GLOBAL FRAMEWORK FOR CLIMATE SERVICES

TRAINING REPORT ON
DOWNSCALING SEASONAL CLIMATE FORECAST USING CLIMATE PREDICTABILITY TOOL

AT UBUNGO PLAZA, DAR ES SALAAM, TANZANIA
FEBRUARY 6TH -8TH 2017
**List of abbreviations:**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT</td>
<td>Climate Predictability Tool</td>
</tr>
<tr>
<td>MAM</td>
<td>March, April, May season</td>
</tr>
<tr>
<td>TMA</td>
<td>Tanzania Meteorological Agency</td>
</tr>
<tr>
<td>WMO</td>
<td>World Meteorological Organization</td>
</tr>
<tr>
<td>GFCS</td>
<td>Global Framework for Climate Services</td>
</tr>
<tr>
<td>DRA</td>
<td>Director of Research and Applied Meteorology</td>
</tr>
<tr>
<td>GIS</td>
<td>Global Information System</td>
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</tbody>
</table>
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1.0 Proceeding of the training:

Tanzania Meteorological Agency (TMA) in collaboration with World Meteorological Organization (WMO), under the umbrella of Global Framework for Climate Services (GFCS) organized a workshop on Downscaling Seasonal Weather Forecasts using Climate Predictability Tool (CPT). The seminar took place at Ubungo Plaza, Tanzania Meteorological Agency seminar room from 6th to 8th February 2017. The training comprised 27 TMA staffs from various departments. The details list of participants is found in Annex 1. The three day technical seminal comprised of the following content:

1. Day one: participants’ arrival and registration, official opening, overview of the downscaling concept of seasonal weather, introduction to CPT and INSTAT software instillation. After tea break we had a session for data preparation into CPT format and presentation on climate predictability tool user interface, and discussion session of model output results.

2. Day two: hands on session on generation of rainfall onsets, cessation, and dry spells length using INSTAT. Generation of tailored climate product using output from instant (as predictant to CPT tool), and discussion session on output results and model skills.

3. Day three: session one was introduction to Climate Predictability using General Circulation Models. A presentation on downloading predictors and predictant from IRI center, and practical session on downloading data and running the tools. The discussion session on output results, model skills, and forecast products followed. The detail of the program is found in Annex 2.

During the official opening Mr. Timiza welcomed Dr. Agnes Kijazifor official opening of the training. In her opening remarks, she insisted participants to use skills gained from the training to improve the coming seasonal forecast of March to May 2017. She highlighted the need for all meteorologists to participate in the research that improves seasonal forecast and the research department to lead research activities in our organization. She stressed that climate is changing and we need to review our research priorities to reflect the changes. She emphasized the need to include participants from Julius Kambarage International Airport and regional staffs. The detail of the opening remarks is found in Annex 3.
During the introduction to CPT session in day one, Mr Lipiki emphasized participants to understand the theory behind regressions and why we build relationship between dependent variables and independent variables. He outlined the need to screen out significant predictors that are influencing MAM rainfall. During the discussion it was found that we need to conduct further research on critical predictors and the predictant should not only from SST, but from other indicators to improve our forecast. The details of the presentation are found in Annex 4.

We managed to install CPT software to our laptops and we prepared data into CPT formats. We learned key feature of climate predictability tool user interface. After lunch Mr Lipiki assisted us on the procedure to forecast 2017 MAM using SST as predictors from 1982 to 2016.

In the second day, Ms Pamela gave us a recap for day one followed by a presentation by Mr Igenge on features of CPT and generation of rainfall onsets, cessation, and dry spells length using INSTAT software. Also we learned about data preparation in INSTAT format using macros. The details of his presentation are found in the Annex 5. It was an opportunity for us to learn INSTAT and to develop our own predictant which are input to CPT tool. Some of the predictant or tailor made information generated from INSTAT are planting dates, lengths of the season and rain days. After tea break we work on generation of tailor made products using CPT and after lunch we discussed about model skills and forecast product. Some of the outputs from the INSTAT run are found in Annex 6.

