Este es el analisis para una serie real Visualizacion de la serie

```
library("TSA")
```

```
## Warning:  package 'TSA' was built under R version 3.2.2
## Loading required package:  leaps
## Warning:  package 'leaps' was built under R version 3.2.2
## Loading required package:  locfit
## Warning:  package 'locfit' was built under R version 3.2.2
## locfit 1.5-9.1 2013-03-22
## Loading required package:  mgcv
## Loading required package:  nlme
## This is mgcv 1.8-6.  For overview type 'help("mgcv-package")'.
## Loading required package:  tseries
## Warning:  package 'tseries' was built under R version 3.2.2
##
## Attaching package:  'TSA'
##
## The following objects are masked from 'package:stats':
##
##    acf, arima
##
## The following object is masked from 'package:utils':
##
##    tar
```

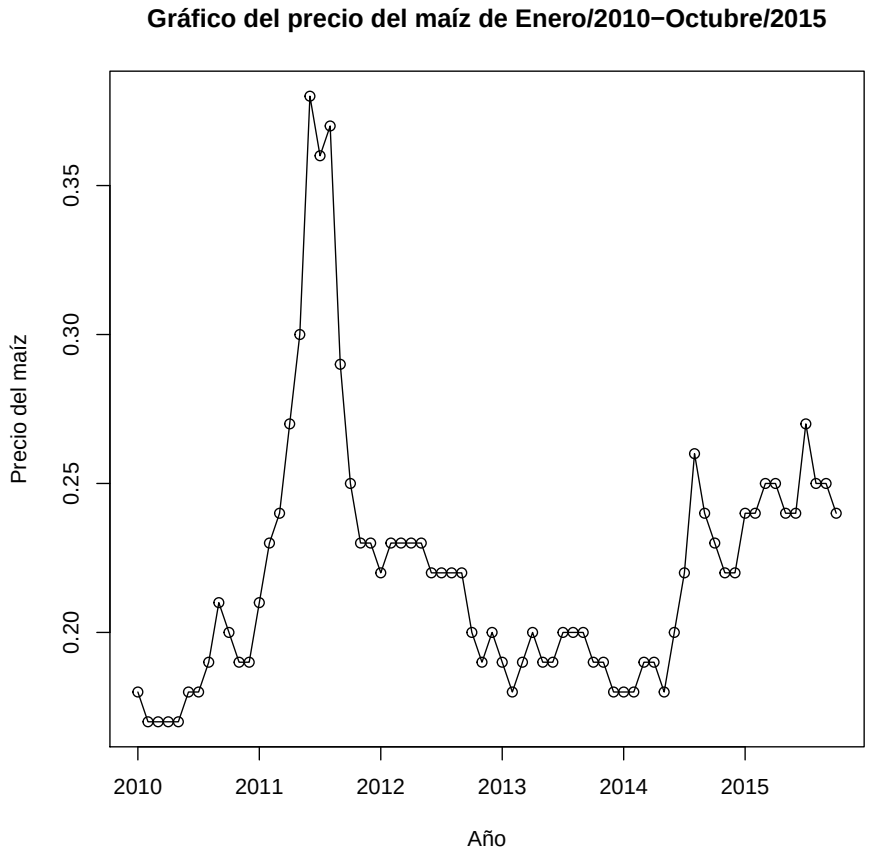
```
library("leaps")
library("locfit")
library("tseries")
basemz=read.table("maiz.txt",header=TRUE)
basemz
```

```
##    maiz
## 1  0.18
## 2  0.17
## 3  0.17
## 4  0.17
## 5  0.17
## 6  0.18
## 7  0.18
## 8  0.19
## 9  0.21
## 10 0.20
## 11 0.19
## 12 0.19
## 13 0.21
```

```
## 14 0.23
## 15 0.24
## 16 0.27
## 17 0.30
## 18 0.38
## 19 0.36
## 20 0.37
## 21 0.29
## 22 0.25
## 23 0.23
## 24 0.23
## 25 0.22
## 26 0.23
## 27 0.23
## 28 0.23
## 29 0.23
## 30 0.22
## 31 0.22
## 32 0.22
## 33 0.22
## 34 0.20
## 35 0.19
## 36 0.20
## 37 0.19
## 38 0.18
## 39 0.19
## 40 0.20
## 41 0.19
## 42 0.19
## 43 0.20
## 44 0.20
## 45 0.20
## 46 0.19
## 47 0.19
## 48 0.18
## 49 0.18
## 50 0.18
## 51 0.19
## 52 0.19
## 53 0.18
## 54 0.20
## 55 0.22
## 56 0.26
## 57 0.24
## 58 0.23
```

```
## 59 0.22
## 60 0.22
## 61 0.24
## 62 0.24
## 63 0.25
## 64 0.25
## 65 0.24
## 66 0.24
## 67 0.27
## 68 0.25
## 69 0.25
## 70 0.24
```

