Technical

MANUAL

Weather Data API, Weather Data Messenger and Little_R Generator

By
MUTESASIRA JOVAN
KYEBAMBE SARAH
OKWII STANLEY
MULONDO MOSES

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Revision Sheet

Release No.	Date	Revision Description
Rev. 0	10/05/2018	User's Manual Template and Checklist
Rev. 1	19/05/2018	Initial Work
Rev. 2	04/06/2018	Revision 1: To Reflect Prototype 1.0

USER'S MANUAL

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

A. GENERAL INFORMATION

1.1 System Overview

The *Weather Data API* is web based system that provides easy and efficient access to weather data. The data available includes that from local manual stations and automatic weather stations stored in the Weather Data Repository(WDR)[1]. The weather data API allows programmers who are interested in using the weather data to access it easily and performs clearly defined functions for which there is a readily identifiable security consideration and need. In addition, it also provides general automatic data processing or network support for a variety of users and applications.

Current operational status:

- Partially Operational.
- Under development.

Weather Data Messaging app and *Little_R Generator* are small applications that use data provided by the weather API for specific purposes. These applications achieve a streamline data flow from the weather data repository to both the WRF model and the message switching system at the national meteorological center.

1.2 Project References

References that were used in preparation of this document in order of importance to the end user.

[1] "Weather Data Repositories – WIMEA-ICT", *Wimea-ict.net*, 2018. [Online]. Available: https://wimea-ict.net/?page_id=1844. [Accessed: 07- Jun- 2018]

[2] J. Michael J. Kavulich, "WRFDA Online Tutorial", *Www2.mmm.ucar.edu*, 2018. [Online]. Available: http://www2.mmm.ucar.edu/wrf/users/wrfda/OnlineTutorial/Help/littler.html. [Accessed: 07- Jun- 2018]

1.3 Authorized Use Permission

The WDR API system provides users with access to a variety of resources on the website which includes documentation, about and signing up for an API key that enables users to use the Weather API. The Weather Data Messaging Application administrator can add recipients,edit,and remove for the weather messaging application. The Little_R generator has no authorization, user are availed with the Little_R files through a web portal.

1.4 Points of Contact

1.4.1 Information

For additional information, please contact any member of the development team shown below:-

Name	Email	Phone
Mutesasira Jovan	mutesasirajovan@gmail.com	+256 702 563 825
Kyebambe Sarah	kyebambesarah75@gmail.com	+256 704 602 453
Moses Mulondo Kasozi	mulondo26@gmail.com	+256 703 493 608
Okwii Stanley	stanleeparker12@gmail.com	+256 785 041 234

1.5 Organization of the Manual

To achieve its purpose and aims, the manual is organized as follows:

A. GENERAL INFORMATION: It presents a short description of the system and reasons for its development. It contains definitions of the basic terms and entities related to the use of the system, the knowledge of which facilitates the clear understanding of this manual.
B. SYSTEM SUMMARY: Contains a general overview of the system written in non-technical terminology. The summary should outline the uses of the system in supporting the activities of the user and staff.
C. GETTING STARTED: Provides a general walkthrough of the system from initiation through exit. The logical arrangement of the information shall enable the functional personnel to understand the sequence and flow of the system.
D. USING THE SYSTEM (ONLINE): Provides a detailed description of the online system from initiation through exit, explaining in detail the characteristics of the required input and system-produced output.

1.6 Acronyms and Abbreviations

A list of the acronyms and abbreviations used in this document and the meaning of each.

App	Application
WDR	Weather Data Repository
WRF	Weather Research Forecasting Model
WIMEA-ICT	Weather Information Management in East Africa ICT
SMS	Short Messaging Service
TOU	Terms of Use
TDCF	Table Driven Code Forms
URI	Uniform Resource Identifier
API	Application Programming Interface
WMO	World Meteorogical Organization
JSON	JavaScript Object Notation

2.0 SYSTEM SUMMARY

B. SYSTEM SUMMARY

2.1 System Configuration

The Weather Data API consists several interfaces some of which are accessible by guest users (not logged in) and others are accessible to logged in users.
Before logging in, a guest can access the home, documentation, about, blog, register and login pages.The home page displays a short summary of the services offered by the API. The documentation page displays instructions on how to use different endpoints of the API to get desired user service. The about page displays a detailed description about the Weather Data API and the system at large.The blog has information about the developers of the API. The login page has a form filled by the user who has logged while the register page has a form to fill in order get an account with the weather data API.

After logging in a user can access all the above pages and in addition, has access to the logged in User page. This page gives a user access to an API key which the user appends to the API url to access the data at different end points.

The Weather Data Messaging application converts the data is converted from JSON format to Table Driven Code format which is required at the national Meteorological Centre. It has a user interface where an administrator is able to add another recipient and also view all the recipients in the system. once a recipient is added, they will automatically receive emails and SMS containing the weather data in after every 30 minutes.

The Little_R generator is an application that runs on the background on the server. It creates Little_R files by consuming the weather data from the API as input, performs data manipulation to achieve consistency in the standards recommended by WMO[2] for little_R files. The application sends the little_R files created to a web portal from which they can be accessed, downloaded and used for weather research and forecasting.

2.2 Data Flows

Users input there emails, username and passwords into the sign-up form on the weather data API website. After signing in, users can access their API key which is unique for every user. The API receives fetches from the Weather Data Repository(WDR) and transforms it into JSON format, which is accessible through the endpoints. WDR contains recorded at both the manual and automatic weather station.

The Weather Messaging Application uses one of the API's endpoint, which returns the current data. The endpoint provides the current weather data in JSON format. The Weather Messaging Application gets the JSON data, transforms it to TDCF and sends email or sms to specified recipients. The system administrator adds a recipient to the Weather Messaging Application and can edit and delete a recipient. Once a recipient is added, they will receive emails and sms containing the weather. The weather data is sent at interval of 30 minutes in TDCF format.

The Little_R Generator gets its input data through the Weather Data API in JSON format. It takes in data specific to a given station and recorded at a particular time since little_r observations are created basing on a station. From the station data provided by the API, it filters out parameters required for the creation of the little_r file such as temperature, humidity, wind speed, wind direction and altitude. Before use of these parameters, it performs data manipulation to ensure that parameters passed in the correct units as recommended by the WMO and calculations to obtain derived values e.g. dew point which is calculated from the wet and dry bulb temperature data.

Once all the parameters have been sanitized, they are fed into a program which produces a Little_R file as output. The created little_R file is moved into a directory on the server from which it can be accessed through the web portal.

