



Current status of the experimental radar data exchange in the Southeast Asia

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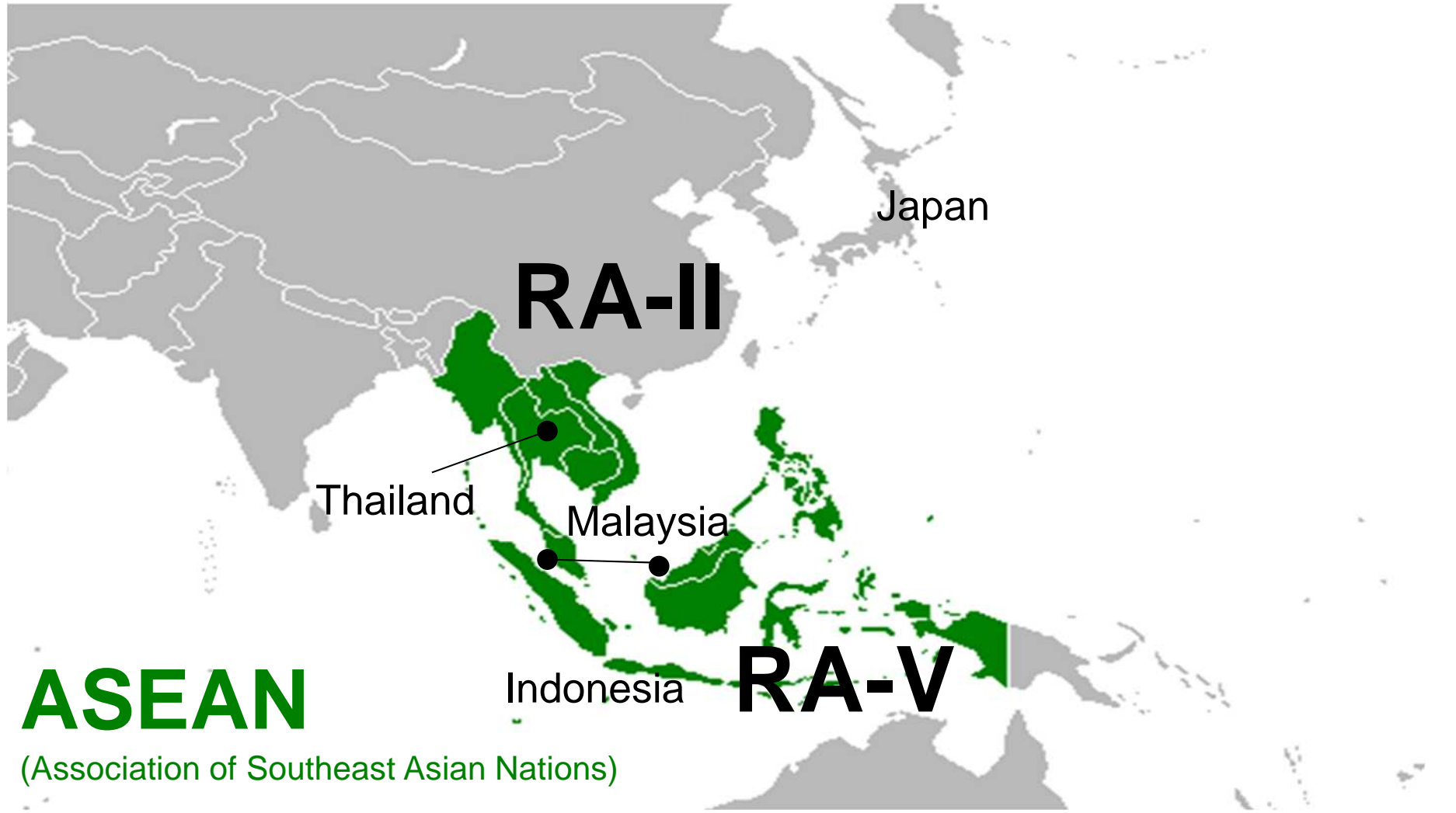
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- Technical cooperation under multilateral framework and bilateral cooperation
- Experimental exchange of radar composite data
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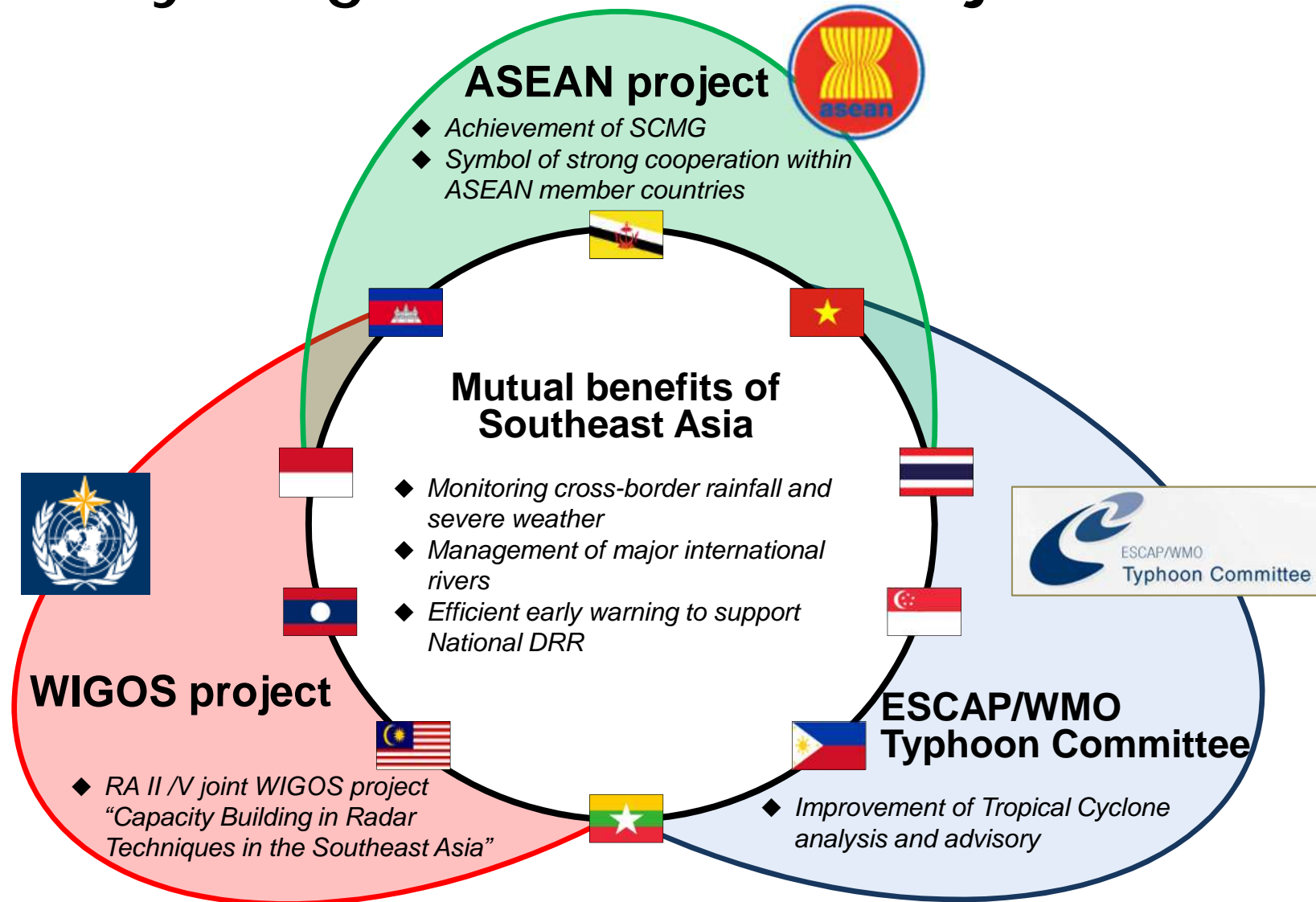
Background



