Workshop on WWW quantitative monitoring
Toulouse (2-4 June 2003)

Executive summary

The workshop on WWW quantitative monitoring was held in Toulouse from 2 to 4 June 2003. Experts from WMC Melbourne and RTHs Cairo, Offenbach, Tokyo and Toulouse participated in the workshop.

The WMO Secretariat presented the WWW monitoring plan, the status of implementation of the monitoring exercises co-ordinated by the Secretariat as well as the proposed Integrated WWW Monitoring (IWM).

The workshop considered the arrangements required for the implementation of the IWM pilot project and the extension of the Special MTN Monitoring (SMM). The workshop made a proposal for monitoring BUFR data, starting with the monitoring of aircraft BUFR data. The workshop proposed to carry out a daily near-real monitoring and drafted general procedures for a pilot test.

The workshop reviewed the questions concerning the transition from the current monitoring to the IWM. The workshop drafted general specifications of a monitoring application on a PC, which would facilitate the transition. The workshop reviewed the IWM procedures and made proposals to amend them.

The Secretariat presented the analysis of the monitoring exercises as available in the WMO Web server. The workshop reviewed the role of the WWW centres in the preparation of the analysis of the monitoring results and their distribution to WWW centres, and in particular the major role of the RTHs in the proposed IWM.

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Outcomes of the workshop

Operational trial and other tests of procedures

1.   The diagram of the proposed operational trial of the IWM is given in Annex I. RTH Toulouse will contact RTH Dakar and one NMC in the zone of responsibility of RTH Toulouse to prepare the operational trial. RTHs Toulouse or Dakar will contact two NMCs in the zone of responsibility of RTH Dakar to prepare their participation in the operational trial; these two NMCs should preferably present their AGM statistics in different formats (e.g. one in an electronic format and another on a paper format). In co-ordination with the Secretariat, the rapporteur on WWW monitoring will prepare a note on the objectives of the operational trial, the procedures to be followed by each centre and the role of each centre in the operational trial. The Secretariat will then send formal invitations to the Member countries concerned to participate in the operational trial.

2.   The responsibilities taken by SMM centres are given in Annex II. Noting the development of the use of the BUFR code, in particular through the migration from traditional alphanumeric codes to table-driven code forms, CBS stressed the importance of monitoring data presented in the BUFR code. It invited RTHs on the MTN, in particular RTHs Melbourne, Offenbach, Tokyo and Toulouse, to consider participating with high priority in the preparation of a pilot study and in preliminary tests for the monitoring of BUFR bulletins. RTHs Cairo, Melbourne and Offenbach will be able to provide BUFR raw data in the near future. RTH Tokyo will be in a position to do so as from 2005-2006 and Toulouse will further investigate the possibility to do so. RTHs Melbourne and Offenbach are willing to contribute to the pre-analysis of the aircraft BUFR raw data. The possibilities for RTHs Melbourne and Offenbach to contribute in the pre-analysis of wind profilers BUFR raw data are to be further investigated. The formats of the pre-analysis will be reviewed by the pre-analysis centres in co-ordination with the Secretariat to take into account the information provided in the BUFR bulletins. The workshop recommended to start a pilot project for the monitoring of aircraft BUFR data (e.g. transfer of the aircraft BUFR raw data as from October 2003 and implementation of the pre-analysis as from January 2004). The rapporteur on WWW monitoring will co-ordinate the necessary action to start the pilot project and evaluate it.

3.   WMC/RTH Melbourne prepares daily near-real-time monitoring reports in the forms of coverage charts and the comparison of this monitoring information with the similar reports prepared by ECMWF made it possible to identify anomalies in the availability of observational data at WMC/RTH Melbourne, which could be corrected. The workshop recommended that WWW centres post such daily monitoring reports on their websites with a view to comparing the availability of data. The design of this publication should follow the Coverage Charts from ECMWF as far as possible. The workshop felt that the monitoring should be carried out as much as possible before any quality control, but recognized that such a monitoring may be implemented at the level of a GDPS data base of WWW centres. The workshop drafted general procedures for a pilot test (see annex III). The workshop recommended to make a test of this procedure with the participation of at least two RTHs (e.g. Melbourne and another RTH). The experts will confirm the possibility of their centres in the pilot test to the rapporteur on WWW monitoring. The workshop recommended to submit this recommendation to the OPAG on ISS for comments before starting any test.

