

# Das Paket maptools

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# Das Paket maptools

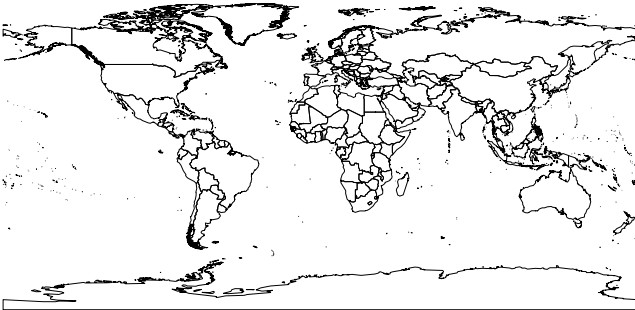
- Datensatz wrld\_simpl aus dem Paket maptools
- Polygone für fast alle Staaten der Erde

```
library(maptools)  
data(wrld_simpl)
```

	FIPS	ISO2	ISO3	UN	NAME
ATG	AC	AG	ATG	28	Antigua and Barbuda
DZA	AG	DZ	DZA	12	Algeria
AZE	AJ	AZ	AZE	31	Azerbaijan
ALB	AL	AL	ALB	8	Albania

# Hello world

```
data(wrld_simpl)  
plot(wrld_simpl)
```



# Der shapefile

- Es handelt sich um einen shapefile

```
typeof(wrld_simpl)
```

```
## [1] "S4"
```

- Die Daten sind als S4 abgespeichert
- Es gibt verschiedene Slots
- In einem davon ist Information als `data.frame` gespeichert.

```
head(wrld_simpl@data)
```

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# Die Struktur der Daten

```
head(wrld_simpl@data$NAME)
```

```
## [1] Antigua and Barbuda Algeria Azerbaijan  
## [4] Albania Armenia Angola  
## 246 Levels: Aaland Islands Afghanistan Albania Algeria
```

```
head(wrld_simpl@data$ISO2)
```

```
## [1] AG DZ AZ AL AM AO  
## 246 Levels: AD AE AF AG AI AL AM AN AO AQ AR AS AT AU AV
```

```
head(wrld_simpl@data$POP2005)
```

```
## [1] 83039 32854159 8352021 3153731 3017661 1609521
```

# Eine logische Abfrage

```
ind_SA <- wrld_simpl@data$NAME == "South Africa"  
head(ind_SA)
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE
```

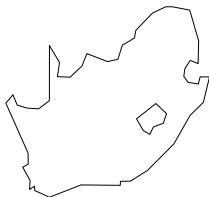
```
table(ind_SA)
```

```
## ind_SA  
## FALSE  TRUE  
##    245    1
```

# Eine Karte für Süd Afrika

- Ein Land zeichnen

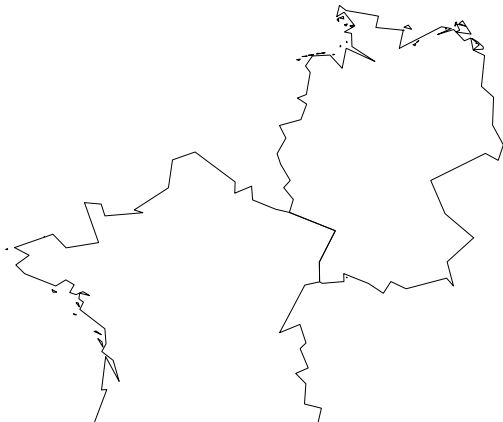
```
SouthAfrica <- wrld_simpl[ind_SA,]  
plot(SouthAfrica)
```





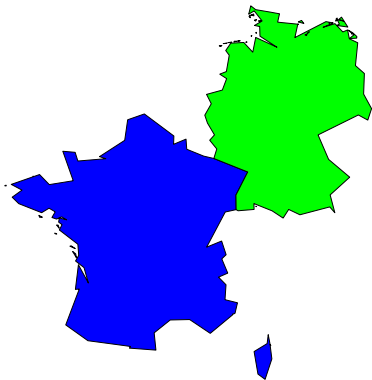
# Mehr als ein Land zeichnen

```
EuropeList <- c('Germany', 'France')  
my_map <- wrld_simpl[wrld_simpl$NAME %in% EuropeList, ]  
par(mai=c(0,0,0,0))  
plot(my_map)
```



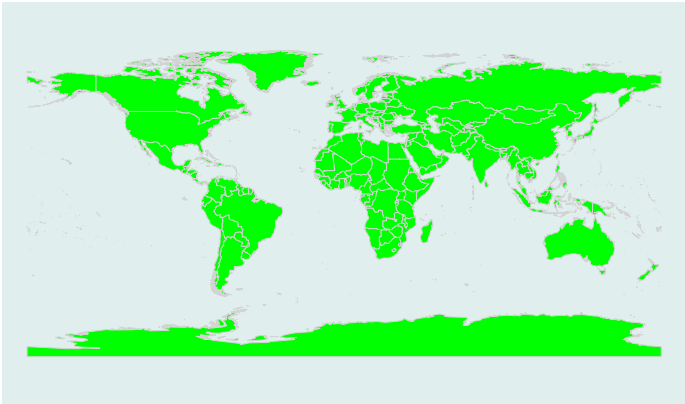
# Mehr Farbe

```
my_map@data$color <- c("blue","green")  
plot(my_map,col=my_map@data$color)
```



