

Summary of WIS2 Training Workshop in Guangzhou

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CONTENTS

1. Overview of the Training
2. Outcomes of the Training
3. National Observation Networks
4. National Implementation Plans
5. Gaps and Suggestions



1. Overview of the Training

WIS2 Training Workshop

15-19 September 2025, Guangzhou China

17 participants from 16 countries/regions

2 trainers from the WMO Secretariat

1 trainer from GISC New Delhi

4 trainers from GISC Beijing



No.	WMO Member or Organization	Participants	GISC
1	China	Mingjiao GONG	GISC Beijing
2	Hong Kong, China	Kai-hou Yip	GISC Beijing
3	Macao, China	Kio Fong WONG	GISC Beijing
4	Mongolia	Batbold Altangerel	GISC Beijing
5	Nepal	Santa Kumar Maharjan	GISC Beijing
6	Pakistan	Muhammad Kashif Memon	GISC Beijing
7	Cambodia	Sokhom KHOEUN	GISC Tokyo
8	Lao PDR	Bounteum Sisouphanthavong	GISC Tokyo
9	Myanmar	Pa Pa Swe	GISC Tokyo
10	Thailand	Natthaporn Lertsamranpinit	GISC Tokyo
11	Vietnam	Nguyen Viet Huy	GISC Tokyo
12	Bangladesh	Md. Abdul Matin	GISC New Delhi
13	India	Trilok Singh	GISC New Delhi
14	Maldives	Ahmed Zalif	GISC New Delhi
15	Sri Lanka	W.P.K. Priyadharsena	GISC New Delhi
16	South Korea	Yuni Lee	GISC Seoul
17	South Korea	Minseon Park	GISC Seoul
1	WMO (trainer)	Maaike Limper	
2	WMO (trainer)	Peiwen JIN	
3	GISC New Delhi (trainer)	Sankar Nath	
4	GISC Beijing (trainer)	Lei XUE	
5	GISC Beijing (trainer)	Xinqiang HAN	
6	GISC Beijing (trainer)	Wenjing GU	
7	GISC Beijing (trainer)	Mingjiao GONG	

- Including this workshop, so far in RA II, only [Afghanistan](#) and [North Korea](#) have not participated in any training.



1. Overview of the Training

Main Learning Objectives

- ✓ To understand the WIS 2.0 architecture
- ✓ To understand the GTS-to-WIS2 transition plan
- ✓ To be able to install and configure the “WIS2 in a box”-software
- ✓ To be able to implement and operate a WIS2 node

Technical Requirements

During the WIS2-training, participants were instructed how to send and receive MQTT messages exchanged using the WIS2 message standard. Participants were also be guided through the process of setting up their own “WIS2-in-a-box” on a virtualized environment accessible on the local WiFi.

DAY1 Introduction to WIS 2.0

- Overview of the **national observation networks and IT infrastructure**.
- Introduction to WIS 2.0 architecture, core components, and data-sharing protocols.
- **Implementation plan** for WIS 2.0 and transition from GTS/WIS 1.0

- Hands-on training using **wis2box** software to set up individual WIS2 nodes on virtual machines.
- Practical sessions on initializing the system, configuring datasets, and publishing data.

DAY2 Working with WIS2 in a box

DAY3 Advanced wis2box Functions and GTS-to-WIS2 transition

- Hands-on training on WMO Binary Codes and data **conversion tools** for standardizing meteorological data.
- **WIS2-to-GTS transition**, including adding GTS headers and configuring access-controlled datasets.

- Training on **data consumption and WIS2 node setup**, covering data discovery, subscription, and operational
- Guided planning for national WIS2 implementation, including drafting customized plans with expert support.

DAY4 WIS2 Node implementation

DAY5 Roundtable: National WIS2 Implementation Plans & Closing

- Participants present and discuss their draft WIS 2.0 implementation plans.
- CMA presentation on the **CMACast** system and its applications.



2. Outcomes of the Training

Enhanced Technical Capacity & Actionable Plans

- The core objective was achieved, ensuring participants mastered WIS 2.0's key technologies, particularly the use of the wis2box software for creating WCMP2 records, publishing notifications, and establishing data services.
- Countries were enabled to develop preliminary national implementation tailored to their specific contexts.

Clarified Transition Path & Global Coordination

- Participants gained a clear understanding of the complete process, principles, and timeline for a seamless transition from WIS1/GTS system to WIS 2.0.
- The mechanism for parallel operation of GTS and WIS2, along with the gateways for ensuring zero data loss, was clarified, providing a roadmap for safely decommissioning Message Switching Systems.

