



# **JMA cooperation activity at South East ASIA region**

**2016.12.7**

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Office of Observation  
Systems Operation

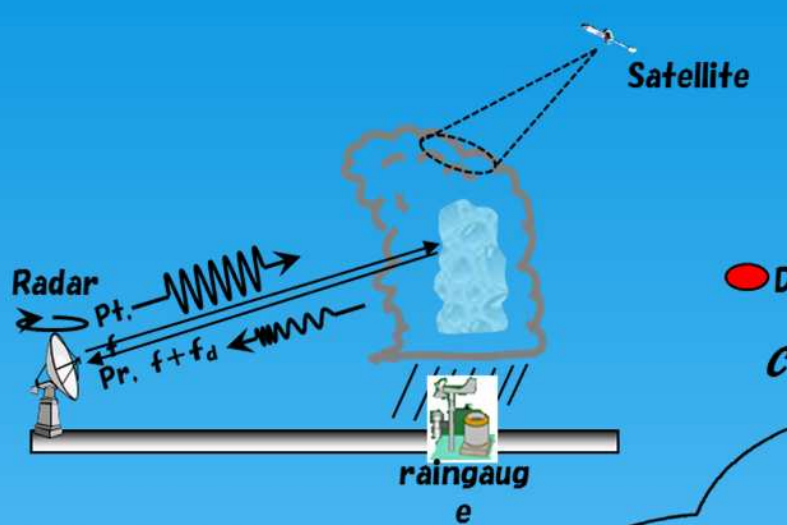


# **Contents ...**

- Radar observation**
- Capacity building activity**
- Trend of Weather Radar Data Exchange (WRDE)**
- Cross-regional radar data utilization on WIS**



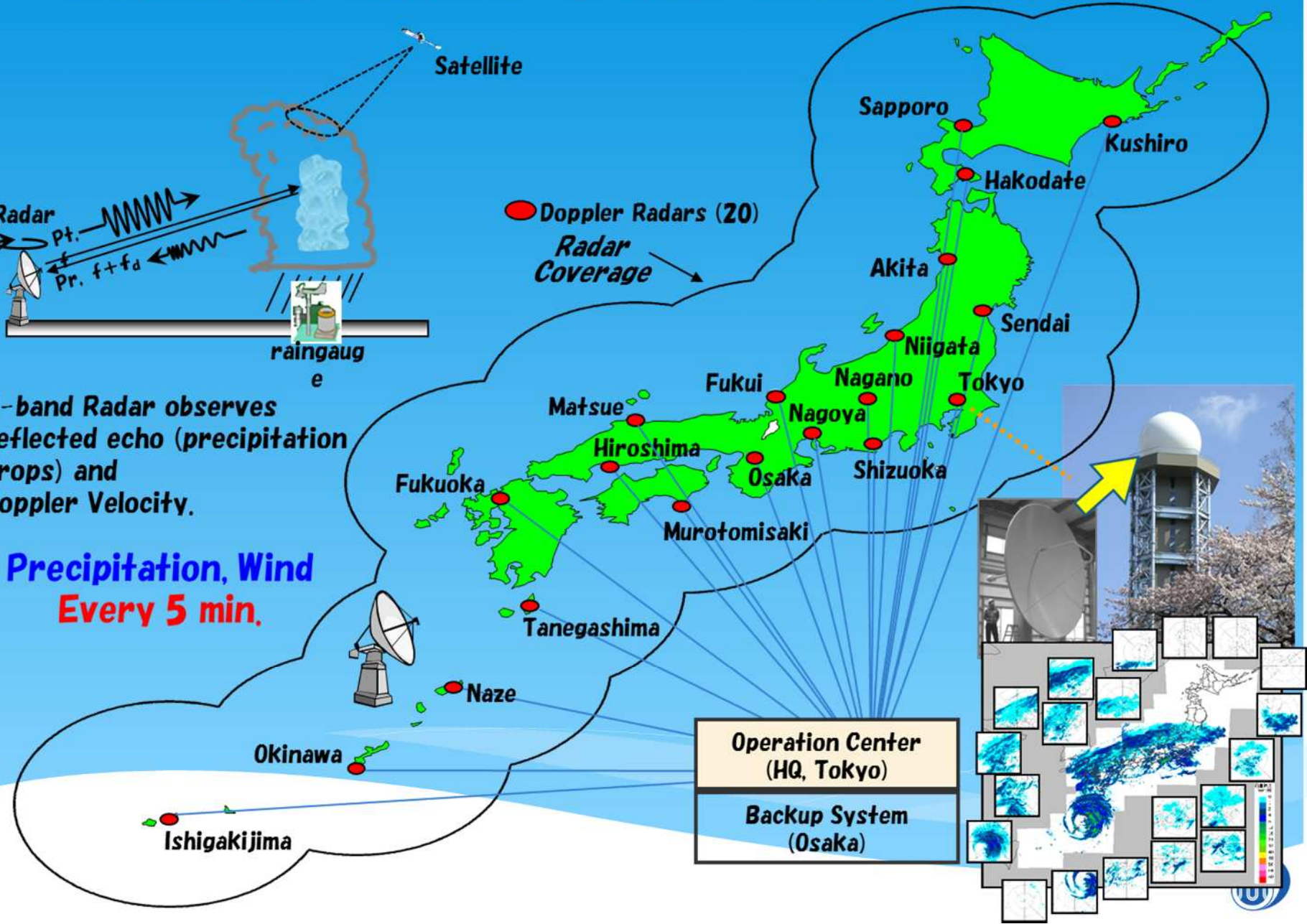
# Weather Radar Observation System



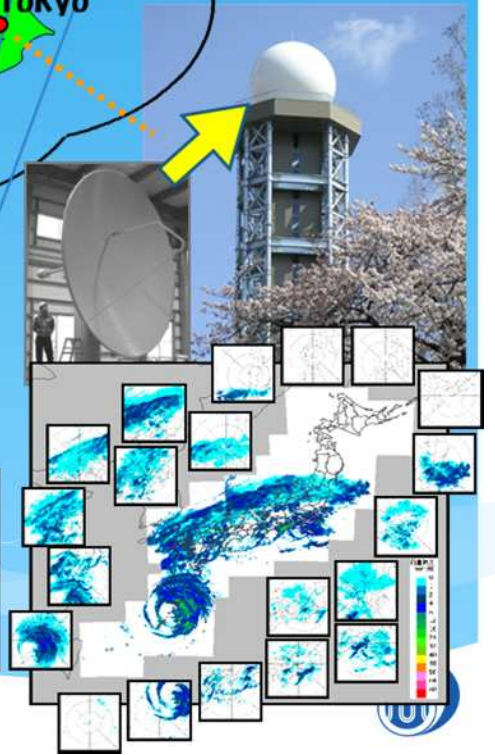
C-band Radar observes reflected echo (precipitation drops) and Doppler Velocity.

