

Module V

WEB-DHM and Drought Indices

Extreme Events Analysis for each
basin

June 20, 2013

Hands-on Training

- Objective: Analyze your own basin's output and identify climate change impacts for floods and droughts
- Requirements:
 - GFDL_CM2_1_ANALYSIS.xls
 - WEB-DHM outputs
 - Fortran codes:
 - `Step1_All_years_merge.f` (merges all files into 1 long daily file for 20 years past and 20 years future)
 - `Step2_Rank.f` (ranks the 20 years merged files from highest to lowest; and ranks each daily file from highest to lowest for both past and future)
 - `Step3_day2month.f` (converts Step1's output into monthly files and 20 years average for each month)

Step1_All_years_merge.f

1. Go to WEB-DHM output/river folder and open fortran code
2. Change outlet name based on the name assigned for your simulations
3. Save file
4. Run the fortran code in putty by typing the following:
ifort Step1_All_years_merge.f -o Step1.exe
./Step1.exe

```
Step1_Allyears_merge.f
55 C
56 C   Beginning of executable code...
57 C
58 C%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
59
60 do igauge = 1, n_gauge
61
62     if(igauge==1)   dis_gauge = 'ws500'           ! Change Outlet Name
63
64     lfile = len(dis_gauge)
65     call strlenth(dis_gauge,lfile)
66
67     write(cyys, '(i4.4)') yystartp
68     write(cyye, '(i4.4)') yyendp
69
```

Step2_Rank.f

1. Go to WEB-DHM output/river folder and open fortran code
2. Change outlet name based on the name assigned for your simulations
3. Save file
4. Run the fortran code in putty by typing the following:
ifort Step2_Rank.f -o Step2.exe
./Step2.exe

```
65
66     else
67         write(cyys, '(i4.4)') startyearf
68         write(cyye, '(i4.4)') endyearf
69         startyear = startyearf
70         endyear = endyearf
71     endif
72
73     OPEN(7, file='ws500'//cyys//'-'//cyye//'.
74     &daily.txt', status='old')
75
76     OPEN(9, file = 'mean.rank'//cyys//'-'//cyye//'.daily',
77     & status = 'unknown')
78     OPEN(10, file = 'year.rank'//cyys//'-'//cyye//'.daily',
79     &status = 'unknown')
80
81     write (9, '(2a15)') 'rank', 'Qrank'
82     write (10, '(21a15)') 'rank',
83     & '81/46', '82/47', '83/48', '84/49', '85/50', '86/51', '87/52', '88/53',
84     & '89/54', '90/55', '91/56', '92/57', '93/58', '94/59', '95/60', '96/61',
85     & '97/62', '98/63', '99/64', '00/65'
```

Step3_day2mon.f

1. Go to WEB-DHM output/river folder and open fortran code
2. Change outlet name based on the name assigned for your simulations
3. Save file
4. Run the fortran code in putty by typing the following:
Ifort Step3_day2mon.f -o Step3.exe
./Step3.exe

```
56 !#####
57 !
58 ! Set site information
59 !
60 !#####
61 !
62
63 do igaug = 1, n_gaug
64
65     if(igaug==1) dis_gaug = 'ws500' ! Change Outlet Name
66
67     lfile = len(dis_gaug)
68     call strlnth(dis_gaug,lfile)
69
70
71 do isim = 1, 2
72
73     if (isim==1) then
74         write(cyys, '(i4.4)') startyearp
75         write(cyye, '(i4.4)') endyearp
76         startyear = startyearp
77         endyear = endyearp
78
79     else
80         write(cyys, '(i4.4)') startyearf
81         write(cyye, '(i4.4)') endyearf
82         startyear = startyearf
```

Outputs

- outletname1981-2000.daily
- outletname2046-2065.daily
- meanrank1981-2000.daily
- meanrank2046-2065.daily
- year.rank1981-2000.daily
- year.rank2046-2065.daily
- outletname1981-2000.monthly.txt
- outletname2046-2065.monthly.txt
- outletname1981-2000.20yr_monthly_average.txt
- outletname2046-2065.20yr_monthly_average.txt

Please fill up the corresponding sheets with the datasets and calculate SA for past and future as we have done together yesterday

Assignment: Summarize your results in a word document from model selection to bias correction to discharge analysis and please submit to Petra-san by email for compiling