

## **Realtime Monitoring of Shallow-landslide Potential Area Using Multi-parameter Radar**

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### **Abstract**

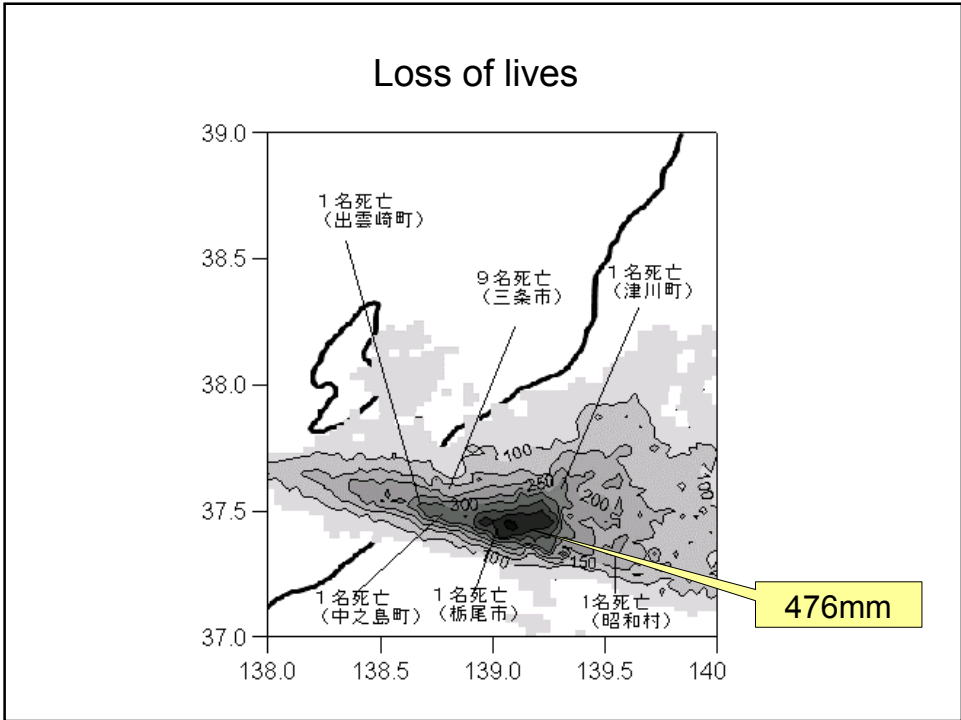
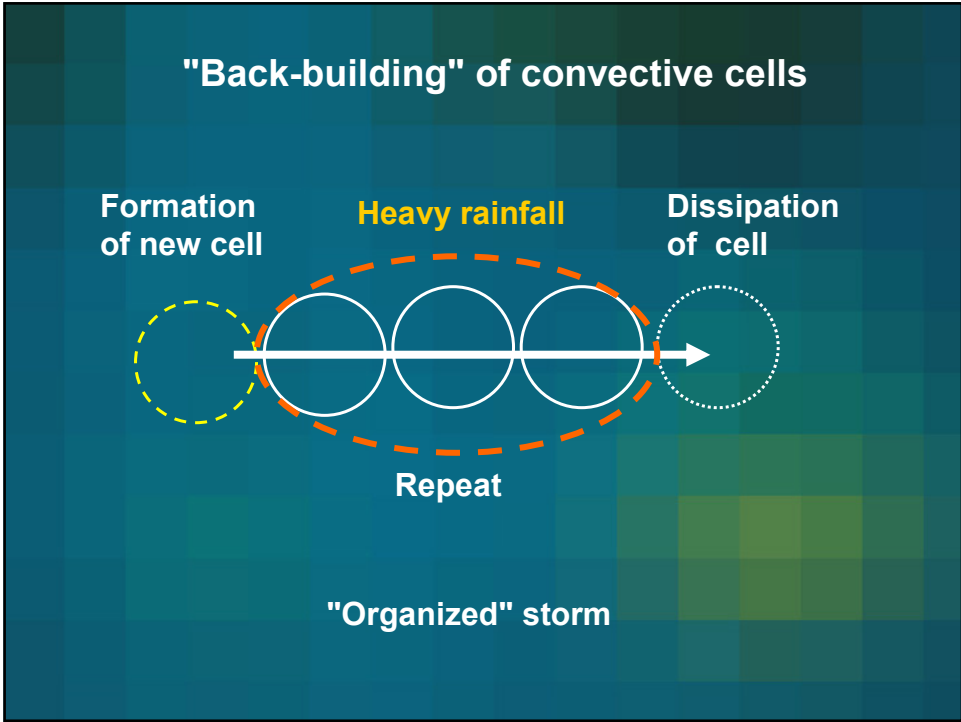
In this lecture, we introduce recent rainfall-induced disasters in Japan and our researches for reducing them with the use of the multi-parameter radar system. As for the heavy rainfall in Japan, precipitation extremely concentrates on narrow regions by peculiar behavior of the convective clouds that is called "back-building". Forecasting of such phenomena is still difficult at present, thus real-time monitoring of rainfall area with meteorological radars and providing information are important for disaster reduction. In National Research Institute for Earth Science and Disaster Prevention, the multi-parameter radar system, which is able to estimate rainfall accurately with 500m mesh, is operated to detect heavy rainfall area in real time and provide information on the WEB. This technology is expected to reduce disasters caused by urban floods and rainfall-induced landslides.