ASEAN and WMO Regions



Synergies of Radar Projects



Jakarta Declaration

Participants in the Joint RA-II/RA-V Workshop on WIGOS for Disaster Risk Reduction (BMKG, Jakarta, 12-14 October 2015)

➤ Propose,

- *To initiate two regional projects to be developed under the WIGOS umbrella, involving the following Members: Australia, Bangladesh, Brunei, Cambodia, China, East Timor, Hong Kong China, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Papua New Guinea, Philippines, Republic of Korea, Singapore, Thailand, Vietnam:*
- **A “Joint RA-II/RA-V WIGOS Radar Data Project” aiming at**
 - (i) improvement of data quality of existing radars,**
 - (ii) development and expansion of national radar networks,**
 - (iii) near real time international exchange of radar data, and**
 - (iv) development of «sub-regional» radar data centre(s);**



Technical cooperation under multilateral framework and bilateral cooperation

Cooperation of Thailand/Japan

ESCAP/WMO Typhoon Committee Activities

- **2011 JMA → TMD**

Expert mission (Bangkok, 7-9 Sep)

- **2012 JMA ← TMD**

Attachment Training for TMD experts on radar composite techniques (Tokyo, 19-22 Nov)

- **2013 JMA ← TMD**

Technical Meeting on radar composite map for TMD and JMA experts (Tokyo, 25-28 Nov)

- **2014 JMA ← TMD**

Technical Meeting on radar composite map for TMD and JMA experts (Tokyo, 25-28 Nov)

- **2015 JMA → TMD**

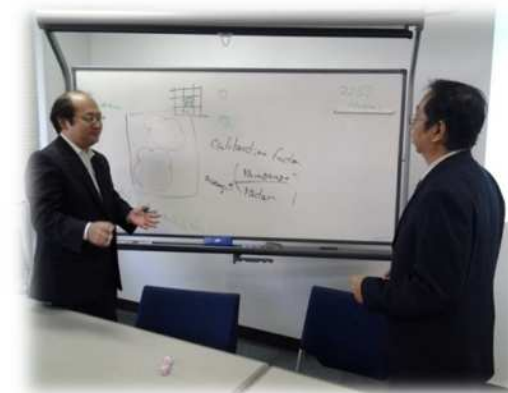
Technical Meeting on radar composite map for TMD and JMA experts (Bangkok, 30 Nov - 4 Dec)

- **2016 JMA ← TMD**

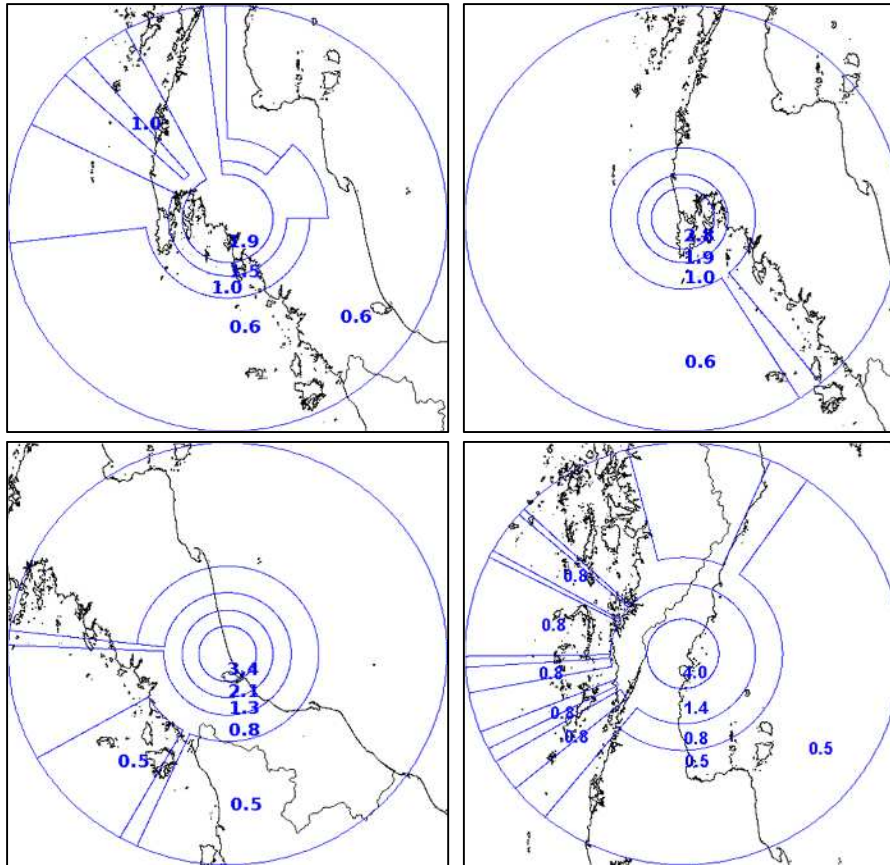
Technical Meeting on radar composite map for TMD and JMA experts (Tokyo, 29 Nov - 2 Dec)

