

WIS 2.0 training workshop

Nairobi, Kenya

13-17 October 2025



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Observation network and data collection and processing systems



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Observation network and data collection and processing systems

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UGANDA

Observation Network

Provide a summary of your observation network:

1. Synoptic stations

- ❖ number of stations, number shared in GTS, frequency: 12
- ❖ Which format (SYNOP FM-12 or BUFR): Synoptic formate and BURF - TDCF - Table driven code, IWXX - ICAO Meterological Information Exchange model

2. Automatic Weather Stations

- ❖ Total number of stations: 98
- ❖ Number of stations shared on GTS and update frequency : 0 Stations
- ❖ Data logger types and data formats: SM cards powered by Message Switching system in form of text format.

3. Radio-sounding network

- ❖ Total number of stations: 01 not operational – Hydrogen generator misfunctional
- ❖ Number of stations shared on GTS and update frequency
- ❖ Data formats used (ASCII, BUFR, or other to specify)

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

Data Collection: How is data gathered from your observation network?

- ❖ Manual stations – 03 hourly time steps, Data is filled on observation slips, and synoptic forms.
- ❖ Automatic Weather stations – real time transmission via SMS.
- ❖ Radar data
- ❖ Wind shear

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

Data Aggregation: What methods or systems are used to compile and organize the collected data?

Data is transmitted to National Forecasting office – SMS and Email.

Observation slips – Posted to DMS data centre, and archived into a repository system .

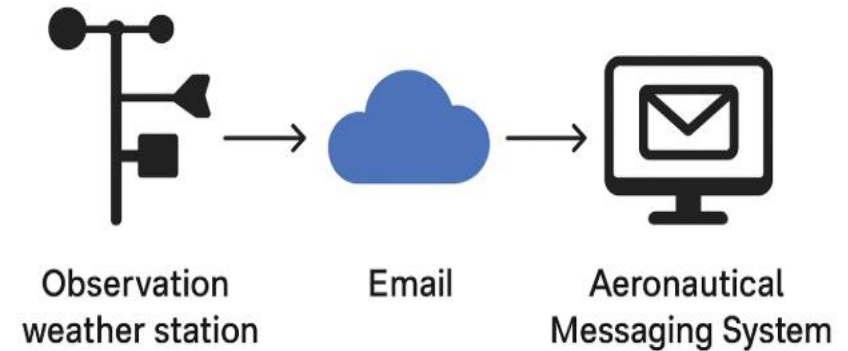
- Bulletined and sent to the GTS system
- Shared with Nairobi through an email – alternative is the mess.com – able to detect errors the data. License is inactive

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

International Data Sharing: How is your data currently published on the GTS?

- Bulletined and sent to the GTS system
- Shared with Nairobi through an email – alternative is the messil.com – license is inactive
- Aeronautical Message handling systems – ICAO aviation purposes.



Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

IT Infrastructure: What hardware, software, and platforms used for these tasks?

Hardware;

- 01 Server for data preprocessing – WRF model initialization for NWP products.
- 03 Radar – covering the all country
- Desktop computers

Software; ClimCom, ClimSoft, PUMA

Observation network and data collection and processing systems

Anthony Farley Wulu
LIBERIA METEOROLOGICAL SERVICE
MINISTRY OF TRANSPORT
LIBERIA



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Observation Network

Provide a summary of your observation network:

1. Synoptic stations

- ❖ There are 5 synoptic stations, Six (6) automatic agro-meteorological and eighteen (18) automatic Rainfall Stations.
- ❖ Which format? SYNOP FM-12

2. Automatic Weather stations

- ❖ There are total 11 Automatic Weather Stations, purchased from Earth Network, mounted on GSM towers, to providing provincial weather forecast for Liberia.
- ❖ Number of stations shared on GTS and update frequency: One station transmitting on the AMHS.. Transmission is every 30 minutes or hourly.
- ❖ Wireless Data logger types, using cellular sim cards and data formats

3. Radio-sounding network

- ❖ We do not have upper air stations

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

1. **Data Collection:** Data is generated and stored automatically on the servers by all of our automatic weather stations.
2. **Data Aggregation:** Data gathered are compiled, organized and stored in a readable .xlsx format for public consumption.
3. **International Data Sharing:** After the Data is analyzed, a forecast is generated for 29 Cities in Liberia and published free for the public on <https://meteoliberia.com>.
4. **IT Infrastructure:** What hardware, software, and platforms used for these tasks? The hardware use is Server, Windows software installed on it and on ADCON server.

All of the stations are automatic which contain data loggers that enable automatic data harvest, storage and transmission to the central server. The data are access through the internet system and downloaded for processing, analysis and presentation. There is no central data base system currently to synchronize the data collected. However, the data are treated using different software including ClimSoft, ClaData Instst, R, ArcGIS, QGIS, Linux, Excel, Sufer and other computer programming/data languages.