In day three we had a recap for day 2 from Mr Swenya followed by Mr Kikwasi presentation on introduction to Climate Predictability using General circulation Models. In his presentations we observed the following:

- There are tools works well with CPT for example in IRI websites and can be used for seasonal weather forecast.
- We have to know well the tools sat hand before considering issue forecast and we have to know how tools accommodated in our environment and domains of interest.
- We have to test the forecasting skill if you capable and if you have enough knowledge to meet forecasting expectations.
- We have to do performance and verification of the tools used. He explained stages for seasonal weather forecast have been transformed: in the beginning we used top down approach and we found that it does not reflect the reality. The concept of downscaling.
came up to refine our forecast. He provided the web link where we can explore several forested output at [https://www.esrl.noaa.gov/psd/map/clim/sst.shtml](https://www.esrl.noaa.gov/psd/map/clim/sst.shtml).

- There is a need to have both the observed forecast and forecasted observations to make correlation on the model skills. Some of the output from his presentations is found in Annex 7.

MrLipikiconcluded the technical aspect of the training led the session on how to download observations, hind casts, and forecasts from ICPAC SCIPEA Portal. The detail is found in Annex 8.

### 2.0 General comments

The Director of Research and Applied Meteorology (DRA) Dr. LadislausChangá led the discussion on the achievements and challenges of the training and also the way forward. The following key points observed.

- The three day trainings improved participants’ skills on CPT and Instant. Some of the trainees are new to Instant and CPT tool.
- The training has created more questions on how to improve forecasting skills and new ways to screen potential predictors.

### 3.0 Future suggestions:

1. There is a need to find easier way for making notes prior to the training rather than snapshotting the procedures as they were done during practical sessions. This will help to manage time and learners to follow procedures more systematically. Otherwise the contents of the training were well structured and the number of experts on CPT and INSTAT tools increased.

2. It was stressed that the trainees should learn new features and application of the tool to sustainable improve skills and be able to transfer the skills gained to other in future training and be able to training more experts. It was recommended that the GIS Computer laboratory be equipped with CPT and INSTAT tools so that the trainees and scientists can use it for their inconvenience.

3. Improvement on Internet connection was recommended to improve hands-on practical.
4. The training period was found to be short and it was suggested to allocate more time especially for INSTA\Band\textit{practical}.

5. It was recommended that we should focus on outcomes rather than output. For example in Simanjiro district in Northern Tanzania, where it is a pilot location for GFCS, we would like to see improvement in people’s socioeconomic lives as results of improved climate services.

6. It was suggested that there should be a link between risk management team and seasonal weather forecasters’ team in order to complement the TMAs objectives quality assurance.

4.0 Closing remarks

As part of a way forward, Dr. Chang’a said that there will be a follow up training of few staffs for an extended period of at least 10 days on CPT and INSTA\textit{B}. Finally, On behalf of the Director General Dr. Chang’a thanked participants for being attentive during the training and for attaining the training objectives. Many thanks were given to trainers and organizing committee for making the training successful. The training was officially closed by Dr. Chang’a at 16.30 PM.
5.0 Appendices

Annex 1: List of participants

1. Dr Agnes Kijazi
2. Dr Ladislaus Chang’a
3. Dr. Hashim Ng’ongolo
4. Pamela Levira
5. Malekela Charles J
6. Mohamed Mwabumba
7. Isack Yonah
8. Elias J Lipiki
9. Wilberforce Kikwasi
10. Wilbert Timiza
11. Dr Hamza Kabelwa
12. Janeth Loningo’o
13. Edwin Igenge
14. Samwel Mbuya
15. Emmanuel Tumaini
16. Magreth Mushi
17. Veronika Mgalula
18. Rahel Ndeka
19. Tunza Sanane
20. Doreen Mwara
21. Chuki Sangalungembe
22. Shaminu Mushi
23. Mohamed Hamis
24. Irene Karumbeta
25. Dr. Pascal Waniha
26. Mecklina Merchedes
## Annex 2: Training Program