- **2017 JMA ← TMD, MMD**

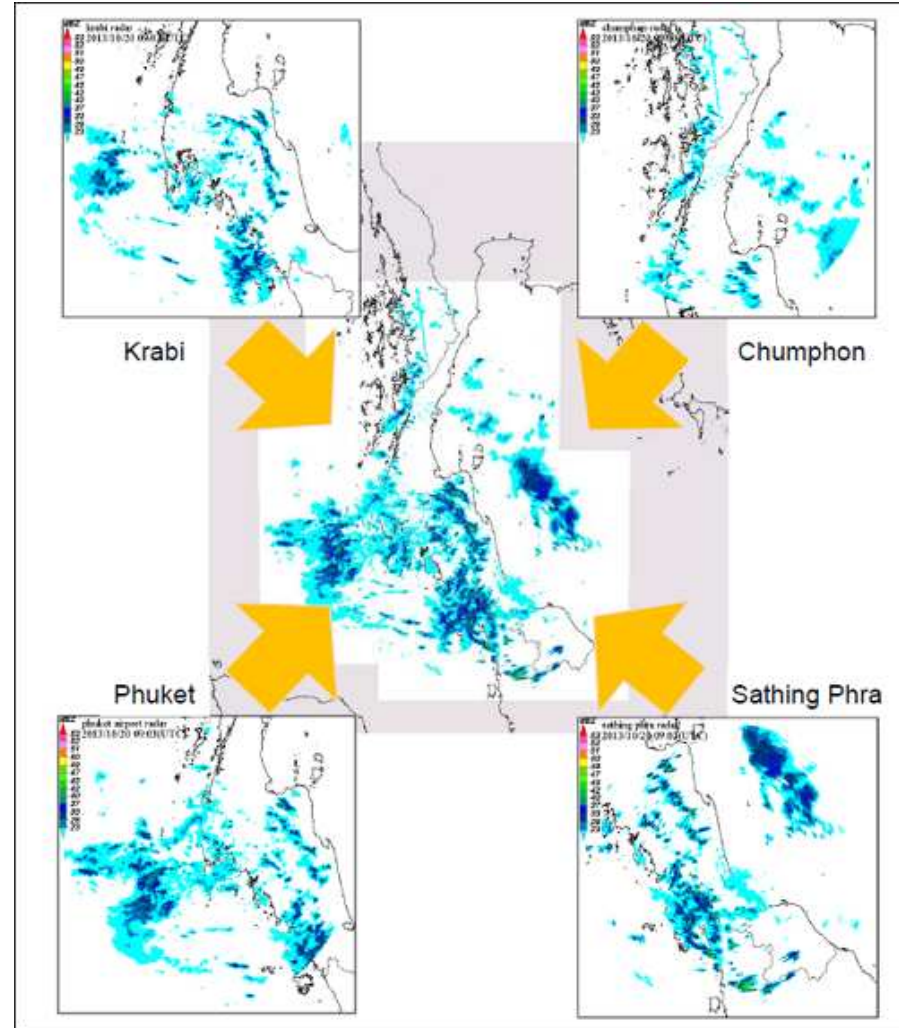
Technical Meeting on Radar QC and QPE for TMD, MMD and JMA experts (Tokyo, 12 Dec - 15 Dec)



Achievements of Thailand



Elevation Angles Composite Tables
- A key to produce high-quality image

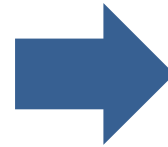
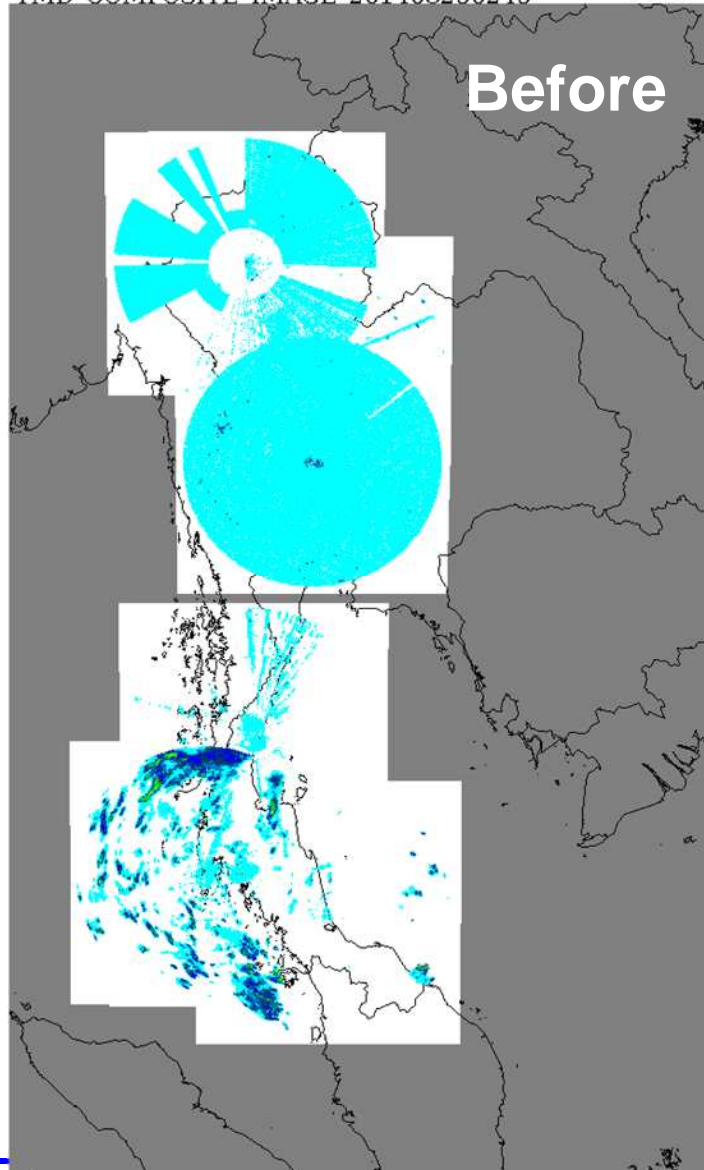


