**Eleventh International Training Workshop Climate Variability and Predictions (11ITWCVP)**

**Seasonal Rainfall Prediction Experiments**

**Instructions**

**Keep the same working groups as for the subseasonal forecasting exercises**

*Please read the document in its entirety, before downloading the data so that you download only the data relevant to your group.*

*ENTIRE EXERCISES ARE FOR WINDOWS SYSTEM AND NOT FOR LINUX (because we have not tested the linux version of CPT and do not have time to do so in this workshop)*

*IF you are working in a linux environment, please work on WINDOWS within your group*

PLEASE DO NOT WAIT TO COME TO CLASS TO DOWNLOAD, DO IT NOW

**Data**

Please download the data here and save in a directory

<https://ftp.cpc.ncep.noaa.gov/International/11ITWCVP_Ankara2019/>

There are two directories: 1) nmme and 2) obs\_data

The nmme directory contains two subdirectories: 1) fcst, and 2) hcst

fcst: contains current monthly and seasonal forecasts for 12 months initial conditions for SST, precipitation, temperature) all initial conditions

hcst contains monthly and seasonal hindcasts data (1982 – 2010) for SST, precipitation, temperature) all initial conditions

The obs\_data directory contains monthly and seasonal data in three subdirectories: a) PRCL (precipitation); b) ersstv5b (SST), c) tmp2m (air temperature).

**Keep the same working groups as for the subseasonal forecasting exercises**

**I. Forecast Experiments**

Each group will run two sets of seasonal prediction experiments for precipitation. All experiments are CCA runs. Each group will choose one season to run the experiments. The ***predictand geographical domain*** is left up to the group to decide. All experiments are run at one-month lead. The ***predictor geographical domain*** is global SST (60N – 40S).

**Predictand** data is Chen data provided through the ftp.

**Predictor** data is ERSST and NMME predicted SST also provided through the ftp.

*Note: CCA forced with model predicted SST: Run experiments with all the individual models of the NMME and the ensemble mean (ENSM)*

**Example for the DJF season**

1) Observed SST: Use October observed SST to run CCA for DJF predictions

2) Model predicted SST: Use DJF model predicted SST, October initial conditions to run CCA for DJF predictions

**Group1: Northern Africa**

**Season: DJF**

**Predictand: DJF Chen precipitation data**

**Predictor:**

Exp1: **ERSST Oct SST**

Exp2: **Model predicted DJF SST, October initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

**Group2: Eastern Europe**

**Season: DJF**

**Predictand: DJF Chen precipitation data**

**Predictor:**

Exp1: **ERSST Oct SST**

Exp2: **Model predicted DJF SST, October initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

**Group3: West Africa**

**Season: JAS**

**Predictand: JAS Chen precipitation data**

**Predictor:**

Exp1: **ERSST May SST**

Exp2: **Model predicted JAS SST, May initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

**Group4: Gulf of Guinea Region**

**Season: OND**

**Predictand: OND Chen precipitation data**

**Predictor:**

Exp1: **ERSST Aug SST**

Exp2: **Model predicted OND SST, Aug initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

Group5: Eastern and Southern Africa

**Season: OND**

**Predictand: OND Chen precipitation data**

**Predictor:**

Exp1: **ERSST Aug SST**

Exp2: **Model predicted OND SST, Aug initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

Group6: South Asia

**Season: JAS**

**Predictand: JAS Chen precipitation data**

**Predictor:**

Exp1: **ERSST May SST**

Exp2: **Model predicted JAS SST, May initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

Group7: Southeast Asia

**Season: JAS**

**Predictand: JAS Chen precipitation data**

**Predictor:**

Exp1: **ERSST May SST**

Exp2: **Model predicted JAS SST, May initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

Group8: South America

**Season: DJF**

**Predictand: DJF Chen precipitation data**

**Predictor:**

Exp1: **ERSST Oct SST**

Exp2: **Model predicted DJF SST, October initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

Group9: Central America and Colombia

**Season: SON**

**Predictand: SON Chen precipitation data**

**Predictor:**

Exp1: **ERSST Jul SST**

Exp2: **Model predicted SON SST, Jul initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

Group10: Turkey

**Season: NDJ**

**Predictand: NDJ Chen precipitation data**

**Predictor:**

Exp1: **ERSST Sep SST**

Exp2: **Model predicted NDJ SST, September initial conditions**

Exp2a: CFSv2

Exp2b: CMC1

Exp2c: CMC2

Exp2d: GFDL

Exp2e: GFDL – Floor

Exp2f: NASA

Exp2g: NCAR

Exp2h: ENSM (ensemble mean)

II) Selecting the model with the best skill score

a) Saving CCA outputs

For each experiment, save the following outputs:

CCA loadings mode1 and mode2 for SST and precipitation

Skill map

ROC map

ROC Curve for one grid point

b) Compute the area average of the correlation skill for each experiment

c) Create a table and register all the correlation values for each experiment

d) Compare the correlation values and note the model with the best skill

III) Hands on Verification Exercises

Instructions are handed out separately and demonstration will be carried out in class.

IV) Forecast verifications

Pick the model with the best skill and run retrospective forecasts last 10 years (2009 – 2018) for that model

In one single forecast run, make retroactive 10-year forecasts from 2009 to 2018

Follow the procedure below

Example for DJF forecasts

For DJF 2009 forecasts, use Oct 2008 initial conditions

For DJF 2010 forecasts, use Oct 2009 initial conditions

Etc….

Saving the verification maps

After completion of the retrospective forecasts, save the maps of tendency diagram, reliability diagram, and ROC diagram

Interpret the verifications results

V) Preparing a PPT for group presentation

Prepare a PPT and include the following for the model for which you have conducted verifications:

CCA loadings for mode1 and mode2

Skill map

Verification diagrams (ROC, Reliability, Tendency)

Present the results