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OF THE GSN AND GUAN

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Status and Development of Software for Monitoring of GCOS Atmospheric Networks

(Submitted by Mr S. Roesner, CBS/OPAG/IOS Rapporteur on GCOS Matters)

Summary and Purpose of Document

The document outlines the major features of software package developed by DWD and JMA to monitor CLIMAT messages from GSN.

ACTION PROPOSED

The meeting is invited to consider the initiative taken by GCOS monitoring centres to share a software package in order to make the monitoring more efficient and less labour-intensive and elaborate proposals, as appropriate.

Appendix: **Status and Development of Software for Monitoring**

STATUS AND DEVELOPMENT OF SOFTWARE FOR MONITORING

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1. Decoding of CLIMATs

At a first step of the monitoring of the CLIMAT messages of GSN stations all incoming CLIMATs received in bulletins with the header code 'CS' at the GSNMCs are decoded on a fixed cut-off date (21st, 00 UTC of the following month) with the software 'FORMCHECK', which was developed by Deutscher Wetterdienst in 1999 and is used at JMA, too.

FORMCHECK especially takes into account that

- some countries still use the old CLIMAT code (FM71-VI) although a new one was introduced by December 1st, 1994;
- there frequently are different random and systematic format errors in the messages;

The software FORMCHECK analyses the CLIMAT messages word (characters separated by a blank) by word. This technique allows for checking if the format of every group of the CLIMAT code was correct. If differences were detected, the programme automatically tries different ways to discover the kind and the reason of the discrepancy. It is able to decide, if the message is reported in the old code or if there was an error and if this one can be rectify. Detected errors are marked by flags in protocols. In addition, for every CLIMAT message the header of the reporting bulletin and the date of receipt are stored.

FORMCHECK is able to recognise

- if there are other codes like SYNOP, CLIMAT TEMP or AGRO;
- if the code name CLIMAT
 - is not written in the correct manner (e.g. like KLIMAT);
 - appears between different station messages;
- if there is added 50 to the month;
- if the month-year indicator
 - is not of the actual month or even missing;
 - appears between station messages;
 - of the previous or following month is at the position of the station number;
 - and the station number are changed;
- if the station number
 - is reported twice
 - or the section number 111 are followed by up to 3 words (NIL, PANNE);
- if the section identifier 111 is missing, mutilated, at wrong position or written as ,//';
- if a section identifier
 - is incorrect or given twice;
 - is followed by // or XX
 - and the prefix of a group are not separated by a blank;
- if a group in section 1 is missing;
- if there are two groups with the same prefix standing together, followed by a correct next group;
- if there is missing a blank between two groups;
- if there is a blank within one group;
- if '=' (end of messages mark)
 - is missing;
 - is written behind every section of a message;
- if 'NNNN' (mark of end of the bulletin) is missing
- if there are parentheses around the sections 2 to 4;
- if there are written typical letter groups instead of figures (which may happen by using mechanic telex machines)

The automatic control stops within a message if:

- the length of the beginning groups does not fit neither the new nor the old code;

- there are three or more groups which are too short;
- one or more groups are for more than 1 character too long.

In this case the message is written to an error list as well as to a protocol list and the whole bulletin including this message is saved into a 'trash' file. The processing continues with the following message.

As a result of FORMCHECK, listings of decoded CLIMAT messages are generated, sorted by different features like old/new code or different types of format errors as well as protocol lists, that contain flags of the detected format errors.

The following listings are produced:

- fort15- Trash
- fort17:
- fort21: decoded CLIMATs of new CLIMAT code and actual month with correct or too short groups
- fort22: decoded CLIMATs of new CLIMAT code with incorrect or missing month-year indicator
- fort23: decoded CLIMATs of old CLIMAT code and actual month with correct or too short groups
- fort24: decoded CLIMATs of old CLIMAT code with incorrect or missing month-year indicator
- fort25: decoded CLIMATs of new CLIMAT code and actual month with groups, which are too long for one character
- fort30: protocol, containing all CLIMAT messages from all received stations regarding
 - the date of the entry into the Meteorological Data Bank at DWD or JMA
 - the bulletin header in which the station was reported
 - different flags which are set for:
 - the kind of data transmission
 - the kind of CLIMAT code
 - the month and year indicator (actual date / missing or erroneous date)
 - every group of section 1 to 4
 - different, frequent errors (mentioned above)
- fort31: protocol, containing all erroneous stations
- fort40: Header of all received bulletins. Different flags are set for:
 - code name CLIMAT missing or incorrect spelled
 - CLIMAT TEMP reported or CLIMAT TEMP additional to CLIMAT
 - month-year indicator missing or incorrect
 - month + 50 reported
 - words like PART, PART!, PART1 or 2, PART III detected
 - Additional group between code name CLIMAT and month-year indicator
 - WMO block number does not suit the bulletin header id of the sending country
- fort41: bulletins with erroneous header only