Precipitation, Wind Every 5 min.

Doppler Radars (20)  
Radar Coverage



Operation Center (HQ, Tokyo)  
Backup System (Osaka)



# Radar Data Utilization

## **Basic use**

- **Weather Monitoring / Analyzing**

## **Advanced use**

- **Assimilation to NWP**
- **Creation QPE / QPF products**
  - **Quantitative Precipitation Estimating / Forecast**
    - **Forecasting disaster from heavy rain, flood, sediment**

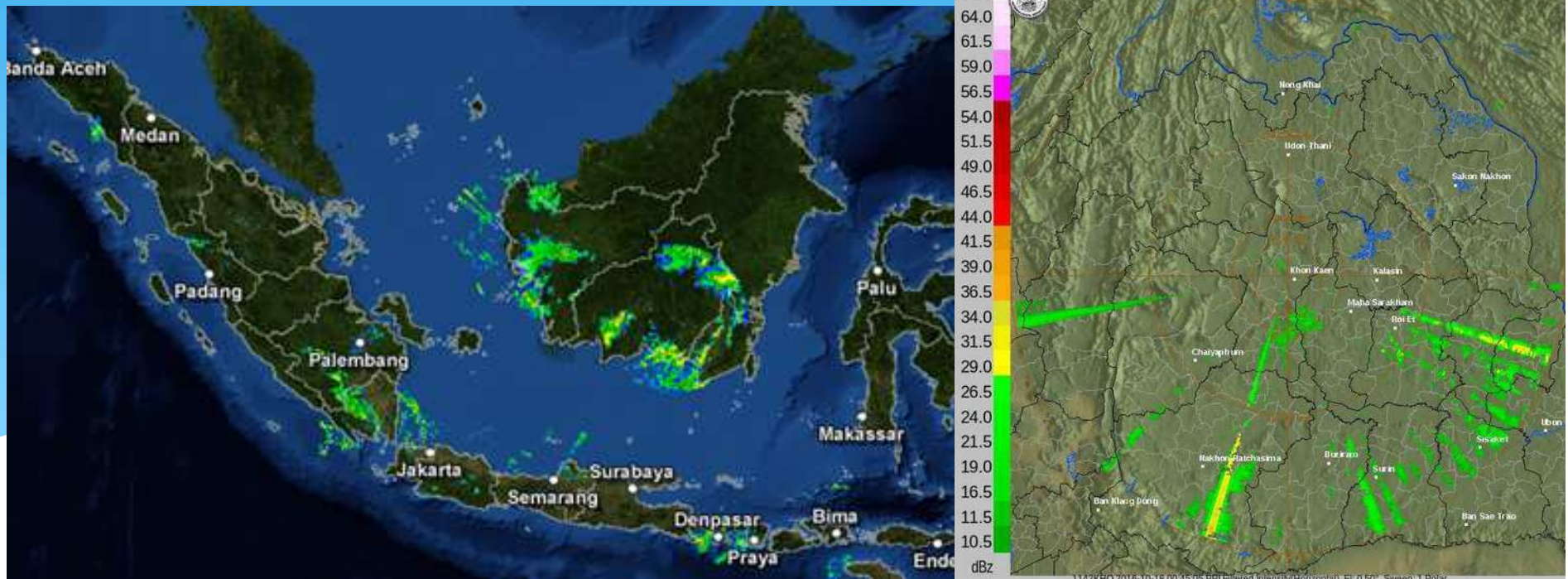
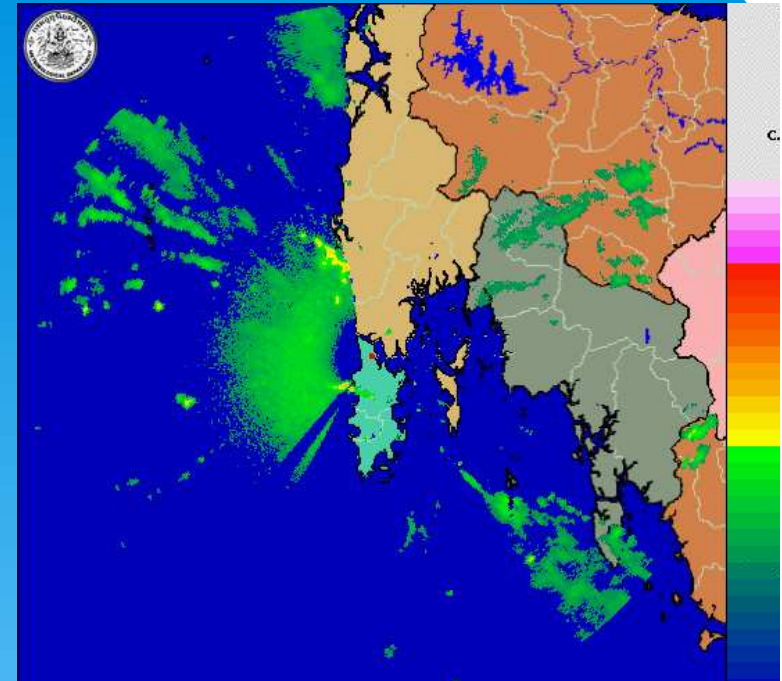
*etc ...*



