CGMS

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Prepared by CMA
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Precipitation Estimation and Validation at CMA

CMA Response to CGMS Action 35.22

Precipitation Estimation and Validation at CMA

1. In General

At present, three rainfall estimation products have been or being developed at NSMC/CMA:

FY-2 Satellite Rainfall Estimate,
Typhoon Rainfall Retrieval, and
FY-3 Satellite Rainfall Estimate.

2. FY-2 Satellite Rainfall Estimate

FY-2 operational rainfall estimate is made using the satellite rainfall estimate and the fusing technique developed by NSMC. Based on hourly rainfall estimate of infrared measurements, the product is created by fusing with the 1, 3, 6, and 24-hour-accumulated rain gauge rainfall amount. The real-time fusing process is designed to improve the precision of rainfall monitoring product.

The FY-2 rainfall estimate product is validated by those unused ground rain gauge amount data. The validation results the correlation efficient can be greater than 90%, and the relative error is below 30%.

3. Typhoon Rainfall Retrieval

Typhoon rainfall is retrieved using microwave measurements. It became operational since June 2006. Based on operationally received microwave measurements from NOAA AMSU-B, the product is created using “Channel-Matching” method developed at NSMC which is based on the radiative transfer model used for very strong convective cloud condition. The “Channel-Matching” method assumes that a single channel determines a rainfall area, but the collectively determined rainfall area by several channels is the possible rainfall area.

Comparison between with the Hong Kong Radar rain rate, the rain belts and the large rain areas are very close. NSMC developed a visual system to display ATOVS sounding products and AMSU-B retrieved rain rate that many weather forecasters have expressed great interest.

4. FY-3 Satellite Rainfall Estimate

Microwave Radiation Imager (MWRI) is carried on FY-3A satellite. Rainfall estimate product is obtained using the MWRI measurements. A statistical method is used in testing the version. The validation of the retrieval method using intensive rain gauge observations and ground-based radar data is being conducted.