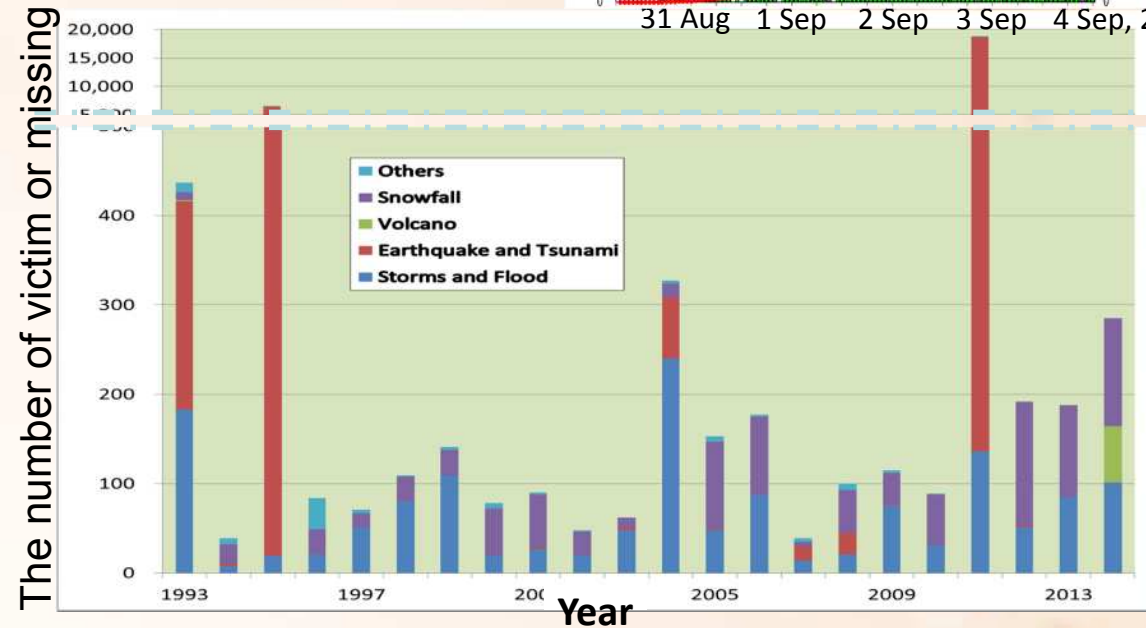
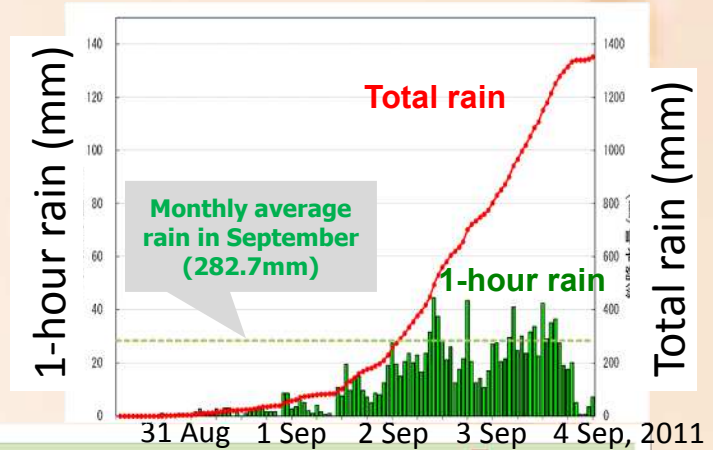


Quantitative Precipitation Estimation

Kazuhiko Nagata
Forecast Division
Forecast Department
Japan Meteorological Agency

Disasters in Japan



Torrential rainfalls sometimes occur and they causes disasters. Because major number of victim or missing is caused by storms and flood, monitoring rainfall is very important in Japan.

