Natural disaster in Asia-Pacific region

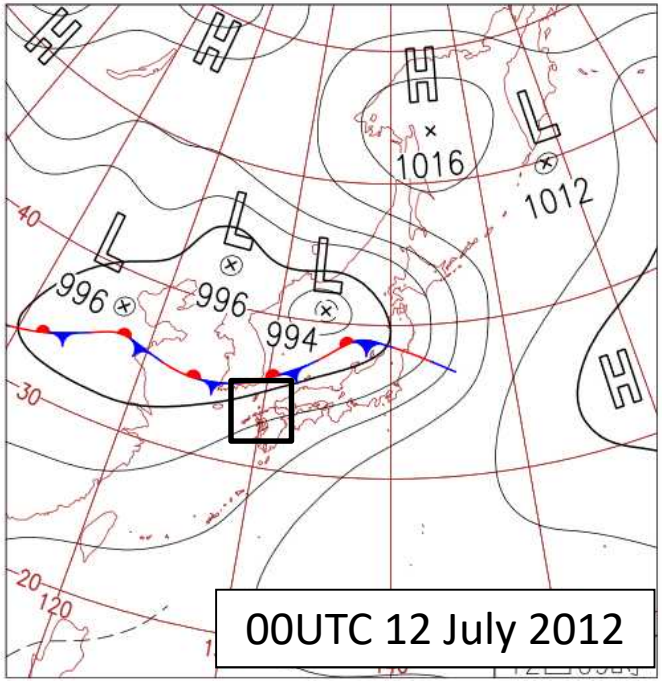
Asia-Pacific countries are subject to frequent natural disaster such as typhoons, torrential rains and heavy snow because of their geographical, topographical and meteorological conditions. Every year, there is a great loss of people's lives and property due to those disasters.

A heavy precipitation event in the Kyusyu Island in Japan
Period: 4 – 14 July 2012

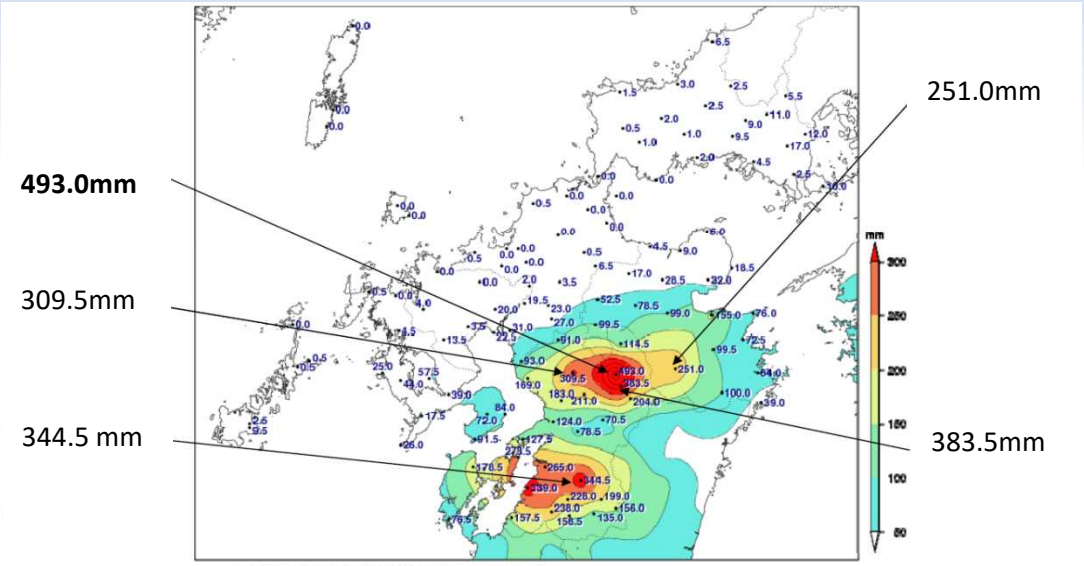
A case study: A heavy precipitation event in the Kyusyu Island in Japan

