When Tsunami run-up in the river, the risk of damage increases with the soliton fission waves. It is necessary for the prediction of soliton fission waves that numerical model is based on nonlinear dispersive wave equations. Moreover, the high-resolution topographic model reproducing soliton fission waves are needed to calculate the numerical model. And the computing time increases with topographic resolution.

By the reproduction of the examination using large wave flume, we studied the resolution of topographic model and accuracy of numerical model for soliton fission waves. We confirmed the potential method which was proposed by Shigihara and Fujima(2007) was able to calculate in practicable time. In this calculation, 1m grid which is about 1/20 wavelength of soliton fission waves was used. For this reason, we developed two-dimensional nonlinear dispersive model using the potential method.

The Tsunami with soliton fission waves was recorded on video image when 2003 Tokachi-oki earthquake occurred. It was taken from the helicopter at Tokachi-river. Detailed positions where the soliton fission waves propagated were obtained from the GIS analysis of the video image.

We used the developed model to the reproduction calculation for the soliton fission waves occurred in Tokachi-river. As a result, the developed model was able to calculate the spatial distribution and wave propagation of the soliton fission waves in high accuracy. Moreover, computing time was in practicable time.