Transition from the current monitoring to the IWM

4.   The extraordinary session of CBS in 2002 requested the OPAG/ISS to analyse the results of the operational trial, and, in light of the outcome, consolidate and submit the procedures for the integrated monitoring to the Commission, at its next session in 2004.

5.   The IWM project is based on the sharing of the responsibilities of the monitoring between the WWW centres and the Secretariat. The RTHs will play a key role since they will be responsible for collecting monitoring reports from their associated NMCs and to send the consolidated IWM

monitoring reports to the Secretariat and their associated MTN centres. Noting that the RTHs could use the AGM reports of their associated NMCs to prepare their IWM reports, the workshop recommended to give the highest priority to the preparation of the IWM reports by RTHs.

6.   The migration from traditional alphanumeric codes to table-driven code forms will require the adaptation of the monitoring applications used by centres to prepare their monitoring reports. The workshop recommended to take this opportunity to stop preparing AGM reports and start preparing IWM reports at least when the centres migrate to table-driven code forms. The workshop emphasised the need for standard BUFR encoding-/decoding-software. The workshop was of the opinion that, for the sake of a broad acceptance and smooth handling of the BUFR code, it would be very desirable to make a Standard BUFR encoding-/decoding-software available to all potential users. In order that all BUFR data are processed by the same software, there should be no reason for any potential user to use a different software. This refers to price reasons as well as to different platforms or operating systems such as WINDOWS, LINUX or other. It noted with appreciation that Germany has developed a BUFR encoding-/decoding-software that would comply with these requirements to a high degree and therefore encouraged Germany to consider making this software available to all.

7.   The use of a monitoring application on a PC would greatly facilitate the implementation of the IWM at WWW centres. The Implementation Co-ordination Meeting on the MTN (Geneva, June 2001) noted with satisfaction that Germany had planned to develop a monitoring application on PC. The workshop drafted a proposal for the general specifications of such a PC monitoring application (see Annex IV). The workshop encouraged Germany to further consider the development of a PC monitoring application based on these general specifications and to test its at an RTH within the framework of the operational trial co-ordinated by the rapporteur on WWW monitoring.

Review of the IWM procedures

8.   With a view to avoiding the use of same names for different files and better detailing the content of the files from their names, the workshop recommended to amend the names of the file names proposed by the meeting of the expert team on quantity monitoring (Geneva, 2000) as given in Annex V.

9.   CBS agreed to stop using the digits ii of the abbreviated headings to differentiate the bulletins for the global, interregional, regional and national distribution. CBS also agreed that all observations should be globally exchanged. Noting that the primary objective of the SMM is to monitor the global exchange of data on the MTN, the workshop agreed that the SMM centres should monitor the bulletins corresponding the data set given in Annex VI without any limitation put on the digits ii.

GDPS quantity monitoring

10.   For the IWM, CBS-XII recommended that GDPS centres record reports which can not be decoded or in which coding errors are detected. GDPS centres should prepare a list of the stations with such anomalies and should send a copy of this report to the responsible NMC for remedial action.

