

GCOS Networks - GUAN & GSN:

GCOS Network Manager reporting to the 29th AOPC Session
NCEI, Asheville, US (16-20 Sept 2024)



**GLOBAL CLIMATE
OBSERVING SYSTEM**

KEEPING WATCH OVER OUR CLIMATE

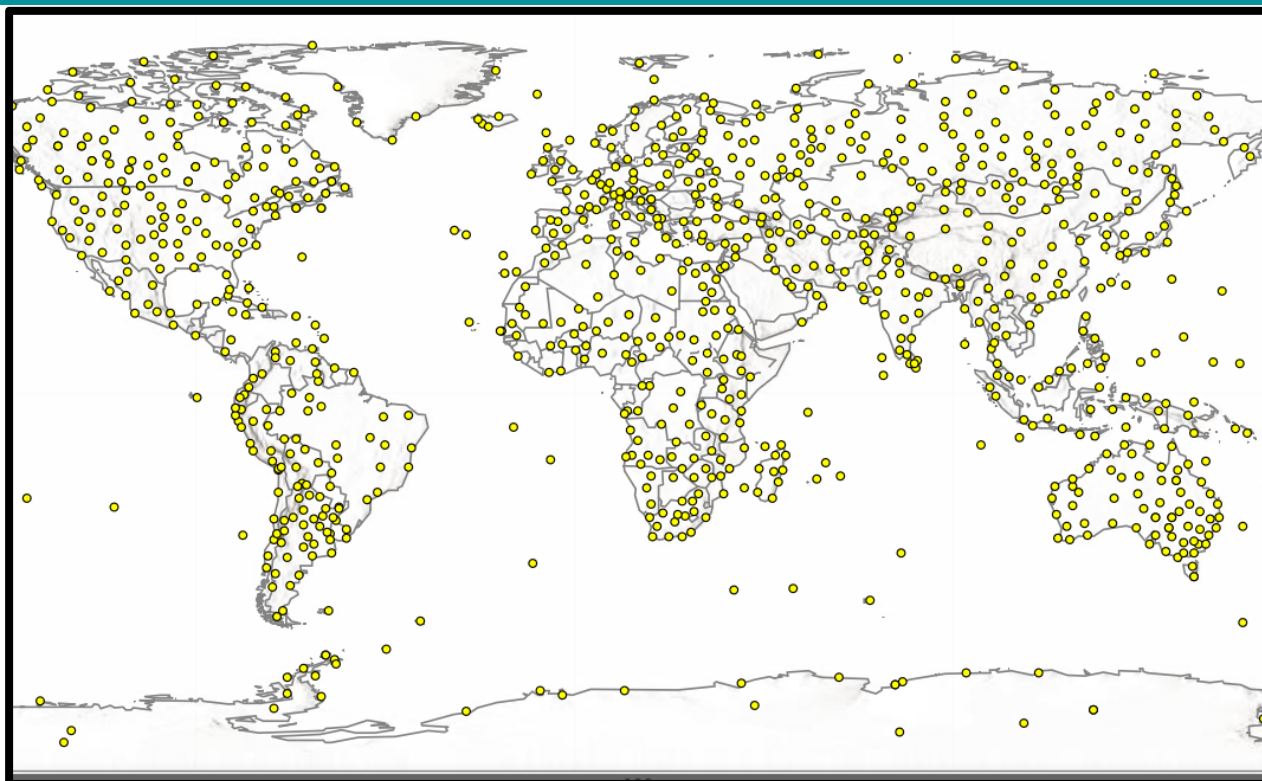


Supported by the European Union



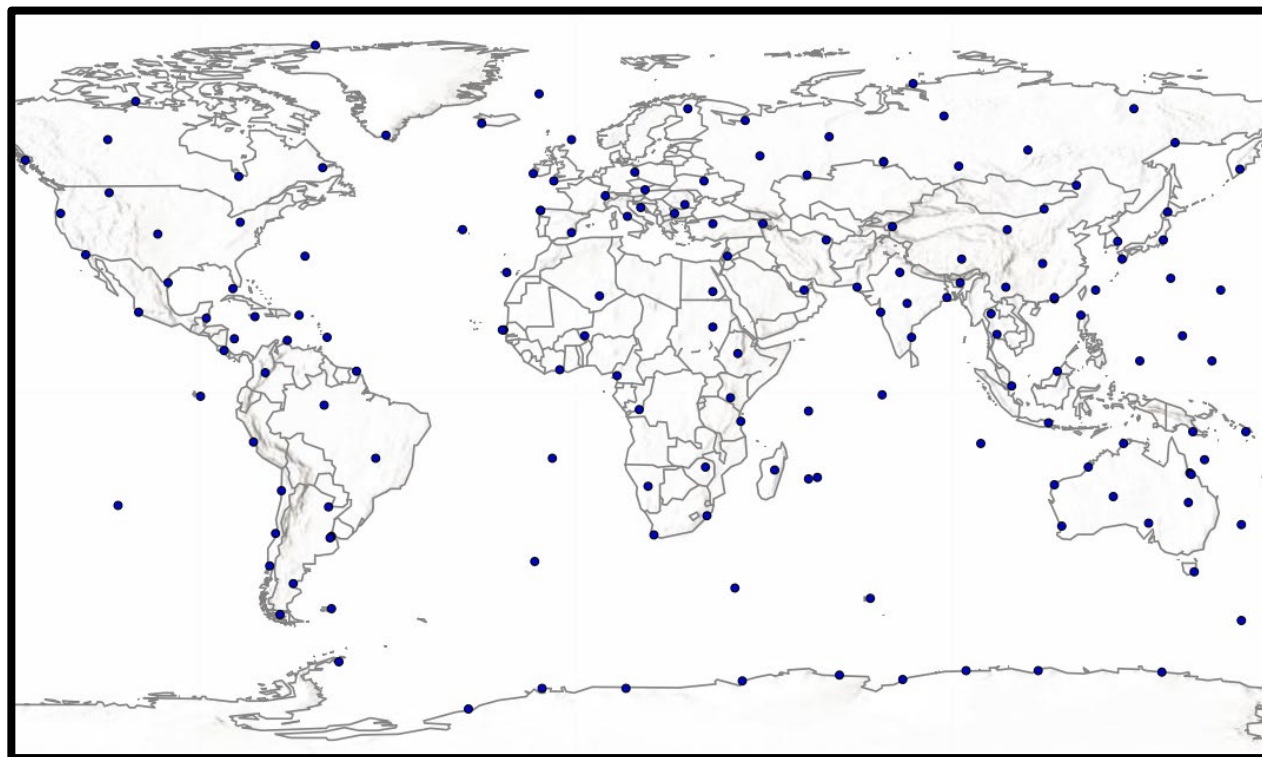
- Network and Station List update
- Performance of GSN (2022)
- Performance of GUAN (2022)
- Items for AOPC guidance

GCOS 'Baseline' Networks



GCOS Surface Network (GSN) : 1024 stations

GCOS Upper-Air Network (GUAN) : 178 stations



1 – GSN/GUAN Metadata

1.1 Network Station List (2024 proposed update, yet to be approved by AOPC)

GCOS Surface Network (GSN)

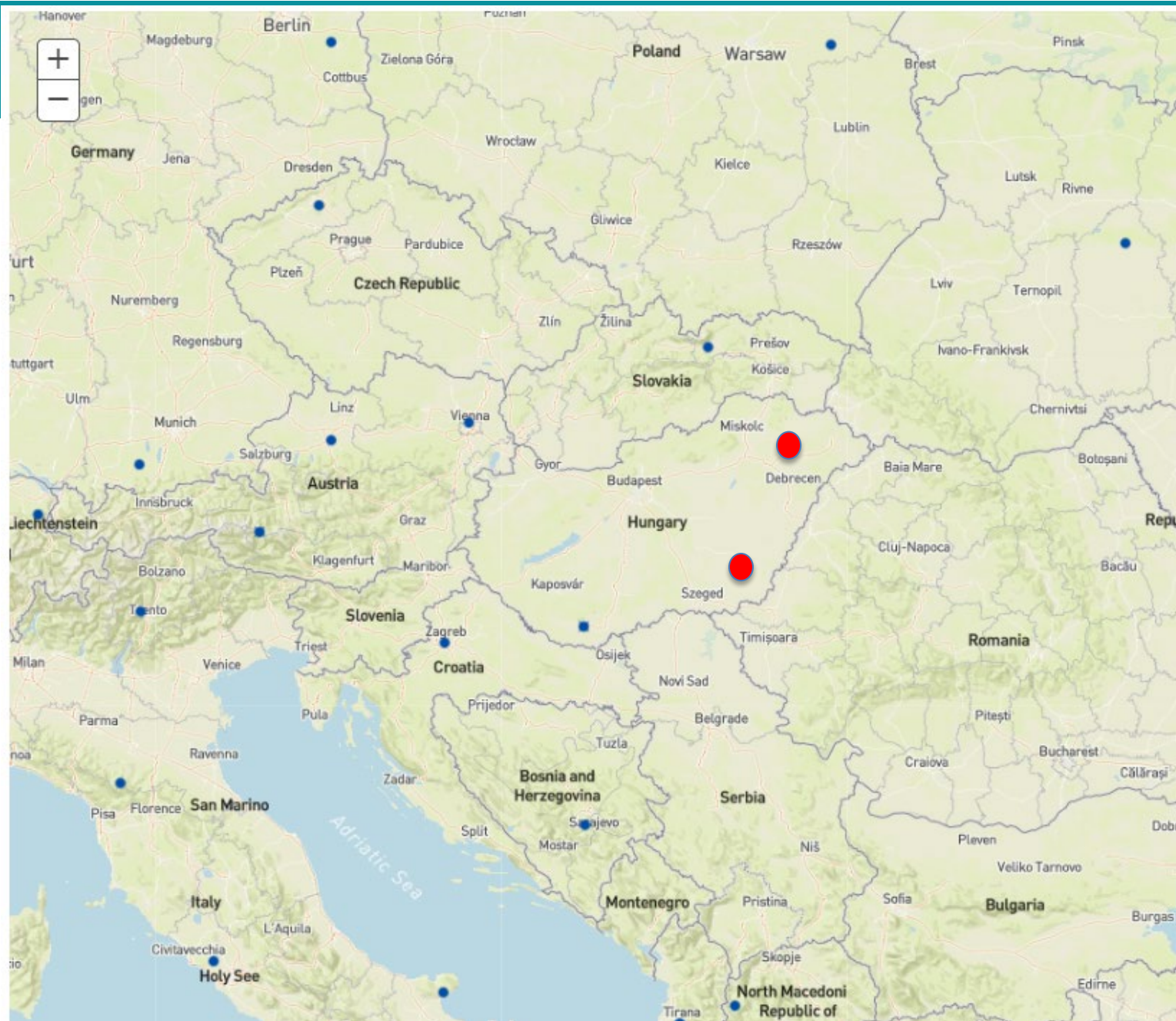
RA-I	154 Stations (0)	No Changes
RA-II	258 Stations (0)	No Changes
RA-III	101 Stations (0)	No Changes
RA-IV	177 Stations (0)	No Changes
RA-V	153 Stations (0)	No Changes
RA-VI	141 Stations (+2)	Hungary Replace: PECS/POGANY (12942) with Pogány repülőtér (0-348-1-39115). Request from Met Service, relocation of climate stations, both are currently producing a CLIMAT for overlapping measurements. Add: NAPKOR 0-348-1-63413/12892: Request from Met Service to provide increased resolution in the region. Station providing BUFR Climate + WSI. Add: BEKESCSABA/REPULOTER 0-348-1-66522/12992: Request from Met Service to provide increased resolution in the region. Station providing BUFR Climate + WSI.
ANTON	41 Stations (-1)	Delete: Antarctica Stations 89327 (Mt Siple) is closed
TOTAL	1025 Stations (+1)	