# Mehr Farbe für die Welt

```
plot(wrld_simpl, bg='azure2', col='green',  
     border='lightgray')
```



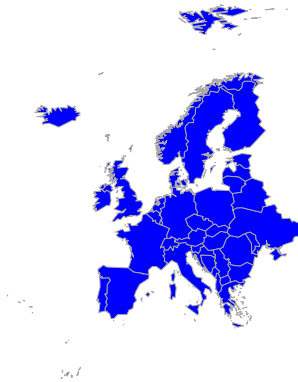
# Eine Karte für Europa

```
Europe <- wrld_simpl[wrld_simpl$REGION=="150",]  
plot(Europe,col="royalblue")
```



# Europa ohne Russland

```
ind <- which(Europe@data$NAME=="Russia")  
EU <- Europe[-ind,]  
plot(EU,col="blue",border="darkgray")
```



# Spielen Sie mit Farben

```
EU$colors <- "green"  
plot(EU,col=EU$colors,border="darkgray")
```



# Mehr über Farben

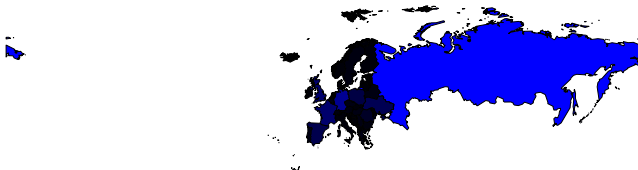
## Colors in R

```
Europe$colors[pop05>median(pop05)] <- "chocolate4"  
plot(Europe,col=Europe$colors)
```



# Europa - Farbschattierung blau

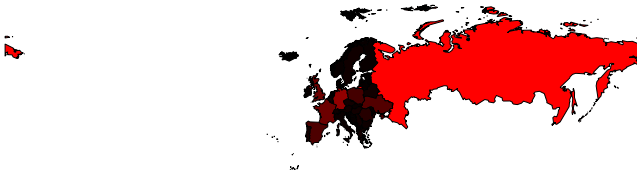
```
val <- Europe$POP2005/max(Europe$POP2005)  
plot(Europe,col=rgb(0,0,val))
```





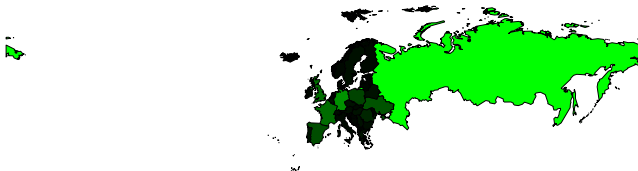
# Europa - Farbschattierung rot

```
val <- Europe$POP2005/max(Europe$POP2005)  
plot(Europe,col=rgb(val,0,0))
```



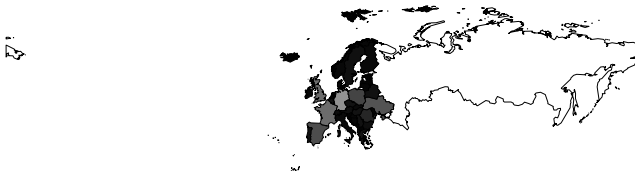
# Europa - Farbschattierung grün

```
val <- Europe$POP2005/max(Europe$POP2005)  
plot(Europe,col=rgb(0,val,0))
```



# Europa - Farbschattierung grau

```
val <- Europe$POP2005/max(Europe$POP2005)  
plot(Europe,col=rgb(val,val,val))
```



# Europa - zwei Graphiken nebeneinander

```
par(mfrow=c(1,2))  
plot(Europe,col=rgb(val,0,val))  
plot(Europe,col=rgb(val,val,0))
```



# Europa - Punkte hinzufügen

```
which(Europe$ISO2=="FR") # 10
```

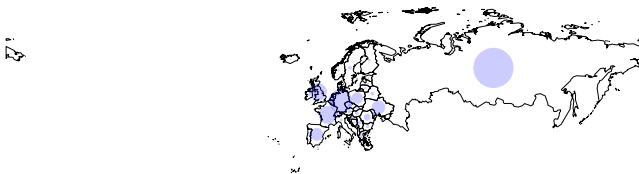
```
## [1] 10
```

```
plot(Europe)  
points(Europe$LON[10],Europe$LAT[10],col="red",pch=20)
```



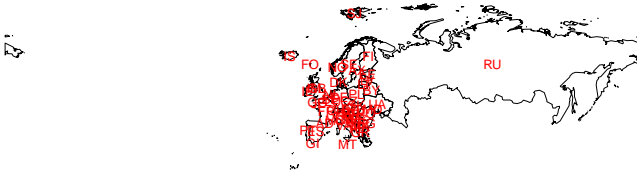
# Europa - Blasen hinzufügen

```
pop <- Europe$POP2005  
pop <- pop/max(pop)*10  
plot(Europe)  
points(Europe$LON,Europe$LAT,cex=pop,col=rgb(0,0,1,.2),  
pch=20)
```



# Europa - Text hinzufügen

```
plot(Europe)  
text(Europe$LON,Europe$LAT,Europe$ISO2,col="red")
```



# Europa - Linien hinzufügen

```
which(Europe$ISO2=="FR") # 15  
which(Europe$ISO2=="DE") # 16
```

```
Dat <- cbind(Europe$LON[15:16],Europe$LAT[15:16])  
plot(Europe)  
lines(Dat,col="red",lwd=2)
```