Observation of rainfall amount



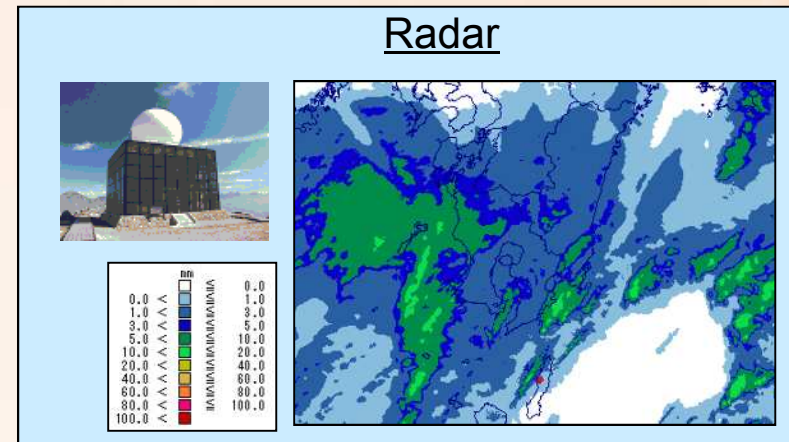
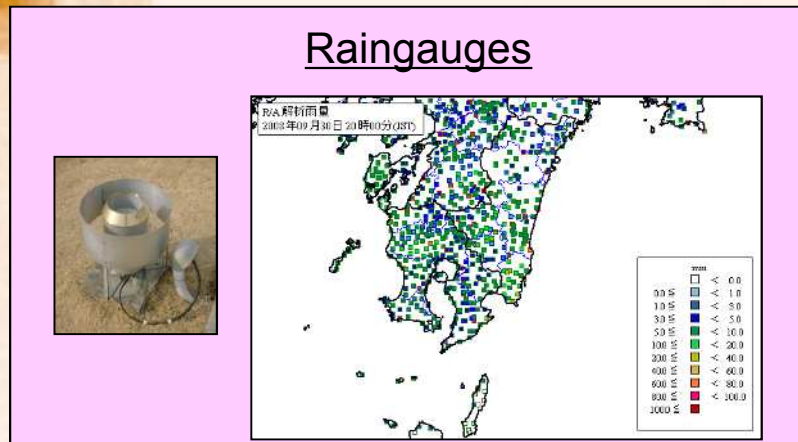
Raingauge



radar

For monitoring the Detailed Precipitation Conditions...