- TMD successfully developed Thai radar composite with QC



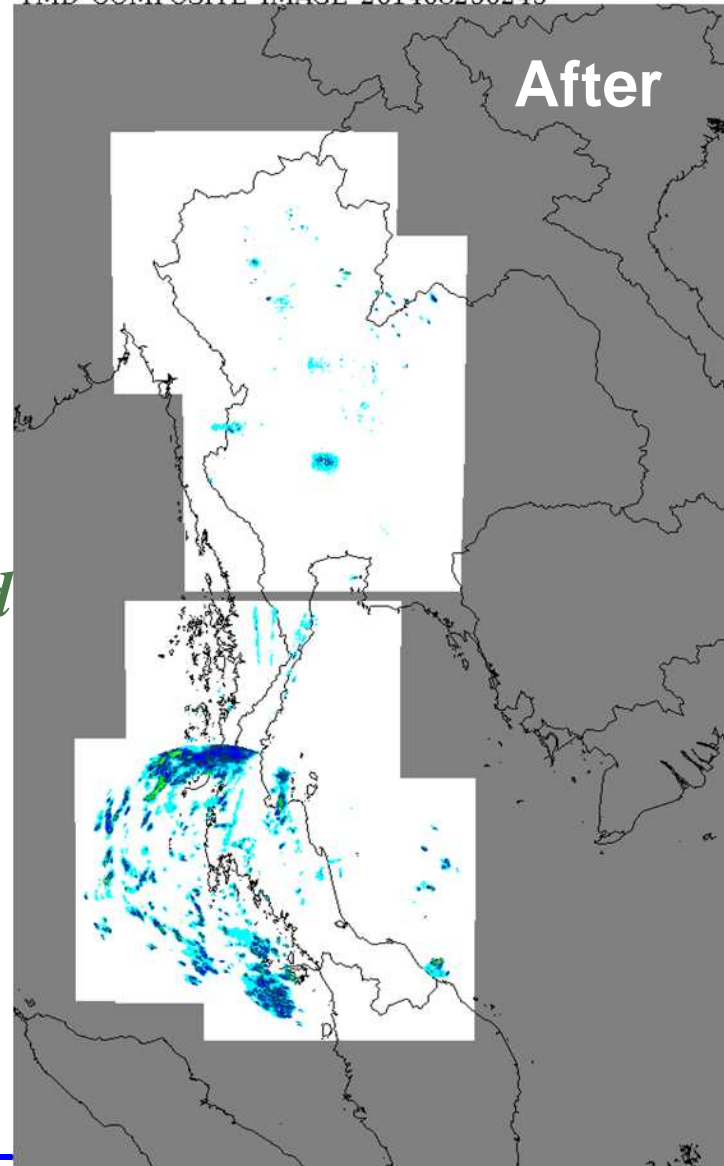
Achievements of Thailand

TMD COMPOSITE IMAGE 201408250245



improved

TMD COMPOSITE IMAGE 201408250245



Cooperation of Malaysia/Japan

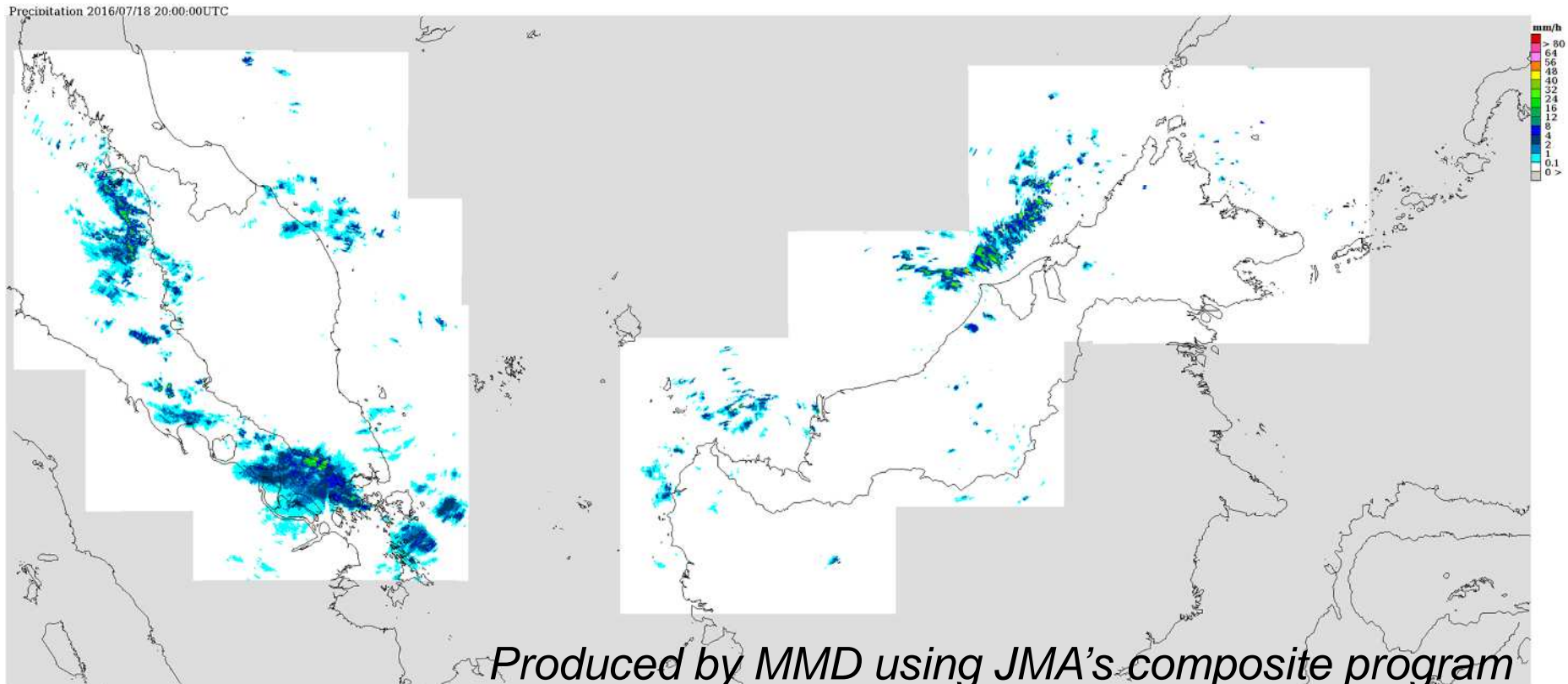
MMD senior officials visited JMA and cooperation started in 2014

Done

- Developed composite table
- Created radar composite from IRIS raw data

To be done

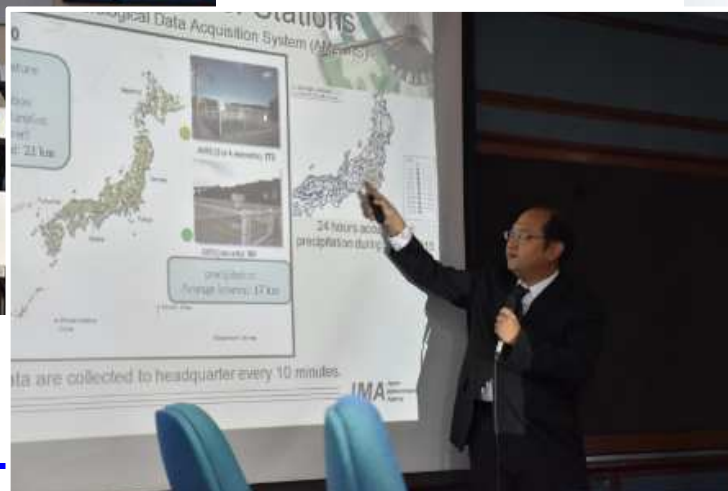
- Improving data quality
- Modifying composite table, if needed
- Sharing experimental data



Cooperation of Malaysia/Japan

MMD and JMA started technical cooperation for radar on bilateral basis.

- **Weather Radar Workshop**
(Petaling Jaya, 2-6 Nov 2015)
- **Training Workshop on Radar Quality and QPE**
(Tokyo, 19-23 Dec 2016)
- **Technical Meeting on radar composite map for TMD/MMD/JMA experts**
(Tokyo, 12 - 15 Dec 2017)