2.3 User Access Levels

The Weather messaging Applications administrator can edit and delete the recipient for the weather data messaging application. Users can sign up on the API interface and also login to access the API key.
The Weather API has one User access Level.
Little R Generator has read, write and execute access Level while all weather/climate forecasters have read access to the files. But the forecasters have downloaded the file onto their personal computers, they get all access to that file.

3.0 GETTING STARTED

C. GETTING STARTED

3.1 Logging On

Weather Data API website.

A user email and password is required to log onto web interface of the Weather API.

Weather Data Messaging application.

The application requires the system's administrator to log in so as to add, edit or remove a recipient.

3.2 System Menu

Weather Data API website.

On visiting the Weather API interface the user will see a menu which consists the Home, Documentation, Blog and About links.In the right top corner, he/she sees a Login and Register links.

3.2.1 Login/Register

Weather Data API website.

Registered users are those who have been given a username and password for the Weather API. A registered user has additional access over the unregistered (guest) user for one or more Weather features. After registering a user can now access a valid API key which is used to access weather data using different endpoints/Urls.To register a user clicks in the register button in the top right corner of the guest interface.

Weather Data Messaging Application.

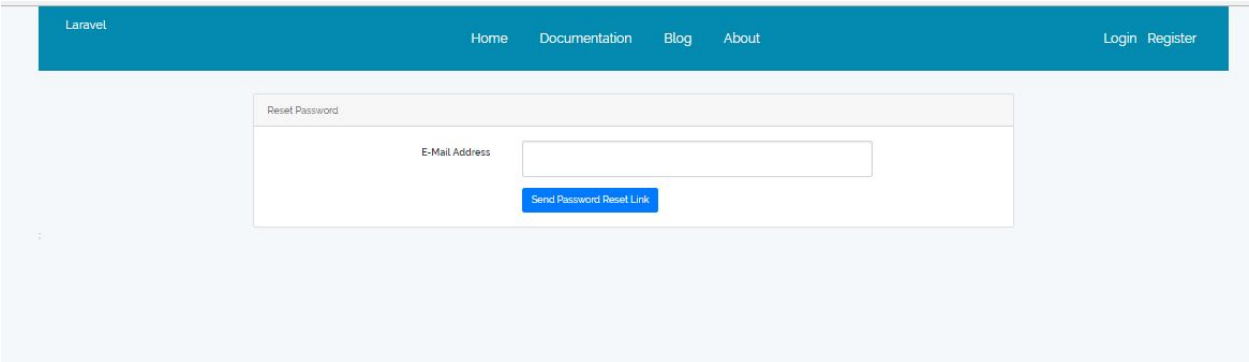
The system's administrator logs into the application and can add, edit and also delete recipients.

3.2.2 Documentation

Both a registered and unregistered user (guest) can read about how to use different endpoints/urls to route to appropriate functions which return required data.To access the documentation a user clicks on the "Documentation" link on the menu bar.

3.3 Resetting User Password on forgetting

Click “Forgot your password” link near the login button.
Fill in the a valid email you registered with the system.
And click the “send password Reset Link” button.
Open your email inbox and click on the sent link.
Your prompted to enter a new password for your account



3.4 Exit System

Click on logout at the top right corner of your interface..

4.0 USING THE SYSTEM (ONLINE)

D. USING THE SYSTEM (ONLINE)

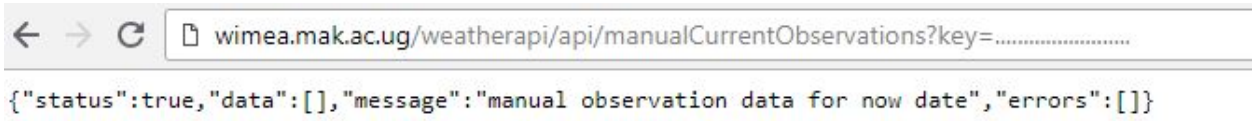
Weather Data API

4.1 Weather API Endpoints

This function directs URI/endpoints specified by the user to the appropriate method that returns required weather data to the user according to the passed url arguments.
Any API endpoint that can be routed to the appropriate method to return data must begin with http://wimea.mak.ac.ug/weatherapi/api/...

4.1.1 Manual observations for today endpoint

If a user wants to access all weather data for a specific manual station for the current day, he or she uses the "manualCurrentObservations" endpoint that returns required data. With this endpoint, the user specifies two parameters which includes the API key and the optional station.

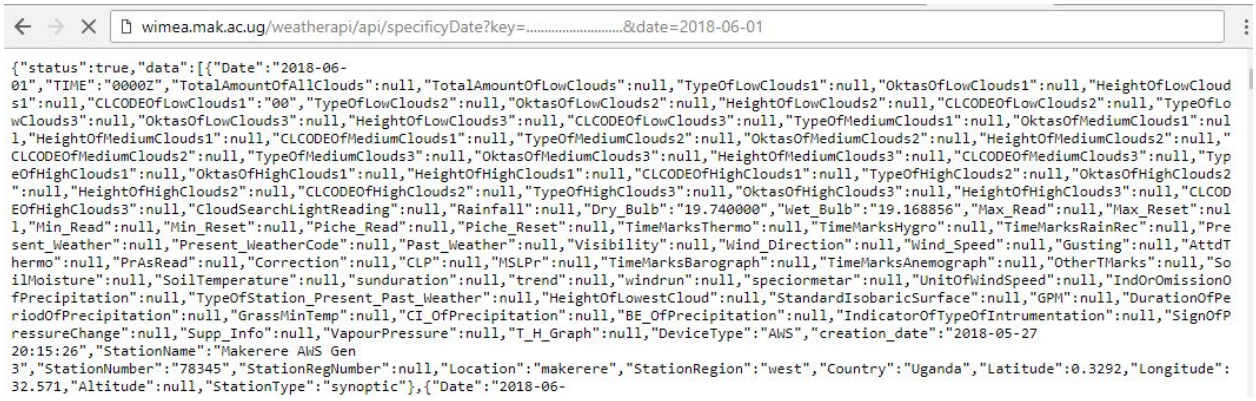


4.1.2 AWS observations for today endpoint

If a user wants to access all weather data for a specific automatic station for the current day, he or she uses the "aws CurrentObservations" endpoint that returns required data. With this endpoint the user specifies two parameters which includes the API key and the optional automatic station name.

