

Abstract

Because 70% of land in Japan is mountainous, typhoons and heavy rains have strong impact. Japan has many areas that are vulnerable to rain. Thus, uniform rain was common in the past few years aside from typhoons. However, in recent years, because of the phenomenon of sudden change in weather, localized heavy rain falls frequency, and water disasters are starting to become huge. Since this trend will probably continue for a long time, the measure for water disaster caused by local heavy rain is urgently needed.

In order to save lives from water disasters, it is must to start evacuation while the rainfall is not too heavy yet. Localized heavy rains occur randomly in quite small areas. However, weather forecasts are predicted in each unit of municipalities which are too wide to represent conditions in small areas. Therefore, it's difficult to grasp the high risk in small areas by current weather forecasts. One of the effective evacuation measures is that municipalities and residents should grasp the rainfall conditions around their current location proactively, make an appropriate action and judgment through an estimation and comparison of past experiences. Thus, the most important method is that "Grasping localized rainfall on real time". The main contents in this study are following 3:

First, the infrastructure sharing the data of X-band MP radar that realized the highest resolution in Japan and frequent data distribution was developed. The data volume of X-band MP radar is larger than the conventional radar, therefore, there are performance issues. These were solved by 3 methods in this study, and the infrastructure was published since 2015. Second, the new method for data fusion of X-band MP radar and C-band radar was proposed. Since the waves of X-band MP radar are short, the electric waves of X-band MP radar may be attenuated or lost by obstacles. Therefore, there are many areas outside the observation range of X-band MP radar in Japan. In this study, as the purpose of complementing data at the areas, the new method for the data fusion with 2 radars was proposed for grasping localized rain of entire Japan. Finally, the method that estimates the localized rain using SNS information was proposed. Although the physical observation devices have limited installation location, I regarded people as "moving observers" and proposed a method to estimate rainfall information from the linguistic expression of Twitter which is one of the representatives of SNS. As a result, the estimated value by this method matched the observation value of X-band MP radar with high precision and proved the usefulness of this proposed methods.