### Day 1

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00-08:30</td>
<td>Participant Arrival and Registration</td>
<td>Secretariat</td>
</tr>
<tr>
<td>8:30-9:00</td>
<td>Official Opening  (Participants introduction, Workshop objectives and expectations)</td>
<td>DRA /Mecklina</td>
</tr>
<tr>
<td>09:00-09:30</td>
<td>Overview on the Downscaling Concept of Seasonal weather</td>
<td>Mr. Elias Lipiki</td>
</tr>
<tr>
<td>09:30-10:00</td>
<td>Introduction to CPT and INSTAT&amp; software Installation</td>
<td>Mr. Elias Lipiki/ Mr. Edwin Igenge</td>
</tr>
<tr>
<td>10:00-10:30</td>
<td>Group photo and Tea</td>
<td>All</td>
</tr>
<tr>
<td>10:30-11:15</td>
<td>Preparation of Monthly Rainfall Data to CPT format (Station data)</td>
<td>Mr Wilberforce Kikwasi</td>
</tr>
<tr>
<td>11:15-13:00</td>
<td>Climate Predictability Tool User Interface</td>
<td>Mr Edwin Igenge</td>
</tr>
<tr>
<td></td>
<td>• Selecting the analysis, Input datasets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Predictor Designs, CPT input file formats</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Selecting the input files, Setting the Training Period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Setting the analysis options, Saving Program setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Running CPT, Data Analysis</td>
<td></td>
</tr>
<tr>
<td>13:00-14:00</td>
<td>Lunch</td>
<td>All</td>
</tr>
<tr>
<td>14:00 - 15:30</td>
<td>Discussion on the output results: Model Skills and Forecast Products.</td>
<td>All</td>
</tr>
<tr>
<td>15:30 - 16:00</td>
<td>Introduction to the Concept of Seasonal rainfall onsets ,Cessation and dry spells</td>
<td>Mr Edwin Igenge</td>
</tr>
</tbody>
</table>

### Day 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-09:00</td>
<td>Recap of Day One</td>
<td>All</td>
</tr>
<tr>
<td>09:00-10:00</td>
<td>Generation of rainfall onsets, cessation and dry spells length using INSTAT</td>
<td>Mr Edwin Igenge</td>
</tr>
<tr>
<td>10:00-10:30</td>
<td>Tea Break</td>
<td>Mr Edwin Igenge</td>
</tr>
<tr>
<td>10:30-13:00</td>
<td>Generation of tailored climate product using CPT</td>
<td>Mr Edwin Igenge</td>
</tr>
<tr>
<td>13:00-14:00</td>
<td>Lunch</td>
<td>All</td>
</tr>
<tr>
<td>14:00 - 15:30</td>
<td>Discussion on the output results: Model Skills and Forecast Products.</td>
<td>All</td>
</tr>
<tr>
<td>15:30 - 16:00</td>
<td>Introduction to Climate Predictability Using General circulation Models (CFSv2, CMC1, and CMC2 &amp; NCAR)</td>
<td>Mr Wilberforce Kikwasi</td>
</tr>
</tbody>
</table>

### Day 3

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recap of Day two</td>
<td>All</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Presenter</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>8:30-10:00</td>
<td>Downloading Predictors and Predictands from Global Centres</td>
<td>Mr. Elias Lipiki</td>
</tr>
<tr>
<td>10:00-13:00</td>
<td>Assessment of Climate Predictability skills from Different climate models (CFSv2, CMC1, and CMC2 &amp; NCAR).</td>
<td>Mr. Elias Lipiki</td>
</tr>
<tr>
<td>13:00-14:00</td>
<td>Lunch</td>
<td>All</td>
</tr>
<tr>
<td>14:00 - 15.30</td>
<td>Discussion on the output results: Model Skills and Forecast Products</td>
<td>All</td>
</tr>
</tbody>
</table>
| 15.30 - 16.00| Course evaluation  
Way Forward  
Closing Remarks                                                  | DRA /Mecklina      |


**STATEMENT BY DR. AGNES KIJAZI, DIRECTOR GENERAL OF TANZANIA METEOROLOGICAL AGENCY DURING OFFICIAL OPENING OF THE TRAINING ON DOWNSCALING OF SEASONAL CLIMATE FORECAST USING CLIMATE PREDICTABILITY TOOL FROM 06th TO 8th FEBRUARY 2017, AT TANZANIA METEOROLOGICAL AGENCY SEMINAR ROOM**

Directors of Tanzania Meteorological Agency;  
Workshop Participants,  
Ladies and Gentlemen