The GSN and GUAN station list change request will be submitted to AOPC (Sept 2024).

The 2024 update will be published in Oct 2024

GCOS Upper Air Network (GUAN)

RA-I	23 Stations (0)	No Changes
RA-II	38 Stations (0)	No Changes
RA-III	18 Stations (0)	Argentina Delete station 87576(Ezeiza Aero): Upper-Air station closed Replace with 0-2000-0-87582 (Aeroparque Aero 34.5589S ; 58.4198W ; 6m)
RA-IV	24 Stations (0)	No Changes
RA-V	39 Stations (0)	No Changes
RA-VI	24 Stations (0)	No Changes
ANTON	12 Stations (0)	No Changes
TOTAL	178 Stations (0)	



1.2 Comparison of GCOS GSN station list with nominations in WMO OSCAR/Surface.

Region/GCOS/OSCAR:

- RA-I/154/152: Missing OSCAR/Surface station in Libya (62124 – Sebha): Not reporting CLIMAT
 Missing OSCAR/Surface station in Mali (61270 – Kita): Reporting CLIMAT
 Missing OSCAR/Surface station in Mauritania (61415 – Nouadhibou): Reporting CLIMAT
 Additional OSCAR/Surface station in Senegal (61660 – Dakar-diass): Reporting CLIMAT
- RA-II/258/247: Missing OSCAR/Surface station in Kazakhstan (28952 – Kostanay): Not reporting CLIMAT
 Missing OSCAR/Surface station in Kazakhstan (35394 – Karaganda): Not reporting CLIMAT
 Missing OSCAR/Surface station in Russian Fed. (25173 – Mys Shmidta): No CLIMAT since 2013
 Missing OSCAR/Surface station in Russian Fed. (25325 – Ust'olaj): No CLIMAT since 2013
 Missing OSCAR/Surface station in Russian Fed. (25594 – Buhta): No CLIMAT since 2013
 Missing OSCAR/Surface station in Saudi Arabia (40361;40393;40430;40438;41024;41140):
 Reporting CLIMAT except 40438. Nomination has recently been removed.
- RA-III/101/102: Additional OSCAR/Surface station in Peru (84455 – Tarapoto): Reporting CLIMAT
- RA-IV/177/177: Complete match
- RA-V/153/153: Complete match
- RA-VI/139/135: Missing OSCAR/Surface station in Cyprus (17609 – Larnaca): Reporting CLIMAT
 Missing OSCAR/Surface station in Romania (15085 – Bistrita): Reporting CLIMAT
 Missing OSCAR/Surface station in Romania (15280 – Vorfu Omu): Reporting CLIMAT
 Missing OSCAR/Surface station in Turkey (17170 – Van/Feritmelen): Reporting CLIMAT
- Antarctica/42/41: Missing OSCAR/Surface station (89642 – Dumont D'urville): Reporting CLIMAT
- GSN/1024/1007 (98.3% consistency)

1.3 Comparison of GCOS GUAN station list with nominations in WMO OSCAR/Surface.

RA-I/23/23: Complete match

RA-II/38/37: Missing OSCAR/Surface station in Saudi Arabia (41112). WSI change?

