

New River Information System and Radar Rain Gauge Network in Japan

11 May 2005 at Hanoi

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FRICS, Japan

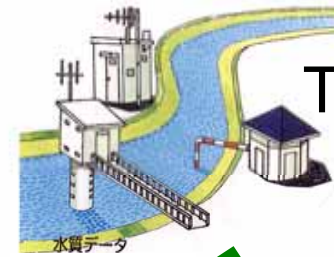
Information indispensable for Flood Fighting and Evacuation



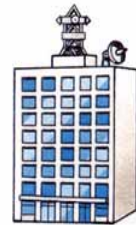
Inundation of Toyooka
City, 21 October 2004

Sharing of Information

Radar Rain Gauges



Telemeter Stations



Prefectures



Regional Bureaus

Japan Water Agency

Meteorological Agency

Regional Dev. Bureaus

New Integrated River Information System



Mass Media



JMA



JWA



Regional Bureaus



Prefectures



Municipalities



Private Enterprises



Public

Sources of Data

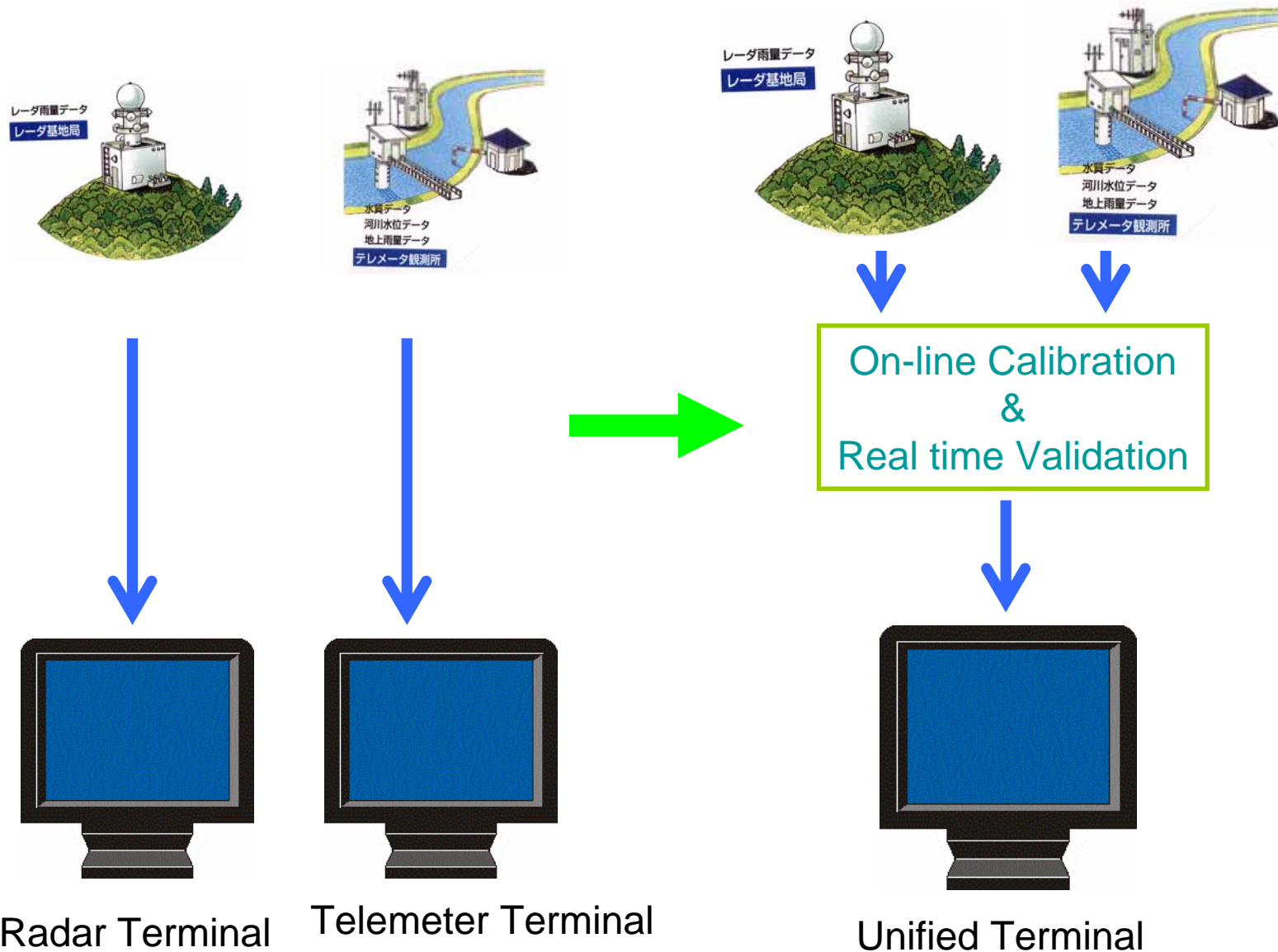
As of 01 March 2005

	River Bureau	Highway Bureau	JMA	Local Gov't	JWA	Others	Total
Radar Rain Gauges	26						26
TM Rain Gauges	2,011	976	1,321	3,919	94	69	8,390
Water Stage	1,760			3,248	67	13	5,088
Others	934			190	100	46	1,270
Subtotal	4,731	976	1,321	7,357	261	128	14,774
Average Rainfall (Telemeter)	805			156	6		967
Average Rainfall (Radar)	12,809						12,809
Total	18,345	976	1,321	7,513	267	128	28,550