11.   CBS-XII also recommended that GDPS centres produce quantity quarterly reports, on the same schedule as the NMC/RTH monitoring, on the volume on the volume of data received at the centre. The former expert team on quantity monitoring recommended that that the responsibility for this monitoring activity be assigned to centres in accordance with the roles of the lead centres for quality monitoring. The GDPS centres, which are not RTHs, should send their IWM reports to their associated RTHs.
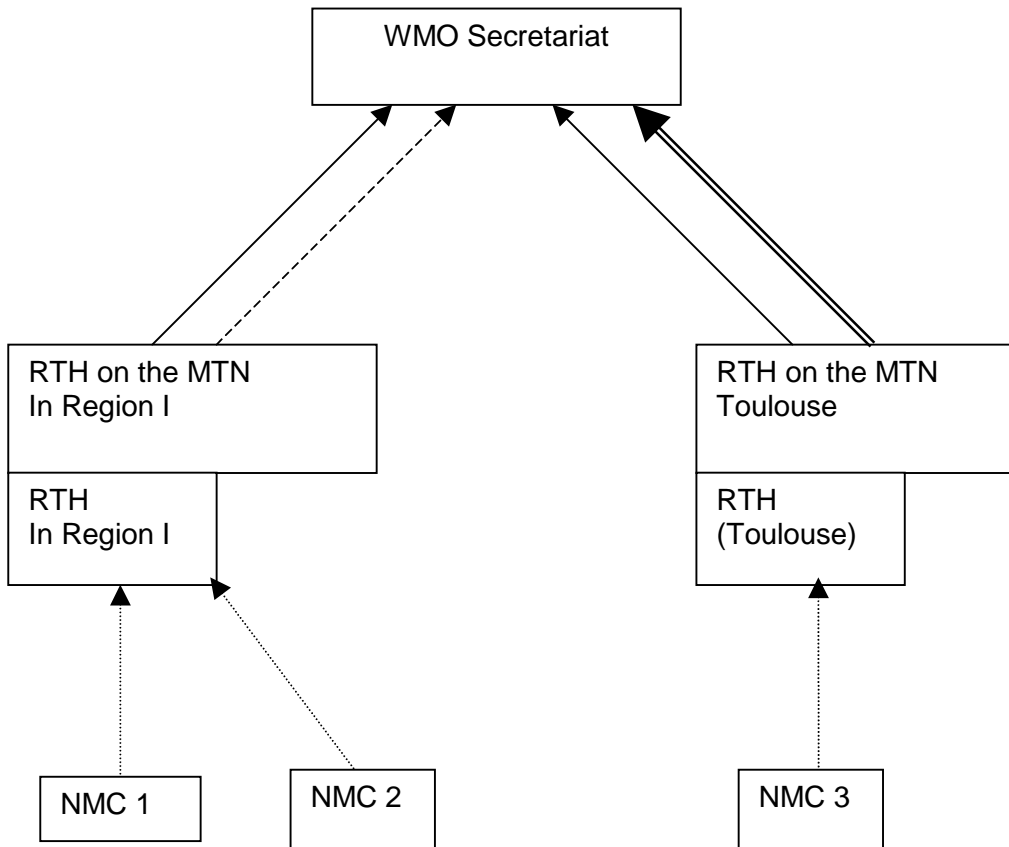
Analysis of the monitoring results

12.   The 32 RTHs should analyse the monitoring results for the data issued from its zone of responsibility and prepare NMC monitoring reports (see blank forms in Annex VII) at least each year from 1 to 15 October. The RTHs should send the reports to the NMCs with copies to the WMO Secretariat. The RTHs may request the Secretariat to send a specific report to a Member country.

13.   The Secretariat prepared a comparison of the availability at SMM centres of the "additional" bulletins including SYNOP reports as defined in Resolution 40. The WMO Secretariat will prepare a comparison at the bulletin and report levels for the July 2003 SMM exercise and will mail the analysis to the RTH focal points concerned before posting it on the WMO server.