Fostered Regional Collaboration & Support Networks

- An effective communication platform was established, enabling countries to understand how to seek and obtain support from regional GISCs, the WMO Secretariat and the neighboring nations.
- The formation of collaborative partnerships within the region was encouraged, leading to coordinated efforts to address implementation challenges.





4. National Observation Networks

Most countries and regions have surface and upper-air observation networks, but they generally face challenges such as **low data sharing rates of AWS stations** and **inconsistent data formats**.

No.	WMO Member or Organization	SYNOP		AWS		Radio-sounding	
		GTS shared	format	GTS shared	format	GTS shared	format
1	Bangladesh	47	SYNOP, BUFR	60	CSV	4	TEMP, BUFR
2	Cambodia	35	BUFR, CSV	13	EXCEL	None	-
3	Hong Kong, China	1	SYNOP, BUFR	-	ASCII, BUFR	-	TEMP, BUFR
4	Lao PDR	22	SYNOP	None	ASCII	-	-
5	Macao, China	-	-	-	-	-	-
6	Maldives	5	SYNOP	None	CSV	1	TEMP
7	Mongolia	63	SYNOP, BUFR	None	ASCII, CSV	4	ASCII, BUFR
8	Myanmar	51	SYNOP	51	CSV	None	ASCII
9	Nepal	22	SYNOP	None	-	None	-
10	Pakistan	46	SYNOP, BUFR	None	JSON	None	ASCII
11	Sri Lanka	24	BUFR	8	CSV/SQL	1	BUFR
12	Thailand	127	SYNOP, BUFR	127	CSV, BUFR	12	TEMP, BUFR
13	Vietnam	33	SYNOP, BUFR	0	Binary, CSV, XML	6	TEMP
14	India	340	SYNOP, BUFR	-	CSV, ASCII	56	ASCII, BUFR
15	South Korea	53	SYNOP, BUFR	None	ASCII	8	ASCII, BUFR
16	China	None	-	372	BUFR	88	BUFR



4. National Observation Networks

Using the GPRS/3G/4G network for observation data collection is the mainstream choice for various countries and regions. Some of them face the challenges such as **aging equipment** and **uneven levels of IT infrastructure modernization**. Some members still rely on manual or semi-automatic data collecting and processing.

No.	WMO Member or Organization	Data Collection	Data Aggregation	International Data Sharing	IT Infrastructure		
					Hardware	Software	Platform
1	Bangladesh	Internet	Manual, software	RTH New Delhi, GISC Tokyo	Server – Inspur Rack Server CPU: 2 × Intel Xeon Gold 5318Y (2.10 GHz, 24 cores total) Storage – Inspur SAN/NAS Drives: 24 × 1.2 TB 10K	MSS	Windows
2	Cambodia	Internet, AWS data logger	Manual, AWS	GTS, ASMC			
3	Hong Kong, China	GPRS/minilink/private wire/Government Security Network/	In-house developed software, ECMWF bufrdc/Eccode	RTH Tokyo, RTH Beijing, RTH Bangkok	PowerPC, Oracle Database	Oracle database, Linux system, SFTP, Shell Scripts, Perl, C/Fortran, PHP	Application server, FTP server, Database
4	Lao PDR	web-based system " MNEO"	Automatic Meteorological Switching System (AMSS)	RTH Bangkok, Thailand			
5	Macao, China	-	-	-	-	-	-
6	Maldives	Manual, Mobile Network	CAE Datalife system	RTH Delhi and RTH Melbourne	Dell HPC server, Lenovo x3500 M5, MESSIR	Datalife software, AHMS, vSphere	Windows, Linux
7	Mongolia	Internet, AWS data logger	application program	GISC Beijing	modem in AWS for data transferring, rack and tower server PC	Windows server 2019, Linux, MS SQL, MySQL, Visual studio....	Hydro and Meteo Data Transferring System /developed by NAMEM
8	Myanmar	Manual, AWS data logger	message switching system	GTS THAILAND, INDIA and JAPAN			
9	Nepal	GPRS/3G/4G network	Manual, DMS	GISC Beijing	Datacenter with PostgreSQL database	FTP Server, MICS Terminal	
10	Pakistan	SMS	MSS	GISC New Delhi and Tehran	Java and Python Based software, MESSIR Comm (MSS), Moving Weather, WIS2.0, Site to Site VPN and CISCO Routers.		
11	Sri Lanka	IBL (Internet)	Met Data Switching System	GISC New Delhi, GISC Beijing	Hardware Dell Precision Tower 3620	MSS	Platforms Windows 10 pro
12	Thailand	Internet	AMSS	RTH Bangkok, RTH Beijing, Japan, New Delhi.....		AMSS, WEB, Forecaster In-house application, etc	RedHat 6.9 64bit for MSS, CentOS 6.9 64bit for Workstation
13	Vietnam	Internet	Internet, LAN	RTH Bangkok, GISC Tokyo	IBM and Dell servers	Automatic stations (3G/4G transmission platforms by), Leased lines (managed by VNPT)	Vietnamese providers
14	India	Satellite, GPRS, Manual	Automatic Switching System	RTH New Delhi and GIS	Internet Bandwidth – 1 GBPS RMDCN – 6 MBPS	AMSS Server - 5 (RTH and WIS)	
15	South Korea	Satellite, LTE	Data collection and Processing system	GTS	-	-	-
16	China	Dedicated lines, 4G	Automatic Switching System	RTH Beijing and GISC Beijing	Total 30 Servers Terrestrial broadband network, mobile networks (4G/5G)	Big Data and Cloud Service Platform MSS	Linux