It is a great honor for me to address you today on this official opening ceremony of the “**TRAINING ON DOWNSCALING OF SEASONAL CLIMATE FORECAST USING CLIMATE PREDICTABILITY TOOL**”. This workshop is held under the auspice of the Global Framework for Climate Services (GFCS) project in Tanzania entitled “**Climate Services Adaptation Programme in Africa on Building Resilience in Disaster Risk Management, Food Security, Nutrition, and Health**”. On behalf of the Government of the United Republic of Tanzania and on my own behalf, I wish to express my appreciation and sincere thanks to the Government of Norway through World Meteorological Organization for supporting this programme. I also thank all implementing partners for continued commitment shown toward implementation of this programme.
Ladies and Gentlemen

Weather and seasonal forecasting are the main activities of Tanzania Meteorological Agency and we are responsible to inform the general public about present and future weather conditions with high level of precision. Due to changing climate, our weather and seasons have greatly impacted. Advances in climate science are creating opportunities to improve weather and seasonal forecasting. Therefore, we have the responsibility to provide weather and seasonal forecasts that suits our society needs. I am pleased to reiterate to you that this programme is addressing resilience to the impacts of climate change and variability to our country.

Ladies and Gentlemen,

The main objective of this training is to enhance the capacity of TMA staffs to downscale seasonal climate forecast and to generate tailor made climate products.

I believe that this training will enhance your capacity to improve forecasting skills hence be able to produce tailor made forecast that fits customer needs.

I hope that you will make proper utilization of the skills gained to make positive changes of our country for sustainable development.

Ladies and Gentlemen,

With these few remarks I wish to declare that this training workshop is officially opened.

Thank you

Asante Sana
Annex 4: Overview presentation by MrLipiki.

### Contents

- 1. Basic idea on Regression (SLR, MLR, PCR)
- 2. Basic idea on Statistical (Regression) Models
- 3. Basic idea on Global Circulation Models (GCMs)
- 4. Statistical (Regression) Downscaling of GCMs

#### 1. Basic idea on Regression (SLR, MLR, PCR)

- Regression is the method of estimating unknown quantities based on known mathematical relationship between these quantities and known quantities.
- Example:
  - Maize Yield = Constant + Coefficient x Rainfall

#### ...cont

- Simple Linear Regression (SLR): One predictand against one predictor.
- Multiple Linear Regression (MLR): One predictand against many predictors.

#### ...cont

- Principal Component Regression (PCR)
- Many predictors are transformed to few, uncorrelated new predictors (so called principal components)
- This removes Multiplicity and Multicollinearity.
2. Basic idea on Statistical (Regression) Models

- Based on relationship between values of a given weather/climate parameter and lagged (earlier) values of another parameter.
- Example:
  - MAM 1981-2010 and Jan Nino 3.4 SST 1981-2010 (3 month lag)
  - MAM 1981-2010 and Dec Nino 3.4 SST 1980-2009 (2 months lag)

3. Basic idea on Global Circulation Models (GCMs)

- A general circulation model (GCM) is a type of climate model. It employs a mathematical model of the general circulation of a planetary atmosphere or ocean. It uses the Navier–Stokes equations on a rotating sphere with thermodynamic terms for various energy sources (radiation, latent heat).

4. Statistical (Regression) Downscaling of GCMs

- Using regression we can use the output from GCMs as predictors to estimate climate parameters (the predictands).
- Example:
  - CFSv2 MAM 1981-2010 and MAM 2017 precipitation hindcasts and forecasts, respectively, against MAM 1981-2010 observations to estimate/forecast MAM 2017
  - This procedure is known as “downscaling”.

---

**Hindcasting**: Estimating known/past climate parameter.

**Forecasting**: Estimating unknown future climate parameter.

**Training Period**: Period used to build a regression model (this period is normally 30 years)

**Cross-validation Period**: Period used to assess the accuracy of the hindcasts. Note: CPT cross-validation period is within the training period; confusing?! It does train one year, cross-validate the next, again train the next, and so on up to the end of training period.

**Forecast**: Producing a forecast.

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As their name suggests, they account for large scale (global) climate parameters; they cannot resolve (see) small spatial (area) variations of climate parameters.

Therefore they need Downscaling...
Annex 5: Mr Igenge presentation on CPT and INSTAT

**Presentation Outline**
- Introduction to CPT and Software Installation
- Introduction to Instat and software Installation

**What is CPT?**
Climate Predictability Tool (CPT) is an easy-to-use Windows-based software package for making seasonal climate forecasts.
Specifically, CPT is designed to produce statistical forecasts of seasonal climate using either the output from a GCM, or fields of sea-surface temperatures.

