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COMMISSION FOR BASIC SYSTEMS OPEN PROGRAMME
AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

CBS/GCOS EXPERT MEETING ON COORDINATION
OF THE GSN AND GUAN

Item : 4

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Monitoring of GCOS Atmospheric Networks

(Submitted by the Secretariat)

Summary and Purpose of Document

The document presents analysis of the GSN monitoring Report No. 5 and comparison with statistics provided by the NCDC for the period August01 - January02.

ACTION PROPOSED

The meeting is invited to take into consideration the information contained in this document when discussing the means and procedures to further improve availability of climate data on the basis of GCOS monitoring activities.

Appendix: Analysis of the GSN monitoring Report No. 5 and comparison with statistics provided by the NCDC for the period August01 - January02.

Analysis of the GSN Monitoring Report #5 and comparison with the statistics provided by the NCDC for the period Aug 01 – Jan 02

1. The following stations are listed in the Monitoring Report # 5 as “never received in the period Jan 99 – June 01” (A.VII.1), but these stations are not also contained in the Jan – June 01 list of mission stations (A.VII.2) : 40706, 40745, 40841 and 40848.

This points to an inconsistency in the Monitoring Report # 5.

2. The following stations were recorded with wrong index numbers. The correct index numbers have to be inserted in Vol A.

Wrong #	Station Name	Correct #
94322	Rabbit Flat	95322
94516	St George Airport	94517
94719	Dubbo Airport AWS	95719*
94916	Cabramurra	95916
94965	Low Head	95964
95314	Newman Aero	94317
95574	Tewantin	94570

3. The following stations, all known to the NCDC archive, are missing in Pub-No. 9 Vol A;

not known CARACAS CAGIGAL OBS

not known CARMEN BOLIVAR

not known OKTIABR'SKAYA

not known SENTANI IRJ

2142 JOKKMOCK

4092 TEIGARHORN

23146 MYS KAMENNYJ

25821 NAJAHAN

37546 TBILISI

87616 VICTORICA

87642 AZUL AE

91788 NUKUALOFA

91930 BORA-BORA

91949 REAO

4. Situation of RA I

Table of RA I countries from where some or all stations were not available at the NCDC and/or at the MCs

Country/Operator	Registered GSN stations	Not available at NCDC	Not (never) available at the MCs	Likely nature of problem
Angola	8	8	8 (6)	GTS connection
Botswana	1	1	1 (1)	Local operations
Burundi	1	1	1 (1)	GTS connection
Cape Verde	1	1	1 (1)	GTS connection
Chad	5	4	4 (0)	Local operations
Congo DPR	3	3	3 (1)	GTS connection
Cote d'Ivoire	3	1	1 (0)	Local operations
Egypt	6	3	3 (3)	Local operations

Eritrea	1	1	1 (1)	GTS connection
Ethiopia	4	3	3 (3)	GTS connection
France, operated by	5	5	4 (3)	GTS routing problem
Gabon	2	1	2 (1)	GTS routing problem
Kenya	6	4	4 (0)	Local operations
Libyan AJ	5	4	2 (0)	GTS routing problem
Madagascar	9	5	1 (0)	GTS routing problem
Mauritania	5	1	0 (0)	GTS routing problem
Morocco	3	1	1 (1)	Local operations
Mozambique	4	4	4 (4)	Local operations
Namibia	4	4	4 (4)	Local operations
Nigeria	2	2	2 (2)	Local operations
Sierra Leone	1	1	1 (1)	GTS connection
South Africa	12	7	7 (7)	Local operations
Sudan	12	1	12 (0)	Local operations
USA, operated by	1	0	1 (1)	GTS routing problem
Zambia	6	3	6 (6)	GTS routing problem
Zimbabwe	3	1	1 (0)	Local operations
	113	70	78	

In RA I, 45 countries or operating countries have registered 153 GSN stations. 26 countries/operators do not provide some or all of their GSN stations reports. 19 countries/operators provide their full GSN programme. The above table contains the countries/operators from where some or all stations' CLIMAT reports are missing at the MCs and/or the NCDC in the periods Jan 01 – June 01 or Aug 01 – Jan 02, respectively.

As can be seen in the fourth column, eight of the 26 countries/operators had, at some point in time during the entire monitoring period (Jan 99 – June 01), provided the CLIMAT reports of all their registered GSN stations via the GTS to the MCs. This indicates that all the stations registered in these countries had been operational and the GTS connections was functioning during some time during the period Jan 99 – June 01.

