
Subject: EOF analysis

Posted by [siumtesfai](#) on Tue, 11 Aug 2015 16:06:15 GMT

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Dear All,

I have tried to use EOF analysis on my data. Any suggestion on how to fix my code below using NCEP/NCAR Sea level pressure.

Best regards

```
;=====
```

```
filename=['ncep1']
```

```
FOR imodel = 0 ,n_elements(filename)-1 do begin
```

```
source ='F:\Data\CMIP5\geopot\1979-2012\zg_Amon_'  
file=source+filename(imodel)+'_r1i1p1_combine_za.sav'
```

```
restore,file  
print,file
```

```
check,time
```

```
xt=where(time GE 1950. and time LT 2006)  
time=time(xt)  
lon=long  
xp=where(ref_press eq 1000)  
new_data1=reform(new_data1(*,*,xp,xt))
```

```
;=====
```

```
; Interpolate models to NCEP resolution (2.5 by 2.5)
```

```
; =====
```

```
if imodel eq 0 then sst=fltarr(n_elements(filename),144,73,n_elements(time))
```

```
FOR timeindx=0,n_elements(time)-1 do begin
```

```
ice=new_data1[*,* ,timeindx]  
nx = 144  
ny = 73  
slon = findgen(144)*2.5  
slat = findgen(73)*2.5-90
```

```

x = Interpol(Findgen(N_Elements(lon)), lon, slon)
y = Interpol(Findgen(N_Elements(lat)), lat, slat)
xx = Rebin(x, nx, ny, /SAMPLE)
yy = Rebin(Reform(y, 1, ny), nx, ny, /SAMPLE)
newwind = INTERPOLATE(ice, xx, yy,missing=1e20)

sst(imodel,*,*,timeindx)=newwind

ENDFOR ; timeindx loop

lat=slat
lon=slon

;=====
ntime=n_elements(time)/12

; over NH 20N-90N

xlat=where(lat GE 20 and lat LE 90)
xlon=where(lon GE 0 and lon LE 360)

tempdata=reform(sst(imodel,xlon,xlat,*))

xmonth=where(time GE 1950 and time LT 2006)
data=tempdata(*,*,xmonth)
lon=lon(xlon)
lat=lat(xlat)

; Calculate and apply cosine weighting to the values.
dims = Size(data, /Dimensions)
nlon = dims[0] & nlat = dims[1] & ntime = dims[2]
dlon = Abs(lon[1]-lon[0])
dlat = Abs(lat[1]-lat[0])
weights = Sqrt(Cos((lat - dlat/2.) * !DtoR))

fac=!pi/180.

FOR k=0,nlon-1 do begin
  FOR m=0,nlat-1 do begin
    FOR j=0,ntime-1 DO begin

      data[k,m,j] = data[k,m,j] * weights(m)

    ENDFOR
  ENDFOR
ENDFOR

```

```

ENDFOR
ENDFOR

data = Reform(data, nlon*nlat, ntime, /OVERWRITE)
data_anomalies = data

FOR jj=0,nlon*nlat-1 DO data_anomalies[jj,*] = data[jj,*] - Mean(data[jj,*])

matrix = (1/ntime-1) * (Double(data_anomalies) ## Transpose(data_anomalies))

LA_SVD, matrix, W, U, V

dims = Size(data_anomalies, /Dimensions)
eof1 = FltArr(dims[1], dims[0])

FOR j=0,dims[1]-1 DO BEGIN
  t = Transpose(data_anomalies) ## U[j,*]
  eof1[j,*] = t / SQRT(Total(t^2))
ENDFOR

pc = FltArr(dims[1], dims[1])

FOR j=0,dims[1]-1 DO pc[j,*] = data_anomalies ## eof1[j,*]

percent_variance = W / TOTAL(W) * 100.0

mode = 1
theEOF = eof1[mode-1,*]

theEOF = Reform(theEOF, nlon, nlat, /OVERWRITE)

pctmp=reform(pc(0,*))
pc1=fltarr(ntime)

FOR k=0,ntime-1 DO pc1[k] = pctmp[k] / stddev(pctmp) ; PC1 is the AO index

AO=pc1

ENDFOR ; end of main loop

END

```
