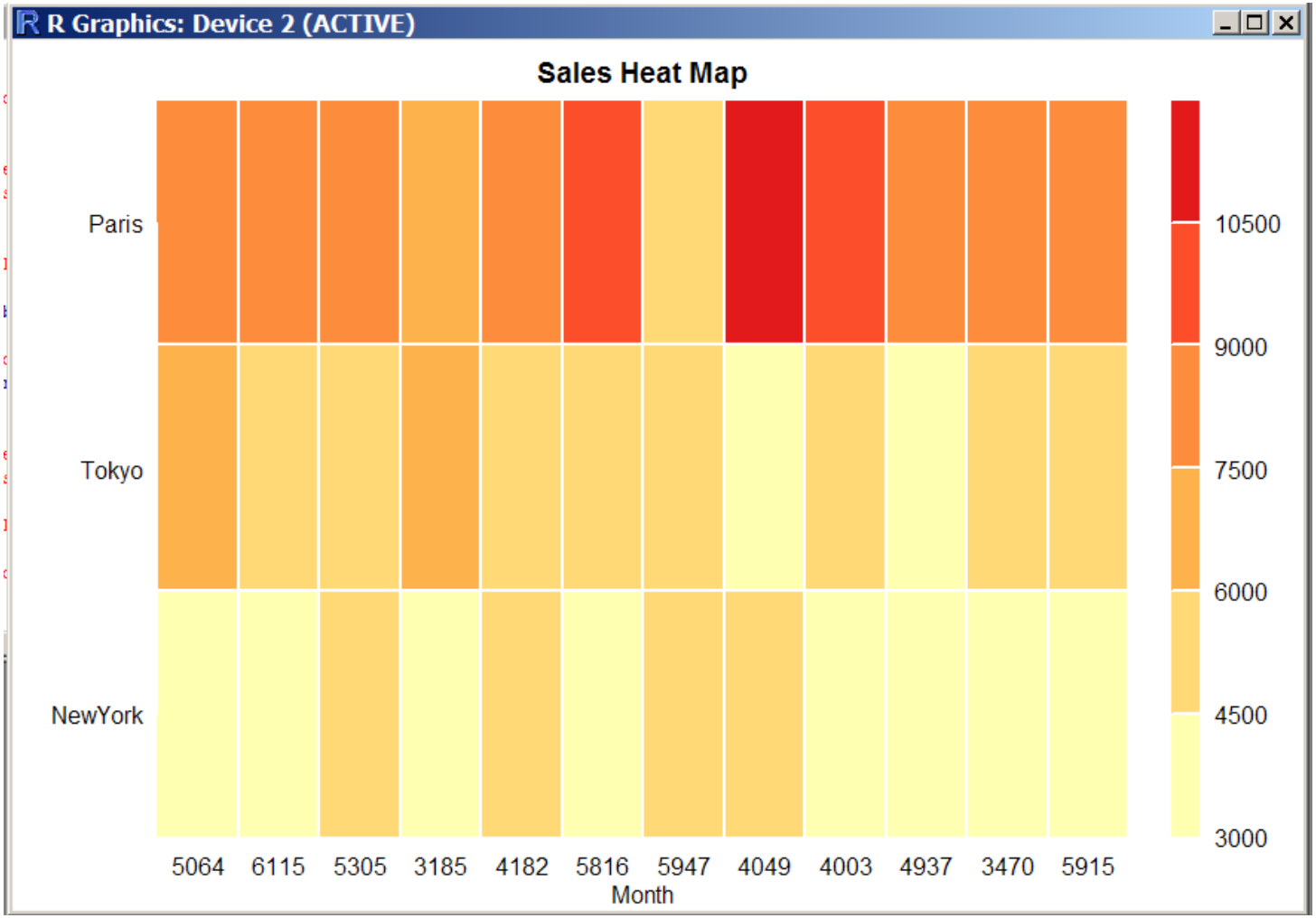


代码

```
par(mar = c(5,1,4,7))


image(x=1, y=0:length(breaks2),z=t(matrix(breaks2))*1.001,
col=pal[1:length(breaks)-1],axes=FALSE,breaks=breaks,
xlab="", ylab="",xaxt="n")
axis(4,at=0:(length(breaks2)-1), labels=breaks2, col="white",
las=1)
abline(h=c(1:length(breaks2)),col="white",lwd=2,xpd=F)
```

结果


R Graphics: Device 2 (ACTIVE)
Sales Heat Map
Paris
Tokyo
NewYork
10500
9000
7500
6000
4500
3000
5064
6115
5305
3185
4182
5816
5947
4049
4003
4937
3470
5915
Month