Annex I

Diagram of the proposed operational trial of the proposed integrated WWW monitoring

WMO Secretariat

RTH on the MTN
In Region I

RTH
In Region I

RTH on the MTN
Toulouse

RTH
(Toulouse)

NMC 1

NMC 2

NMC 3

→ RTH summary report

┈┈► NMC summary report

------► RTH/MTN report

⇒ SMM raw data

Annex II

Responsibilities taken by SMM centres

Set of data	Centres providing raw data	Pre-analysis centres
SYNOP reports	Algiers, Cairo, Melbourne, Offenbach, Tokyo, Toulouse	Tokyo
Parts A of TEMP and PILOT reports	Cairo, Melbourne, Nairobi, Tokyo, Toulouse,	Tokyo
CLIMAT and CLIMAT TEMP reports	Cairo, Melbourne, Toulouse	Cairo
SHIP, TEMP SHIP, PILOT SHIP, BUOY, BATHY, TESAC, TRACKOB reports	Cairo, Melbourne, Offenbach, Toulouse	Offenbach
AIREP and AMDAR reports	Cairo, Melbourne, Nairobi, Tokyo, Toulouse	Toulouse

Annex III

Procedures for near-real-time monitoring

The monitoring information should be prepared 4 times a day (21 – 03 UTC, 03 – 09 UTC, 09 – 15 UTC, 15 – 21 UTC) for the types of data given in Annex VI. The monitoring information should be posted on the website of the WWW centres (with links on the WMO server) in the following formats:

- Coverage charts and time series as those of ECMWF

- ASCII Tables listing the WMO index station numbers of fixed stations for which at least one report was received by the WWW centre

- ASCII Tables showing the identifier of the mobile stations (e.g. Ship call signs) and the co-ordinates of the observations (in tenths of degrees, latitude (N: +, S: -), Longitude (W: +, E: -; e.g. +54,3 −154,3).

The names of the above tables should be:

XyyyymmddhhCCCTT.txt, e.g. X2003060303LFPWSY.txt for the SYNOP reports received by Toulouse for the time window 21 – 03 UTC ending at 03 UTC on 3 June 2003. The first character of the name "X" specifies the type of monitor report.

The location indicator CCCC of the monitoring centre and the data type designator TT should be entered into the first two fields of each line of the tables.

Annex IV

Proposal for the general specifications of a PC monitoring application

Monitoring PC

The group discussed the proposal of a Monitoring PC and agreed on the following system design features:

1. The Monitoring PC should operate under either WINDOWS or LINUX OS.

2. The Monitoring PC should be open to different INPUT-data so as to process GTS data or SMM, AGM and SAM data

3. The GTS-data should be provided by either a MSS-environment or by appropriate processing of a direct GTS data-stream (time-date-stamp).

4. The processed data should be written to OUTPUT-files in a column-oriented ASCII-format which could easily be adjusted to any post-processing applica--tion, predominantly on the Monitoring-PC itself, but also on other components of a given computer environment.

5. The post-processing programs should cover a wide range of applications such as EXCEL, MAP-Info or any GIS-software.

In order to comply with these requirements, the processing software should preferably be based on JAVA. This guarantees the highest degree of portability which is mandatory for the intended wide range of future use of this Monitoring-PC system.

Context diagram of Integrated WWW Monitoring (IWM)

Input

- IWM monitoring application will take input data in two different modes of processing:
(i)   Online data directly from Message Switching System (MSS) in online processing mode
(ii)   Offline data indirectly from Automatic File Distribution (AFD) in batch processing mode

