Development of Disaster Prevention Technology for River Basin

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● Research Outline

Evaluation and Characteristics Analysis of Ensemble Flood Prediction

To evacuate in plenty of time, the prediction information having long lead time is important such as rainfall and water level. Especially, water level calculated by numerical model is recommended because it leads directly to river disaster. On the other hands, predicted rainfall data for input of flood prediction has the problem. The error grow large with duration. the ensemble prediction has the potential for resolving this problem. Ensemble prediction can cover a variety of prediction possibility because this method adds slight perturbations to initial condition meteorology numerical model. This study aim at developing ensemble flood prediction system using ensemble rainfall data and validate the performance of the system (Fig.1). Especially, we focus on probabilistic characteristic of water level obtained from the system.
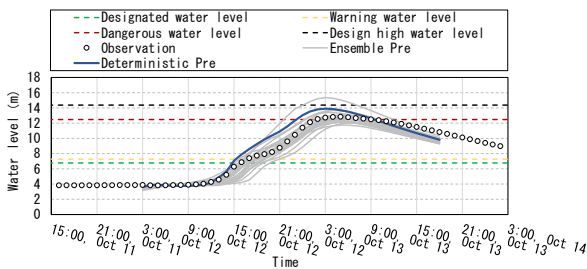

Fig.1 Ensemble water level hydrograph

Evaluation and Characteristics Analysis of Ensemble Flood Prediction

In the future, Climate change will affect the frequency of flood and draught in the basin. We must consider the deal with water resource near future. In this study, we conduct the rainfall and flood numerical simulation considering effect of climate change. With respect to rainfall simulation, pseudo-global warming method is employed. This study aims at evaluate the probability of flood hazard (Fig.3) and discuss the suitable operation of flood control and water utilization facility(e.g., dam etc).

Enhancement of Numerical Prediction for Heavy Rainfall Using Data Assimilation

High accuracy prediction for rainband precipitation system is important to prevent the water hazard. Moreover, Numerical model can have longer lead time than kinematic method. The model strongly depend on initial condition. We focus on data assimilation method. Data assimilation modify the initial condition using observation data. In this study, we employ the meteorological radar data. Particularly, X-band MP radar data operated by MLIT (Ministry of Land, Infrastructure, Transport and Tourism) can capture the rain cloud in high temporal-spatial resolution. This study aims at evaluation the accuracy of rainfall prediction using numerical model with radar data assimilation(Fig.2). Moreover, we discuss the effective utilization for radar data.
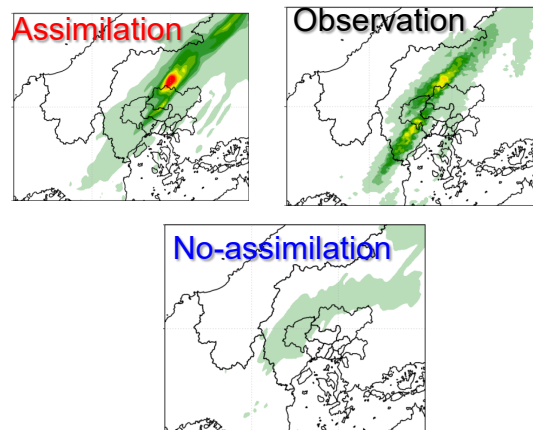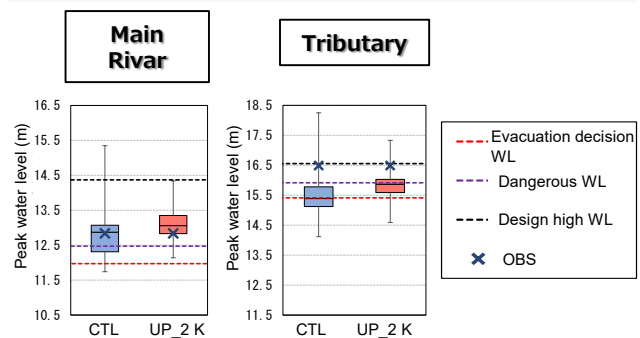

Fig.2 rainfall prediction using numerical model

Fig.3 Box plot of peak water level