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Present Status of Intercalibration Activities in MSC/JMA

This working paper reviews the intercalibration activities in MSC/JMA up to the previous CGMS meeting and describes the present status and plans for the intercalibration in response to the Action 28.23 at CGMS-XXVIII.

A homepage of MSC will be established along with a plan to increase the network capacity for Internet by the end of this year. The results of intercalibration will be seen in the MSC home page after its establishment, and it is also capable to be linked from the CGMS home page to the MSC home page. MSC will start the intercalibration activities on a routine basis in March 2002 at the earliest.

No action is required on this subject.

Present Status of Intercalibration Activities in MSC/JMA

1. Background

The purpose of the CGMS intercalibration was to quantify the relation among the sensors onboard the operational meteorological satellites. The CGMS members were requested to perform the intercalibration of sensors between the geostationary meteorological satellites and the polar orbiting meteorological satellites, i.e. NOAA satellites, at the CGMS-XXV meeting held at St. Petersburg, Russian Federation in 1997.

JMA has been studying to define the method of intercalibration between GMS-5 and NOAA sensors as described below, and its performance was also demonstrated through the report to CGMS with the working papers prepared by the Meteorological Satellite Center (MSC), JMA. At the previous CGMS meeting, satellite operators are encouraged to establish a routine satellite intercalibration to embrace the techniques for intercalibration on a routine and to establish regular reporting of their results in CGMS report and on the www (CGMS home page).

This working paper reviews the intercalibration activities in MSC/JMA up to the previous CGMS meeting and describes the present status and plans for the intercalibration in response to the Action 28.23 at CGMS-XXVIII.

ACTION 28.23 **Each satellite operator to post on the CGMS homepage available relevant papers and results on satellite radiance (VIS, IR, WV) inter-comparisons in convenient format and to update them periodically throughout the period until CGMS XXIX.**

2. Intercalibration Activities up to the previous meeting

2.1 IR window channel

JMA compared the brightness temperature of GMS-5 data with that of GAC data of NOAA-14 AVHRR in the following IR window channels using the intercalibration method in the working paper [(1)], USA-WP-15 prepared at the CGMS-XXV meeting.

Satellite	Channel	Wave Length	Resolution
GMS-5	IR-1	10.5–11.5 micron	5 km at SSP
NOAA-14	CH-4	10.5–11.5 micron	4 km at SSP

At the CGMS-XXVI meeting, JMA reported the results of the comparison, which indicated that the brightness temperature of GMS-5 was about 1.2 degrees C lower than that of NOAA-14 AVHRR with a scatter of about 0.2 C.

It was found that the differences of the spectral responses of the sensors required no

correction for atmospheric effect at the sub-satellite point (SSP). The atmospheric calculations using LOWTRAN 7 revealed that the difference of their brightness temperatures was less than 0.01 K in the field of view within 10 degrees from the SSP. The detailed results are described in the working paper [2], JAPAN-WP-12 prepared at the CGMS-XXVI meeting and in the paper [3] authored by Tokuno and Kurihara (1999).

2.2 Visible channels

MSC continued the further investigation for the intercalibration of the visible channels between GMS-5 and NOAA-14 in the case of clear and cloudy conditions.

Since the digital counts of GMS-5 visible channel are converted into albedo with the fixed conversion table, MSC proposed a method to convert GMS-5 visible counts to albedo measured by NOAA AVHRR Channel 1 and Channel 2 for the quantitative use of GMS-5 visible data. MSC reported the preliminary results in applying the method in the case of clear condition with the working paper [4], JPN-WP-18 at CGMS-XXVII. The results showed that the square values of GMS-5 visible counts were linearly related to those of NOAA-14 AVHRR Channel 1 with approximately 0.76 of correlation coefficient.

The same method was applied to the clear condition including cloudy condition. It was resulted that GMS-5 visible albedo was linearly related to NOAA-14 AVHRR visible albedo in the four different cases with very good correlation (correlation coefficient: 0.99), although the fitting equations varied from case to case. The results were presented in the working paper [5], JPN-WP-11 at CGMS-XXVIII. MSC concluded that this method would be useful to monitor the quality of the GMS-5 visible calibration and the further study was to be required to improve the method in many cases.

3. Preparation of the Intercalibration Results through the homepages

MSC has been conducting further investigation for the intercalibration between the sensors onboard the GMS-5 and NOAA satellites on a routine basis. Figure 1 shows the process from the acquisition of satellite data to the provision of the information of the intercalibration results at MSC.

The VISSR data and the NOAA GAC data available at NOAA homepage via Internet are processed to grid data. The grid data are matched for a target in reference to the condition file indicating selected area. The detailed methods for the intercalibration including the selection of a target and the grid matching are shown in the papers mentioned above. MSC also continues to make efforts to prepare the software on a workstation and improve means of statistic treatment.

