Report from CBS Lead Centres for GCOS – JMA

1 Performances of GSN and RBCN stations

JMA serves as the CBS 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 minimal format errors (CC: 0.7 or more), with Vietnam's CC score showing particular improvement from 0.3 in 2021 to 0.7 in 2022. There were exceptions with Malaysia and Myanmar (CC: 0.0), where there were systematic errors such as overly long character strings in Group 8 Section 1 from Malaysia and overly short character strings in Group 3 Section 1 from Myanmar. The former was improved with regular monthly input from JMA (see 3.2).

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: 0.8 or more), and those for Myanmar, the Philippines and Vietnam were significantly improved from 2021 but slightly degraded for Korea.

Table 1 Performances of CLIMAT reports

	GSN				RBCN			
Country	# Stn	CA	CC	CT	# Stn	CA	CC	CT
Brunei	-	-	-	-	1	1.0	0.8	1.0
Cambodia	-	-	-	-	2	0.0	0.0	0.0
China	32	1.0	1.0	1.0	78	1.0	1.0	1.0
Japan	13	1.0	1.0	1.0	52	1.0	1.0	1.0
Lao PDR	-	-	-	-	4	0.2	0.0	0.8
Malaysia	6	1.0	0.0	1.0	15	1.0	0.0	1.0
Mongolia	10	1.0	0.8	1.0	36	1.0	0.8	1.0
Myanmar	3	0.9	0.0	0.8	5	0.9	0.0	0.8
Philippines	6	0.9	0.9	0.9	8	0.8	0.8	0.8
R. of Korea	3	0.8	0.8	0.8	11	0.8	0.8	0.8
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	0.7	1.0	16	0.9	0.3	0.8

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.

Errors for GSN stations tend to be found similarly for Regional Basic Climate Network (RBCN) 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).

2 2022 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.

Figure 1 shows percentages of CLIMAT reports in BUFR format per station for 2022 as per the GSN Monitoring Centre website[1]. 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 Philippines, the Republic of Korea, Singapore, and Thailand, while less than half were received from Myanmar and Vietnam. No BUFR reports were received from Brunei, Cambodia, Lao PDR, Malaysia, and Mongolia in 2022.