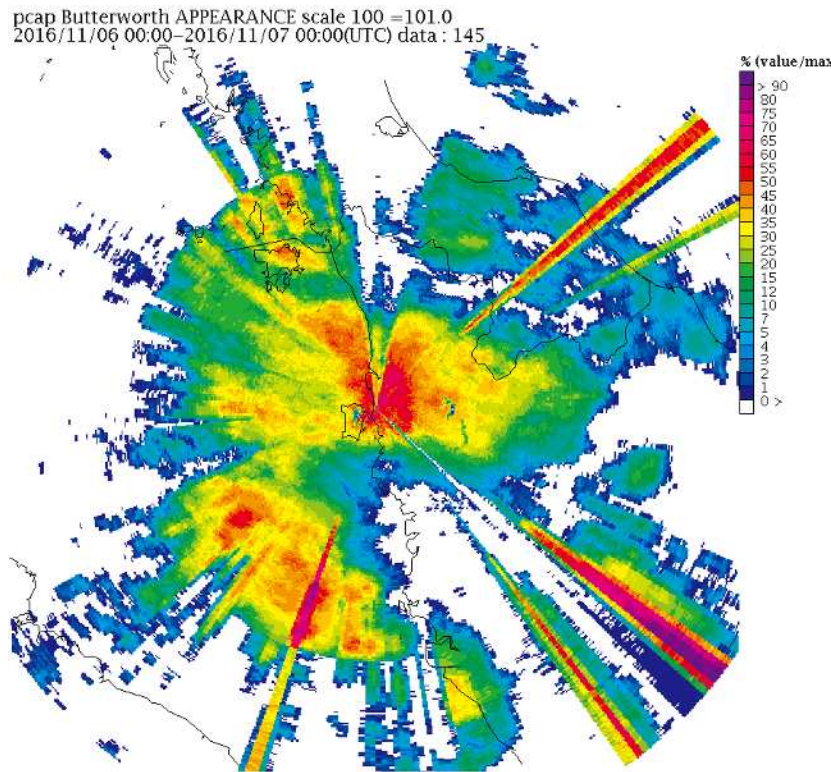


Bangkok, Thailand, 5-15 February 2016

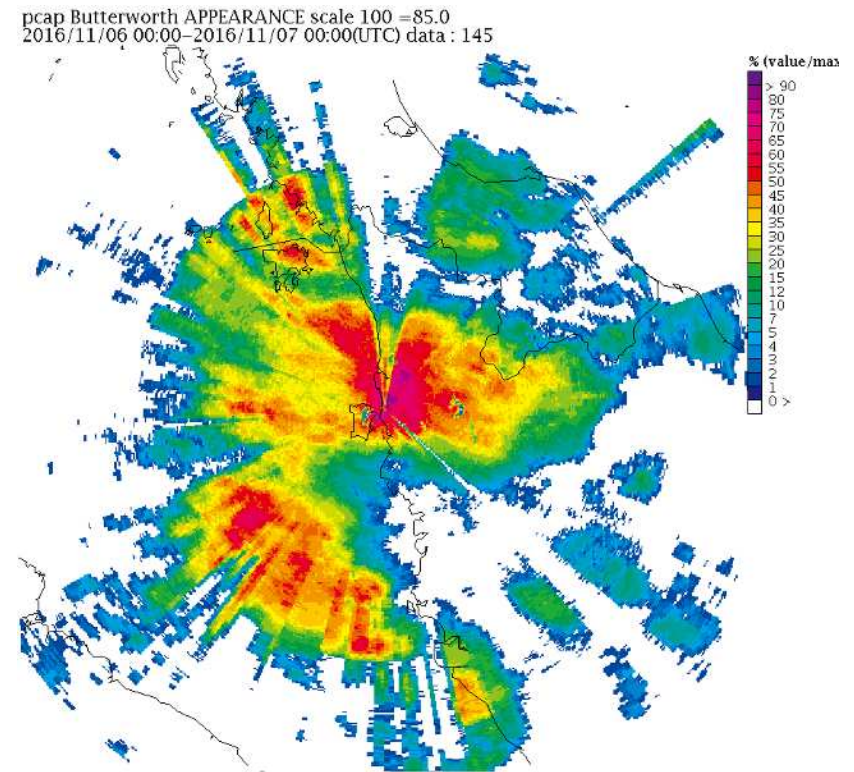


Achievements of Malaysia

Before



After

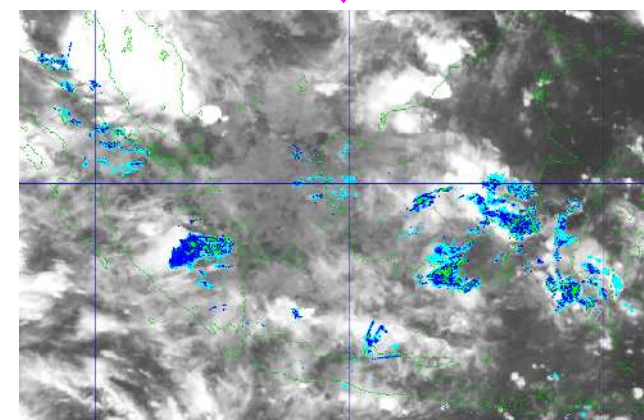
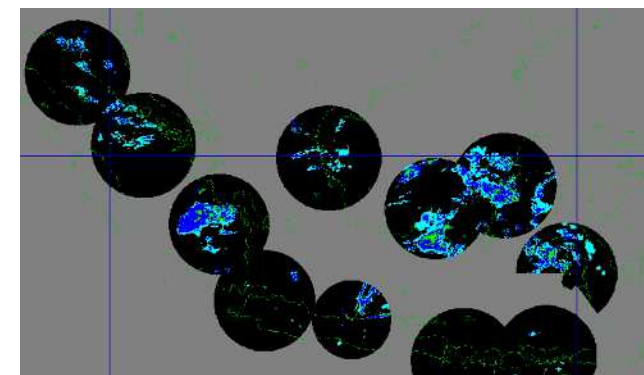


Improvement of Butterworth radar, Malaysia

Cooperation of Indonesia/Japan

BMKG/JMA started discussion on remote sensing technology on bilateral basis. Some achievements include

- **Himawari 8/9 data utilization**
- **Radar data display on SATAID**





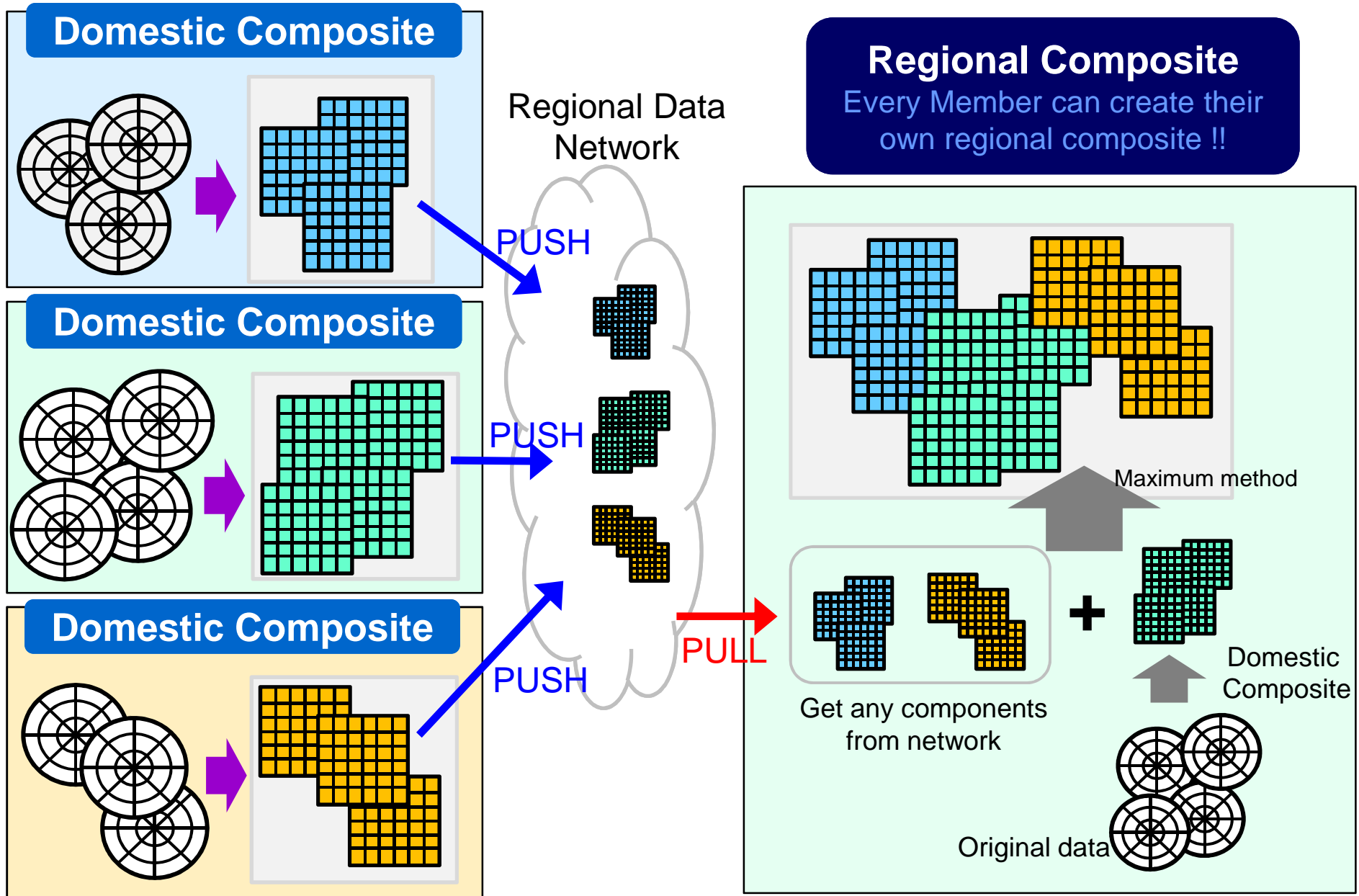
Experimental exchange of radar composite data



