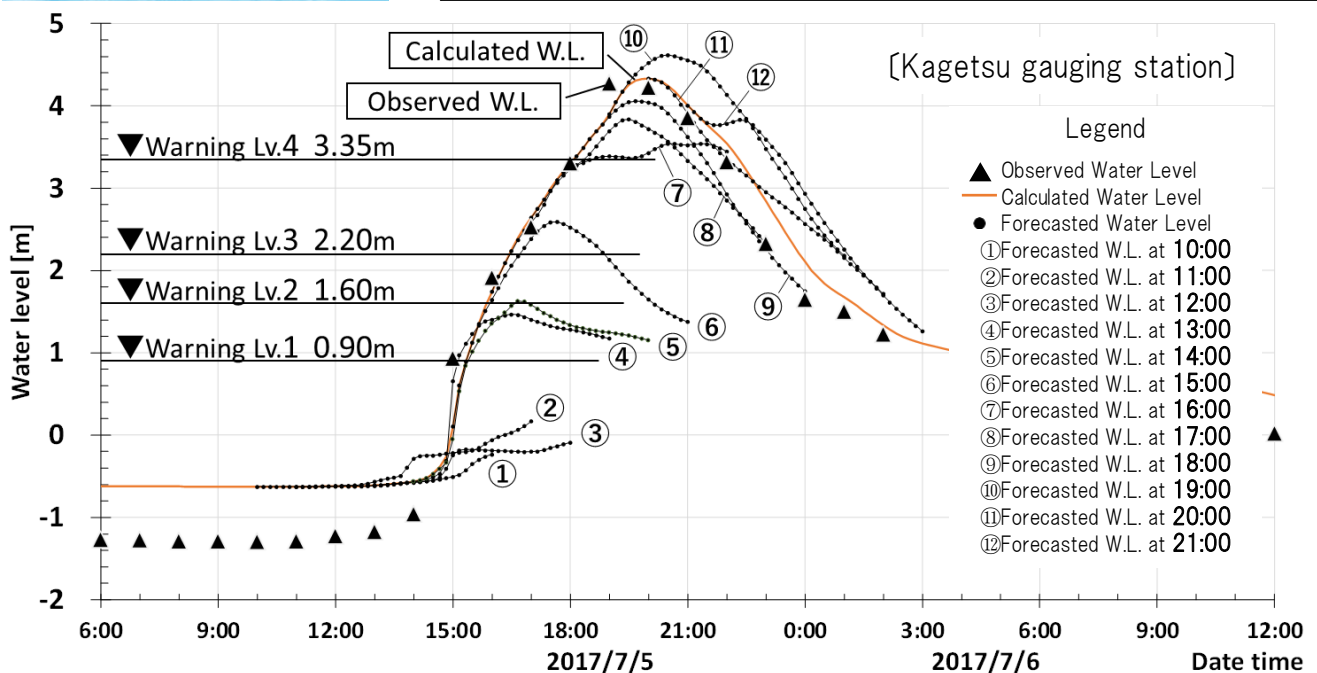
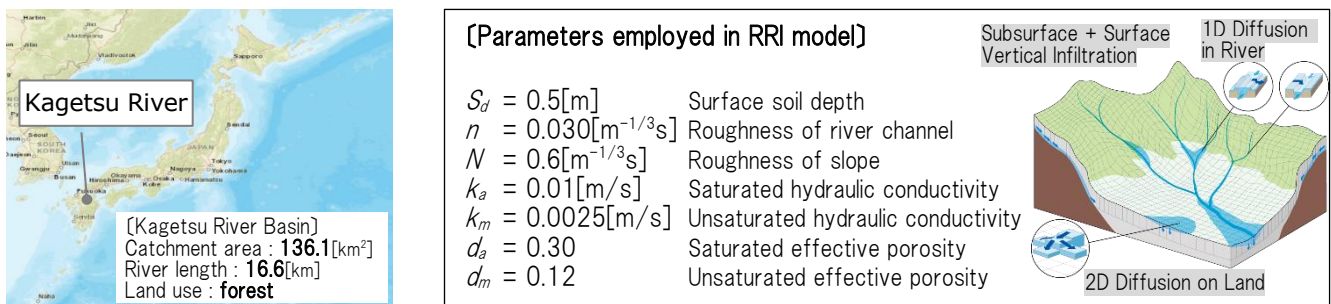