The table also shows the likely causes of the problem in each country/operator. In particular, "Local operations" comprises the following problems:

- Station(s) not operational;
- Station(s) operational, but failed to produce a CLIMAT report;
- The CLIMAT report was produced but submitted with an incorrect Bulletin Heading, which prevented the on-ward transmission on the GTS;
- The NMC did not receive the CLIMAT report for on-ward GTS transmission; this could be because of poor national telecommunications, but also because of other operational deficiencies.

"GTS connection" means that the NMC may lack a functioning GTS connection and cannot transmit the Bulletin(s) to the RTH for on-ward transmission.

5. Hypothesis

Hypothesis:

Monitoring the GSN data availability through counting the reports exchanged on the GTS results in a lower than the actual data availability, because NMHSs provide reports to the World Data Centres also through other data dissemination mechanisms (than through the GTS).

Monitoring Report #5 - A VII.1 - The following 27 GSN stations were listed as “never received during the entire monitoring period Jan 99 – June 01”, but are available in the NCDC archive in the period Aug 01 – Jan 02; it is unrealisted to conclude that these station became operational after July 01; reports from these stations get to the NCDC archive through ways different from the GTS; this underpins the hypotheses; it should be investigated how these reports actually reached the NCDC:

01026 TROMSO
01238 FOKSTUA II
01403 UTSIRA FYR
01465 TORUNGEN FYR
08506 HORTA / FAIAL
08513 PONTA DELGADA / ACORES
23724 NJAKSIMVOL'
32389 KLYUCHI / KAMCHATKA
33038 VASILEVICH
40706 TABRIZ
40745 MASHHAD
40841 KERMAN
40848 SHIRAZ
41560 PARACHINAR
41759 PASNI
41764 HYDERABAD AIRPORT
61902 WIDEAWAKE FIELD / ASCENSION ISL.
67475 KASAMA
67633 MONGU
67743 LIVINGSTONE
85207 SAN IGNACIO DE VELASCO
85223 COCHABAMBA AIRP.
85230 CHARANA
85289 PUERTO SUAREZ AIRP.
85364 TARIJA (CAP. ORIEL AIRP.)
85365 YACUIBA
91753 HIHIFO / ILE WALLIS

Monitoring Report #5 - A VII.2 – The following 40 GSN stations were listed as “not received during the monitoring period January – June 01”, but are available in the NCDC archive six months later in the period Aug 01 – Jan 02; it is unrealisted to conclude that these station became operational after July 01; reports from these stations get to the NCDC archive through ways different from the GTS; this underpins the hypotheses; although the monitoring period is not identical, it is still worth studying how these station get to the NCDC archive:

01026 TROMSO
01238 FOKSTUA II
01403 UTSIRA FYR
01465 TORUNGEN FYR
08506 HORTA / FAIAL
08513 PONTA DELGADA / ACORES
23724 NJAKSIMVOL'
33038 VASILEVICH
41560 PARACHINAR
41759 PASNI
41764 HYDERABAD AIRPORT
52836 DULAN

57461 YICHANG
61902 WIDEAWAKE FIELD / ASCENSION ISL.
62010 TRIPOLI AP
62600 WADI HALFA
62640 ABU HAMED
62641 PORT SUDAN
62650 DONGOLA
62730 KASSALA
62760 EL FASHER
62762 SENNAR
62770 GENEINA
62781 EN NAHUD
62840 MALAKAL
62941 JUBA
64503 MAYUMBA
67633 MONGU
67743 LIVINGSTONE
83481 JOAO PINHEIRO
85207 SAN IGNACIO DE VELASCO
85223 COCHABAMBA AIRP.
85230 CHARANA
85289 PUERTO SUAREZ AIRP.
85364 TARIJA (CAP. ORIEL AIRP.)
85365 YACUIBA
86565 ROCHA
91753 HIHIFO / ILE WALLIS
93947 CAMPBELL ISLAND AWS

Monitoring Report #5 – A.VII.2 The following 57 GSN stations were received (at least once) during the entire monitoring period Jan 99 – June 01 as they are not listed in A.VII.1, but disappeared from the GTS in the period Jan – June 01 as they are contained in A.VII.2; this indicates GTS problems developed after Jan 01; 17 stations marked with “+” are available in the NCDC archive in the period Aug 01 – Jan 02; this underpins the hypothesis.