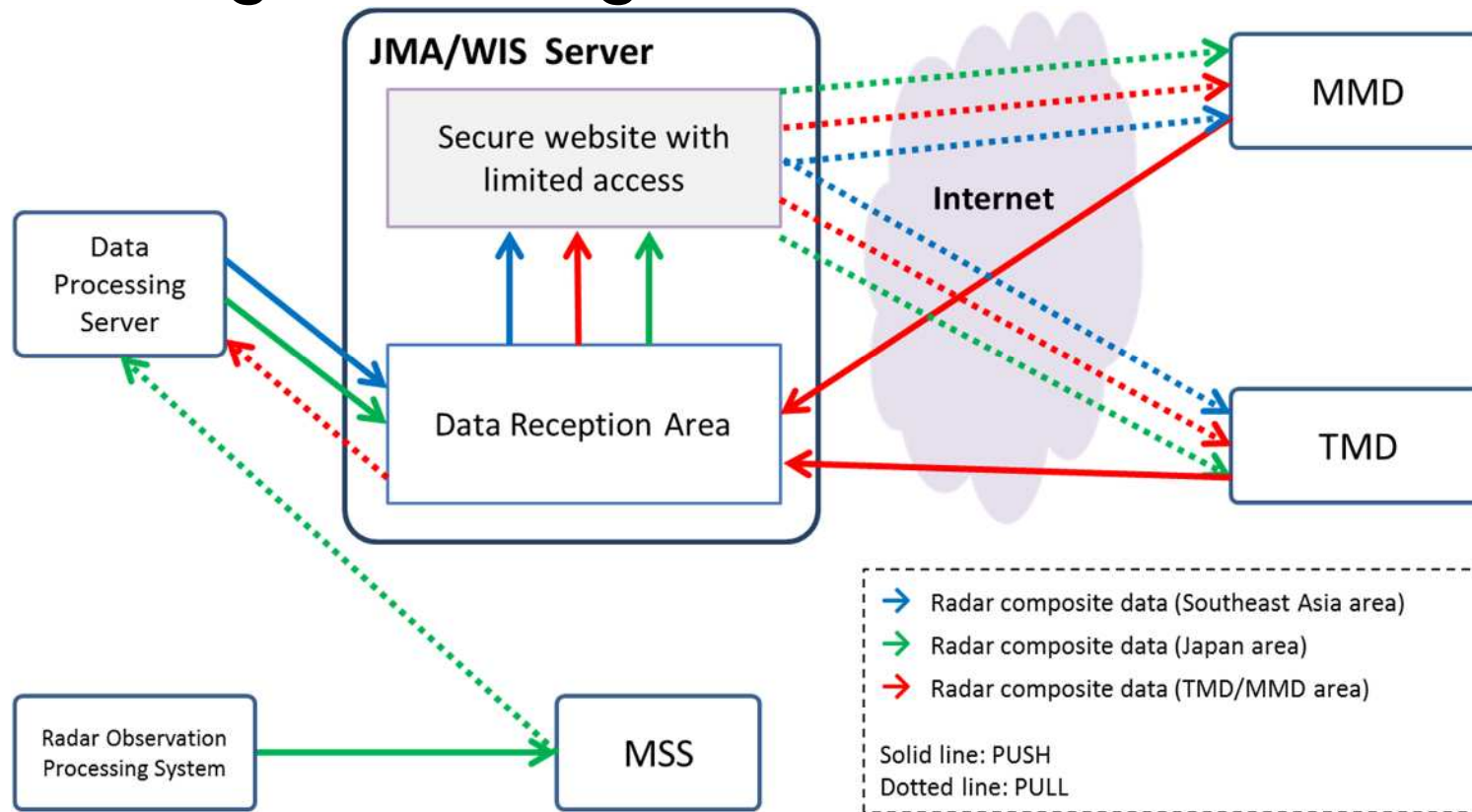
Experimental exchange of radar composite data

- Experimental exchange of radar composite data among TMD, MMD and JMA started on 10 November 2016.
- Radar composite imagery using radar composite data through experimental data exchange among TMD, MMD and JMA has been shared with Typhoon Committee Members from 25 October 2017.