4.1.3 Observations for a Specific Day endpoint

Here a user accesses weather data for a specified day and station. The user accesses the data through the endpoint "specificyDate" as shown in the picture below.With this endpoint the user specifies three arguments which includes the API key, date and the optional station.




```
{"status":true,"data":[{"Date":"2018-06-
01","TIME":"0000Z","TotalAmountOfAllClouds":null,"TotalAmountOfLowClouds":null,"TypeOfLowClouds1":null,"OktasOfLowClouds1":null,"HeightOfLowCloud
s1":null,"CLCODEOfLowClouds1":"00","TypeOfLowClouds2":null,"OktasOfLowClouds2":null,"HeightOfLowClouds2":null,"CLCODEOfLowClouds2":null,"TypeOfLo
wClouds3":null,"OktasOfLowClouds3":null,"HeightOfLowClouds3":null,"CLCODEOfLowClouds3":null,"TypeOfMediumClouds1":null,"OktasOfMediumClouds1":nul
l,"HeightOfMediumClouds1":null,"CLCODEOfMediumClouds1":null,"TypeOfMediumClouds2":null,"OktasOfMediumClouds2":null,"HeightOfMediumClouds2":null,"
CLCODEOfMediumClouds2":null,"TypeOfMediumClouds3":null,"OktasOfMediumClouds3":null,"HeightOfMediumClouds3":null,"CLCODEOfMediumClouds3":null,"Typ
eOfHighClouds1":null,"OktasOfHighClouds1":null,"HeightOfHighClouds1":null,"CLCODEOfHighClouds1":null,"TypeOfHighClouds2":null,"OktasOfHighClouds2
":null,"HeightOfHighClouds2":null,"CLCODEOfHighClouds2":null,"TypeOfHighClouds3":null,"OktasOfHighClouds3":null,"HeightOfHighClouds3":null,"CLCOD
EOfHighClouds3":null,"CloudSearchLightReading":null,"Rainfall":null,"Dry_Bulb":"19.740000","Wet_Bulb":"19.168856","Max_Read":null,"Max_Reset":nul
l,"Min_Read":null,"Min_Reset":null,"Piche_Read":null,"Piche_Reset":null,"TimeMarksThermo":null,"TimeMarksHygro":null,"TimeMarksRainRec":null,"Pre
sent_Weather":null,"Present_WeatherCode":null,"Past_Weather":null,"Visibility":null,"Wind_Direction":null,"Wind_Speed":null,"Gusting":null,"AttdT
hermo":null,"PrAsRead":null,"Correction":null,"CLP":null,"MSLPr":null,"TimeMarksBarograph":null,"TimeMarksAnemograph":null,"OtherTMarks":null,"So
ilMoisture":null,"SoilTemperature":null,"sunduration":null,"trend":null,"windrun":null,"speciormetar":null,"UnitOfWindSpeed":null,"IndOrOmissionO
fPrecipitation":null,"TypeOfStation_Present_Past_Weather":null,"HeightOfLowestCloud":null,"StandardIsobaricSurface":null,"GPM":null,"DurationOfPe
riodOfPrecipitation":null,"GrassMinTemp":null,"CI_OfPrecipitation":null,"BE_OfPrecipitation":null,"IndicatorOfTypeOfIntrumentation":null,"SignOfP
ressureChange":null,"Supp_Info":null,"VapourPressure":null,"T_H_Graph":null,"DeviceType":"AWS","creation_date":"2018-05-27
20:15:26","StationName":"Makerere AWS Gen
3","StationNumber":"78345","StationRegNumber":null,"Location":"makerere","StationRegion":"west","Country":"Uganda","Latitude":0.3292,"Longitude":
32.571,"Altitude":null,"StationType":"synoptic"},{"Date":"2018-06-
```


4.1.4 Observations for a Specific Date Range endpoint

User accesses weather data for a specified date range and station.The user access the data through the endpoint "specifyDateRange" as shown in the picture below.With this endpoint the user specifies three compulsory arguments which includes the API key, datefrom and dateto. On addition the user may append an optional station argument.


```
{"status":true,"data":[{"Date":"2018-05-
17","TIME":"06:00Z","TotalAmountOfAllClouds":2,"TotalAmountOfLowClouds":3,"TypeOfLowClouds1":2,"OktasOfLowClouds1":1,"HeightOfLowClouds1":6,"CLCO
DEOfLowClouds1":"St","TypeOfLowClouds2":6,"OktasOfLowClouds2":6,"HeightOfLowClouds2":6,"CLCODEOfLowClouds2":"St","TypeOfLowClouds3":8,"OktasOfLow
Clouds3":8,"HeightOfLowClouds3":8,"CLCODEOfLowClouds3":"Cu","TypeOfMediumClouds1":6,"OktasOfMediumClouds1":6,"HeightOfMediumClouds1":6,"CLCODEOfM
ediumClouds1":"Ac","TypeOfMediumClouds2":6,"OktasOfMediumClouds2":6,"HeightOfMediumClouds2":6,"CLCODEOfMediumClouds2":"As","TypeOfMediumClouds3":
8,"OktasOfMediumClouds3":8,"HeightOfMediumClouds3":8,"CLCODEOfMediumClouds3":"Ns","TypeOfHighClouds1":6,"OktasOfHighClouds1":6,"HeightOfHighCloud
s1":6,"CLCODEOfHighClouds1":"Cc","TypeOfHighClouds2":7,"OktasOfHighClouds2":8,"HeightOfHighClouds2":8,"CLCODEOfHighClouds2":"Cs","TypeOfHighCloud
s3":8,"OktasOfHighClouds3":8,"HeightOfHighClouds3":8,"CLCODEOfHighClouds3":"Cl","CloudSearchLightReading":88,"Rainfall":"8","Dry_Bulb":"23","Wet_
Bulb":"12","Max_Read":0,"Max_Reset":0,"Min_Read":0,"Min_Reset":0,"Piche_Read":0,"Piche_Reset":0,"TimeMarksThermo":0,"TimeMarksHygro":0,"TimeMarks
RainRec":0,"Present_Weather":"LL","Present_WeatherCode":"1111","Past_Weather":"788","Visibility":0,"Wind_Direction":"45","Wind_Speed":"233","Gust
ing":0,"AttdThermo":0,"PrAsRead":888,"Correction":0,"CLP":"77","MSLPr":0,"TimeMarksBarograph":0,"TimeMarksAnemograph":0,"OtherTMarks":"","SoilMoi
sture":null,"SoilTemperature":null,"sunduration":"","trend":null,"windrun":"","speciormetar":"metar","UnitOfWindSpeed":"5","IndOrOmissionOfPrecip
itation":"2","TypeOfStation_Present_Past_Weather":"2","HeightOfLowestCloud":"4","StandardIsobaricSurface":"11","GPM":"11","DurationOfPeriodOfPrec
ipitation":"11","GrassMinTemp":"","CI_OfPrecipitation":"","BE_OfPrecipitation":"8-
9","IndicatorOfTypeOfIntrumentation":"","SignOfPressureChange":"-
ve","Supp_Info":"","VapourPressure":"130","T_H_Graph":"","DeviceType":"web","creation_date":"2015-07-07
```


