Trial distribution of X-band MP radar rainfall information

TSUCHIYA Shuichi, Researcher
KATO Takuma, Researcher
Water and Management and Dam Division

KIKUMORI Yoshito, Senior Researcher
River Division
River Department

(Key words) Guerilla rainfall, flood disaster, X-band MP radar

1. Introduction

Flood disasters caused by so-called guerrilla rainfall, the 2008 flood on the Togagawa River in Kobe City, Hyogo Prefecture, or the water accident on the main line of the Zoshigaya Sewer System in Toshima Ward in Tokyo for example, have occurred frequently in recent years. The River Bureau of the Ministry of Land, Infrastructure, Transport and Tourism is introducing X-band Multi-Parameter radar (below called X-MP radar), a type with high special and temporal resolution, in order to perform refined observations and monitoring of guerrilla radar.

2. Characteristics of conventional radar and newly-installed X-MP radar

The conventional MLIT C-band radar (radius of quantitative observation range: 120km, 1km mesh), which provides wide observation range and is installed to cover the entire nation, is a large river flood-management tool useful in observing the seasonal rain front or typhoons, but its observation mesh is too large to allow its use for precise observation of local and sudden guerrilla rainfall. In contrast, the newly installed X-MP radar (radius of quantitative observation range: 60km, 250m mesh) uses small observation meshes which permit high resolution rainfall observations, allowing users to temporospatially clarify the constantly changing state of rainfall (Fig. 1).

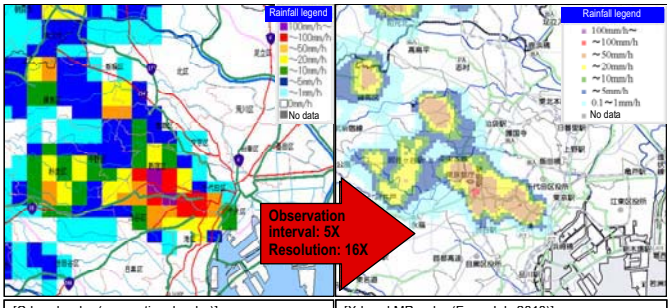

Figure 1. Images of C Band Radar and X-MP Radar

3. Trial operation of X-MP radar

The River Bureau of the MLIT installed 11 X-MP radar bases in the three large metropolitan regions (Kanto, Chubu, Kinki, Hokuriku) in 2009, then conducted trial transmissions beginning in July 2010. The NILIM provided technical support for the introduction of X-MP radar by, for example, building the rainfall information transmission system.

Because the quality of radar observations is reduced by, for example, noise signals etc. received as a result of mountains, buildings, and other obstructions in the observation direction, to mitigate this problem, the NILIM set appropriate observation methods for X-MP radar and adjusted patterns, improving the precision and quality of rainfall observations. Considering that guerrilla rainfall occurs unexpectedly, we also constructed an integrated system able to rapidly collect data from rainfall observations, process the information, and transmit it to a web site in order to meet the challenge of real-time information provision.

For these reasons, on the X-band MP radar rainfall information web site published by the Ministry of Land, Infrastructure, Transport and Tourism, users can view images of rainfall distribution occurring from 30 minutes earlier to the present moment (updated at 1 minute intervals).

4. Future initiatives

Plans for X-MP radar installations in 2010 call for 4 bases in Chugoku, 5 in Kyushu, 3 in Chubu, 2 in Tohoku, and 1 in Hokuriku. Beginning in 2011, trial operations intended to improve observation precision and advance torrential rainfall observations of a total of 26 X-MP radar installations will begin, with full-scale operation scheduled to begin in 2013.

[X-band MP radar rainfall information web site]
http://www.river.go.jp/xbandradar/