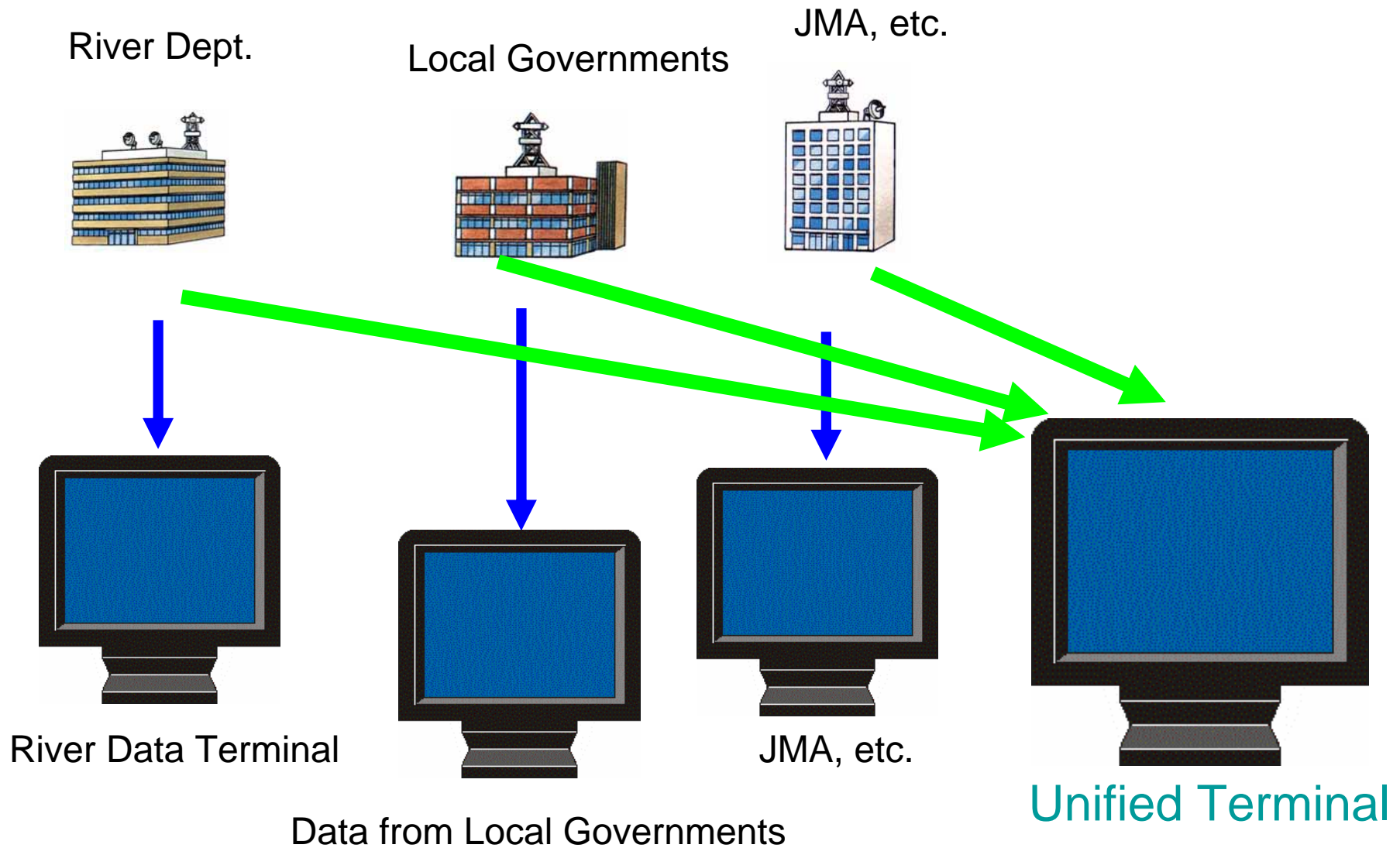
5 Points of the New System

- National system integrating local systems
- Single system integrating telemeter & radar
- Single display viewing data from variety of sources
- Single user terminal for both flood and non-flood tasks in an ordinary office environment
- Coherent information to be shared among river administrators, related organizations, municipalities, and the public

Integration of Telemeter & Radar



Single Display for different Sources



Integration Procedure

- River Information Systems in Japan have been developed for individual river basins. Minor difference in the application of general rules poses difficulty for integration.
- Integration of data obtained from other agencies than river administration also demands careful handling.
- Establishment and maintenance of a “metadata” database should be paid special attention.
- In solving above problems, eXtensible Markup Language (XML) has shown its effectiveness.

Binary transmission currently used

0	0	0	1
0	0	1	4
0	4	f	2
e	8	2	0
0	0	0	0
5	3	0	b
0	0	0	1
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	1

- Kind of data
- Calculated/Observed
- RiverAreaNumber
- (Reserved)
- ControlOfficeNumber
- StationNumber
- (Reserved)
- Flag1, Flag2
- Flag3, Flag4
- Data

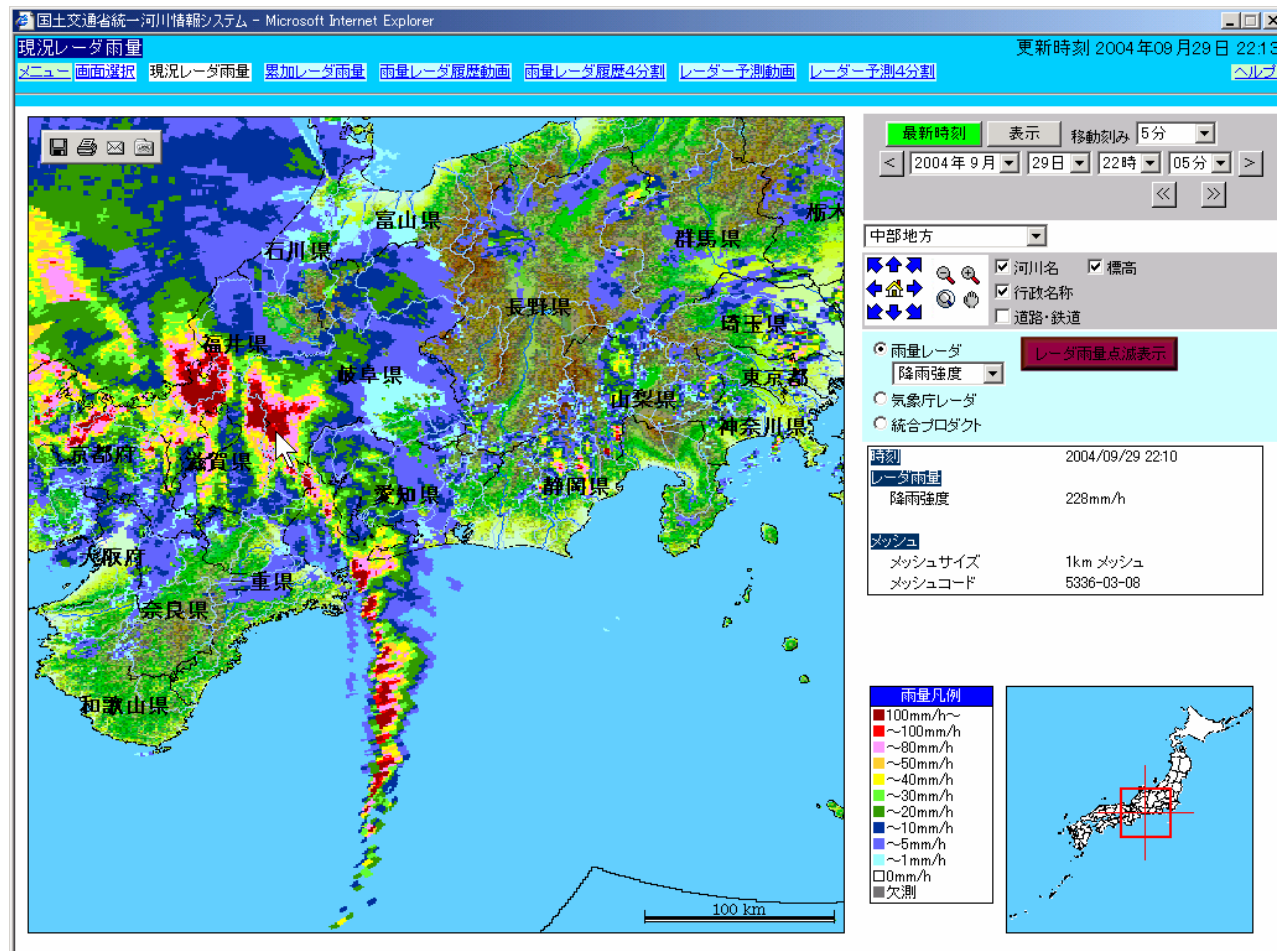
Transmission of Data using XML

```
<Data>
  <DataDetail item="dataKind">
    <Binary>0001</Binary>
    <Data>雨量</Data>
  </DataDetail>
  <DataDetail item="calcObsrvtn">
    <Binary>0014</Binary>
    <Data>30分雨量</Data> *
  </DataDetail>
  <DataDetail item="riverAreaNo">
    <Binary>04f2e820</Binary>
    <Data>利根川</Data> *
  </DataDetail>
  <DataDetail item="yobi">
    <Binary>0000</Binary>
    <Data></Data>
  </DataDetail>
  <DataDetail item="ctlOfficeNo">
    <Binary>530b</Binary>
    <Data>利根川上流河</Data> *
  </DataDetail>
</Data>
```