FORMCHECK provides the basic information for the monitoring of GSN stations in respect to availability, timeliness, formal correctness of the CLIMAT code and the transmitted CLIMAT data itself.

2 Generation of the GSN data file

To provide the GSN monitoring information to users in near real time, the GSNMCs merge monitoring results into one file of the GSN data. It consists of four blocks: a) a block with station meta data, b) the CLIMAT messages (if available), c) information on the format errors detected, d) the bulletin header by which the CLIMAT messages was received, and e) a block with the quality information on temperature and precipitation reported.

The software developed at JMA generates the GSN data file from results of FORMCHECK (see the following figure).

1. The software merges fort30s at the two GSNMCs and refers statistical data such as the receiving time, the bulletin header, different flags which are set for CLIMAT code, the month-year indicator, frequent format errors.

2. According to the priority defined by these data, the latest available CLIMAT bulletin from the GSN station is selected from fort21 or 23, 25 at DWD or JMA.
3. The selected GSN-CLIMAT bulletin with the station meta data, information on the format errors detected, the header and the quality information are archived to the GSN data file.
4. The GSN data file generated is ftp-ed from JMA to DWD and the WDC-A with an automatic noticing-email. Finally, the complete GSN data file is available on the GSNMC web site operated by DWD.

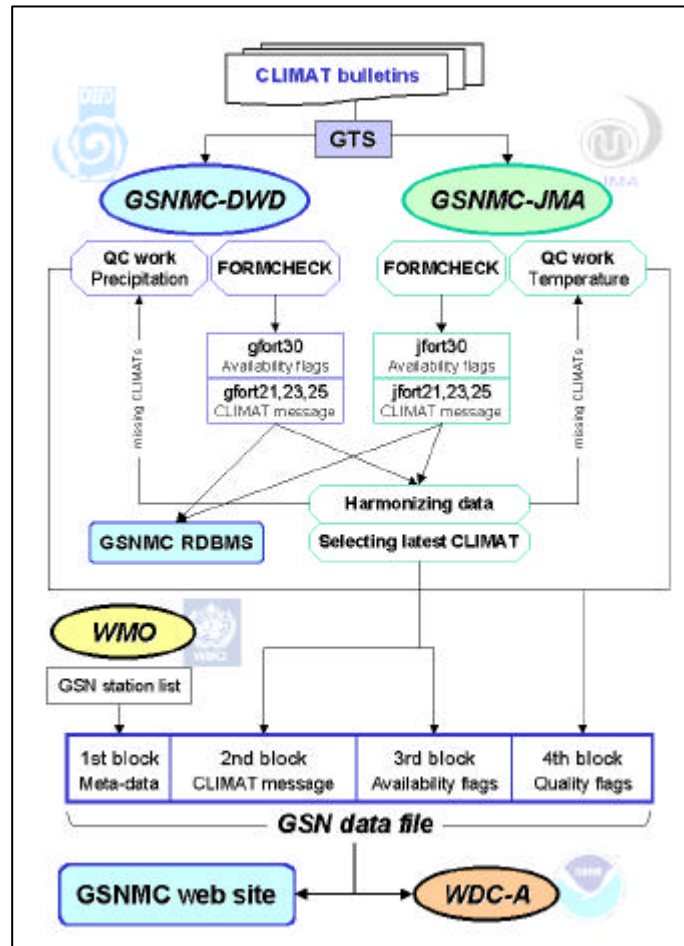


Figure: Data flow in generating the GSN data file