# Three-dimensional Fine Structure of Localized Heavy Rainfalls Measured by Phased Array Weather Radar

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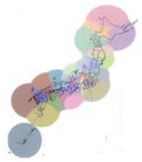
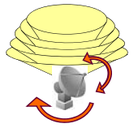
## 1. Introduction

- **In Japan, severe weather disasters caused by localized heavy rainfalls or tornadoes have occurred frequently in the last several years.**
- **Although it is important to measure three dimensional structure of the rapidly developed severe storms, a volume scan by a parabolic antenna requires substantial time of more than 5 minutes.**

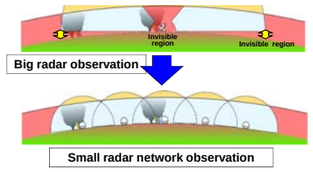

Flash flood in the Toga river, Kobe (28 July 2008)


F2 tornado in Tsukuba (6 may 2012)

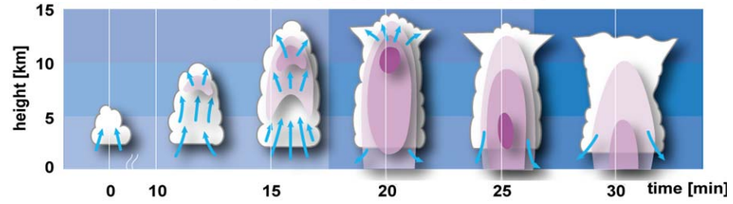

The observation area of MLIT C-band radar and X-band MP radar (small blue circles).


3-dim measurement using a parabolic antenna (5-10 min)

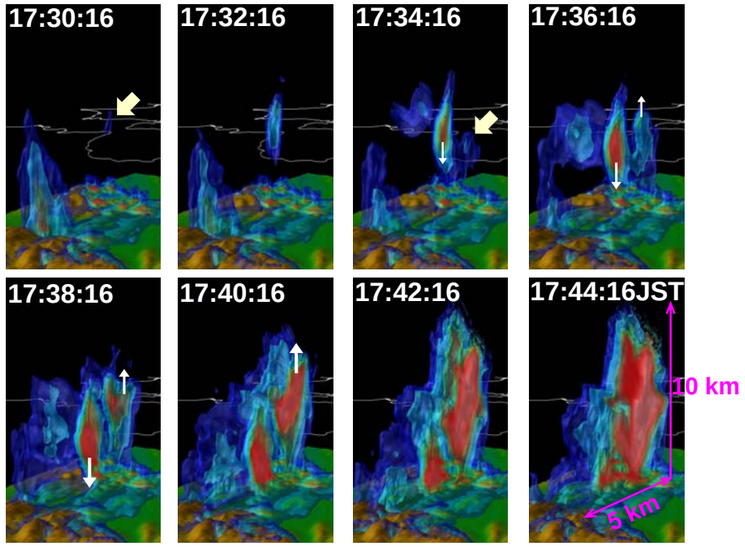

3-dim measurement using phased array radar (10-30 sec)