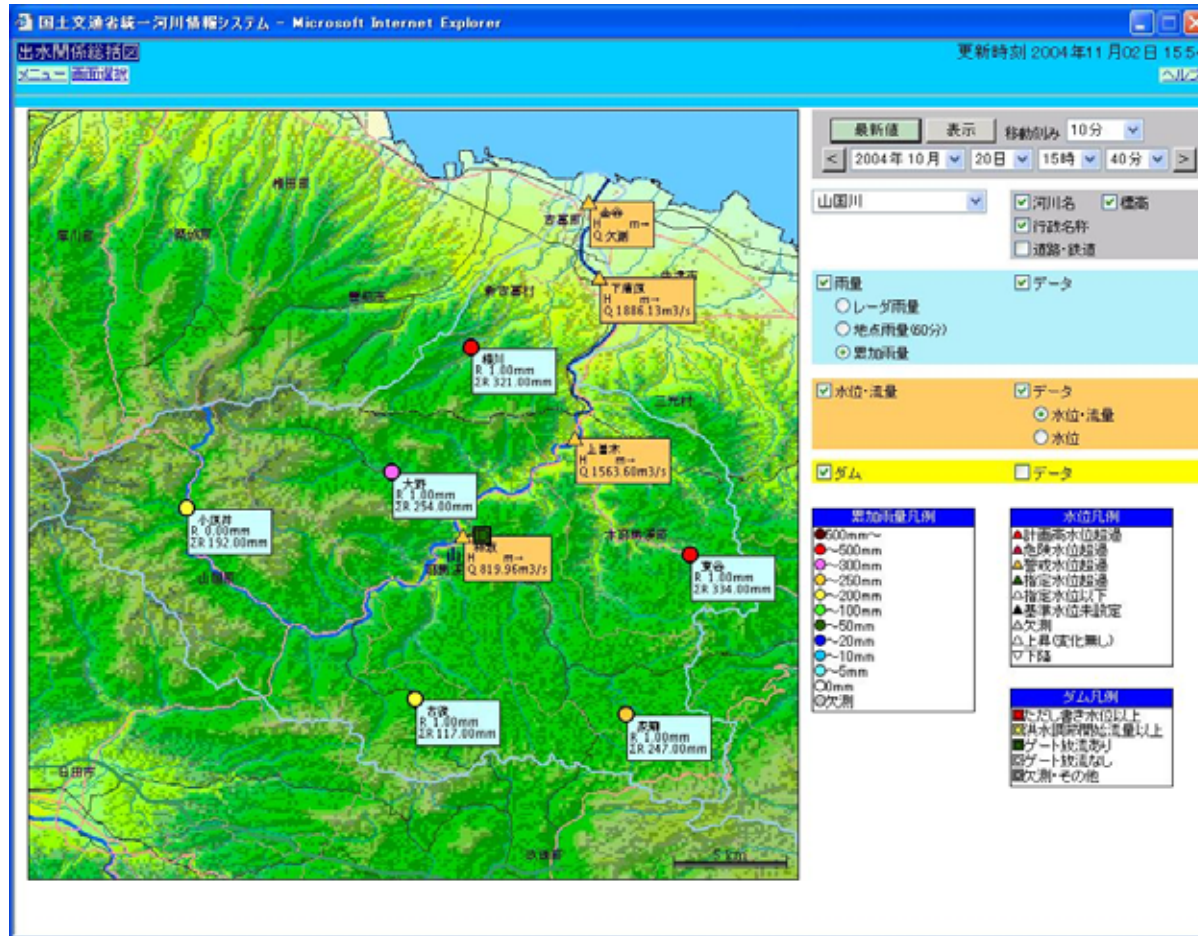
- More number of bits than binary transmission, but
- More readable therefore more convenient for system maintenance
- Taking advantage of high speed transmission network and computer power

* Data indicated by arrows are provided from (meta)database(s).