RA-III/18/16: Additional OSCAR/Surface station in Argentina (87582 – Aeroparque): New station request
Missing OSCAR/Surface station in Brazil (82193 Belem): Reporting TEMP
Missing OSCAR/Surface station in Brazil (82397 Fortaleza): Not reporting TEMP
Missing OSCAR/Surface station in Brazil (83779 Marte): Reporting TEMP

RA-IV/24/24: Complete match

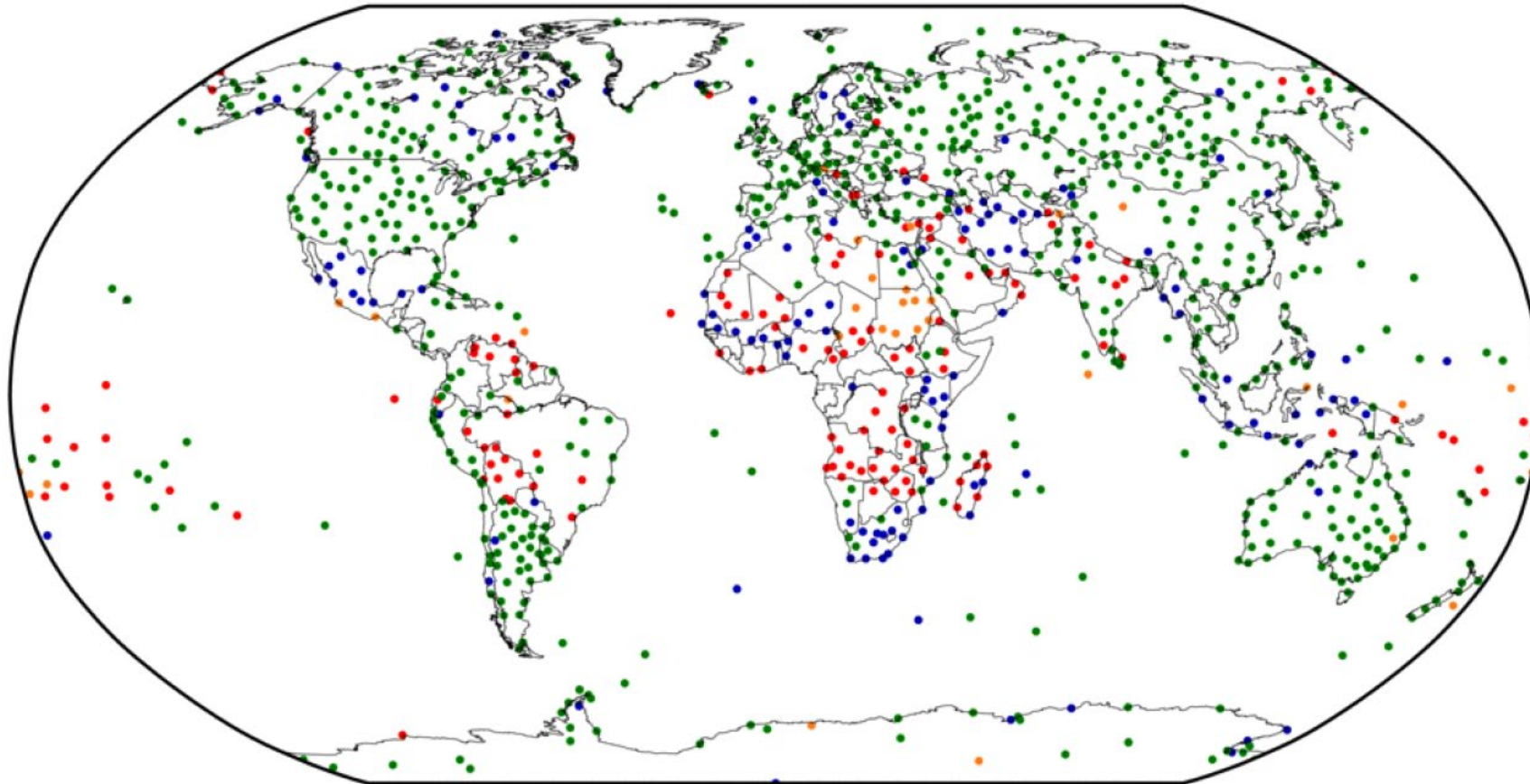
RA-V/39/39: Complete match

RA-VI/24/24: Complete match

Antarctica/12/12: Complete match

GSN/178/175 (98.3% consistency)

GSN, No. months reporting (202301 to 202312), GREEN=12, BLUE=6 to 11, ORANGE=1 to 5, RED=0



GCOS Surface Network (GSN)

