## Analysis of Rapidly Developing Cumulus Areas from MTSAT-1R Rapidscan observation images

Akira Sobajima<sup>1</sup>, Takahito Imai<sup>1</sup>, Izumi Okabe<sup>2</sup>, Yasushi Izumikawa<sup>1</sup>

1 : Japan Meteorological Agency / Meteorological Satellite Centre

2 : Japan Meteorological Agency / Numerical Prediction Division

8 December 2011

#### 1. Introduction

#### Rapidly Developing Cumulus Areas (RDCA)



#### **MTSAT-1R Rapid Scan observation**

- 5-minute interval
- Available in daytime of summer

#### Example of RDCA

- Mainly to capture airmass thunderstorms
- For aviation
- Service will start in 2012

### 1. Introduction

#### Concept of RDCA



Standard deviation of 10.8 µm, VIS, and their temporal variations …

... Are these features observed in fact?

#### 2. Case study

#### 11 July 2011 04:20UTC



### 3. Parameter list on RDCA

No.	Parameters	Main objective	<ul> <li>Non-time-trend parameters</li> <li>Diagnostic parameters based on a single image</li> </ul> Time-trend parameters <ul> <li>Temporal variation in 5 minutes</li> <li>Cloud motion is considered</li> </ul>
1	VISR	To detect optical thick cloud (mainly for *Pre- detection)	
2	Difference between maximum and minimum of VISR	To detect a roughness in developing cloud	
3	Standard deviation of VISR		
4	Difference between maximum and minimum of 10.8µm BT		
5	Standard deviation of 10.8µm BT		
6	Difference between 10.8µm and 12µm BT	To exclude optically thin cloud (cirrus) (mainly for Pre-detection)	
7	Difference between 6.8µm and 10.8µm BT	To detect the potential to develop	
8	Slope index (relation between 10.8µm BT and effective radius of cloud top estimated from 3.8µm)	To evaluate cloud microphysical structure	
9	Time differential of maximum of VISR	To evaluate vertically developing trend of developing cloud	
10	Time differential of averaged VISR		
11	Time differential of minimum of 10.8µm BT		
12	Time differential of averaged 10.8µm BT		
13	Pinpoint fall down of 10.8µm BT		

\* Pre-Detection : To extract candidates of cloud

#### 4. Parameter's sensitivity and index



## 5. Example of RDCA - 1

#### Airmass thunderstorms : 14 July 2011



## 5. Example of RDCA - 2

# Heavy rainfall and thunderstorms : 26 August 2011













#### 6. Summary

- RDCA product is under development using MTSAT-1R Rapid Scan observation data.
- Time-trend and Non-time trend detection parameters are introduced to detect developing signals.
- Index based on logistic regression is used for detection.
- RDCA was effective for several cases of the summer 2011.
- Preparation for the summer 2012 is needed.
  - ✓ Introduction of other parameters, methodologies.
  - ✓ Tuning, validation of RDCA

## Thank you.