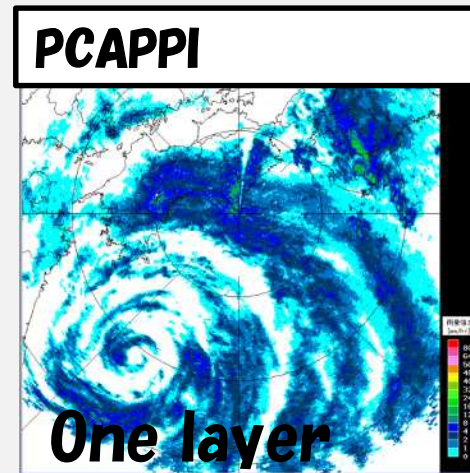
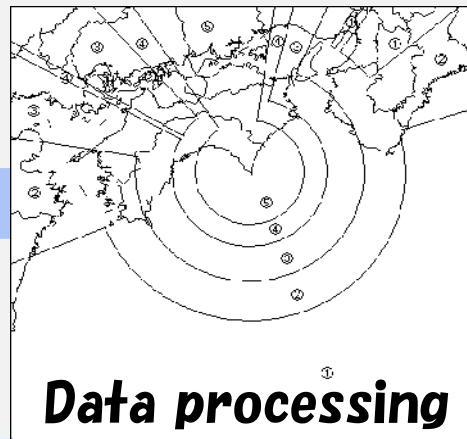
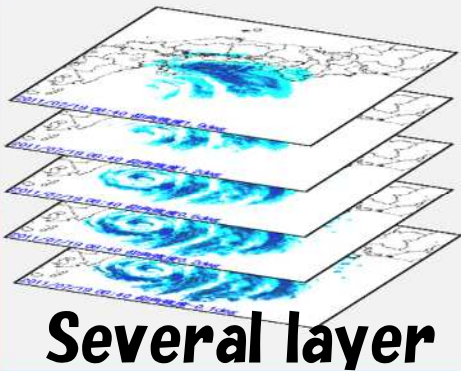
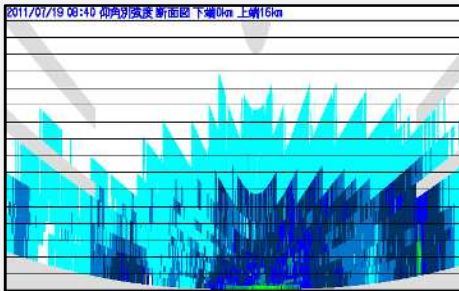
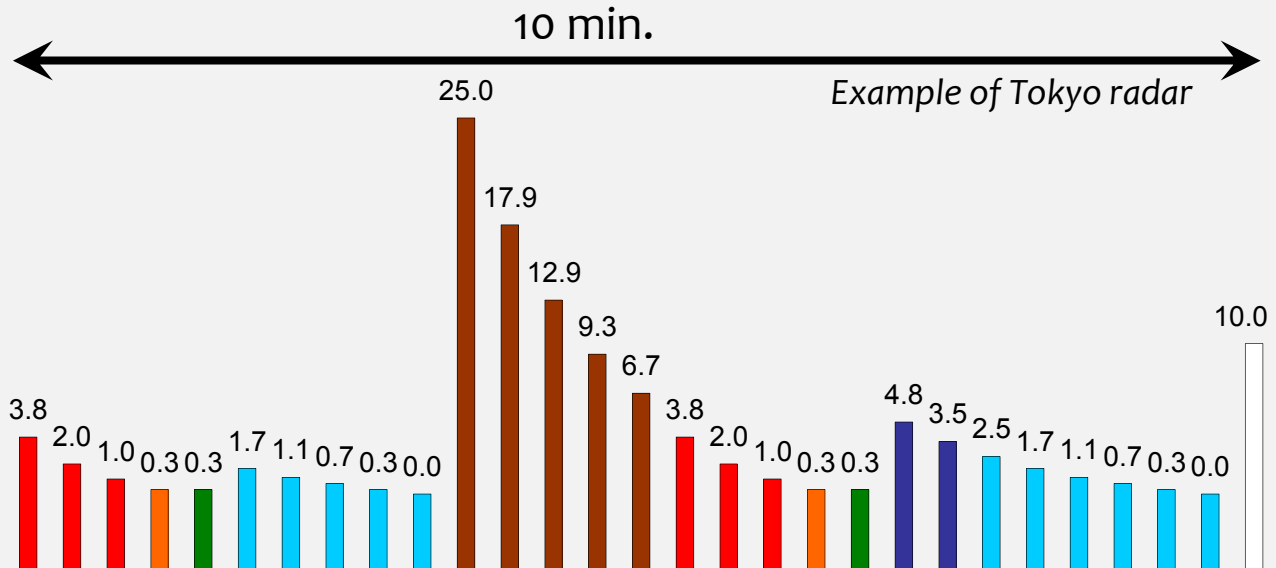


# Motivation

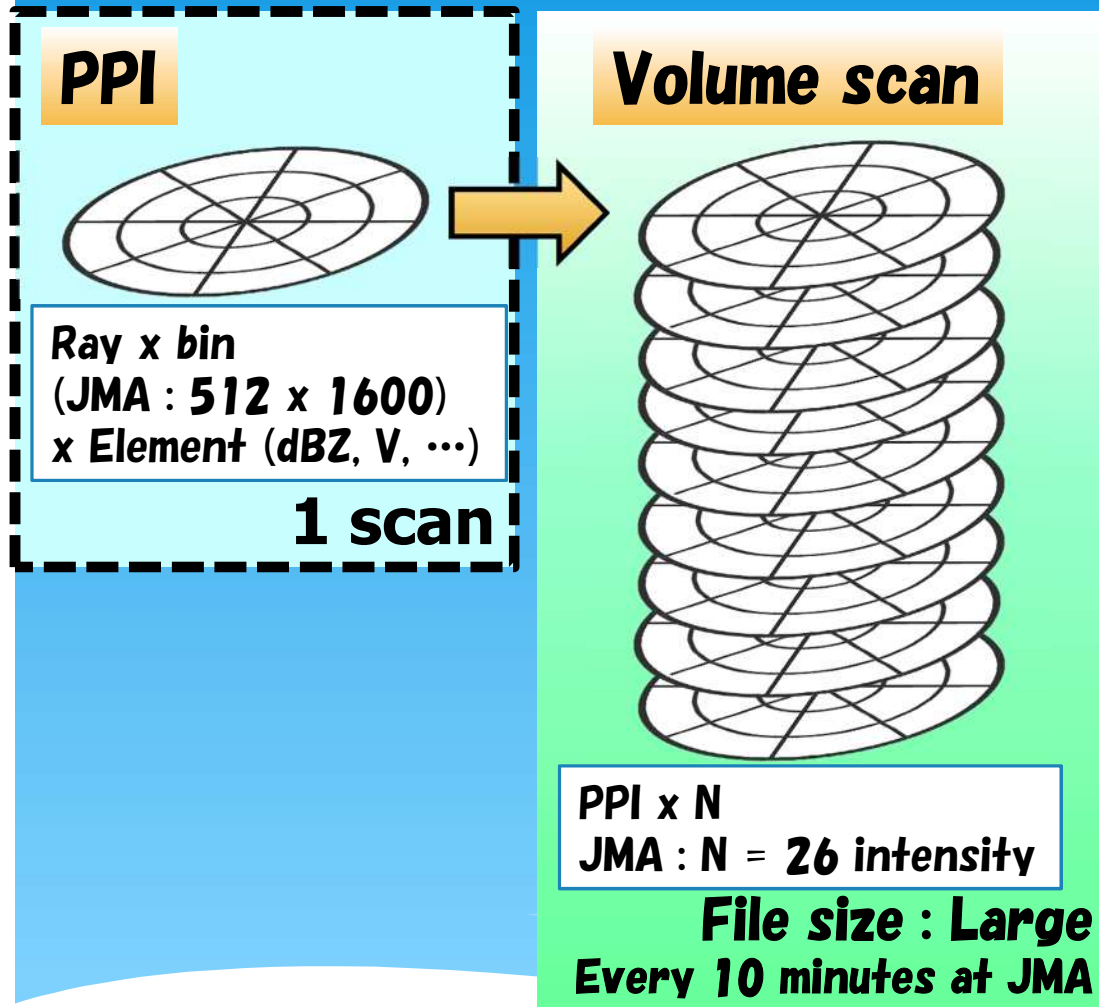
- **NMHSs of South East ASIA region have many challenges on radar observation.**
- **JMA's long time experience could be helpful.**