Observation network and data collection and processing systems

Fatsanawo Dzingomvera
Department of Climate Change and Meteorological
Services
Malawi

Observation Network

Provide a summary of your observation network:

1. Synoptic stations

- ❖ 20 synoptic stations (conventional)
- ❖ 20 share data (2 times a day) SYNOP FM-12

2. Automatic Weather Stations

- ❖ 80 Total number of stations
- ❖ 6 core 3 Recommended (24hrs) Buffer
- ❖ Campbell and Tahmo

3. Radio-sounding network

- ❖ none

DATA COLLECTION

Phone calls, whatsapp groups (convention stations)

GPRS from automatic stations (to server)

API

Data Aggregation

Hourly and Daily
15 minute to Hourly

International Data Sharing

Through GTS via Netsys

Wis2box

IT Infrastructure

Sensors – Loggers –GPRS- Server-ftp- 1. Archaive(climsoft)

Sensors – Loggers –GPRS- Server-WIS2

Sensors – Loggers –GPRS- API Server-ftp- 1. Archaive(climsoft)

Stations –Whatsapp or phone call- Netsys(servers) - GTS

Observation network and data collection and processing systems

IRAMBONA Yves

Institut Géographique du Burundi(IGEBU)

BURUNDI

Observation Network

A. Synoptic stations

* number of stations

We have two synoptic stations (Bujumbura Airport and Muyinga).

***Number shared on the GTS**

- We have one currently synoptic station(Bujumbura) shared on the GTS.

***Update frequency**

- For the Bujumbura Airport station, the data frequency is 1h

• ***Format**

- The format used is Csv or Text

Observation Network 2

B. Automatic Weather Stations

*Total number of stations

We have 20 main automatic stations (more parameters) and more than 30 rain stations on the national territory

*Number of stations shared on GTS and update frequency

At the moment we have only one shared station on the GTS (Bujumbura Airport) and its frequency is hourly

*Data logger types and data formats

Our Data loggers are categorized into two categories based on the Provider :

A. Adcon Telemetry

B. LSI

The data formats are almost the same (CSV and Text), except that the processing software is different (Addvantange and 3dom).

Observation Network 3

- ***Radio-sounding network**
- We don't have a radio-sounding network

Data Collection and Processing Systems

Data Collection(manual metrological stations)

We have manual metrological stations, the collection is done by manual readings by the observers then they send them to the Meteorological center in paper format.

Data Aggregation(manual metrological stations)

We use CLIMSOFT for archiving and processing this data.

International Data Sharing(manual metrological stations)

At de moment we don't shard this data

Data Collection and Processing Systems

Data Collection(AWS)

For automatic stations, transmission is done via the GPRS system from the station to the server

We have also 2stations telemetric

Data Aggregation(AWS)

We have Advantage Pro software for archiving, data processing and visualization

International Data Sharing(AWS)

At the moment we don't shard this data .

The reason is that we have a big problem with the maintenance of these automatic stations because most of them are donations from projects.

At the moment we have only one station that shares the newly connected data via the WIS2 project

IT Infrastructure

- We have servers for the automatic stations and servers for the data from the manual stations.
 - We also have PCs for manual data entry.
- We have a local network to enter and process this data.
 - We also have a slow internet network.
- For software, we use Climsoft, Addvantage Pro, and 3Dom.

Observation network and data collection and processing systems

<Melesse Lemma Tena>
<Ethiopian Meteorology Institute>
<Ethiopia>



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Observation Network

Provide a summary of your observation network:

1. Synoptic stations

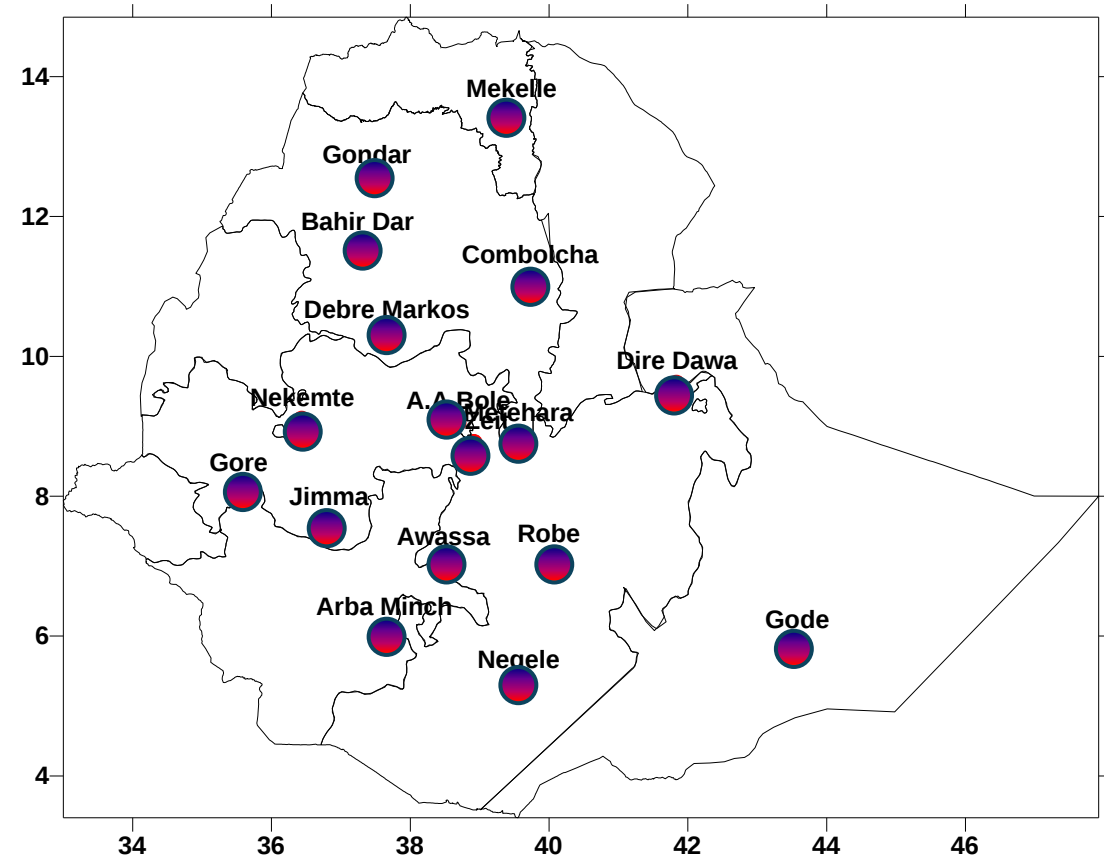
- ❖ number of stations (17), number shared in GTS (17), frequency (3 hourly)
- ❖ Which format (SYNOP FM-12)

