

Measuring river surface flow with image analysis

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Fujita Ichiro, a Professor at the Graduate School of Engineering in Kobe University, has developed a piece of software that can measure the flow rate of rivers using image analysis. The software is called KU-STIV

(Kobe University Space-Time Image Velocimetry). This technology makes it easier to obtain accurate data about river flow rates that can be used in strategies for flood risk management.

Japan is hit by flood-related disasters almost every year – one of the most recent examples occurred in September 2015 when the Kinugawa River collapsed its banks, sending a wall of water into the nearby town of Joso. Accurate data for rainfall and river [flow rate](#) are vital elements in creating flood risk management strategies. Thanks to developments in radar technology, rainfall measurements have become highly precise. However, measuring the flow rate of rivers is still carried out using the old-fashioned method of dropping a stick-shaped float in the river and estimating the flow rate from the float's speed through a section of the river. When extreme flooding occurs this method becomes difficult to conduct due to the dangers involved, and there are a growing number of cases in which flow rates cannot be measured at the peak of a flood.

The KU-STIV system developed by Professor Fujita uses video footage taken from cameras and drones to measure the river flow rate. The system superimposes "searching lines" (each between 10 and 20 meters long) on footage of the river as measurement standards. It calculates the flow speed from the time it takes water surface features and floating matter on the surface of the river to cross these lines, then analyses distribution to indirectly calculate the river flow rate. Surface flow measurements taken using this system were very similar to those taken using acoustic current meters (ADCPs) and it can be used to measure river flow rates faster and more safely than the established method.

KU-STIV has already been adopted by many river consultants and River Offices in Japan's Ministry of Land, Infrastructure, Transport and Tourism, and organizations in Hyogo Prefecture have begun adapting the system for river observation cameras. An English-language version of the system is also available, and recently Ghana researchers invited by

the Japan International Cooperation Agency (JICA) are being trained to use the technology. "We are aiming to adapt this system for real-time calculations, and at the same time we want to establish this as the standard method for measuring [river flow](#) rate both within Japan and overseas" commented Professor Fujita.



A screenshot of the English-language version of the KU-STIV system

Provided by Kobe University

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