Instruments for observing precipitation

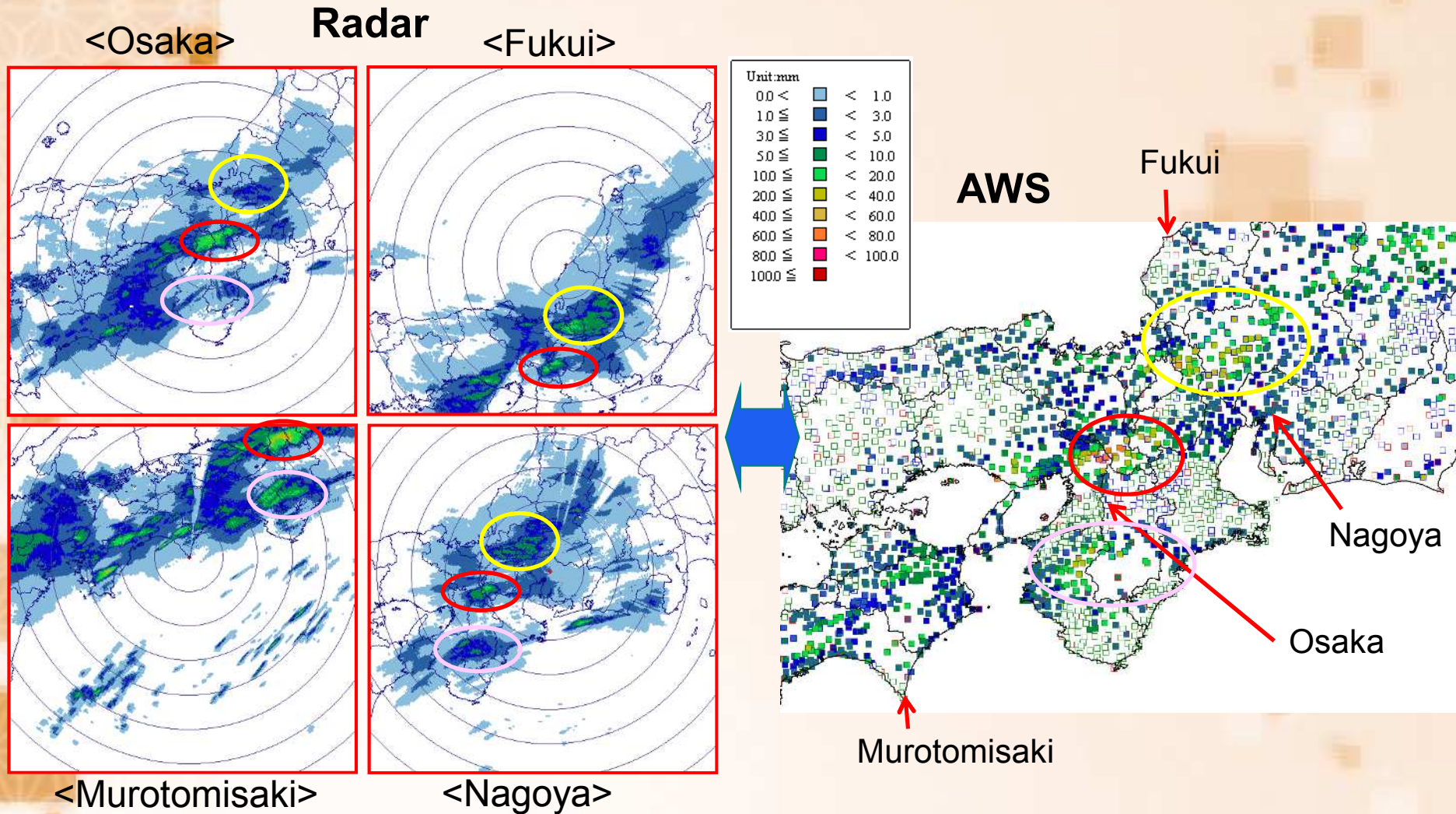


Features of raingauges and radars

	Raingauges	Radars
Advantages	Can measure actual amounts of precipitation.	Can observe large areas with higher spatial resolution than the raingauge network.
Dis-advantages	Can observe precipitation at single points only.	May produce readings different from precipitation observed on the ground, as it measures the amount of rain overhead.

Let's create a system with the advantages of both radar and rain gauge!

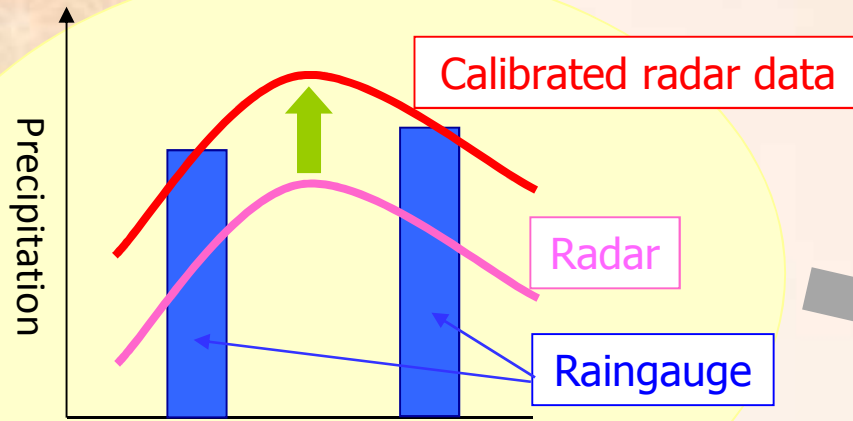
Integrated Hourly Precipitation at 6:00 on 14 August 2012