**REALTIME MONITORING OF SHALLOW-  
LANDSLIDE POTENTIAL AREA USING  
MULTI-PARAMETER RADAR**

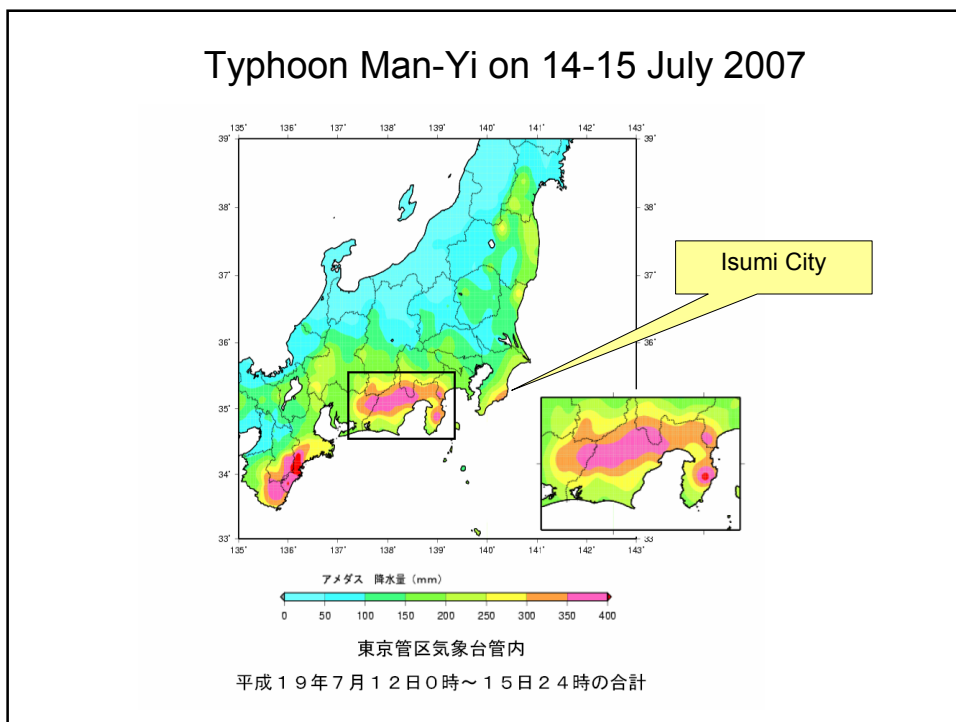
**Ryohei Misumi**

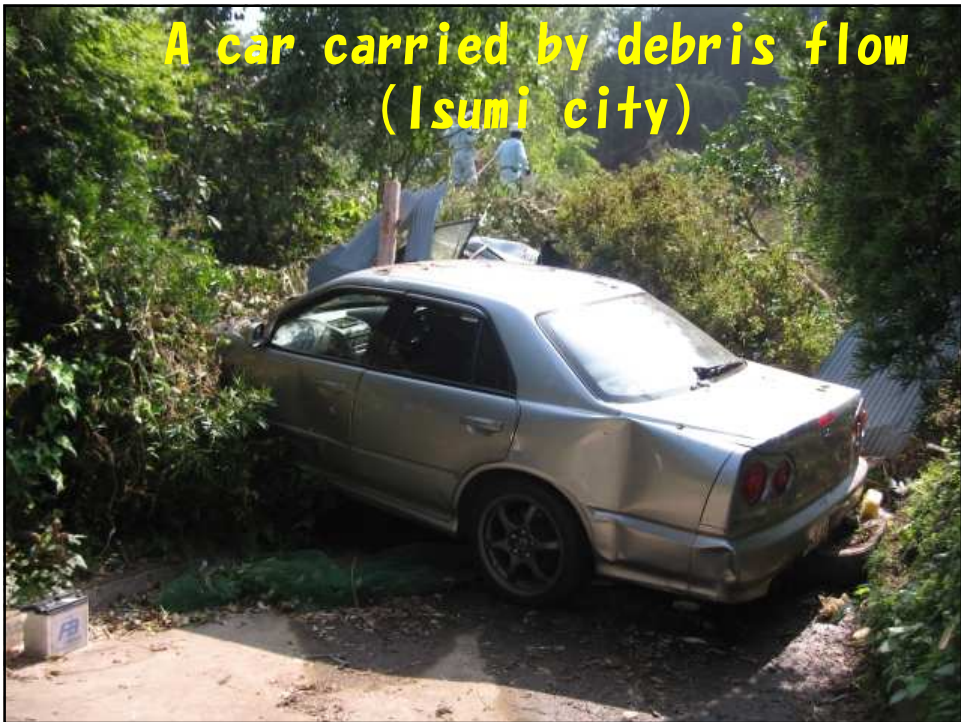
*National Research Institute for Earth Science and Disaster Prevention, Japan*

