#a simple example showing the import of oscar current vectors u and v.

setwd("C:/Users/liuq/Desktop/Timing-Diversion-2022/Timing-and-Diversion-2022/timing\_diversion\_forecasting/DATAIN")

rm(list = ls(all=T))

library(tidyverse)

# data:grid means ---------------------------------------------------------

#these data are grid means (polygon groups 0:3) of monthly means

data.gridmean <- readRDS("currentvelocity\_oscar\_gridmean\_2022-05-03.rds")

#data.gridmean.long <- rbind(data.gridmean[[1]]$data.long, data.gridmean[[2]]$data.long)

data.gridmean.wide <- merge(data.gridmean[[1]]$data.wide, data.gridmean[[2]]$data.wide)

str(data.gridmean.wide)

gridmean.wide.area1\_Jan <- filter(data.gridmean.wide, group == 1, month== 1, year <= 2021)

#write.csv(gridmean.wide.area1\_Jan, file = "gridmean.wide.A1Jan.csv")

gridmean.wide.area2\_Jan <- filter(data.gridmean.wide, group == 2, month== 1, year <= 2021)

#write.csv(gridmean.wide.area2\_Jan, file = "gridmean.wide.A2Jan.csv")

gridmean.wide.area3\_Jan <- filter(data.gridmean.wide, group == 3, month== 1, year <= 2021)

#write.csv(gridmean.wide.area3\_Jan, file = "gridmean.wide.A3Jan.csv")

gridmean.wide.area0\_Jan <- filter(data.gridmean.wide, group == 0, month== 1, year <= 2021)

#write.csv(gridmean.wide.area0\_Jan, file = "gridmean.wide.A0Jan.csv")

# gridmean.wide.area1\_Apr <- filter(data.gridmean.wide, group == 1, month== 4)

# gridmean.wide.area1\_May <- filter(data.gridmean.wide, group == 1, month== 5)

# gridmean.wide.area1\_Jun <- filter(data.gridmean.wide, group == 1, month== 6)

# gridmean.wide.area1\_Jul <- filter(data.gridmean.wide, group == 1, month== 7)

# gridmean.wide.area1\_Aug <- filter(data.gridmean.wide, group == 1, month== 8)

# gridmean.wide.area1\_Sep <- filter(data.gridmean.wide, group == 1, month== 9)

# gridmean.wide.area1\_Oct <- filter(data.gridmean.wide, group == 1, month== 10)

# gridmean.wide.area1\_Nov <- filter(data.gridmean.wide, group == 1, month== 11)

# gridmean.wide.area1\_Dec <- filter(data.gridmean.wide, group == 1, month== 12)

# timing/day for earlystuart and chilko 1993-2021

sockeye.timing <- read.csv("ChilkoTimingForecastData.csv")

early.stuart.df <- filter(sockeye.timing, Stock == "earlystuart", year >= 1993)

early.stuart.timing <- select(early.stuart.df, A20.day)

chilko.df <- filter(sockeye.timing, Stock == "chilko", year >= 1993)

chilko.timing <- select(chilko.df, A20.day)

#relationship between timing and current velocity in January of return year using 3 areas

df.test <- read.csv("timing\_velocity\_test.csv")

hist(df.test$estuart.day)

hist(df.test$chilko.day)

hist(df.test$nd)

# for early stuart

plot(estuart.day ~ gridmean.A1Jan.u, data = df.test)

plot(estuart.day ~ gridmean.A1Jan.v, data = df.test)

plot(estuart.day ~ gridmean.A2Jan.u, data = df.test)

plot(estuart.day ~ gridmean.A2Jan.v, data = df.test)

plot(estuart.day ~ gridmean.A3Jan.u, data = df.test)

plot(estuart.day ~ gridmean.A3Jan.v, data = df.test)

plot(estuart.day ~ gridmean.A0Jan.u, data = df.test)

plot(estuart.day ~ gridmean.A0Jan.v, data = df.test)

ES.A1Jan.u.reg <- lm(estuart.day ~ gridmean.A1Jan.u, df.test)

ES.A1Jan.v.reg <- lm(estuart.day ~ gridmean.A1Jan.v, df.test)

summary(ES.A1Jan.u.reg)

summary(ES.A1Jan.v.reg)

ES.A2Jan.u.reg <- lm(estuart.day ~ gridmean.A2Jan.u, df.test)

ES.A2Jan.v.reg <- lm(estuart.day ~ gridmean.A2Jan.v, df.test)

summary(ES.A2Jan.u.reg)

summary(ES.A2Jan.v.reg)

ES.A3Jan.u.reg <- lm(estuart.day ~ gridmean.A3Jan.u, df.test)

ES.A3Jan.v.reg <- lm(estuart.day ~ gridmean.A3Jan.v, df.test)

summary(ES.A3Jan.u.reg)

summary(ES.A3Jan.v.reg)

