

## Using River Historical Channel Map to Study Paleo-Hydrology in Yodo River Basin

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The ancient capitals of Japan and the present big cities such as Osaka and Kyoto are located in the Yodo River basin, which plays an important role on economic, culture and policy in Japan. In the past 1700 years, it suffered the flood events very frequently. The earliest recorded flood control construction called Mamutanotsutsumi field bank was built by the Emperor Nintoku (A.D.257-339) in the Yodo River basin. During the past three decades, the flood disasters were reduced significantly. However, the uncertainties of flood disaster events are not yet fully identified and may be increased under the impact of climate change. Paleo-hydrology is the study of the hydrologic systems and its past conditions including flood events occurrences, flows and distributions of water, etc.

The flux channel of Yodo river basin has been changed very much specially since Meiji period under the development of urbanization and the population growth. The paleo-hydrological studies of the Yodo river basin under the fluvial system change could help us to understand the effect from the change of the fluvial directions and the flood plain structures.

This research uses the historical channel maps of the Yodo river basin from Meiji period to identify the past flux channel condition. The old channel maps are collected from the old books and the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The rainfall, temperature and discharge from MLIT are also used to analyze the correlation among the climate, discharge and flux channel. This study also analyzes

the relationship between the extreme flood events and the change of flux channel. Due to the flux channel change in the Yodo River basin, the channel become straight and the floodplain was reduced significantly. Under the straight river channel, the water in the river channel flows quicker and the peak discharge comes earlier than that before the channelization. The reduction of the floodplain could trash the suspended sediment smoothly. With the high discharge and the smooth trashing condition, the erosion of river bed and bank may increase, in other words, it may increase the water level in the river channel and raise the possibility of the flood disaster.

The results of paleo-hydrological analysis under the past flux system condition could highlight a better understanding on the climatic change and its potential impact on fluvial systems and the flood management.