2. Automatic Weather Stations

- ❖ Total number of stations – about 300 in number
- ❖ Number of stations shared on GTS and update frequency – 0
- Data logger types and data formats
 - ✓ Adcon (RTU), Vaisal, KOICA ()
 - ✓ Data format – csv

3. Radio-sounding network

- ❖ Total number of stations – 2 stations
- ❖ Number of stations shared on GTS and update frequency – 1, currently not operation due to lack of consumables
- ❖ Data formats used (ASCII, BUFR, or other to specify)
 - FM 35–XI Ext. TEMP
 - FM 32–XI Ext. PILOT



Distribution of Synoptic Stations

SOFF GBON Plan

Plan for coming 2026 and 2027

Table 4. Ethiopia’s results of the GBON national gap analysis.

GBON requirements	GBON target (#of stations)	Compliant stations with GBON requirement (# of stations)	Stations needed against GBON requirement	
			New	Improved
SURFACE STATIONS • Horizontal resolution: 200km • Variables: SLP, T, H, W, SD • Observation cycle: 1h	29	0	13	16
UPPER-AIR STATIONS. Horizontal resolution: 500km • Vertical resolution: 100m, up to 30 hpa Variables: T, H, W • Reporting cycle: twice a day	5	0	3	2

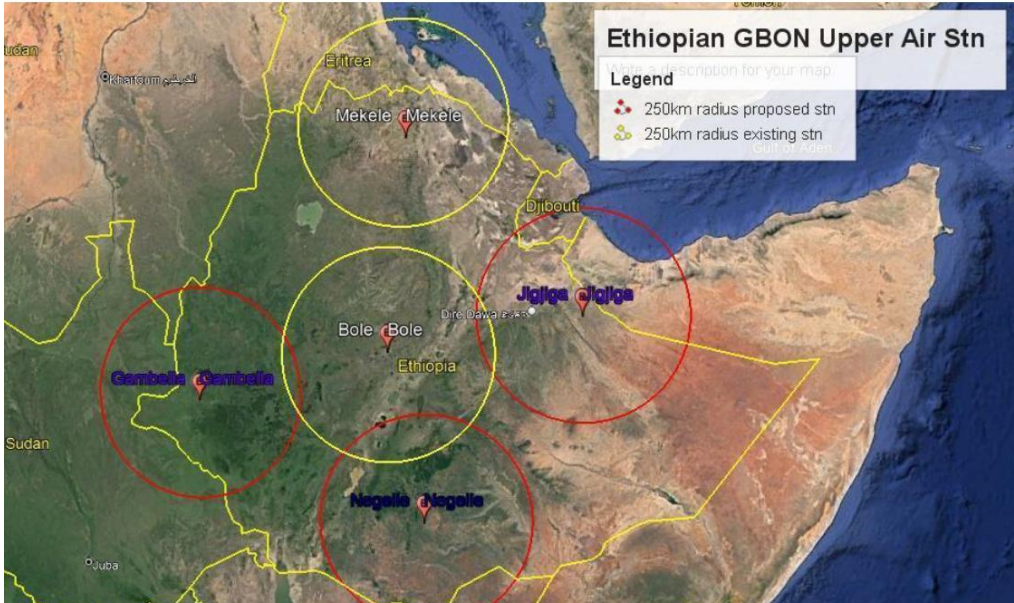


Table 2: Ethiopia's National Contribution Target toward GBON compliance

Requirements	SOFF progressive threshold	National target toward GBON compliance and timeline	Vision for long-term target toward full GBON compliance
Horizontal resolution			
Surface-based	29 stations	60% of stations by 2025	100% of stations by 2026
Upper air	5 stations	60 of stations by 2025	100% of stations by 2026
Reporting cycle			
Surface-based	80% of monthly reports exchanged	60% of monthly reports exchanged by 2026	80% of monthly reports exchanged
Upper air	80% of monthly reports exchanged	60% of monthly reports exchanged by 2026	80% of monthly reports exchanged