Concept of Regional Radar Composite



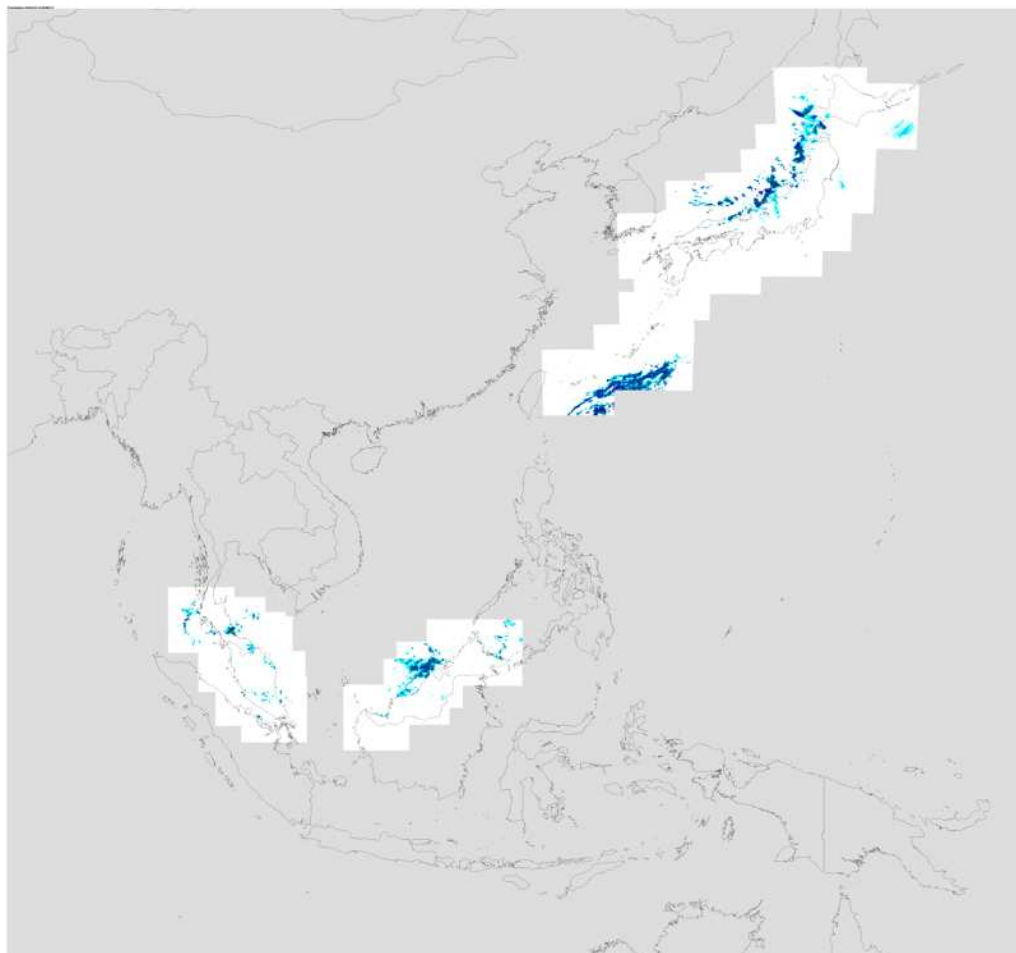
Network for Radar Composite Data Exchange among TMD, MMD and JMA



Data	File name
Composite data in SE	Z__C_RJTD_yyyyMMddhhmmss_RDR_SEAGPV_Gll0p01deg_Pri60lv_Aper60min_ANAL_grib2.bin
Composite data in JMA	Z__C_RJTD_yyyyMMddhhmmss_RDR_JPNGPV_Ggis1km_Pri60lv_Aper5min_ANAL_grib2.bin
Composite data in MMD	Z__C_WMKK_yyyyMMddhhmmss_RDR_MMDGPV_Gll0p01deg_Pri60lv_Aper10min_ANAL_grib2.bin
Composite data in TMD	Z__C_VTBB_yyyyMMddhhmmss_RDR_TMDGPV_Gll0p01deg_Pri60lv_Aper15min_ANAL_grib2.bin

Radar composite imagery

22:00 UTC 22/01/2018



<https://tynwp-web.kishou.go.jp/Analysis/Radar/index.html> (Required ID and password)



Lessons learnt and future challenges

Technical/Operational Challenges

Each Member may have different radar operation.

1. Scan sequences

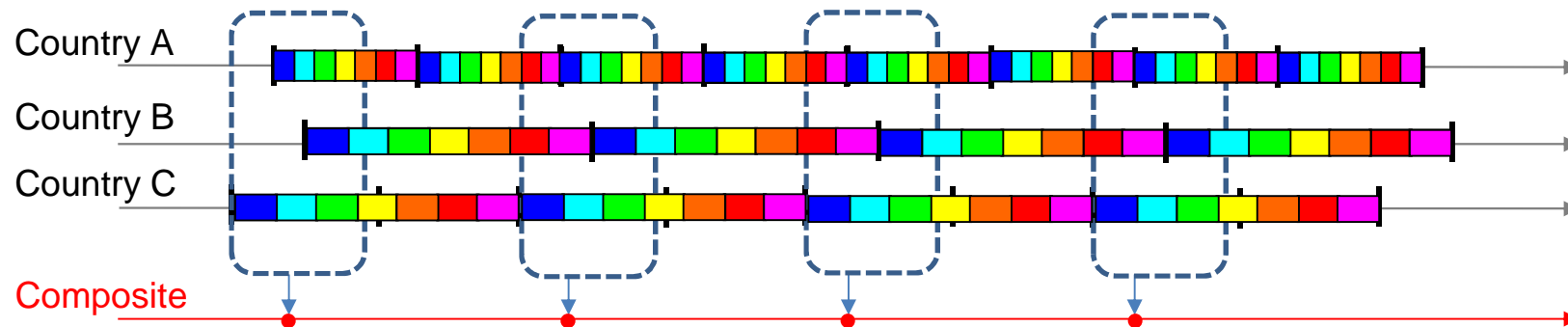
Radar for aviation weather / radar for general weather