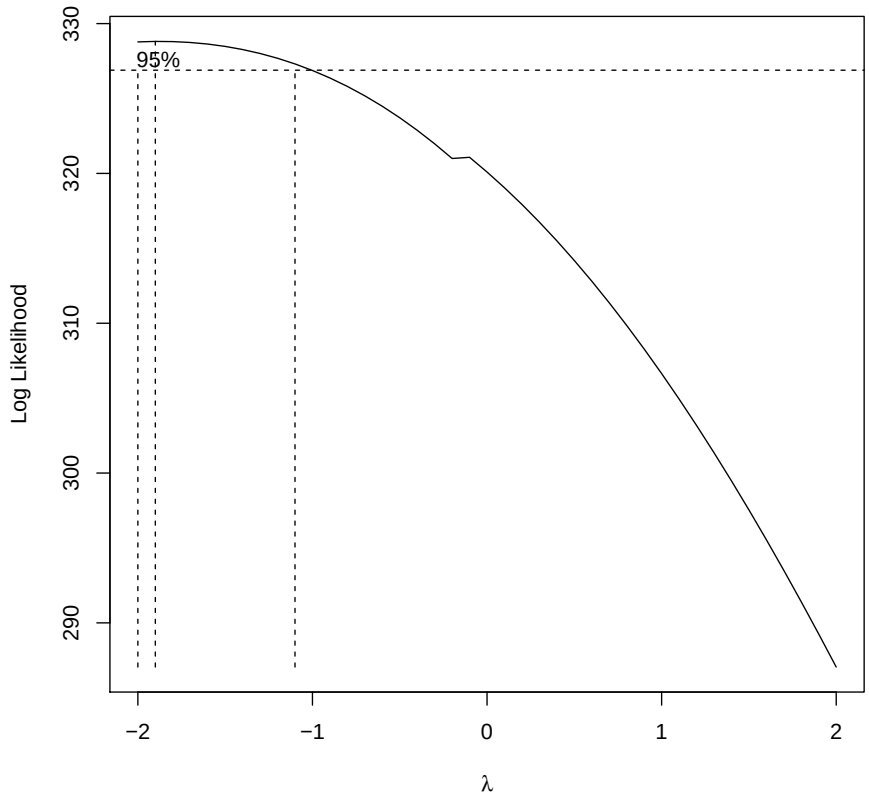
```
mz=ts(basemz$maiz,start=c(2010,1),end=c(2015,10),frequency = 12,names="Precio del maÃ-
z")
plot(mz,type="o", xlab="AÃ±o", ylab = "Precio del maÃz",main="GrÃ!'fico del precio del maÃz
```



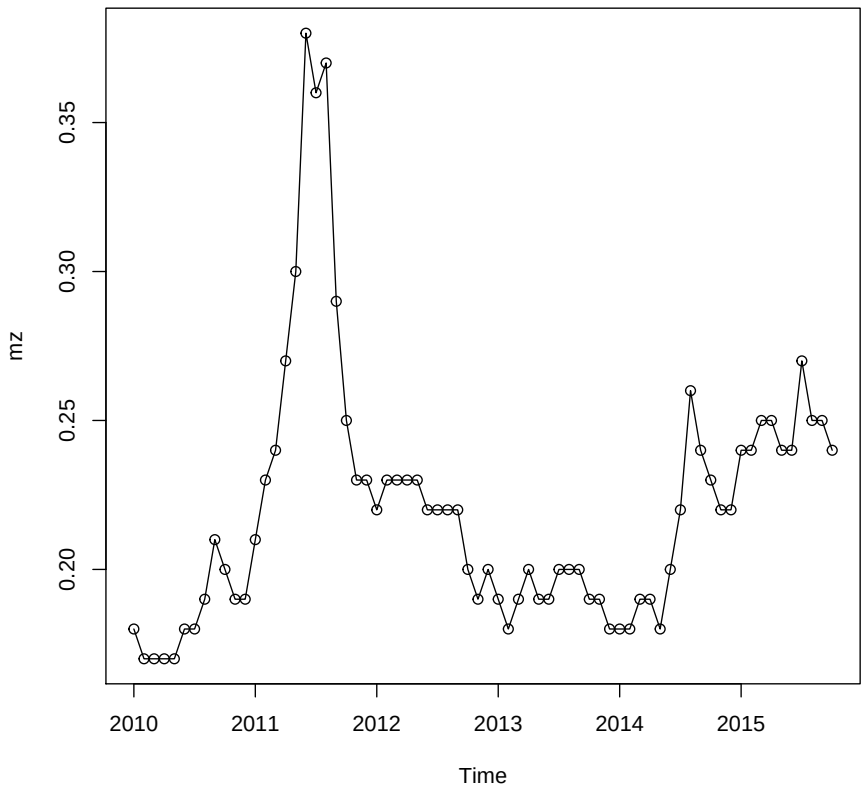
Analisis de estacionariedad

```
library("TSA")
library("leaps")
library("locfit")
library("tseries")
adf.test(mz)

##
##  Augmented Dickey-Fuller Test
##
## data:  mz
## Dickey-Fuller = -2.4654, Lag order = 4, p-value = 0.386
## alternative hypothesis: stationary

BoxCox.ar(mz)
```