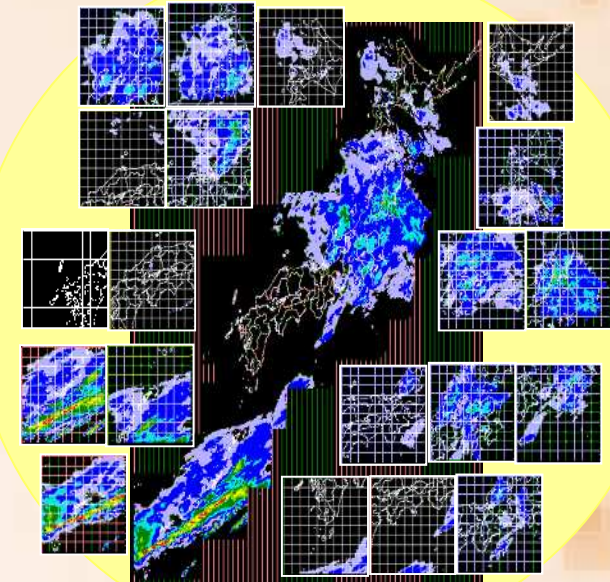
Observed precipitation varies radar by radar.

Precipitation distribution differs between AWS and radars, too.

Radar/Raingauge-Analyzed Precipitation - QPE

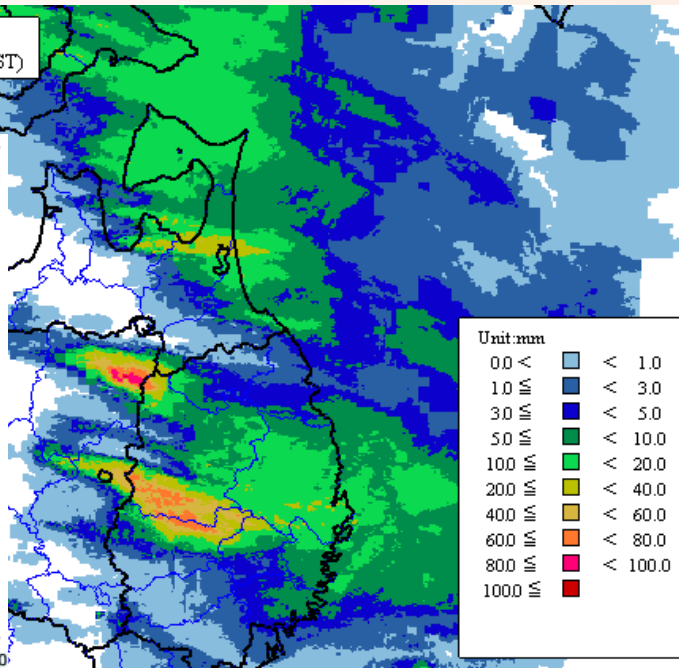
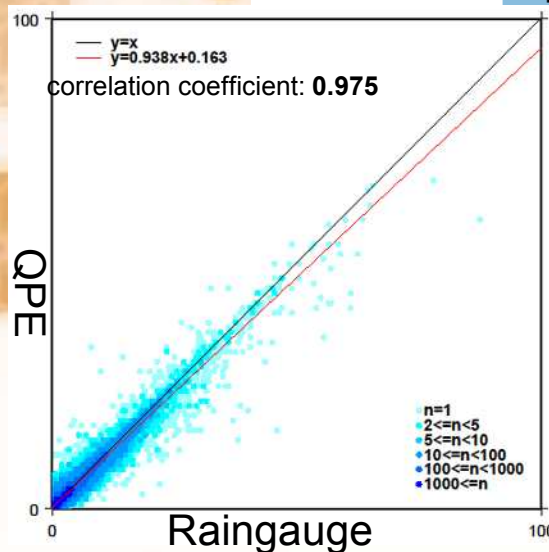


Precipitation amounts observed by radar normally does not agree with those observed by raingauges, and radar data are therefore calibrated with raingauge data.