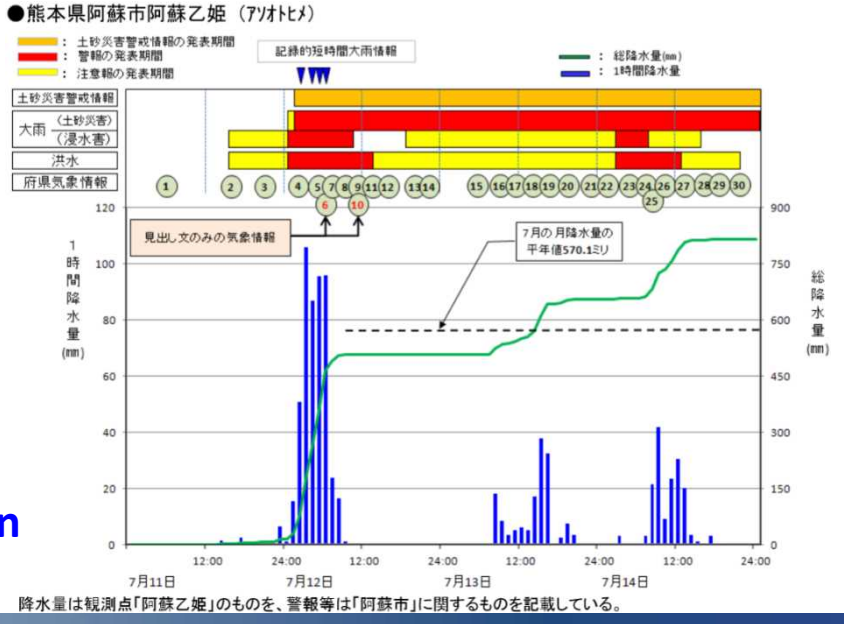
Period: 4 – 14 July 2012

Surface Weather Chart



Observed 1 Day rain fall amount for 12 July 2012





Observing system experiments (OSE) were conducted by using Japan Meteorological Agency's meso-scale Numerical Weather Prediction (NWP) system

JAXA's microwave radiometer AMSR2 observation are operationally used in JMA NWP systems

OSE results in JMA Meso-scale NWP system

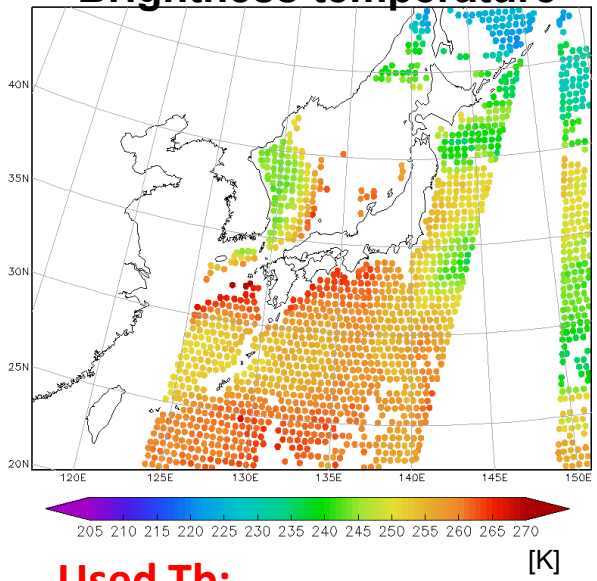
A case study: A heavy precipitation event in the Kyusyu Island in Japan

Period: 4 – 14 July 2012

An example of assimilated AMSR2 data distribution
(18 UTC 11 July 2012)