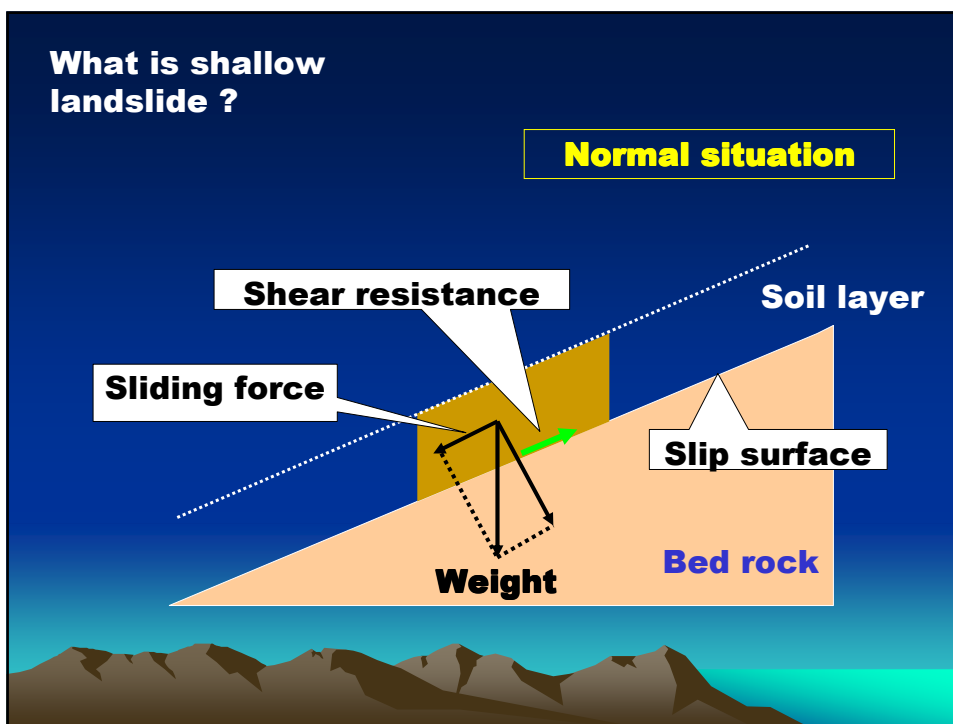
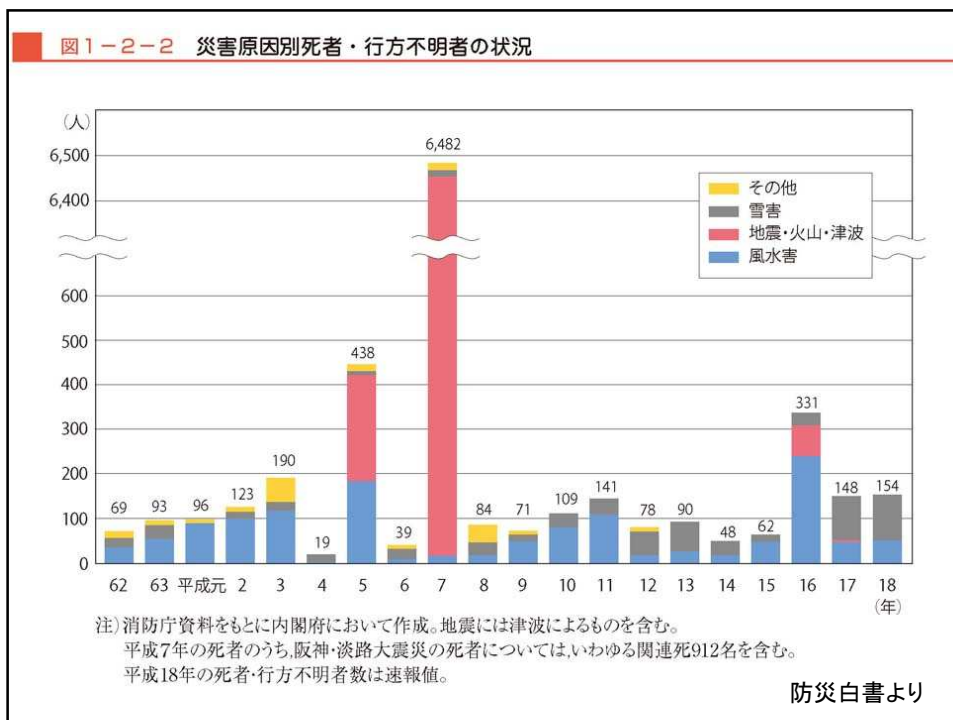
Recent rainfall disasters in Japan