4.1.5 AWS Observations for a Specific date and time endpoint

User accesses AWS weather data for a specified date,time and station.The user access the data through the endpoint "awsSpecificDateTimeStationObservations" as shown in the picture below.With this endpoint the user specifies three compulsory arguments which includes the API key, date and time. On addition the user may append an optional station argument.


```
{"status":true,"data":[{"Date":"2018-06-
01","TIME":"0900Z","TotalAmountOfAllClouds":null,"TotalAmountOfLowClouds":null,"TypeOfLowClouds1":null,"OktasOfLowClouds1":null,"HeightOfLowClouds1"
:null,"CLCODEOfLowClouds1":"00","TypeOfLowClouds2":null,"OktasOfLowClouds2":null,"HeightOfLowClouds2":null,"CLCODEOfLowClouds2":null,"TypeOfLowCloud
s3":null,"OktasOfLowClouds3":null,"HeightOfLowClouds3":null,"CLCODEOfLowClouds3":null,"TypeOfMediumClouds1":null,"OktasOfMediumClouds1":null,"Height
OfMediumClouds1":null,"CLCODEOfMediumClouds1":null,"TypeOfMediumClouds2":null,"OktasOfMediumClouds2":null,"HeightOfMediumClouds2":null,"CLCODEOfMedi
umClouds2":null,"TypeOfMediumClouds3":null,"OktasOfMediumClouds3":null,"HeightOfMediumClouds3":null,"CLCODEOfMediumClouds3":null,"TypeOfHighClouds1"
:null,"OktasOfHighClouds1":null,"HeightOfHighClouds1":null,"CLCODEOfHighClouds1":null,"TypeOfHighClouds2":null,"OktasOfHighClouds2":null,"HeightOfHi
ghClouds2":null,"CLCODEOfHighClouds2":null,"TypeOfHighClouds3":null,"OktasOfHighClouds3":null,"HeightOfHighClouds3":null,"CLCODEOfHighClouds3":null,
"CloudSearchLightReading":null,"Rainfall":null,"Dry_Bulb":"26.809999","Wet_Bulb":"19.474783","Max_Read":null,"Max_Reset":null,"Min_Read":null,"Min_R
eset":null,"Piche_Read":null,"Piche_Reset":null,"TimeMarksThermo":null,"TimeMarksHygro":null,"TimeMarksRainRec":null,"Present_Weather":null,"Present
_WeatherCode":null,"Past_Weather":null,"Visibility":null,"Wind_Direction":null,"Wind_Speed":null,"Gusting":null,"AttdThermo":null,"PrAsRead":null,"C
orrection":null,"CLP":null,"MSLPr":null,"TimeMarksBarograph":null,"TimeMarksAnemograph":null,"OtherTMarks":null,"SoilMoisture":null,"SoilTemperature
":null,"sunduration":null,"trend":null,"windrun":null,"speciormetar":null,"UnitOfWindSpeed":null,"IndOrOmissionOfPrecipitation":null,"TypeOfStation_
Present_Past_Weather":null,"HeightOfLowestCloud":null,"StandardIsobaricSurface":null,"GPM":null,"DurationOfPeriodOfPrecipitation":null,"GrassMinTemp
":null,"CI_OfPrecipitation":null,"BE_OfPrecipitation":null,"IndicatorOfTypeOfIntrumentation":null,"SignOfPressureChange":null,"Supp_Info":null,"Vapo
urPressure":null,"T_H_Graph":null,"DeviceType":"AWS","creation_date":"2018-05-27 20:15:26","StationName":"Makerere AWS Gen
3","StationNumber":"78345","StationRegNumber":null,"Location":"makerere","StationRegion":"west","Country":"Uganda","Latitude":0.3292,"Longitude":32.
571,"Altitude":null,"StationType":"synoptic"}],"message":"AWS observation data for a specific time and station","errors":[]}
```


4.1.6 Manual station Observations for a Specific date and time endpoint

User accesses Manual station weather data for a specified date, time and station. The user access the data through the endpoint "manualSpecificDateTimeStationObservations" as shown in the picture below.With this endpoint, the user specifies three compulsory arguments which includes the API key, date and time. In addition, the user may append an optional station argument.


```
{"status":true,"data":[{"Date":"2017-05-
01","TIME":"0900Z","TotalAmountOfAllClouds":7,"TotalAmountOfLowClouds":4,"TypeOfLowClouds1":5,"OktasOfLowClouds1":4,"HeightOfLowClouds1":1700,"CLCOD
EOfLowClouds1":"SC","TypeOfLowClouds2":0,"OktasOfLowClouds2":0,"HeightOfLowClouds2":0,"CLCODEOfLowClouds2":"","TypeOfLowClouds3":0,"OktasOfLowClouds
3":0,"HeightOfLowClouds3":0,"CLCODEOfLowClouds3":"","TypeOfMediumClouds1":2,"OktasOfMediumClouds1":7,"HeightOfMediumClouds1":11000,"CLCODEOfMediumCl
ouds1":"AS","TypeOfMediumClouds2":0,"OktasOfMediumClouds2":0,"HeightOfMediumClouds2":0,"CLCODEOfMediumClouds2":"","TypeOfMediumClouds3":0,"OktasOfMe
diumClouds3":0,"HeightOfMediumClouds3":0,"CLCODEOfMediumClouds3":"","TypeOfHighClouds1":0,"OktasOfHighClouds1":0,"HeightOfHighClouds1":0,"CLCODEOfHi
ghClouds1":"","TypeOfHighClouds2":0,"OktasOfHighClouds2":0,"HeightOfHighClouds2":0,"CLCODEOfHighClouds2":"","TypeOfHighClouds3":0,"OktasOfHighClouds
3":0,"HeightOfHighClouds3":0,"CLCODEOfHighClouds3":"","CloudSearchLightReading":0,"Rainfall":"","Dry_Bulb":"20.4","Wet_Bulb":"18.8","Max_Read":0,"Ma
x_Reset":0,"Min_Read":0,"Min_Reset":0,"Piche_Read":0,"Piche_Reset":0,"TimeMarksThermo":0,"TimeMarksHygro":0,"TimeMarksRainRec":0,"Present_Weather":"
","Present_WeatherCode":null,"Past_Weather":null,"Visibility":9999,"Wind_Direction":"0","Wind_Speed":"00KT","Gusting":0,"AttdThermo":0,"PrAsRead":0,
"Correction":0,"CLP":"880.9","MSLPr":1019.8,"TimeMarksBarograph":0,"TimeMarksAnemograph":0,"OtherTMarks":"","SoilMoisture":null,"SoilTemperature":nu
ll,"sunduration":null,"trend":"","windrun":null,"speciormetar":null,"UnitOfWindSpeed":null,"IndOrOmissionOfPrecipitation":null,"TypeOfStation_Presen
t_Past_Weather":null,"HeightOfLowestCloud":null,"StandardIsobaricSurface":null,"GPM":null,"DurationOfPeriodOfPrecipitation":null,"GrassMinTemp":null
,"CI_OfPrecipitation":null,"BE_OfPrecipitation":null,"IndicatorOfTypeOfIntrumentation":null,"SignOfPressureChange":null,"Supp_Info":null,"VapourPres
sure":null,"T_H_Graph":null,"DeviceType":"web","creation_date":"2015-07-07
05:13:13","StationName":"Kampala","StationNumber":"63680","StationRegNumber":"8932022","Location":"Kampala","StationRegion":"Central","Country":"Uga
nda","Latitude":0.3372744,"Longitude":32.5674789,"Altitude":3000,"StationType":"Synoptic"}],"message":"AWS observation data for a specific time and
station","errors":[]}
```