ES.A0Jan.u.reg <- lm(estuart.day ~ gridmean.A0Jan.u, df.test)

ES.A0Jan.v.reg <- lm(estuart.day ~ gridmean.A0Jan.v, df.test)

summary(ES.A0Jan.u.reg)

summary(ES.A0Jan.v.reg)

#for chilko

plot(chilko.day ~ gridmean.A1Jan.u, data = df.test)

plot(chilko.day ~ gridmean.A1Jan.v, data = df.test)

plot(chilko.day ~ gridmean.A2Jan.u, data = df.test)

plot(chilko.day ~ gridmean.A2Jan.v, data = df.test)

plot(chilko.day ~ gridmean.A3Jan.u, data = df.test)

plot(chilko.day ~ gridmean.A3Jan.v, data = df.test)

plot(chilko.day ~ gridmean.A0Jan.u, data = df.test)

plot(chilko.day ~ gridmean.A0Jan.v, data = df.test)

CK.A1Jan.u.reg <- lm(chilko.day ~ gridmean.A1Jan.u, df.test)

CK.A1Jan.v.reg <- lm(chilko.day ~ gridmean.A1Jan.v, df.test)

summary(CK.A1Jan.u.reg)

summary(CK.A1Jan.v.reg)

CK.A2Jan.u.reg <- lm(chilko.day ~ gridmean.A2Jan.u, df.test)

CK.A2Jan.v.reg <- lm(chilko.day ~ gridmean.A2Jan.v, df.test)

summary(CK.A2Jan.u.reg)

summary(CK.A2Jan.v.reg)

CK.A3Jan.u.reg <- lm(chilko.day ~ gridmean.A3Jan.u, df.test)

CK.A3Jan.v.reg <- lm(chilko.day ~ gridmean.A3Jan.v, df.test)

summary(CK.A3Jan.u.reg)

summary(CK.A3Jan.v.reg)

CK.A0Jan.u.reg <- lm(chilko.day ~ gridmean.A0Jan.u, df.test)

CK.A0Jan.v.reg <- lm(chilko.day ~ gridmean.A0Jan.v, df.test)

summary(CK.A0Jan.u.reg)

summary(CK.A0Jan.v.reg)

#for ND

plot(nd ~ gridmean.A1Jan.u, data = df.test)

plot(nd ~ gridmean.A1Jan.v, data = df.test)

plot(nd ~ gridmean.A2Jan.u, data = df.test)

plot(nd ~ gridmean.A2Jan.v, data = df.test)

plot(nd ~ gridmean.A3Jan.u, data = df.test)

plot(nd ~ gridmean.A3Jan.v, data = df.test)

plot(nd ~ gridmean.A0Jan.u, data = df.test)

plot(nd ~ gridmean.A0Jan.v, data = df.test)

ND.A1Jan.u.reg <- lm(nd ~ gridmean.A1Jan.u, df.test)

ND.A1Jan.v.reg <- lm(nd ~ gridmean.A1Jan.v, df.test)

summary(ND.A1Jan.u.reg)

summary(ND.A1Jan.v.reg)

ND.A2Jan.u.reg <- lm(nd ~ gridmean.A2Jan.u, df.test)

ND.A2Jan.v.reg <- lm(nd ~ gridmean.A2Jan.v, df.test)

summary(ND.A2Jan.u.reg)

summary(ND.A2Jan.v.reg)

ND.A3Jan.u.reg <- lm(nd ~ gridmean.A3Jan.u, df.test)

ND.A3Jan.v.reg <- lm(nd ~ gridmean.A3Jan.v, df.test)

summary(ND.A3Jan.u.reg)

summary(ND.A3Jan.v.reg)

ND.A0Jan.u.reg <- lm(nd ~ gridmean.A0Jan.u, df.test)

ND.A0Jan.v.reg <- lm(nd ~ gridmean.A0Jan.v, df.test)

summary(ND.A0Jan.u.reg)

summary(ND.A0Jan.v.reg)

# data:monthly means ------------------------------------------------------

#these data are monthly means but still at full grid resolution (1/4deg lat by 1/4 deg lon)

data.currents.periodicmean <- readRDS("currentvelocity\_oscar\_periodicmean\_2022-05-03.rds")

str(data.currents.periodicmean)

#gives a sense of the array dimensions (lat, lon, year:month)

attributes(data.currents.periodicmean$u)

period <- dimnames(data.currents.periodicmean$u)[[3]]

period

lat <- dimnames(data.currents.periodicmean$u)[[1]]

lon <- dimnames(data.currents.periodicmean$u)[[2]]

data.currents.periodicmean$u[1,1,1]

data.currents.periodicmean$u[lat==40,lon==180,period=="1993-01"]

data.currents.periodicmean$u[lat==40, lon==180,]