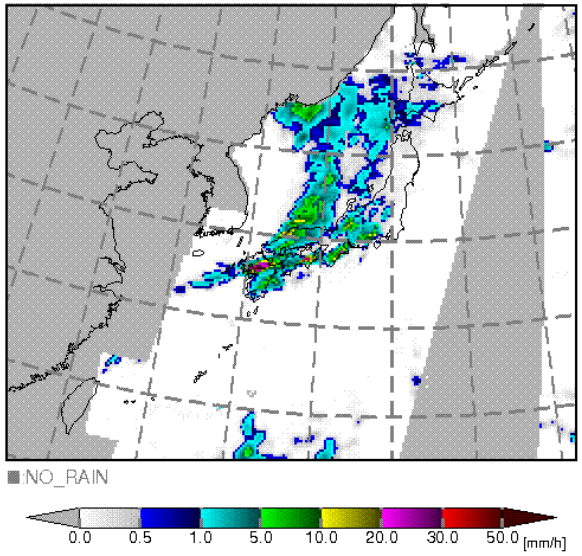
23GHz V-pol. Tb

Brightness temperature



Used Tb:
19, 23, 37, 89 GHz V-pol.

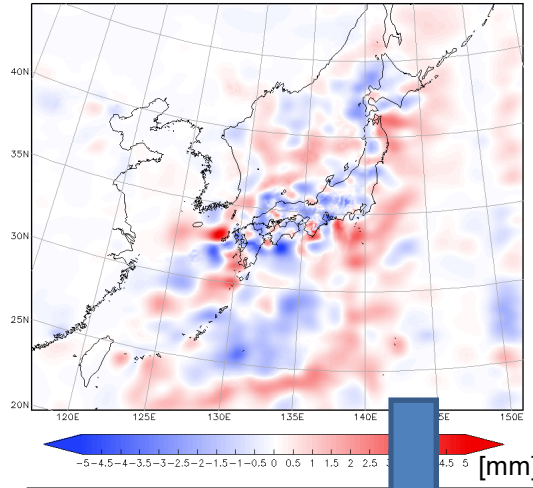
Rain Rate [mm/hr]



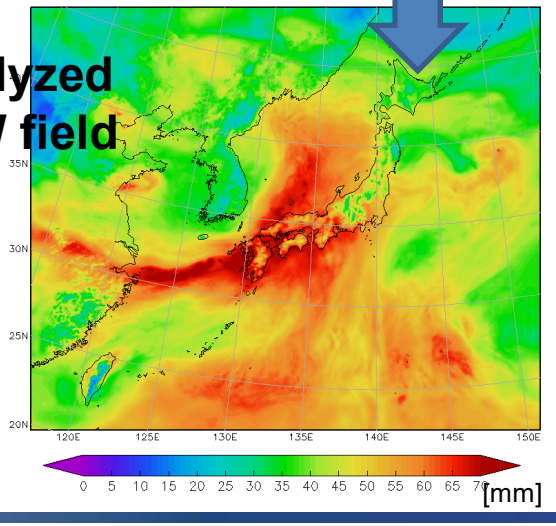
Used Tb in rain retrieval:
19 - 89 GHz V and H-pol.

Total Precipitable Water vapor (TPW)

TPW increment



Analyzed TPW field



Impacts on analyzed humidity field

TPW Analysis(Test)

TPW diff (Test – Control)