**What is CPT?**
CPT is both a statistical prediction tool, and a statistical downscaling tool. Identical statistical techniques are used in both cases. When the predictors are outputs from another model, the procedure is called model output statistics (MOS), but conceptually there is no difference from a standard statistical forecast model.

**What does the CPT do?**
- Canonical Correlation Analysis – Multiple Predictors, Multiple Predictands
- Principal Component Regression - Multiple Predictors, one or only few Predictands
- Multiple Linear Regression – Small number of Predictors and Predictands

**CPT as a Forecasting Tool**
**What is Instat?**

- Instat is a general statistical package.
- It is simple enough to be useful in teaching statistical ideas, yet has the power to assist research in any discipline that requires the analysis of data.
- Instat is used to apply good statistical practice for exploring, analyzing and presenting data.

**How Instat Works?**

- Instat works by responding to instructions (commands) that you submit in one of three ways, which are:
  - Method 1: Use the Menus and dialogues
  - Method 2: Type the command directly
  - Method 3: Store the commands in a file and submit the file

**What can Instat do?**

- Instat can be used for research that requires statistical analyses of data.
- Instat can also facilitate the analysis of climatic and agro-climatic data.

**Why use Instat?**

- Instat provides a way to use statistics for data analysis and helps in the production of tailored information.

**Examples of Some of the Derived Products from CPT originated from Instat**

- Third week of October
Annex 6: Output from INSTAT and CPT as diagnostic tool for predicting predictor.

a) INSTAT output showing planting date’s variability for MAM for the past 30 years from 1981 to 2010.

b) INSTAT window showing how we define the start of the rain season by selecting data available options, the earliest starting dates and the threshold rain total over three days for Dodoma.
c) An output window showing data extracted from Dodoma (planting dates are inputs to CPT as predictant).

e) This is an output that we can select predictors that correlate well with MAM rainfall in Dodoma. And these are diagnostic predictant that can be selected in hotspot location for further seasonal forecast.
f) This snapshot shows probability of MAM forecast for Dodoma 2017. The forecast ranges from 41.6% to 62%.

e) The window snapshot showing probability of exceeding forecasted rainfall for MAM 2017
f) Probabilistic forecast map for MAM rainfall from climate prediction tool

g) Rock area probability of the CPT forecast above normal rainfall in Northern Tanzania.
Annex 7: Product from Kikwasi presentation

a) Forecast from NOAA on weekly SST Anomaly for 29/01/2017 to 04/02/201. The details is found here at [http://www.cpc.ncep.noaa.gov/products/NMME/](http://www.cpc.ncep.noaa.gov/products/NMME/)

b) This is forecasted SST from different models as seen in a) above. We need to compare different models to see their forecast and make judgments.
c) This is ensemble forecast obtained by merging different models.

d) This is Elnino forecast plumes from various models, good tool to predict Elnino conditions.
Annex 8: How to download observations, hind casts, and forecasts from ICPAC SCIPEA Portal
home mbell ICPAC Models Montreal CMC1-CanCM3

Documents
overview an outline showing sub-datasets of this dataset

Datasets and Variables
FORECAST home mbell ICPAC Models Montreal CMC1-CanCM3 FORECAST [MONTHLY ]
HINDCAST home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST [MONTHLY SEASONAL mcb110 scb110 ]

Last updated: Mon 23 May 2016 14:27:51 GMT

home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST

Documents
overview an outline showing sub-datasets of this dataset

Datasets and Variables
mcb110 home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST mcb110 [tref T prec sat ]
MONTHLY home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST MONTHLY [tmp max soliw prec prmsal ugrd t vrgd tmin tref sat ]
scb110 SEASONAL home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST scb110 [tref prec sat ]

Last updated: Wed, 25 May 2016 15:20:11 GMT
home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST MONTHLY

Documents

Outline an outline showing all sub-datasets and variables contained in this dataset.

Datasets and Variables

- Total Precipitation
- Pressure Reduced to Mean Sea Level
- Soil Moisture Content 0-10cm Below Surface
- Sea Surface Temperature
- Time
Data Selection

You can interactively pick out the data you would like with the Data Viewer.

You can reduce the amount of data by restricting the range of the grids.