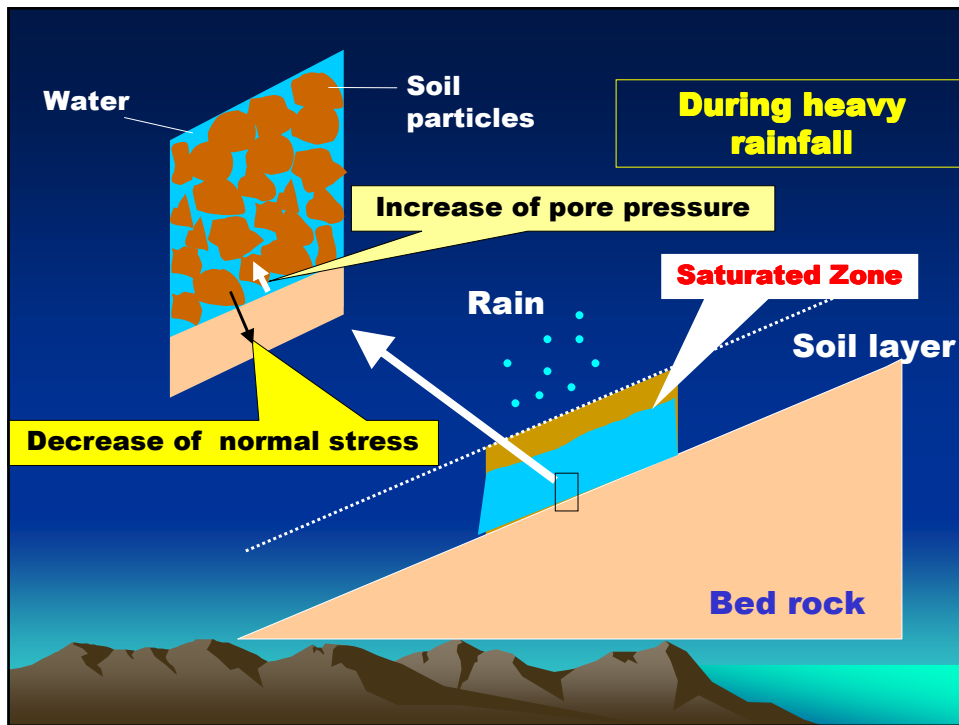












### Why do rainfall induced disaster occur ?

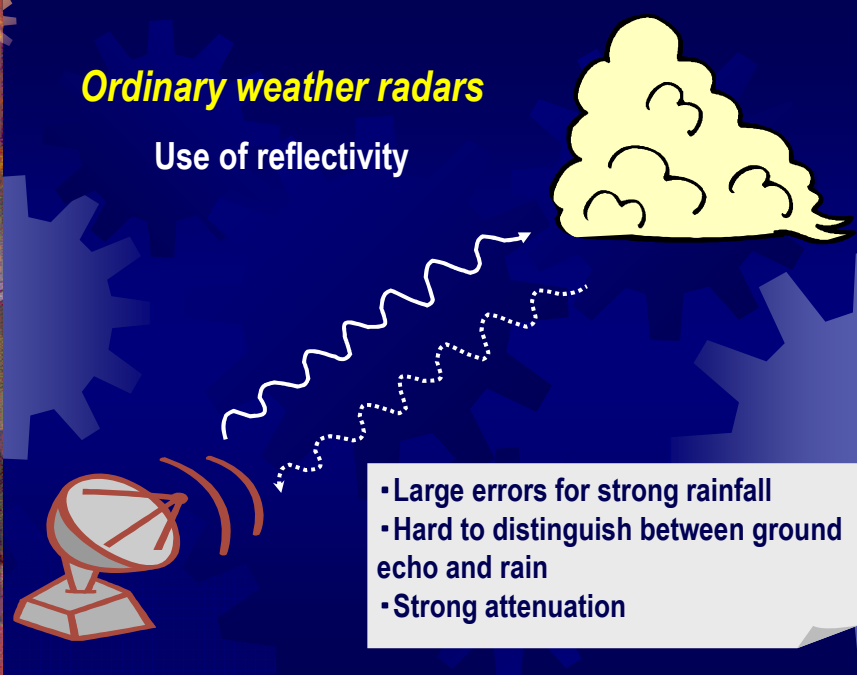
- Problems in rainfall forecasting
- Difficulty in making appropriate warning
- Problems of "aging society" etc.

Monitoring heavy rainfall using  
Multi-parameter radar





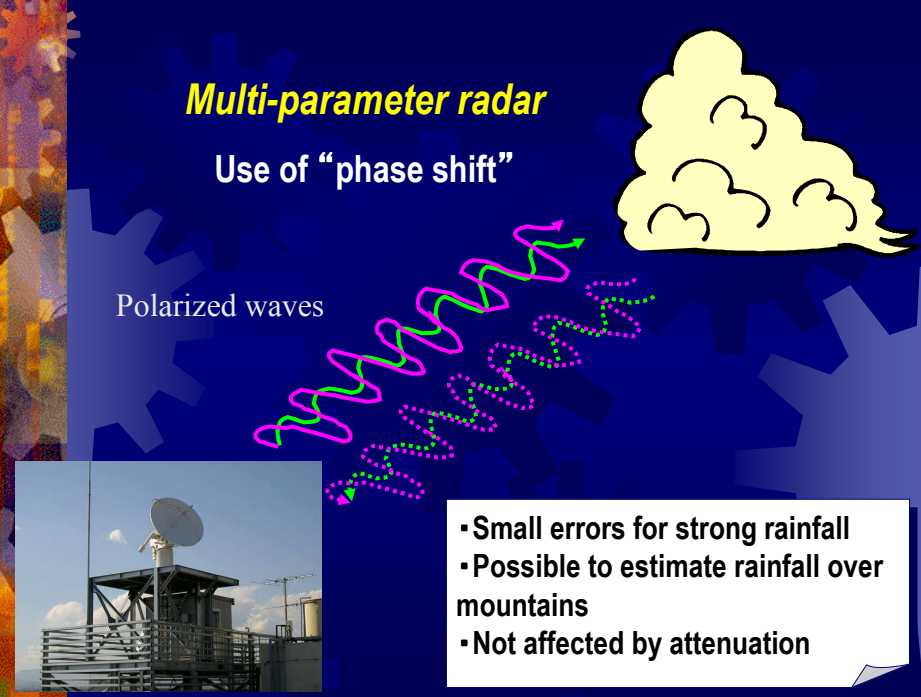
**Ordinary weather radars**  
Use of reflectivity