Some Views of the New System (1)



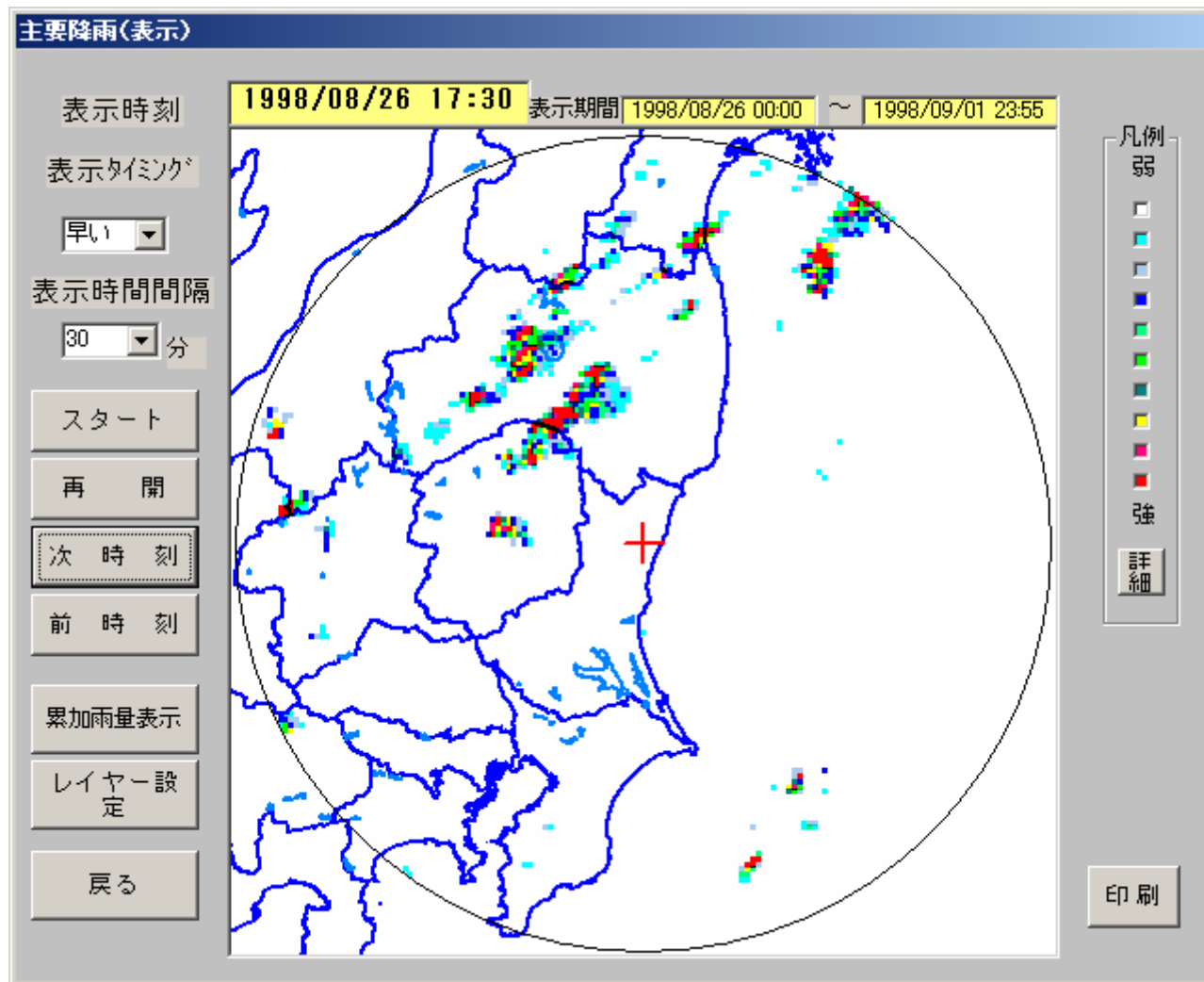
View of the New System (2)

