setwd("XXX")

library(ncf)

Pall2\_im <- read.csv("FakePrev.csv", row.names = 1, header =TRUE, as.is = TRUE)

colnames(Pall2\_im) <- c("Cairns Central", "Tannum Sands", "Boonah", "Alstonville", "Lismore", "Bellingen",

"Nambucca Heads", "Port Macquarie", "Wingham", "Singleton", "Sydney")

LABS2012<-c(

"Jan12","Feb12","Mar12","Apr12","May12","Jun12","Jul12","Aug12","Sept12","Oct12","Nov12","Dec12",

"Jan13","Feb13","Mar13","Apr13","May13","Jun13","Jul13","Aug13","Sept13","Oct13","Nov13","Dec13",

"Jan14","Feb14","Mar14","Apr14","May14","Jun14","Jul14","Aug14","Sept14","Oct14","Nov14")

Pall2\_im2012 <- Pall2\_im[7:nrow(Pall2\_im),]

coords<-rbind(c(-27.992, 152.681),c(-28.481, 153.439),c(-30.642, 153.003),

c(-23.943, 151.358),c(-33.902662, 151.237756 ),c(-32.562, 151.175),c(-16.92, 145.775),

c(-28.807, 153.277),c(-30.452, 152.897),c(-31.871, 152.376),c(-31.431, 152.908))

distLoc<-coord2dist(coords)

locs<-c('Boonah','Alstonville','Nambucca Heads','Tannum Sands','Sydney CP',

'Singleton','Cairns Central','Lismore','Bellingen','Wingham','Port Macquarie')

coordsGS <- data.frame(coords, locs)

coordsGS <- coordsGS[order(coordsGS$X1, decreasing = TRUE),]

row.names(coordsGS)<-1:nrow(coordsGS)

coordsAll<-as.matrix(coordsGS[,1:2])

distLocGS <- coord2dist(coordsAll)

locsAbr<-c('Bo','Al','NH','TS','Sy',

'Si','CC','Li','Be','Wi','PM')

NS<-c(3,4,7,2,11,10,1,5,6,9,8)

cooLocGS<-data.frame(coords, locsAbr, NS)

cooLocGS<-cooLocGS[order(cooLocGS$NS),]

cooLocGS <- cooLocGS[1:11,]

rownames(cooLocGS)<-1:nrow(cooLocGS)

##########################################################################

#####################################

#####################################correlogram

#####################################

##########################################################################

#Need to read previous code ##############################################

#Containing Imputed values

P2012P <- data.frame(cbind(coordsGS[,-3], rbind(t(apply(Pall2\_im2012, 2, scale)))))

names(P2012P)<-c("latitude", "longitude", paste("M", 1:35, sep=""))

DiffPall2\_im2012 <- apply(Pall2\_im2012, 2, diff)

PCorDiff<-(cor(DiffPall2\_im2012))

PCor<-(cor(Pall2\_im2012))

PCorDiff<-PCorDiff[lower.tri(PCorDiff)]

PCor<-PCor[lower.tri(PCor)]

head(Pall2\_im2012)

Paired<-c(paste(1, 2:11, sep="-"), paste(2,3:11, sep="-"),paste(3,4:11, sep="-"),

paste(4,5:11, sep="-"),paste(5,6:11, sep="-"),paste(6,7:11, sep="-"),

paste(7,8:11, sep="-"),paste(8,9:11, sep="-"),paste(9,10:11, sep="-"), "10-11")

CorDistDiff<-data.frame(PCorDiff=PCorDiff, distkm=distLocGS, PW=Paired)

CorDist<-data.frame(PCor=PCor, distkm=distLocGS, PW=Paired)

CorDist<-CorDist[order(CorDist$distkm),]

CorDist$s1<-cooLocGS[unlist(strsplit(as.character(CorDist$PW), split="-")),"locsAbr"][c(TRUE,FALSE)]

CorDist$s2<-cooLocGS[unlist(strsplit(as.character(CorDist$PW), split="-")),"locsAbr"][c(FALSE, TRUE)]

CorDistDiff<-CorDistDiff[order(CorDistDiff$distkm),]

CorDistDiff$s1<-cooLocGS[unlist(strsplit(as.character(CorDistDiff$PW), split="-")),"locsAbr"][c(TRUE,FALSE)]

CorDistDiff$s2<-cooLocGS[unlist(strsplit(as.character(CorDistDiff$PW), split="-")),"locsAbr"][c(FALSE, TRUE)]

#############################################################################################

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######ncf correlogram using spline

lat<-as.numeric(coordsGS[,1])

lon <- as.numeric(coordsGS[,2])

z <- t(Pall2\_im2012)

Allsync<- Sncf(x=lon, y=lat, z=z, latlon=TRUE, quiet = FALSE, npoints= 500, resamp = 500)

zdiff<-t(DiffPall2\_im2012)

diffsync<- Sncf(x=lon, y=lat, z=zdiff, latlon=TRUE, quiet=FALSE, npoints=500, resamp=500)

#Correlogram 2012P

#tiff("FakeCorrelogram.tiff", width=8, height=10, units="in", res=300)

nf<-layout(matrix(c(1:2), 2, 1, byrow = FALSE), height=1)

layout.show(nf)

par(mar=c(5, 5, 1, 1))

plot(x=CorDist$distkm, y=CorDist$PCor, ylab="Correlation",

xlab="", axes=FALSE, cex.lab=1.5,

ylim=c(-1,1), pch=16, col="grey57")

abline(h=0, lty=2, lwd=2)

axis(1, at=seq(0,2000,500), labels=rep("",length(seq(0,2000,500))), cex.axis=1.25)

axis(2, at=seq(-1,1,.2), las=1, cex.axis=1.25)

lines(Allsync$real$predicted$x, Allsync$real$predicted$y, lwd=3)

#lines(x=c(0, max(Allsync$real$predicted$x)), c(Allsync$real$cbar, Allsync$real$cbar), lty=2, lwd=2)

lines(Allsync$boot$boot.summary$predicted$x,

Allsync$boot$boot.summary$predicted$y["0.025",], lty=9, lwd=2)

lines(Allsync$boot$boot.summary$predicted$x,

Allsync$boot$boot.summary$predicted$y["0.975",], lty=9, lwd=2)

plot(x=CorDistDiff$distkm, y=CorDistDiff$PCor, ylab="Correlation",

xlab="Distance (km)", axes=FALSE, cex.lab=1.5,

ylim=c(-1,1), pch=16, col="grey57")

abline(h=0, lty=2, lwd=2)

axis(1, at=seq(0,2000,500), cex.axis=1.25)

axis(2, at=seq(-1,1,.2), las=1, cex.axis=1.25)

lines(diffsync$real$predicted$x, diffsync$real$predicted$y, lwd=3)

#lines(x=c(0, max(diffsync$real$predicted$x)), c(diffsync$real$cbar, diffsync$real$cbar), lty=2, lwd=2)

lines(diffsync$boot$boot.summary$predicted$x,

diffsync$boot$boot.summary$predicted$y["0.025",], lty=9, lwd=2)

lines(diffsync$boot$boot.summary$predicted$x,

diffsync$boot$boot.summary$predicted$y["0.975",], lty=9, lwd=2)

#dev.off()