4.1.7 Observations for the recent 30 days endpoint

If a user want to access all weather data for recent 30 days, he or she uses the "data forrecent30days" endpoint that returns required data. With this endpoint the user specifies two parameters which includes the API key and the optional automatic station name.


```
{"status":true,"data":[{"Date":"2018-05-
17","TIME":"06:00Z","TotalAmountOfAllClouds":2,"TotalAmountOfLowClouds":3,"TypeOfLowClouds1":2,"OktasOfLowClouds1":1,"HeightOfLowClouds1":6,"CLCO
DEOfLowClouds1":"St","TypeOfLowClouds2":6,"OktasOfLowClouds2":6,"HeightOfLowClouds2":6,"CLCODEOfLowClouds2":"St","TypeOfLowClouds3":8,"OktasOfLow
Clouds3":8,"HeightOfLowClouds3":8,"CLCODEOfLowClouds3":"Cu","TypeOfMediumClouds1":6,"OktasOfMediumClouds1":6,"HeightOfMediumClouds1":6,"CLCODEOfM
ediumClouds1":"Ac","TypeOfMediumClouds2":6,"OktasOfMediumClouds2":6,"HeightOfMediumClouds2":6,"CLCODEOfMediumClouds2":"As","TypeOfMediumClouds3":
8,"OktasOfMediumClouds3":8,"HeightOfMediumClouds3":8,"CLCODEOfMediumClouds3":"Ns","TypeOfHighClouds1":6,"OktasOfHighClouds1":6,"HeightOfHighCloud
s1":6,"CLCODEOfHighClouds1":"Cc","TypeOfHighClouds2":7,"OktasOfHighClouds2":8,"HeightOfHighClouds2":8,"CLCODEOfHighClouds2":"Cs","TypeOfHighCloud
s3":8,"OktasOfHighClouds3":8,"HeightOfHighClouds3":8,"CLCODEOfHighClouds3":"Cl","CloudSearchLightReading":88,"Rainfall":"8","Dry_Bulb":"23","Wet_
Bulb":"12","Max_Read":0,"Max_Reset":0,"Min_Read":0,"Min_Reset":0,"Piche_Read":0,"Piche_Reset":0,"TimeMarksThermo":0,"TimeMarksHygro":0,"TimeMarks
RainRec":0,"Present_Weather":"LL","Present_WeatherCode":"1111","Past_Weather":"788","Visibility":0,"Wind_Direction":"45","Wind_Speed":"233","Gust
ing":0,"AttdThermo":0,"PrAsRead":888,"Correction":0,"CLP":"77","MSLPr":0,"TimeMarksBarograph":0,"TimeMarksAnemograph":0,"OtherTMarks":"","SoilMoi
sture":null,"SoilTemperature":null,"sunduration":"","trend":null,"windrun":"","speciormetar":"metar","UnitOfWindSpeed":"5","IndOrOmissionOfPrecip
itation":"2","TypeOfStation_Present_Past_Weather":"2","HeightOfLowestCloud":"4","StandardIsobaricSurface":"11","GPM":"11","DurationOfPeriodOfPrec
ipitation":"11","GrassMinTemp":"","CI_OfPrecipitation":"","BE_OfPrecipitation":"8-
9","IndicatorOfTypeOfIntrumentation":"","SignOfPressureChange":"-
ve","Supp_Info":"","VapourPressure":"130","T_H_Graph":"","DeviceType":"web","creation_date":"2015-07-07
05:13:13","StationName":"Kampala","StationNumber":"63680","StationRegNumber":"8932022","Location":"Kampala","StationRegion":"Central","Country":"
```

