

JMA Activity on Lead Centres for GCOS in 2023

1 Performances of GSN and CLIMAT stations

JMA serves as the Lead Centre for GCOS in its area of responsibility, which covers East Asia and Southeast Asia (Brunei, Cambodia, China, Japan, Lao PDR, Malaysia, Mongolia, Myanmar, the Philippines, the Republic of Korea, Singapore, Thailand, and Vietnam).

The left part of Table 1 highlights the performance of GSN (GCOS Surface Network) stations in the region. JMA received CLIMAT reports from most stations (CA: 0.9 or more), and there were no silent stations. Most reports had few format errors (CC: 0.9 or more), with particular improvement in Malaysia and Myanmar since 2022 as a result of efforts by relevant NMHSs based on error reports and support from JMA (see 3.3).

JMA routinely performs quality checking of reports based on statistics from past data, comparison against SYNOP reports, and/or comparison among nearby stations. Ratios of valid monthly mean temperature were generally good in the region (CT: 0.9 or more).

Errors for GSN stations tend to be found similarly for CLIMAT stations, as per the scores shown on the right of Table 1. Station evaluation is based on the Performance Indicator of the GSN Monitoring Center (https://www.dwd.de/DWD-GCOS/EN/nationalcontributions/servicesforgcos/centresforqualityassurance/gsmnc/gsnmc_monitoring_produkte/gsnmc/performance_indicator/performance_indicator_node.html).

Table 1 Performances of CLIMAT reports

Country	# Stn	GSN			# Stn	CLIMAT		
		CA	CC	CT		CA	CC	CT
Brunei	-	-	-	-	1	0.9	0.6	0.9
Cambodia	-	-	-	-	2	0.0	0.0	0.0
China	32	1.0	1.0	1.0	78	0.9	0.9	0.9
Japan	13	1.0	1.0	1.0	52	1.0	1.0	1.0
Lao PDR	-	-	-	-	4	0.7	0.0	1.0
Malaysia	6	1.0	0.9	1.0	15	1.0	0.9	1.0
Mongolia	10	1.0	1.0	1.0	36	1.0	1.0	0.9
Myanmar	3	1.0	0.4	1.0	5	1.0	0.4	1.0
Philippines	6	1.0	0.7	1.0	8	0.9	0.6	0.9
R. of Korea	3	0.9	0.9	0.9	11	0.9	0.9	0.9
Singapore	-	-	-	-	1	1.0	1.0	1.0
Thailand	6	1.0	1.0	1.0	13	1.0	1.0	1.0
Vietnam	1	1.0	0.2	0.9	16	0.9	0.2	0.9

Ratios against expected total reports are evaluated for CA here based on available reports transmitted in a timely manner; CC: correct reports with no format errors; CT: valid reports of monthly mean temperature passing quality control. Scores equal to and below 0.7, shown in red, indicate that JMA recognizes a need for LC action.

2 2023 BUFR CLIMAT reports

Transition from TAC to BUFR format for CLIMAT reports remains ongoing worldwide. Here summarizes the results of JMA's analysis regarding the current BUFR CLIMAT situation in the region.

Table 2 summarizes the progress of transition to BUFR format in individual countries and the quality of BUFR reports based on comparison with TAC reports. Most CLIMAT reports were transmitted in dual BUFR/TAC format, with provision rates varying by country. A high percentage of BUFR reports were received from China, Japan, the Republic of Korea, Singapore, and Thailand, while intermediate percentage of the reports were received from the Philippines and Vietnam. No correct BUFR reports were received from Brunei, Cambodia, Lao PDR, Malaysia, Myanmar, and Mongolia in 2023. Tendencies in transition to BUFR have not generally changed in the last five years. Some degradation has been observed in the Philippines, and improvement has been seen in Vietnam. Undecodable BUFR reports from Myanmar during 2023 have been pointed out by DWD, and Myanmar is working toward resolution (as of July 2024). BUFR reports show close agreement with TAC in countries providing both formats (shown as discrepancies in Table 2). Correspondence between BUFR and TAC for these countries has generally improved in the last five years. It should be noted that the comparison results are preliminary, and some of the discrepancies might be attributable to errors on JMA's part.

Table 2 Summary of 2023 CLIMAT reports with BUFR format in the region

Country	Reported format	BUFR	Discrepancies w/ TAC
Brunei	TAC	-	-
Cambodia	No CLIMAT reports in 2023		
China	BUFR	100%	-
Japan	TAC & BUFR	100% (98%)	0% (0%)
Lao PDR	TAC	-	-
Malaysia	TAC	-	-
Mongolia	TAC	-	-
Myanmar	TAC&BUFR	0% (5%)	- (100%)
Philippines	TAC & BUFR	53% (84%)	2% (3%)
R. of Korea	TAC & BUFR	90% (97%)	0% (10%)
Singapore	TAC & BUFR	100% (96%)	0% (2%)
Thailand	TAC & BUFR	90% (98%)	1% (0%)
Vietnam	TAC & BUFR	54% (38%)	9% (18%)

Ratios against all reports for received BUFR format in 2023 (for 2018 – 2022). Ratios of disparity between BUFR and TAC reports are also shown for countries with both formats available. Red indicates suggestion of incomplete BUFR transition (i.e., ratios below 90% and/or discrepancy with TAC).