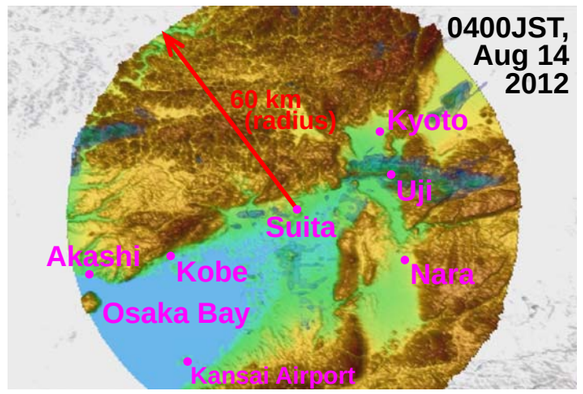

**< Evolution of cumulonimbus >**



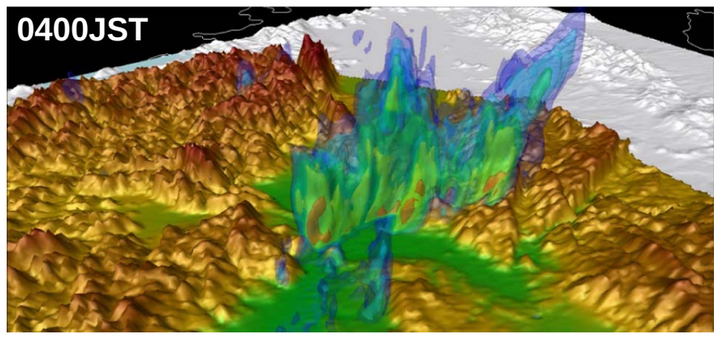

## 2. 3-dim precipitation distribution in isolated cumulonimbus (July 26, 2012)



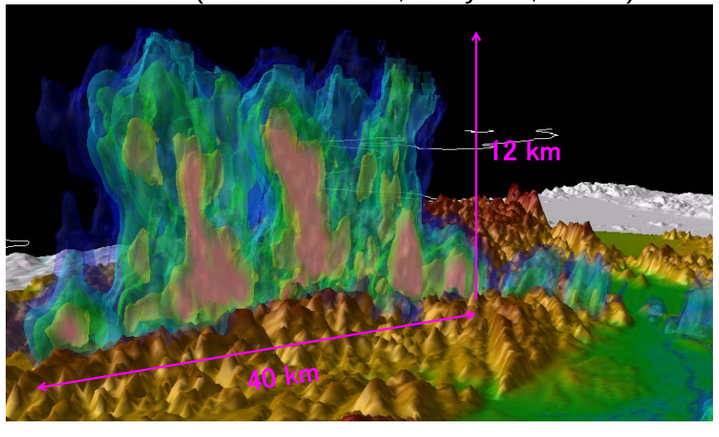

## 3-1. PAWR Observation Range



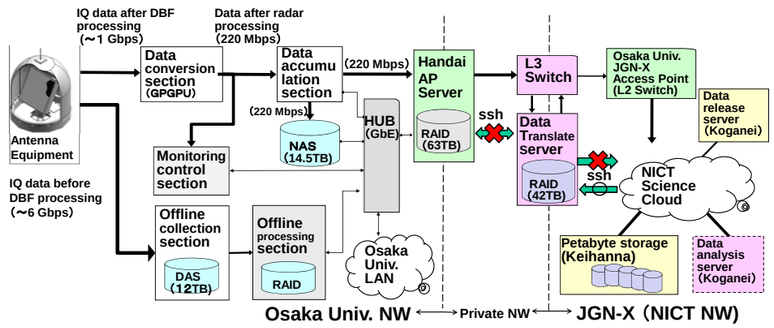

## 3-2. Back-building localized heavy rainfalls around Uji (Aug 14, 2012)




## 3-3. Stationary line-shaped rain-falls (18:51:20JST, July 22, 2012)




## 4-1. Data processing system

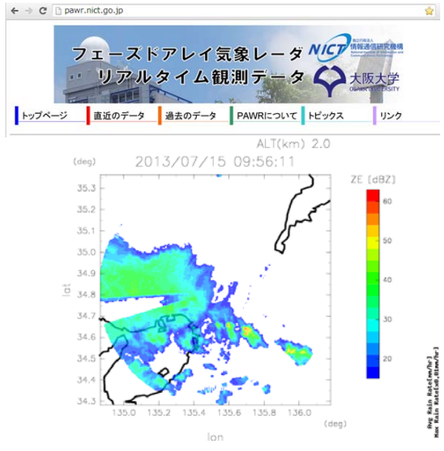



**< Observation mode and data size / data rate >**

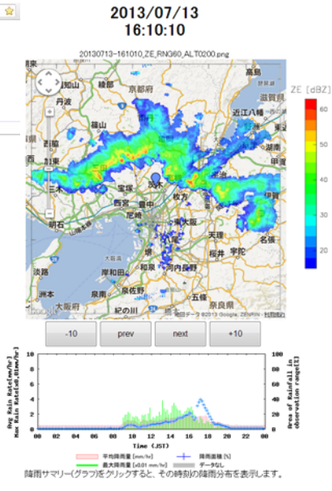
| | |
|---|---|
| Detailed (10 sec.) | 300 range × 320 sector (AZ) × 110 angle (EL) × 2 byte = 20.3 MB / file<br>Total size (13 files): 275 MB / 10sec (~2.4TB/day) ⇒ 220 Mbps |
| Normal (30sec.) | 600 range × 300 sector (AZ) × 110 angle (EL) × 2 byte = 37.8 MB / file<br>Total size (13 files): 493 MB / 30sec (~1.4TB/day) ⇒ 131 Mbps |

## 4-2. Publication (http://pawr.nict.go.jp)

**< Real-time data >**




**< Past data >**




## 5. Summary

- ***We showed some localized heavy rainfall events observed phased array weather radar using 3-dim visualization.***
- ***We have developed real-time data processing system and are at work on creating the web page.***