# Radar Observation data



# What is raw radar data

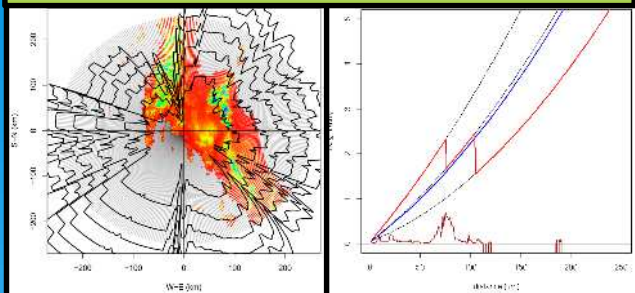


- ❑ Raw radar data contains volume scan data.
- ❑ PPI scan makes GPV data.
- ❑ Volume scan has number of PPI scans.

**Radar sites number**  $\times$  **Volume scan**  $=$  **Radar raw data size is large**

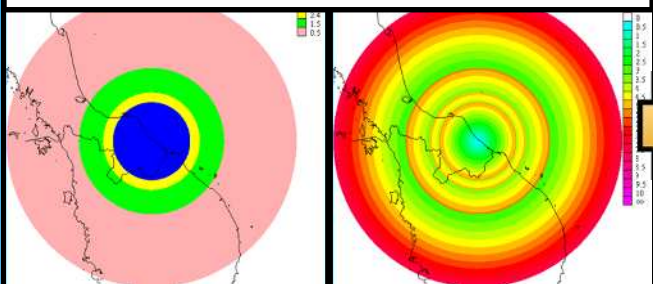


**RadarBeams.r**

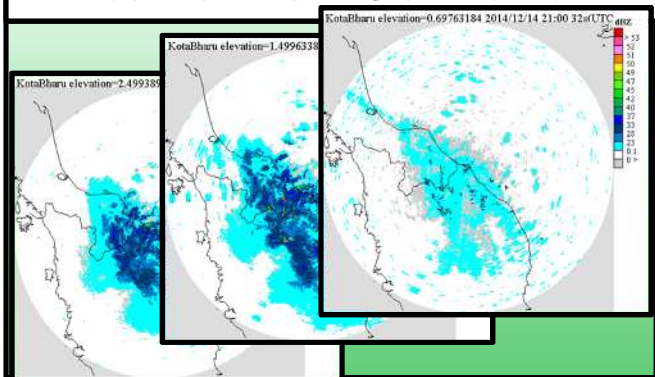


For creation  
PCAPPI table

**PCAPPI table**



**Radar sites data**



# Cooperation tools

Data processing contains QC algorithm  
Visualization tools

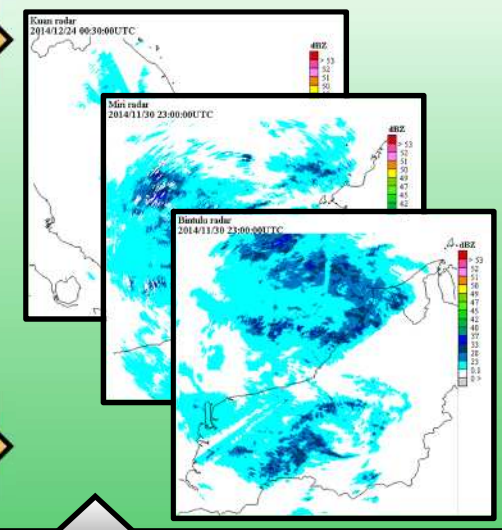
in cross-platform program language (java)