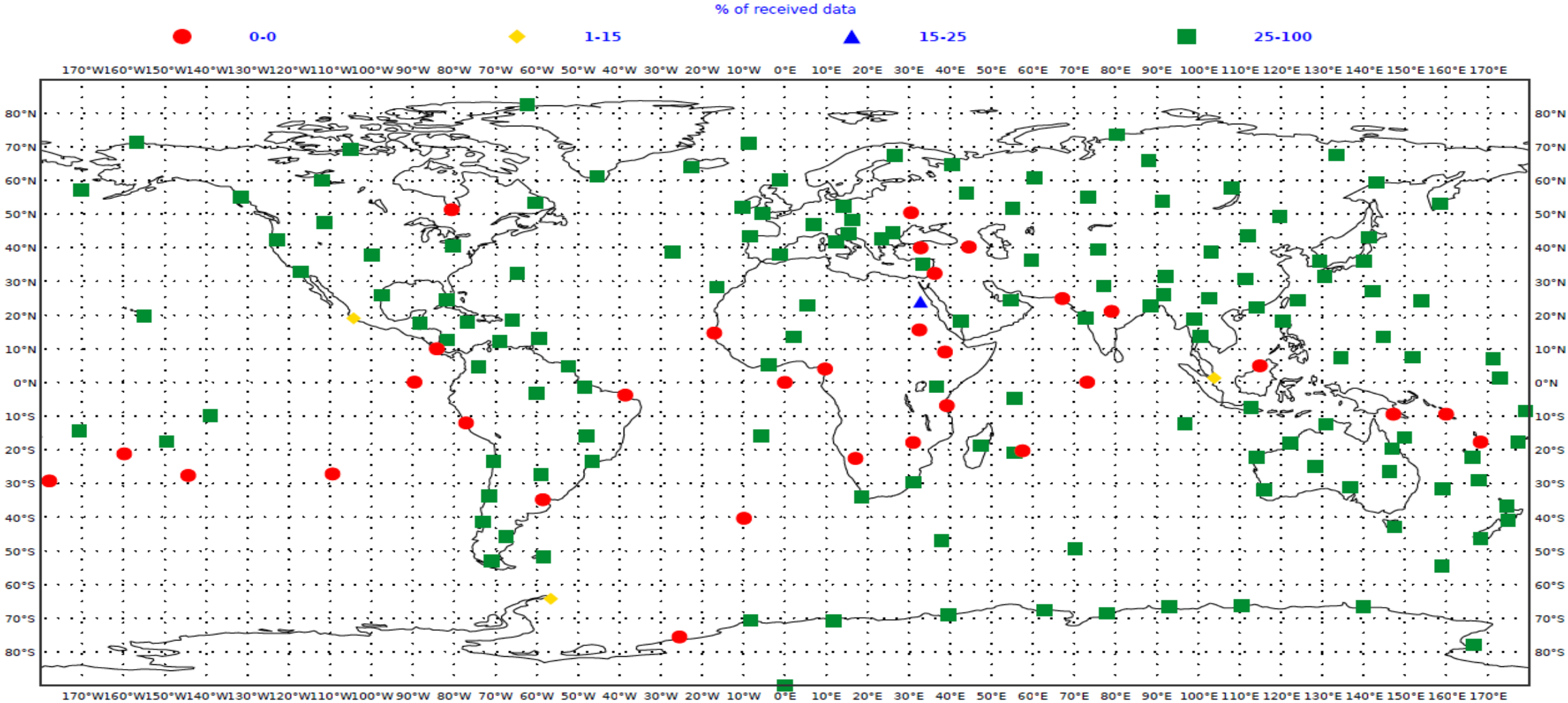
The following statistics are an annual summary of the monthly CLIMAT messages in the GCOS Climate Archive (National Climate Environmental Information, NCEI, US). According to the GCOS requirements, a fully compliant GSN/RBCN shall have 12 CLIMAT reports. The values represent the 2023 percentage of stations that are compliant and those that are partially or non-compliant. In brackets are the statistics for 2022, 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012 and 2011 respectively.

GCOS Surface Network (GSN)

Region	No.	12 Monthly CLIMAT	6 - 11 Monthly CLIMAT	1 - 5 Monthly CLIMAT	0 Monthly CLIMAT
RA-I	155	23% (30% 2022) (21, 20, 26, 37, 31, 40, 29, 29, 32, 28, 23)	31% (30% 2022) (38, 37, 33, 21, 34, 25, 31, 33, 33, 36, 39)	8% (5% 2022) (5, 4, 6, 5, 3, 9, 15, 10, 10, 11, 14)	38% (35% 2022) (36, 39, 35, 37, 32, 26, 25, 28, 25, 25, 24)
RA-II	258	82% (81% 2022) (76, 77, 76, 74, 79, 83, 78, 71, 73, 73, 75)	9% (11% 2022) (16, 14, 17, 14, 15, 10, 14, 21, 19, 19, 19)	1% (0% 2022) (0, 2, 1, 5, 0, 2, 2, 3, 2, 2, 1)	8% (8% 2022) (8, 7, 6, 7, 6, 5, 6, 5, 6, 6, 5)
RA-III	101	70% (73% 2022) (72, 68, 72, 52, 63, 65, 61, 76, 89, 84, 69)	4% (11% 2022) (13, 7, 5, 24, 15, 29, 35, 20, 6, 13, 28)	1% (1% 2022) (2, 2, 9, 1, 6, 0, 0, 1, 0, 0, 0)	25% (15% 2022) (13, 23, 14, 23, 16, 6, 4, 3, 5, 3, 3)
RA-IV	178	83% (86% 2022) (86, 87, 82, 88, 86, 90, 88, 88, 88, 81, 80)	14% (11% 2022) (12, 9, 16, 7, 12, 7, 9, 10, 11, 17, 18)	2% (1% 2022) (1, 2, 1, 4, 1, 2, 2, 1, 1, 1, 1)	1% (2% 2022) (1, 2, 1, 1, 1, 1, 1, 1, 0, 1, 1)
RA-V	151	68% (62% 2022) (60, 72, 66, 62, 61, 67, 66, 70, 63, 58, 52)	12% (19% 2022) (22, 11, 15, 21, 21, 15, 16, 17, 16, 23, 34)	6% (5% 2022) (2, 3, 4, 1, 3, 3, 4, 1, 7, 7, 1)	14% (14% 2022) (16, 14, 15, 16, 15, 15, 14, 13, 14, 12, 11)
RA-VI	138	80% (78% 2022) (77, 79, 81, 75, 82, 84, 77, 80, 82, 78, 81)	9% (9% 2022) (11, 7, 7, 15, 8, 7, 14, 9, 12, 17, 15)	2% (3% 2022) (1, 4, 3, 1, 2, 2, 3, 5, 2, 1, 0)	9% (10% 2022) (11, 10, 9, 9, 8, 7, 6, 6, 4, 4, 4)
ANTON	42	76% (79% 2022) (81, 91, 88, 84, 83, 81, 77, 79, 60, 45, 50)	17% (19% 2022) (17, 5, 10, 14, 12, 17, 19, 19, 36, 43, 33)	5% (0% 2022) (2, 2, 2, 2, 5, 2, 2, 2, 2, 5, 12)	2% (2% 2022) (0, 2, 0, 0, 0, 0, 2, 0, 2, 7, 5)