5. National Implementation Plans

- The current implementation status **varies significantly** across members.
- wis2box is the predominant software choice, and most of the members choose **on-premises** way to hosting the WIS2 solution.
- Most of the members plan to **deploy the system by 2026** and achieve **full operational transition by 2027**.

No.	Members	Software (wis2box)	Hosting	Operations	2025	2026	2027
1	Bangladesh	WILL BE USED	On-Premises	NMHS & company	-	implement	-
2	Cambodia	WILL BE USED	On-Premises	NMHS	planning	Ingest and publish data	CSV to BUFR registration
3	Hong Kong, China	BEING USED	Cloud	NMHS	Fine tune	migration	-
4	Lao PDR	WILL BE USED	Public cloud	NMHS	Propose WIS 2.0 to CREWS	Set up system	operation
5	Macao, China	WILL BE USED	TBD	NMHS	Planning	Go live for wis2box/register	optimization
6	Maldives	WILL BE USED	On-Premises	NMHS	planning	Installing wis2box / pilot data ingestion	Registration Transition completed
7	Mongolia	WILL BE USED	On-Premises	NMHS	setup	testing	operation
8	Myanmar	WILL BE USED	On-Premises, TBD	NMHS	-	implement	-
9	Nepal	WILL BE USED	On-Premises	NMHS & company, TBD	Planning	Registration/Installation	Expand data
10	Pakistan	BEING USED	On-Premises	NMHS	Has finished installation / Wait for registration	-	-
11	Sri Lanka	IBL	On-Premises	NMHS & company	HW/SW upgrade	operation	-
12	Thailand	BEING USED	On-Premises	NMHS	-	TBD	TBD
13	Vietnam	WILL BE USED	On-Premises	NMHS & company	planning	Registration/Synop to BUFR	AWS to WIS2
14	India	BEING USED	On-Premises	NMHS	Ingest new data / New wis2node /Global services	Migration of WIS2 Node in cloud	Migration completed
15	South Korea	BEING USED	Private cloud	NMHS & company		Expand data	Expand data
16	China	BEING USED	On-Premises	NMHS	Expand data	Migration	Migration



6. Gaps and Suggestions

- 11 members in RA II have established 12 WIS2 Nodes while 24 members have not done yet.

No.	Countries/Regions	Centre-id
1	China	cn-cma
2	Hongkong, China	hk-hko-swic
3	Hongkong, China	hk-hko
4	India	in-imd
5	Iran	ir-irimo
6	Israel	il-ims
7	Japan	jp-jma
8	Kazakhstan	kz-kazhydromet
9	Korea	kr-kma
10	Kyrgyzstan	kg-kyrgyzhydromet
11	Saudi Arabia	sa-ncm
12	Thailand	th-tmd



6. Gaps and Suggestions

- **Gaps**
 - Infrastructures / Human resource / Technical threshold / Operation
- **Suggestions**
 - Training workshop
 - WMO Secretariat/ GISCs/ Internal training for staff
 - On-site / Online
 - P2P technical support
 - GISCs
 - On-site / Online
 - Financial support
 - CREWS / SOFF.....
 - Solutions / Easy-to-use tools
 - Available: wis2box, wis2downloader, pywis-pubsub, ecCodes.....
 - Lacking:
 - First-mile: building an automated process from the station to the wis2node
 - Last-mile: building an automated process from the wis2 consumer to local applications
 - Concrete national implantation plans



**Thank you for listening
Questions and Comments?**