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相关热力图

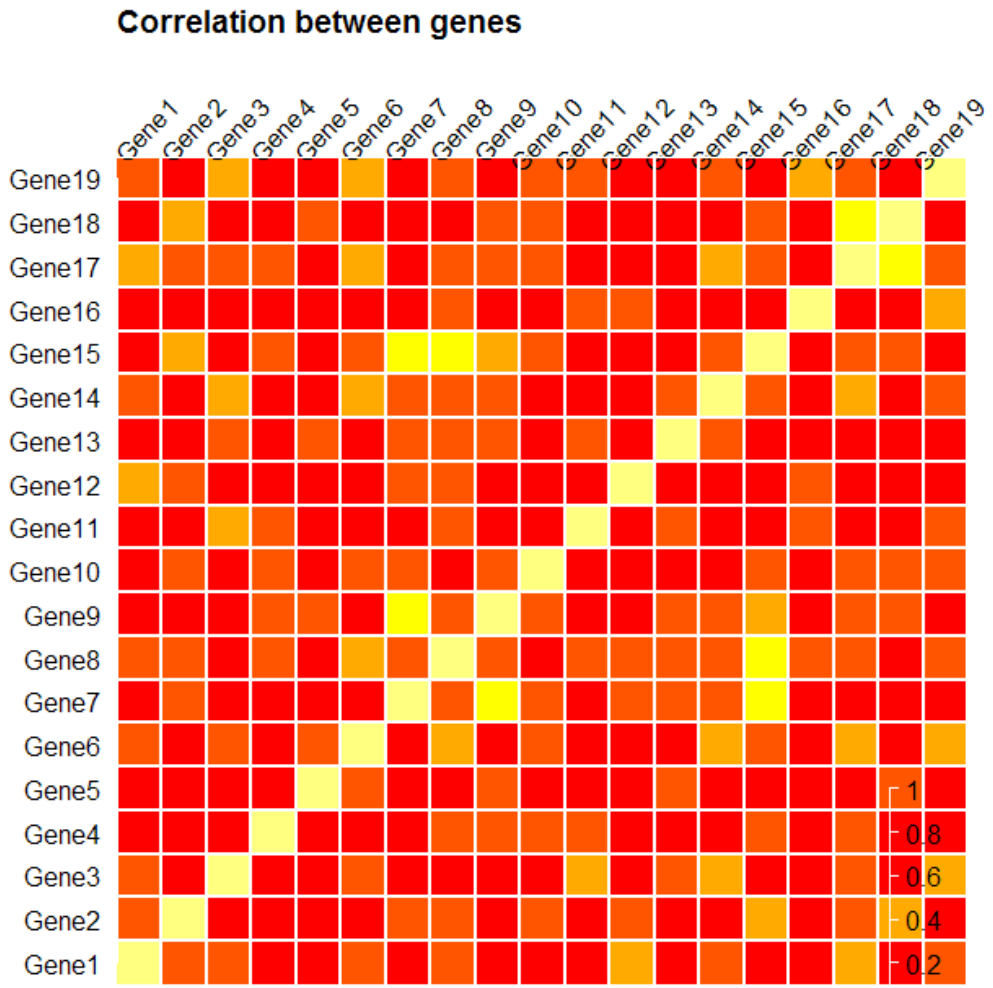
```
genes<-read.csv("genes.csv")


rownames(genes)<-genes[,1]
data_matrix<-data.matrix(genes[,-1])
pal=heat.colors(5)
breaks<-seq(0,1,0.2)
layout(matrix(data=c(1,2), nrow=1, ncol=2), widths=c(8,1),
heights=c(1,1))
par(mar = c(3,7,12,2),oma=c(0.2,0.2,0.2,0.2),mex=0.5)
image(x=1:nrow(data_matrix),y=1:ncol(data_matrix),
z=data_matrix,xlab="",ylab="",breaks=breaks,
col=pal,axes=FALSE)
```

相关热力图

```
text(x=1:nrow(data_matrix)+0.75, y=par("usr")[4] + 1.25,
srt = 45, adj = 1, labels = rownames(data_matrix),
xpd = TRUE)
axis(2,at=1:ncol(data_matrix),labels=colnames(data_matrix),
col="white",las=1)
abline(h=c(1:ncol(data_matrix))+0.5,v=c(1:nrow(data_matrix))+0.5,
col="white",lwd=2,xpd=F)
title("Correlation between genes",line=8,adj=0)
breaks2<-breaks[-length(breaks)]
# Color Scale
par(mar = c(25,1,25,7))
image(x=1, y=0:length(breaks2),z=t(matrix(breaks2))*1.001,
col=pal[1:length(breaks)-1],axes=FALSE,
breaks=breaks,xlab="",ylab="",
xaxt="n")
axis(4,at=0:(length(breaks2)),labels=breaks,col="white",las=1)
abline(h=c(1:length(breaks2)),col="white",lwd=2,xpd=F)
```

相关热力图



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展现多变量数据

```
rownames(nba)<-nba[,1]
data_matrix<-t(scale(data.matrix(nba[,-1])))
pal=brewer.pal(6,"Blues")
statnames<-c("Games Played", "Minutes Played", "Total Points",
"Field Goals Made", "Field Goals Attempted",
"Field Goal Percentage", "Free Throws Made",
"Free Throws Attempted", "Free Throw Percentage",
"Three Pointers Made", "Three Pointers Attempted",
"Three Point Percentage", "Offensive Rebounds",
"Defensive Rebounds", "Total Rebounds", "Assists", "Steals",
"Blocks", "Turnovers", "Fouls")
par(mar = c(3,14,19,2),oma=c(0.2,0.2,0.2,0.2),mex=0.5)
#Heat map
image(x=1:nrow(data_matrix),y=1:ncol(data_matrix),
z=data_matrix,xlab="",ylab="",col=pal,axes=FALSE)
```

展现多变量数据

```
#X axis labels
text(1:nrow(data_matrix), par("usr")[4] + 1,
srt = 45, adj = 0,labels = statnames,
xpd = TRUE, cex=0.85)
#Y axis labels
axis(side=2,at=1:ncol(data_matrix),
labels=colnames(data_matrix),
col="white",las=1, cex.axis=0.85)
#White separating lines
abline(h=c(1:ncol(data_matrix))+0.5,
v=c(1:nrow(data_matrix))+0.5,
col="white",lwd=1,xpd=F)
#Graph Title
text(par("usr")[1]+5, par("usr")[4] + 12,
"NBA per game performance of top 50corers",
xpd=TRUE,font=2,cex=1.5)
```

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Thanks

FAQ时间