Monitoring and Prediction of Torrential Rainfall for Extreme Weather Resilient Cities

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Core Research Institutes:
- National Research Institute for Earth Science and Disaster Prevention (NIED)
- Meteorological Research Institute (MRI)
- Toyo University

Collaborated with 23 organizations:
- Universities and research institutes
- National and local governments
- Private sector

Tokyo Metropolitan Area Convection Study

It is recognized that large cities with a population of several million people are inherently vulnerable to severe weather such as torrential rainfall, lightning, and tornadoes. Increase in the number of occurrences of torrential rainfall and plant typhoons, which may be due to the global warming, can bring extensive damages in large cities. Thus, the developments of monitoring and prediction system of extreme weather are urgent. The present research project aims to understand the process and mechanism of extreme weather using dense meteorological observation networks designed in the Tokyo metropolitan district, to develop the monitoring and predicting system of extreme phenomena (MPSEP), and to implement social experiments on extreme weather resilient cities in collaboration with the related government institutions, local governments, private companies, and residents.

Test bed and X-NET

Target area of X-NET. About 30 million people live in the Tokyo metropolitan area which is defined as an area within a 15km radius of the Tokyo Metropolitan Government office. Numbers show populations in millions.

Monitoring and Prediction System

The aims of the second research subject is to establish the “Monitoring and Prediction System of Extreme Phenomena (MPSEP)”, which can process real-time data of the dense meteorological observation networks and predict localized heavy rainfalls and strong winds. Information from the MPSEP is utilized in social experiments described in the third research subject. It is also an aim of the research subject to establish database of the extreme weather which is useful for planning disaster countermeasures.

Social Experiments

The aims of the third research project is to validate the effects of the MPSEP on disaster prevention and the reduction of damage in these situations trough field tests of the MPSEP in four different disciplines: Emergency deployments, river managements, infrastructures, and educations. Before implementing social experiments, surveys on appropriate information and effective means of transmitting information will be done in the each experimental field to make the MPSEP suitable for practical use.