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A TENTATIVE PRODUCT GENERATION AND DISSEMINATION PLAN FOR COMS

This is in response to CGMS-34 Action Item 34.23.

This paper reports on the plan for meteorological products generation using COMS Meteorological Imager observation data and their dissemination. COMS Meteorological Data Processing System (CMDPS), which is developing in KMA, is designed to extract 16 baseline products operationally, and cloud information, sea surface temperature, fog, and wind product are considered to distribute via LRIT service.

A Tentative Product Generation and Dissemination Plan for COMS

The purpose of this document is to report a tentative meteorological products generation and dissemination plan for COMS (Communication, Ocean and Meteorological Satellite).

1 INTRODUCTION

Korean first multi-purpose geostationary satellite, COMS, is scheduled to launch in 2009. For the COMS operational application, COMS Meteorological Data Processing System (CMDPS) is under development in KMA. The major function of CMDPS is the derivation of the baseline meteorological products from the COMS calibrated and geo-located level 1B data.

2 COMS METEOROLOGICAL PRODUCTS GENERATION PLAN

The CMDPS baseline products consist of 16 products, which can be categorized into scene analysis, surface information, cloud information, water vapour information, environmental information, and atmospheric motion vector. The overall flow chart for the 16 baseline products is shown in Figure 1. The very beginning of the production chain is the scene analysis, which has main purpose of cloud screening, snow/sea ice detection and aerosol detection. The results from the scene analysis play a key role in the determination of product type, whether it is a cloudy or clear sky product, and all the necessary basic information for the consequent products. The cloudy products include parameters such as cloud phase, cloud amount, cloud type, cloud top temperature and height, fog, and rain rate. The clear products are the surface temperatures of sea and land, water vapour information such as upper tropospheric humidity and tropospheric precipitable water, and clear sky radiance. And, the aerosol optical depth, insolation, and outgoing longwave radiation are derived from every pixel although it is determined as cloudy or clear.

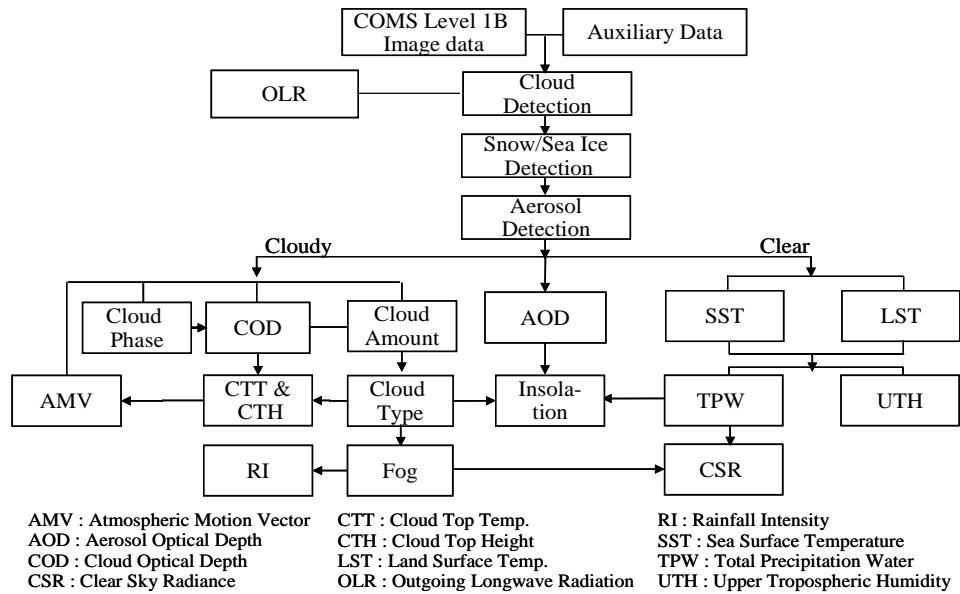


Figure 1. Flow chart of CMDPS.