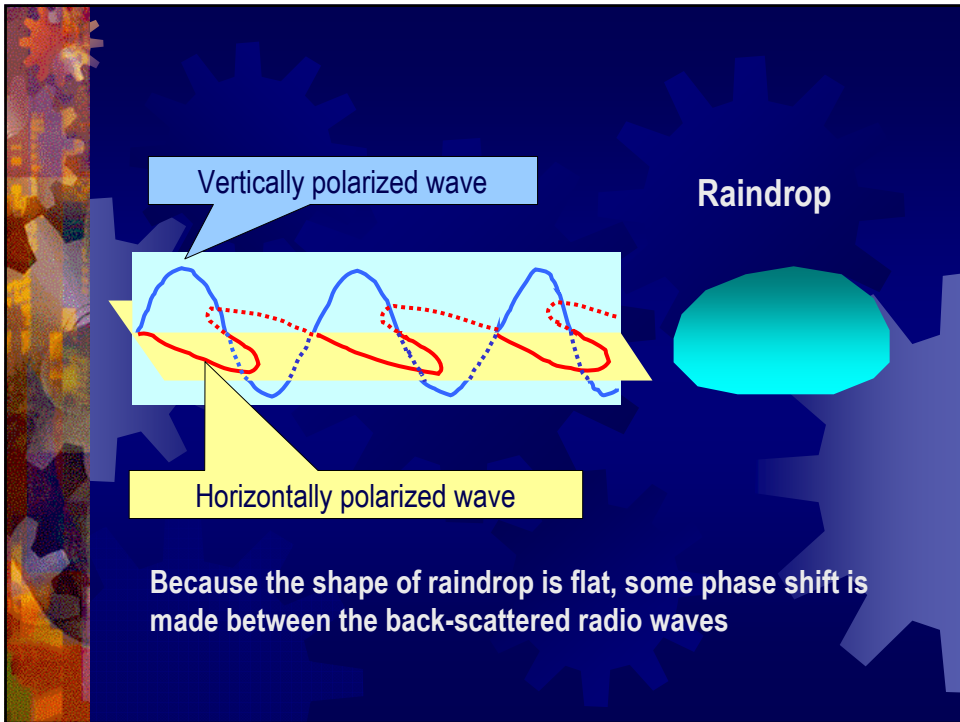
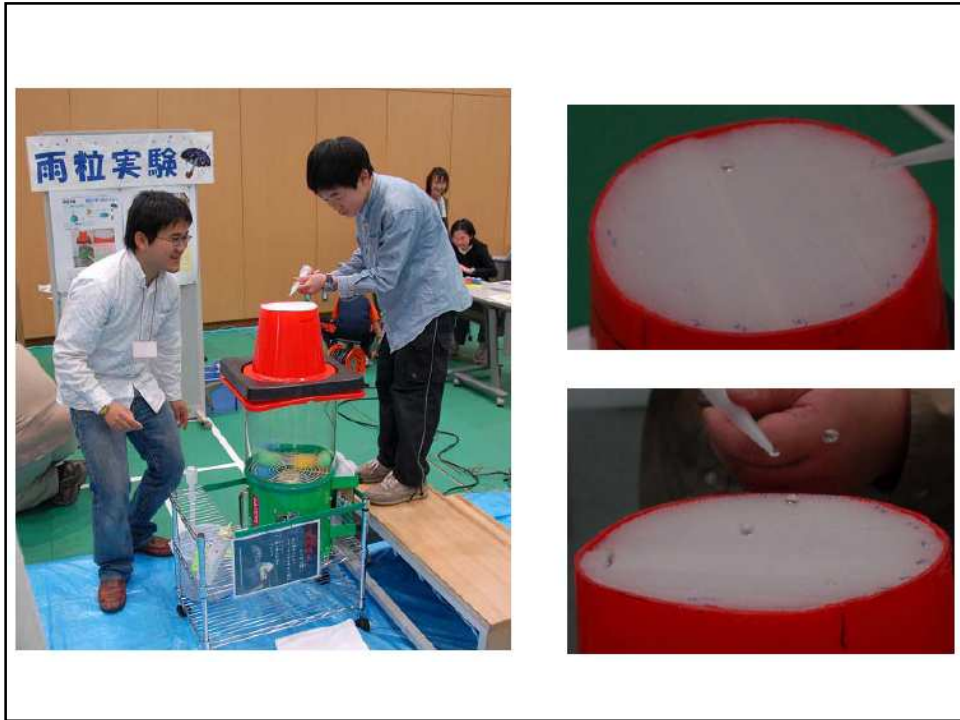
- Large errors for strong rainfall
- Hard to distinguish between ground echo and rain
- Strong attenuation

**Multi-parameter radar**  
Use of “phase shift”

Polarized waves

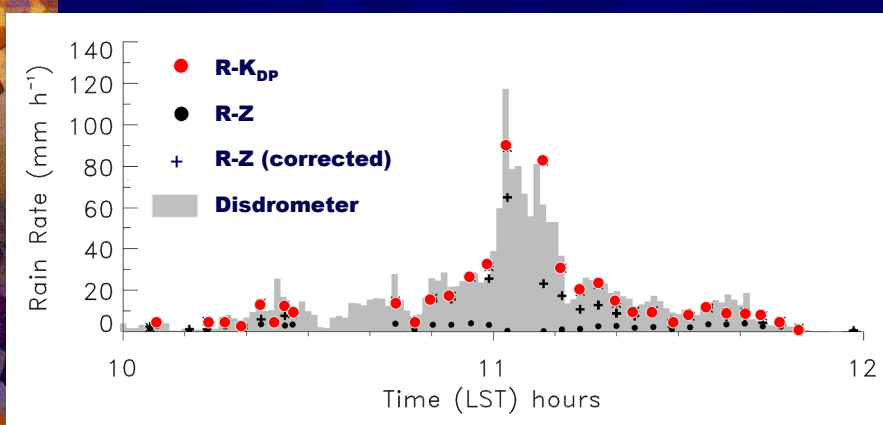
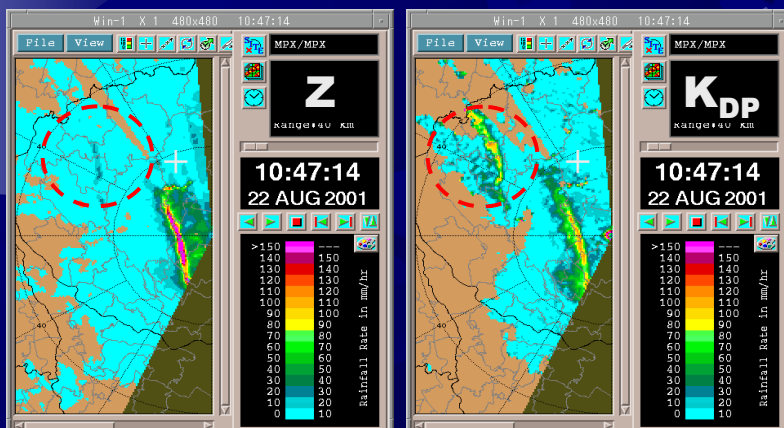