Online data consist of GTS bulletins and messages in traditional alphanumeric codes (TAC) or BUFR code. Offline data are text (ASCII) or binary raw data files of GTS bulletins and messages prepared by Special MTN Centres for the SMM during 1-15 Jan, Apr, Jul and Oct and for example downloaded from the WMO server or servers operated by WWW centres.
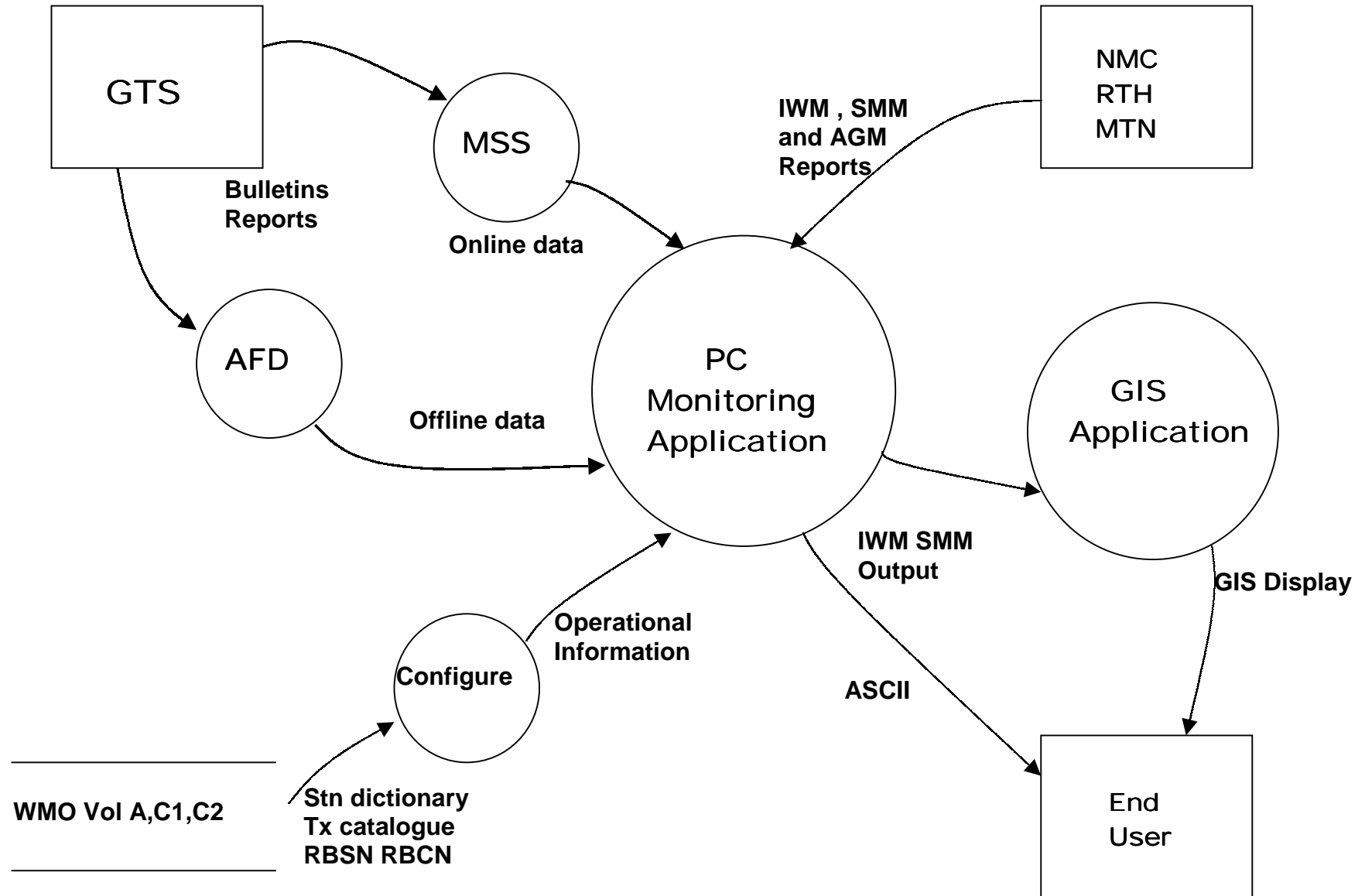
- IWM monitoring applications will accept AGM, SMM and IWM report inputs from NMC, RTH, RTH on the MTN and compare with data collected at the local WWW centre.

- IWM monitoring applications will import latest metadata information as compiled in WMO Volume A, C1 and C2, routeing catalogue and lists of RBSN, RBCN and produce the required configuration information for operational use at the monitoring centre at NMC, RTH or RTH on the MTN.

Output

- IWM output for end users will include IWM and SMM standard reports as well as standard analysis, reports and data files as produced by the WMO secretariat currently.

- Additional IWM output for process by GIS application is intended for producing GIS displays which will integrate with the relevant attribute information referring the station metadata and routeing and transmission catalogues.