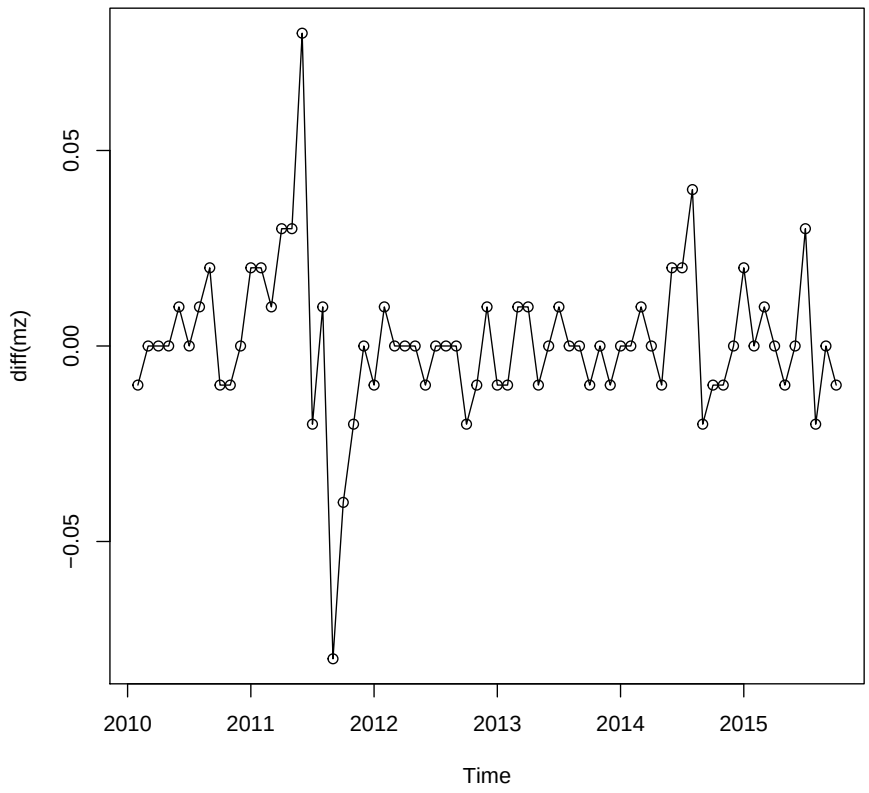
```
## Warning in arima0(x, order = c(i, 0L, 0L), include.mean = demean):
possible convergence problem:  optim gave code = 1
## Warning in arima0(x, order = c(i, 0L, 0L), include.mean = demean):
possible convergence problem:  optim gave code = 1
## Warning in arima0(x, order = c(i, 0L, 0L), include.mean = demean):
possible convergence problem:  optim gave code = 1
```