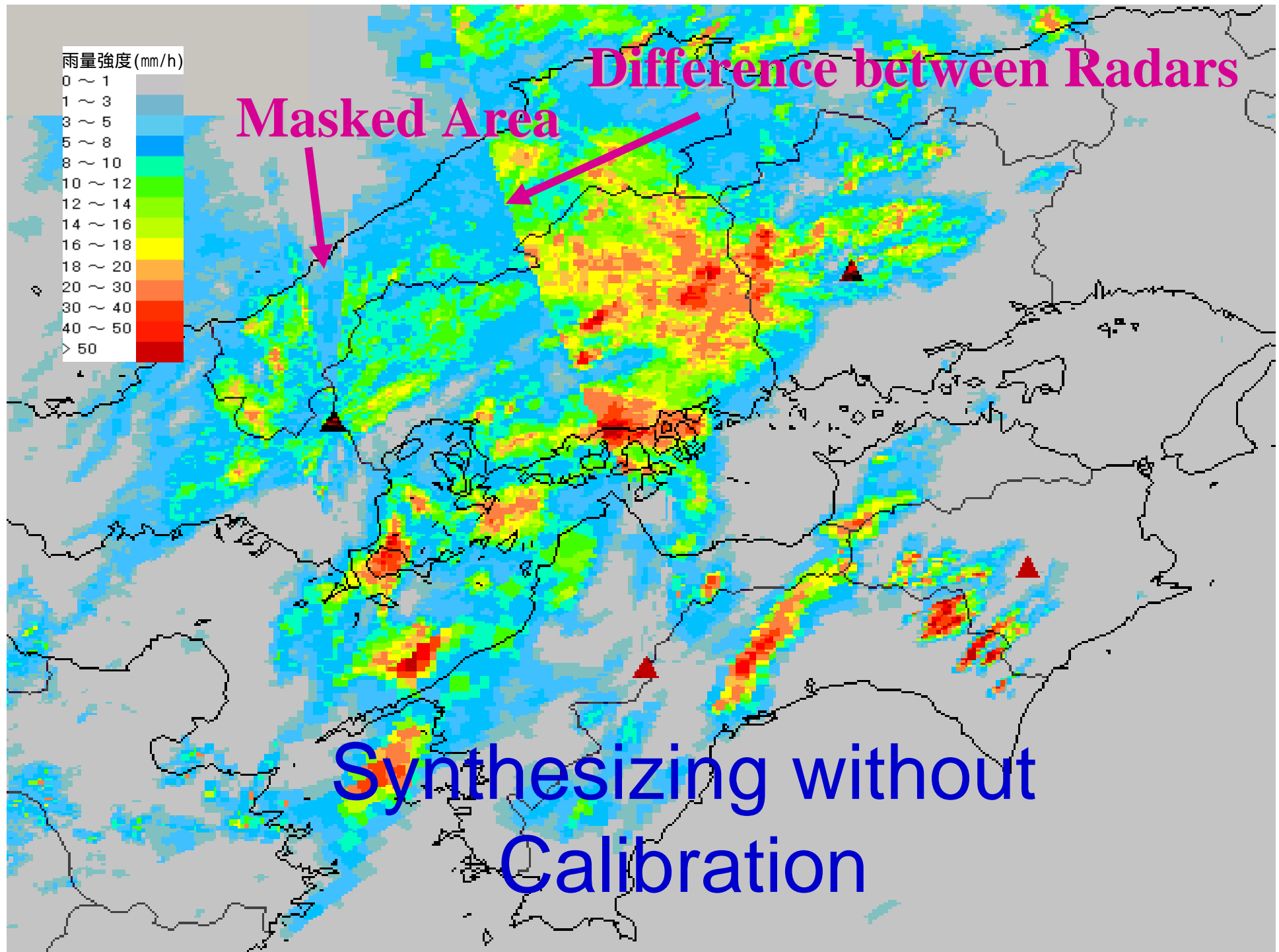


Radar Rain Gage



Takasuzuyama Radar, August 1998



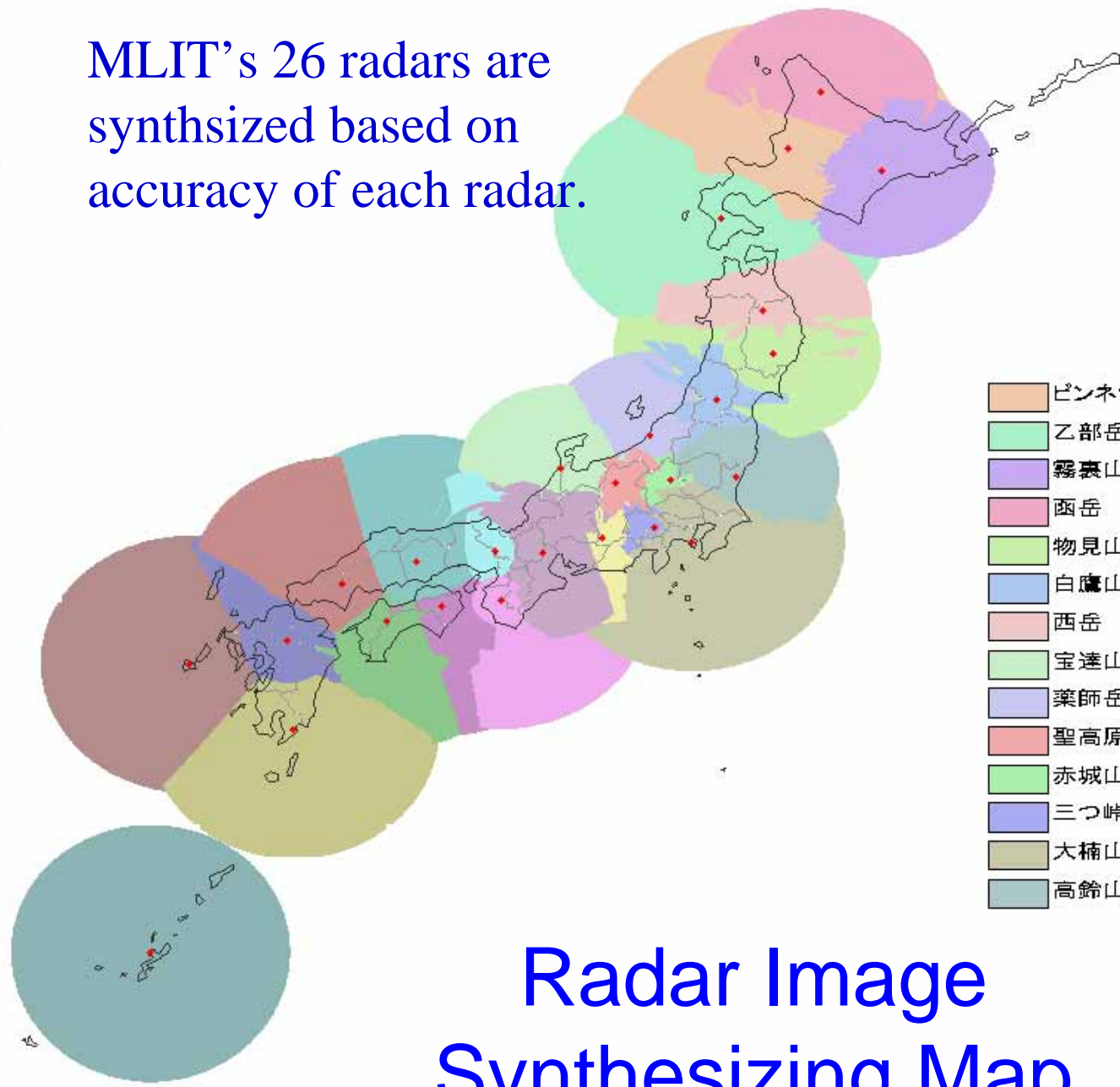


Opposition to the Radar Rain Gauge System

- Seams between radars show that radars will give us a false information.
- A Good moving picture is available, but it is not suitable for further usages.
- A ground rainfall gauge gives the real and reliable data.
- Against these prejudices, FRICS developed an online synthesis system incorporating real-time calibration.

MLIT's 26 radars are synthesized based on accuracy of each radar.