Specification of Integrated WWW Monitoring (IWM) application

GTS

MSS

Bulletins Reports

Online data

NMC RTH MTN

IWM , SMM and AGM Reports

AFD

Offline data

PC Monitoring Application

GIS Application

IWM SMM Output

GIS Display

Configure

Operational Information

ASCII

WMO Vol A,C1,C2

Stn dictionary Tx catalogue RBSN RBCN

End User

FORMATS OF THE QUARTERLY MONITORING REPORTS

1. NMC Quarterly Monitoring

1.1   Real-time operational monitoring of the data exchanged between NMCs and their responsible RTHs should be conducted. At the end of each of the four periods of the Integrated WWW Monitoring periods, each NMC should provide reports on the observational data available at the centre during the monitoring period (first 15 days of the month). If an NMC prefers it can send reports based on the summaries it had prepared for the AGM (but run 4 times per year). The reports, in digital format, should be forwarded to the centre's responsible RTH as soon as possible, preferably within 10 days.

1.2   The report should be based on the information collected in the real-time quantity monitoring.

1.3   Each report shall consist of a number of data lines organised into files defined by data type and formatted as given below. All fields would be surrounded by double-quotation marks (") and separated by commas. The two first fields include the data type indicator and the location indicator of the NMC.

a. SYNOP

Station Index Number	Hour UTC	Number of reports available	
		Within 60 minutes	In total
5 digits	2 digits	Digits	digits

Example contents of file "N2003100115EBBRSY.TXT" (October 2003 SYNOP for EBBR)
"SY","EBBR","06400","00","12","15"
"SY","EBBR","06400","12","15","15"
"SY","EBBR","06401","00","14","15"
"SY","EBBR","06401","06","12","15"
"SY","EBBR","06401","12","15","15"
"SY","EBBR","06401","18","10","13"

b. TEMP and PILOT

Station Index Number	Hour UTC	Number of reports available	
		Within 120 minutes	In total
5 digits	2 digits	Digits	digits

Example contents of file "N2003100115EBBRTT.TXT"
"TT","EBBR","06400","00","15","15"
"TT","EBBR","06400","12","15","15"
"TT","EBBR","06401","00","14","15"
"TT","EBBR","06401","06","15","15"
"TT","EBBR","06401","12","15","15"
"TT","EBBR","06401","18","14","14"

c. BUOY, BATHY, TESAC, TRACKOB, WAVEOB, AIREP and AMDAR

Monitoring reports should list the number of bulletins and reports compiled from 2100 to 0259 UTC, 0300 to 0859 UTC, 0900 to 1459 UTC and 1500 to 2059 UTC with one data line per time period. Each data line will contain the ending time of the compiled period **rounded up** to the nearest hour. For example, data compiled from 2100 to 0259 would be indicated as hour 03.

AHL	Ending hour UTC of time period	Number of bulletins available	Number of reports available
TTAAii CCCC	2 digits	Digits	digits

Example contents of file "N2003100115LFPWBT.TXT"
"BT","LFPW","SSVX01 LFPW","03","24","163"
"BT","LFPW","SSVX01 LFPW""09","25","115"
"BT","LFPW","SSVX01 LFPW""15","88","211"
"BT","LFPW","SSVX01 LFPW""21","22","134"
"BT","LFPW","SSVX13 LFPW""03","45","173"
"BT","LFPW","SSVX13 LFPW""09","34","414"
"BT","LFPW","SSVX13 LFPW""15","10","192"
"BT","LFPW","SSVX13 LFPW""21","33","135"

d. SHIP, TEMP SHIP, PILOT SHIP

AHL	Hour UTC	Number of bulletins available	Number of reports available
TTAAii CCCC	2 digits	Digits	digits