**JMAPCappiMain (lib)**



For creation  
PCAPP

**PCAPPI**

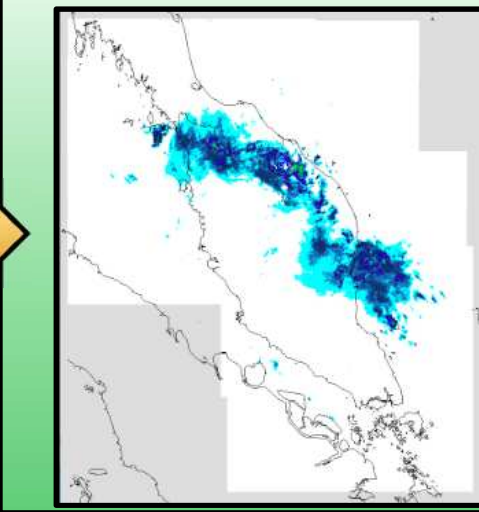


**CompositeMain (lib)**



For creation  
Radar Composite

**Radar Composite**



**Sitelowmake.ini**  
**Clutter map**



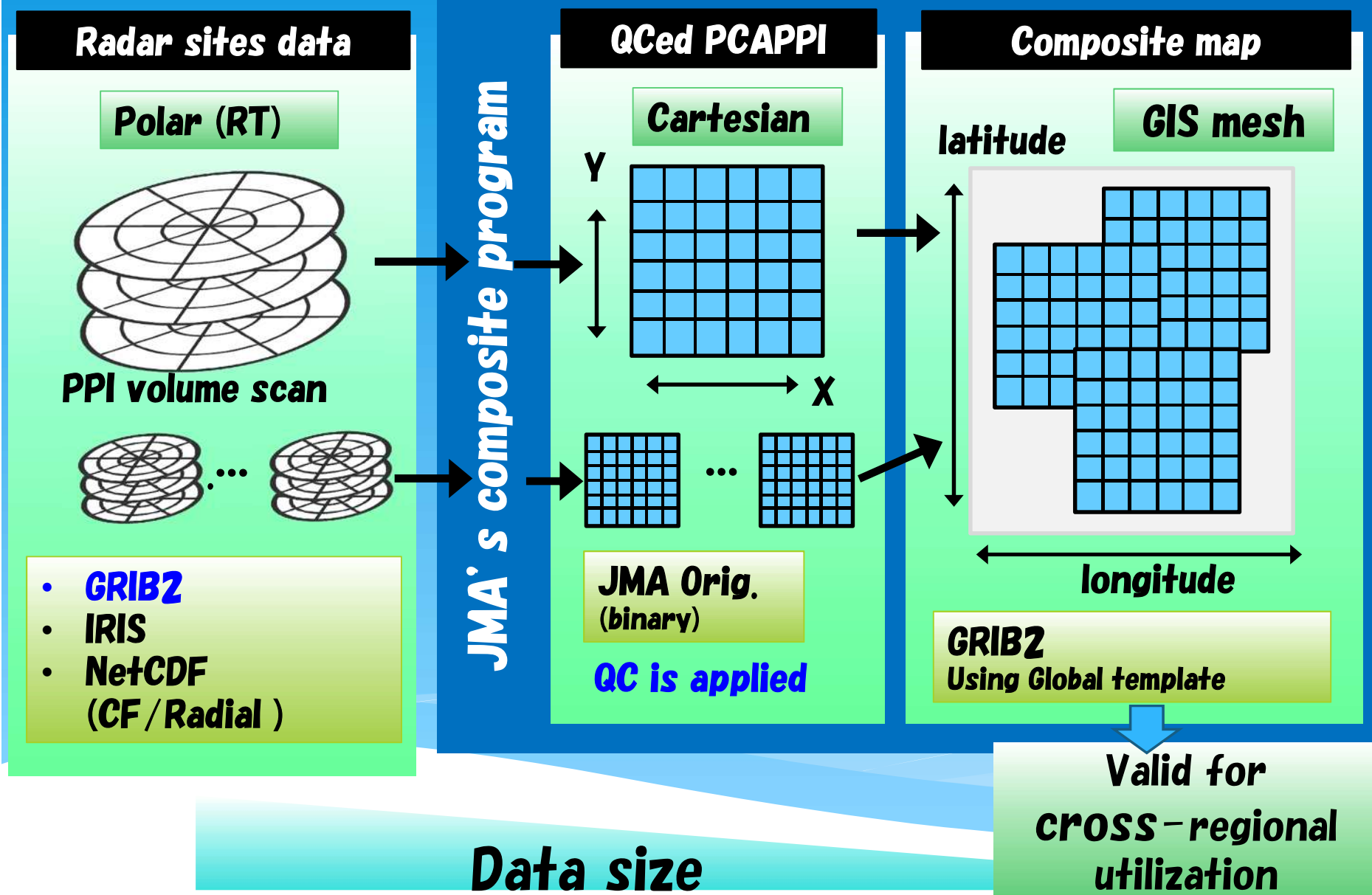
To be developed  
by themselves





# Data formats on radar composite

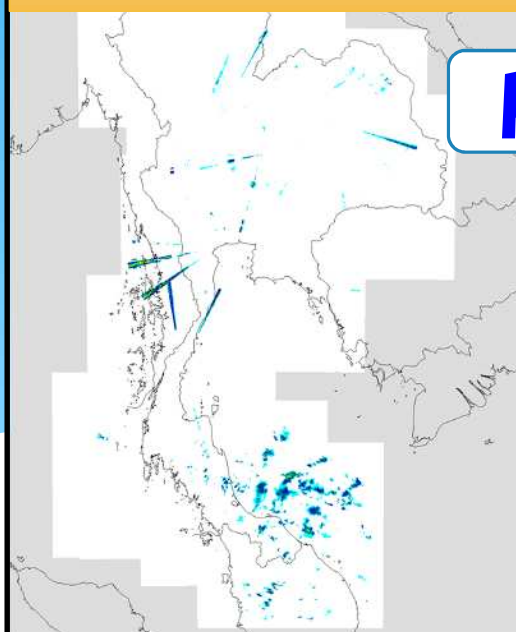
which will be used in regional radar composite on cooperation



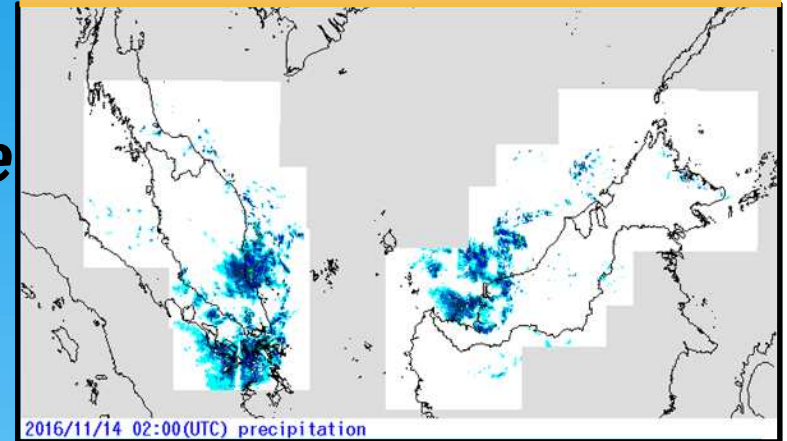
# Capacity Building Activity for Quality Control

JMA successfully contribute to  
capacity building for quality control  
And result in making radar composite