2. Observation intervals

1 volume per 10 or 15 minutes

3. Data quality control process

Not only data processing level but also signal processing level

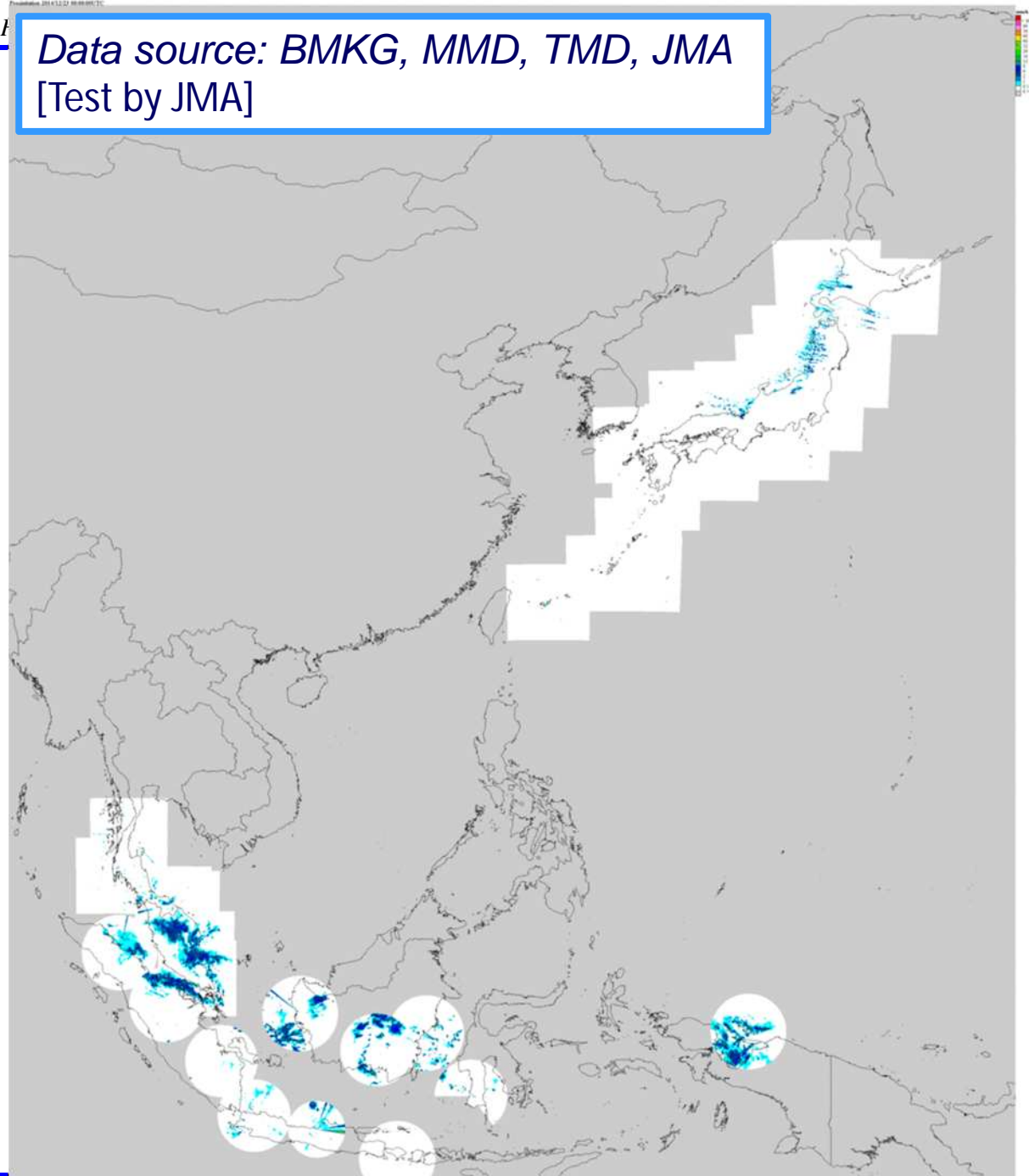


Not only data format, but also operational differences (e.g. scan sequence, QC, technical capability etc.) should be considered in developing international products.

Data source: *BMKG, MMD, TMD, JMA*
[Test by JMA]

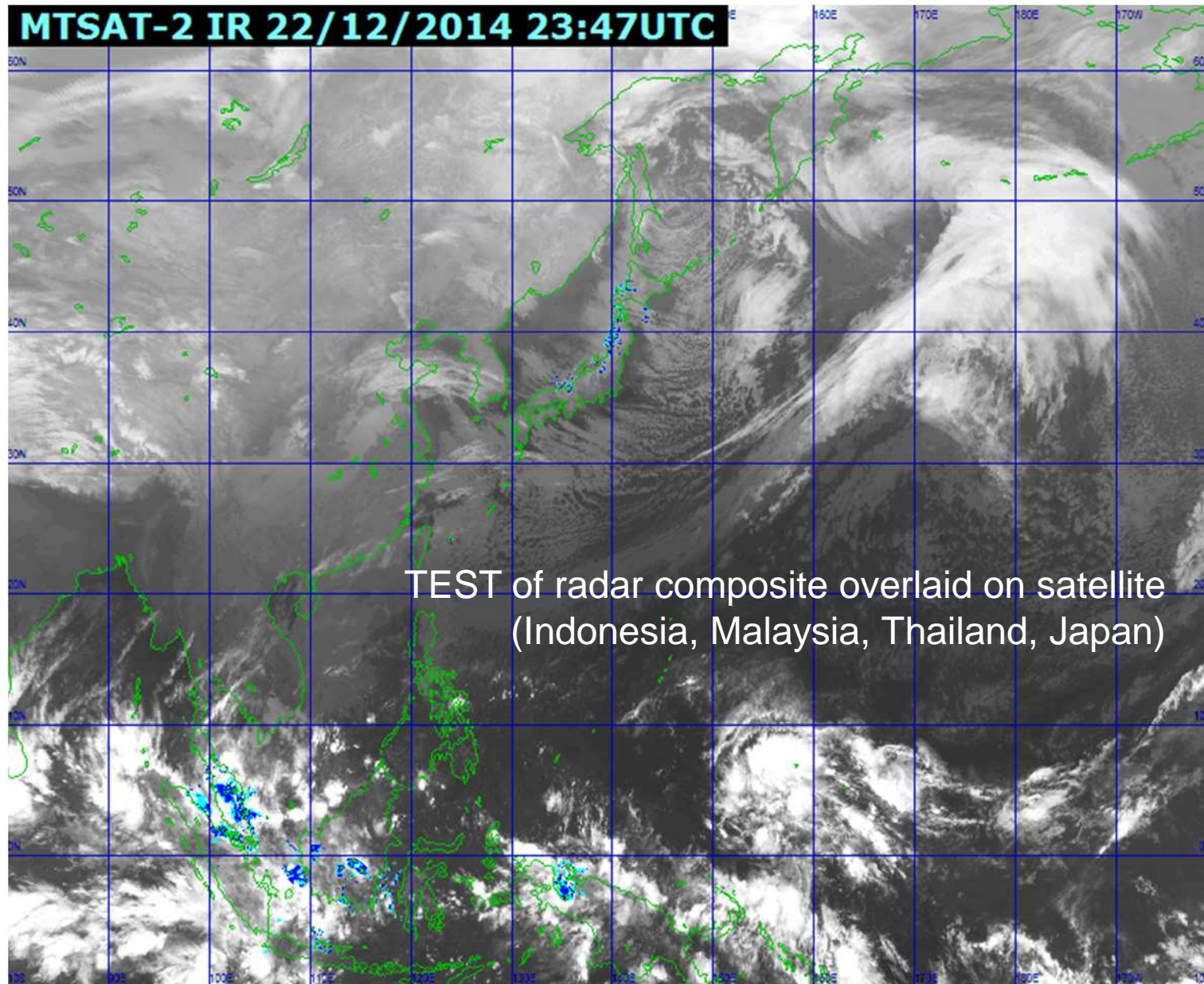
MMD, TMD and JMA started a test of near real-time radar data exchange in Nov 2016 in the framework of Typhoon Committee.

The next step will be
(1) To improve Quality
(2) To increase Members





Radar Composite on Satellite





What is the next step of the
WIGOS project on radars?

Guide map of the workshop

Weather radar

Basics and operation of weather radars

Day 1: 1

Hardware

Install

Calibration

Maintenance

Day 1-2: 2

Advanced techniques

Solid-state transmitter

Day 1-2: 2

Observation

Obs. scheduling

Quality control

Sites composite

Day 2-4: 4,5

Advanced techniques

Doppler velocity

Accurate obs. using dual-pol

Day 4: 7

Application

QPE&QPF

Day 4: 7

Advanced techniques

Detecting mesocyclone

Products derived from dual-pol obs.

Day 4: 7

Weather summary

Day 5: 9

Regional radar network

Capacity development

Data exchange

Regional cooperation

Day 9: 12

Assumed next step

National level

- Improvement of operation and maintenance
- Quality Control
- Data Composite (National, Sub-national)
- Utilization of dual-pol Parameters
- QPE/QPF

Regional level

- Expansion of experimental radar data exchange



Summary

Summary

- Technical cooperation on radar has been conducted under multilateral framework (Typhoon Committee) and bilateral cooperation.
- Through these cooperation, qualities of radar data have been significantly improved.
- There are differences in radar data, depending on radar operation, and it is desirable that the differences should be minimized by capacity building as far as possible.
- To expand radar network in this region will contribute to improvement of services in each NMHS as well as Disaster Risk Reduction in this region.



Thank you.