Data Collection and Processing Systems

1. Please provide an overview of your current data collection and processing systems, including:

- **Data Collection: How is data gathered from your observation network?**

The data collection has three parts:-

Real time data collection from manual stations

- From 17 synoptic stations – every three hours data collected in coded form and shared globally
- Once in a day data is collected via telephone or radio from selected 100-130 stations for internal purpose and sharing 50 stations daily RF and TT data to ICPAC on dekadal bases. The data are obtained directly from the stations or from Meteorological Services Centers

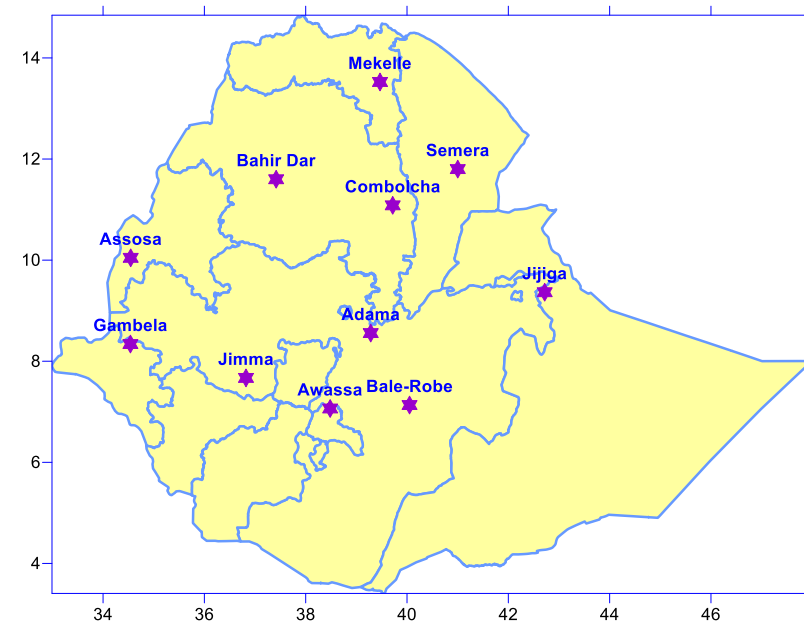
Historical data collection from all manual stations

Hard copy data sent from 11 Meteorological Services Centers via post

Digitized data in excel format come to the head office via email and imported into CDMS.

Real time data collection from AWS stations

Data come to the central servers via GPRS – mobile system- ethiotelecom



Data Collection and Processing Systems...

1. **Data Aggregation:** What methods or systems are used to compile and organize the collected data?

We use a climate database system called CLIDATA. It has an inbuilt data processing feature.

Aggregate

Outputs from the clidata database system

- Daily weather records in different format
 - Days along rows or along columns
 - Ten daily processed data
- Monthly and annual processed data
 - Normal values (30 year mean)
- 30 years and station life time extreme values and record values
- Wind rose diagrams by month, season and annual
 - It can be single month, season or annual or mean of mother one month, season or year
- Maximum and minimum values along with date of occurrence
 - Monthly counted values
 - Rainfall > 30 mm
 - Temperature > 35°C
 - Temperature < 5°C

Oracle Discoverer - [Workbook2]

File Edit View Sheet Format Tools Graph Window Help

Page Items:

	Gh id	Name	Elevation	Geogr1	Geogr2	Eg gh id	Eg el abbreviation	Year	Mdtype	Pktype	Mdfuction	Time	Regular	Valmon01	Valmon02	Valmon03	Valmon04	Valmon05	Valmon06	Valmon07	Valmon08	Valmon09	Val
1	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1949	0	0	AVG	09:00	Y					10.80				9.70	
2	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1949	0	0	AVG	18:00	Y					24.80			20.40	20.40	
3	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1951	0	0	SUM	09:00	Y	.90	3.60	140.70	.00	81.10	69.70	195.10	232.50	120.10	
4	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1951	0	0	AVG	09:00	Y	5.30		11.20		10.80	9.50	10.50	10.60	10.50	
5	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1951	0	0	AVG	18:00	Y	24.50	25.60	24.60	20.50	24.80	23.70	20.30	20.20	22.60	
6	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1952	0	0	SUM	09:00	Y	11.80	.40	29.60	157.40	27.80	77.70	292.60	260.20	177.00	
7	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1952	0	0	AVG	09:00	Y	6.30	8.80	10.80	11.30	11.60	10.30	10.40	10.50	9.80	
8	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1952	0	0	AVG	18:00	Y	24.90	26.00	26.70	22.70	25.20	23.60	20.10	19.80	21.40	
9	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1953	0	0	AVG	18:00	Y	24.80	25.00	25.80	23.50	25.70	23.50	19.10	20.30	21.50	
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11	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1953	0	0	AVG	09:00	Y	6.80	9.20	10.40	11.70	11.20	10.70	11.00	10.50	9.50	
12	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1954	0	0	SUM	09:00	Y	.00	1.60	60.40	38.00	75.90	115.80	252.60	308.50	252.30	
13	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1954	0	0	AVG	18:00	Y	24.30	26.00	25.10	25.90	25.50	22.20	19.10	19.30	19.50	
14	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1954	0	0	AVG	09:00	Y	5.00	8.70	10.60	10.30	11.50	10.10	10.10	9.90	9.10	
15	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1955	0	0	SUM	09:00	Y	39.10	5.80	18.90	107.40	37.60	163.30	263.70	334.80	213.50	
16	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1955	0	0	AVG	18:00	Y	22.60	24.50	25.90	25.20	25.00	22.60	20.40	20.10	20.90	
17	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1955	0	0	AVG	09:00	Y	8.80	6.90	9.70	9.90	9.90	9.00	9.10	9.30	8.90	
18	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1956	0	0	SUM	09:00	Y	27.10	18.30	38.80	96.30	6.20	123.90	141.10	219.90	191.10	
19	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1956	0	0	AVG	18:00	Y	22.30	24.90	26.40	23.50	25.40	22.90	19.90	19.60	21.00	
20	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1956	0	0	AVG	09:00	Y	6.80	5.90	9.20	9.40		9.20	9.90	9.50	9.90	
21	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1957	0	0	AVG	18:00	Y	24.30	23.40	22.50	23.30	23.90	23.70	21.10	20.90	23.10	
22	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1957	0	0	SUM	09:00	Y	.10	86.40	247.70	204.50	102.90	133.20	232.10	249.10	60.20	
23	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1957	0	0	AVG	09:00	Y	5.40	7.90	9.60	9.80	9.70	8.90	9.60	9.70	8.80	
24	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1958	0	0	AVG	09:00	Y	9.20	9.10	9.80	10.40	10.70	10.40	10.60	10.10	9.80	
25	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1958	0	0	AVG	18:00	Y	24.60	23.50	26.80	25.70	28.20	23.00	20.00	20.00	21.20	
26	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1958	0	0	SUM	09:00	Y	75.70	24.90	55.90	53.60	12.50	104.90	404.40	316.70	173.50	
27	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	PRECIP	1959	0	0	SUM	09:00	Y	42.90	24.90	17.30	45.30	76.80	82.50	194.80	300.20	238.00	
28	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1959	0	0	AVG	18:00	Y	23.80	25.70	26.20	26.80	25.40	24.10	20.40	19.50	21.20	
29	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMIN	1959	0	0	AVG	09:00	Y	8.00	8.10	9.60	10.70	10.50	9.80	10.30	10.00	9.60	
30	SHADDI21	Addis Ababa Obs	2386.00	38.7475	9.0189	SHADDI21	TMPMAX	1960	0	0	AVG	18:00	Y	23.70	25.80	24.50	25.50	24.20	23.90	20.30	20.90	21.00	

Sheet 1

Monthly rainfall, maximum and minimum temperature data from Clidata CDMS

Data Collection and Processing Systems...

1. International Data Sharing: How is your data currently published on the GTS?

a. GTS

b. We use the COROBOR system to share data globally

a. Unfortunately we encounter a problem now, we share via email

2. IT Infrastructure: What hardware, software, and platforms used for these tasks?

I. Two servers dedicate for GTS – COROBOR MESSIR

II. Two dedicated servers for MEISSER COM – GTS data transfer

III. Three servers for AWS data management from three suppliers

- Adcon
- Vaisal
- South Korea

Observation network and data collection and processing systems

Victor Massam
Tanzania Meteorological Authority (TMA)
Tanzania

Observation Network

A summary of your observation network:

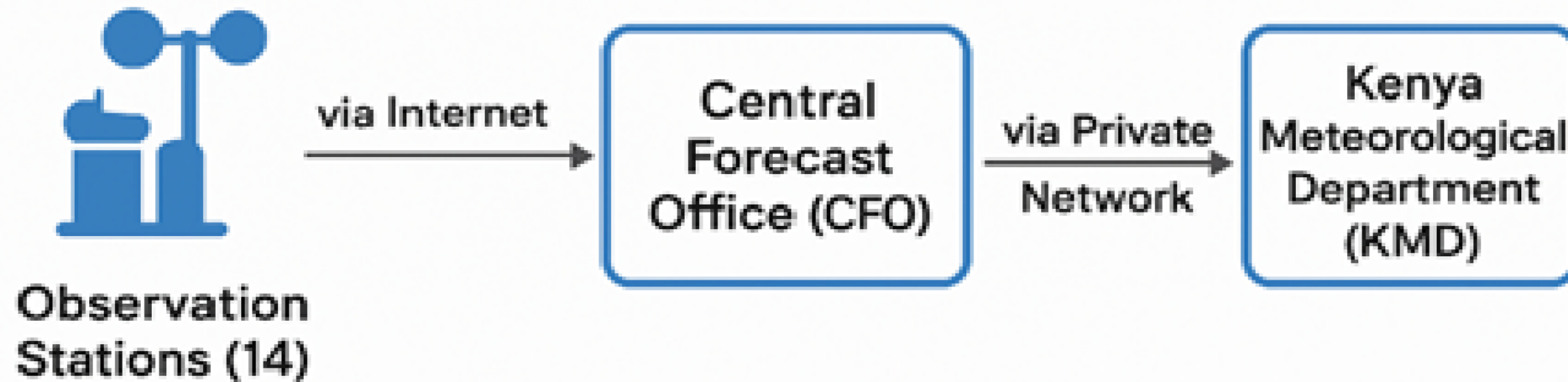
- 1. Synoptic stations** Number of stations **27**, number shared in GTS **14**, Which format (**SYNOP FM-12** or BUFR)
- 2. Automatic Weather Stations:** Total number of stations **98**; Number of stations shared on GTS **0** and update frequency Data logger types and data formats **ASCII**,
- 3. Radio-sounding network:** Total number of stations **1**, Number of stations shared on GTS **1** and update frequency, Data formats used (**ASCII**, **BUFR**, or other to specify)