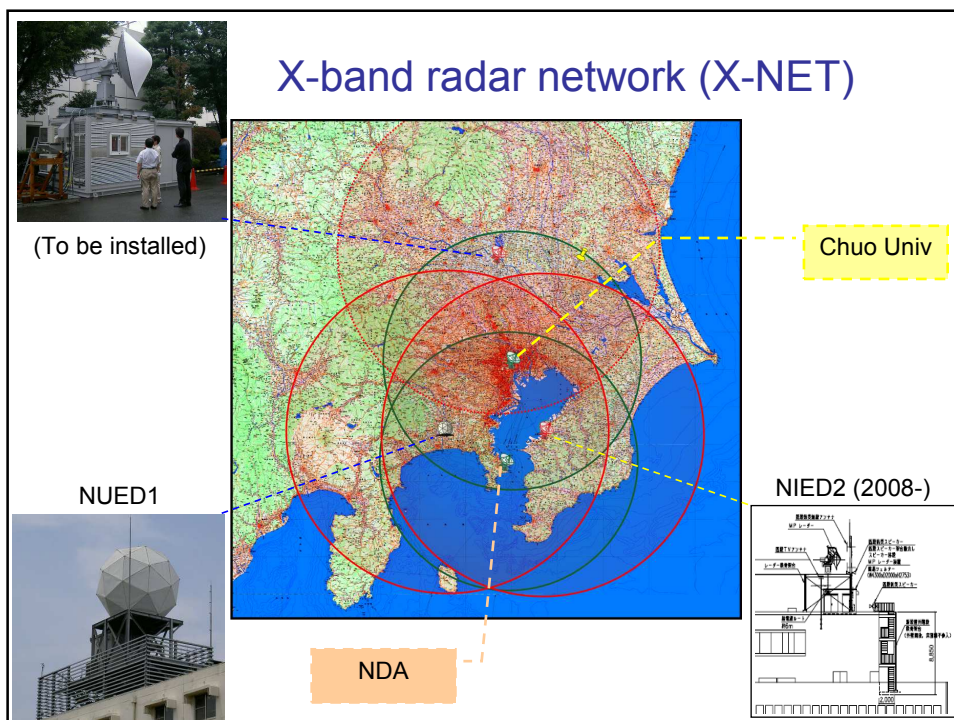
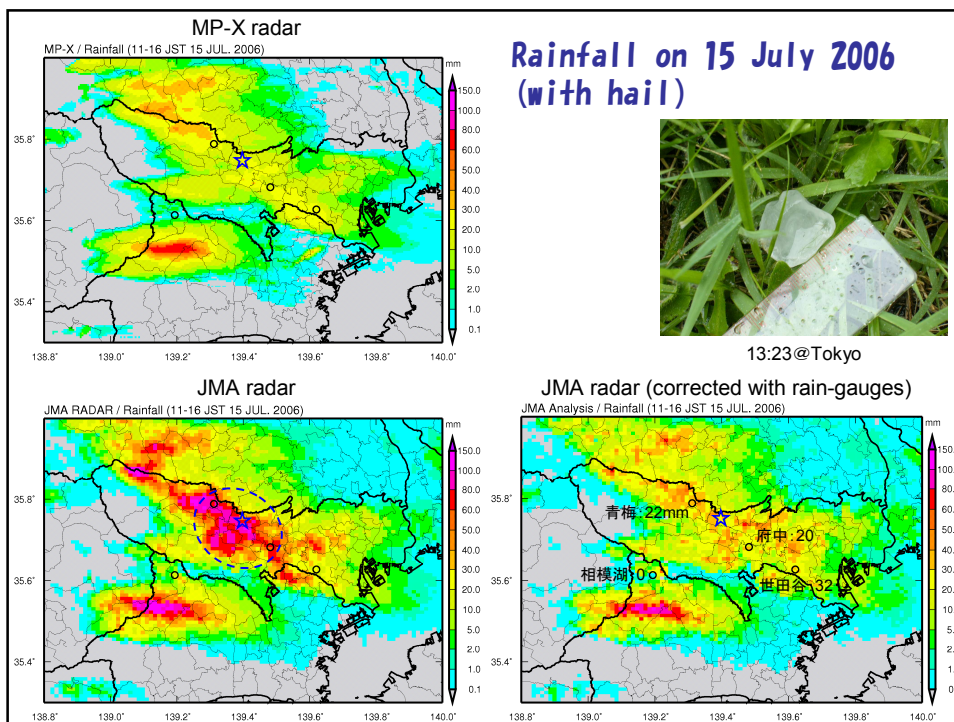
- Small errors for strong rainfall
- Possible to estimate rainfall over mountains
- Not affected by attenuation