The calibrated radar data are made into a single composite data set.

R/A 解析雨量
2013年08月09日 11時00分(JST)



Radar/Raingauge-Analyzed Precipitation (Quantitative Precipitation Estimation, QPE)

- 1-hr precipitation
- Every 30 min.
- 1 km resolution
- 15 min. after obs.

Very Short Range Forecast (VSRF) - QPF

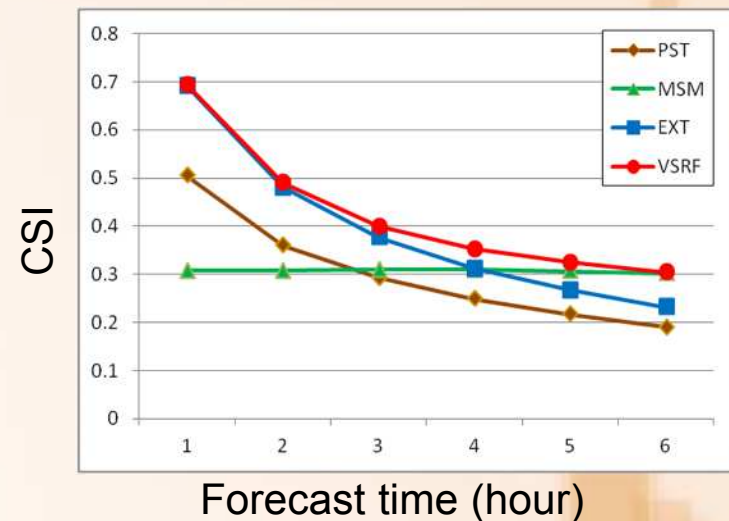
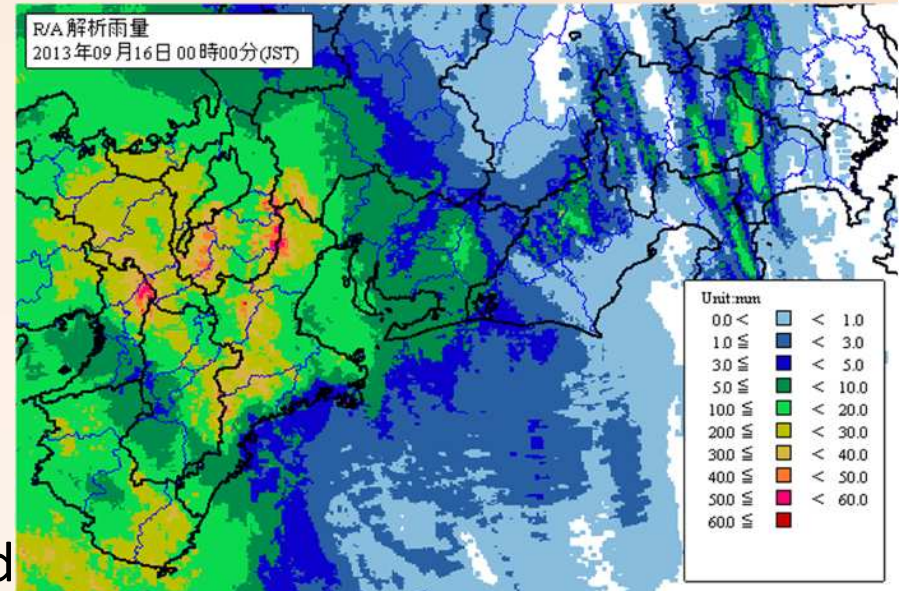
Q: What is VSRF?

A:

Quantitative precipitation forecast using QPE and meso-scale NWP.