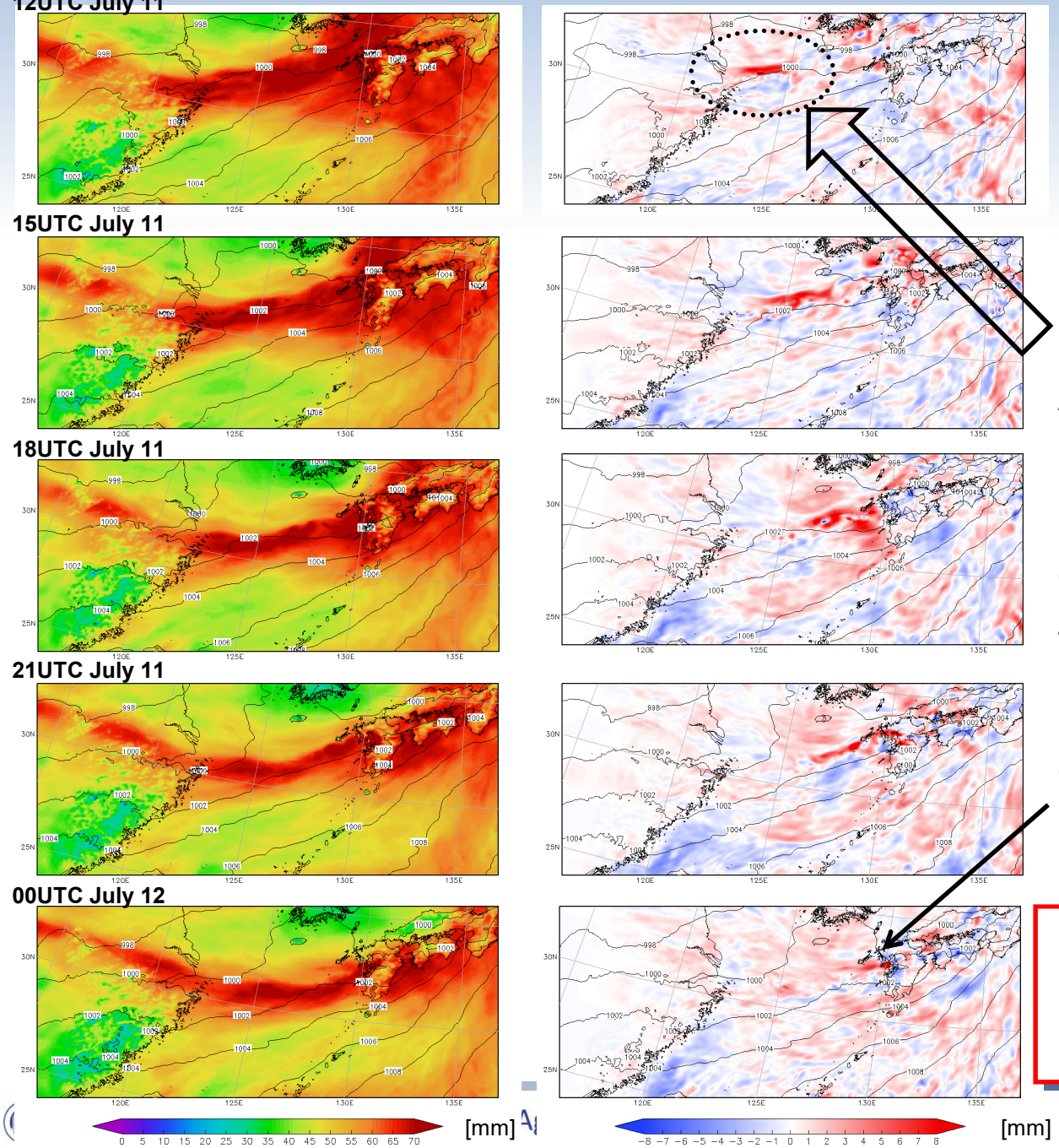
12UTC July 11

15UTC July 11

18UTC July 11

21UTC July 11

00UTC July 12



Test: With AMSR2

Control: Without AMSR2

Assimilation of AMSR2 data increases TPW in the northern edge of front

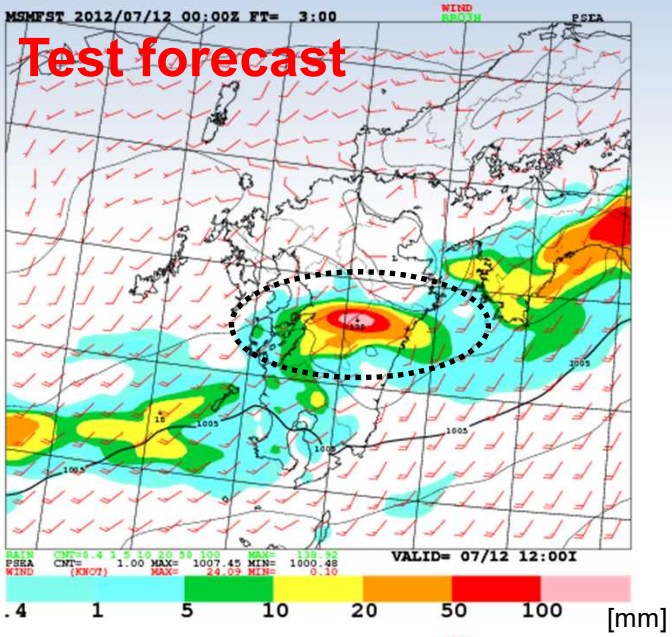
The change are produced from a cycling of the data assimilation.

