

ARIMA_Workshop

KB

1/24/2020

```
library(zoo) library(tseries) library(forecast) library(xts) nee ->
ts(mangroves$nee, start = 1, frequency = 30) nee <- ts(mangroves$nee, start = 1,
frequency=30) par(mfrow=c(1,1), mai=c(0.25,0.8,0.1, 0.1)) plot( nee, typ="l", ylab= "NEE", xlab="")
plot(nee) lines(tsclean(nee), col="red") nee <- tsclean(nee) nee.d <- decompose(nee, 'multiplicative')
plot(nee.d) adf.test(nee ) acf(nee, lag.max=45)

arima.nee1 <- auto.arima(nee, trace=TRUE) tsdisplay(residuals(arima.nee1), lag.max=45) arima.nee2
<- arima(nee , order=c(10,1,3), seasonal= list(order=c(2,0,2)))

tsdisplay(residuals(arima.nee2), lag.max= 30)

AIC(arima.nee1, arima.nee2)

par(mfrow=c(1,1)) plot(nee , typ="l"); lines(fitted(arima.nee2),col="red") checkresiduals(arima.nee2,
lag=36)

par(mfrow=c(1,1)) plot(nee , typ="l"); lines(fitted(arima.nee2),col="red")

plot(forecast(arima.nee2, h=30))

sal <- ts(mangroves$salinity.max, start= 1, frequency=30)

par(mfrow=c(1,1), mai=c(0.25,0.8,0.1, 0.1)) plot(sal , typ="l", ylab= "Salinity", xlab="")

plot(sal , typ="l", ylab= "Salinity", xlab="") lines(tsclean(sal) , col="red")

sal <- tsclean(sal)

sal.d <- decompose(sal, 'multiplicative') plot(sal.d)

adf.test(sal) adf.test(diff(sal))

ccf( diff(sal), nee, na.action = na.pass, lag.max=40, plot=TRUE)

arima.nee3 <- auto.arima(nee, xreg=c(diff(sal),0), trace=TRUE)

AIC(arima.nee2, arima.nee3 )

sal.i <- sal sal.i[sal.i < 25 ] <- 0 sal.i[sal.i >= 25 ] <- 1 plot(sal.i)

arima.nee4 <- auto.arima(nee, xreg=sal.i, trace=TRUE)

AIC(arima.nee2, arima.nee4 )

checkresiduals(arima.nee4, lag=36)

par(mfrow=c(1,1)) plot(nee , typ="l"); lines(fitted(arima.nee4),col="red")
```

use PAR as explanatory variable, challenge for better model

```
photo <- ts(mangroves$par, start= 1, frequency=30)

par(mfrow=c(1,1), mai=c(0.25,0.8,0.1, 0.1)) plot(photo , typ="l", ylab= "PAR", xlab="")

plot(photo, typ="l", ylab= "PAR", xlab="") lines(tsclean(photo) , col="red")

photo <- tsclean(photo)

photo.d <- decompose(photo, 'multiplicative') plot(photo.d)

adf.test(photo)

adf.test(diff(photo))

ccf( diff(photo),nee, na.action = na.pass, lag.max=40, plot=TRUE)

arima.nee.p1 <-auto.arima(nee, xreg=c(diff(photo),0), trace=TRUE)

AIC(arima.nee4,arima.nee.p1)
```