The current settings for the grids are:
- grid /X (degree_east) periodic (0) to (1W) by 1.0 N= 360 pts grid
- grid /Y (degree_north) ordered (90S) to (90N) by 1.0 N= 161 pts grid
- grid /L (months) ordered (0.5 months) to (11.5 months) by 1.0 N= 12 pts grid
- grid /M (units less) ordered (1.0) to (10.0) by 1.0 N= 10 pts grid
- grid /S (months since 1960-01-01) ordered (0000 1 Jan 1981) to (0000 1 Dec 2010) by 1.0 N= 360 pts grid

If this is what you want, choose **Stop Selecting**.

Setting Ranges

If you want to restrict the range along a grid, choose here.

<table>
<thead>
<tr>
<th>name</th>
<th>range</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>0 to 1W</td>
</tr>
<tr>
<td>Y</td>
<td>90S to 90N</td>
</tr>
</tbody>
</table>

HINTS

- longitude is best specified as west to east, two east values or two west values, otherwise you can end up with the wrong half of the world (e.g. 0.5E to 355.5E will work much better than 0.5E to 0.5W).
mean [ home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST MONTHLY prec ]: Total Precipitation data

mean [ home mbell ICPAC Models Montreal CMC1-CanCM3 HINDCAST MONTHLY prec ]

Independent Variables (Grids)
Forecast Start Time (forecast_reference_time)
grid / (months since 1960-01-01) ordered (0000 1 Dec 1981) to (0000 1 Dec 2010) by 12.0 N = 30 pts: grid

This dataset has bytes (41040 0.03913679MB) of data in it, which should give you a rough idea of the size of any file that you ask for.

Download Data To Specific Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ingrid</td>
<td>The Postscript-based software on which the Data Library is built.</td>
</tr>
<tr>
<td>CPT</td>
<td>Climate Predictability Tool.</td>
</tr>
<tr>
<td>Formfit</td>
<td>Interactive computer visualization and analysis software.</td>
</tr>
<tr>
<td>GrADS</td>
<td>Grid Analysis and Display System.</td>
</tr>
<tr>
<td>matlab</td>
<td>Data analysis and visualization software.</td>
</tr>
<tr>
<td>NCL</td>
<td>NCAR Command Language.</td>
</tr>
<tr>
<td>WinGPS</td>
<td>A public domain software package for the display and analysis of satellite</td>
</tr>
</tbody>
</table>

Other Available File Formats

Full Information Formats
These files contain all of the available metadata.
Please select the old version of the file, if you paste the expert mode DO NOT FORGET TO SELECT "OK"
**Strengthening Climate Information Partnerships - East Africa** is a UKAid-funded project of the WISER programme (Weather and climate information and decision support for Africa).

SCIEPA aims to strengthen partnerships between organisations involved in production, use, research and training activities regarding seasonal climate forecast information, towards increased capacity for national/regional early warning and effective early actions. SCIEPA is led by the IMD Office (UK), together with the IRI, the IGAD Climate Prediction and Applications Centre (ICPAC), and national meteorological services and universities/training and other centres from Ethiopia, Kenya, Tanzania and Uganda.

**Model Datasets**
- CPC Montreal
- CPC Washington
- CPC Center
- NASA
- GFDL
- CCM4

**Observation Datasets**
- CAMS OPI Precipitation
- ORCM CAMS Temperature
- ERSST Sea Surface Temperature
- Reanalysis Mode: Data Level Pressure
- NASA/GPCP Precipitation
- FEWS-ARC2 Daily Precipitation
- UCL/IRIEDO Precipitation

---

**NOAA NCEP CPC FEWS Africa DAILY ARC2 daily est_prcp: Estimated Precipitation data**

NOAA NCEP CPC FEWS Africa DAILY ARC2 daily Estimated Precipitation: CPC/Africa Rainfall Climatology 2: Daily Values.

**Independent Variables (Grids)**

Time (time)
grid /t (days since 1960-01-01 12:00:00) ordered (1 Jan 1983) to (6 Feb 2017) by 1.0 N= 12456 pts grids

Longitude (longitude)
grid /x (degree_east) ordered (20W) to (55E) by 0.1 N= 751 pts grids

Latitude (latitude)
grid /y (degree_north) ordered (40S) to (40N) by 0.1 N= 801 pts grids

Other Info
- buffer
- twosidesize