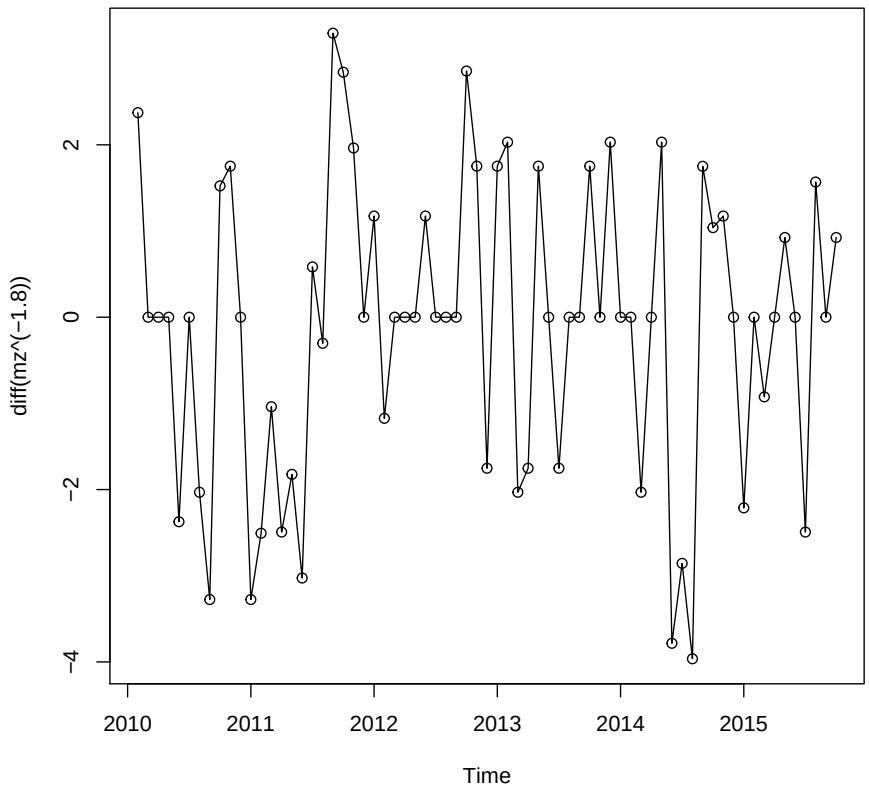

```
plot(mz,type="o")
```



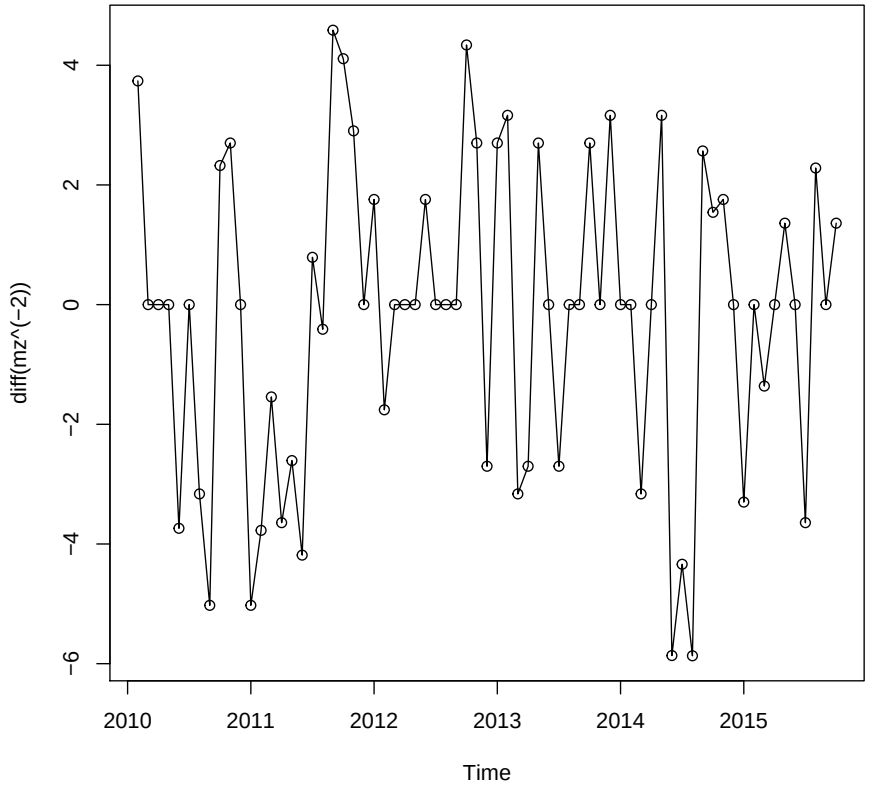

```
plot(diff(mz),type="o")
```




```
plot(diff(mz^(-1.8)),type="o")
```




```
plot(diff(mz^(-2)),type="o")
```




```
adf.test(diff(mz))
```

```
##
##  Augmented Dickey-Fuller Test
##
## data:  diff(mz)
## Dickey-Fuller = -3.783, Lag order = 4, p-value = 0.02463
## alternative hypothesis: stationary
```