**TMD composite  
by JMA program**

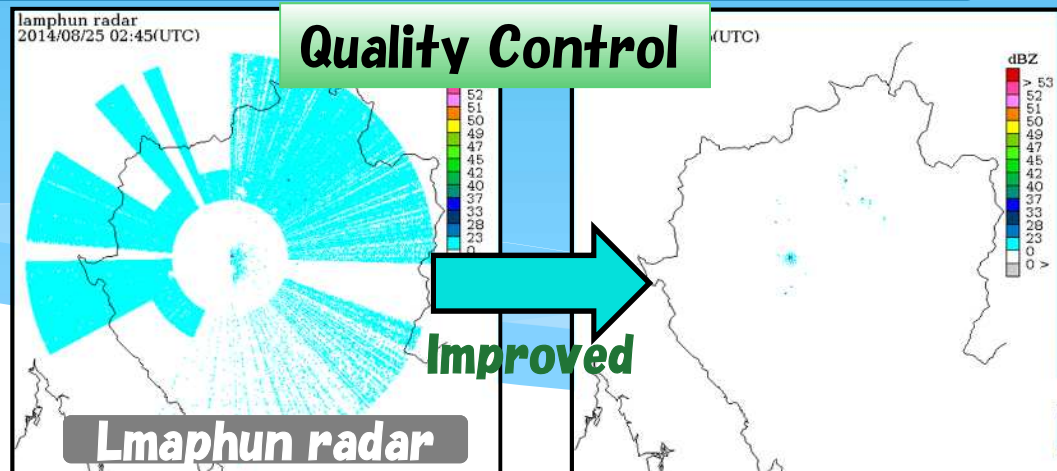


**MMD composite by JMA program**



**Possible to QC by their own**

**Quality Control**



# Challenges on radar data utilization

**Experienced ...**

- **Few experts**
  - **Necessary capacity building**
    - **For radar data processing**
    - **At operation level product**
- **Difficulties in data utilization**
  - **No standard**
    - **Various format (some of them is unreadable ... )**
    - **Different radar operation**





# Trend of Weather Radar Data Exchange

## □ TT-WRDE

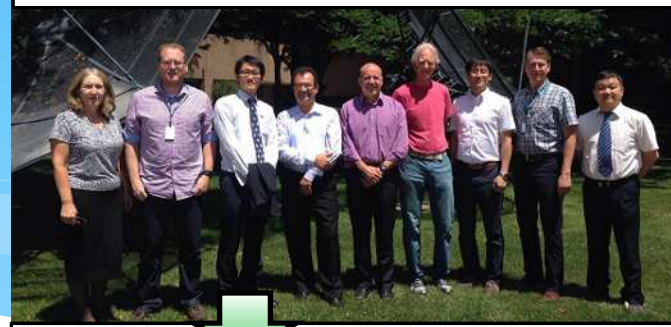
Task team of WMO

- Task Team on Weather Radar Data Exchange
- Had been created in response to anticipated increased demand for weather radar data for **assimilation into numerical prediction models**
- Create information model
  - Can act as a **single global standard** for weather radar data.

Share activity on SE ASIA region



26-28 July, Boulder, United States



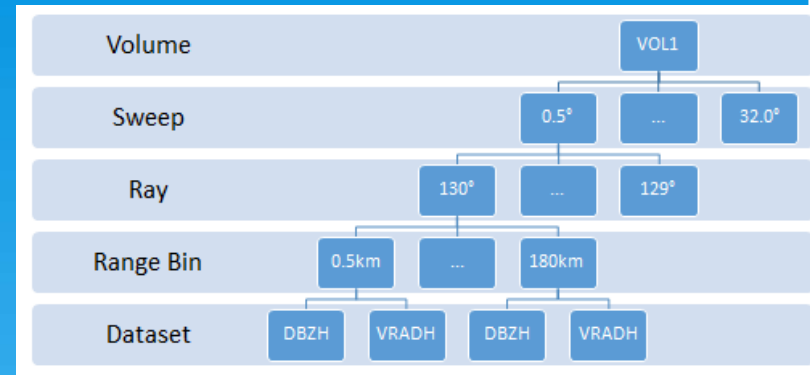
JMA expert joined !



# Information model (draft)

- ❑ Representation of weather radar and scanning LIDAR data, metadata, and products.
- ❑ Independent of any data model or file format
- ❑ To exchange with no loss in information
- ❑ Candidate to be made expressing information model
  - ❑ NetCDF in CF
  - ❑ HDF5 in ODIM\_H5

## Information mode for radar raw



Information  
model

Express

Standard  
Format



# Deliverable Items

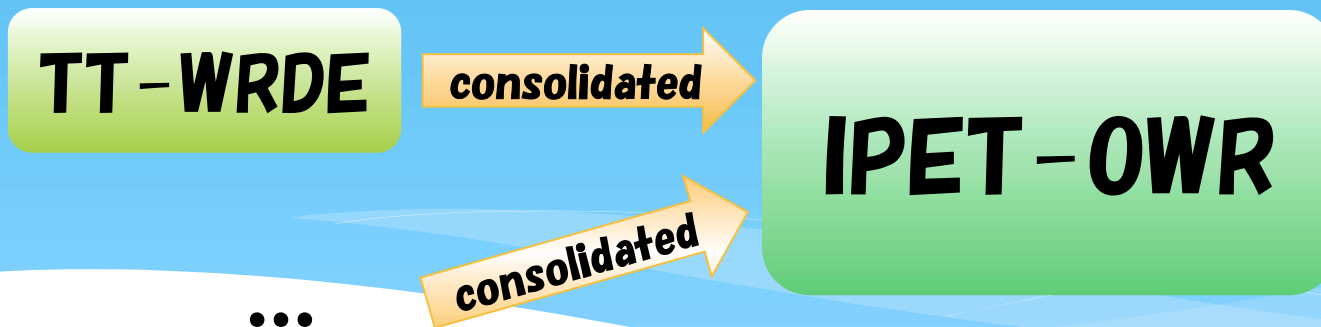
- ❑ *Requirements on weather radar data to be exchanged globally*
- ❑ *Information model for weather radar data*
- ❑ *Recommended file formats for operational and scientific exchange*
- ❑ **Recommendations on requirements for documentation and training materials to support WMO members**