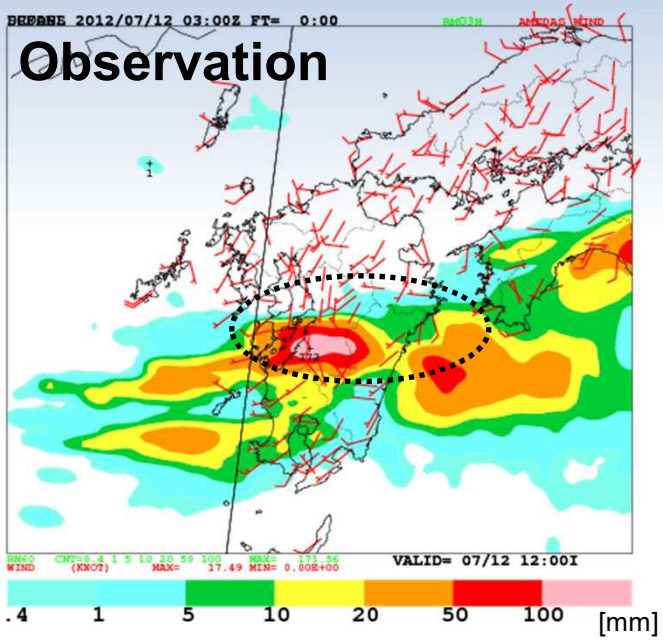
The change reached in the northern Kyushu on 00UTC 12 July 2012.

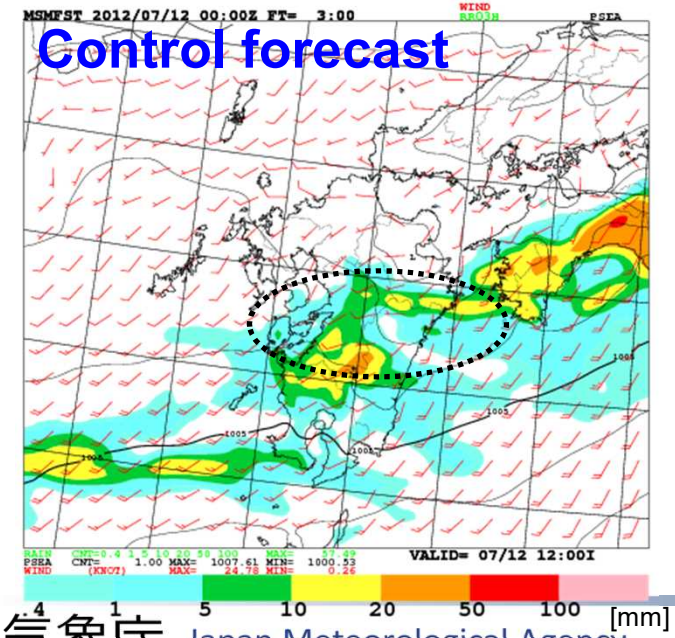
How different are precipitation forecast from this initial time?

Test: with AMSR2
Control: without AMSR2

Impact on precipitation forecast







Three-hour precipitation prediction for 00-03 UTC 12 July 2012 by JMA's Meso-Scale Model initialized at 00 UTC in the same day

Assimilation of AMSR2 data improved short range precipitation forecast (rainfall intensity and location)

Improved humidity field upstream of the Kyushu Island in the initial time brought the precipitation forecast improvement

Loss of microwave observations degrades NWP accuracy in the heavy precipitation events.