4.1.8 Observations for the recent 7 days endpoint

If a user wants to access all weather data for recent 7 days, he or she uses the "dataforrecent7days" endpoint that returns required data. With this endpoint, the user specifies two parameters which includes the API key and the optional automatic station name.


```
{"status":true,"data":[{"Date":"2018-05-
31","TIME":"12:00Z","TotalAmountOfAllClouds":0,"TotalAmountOfLowClouds":0,"TypeOfLowClouds1":0,"OktasOfLowClouds1":7,"HeightOfLowClouds1":0,"CLCO
DEOfLowClouds1":"","TypeOfLowClouds2":0,"OktasOfLowClouds2":0,"HeightOfLowClouds2":0,"CLCODEOfLowClouds2":"","TypeOfLowClouds3":0,"OktasOfLowClou
ds3":0,"HeightOfLowClouds3":0,"CLCODEOfLowClouds3":"","TypeOfMediumClouds1":0,"OktasOfMediumClouds1":0,"HeightOfMediumClouds1":0,"CLCODEOfMediumC
louds1":"","TypeOfMediumClouds2":0,"OktasOfMediumClouds2":0,"HeightOfMediumClouds2":0,"CLCODEOfMediumClouds2":"","TypeOfMediumClouds3":0,"OktasOf
MediumClouds3":0,"HeightOfMediumClouds3":0,"CLCODEOfMediumClouds3":"","TypeOfHighClouds1":0,"OktasOfHighClouds1":0,"HeightOfHighClouds1":0,"CLCOD
EOfHighClouds1":"","TypeOfHighClouds2":0,"OktasOfHighClouds2":0,"HeightOfHighClouds2":0,"CLCODEOfHighClouds2":"","TypeOfHighClouds3":0,"OktasOfHi
ghClouds3":0,"HeightOfHighClouds3":0,"CLCODEOfHighClouds3":"","CloudSearchLightReading":0,"Rainfall":"","Dry_Bulb":"0","Wet_Bulb":"0","Max_Read":
0,"Max_Reset":0,"Min_Read":0,"Min_Reset":0,"Piche_Read":0,"Piche_Reset":0,"TimeMarksThermo":0,"TimeMarksHygro":0,"TimeMarksRainRec":0,"Present_We
ather":"","Present_WeatherCode":"","Past_Weather":"","Visibility":0,"Wind_Direction":"","Wind_Speed":"","Gusting":0,"AttdThermo":0,"PrAsRead":0,"
Correction":0,"CLP":"","MSLPr":0,"TimeMarksBarograph":0,"TimeMarksAnemograph":0,"OtherTMarks":"","SoilMoisture":null,"SoilTemperature":null,"sund
uration":"","trend":null,"windrun":"","speciormetar":"metar","UnitOfWindSpeed":"","IndOrOmissionOfPrecipitation":"","TypeOfStation_Present_Past_W
eather":"","HeightOfLowestCloud":"","StandardIsobaricSurface":"","GPM":"","DurationOfPeriodOfPrecipitation":"","GrassMinTemp":"","CI_OfPrecipitat
ion":"","BE_OfPrecipitation":"","IndicatorOfTypeOfIntrumentation":"","SignOfPressureChange":"","Supp_Info":"","VapourPressure":"","T_H_Graph":"",
"DeviceType":"web","creation_date":"2015-07-07
05:13:13","StationName":"Kampala","StationNumber":"63680","StationRegNumber":"8932022","Location":"Kampala","StationRegion":"Central","Country":"
Uganda","Latitude":0.3372744,"Longitude":32.5674789,"Altitude":3000,"StationType":"Synoptic"},{"Date":"2018-06-
```


4.1.9 Available and active stations endpoint

If a user wants to access all stations data that submit data to this repository, he or she uses the "availableStations" endpoint that returns required data. With this endpoint, the user specifies one argument the API key.


```
{"status":true,"data":
[{"StationName":"Kampala","StationNumber":"63680","StationRegNumber":"8932022","Latitude":0.3372744,"Longitude":32.5674789,"Location":"Kampala","
Altitude":3000,"StationRegion":"Central","Country":"Uganda"},{"StationName":"Fort
Portal","StationNumber":"63676","StationRegNumber":"5689","Latitude":67.777,"Longitude":78.777,"Location":"Fort
Portal","Altitude":777,"StationRegion":"Eastern","Country":"Uganda"},
{"StationName":"Tester","StationNumber":"3333","StationRegNumber":"3","Latitude":2121,"Longitude":123123213,"Location":"Guluptc","Altitude":12312
312,"StationRegion":"Northern","Country":"Uganda"},{"StationName":"Makerere
AWS","StationNumber":"536738","StationRegNumber":null,"Latitude":0.3292,"Longitude":32.571,"Location":"Makerere","Altitude":0,"StationRegion":"",
"Country":"Uganda"},
{"StationName":"Westerntest","StationNumber":"1223","StationRegNumber":"234","Latitude":990,"Longitude":223,"Location":"Westofuganda","Altitude":
44,"StationRegion":"Western","Country":"Uganda"},
{"StationName":"Northerntest","StationNumber":"12333","StationRegNumber":"5322","Latitude":998,"Longitude":78888,"Location":"Northofuganda","Alti
tude":666,"StationRegion":"Northern","Country":"Uganda"},
{"StationName":"Easterntest","StationNumber":"12345","StationRegNumber":"998787","Latitude":988,"Longitude":6877,"Location":"Jinja","Altitude":55
55,"StationRegion":"Eastern","Country":"Uganda"},
{"StationName":"Centraltest","StationNumber":"98777","StationRegNumber":"900000","Latitude":8999,"Longitude":5555,"Location":"Namasuba","Altitude
":9877,"StationRegion":"Central","Country":"Uganda"},
{"StationName":"Southerntest","StationNumber":"88199","StationRegNumber":"00766","Latitude":8999,"Longitude":6555,"Location":"Kisoro","Altitude":
447,"StationRegion":"Southern","Country":"Uganda"},{"StationName":"Makerere AWS GEN
3","StationNumber":"2562737","StationRegNumber":"356383","Latitude":1,"Longitude":0,"Location":"Makerere","Altitude":3673,"StationRegion":"Centra
l","Country":"Uganda"},
```


4.2 Weather API Key Generation

With this function, a user is given a permanent API key of 60 characters after a successful user account registration. This API can always be accessed by the user on logging into the system.

4.2.1 Weather API Account Registration

A user enters a unique username, valid email and password. On successful registration a user is logged in and redirected to logged in page where he or she can copy the API key.

4.2.2 Weather API Login

A user enters email and password they used for registration of the API key to log in. On successful login, the user redirected to the logged in page where he or she can copy the API key.

4.3 Special Instructions for Error Correction

As a condition of your use of the Services, you will not use the Services for any purpose that is unlawful or prohibited by these terms, conditions, and notices. You may not use the Services in any manner that could damage, disable, overburden, or impair any WIMEA-ICT/UNMA server, or the network(s) connected to any WIMEA-ICT/UNMA server, or interfere with any other party use and enjoyment of any Services. You may not attempt to gain unauthorized access to any Services, other accounts, computer systems or networks connected to any WIMEA-ICT/UNMA server or to any of the Services, through hacking, password mining or any other means. You may not obtain or attempt to obtain any materials or information through any means not intentionally made available through the Services.