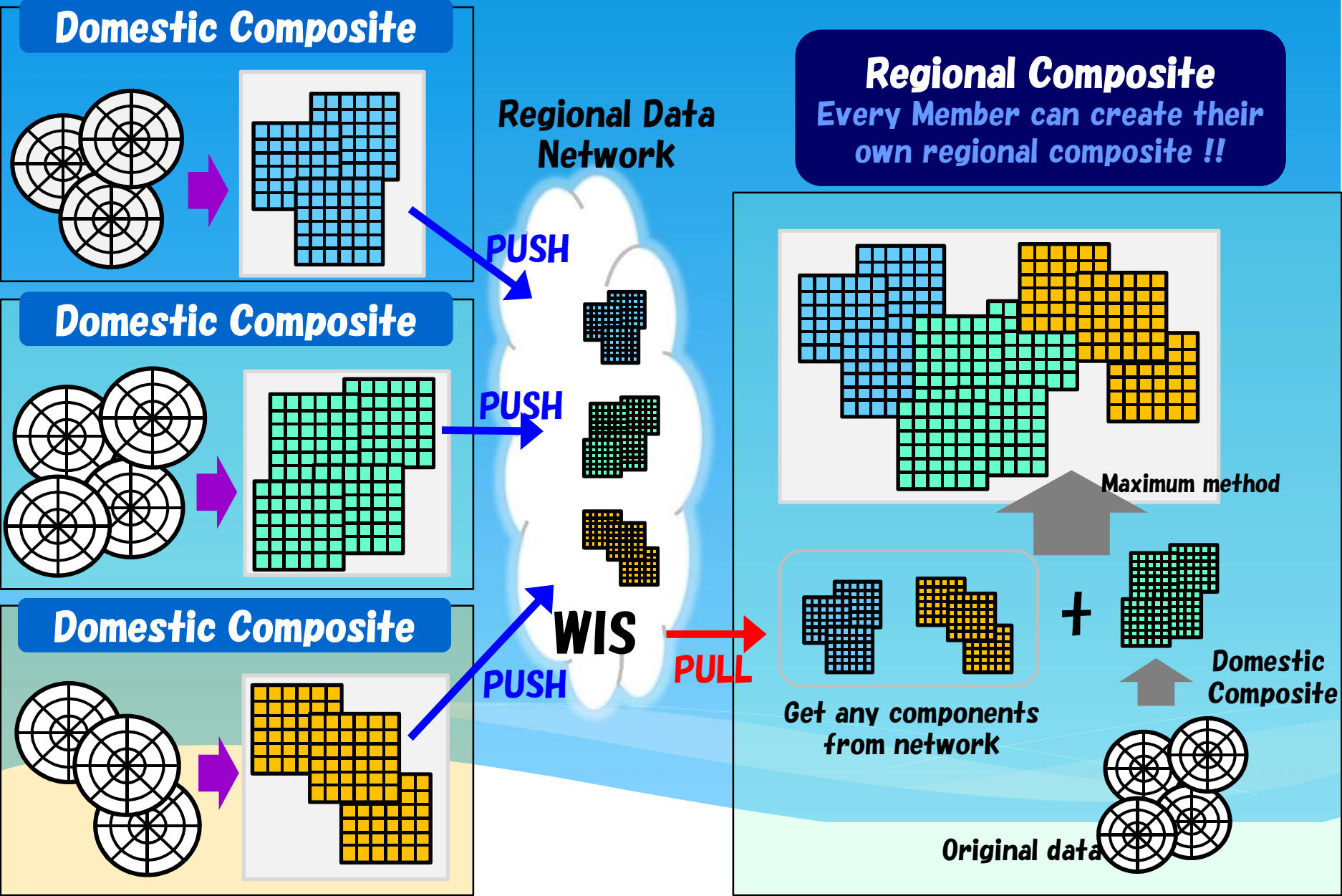


# TT-WRDE to IPET-OWR

- *Inter-Programme Expert Team on Operational Weather Radars (IPET-OWR)*
- *IPET-OWR Sub-Group on Weather Radar Data Exchange*
  - *Overall objective for TT-WRDE would be consolidated together*



# Conceivable concept of radar data exchange on SE Asia region



# **Challenges on radar data exchange in South East ASIA**

- **Telecommunications capacity**
  - **There are many scenes to rely on satellite links for data collection.**
- **Raw radar data would have challenges for exchange in some countries on data policy.**
- **Exchanging product data ( like radar composite ) is not problem.**