[Notes]

- Issued every 30 min up to 6 hours ahead
- The longer the forecast time, the higher the weight of NWP (changing merging weight every forecast time)
- Orographic effect of precipitation is considered

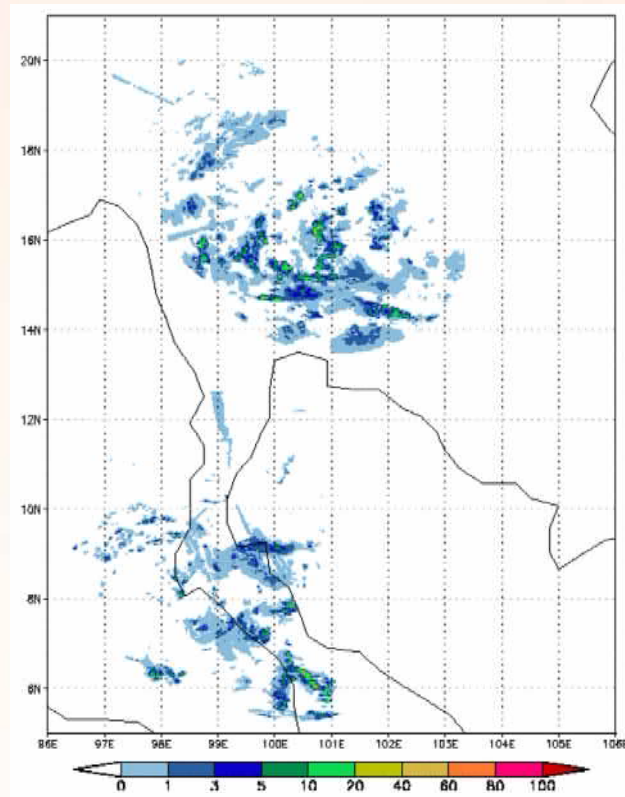


Cooperation with TMD

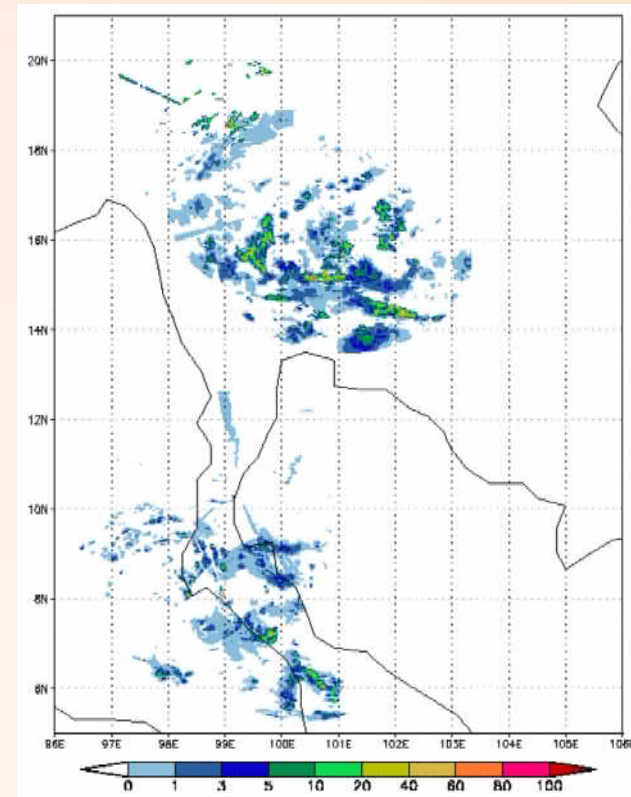
- JMA and TMD cooperate to work out QPE program for TMD.
- JMA and TMD held a technical meeting from 6 to 9 Dec. 2016.



Cooperation with TMD



Raw radar data



QPE

JMA and TMD will continue to make better QPE.

THANK YOU FOR YOUR ATTENTION.