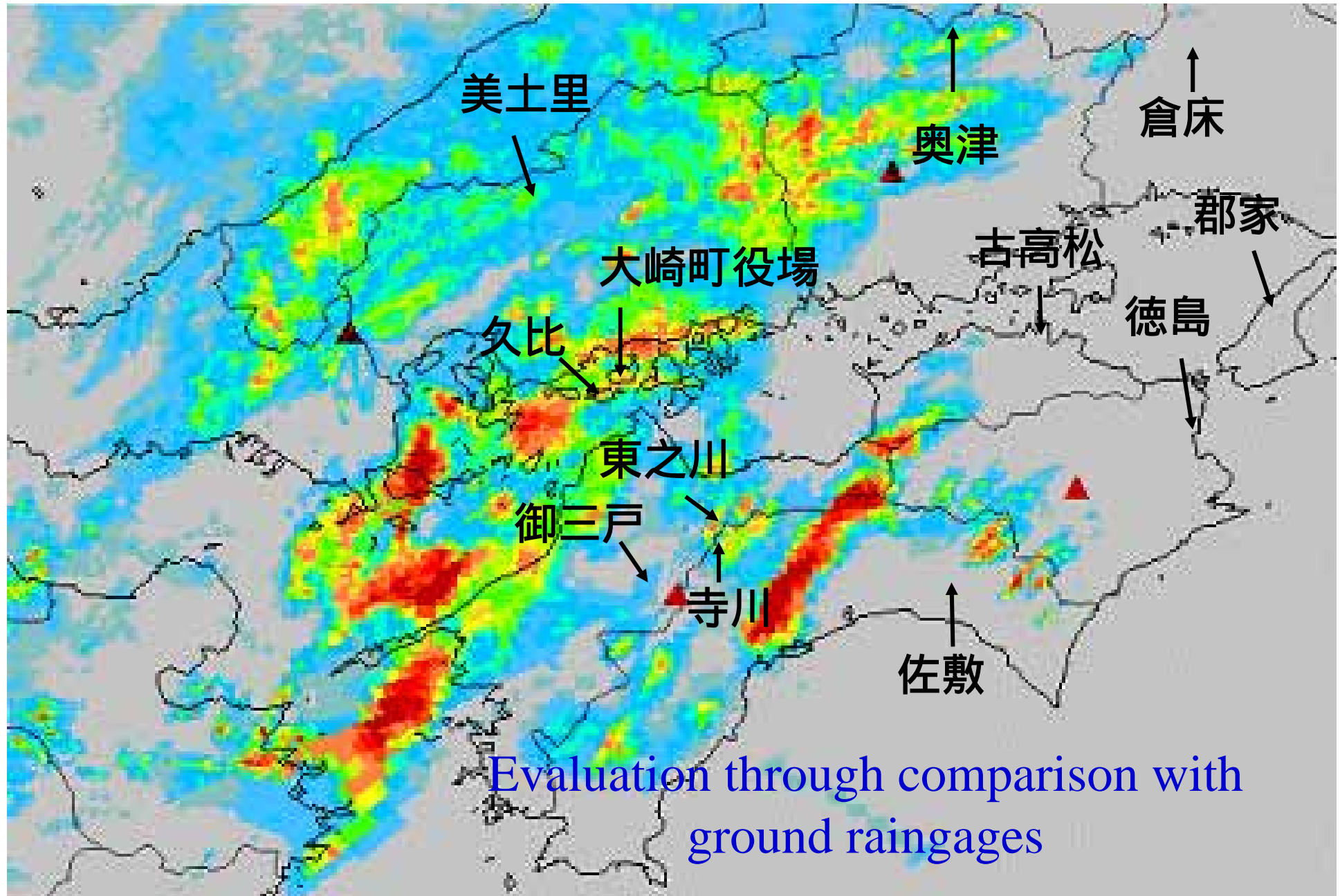
- 御在所
- 蛇峠
- 深山
- 城が森山
- 羅漢山
- 大和山
- 明神山
- 高城山
- 釈迦岳
- 国見山
- 八本木山
- 八重岳



- ピンネシリ
- 乙部岳
- 霧裏山
- 函岳
- 物見山
- 白鷹山
- 西岳
- 宝達山
- 薬師岳
- 聖高原
- 赤城山
- 三つ峠
- 大桶山
- 高鈴山

Radar Image Synthesizing Map

Accuracy of the Radar Rainfall System (1)



Comparison Ground & Radar

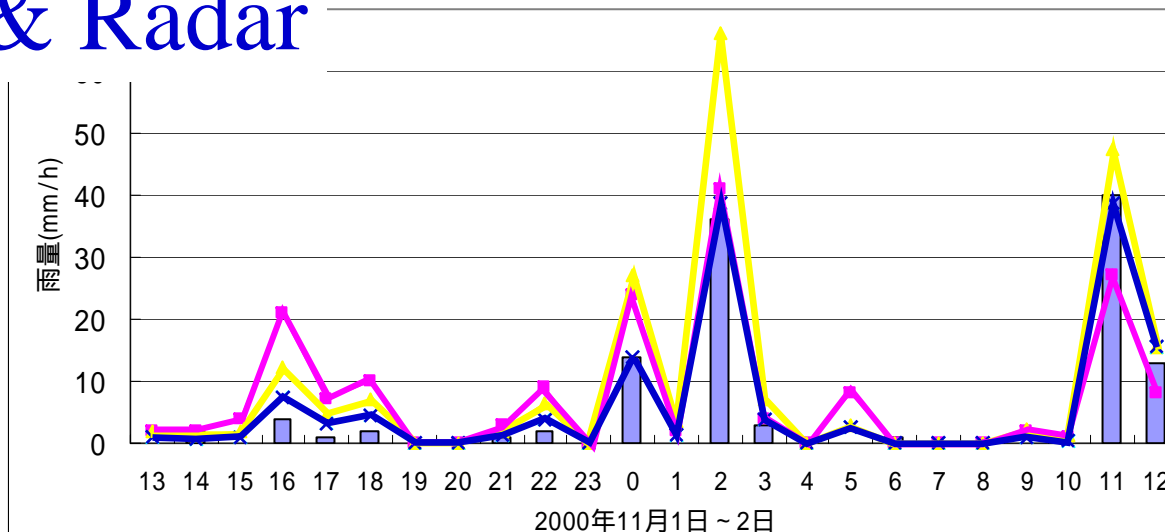
Ground

Radar (raw)

Radar
(processed)

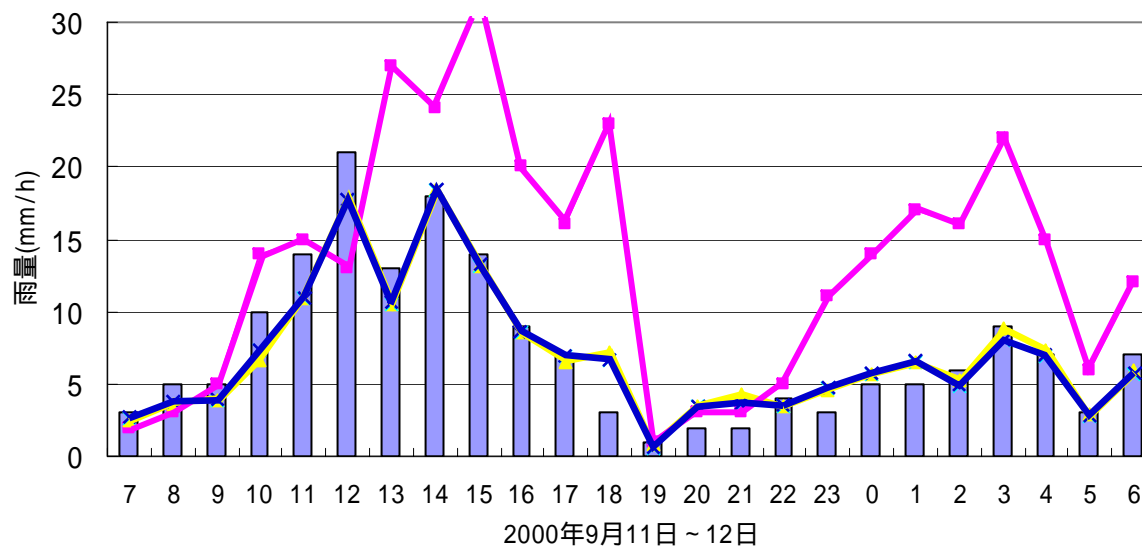
Sashiki Station

量 レーダ雨量 レーダ(DWのみ) レーダ(均質化補正・DW)