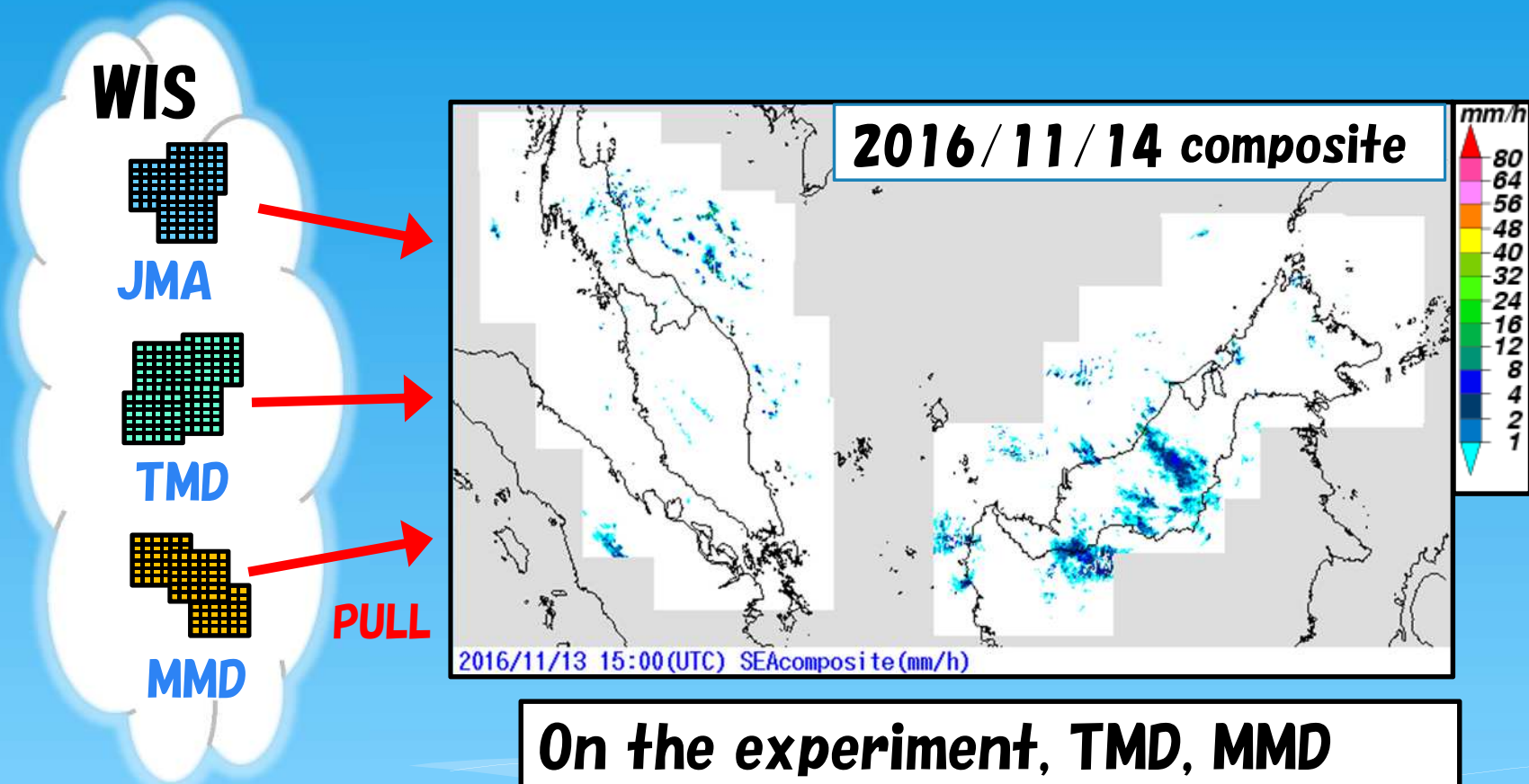


**Now on challenge for exchange radar data on radar composite product to enhance weather monitoring and analysis**





# Experimental data sharing on AOP of ESCAP / WMO Typhoon Committee



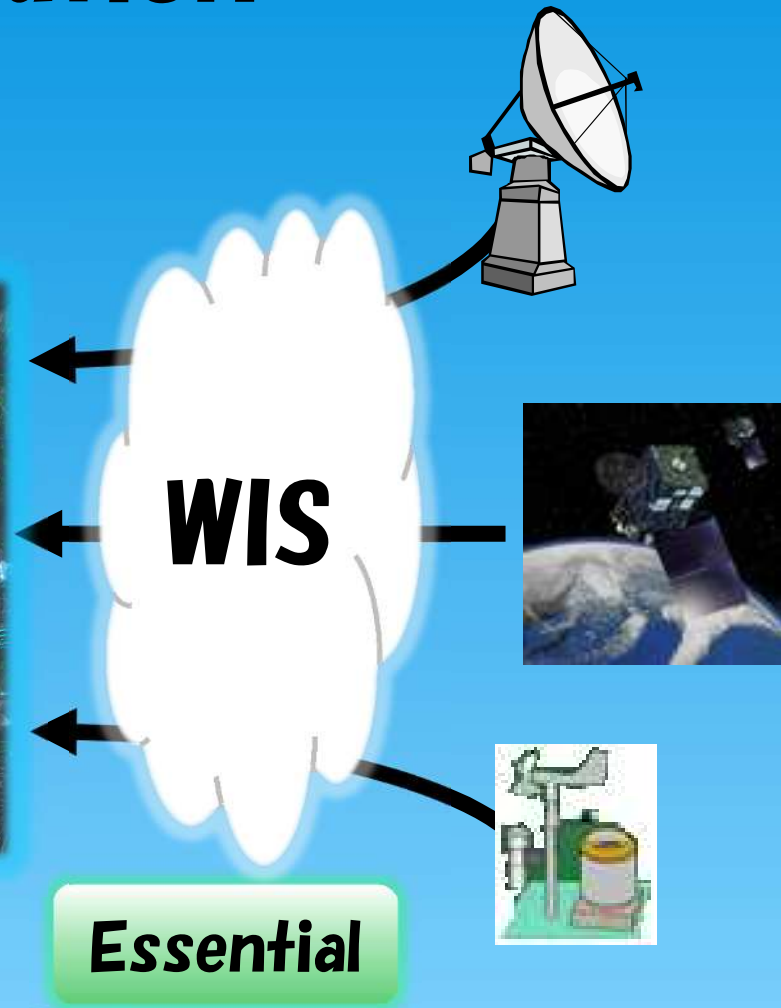
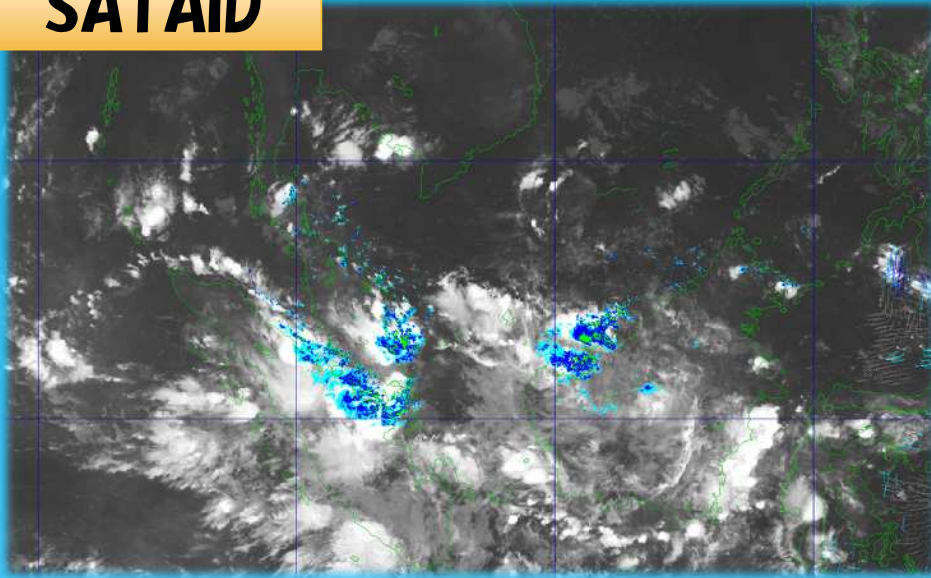
**On the experiment, TMD, MMD and JMA successfully exchanged**

**WIS plays a key role on this experiment**



# Future data utilization on WIS for NHMS

SATAID



Would contribute to  
**Disaster Risk Reduction**



# Summary

- ❑ **Based on Capacity Building Activity**
  - ❑ **Quality Control**
  - ❑ **Radar data utilization**
- ❑ **Demand for weather radar data exchange is increasing for advanced utilization**
- ❑ **Radar data exchanges**
  - ❑ **has challenges in South East ASIA region**
  - ❑ **would contribute to DRR**
- ❑ **WIS is essential on this activity**





# Thank you



**Capacity  
building**

**Quality  
Management**

**Contribution  
to DRR**