Example contents of file "N2003100115LEMMTS.TXT"
"TS","LEMM","USVA01 LEMM","00","22","134"
"TS","LEMM","USVA01 LEMM","06","24","163"
"TS","LEMM","USVA01 LEMM","12","25","115"
"TS","LEMM","USVA01 LEMM","18","88","211"
"TS","LEMM","USVA13 LEMM","00","33","135"
"TS","LEMM","USVA13 LEMM","06","45","173"
"TS","LEMM","USVA13 LEMM","12","34","414"
"TS","LEMM","USVA13 LEMM","18","10","192"

e. CLIMAT, CLIMAT TEMP

Station Index Number	Available at the NMC
5 digits	1 = yes, 0 = no

Example contents of file "N2003100115EBBRCL.TXT"
"CL","EBBR","06400","1"
"CL","EBBR","06401","1"

f. BUFR
Format appropriate to the type of data in the report (e.g. reports of BUFR aircraft observations will be in the format as described in c above).

2. RTH quarterly monitoring

2.1   Four times per year every RTH, including RTHs on the MTN, should provide monitoring reports on the availability of observations within its area of responsibility. The reports should list the number of observations reported as available by the associated NMCs in their quarterly reports (defined in section 3.5) compared with the number of observations received at the RTH during the monitoring period. The reports should be sent to the Secretariat **and** to the RTH's associated RTH on the MTN as quickly as possible, preferably within 10 days.

2.2   Each report shall consist of a number of data lines organised into files defined by data type and formatted as given below. All fields would be surrounded by double-quotation marks (") and separated by commas. The three first fields include the data type indicator and the location indicators of the NMC and the RTH.

a. SYNOP

Station Index Number	Hour UTC	Number of reports reported as available by the NMC versus the number received by the RTH			
		NMC		RTH	
		Within 60 minutes	In total	Within 60 minutes	In total
5 digits	2 digits	digits	digits	digits	digits

Example contents of file "R2003100115LEMMLFPWSY.TXT"
"SY","LEMM","LFPW","08001","00","12","15","12","15"
"SY","LEMM","LFPW","08001","06","15","15","15","15"
"SY","LEMM","LFPW","08001","12","14","15","14","15"
"SY","LEMM","LFPW","08001","18","8","14","8","13"
"SY","LEMM","LFPW","08015","00","14","15","14","15"
"SY","LEMM","LFPW","08015","06","15","15","15","15"
"SY","LEMM","LFPW","08015","12","12","15","12","15"
"SY","LEMM","LFPW","08015","18","14","14","14","14"

b. TEMP and PILOT

Station Index Number	Hour UTC	Number of reports reported as available by the NMC versus the number received by the RTH			
		NMC		RTH	
		Within 120 minutes	In total	Within 120 minutes	In total
5 digits	2 digits	Digits	digits	digits	digits

Example contents of file "R2003100115LEMMLFPWTT.TXT"
"TT","LEMM","LFPW","08001","00","15","15","15","15"
"TT","LEMM","LFPW","08001","12","15","15","15","15"
"TT","LEMM","LFPW","08023","00","14","15","14","15"
"TT","LEMM","LFPW","08023","12","12","15","12","15"

c. BUOY, BATHY, TESAC, TRACKOB, WAVEOB, AIREP and AMDAR
Reports contain the number of bulletins and reports compiled from 2100 to 0259 UTC, 0300 to 0859 UTC, 0900 to 1459 UTC and 1500 to 2059 UTC with one data line per time period. Each data line will contain the ending time of the compiled period **rounded up** to the nearest hour. For example, data compiled from 2100 to 0259 would be indicated as hour 03.

AHL	Ending hour UTC of time period	Number of reports reported as available at the NMC versus the number received by the RTH			
		NMC		RTH	
		Number of bulletins	Number of reports	Number of bulletins	Number of reports
TTAAii CCCC	2 digits	digits	digits	digits	digits

Example contents of file "R 2003100115LPMGLFPWAI.TXT"
"AI","LPMG","LFPW","UAEW01 LPMG","03","24","163","24","163"
"AI","LPMG","LFPW","UAEW01 LPMG","09","21","152","21","152"
"AI","LPMG","LFPW","UAEW01 LPMG","15","19","143","19","143"
"AI","LPMG","LFPW","UAEW01 LPMG","21","20","149","20","149"

d. SHIP, TEMP SHIP, PILOT SHIP

AHL	Hour UTC	Number of reports reported as available at the NMC versus the number received by the RTH			
		NMC		RTH	
		Number of bulletins	Number of reports	Number of bulletins	Number of reports