23891 BAJKIT
24329 SHOLOGONCY
24343 ZHIGANSK
24382 UST'-MOMA
24671 TOMPO
24944 OLEKMINSK
24966 UST'MAYA
25744 KAMENSKOYE
25913 MAGADAN
30372 CHARA
52836 DULAN +
57461 YICHANG +
61996 MARTIN-DE-VIVIES / ILE AMSTERDAM
62010 TRIPOLI AP +
62131 HUN
62463 HURGHADA AIRPORT
62600 WADI HALFA +
62640 ABU HAMED +
62641 PORT SUDAN +
62650 DONGOLA +

62730 KASSALA +
 62760 EL FASHER +
 62762 SENNAR +
 62770 GENEINA +
 62781 EN NAHUD +
 62840 MALAKAL +
 62880 WAU
 62941 JUBA +
 64040 KISANGANI
 64282 MANONO
 64503 MAYUMBA +
 64706 MOUNDOU
 64751 ATI
 64753 FAYA
 64754 AM-TIMAN
 65585 ADIAKE
 66160 LUANDA
 66410 MENONGUE (SERPA PINTO)
 67019 ANALALAVA
 67983 CHIPINGE
 71953 WATSON LAKE A
 76311 CHOIX
 82113 BARCELOS
 83481 JOAO PINHEIRO +
 83611 CAMPO GRANDE
 86565 ROCHA +
 87007 LA QUIACA OBSERVATORY
 87305 JACHAL
 87903 LAGO ARGENTINO AERO
 89542 MOLODEZNAJA
 89573 ZHONGSHAN
 91517 HONIARA
 91554 PEKOA AIRPORT
 91568 ANEITYUM
 96745 JAKARTA OBS. / JAVA
 96925 SANGKAPURA, JAW
 97240 MPENAN SELAPARANG, NUS
 97686 WAMENA AIRPORT / IRIAN JAYA

6. Summary of the NCDC Monitoring Results Aug 01 – Jan 02

The numbers in parentheses are the corresponding percent values taken from the GSN Monitoring Report # 5 (Jan – June 01)

Region	Total number of GSN stations	Number of stations not available at NCDC	Number of stations available at NCDC	Percentage of not available stations	Percentage of available stations
I	153	72	81	47.06 (52)	52.94 (47)
II	261	93	168	35.63 (33)	64.37 (67)
III	119	47	72	39.5 (40)	60.5 (60)
IV	156	19	137	12.18 (10)	87.82 (90)
V	154	36	118	23.38 (21)	76.62 (79)
VI	122	24	98	19.67 (30)	80.33 (70)

[VII]	20	14	6	70 (25)	30 (75)
Global	985	305	680	30.96 (31)	69.04 (69)

Although the monitoring periods of the Monitoring Report #5 and the NCDC monitoring are not identical, there is enough evidence for concluding that the hypothesis holds. The number of GSN stations contained in the NCDC archive but not counted at the MCs, is significant in absolute numbers, but small in terms of percent (of the total number of stations = 985). Vice versa, there were several stations counted at the MCs that were not available in the NCDC archive. The above table summarises this for Regions IV, V, VII and for [VII], where the data availability was higher at the MCs than at the NCDC.

It is particularly intriguing in Region IV, where the NCDC, located in the same Region, had a lower data availability of RA IV stations than the MCs, and vice versa in Region VI, where the NCDC has, in fact, a significantly higher data availability for RA VI stations than MC Offenbach, located in the same Region. There is also no easy explanation for the much higher data availability for [VII] in the MCs, which becomes even more irritating through the fact that the stations McMurdo and Amundsen-Scott, both operated by the USA, were not even available at NCDC.

7. Conclusion and Recommendations

- (a) The harmonisation of the data availability between the MCs and the NCDC would significantly increase the overall GSN network performance.
- (b) Further performance increases could be achieved by taking the appropriate actions to make available reports from obviously operational stations to the World Data Centres (possibly by-passing the GTS as means of the data delivery). This should be most easily achievable for certain stations operated by France, UK, USA in the Regions I and V.
- (c) It should also be possible to achieve a 100 % availability for the 20 Antarctic stations.
- (d) Countries with known telecommunication problems, either concerning the national data collections mechanism or concerning the GTS connection, should be invited to submit their CLIMAT reports on diskette via regular mail to the World Data Centres. The World Data Centres should include the off-line submitted reports into their archives.
- (e) The World Data Centres should inform the MCs of the reports they received. The MCs should incorporate the off-line submitted data in the monitoring process.
- (f) A detailed analysis similar to the one above for RA I, should be carried out for each Region. This should reveal those stations whose reports had been available at some point in time during the entire monitoring period and have disappeared since. It is worthwhile to contact each of the countries/operators concerned to inquire about the problems and to encourage the continuing provision of the CLIMAT reports.
- (g) The deficiencies in the monitoring reference files indicated in sections 1 – 3 above should be corrected.

In summary, it seems realistic to achieve, through a combination of the above recommendations, a performance increase of the GSN of about 15 percent.