Data Collection and Processing Systems

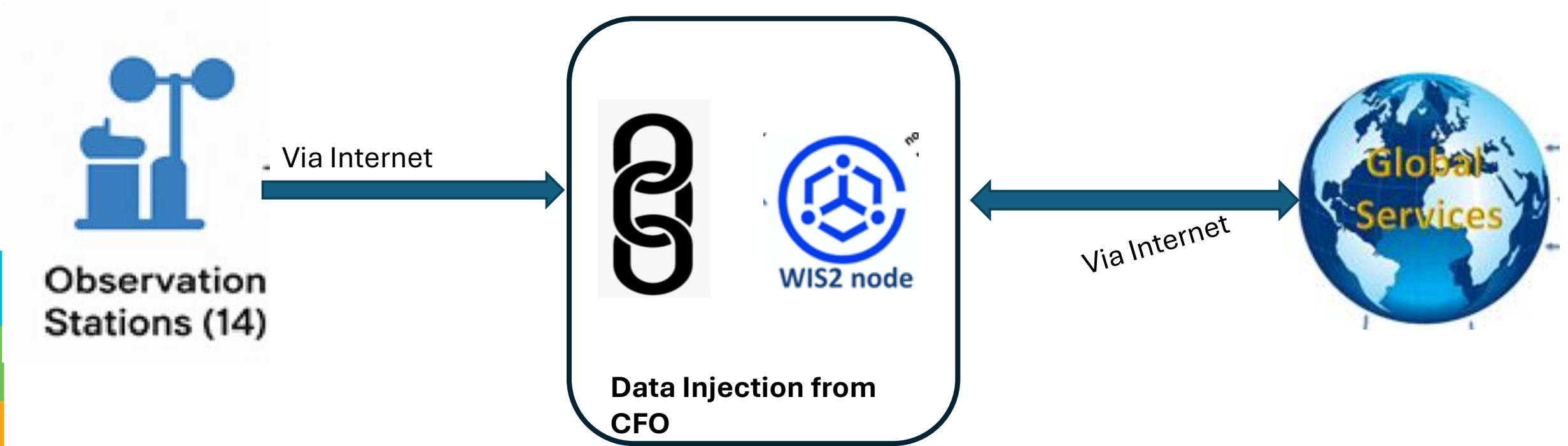
Overview of current data collection and processing systems

- 1. Data Collection:** How is data gathered from your observation network? **Manual and Automatic**
- 2. Data Aggregation:** What methods or systems are used to compile and organize the collected data? **Web interface**
- 3. International Data Sharing:** How is your data currently published on the GTS? **WIS2.0 Node and Email**
- 4. IT Infrastructure:** What hardware(**Cloud Computation**), software(**Custom software** and **WIS2.0 Node**), and platforms used for these tasks?

TMA Observation Network and Data Flow



New infrastructure Currently Implemented



Observation network and data collection and processing systems

Rinae Tshibubudze / Lesedi Mothiba
South African Weather Service
South Africa

Observation Network

Provide a summary of your observation network:

1. Synoptic stations

- ❖ number of stations, number shared in GTS, frequency – **24 stations, 24 shared, hourly (AWS + Observations)**
- ❖ Which format (SYNOP FM-12 or BUFR) - **both SYNOP FM-12 and BUFR**

2. Automatic Weather Stations

- ❖ Total number of stations – **247**
- ❖ Number of stations shared on GTS and update frequency – **100, hourly**
- ❖ Data logger types and data formats – **CR10X & CR1000, ASCII format**

3. Radio-sounding network

- ❖ Total number of stations - **8**
- ❖ Number of stations shared on GTS and update frequency – **8, 12 hourly**
 - Data formats used (ASCII, BUFR, or other to specify) - **both SYNOP FM-12 and BUFR**

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

- 1. Data Collection:** How is data gathered from your observation network? *SAWS makes use of SDWAN, LAN, APN (3G & LTE (newer stations) mobile technology)*
- 2. Data Aggregation:** What methods or systems are used to compile and organize the collected data? *Download data to regional SQL databases (24) with in-house developed software, data is quality controlled then distributed to main Climate SQL Database. Observational data is distributed to MHS, from MHS to GTS and to WIS2 via WIS2Box.*
- 3. International Data Sharing:** How is your data currently published on the GTS? *Via Routing tables.*
- 4. IT Infrastructure:** What hardware, software, and platforms used for these tasks? *Windows 11 & 10 PC's (busy upgrading all PC's to Windows 11) at the regional offices, SQL server std edition (2019 or 2022). Head Office use VMWARE version 8 for server environment, Windows Server 2019 Std Edition, SQL Server Enterprise Edition 2022 and in-house developed software to import the data received from the regions.*

Observation network and data collection and processing systems

Godfrey HABUKURI/Telecommunication Engineer,WIS NFP
Rwanda Meteorology Agency(METEO RWANDA)

RWANDA



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Observation Network

Provide a summary of your observation network:

1. Synoptic stations

- ❖ number of stations:5, number shared in GTS:4, frequency:SYNOP:3hrs ,METAR:1hrs
- ❖ Which format : BUFR

2. Automatic Weather stations

- ❖ Total number of stations:107
- ❖ Number of stations shared on GTS : 3 (GBON Stations),but on WIS2.0 not GTS
- ❖ update frequency: Every one hour
- ❖ Data logger types and data formats: data logger type:CR1000Xe.