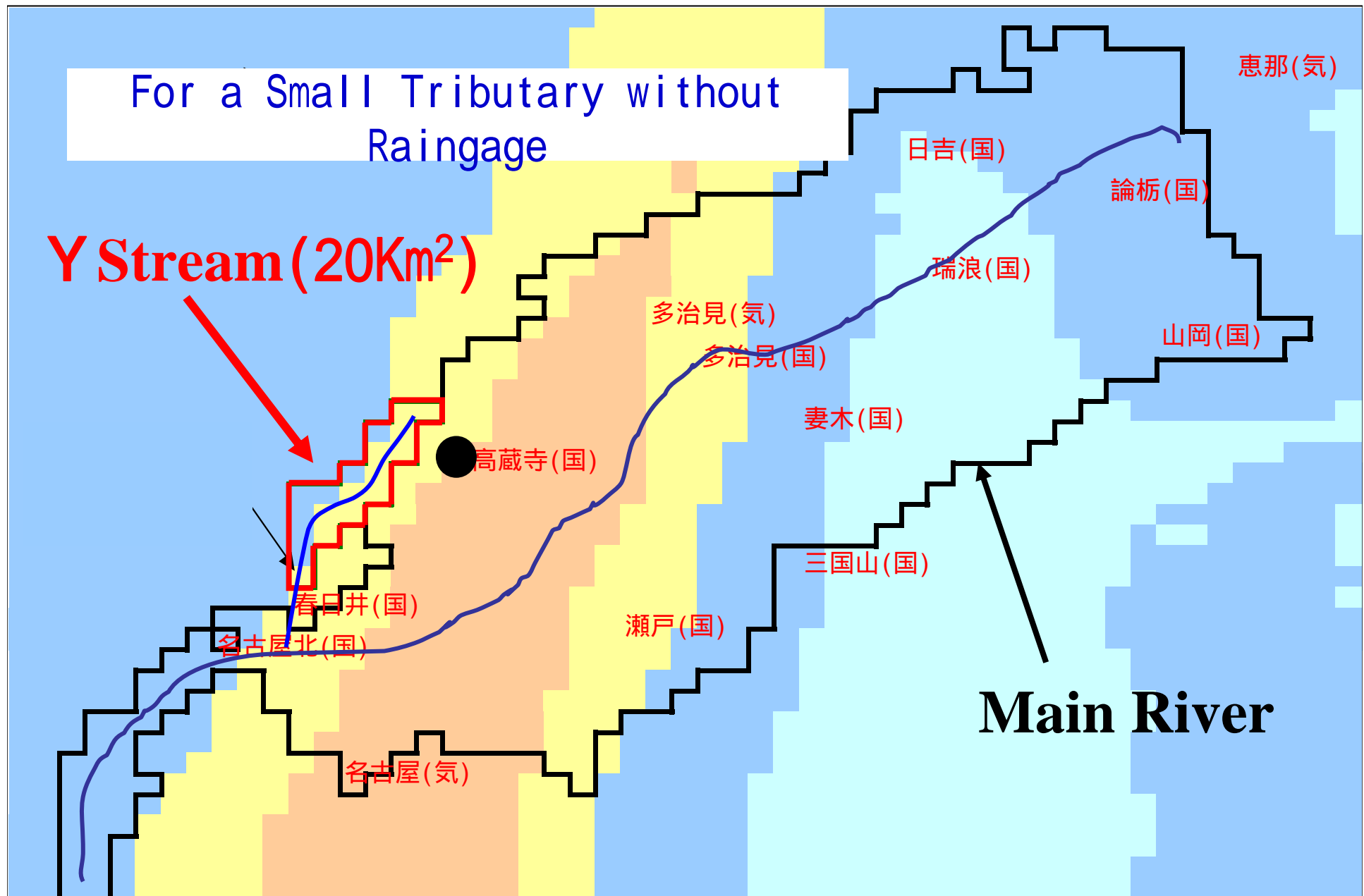


Tokushima Station

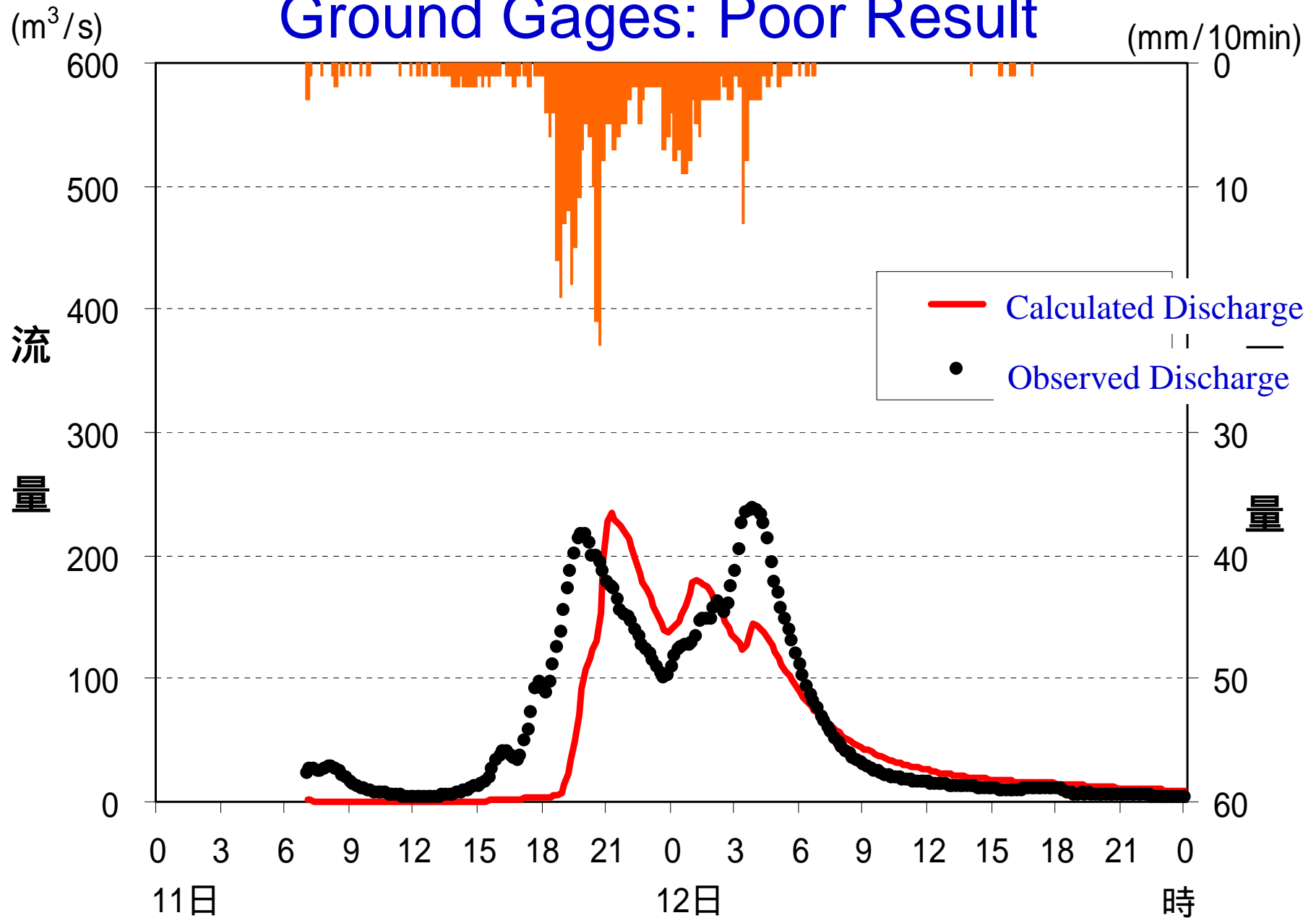
地上雨量 レーダ雨量 レーダ(DWのみ) レーダ(均質化補正・DW)