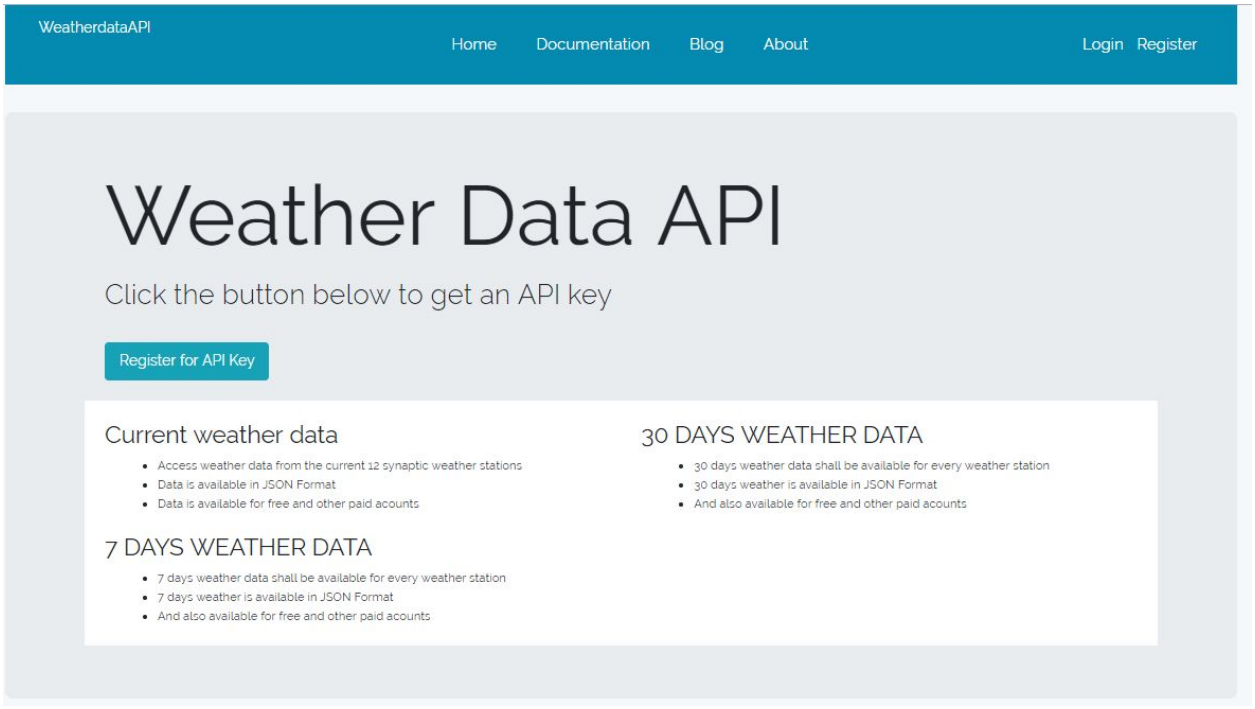
4.4 Caveats and Exceptions

The services that WIMEA-ICT provides to you are subject to the following Terms of Use ("TOU"). WIMEA-ICT reserves the right to update the TOU at any time without notice to you. The most current version of the TOU can be reviewed by clicking on the "Terms of Use".