3 Lead Centre activities of JMA in 2023

3.1 Visualization tool

JMA provides a visualization tool for monthly mean temperatures, monthly total precipitation amounts, and Standardized Precipitation Index (SPI) derived from CLIMAT reports (ClimatView¹). This is expected to be useful in monitoring of reports from other NMHSs.

3.2 Direct inquiries

JMA contacted NMHSs in relation to the following:

- Malaysia; missing reports in February 2023
- Malaysia; errors in correction (COR) reports for September 2017 through August 2022
- Myanmar; format errors in July 2023
- Mongolia; invalid precipitation reports in February 2023

These issues were resolved promptly in collaboration with relevant NMHSs. Other minor issues were also highlighted and resolved within a framework of error-reporting activity.

3.3 Error-report sharing

Since October 2022, JMA has shared monthly information summarizing CLIMAT report errors for GSN stations provided by DWD with NMHSs in the region to encourage reporting improvement based on common understanding and interaction with focal points/supervisors of member countries. The work has significantly reduced report errors (Figure 1). As of late 2023, JMA shared reports regularly with Korea, Malaysia, Mongolia, *Myanmar, Singapore, *Thailand and Vietnam (*joined in 2023).

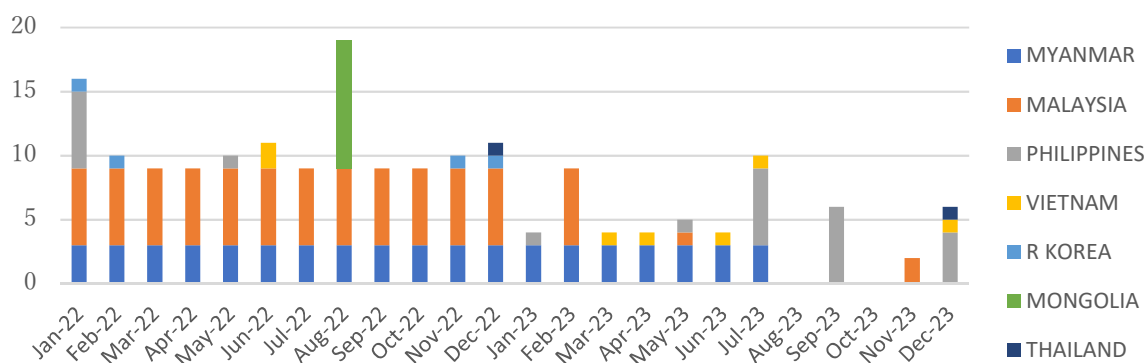


Figure 1 Time evolution of number of erroneous GSN stations in the region

¹ <https://www.data.jma.go.jp/tcc/tcc/products/climate/climatview/frame.php>

3.4 Training

Selected NMHS staff are invited to JMA's Group Training Course for Reinforcement of Meteorological Services (*) annually. The 12 attendees on the 2023 course learned about CLIMAT reports and the activities of the Lead Centre for GCOS in JMA Tokyo.

* The course is organized by the Japan International Cooperation Agency (JICA) and JMA.

4 Remarks on JMA's activity

4.1 Decoding of BUFR CLIMAT reports

Some parts of BUFR CLIMAT reports received on JMA's end were not included in the dataset for GSN Monitoring Centre products (Groups 8 and 9 in Section 1). This affected WIGOS Data Quality Monitoring System products (e.g., https://wdqms.wmo.int/gcos/land_surface/completeness/temperature/2022-12). JMA had fixed the routine system by February 2023.

Further improvement of JMA's BUFR decoding system is under consideration for adaptation to WIGOS-ID and Daily-CLIMAT (DAYCLI).

4.2 Regional progress in transition to BUFR format

Transition progress in recent years has been limited. JMA recognizes the need to monitor the progress of each country in the region.

5 Attendance at the 7th Lead Centres for GCOS workshop in Geneva, Switzerland

JMA representatives attended the 7th LC-GCOS workshop at WMO headquarters in Geneva from 7 to 9 November 2023. Staff reported on general performance in the region and recent activities in JMA's role as a Lead Center. The introduction of error-report sharing and related effectiveness were also discussed, as well as JMA's concerns over implementation relating to the Regional Basic Observing Network (RBON) in terms of missing CLIMAT station identification. JMA also contributed to discussions in areas including difficulties in transition to BUFR format reporting.