3. Radio-sounding network

- ❖ Total number of stations: 0
- ❖ There is a plan to have 1 by the end of the year 2025

4. Radar systems:01,C-band but in upgrade completion phase to solid state in early November 2025

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

1. **Data Collection:** Manual(volunteer: USSD code, Principal stations:-**climsoft** (DB to DB by pushing data from local server address to HQ server address:FTP/IP).
2. **Data Aggregation:** What methods or systems are used to compile and organize the collected data?. We use **climsoft software** to manage our data.
3. **International Data Sharing:** How is your data currently published on the GTS?:**via AMSS system by FTP/IP**
4. **IT Infrastructure:**
 - **Hardware:** **C-band** dual polarized weather radar (**solid state**),Ground satellite receiver (**ClimSA\PUMA-2025**) ,Radio sounding, Automatic Weather Stations(AWS)
 - **Software:****Climsoft** for data management,**WRF** model for forecasting.. etc
 - **platforms/Systems:** Smart Met and Smart Alert system, AMSS(by using ftp protocol)
 - **Storage devices:** Network Attached Storage (**NAS-128TB**), for storing onsite backup then replicated to the offsite at national data center as backup.
 - **High Performance Computer(HPC):** for heavy climate data processing and analysis

GBON Stations

- ✓ Number of stations:03
- ✓ number shared in WIS2.0:03

Future plan and challenges

□ Future plan

- Installation of **Upper air station/radio sounding** by end of 2025 via SOFF-UNDP Rwanda project.
- Revive **Butare Synoptic station** and to be placed in same enclosure with radio sounding station.
- Install **X-band and C-band solid state** weather radar and to be operational by the end of June 2027 via Volcano community resilience project (**VCRP**) project financed by World bank.

□ Challenges.

- Maintenance of Observing stations due to budget constraints
- Lack of capacity building and enough skills on new acquired equipment, systems.
- High turnover

Observation network and data collection and processing systems

Liban Abdi Isse
PR of Somalia to WMO Office/Somali National
Meteorological Agency
Somalia



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Observation Network

Synoptic Stations

Total Stations: 3

Reporting to GTS: (Mogadishu, Hargeisa, Berbera)

Observation Frequency: 6-hour intervals (00, 06, 12, 18 UTC)

Format: SYNOP FM-12

Automatic Weather Stations (AWS)

Total Stations: 36 (5 from Ministry of Water and Energy, 18 from ICPAC, 13 from FAO-SWALIM)

Shared on GTS: 5

Update Frequency: every 15 Minutes

Data Loggers:

Adcon Telemetry, Campbell Scientific, Vaisala

Formats: XML, CSV, JSON, BUFR

Data Collection and Processing Systems

Data Collection:

Methods in Use:

AWS transmit via GSM/3G or satellite

Manual stations report by SMS or email

Radiosonde data uploaded through dedicated software

Limitations: Network instability, low automation, and irregular updates

Data Aggregation

Current Tools: Excel sheets, CLIMSOFT (underway)

Databases: ICPAC servers, MoEWR database, Somali Aviation Centre

Quality Control: Combination of manual checks and automated scripts

International Data Sharing (GTS)

Channel: Through IGAD-ICPAC (Nairobi Hub)

Formats: BUFR, SYNOP

Current Practice: Limited number of stations publishing in real time.

Partners: WMO, ICPAC

IT Infrastructure

Current Tools: Local servers. CLIMSOFT and MeteoInfo, both under-development.

Platform: WIS (through ICPAC), Cloud backup

Gaps: Weak connectivity, limited infrastructure

Observation network and data collection and processing systems

Badreldin Fartak
South Sudan Meteorological Services
South Sudan

Observation Network

observation network:

1. **Synoptic stations**

- ❖ Five Stations:
- ❖ Juba
- ❖ Wau
- ❖ Malaka
- ❖ Renk
- ❖ Raja
- ❖ Format SYNOP FM-12

2. **Automatic Weather Stations**

Twelve stations:

- ❖ Aweil Rice Scheme
- ❖ Bor Town
- ❖ Gokmachar
- ❖ Halima Research center
- ❖ Kuajok Town
- ❖ Lokiliri
- ❖ Narus Cad

Number of stations shared on GTS and update frequency Nine stations out of twelve

- ❖ Data logger types and data formats:
- ❖ Wireless Data Logger Cellular Networks



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Data Collection and Processing Systems

Data collection and processing systems, including:

1. **Data Collection:** Data from network observations is gathered by recording information directly from observation points by Telephone(Synoptic Stations) and Automated system from Automatic Weather Stations collect, process and transmit to the Cloud.
2. **Data Aggregation:** after collected the Data from Synoptic Stations we are using CLIMSOF to process the Data in excel formats.
3. **International Data Sharing:** our data published on the GTS through wis2 network.
4. **IT Infrastructure:** We have Server with CLIMSOF software for the data task.