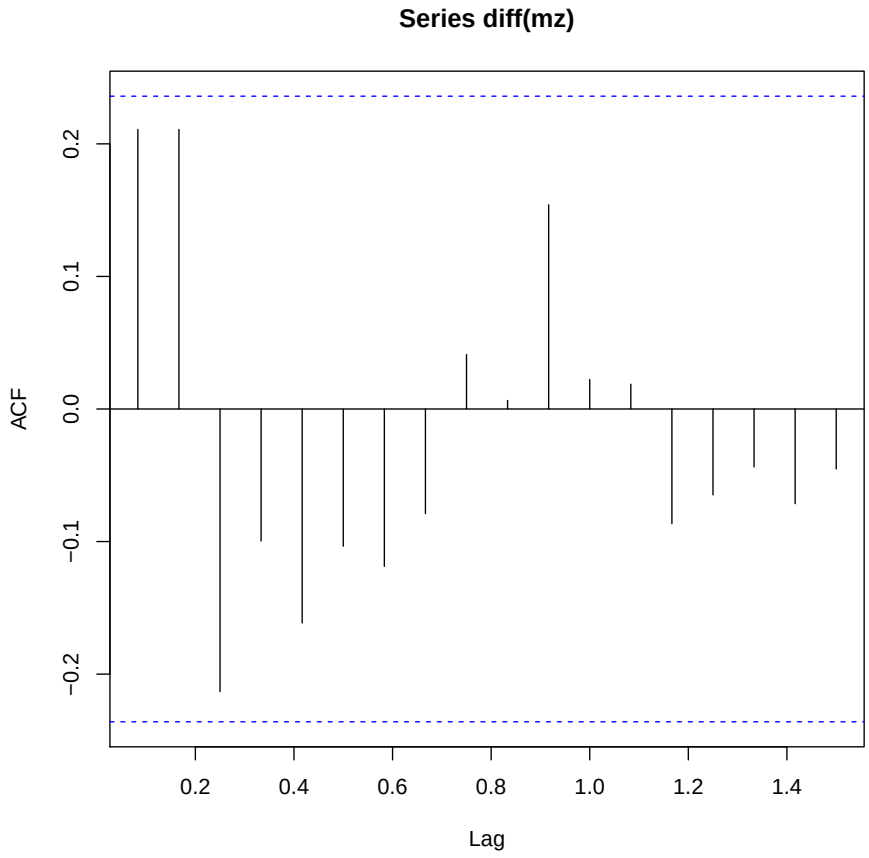
```
adf.test(diff(mz^(-1.8)))
```

```
##
##  Augmented Dickey-Fuller Test
##
## data:  diff(mz^(-1.8))
## Dickey-Fuller = -3.4573, Lag order = 4, p-value = 0.05394
## alternative hypothesis: stationary
```

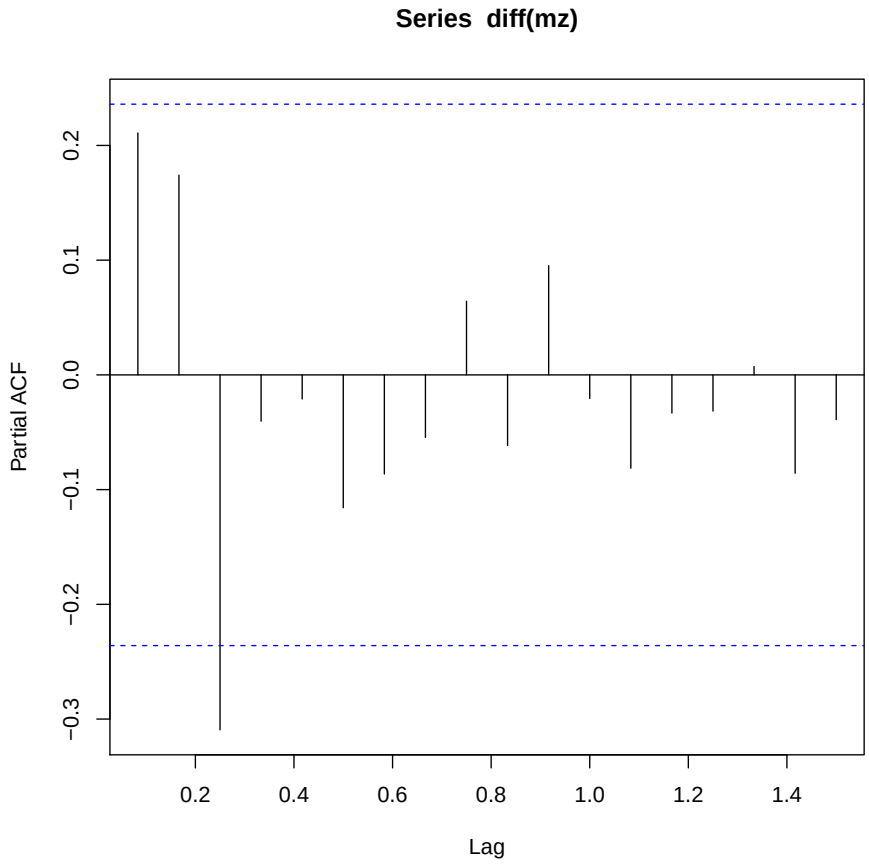
```
adf.test(diff(mz^(-2)))

##
##  Augmented Dickey-Fuller Test
##
## data:  diff(mz^(-2))
## Dickey-Fuller = -3.4341, Lag order = 4, p-value = 0.05765
## alternative hypothesis: stationary
```

De los resultados anterires se concluye que solomente se hara una diferencia a las serie

