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River-stage prediction for urban small rivers with deep learning model by using x-band radar rainfall

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Improving the accuracy of flood forecasting is critical in reducing the damage that can occur during flood disasters. In Japan, the flood prediction system is in operation in the first class rivers – relatively large and important rivers. However, small rivers, especially urban rivers, are so difficult to predict the river stage because of the quick rainfall-runoff responses. Such rivers are regarded as difficult to deliver the real time information on flood risk.

Recently in Japan, X-band radar rainfall data can be used in real-time prediction for operation. X-band radar is highly resolution in both spatially and temporally. Furthermore, deep learning model has been applied to the river stage prediction and confirmed to have a good accuracy. By applying the X-band radar data to the deep learning model, river-stage prediction could be possible to the urban small rivers.

In this study, we developed the deep learning river stage prediction model using the x-band radar rainfall data. We applied the model to the small urban rivers in Tokyo and confirmed the good prediction result.