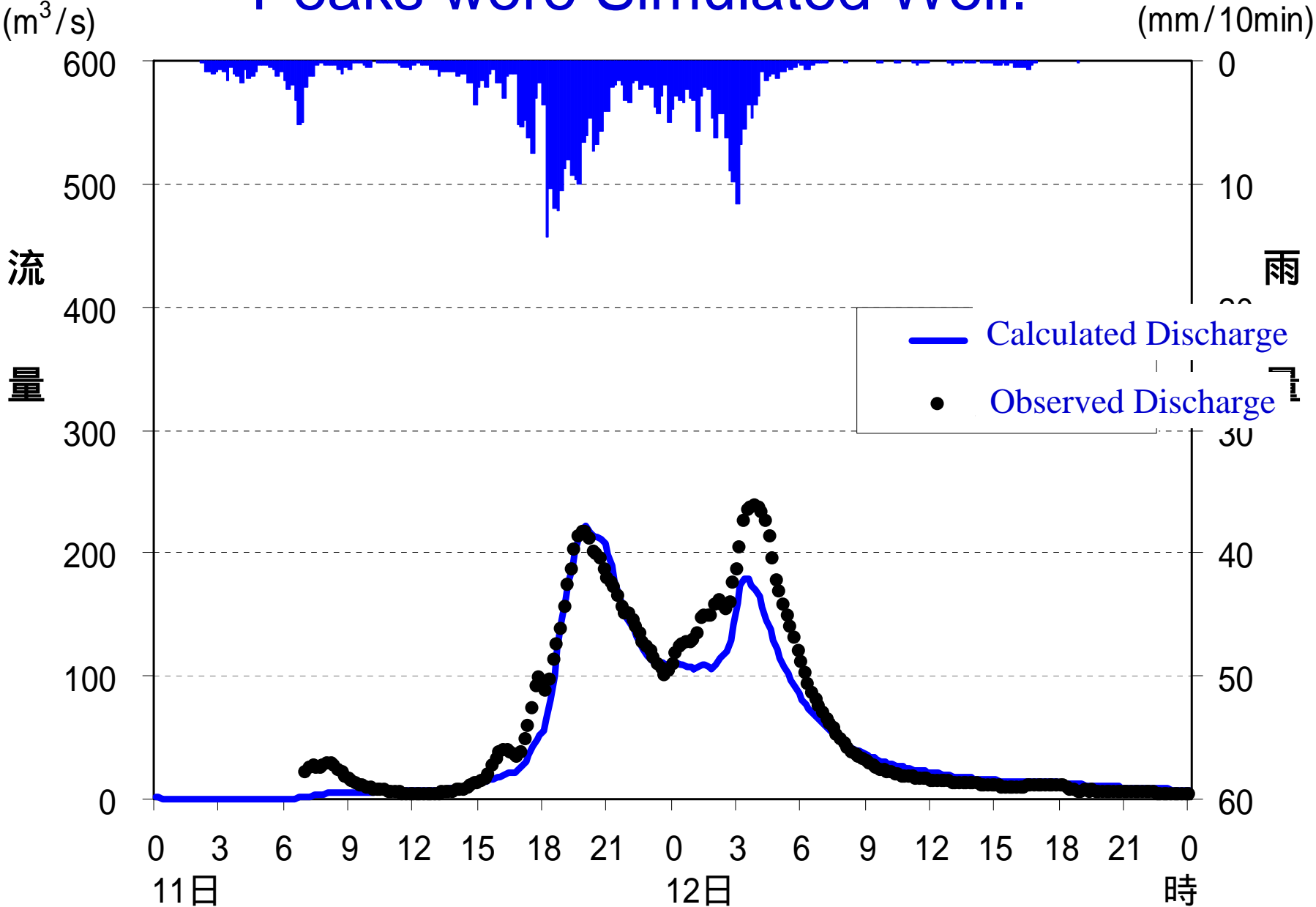
Accuracy of Radar evaluated through Runoff (2)



Runoff Calculated from neighboring Ground Gages: Poor Result



Runoff Calculated from Radar Rain Gauge: Peaks were Simulated Well.



Radar Information is Reliable!

- Since the first installation of a radar raingage on the Mt. Akagi, **doubts** have been raised: Does it give quantitative information, and **is it reliable?**
- **FRICS answers positively** to this question. **Yes**, radar system will provide quantitative and reliable information vital for river administration.
- However, due consideration should be paid to get optimum results. **Thorough tuning and calibration is essential** to make best use of the system.

Thank you for listening.

Radar Images:

<http://www.river.go.jp/>

<http://i.river.go.jp/>

mailto:

nakao@river.or.jp