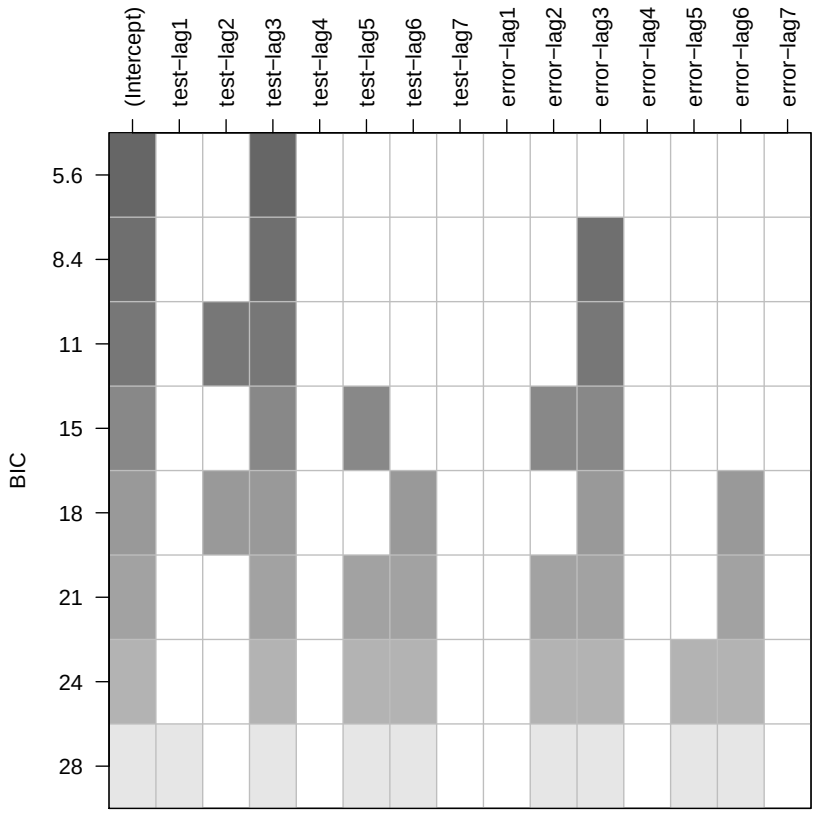
```
library("TSA")
library("leaps")
library("locfit")
library("tseries")
acf(diff(mz))
```




```
pacf(diff(mz))
```




```
eacf(diff(mz))

## AR/MA
##   0 1 2 3 4 5 6 7 8 9 10 11 12 13
## 0 o o o o o o o o o o o  o  o  o
## 1 x o x o o o o o o o o  o  o  o
## 2 x x x o o o o o o o o  o  o  o
## 3 o o o o o o o o o o o  o  o  o
## 4 x o o o o o o o o o o  o  o  o
## 5 o o o o o o o o o o o  o  o  o
## 6 x o x o o o o o o o o  o  o  o
## 7 x o o o o o o o o o o  o  o  o

cua=armasubsets(y=diff(mz),nar=7,nma=7,
                y.name='test', ar.method='ols')
plot(cua)
```



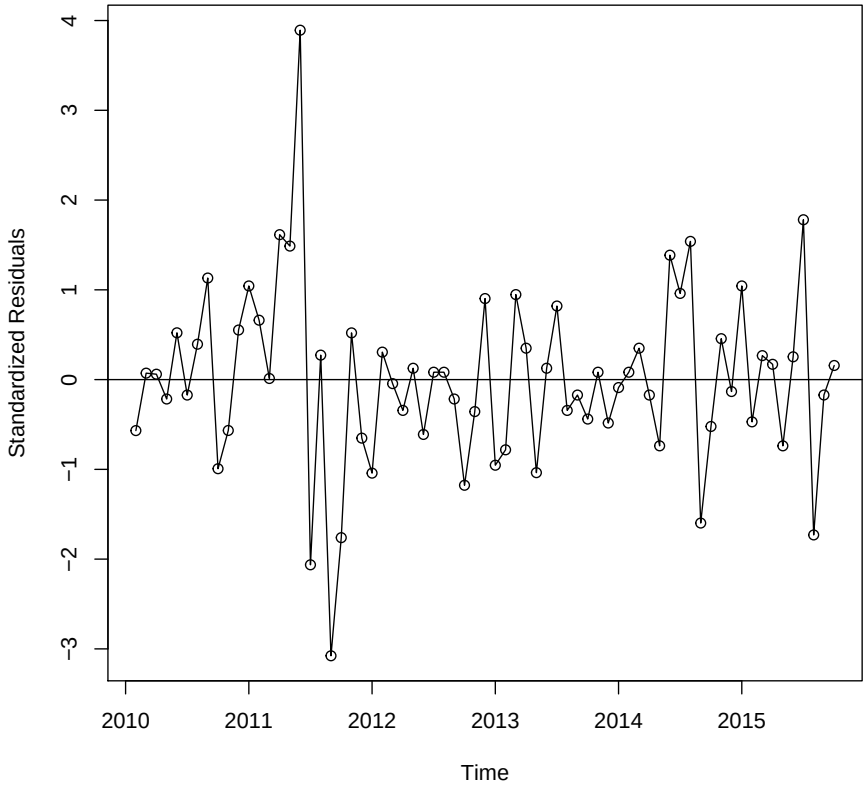
Modelos que podrian a probar: ARI(3,1)
ARIMA(1,1,3)
ARIMA(3,1,3)
estimacion de parametros Se toma el ARI(3) para probarlo

```
library("TSA")
library("leaps")
library("locfit")
library("tseries")
arima(diff(mz), order=c(3,0,0),method='ML')

##
## Call:
## arima(x = diff(mz), order = c(3, 0, 0), method = "ML")
##
## Coefficients:
##          ar1     ar2      ar3  intercept
```