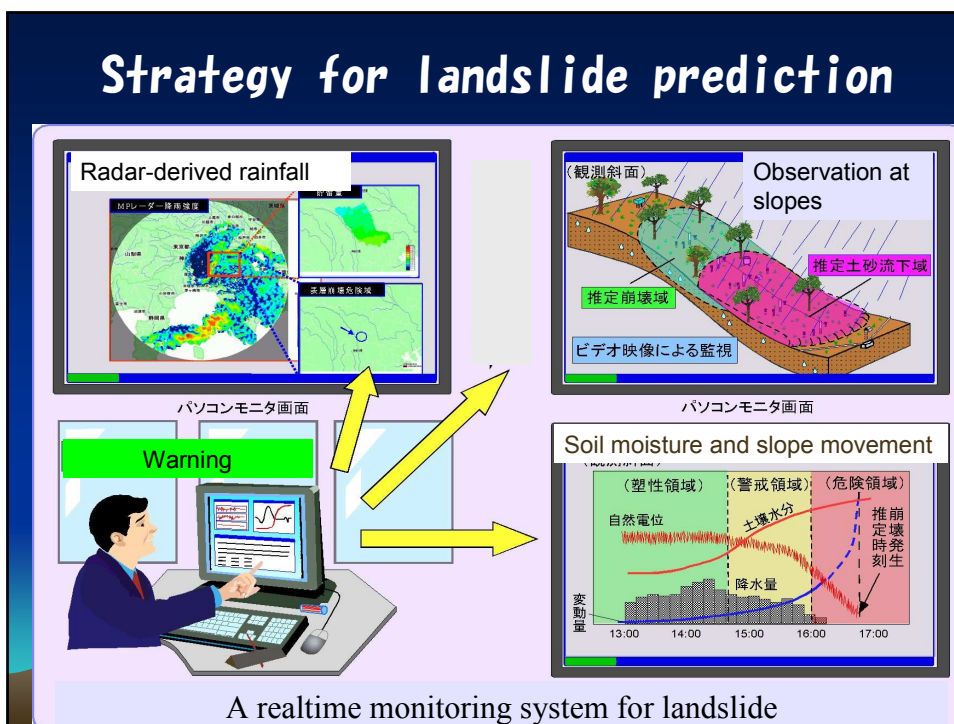
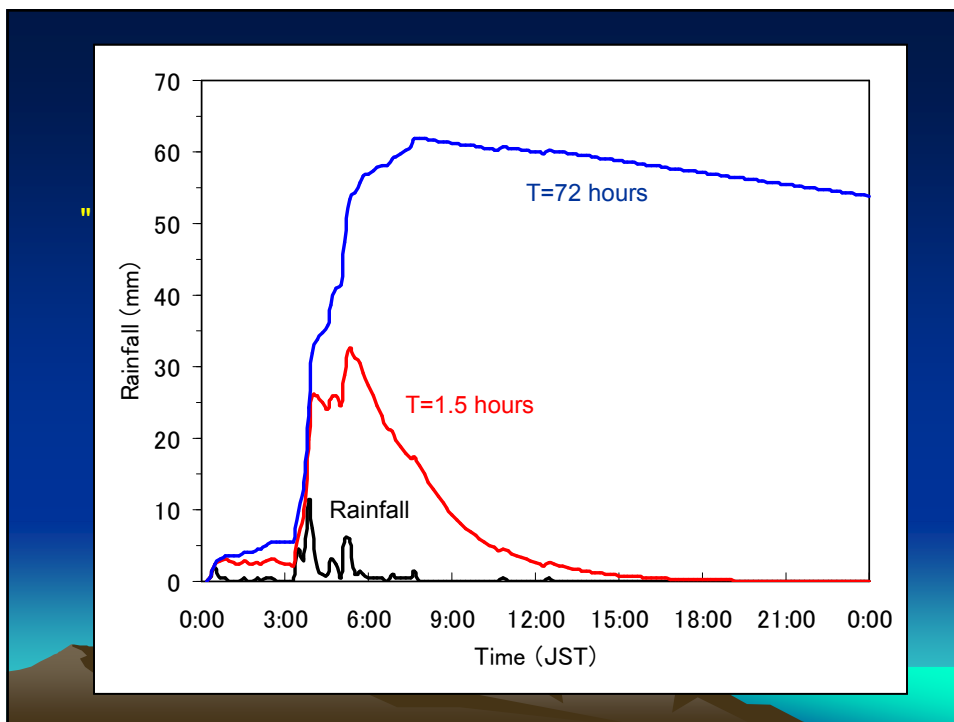


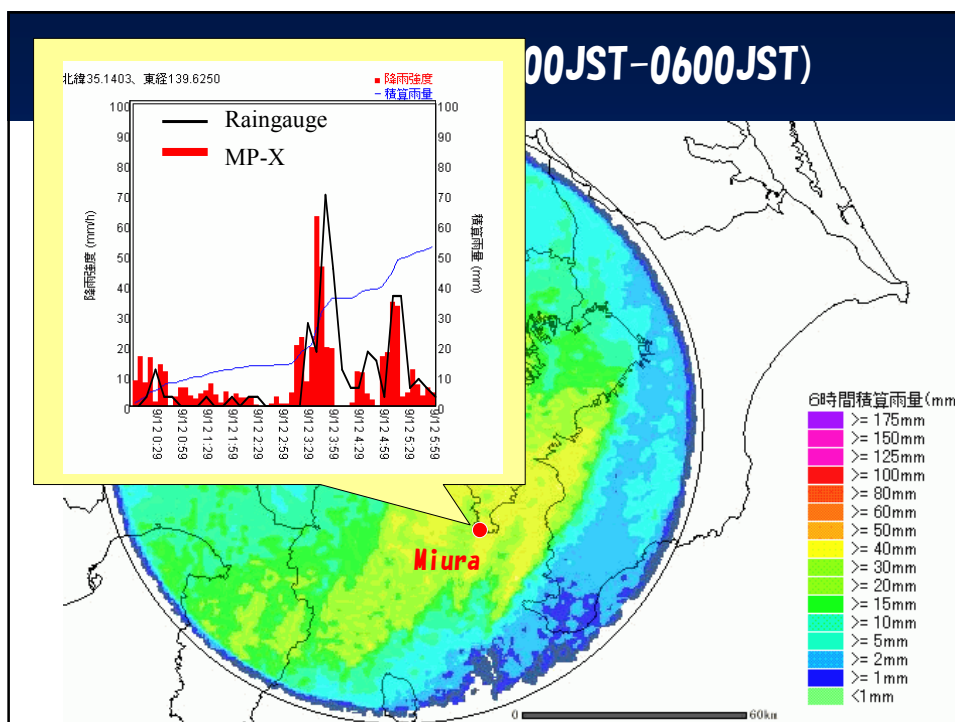
## Estimation of rainfall intensity using the specific differential phase ( $K_{DP}$ )