Some algorithms of the baseline products are recycled from the currently available algorithms either from operational or research/development community. However, algorithms for cloud optical depth and cloud phase are newly developed by adjusting MODIS algorithms for COMS. Also algorithms such as aerosol detection and aerosol optical depth, etc. have been newly developed.

Table 1 shows the user requirement for the CMDPS baseline products. Temporal and spatial resolution and generation area for the corresponding product are specified for each parameter in the table.

Especially, COMS MI mission plans to operate a special observation mode for severe weather phenomena. When typhoon or rapidly developing severe storms and heavy rainfall are predicted, a limited local area observation covering southern part of the Korean peninsula will be added to the nominal schedule. In this special observation mode, CMDPS derive only cloud information to help forecasters immediately.

Table 1. User Requirement for the baseline products

Product	Area	Temporal Resolution	Spatial Resolution
Cloud Detection	COMS Obs. Area	Normal/Special Obs. Schedule	1*1 pixel
Clear Sky Radiance	COMS Obs. Area	Normal	Less than 100*100 km ²
Atmos. Motion Vector	COMS Obs. Area	3 hour	50*50 km ²
Sea Surface Temp.	COMS Obs. Area	1 hour	1*1 or 3*3 pixel
Land Surface Temp.	East Asia Region	1 hour	1*1 pixel
Snow/Sea Ice Detection	COMS Obs. Area	1 day	1*1 pixel (vis.)
Insolation	COMS Obs. Area	1 hour	1*1 pixel (vis.)
Upper Tropospheric Humidity	COMS Obs. Area	1 hour	50km*50km

Total Precipitable Water	COMS Obs. Area	1 hour	50km*50km
Cloud Analysis	COMS Obs. Area	Normal/Special	3*3 pixel
Cloud Top Temp./Height	COMS Obs. Area	Normal/Special	1*1 (3*3) pixel
Fog Detection	COMS Obs. Area	Normal	1*1 pixel
Rainfall Intensity	East Asia Region	Normal/Special	1*1 pixel
Outgoing Longwave Radiation	COMS Obs. Area	~ 1 hour (daily mean)	Less than 10*10 km ²
Aerosol Detection	East Asia Region	Normal	~ 1*1 pixel
Aerosol Optical Depth	East Asia Region	Normal	~ 10*10 pixel

3 CMDPS PRODUCTS DISSEMINATION PLAN

KMA has plans to broadcast the meteorological products via LRIT service. Now it is not firmly determined which products are included in LRIT data, but atmospheric motion vector, cloud information, sea surface temperature and fog detection results are being discussed (Table 2). Except for atmospheric motion vector, the products are disseminated as forms of analyzed images, not physical values. On the other hand, for AMV, numerical values such as wind direction, wind speed and height, vector location and quality indicator are included. The contents for the LRIT data will be refined later after consideration of accuracy, an extent of practical use and impact, data size of those products.

In addition, KMA plans to provide most CMDPS baseline products to authorized users through the web site of the National Meteorological Satellite Center in Korea.

Table 2. The COMS LRIT data contents of meteorological products generated by CMDPS.

Product	Period	Data format	File size
Sea Surface Temp.	Once a day (Daily and five day mean composite map)	Image	1.2 MB (0.6 * 2)
Fog	Hourly	Image	0.6 MB
Atmospheric Motion Vector	8 per day (3 hourly)	ASCII or Binary	0.7 – 3 MB
Cloud Information	4 per day (6 hourly)	Image	0.6 MB

4 CONCLUSION

The algorithms of the CMDPS have been successfully developed according to the initial conceptual design and now have been integrating as a total system for Level 2 products including pre/post processing module, data processing module, and interfacing to the operating system of the COMS ground segment. Once it is fully developed and integrated into the operational system, it will produce the defined baseline products in accordance with the user requirement, which will be used for weather forecasting of severe local storms, floods,

yellow sand transport in the atmosphere, as well as for the extraction of data on long-term change analysis of sea surface temperature and cloud coverage, and various application areas.

CMDPS derived products as well as COMS observation data will be freely available to both domestic and international community in real-time or near real-time basis through direct broadcasting or land lines. The means for dissemination will be defined additionally later.