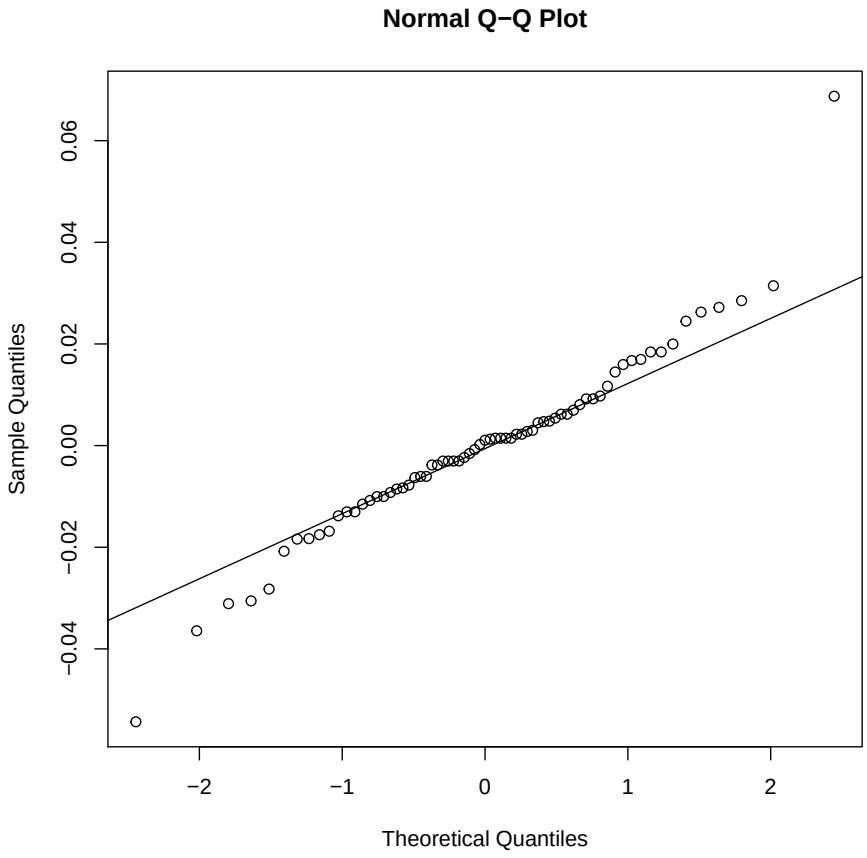
```
##       0.2249  0.2246  -0.3026     0.0009
## s.e.  0.1133  0.1128   0.1129     0.0025
##
## sigma^2 estimated as 0.000312:  log likelihood = 180.4,  aic = -352.81
```