Observation network and data collection and processing systems

JERREH JAMMEH
DEPARTMENT OF WATER RESOURCES
THE GAMBIA



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Observation Network

Provide a summary of your observation network:

1. Synoptic stations

- ❖ Ten stations, seven station shared in GTS via Amazon web service, 15 minutes interval
- ❖ Local data is been transmitted via cellular Phone.
- ❖ Which format (SYNOP)

2. Automatic Weather Stations

- ❖ Seven Vaisala stations, Four operational, Adcon not working and One AviMet stations (RME111)
- ❖ Seven stations shared on GTS and every 15 minutes.
- ❖ Data logger types (wired and wireless) and data formats is CSV

3. Radio-sounding network

- ❖ Two stations under constructions

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

1. **Data Collection:** Data is transmitted using cellular phone.
2. **Data Aggregation:** Data is compiled using Forms eg. 101.
3. **International Data Sharing:** Two system are currently available AMHs and the COROBO.
4. **IT Infrastructure:** Hardware components Desktop computers and printers
Software in use Operating system windows XP and Linux base.
Platforms use COROBO and AMHs.

Observation network and data collection and processing systems

Islam Omia Mohammed Adam
Sudan Meteorological Authority
Sudan



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Observation Network

Provide a summary of your observation network:.

1. Automatic Weather Stations :

- ❖ Total number of stations
- ❖ 60stations, need to be confirmed due to war.
- ❖ Number of stations shared on GTS and update frequency
- ❖ No stations shared .
- ❖ Data logger types and data formats.
- ❖ AUTOMATIC AND MANYALLY LOGGERS ,CSV format.

Observation Network

2. Radio-sounding network :

- ❖ Total number of stations
- ❖ BEFORE war it was 1 in Khartoum. Now not available .
- ❖ Number of stations shared on GTS and update frequency (no stations)
- ❖ Data formats used (ASCII, BUFR, or other to specify)
- ❖ ASCII

Data Collection and Processing Systems

Please provide an overview of your current data collection and processing systems, including:

1. Data Collection: How is data gathered from your observation network?

Using :

#.NM10 system provided by VAISALA available now .

#. CAWSanywhere Provided by Huayun china.

1. Data Aggregation: What methods or systems are used to compile and organize the collected data?

#.Climsoft.

#dms data management system provided by FMI Finland .

1. International Data Sharing: How is your data currently published on the GTS?

Not published yet.

1. IT Infrastructure: What hardware, software, and platforms used for these tasks?

2. We have lost all IT Infrastructure in HQ Khartoum .

Observation network and data collection and processing systems

PRESENTED BY
GAPTIA LAWAN K.GREMA KAOUMI

ORGANIZATION:
AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS
FOR DEVELOPMENT (**ACMAD**)

COUNTRY:
NIGER



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Observation Network

Summary of ACMAD observation network:

1. Synoptic stations

The synoptic stations are non-applicable within ACMAD but ACMAD is related to national met services to receive data, it also has a ClimSoft database that includes about 200 synoptic stations data from GTS and from country stations

- ❖ number of stations, number shared in GTS, frequency (non-applicable)

ACMAD handles more than 200 stations in the ClimSoft database

- ❖ Which format (SYNOP FM-12 or BUFR), it uses SYNOP format

2. Automatic Weather Stations

- ❖ Total number of stations:

ACMAD doesn't have any automatic weather stations but it has reception, processing and displaying equipment such as ClimSA and PUMA Station

- ❖ Number of stations shared on GTS and update frequency (non application)
- ❖ Data logger types and data formats N/A (non applicable)

3. Radio-sounding network (non applicable)

- ❖ Total number of stations: Radio-sounding data is received from GTS, ACMAD has no specific radio sounding station
- ❖ Number of stations shared on GTS and update frequency (non applicable)
- ❖ Data formats used (ASCII, BUFR, or other to specify) (non applicable)



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Data Collection and Processing Systems

Overview of ACMAD'S current data collection and processing systems, including:

1. **Data Collection:** How is data gathered from your observation network?

ACMAD gathers input data from EUMETCAST Antenna, ClimSA Stations, PUMA Stations, PUMA-EUMETCAST, Internet, WIS, GTS/SMT; RARS stations; Archives

2. **Data Aggregation:** What methods or systems are used to compile and organize the collected data?

ACMAD organizes and compiles its data using ClimSoft Database, THREDDS Data server (TDS) and High Performance Computing (HPC) ,

The Four RARS stations are contributing to GTS via the South African Weather Service SAWS-Hub.

3. **International Data Sharing:** How is your data currently published on the GTS?

ACMAD uses GTS/SMT connexion with ASECNA regional hub which is now on stand by with a bandwidth of 1Mb/s, Data is published via Web and Internet

4. **IT Infrastructure:** What hardware, software, and platforms used for these tasks?

For these tasks, ACMAD firstly relies on a combination of its platform : PUMA2015-PUMA2025, <https://www.acmad.org> ,WMO, telecom systems (GTS/WIS), satellite reception hardware(RARS) and software like WRF to manage meteorological and climate data.