- ▶ not affected by rain attenuation
- ▶ immune to beam blockage
- ▶ less sensitive to beam filling and drop size distribution



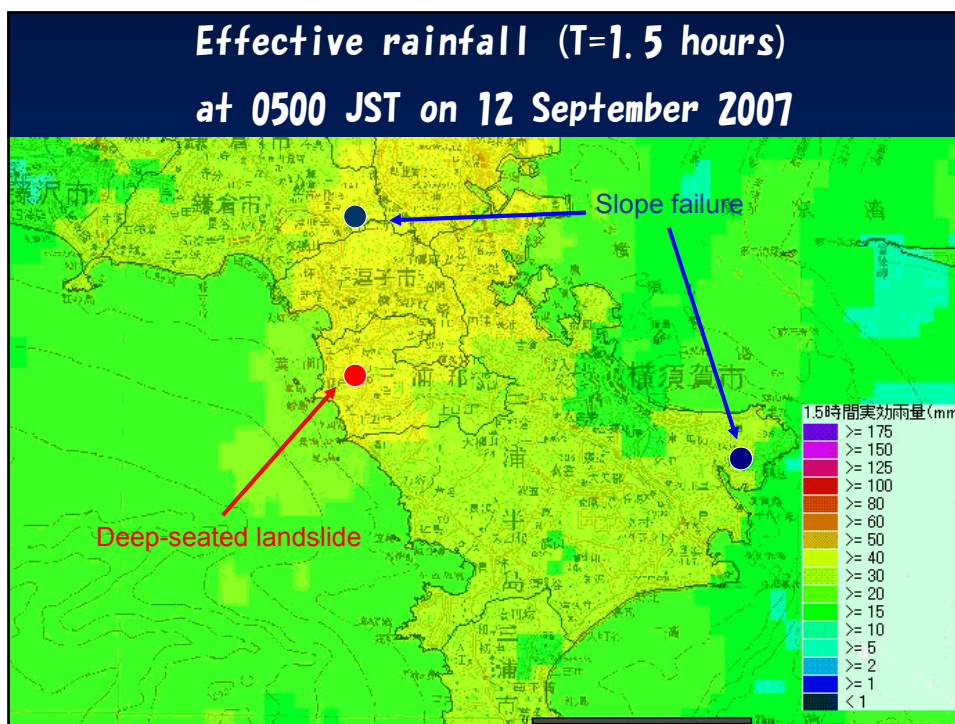
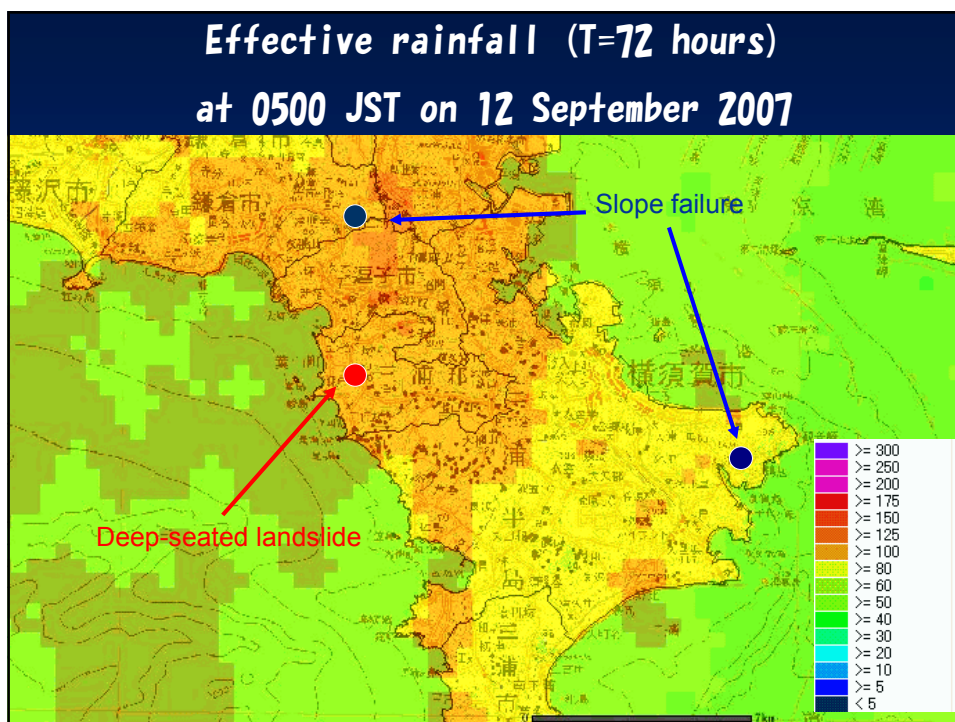






### Slope failure (shallow landslide) at 0530 JST





# Landslide Prediction Support System (LAPSUS)

<http://lapsus.bosai.go.jp>