Validacion del modelo

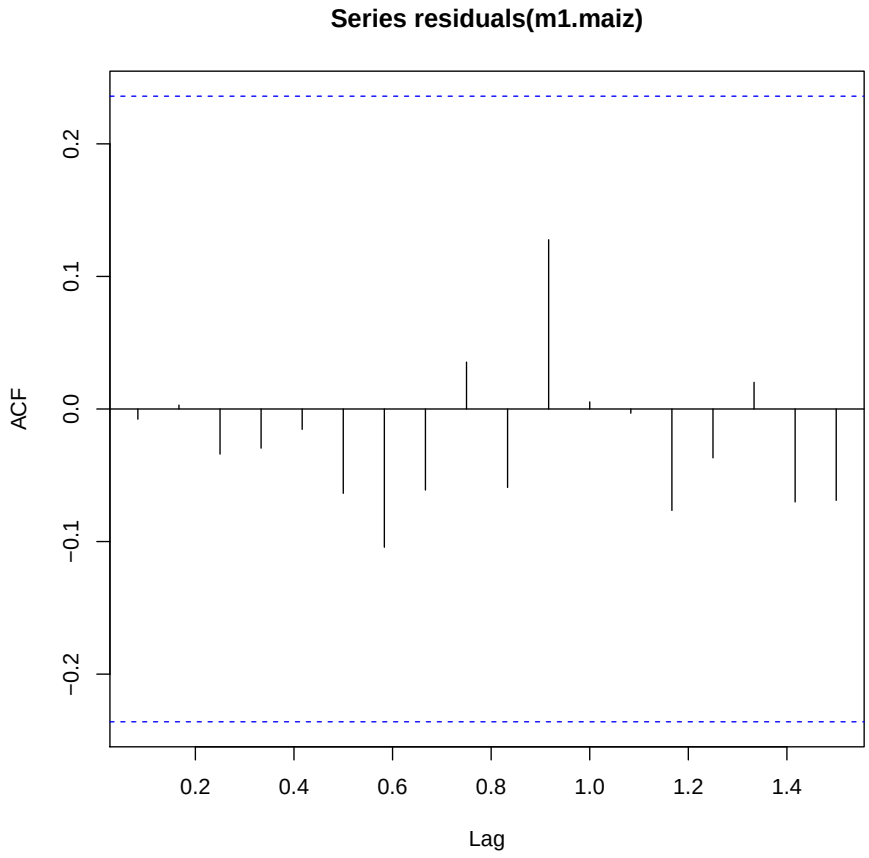
```
m1.maiz=arima(diff(mz),order=c(3,0,0), method='ML'); m1.maiz

##
## Call:
## arima(x = diff(mz), order = c(3, 0, 0), method = "ML")
##
## Coefficients:
##          ar1     ar2      ar3  intercept
##       0.2249  0.2246  -0.3026     0.0009
## s.e.  0.1133  0.1128   0.1129     0.0025
##
## sigma^2 estimated as 0.000312:  log likelihood = 180.4,  aic = -352.81

plot(rstandard(m1.maiz),ylab ='Standardized Residuals',
       type='o'); abline(h=0)
```



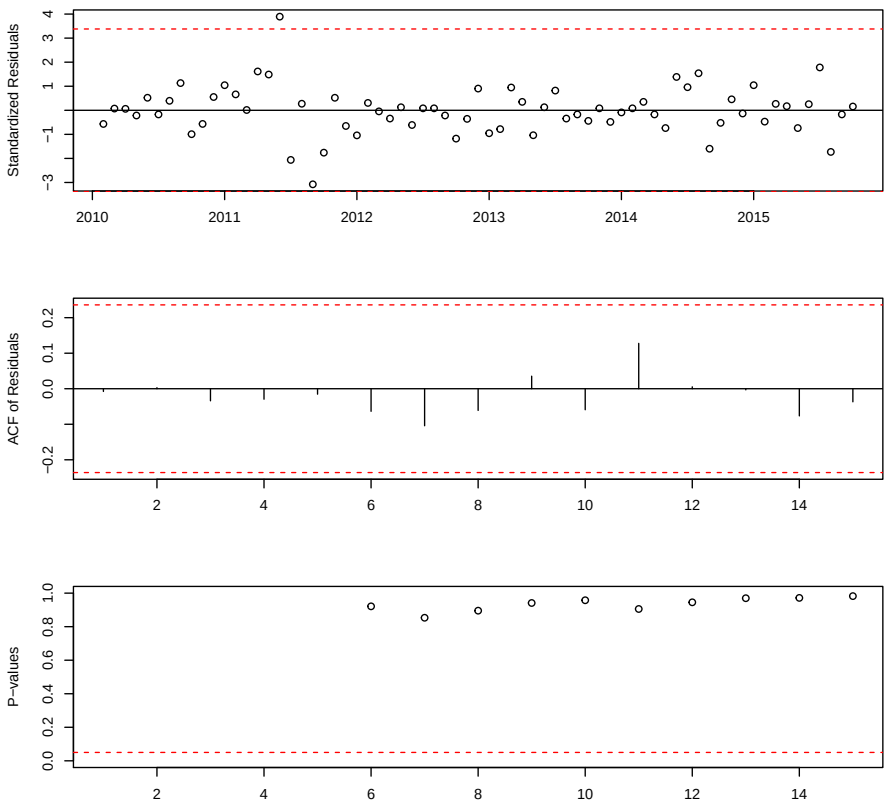

```
qqnorm(residuals(m1.maiz)); qqline(residuals(m1.maiz))
```




```
acf(residuals(m1.maiz))
```




```
tsdiag(m1.maiz,gof=15,omit.initial=F)
```



Pues sin ser tan esctrictos el modelo se validara