On the other hand, a homepage of MSC will be established along with a plan to increase the network capacity for Internet by the end of this year. The results of intercalibration will be seen in the MSC home page after its establishment, and it is also

capable to be linked from the CGMS home page to the MSC home page. MSC will start provide the results of the intercalibration on a routine basis in March 2002 at the earliest.

References

1. Wanzong, S., and W. P. Menzel, 1997: Intercalibration of GOES, Meteosat, and HIRS Infrared Radiances, USA-WP-15, CGMS-XXV

2. The Intercalibration Activities, JAPAN-WP-12, CGMS-XXVI

3. Tokuno, M., and S. Kurihara, 1999: Intercalibration of GMS-5 IR channels and NOAA-14 AVHRR channels 4 and 5, Adv. Space Res., 23, No. 8, 1349-1356.

4. Inter-calibration of GMS-5 and NOAA-14 AVHRR Visible Channel, JPN-WP-18, CGMS-XXVII

5. Preliminary Study on Inter-calibration of the Visible Channels between GMS-5 and NOAA-14, JPN-WP-11, CGMS-XXVIII

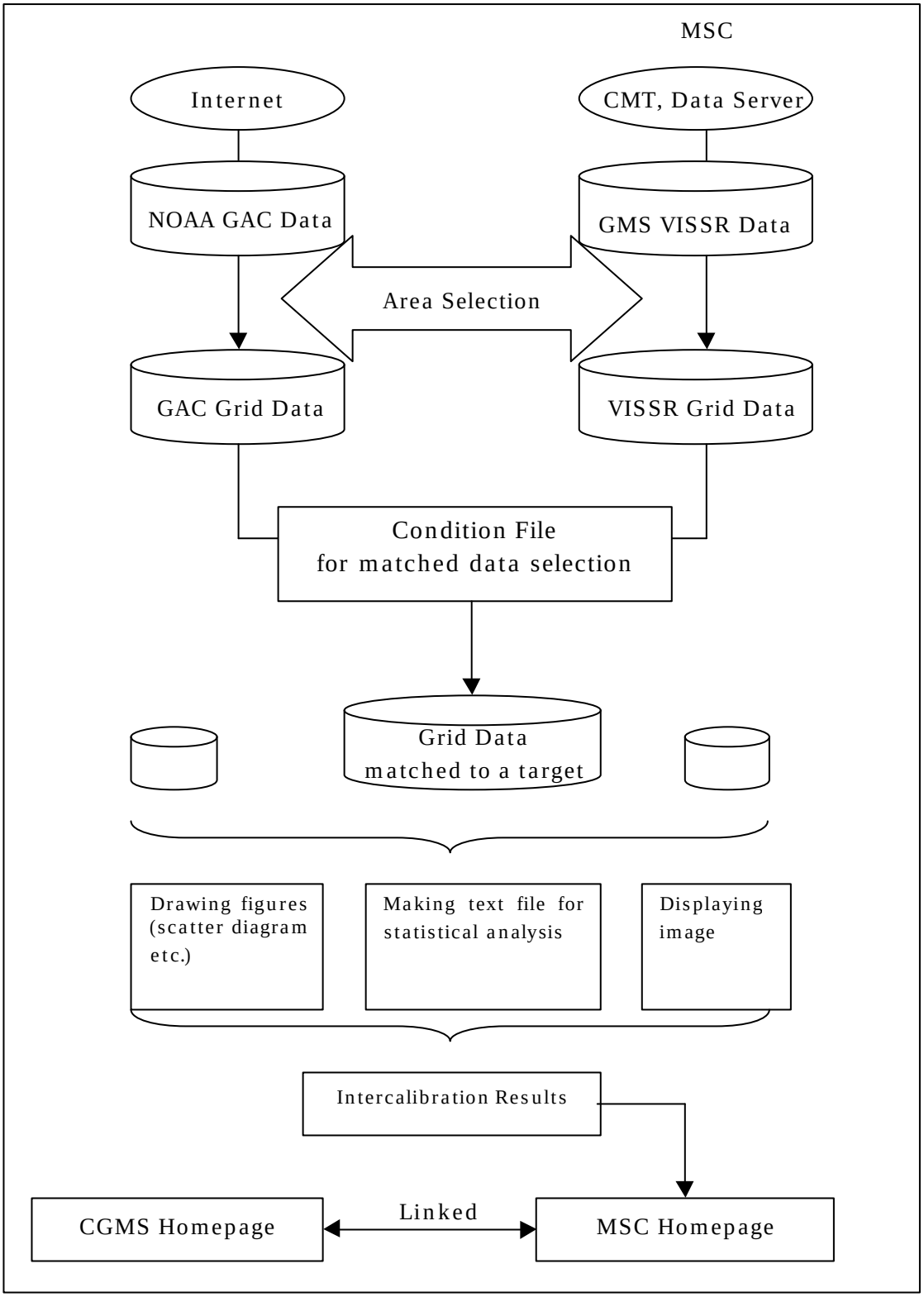

Fig. 1 Intercalibration and Information Provision at MSC