CGMS

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PREPARATION FOR NEW PRODUCTS EXPECTED FROM FOLLOW-ON SATELLITE INTRODUCTION

The follow-on satellites to MTSAT-2 (formally named Himawari-8 and Himawari-9) of the Japan Meteorological Agency (JMA) are scheduled to have two specific missions based on the variety of channels and rapid scanning observations. One mission is to enrich nowcasting capabilities, especially for the detection and prediction of severe weather. The other is to improve the accuracy of Numerical Weather Prediction (NWP).

JMA has set up an environment for the development of new products from the follow-on satellites in collaboration with JMA's Meteorological Satellite Center (MSC) and other internal related divisions. In the future, the Agency plans to start development with the cooperation of EUMETSAT and NOAA/NESDIS. Products of interest to be developed are as follows:

- Global Instability Index (GII) for preconvective weather situation monitoring (to be used in weather forecasting services)
- Detection of volcanic ash plumes for volcanic activity monitoring
- Improvement of Atmospheric Motion Vectors (AMVs) derived from satellite observation as essential input for global and regional NWP models

PREPARATION FOR NEW PRODUCTS EXPECTED FROM FOLLOW-ON SATELLITE INTRODUCTION

The Japan Meteorological Agency (JMA) has selected and defined the functions and specifications of the follow-on observation missions primarily based on user requirements for satellite data and products. To meet these requirements, JMA's follow-on satellites to MTSAT-2 (formally named Himawari-8 and Himawari-9) will each carry an imager with a capability comparable to that of GOES-R/ABI with the following functions:

- Multi-channel capacity (16 channels in visible and infrared bands)
- High spatial resolution (0.5 – 1.0 km for visible and 1 – 2 km for infrared)
- Fast imaging (within 10 minutes for full disk)
- Rapid scanning with flexible area selection and scheduling

The follow-on satellites will offer high potential observation, which will enable users to analyze cloud properties and cloud physics. To make the most of these functions and also to provide effective information to users with the beginning of Himawari-8's operation, JMA has set up an environment for the development of new products from the follow-on satellites in collaboration with JMA's Meteorological Satellite Center (MSC) and other internal related divisions according to the policies outlined here. In the future, the Agency plans to start the development of related products, and is interested in pursuing scientific and prototyping activities in cooperation with CGMS members, and particularly with EUMETSAT and NOAA/NESDIS, which already operate or are preparing for the use of a new generation of multi-channel imaging instruments (MSG and GOES-R).

1 IMPROVEMENT OF CURRENT SATELLITE PRODUCTS

JMA plans to improve the current products from MTSAT by applying new information derived from new sensors installed in the imagers of the follow-on satellites. The products expected to improve are as follows:

- Atmospheric Motion Vector (AMV)
- Clear Sky Radiance (CSR)
- Cloud Grid Information (CGI)
- Sea Surface Temperature (SST)

In particular, the algorithm for AMV derivation is scheduled for further review with regard to the method used, which consists of targeting cloud and its height assignment, to utilize the new sensor's information effectively. The derivation programs are scheduled to be modularized for comprehensive management at the same time.

2 DEVELOPMENT OF NEW PRODUCTS

Products referred to current operational MSG products

JMA has investigated the operational MSG products currently provided by EUMETSAT in terms of their utilization and accuracy with a view to introducing new JMA products from the follow-on satellites. As recent disasters caused by severe weather events such as torrential downpours remain in the public eye, the Agency plans to introduce the derivation technique of the Global Instability Index (GII), which is operationally generated at EUMETSAT and at NOAA, and localize it for operational derivation around Japan. It also plans to develop a product for volcanic ash plume

detection to allow volcanic activity monitoring in a way similar to a prior product. The influence of volcanic ash plumes on airlines (an issue that recently attracted attention with the April 2010 eruption of a volcano in Iceland) is directly related to the services of JMA's Tokyo Volcanic Ash Advisory Center (VAAC).

Products referred to experimental products towards GOES-R

JMA has investigated a number of experimental products towards GOES-R developed by NOAA/NESDIS in terms of their algorithms and status of development. Since these products (e.g., data on the radiation properties of cloud/land surfaces and aerosol optical thickness derived from multiple information of visible and near-infrared channels) have been developed for environmental research in NOAA/NESDIS, JMA plans to investigate the feasibility of their operational use by JMA.

3 PREPARATION OF SIMULATED SATELLITE IMAGES FOR THE DEVELOPMENT OF NEW PRODUCTS

Simulated images (e.g., those for synthetic brightness temperature) to be produced by the follow-on satellites are essential for the development of new products and their validation. MSC plans to generate simulated infrared images from the IASI installed on the Metop-A satellite with near-real time processing. In the future, MSC will maintain its commitment to developing techniques for the generation of simulated images based on the outputs of JMA's NWP Global Model using radiative transfer models.

4 CONCLUSION

In the preparation for the operational ground segment for Himawari-8/9, JMA plans to start the development of operational products from the new 16-channel Himawari imager. JMA is interested to pursue the scientific and prototyping activities in cooperation with CGMS members, notably with EUMETSAT and NOAA/NESDIS who operate already or prepare for the use of a new generation of multi-channel imaging instruments (MSG and GOES-R). The cooperative activities will be beneficial to all participants and also to the users because they can expect consistent products from different geostationary satellite operators.