GUAN Monitoring ECMWF – August 2024

GUAN STATIONS Aug 2024 Frequency of Reception data at ECMWF Level: 100 hPa Temperature SUMMARY 00/12 UTC



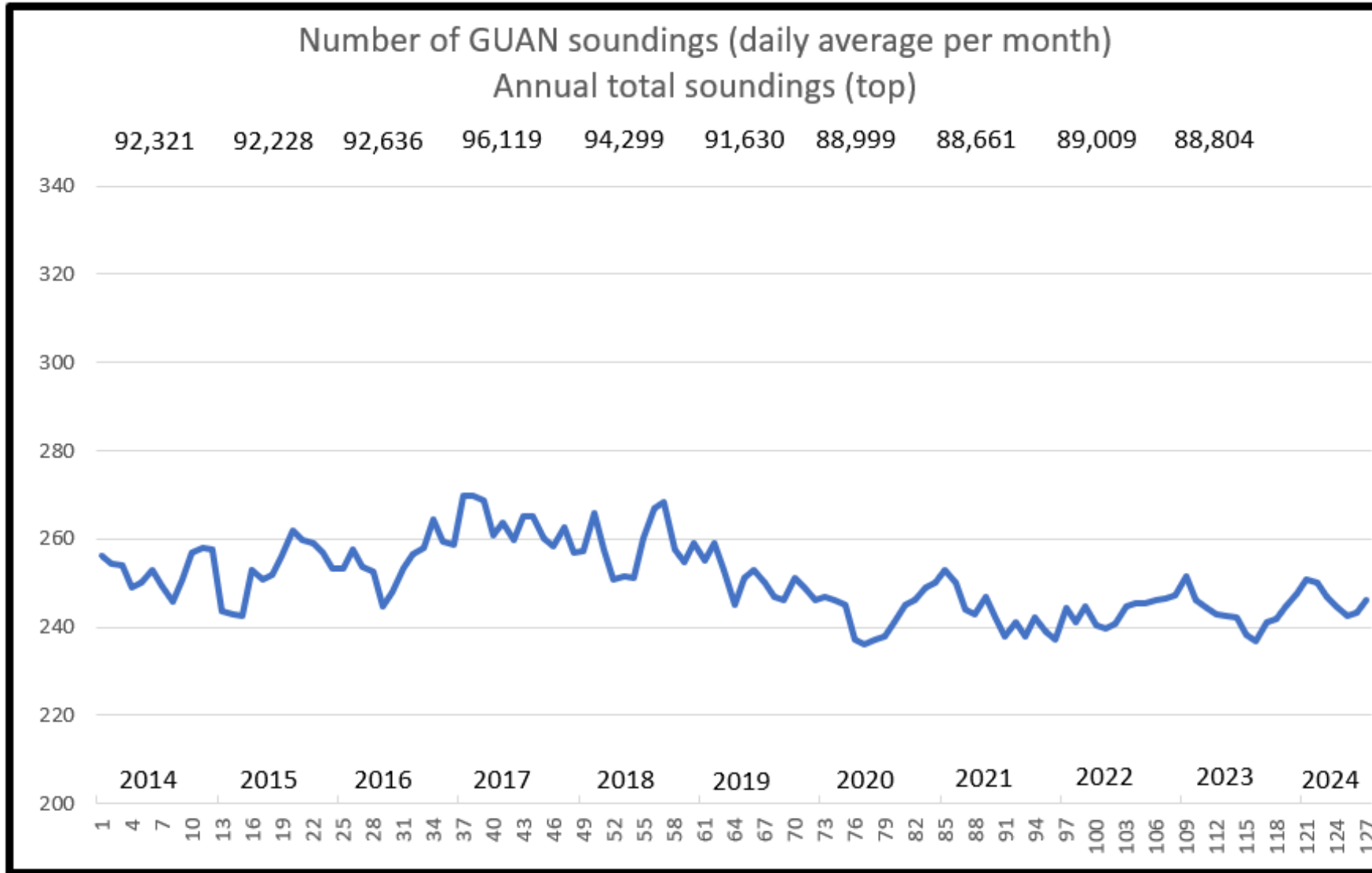
GCOS Upper Air Network (GUAN)

The following table is the 2023 summary for the GCOS Upper-Air Network (GUAN) monitoring against the GCOS minimum requirements (25 daily soundings to 30hPa per month) for each region, according to the monthly statistics provided by ECMWF. In brackets are the same statistics for 2011 to 2022. For 2013 to 2018 these are based on availability according to NCEP, and for 2011 to 2012 to NCEI.