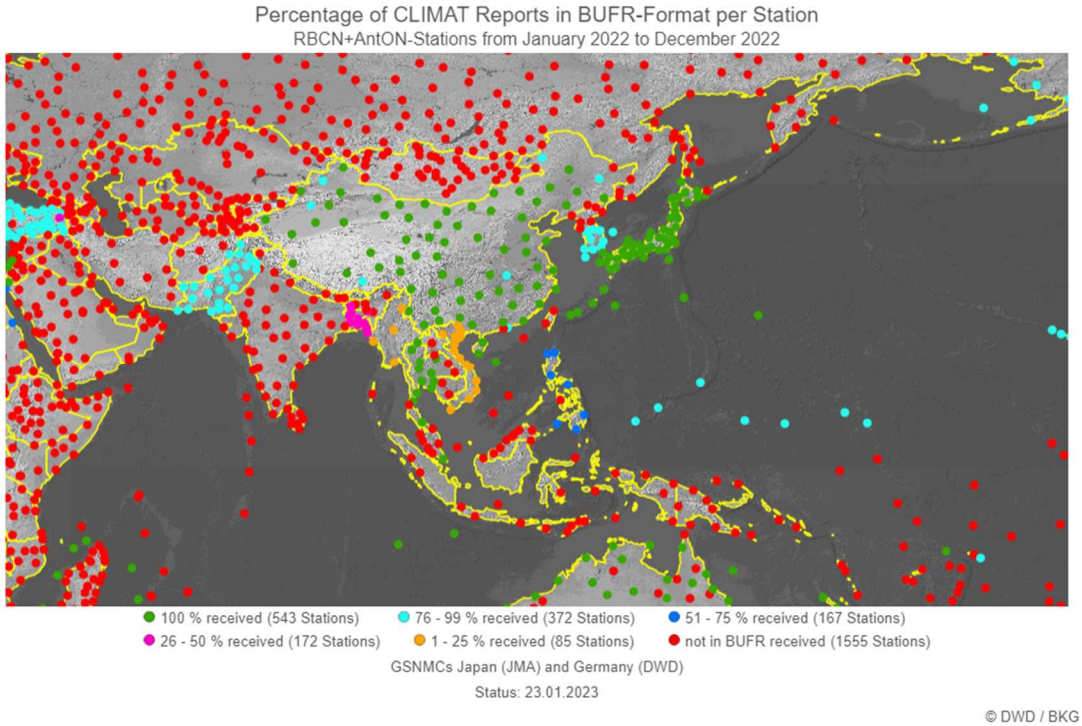

Figure 1 Percentage of CLIMAT reports in BUFR format for RBCN stations in 2022

[1] GSNMC - Global Climate Observing System Surface Network Monitoring Centre https://www.dwd.de/DWD-GCOS/EN/nationalcontributions/servicesforgcos/centresforqualityassurance/gsmnc/gsnmc_monitoring_produkte/gsnmc_monitoring_produkte_node.html

Table 2 Summary of 2022 CLIMAT reports with BUFR format in the region

Country	Reported format	BUFR	Discrepancies w/ TAC
Brunei	TAC	-	-
Cambodia		No CLIMAT reports in 2022	
China	BUFR	99%	-
Japan	TAC & BUFR	100% (98%)	0% (0%)
Lao PDR	TAC	-	-
Malaysia	TAC	-	-
Mongolia	TAC	-	-
Myanmar	TAC & BUFR	6% (3%)	0% (100%)
Philippines	TAC & BUFR	89% (80%)	5% (2%)
R. of Korea	TAC & BUFR	90% (99%)	0% (20%)
Singapore	TAC & BUFR	100% (96%)	0% (7%)
Thailand	TAC & BUFR	100% (93%)	1% (0%)
Vietnam	TAC & BUFR	25% (33%)	7% (19%)

Ratios against all reports for received BUFR format in 2022 (for 2017 – 2021). Ratios of disparity between BUFR and TAC reports are also shown for countries with both formats available.

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. It should be noted that the comparison results are preliminary, and discrepancies might be attributable to errors on JMA's part. Tendencies in transition to BUFR have not generally changed in the last five years, although some degradation has been observed in data from certain countries. 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.

3 Lead Centre activities of JMA in 2022

3.1 Visualization tool

JMA provides a visualization tool for monthly mean temperatures and monthly total precipitation amounts derived from CLIMAT reports (ClimatView)[2]. This is expected to be useful in monitoring of reports from other NMHSs.

3.2 Direct inquiries

JMA emailed NMHSs in the following cases:

- Malaysia, reporting monthly max/min of daily max/min temperature instead of monthly average of them
- Singapore, inconsistency of air pressure between CLIMAT and SYNOP reports

[2] https://www.data.jma.go.jp/tcc/tcc/products/climate/climatview/frame.php

in Changi Airport #48698

- Vietnam, duplication with past report
- China, June 2022, undecodable BUFR reports due to wrong declaration of master table version in BUFR content
- Korea, missing reports in October and December 2022
- Vietnam, suspend of BUFR reports since November 2021
- Mongolia, missing metadata for closed stations

All these issues were resolved in collaboration with relevant NMHSs by early 2023 except for Vietnam's BUFR report, for which the Viet Nam Meteorological and Hydrological Administration (VNMHA) reported ongoing efforts with transition from TAC to BUFR.

3.3 Error-report sharing

JMA now shares monthly information summarizing CLIMAT report errors for GSN stations provided by DWD with some NMHSs in the region. This activity is intended to encourage report improvement based on common understanding of situations and maintenance of contact with focal points/supervisors of member countries. As of late 2022, JMA was sharing reports regularly with Korea, Malaysia, Mongolia, Singapore and Vietnam.

3.4 Training

Selected NMHS staff are invited to JMA's Group Training Course for Reinforcement of Meteorological Services (*) annually. The 11 attendees on the 2022 course learned about CLIMAT reports and the activities of the CBS 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.

4.2 Identification of CLIMAT stations

As RBCN is to be merged into RBON, JMA recognizes a concern that some LC activities (e.g., silent CLIMAT station notifications and evaluation of CLIMAT report (CA score) availability) may be compromised. The Agency understands the importance

of common recognition for this issue among LCs, which would also be supported by identification of CLIMAT stations under RBON as per Pub. 9 Vol. A remaining in OSCAR/Surface metadata.