TTAAii CCCC	2 digits	digits	digits	digits	digits

Example contents of file "R2003100115LPMGLFPWTS.TXT"
"TS","LPMG","LFPW","SMVX01 LPMG","00","24","163","24","163"
"TS","LPMG","LFPW",SMVX01 LPMG","00","24","163","24","163"

e. CLIMAT, CLIMAT TEMP

Station Index Number	Reported by the NMC	Received by the RTH
5 digits	1 = yes, 0 = no	1 = yes, 0 = no

Example contents of file " R2003100115LPMGLFPWCL.TXT"
"CL","LPMG","LFPW","08501","1","1"
"CL","LPMG","LFPW","08506","1","1"
"CL","LPMG","LFPW","08509","1","1"

f. BUFR
Format appropriate to the type of data in the report

3. RTH/MTN quarterly monitoring

3.1   In addition to the RTH quarterly monitoring reports produced by every RTH, it is recommended that RTHs on the MTN that do not participate in the SMM also produce a report on all of the data received at their centre and pass these reports to the WMO Secretariat for comparison with other MTN centres. The report should monitor all data of all of the types listed in Annex VI. A that are received at the RTH. The formats and file names of the reports should conform to those defined for the NMC quarterly reports.

Annex VI

Data subject to monitoring and corresponding report file data type indicators

Type of data	T₁T₂	Data type indicator
SYNOP	SM, SI, SN	SY
TEMP part A	US	TT
PILOT part A	UP	PP
CLIMAT	CS	CL
CLIMAT TEMP	CU	CT
SHIP	SM, SI	SH
SHIP TEMP	US	TS
SHIP PILOT	UP	PS
BUOY	SS	BU
BATHY,TESAC,TRACKOB, WAVEOB	SO	BT
AIREP (CODAR)	UA	AI
AMDAR	UD	AM
BUFR aircraft reports	IUA	BA
BUFR wind profiler	IUP	BP
Other BUFR data	All observational data transmitted in BUFR (except radar and satellite)	To be allocated as required

Annex VII

Monitoring Report for NMC ………. for 1 - 15 October …..
Prepared by RTH ………

1. Bulletins listed in Catalogue of Meteorological Bulletins (Volume C1) but not received

    …………………………………………………………………………………………………

    …………………………………………………………………………………………………

2. Bulletins received but not listed in Catalogue of Meteorological Bulletins (Volume C1)

    …………………………………………………………………………………………………

    …………………………………………………………………………………………………

3. Extra stations received but not listed in Catalogue of Meteorological Stations (Vol A)

    …………………………………………………………………………………………………

    …………………………………………………………………………………………………

4. Stations listed as part of the Regional Basic Synoptic Network for which reports were received only with the mention NIL

a) SYNOP…………………………………………………………………… …………

b) TEMP…………………………………………………………………… …… ……

c) CLIMAT……………………………………………………………………………

d) CLIMAT TEMP……….……………………………………………………………

5. Stations listed as part of the Regional Basic Synoptic Network for which no reports were received

a) SYNOP……………………………………………………………………………

b) TEMP………………………………………………………………………………

c) CLIMAT……………………………………………………………………………

d) CLIMAT TEMP……….……………………………………………………………

6. RBSN stations compiled into bulletins with ii > 19 (RBSN stations should be in bulletins ii < 19 for 00, 06, 12 and 18 UTC

    …………………………………………………………………………………………………

    …………………………………………………………………………………………………

7. Timeliness of data reception at the associated RTH

(The responsible RTH should prepare tables showing the timeliness of the reception of the reports for each station and for each time of observations. A first table should include the stations belonging to the RBSN and a second table should include the others.)

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