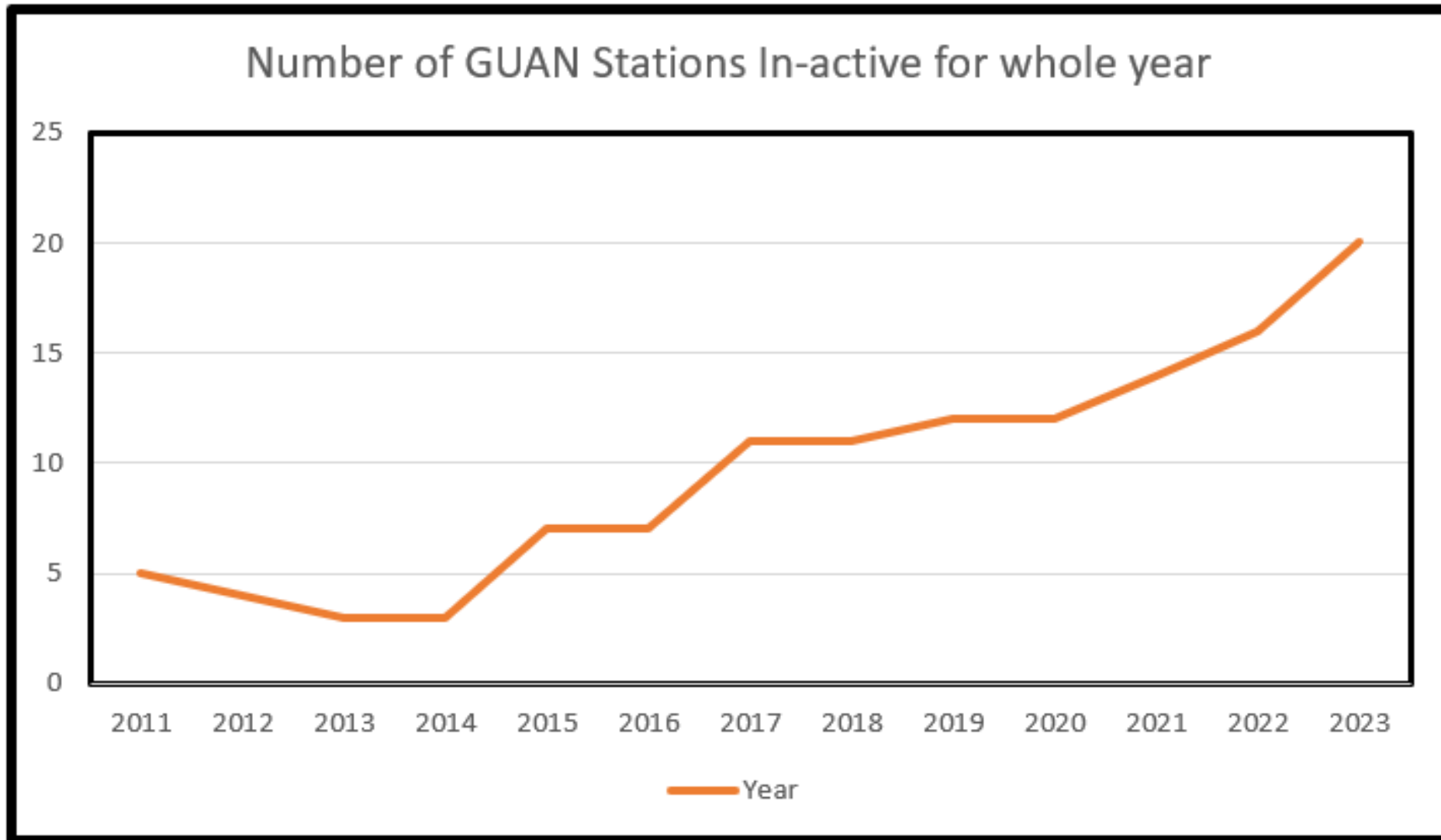
Region	Number of GUAN stations (2023)	% meeting minimum GCOS requirements in 2023 (% for 2022, 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012 and 2011)
RA-I	23	43% (47%, 47%, 30%, 22%, 22%, 30%, 39%, 35%, 39%, 46%, 48%, 57%)
RA-II	38	84% (84%, 71%, 84%, 87%, 87%, 89%, 87%, 87%, 87%, 87%, 87%, 87%)
RA-III	18	56% (61%, 61%, 61%, 72%, 72%, 61%, 61%, 67%, 72%, 67%, 89%, 78%)
RA-IV	24	79% (92%, 96%, 96%, 96%, 92%, 92%, 87%, 79%, 83%, 75%, 83%, 87%)
RA-V	38	82% (82%, 79%, 79%, 79%, 79%, 79%, 84%, 79%, 76%, 74%, 84%, 87%)
RA-VI	24	75% (83%, 87%, 87%, 92%, 87%, 87%, 87%, 87%, 87%, 83%, 92%, 87%)
Antarctica	12	67% (67%, 50%, 50%, 67%, 67%, 67%, 58%, 67%, 58%, 58%, 83%, 83%)