Simulation of a flash flood forecast for a mountainous river

We conducted simulation of a flash flood forecast for a mountain stream in a southern part of Japan as part of flood hazard research on mountainous rivers using a Rainfall Runoff Inundation model (the RRI model¹⁾) with forecasted rainfall data. The figure shows the simulation results on hourly changes in flood water level resulting from severe rainfall in July 2017 over the Kagetsu River, a tributary of the Chikugo River. In the figure, the forecasted curves of flood water level from 10:00 to 19:00 cross several Warning Water Levels (WWLs), which are announced for the public to use for safe evacuation. For example, WWL4 denotes that the river water reaching this level is likely to cause a serious flood disaster.

According to the results, the 16:00 forecast (the dotted line marked with ⑦) shows that the flood water level is anticipated to exceed WWL 4 around 18:40 (with a lead time of 160 minutes).

The results of simulation in the Kagetsu River demonstrated a good reproducibility of the RRI model for flood events in mountainous rivers and the practicality of real-time forecasting of flood water levels, both of which will contribute to ensuring a lead time for safe evacuation.



WWL 4 : water level with high risk of flooding
 WWL 3 : warning water level to start evacuation
 WWL 2 : pre-cautious water level of inundation
 WWL 1 : water level for stand-by of flood fighting corps

Forecasted flood water levels at specified times using the RRI model with analyzed and forecasted rainfall data. The forecasting used rainfall data forecasted and analyzed by JMA and water stage data from the MLIT water information system. Flow discharge was converted into water level based on the cross-sectional data collected in 2012.

1) Takahiro SAYAMA, Rainfall-Runoff-Inundation(RRI) Model ver. 1.4.2, ICHARM, PWRI (http://www.icharm.pwri.go.jp/research/rri/rri_top.html)

Chikugo River Basin Map and Kagetsu River

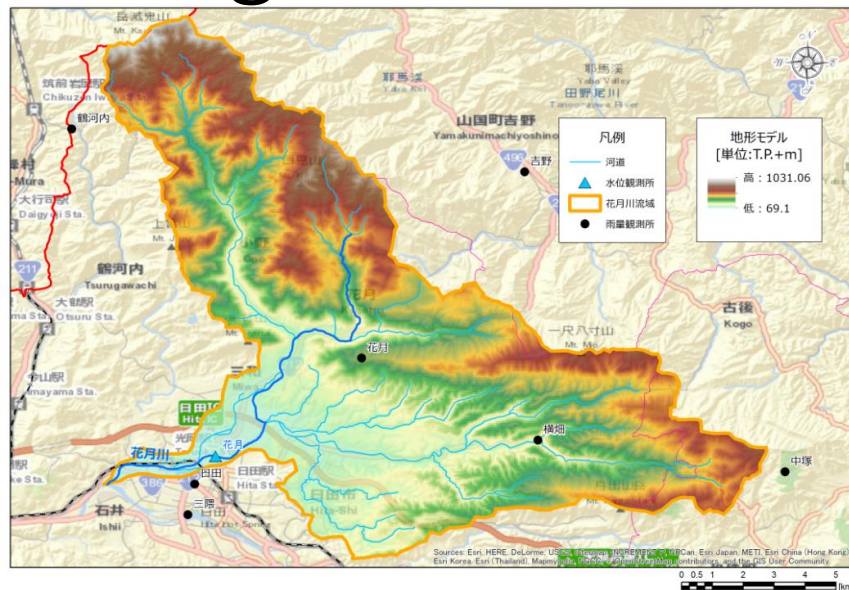


Fig. Kagetsu River Basin

Chikugo river
Catchment area : 2,860[km²]

Kagetsu river
Catchment area : 136.1[km²]
River length : 16.6[km]
Land use : forest