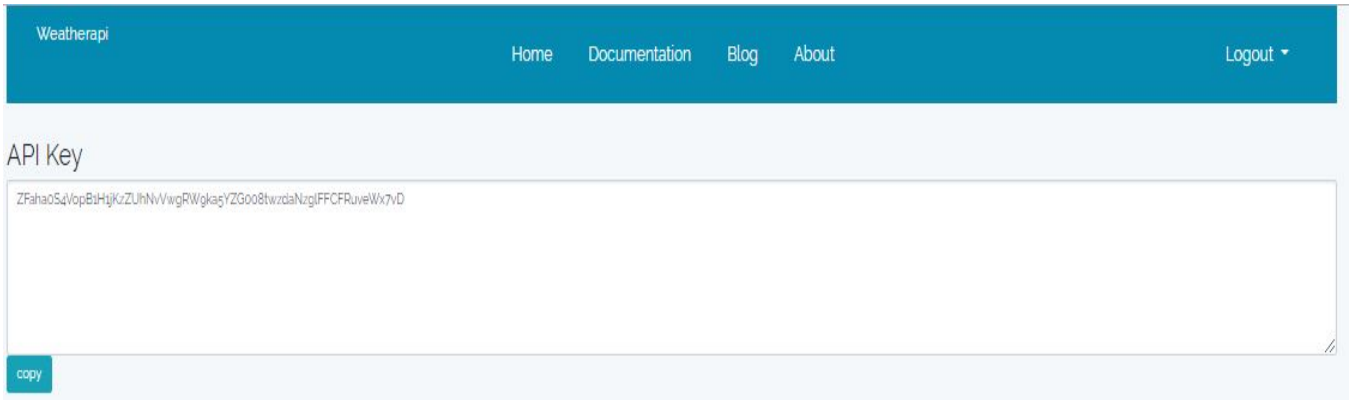
APPENDIX

A. SYSTEM SCREENSHOTS

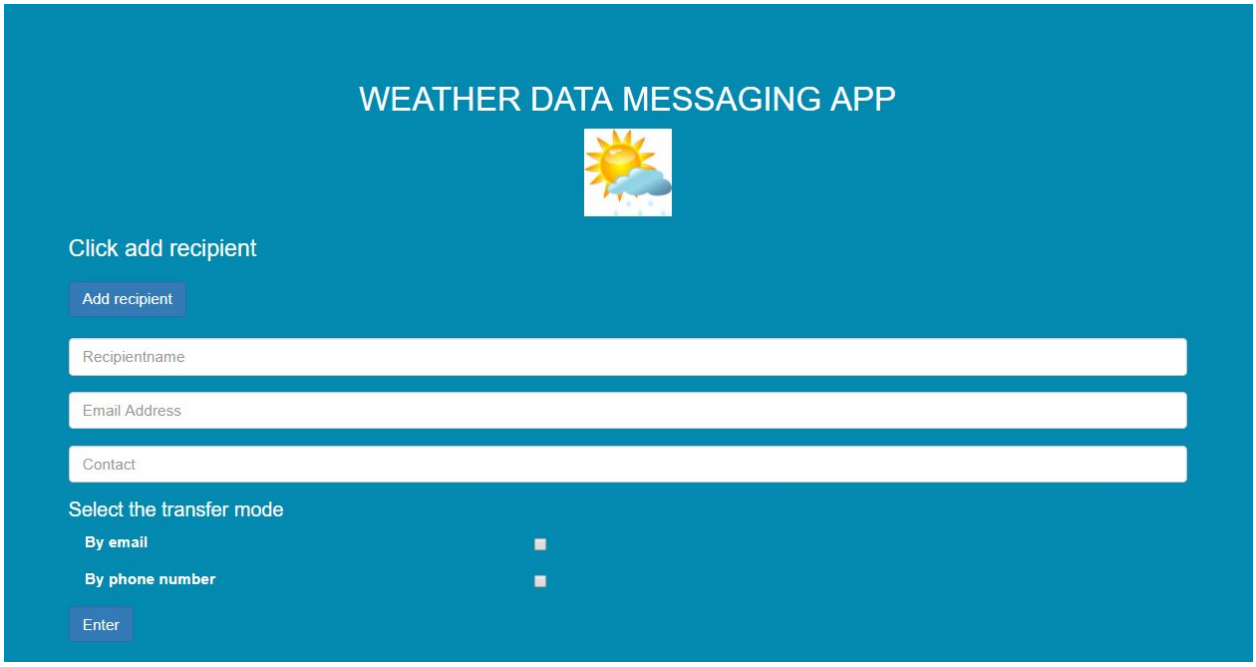
Weather Data API: Home Page



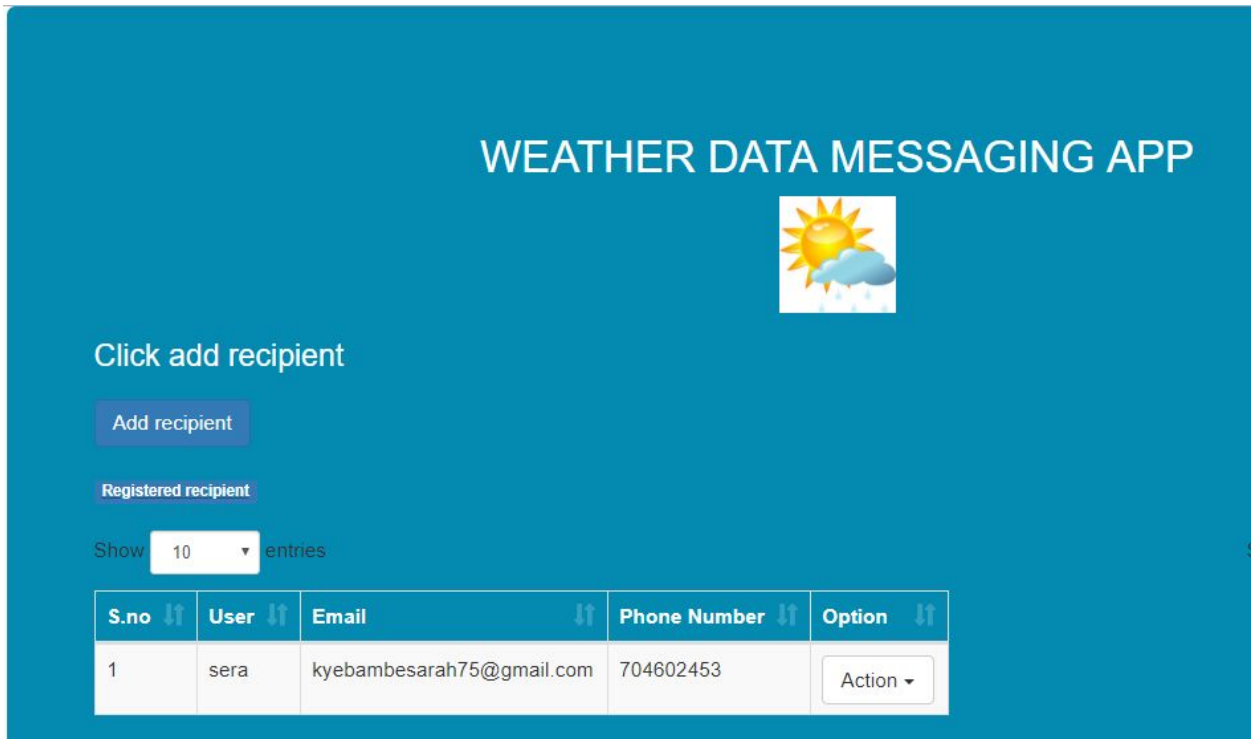
Weather Data API: User's Home Page



Weather Data Messaging Application: Add recipient



Weather Data Messaging Application: View recipients



Weather Data Messaging Application: Data in TDCF format

Station Name	TABLE ELEMENT NAME	VALUES	UNITS
Makerere Aws Gen3	Dry-bulb temperature	20.100000	^{0}C
	Wet-bulb temperature	17.852821	^{0}C
	Rainfall	xxx	mm
	Visibility	xxx	
	Wind speed	xxx	Degree
	Wind direction	17.852821	^{0}C
	Maximum Read	xxx	

Little_r Generator: Web portal to access little_r files

Index of /weatherapi/little_r

Name	Last modified	Size	Description
Parent Directory		-	
20180620.obs	2018-06-20 19:01	3.0K	
20180621.obs	2018-06-21 08:59	60K	
20180622.obs	2018-06-22 08:59	60K	
20180623.obs	2018-06-23 08:59	60K	
20180624.obs	2018-06-24 08:59	60K	
20180625.obs	2018-06-25 08:59	60K	
20180626.obs	2018-06-26 08:59	60K	
20180627.obs	2018-06-28 01:54	61K	
20180628.obs	2018-06-28 08:59	60K	
Kampala__2018062700.obs	2018-06-28 02:45	3.0K	
Kampala__2018062800.obs	2018-06-29 06:57	7.0K	
Kampala__2018062900.obs	2018-06-30 06:30	220K	
Kampala__2018063000.obs	2018-07-07 12:39	185K	
Kampala__2018070100.obs	2018-07-07 12:39	48K	
Kampala__2018070200.obs	2018-07-07 12:39	48K	
Kampala__2018070300.obs	2018-07-07 12:39	37K	
Kampala__2018070600.obs	2018-07-07 12:39	20K	
Kampala__2018070700.obs	2018-07-07 12:39	26K	

Little_r Generator: Data in little_r format


```
             0.33727            32.56748                                        Kampala
FM-96 AIREP                                                   3000.00000         1         0         0
0         0         T         F         F   -888888   -888888     20180703000000    -88.00000      0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0
      1.00000     1      1.00000     1      1.00000     1      1.00000     1      1.00000     1
1.00000      1      1.00000      1      1.00000      1      1.00000      1      1.00000      1
-777777.00000     0-777777.00000     0      1.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0
      1      0      0
             0.33727            32.56748                                        Kampala
FM-96 AIREP                                                   3000.00000         1         0         0
0         0         T         F         F   -888888   -888888     20180703000000    -88.00000      0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0
      1.00000     1      1.00000     1      1.00000     1      1.00000     1      1.00000     1
1.00000      1      1.00000      1      1.00000      1      1.00000      1      1.00000      1
-777777.00000     0-777777.00000     0      1.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0
      1      0      0
             0.33727            32.56748                                        Kampala
FM-96 AIREP                                                   3000.00000         1         0         0
0         0         T         F         F   -888888   -888888     20180703000000    -88.00000      0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0
      1.00000     1      1.00000     1      1.00000     1      1.00000     1      1.00000     1
1.00000      1      1.00000      1      1.00000      1      1.00000      1      1.00000      1
-777777.00000     0-777777.00000     0      1.00000     0-888888.00000     0-888888.00000     0-
888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0-888888.00000     0
      1      0      0
```