Twenty (20) of the GUAN stations (11%) were 'Silent' (zero reported TEMP observations) during 2023, a further increase of 4 from 2022, which is again the highest since this monitoring was started in 2011. In 2022 it was 16, in 2021 it was 14, 2020 and 2019 it was 12, 2018 and 2017 it was eleven (11), 2016 and 2015 it was seven (7), 2014 and 2013 it was three (3), four (4) in 2012 and five (5) in 2011. Graph below shows this trend.

GUAN Monitoring Statistics – Trend (2014 – 2024)



GUAN Monitoring Statistics – Trend (2014 – 2023)

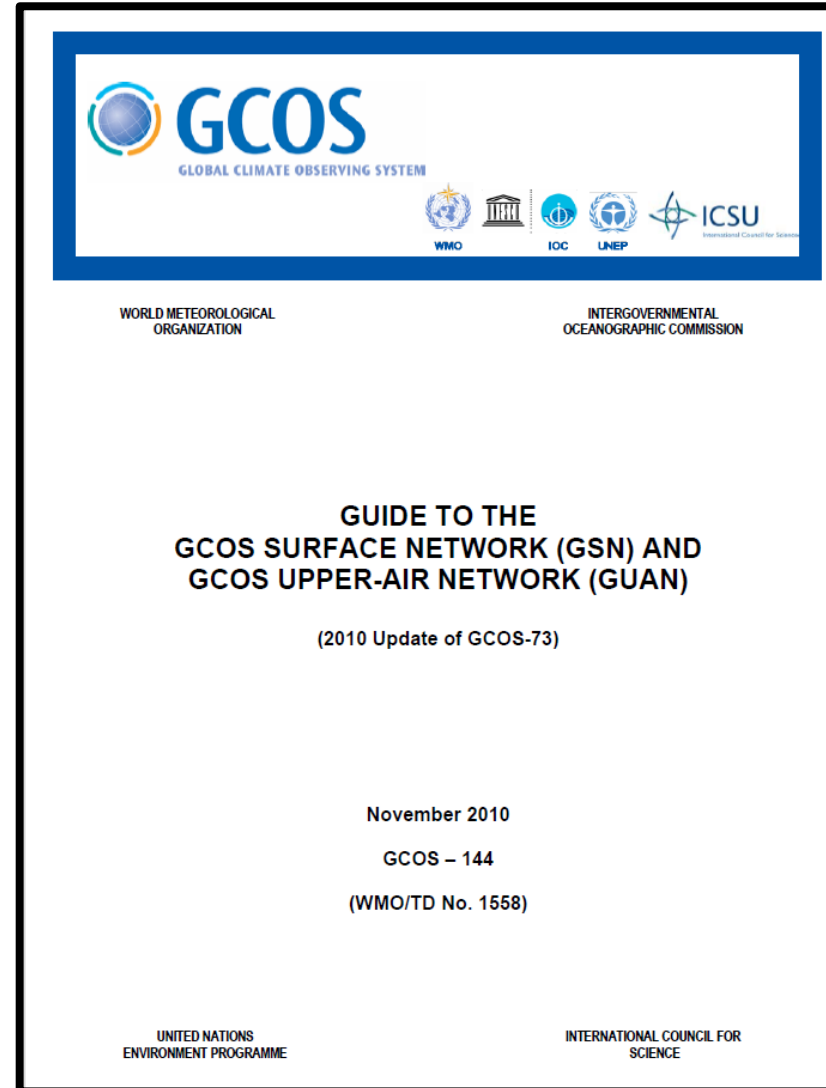


GUAN TEMP message reporting

Of the 158 GUAN stations which reported a TEMP message in 2023:

89% (141) reported either a low/high resolution BUFR message	85% (2022); 85% (2021)
11% (17) did not report in BUFR (i.e. TAC only)	15% (2022); 15% 2021)
12% (19) only reporting BUFR	9% (2022); 10% (2021)

GCOS-144 (2010 guide on GSN & GUAN)



- Approve 2024 GSN and GUAN station list change request
- GSN and GUAN monitoring shows that both networks are under ‘stress’, particularly in the poorer countries where availability statistics show a worsening performance. What can AOPC/GCOS do here? The GCM has no funds and other initiatives (i.e. GBON/SOFF) are as yet to show any positive impact.
- Review of GCOS-144 later in the meeting.

GLOBAL CLIMATE OBSERVING SYSTEM

GLOBAL CLIMATE OBSERVING SYSTEM

KEEPING WATCH OVER OUR CLIMATE



International Science Council

International Science Council



THANK YOU

Supported by the European Union

